

New Construction for:
Belmont College - Construction Trades Building

Addendum No. 03 – 21.162

January 10, 2025

This Addendum shall hereby be and become a part of the Contract Documents the same as if originally bound thereto. The following clarifications, amendments, revisions, changes and modifications change the original Contract Documents only in the amount and to the extent hereinafter specified in this Addendum. Each bidder shall acknowledge receipt of this Addendum in his bid proposal. Bidders shall be responsible for becoming familiar with every item of this Addendum.

General:

1. Pre bid meeting agenda and sign in sheet attached.
2. **Clarification: No EDGE requirement for 2-year colleges.**
3. Question: I see Room 102B Kitchenette, but there is no elevation provided for any casework. Please confirm if there are any finishes for that room required.

Response: Casework elevation for Kitchenette 102B in the office space is A3/12.1, marked on the enlarged plan for the office on sheet 4.5.

4. Question: Ref. Spec Section 062200-1.6.B – Millwork. Can the AWI Quality Certification Program requirement be waived for this project if AWI standards are adhered to?

Response: No

5. Question: Ref. Spec Sections 062200 – Millwork and 123216 – Manufactured Plastic-Laminate-Clad Casework. Do both of these sections apply?

Response: Spec Section 06 22 00 has been removed. Please see revised 12 32 16.

6. Question: Ref. Spec Section 133419-2.1.A – Metal Building Systems. Are subsidiaries of Nucor Building Systems (i.e. Kirby Building Systems) considered acceptable manufacturers?

Response: Yes.

7. Question: Ref. Spec Section 101400-2.1.D.3 – Signage. Are 200 “Emergency Evacuation Window” signs required?

Response: No, Emergency Evacuation Windows are not required. Section has been removed from specification.

8. Question: Ref. Sheet 3.10 – Foundation Plan Notes. Can the top of interior continuous wall footings be (-0'-8") for masonry coursing?

Response: The only interior footings where this could potentially have any effect on masonry coursing would be at the masonry and metals storage and water service/electrical room. Footing has been coordinated with utilities. Footings to remain at -2'-8" as drawn to allow services to pass thru as there are no footing steps for those rooms to the exterior wall footing.

9. Question: Ref. Spec Section 083613 – Sectional Doors. 2.3.E – Spec calls for windows, but Door Type S on Sheet 8.3 does not indicate windows. Please clarify whether or not windows are required.

Response: Windows have been added to Door Type "S". See Drawing 8.3.

10. Question: Ref. Spec Section 083613 – Sectional Doors. 2.3.F – Spec calls for manufacturer's standard primer and powder-coat-applied finish coats. Industry standard for specified door type includes a baked-on polyester finish in white only. Powder-coat finish, with multiple color options, can be applied to exterior face only at a significant upcharge. Please confirm finish requirements.

Response: Color options will be required. We will need a dark bronze finish to match other doors and window frames.

11. Question: Ref. Spec Section 083613 – Sectional Doors. 2.5.C – Some sectional doors will be front-mounted, low headroom doors with 3" track. A cable safety device is not available in this condition. Doors with lift clearance (non-low headroom) can have cable safety devices installed. Please confirm that cable safety devices are NOT required on low headroom doors.

Response: Cable safety devices are not required on low headroom doors.

12. Question: Ref. Spec Section 323300-2.1 – Site Furnishings (Bollards), Detail C1 / Sheet 7.4, and Detail 12 / Sheet C-501. Please clarify which type of bollard is to be installed in which location.

Response: Detail C1 on Sheet 7.4 has been removed. Please refer to spec section and Detail 12 on C-501.

13. Question: Spec Section 323113 – Chain Link Fence and Gates is included in the Project Manual, but we cannot locate any fencing in the drawings. Please clarify.

Response: At the current time, no gates or fencing are proposed for the project. Should future project addendums, if applicable, implement the necessity for such appurtenances, then this portion of Section 323113 would apply and become applicable, unless otherwise noted at that time.

14. Question: Ref. Detail 6/C-502. Can a surface mounted base plate be used for attachment in lieu of an embedded sleeve? We have found that embedded posts are much more prone to failure than surface mounted posts.

Response: No, please proceed with embedded posts per drawings.

15. Question: Locations on drawings P-11 MA/2 P-11 MC/7 (Note 16) Counter top sinks call for under-mount trap primer on drawings routed to nearest floor drain, but there is no floor drain on drawings located in vicinity of sinks. Are these areas meant to have a floor drain installed in the room, or are those sinks not meant to have trap primer?

Response: Please see revised drawings.

16. Question: Is the Plumbing Contractor responsible for the housekeeping pad for the Air Compressor, Refrigerated Air Dryer, and/or Water Heater?

Response: This project is a single prime contract. General contractor and their plumbing contractor to coordinate who will be responsible for housekeeping pad

17. Question: Is duct cleaning required if the duct is sealed and capped prior to installation?

Response: Duct cleaning is required.

18. Question: Can specifications/detail be provided for the Expansion Tanks (ET-1, ET-16) located on drawing H32?

Response: There are details on H63

19. Question: What panels do we need to use for the soffit panels on the inset entrance areas? Will these panels match the wall panels or will they be the 12" soffit panels?

Response: Yes, use the standard 12" soffit panels

20. Question: What are the 1'-0" projected wing walls on the corners of the buildings framed with? Will these areas just be our girts extending out an additional 1'-0" to match the roof extension? I just see notes that mention these areas are metal wall panels. If these areas will be framed by us, they may not match exactly how they are shown on the drawings. Please clarify what we are needing to provide for these areas. Also will the panels on these areas match the main wall panels (R Panels) on the outside face and the soffit panels on the inside face with flat trims covering the end of the girts?

Response: Refer to plan detail A4 on Sheet 4.6.

21. Question: To verify, the drawings don't show any supports for the masonry walls around the building, other than bond beams in the block, so we aren't providing any supports correct?

Response: Full Height masonry occurs along grid line 11 and grid line 10. Provide spandrel beam per 8/3.30

22. Question: Please clarify if we need to use the special deflections shown on 3.01 for the exterior walls or will standard deflections work, if we aren't supporting the block walls?

Response: Deflection criteria for various finishes provided on 3.01.

23. Question: The upper wall area above the lower building (wall with the long narrow windows) shows 6" studs at 16" OC with wall panels over the studs, can we use our standard girts here instead? On the same detail calling for studs, it also shows a framed opening sill by PEMB and this framing scales out to 8" material. Please verify.

Response: Standard girts in this location would be acceptable.

24. Question: The specs are calling for a 26ga Flat soffit panel and the drawings are calling for a vented soffit panel. We don't have a vented soffit panel and our flat panel is 24ga. Will our standard 24ga 12" wide flat soffit panel work?

Response: Yes.

25. Question: What color primer do we need to use for the primary and secondary? Red, gray, galvanized?

Response: gray

26. Question: To verify, the mezzanine level looks to be all pre-sized materials by others and self-supported; no support or materials by PEMB. Is this correct?

Response: That is correct. The mezzanine is self supported. No support and materials by PEMB.

27. Question: To verify, there aren't any additional loads that we need to consider like roof top units, cranes, hanging or suspended equipment from the roof?

Response: Please review entire drawing set to understand the full scope.

28. Question: Will all exterior frame and endwall columns be at finish floor? Please confirm.

Response: PEMB columns bear on concrete piers. Concrete pier elevation is noted as +0'-0" in plan notes on 3.10.

29. Question: Detail 8 on 3.30 shows a W12x35 beam that will be attaching to the PEMB framing... is this suppose to be a spandrel beam to support the full height masonry walls? If so, we would design the beam and provide as required. Or is this beam needed with the bond beams? Please clarify what to do here.

Response: Bond beam(s) shall occur within masonry walls per typical details on 3.20 and per sections/details. Spandrel beam is sized by TBA to provide support to top of full height masonry at end walls along grid line 10 and grid line 11. Attachment of spandrel beam to PEMB columns is by PEMB EOR/mfr. This is stated along with other pertinent info in section 8/3.30.

30. Question: To verify, the 3/8" x 1'-3" plate shown on the structural details will be by others and won't affect any of the PEMB materials correct?

Response: SHD to advise why plate in question (section 4 and 5/3.30) is provided. PEMB wall and finishing should be supported by means determined by PEMB EOR/mfr.

31. Question: What do we need to use for bracing on this project? I would assume portal frames as required with all bays having framed openings. Are there specific bays that can have portals? Please verify.

Response: Portals will need to be coordinated to avoid window locations.

32. Question: Alternate #3 states the Base bid is to be concrete slab, and the Alternate is to be (2) College Logos in brick pavers. Dwg C-102 shows (2) College Logos 4x8 Clay Brick Pavers on concrete base, but they are not labeled as Alternate #3. Are these in fact the (2) Logos for Alternate #3?

Response: Yes, these are the Clay Brick Pavers to be provided in Alternate #3.

33. Question: There are white boards listed in both classrooms (106 & 107), but no specs or sizes are indicated. Can you please advise on the sizes that are needed and / or provide specifications?

Response: White Board Spec has now been added.

34. Question: Elevation A1/9.3 notes that the tops at the classroom windows are to be Stained Oak. But the detail C3/12.1 (shown on Equipment Plan 11.4) has the tops as plastic laminate PL-01. Which is correct?

Response: Oak window sill is to be stained to match PL01 as noted.

35. Question: A3/12.1 is the center base cabinet a sink base, possibly an ADA front?

Response: No. See updated drawings.

36. Question: B3/12.1 the left base cabinet under the sink, please confirm a sink base cabinet is acceptable as drawers and plumbing can be difficult to coordinate. Please note, the cabinet is too narrow if an ADA front is required.

Response: Yes, this is acceptable. See updated drawings.

37. Question: B2/12.1 the left base cabinet under the sink, please confirm a sink base cabinet is acceptable as drawers and plumbing can be difficult to coordinate.

Response: Yes, this is acceptable. See updated drawings.

38. Question: A2/12.1 at the two sink location, please confirm a sink base cabinet is acceptable as drawers and plumbing can be difficult to coordinate.

Response: Yes, this is acceptable. See updated drawings.

39. Question: C4/12.2 can you provide more information on the 3 base cabinets in the area of the sink. is that an ADA front? Also no dimensions are provided for the wall cabinets.

Response: Yes, this is acceptable. See updated drawings.

40. Question: B3/7.4 calls for oak wood sill painted to match the wall. Does this need to be fire retardant material?

Response: Yes.

41. Question: Ref. Sheets 4.1 and 4.3. Please confirm that no stair access or railings are required around the Storage Mezzanine at the east end of the building.

Response: Correct, no stair access or railings are required around the conc. Lid above rooms 124C, 124D, 125, and 126.

42. Question: Ref. Sheet 14.1. The handrail detail with 2" dia. rail and 1.5" dia. rail and pickets appears to be very heavy. Is this substantial design for the railing necessary?

Response: Please bid per print.

43. Question: The spec section calls for triple glazed units with integral blinds. See drawings for locations. Door and window notes WS1 surface mounted shades within the window frame. These are two different options for the same result. I do not see where either of these occur. If they do can we get locations and which option they want.

Response: There are no "triple glazed units with integral blinds" in the project. WS1 locations called out on 11.1 FIRST FLOOR EQUIPMENT PLAN. See roller shade specification.

44. Question: Will the handrail shown on 4/3.50 be part of this bid? More information is needed.

Response: All items and details shown in the drawings are part of this bid. Please refer to the entire set for full information.

45. Question: Will there be architectural drawings released for this project? They are referred to but are not available in the bid documents.

Response: These have been issued.

46. Question: Where is the handrail shown on 0.3 located and what are the dimensions?

Response: These are standard ADA height requirements. Not architectural or structural details.

47. Question: Only Lintels shown on structural as labeled L-X will be part of this bid. Can you provide all the locations of lintels?

Response: Bidder is responsible for including all items shown on the bid drawings and bid specifications in their bid.

Specifications:

1. Specification 00 01 01 – Table of Contents:
 - A. Section 01 22 00 removed from Table of Contents
 - B. Section 03 33 00 renamed to 03 30 00.
 - C. Section 06 22 00 removed from Table of Contents
 - D. Section 10 11 00 added to Table of Contents
 - E. Section 31 3400 removed from Table of Contents
2. Specification 06 22 00 – Millwork
 - A. Spec section removed. Refer to 12 32 16 – Manufactured Plastic-Laminate-Clad
3. Specification 07 14 16 – Fluid Applied Waterproofing
 - A. Polycoat Products added as acceptable manufacturer
4. Specification 07 27 26 – Fluid Applied Membrane Air & Vapor Barrier:
 - A. Footer section number changed to 07 27 26
5. Specification 08 43 00 – High Performance Aluminum Storefronts
 - A. YKK AP added as acceptable manufacturer
6. Specification 08 43 00 – Interior Aluminum Framed Storefronts
 - A. YKK AP added as acceptable manufacturer
7. Specification 08 71 00 – Door Hardware:
 - A. Hardware schedule has been added.
8. Specification 08 36 13 – Sectional Doors

- A. 2.1.A.2 – Raynor TC-20(20) is no longer available. Raynor TM-220 20 ga. door, its replacement, is to be utilized for pricing purposes.
- B. 2.3.A.1 – Tracks are to be galvanized tracks.
- C. 2.6.B.1 – Specs call for jackshaft-type door operators. Trolley operators to be used on low headroom openings.
- 9. Specification 10 11 00 – Visual Display Units
 - A. Specification added
- 10. Specification 10 14 00 – Signage
 - A. Emergency Evacuation Windows have been removed from the signage specification.
- 11. Specification 12 32 16 – Manufactured Plastic-Laminate-Clad
 - A. Specification revised.
- 12. Specification 13 34 19 – Metal Building Systems
 - A. Schulte Building Systems added as acceptable manufacture.
- 13. Specification 23 30 00 – Air Distribution
 - A. Revised Specialized Ductwork
- 14. Specification 23 35 15 – Dust Collector
 - A. Spec added.

Architectural / Structural Drawings:

- 1. Drawing 7.4 – WALL SECTIONS AND DETAILS
 - A. Detail C1 – Site Detail – Bollard has been removed. Refer to civil drawings for bollard details.
- 2. Drawing 8.3 – DOOR SCHEDULE, DOOR TYPES & WINDOW DETAILS
 - A. Windows added to door type “S”
- 3. Drawing 12.1 – CASEWORK ELEVATIONS

- A. A3 CASEWORK ELEVATION modified

HVAC Drawings:

1. Drawing H01 - HVAC LEGEND AND GENERAL NOTES
 - A. Revised cover sheet notation.
2. Drawing H02 - HVAC SCHEDULES
 - A. Revised schedule information and added new schedules.
3. Drawing H03 - HVAC SCHEDULES
 - A. Revised schedule information and added new schedules.
4. Drawing H11 - FIRST FLOOR HVAC PLAN
 - A. Revised ductwork and airflow information.
5. Drawing H12 - SECOND FLOOR HVAC PLAN
 - A. Revised ductwork and airflow information.
6. Drawing H31 - FIRST FLOOR HVAC PIPING PLAN
 - A. Revised pipe routing and thermostat locations.
7. Drawing H32 - SECOND FLOOR HVAC PIPING PLAN
 - A. Revised pipe routing.
8. Drawing H64 - HVAC PIPING DIAGRAMS
 - A. Revised pipe diagram equipment information.
9. Drawing H65 - HVAC PIPING DIAGRAMS
 - A. Revised pipe diagram equipment information.

Plumbing:

1. Drawing P01 - PLUMBING SYMBOL LEGEND AND GENERAL NOTES
 - A. Revised general notes.
2. Drawing P11 - FIRST FLOOR PLUMBING PLAN
 - A. Revised piping and equipment.
3. Drawing P50 - ENLARGED PLUMBING PLANS
 - A. Revised equipment information.

- - - END OF ADDENDUM NO. 03 - - -

Attachments:

Specification 00 01 01 – Table of Contents
Specification 07 14 16 – Fluid Applied Waterproofing
Specification 07 27 26 – Fluid Applied Membrane Air & Vapor Barrier
Specification 08 36 13 – Sectional Doors
Specification 08 43 00 – High Performance Aluminum Storefronts
Specification 08 43 00 – Interior Aluminum Framed Storefronts
Specification 08 71 00 – Door Hardware
Specification 10 11 00 – Visual Display Units
Specification 10 14 00 – Signage
Specification 12 32 16 – Manufactured Plastic-Laminate-Clad
Specification 13 34 19 – Metal Building Systems
Specification 23 30 00 – Air Distribution
Specification 23 35 15 – Dust Collector

Drawing 7.4 – WALL SECTIONS AND DETAILS

Drawing 8.3 – DOOR SCHEDULE, DOOR TYPES & WINDOW DETAILS

Drawing 12.1 – CASEWORK ELEVATIONS

Drawing 12.2 – CASEWORK ELEVATIONS

Drawing H01 - HVAC LEGEND AND GENERAL NOTES

Drawing H02 - HVAC SCHEDULES

Drawing H03 - HVAC SCHEDULES

Drawing H11 - FIRST FLOOR HVAC PLAN

Drawing H12 - SECOND FLOOR HVAC PLAN

Drawing H31 - FIRST FLOOR HVAC PIPING PLAN

Drawing H32 - SECOND FLOOR HVAC PIPING PLAN

Drawing H64 - HVAC PIPING DIAGRAMS

Drawing H65 - HVAC PIPING DIAGRAMS

Document 00 01 10 - Table of Contents (General Contracting Project)

State of Ohio Standard Requirements for Public Facility Construction

PROCUREMENT AND CONTRACTING REQUIREMENTS GROUP

Division 00 – Procurement and Contracting Requirements

Introductory Information

00 01 10..... Table of Contents

Procurement Requirements

00 10 00..... Solicitation

00 11 13..... Advertisement for Bids

00 11 54..... Terrorist Declaration

00 21 13..... Instructions to Bidders

00 22 00..... Supplementary Instructions

00 26 00..... Standard Substitution Request Form

00 41 13..... Bid Form

00 43 13..... Bid Security Form

00 45 13..... Bidder's Qualifications

00 45 19..... Non-Collusion Affidavit

00 45 20..... Asbestos Statement

00 45 39..... EDGE Affidavit

Contracting Requirements

00 52 00..... Agreement Form

00 52 14..... Subcontract Form (OAC 153:1-03-02)

00 61 13..... Performance and Payment Bond Form

00 61 13.19..... Acknowledgement of Surety

00 62 46..... Contractor's Personal Property Tax Affidavit

00 71 00..... Contracting Definitions

00 72 13..... General Conditions

00 91 13..... Addenda

SPECIFICATIONS GROUP

GENERAL REQUIREMENTS SUBGROUP

Division 01 General Requirements

01 11 00 Summary of Work

01 12 16 Project Phasing & Schedule

01 14 00 Work Restrictions

01 21 00 Allowances

~~01 22 00 Unit Prices~~

01 23 00 Alternates

01 26 00 Contract Modification Procedures

01 29 00 Payment Procedures

01 31 00 Project Management & Coordination

01 32 16 Construction Progress Schedule

01 32 33 Photographic Documentation

01 33 00 Submittal Procedures

01 45 00 Quality Control

01 45 29 Testing Laboratory Services

01 50 00 Temporary Facilities and Controls

01 58 00 Project Signs

01 60 00	Product Requirements
01 71 23	Field Engineering
01 73 29	Cutting & Patching
01 74 00	Construction Cleaning
01 74 19	Construction Waste Management
01 77 00	Closeout Procedures
01 78 36	Warranty
01 11 00	Summary of Work
01 12 16	Project Phasing & Schedule
01 14 00	Work Restrictions
01 21 00	Allowances
01 22 00	Unit Prices
01 23 00	Alternates
01 26 00	Contract Modification Procedures
01 29 00	Payment Procedures
01 31 00	Project Management & Coordination
01 32 16	Construction Progress Schedule
01 32 33	Photographic Documentation
01 33 00	Submittal Procedures
01 45 00	Quality Control
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01 50 00	Temporary Facilities and Controls
01 58 00	Project Signs
01 60 00	Product Requirements
01 71 23	Field Engineering
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FACILITY CONSTRUCTION SUBGROUP

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03 35 36 Polished Concrete Floor

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04 05 16 Masonry Grouting

04 05 19 Masonry Anchorage & Reinforcing

04 05 23 Masonry Accessories

04 20 00 Unit Masonry

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05 12 00 Structural Steel Framing

05 31 00 Steel Decking

05 40 00 Cold-Formed Metal Framing

05 50 00 Metal Fabrications
05 51 00 Metal Stairs
05 52 00 Metal Railings

Division 06 Wood, Plastics, and Composites

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06 61 16 Solid Surfacing Fabrications (Non Proprietary)

Division 07 Thermal and Moisture Control

07 13 26 Self-Adhering Sheet Waterproofing (Foundation Walls)
07 13 28 Foundation ICF Waterproofing Membrane
07 14 16 Fluid Applied Waterproofing
07 19 00 Water Repellents
07 21 00 Thermal Insulation
07 26 30 Spray Foam Insulation Air Barrier
07 27 26 Fluid Applied Membrane Air & Vapor Barriers
07 52 53 Snow Guards
07 92 00 Joint Sealants

Division 08 Openings

08 11 13 Hollow Metal Doors & Frames
08 11 16 Aluminum Doors Medium & Wide Stile
08 14 29 Pre-Finished Wood Doors
08 16 14 FRP Doors
08 31 00 Access Doors & Frames
08 36 13 Sectional Doors
08 43 00 Aluminum Framed Storefronts (High Performance)
08 43 00 Aluminum Framed Storefronts (Interior)
08 44 13 Glazed Aluminum Curtain Walls
08 71 00 Door Hardware
08 71 13 Automatic Door Operators
08 80 00 Glazing

Division 09 Finishes

09 22 00 Non-Load Bearing Steel Framing
09 22 26 Gypsum Board Suspension System
09 28 13 Cementitious Backing Board
09 29 00 Gypsum Board
09 30 00 Tiling
09 51 00 Acoustical Ceilings
09 65 00 Resilient Flooring (LVT)
09 65 13 Resilient Base and Accessories
09 68 13 Tile Carpeting
09 72 16 Vinyl Wall Coverings
09 90 00 Paints & Coatings

Division 10 Specialties

~~10 11 00 Visual Display Units~~
10 14 00 Exterior Illuminated Signage

10 14 00	Signage
10 14 01	Exterior Signage Aluminum Letters
10 21 13	Plastic Toilet Compartments
10 26 13	Corner Guards
10 28 13	Toilet Accessories
10 44 00	Fire Protection Specialties
10 51 13	Metal Lockers (All Locker Types)
10 81 11	Electric Hand Dryers

Division 11 Not Used

Division 12 Furnishings

12 24 13	Roller Window Shades
12 32 16	Manufactured Plastic-Laminate-Clad Casework

Division 13 Special Construction

13 34 19	Metal Building Systems
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Division 14 Not Used

Divisions 15 through 19 – Not Used

FACILITY SERVICES SUBGROUP

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Division 21 Fire Suppression

21 01 00	Fire Protection General Provisions
21 01 01	Fire Protection Supplemental General Provisions
21 03 00	Fire Protection Basic materials and Methods
21 04 00	Fire Protection Firestopping
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Division 22 Plumbing

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22 01 01	Plumbing Supplemental General Provisions
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22 04 00	Plumbing Firestopping
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22 10 00	Plumbing System Components and Devices
22 13 25	Oil Interceptor – Non-Metallic
22 13 61	Solids Interceptor – Point of Use Fixture Trap
22 34 15	Domestic Water heater – Gas Fired, Storage Type – Condensing [Small, Less than 250 MBH, 30 to 199 Gallon]
22 40 00	Plumbing Fixtures

Division 23 Heating, Ventilating, and Air Conditioning

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23 20 00	HVAC Piping and Accessories
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23 41 00	Particulate Air Filters
23 50 01	Condensing Boilers
23 51 00	Flues
23 60 00	Central Cooling Equipment
23 73 13	Modular Indoor Air Handling Units
23 74 00	Packaged Rooftop Air Conditioning Units
23 82 01	Hydronic Heating Units

Division 24 Not Used**Division 25 Integrated Automation – Not Used****Division 26 Electrical**

26 01 00	Electrical General Provisions
26 01 01	Electrical Supplemental General Provisions
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26 03 10	Low-Voltage Electrical Power Conductors and Cables
26 03 20	Raceways, Enclosures, and Pathways
26 03 40	Wiring Devices
26 04 00	Electrical Firestopping
26 05 00	Equipment Identification
26 08 10	Functional Testing of Lighting Controls
26 21 00	Power Distribution Equipment
26 21 15	Grounding of Electrical Systems
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26 22 60	Surge Protective Devices (SPDS) Low Voltage Electrical Power Circuits
26 25 00	Power Distribution System Studies
26 51 00	LED Luminaires
26 52 00	Stand Alone Lighting Controls
26 52 25	Lighting Control System
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Division 27 Communications

27 01 00	Technology General Provisions
27 03 00	Cabling Systems Administration
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27 05 00	Technology Basic Materials and Methods
27 06 00	Technology Pathways Hardware
27 07 00	Technology Grounding System
27 11 16	Technology Equipment Racks and Equipment Cabinets
27 11 19	Copper Cabling Termination Hardware
27 12 00	Technology Outside Plant
27 13 13	Backbone High Pair Copper Cabling
27 13 23	Backbone Fiber Optic Cabling
27 15 00	Horizontal Copper Cabling
27 22 00	Controlled Access System Wiring
27 22 50	Video Surveillance System Wiring
27 53 00	Emergency Responder Radio Coverage Testing

Division 28 Electronic Safety and Security – Not Used

Division 29 Not Used

SITE AND INFRASTRUCTURE SUBGROUP

Division 30 Earthwork

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31 20 00	Earth Moving
31 25 13	Erosion Controls
~~31 34 00~~	~~Geopier Rammed Aggregate Piers~~

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32 12 16	Asphalt Paving
32 13 13	Concrete Paving
32 13 73	Concrete Joint Sealant
32 14 00	Unit Paving
32 17 13	Parking Bumpers
32 17 23	Pavement Markings
32 31 13	Chain Link Fences & Gates
32 33 00	Site Furnishings
32 91 13	Soil Preparation
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33 46 00	Subdraingage

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Division 35 Waterway and Marine – Not used

Divisions 36 through 39 - Not Used

PROCESS EQUIPMENT SUBGROUP

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Division 41 Material Processing and Handling Equipment

Division 42 Process Heating, Cooling, and Drying Equipment

Division 43 Process Gas and Liquid Handling Equipment

Division 44 Pollution Control Equipment

Division 45 Industry-Specific Manufacturing Equipment

Division 46 Water and Wastewater Equipment

Division 47 Not Used

Division 48 Electrical Power Generation

Division 49 Not Used

Appendices

Appendix A Certification of Compliance with the “Buy America” Provision of the Infrastructure Investments and Jobs Act

Appendix B Standard Buy American Specifications for Bid Package

Appendix C Geotechnical Report

Appendix D Davis Bacon Wage Rates

Appendix E EDA Contracting Provisions for Construction Projects

Appendix F EDA Notice of Requirements for Affirmative Action

Appendix G Lobbying Restriction Form

Appendix H EDA Site Sign Specifications

END OF DOCUMENT

SECTION 07 14 16

FLUID APPLIED WATERPROOFING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Sections included under Division 0 & Division 1 are included as a part of this Section as though bound herein.
- B. If AIA Document 201 is included in this contract (refer to Section 01 11 00 Summary of Work to verify), it is part of this Section as though bound herein.

1.2 SUMMARY

- A. Provide complete polyurethane waterproofing membrane system including all applicable sealants and elastomeric flashings needed to prevent water penetration at locations indicated.
- B. System Description:
 - 1. Fluid-applied, coal-tar free polyurethane waterproofing membrane system designed for concealed building components subject to hydrostatic head and meeting ASTM C 836-89a.
 - 2. The membrane:
 - a. Is seamless;
 - b. Fully bonds to substrates both adhesively and mechanically;
 - c. Bridges developing cracks up to 1/8" in concrete and masonry substrates at 60 mil thickness;
 - d. Is suitable for continuous immersion in water;
 - e. Can be applied to concrete, masonry, plywood, and metal substrates;
 - f. Can be used in a broad variety of demanding buried conditions such as "between-slab" plaza and parking decks, bridge decks, roof terraces, podiums, reflecting pools, foundation walls, retaining walls, planter boxes, tunnels, etc.;
 - g. Is available in viscosities to suit every orientation of surface from vertical to horizontal and overhead.

1.3 BID REQUIREMENTS

- A. If Contractor discovers an apparent conflict or discrepancy between portions of the Contract Documents that appears to be inconsistent or is not reasonably inferred from the intent of the Contract Documents, the Contractor shall include in their bid the most stringent and demanding, or highest cost requirement.
- B. Pre-Bid Exceptions: If, for any reason, you deem the designed system is not appropriate or feasible, submit this concern, proposed modification, qualification and / or exception to the drawings and specifications with your bid proposal.

1.4 SUBMITTALS

- A. In accordance with Section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer's product data, samples and a complete set of standard details for the air/vapor barrier membrane systems showing a continuous plane of air tightness throughout the building envelope.

1.5 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.
- B. Applicator qualifications:
 - 1. Applicator shall have at least three years experience in installing materials of types specified and shall have successfully completed at least three projects of similar scope and complexity.
 - 2. Applicator shall designate a single individual as project foreman who shall be on site at all times during installation.
- C. Convene a pre-installation job-site conference three weeks prior to commencing work of this Section:
 - 1. Secure attendance by Architect, Contractor, applicator, and authorized representatives of the membrane system manufacturer and interfacing trades.
 - 2. Examine Drawings and Specifications affecting work of this Section, verify all conditions, review installation procedures, and coordinate scheduling with interfacing portions of the Work.

1.6 DELIVERY, STORAGE & HANDLING

- A. Deliver materials to job site in manufacturer's unopened containers with all labels intact and legible at time of use.
- B. Maintain the products in accord with manufacturer's recommendations with proper precautions to ensure fitness of material when installed.

1.7 SUBSTRATE CONDITIONS

- A. General:
 - 1. Provide applicator with surfaces that are broom clean, dry, sound and free of voids, bugholes, rockpockets, honeycombs, protrusions, excessive roughness, foreign matter, frost, ice and other contaminants which may inhibit application or performance of the waterproofing membrane system.
 - 2. Using suitable abrasive methods, remove residue of form release, curing compound, chemical retarders and other surface treatments, laitance, mortar smear, sawcutting residue, mill scale, rust, loose material and other contaminants from concrete, masonry and ferrous metal surfaces to receive the work of this Section.

- B. Concrete: Where work of this Section will be applied to concrete, provide surfaces that are smooth with finish equal to one that is light steel troweled followed by a fine hair broom.
- C. Decks:
 - 1. Slope deck surfaces to drains that have flanges at membrane level which are flush with deck surfaces.
 - 2. Rigidly install pipe, vents and other surface protrusions, properly flash them, and cover to prevent entry of membrane materials.
- D. Metal flashings: Where metal flashings are substrate to waterproofing membrane, set the flashings in continuous bedding bead of urethane sealant; install sealant S-bead between metal laps and mechanically fasten to substrate along leading edges at every 4" on center, staggered linearly, to lay flat without fishmouths.
- E. Joints: Configuration shall be consistent with this Section and with all other requirements of the Contract Documents.

1.8 WARRANTY

- A. Deliver to the Architect signed copies of the following written warranties against defective materials and workmanship executed for the following periods following date of completion. Warrant that installed waterproofing membrane system shall be free of defects including adhesive failure, cohesive failure, and waterproofing failure resulting from substrate cracking up to 1/16 inch.
 - 1. Manufacturer's standard warranty covering materials for five year period;
 - 2. Applicator's standard warranty covering workmanship for two year period.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Acceptable Manufacturers:
 - 1. Tremco (Basis of Design)
 - 2. W.R. Meadows
 - 3. Carlisle
 - 4. Henry
 - 5. Poly Wall Commercial Stretch, Polyguard Products Inc., Ennis, TX.
 - 6. Polycoat Products
- B. Fluid Applied Waterproofing
 - 1. Provide a complete fluid applied elastomeric waterproofing membrane system designed for concealed building components subject to hydrostatic head that is polyurethane, coal-tar free and complies with ASTM C836 :
 - a. Acceptable product:
 - 1) TREMproof 201/60; Tremco Inc.
 - b. For application to green- or surface-dry-but-damp concrete surfaces, acceptable product:
 - 1) TREMproof 250 GC; Tremco Inc.

2.2 ACCESSORIES

- A. Primer: As recommended by waterproofing membrane system manufacturer;
- B. Joint backing: Closed-cell, polyethylene rod as recommended by membrane manufacturer;
- C. Reinforcing fabric: Woven fiberglass scrim cloth;
- D. Elastomeric sheet flashing: 1/16 inch thick by 12 inch wide uncured neoprene sheeting;
- E. Elastomeric transition flashing to above-grade: polyurethane liquid-applied coating system with ultraviolet protective topcoat. Acceptable product:
 - 1. Acceptable product:
 - a. Vulkem 350/351; Tremco Inc.
- F. Joint Treatment:
 - 1. Acceptable product:
 - a. Dymeric 240FC; Tremco Inc.
 - b. TREMproof 201T; Tremco Inc.
- G. Protection board: As recommended by waterproofing membrane manufacturer.
 - 1. Acceptable product for walls:
 - a. Protection Mat; Tremco Inc.
 - 2. Acceptable product for slabs:
 - a. Powerply standard smooth; Tremco Inc
 - 3. Acceptable product for planters:
 - a. Root barrier; Tremco Inc.
- H. Prefabricated Composite Drainage: Two-part prefabricated composite drainage material consisting of a formed polystyrene core covered on one side with filter fabric.
 - 1. For backfilled walls less than 20 feet in height, a composite drainage mat with non-woven needle-punched polypropylene filter fabric, 9 gpm/ft flow capacity per unit width and 10,800 lbs/ft² compressive strength. Acceptable product:
 - a. Tremdrain; Tremco Inc.
 - 2. For backfilled walls 20 feet or greater in height, a composite drainage mat with non-woven needle-punched polypropylene filter fabric, 16 gpm/ft flow capacity per unit width and 15,000 lbs/ft² compressive strength. Acceptable product:
 - a. Tremdrain 1000; Tremco Inc.
 - 3. For slabs receiving concrete topping and for planters, a composite drainage mat with woven monofilament filter fabric, 18 gpm/ft flow capacity per unit width and 21,000 lbs/ft² compressive strength. Acceptable products:
 - a. Tremdrain 2000; Tremco Inc.
 - 4. For slabs receiving pavers, a composite drainage mat with non-woven needle-punched polypropylene filter fabric, 9 gpm/ft flow capacity per unit width and 30,000 lbs/ft² compressive strength. Acceptable product:
 - a. Tremdrain S; Tremco Inc.
 - 5. For water collection and high profile section for water flow around the perimeter of the structure, a drainage composite with non-woven needle-punched polypropylene filter fabric, a transition section to couple with adjoining drainage mat, high profile

flow capacity of 100 gpm and fitted with compatible factory-molded universal tees, universal outlets and 12" corner guards. Acceptable product:

- a. TREMDrain Total-Drain; Tremco Inc.

2.3 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor and approved by the membrane system manufacturer as compatible, subject to review of the Architect.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Applicator shall examine the areas and conditions under which work of this Section will be performed.
 1. Verify conformance with manufacturer's requirements;
 2. Report unsatisfactory conditions in writing to the Architect;
 3. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Surface preparation and detailing procedures to be in accord with waterproof membrane system manufacturer's instructions and recommendations except where more stringent requirements are indicated.
- B. Clean all deck surfaces to receive membrane system in accord with manufacturer's instructions; vacuum clean or blow clean with oil-free compressed air all surfaces to receive sealants, detailing materials or membranes immediately prior to installation.
- C. Rout, clean, prepare and detail surface cracks in accord with manufacturer's instructions; install backer rod where required.
- D. Clean metal surfaces to bright metal by wire brushing or mechanical etching; scuff-sand lead flashing and plastic surfaces.
- E. Prime surfaces in accord with manufacturer's instructions.
- F. Install 1/4" diameter backer rod into corner of all horizontal-to-vertical junctures subject to movement and cover with 1" detail cant of approved sealant; install 1" detail cants at projections, curbs and other horizontal-to-vertical junctures.
- G. Install detail coats, joint and crack treatments, elastomeric flashing and reinforcing fabric in accord with manufacturer's instructions.
- H. Allow detail applications to cure in accord with manufacturer's instructions prior to general application of membrane.

3.3 APPLICATION

- A. General: Install waterproofing system in accord with manufacturer's recommendations and instructions as applies to the Work except where more stringent requirements are indicated.
 - 1. Waterproofing membrane shall be applied in two lifts of 30-mils each to provide an overall pinhole-free membrane of minimum 60-mil thickness.
 - 2. Grid deck surfaces to assure proper coverage rates and verify membrane wet-film mil thickness with gauges as work progresses.
 - 3. Retain empty product containers during course of work to aid in determining whether completed membrane complies with required average dry-film thickness.
- B. Verify proper dry condition of substrate using method recommended by membrane system manufacturer; perform adhesion checks prior to general application of membrane system using field adhesion test method recommended by manufacturer.
- C. Mask off adjoining surfaces not to receive membrane system.
- D. Wipe clean all detail coats with white rags wetted with Xylene solvent; do not saturate detail coat.
- E. Apply membrane uniformly and allow cure in accord with manufacturer's instructions.
- F. Feather terminating edge when entire area cannot be completed in one day; clean area 6" wide along terminating edge of membrane with Xylene solvent on clean white rags prior to startup on next working day; use interlaminary primer per manufacturer's instructions as needed; overlap existing work by 6" with new work.
- G. Flood test: Plug drains on deck surfaces and use sand bags or other means to restrict runoff. Flood deck with water to depth of 2" (50 mm) and allow to stand at least 48 hours; repair leaks if occurs and retest.
- H. Install protection board over cured membrane in accord with manufacturer's instructions.
- I. Install drainage material in accord with manufacturer's instructions.

3.4 PROTECTION AND CLEAN-UP

- A. Promptly remove primer or membrane system material from adjacent surfaces with MEK, Toluene or Xylene; leave work area in broom clean condition.
- B. Prohibit traffic over completed work and protect against work overhead until protection course is installed; protect from damage until protected beneath overlaying work.

END OF SECTION

SECTION 07 27 26

FLUID APPLIED MEMBRANE AIR & VAPOR BARRIERS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Sections included under Division 0 & Division 1 are included as a part of this Section as though bound herein.
- B. If AIA Document 201 is included in this contract (refer to Section 01 11 00 Summary of Work to verify), it is part of this Section as though bound herein.

1.2 SUMMARY

- A. System Description:
 - 1. The work included in this Section consists of materials and installation methods for fluid-applied membrane to provide an air barrier component and secondary water-resistive barrier/drainage plane for unit masonry and sheathing wall assemblies to completely enclose the building.

1.3 REFERENCES

- A. Reference Standards:
 - 1. C 297 Test Method for Tensile Strength of Flat Sandwich Constructions in Flatwise Plane
 - 2. D 522 Test Methods for Mandrel Bend Test of Attached Organic Coatings
 - 3. D 882 Test Methods for Tensile Properties of Thin Plastic Sheeting
 - 4. D 2247 Practice for Testing Water Resistance of Coatings in 100 percent Relative Humidity
 - 5. D 3273 Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
 - 6. E 84 Test Method for Surface Burning Characteristics of Building Materials
 - 7. E 96 Test Methods for Water Vapor Transmission of Materials
 - 8. E 283 Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
 - 9. E 330 Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
 - 10. E 331 Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
 - 11. E 1233 Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential
 - 12. E 2178 Test Method for Air Permeance of Building Materials

1.4 DESIGN REQUIREMENTS

- A. Deflection Criteria: maximum allowable deflection normal to the plane of the wall: L/240

- B. Wind Load: conform with code requirements.
- C. Moisture Control:
 - 1. Minimize condensation within the assembly.
 - 2. Drain water directly to the exterior where it is unlikely to penetrate components in the wall assembly (windows and doors, for example).
 - 3. Provide flashing to direct water to the exterior in accordance with code requirements, including, above window and door heads, beneath window and door sills, at roof/wall intersections, decks, intersections of lower walls with higher walls, and at the base of the wall.
- D. Air Barrier Continuity: provide continuous air barrier system of compatible air barrier components.
- E. Mechanical Ventilation: maintain pressurization and indoor humidity levels in accordance with recommendations of ASHRAE (see 2001 ASHRAE Handbook—Fundamentals).

1.5 BID REQUIREMENTS

- A. If Contractor discovers an apparent conflict or discrepancy between portions of the Contract Documents that appears to be inconsistent or is not reasonably inferred from the intent of the Contract Documents, the Contractor shall include in their bid the most stringent and demanding, or highest cost requirement.
- B. Pre-Bid Exceptions: If, for any reason, you deem the designed system is not appropriate or feasible, submit this concern, proposed modification, qualification and / or exception to the drawings and specifications with your bid proposal.

1.6 SUBMITTALS

- A. In accordance with Section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer's product data, samples and a complete set of standard details for the air/vapor barrier membrane systems showing a continuous plane of air tightness throughout the building envelope.

1.7 QUALITY ASSURANCE

- A. Perform Work in accordance with the manufacturer's written instructions of the air/vapor barrier membrane and this specification.
- B. Maintain one copy of manufacturer's written instructions on site.
- C. At the beginning of the Work and at all times during the execution of the Work, allow access to Work site by the air barrier membrane manufacturers' representative.
- D. Components used in this section shall be sourced from one manufacturer, including sheet membrane, air barrier sealants, primers, mastics, and adhesives.
- E. Ensure all preparation work is complete prior to installing air/vapor barrier membrane.

- F. Ensure continuity of the air/vapor barrier membrane system throughout the scope of this section.
- G. Qualifications:
 - 1. Installer Qualifications: Submit in writing a document stating that the applicator of the primary air barrier membranes specified in this section is recognized by the manufacturer as suitable for the execution of the Work.

1.8 DELIVERY, STORAGE & HANDLING

- A. Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.
- B. Protect coatings (pail products) from freezing temperatures and temperatures in excess of 90 degrees F (32 degrees C). Store away from direct sunlight.

1.9 PROJECT CONDITIONS

- A. Maintain ambient and surface temperatures above 40 degrees F (4 degrees C) and below 100 degree F (38 degrees C) during application and drying period, minimum 24 hours after application of air and water-resistive barrier.
- B. Provide supplementary heat for installation in temperatures less than 40 degrees F (4 degrees C) or if surface temperature is likely to fall below 40 degrees F (4 degrees C). (*Note: surface temperature is lower than air temperature at night*).

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Acceptable Manufacturers:
 - 1. Prosoco R-Guard VB (Basis-of-Design)
 - 2. W.R. Meadows; Air Shield LM (All Season)
 - 3. Carlisle ; Barriseal-S Spray Applied
 - 4. Grace Construction Products (Perm-a-Barrier Liquid)
 - 5. Polyguard Products, Inc. (Poly Wall Airlok Flex)
 - 6. BASF Wall Systems, (Enershield-I)
- B. Fluid Applied Membrane (IMPERMEABLE)
 - 1. Procoso R-Guard VB: Is a fluid-applied air and water-resistive barrier that stops air and water leakage in cavity wall, masonry veneer construction, as well as in stucco, EIFS and most other building wall assemblies. The easily applied liquid quickly dries into a rubberized, highly-durable, water-resistant membrane. R-GUARD VB performs the function of both a vapor barrier and an air/water resistive barrier and is ideal for special construction types that require protection from the passage of air, liquid water and water vapor. R-GUARD VB reduces heating and cooling costs and lowers the risk of mold and mildew.

2. Use: Procoso R-Guard VB as a high-performing water resistive barrier, vapor barrier or as part of a continuous building-wide air barrier system. The durable membrane conforms and adheres to common building surfaces and is compatible with most paints, sealants and self-adhered waterproofing or air barrier components. R-GUARD VB is appropriate for vertical, above-grade applications to structural sheathing, CMU, cast concrete and most other common building materials.
3. Technical Data:
 - a) Thickness: Apply in accordance with manufacturer's instruction.
 - b) Air Infiltration: Less than 0.004 cfm per square foot (0.02 L/s/sq m) when tested in accordance with ASTM E 2178 or ASTM E 283.
 - c) Water vapor permeability: Less than 0.1 perms when tested in accordance with ASTM E 96.
 - d) Surface Burning: Pass when tested in accordance with ASTM E 84.
 - e) Water Penetration (static pressure): No uncontrolled water penetration when tested in accordance with ICC-ES AC 212 AATCC 127 (Water Column).
 - f) Tensile Strength: Greater than 15 psi or exceeds strength of substrate when tested in accordance with ASTM C 297 modified.
 - g) Nail Sealability: Pass when tested in accordance with ASTM D 1970.
 - h) Flexibility: Pass when tested in accordance with ASTM D 522.
 - i) Volatile organic compounds (VOC): Less than 50 g/L.
 - j) Color: Mint Green.
4. Other Related Items:
 - a. R-GUARD Transition Membrane - A 6 inch (152 mm) wide self-adhering water-resistive air barrier material that functions as alternative protection for sheathing joints and rough openings; a secondary seal for sealant joints; or as an air barrier connection material bridging dissimilar materials. Pliable black self-adhering membrane for bridging dissimilar materials. Covering with a coat of R-GUARD Spray Wrap or MVP will extend UV exposure window from thirty days to six months.
 - b. R-Guard AirDam Air and Waterproof Sealant for Windows and Doors.
 - 1) Acceptable product: PROSOCO, Inc. AirDam
 - 2) Description: AirDam is a medium modulus sealant that combines the best silicone and polyurethane properties. This single component, 98% solids Silyl-Terminated-Poly-Ether (STPE) is easy to gun and tool in all weather conditions. AirDam cures quickly to produce a durable, high performance, high movement elastomeric interior air sealant

- 3) Characteristics:
 - i. Hardness: Shore A, 20-25 when tested in accordance with ASTM C661.
 - ii. Tensile strength: 110 psi when tested in accordance with ASTM D412.
 - iii. Elongation at break: 1300% when tested in accordance with ASTM D412.
 - iv. Peel strength: 30 pli when tested in accordance with ASTM D1781.
 - v. Type: Type S, Grade NS, Class 50 when tested in accordance with ASTM C920.
 - vi. Volatile organic content (VOC): 30 g/L.
 - vii. Shrinkage: None.
 - viii. Form: heavy white paste, mild odor
 - 4) Backer rod: Compressible, closed cell rod stock as recommended by manufacturer for compatibility with sealant. Provide size and shape of rod to control joint depth.
- c. R-Guard Gypprime Water Based Primer for Raw Gypsum Board Edges.
- 1) Acceptable product: PROSOCO, Inc. R-GUARD GypPrime.
 - 2) Description: GypPrime consolidates and seals the cut edges of gypsum wall boards where they are exposed in rough openings for windows and doors. The sealed edge makes a compatible surface for easy application of R GUARD Joint and Seam Filler fiber-reinforced fill coat and seam treatment for through-wall components. GypPrime brushes or sprays on easily and is usually dry in 30 minutes.
 - 3) Characteristics:
 - i. Freeze point: 32 degrees Fahrenheit.
 - ii. Flash point: greater than 200 degrees Fahrenheit.
 - iii. Active content: 18 percent.
 - iv. Volatile organic content (VOC): less than 100 g/L.
 - v. Form: Milky blue liquid, mild odor.
- d. R-Guard Joint and Seam Filler fiber reinforced fill coat and seam filler.
- 1) Acceptable product: PROSOCO, Inc. R-GUARD Joint & Seam Filler
 - 2) Description: Joint & Seam Filler is a high modulus, gun-grade, crack and joint filler, adhesive and detailing compound that combines the best silicone and polyurethane properties. This single-component, 99% solids, fiber-reinforced, Silyl-Terminated-Poly-Ether (STPE) is easy to gun, spread and tool.
 - 3) Characteristics:
 - i. Thickness: Apply according to manufacturer's instructions.
 - ii. Hardness: Shore A, 45-50 when tested in accordance with ASTM C661.
 - iii. Water vapor permeability: Minimum 14 perms when tested in accordance with ASTM E-96.
 - iv. Tensile strength: 225 psi when tested in accordance with ASTM D412.
 - v. Lap shear strength: 275 psi when tested in accordance with ASTM D1002.
 - vi. Elongation at break: 275% when tested in accordance with ASTM D412.
 - vii. Peel strength: 30 pli when tested in accordance with ASTM D1781.
 - viii. Volatile organic content (VOC): 30 g/L.
 - ix. Shrinkage: None.
 - x. Form: Pale Red, Gun Grade.

- e. R-Guard Fastflash Liquid-Applied Flashing Membrane.
 - 1) Acceptable product: PROSOCO, Inc. R-GUARD FastFlash.
 - 2) Description: FastFlash is a gun-grade waterproofing, adhesive and detailing compound that combines the best of silicone and polyurethane properties. This single component, 99% solids, Silyl-Terminated-Poly-Ether (STPE) is easy to gun, spread and tool to produce a highly durable, seamless, elastomeric flashing membrane in rough openings of structural walls.
 - 3) Characteristics:
 - a) Thickness: Apply according to manufacturer's instructions.
 - b) Water vapor permeability: Minimum 14 perms when tested in accordance with ASTM E96.
 - c) Water penetration (cyclical static air pressure difference): No uncontrolled water penetration when tested in accordance with ASTM E547.
 - d) Hardness: Shore A, 40-45 when tested in accordance with ASTM C661.
 - e) Tensile strength: 180 psi when tested in accordance with ASTM D412.
 - f) Elongation at break: 400% when tested in accordance with ASTM D412.
 - g) Peel strength: 25 pli when tested in accordance with ASTM D1781.
 - h) Volatile organic content (VOC): 30 g/L.
 - i) Form: Brick Red, Gun Grade Sealant.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and conditions are ready to accept the Work of this section. Notify design professionals in writing of any discrepancies. Commencement of the Work or any parts thereof shall mean acceptance of the prepared substrates.
- B. All surfaces must be sound, dry, clean, and free of grease, dirt, excess mortar or other contaminants. Fill voids, gaps, and spalled areas with R GUARD Joint & Seam Filler in substrate to create an even plane. Masonry head joints should be fully filled and tooled.
- C. Where curing materials are used they must be clear resin based without oil, wax or pigments
- D. Condition materials to room temperature prior to application to facilitate extrusion and handling.

3.2 PREPARATION

- A. Air, water-resistive and waterproofing membrane and accessories may be applied to green concrete 16 hours after removal of forms.

- B. Refer to manufacturer's product data for requirements for condition of and preparation of substrates.
 - 1. Surfaces shall be sound and free of voids, spalled areas, loose aggregate and sharp protrusions.
 - 2. Remove contaminants such as grease, oil and wax from exposed surfaces.
 - 3. Remove dust, dirt, loose stone and debris.
 - 4. Use repair materials and methods that are acceptable to manufacturer of the air and water-resistive barrier system.
 - 5. The PROSOCO R-GUARD product line includes several options for preparing structural walls to receive the primary air and water resistive barrier. Refer to manufacturer's product data and R-Guard Installation Guidelines for additional information.

- C. Exterior sheathing:
 - 1. Ensure that sheathing is properly installed with ends, corners and edges properly fastened.
 - 2. Mechanical fasteners used to secure sheathing boards or penetrate sheathing boards shall be set flush with sheathing, fastened and spotted with R-GUARD Joint & Seam Filler and fastened into solid backing.
 - 3. Fill sheathing end and prime edge joints with R-GUARD GypPrime as herein specified.

- D. Masonry and concrete substrates:
 - 1. Masonry shall have smooth trowel-cut mortar joints.
 - 2. Mechanically remove loose mortar fins, snots and debris.

3.3 INSTALLATION

- A. Before applying, read "Preparation" and "Safety Information" sections in the Manufacturer's Product Data Sheet for PROSOCO R-GUARD® VB. Refer to the Product Data Sheet for additional information about application.

- B. Do not dilute or alter R-GUARD VB, except for use in sprayers. The product may be thinned with up to 5 percent fresh water, based on surface, drying conditions and equipment. Mix well before use with a low-speed drill and clean mixing paddle. Avoid mixing air into the membrane.

- C. Structural Sheathing : Exterior gypsum sheathing board or exterior plywood.
 - 1. Spray or roller apply sufficient VB to cover and hide the entire face of the structural wall. Apply to uniform thickness of 15 wet mils per coat.
 - 2. Apply second coat to uniform thickness of 15 wet mils. Coating must be opaque after drying.
 - 3. Back roll as needed to ensure there are no pinholes, voids or gaps in the membrane.
 - 4. Inspect membrane before covering. Repair any punctures or damaged areas by applying additional R-GUARD VB. Overlap repairs, penetration treatments,

transitions, rigid flashing and other air barrier components to ensure positive drainage and continuity of the air and water-resistive barrier.

D. CMU Wall Construction:

1. Spray or roller apply sufficient R-GUARD VB to cover and fill the entire surface. Back roll spray applications if necessary. Let dry.
2. Spray or roller-apply a second coat of R-GUARD VB to achieve hide. Back roll spray to achieve a void- and pinhole-free surface. Take special care to achieve full coverage around wall ties or surface irregularities.
3. Inspect membrane before covering. Repair any punctures or damaged areas by applying additional R-GUARD VB. Overlap repairs, penetration treatments, transitions, rigid flashing and other air barrier components to ensure positive drainage and continuity of the air and water-resistive barrier.

3.4 CURING AND DRYING

- A. Complete drying times vary with temperature, humidity and surface conditions. Protect from rain or freezing until completely dry. At 70 degrees Fahrenheit (21 degrees Celsius) and 50 percent relative humidity, R-GUARD VB dries to touch and can be over coated in 2 to 4 hours.

END OF SECTION

B.

SECTION 08 36 13

SECTIONAL DOORS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Sections included under Division 0 & Division 1 are included as a part of this Section as though bound herein.
- B. If AIA Document 201 is included in this contract (refer to Section 01 11 00 Summary of Work to verify), it is part of this Section as though bound herein.
- C. Related Sections:
 - 1. Section 01 74 19 – Construction Waste Management
 - 2. Section 04 02 00 – Unit Masonry
 - 3. Section 13 34 19 – Metal Building Systems

1.2 SUMMARY

- A. System Description:
 - 1. Provide all labor, materials, tools and equipment necessary to provide complete sectional overhead door assemblies with door sections, tracks and appurtenances sized and arranged to suit opening sizes, conditions, and clearance limitations indicated on the Drawings.

1.3 DEFINITIONS

- A. Operation Cycle: One complete cycle of a door begins with the door in the closed position. The door is then moved to the open position and back to the closed position.

1.4 REFERENCES

- A. Reference Standards:
 - 1. ASTM - The American Society for Testing and Materials
 - 2. SSPC - The Society for Protective Coatings
 - 3. NFPA - National Fire Protection Association
 - 4. NEMA ICS - National Electrical Manufacturers Association Industrial Control and Systems

1.5 BID REQUIREMENTS

- A. If Contractor discovers an apparent conflict or discrepancy between portions of the Contract Documents that appears to be inconsistent or is not reasonably inferred from the intent of the Contract Documents, the Contractor shall include in their bid the most stringent and demanding, or highest cost requirement.

- B. Pre-Bid Exceptions: If, for any reason, you deem the designed system is not appropriate or feasible, submit this concern, proposed modification, qualification and / or exception to the drawings and specifications with your bid proposal.

1.6 SUBMITTALS

- A. In accordance with Section 01 33 00 – Submittal Procedures.
- B. Product Data: For each type and size of sectional overhead door and accessory. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes. Provide roughing-in diagrams, operating instructions, and maintenance information. Include the following:
1. Setting drawings, templates, and installation instructions for built-in or embedded anchor devices.
 2. Motors: Show nameplate data and ratings; characteristics; mounting arrangements; size and location of winding termination lugs, conduit entry, and grounding lug; and coatings.
- C. Shop Drawings: For special components and installations not dimensioned or detailed in manufacturer's data sheets.
1. Wiring Diagrams: Detail wiring for power, signal, and control systems. Differentiate between manufacturer-installed and field-installed wiring and between components provided by door manufacturer and those provided by others.
- D. Samples for Selection: Manufacturer's color charts showing the full range of colors available for units with factory-applied finishes.

1.7 QUALITY ASSURANCE

- A. Source Limitations: Obtain sectional overhead doors through one source from a single manufacturer.
1. Obtain operators and controls from the sectional overhead door manufacturer.
- B. Listing and Labeling: Provide electrically operated fixtures specified in this Section that are listed and labeled.
1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.
- C. Qualifications:
1. Material Qualifications: Engage a firm experienced in manufacturing sectional overhead doors similar to those indicated for this Project and with a record of successful in-service performance.

1.8 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide sectional overhead doors capable of withstanding the effects of gravity loads and the following loads and stresses without evidencing permanent deformation of door components:
1. Wind Load for Typical Doors: Uniform pressure (velocity pressure) of 20 lbf/sq. ft., acting inward and outward.

- B. Operation-Cycle Requirements: Design sectional overhead door components and operator to operate for not less than 100,000 cycles.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Accepted Manufacturers (* indicates the basis of design)
1. Overhead Door Corporation
 - a. Series 595 Thermacore Door System
 2. Raynor Garage Doors
 - a. ~~T.C.-20~~ TM-220 20
 3. Wayne-Dalton Corp
 - a. TS-200-20
 4. Or Architect Approved Equal

2.2 STEEL SECTIONS

- A. Construct door sections from galvanized structural-quality carbon steel sheets complying with ASTM A 653, commercial quality, with a minimum yield strength of 33,000 psi and a minimum G60 zinc coating.
1. Exterior Steel Sheet Thickness: 20 gage (nominal 0.040 inch) minimum.
 2. Exterior Section Face: Flat or stucco-embossed; manufacturer's standard essentially flat face.
- B. Fabricate door panels from a single sheet to provide sections not more than 24 inches high and not less than 1-5/8 inches deep. Roll horizontal meeting edges to a continuous, interlocking, keyed, rabbeted, shiplap, or tongue-in-groove weathertight seal, with a reinforcing flange return.
1. Provide door sections with continuous thermal-break construction, separating faces of door.
- C. Enclose open section with not less than 16 gage (nominal 0.064-inch) galvanized steel channel end stiles welded in place. Provide not less than 0.064-inch galvanized intermediate stiles, cut to door section profile, spaced at not more than 48 inches o.c., and welded in place.
- D. Reinforce bottom section with a continuous channel or angle complying with bottom section profile and allowing installation of astragal.
- E. Reinforce sections with continuous horizontal and diagonal reinforcement as required to stiffen door and for wind loading. Provide galvanized steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place.
- F. Provide reinforcement for hardware attachment.
- G. Insulation: Manufacturer's standard rigid polyurethane-foam-type thermal insulation, foamed in place to completely fill inner core of section, pressure bonded to face sheets to prevent delamination under wind load and with maximum flame-spread and smoke-

developed indices of 75 and 450 respectively, according to ASTM E 84. Enclose insulation completely, with no exposed insulation material evident.

1. Steel Sheet Inside Face: 26 gage (nominal 0.022-inch-) thick manufacturer's standard.

- H. Fabricate sections so finished door assembly is rigid and aligned, with tight hairline joints, and free of warp, twist, and deformation.

2.3 TRACKS, SUPPORTS, AND ACCESSORIES

- A. Tracks: Provide heavy-duty industrial steel track system, of 3 inch, 11 gage angle, designed for lift type indicated and clearances shown. Provide complete track assembly, including brackets, bracing, and reinforcement for rigid support of ball-bearing roller guides for required door type and size. Slope tracks at proper angle from vertical, or otherwise design to ensure tight closure at jambs when door unit is closed. Weld or bolt to track supports.
 1. ~~Utilize galvanized tracks. Prime paint with zinc-rich primer complying with SSPC-Paint 20 or SSPC-Paint 29 after fabrication.~~
- B. Track Reinforcement and Supports: Provide galvanized steel track reinforcement and support members, complying with ASTM A 36 and ASTM A 123. Secure, reinforce, and support tracks as required for door size and weight to provide strength and rigidity without sag, sway, and vibration during opening and closing of doors.
- C. Support and attach tracks to opening jambs with continuous angle welded to tracks and attached to wall. Support horizontal (ceiling) tracks with continuous angle welded to track and supported by laterally braced attachments to overhead structural members at curve and end of tracks.
- D. Weatherseals: Provide replaceable, adjustable, continuous, compressible weatherstripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom and at top of overhead door.
 1. Provide motor-operated doors with combination bottom weatherseal and sensor edge. Refer to paragraph "Obstruction Detection Device" for sensor edge information.
 2. In addition, provide continuous flexible seals at door jambs for a weathertight installation.
- E. Windows: Provide windows of type and size indicated and in arrangement shown. Set glazing in vinyl, rubber, or neoprene glazing channel, as required. Provide removable stops of same material as door section frames.
 1. Size: Manufacturer's standard panel for type of glazing indicated.
 - a. Size: Nominal 24 inches wide x 7 inches high.
 - b. Arrangement: Provide two windows in doors less than 12 feet wide. Provide four windows in doors 12 feet and wider. Center window area in door width and center at 5 feet above floor.
 2. Clear Polycarbonate Plastic: 3-mm clear, transparent, fire-retardant polycarbonate sheet manufactured by extrusion process, UV resistant.
- F. Finishes: Apply manufacturer's standard primer and powder-coat-applied finish coats to interior and exterior door faces after forming, according to coating manufacturer's written instructions for application, thermosetting, and minimum dry film thickness.

1. Door Panels Color: Selected from Manufacturer's standard.
2. Control Panels Color: Manufacturer's standard grey.

2.4 HARDWARE

- A. General: Provide heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless steel, or other corrosion-resistant fasteners, to suit door type.
- B. Hinges: Provide heavy-duty galvanized steel hinges, of not less than 0.120-inch-thick uncoated steel, at each end stile and at each intermediate stile, in accordance with manufacturer's written recommendations for door size. Attach hinges to door sections through stiles and rails with bolts and locknuts or lock washers and nuts. Use rivets or self-tapping fasteners where access to nuts is not possible. Provide double-end hinges, where required, for doors exceeding 16 feet in width, unless otherwise recommended by door manufacturer.
- C. Rollers: Provide heavy-duty rollers, with steel ball bearings in case-hardened steel races, mounted with varying projections to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Provide 3-inch- diameter case-hardened roller tires.

2.5 COUNTERBALANCING MECHANISM

- A. Torsion Spring: Operation by torsion-spring counterbalance mechanism consisting of adjustable-tension torsion springs, fabricated from oil-tempered-steel wire complying with ASTM A 229, Class II, mounted on a cross-header tube or steel shaft. Connect to door with galvanized aircraft-type lift cables with cable safety factor of at least 5 to 1. Provide springs calibrated for 100,000 cycles minimum.
- B. Cable Drums: Provide cast-aluminum or gray-iron casting cable drums grooved to receive cable. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of shaft. Provide 1 additional midpoint bracket for shafts up to 16 feet long and 2 additional brackets at one-third points to support shafts more than 16 feet long, unless closer spacing is recommended by door manufacturer.
- C. Cable Safety Device: Include a spring-loaded, steel or bronze cam mounted to bottom door roller assembly on each side, designed to automatically stop door if either cable breaks.
- D. Bracket: Provide anchor support bracket, as required to connect stationary end of spring to the wall, to level shaft and prevent sag.
- E. Provide a spring bumper at each horizontal track to cushion door at end of opening operation.

2.6 ELECTRIC DOOR OPERATORS

- A. General: Provide electric door controls and operator assembly of size and capacity recommended and provided by door manufacturer for door and operational life specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit,

solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

1. Comply with NFPA 70.

B. Door-Operator

1. Operator Type: Provide jackshaft type unit consisting of electric motor, enclosed worm-gear running-in-oil, secondary and third stage drive, chain and sprocket drive, first stage heavy duty V-belt drive and auxiliary chain-hoist with floor level disconnect (i.e., automatic operation suspension). **Trolley operators on low headroom openings to be provided.**
 - a. Configure operator so motor can be removed without disturbing limit-switch adjustment and without affecting emergency auxiliary operator.
 - b. Include safety friction clutch to adjust transmission of torque from motor to gear reducer for slip during starting. Mount between motor and gear reducer in the factory.
 - c. Basis-of-Design Product: LiftMaster Model MJ, or Architect approved equal.
2. Electric Motors: High-starting torque, reversible, continuous-duty, Class A insulated, complying with NEMA MG 1, with overload protection, sized to start, accelerate, and operate door in either direction, from any position, at not less than 1.5 fps or more than 2.0 fps, without exceeding nameplate ratings or considering service factor.
 - a. Type: Polyphase, medium-induction type.
 - b. Service Factor: According to NEMA MG 1, but not less than 115 percent of nameplate rating.
 - c. Provide totally enclosed, nonventilated or fan-cooled motors (TEFC), fitted with plugged drain, and controller with NEMA ICS 6, Type 12 oil-resistant enclosure unless otherwise indicated.
 - d. Coordinate wiring requirements and electric characteristics of motors with building electrical system.
3. Automatic Operation Suspension or Disconnect Device: Provide hand-operated disconnect or mechanism for automatically engaging sprocket-chain operator and releasing brake for emergency manual operation while disconnecting motor, without affecting timing of limit switch. Mount disconnect and operator so they are accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
4. Limit Switches: Provide heavy duty, rotary cam type adjustable switches, interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions. Provide in NEMA ICS 6, Type 12 oil-resistant enclosure unless otherwise indicated. Provide contacts for interlocks with the following:
 - a. Automatic operation suspension device.
 - b. Door controls.
 - c. Obstruction detection device.

C. Door Controls: Provide control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70, Class 2, control circuit, maximum 24-V, ac or dc.

1. Provide one of control panel for each door having an electric operator.
2. Control Panel: NEMA ICS 6, Type 12, oil-resistant enclosure with flange-mounted hinged door. Include the following:
 - a. General: Mount electrical components inside enclosure to allow physical clearances sufficient for mounting, wiring adjustment, testing, and replacement. Arrange and orient each component so identification can be

- determined without moving component or its wiring. Use separately mounted terminal strips for power circuits and control circuits.
- b. Provide contacts, relays and other components necessary for an operational installation, including but not limited to:
 - 1) Obstruction detection device controls.
 - c. Disconnect: Hand-operated lockable blade-type with three lock-out hasps. Fused and integral motor starter.
 - d. Incoming Power Supply: 480 volt, 3 phase, 60 Hertz
 - e. Starters: Two magnetic full voltage with thermal overloads.
 - f. Transformer: Step-down type for 24 volt control voltage. Provide additional transformer, if required, for door operator.
 - g. Panel Mounting Height: 4 feet above finish floor.
- 3. Remote Control Station (Interior): 3-button control station with pushbutton controls labeled "Open," "Close," and "Stop."
 - a. Momentary contact type for green "Open" and red "Stop" buttons.
 - b. Constant contact type for black "Close" button.
 - c. Enclosure: NEMA ICS 6, Type 12 or Type 4, surface mounted unless otherwise indicated.
 - 4. Remote Control Station (Exterior): Key operated switch having "Open", "Off", "Close" positions, and with "Stop" push buttons.
 - a. Enclosure: NEMA 3R, surface mounted unless otherwise indicated.
 - 5. Handheld Radio Control Units: Three channel units for full control of Open, Close, Stop. Power 24 V AC. Each door is to have its own frequency. Provide two (2) units for each door.
 - 6. Obstruction Detection Device: Each motorized door shall have an external automatic safety sensor able to protect full width of door opening. Activation of sensor immediately stops and reverses downward door travel.
 - a. Sensor Edge: Locate within astragal or weatherstripping mounted to bottom bar. Contact with sensor shall immediately stop and reverse downward door travel. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.
 - 1) Provide electrically actuated automatic bottom bar of self-monitoring type, a 4-wire configured device.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine wall and overhead areas, including opening framing and blocking, with Installer present, for compliance with requirements for installation tolerances, clearances, and other conditions affecting performance of Work of this Section.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install door, track, and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports according to manufacturer's written instructions and as specified.

- B. Fasten vertical track assembly to framing at not less than 24 inches o.c. Hang horizontal track from structural overhead framing with angle or channel hangers welded and bolt fastened in place. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.
 - 1. Touch-up welds at painted surfaces.
- C. Install bracing and supports as necessary to rigidly secure door operating equipment and appurtenances.
- D. Install junction box for wiring of safety edge device at mid-point of door travel. Connect flexible wiring to safety edge device and junction box with strain relief grips.
 - 1. Install flexible wiring to be free from obstructions, with no excess wiring, when door is fully open or fully closed.
- E. Electrical Work: Conduit, wiring, and mounting of controls are specified in Division 16.

3.3 ADJUSTING

- A. Lubricate bearings and sliding parts; adjust doors to operate easily, free from warp, twist, or distortion, and fitting weathertight for entire perimeter.
- B. Repair cut, welded, and abraded galvanized surfaces with a minimum 2 mil thick coating of cold galvanizing compound (containing 93 percent zinc) applied in accordance with compound manufacturer's instructions.

3.4 CLEANING

- A. Clean doors, and clean work area surfaces that have been soiled performing the Work.

END OF SECTION

SECTION 08 43 00

HIGH PERFORMANCE ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Sections included under Division 0 & Division 1 are included as a part of this Section as though bound herein.
- B. If AIA Document 201 is included in this contract (refer to Section 01 11 00 Summary of Work to verify), it is part of this Section as though bound herein.
- C. Related Sections:
 - 1. Section 01 74 19 – Construction Waste Management

1.2 SUMMARY

- A. Section includes, but is not limited to:
 - 1. Aluminum curtain wall systems, complete with reinforcing, shims, anchors, and attachment devices.
 - 2. Accessories necessary to complete Work.
- B. Products Furnished But Not Installed Under this Section:
 - 1. Inserts and anchoring devices which are to be built into structure.

1.3 REFERENCES

- A. Reference Standards:
 - 1. Aluminum Association (AA):
 - a. DAF-45 – Designation System for Aluminum Finishes.
 - 2. American Architectural Manufacturers Association (AAMA):
 - a. Aluminum Curtain Wall Design Guide Manual.
 - b. 501.2- Field Check of Metal Curtain Walls for Water Leakage.
 - c. 2605 - Voluntary Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.
 - d. 606.1 - Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum.
 - e. 607.1 - Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.
 - f. 608.1 - Specification and Inspection Methods for Electrolytically Deposited Color Anodic Finishes for Architectural Aluminum.
 - g. 701.2 - Specifications for Pile Weatherstripping.
 - h. Manual #10 - Care and Handling of Architectural Aluminum From Shop to Site.
 - 3. American National Standards Institute (ANSI):
 - a. Z97.1 - Specifications and Methods of Test for Safety Glazing Material Used in Buildings.

4. American Society for Testing and Materials (ASTM):
 - a. A36 - Structural Steel.
 - b. A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - c. A525 - General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
 - d. A526 - Sheet Steel, Zinc Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.
 - e. B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
 - f. B221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
 - g. B308 - Aluminum-Alloy 6061-T6 Standard Structural Shapes, Rolled or Extruded.
 - h. C716 - Installing Lock-Strip Gaskets and Infill Glazing Materials.
 - i. C920 - Elastomeric Joint Sealants.
 - j. E283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors.
 - k. E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
 - l. E331 - Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
 - m. E773 - Test Method for Seal Durability of Sealed Insulating Glass Units.
 - n. E774 - Sealed Insulating Glass Units.
5. Consumer Product Safety Commission (CPSC):
 - a. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.
6. Federal Specifications (FS):
 - a. TT-P-645A Primer, Paint, Zinc Chromate, Alkyd Type.
7. Flat Glass Marketing Association (FGMA):
 - a. Glazing Manual.
8. Steel Structures Painting Council (SSPC):
 - a. SP2 - Hand Tool Cleaning.
 - b. SP3 - Power Tool Cleaning.
 - c. Paint 12 - Cold-Applied Asphalt Mastic (Extra Thick Film).

1.4 BID REQUIREMENTS

- A. If Contractor discovers an apparent conflict or discrepancy between portions of the Contract Documents that appears to be inconsistent or is not reasonably inferred from the intent of the Contract Documents, the Contractor shall include in their bid the most stringent and demanding, or highest cost requirement.
- B. Pre-Bid Exceptions: If, for any reason, you deem the designed system is not appropriate or feasible, submit this concern, proposed modification, qualification and / or exception to the drawings and specifications with your bid proposal.

1.5 SUBMITTALS

- A. In accordance with Section 01 33 00 – Submittal Procedures.
- B. Product Data:
 1. Submit manufacturer's descriptive literature for each manufactured products.
 2. Include information for factory finishes, accessories and other required components.

3. Include color charts for finish indicating manufacturer's standard colors available for selection.
- C. Shop Drawings:
1. Submit drawings indicating elevations, detailed design, dimensions, member profiles, joint locations, arrangement of units, member connections, and thickness of various components.
 2. Show following items:
 - a. Details of special shapes.
 - b. Reinforcing.
 - c. Drainage details and flow diagrams.
 - d. Anchorage system.
 - e. Interfacing with building construction.
 - f. Provisions for system expansion and contraction.
 - g. Thermal breaks.
 3. Indicate glazing details, methods, locations of various types and thickness of glass and internal sealant requirements.
 4. Clearly indicate locations of exposed fasteners and joints for Architect's acceptance.
 5. Clearly show where and how manufacturer's system deviates from Contract Drawings and these Specifications.
- D. Mock-up Drawings: Submit drawings for mock-ups; refer to Section 01430 for mock-up requirements.
- E. Manufacturer's Installation Instructions: Submit manufacturer's printed installation instructions.
- F. Samples:
1. Submit manufactures samples indicating quality of finish [in required colors] on alloys used for work, 12 inches long for extrusions and 6 inches square for sheet materials.
 2. Where normal texture or color variations are expected, include additional samples illustrating range of variation.
- G. Test Reports: Submit certified copies of previous tests reports by independent laboratory substantiating performance of system. Include other supportive data as necessary.
- H. Certificates:
1. Submit manufacturer's certification stating that installed system is in compliance with specified requirements.
- I. Sample Warranty: Sample copy of manufacturer's warranty.
- J. Close-Out Document Submittals
1. Warranty: Signed warranty.
 2. Operations & Maintenance Data: Maintenance instructions.

1.6 QUALITY ASSURANCE

- A. Single Source Responsibility:

1. Provide curtainwall systems that are products of a single manufacturer.
- B. Qualifications:
 1. Engineer Qualifications: Professional Structural Engineer registered in State where Project is located.
 2. Installer Qualifications: Certified in writing by system manufacturer as qualified for specified systems.

1.7 DELIVERY, STORAGE & HANDLING

- A. Protect finished surfaces to prevent damage.
- B. Do not use adhesive papers or sprayed coatings which become firmly bonded when exposed to sun.
- C. Do not leave coating residue on surfaces.
- D. Deliver glass units with manufacturer's labels intact on interior side of glass. Ensure labels indicate glass thickness, unit location, glass strength and orientation of units in vertical position.
- E. Protect glass edges and corners to prevent chipping, cracking, and other similar damages.

1.8 PROJECT CONDITIONS

- A. Ensure ambient and surface temperatures and joint conditions are suitable for installation of materials.

1.9 PERFORMANCE REQUIREMENTS

- A. General Standard: In addition to requirements shown or specified, comply with applicable provisions of Aluminum Curtain Wall Design Guide Manual for design, materials, fabrication and installation of component parts.
- B. Design Requirements:
 1. Metal stick framed systems with interior and exterior exposed metal framing.
 2. System manufacturer shall provide curtainwall systems, including necessary modifications to meet specified requirements and maintaining visual design concepts.
 3. System manufacturer shall provide low profile entrance frames as an integral part of the curtain wall system.
 4. Fabricate glazing systems for interior [exterior] glazing at vision areas and exterior [interior] glazing at spandrel areas.
 5. Perimeter conditions shall allow for installation tolerances, expansion and contraction of adjacent materials, and sealant manufacturer's recommended joint design.
 6. Drawings are diagrammatic and do not purport to identify nor solve problems of thermal or structural movement, glazing, anchorage or moisture disposal.
 7. Requirements shown by details are intended to establish basic dimension of unit, sight lines and profiles of members.

8. Do not assume glass, sealants, and interior finishes contribute to framing member strength, stiffness, or lateral stability.
9. Attachment considerations are to take into account site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening or fracturing connection between units and building structure or between units themselves.
10. Anchors, fasteners and braces shall be structurally stressed not more than 50% of allowable stress when maximum loads are applied.
11. Allow for expansion and contraction due to structural movement without detriment to appearance or performance.
12. System shall drain to exterior face of wall, water entering joints and condensation occurring within system by drain holes and gutters of adequate size to evacuate water without infiltration to interior or top of lower light of glass. No visible weep holes allowed.
13. Provide concealed fastening.
14. Metal faces are required to be visually flat under all lighting conditions, subject to acceptance of Architect.
15. Provide uniform color and profile appearance at components exposed to view.
16. Not Permitted: Vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system.

C. Performance Requirements:

1. Air infiltration: Air leakage shall not exceed 0.03 cfm per square foot of surface area when tested in accordance with ASTM E283 at differential static pressure of 6.24 psf.
2. Water infiltration: No uncontrolled leakage when tested in accordance with ASTM E331 at test pressure of 9.0 psf.

D. Structural Requirements:

1. Wind loading:
 - a. Basic zones:_____.
 - b. Corner zones:_____.
 - c. Parapet zones:_____.
2. Deflection under uniform loading: When tested in accordance with ASTM E330 at design pressure, maximum deflection of exterior member shall not exceed L/175 of span or 3/4 inch or L/240 + 1/4" for spans over 13'-6".
3. Parallel to wall and corner mullion deflections: 75% of glass edge bite or 3/8 inch, whichever is less.
4. Compression flanges of flexural members may be assumed to receive effective lateral bracing only from:
 - a. Anchors to building structure and
 - b. Horizontal glazing rails or interior trim which are in actual contact with compression flange.
5. Do not regard points of contraflexure as lateral braces or as end points of unbraced length; unbraced length is actual distance between effective lateral braces as defined above.
6. Where framing member reaction is resisted by continuous element, maximum assumed effective length of the resisting element is 4 times bearing length, but not more than 12 inches.

- E. Thermal Requirements: Framing systems shall accommodate expansion and contraction movement due to surface temperature differential of 180°F without causing buckling, stress on glass, failure of joint seals, excessive stress on structural elements, reduction of performance or other detrimental effects.
- F. Interface:
 - 1. Furnish inserts and anchoring devices which need to be preset and built into structure to appropriate trade.
 - 2. Supply on timely basis to avoid delay in Work.
 - 3. Instruct other trades of proper location and position.
 - 4. Furnish setting drawings, diagrams, templates and installation instructions.

1.10 COORDINATION

- A. Pre-installation Meeting:
 - 1. Arrange with Construction Manager, Architect and representatives of window and sealant manufacturer to visit Project site before beginning glazing operations to analyze site conditions, and inspect surfaces and joints to be sealed in order that recommendations may be made should adverse conditions exist.
 - 2. Discuss following items:
 - a. Weather conditions under which work will be done.
 - b. Anticipated frequency and extent of joint movement.
 - c. Joint design.
 - d. Glazing procedures.

1.11 WARRANTY

- A. See Section 01 77 00 – Closeout Procedures, for additional close out submittal information.
- B. See Section 01 78 36 – Warranties, for additional warranty requirements.
- C. Provide written warranty in form acceptable to Owner jointly signed by manufacturer, installer and Contractor warranting work to be watertight, free from defective materials, defective workmanship, glass breakage due to defective design, and agreeing to replace components which fail within 1 year from date of Substantial Completion.
- D. Warranty shall cover following:
 - 1. Complete watertight and airtight system installation within specified tolerances.
 - 2. Glass and glazing gaskets will not break or "pop" from frames due to design wind, expansion or contraction movement or structural loading.
 - 3. Glazing sealants and gaskets will remain free from abnormal deterioration or dislocation due to sunlight, weather or oxidation.
- E. Provide written warranty stating organic coating finish will be free from fading more than 10%, chalking, yellowing, peeling, cracking, pitting, corroding or non-uniformity of color, or gloss deterioration beyond manufacturer's descriptive standards for 5 years from date of Substantial Completion and agreeing to promptly correct defects.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Accepted Manufacturers (* indicates the basis of design)
1. Oldcastle (previously Vistawall), Terrell, TX*
 - a. HP-175 -1-3/4" x 4-1/2", 5-1/4", or 6" mullion profile - front set, exterior loaded, thermally broken system; available with butt glazed verticals, as manufactured by Oldcastle. Can accept 1/4", 1", 1-1/4" glazing and variations in between.
 - b. Basis-of-design shall be HP-225 - 2-1/4" x 5", 5-3/4", 7", or 7-1/4" mullion profile - front set, exterior loaded; available with butt glazed verticals, as manufactured by Oldcastle. Can accept 1/4", 1", 1-1/4" glazing and variations in between. For applications where longer and wider spans are encountered and/or greater wind load performance is needed.
 2. EFCO Corporation, Monett, MO
 3. Kawneer Company, Inc., Norcross, GA
 4. TRACO, Cranberry Township, PA
 5. Tubelite, Inc., Reed City, MI
 6. CMI Architectural Products, Inc., Minneapolis, MN
 7. YKK AP
 8. Or Architect approved equal.

2.2 FRAMING MATERIALS AND ACCESSORIES

- A. Aluminum:
1. ASTM B221, alloy 6063-T5 for extrusions; ASTM B209, alloy 5005-H16 for sheets; or other alloys and temper recommended by manufacturer appropriate for specified finish.
 2. Minimum thickness of 0.125 inch for framing members and 0.050 inch for glazing stops and similar components.
- B. Internal Reinforcing:
1. ASTM A36 for carbon steel; or ASTM B308 for structural aluminum.
 2. Shapes and sizes to suit installation.
 3. Shop coat steel components after fabrication with alkyd type zinc chromate primer complying with FS TT-P-645.
- C. Inserts and Anchorage Devices:
1. Manufacturer's standard formed or fabricated assemblies, steel or aluminum, of shapes, plates, bars or tubes.
 2. Hot-dip galvanize steel assemblies after fabrication, comply with ASTM A123, 2.0 ounce minimum coating.
- D. Fasteners:
1. Non-magnetic stainless steel or cadmium plated steel coated with yellow or silver iridescence plating, compatible with materials being fastened.
 2. Series 300 stainless steel for exposed locations. Cadmium plated steel with 0.0005 inch plating thickness and color chromate coated for concealed locations.

3. Provide nuts or washers of design having means to prevent disengagement; deforming of fastener threads is not acceptable.
 4. Provide concealed fasteners wherever possible.
 5. For exposed locations, provide countersunk flathead fasteners with finish matching item fastened.
- E. Expansion Anchor Devices: Lead-shield or toothed-steel, drilled-in, expansion bolt anchors.
- F. Shims: Non-staining, non-ferrous, type as recommended by system manufacturer.
- G. Protective Coatings: Cold applied asphalt mastic complying with SSPC-Paint 12, compounded for 30 mil thickness for each coat; or alkyd type zinc chromate primer complying with FS TT-P-645.
- H. Glazing Gaskets:
1. Compression type design, replaceable, molded or extruded neoprene, polyvinyl chloride (PVC), or ethylene propylene diene monomer (EPDM).
 2. Comply with ASTM C509 or C864.
 3. Profile and hardness as necessary to maintain uniform pressure for watertight seal.
 4. Manufacturer's standard black color.
- I. Internal Sealants: Types recommended by system manufacturer to remain permanently elastic, tacky, non-drying, non-migrating and weathertight.
- J. Curtain Wall Insulation and Fire Safing: Refer to Sections 07210 and 07840.
- K. Spandrel Panels:
1. Type: Aluminum sheet, 1/8 inch thick, suitably reinforced on concealed surface for surface flatness, or prefabricated sandwich panels at manufacturer's option.
 2. Surface flatness: 0.015 inch maximum deviation when measured with 6 inch rule.
 3. Squareness: 0.002 inch maximum for each inch of length at panel edge.
 4. Anchorage: Allow for expansion and contraction, to minimize oilcanning and distortion.

2.3 GLASS AND GLAZING ACCESSORIES

- A. Refer to Section 08800.

2.4 SYSTEM FABRICATION

- A. Take accurate field measurements to verify required dimensions prior to fabrication.
- B. Location of exposed joints are subject to Architect's acceptance.
- C. Fabricate components in accord with approved shop drawings. Remove burrs and ease edges. Shop fabricate to greatest extent practicable to minimize field cutting, splicing, and assembly. Disassemble only to extent necessary for shipping and handling limitations.
- D. Steel Components:
1. Clean surfaces after fabrication and immediately prior to application of primer in accord with SSPC-SP2 or SSPC-SP3 at manufacturer's option.

2. Apply specified shop coat primer in accord with manufacturer's instructions to provide 2.0 minimum dry film thickness.
- E. Fabricate components true to detail and free from defects impairing appearance, strength or durability. [Fabricate custom extrusions indicated and as necessary for complete installation.]
- F. Fabricate components to allow for accurate and rigid fit of joints and corners. Match components carefully ensuring continuity of line and design. Ensure joints and connections will be flush and weathertight. Ensure slip joints make full, tight contact and are weathertight.
- G. Reinforce components as required at anchorage and support points, at joints, and at attachment points for interfacing work.
- H. Provide structural reinforcing within framing members where required to maintain rigidity and accommodate design loads.
- I. Provide holes or slots, deflector plates, internal flashings, and sealants to accommodate internal weep and drainage system.
- J. Head and sill extrusions act as gutter and weep water to exterior; do not penetrate sections with fasteners.
- K. Allow for adequate clearance around perimeter of system to enable proper installation and for thermal movement within system.
- L. Separate dissimilar metals with protective coating or preformed separators to prevent contact and corrosion.
- M. Provide framing members to rigidly glaze spandrel panels and column covers within framing system.
- N. Provide special shapes and filler pieces with tight corners.

2.5 FINISH

- A. Organic Coating high performance fluorocarbon:
 1. Comply with requirements of AAMA 2605.
 2. Surfaces cleaned and given conversion coating pre-treatment prior to application of 0.3 mil dry film thickness of epoxy or acrylic primer following recommendations of finish coat manufacturer.
 3. Finish coat of [50%] [70%] minimum fluorocarbon resin fused to primed surfaces at temperature recommended by manufacturer, 1.0 mil minimum dry film thickness.
 4. Acceptable coatings are Trinar by Akzo Coatings, Inc.; Nubelar by Glidden Company; Fluoroceram by Morton International, Inc.; Duranar by PPG Industries Inc.; and Fluropon by Valspar Corporation.
 5. Provide in either 2, 3, or 4 coat system as required for color selected.
 6. Manufacturer's standard colors as selected by Architect.
- B. Clear Anodized:

1. Conforming to AA-M12C22A31 and AAMA 607.1.
 2. Architectural Class I, etched, medium matte, clear anodic coating, 0.7 mil minimum thickness.
- C. Color Anodized:
1. Conforming to AA-M12C22A42 or A43 or A44 and AAMA 606.1 and 608.1.
 2. Architectural Class [I], etched, medium matte, [black] [dark bronze] [medium bronze] [light bronze] colored anodic coating, 0.7 mil minimum thickness.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions: Verify substrate conditions are acceptable for product installation in accordance with manufacturer's instructions.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions and applicable provisions of AAMA Aluminum Curtain Wall Design Guide Manual.
- B. Align assemblies plumb and level, free of warp or twist, aligning with adjacent Work.
- C. Tolerances:
1. Limit variations from plumb and level:
 - a. 1/8 inch in 20'-0" vertically and horizontally.
 - b. 1/4 inch in 40'-0" either direction.
 2. Limit offsets in theoretical end-to-end and edge-to-edge alignment:
 - a. 1/16 inch where surfaces are flush or less than 1/2 inch out of flush and separated by not more than 2 inches.
 - b. 1/8 inch for surfaces separated by more than 2 inches.
 3. Step in face: 1/16 inch maximum.
 4. Jog in alignment: 1/16 inch maximum.
 5. Location: 1/4 inch maximum deviation of any member at any location.
 6. Tolerances are not accumulative.
- D. Provide attachments and shims to permanently fasten system to building structure.
- E. Anchor securely in place, allowing for required movement, including expansion and contraction.
- F. Separate dissimilar materials at contact points, including metal in contact with masonry or concrete surfaces, with protective coating or preformed separators to prevent contact and electrolytic action.
- G. Set sill members in bed of sealant. Set other members with internal sealants and baffles to provide weathertight construction.
- H. Glazing:

1. Install glazing gaskets and sealants in accordance with manufacturer's instructions without exception, including surface preparations. Refer to Section 08800 for additional requirements.
 - I. Fire Safing and Curtain Wall Insulation:
 1. Install fire safing and curtain wall insulation specified in Section 07210 and 07840.
- 3.3 FIELD QUALITY CONTROL
- A. Field Tests: Independent testing laboratory will perform air infiltration, water infiltration, and] hose test; refer to Section 01411 for requirements.
- 3.4 CLEANING
- A. Clean surfaces in compliance with manufacturer's recommendations; remove excess mastic, mastic smears, and other foreign materials.
 - B. Clean metal surfaces exercising care to avoid damage.

END OF SECTION

SECTION 08 43 00

INTERIOR ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Sections included under Division 0 & Division 1 are included as a part of this Section as though bound herein.
- B. If AIA Document 201 is included in this contract (refer to Section 01 11 00 Summary of Work to verify), it is part of this Section as though bound herein.
- C. Related Sections:
 - 1. Section 01 74 19 – Construction Waste Management
 - 2. Section 07 92 00 – Joint Sealants
 - 3. Section 08 11 16 – Aluminum Doors
 - 4. Section 08 80 00 – Glazing

1.2 SUMMARY

- A. Section includes, but is not limited to:
 - 1. Interior aluminum storefront system, complete with reinforcing, fasteners, shims, anchors, and attachment devices.
 - 2. Interior aluminum storefront system for display cases.
 - 3. Accessories necessary to complete Work.
- B. Products Furnished But Not Installed Under this Section:
 - 1. Inserts and anchoring devices which are to be built into structure.

1.3 REFERENCES

- A. Reference Standards:
 - 1. Aluminum Association (AA):
 - a. DAF-45 Designation System for Aluminum Finishes.
 - 2. American Architectural Manufacturers Association (AAMA):
 - a. 501.2 - Field Check of Metal Curtain Walls for Water Leakage.
 - b. 2605 - Voluntary Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.
 - c. 606.1 - Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum.
 - d. 607.1 - Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.
 - e. 608.1 - Specification and Inspection Methods for Electrolytically Deposited Color Anodic Finishes for Architectural Aluminum.
 - f. 701.2 - Specifications for Pile Weatherstripping.
 - g. Manual #10 - Care and Handling of Architectural Aluminum From Shop to Site.

- h. SFM-1 – Aluminum Storefront and Entrance Manual.
- 3. American National Standards Institute (ANSI):
 - a. Z97.1 - Specifications and Methods of Test for Safety Glazing Material Used in Buildings.
 - b. A117.1 – Safety Standards for the Handicapped.
- 4. American Society for Testing and Materials (ASTM):
 - a. A36 - Structural Steel.
 - b. A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - c. B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
 - d. B221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
 - e. B308 - Aluminum-Alloy 6061-T6 Standard Structural Shapes, Rolled or Extruded.
 - f. E283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors.
 - g. E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
 - h. E331 - Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- 5. Consumer Product Safety Commission (CPSC):
 - a. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.
- 6. Federal Specifications (FS):
 - a. TT-P-641G(1) - Primer Coating, Zinc Dust-Zinc Oxide (For Glaz. Surfaces)
 - b. TT-P-645A - Primer, Paint, Zinc Chromate, Alkyd Type.
- 7. Steel Structures Painting Council (SSPC):
 - a. Paint 12 - Cold-Applied Asphalt Mastic (Extra Thick Film).

1.4 BID REQUIREMENTS

- A. If Contractor discovers an apparent conflict or discrepancy between portions of the Contract Documents that appears to be inconsistent or is not reasonably inferred from the intent of the Contract Documents, the Contractor shall include in their bid the most stringent and demanding, or highest cost requirement.
- B. Pre-Bid Exceptions: If, for any reason, you deem the designed system is not appropriate or feasible, submit this concern, proposed modification, qualification and / or exception to the drawings and specifications with your bid proposal.

1.5 SUBMITTALS

- A. In accordance with Section 01 33 00 – Submittal Procedures.
- B. Product Data:
 - 1. Submit manufacturer's descriptive literature and product specifications.
 - 2. Include information for factory finishes, hardware, accessories, and other required components.
 - 3. Include color charts for finish indicating manufacturer's standard colors available for selection.
- C. Shop Drawings:

1. Submit shop drawings covering fabrication, installation and finish of specified systems.
 2. Include following:
 - a. Fully dimensioned plans and elevations with detail coordination keys.
 - b. Locations of exposed fasteners and joints.
 3. Provide detailed drawings of:
 - a. Composite members.
 - b. Joint connections for framing systems and for entrance doors.
 - c. Anchorage.
 - d. System reinforcements.
 - e. System expansion and contraction provisions.
 - f. Glazing methods and accessories.
 - g. Internal sealant requirements.
 4. Schedule of finishes.
- D. Samples:
1. Submit manufacturers standard samples indicating quality of finish.
 2. Where normal texture or color variations are expected, include additional samples illustrating range of variation.
- E. Test Reports:
1. Standard Systems: Submit certified copies of previous test reports substantiating performance of system in lieu of retesting. Include other supportive data as necessary.
- F. Qualification Data:
1. Submit installer qualifications verifying years of experience.
- G. Manufacturer's Installation Instructions: Submit manufacturer's printed installation instructions.
- H. Sample Warranty: Sample copy of manufacturer's warranty.
- I. Close-Out Document Submittals
1. Warranty: Signed warranty.
 2. Operations & Maintenance Data: Maintenance instructions.

1.6 QUALITY ASSURANCE

- A. Single Source Responsibility:
1. To ensure quality of appearance and performance, obtain materials for systems from either a single manufacturer or from manufacturer approved by systems manufacturer.
- B. Perform Work in accordance with AAMA SFM-1 and manufacturer's written instructions.
- C. Conform to requirements of ANSI A117.1 and local amendments.
- D. Qualifications:

1. Installer Qualifications: Certified in writing by system manufacturer as qualified for installation of specified systems.

1.7 DELIVERY, STORAGE & HANDLING

- A. Protect finished surfaces as necessary to prevent damage.
- B. Do not use adhesive papers or sprayed coatings which become firmly bonded when exposed to sun.
- C. Do not leave coating residue on any surfaces.
- D. Replace damaged units.

1.8 PERFORMANCE REQUIREMENTS

A. Design Requirements:

1. Drawings are diagrammatic and do not purport to identify nor solve problems of thermal or structural movement, glazing, anchorage, or moisture disposal.
2. Requirements shown by details are intended to establish basic dimension of units, sight lines and profiles of members.
3. Provide concealed fastening.
4. Provide entrance and storefront systems, including necessary modifications, to meet specified requirements and maintaining visual design concepts.
5. Attachment considerations are to take into account site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening or fracturing connection between units and building structure or between units themselves.
6. Anchors, fasteners and braces shall be structurally stressed not more than 50% of allowable stress when maximum loads are applied.
7. Provide for expansion and contraction due to structural movement without detriment to appearance or performance.

B. Performance Requirements:

1. Air infiltration: Air leakage through fixed light areas of storefront shall not exceed 0.06 cfm per square foot of surface area when tested in accordance with ASTM E283 at differential static pressure of 6.24 psf.
2. Water infiltration: No uncontrolled leakage when tested in accordance with ASTM E331 at test pressure of 10 psf.

C. Thermal Requirements:

1. Framing systems shall accommodate expansion and contraction movement due to surface temperature differentials of 180°F without causing buckling, stress on glass, failure of joint seals, excessive stress on structural elements, reduction of performance, or other detrimental effects.

D. Structural Requirements, as measured in accordance with ANSI/ASTM E330:

1. Deflection: Maximum calculated deflection of any framing member in direction normal to plane of wall when subjected to specified design pressures for spans up to and including 13'-6" shall be limited to 1/175 of its clear span and for spans

greater than 13'-6" deflection shall be limited to $1/240 + 1/4$ " of its clear span, except that maximum deflection of members supporting plaster surfaces shall not exceed $1/360$ of its span.

- E. Testing Requirements: Provide components that have been previously tested by an independent testing laboratory.

1.9 WARRANTY

- A. See Section 01 77 00 – Closeout Procedures, for additional close out submittal information.
- B. See Section 01 78 36 – Warranties, for additional warranty requirements.
- C. Provide written warranty in form acceptable to Owner jointly signed by manufacturer, installer and Contractor warranting work to be watertight, free from defective materials, defective workmanship, glass breakage due to defective design, and agreeing to replace components which fail within 1 year from date of Substantial Completion.
- D. Warranty shall cover following:
 - 1. Complete watertight and airtight system installation within specified tolerances.
 - 2. System is structurally sound and free from distortion.
- E. Provide written warranty stating anodized finish will be free from abnormal aging or deterioration beyond manufacturer's descriptive standards for two (2) years from date of Substantial Completion and agreeing to promptly correct defects.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Accepted Manufacturers (* indicates the basis of design)
 - 1. Oldcastle (previously Vistawall), Terrell, TX*
 - a. Flush Glazed System, center set, exterior loaded: Series 2000; 1-3/4" x 4-1/2" mullion profile; accommodates 1/4" glazing only.
 - b. Flush Glazed System, center set, exterior loaded: Series 3000; For storefront requiring 1/2" glazing
 - c. These products to be used on interior applications only.
 - 2. Kawneer Company, Inc., Norcross, GA
 - 3. Wausau Metals Corp., Wausau, WI
 - 4. YKK AP
 - 5. Or Architect approved equal.

2.2 FRAMING MATERIALS AND ACCESSORIES

- A. Aluminum:
 - 1. ASTM B221, alloy 6063-T5 for extrusions; ASTM B209, alloy 5005-H16 for sheets; or other alloys and temper recommended by manufacturer appropriate for specified finish.
 - 2. Minimum thickness of 0.078 inch for main framing members.

- B. Internal Reinforcing:
 - 1. ASTM A36 for carbon steel; or ASTM B308 for structural aluminum.
 - 2. Shapes and sizes to suit installation.
 - 3. Steel components factory coated with alkyd type zinc chromate primer complying with FS TT-P-645.
- C. Anchorage Devices:
 - 1. Manufacturer's standard formed or fabricated steel or aluminum assemblies of shapes, plates, bars or tubes.
 - 2. Hot-dip galvanize steel assemblies after fabrication, comply with ASTM A123, 2.0 ounce minimum coating.
- D. Fasteners:
 - 1. Aluminum, non-magnetic stainless steel or other non-corrosive materials compatible with items being fastened.
 - 2. Provide concealed fasteners wherever possible.
 - 3. For exposed locations, provide Phillips flathead screws with finish matching item fastened.
 - 4. For concealed locations, provide manufacturer's standard fasteners.
- E. Expansion Anchor Devices: Lead-shield or toothed-steel, drilled-in, expansion bolt anchors.
- F. Protective Coatings: Cold-applied asphalt mastic complying with SSPC-Paint 12, compounded for 30 mil thickness for each coat; or alkyd type zinc chromate primer complying with FS TT-P-645.
- G. Touch-Up Primer for Galvanized Components: Zinc oxide conforming with FS TT-P-641.
- H. Glazing Gaskets:
 - 1. Compression type design, replaceable, molded or extruded, of neoprene, polyvinyl chloride (PVC), or ethylene propylene diene monomer (EPDM).
 - 2. Profile and hardness as required to maintain uniform pressure for watertight seal.
- I. Internal Sealants and Baffles.

2.3 GLASS AND GLAZING ACCESSORIES

- A. Refer to Section 08800.

2.4 FABRICATION

- A. Coordination of Fabrication:
 - 1. Check actual frame or door openings required in construction work by accurate field measurements before fabrication.
 - 2. Fabricate units to withstand loads which will be applied when system is in place.
- B. General
 - 1. Conceal fasteners wherever possible.
 - 2. Reinforce work as necessary for performance requirements, and for support to structure.

3. Separate dissimilar metals and aluminum in contact with concrete utilizing protective coating or preformed separators which will prevent contact and corrosion.
 4. Comply with Section 08800 for glazing requirements.
- C. Aluminum Framing:
1. Provide members of size, shape and profile indicated, designed to provide for glazing from exterior.
 2. Fabricate frame assemblies with joints straight and tight fitting.
 3. Reinforce internally with structural members as necessary to support design loads.
 4. Maintain accurate relation of planes and angles, with hairline fit of contacting members.
 5. Seal horizontals and direct moisture accumulation to exterior.
 6. Provide flashings and other materials used internally or externally that are corrosive resistant, non-staining, non-bleeding and compatible with adjoining materials.
 7. Provide manufacturer's extrusions and accessories to accommodate expansion and contraction due to temperature changes without detrimental to appearance or performance.
 8. Make provisions in framing for minimum edge clearance, nominal edge cover and nominal pocket width for thickness and type of glazing or infill used in accordance with recommendations of manufacturer and FGMA Glazing Manual.
- D. Welding:
1. Comply with recommendations of the American Welding Society.
 2. Use recommended electrodes and methods to avoid distortion and discoloration.
 3. Grind exposed welds smooth and flush with adjacent surfaces; restore mechanical finish.
- E. Flashings: Form from sheet aluminum with same finish as extruded sections. Material thickness as required to suit condition without deflection or "oilcanning".

2.5 FINISHES

- A. Clear Anodized:
1. Conforming to AA-M12C22A31 and AAMA 607.1.
 2. Architectural Class I, etched, medium matte, clear anodic coating, 0.7 mil minimum thickness.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions: Verify substrate conditions are acceptable for product installation in accordance with manufacturer's instructions.

3.2 INSTALLATION

- A. Erection Tolerances:
1. Limit variations from plumb and level:

- a. 1/8 inch in 10'-0" vertically.
 - b. 1/8 inch in 20'-0" horizontally.
- 2. Limit variations from theoretical locations: 1/4 inch for any member at any location.
- 3. Limit offsets in theoretical end-to-end and edge-to-edge alignment: 1/16 inch from flush surfaces not more than 2 inches apart or out-of-flush by more than 1/4 inch.
- B. Set units plumb, level and true to line, without warp or rack of frame.
- C. Anchor securely in place, allowing for required movement, including expansion and contraction.
- D. Separate dissimilar materials at contact points, including metal in contact with masonry or concrete surfaces, with bituminous paint or preformed separators to prevent contact and corrosion.
- E. Set sill members in bed of sealant. Set other members with internal sealants and baffles to provide weathertight construction.
- F. Coordinate installation of perimeter sealant and backing materials between assemblies and adjacent construction in accordance with requirements of Section 07920.
- G. Glazing: Refer to requirements of Section 08800.

3.3 CLEANING

- A. Clean surfaces in compliance with manufacturer's recommendations; remove excess mastic, mastic smears, foreign materials and other unsightly marks.
- B. Clean metal surfaces exercising care to avoid damage.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Sections included under Division 0 & Division 1 are included as a part of this Section as though bound herein.
- B. If AIA Document 201 is included in this contract (refer to Section 01 11 00 Summary of Work to verify), it is part of this Section as though bound herein.
- C. Related Sections:
 - 1. Section 01 74 19 – Construction Waste Management
 - 2. Section 08 11 13 – Hollow Metal Doors & Frames
 - 3. Section 08 14 29 – Pre-Finished Wood Doors
 - 4. Section 08 16 14 – FRP Doors
 - 5. Section 08 41 13 – Aluminum-Framed Entrances & Storefronts
 - 6. Section 08 43 00 – Aluminum-Framed Storefronts

1.2 SUMMARY

- A. System Description:
 - 1. This section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.
- B. Regarding electrical hardware:
 - 1. Factory wiring diagrams are to be provided for all openings with electrical hardware.
 - 2. The hardware supplier shall supply a written description of the operation of each electrical door as part of their submittals.
 - 3. Electrical hardware shall be provided from the manufacturer of the lock or exit device. No hardware shall be forwarded to a secondary source for modification or electrification.
 - 4. All power transfers shall be supplied with factory wiring inside the hardware (similar to Von Duprin EPT power transfers). No power transfers shall be supplied without the wiring already in the device.
- C. Where new hardware is being furnished for existing doors or for new doors in existing frames, it shall be the responsibility of the hardware supplier to review the existing doors and frames and notify the architect of any problems prior to ordering any materials.

1.3 BID REQUIREMENTS

- A. If Contractor discovers an apparent conflict or discrepancy between portions of the Contract Documents that appears to be inconsistent or is not reasonably inferred from the intent of

the Contract Documents, the Contractor shall include in their bid the most stringent and demanding, or highest cost requirement.

- B. Pre-Bid Exceptions: If, for any reason, you deem the designed system is not appropriate or feasible, submit this concern, proposed modification, qualification and / or exception to the drawings and specifications with your bid proposal.

1.4 SUBMITTALS

- A. In accordance with Section 01 33 00 – Submittal Procedures.
- B. Product Data: Product data including manufacturer's technical product data for each item of door hardware and other information necessary to show compliance with requirements.
- C. Manufacturer's Installation Instructions: Provide manufacturer's installation instructions.
- D. Hardware Schedule: Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
 - a. Type, style, function, size, and finish of each hardware item.
 - b. Name and manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of each hardware set cross referenced to indications on Drawings both on floor plans and in door and frame schedule.
 - e. Explanation of all abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for hardware.
 - g. Door and frame sizes and materials.
 - h. Keying information.
 2. Submittal Sequence: Submit final schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.
- E. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
- F. Templates: Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawing of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- G. Sample Warranty: Sample copy of manufacturer's warranty.
- H. Close-Out Document Submittals
1. Warranty: Signed warranty.

2. Operations & Maintenance Data: Operation & maintenance instructions. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.
3. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

1.5 QUALITY ASSURANCE

- A. The hardware supplier shall be a direct representative for the factories the hardware is being obtained from.
- B. It shall be the responsibility of the hardware supplier to properly size all hardware.
- C. Single Source Responsibility: Obtain each type of hardware from a single manufacturer.
- D. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to Protect tested by UL, Warnock Hersey, FM, or other testing and inspecting organization acceptable to authorities having jurisdiction for use on types and sizes of door indicated in compliance with requirements of fire-rated door and door frame labels.
- E. Qualifications:
 1. Supplier Qualifications: A recognized architectural door hardware supplier that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced architectural hardware consultant who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.
 - a. Require supplier to meet with Owner to finalize keying requirements and to obtain final instructions in writing.

1.6 DELIVERY, STORAGE & HANDLING

- A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.
- B. Packaging of door hardware is the responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set number of approved hardware schedule. Two or more identical sets may be packed in same container.
- C. Inventory door hardware jointly with representative of hardware supplier and hardware installer until each is satisfied that count is correct.
- D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).
- E. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so

that completion of the Work will not be delayed by hardware losses both before and after installation.

- F. Provide a pre-installation meeting with the general contractor reviewing the installation of all hardware.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include but are not limited to, the following:
1. Butts and Hinges:
 - a. McKinney – FBB179
 - b. Hager BB1279 Series
 - c. Stanley
 2. Lock and Latchsets:
 - a. Sargent – 7 Line
 - b. Schlage – AL Series
 - c. Yale
 3. Stops:
 - a. H.B.Ives Company – WS407
 - b. Glynn Johnson Corp.
 - c. Rockwood
 - d. Hager – 236 Series
 4. Overhead Closers:
 - a. LCN – 1461 Series
 - b. Sargent – 1431 Series
 - c. Norton
 5. Kick, Mop, and Armor Plates:
 - a. Rockwood Mfg
 - b. H.B. Ives Company
 - c. Baldwin
 - d. Hager
 6. Overhead Stops:
 - a. Glynn Johnson Corp.
 - b. Sargent
 - c. Rixson
 7. Automatic Door Operators and Wall Actuators:
 - a. LCN
 - b. Sargent
 8. Exit Devices and Accessories:
 - a. Sargent – 38 Series
 - b. Von Duprin – 22 Series
 9. Threshold and Weatherstrip
 - a. National Guard
 - b. Zero
 - c. Pemko
 10. Bifold and Bypass Hardware

- a. Hager
 - b. Lawrence
 - c. Stanley
- 11. Cylinders
 - a. Sargent F1 Keso Cylinders
 - b. Assa

2.2 SCHEDULED HARDWARE

- A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of finish hardware are indicated in the "Hardware Schedule" at the end of this Section. Products are identified by using hardware designation numbers of the following:
 - 1. Manufacturer's Product Designation: The product designation and name of one manufacturer are listed for each hardware type required for the purpose of establishing minimum requirements. Provide either the product designated or, where more than one manufacturer is specified under the Article "Manufacturers" in Part 2 for each hardware type, the comparable product of one of the other manufacturers that complies with requirements.

2.3 MATERIALS AND FABRICATION

- A. Manufacturer's Name Plate: Do not use manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise acceptable to Architect.
 - 1. Manufacturer's identification will be permitted on rim of lock cylinders only.
- B. Base Metals: Produce hardware units of basic metal and forming method indicated using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware unit for finish designations indicated.
- C. Fastener: provide hardware manufactured to conform to published templated, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
- D. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.

2.4 HINGES, BUTTS, AND PIVOTS

- A. Templates: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- B. Screws: Provide Phillips flat-head screws complying with the following requirements:
 - 1. For metal doors and frames install machine screws into drilled and tapped holes.
 - 2. For wood doors and frames install wood screws.
 - 3. For fire-rated wood doors install #12 x 1 1/4-inch (32mm), threaded-to-the-head steel wood screws.

4. Finish screw heads to match surface of hinges or pivots
- C. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 1. Out-Swing Exterior Doors: Nonremovable pins.
 2. Interior Doors: Nonrising pins.
 3. Tips: Flat button and matching plug, finished to match leaves, except where hospital tip (HT) indicated.
- D. Number of Hinges: Provide number of hinges indicated but not less than 3 hinges per door leaf for doors 90 inches (2250mm) or less in height and one additional hinge for each 30 inches (750mm) of additional height.
- E. Fire-Rated Doors: Not less than 3 hinges per door leaf for doors 86 inches (2150mm) or less in height with same rule for additional hinges.

2.5 LOCK CYLINDERS AND KEYING

- A. Keying System: Provide Sargent Keso F1 key system keyed into the existing key system. Contact Cleveland Vicon Company for keying records (216-341-3300). There will be no substitutions allowed for the Sargent Keso cylinders.
 1. Provide a Sargent Key Wizard key management software for this project. Eight hours of training at the owners office shall be provided by the hardware distributor.

2.6 LOCKS, LATCHES, AND BOLTS

- A. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set, unless otherwise indicated.
 1. Provide flat lip strikes for locks with 3-piece, antifriction latch bolts as recommended by manufacturer.
 2. Provide extra long strike lips for locks used on frames with applied wood casing trim.
 3. Provide recess type top strikes for bolts locking into head frames, unless otherwise indicated.
- B. Lock Throw: Provide 5/8-inch (16mm) minimum throw of latch on pairs of doors. Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.
 1. Provide 1/2-inch (13mm) minimum throw of latch for other bored and preassembled types of locks and 3/4-inch (19mm) minimum throw of latch for mortise locks. Provide 1-inch (25mm) minimum throw for all dead bolts.
- C. Flush Bolt Heads: Minimum of 1/2-inch (13mm) diameter rods of brass, bronze, or stainless steel with minimum 12-inch (300mm) long rod for doors up to 84 inches (2100mm) in heights. Provide longer rods as necessary for doors exceeding 84 inches (2100mm) in height.
- D. Exit Device Dogging: Except on fire-rated doors where closers are provided on doors equipped with exit devices, equip the unit with keyed cylinder dogging device to keep the latch bolt retracted, when engaged. Dogging with an allen wrench will not be acceptable.

2.7 PUSH/PULL UNITS

- A. Exposed Fasteners: Provide manufacturer's standard exposed fasteners for installation, thru-bolted for matched pairs but not for single units.
- B. Concealed Fasteners: Provide manufacturer's special concealed fastener system for installation, thru-bolted for matched pairs but not for single units.

2.8 CLOSERS AND DOOR CONTROL DEVICES

- A. Size of Units: Except as otherwise specifically indicated, comply with the manufacturer's recommendations for size of door control unit depending on size of door, exposure to weather, and anticipated frequency of use.
 - 1. Where parallel arms are indicated for closers, provide closer unit one size larger than recommended for use with standard arms.
 - 2. Provide parallel arms for all overhead closers, except as otherwise indicated.
- B. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped, provide adjustable units complying with ANSI A117.1 provisions for door opening force and delayed action closing.
- C. Combination Door Closers and Holders: Provide units designed to hold door in open position under normal usage and to release and close door automatically under fire conditions. Incorporate an integral electromagnetic holder mechanism designed for use with UL listed fire detectors, provided with normally closed switching contacts.

2.9 DOOR TRIM UNITS

- A. Fasteners: Provide manufacturer's standard exposed fasteners for door trim units consisting of either machine screws or self-tapping screws.
- B. Fabricate edge trim of stainless steel to fit door thickness in standard lengths or to match height of protection plates.
- C. Fabricate protection plates not more than 2 inches less than door width on the push side by the height indicated.
 - 1. Metal Plates: Stainless steel, .050 (U.S. 16 gage) (1.6mm).

2.10 HARDWARE FINISHES

- A. Match items to the manufacturer's standard color and texture finish for the latch and lock sets (for push-pull units if no latch or lock sets).
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.
- C. The designations used in schedules and elsewhere to indicate hardware finishes are the industry recognized standard commercial finishes, except as otherwise noted.
 - 1. Rust-Resistant Finish: For iron and steel base metal required for exterior work and in areas shown as "High Humidity" areas (and also when designed with the suffix-

RR), provide 0.2ml (0.005mm) thick copper coating on base metal before applying brass, bronze, nickel, or chromium plated finishes.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Mount hardware units at heights indicated in following applicable publication, except as specifically indicated or required to comply with governing regulation and except as otherwise directed by Architect.
 - 1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
- B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Section. Do not install surface mounted items until finishes have been completed on the substrates involved.
- C. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- E. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 Section "Joint Sealers."
- F. Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

3.2 ADJUSTING, CLEANING, AND DEMONSTRATING

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Instruct Owner's personnel in proper adjustment and maintenance of door hardware and hardware finishes.

3.3 HARDWARE SCHEDULE

- A. General: Provide hardware for each door to comply with requirements of Section "Door Hardware," hardware set numbers indicated in door schedule, and in the following schedule of hardware sets.
- B. PROJECT OPENING/DOOR SCHEDULE:

DOORS, FRAMES & FINISH HARDWARE

Distributed By:



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Date: July 2, 2024

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Opening List

Opening	Hdw Set	Hdw Heading	Opening Label	Door Type	Frame Type
100	02	02			
102A	06	06			
102B	06	06			
103	05	05			
104	05	05			
105	05	05			
106	04	04			
107	04	04			
108A	04	04			
108B	05	05			
108C	04	04			
109	08	08			
110	07	07			
111	07	07			
112	04	04			
112.1	10	10			
113	08	08			
115	04	04			
116.1	08	08			
116.2	08	08			
117	04	04			
118.1	09	09			
118.2	09	09			
119	08	08			
121	09	09			
122	04	04			
123.1	10	10			
124	10	10			
124A	08	08			
124B	05	05			
124C	08	08			
124D	08	08			
125	08	08			
126	08	08			
EXT-1	01	01			
EXT-4	03	03			
EXT-6	03	03			
EXT-9	03	03			
EXXT-10	01	01			

Manufacturer List

Code	Name
HA	Hager
IV	Ives

Code	Name
LC	LCN Closers
NA	National Guard
NOTE	Job Note
PREP	Job Note
SC	Schlage
VO	Von Duprin

Hardware Schedule

Heading #01

1 Pair Doors #EXT-1

1 Pair Doors #EXXT-10

B2	14 Hinges	5BB1 4 1/2 x 4 1/2 NRP	F-BLK	IV
B3	2 Hinges	5BB1 4 1/2 x 4 1/2 TW8	F-BLK	IV
ED1	2 Exit Device	CD 9927EO ER-12-88	315	VO
ED2	2 Exit Device	QEL 9927L x 996L-R&V ER-12-88	SPBLK, 315	VO
CY1	2 Rim Cylinder	20-057	622	SC
CY2	2 Mortise Cylinder	20-091	622	SC
CL2	4 Closer	4040XP CUSH TBSRT	622	LC
DP1	4 Adapter Plate	4040XP-18PA	622	LC
N2	2 Note(By Others)	CARD READER BY OTHERS		PREP
PS1	2 Power Supply	PS904 900-4RL-FA		VO
N1	2 Note(By Others)	GASKETING BY DOOR SUPPLIER		NOTE
DS1	4 Door Sweep	200 NBLA 36"		NA
T2	2 Saddle Threshold	425 72" PA	AL	NA

Heading #02

1 Pair Doors #100

B2	7 Hinges	5BB1 4 1/2 x 4 1/2 NRP	F-BLK	IV
B3	1 Hinges	5BB1 4 1/2 x 4 1/2 TW8	F-BLK	IV
ED1	1 Exit Device	CD 9927EO ER-12-88	315	VO
ED2	1 Exit Device	QEL 9927L x 996L-R&V ER-12-88	SPBLK, 315	VO
CY1	1 Rim Cylinder	20-057	622	SC
CY2	1 Mortise Cylinder	20-091	622	SC
CL2	2 Closer	4040XP CUSH TBSRT	622	LC
DP1	2 Adapter Plate	4040XP-18PA	622	LC
N2	1 Note(By Others)	CARD READER BY OTHERS		PREP
PS1	1 Power Supply	PS904 900-4RL-FA		VO

Heading #03

1 Single Door #EXT-4

1 Single Door #EXT-6

1 Single Door #EXT-9

B2	9 Hinges	5BB1 4 1/2 x 4 1/2 NRP	F-BLK	IV
B3	3 Hinges	5BB1 4 1/2 x 4 1/2 TW8	F-BLK	IV
ED3	3 Exit Device	QEL 99L x 996L-R&V	US19, 315	VO
CY1	3 Rim Cylinder	20-057	622	SC
CL2	3 Closer	4040XP CUSH TBSRT	622	LC
DP1	3 Adapter Plate	4040XP-18PA	622	LC
N2	3 Note(By Others)	CARD READER BY OTHERS		PREP
PS1	3 Power Supply	PS904 900-4RL-FA		VO
N1	3 Note(By Others)	GASKETING BY DOOR SUPPLIER		NOTE
DS1	3 Door Sweep	200 NBLA 36"		NA
T1	3 Saddle Threshold	425 36" PA	AL	NA

Heading #04

- 1 Single Door #106
- 1 Single Door #107
- 1 Single Door #108A
- 1 Single Door #108C
- 1 Single Door #112
- 1 Single Door #115
- 1 Single Door #117
- 1 Single Door #122

B1	24 Hinges	5BB1 4 1/2 x 4 1/2	652	IV
L71	8 Mortise Classroom Lockset	L9071R 06A	626	SC
WS1	8 Wall Stop	WS406/407CVX	US26D	IV

Heading #05

- 1 Single Door #103
- 1 Single Door #104
- 1 Single Door #105
- 1 Single Door #108B
- 1 Single Door #124B

B1	15 Hinges	5BB1 4 1/2 x 4 1/2	652	IV
L50	5 Mortise Entrance Lockset	L9050R 06A	626	SC
WS1	5 Wall Stop	WS406/407CVX	US26D	IV

Heading #06

- 1 Single Door #102A
- 1 Single Door #102B

B1	6 Hinges	5BB1 4 1/2 x 4 1/2	652	IV
L70	2 Mortise Classroom Lockset	L9070R 06A	626	SC
CL1	2 Closer	4040XP HWPB TBSRT	AL	LC
WS1	2 Wall Stop	WS406/407CVX	US26D	IV

Heading #07

- 1 Single Door #110
- 1 Single Door #111

B1	6 Hinges	5BB1 4 1/2 x 4 1/2	652	IV
PH1	2 Push Plate	30S 3 1/2 X 15	US32D	HA
PL1	2 Pull Plate	33G 3 1/2 X 15	US32D	HA
CL1	2 Closer	4040XP HWPB TBSRT	AL	LC
KP1	2 Protection Plate	8400 8" X 34"	US32D	IV
WS1	2 Wall Stop	WS406/407CVX	US26D	IV

Heading #08

- 1 Single Door #109
- 1 Single Door #113
- 1 Single Door #116.1
- 1 Single Door #116.2
- 1 Single Door #119
- 1 Single Door #124A
- 1 Single Door #124C
- 1 Single Door #124D
- 1 Single Door #125
- 1 Single Door #126

B1	30 Hinges	5BB1 4 1/2 x 4 1/2	652	IV
L80	10 Mortise Storeroom Lockset	L9080R 06A	626	SC
CL1	10 Closer	4040XP HWPB TBSRT	AL	LC
WS1	10 Wall Stop	WS406/407CVX	US26D	IV

Heading #09

- 1 Single Door #118.1
- 1 Single Door #118.2
- 1 Single Door #121

B1	9 Hinges	5BB1 4 1/2 x 4 1/2	652	IV
FB1	6 Flush Bolt	282D	US26D	HA
L80	3 Mortise Storeroom Lockset	L9080R 06A	626	SC
CL1	3 Closer	4040XP HWPB TBSRT	AL	LC
WS1	3 Wall Stop	WS406/407CVX	US26D	IV
DPS1	3 Dust Proof Strike	280X	US26D	HA

Heading #10

- 1 Pair Doors #112.1
- 1 Pair Doors #123.1
- 1 Pair Doors #124

B1	18 Hinges	5BB1 4 1/2 x 4 1/2	652	IV
FB2	3 Set Latching Flush Bolts	293D	US32D	HA
L71	3 Mortise Classroom Lockset	L9071R 06A	626	SC
CL1	6 Closer	4040XP HWPB TBSRT	AL	LC
WS1	6 Wall Stop	WS406/407CVX	US26D	IV

Hardware List

Mfg	Short Code	Short Description	Product Number	Finish
HA	FB1	Flush Bolt	282D	US26D
	FB2	Set Latching Flush Bolts	293D	US32D
	PL1	Pull Plate	33G 3 1/2 X 15	US32D
	PH1	Push Plate	30S 3 1/2 X 15	US32D
	DPS1	Dust Proof Strike	280X	US26D
IV	B1	Hinges	5BB1 4 1/2 x 4 1/2	652
	B2	Hinges	5BB1 4 1/2 x 4 1/2 NRP	F-BLK
	B3	Hinges	5BB1 4 1/2 x 4 1/2 TW8	F-BLK
	KP1	Protection Plate	8400 8" X 34"	US32D
	WS1	Wall Stop	WS406/407CVX	US26D
LC	DP1	Adapter Plate	4040XP-18PA	622
	CL2	Closer	4040XP CUSH TBSRT	622
	CL1	Closer	4040XP HWPB TBSRT	AL
NA	DS1	Door Sweep	200 NBLA 36"	
	T1	Saddle Threshold	425 36" PA	AL
	T2	Saddle Threshold	425 72" PA	AL
NOTE	N1	Note	GASKETING BY DOOR SUPPLIER	
PREP	N2	Note	CARD READER BY OTHERS	
SC	L70	Mortise Classroom Lockset	L9070R 06A	626
	L71	Mortise Classroom Lockset	L9071R 06A	626
	L50	Mortise Entrance Lockset	L9050R 06A	626
	L80	Mortise Storeroom Lockset	L9080R 06A	626
	CY2	Mortise Cylinder	20-091	622
	CY1	Rim Cylinder	20-057	622
VO	ED1	Exit Device	CD 9927EO ER-12-88	315
	ED2	Exit Device	QEL 9927L x 996L-R&V ER-12-88	SPBLK, 315
	ED3	Exit Device	QEL 99L x 996L-R&V	US19, 315
	PS1	Power Supply	PS904 900-4RL-FA	

Image Reference: HA280X PROD



Image Reference: HA293D PROD



33G

Pull Plate
Square Corner
30S Plate, 3G Pull

Note:

- Pull Plate
- Aluminum, Brass, Bronze, Stainless Steel
- Square Corner
- 30S Plate
- 3G Pull

Image Reference: HA33G DOORPULL



PRODUCT SPECIFICATIONS

GAUGE:

- 0.050" (1.3 mm)

STANDARD SIZES:

- 3" x 12" (76 mm x 305 mm)
- 3-1/2" x 15" (89 mm x 381 mm)
- 4" x 16" (102 mm x 406 mm)
- 6" x 16" (152 mm x 406 mm)
- 8" x 16" (203 mm x 406 mm)

FINISHES:

- US3, US4, US10, US10B, US26, US26D, US28, US32, US32D

CERTIFICATIONS:

- Meets ANSI A156.6 for J405 Pull Plate

FASTENERS:

- #6 x 5/8" OPH tapping screws
- 2 each 1/4-20 x 2.25" Flat Phillips Head Machine bolts with finish washers

Image Reference: HAHD FLOOR STOP 280X



280X

Dust Proof Strike

Certification: Meets ANSI A156.16 for L04021
 Face Plate: 1-7/16" x 2-29/32" x 1/8" depth (37 mm x 74 mm x 3 mm)
 Barrel Diameter: 1" (25 mm)
 Barrel Depth: 2-3/16" (56 mm)
 Plunger Diameter: 3/4" (19 mm)
 Materials: Brass
 Finishes: US3, US4, US9, US10, US10B, US15, US15A, US19, US26, US26D
 Fasteners: Two (2) #8 x 1" FPHWS, two (2) plastic anchors, and spanner wrench
 Notes:

- Packed unassembled with plate, strike, fasteners, and spanner wrench
- May be used with carpet or threshold application by omitting face plate
- Designed for use with the bottom bolt of a flushbolt set
- Spring loaded plunger returns to floor or threshold level anytime flushbolt is retracted, eliminating the need to clean out the bottom strike

Image Reference: HAHD FLOOR STOP 282D



282D

Manual Flush Bolt

Certification:

- Fits ANSI A115 door and frame prep
- Meets ANSI A156.16 for L14251

 Face Plate: 1" x 6-3/4" (25 mm x 172 mm)
 Bolt Head: 1/2" (13 mm) square
 Bolt Throw: 3/4" (19 mm)
 Standard Rod Length: 12" (305 mm) (center of face to corner of door)
 Bolt Backset: 3/4" (19 mm)
 Mortise Strike: 15/16" x 2-1/4" (24 mm x 57 mm)
 Materials: Brass faceplate with steel components
 Finishes: US3, US4, US5, US9, US10, US10B, US15, US15A, US19, US26, US26D
 Fasteners: Eight (8) #8 x 3/4" combo screws; eight (8) #8 x 1-1/2" combo screws
 Notes:

- For use on hollow metal/fire-rated doors
- Non-handed
- Bolt head rods are adjustable
- Sold in increments of two
- 3 hour fire rating for metal doors up to 4 feet wide by 10 feet tall
- 282S strike plate bag and 282P bolt head available
- Specify 282R for optional rod length of 18" (457 mm), 25" (635 mm), or 30" (762 mm) (bolt head not included)

Image Reference: HAPUSH PLATE 30S A30S



30S | A30S

Square Corner - Beveled Push Plate

Certification: Meets ANSI A156.6 for J301 Push Plate
 Gauge:

- 30S - 0.050" (1.3 mm)
- A30S - 0.062" (1.6 mm)

 Materials: Aluminum, brass, bronze, stainless steel
 Finishes: US3, US4, US10, US10B, US26, US26D, US28, US32, US32D
 Fasteners: Six (6) #6 x 5/8" OPH tapping screws
 Options: May be ordered cut for cylinder (CFC) or engraved "PUSH"
 Notes: For sizes or finishes not listed in this catalog, contact Hager Customer Service for availability

Available in Sizes					
Inches	3 x 12	3-1/2 x 15	4 x 16	6 x 16	8 x 16
Millimeters	76 x 305	89 x 38	102 x 406	152 x 406	203 x 406

Image Reference: IV5BB1 OPTIONS

Options

NRP	Non-removable pin	TW4	Four wire
HT	Hospital tip	TW4M*	Four wire with monitor
SH	Security stud - comes standard with NRP	TW8	Eight wire
RC-¹/₄, RC-⁵/₈	Rounded corners	TW8M*	Eight wire with monitor
SEC	Security fasteners - pin-in-socket	TW12	Twelve wire
		MON*	Monitor (not available on 4x4)

*TW and MON options are not available on 3.5 x 3.5.

Image Reference: IV5BB1 PROD



5BB1

5 Knuckle, ball bearing full mortise hinge

- Recommended for medium weight doors (<150 lbs)
- Recommended for medium frequency usage (<400 cycles per day)
- Made with two ball bearing assemblies
- Recommended for use with a door closer
- Packed with fasteners for hollow metal and wood doors
 - 12-24 x 1 1/2 UFPHMS, 12 x 1 1/4 FPHWS
 - 10-24 x 1 1/2 UFPHMS, 10 x 1 FPHWS (3.5x3.5 hinge size only)

Specifications

Material substrate	Made from brass, 1040 steel or 304 series stainless steel
Certifications	▪ Certified to ANSI/BHMA A156.1 for performance standards ▪ Meets ANSI/BHMA 156.7 for template hinge dimensions ▪ UL Classified for windstorm rated assemblies - R37965 ▪ UL10C Listed (3 hour)



Image Reference: IV8400 8402 PROD

8400 / 8402

**Commercial protection plates
(UL and non-UL models)**

- All plates, metal and plastic, come standard with four beveled edges and countersunk mounting holes (B-CS)
- Protection plates must be ordered in 1/2" increments. Available in other sizes, consult customer service
- For 8402 UL Plates, UL mark appears in upper left corner. Not available on plastic protection plates (special cutouts are not allowed on UL kick plates)

Specifications

Material substrate	▪ Available in .050" thick brass, stainless steel or aluminum; and 1/8" thick high impact polyethylene in clear or black ▪ Aluminum 5005 Series, brass C26800 Series, stainless steel 300 Series, plastic
Mounting hardware	▪ Standard mounting package, 16 per pack - #6 x 5/8" Oval head screws ▪ Optional TEK/TORX package, specify TK-TX - #6 x 5/8" Self-drilling, self-tapping screws - #6 x 5/8 5/8" Torx screws
Certifications	▪ Meets ANSI/BHMA A156.6 for J301 ▪ UL protection plates certified to UL10C



WS406CVX and WS407CVX

Image Reference: IVWS406 WS407CVX WS407CCV SPEC

WS406, WS407CVX / WS406, WS407CCV

Wall bumpers (convex and concave models)

- Constructed in sturdy yet economical wrought base of brass or stainless steel construction
- Feature concealed tamper-proof mounting
- Shipped factory preassembled backplate to reduce installation cost
- Easy installation by inserting screwdriver through small hole in rubber
- WS406/407CVX – convex rubber bumper, packed with fasteners for drywall/wood applications
- WS406/407CCV – concave rubber bumper which avoids damage to locks with projecting buttons, packed with fasteners for drywall/wood applications

Specifications

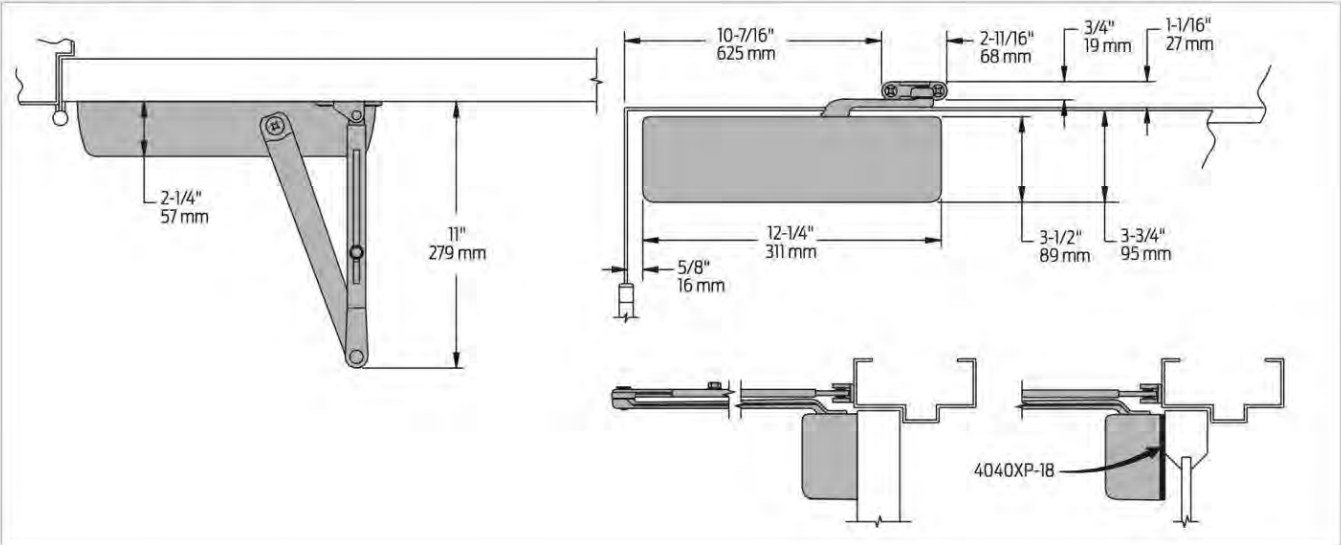
Material substrate	Made from brass and stainless steel
Certifications	▪ WS406/407CVX Meets ANSI/BHMA 156.16, L22201 for brass and L52201 for stainless steel ▪ WS406/407CCV Meets ANSI/BHMA 156.16, L22251 for brass and L52251 for stainless steel

Dimensions

Base diameter	Base thickness	Overall projection
2 1/2"	3/8"	1"

Image Reference: LC4040XP HINGE PULL SIDE DIMS

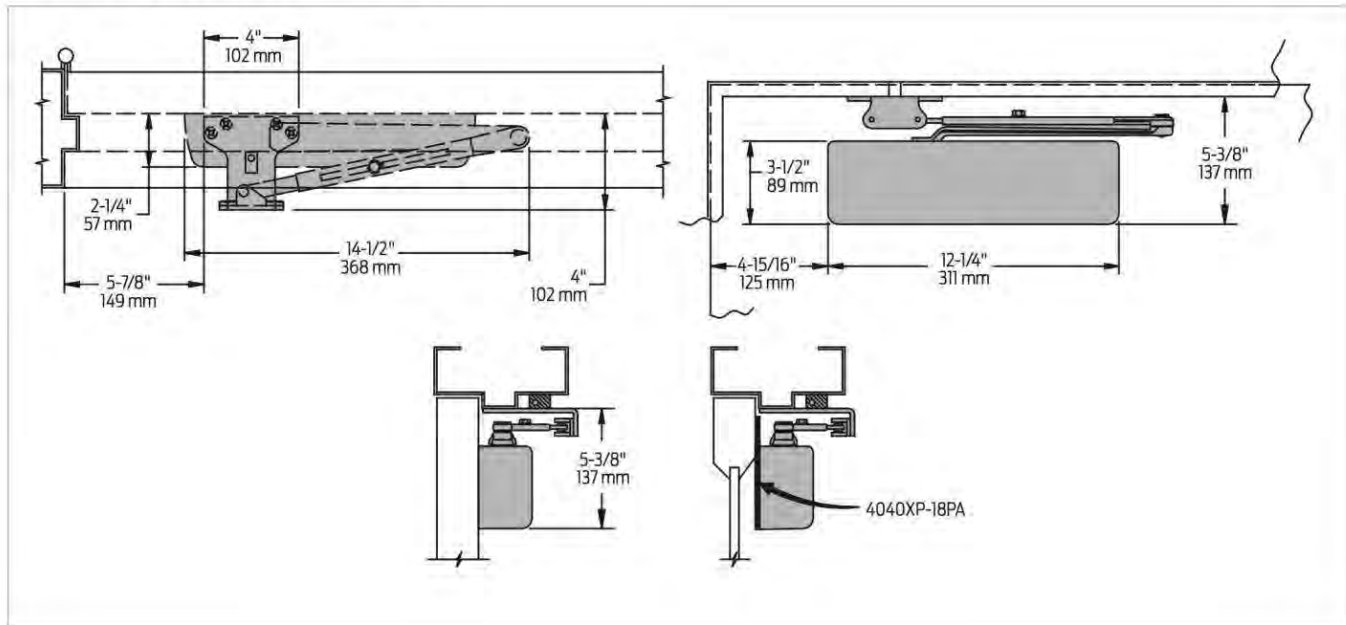
Hinge (pull) side mounting



Butt hinges	Should not exceed 5" (127 mm) in width
Auxiliary stop	Recommended at hold open point or where a door cannot swing beyond 120°
Reveal	Should not exceed 3/4" (19 mm) for Regular or Hold Open Arm
Top rail	Less than 3 3/4" (95 mm) requires plate, 4040XP-18; Plate requires 2" (51 mm) minimum
Clearance	2 3/8" (60 mm) behind door required for 90° installation
Delay action	▪ Incorporates standard 4041 cylinder ▪ Delays closing from 120° to 70° ▪ Delay time adjustable up to approximately 1 minute
Maximum opening	▪ Templating allows up to 120° ▪ Hold open points 90° up to 120° with Hold Open Arm

Image Reference: LC4040XP PAR ARM PUSH SIDE DIMS

Parallel arm (push) side mounting



Butt hinges	Should not exceed 5" (127 mm) in width
Auxiliary stop	Recommended at hold open point, where the door cannot swing 180°, or where Cush-n-Stop Arm is not used
Reveal	Should not exceed 7/32" (6 mm)
Top rail	Less than 5 3/8" (137 mm) measured from the stop requires plate, 4040XP-18PA. Plate requires 2" (51 mm) minimum from the stop.
Head frame	Flush or rabbetted requires PA shoe adapter, 4040XP-419
Stop width	Minimum 1" (25 mm). CUSH arm requires minimum 1 1/2" (38 mm)
Blade stop	Clearance requires 1/2" (13mm) blade stop spacer, 4040XP-61
Clearance	4040XP-62PA shoe is 4" (102 mm) from door face - EDA shoe projects 5 1/2" (140 mm) from door face - CUSH shoe projects 6" (152 mm) from door face
Delay action	- Incorporates standard 4041 cylinder, without XP cylinder - Delays closing from 120° to 70° - Delay time adjustable up to approximately 1 minute
Maximum opening	180° opening/hold open points with all except CUSH arms 110° opening/hold open with CUSH arms

Notes:

- Optional mounting requires PA shoe, 4040XP-62PA for regular or Hold Open Arms
- Add prefix "P" to closer description (eg. P4040XP)
- P4040XP closer includes 4040XP-201 fifth hole spacer to support PA shoe

Image Reference: LC4040XP SERIES 18PA PART



4040XP-18PA
Plate

- Required for parallel arm mounting where top rail is less than 5 1/2" (140 mm), measured from the stop
- Requires 2" (51 mm) minimum top rail

Image Reference: LC4040XP SERIES FEATS

Features

Certifications	Grade 1 - ANSI A156.4, UL 10C, ADA, 100 hour salt spray, meets BAA - Buy American Act
Body construction	▪ Patent-pending positive stop ▪ Patent-pending regulation valve indicators ▪ Independent speed adjustments ▪ QR code for instructions and support ▪ Cast iron body ▪ Full complement bearing ▪ 1 1/2" diameter piston ▪ Double heat treated pinion journal
Fluid	All weather liquid X fluid
Handing	Non-handed
Templating	Peel-n-Stick templates - 2 1/4" x 5" mounting hole pattern
Size	Adjustable spring size 1-6, includes LCN Green Dial
Warranty	30 years

Cover	▪ Redesigned snap-fit plastic cover (PC) with improved retention fit, standard ▪ Metal Cover (MC), optional
Fasteners	Self reaming and tapping screws (SRT)
Mounting	Hinge (pull side), top jamb (push side), parallel arm (push side)
Arms	Regular arm
Finishes/colors/ powder coat	▪ 622 Matte black ▪ 689 Aluminum ▪ 690 Statuary bronze ▪ 691 Light bronze ▪ 693 Black ▪ 695 Dark bronze ▪ 696 Brass ▪ Custom colors optional ▪ Optional SRI primer - powder coat only ▪ Optional plated finishes

Image Reference: LC4040XP SERIES PROD



Image Reference: LC4040XP spec



The 4040XP is LCN's most durable and flexible heavy duty closer designed for institutional and other demanding high traffic applications.

Certifications	Grade 1 - ANSI A156.4, UL 10C, ADA, 100 Hour Salt Spray, Meets BAA - Buy American Act	Cover	Plastic, Standard Metal, Optional
Body Construction	Cast Iron Body Full Complement Bearings 1-1/2" Diameter Piston 3/4" Diameter Double Heat Treated Pinion Journal	Fasteners	Self Reaming and Tapping Screws (SRT)
Fluid	All Weather Liquid X Fluid	Mounting	Hinge (Pull Side), Top Jamb (Push Side), Parallel Arm (Push Side)
Handing	Non-Handed	Arms	Regular Arm
Templating	Peel-n-Stick templates - 2-1/4" x 5" Mounting Hole Pattern	Finishes/Colors/ Powder Coat	Aluminum (689) Statuary Bronze (690) Light Bronze (691) Black (693) Dark Bronze (695) Brass (696) Custom colors optional Optional SRI primer - powder coat only Optional plated finishes
Size	Adjustable Spring Size 1-6, includes Patented Green Dial		
Warranty	30 years		

**Special
Templates**

Customized installation templates or products may be available to solve unusual applications. Contact LCN Product Support for assistance.

MOUNTING	FINISH	COVER	CYLINDER	*ARM FUNCTION
HINGE (PULL SIDE) TOP JAMB (PULL) TOP JAMB (PUSH) PARALLEL ARM STOP FACE	POWDER COAT PLATED PLASTIC METAL	NON-HANDED NON-SIZED ACCESSIBILITY DELAYED ACTION*** AVB**	180° 180° 180° 110° 110°	REGULAR (DOUBLE) STANDARD (SINGLE) HOLD-OPEN FUSIBLE LINK EDA/MEDA CUSH/HCUSH SCUSH/HCUSH DOUBLE EGRESS

● AVAILABLE
○ NOT AVAILABLE

Closer available with less than 5.0 lbs. opening force on 36" door.
* Maximum opening/hold-open point with standard template.
** Advanced Variable Backcheck.
*** Delay feature incorporates standard 4040 cylinder (not XP).

Image Reference: LCSEX-BOLT

Fasteners



Image Reference: NA200NB NEOPRENE SWEEP

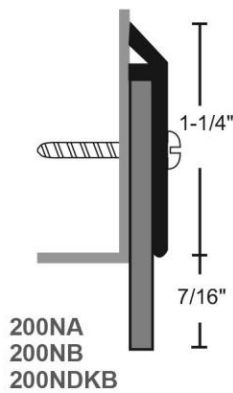
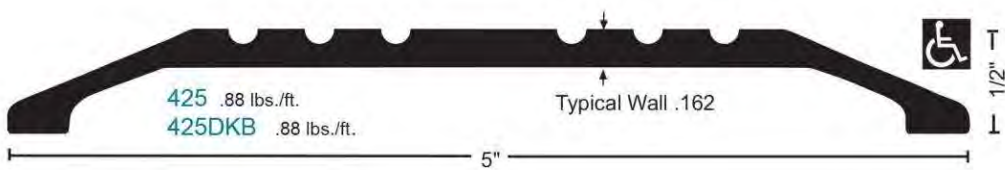
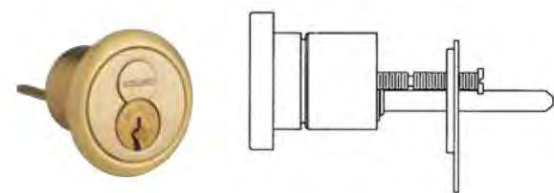


Image Reference: NA425 SADDLE THRESHOLD



Full size interchangeable core cylinders
for exit devices, aluminum door, etc.



Interchangeable core rim cylinders for exit devices	
Number	Core mechanism
20-057	Conventional core
20-757	Primus core
20-757-XP	Primus XP core
20-079	Housing only, less core

Available in 605, 606, 609, 612, 613, 619, 625, 626, and 643e finish.



Cylinders for Adams Rite MS and 4700 Series Lori 4500 Series and Corbin Russwin DL3000 Series		
Number	Core mechanism	Collar
26-098	Conventional core	Compression ring & spring
20-062	Conventional core	$\frac{3}{16}$ " + $\frac{3}{8}$ " blocking rings
20-766	Primus core	$\frac{3}{16}$ " + $\frac{3}{8}$ " blocking rings
20-766-XP	Primus XP core	$\frac{3}{16}$ " + $\frac{3}{8}$ " blocking rings
20-060	Housing less core	None

These cylinders include set screw pack B220-050 for Adams Rite locks.



K510-711
Adams Rite
MS cam

Cylinders for Adams Rite 4070 Series deadlocks		
Number	Core mechanism	Collar
20-091	Conventional core	$\frac{3}{16}$ " + $\frac{3}{8}$ " blocking rings
20-722	Primus core	$\frac{3}{16}$ " + $\frac{3}{8}$ " blocking rings
20-722-XP	Primus XP core	$\frac{3}{16}$ " + $\frac{3}{8}$ " blocking rings
20-090	Housing less core	None



B520-378
Adams Rite
4070 cam

Notes 1. Mortise cylinders available 605, 606, 609, 612, 613, 619, 625, 626, and 643e finish. Cores furnished 606 and 626 only.
2. To differentiate between Classic and Everest 29, specify keyway. Example: C or CP (Classic), S123 (Everest 29).
3. All cylinders are 1 1/2" long.
4. Specify LKB if 0-bitted Primus XP cylinders are required less key blanks.

Image Reference: SCL SERIES 06 LEVER



Image Reference: SCL SERIES A ROSE

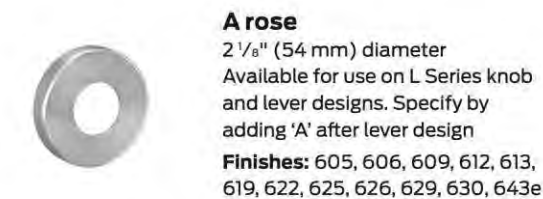


Image Reference: SCL SERIES L9050 FUNCT

Schlage	ANSI
L9050	F04
LV9050	

Office and inner entry lock

- Latchbolt retracted by lever/knob from either side unless outside lever is locked by key or thumbturn
- With outside locked, latchbolt retracted by key or inside lever
- Outside lever locked until unlocked by thumbturn or key
- Auxiliary latch deadlocks latchbolt when door is closed
- Inside lever always free for immediate egress

Image of a Schlage L9050 lock cylinder and handle assembly. The handle is a vertical lever with a thumbturn on the inside. To the left of the handle is a small image of the lock cylinder.

L mechanical



Applications

The Schlage L Series has long been the benchmark for mortise locks. Beyond strength and security – it offers tremendous flexibility to allow it to meet the needs of most every application.

The ability to suite across electronic, tubular, exit trim, and multi-point locks allows the Schlage L Series mortise lock to integrate seamlessly into any environment.

Key features

- Exceeds ANSI/BHMA Grade 1 operational and security standards
- Expansive list of configurations and options, including retrofit indicators
- 50 standard mechanical functions, custom functions also offered
- “The Original” universal lock case allows creation of 10 functions from a single lock body
- 14 finishes and 33 levers, two knobs, five roses and three escutcheon designs
- Supports standard, SFIC and FSIC cylinder formats
- Multiple key systems available – open, patented, restricted, geographic exclusive, UL 437

L mechanical and L wired electrified		LM9200	LM9300
Chassis			
Case material	CRS with zinc dichromate plating		
Case size	L9000 Series: 4 7/16" x 6 1/16" x 1" (113 mm x 154 mm x 25 mm) L400 Series: 4 7/16" x 3 5/8" x 1" (113 mm x 92 mm x 25 mm)	4 7/16" x 12 19/32" X 1" (113 mm x 320 mm x 25 mm)	4 7/16" x 6 1/16" x 1" (113 mm x 154 mm x 25 mm) (chassis only)
Spacing	Knob or lever to cylinder: 3 7/8" (98 mm); knob or lever to thumbturn hub: 2 11/16" (68 mm)		
Door thickness	Standard: 1 3/4" (44 mm) Optional: 1 3/8" (35 mm) to 2 1/2" (64 mm) Over 2 1/2" (64 mm) door ranges vary by function. Specify door thickness if other than 1 3/4" and position in door EE, EI, EO, ED	Standard: 1 3/4" (44 mm) Optional: 1 3/8" (35 mm) to 2 1/2" (64 mm) Over 2 1/2" (64 mm) door ranges vary by function. Specify door thickness if other than 1 3/4" and position in door EE, EI, EO, ED	Standard: 1 3/4" (44 mm)
Handing	L9000 Series: Field-reversible without disassembly L400 Series: Non-handed	Handed to order, field reversible	Handed to order, not field reversible
Trim			
Levers/knobs	33 lever designs (see page 12-15): Forged brass or bronze and cast stainless steel		
	Two knob designs (see page 15): Heavy-duty wrought brass, bronze or stainless steel		
	Ligature resistant lever (SL1) and knob (SK1) HL6 hospital latch (available on 9010 and 9040 functions only) Tactile warning applied to outside lever; available on 01, 02, 03, 05, 06, 07, 12, 17, 18, M51, M52, M81, ME1, ME2, ME3 lever designs		
Roses/ escutcheons	L escutcheons: 7 15/16" x 1 3/4" x 7/16" (202 mm x 44 mm x 11 mm); cold-forged brass or bronze and stainless steel N escutcheons: 7 7/8" x 2 1/2" x 7/16" (200 mm x 64 mm x 11 mm); heavy wrought reinforced brass, bronze and stainless steel Roses: A, B, C: wrought brass or bronze and stainless steel; AVA and MER: forged brass		
Finishes	14 available: 605, 606, 609, 612, 613, 619, 622, 625, 626, 626AM, 629, 630, 630AM, 643e		
Combinations	Available with knob both sides, lever both sides, or knob/lever combinations. Roses cannot be combined with escutcheons.		
Latches			
Backset	2 3/4" (70 mm) only		
Armor	L9000 Series Standard: 1 1/4" x 8" x 7/32" (32 mm x 203 mm x 6 mm) Optional: 1 1/16" x 8" x 7/32" (27 mm x 203 mm x 6 mm) L400 Series: 1 1/4" x 5 9/16" x 7/32" (32 mm x 141 mm x 6 mm)	1 1/4" x 15 55/64" x 7/32" (32 mm x 403 mm x 6 mm)	Standard: 1 1/4" x 8" x 7/32" (32 mm x 203 mm x 6 mm) Optional: 1 1/16" x 8" x 7/32" (27 mm x 203 mm x 6 mm)
Bolt	1" (25 mm) throw stainless steel deadbolt 3/4" (19 mm) throw stainless steel latch with anti-friction tongue	Via concealed vertical cable	3/4" (19 mm) throw stainless steel latch
Strike	L9000 Series Standard: ANSI curved lip strike 1 1/4" x 4 7/8" (32 mm x 124 mm) x 1 3/16" (30 mm) lip to center with dust box Optional: Extended lip strike options (7/8", 1", 1 1/2", 1 3/4", 2") L400 Series Standard: 1 1/8" x 3 1/2" (29 mm x 89 mm) with dust box Optional: 1 1/4" x 4 7/8" (32 mm x 124 mm) with dust box	Via concealed vertical cable	Standard: ANSI curved lip strike 1 1/4" x 4 7/8" (32 mm x 124 mm) x 1 3/16" (30 mm) lip to center with dust box Optional: Extended lip strike options (7/8", 1", 1 1/2", 1 3/4", 2")

L mechanical and L wired electrified		LM9200	LM9300
Cylinders and key systems			
Formats	Standard: Pin and tumbler mechanism in the Patented Schlage Everest 29 S123 keyway (6-pin); two nickel silver cut keys per lock		
	Additional keying options available: Conventional and interchangeable cores; master and grand master keying; compatible with competitor cylinders and cams that support the L9000 Series		
Wired electrified			
Input voltage	12V or 24V DC for L909X	12V or 24V DC for LM92X	—
Operating mode	Fail Safe or Fail Secure via switch on chassis	Fail Safe or Fail Secure via switch on chassis	—
Current draw	0.23 amps maximum; 0.01 amps holding	0.23 amps maximum; 0.01 amps holding	—
Request to Exit	Modular option on L909X and L949X electrified functions (when ordering or added in field)		
	Available upon request: L9010/50/56/70/71/80 and L9453/56/58/65/66/80/85 mechanical functions Rating: 3A @ 125V AC/2A @ 30V DC	—	—
Latch bolt monitor	Available on all L909x and L949x electrified and L9010/25/26/50/56/70/71/80/82 and L9453/56/65/66/80/85 mechanical functions	—	—
Door position sensor	Internal available on L909x electrified and L9010/80/82 mechanical functions; external available on all functions	—	—
Deadbolt monitor	Available on L949x electrified and L9453/56/57/58/80/85/86/96 mechanical functions	—	—
Warranty			
	3 year limited mechanical and 1 year limited electromechanical	3 year limited mechanical and 1 year limited electromechanical	3 year limited mechanical
Certifications			
ANSI/BHMA	L/LV9000: ANSI/BHMA A156.13-2017 Series 1000, Grade 1 Operational and Security With FSIC interchangeable core cylinders: Grade 2 Security With SFIC interchangeable core cylinders: Grade 3 Security ASTM F476-76 Grade 40 L400: ANSI/BHMA A156.36 Grade 1	ANSI/BHMA A156.37-2014 Grade 1 Operational and Security With FSIC interchangeable core cylinders: Grade 2 Security With SFIC interchangeable core cylinders: Grade 3 Security	ANSI/BHMA A156.37-2014 Grade 1 Operational and Security With FSIC interchangeable core cylinders: Grade 2 Security With SFIC interchangeable core cylinders: Grade 3 Security
ICC	Complies with ICC A117.1 Accessible and Usable Buildings and Facilities	—	—

Image Reference: SCL SERIES SPEC 3

	L mechanical and L wired electrified	LM9200	LM9300
UL/cUL	UL 10C and CAN/ULC-S104 3-hour Fire Listed All locks listed for A label single doors, 4' x 10' and pairs 8' x 10' Letter F and UL symbol on latch front indicate listing Electrified functions are UL/ULC Listed for single-point locking applications UL 437 Listed when using UL 437 cylinder UL Listed for 3-hour fire door (except L9076 and L9077)	UL 10C and CAN/ULC-S104 1 1/2 hour maximum Fire Listing - pairs only UL 437 Listed when using UL 437 cylinder Hollow metal: Pair swinging same direction 2 point or LBL, 8' x 8': 90 minute; pair double egress w/astragal 2 point or LBL, 8' x 8': 90 minute Wood covered: Composite core pair swinging same direction 2 point, 8' x 8': 45 minute; composite core pair swinging same direction LBL, 8' x 8': 20 minute no hose stream	UL 10C and CAN/ULC-S104 3-hour Fire Listed UL 437 Listed when using UL 437 cylinder When furnished with the door trim and strike plate, is intended for use on single swing doors or on the active leaf of door pairs rated up to and including 3 hour, with individual door leafs measuring up to and including 4' x 8'
CA Fire Code	All levers with a return to door of 1/2" (64 mm) or less comply (Formerly Title 19, California State Fire Marshal Standard)		
FL Building Code	Miami-Dade NOA's and Florida Building Commission Listings	—	Florida Building Commission Listings
Tornado	—	—	Tornado Assembly Approvals: With Intertek Testing UL approved to FEMA 361 and FEMA 320 and ICC 500 tornado shelter guidelines when paired with Steelcraft Paladin doors and frames

Image Reference: VO98 99 GEN EO FUNCT



EO No outside trim
▪ Exit only

Nomenclature – how to order

Prefix	Device series/type		Trim/rating		Suffix/finish		Door width	Handing	Less bottom rod/cable	Trim options/finish	Lever style	Accessories	Other information										
1	2	3	4	5	6	7	8	9	10	11	12	13	14										
QEL	-	98	-	27	-	L - F	-	-	626	-	3'	-	RHR	-	LBR	-	996/626	-	299F/06	-	SNB	-	HM

Detail

1 Prefixes		4 Trim functions		9 Handing	
None	Standard	EO	For AD or CO locks, order the panic as Exit Only (EO)	LHR	Left hand reverse
AX	Accessible device	DT	Dummy trim	RHR	Right hand reverse
CD	Cylinder dogging - panic only	EO	Exit only	10 Less bottom rod/cable	
CDSI	Cylinder dogging with security indicator	HL	Hospital pull trim	LBR	Less bottom rod
CI	Cylinder dogging indicator	K	Knob	LBL	Less bottom latch
CD-CX	Chexit cylinder dogging	K-BE	Knob - blank escutcheon	LBR-AFL	LBR with fire pin
CX	Chexit	K-DT	Knob, rigid - dummy trim	LBL-AFL	LBL with fire pin
DI	Dogging indicator	K-NL	Knob, rigid - night latch	11 Trim options/finish	
E	Electric locking mortise/lever	L	Lever (classroom)	See trim options/finish for each device type	
EL	Electric latch retraction	L-BE	Lever - blank escutcheon	12 Lever style	
HDSI	Hex dogging with security indicator	L-DT	Lever, rigid - dummy trim	06	Standard default (optional levers available)
HH	Hurrican device	L-NL	Lever, rigid - night latch	13 Accessories	
LD	Less dogging	NL	Night latch	CYL	Cylinder
LX	Latch bolt monitoring	NL-OP	Night latch cylinder assembly, optional pull	GBK	Glass bead kit
LX-LC	Latch bolt monitoring, low current	TL	Turn lever	SEC	Security screws
LX-RX	Latch bolt monitoring, request to exit	TL-BE	Turn lever - blank escutcheon	SLM	SLM blocking
LX-RX-LC	Latch bolt monitoring, request to exit low current	TP	Thumbpiece	SNB	Sex bolts
PL	Pullman latch	TP-BE	Thumbpiece - blank escutcheon	14 Other information	
PN	Pneumatic latch retraction	5 Rating		Touchbar options	
QEL	Quiet electric latch retraction	F	Fire exit hardware	BRaille	Vision impaired touchpad, raised letter, and braille
QM	Quiet mechanical	Blank	Panic exit hardware	PUSH	Touchbar trim embossed 'PUSH'
RX	Request to exit	6 Suffix		RSS	Red silk-screened lettered touchbar trim
RX2	Double request to exit	-2	Double cylinder (rim and mortise only)	KN	Knurled touchbar
RX-AUX	Request to exit, auxiliary	-2SI	Double cylinder with security indicator (rim only)	SG	Safety glow
RX-LC	Request to exit, low current	CON	Connectors	Miscellaneous	
SD	Special dogging -panic only	WH	Weep holes	CE	CE labeled
SS	Signal switch	7 Finish		LCP	Less cover plate
WP-RX	Waterproof request to exit	605	Bright Brass	IOWDA	#LOWDA cover plate
WS	Windstorm (FEMA rated) surface vertical rod device	612	Satin Brass	RAT REL	Ratchet release assy
XP	Heavy protection - rim	619	Satin Nickel	Door material	
2 Device series		622/711	Matte Black/Matte Black, Anodized	AL	Aluminum door
98	Series 98-smooth	625	Bright Chrome	HM	Hollow metal
99	Series 99-grooved	626	Satin Chrome	WD	Wood door
3 Device type		626AM	Satin Chrome, Antimicrobial	CP	Composite door
None	Rim device	628	Aluminum, Anodized	INS2	Insulclad - 1/2"
27	Surface mounted vertical rod device	630	Satin Stainless	INS4	Insulclad - 1/4"
47	Concealed vertical rod device	630AM	Satin Stainless, Antimicrobial	SC	Steelcraft, HH device only
47WDC	Concealed vertical rod wood door device	643e	Aged Bronze	Door application	
48	Concealed vertical rod device	693	Black Paint	D	Double egress
49	Concealed vertical cable device	710	Dark Brown, Anodized	P	Pair of doors
50WDC	Concealed vertical cable wood door device	8 Door width Door thickness		S	Single door
52	Rim device with remote trim input (pool exit hardware)	3'	Standard default	1 3/4"	Standard
57	Three-point latch device	4'		2 1/4"	Optional
75	Mortise lock device	2'	Vertical only		

Image Reference: VO9827 9927 FEATS

Features and options

Electrified options

LX	Latch bolt monitor switch
RX	Request to exit
RX2	Double request to exit
E	Electric locking and unlocking trim
EL	Electric latch retraction
QEL	Quiet electric latch retraction
SS	Signal switch
CX	Chexit delayed exit
ALK	Alarm exit kit
WP-RX	Waterproof request to exit
CON	Allegion Connect

Mechanical options

AX	Accessible device
GBK	Glass bead kit
LBR	Less bottom rod
PL	Pullman latch
PN	Pneumatic latch retraction
QM	Quiet mechanical
SNB	Sex bolts
SEC	Security screws
WH	Weep holes
WS	Tornado and hurricane tested

Dogging feature

Hex key dogging standard

Dogging options

CD	Cylinder dogging
CDSI	Cylinder dogging with security indicator
HDSI	Hex dogging with security indicator
SD	Special center case dogging
LD	Less dogging
DI	Dogging indicator
CI	Cylinder dogging indicator

Strikes

Top – 299 – Dull black

Bottom – 248L4 and 304L – Unfinished

Image Reference: VO9827 9927 PROD



Specifications

Device functions	Device ships EO/DT/NL; Field selectable; For TP, K or L remove NL drive screw from device
Device lengths	2' 2' (610 mm) Door size 3' 2'4" to 3' (711mm to 914mm) Door size 4' 2'10" to 4' (864mm to 1219mm) Door size
Device centerline from finished floor	39 5/8" (1006 mm)
Center case	8" x 2 3/4" x 2 3/8" (203mm x 70mm x 60mm)
Mechanism case	2 1/4" x 2 1/4" (57mm x 57mm)
Projection	Pushbar neutral – 3 13/16" (97mm) Pushbar depressed – 3 1/16" (78mm)
Latch bolt	Deadlocking anti-friction top and bottom bolt, 5/8" (16mm) throw
Door undercut	1/4" (7mm) recommended
Top and bottom latch case	4 1/2" x 2 1/8" x 1 1/2" (114mm x 54mm x 38mm)
Vertical rods	1/2" square tubing, standard rods accommodate 7' (2134mm) doors. Top rod length: 34 15/16" (887mm); Bottom rod length: 31 1/2" (794mm). Extension rods available in 3' (914mm) for doors over 7'; One piece top rod is available for 8' (2438mm) and 10' (3048mm) doors
Finishes	605, 606, 612, 625, 626/626AM, 628, 710, 711 and 643e (619 and 630 available with 98 Series only)
Fasteners and sex bolts (SNB)	Includes screw pack for 1 3/4" (44mm) to 2 1/4" (57mm) thick metal or wood doors, and 325 SNB for top and bottom latch. (Optional 425 SNB available)

Cylinder dogging (CD)

Cylinder dogging is
available on all 98/99



Panic exit devices to replace the standard hex key
dogging. Unit requires a standard 1 1/4" (32mm)
mortise cylinder with an inverted straight cam.
When ordering, reference Schlage cylinder 20-001,
1 1/4", XQ11-949. This provides the L583-477 cam
inverted at the factory.

To order, specify: Use prefix, CD, example CD99L

Image Reference: VOPS900 GEN FEATS

Features:

- Constant output rating at both 12 VDC or 24 VDC provides superior performance ; includes field selectable jumper
- Flat mounting of option boards provides easier access to terminal blocks for connection of electrified devices
- High voltage protective cover
- Battery back-up board auto-selects voltage
- Fire alarm relay can be configured to provide either switched or un-switched outputs from a power supply
- PS914 designed with high inrush current for powering solenoid-driven EL exit devices
- Universal 120-240 VAC input
- Low voltage DC, regulated and filtered
- Electronic power limiting foldback circuit for AC current overload protection
- Fused primary input
- AC status monitor- isolated SPDT contacts
- AC input and DC output LED status indicators
- Cover mounted AC input indication
- Hinged cover with lock down screws

Image Reference: VOPS900 GEN OPTIONS

Option boards:

900-4R: 4 relay controlled output board to power multiple devices

900-4RL: 4 relay distribution board with logic is field configurable for time delay function, auto operator, security interlock

900-8F: Provides 8 individually fuse-protected outputs, giving the flexibility to power multiple devices and provide another layer of protection

900-8P: Provides 8 individually PTC -protected (thermally protected) outputs, giving the flexibility to power multiple devices and provide another layer of protection

900-FA: Emergency interface relay integrates with fire alarm and is used to cut power in case of emergency**

900-BB: Battery backup

900-2RS: 2 relay control board for electric latch panic devices (EL or QEL), electric strikes or electrified trim

900-BBK: Battery backup kit includes two 7A/hr batteries and provides up to four hours of backup power when cycled every 5 minutes at full load

Additional options:

900-KL: Key lock

BAA: Buy American Act compliant product

Image Reference: VOPS900 GEN PROD

PS900 Series power supplies



END OF SECTION

SECTION 10 11 00
VISUAL DISPLAY SURFACES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Sections included under Division 0 & Division 1 are included as a part of this Section as though bound herein.
- B. Related Sections:
 - 1. Section 01 74 19 – Construction Waste Management
 - 2. Section 04 20 00 – Unit Masonry
 - 3. Section 06 10 00 – Rough Carpentry
 - 4. Section 09 29 00 – Gypsum Board

1.2 SUMMARY

- A. Section includes, but is not limited to:
 - 1. Markerboards
 - 2. Trim and accessories for a complete installation.

1.3 SUBMITTALS

- A. In accordance with Section 01 33 00 – Submittal Procedures.
- B. Product Data: Furnish product data sheets, including installation instructions, for review for each type of visual display board indicated.
- C. Shop Drawings: For each type of visual display board required.
 - 1. Include dimensioned elevations. Show location of joints between individual panels where unit dimensions exceed maximum panel length.
 - 2. Include sections of typical trim members.
 - 3. Show anchors, grounds, reinforcement, accessories, layout, and installation details.
- D. Samples: Manufacturer's color charts showing the full range of colors and textures available for each type of visual display board indicated.
 - 1. Markerboard: One 12 x 12 inch piece, each type specified.
 - 2. Fasteners: One each, of type required.
- E. Product Certificates: Signed by manufacturers of tackboards certifying that fabric-faced tackboard materials furnished comply with requirements specified for flame-spread ratings.
- F. Sample Warranty: Sample copy of manufacturer's warranty.
- G. Close-Out Document Submittals
 - 1. Warranty: Signed warranty.

2. Operations & Maintenance Data: Operation & maintenance instructions. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain visual display boards through one source from a single manufacturer.
- B. Qualifications:
 1. Installer Qualifications: Engage an experienced installer who is an authorized representative of markerboard manufacturer for installation.

1.5 WARRANTY

- A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer's standard form in which manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Surfaces lose original writing and erasing qualities.
 - b. Surfaces become slick or shiny.
 - c. Surfaces exhibit crazing, cracking, or flaking.
 2. Warranty Period: Life of the building.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Products of the following manufacturers will be considered, providing their products equal or exceed the quality specified; and they can provide products of the type, size, function, and arrangement required.
 1. Marsh Industries, Inc., New Philadelphia, Ohio
 2. Ghent Manufacturing Inc., Lebanon, Ohio
 3. Educational Equipment, Kent, Ohio (Basis-of-Design)
 4. Platinum Visual Systems, Corona, CA
- B. Product Options: Drawings indicate size, profiles, and dimensional requirements of visual display boards and are based on the products indicated. Other manufacturers' products with equal performance characteristics may be considered.
 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval and only to the extent needed to comply with performance requirements. Where modifications are proposed, submit comprehensive explanatory data to Architect for review.

2.2 MARKERBOARD ASSEMBLIES (Indicated as "MARKERBOARD on the drawings)

- A. Porcelain-Enamel Face Sheet: Porcelain-enamel-clad, ASTM A 463/A 463M, Type 1, stretcher-leveled aluminized steel, with 0.024-inch uncoated thickness; with porcelain-

enamel coating fused to steel at approximately 1000 deg F. Coat the exposed face with a 3-coat process consisting of primer, ground coat and color cover coat, and the concealed face with a 2-coat process consisting of primer and ground coat.

1. Matte Finish: Ultra smooth surface with low luster/ low reflective surface; board wipes clean with dry cloth or standard eraser.
 2. Size: 10'-0" W x 5'-0" H
 3. Color: As selected by Architect from manufacturer's standard colors.
- B. Porcelain-Enamel Markerboard Assembly: Balanced, high-pressure, factory-laminated markerboard assembly of 3-ply construction consisting of backing sheet, core material, and 0.021-inch- thick, porcelain-enamel face sheet with low-gloss finish.
1. Particleboard Core: 3/8 inch thick; with 0.015-inch- thick, aluminum sheet backing.
 2. Laminating Adhesive: Manufacturer's standard moisture-resistant thermoplastic type.
 3. Size: As indicated on the drawings (See 11 Series Drawings)

2.3 FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.
- B. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
- C. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: non-specular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 607.1.

2.4 MARKERBOARD ACCESSORIES

- A. Metal Trim and Accessories: Fabricate frames and trim of not less than 0.062-inch- thick, extruded-aluminum alloy, size and shape as indicated, to suit type of installation. Provide straight, single-length units. Keep joints to a minimum. Miter corners to a neat, hairline closure.
- B. Where size of visual display boards or other conditions require support in addition to normal trim, provide structural supports or modify trim as required.
- C. Field-Applied Trim: Manufacturer's standard slip-on trim with Phillips flat-head screws.
- D. Markerboard Tray: 2' wide magnetic, aluminum marker tray. **Provide (1) on each markerboard unit.**
- E. Map Rail: Standard continuous 2" map rail with cork insert and end stops. **See 11 and 12 series drawings for locations**

2.5 TACKWALL ACCESSORIES

- A. Metal Trim and Accessories: No frame is required around these

2.6 FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.
- B. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
- C. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 607.1.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine wall surfaces, with Installer present, for compliance with requirements and other conditions affecting installation of visual display boards.
 - 1. Wall surfaces to receive Work of this Section shall be completely finished.
 - 2. Surfaces to receive visual display boards shall be free of dirt, scaling paint, and projections or depressions that would affect smooth, finished surfaces of visual display boards.
 - 3. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Deliver factory-built visual display boards completely assembled in one piece without joints, where possible. If dimensions exceed panel size, provide 2 or more pieces of equal length as acceptable to Architect. When overall dimensions require delivery in separate units, prefabricate components at the factory, disassemble for delivery, and make final joints at the site. Use splines at joints to maintain surface alignment.
- B. Install units in locations and at mounting heights indicated or directed and according to manufacturer's written instructions. Install units with concealed hangers. Keep perimeter lines straight, plumb, and level. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.
- C. All joints shall be flush and even. Shim the boards to ensure even butt joints and a close fit between board and trim.

3.3 CLEANING

- A. Remove protective covering, if any, and clean surfaces and trim on markerboards, chalkboards, and tackboards on completion of installation.

END OF SECTION

SECTION 10 14 00

SIGNAGE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Sections included under Division 0 & Division 1 are included as a part of this Section as though bound herein.
- B. If AIA Document 201 is included in this contract (refer to Section 01 11 00 Summary of Work to verify), it is part of this Section as though bound herein.
- C. Related Sections:
 - 1. Section 01 74 19 – Construction Waste Management
 - 2. Section 04 20 00 – Unit Masonry
 - 3. Section 09 22 00 – Non-Load Bearing Steel Framing
 - 4. Section 09 29 00 – Gypsum Board
 - 5. Section 10 14 10 – Exterior Signage Aluminum Letters

1.2 SUMMARY

- A. Section includes, but is not limited to:
 - 1. Interior Room Signage (See drawings for details)
 - 2. Occupancy Signs
 - 3. Emergency Entrance Lettering
 - ~~4. Emergency Evacuation Windows~~

1.3 REFERENCES

- A. Reference Standards:
 - 1. ANSI A117.1 – Specifications for Making Building and Facilities Accessible to and Usable by Physically Handicapped People.

1.4 BID REQUIREMENTS

- A. If Contractor discovers an apparent conflict or discrepancy between portions of the Contract Documents that appears to be inconsistent or is not reasonably inferred from the intent of the Contract Documents, the Contractor shall include in their bid the most stringent and demanding, or highest cost requirement.
- B. Pre-Bid Exceptions: If, for any reason, you deem the designed system is not appropriate or feasible, submit this concern, proposed modification, qualification and / or exception to the drawings and specifications with your bid proposal.

1.5 SUBMITTALS

- A. In accordance with Section 01 33 00 – Submittal Procedures.

- B. Product Data: Furnish product data sheets, including installation instructions, for review.
- C. Shop Drawings: Indicate letter style, lettering font, colors, locations, overall dimensions.
- D. Color Selection Samples: Submit three (3) sets of color chips displaying manufacturer's full range of colors and finishes.
- E. Sample: Submit one (1) sample building letter, room/occupancy sign shown construction, text style, etc. Sample will be returned to contractor.
- F. Sample Warranty: Sample copy of manufacturer's warranty.
- G. Close-Out Document Submittals
 - 1. Warranty: Signed warranty.
 - 2. Operations & Maintenance Data: Operation & maintenance instructions. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.

1.6 QUALITY ASSURANCE

- A. Comply with requirements of authorities having jurisdiction applicable to signage work.
- B. Obtain signs from a single fabricator.
- C. Qualifications:
 - 1. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE & HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 01 60 00 – Product Requirements.
- B. Store adhesive attachment tape at ambient room temperatures.

1.8 PROJECT CONDITIONS

- A. Do not install signs when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

1.9 PERFORMACE REQUIREMENTS

- A. Conform to OBBC code and ANSI A177.1 for requirements for the physically handicapped.
- B. Signage shall conform to with the Americans with Disabilities Act Accessibility Guidelines (ADAAG). These requirements supersede Technical Specifications in this Section.
- C. Design foundations / connections / posts for 90 mph wind loading and 1,500 psi soil pressure.

PART 2 PRODUCTS

2.1 SIGN TYPES

A. Interior Room Signage (RS, RSS)

1. Manufacturer: ASI Sign Systems, Indianapolis, Indiana: Cleveland, Ohio: Cincinnati, Ohio specified as the type, size, function and quality of the products required.
 - a. Acceptable Manufacturers:
 - 1) Ellet Signs, Akron, Ohio
 - 2) Matthews, Pittsburgh, Pennsylvania
 - 3) Americraft Co. Inc.
 - 4) Lettergraphics Sign Co., Orrville, Ohio
 - 5) Roban Signs Inc. Lakemore, Ohio
 - 6) Interior Graphics Systems, North Canton, Ohio
2. Product: ASI InForm
 - a. Sign Face: High impact Acrylic/PVC Thermoplastic Alloy, pressure molded using Unibond™ co-molding process.
 - b. Graphic Process: Provide tactile copy and grade 2 Braille raised 1/32 inch minimum from plaque surface using manufacturer's co-molding process. Surface applied letters and Braille are not permitted.
 - 1) Provide lettering and graphics precisely formed, uniformly opaque to comply with relevant ADA regulations and requirements indicated for size, style, spacing, content, position, and colors.
 - c. Letters: Letters and numbers shall be raised 1/32 inch from sign face. All text shall be accompanied by Grade 2 Braille.
 - d. Colors: The architect will select from manufacturers standard colors OR Custom color shall be an option for background and text. Characters, symbols and text shall contrast with background and have a non-glare finish.
 - e. Sign Size: See Drawings
 - 1) Toilet Room Handicapped Sign: (RRS) See details on drawings
 - 2) Interior Room Name and Number Sign: (RS) See details on drawings
 - f. Sign Text:
 - 1) Toilet Room Handicapped Sign: International Men/Women Symbol, accessibility symbol, text "Men" or "Women" and Grade 2 Braille.
 - 2) Stairway Door Signs: International Stair Symbol, accessibility symbol, text "Stair" and Grade 2 Braille.
 - 3) Interior Room Name and Number Sign: Copy to be centered horizontally and vertically. Text size 1 inch high. Text type to be Arial, Upper and lower case. Copy to be provided by the architect.
 - 4) NOTE: Rooms being utilizing as an "office space" shall contain "Room Name, Room Number and window area for Name Insert". The height of the window area shall be 1-1/2" high x 8" long. The name insert area is interchangeable as personnel changes.
 - a) Lens: Clear, .080 inch thick, matte first surface
 - g. Mounting: SA, Silicone Adhesive with vinyl double faced tape 1/32 inch thick.
 - h. Schedule: Refer to signage schedule on drawings for sizes, locations, and layout of signage types, sign text copy, and graphics.

B. Occupancy Signs

1. Manufacturer: ASI Sign Systems, Indianapolis, Indiana: Cleveland, Ohio: Cincinnati, Ohio specified as the type, size, function and quality of the products required. Provide these signs for areas that require occupancy posting (places of assembly).
 - a. Acceptable Manufacturers:
 - 1) Ellet Signs, Akron, Ohio
 - 2) Matthews, Pittsburgh, Pennsylvania
 - 3) Americraft Co. Inc.
 - 4) Lettergraphics Sign Co., Orrville, Ohio
 - 5) Roban Signs Inc. Lakemore, Ohio
 - 6) Interior Graphics Systems, North Canton, Ohio
2. Product: ASI InForm
 - a. Sign Face: High impact Acrylic/PVC Thermoplastic Alloy, pressure molded using Unibond™ co-molding process.
 - b. Graphic Process: Provide tactile copy and grade 2 Braille raised 1/32 inch minimum from plaque surface using manufacturer's co-molding process. Surface applied letters and Braille are not permitted.
 - 1) Provide lettering and graphics precisely formed, uniformly opaque to comply with relevant ADA regulations and requirements indicated for size, style, spacing, content, position, and colors.
 - c. Letters: Letters and numbers shall be raised 1/32 inch from sign face. All text shall be accompanied by Grade 2 Braille.
 - d. Colors: The architect will select from manufacturers standard colors OR Custom color shall be an option for background and text. Characters, symbols and text shall contrast with background and have a non-glare finish.
 - e. Sign Size: See Drawings
 - 1) Occupancy Sign: 8 inch high by 8 inch long with 3/8 inch radius corners.
 - f. Sign Text:
 - 1) Occupancy Sign: Copy to be centered horizontally and vertically. Text size 3/4 inch high. Text type to be Arial, Upper and lower case. Copy to be provided by the architect.
 - g. Mounting: SA, Silicone Adhesive with vinyl double faced tape 1/32 inch thick.
 - h. Schedule: Refer to signage schedule on drawings for sizes, locations, and layout of signage types, sign text copy, and graphics.

C. Emergency Entrance Lettering

1. Manufacturer: ASI Sign Systems, Indianapolis, Indiana: Cleveland, Ohio: Cincinnati, Ohio specified as the type, size, function and quality of the products required.
 - a. Acceptable Manufacturers:
 - 1) Ellet Signs, Akron, Ohio
 - 2) Matthews, Pittsburgh, Pennsylvania
 - 3) Americraft Co. Inc.
 - 4) Lettergraphics Sign Co., Orrville, Ohio
 - 5) Roban Signs Inc. Lakemore, Ohio
 - 6) Interior Graphics Systems, North Canton, Ohio
2. Product: ASI
 - a. Letter Style: Arial
 - b. Text: As indicated on the drawings

- c. Mounting: See drawings for surface to be mounted on
 - d. Letter Height: 12"
 - e. Material: Engineering grade reflective vinyl
 - f. Color: White
 - g. Exterior Life of the letters
3. .

~~D. Emergency Evacuation Windows~~

- ~~1. Provide and install a large subsurface window frame made from 1/16" non-glare acrylic laminated to 1/8" backer plate with substrate text to read "Emergency Evacuation Route".~~
- ~~2. Window to accept standard letter size paper 8 1/2" x 11"~~
- ~~3. Provide a total of 200 as the cost identified as alternate S-2.~~

PART 3 EXECUTION

3.1 INSTALLATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Architect will provide location drawings for installation.
- C. Install signs level, plumb, and at the height required by the authority having jurisdiction, with sign surfaces free from distortion or other defects in appearance.
 - 1. Install in accordance with manufacturer's instructions.

3.2 CLEANING, PROTECTION, AND REPAIR

- A. Repair scratches and other damage which might have occurred during installation. Replace components where repairs were made but are still visible to the unaided eye from a distance of 5 feet.
- B. Remove temporary coverings and protection to adjacent work areas. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project in accordance with provisions in Division 1.

3.3 SIGNAGE SCHEDULE

- A. Interior Room Signage
 - 1. Count: See schedule on drawings
 - a. Doors off halls, corridors, and passages.
 - b. All spaces listed in Finish Schedule. If more than one door to a space, a sign will be required for each door
 - c. All stairway doors, mechanical / electrical / data rooms, restrooms
 - 2. Location(s): See schedule on drawings
- B. Emergency Entrance Lettering
 - 1. Location(s): As shown on drawings

END OF SECTION

SECTION 12 32 16

MANUFACTURED PLASTIC-LAMINATE-CLAD CASEWORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Sections included under Division 0 & Division 1 are included as a part of this Section as though bound herein.
- B. If AIA Document 201 is included in this contract (refer to Section 01 11 00 Summary of Work to verify), it is part of this Section as though bound herein.
- C. Related Sections:
 - 1. Section 01 74 19 – Construction Waste Management
 - 2. Section 06 22 00 – Mill work for general millwork and custom cabinetry unless specified herein or so noted on plans as included within this section.
 - 3. Division 9 for rubber, vinyl or other finished toe base.
 - 4. Section 08 71 00 – Door Hardware for locks master keyed to room doors and other special locks.
 - 5. Section 06 10 00 – Rough Framing for blocking within walls.
 - 6. Divisions 22, 23 and 26 for sinks, faucets, fittings, traps, stops, tail pieces, vacuum breakers, and other fixtures, electrical and mechanical runs and connections.
 - 7. Fixture installation/services connections: Setting and installation of equipment and fixtures, and related utility connections, are provided under the other sections of the Project Specification governing that utility.

1.2 SUMMARY

- A. System Description:
 - 1. Provide all plastic laminate casework and accessory items as specified herein. Refer to plans for specific details and requirements.

1.3 BID REQUIREMENTS

- A. If Contractor discovers an apparent conflict or discrepancy between portions of the Contract Documents that appears to be inconsistent or is not reasonably inferred from the intent of the Contract Documents, the Contractor shall include in their bid the most stringent and demanding, or highest cost requirement.
- B. Pre-Bid Exceptions: If, for any reason, you deem the designed system is not appropriate or feasible, submit this concern, proposed modification, qualification and / or exception to the drawings and specifications with your bid proposal.

1.4 SUBMITTALS

- A. In accordance with Section 01 33 00 – Submittal Procedures.

- B. Product Data: Furnish product data sheets, including installation instructions, for review.
- C. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - 1. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 - 2. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, and other items installed in casework.
- D. Samples: Samples of colors shall be submitted upon award of contract for selection and coordination with other suppliers. Architect may request and retain samples and catalog cuts as required for accessory and special items.
- E. Samples for Initial Selection: For Factory applied finishes" Plastic Laminate. PVC edging, Hardware finishes, Hinges and Resin Top (where noted to be provided by this Contract)
- F. Close-Out Document Submittals
 - 1. Operations & Maintenance Data: Operation & maintenance instructions. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.

1.5 QUALITY ASSURANCE

- A. Single Source Limitations: Engage a qualified casework firm to assume undivided responsibility for production and installation of casework.
- B. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of casework, construction, finishes, & other requirements.
- C. Qualifications:
 - 1. Manufacturer Qualifications: A firm experienced in producing casework similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

1.6 DELIVERY, STORAGE & HANDLING

- A. Do not deliver casework until painting and similar operations that could damage casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install casework until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Where casework is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate

measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, & reinforcements that support casework by field measurements before being enclosed & indicate measurements on Shop Drawings.

1.8 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: Where fire-retardant materials or products are indicated, provide materials and products with specified fire-test-response characteristics as determined by testing identical products per test method indicated by UL, ITS, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify with appropriate markings of applicable testing and inspecting agency in the form of separable paper label or, where required by authorities having jurisdiction, imprint on surfaces of materials that will be concealed from view after installation.

1.9 COORDINATION

- A. Coordinate sizes and locations of framing, blocking furring, reinforcements, and other related units of Work specified in other Sections to ensure that casework can be supported and installed as indicated.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: ~~(*Specification is based on this manufacturer)~~
 1. ~~*LSI Corporation of America, Inc.~~
 2. Kisha & Tabellion Compnay, LLC
 3. Riceland Commercial Cabinet
 4. MROBuilt, North Canton, Ohio
 5. Specified Architectural Casework
 6. TMI Systems Design Corporation.
 7. Stevens Cabinet Company.
 8. Case Systems.
 9. Capitol Equipment Inc.
 10. Topcraft Casework, Barberton, Ohio
 11. Carter Custom Millwork, Millersburg, Ohio
- B. Approval of additional manufacturers:
 1. Casework of other nationally recognized casework Manufacturers may be considered equal provided casework must conform to design, quality of materials, design intent, workmanship and exact performance function of casework components and details specified and implied by Manufacturer's reference, and as shown on plans.
 2. Other casework Manufacturers have been listed as equal with the realization that some design construction features and specifications vary slightly between Manufacturers. However, two design features are required of all casework

Manufacturers, regardless of whether it is their standard construction specification. These include:

- a. The high pressure laminate surface finish
 - b. The 3mm PVC edge banding.
3. Architect/Owners decision shall be final in the evaluation of manufacturer's products for approval to bid or award of contract. Manufacturers must be formally added to the list of acceptable manufacturers via addendum prior to submitting a bid.

2.2 MATERIALS

- A. Adhesive for Bonding Plastic Laminate: Contact cement. VOC emissions from adhesives and sealants must not exceed the VOC and chemical components limits of the LEED EQ Credit 4.1 - Low-Emitting Materials: Adhesives & Sealants.
- B. Laminated Plastics/Finishes:
1. High-pressure plastic laminate, .028 inch (.71 mm) in thickness, for exterior surfaces shall meet NEMA LD3-2000 VGS standards including thickness. This includes ALL open cabinets and shelves (any casework exposed shall be high-pressure plastic laminate)
 2. Exterior Color Selection Available:
 - a. Standard finish from casework manufacturer's standard stock colors consisting of wood grain patterns and solid colors. Minimum of 200 selections available.
 - 1) **Accepted Manufacturers & corresponding colors:**
PL1
 - a) **Wilsonart (Basis of Design)**
 1. **Landmark Wod (7891K-12)**
 - b) **Formica**
 1. **Millenium Oak(05887-NT)**
 - c) **Lamitech**
 1. **Century Oak (1554 PR)**
 - b. Direction of wood grain shall be vertical on door, end panels, fascia panels, and exposed backs; horizontal on drawer faces, aprons, and top rails.
 3. Plastic Laminate Balancing Sheet: White high-pressure cabinet-liner, .020 inch (.051 mm) in thickness shall meet NEMA LD3-2000 CLS standards. Use for balancing exterior surface laminates.
 4. Countertop High-Pressure Plastic Laminate:
 - a. High-pressure plastic laminate, textured finish .048 inch (1.22 mm) thickness or .042 inch (1.07 mm) postforming grade as detailed. Color as selected from manufacturer's stock standard patterns and solid colors.
 - b. Heavy gauge neutral colored backing sheet for balanced construction.
 5. Pressure Fused Laminate:
 - a. Melamine resin impregnated, 85 gram PSM average, thermofused to core under pressure.
 - b. Shall meet NEMA LD3-2000 VGL standards and NEMA LD3-2000 CLS standards, except thickness.
 - c. White pressure fused laminate for cabinet interiors behind door and drawers, and underside of wall cabinets.

- d. Shall be balanced at all concealed surfaces with same thermofused melamine. Unsurfaced coreboard or simple backers not allowed.
- C. High Performance Core:
 - 1. Shall be particleboard, minimum 47 lb. (21.3 kg) density, of balanced 3-ply construction with moisture content not to exceed 8%. Particleboard shall conform to ANSI A208.1-1999, Grade M-3.
 - 2. Cabinet components shall be of the following minimum core thicknesses:
 - a. 1/2 inch (12.7 mm): cabinet backs, drawer body, and drawer bottoms.
 - b. 3/4 inch (19.1 mm): door and drawer face, base, wall, and tall cabinet tops and bottoms, cabinet sides, drawer spreaders, cabinet back rear hangstrips, structural dividers, exposed cabinet backs, and shelves of less than 30 inch (762 mm) span.
 - c. 1 inch (25.4 mm): product-specific work surfaces and library stack shelving unless stack fitted with vertical divider. Shelves over 30 inch (762 mm) span.
- D. Edging types: Provide one or more of the following in accordance with "Edging Locations":
 - 1. 3 mm thick PVC/ABS. Solid, high-impact, purified, color-thru, acid resistant, pre-lamination primed edging, machine-applied with hot melt adhesives, automatically trimmed, inside/outside length-radiused for uniform appearance, buffed and corner-radiused for consistent design.
- E. Edging Locations: Provide the above specified edging types at the following locations, of the following colors:
 - 1. Door/Drawer-Front edging: FlatEdge PVC/ABS, color matched to door/drawer face or as selected.
 - 2. Cabinet body front-facing edge, including door/drawer front spacer rail: FlatEdge PVC/ABS, color matched to door/drawer face or as selected.
 - 3. Front-facing edge of interior body components, interior dividers, shelf, and top edges of drawer body: FlatEdge PVC/ABS to match adjacent interior surface color.
 - 4. Countertop edging: 3 mm thick PVC/ABS, color matched to door/drawer face or as selected.
- F. Hardware
 - 1. Hinges:
 - a. Heavy Duty, concealed European hinges, soft closing.
 - b. One pair per door to 30 inch (1219 mm) height, (3) hinges per door from 31" to 48", (4) hinges per door from 49" to 60" high, (5) hinges per door from 61"-72" high, (6) hinges per door from 73"-84" high, (7) hinges per door from 85" – 96" high. Hinge shall accommodate 13/16 inch (20.6 mm) thick laminated door and allow 120 degree swing.
 - c. Finish shall be LH-301 ChromeCoat Powder Finish or LH-304 Dove Grey epoxy coated.
 - 2. Pulls:
 - a. Accepted Manufacturers:
 - 1) Hardware Resources: Gibson Cabinet Pull (PART 105-Pull. 192mm length. Matte Black finish.
 - 2) Stanton Cabinet Bar Pull (PART #625-192MB). 192mm length. Matte Black Finish.

3) Or approved equal by architect.

3. Sliding Door Hardware:
 - a. Frameless 1/4 inch (6.4 mm) glass sliding doors: LH-370 double track rolling door assembly.
 - b. Framed 13/16 inch (20.6 mm) thick stile and rail sliding doors: LH-372 top mounted track with dual roller hangers. Vertical adjustment for accurate alignment.
4. Drawer Slides:
 - a. Standard Drawers: LSI Lab Series Slide, LH-375, self-closing design, epoxy powder coated White, with positive in-stop, out-stop, and out-keeper to maintain drawer in 80% open position. Captive nylon rollers, front and rear. Minimum 100 lb (45 kg) dynamic load rating at 50,000 cycles.
 - b. File Drawers: Full extension, 3-part progressive opening slide, minimum 100 lb (45 kg), zinc plated or epoxy coated at manufacturer's option.
 - c. Provide body mounted molded rails for hanging file system for legal or letter size as indicated by manufacturer's model number. Cutting or machining of drawer body/face not allowed.
 - d. Paper Storage Drawers: Full extension, 3-part progressive opening slide, minimum 100 lb (45 kg), zinc plated or epoxy coated at manufacturer's option.
5. Catches: Catch shall provide opening resistance in compliance with the Americans with Disabilities Act.
 - a. Provide top-mounted magnetic catch for base and wall cabinet door. Provide two at each tall cabinet door. Catch housing shall be molded in White. LH-340ADA.
 - b. LH-345 Roller catch for mobile cabinets.
6. Adjustable Shelf Supports: Shall be LH-354.1 twin pin design with anti tip-up shelf restraints for both 3/4 inch (19.1 mm) and 1 inch (25.4 mm) shelves. Design shall include slot for ability to mechanically attach shelf to clip. Load rating shall be minimum 300 lbs. (136 kg) each support without failure. Cabinet interior sides shall be flush, without shelf system permanent projection.
7. Locks: Where indicated, shall be disc tumbler lock eyed alike and master keyed. Dull chrome finish.
 - a. Hinged doors and drawers National Lock NO. M4-7054.
 - b. Sliding doors, 13/16 inch (20.6 mm) thick, National Lock no. M4-0057.
 - c. 1/4 inch (6.4 mm) sliding panel doors, National Lock No. M2-0225.

G. Detailed Requirements For Cabinet Construction:

1. Sub-Base:
 - a. Cabinet sub-base shall be separate and continuous (no cabinet body sides-to-floor), water resistant exterior grade plywood with concealed fastening to cabinet bottom. Ladder-type jobsite construction of individual front, back, and intermediates, to form a secure and level platform to which cabinets attach.
 - b. Sub-base at exposed cabinet end panels shall be recessed 1/4 inch (6.4 mm) from face of finished end, for flush installation of finished base material by other trades.
2. Cabinet Top and Bottom:

- a. Solid sub-top shall be furnished for all base and tall cabinets.
 - b. At cabinets over 36 inches (914 mm), bottoms and tops shall be mechanically joined by a fixed divider.
 - c. Exterior exposed wall cabinet bottoms shall be white pressure fused laminate both sides. Assembly devices shall be concealed on bottom side of wall cabinets.
3. Cabinet Ends:
 - a. Holes drilled for adjustable shelves 1 1/4 inches (32 mm) on center.
 - b. Exposed exterior cabinet ends shall be laminated with high-pressure plastic laminate, balanced with high-pressure cabinet-liner interior surface.
4. Fixed And Adjustable Shelves:
 - a. Thickness shall be 3/4 inch (19.1 mm) at standard cabinetry, and 1 inch (25.4 mm) at library stack shelving.
5. Cabinet Backs:
 - a. Cabinet back shall be fully bound (dadoed) into sides, top, and bottom, recessed 7/8 inch (22.2 mm) from cabinet rear. Rear, unexposed, side of back shall be toe-nailed to cabinet body with mechanical fasteners and solidified with a continuous bead of industrial grade hot melt adhesive.
 - b. Hang rails shall be located at rear of cabinet back and fastened to cabinet sides. Provide minimum of 2 at base, 2 at wall, and 3 at tall cabinets.
 - c. Exposed exterior backs shall be high-pressure plastic laminate balanced with high-pressure cabinet-liner.
6. Door And Drawer Fronts:
 - a. Laminated door and drawer fronts shall be 13/16 inch (20.6 mm) thick for all hinged and sliding doors. Drawer fronts and hinged doors shall overlay the cabinet body. Maintain a maximum 1/8 inch (3.2 mm) reveal between pairs of doors, between door and drawer front, or between multiple drawer fronts within the cabinet.
 - b. Stile and Rail doors shall be 13/16 inch (20.6 mm) thick with full 1/4 inch (6.4 mm) plate glass. Available hinged or sliding. All exposed lite-opening edges shall be trimmed and glazed with extruded glazing bead.
 - c. Frameless sliding glass doors shall be 1/4 inch (6.4 mm) thick plate glass with ground and polished edges. Fit with anodized aluminum shoes and nylon rollers.
7. Drawers:
 - a. Drawer fronts shall be applied to separate drawer body component sub-front.
 - b. Drawer sides shall be doweled and glued to receive front and back, machine squared and held under pressure, to set.
 - c. Drawer bottom shall be fully bound (dadoed) into front, sides, and back. Routing, in drawer body for bottom, shall receive glue. Reinforce drawer bottoms with 1/2 inch (12.7 mm) x 4 inch (101.6 mm) front-to-back intermediate underbody stiffeners, mechanically fastened. One at 24 inches (610 mm), two at 36 inches (914 mm), and four at 48 inches (1219 mm).
 - d. Paper storage drawers shall be fitted with full width hood at back.
8. Vertical and Horizontal Dividers: One of the following as indicated by cabinet number:

- a. Natural hardboard 1/4 inch (6.4 mm) thick, smooth both faces. Secured in cabinet with molded plastic clips.
- b. Pressure Fused laminate 3/4 inch (19.1 mm) thickness. Sub-dividers secured in cabinet with molded plastic clips or dowels. Structural dividers in cabinets over 36 inches (914 mm) wide secured in cabinet with mechanical euro fasteners.
- 9. Door/Drawer Front Rail: Provide minimum 3/4 inch (19.1 mm) x 6 inch (152 mm) x full width cabinet body rails immediately behind all door/drawer and multiple drawer horizontal joints to maintain exact body dimensions, close off reveal, and be locator for lock strikes.
- 10. ADA, Americans with Disabilities Act Requirements: The following special requirements shall be met, where specifically indicated on architectural plans as "ADA", or by General Note. Shall be in compliance with Federal Register Volume 56, No. 144, Rules and Regulations:
 - a. Countertop height: With or without cabinet below, not to exceed a height of 34 inches (864 mm) A.F.F., (Above Finished Floor), at a surface depth of 24 inches (610 mm).
 - b. Kneespace clearance: Shall be minimum 29 inches (737 mm) A.F.F. at apron, and 30 inches (762 mm) clear span width.
 - c. 12 inch (305 mm) deep shelving, adjustable or fixed: Not to exceed a range from 9 inches (229 mm) A.F.F. to 54 inches (1372 mm) A.F.F.
 - d. Wardrobe cabinets: Shall be furnished with rod/shelf adjustable to 48 inches (1219 mm) A.F.F. at a maximum 21 inch (533 mm) shelf depth.
 - e. Sink cabinet clearances: In addition to above, upper kneespace frontal depth shall be no less than 8 inches (203 mm), and lower toe frontal depth shall be no less than 11 inches (279 mm), at a point 9 inches (229 mm) A.F.F., and as further described in Volume 56, Section 4.19.

H. Countertops:

- 1. High-pressure plastic laminate bonded to core. Thickness as shown on plans. Underside shall be properly balanced with heavy gauge backing sheet. Furnish countertops with edge treatment and design profile as shown on drawings. Provide tops in as long as practical continuous lengths. Provide field glued splines at joints. No joints closer than 24 inches (610 mm) either side of sink cutout.
- 2. Mobile cabinet tops shall be high-pressure plastic laminate on exterior and high-pressure cabinet-liner on underside. Edges shall be high-impact 3 mm PVC/ABS.

I. Workmanship:

- 1. All exposed vertical exterior cabinet surfaces shall be .028 inch (.71 mm) high-pressure laminate, color as selected from casework manufacturer's standards, over 200 colors/wood grains available. Laminate surface/balancing liner to core under controlled conditions by approved and regulated laminating methods to assure a premium lamination. Natural-setting hybrid P.V.A. Type III water resistant adhesives that cure through chemical reaction, containing no health or environmentally hazardous ingredients, are required. Methods requiring heat are not allowed; "contact" methods of laminating are not allowed.
- 2. Cabinet parts shall be accurately machined and bored for premium grade quality joinery construction utilizing automatic machinery to insure consistent sizing of modular components. End panels shall be doweled to receive bottom and top.

3. Back panel shall be fully bound (dadoed) into, and recessed 7/8 inch (22.2 mm) from the back of cabinet sides, top, and bottom to insure rigidity and a fully closed cabinet. Cabinet back shall be mechanically fastened from rear of body for tight interior fit and sealed with full-perimeter high-strength hot-melt adhesive.
4. Drawer bottom shall be fully bound (dadoed) and glued into and recessed 1/2 inch (12.7 mm) up from the bottom of sides, back, and sub-front. Sides of drawer shall be doweled to receive drawer back and sub-front.
5. 3/4 inch (19.1 mm) thick hang rails shall be mechanically fastened to end panels of all wall, base, and tall cabinets for extra rigidity and to facilitate installation.
6. All cases shall be square, plumb, and true.
7. Case body and drawer workmanship and quality of construction shall be further evidenced by manufacturer being certified in the AWI Quality Certification Program.
8. Provide removable back panels and closure panels for plumbing access at all sink cabinets, and where shown on drawings.

PART 3 EXECUTION

3.1 COORDINATION

- A. Coordinate work of this Section with related work of other Sections as necessary to obtain proper installation of all items.
- B. Verify site dimensions of cabinet locations in building prior to fabrication.

3.2 INSTALLATION

- A. Storage and Protection: Casework shall be protected in transit. Store under cover in a ventilated building not exposed to extreme temperature and humidity changes. Do not store or install casework in building until concrete, masonry & drywall/plaster work is dry.
- B. Workmen: Install casework under the supervision of the manufacturer's representative with factory-trained mechanics certified by manufacturer.
- C. Workmanship:
 1. Erect casework straight, level and plumb and securely anchor in place. Scribe and closely fit to adjacent work. Cut and fit work around pipes, ducts, etc.
 2. Install all items complete and adjust all moving parts to operate properly.
 3. Leave surfaces clean and free from defects at time of final acceptance.
- D. Scribe and cut casework to fit adjoining work, and refinish cut surfaces and repair damaged finish at cuts.
- E. Anchor casework to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation.
- F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to

provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
 2. Maintain veneer sequence matching of cabinets with transparent finish.
 3. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer-head screws sized for 1-inch penetration into wood framing, blocking, or hanging strips.
- G. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
1. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
 2. Secure backsplash and wall with sealant specified in Division 7 Section "Joint Sealants". VOC emissions from adhesives and sealants must not exceed the VOC and chemical components limits of the LEED EQ Credit 4.1 - Low-Emitting Materials: Adhesives & Sealants.
- H. Guarantee: All materials shall be guaranteed for a period of 5 years from manufacturer's defects and workmanship.
- I. Clean Up: Remove all cartons, debris, sawdust, scraps, etc., and leave spaces clean and all casework ready for Owner's use.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective casework, where possible, to eliminate functional & visual defects; where not possible to repair, replace casework. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean casework on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION

SECTION 13 34 19

METAL BUILDING SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Sections included under Division 0 & Division 1 are included as a part of this Section as though bound herein.
- B. If AIA Document 201 is included in this contract (refer to Section 01 11 00 Summary of Work to verify), it is part of this Section as though bound herein.
- C. Related Sections:
 - 1. Section 03 30 00 – Cast-In-Place Concrete

1.2 SUMMARY

- A. System Description:
 - 1. Section includes pre-engineered, shop fabricated structural steel building frame; including, secondary framing including purlins and girts, metal wall panels, sloped metal roof system including soffits, gutters and downspouts, roof mounted equipment curbs, roof and wall insulation, and exterior doors, windows, skylights, overhead doors, louvers, and framed openings.

1.3 REFERENCES

- A. American Institute of Steel Construction:
 - 1. AISC S335 - Specification for Structural Steel Buildings Allowable Stress Design, and Plastic Design.
 - 2. AISC S342L - Load and Resistance Factor Design Specification for Structural Steel Buildings.
 - 3. AISC S344L - Metric Load and Resistance Factor Design Specification for Structural Steel Buildings.
- B. ASTM International:
 - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
 - 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 3. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 4. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
 - 5. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - 6. ASTM A475 - Specifications for Zinc Coated Steel Wire Strand.
 - 7. ASTM A490 - Standard Specification for Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength.

8. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
9. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
10. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
11. ASTM A570 - Specification for Structural Steel, Sheet and Strip, Carbon, Hot Rolled.
12. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
13. ASTM A607 - Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Columbium or Vanadium, or Both Hot-Rolled and Cold-Rolled.
14. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
15. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
16. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
17. ASTM C991 - Standard Specification for Flexible Glass Fiber Insulation for Pre-Engineered Metal Buildings.
18. ASTM A992 - Specification for Structural Steel Shapes
19. ASTM A1011 or ASTM A1011HSLAS - Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
20. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
21. ASTM D1494 - Test Method for Diffuse Light Transmission Factor of Reinforced Plastic Panels
22. ASTM D2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates
23. ASTM D4214 - Test Method for Evaluation Degree of Chalking of Exterior Paint Films
24. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials
25. ASTM E283 - Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, And Doors Under Specified Pressure Differences Across the Specimen
26. ASTM E331 - Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference
27. ASTM E1592 - Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference
28. ASTM E1646 - Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference
29. ASTM E1680 - Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems

C. American Welding Society:

1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
2. AWS D1.1 - Structural Welding Code - Steel.
3. AWS D1.3 - Structural Welding Code - Sheet Metal.

D. Metal Building Manufacturers Association:

EDA Award No.:
06-01-06458

July 8, 2024

Belmont College Construction Trades Building

Metal Building Systems
13 34 19-2

1. MBMA - Low Rise Building Systems Manual.
- E. North American Insulation Manufacturers Association
 1. NAIMA 202 - Standard for Flexible Fiberglass Insulation Systems in Metal Buildings
- F. SSPC: The Society for Protective Coatings:
 1. SSPC - Steel Structures Painting Manual.
 2. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).
- G. Underwriters Laboratories Inc.:
 1. UL - Building Materials Directory.

1.4 BID REQUIREMENTS

- A. If Contractor discovers an apparent conflict or discrepancy between portions of the Contract Documents that appears to be inconsistent or is not reasonably inferred from the intent of the Contract Documents, the Contractor shall include in their bid the most stringent and demanding, or highest cost requirement.
- B. Pre-Bid Exceptions: If, for any reason, you deem the designed system is not appropriate or feasible, submit this concern, proposed modification, qualification and / or exception to the drawings and specifications with your bid proposal.

1.5 SUBMITTALS

- A. In accordance with Section 01 33 00 – Submittal Procedures.
- B. Product Data: Furnish product data sheets, including installation instructions, for review.
- C. Certifications: Provide a letter of design certification for the structural framing system, signed and sealed by a qualified professional engineer registered in the state where the jobsite is located. The certification letter shall indicate the location (city and state) where the building is designed and the location of the manufacturing plant. AISC – Category MB certification shall be indicated for the Design facility and the Manufacturing facility.
- D. Erection Drawings: Erection Drawings stamped by a Professional Engineer registered in the state of Ohio including:
 1. Anchor bolt setting plan, base plate details and column reactions
 2. Roof framing plan and panel layout.
 3. Wall framing elevations and panel layout.
 4. Transverse cross sections.
 5. Edge conditions, panel joints, corners, trims, and flashings.
 6. Exact location of factory located openings
 7. Approximate location of field located opening
 8. Framing details
 9. Flashing details
 10. Accessory details
- E. Design Calculations: Design calculations, stamped by a Professional Engineer registered in the state of Ohio including:

1. Stress analysis
 2. Deflection analysis
 3. Foundation loads for each loading case
 4. Foundation Reactions: Submit foundation reactions and anchor bolt sizes.
- F. Upon Architect's Request:
1. Sample Warranty: Sample copy of manufacturer's warranty.
- G. Close-Out Document Submittals
1. Warranty: Signed warranty.
 2. Operations & Maintenance Data: Operation & maintenance instructions. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.
 3. Project Record Documents: Record actual locations of concealed components and utilities.

1.6 QUALITY ASSURANCE

- A. Conform to Ohio Building Code (OBC) for submission of design calculations, reviewed shop and erection drawings, and as required for acquiring permits.
- B. Cooperate with regulatory agency or authority and provide data as requested authority having jurisdiction.
- C. Provide components of each type from one manufacturer compatible with adjacent materials.
- D. Design structural components, develop shop drawings, and perform shop and site work under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Ohio.
- E. Qualifications:
 1. Installer Qualifications: Company specializing in performing Work of this section with minimum 10 years documented experience. approved by manufacturer.
 2. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum ten years documented experience.
 - a. Manufacturer shall be AISC Certified Category MB and member of MBMA.

1.7 PERFORMACE REQUIREMENTS

- A. Design primary and secondary structural members and exterior covering materials for applicable load and combinations of loads in accordance with the building code requested. Design loads shall be combined to produce maximum stresses within the structure in accordance with AISC and/or AISI as they apply.
- B. The design loads plus Dead Load shall be used in the structure design.
 1. Roof Live Load shall be applied on the horizontal projection of the roof. Live Load reduction shall be applied according to MBMA or the Ohio Building Code (OBC 2005).
 2. Wind Load shall be applied as pressure and suction in accordance with standard design criteria.

3. The Roof Snow Load shall be applied on the horizontal projection of the roof.
 4. The Ground Snow Load shall be used with the exposure factor and importance factor to determine the Roof Snow Load.
 5. The metal building system shall be designed for snowdrift conditions if required based on location of the facility.
 6. Collateral loads shall be those other than the basic design loads for which the building must be adequately designed. Loads of this type include, but shall not be limited to, suspended ceilings, sprinkler, electrical or mechanical systems, or any suspended or roof mounted HVAC units.
- C. Design Loading Criteria:
1. Wind Loads shall be in accordance with OBBC. Exposure (C), and a basic wind speed of 90 MPH.
 2. Roof Live Load: 20 psf with reductions based on tributary area per the Building Code.
 3. The Ground Snow Load shall be 20 PSF .
 4. Auxiliary (Collateral) Design Loads shall be 3 PSF..
 5. Seismic Loads shall be based on Seismic Zone (2) as per code application.
 6. For purposes of assessing wind, snow and seismic loads the building shall be designed with an importance factor of 1.0.
- D. The building components shall be designed to the following deflection requirements, unless a specific deflection is required by the building code. Deflection based on wind shall be based on a 10 year map, or 75% of the design pressure for a 50 year map.
1. Frame rafters – L/150
 2. Frame sidesway – H/60
 3. Purlins – L/150
 4. Girts – L/120
 5. Endwall posts – L/180
 6. Roof panel – L/150
 7. Wall panel – L/120

1.8 COORDINATION

- A. Pre-installation Meeting: In accordance to Section 01 31 00 – Project Management and Coordination.
- B. Coordination Meeting: A coordination meeting shall be held within 45 days after contract award for mutual understanding of the metal building system contract requirements. This meeting shall take place at the building site and shall include representatives from the Contractor, the roofing/metal building system manufacturer, the roofing/metal building supplier, the erector, the designer, the Construction Manager and the Architect. All items required by paragraph SUBMITTALS shall be discussed, including applicable standard manufacturer shop drawings, and the approval process. The Contractor shall coordinate time and arrangements for the meeting.

1.9 WARRANTY

- A. See Section 01 77 00 – Closeout Procedures, for additional close out submittal information.
- B. See Section 01 78 36 – Warranties, for additional warranty requirements.

- C. Provide building manufacturer's warranty guaranteeing the building system against defects in material for one year from the date of acceptance and shall provide for replacement of warranted material as required within that time period.
- D. The Metal Building System, composed of framing and structural members, roofing and siding, gutters and downspouts, accessories, fasteners, trim, and miscellaneous building closure items such as doors and windows (when furnished by the manufacturer) shall be warranted as described below against material and workmanship deficiencies, system deterioration caused by exposure to the elements and service design loads, leaks and wind uplift damage. Any emergency temporary repairs conducted by the owner shall not negate the warranties.
- E. Metal Building Contractor's Weathertightness Warranty:
 - 1. The Metal Building System shall be warranted by the Contractor on a no penal sum basis for a period of five years against materials and workmanship deficiencies; system deterioration caused by exposure to the elements and/or inadequate resistance to specified service design loads, water leaks, and wind uplift damage. The Metal Building System covered under this warranty shall include but is not limited to the following: framing and structural members, roofing and siding panels and seams, interior or exterior gutters and downspouts, accessories, fasteners, trim, flashings and miscellaneous building closure items such as doors and windows (when furnished by the manufacturer), connectors, components, and fasteners, and other system components and assemblies installed to provide a weathertight system; and items specified in other sections of these specifications that become part of the metal building system. All material and workmanship deficiencies, system deterioration caused by exposure to the elements and/or inadequate resistance to specified service design loads, water leaks and wind uplift damage shall be repaired as approved by the Architect. See the attached Contractor's written warranty for issue resolution of warrantable defects. This warranty shall warrant and cover the entire cost of repair or replacement, including all material, labor, and related markups. The Contractor shall supplement this warranty with written warranties from the installer and/or system manufacturer, which shall be submitted along with Contractor's warranty. However, the Contractor is ultimately responsible for this warranty.
- F. Manufacturer's Material and/or System Weathertightness Warranties
 - 1. The Contractor shall furnish, in writing, the following manufacturer's material warranties to the Architect which covers all Metal Building System components: A manufacturer's 20 year material warranty warranting that the specified aluminum, zinc-coated steel, aluminum-zinc alloy coated steel or aluminum-coated steel will not rupture, structurally fail, fracture, deteriorate, or become perforated under normal design atmospheric conditions and service design loads. Liability under this warranty shall be limited exclusively to the cost of either repairing or replacing nonconforming, ruptured, perforated, or structurally failed securement system including fasteners and coil material. b. A manufacturer's 20 year exterior material finish warranty on the factory colored finish warranting that the finish, under normal atmospheric conditions at the site, will not crack, peel, or delaminate; chalk in excess of a numerical rating of eight, as determined by ASTM D 4214 test procedures; or change colors in excess of five CIE or Hunter Lab color difference

(delta E) units in accordance with ASTM D 2244. Liability under this warranty is exclusively limited to replacing the defective coated material.

PART 2 PRODUCTS

2.1 PRE-ENGINEERED BUILDINGS

A. Manufacturers:

1. American Steel Building Co., Inc.
2. Behlen-Inland Group
3. Butler Manufacturing Co.
4. Ceco Building Systems
5. A & S Building Systems
6. Magnatrax Buildings Group
7. NCI Building Systems, LP
8. Nucor Building Systems
9. Star Building Systems
10. United Structures Of America
11. VP Buildings
12. Schulte Building Systems

B. System Description

1. The building shall include all primary and secondary structural framing members, connection bolts, roof and wall covering, trim, fasteners, closures, sealer, canopies, roof extensions, windows, doors, insulation, gutters, downspouts, louvers, ventilators and other miscellaneous items as stated in the specifications and/or shown or called for on the drawings.
2. Primary framing shall consist of transverse rigid frames of rafters and columns with solid webs. The rigid frame shall be fabricated of shop-welded steel plate and designed for erection by field bolting. Frames shall be:
 - a. Clear span with no interior columns.
 - b. Gabled sloped
 - c. With tapered exterior columns.
3. Secondary framing shall consist of purlins, girts, eave struts, flange braces and sag angles as required by design.
4. Horizontal loads not resisted by main frame action shall be resisted by
 - a. Standard cable or rod x-bracing in the roof
 - b. Standard cable or rod x-bracing, rigid portal frames, or shearwall by others in the sidewalls
 - c. Panel diaphragm, standard cable or rod x-bracing, rigid portal frames, or shearwall by others in the endwalls.
5. Roof and Wall System consists of preformed steel panels, trim, and accessories as required for a complete installation.
6. Building overall dimensions, bay spacing, post spacing, eave height, clear dimensions and roof pitch shall be as indicated on the drawings and as defined here.
 - a. The building "Width" shall be the measurement from outside face to outside face of the sidewall girts.
 - b. The building "Length" shall be the measurement from outside face to outside face of the endwall girts.

- c. "Eave" to be determined as the line along the sidewall formed by the intersection of the planes of the roof and sidewall.
 - d. "Eave Height" is defined as the vertical dimensions as measured from the finished floor to the top of the eave strut.
 - e. The "Bay Spacing" shall be the distance between the centerlines of frames for interior bays and the distance from the outside face of endwall girt to the centerline of the adjacent interior frame for end bays.
 - f. The "Module Spacing" shall be measured between the centerlines of interior columns for interior modules and the distance from the outside face of sidewall girts to the centerline of the adjacent interior column
7. "Roof Pitch" shall be the inches of vertical rise per inches of horizontal run, expressed as inches of rise per 12 inches of run.

2.2 COMPONENTS - FRAMING

A. General:

- 1. Structural steel members shall be sheared, formed, punched, welded and painted in the plant of the manufacturer. All shop connections shall be welded in accordance with the AWS "Standard Code for Welding in Building Construction" and CWB "General Specifications for Welding of Steel Structures".
- 2. The building manufacturer shall have on file certified mill test reports that verify that these requirements have been met.
- 3. All structural framing members shall be prepared according to SSPC-SP2 and given one shop coat of Gray Modified Acrylic paint applied by Anodic Electrocoat process.
- 4. All framing members shall carry an easily visible identifying mark to aid the erector in the erection of the building.
- 5. Field connections shall be bolted with high strength bolts and nuts.
- 6. Anchor Bolts: ASTM A307, galvanized.
- 7. Bolts, Nuts, and Washers: ASTM A325, ASTM A490, galvanized.
- 8. Welding Materials: AWS D1.1; type required for materials being welded.
- 9. Grout: ASTM C1107 Non-shrink type, premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents, capable of developing minimum compressive strength of 2400 psi in two days and 7000 psi in 28 days.

B. Primary Structural Members:

- 1. The primary structural members shall be rigid framing manufactured of solid web members having tapered or uniform depth rafters rigidly connected to tapered or uniform depth columns.
- 2. Steel used to fabricate built up framing members shall be 55,000 PSI minimum yield point material and shall conform to the physical characteristics of ASTM A607, ASTM A570, ASTM A572 or ASTM A529, Grade 55.

C. Secondary Structural Members:

- 1. Secondary structural framing shall distribute the loads to the primary structural system and shall include endwall columns and rafters, purlins, girts, eave struts, base support, headers, jambs, flange bracing, clips, and other miscellaneous structural framing.
- 2. Steel used for cold-formed members shall be 55,000 PSI minimum yield point material and shall conform to the physical characteristics of ASTM A570 or ASTM A607 Grade 55.

3. Light gauge cold-formed sections shall be manufactured by precision roll or brake forming. All dimensions shall be true, and the formed member shall be free of fluting, buckling or waviness.
4. Endwall rafters shall be manufactured from built-up sections of adequate size and thickness as determined by the design criteria.
5. Endwall columns shall consist of built-up sections or cold formed "C" sections of adequate size and thickness as determined by the design criteria.
6. Purlins and girts shall be precision roll-formed 8", 8 1/2" or 10" deep "C" sections or "Z" sections of adequate size and thickness as determined by the design criteria, minimum 16 gauge. Purlins and girts shall be either simple span or continuous span members.
7. Eave struts shall be precision roll-formed and/or press broke "C" sections, minimum 14 gauge. The upper flange shall slope with the normal roof slope, and the web shall be vertical and free to receive the sidewall covering.
8. Base support shall consist of a continuous base angle, base "C", or Paneledge to which the base of the wall covering shall be attached. The base support shall be securely fastened into the concrete by the erector.
9. Headers and jambs shall be precision roll-formed "C" sections of the same depth as the girts.
10. Flange bracing shall consist of angle or tube members connected to the web of the purlin or girt and to the compression flange of the primary structural member.
11. Clips shall be fabricated from 55,000 PSI minimum yield point material and be factory punched for field bolted connections.

D. Bracing:

1. Horizontal load resisting bracing shall be accomplished by diagonal cable bracing, rod bracing, portal frames, and/or diaphragm action of the roof and wall covering.
2. All cables for diagonal bracing shall be fabricated from extra high strength Grade-7 wire Class A coating, left hand lay, galvanized steel strand, conforming to the provisions of ASTM A475. Adjustment shall be provided by an eyebolt assemble.
3. Rod bracing shall be fabricated from minimum 1/2" diameter steel rod conforming to the provisions of ASTM A36.
4. Portal frames shall be fabricated of built-up sections and conform to the same specifications as primary framing.

2.3 COMPONENTS ROOF SYSTEM

- A. Standing Seam Rib having 3" high trapezoidal major ribs at 24" on centers and minor ribs between the major ribs. Install utilizing concealed steel clips, snap-locked at the side joints and weatherproofed with factory applied sealants. Panels shall be continuous from ridge to eave until panel exceeds 40'. Each panel shall provide a net coverage width of 24".
- B. High ribs shall be sealed with factory-applied sealants and shall be mechanically field seamed at the side joints.
- C. Panels shall be manufactured from 24 gauge, 50,000 PSI material.
- D. Panel-to-roof purlin structural attachments:

1. Clips shall be a nominal 3 1/8" in height, movable tabs that interlock with seamed roof panel ribs and provide 1" (25 mm) of panel movement in either direction from center of clip to compensate for thermal effects.
 2. Provide 1" thick thermal blocks.
- E. Panels shall be one piece for slope lengths less than 50'-0". The panel endlap, if required, shall have tape sealer sandwiched between the top and bottom panel with a rigid metal backer plate.
- F. Roof system must be tested in accordance with Underwriters Laboratories, Inc. (UL) Test Method 580 "Tests for Uplift Resistance of Roof Assemblies".
- G. Roof system must have been tested according to the procedures in ASTM E 1592 (structural performance by uniform static air pressure differential).
- H. Panels shall be reversible end for end and no field notching shall be required.
- I. Panel finish shall be Galvalume® AZ55 coating in accordance with ASTM A792.

2.4 COMPONENTS WALL SYSTEM

- A. Exterior wall panel:
1. Rollformed profile panels shall have 1 1/8" deep major ribs spaced at 12" on center, with minor ribs between major ribs. Each panel shall provide a net coverage width of 36".
 2. Manufactured from 26 gauge, 50,000 PSI material.
 3. Provide wall panel assemblies with permanent resistance to air leakage through assembly of not more than 0.006 cfm/sf of fixed wall area when tested according to ASTM E283 at a static pressure differential of 6.24 psf.
 4. Provide wall panel assemblies with no water penetration as defined in the test method when tested according to ASTM E331 at a static pressure differential of 12.0 psf.
 5. Substrate shall be Galvalume® AZ50 coating in accordance with ASTM A792.
 6. Sheets shall be coated with a fluoropolymer topcoat containing not less than 70% polyvinylidene fluoride (PVDF) over primer with total DFT of 0.8 – 1.0. The reverse side shall be coated with pigmented polyester. Exterior color to be selected from standard color choices.
 7. Panels shall be one piece from base to eave for lengths less than 35'-9". Endlaps, if required, shall be 6" and occur at a girt.
 8. Panel to structural fasteners for wall panels shall be No. 12 self-drilling carbon steel screw, hex head, 1 1/4" long. Fastener shall have a painted head to match panel color.
 9. Panel to panel, stitch fasteners for wall panels shall be No. 12 sharp point carbon steel screw, hex head, 3/4" long. Fastener shall have a painted head to match panel color.
- B. Interior Wall Panel:
1. Liner panel, if required shall be 26 gauge with a manufacturer's standard color finish, roll formed to manufacturer's standard ribbed profile.

2.5 COMPONENTS - SOFFIT

- A. Rollformed profile shall be (Flat Soffit Panel) configuration. Panels shall attach to framing members using concealed fasteners. Each panel shall provide a net coverage width of 12" and have one stiffening rib.
- B. Manufactured from 26 gauge, 50,000 PSI material.
- C. Substrate shall be Galvalume® AZ50 coating in accordance with ASTM A792.
- D. Sheets shall be coated with a fluoropolymer topcoat containing not less than 70% polyvinylidene fluoride (PVDF) over primer with total DFT of 0.8 – 1.0. The reverse side shall be coated with pigmented polyester. Exterior color shall be Polar White.

2.6 COMPONENTS – TRIM

- A. Trim shall be 26 gauge with a fluoropolymer topcoat containing not less than 70% polyvinylidene fluoride (PVDF) typical to wall panels. Color to be selected from manufacturers full range of standard colors.
- B. Provide all trim pieces necessary to achieve a finished appearance. Gable trim and eave trim or gutter shall have a roll formed face to maintain uniformity. Provide corner boxes to transition from gable trim to eave trim or gutter. Gutter, shall have a horizontal bottom leg and the front leg shall not project above the bottom of roof panel.
- C. Provide trim at all corners of the building and for all sides of framed openings. Provide trim for base of building if required.
- D. Downspouts, shall be 26 gauge with a fluoropolymer finish and shall have a minimum cross sectional area of 15.85 square inches. Downspouts shall terminate with an elbow at approximately 75° or transition to an underground drainage system.

2.7 INSULATION

- A. Acceptable Manufacturer: Thermal Design, Inc., Simple Saver System. P.O. Box 468, 601 N. Main Street, Madison, NE 68748. ASD. Tel: (800) 255-0776 or (402) 454-6591. Fax: (402) 454-2708. Email: sales@thermaldesign.com, www.thermaldesign.com.
 - 1. Requests for substitutions will be considered in accordance with provisions of Section 01600.
- B. Simple Saver System consists of Batt Insulation, Roof Insulation, Wall Insulation, Vapor Barrier Liner Fabric, Thermal Breaks, Straps, and other devices and components in a proprietary insulation system as follows:
 - 1. Roof Insulation: Fiberglass batt or fiberglass blanket complying with ASTM C 665 and ASTM E 84 with a thermal resistance and thickness as follows:
 - a. R-30; 9-1/2 inches (241 mm), 6 inches (152 mm) plus 3-1/2 inches (89 mm) (two layers).
 - 2. Wall Insulation: Fiberglass blanket or batt complying with ASTM C 665 and ASTM E 84 with a thermal resistance and thickness as follows:
 - a. R-25; 8 inches (203 mm).

- C. Vapor Barrier Liner Fabric: Syseal type woven, reinforced, high-density polyethylene yarns coated on both sides with a continuous white or colored polyethylene coatings, as follows:
1. Product complies with ASTM C 1136, Types I through Type VI.
 2. Perm rating: 0.02 for fabric and for seams in accordance with ASTM E 96.
 3. Flame/Smoke Properties:
 - a. 25/50 in accordance with ASTM E 84.
 - b. Self-extinguishes with field test using matches or butane lighter.
 4. Ultra violet radiation inhibitor to minimum UVM_{ax} rating of 8.
 5. Size and seaming: Manufactured in large custom pieces by extrusion welding from roll goods, and fabricated to substantially fit defined building area with minimum practicable job site sealing.
 6. Provide with factory double, extrusion welded seams. Stapled seams or heat-melted seams are not acceptable due to degradation of fabric.
 7. Factory-folded to allow for rapid installation.
 8. Color:
 - a. Roof, Super white.
 - b. Walls, Green.
- D. Vapor Barrier Lap Sealant: Solvent-based, Simple Saver polyethylene fabric adhesive.
- E. Vapor Barrier Tape: Double-sided sealant tape 3/4 inch (19 mm) wide by 1/32 inch (.79 mm) thick.
- F. Vapor Barrier Patch Tape: Single-sided, adhesive backed sealant tape 3 inches (76 mm) wide made from same material as Syseal type liner fabric.
- G. Thermal Breaks:
1. 1/8 inch (3 mm) thick by 3 inch (76 mm) wide white, closed-cell polyethylene foam with pre-applied adhesive film and peel-off backing.
 2. Polystyrene Snap-R snap-on thermal blocks.
- H. Straps:
1. 100 KSI minimum yield tempered, high-tensile-strength steel.
 2. Size: Not less than 0.020 inch (0.50 mm) thick by 1 inch (25 mm) by continuous length.
 3. Galvanized, primed, and painted to match specified insulation finish color on the exposed side.
- I. Fasteners:
1. For light gage steel: #12 by 3/4 (19 mm) inch plated Tek 2 type screws with sealing washer, painted to match specified color.
 2. For heavy gage steel: #12 by 1-1/2 inch (38 mm) plated Tek 4 type screws with sealing washer, painted to match specified color.
 3. For wood, concrete, other materials: As recommended by manufacturer.
- J. Wall Insulation Hangers: Fast-R preformed rigid hangers, 32 inch (813 mm) long galvanized steel strips with barbed arrows every 8 inches (203 mm) along its length.

2.8 COMPONENTS - METAL DOORS AND FRAMES

- A. Provide personnel doors and frame, knocked down for field assembly, as follows:
1. Frames shall be fabricated from 16 gauge galvanized steel, 5 3/4" depth, non-handed and reversible, with weather stripping.
 2. Doors shall be manufactured from 18 gauge galvanized steel, 1-3/4" thick, full flush or half glass type.
 3. Lock edge shall be square with vertical seam mechanically interlocked and have 12 gauge reinforcement for strike preparation.
 4. Hinge edge shall be square with vertical seam mechanically interlocked and have 7 gauge reinforcing plates at 3 locations with hinge preparations.
 5. Doors shall have 16 gauge steel, flush-mounted, top channel and inverted bottom channel.
 6. Doors shall be prepared for cylindrical lockset (2-3/4" backset)
 7. Door core shall be a rigid cell, foamed-in-place polyurethane with 1.8 lbs. per cubic foot density. Insulation core shall be chemically bonded to all interior surfaces, completely seal unit and produce total surface support.
 8. Half glass doors, if required, shall have glass cutout with removable glazing bead and accommodate glass up to 1/4" thick. Glass and wet glazing are not provided.
 9. Paint finish shall be white.
 10. Hinges shall be 4-1/2" x 4-1/2" full mortise with non-removable pin, dull chrome finish.
 11. Lockset shall have dull chrome finish. Entry function is key outside with turn button inside.
 12. Threshold shall be provided in one-piece unit.
 13. An Astragal Kit shall be provided to reduce the opening between a pair of doors and to protect the lock from tampering. A filler plate shall be provided to cover the lock preparation on the inactive leaf
 14. Surface Bolts shall be provided for use on inactive leaf of double doors.
 15. Closer shall be completely non-handed with parallel arms and be UL listed.
 16. Panic Device shall be a low profile rim-type with horizontal push bar and be UL rated. Outside handle is lever type with key entry function. Finishes shall be baked enamel for the push bar and dull chrome for the outside lever handle and trim.

2.9 ACCESSORIES

- A. Fasteners to be manufacturers standard long life fasteners. Exposed fastener heads to be factory painted to match the panel color. Self-drilling fasteners shall be used for panel to structural connections. Lapteks shall be used for panel to panel connections. Pop rivets shall be used at endlaps of eave and gable trims.
- B. Closed cell foam closure strips, die cut to match CS, AP, or LTC panel configuration. Metal closures shall be used with STC or MSC panel.
- C. Mastic for roof sidelaps, endlaps, and flashings to be a non-hardening butyl tape, non-corrosive to the substrate, of 100% solids. Tape size to be minimum 3/32" x 3/4", supplied in rolls.
- D. Caulk shall be manufacturers standard product as appropriate for the application.

- E. Thermal blocks of expanded polystyrene shall be supplied with standing seam roof systems for the requested insulation thickness. The thickness of the thermal block shall be compatible with the clip height and insulation thickness.
- F. Louvers shall be 3' x 3' self-framing and self-flashing units with insect screen. Louver frame to be minimum 18 gauge galvanized and blades to be minimum 20 gauge galvanized. Finish to be electrostatically applied polyester paint. Operator to be either hand crank or chain operator.
- G. Continuous gravity ventilators shall have 9" or 12" throat, supplied in 10' lengths, with birdscreen. Ventilators to be of low profile design to provide gravity type ventilation. Include flashing for either single unit or continuous-run installation. 9" x 10' unit shall have a base ventilating capacity of 2700 and the 12" x 10' unit shall have a base ventilating capacity of 3600 CFM, assuming 10 degree temperature differential and 5 mph wind speed. Exterior parts to be minimum 26 gauge in Galvalume or painted galvanized. Interior parts to be G90 galvanized.
- H. Roof Jacks shall be used at all 13" diameter and less pipes that penetrate the roof. Roof jacks shall be EPDM with a flexible aluminum base to form a weathertight seal at the roof panel.

2.10 FABRICATION - FRAMING

- A. Fabricate members in accordance with AISC Specification for plate, bar, tube, or rolled structural shapes.
- B. Fabricate built-up members in accordance with MBMA Low Rise Building Systems Manual, Common Industry Practices.
- C. Fabricate cold formed members in accordance with MBMA Low Rise Building Systems Manual, Common Industry Practices.
- D. Provide factory drilled or punched framing members for field bolted connections.
- E. Anchor Bolts: Formed with bent shank, assembled with 1/4" steel template for casting into concrete.
- F. Provide framing for all openings, doors, windows, etc.
- G. All framing members shall be prepared according to SSPC-SP2 and given one shop coat of Gray Modified Acrylic paint applied by Anodic Electrocoat process.
- H. Clearly and legibly mark each piece to correspond with previously prepared erection drawings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.

- B. Verify foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position.

3.2 ERECTION - FRAMING

- A. Erect framing in accordance with AISC Specification and MBMA Low Rise Building Systems Manual, Common Industry Practices.
- B. Provide for erection and wind loads.:
 - 1. The erector shall furnish temporary guys and bracing where needed for squaring, plumbing, and securing the structural framing against loads, such as wind loads acting on the exposed framing and seismic forces, as well as loads due to erection equipment and erection operation, but not including loads resulting from the performance of work by others. Bracing furnished by the manufacturer for the metal building system cannot be assumed to be adequate during erection. The temporary guys, braces, falseworks and cribbing are the property of the erector, and the erector shall remove them immediately upon completion of erection.
- C. Set column base plates with non-shrink grout to achieve full plate bearing.
- D. Do not field cut or alter structural members without approval of Architect/Engineer.
- E. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized.

3.3 ERECTION - WALL AND ROOFING SYSTEMS

- A. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.
- B. Fasten cladding system to structural supports, aligned level and plumb.
- C. Locate end laps over supports. End laps minimum 2 inches. Place side laps over bearing.
- D. Install expansion joints where indicated on Drawings.
- E. Use concealed fasteners.
- F. Install sealant and gaskets to prevent weather penetration.

3.4 ERECTION - GUTTER AND DOWNSPOUTS

- A. Rigidly support and secure components. Joint lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.
- B. Apply bituminous paint on surfaces in contact with cementitious materials.
- C. Slope gutters minimum 1/16 inch/ft.
- D. Connect downspouts to storm sewer system or install splash pads under each downspout.

3.5 INSTALLATION - INSULATION

- A. Install pre-engineered building insulation system in accordance with manufacturer's installation instructions and the approved shop drawings.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Install in exterior spaces without gaps or voids. Do not compress insulation.
- D. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- E. Fit insulation tight in spaces and tight to exterior side of the sealed liner fabric and around mechanical and electrical services within plane of insulation.

3.6 ERECTION - ACCESSORIES

- A. Install door frame, door.
- B. Seal wall and roof accessories watertight with sealant in accordance with Section 07900.

3.7 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Framing Members: 1/4 inch from level; 1/8 inch from plumb.
- C. Siding and Roofing: 1/8 inch from indicated position.

END OF SECTION

New Construction for:
Belmont College - Construction Trades Building

Addendum No. 03 – 21.162

January 10, 2025

This Addendum shall hereby be and become a part of the Contract Documents the same as if originally bound thereto. The following clarifications, amendments, revisions, changes and modifications change the original Contract Documents only in the amount and to the extent hereinafter specified in this Addendum. Each bidder shall acknowledge receipt of this Addendum in his bid proposal. Bidders shall be responsible for becoming familiar with every item of this Addendum.

General:

1. Pre bid meeting agenda and sign in sheet attached.
2. **Clarification: No EDGE requirement for 2-year colleges.**
3. Question: I see Room 102B Kitchenette, but there is no elevation provided for any casework. Please confirm if there are any finishes for that room required.

Response: Casework elevation for Kitchenette 102B in the office space is A3/12.1, marked on the enlarged plan for the office on sheet 4.5.

4. Question: Ref. Spec Section 062200-1.6.B – Millwork. Can the AWI Quality Certification Program requirement be waived for this project if AWI standards are adhered to?

Response: No

5. Question: Ref. Spec Sections 062200 – Millwork and 123216 – Manufactured Plastic-Laminate-Clad Casework. Do both of these sections apply?

Response: Spec Section 06 22 00 has been removed. Please see revised 12 32 16.

6. Question: Ref. Spec Section 133419-2.1.A – Metal Building Systems. Are subsidiaries of Nucor Building Systems (i.e. Kirby Building Systems) considered acceptable manufacturers?

Response: Yes.

7. Question: Ref. Spec Section 101400-2.1.D.3 – Signage. Are 200 “Emergency Evacuation Window” signs required?

Response: No, Emergency Evacuation Windows are not required. Section has been removed from specification.

8. Question: Ref. Sheet 3.10 – Foundation Plan Notes. Can the top of interior continuous wall footings be (-0'-8") for masonry coursing?

Response: The only interior footings where this could potentially have any effect on masonry coursing would be at the masonry and metals storage and water service/electrical room. Footing has been coordinated with utilities. Footings to remain at -2'-8" as drawn to allow services to pass thru as there are no footing steps for those rooms to the exterior wall footing.

9. Question: Ref. Spec Section 083613 – Sectional Doors. 2.3.E – Spec calls for windows, but Door Type S on Sheet 8.3 does not indicate windows. Please clarify whether or not windows are required.

Response: Windows have been added to Door Type "S". See Drawing 8.3.

10. Question: Ref. Spec Section 083613 – Sectional Doors. 2.3.F – Spec calls for manufacturer's standard primer and powder-coat-applied finish coats. Industry standard for specified door type includes a baked-on polyester finish in white only. Powder-coat finish, with multiple color options, can be applied to exterior face only at a significant upcharge. Please confirm finish requirements.

Response: Color options will be required. We will need a dark bronze finish to match other doors and window frames.

11. Question: Ref. Spec Section 083613 – Sectional Doors. 2.5.C – Some sectional doors will be front-mounted, low headroom doors with 3" track. A cable safety device is not available in this condition. Doors with lift clearance (non-low headroom) can have cable safety devices installed. Please confirm that cable safety devices are NOT required on low headroom doors.

Response: Cable safety devices are not required on low headroom doors.

12. Question: Ref. Spec Section 323300-2.1 – Site Furnishings (Bollards), Detail C1 / Sheet 7.4, and Detail 12 / Sheet C-501. Please clarify which type of bollard is to be installed in which location.

Response: Detail C1 on Sheet 7.4 has been removed. Please refer to spec section and Detail 12 on C-501.

13. Question: Spec Section 323113 – Chain Link Fence and Gates is included in the Project Manual, but we cannot locate any fencing in the drawings. Please clarify.

Response: At the current time, no gates or fencing are proposed for the project. Should future project addendums, if applicable, implement the necessity for such appurtenances, then this portion of Section 323113 would apply and become applicable, unless otherwise noted at that time.

14. Question: Ref. Detail 6/C-502. Can a surface mounted base plate be used for attachment in lieu of an embedded sleeve? We have found that embedded posts are much more prone to failure than surface mounted posts.

Response: No, please proceed with embedded posts per drawings.

15. Question: Locations on drawings P-11 MA/2 P-11 MC/7 (Note 16) Counter top sinks call for under-mount trap primer on drawings routed to nearest floor drain, but there is no floor drain on drawings located in vicinity of sinks. Are these areas meant to have a floor drain installed in the room, or are those sinks not meant to have trap primer?

Response: Please see revised drawings.

16. Question: Is the Plumbing Contractor responsible for the housekeeping pad for the Air Compressor, Refrigerated Air Dryer, and/or Water Heater?

Response: This project is a single prime contract. General contractor and their plumbing contractor to coordinate who will be responsible for housekeeping pad

17. Question: Is duct cleaning required if the duct is sealed and capped prior to installation?

Response: Duct cleaning is required.

18. Question: Can specifications/detail be provided for the Expansion Tanks (ET-1, ET-16) located on drawing H32?

Response: There are details on H63

19. Question: What panels do we need to use for the soffit panels on the inset entrance areas? Will these panels match the wall panels or will they be the 12" soffit panels?

Response: Yes, use the standard 12" soffit panels

20. Question: What are the 1'-0" projected wing walls on the corners of the buildings framed with? Will these areas just be our girts extending out an additional 1'-0" to match the roof extension? I just see notes that mention these areas are metal wall panels. If these areas will be framed by us, they may not match exactly how they are shown on the drawings. Please clarify what we are needing to provide for these areas. Also will the panels on these areas match the main wall panels (R Panels) on the outside face and the soffit panels on the inside face with flat trims covering the end of the girts?

Response: Refer to plan detail A4 on Sheet 4.6.

21. Question: To verify, the drawings don't show any supports for the masonry walls around the building, other than bond beams in the block, so we aren't providing any supports correct?

Response: Full Height masonry occurs along grid line 11 and grid line 10. Provide spandrel beam per 8/3.30

22. Question: Please clarify if we need to use the special deflections shown on 3.01 for the exterior walls or will standard deflections work, if we aren't supporting the block walls?

Response: Deflection criteria for various finishes provided on 3.01.

23. Question: The upper wall area above the lower building (wall with the long narrow windows) shows 6" studs at 16" OC with wall panels over the studs, can we use our standard girts here instead? On the same detail calling for studs, it also shows a framed opening sill by PEMB and this framing scales out to 8" material. Please verify.

Response: Standard girts in this location would be acceptable.

24. Question: The specs are calling for a 26ga Flat soffit panel and the drawings are calling for a vented soffit panel. We don't have a vented soffit panel and our flat panel is 24ga. Will our standard 24ga 12" wide flat soffit panel work?

Response: Yes.

25. Question: What color primer do we need to use for the primary and secondary? Red, gray, galvanized?

Response: gray

26. Question: To verify, the mezzanine level looks to be all pre-sized materials by others and self-supported; no support or materials by PEMB. Is this correct?

Response: That is correct. The mezzanine is self supported. No support and materials by PEMB.

27. Question: To verify, there aren't any additional loads that we need to consider like roof top units, cranes, hanging or suspended equipment from the roof?

Response: Please review entire drawing set to understand the full scope.

28. Question: Will all exterior frame and endwall columns be at finish floor? Please confirm.

Response: PEMB columns bear on concrete piers. Concrete pier elevation is noted as +0'-0" in plan notes on 3.10.

29. Question: Detail 8 on 3.30 shows a W12x35 beam that will be attaching to the PEMB framing... is this suppose to be a spandrel beam to support the full height masonry walls? If so, we would design the beam and provide as required. Or is this beam needed with the bond beams? Please clarify what to do here.

Response: Bond beam(s) shall occur within masonry walls per typical details on 3.20 and per sections/details. Spandrel beam is sized by TBA to provide support to top of full height masonry at end walls along grid line 10 and grid line 11. Attachment of spandrel beam to PEMB columns is by PEMB EOR/mfr. This is stated along with other pertinent info in section 8/3.30.

30. Question: To verify, the 3/8" x 1'-3" plate shown on the structural details will be by others and won't affect any of the PEMB materials correct?

Response: SHD to advise why plate in question (section 4 and 5/3.30) is provided. PEMB wall and finishing should be supported by means determined by PEMB EOR/mfr.

31. Question: What do we need to use for bracing on this project? I would assume portal frames as required with all bays having framed openings. Are there specific bays that can have portals? Please verify.

Response: Portals will need to be coordinated to avoid window locations.

32. Question: Alternate #3 states the Base bid is to be concrete slab, and the Alternate is to be (2) College Logos in brick pavers. Dwg C-102 shows (2) College Logos 4x8 Clay Brick Pavers on concrete base, but they are not labeled as Alternate #3. Are these in fact the (2) Logos for Alternate #3?

Response: Yes, these are the Clay Brick Pavers to be provided in Alternate #3.

33. Question: There are white boards listed in both classrooms (106 & 107), but no specs or sizes are indicated. Can you please advise on the sizes that are needed and / or provide specifications?

Response: White Board Spec has now been added.

34. Question: Elevation A1/9.3 notes that the tops at the classroom windows are to be Stained Oak. But the detail C3/12.1 (shown on Equipment Plan 11.4) has the tops as plastic laminate PL-01. Which is correct?

Response: Oak window sill is to be stained to match PL01 as noted.

35. Question: A3/12.1 is the center base cabinet a sink base, possibly an ADA front?

Response: No. See updated drawings.

36. Question: B3/12.1 the left base cabinet under the sink, please confirm a sink base cabinet is acceptable as drawers and plumbing can be difficult to coordinate. Please note, the cabinet is too narrow if an ADA front is required.

Response: Yes, this is acceptable. See updated drawings.

37. Question: B2/12.1 the left base cabinet under the sink, please confirm a sink base cabinet is acceptable as drawers and plumbing can be difficult to coordinate.

Response: Yes, this is acceptable. See updated drawings.

38. Question: A2/12.1 at the two sink location, please confirm a sink base cabinet is acceptable as drawers and plumbing can be difficult to coordinate.

Response: Yes, this is acceptable. See updated drawings.

39. Question: C4/12.2 can you provide more information on the 3 base cabinets in the area of the sink. is that an ADA front? Also no dimensions are provided for the wall cabinets.

Response: Yes, this is acceptable. See updated drawings.

40. Question: B3/7.4 calls for oak wood sill painted to match the wall. Does this need to be fire retardant material?

Response: Yes.

41. Question: Ref. Sheets 4.1 and 4.3. Please confirm that no stair access or railings are required around the Storage Mezzanine at the east end of the building.

Response: Correct, no stair access or railings are required around the conc. Lid above rooms 124C, 124D, 125, and 126.

42. Question: Ref. Sheet 14.1. The handrail detail with 2" dia. rail and 1.5" dia. rail and pickets appears to be very heavy. Is this substantial design for the railing necessary?

Response: Please bid per print.

43. Question: The spec section calls for triple glazed units with integral blinds. See drawings for locations. Door and window notes WS1 surface mounted shades within the window frame. These are two different options for the same result. I do not see where either of these occur. If they do can we get locations and which option they want.

Response: There are no "triple glazed units with integral blinds" in the project. WS1 locations called out on 11.1 FIRST FLOOR EQUIPMENT PLAN. See roller shade specification.

44. Question: Will the handrail shown on 4/3.50 be part of this bid? More information is needed.

Response: All items and details shown in the drawings are part of this bid. Please refer to the entire set for full information.

45. Question: Will there be architectural drawings released for this project? They are referred to but are not available in the bid documents.

Response: These have been issued.

46. Question: Where is the handrail shown on 0.3 located and what are the dimensions?

Response: These are standard ADA height requirements. Not architectural or structural details.

47. Question: Only Lintels shown on structural as labeled L-X will be part of this bid. Can you provide all the locations of lintels?

Response: Bidder is responsible for including all items shown on the bid drawings and bid specifications in their bid.

Specifications:

1. Specification 00 01 01 – Table of Contents:
 - A. Section 01 22 00 removed from Table of Contents
 - B. Section 03 33 00 renamed to 03 30 00.
 - C. Section 06 22 00 removed from Table of Contents
 - D. Section 10 11 00 added to Table of Contents
 - E. Section 31 3400 removed from Table of Contents
2. Specification 06 22 00 – Millwork
 - A. Spec section removed. Refer to 12 32 16 – Manufactured Plastic-Laminate-Clad
3. Specification 07 14 16 – Fluid Applied Waterproofing
 - A. Polycoat Products added as acceptable manufacturer
4. Specification 07 27 26 – Fluid Applied Membrane Air & Vapor Barrier:
 - A. Footer section number changed to 07 27 26
5. Specification 08 43 00 – High Performance Aluminum Storefronts
 - A. YKK AP added as acceptable manufacturer
6. Specification 08 43 00 – Interior Aluminum Framed Storefronts
 - A. YKK AP added as acceptable manufacturer
7. Specification 08 71 00 – Door Hardware:
 - A. Hardware schedule has been added.
8. Specification 08 36 13 – Sectional Doors

- A. 2.1.A.2 – Raynor TC-20(20) is no longer available. Raynor TM-220 20 ga. door, its replacement, is to be utilized for pricing purposes.
 - B. 2.3.A.1 – Tracks are to be galvanized tracks.
 - C. 2.6.B.1 – Specs call for jackshaft-type door operators. Trolley operators to be used on low headroom openings.
9. Specification 10 11 00 – Visual Display Units
- A. Specification added
10. Specification 10 14 00 – Signage
- A. Emergency Evacuation Windows have been removed from the signage specification.
11. Specification 12 32 16 – Manufactured Plastic-Laminate-Clad
- A. Specification revised.
12. Specification 13 34 19 – Metal Building Systems
- A. Schulte Building Systems added as acceptable manufacture.
13. Specification 23 30 00 – Air Distribution
- A. Revised Specialized Ductwork
14. Specification 23 35 15 – Dust Collector
- A. Spec added.

Architectural / Structural Drawings:

- 1. Drawing 7.4 – WALL SECTIONS AND DETAILS
 - A. Detail C1 – Site Detail – Bollard has been removed. Refer to civil drawings for bollard details.
- 2. Drawing 8.3 – DOOR SCHEDULE, DOOR TYPES & WINDOW DETAILS
 - A. Windows added to door type “S”
- 3. Drawing 12.1 – CASEWORK ELEVATIONS

- A. A3 CASEWORK ELEVATION modified

HVAC Drawings:

1. Drawing H01 - HVAC LEGEND AND GENERAL NOTES
 - A. Revised cover sheet notation.
2. Drawing H02 - HVAC SCHEDULES
 - A. Revised schedule information and added new schedules.
3. Drawing H03 - HVAC SCHEDULES
 - A. Revised schedule information and added new schedules.
4. Drawing H11 - FIRST FLOOR HVAC PLAN
 - A. Revised ductwork and airflow information.
5. Drawing H12 - SECOND FLOOR HVAC PLAN
 - A. Revised ductwork and airflow information.
6. Drawing H31 - FIRST FLOOR HVAC PIPING PLAN
 - A. Revised pipe routing and thermostat locations.
7. Drawing H32 - SECOND FLOOR HVAC PIPING PLAN
 - A. Revised pipe routing.
8. Drawing H64 - HVAC PIPING DIAGRAMS
 - A. Revised pipe diagram equipment information.
9. Drawing H65 - HVAC PIPING DIAGRAMS
 - A. Revised pipe diagram equipment information.

Plumbing:

1. Drawing P01 - PLUMBING SYMBOL LEGEND AND GENERAL NOTES
 - A. Revised general notes.
2. Drawing P11 - FIRST FLOOR PLUMBING PLAN
 - A. Revised piping and equipment.
3. Drawing P50 - ENLARGED PLUMBING PLANS
 - A. Revised equipment information.

- - - END OF ADDENDUM NO. 03 - - -

Attachments:

Specification 00 01 01 – Table of Contents
Specification 07 14 16 – Fluid Applied Waterproofing
Specification 07 27 26 – Fluid Applied Membrane Air & Vapor Barrier
Specification 08 36 13 – Sectional Doors
Specification 08 43 00 – High Performance Aluminum Storefronts
Specification 08 43 00 – Interior Aluminum Framed Storefronts
Specification 08 71 00 – Door Hardware
Specification 10 11 00 – Visual Display Units
Specification 10 14 00 – Signage
Specification 12 32 16 – Manufactured Plastic-Laminate-Clad
Specification 13 34 19 – Metal Building Systems
Specification 23 30 00 – Air Distribution
Specification 23 35 15 – Dust Collector



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Drawing 7.4 – WALL SECTIONS AND DETAILS

Drawing 8.3 – DOOR SCHEDULE, DOOR TYPES & WINDOW DETAILS

Drawing 12.1 – CASEWORK ELEVATIONS

Drawing 12.2 – CASEWORK ELEVATIONS

Drawing H01 - HVAC LEGEND AND GENERAL NOTES

Drawing H02 - HVAC SCHEDULES

Drawing H03 - HVAC SCHEDULES

Drawing H11 - FIRST FLOOR HVAC PLAN

Drawing H12 - SECOND FLOOR HVAC PLAN

Drawing H31 - FIRST FLOOR HVAC PIPING PLAN

Drawing H32 - SECOND FLOOR HVAC PIPING PLAN

Drawing H64 - HVAC PIPING DIAGRAMS

Drawing H65 - HVAC PIPING DIAGRAMS

SECTION 233000 - AIR DISTRIBUTION

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Ductwork
- B. Inserts, Hanger and Supports
- C. Flexible Duct
- D. Flexible Duct Connections
- E. Ductwork Access Doors
- F. Dampers and Deflectors
- G. Grilles and Diffusers
- H. Louvers
- I. Cleaning of Air Conveyance System

1.2 QUALITY ASSURANCE

- A. Air Distribution System Cleanliness
 - 1. The air distribution system shall be free of construction debris. New ductwork installation shall comply with this Specification and SMACNA Duct Cleanliness for New Construction Guidelines - Intermediate Duct Cleanliness Level.
 - a. Protect ductwork and air distribution equipment stored on site and during delivery, from construction dust and debris and from moisture such as rainwater and building system leaks. Ductwork stored on the project site shall be stored off the ground, on wood pallets or blocks and covered with plastic or tarps to prevent from becoming covered with construction dust or debris prior to installation.
 - b. The internal surfaces of ductwork and air distribution equipment shall be wiped to remove dust, immediately prior to installation.
 - c. Installed ductwork and air distribution equipment shall be protected prior to air distribution system operation. All open ends of ductwork or openings to equipment shall be covered/sealed to prevent entry of dust and debris. This includes both completed systems and overnight work in progress.

- d. Protect ductwork and air distribution equipment with methods meeting the following minimum standards.
 - 1) Ductwork openings for ductwork installed or stored on site
 - a) Plastic adhesive film: colored for easy identification on the project site. Thickness: minimum 2.5 mils. Tensile strength: minimum 11 pounds per inch.
 - b) Protective cover bag: colored for easy identification on the project site. Polypropylene plastic. Thickness: .002 mil. Elastic end band.
 - 2) Air distribution equipment openings
 - a) Plastic coverings as described for ductwork.
 - b) Plywood or sheet metal with protective tape around edges.
 - c) Plastic shrink wrap.
 - 3) Plastic garbage bags, grocery bags, scrap plastic sheeting, are not acceptable for use in protection of air distribution systems.
 - e. Remove all ductwork and air distribution equipment protection prior to equipment start up, testing, and balancing. Dispose of removed materials properly and remove from site.
- 2. If air distribution system is to be used during construction, comply with the following requirements:
 - a. Cover all outdoor air and return air openings to duct system with temporary construction filters. Filters shall be a minimum of MERV 8. Replace filters when dirty. At completion of construction, filters shall be removed.
 - b. In addition to filters specified on outdoor air and return air duct openings, provide specified pre-filters and final filters in air handling equipment. Replace periodically when dirty. Do not operate air handling equipment without specified pre-filters and final filters installed.
 - c. After construction is complete and before project turnover, provide new (clean) pre-filters and (clean) final filters in air handling units.
 - 3. If ductwork and/or air distribution equipment become dirty or contaminated with construction dust, dirt, or debris, during delivery or installation, while stored or installed on site, or being operated during construction, equipment and/or ductwork shall be cleaned.
 - a. Cleaning to include air handling units, fans, ductwork, terminal units, coils, dampers, louvers, grilles and diffusers.

- b. Contractor shall be a member of the National Air Duct Cleaners Association (NADCA) and certified by NADCA to perform Air Conveyance System (ACS) cleaning.
- c. The standard of cleanliness shall be consistent with NADCA Standard ARC - 2013: Assessment, Cleaning and Restoration of HVAC Systems.
- d. Interior of the entire air distribution system shall be cleaned using direct contact vacuum methods. Provide access openings at intervals that will enable the cleaning technician to maintain close contact with the surfaces being cleaned. Remote type vacuuming, air washing or cleaning methods utilizing hoses longer than can be visually observed from the point of insertion are not acceptable.
- e. All access openings shall be closed with prefabricated sheet metal cover plates, fastened with sheet metal screws and caulked to prevent air leakage. Access openings cut into round ductwork shall be closed with Ductmate brand round access doors to ensure proper air tight enclosure. Any rigid or blanket type insulation removed to allow for installation of duct access openings shall be re-installed and seams covered and secured to eliminate any heat or cooling loss.

B. Duct Leakage Testing

- 1. The HVAC Contractor shall be responsible for sealing all ductwork and performing duct leakage testing in accordance with procedures described in Chapter 23 of AABC's National Standards, Sixth Edition, 2002. Allowable leakage shall not exceed 2% of design airflow in duct section being tested. Test pressure shall be equal to duct construction pressure. The following systems shall be tested:
 - a. Supply ductwork upstream of VAV terminal units
 - b. Exhaust ductwork
 - c. Return ductwork
 - d. Smoke exhaust ductwork
 - e. Stair pressurization ductwork
 - f. Ductwork installed outdoors
- 2. All duct leakage testing shall be witnessed, and results verified by a certified AABC or NEBB test agency. Copies of the final results, as witnessed by the test agency, shall be included in the Operating and Maintenance Manual.
- 3. If any portion of the ductwork system fails the duct leakage test, the HVAC Contractor shall be responsible for correcting all deficiencies and providing additional testing until leakage is within acceptable limits.

1.3 SUBMITTALS

- A. Refer to Section 230100 and 23 01 01 for additional information.

- B. Submit product data for all manufactured items listed in paragraph 1.1 WORK INCLUDES.
- C. Prior to start of work submit [full size hard copies and] electronic ductwork fabrication drawings in AutoCAD format indicating duct layout, fittings, gauges, sizes, welds, reinforcing, elevations and configuration.

1.4 CONSTRUCTION DOCUMENTATION

- A. Refer to Section 230101.
- B. Submit ductwork pressure test documentation upon completion of testing. Include final copies in the Operating and Maintenance Manuals.

PART 2 - PRODUCTS

2.1 DUCTWORK

- A. General Ductwork
 - 1. Ductwork and plenum chambers shall be constructed to the gauge (26 minimum) and corresponding reinforcing schedule as indicated in the latest edition of SMACNA Standards.
 - 2. Ductwork shall have a minimum thickness of 26 gauge for code compliance as a fully ducted system. Deviation from this requirement may prompt the need for additional fire dampers.
 - 3. All ductwork shall be constructed of galvanized steel except where indicated to be of another material. Exposed ductwork in Architecturally finished spaces shall be fabricated G90 galvanized steel and thoroughly cleaned prior to painting.
- B. Ductwork with a static pressure above 2-inches.
 - 1. Round Ductwork
 - a. Galvanized steel spiral conduit, lock seam construction.
 - 1) Fittings, welded steel construction for tight slip fit with spiral. Provide connections from mains to branches or to flexible ducts with conical tee take-off.
 - 2) All spiral ducts and fittings shall be as manufactured by United Sheet Metal Co., Semco or Lindab.
 - 2. Rectangular Ductwork
 - a. Construct of galvanized steel of the U.S. standard gauge indicated in the latest edition of SMACNA Standards.

C. Special Service Ductwork

1. Hood exhaust: 18 gauge (minimum) type 304 stainless steel with welded joints.
2. Dust collection exhaust: Galvanized G90 steel spiral pipe fabricated from 5.394" slit coil with 4-ply lock seam. Grooved seam material must be formed on the exterior of the duct, creating a smooth inside surface.
 - a. Connections shall be made with angle rings welded to the spiral duct. Angle rings shall have prepunched holes for bolt connection and fabricated from the same material as the duct. Connection shall be bolted together with neoprene gasket between the connection angle rings.
 - b. Fittings shall consist of the same duct construction and angle rings. and consist of sweep elbows, reducers, and full body takeoff wyes. Duct tees and short radius elbows are not allowed. Final tap off of main shall be full body takeoff with end cap.
 - c. Duct access doors shall be heavy-duty sandwich type with bolt fasteners.
 - d. Duct system shall be capable of negative 20 in wg of pressure.

D. Air Duct Sealants

1. Air duct sealants shall conform to NFPA 90A, ASTM E84, ASTM E96, UL181A, and UL181B.
2. Acceptable manufacturers: Ductmate Industries, Inc. "Proseal" or "Fiberseal", RCD Corp. Provide all products in this section from a single manufacturer.
3. Air duct sealant: Ductmate Industries, Inc. "Proseal", water-based, 66% solids content, 11 lbs. per gallon, non-flammable, synthetic latex emulsion for permanently sealing fabricated joints and seams of sheet metal air ducts, UL 181 listed rigid fiberglass air ducts, UL181 listed flexible air ducts and thermal insulation; for repairing damaged and leaking air duct.
4. Air duct sealant where fiberglass reinforcement is required. Ductmate Industries, Inc. "Fiberseal", water-based, 66% solids content, 11 lbs. per gallon, non-flammable, synthetic latex emulsion with polypropylene fiber reinforcement for permanently sealing fabricated joints and seams of sheet metal air ducts, UL181 listed rigid fiberglass air ducts, UL181 listed flexible air ducts and thermal insulation; for repairing damaged and leaking air ducts.
5. Sealant application temperature: 35 degrees F to 110 degrees F; Sealant service temperature: -25 degrees F to 175 degrees F; Storage temperature: 40 degrees F to 85 degrees F.
6. VOC content of air duct sealants shall not exceed 10 grams per liter.

E. Acoustic Duct Lining

1. Where indicated, for ductwork located inside building line ductwork with 1-1/2 inch thick Owens-Corning QuietR Acoustic Duct Liner (R-Value = 6.3). Coating shall be UL rated for flame spread less than 25 and smoke developed less than 50. Lining to be installed with stick-klips and adhesive per manufacturer's instructions.
2. Where indicated, for supply and return air ductwork located in unheated areas or ventilated attics, line ductwork as specified above except lining shall be 2 inch thick (R-Value = 8.0).
3. Where indicated, for supply and return ductwork located outdoors, line ductwork as specified above except lining shall be 1 inch thick (R-Value = 4.2). In addition, provide insulation on the exterior of the duct. Refer to the Ductwork Insulation Schedule for additional information.
4. Equivalent Manufacturers: Knauf, Certain Teed, and Johns Manville.

2.2 INSERTS, HANGERS AND SUPPORTS

- A. Manufacturer: Basis of design shall be Anvil. Other acceptable manufacturers include Mason, Modern or Erico/Caddy.
- B. Provide all inserts, hangers, anchors, guides and supports to properly support and retain ductwork and prevent sway and vibration.
- C. Provide inserts for support of work in concrete construction.
- D. Provide forged steel beam clamps when attaching to steel construction.
- E. Provide supplementary steel angles, channels, and plates where supports are required between building structural members, span the space and attach to building structural members by welding, bolting or anchors.
- F. Provide hangers, threaded rods, anchors, and all other miscellaneous specialties for the attachment of hangers and supports to structure.
 1. For up to 3/4 inch diameter rod: Anvil Figure 92, 93, or 94 beam clamps.
 2. For 7/8 inch and 1 inch diameter rod: Anvil Figure 134 beam clamp with Anvil Figure 290 eyenut.
 3. Pressed steel beam clamps are not permitted.
- G. Provide rods, angles, rails, struts, brace plates, and platforms required for suspension or support of ductwork.
- H. Do not support ductwork from another pipe or ductwork. Do not support ductwork from conduit. Do not support ceiling framing or lighting from ductwork. Do not support any item from metal roof deck.
- I. Support ductwork with 16 gage galvanized steel strap hangers, steel rods or steel trapeze hangers per SMACNA Standards. Maximum spacing 8'-0".

- J. Where fireproofing is removed or damaged to allow attachment to building structural members, repair to maintain integrity of fireproofing.

2.3 FLEXIBLE DUCT

A. Type 1 - Insulated

1. Tested and classified by Underwriters Laboratories, Inc. as Class 1 Air Duct and labeled in accordance with Underwriters Laboratories, Inc. Standard for Air Ducts, UL 181. The flame spread rating shall be 25 or less and the smoke developed rating shall not exceed 50.
2. Flexible ductwork shall be rated for low or high pressure with a vapor transmittance of 0.05 perm per ASTM E96, Procedure A. Minimum positive pressure rating shall be 6" w.g. for sizes up to 12", and 4" w.g for size 14" and above. Minimum negative pressure rating shall be $\frac{3}{4}$ " w.g for sizes up to 12", and $\frac{1}{2}$ " w.g for sizes 14" and above. Minimum rated air velocity of 5000 feet per minute.
3. Inner core construction shall be double or triple laminated, polyester, or Chlorinated polyethylene (CPE) that is permanently bonded to or encapsulating a steel wire helix. Outer jacket shall be made of fiberglass scrim reinforced metalized polyester.
4. Fiberglass insulation sleeve shall have minimum thermal resistance value of R-4.2. Flexible duct shall be manufactured with the following information printed on the exterior jacket: name of manufacturer, thermal resistance R-value at the specified thickness, flame spread and smoke development of the composite material.
5. Product shall carry a minimum 5 year limited warranty.
6. Manufacturer: Atco UPC #030, Flexmaster Type 5M, or Thermaflex Type M-KE.

B. Type 2 - Non-Insulated

1. Tested and classified by Underwriters Laboratories, Inc. as Class 1 Air Connector and labeled in accordance with Underwriters Laboratories, Inc. Standard for Air Ducts, UL 181. The flame spread rating shall be 25 or less and the smoke developed rating shall not exceed 50.
2. Flexible ductwork shall be rated for low or high pressure with a minimum positive pressure rating of 6" w.g. for all diameters. Minimum negative pressure rating shall be $\frac{3}{4}$ " w.g for all diameters. Minimum rated air velocity of 5000 feet per minute.
3. Construction shall be double or triple laminated, metalized polyester that is permanently bonded to or encapsulating a steel wire helix.
4. Product shall carry a minimum 5 year limited warranty.
5. Manufacturer: Atco UPC #050, Flexmaster Type 5NI, or Thermaflex Type S-LD.

C. Type 3 - Non-Insulated

1. Tested and classified by Underwriters Laboratories, Inc. as Class 1 Air Connector or Class 0 Air Duct and labeled in accordance with Underwriters Laboratories, Inc. Standard for Air Ducts, UL 181. The flame spread rating shall be 25 or less and the smoke developed rating shall not exceed 50.
2. Flexible ductwork shall be rated for low or high pressure with a minimum positive pressure rating of 6" w.g. and negative pressure rating of 4" w.g. for all diameters. Minimum rated air velocity of 4000 feet per minute.
3. Construction shall be heavy gauge corrugated aluminum with water tight continuous lock seams.
4. Product shall carry a minimum 5 year limited warranty.
5. Manufacturer: Atco UPC #017, Cleveflex Type S, or Flexmaster Type NI-TL.

2.4 FLEXIBLE DUCT CONNECTIONS

- A. Provide flexible connections with 1 inch slack between ducts and fans where indicated. Flexible material shall be Duro Dyne Metal Fab with "Grip Loc" metal to fabric seam.
- B. Flexible fabric shall be UL classified black neoprene coated woven fiberglass (weight 30 oz/sq.yd.)

2.5 DUCTWORK ACCESS DOORS

- A. Ductwork access doors shall be double wall with 1 inch thick insulation, latches, hinges and felt gaskets Cesco-Advanced Air model HADF-10, Ventlock, Duro Dyne or Ruskin.
- B. Access door material and pressure classification shall match ductwork in which it is installed.
- C. Main door hardware shall include three hinges with latches operable from either side, and all other access doors shall include two hinges and latches. Open doors outward on suction side, inward on pressure side. Doors shall be double wall construction with minimum 6 pound density fiberglass insulation.

2.6 DAMPERS AND DEFLECTORS

- A. Furnish and install all manual dampers, and deflectors where indicated or where necessary to properly distribute and balance air. Provide damper in each supply duct leaving duct main and in each branch serving individual supply, return and exhaust outlets and where otherwise indicated.
- B. Dampers shall be fabricated with blades no larger than 8 inches wide by 48 inches long. Dampers over 48 inches in length shall have intermediate support and bearings.

- C. Provide all manual dampers with Young Regulator Company, Ventlock or Duro Dyne operators. Use Young Regulator No. 443-B operators for balancing dampers. Opposite end of damper rod shall have Young Regulator No. 670 or 656 bearing set.
- D. Where dampers are concealed above inaccessible ceilings or behind walls [provide access doors] [provide adjustable concealed ceiling regulators with flush prime coated cover plate].
- E. Install additional dampers where required by the Air Balance Contractor to properly adjust the system air volumes.

2.7 GRILLES AND DIFFUSERS

- A. See Drawings for all grille, diffuser and accessory specifications, locations and air quantity.
- B. In general, Titus grilles and diffusers are specified, equals as manufactured by Anemostat, Krueger, E. H. Price Company, Tuttle and Bailey or Nailor-Hart are acceptable.
- C. All grilles, registers and diffusers shall have a factory applied white finish unless noted otherwise.
- D. Refer to Architectural Drawings for exact location of ceiling diffusers.

2.8 LOUVERS

- A. Louvers shall be provided by the HVAC Contractor.
- B. Louvers: 6 inch deep, stormproof, extruded aluminum, with 1/2 inch square mesh aluminum screen on interior face. Water penetration: 0.01 ounces of water per square foot of free area at a velocity of 875 FPM according to AMCA test. AMCA certified ratings for both water penetration and air performance.
- C. Finish: Provide with the following finish: [mill] [Kynar] [anodized]. [Color to be selected by Architect.] [Custom color to be selected by Architect.]
- D. Manufacturer: American Warming, Model LE-31, or equivalent by Airolite, Arrow or Ruskin.

2.9 CLEANING OF AIR CONVEYANCE SYSTEMS

- A. General Description of Work
 - 1. The work to be accomplished under this project includes thoroughly cleaning existing ductwork and air handling equipment associated with the HVAC systems as identified on the drawings.

2. The area of operation is an occupied facility and disruptions shall be held to a minimum.
3. Refer to Part 3 - Execution of this section.

B. Scope of Work

1. The work consists of furnishing all labor, supervision, materials and equipment necessary to clean the ductwork and HVAC components as indicated. Cleaning to include existing supply, exhaust and return ductwork, reheat coils, dampers, grilles and diffusers.

C. Project Scheduling

1. Schedule and coordinate all work with the Owner and with work of other trades.
2. Prior to start of work, Contractor shall provide the Owner with a schedule of the work to be performed.

D. Work Hours

1. Work hours will be pre-approved by the Owner.
2. All systems shall be assumed to be in operation during cleaning. Coordinate with the progress of other construction.

E. Project Reports

1. The Contractor will be required to leave a daily status report for the Owner's Construction Representative.
2. Provide a list of any mechanical or ductwork deficiencies noted during performance of services, to allow for immediate corrective action.

F. Qualifications of Contractor and Required Standards

1. Contractor shall be member to the National Air Duct Cleaners Association (NADCA) and is certified by NADCA to perform Air Conveyance System (ACS) cleaning.
2. Contractor shall be regularly engaged in the field of ACS cleaning and submit a list of references upon request.
3. The standard of cleanliness shall be consistent with the current NADCA Standard 1992-01, titled "Mechanical Cleaning of Non-Porous Air Conveyance System Components".

G. Protection of Property and Occupants

1. Keep doorways and aisles clear of any equipment and materials at all times.
2. All equipment and furniture shall be covered and protected from any dust or contaminants in each work area.
3. Keep work areas neat and orderly at all times.

4. All vacuum equipment utilized to clean the Air Conveyance System shall be HEPA filtered to prevent contamination of the occupied space.

H. Materials, Services and Utilities

1. Water: Furnished by the Owner at no cost to the Contractor.
2. Electricity: Furnished by the Owner at no cost to the Contractor, from existing electrical system adjacent to the site. All connections to the power source - cables, equipment, temporary lighting, etc., shall be provided by the Contractor.
3. Waste Disposal: Contractor will be responsible for the disposal of all solid and liquid waste.

PART 3 - EXECUTION

3.1 GENERAL

- A. Provide all sheet metal work as indicated and according to the latest edition of the ASHRAE guide and data book, SMACNA standards and this specification, the most demanding of which shall be the minimum standard.
- B. Install ductwork where indicated. Make all necessary changes in cross sections and offsets, whether or not specifically indicated.
- C. All changes in cross section shall be made without reducing the design area of the duct.
- D. Cap all open ends of ductwork until connected to grilles, diffusers, equipment to prevent entrance of debris, dust, etc.
- E. No pipe or other obstructions shall pass through air ducts.
- F. Install all ductwork run above ceiling so as to maintain design ceiling heights, ductwork run exposed shall be installed to provide maximum headroom in all rooms and corridors.
- G. Locate ductwork a sufficient distance from walls, piping, other ductwork, other obstacles, to permit application of full thickness of insulation specified.
- H. Ducts passing through exterior walls shall be provided with weatherproof flashings, ducts passing through roof shall be provided with roof curb and counter flashing. Where ducts pass exposed through interior building walls provide a sheet metal collar to conceal the gap between the wall opening and the duct.
- I. Ducts shall not be hung from other ducts, pipe, conduit or from metal deck.

- J. Ducts exposed to the weather shall be constructed with waterproof joints. Coat the entire duct and supports with aluminum color outdoor vapor barrier mastic.
- K. Duct dimensions are gross including dimensions for lined ducts where dimensions are outside sheet metal size.
- L. Set all automatic air control dampers furnished by the Automatic Temperature Control Contractor.
- M. All joints and seams in ducts shall be air-tight; poorly made joints, splits, visible holes at corners, etc., shall be reworked or new pieces of ductwork installed. Where excessive pulsating of ductwork or plenum housing is found, additional stiffeners shall be added. Any cracking in the coating around seams or joints, or in any other part of the formed ducts that is apparent upon inspection shall be sufficient to warrant rejection.
- N. Sheet metal exposed to view through air distribution devices in finished areas of the building shall be coated with primer and a flat black finish coat.
- O. Provide flexible duct connections at all fan inlets and outlets.
- P. Size openings for ductwork penetrating non fire-rated walls and floor or ceilings so the opening is 1/2 to 3/4 inches larger than the duct or sleeve. Loosely stuff the annular opening with glass or mineral fiber, and caulk both sides with a non-aging, non-hardening acoustical sealant.
- Q. Provide ductwork access doors for each automatic damper, fire damper, fire/smoke damper, smoke damper, smoke detector, reheat coil inlet and outlet, humidifier and where indicated. Locate access doors to allow proper access to and inspection of the device.

3.2 DUCTWORK

A. General Ductwork

- 1. Ductwork shall be constructed per SMACNA Standard for the static pressure and seal class as follows:

System	Static Press.	Seal Class
Supply ductwork upstream of terminal units	3	A
Supply ductwork downstream of terminal	2	A

units		
Return ductwork	2	A
Exhaust ductwork	2	A
Smoke exhaust ductwork	4	A
Stair pressurization ductwork	3	A

2. Radius elbows shall be utilized throughout the ductwork system. Splitter vanes are not required where full radius elbows are used. Do not substitute 90° mitered elbows with turning vanes without prior approval of the Engineer.
3. Branch connections shall be 45 degree entry for rectangular and round ducts. Straight taps are not permitted. Conical tees are acceptable in round branch take-off from round duct mains.
4. Seal all seams, joints, fasteners, penetrations and connections per SMACNA requirements.

B. Ductwork Identification

1. All ductwork (supply, return, exhaust, etc.) serving multiple spaces or floors shall be identified with directional flow arrows and unit identification numbers (AHU-1, EF-1, etc.) on the side of each duct (or bottom if abutting other systems or obstructions).
2. All identification numbers and flow arrows shall be stencil painted or similar to Seton Name Plate Company vinyl labels. Refer to Section 230300 for stenciling requirements.

3.3 FLEXIBLE DUCT

- A. Flexible duct shall only be used in non-visible locations above a ceiling. Type shall be as follows:
 1. Type 1: Supply air connections to diffusers and air terminal unit inlets.
 2. Type 2: Return and exhaust air connections to grilles.
 3. Type 3: Return and exhaust air connections to air terminal unit inlets.
- B. Flexible duct shall not be used where ductwork is exposed (visible). Flexible duct shall not penetrate through walls or floors - rigid sheetmetal ductwork is required at all wall or floor penetrations. Flexible duct shall not be installed in chases.
- C. Install flexible duct per manufacturer's recommendations.

- D. The minimum length of flexible duct shall be used. Install flexible duct fully extended free of sags and properly supported to avoid any kinks or airflow restrictions. Support with 3 inch wide saddle type supports as manufactured by Thermo Manufacturing Inc. Do not lay unsupported on ceiling tiles.
- E. Secure flexible duct in place with duct adhesive and plastic band using banding tool supplied by manufacturer. Adhesive shall be RCD No. 8, Duro Dyne "DSW" or MEI ECC EZ Seal 44-41. Adhesive must be compatible with flexible duct material. Where insulated flexible duct is used, insulation vapor barrier shall be taped in place tight to duct collar connections with two (2) complete wraps of duct tape.
- F. Maximum length of flexible duct connections to diffusers and grilles shall be 60 inches. Bends shall be made with not less than one duct diameter centerline radius.
- G. Maximum length of flexible duct connections to air terminal unit inlets shall be 24 inches. Maximum bend shall be 22 degrees.

3.4 LOUVERS

- A. Install louver plumb in opening. Seal edges air and water tight with silicon caulk matching louver or brick color.
- B. Insulate unused, interior portions of louvers with 1 inch thick polyisocyanurate (R= 6.0 minimum) cover exterior and interior sides of insulation with 20 gauge galvanized sheetmetal with stainless steel fasteners.

3.5 CLEANING OF AIR CONVEYANCE SYSTEMS

- A. Ductwork - The interior of all supply, exhaust and return, ductwork shall be cleaned using direct contact vacuum methods. Utilizing existing and newly cut access openings in the duct system at intervals that will enable the cleaning technician to maintain close contact with the surfaces being cleaned. Note remote type vacuuming, air washing or cleaning methods utilizing hoses longer than can be visually observed from the point of insertion are not acceptable.
- B. Existing reheat coils shall be vacuum cleaned to remove surface contamination then pressure washed to remove debris from between coil fins.
- C. Dampers shall be cleaned. If dampers must be moved to ensure complete cleaning, they shall be marked and returned to their original position to prevent unbalancing the system.
- D. Where applicable all existing grilles and diffusers and their internal components shall be removed, washed and replaced in their original position.

- E. The ceiling/walls surrounding the grilles and diffusers shall be vacuum cleaned to remove loose dirt accumulation.
- F. Every effort shall be made to clean the ductwork and components, which includes cutting access into the ductwork and removing panels from equipment.
- G. Access Openings
 - 1. Contractor shall provide access openings as required for proper cleaning, at various points of the ductwork, for physical and mechanical entry.
 - 2. Access openings in rectangular ductwork shall be closed with prefabricated sheet metal cover plates, fastened with sheet metal screws and caulked to prevent air leakage.
 - 3. Access openings in round ductwork shall be closed with Ductmate brand round duct access doors to ensure proper air tight enclosure.
 - 4. Any rigid or blanket type insulation removed to allow for the installation of duct access doors shall be re-installed and seams covered and secured to eliminate any heat or cooling loss.
- H. Contractor shall prevent dust and contaminants from returning to air handling unit.

END OF SECTION

SECTION 233515 – DUST COLLECTOR

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Dust Collector
- B. Inlet Explosion Isolation Valve
- C. High Speed Abort Gate

1.2 SUBMITTALS

- A. Refer to Section 230100 and 23 01 01 for additional information.
- B. Submit product data for all manufactured items listed in paragraph 1.1 WORK INCLUDES.

1.3 QUALITY ASSURANCE

- A. Unit capacity rated according to AHRI Standard 340/360.
- B. Unit sound rating according to AHRI Standard 270.
- C. Roof curb designed to conform to NRCA standards.
- D. Unit insulation and adhesive shall meet NFPA 90A.

PART 2 - PRODUCTS

2.1 DUST COLLECTOR:

- A. General: Packaged dust collector units shall be type, size and configuration indicated. Cooling capacity ratings shall be based upon ARI Standard 360. Unit shall consist of weather-tight casing with filters, compressed air pulse cleaning system, blower with direct drive motor, safety filters, particulate filters, dry type fire suppression system, support legs/sub-structure, unit controls, variable frequency drive, and rupture disk explosion relief vent. Units shall be multiple piece construction as manufactured at the factory with site assembly by manufacturer. Units shall be factory run tested to include the operation of all fans and control sequences.
- B. Unit Casing: Corrosion resistant triglycidyl isocyanurate polyester powder coated 7 and 10 gauge steel. Roof panels shall be sloped to provide positive drainage of rain water or melting snow away from the cabinet.

- C. Casing Access: Fully gasketed 10 gauge steel doors on bar hinges. Doors shall be sealed by a heavy-duty lift camber mechanism. Doors shall be reversible and capable of lock out tag out.
- D. **Blower – Direct drive backward inclined non-overloading wheel.**
- E. Blower Control Method: Variable frequency drive, provided by manufacturer.
- F. Motor: High efficiency open drip-proof. Motor shall have a standard T-frame and a minimum service factor of 1.15.
- G. Filter Module: Vertically mounted cartridge filters. Filters shall be self-positioning within support frame, cam locking bars shall retain filters to their track and accessible via bar hinged access panels. Filter shall be corrugated cylinder with internal cone. Cartridge median shall be fire retardant and rated at MERV 10. Compressed air pulse cleaning system shall purge filters removing dust to the hopper module below. The inlet plenum of the filter module shall have a staggered channel inlet baffle.
- H. Safety Filter Module: Riga-Flo filters shall have 95% ASHRAE efficiency. Filters shall clamp into position with cam locking bars. Integrated Riga-Flo safety monitoring system is necessary for recirculating air back to the building and will act as flame arrestor.
- I. Explosion Vent: A domed rupture disk type explosion relief vent with a Kst of 400 bar-m/s or less. Vent shall have an angle discharge plenum (55 deg) to ensure that venting is up and away from surrounding elements. Angled vent plenum shall have a weather cover to prevent water from entering the plenum.
- J. Controls:
 - 1. General: Provide a factory run tested, stand alone, microprocessor control system suitable for variable volume control. The system shall consist of pressure (transducer) sensors, modular printed circuit boards (for ease of service or retrofit), and a operator interface panel. Microprocessor equipped with on-board diagnostics to indicate that all hardware, software, and all interconnected wiring and sensors are in proper operating condition.
 - 2. Provide fan and control interlock to explosion isolation valve.
 - 3. Provide control interlock to high speed abort gate.
 - 4. Dust collector pressure sensor shall be configured in field per **manufacturer's requirements.**
 - 5. Operator Interface panel mounting: Remotely mounted.
- K. System Controls:

1. Variable volume.
 - L. Generic Building Automation Interface: Consisting of the following: 1 binary input, 4 analog inputs, 5 digital outputs.
 - M. Disconnect Switch: Non-fused type with external handle.
 - N. Vibration Isolation: Spring type isolators for supply and exhaust fans.
 - O. Agency Approval: UL listed with all components and construction in accordance with NFPA.
 - P. Manufacturers: Camfil APC Gold Series or equivalent as determined by the engineer.
- 2.2 INLET EXPLOSION ISOLATION VALVE:
- A. General: Passive flow activated inlet isolation flap valve. To protect the ductwork and spaces from a deflagration event in the dust collector. Valve shall utilize a removable/replaceable blade and blade seat. The valve house shall have angle ring flanges and single access door. Activation sensor shall be hermetically seal and wired to a NEMA 4 junction box. Valve shall be interlocked to dust collector blower for fan shutdown.
 - B. Manufacturers: Camfil APC Stinger or equivalent as determined by the engineer.
- 2.3 HIGH SPEED ABORT GATE:
- A. General: Inline discharge high speed abort gate consisting of a spring assisted damper with electromagnetic lock. The lock shall be activated by spark detectors located upstream of the gate. Abort gate shall be selected by the dust collector manufacturer and installed in accordance with NFPA. Spark detectors shall be provided by abort gate manufacturer.
 - B. Manufacturers: Flamex or equivalent as determined by the engineer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install dust collector on exterior concrete equipment pad.
- B. Install all loose equipment and accessories furnished by dust collector manufacturer.

- C. Contact manufacturer to review installation procedures for all field installed accessories.
- D. Perform all miscellaneous wiring not specifically shown on the Electrical Drawings in order that all field installed accessories operate in accordance with the manufacturer's intentions.
- E. Make final duct connections to the unit.
- F. Coordinate final compressed air connections to the dust collector with plumbing contractor.
- G. Coordinate final sprinkler connections to the dust collector with fire protection contractor.
- H. Coordinate final wiring connections and requirements with electrical contractor. Coordinate remote VFD installation with electrical contractor.
- I. Coordinate final fire alarm connections to the dust collector and associated equipment with the fire alarm contractor.
- J. Coordinate final BAS connections to the dust collector with the temperature controls contractor.

END OF SECTION



S&L Harris/Day Architecture



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EXPIRATION DATE 12/31/2025
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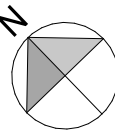
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St Clairsville, OH, 43950

EDA AWARD NUMBER: 06-01-06458

**100% CONSTRUCTION DOCUMENTS:
07/08/2024**

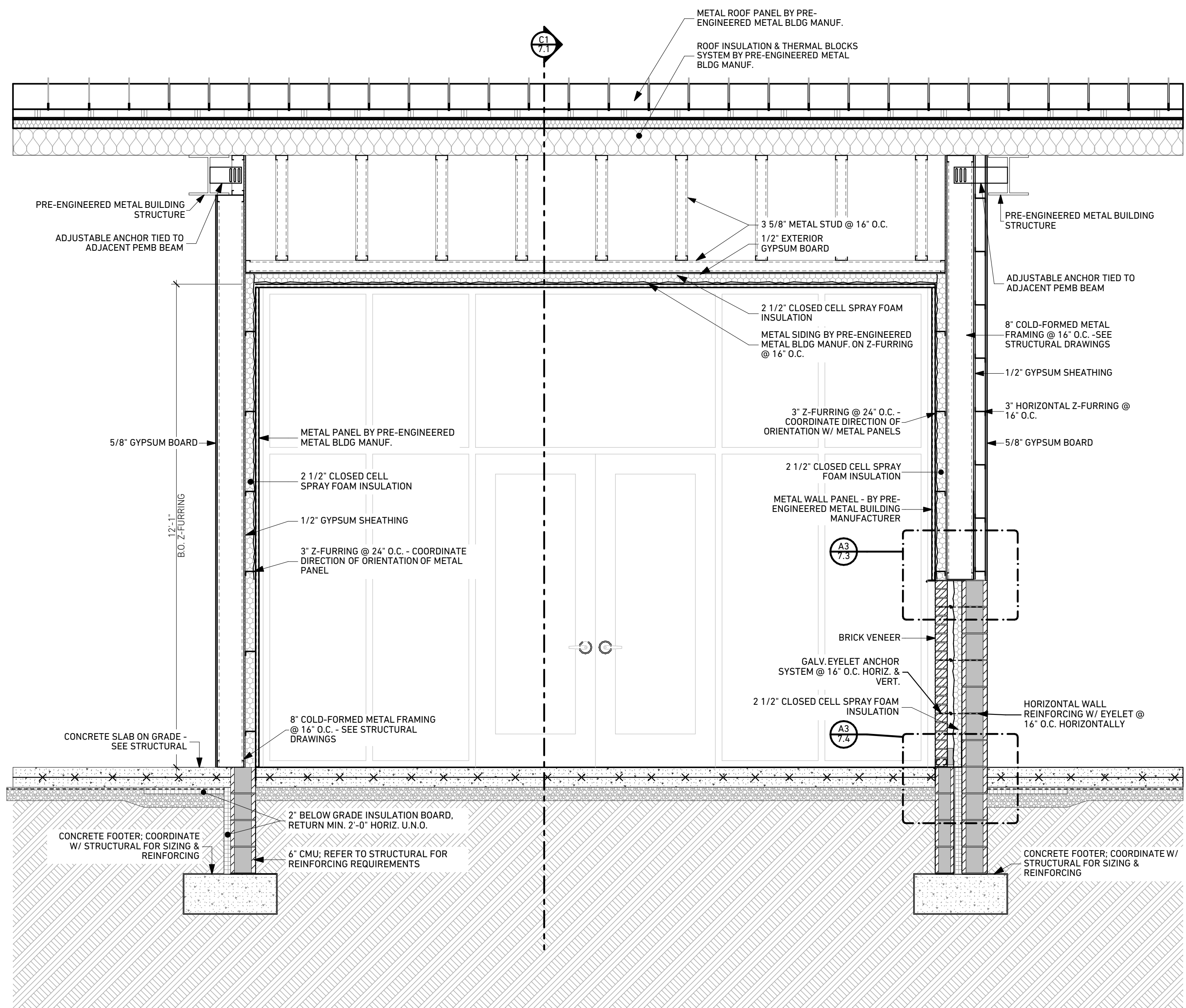
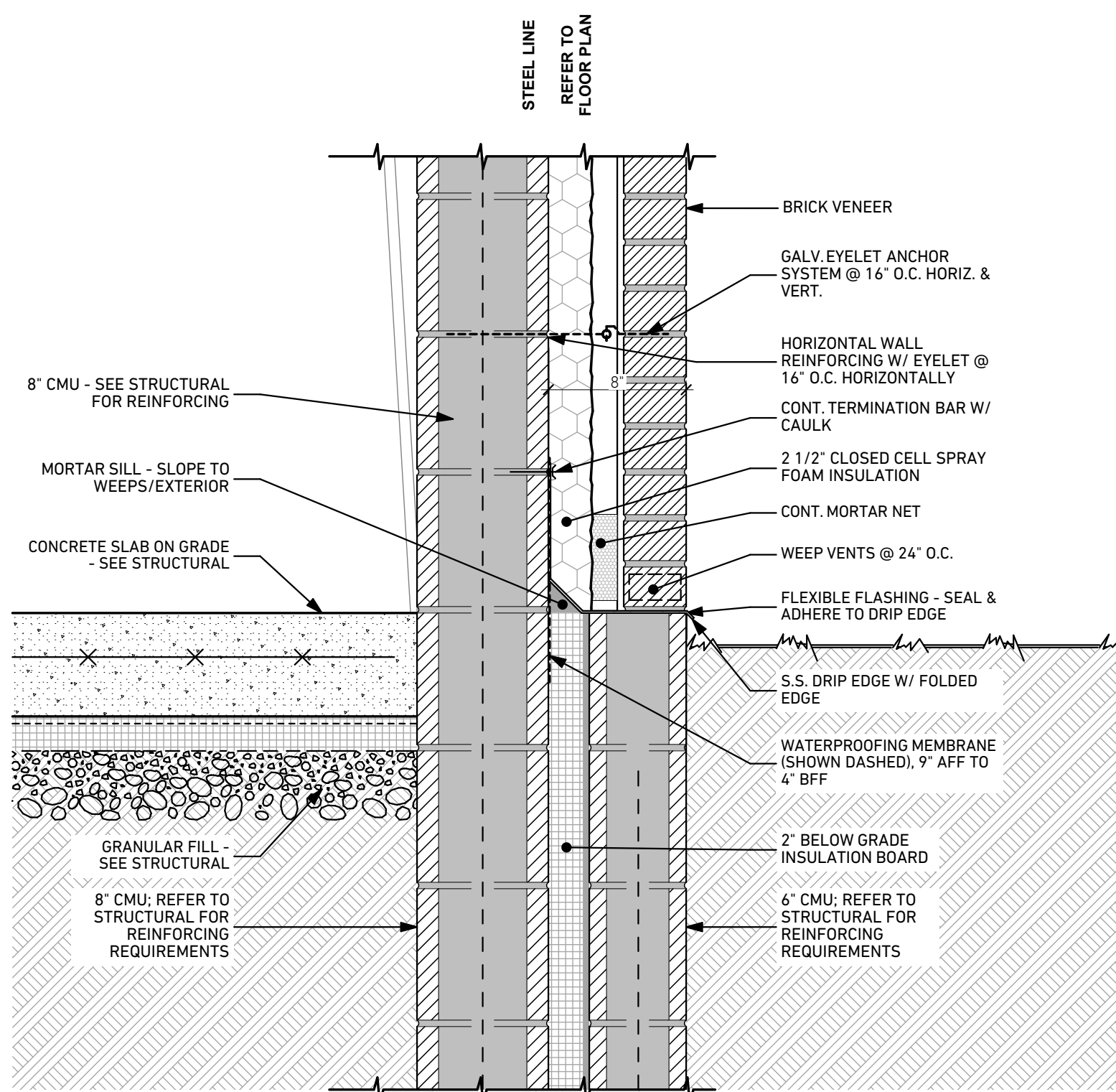
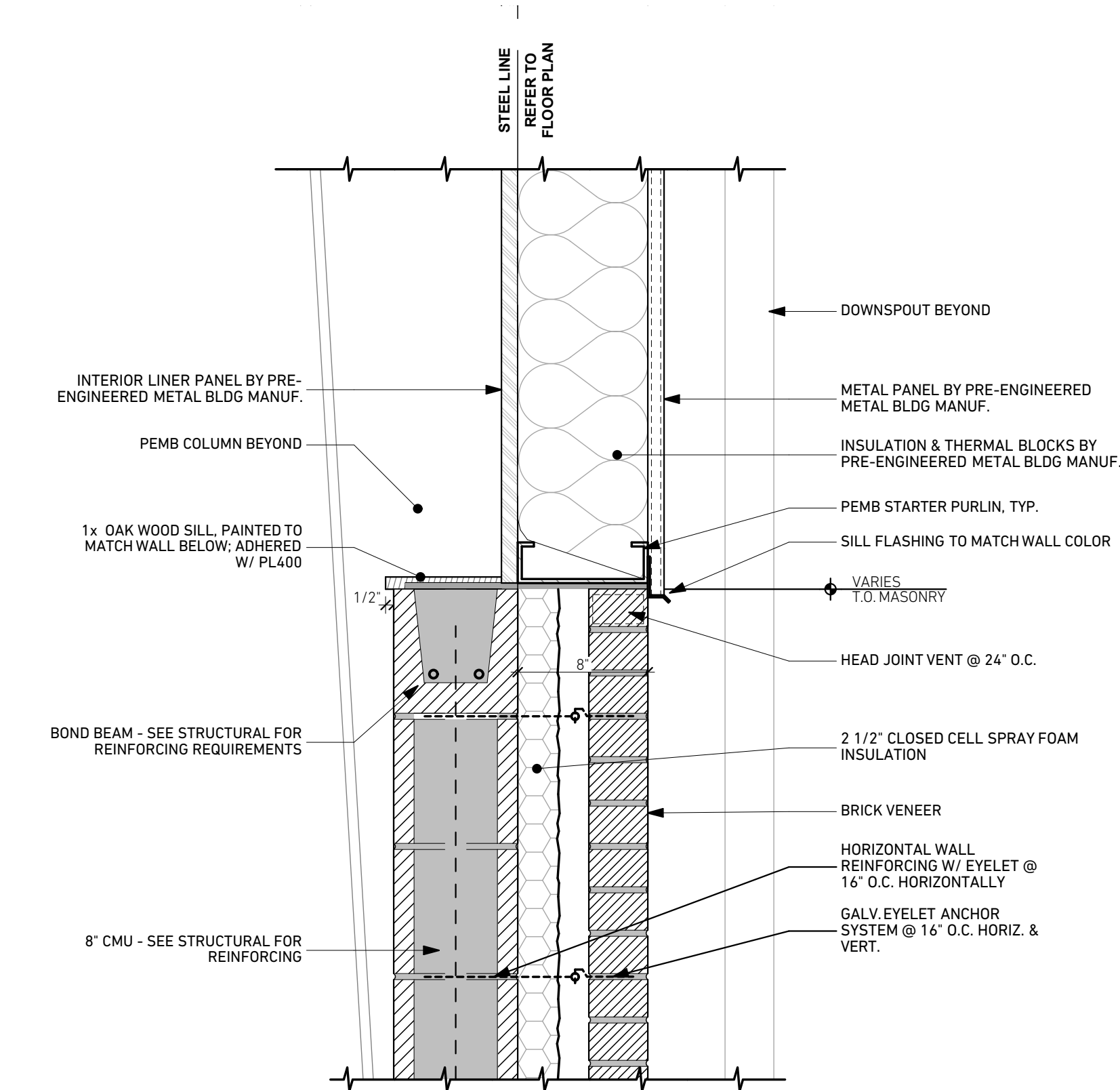
DRAWING UPDATES

ADDENDUM NO 3 1.10.2025



WALL SECTIONS & DETAILS

7.4



C2 SITE DETAIL - BOLLARD
SCALE: 1 1/2" = 1'-0"

DOOR SCHEDULE																		
DOOR#	DOOR INFORMATION							DOOR HARDWARE		FIRE RATING	FRAME INFORMATION						Remarks	
	W	H	T	TYPE	MATERIAL	FINISH	CORE	GLAZING	FUNCTION		SET #	HEAD	JAMB	SILL	TYPE	MATERIAL		FINISH
100	6'-0"	7'-10"	1 3/4"	WS	ALUMINUM	DARK BRONZE	INSUL.	1" TEMP.	ELEC. w/ PANIC	02	---	H-3	J-5	---	F-15	ALUMINUM	DARK BRONZE	
102A	3'-0"	7'-10"	1 3/4"	FG	WOOD	PRE-FIN.	SOLID	1/4" TEMP.	OFFICE	06	---	H-1	J-1 / J-6	---	F-03	H. METAL	PAINT	
102B	3'-0"	7'-10"	1 3/4"	FG	WOOD	PRE-FIN.	SOLID	1/4" TEMP.	OFFICE	06	---	H-1	J-1	---	F-01	H. METAL	PAINT	
103	3'-0"	7'-10"	1 3/4"	FG	WOOD	PRE-FIN.	SOLID	1/4" TEMP.	OFFICE	05	---	H-1	J-1 / J-4	---	F-04	H. METAL	PAINT	
104	3'-0"	7'-10"	1 3/4"	FG	WOOD	PRE-FIN.	SOLID	1/4" TEMP.	OFFICE	05	---	H-1	J-1 / J-4	---	F-04	H. METAL	PAINT	
105	3'-0"	7'-10"	1 3/4"	FG	WOOD	PRE-FIN.	SOLID	1/4" TEMP.	OFFICE	05	---	H-1	J-1 / J-4	---	F-04	H. METAL	PAINT	
106	3'-0"	7'-10"	1 3/4"	FG	WOOD	PRE-FIN.	SOLID	1/4" TEMP.	CLASSROOM	04	---	H-1	J-6 / J-8	---	F-03	H. METAL	PAINT	
107	3'-0"	7'-10"	1 3/4"	FG	WOOD	PRE-FIN.	SOLID	1/4" TEMP.	CLASSROOM	04	---	H-1	J-6 / J-8	---	F-03	H. METAL	PAINT	
108A	3'-0"	7'-10"	1 3/4"	FG	WOOD	PRE-FIN.	SOLID	1/4" TEMP.	CLASSROOM	04	---	H-1	J-6 / J-8	---	F-03	H. METAL	PAINT	
108B	3'-0"	7'-10"	1 3/4"	FG	WOOD	PRE-FIN.	SOLID	1/4" TEMP.	OFFICE	05	---	J-1	J-4	---	F-06	H. METAL	PAINT	
108C	3'-0"	7'-10"	1 3/4"	FG	WOOD	PRE-FIN.	SOLID	1/4" TEMP.	CLASSROOM	04	---	H-1	J-8	---	F-03	H. METAL	PAINT	
109	3'-0"	7'-10"	1 3/4"	F	WOOD	PRE-FIN.	SOLID	---	STOREROOM	08	---	H-1	J-1	---	F-01	H. METAL	PAINT	
110	3'-0"	7'-10"	1 3/4"	F	WOOD	PRE-FIN.	SOLID	---	PUSH / PULL	07	---	H-1	J-1	---	F-01	H. METAL	PAINT	
111	3'-0"	7'-10"	1 3/4"	F	WOOD	PRE-FIN.	SOLID	---	PUSH / PULL	07	---	H-1	J-1	---	F-01	H. METAL	PAINT	
112	3'-0"	7'-10"	1 3/4"	FG	WOOD	PRE-FIN.	SOLID	1/4" TEMP.	CLASSROOM	04	---	H-1	J-7 / J-8	---	F-02	H. METAL	PAINT	
112.1	5'-0"	7'-0"	1 3/4"	F	WOOD	PRE-FIN.	SOLID	---	CLASSROOM	10	---	H-1	J-1	---	F-01	H. METAL	PAINT	
113	3'-0"	7'-10"	1 3/4"	F	WOOD	PRE-FIN.	SOLID	---	STOREROOM	08	---	H-1	J-1	---	F-01	H. METAL	PAINT	
115	3'-0"	7'-10"	1 3/4"	FG	WOOD	PRE-FIN.	SOLID	1/4" TEMP.	CLASSROOM	04	---	H-1	J-6 / J-8	---	F-02	H. METAL	PAINT	
116.1	4'-0"	7'-10"	1 3/4"	F	WOOD	PRE-FIN.	SOLID	---	STOREROOM	08	---	H-1	J-1	---	F-01	H. METAL	PAINT	
116.2	4'-0"	7'-10"	1 3/4"	F	WOOD	PRE-FIN.	SOLID	---	STOREROOM	08	---	H-1	J-1	---	F-01	H. METAL	PAINT	
117	3'-0"	7'-10"	1 3/4"	FG	WOOD	PRE-FIN.	SOLID	1/4" TEMP.	CLASSROOM	04	---	H-1	J-7	---	F-03	H. METAL	PAINT	
118.1	5'-0"	7'-0"	1 3/4"	F	H. METAL	PAINT	---	---	STOREROOM	09	---	H-1	J-1	---	F-01	H. METAL	PAINT	ACTIVE / INACTIVE LEAFS
118.2	5'-0"	7'-0"	1 3/4"	F	WOOD	PRE-FIN.	SOLID	---	STOREROOM	09	---	H-1	J-1	---	F-01	H. METAL	PAINT	ACTIVE / INACTIVE LEAFS
119	3'-0"	7'-10"	1 3/4"	F	H. METAL	PAINT	---	---	STOREROOM	08	---	H-1	J-1	---	F-01	H. METAL	PAINT	
121	6'-0"	7'-10"	1 3/4"	F	H. METAL	PAINT	---	---	STOREROOM	09	---	H-1	J-1	---	F-01	H. METAL	PAINT	
122	3'-0"	7'-10"	1 3/4"	FG	WOOD	PRE-FIN.	SOLID	1/4" TEMP.	CLASSROOM	04	---	H-1	J-6 / J-7	---	F-03	H. METAL	PAINT	
123.1	5'-0"	7'-10"	1 3/4"	FG	WOOD	PRE-FIN.	SOLID	1/4" TEMP.	CLASSROOM	10	---	H-1	J-1 / J-4	---	F-05	H. METAL	PAINT	
124	3'-0"	7'-10"	1 3/4"	FG	WOOD	PRE-FIN.	SOLID	1/4" TEMP.	OFFICE	05	---	H-1	J-1	---	F-01	H. METAL	PAINT	
124	5'-0"	7'-10"	1 3/4"	FG	WOOD	PRE-FIN.	SOLID	1/4" TEMP.	CLASSROOM	10	---	H-1	J-1 / J-4	---	F-05	H. METAL	PAINT	
124A	3'-0"	7'-10"	1 3/4"	F	WOOD	PRE-FIN.	SOLID	---	STOREROOM	08	---	H-1	J-1	---	F-01	H. METAL	PAINT	
124C	3'-0"	7'-10"	1 3/4"	F	H. METAL	PAINT	---	---	STOREROOM	08	---	H-1	J-1	---	F-01	H. METAL	PAINT	
124D	3'-0"	7'-10"	1 3/4"	F	H. METAL	PAINT	---	---	STOREROOM	08	---	H-1	J-1	---	F-01	H. METAL	PAINT	
125	3'-0"	7'-10"	1 3/4"	F	H. METAL	PAINT	---	---	STOREROOM	08	---	H-1	J-1	---	F-01	H. METAL	PAINT	
126	3'-0"	7'-10"	1 3/4"	F	H. METAL	PAINT	---	---	STOREROOM	08	---	H-1	J-1	---	F-01	H. METAL	PAINT	
EXT-1	6'-0"	7'-10"	1 3/4"	WS	ALUMINUM	DARK BRONZE	INSUL.	1" TEMP.	ELEC. w/ PANIC	01	---	H-3	J-5	---	F-15	ALUMINUM	DARK BRONZE	
EXT-2	6'-0"	8'-0"	1 3/4"	S	BY MANUF.	BY MANUF.	INSUL.	---	BY MANUF.	---	---	B37.3	J-3	---	BY MANUF.	BY MANUF.	BY MANUF.	LOW HEADROOM SECTIONAL DOOR w/ WEATHER STRIPPING
EXT-3	6'-0"	8'-0"	1 3/4"	S	BY MANUF.	BY MANUF.	INSUL.	---	BY MANUF.	---	---	B37.3	J-3	---	BY MANUF.	BY MANUF.	BY MANUF.	LOW HEADROOM SECTIONAL DOOR w/ WEATHER STRIPPING
EXT-4	3'-0"	7'-10"	1 3/4"	F	FRP	PAINT	INSUL.	---	ELECTRIFIED	03	---	H-2	J-2	---	F-17	ALUMINUM	DARK BRONZE	
EXT-5	12'-0"	11'-10"	1 3/4"	S	BY MANUF.	BY MANUF.	INSUL.	---	BY MANUF.	---	---	D27.2	J-3	---	BY MANUF.	BY MANUF.	BY MANUF.	SECTIONAL DOOR w/ WEATHER STRIPPING
EXT-6	3'-0"	7'-10"	1 3/4"	F	FRP	PAINT	INSUL.	---	ELECTRIFIED	03	---	H-2	J-2	---	F-17	ALUMINUM	DARK BRONZE	
EXT-7	12'-0"	11'-10"	1 3/4"	S	BY MANUF.	BY MANUF.	INSUL.	---	BY MANUF.	---	---	D27.2	J-3	---	BY MANUF.	BY MANUF.	BY MANUF.	SECTIONAL DOOR w/ WEATHER STRIPPING
EXT-8	12'-0"	11'-10"	1 3/4"	S	BY MANUF.	BY MANUF.	INSUL.	---	BY MANUF.	---	---	D27.2	J-3	---	BY MANUF.	BY MANUF.	BY MANUF.	SECTIONAL DOOR w/ WEATHER STRIPPING
EXT-9	3'-0"	7'-10"	1 3/4"	F	FRP	BY MANUF.	INSUL.	---	ELECTRIFIED	03	---	H-2	J-2	---	F-17	ALUMINUM	DARK BRONZE	
EXT-10	6'-0"	7'-10"	1 3/4"	WS	ALUMINUM	DARK BRONZE	INSUL.	1" TEMP.	ELEC. w/ PANIC	01	---	H-3	J-5	---	F-15	ALUMINUM	DARK BRONZE	

NOT USED

H-4

H-3

H-2

H-1

DOOR & WINDOW NOTES

- ALL EXTERIOR GLASS TO BE 1" INSULATED GLAZING.
- ALL INTERIOR GLASS SHALL BE 1/4" THICK (U.N.G.).
- REFER TO DOOR SCHEDULE, FRAME, AND WINDOW ELEVATIONS AND EXTERIOR ELEVATIONS FOR ADDITIONAL INFORMATION.

WS1 - SURFACE MOUNTED SHADE (MANUAL MOUNTED WITHIN WINDOW FRAME)

EH1 - DOOR TO RECEIVE PANIC EXIT DEVICE WITH ELECTRIC LOCK & DOOR CONTACT

EH2 - DOOR TO RECEIVE PANIC EXIT DEVICE WITH ELECTRIC LOCK

* INDICATES SAFETY GLAZING

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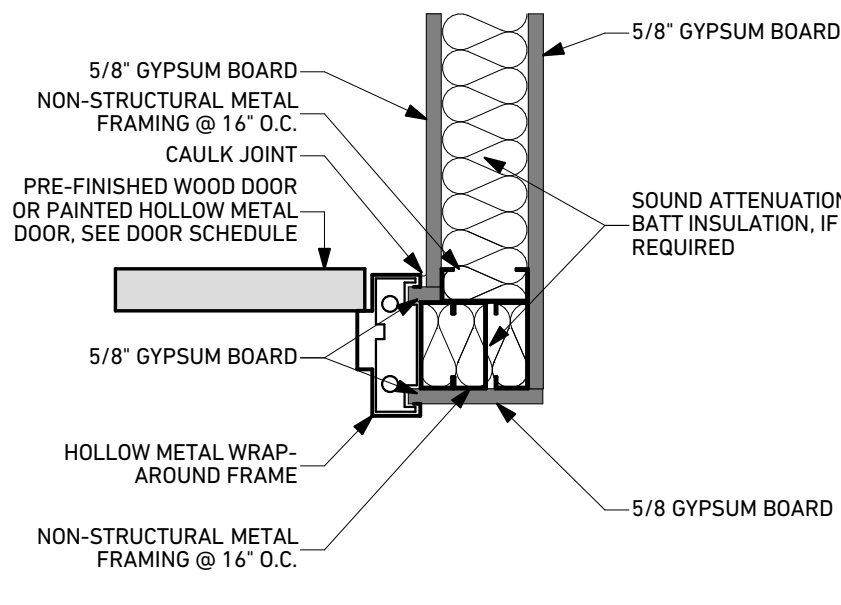
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St Clairsville, OH, 43950

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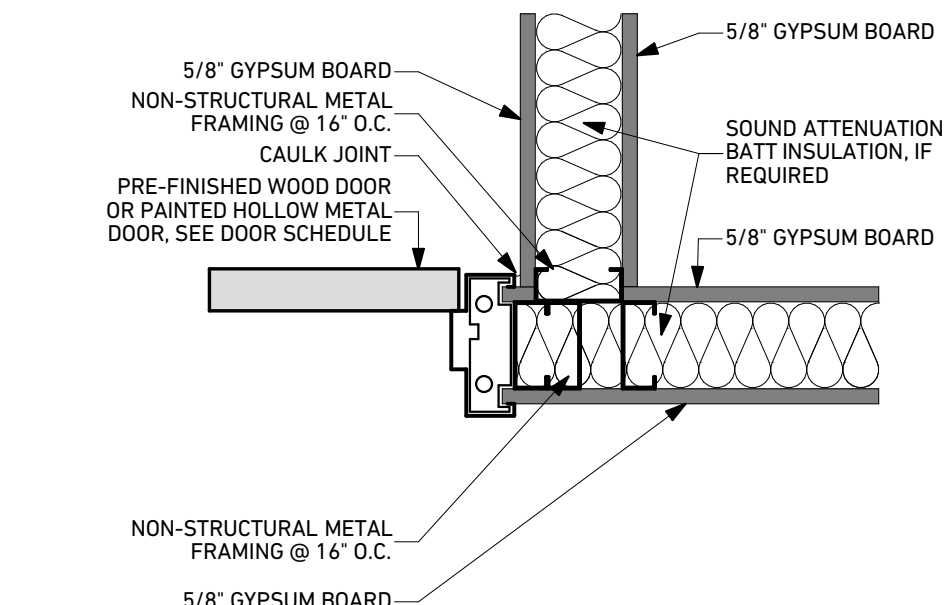
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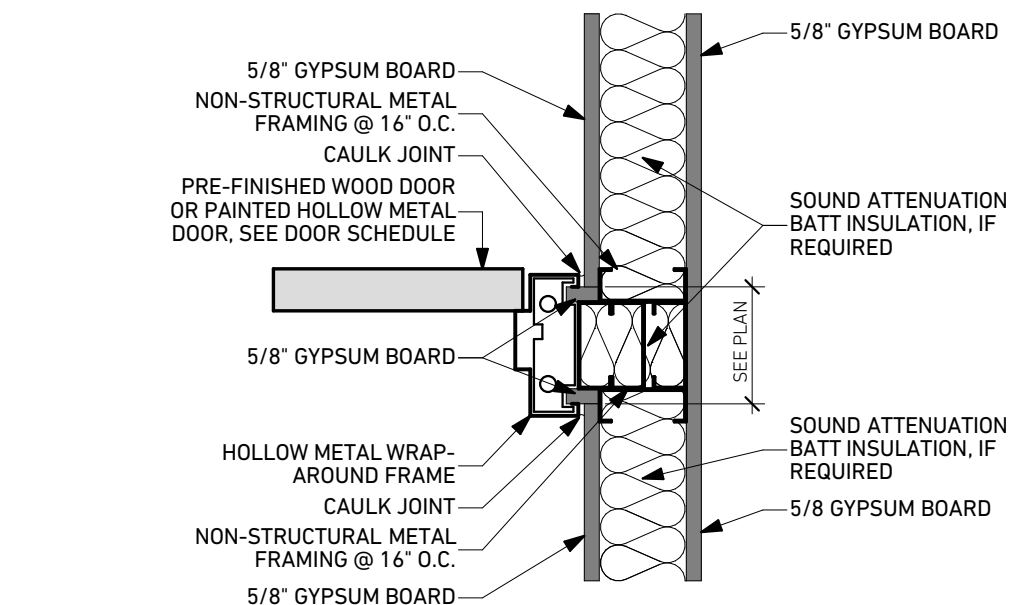
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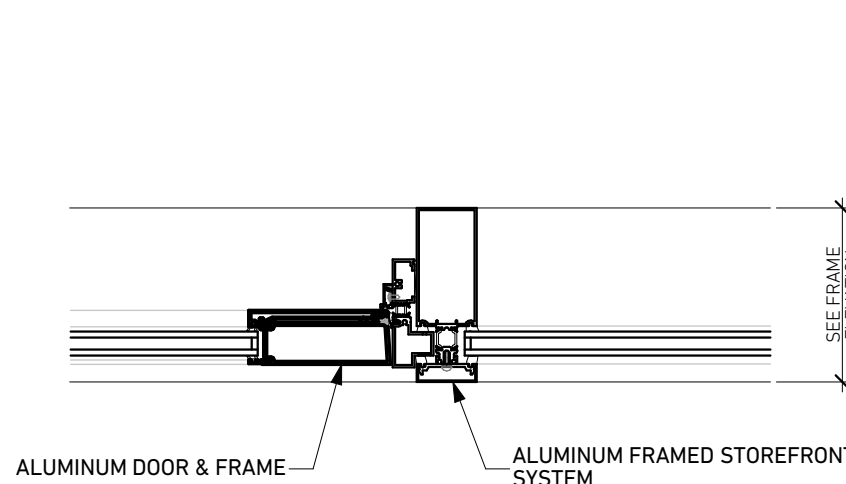
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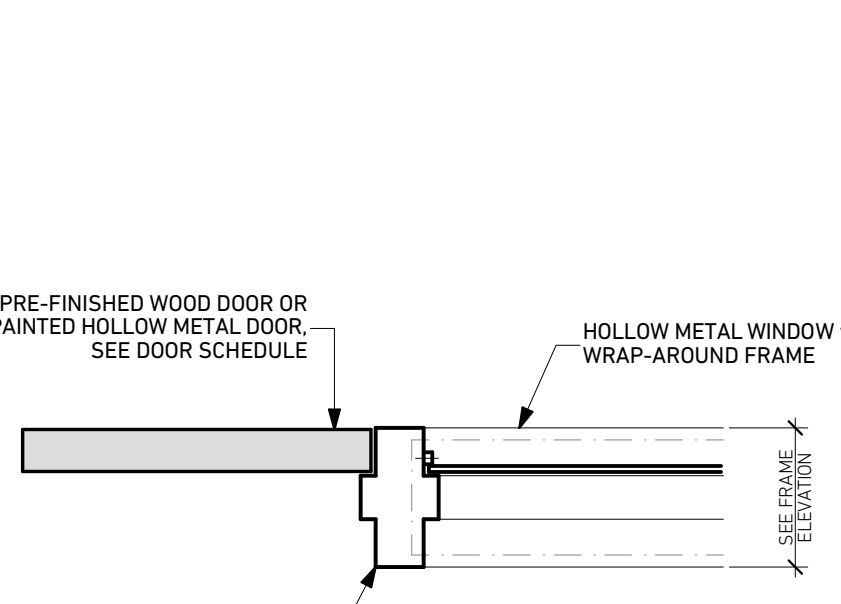
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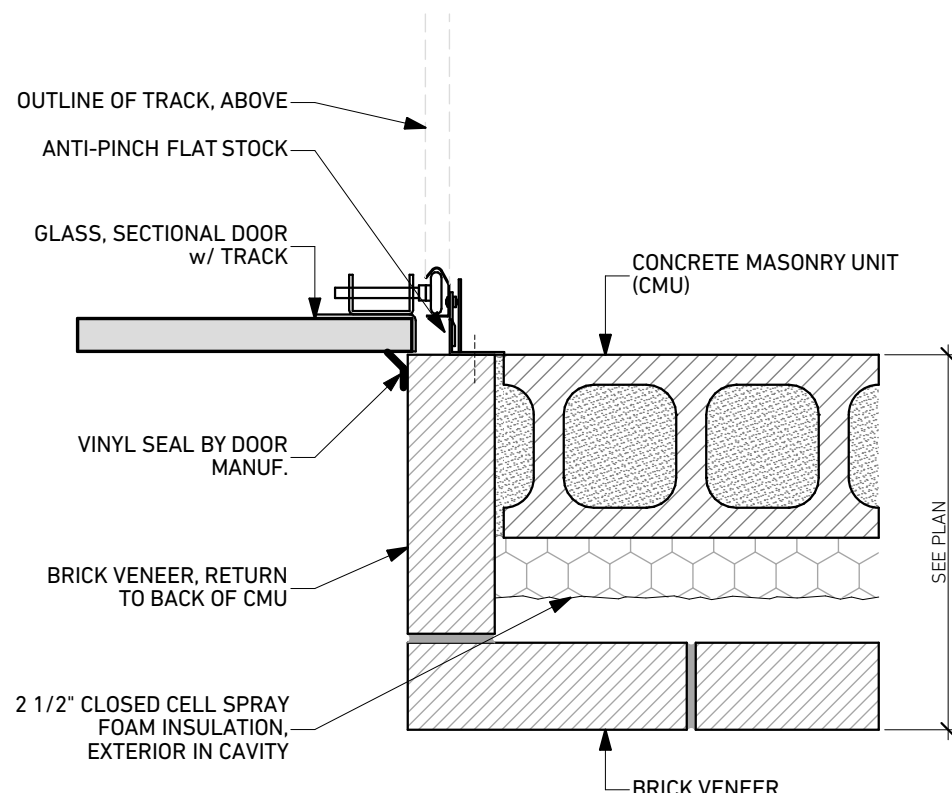
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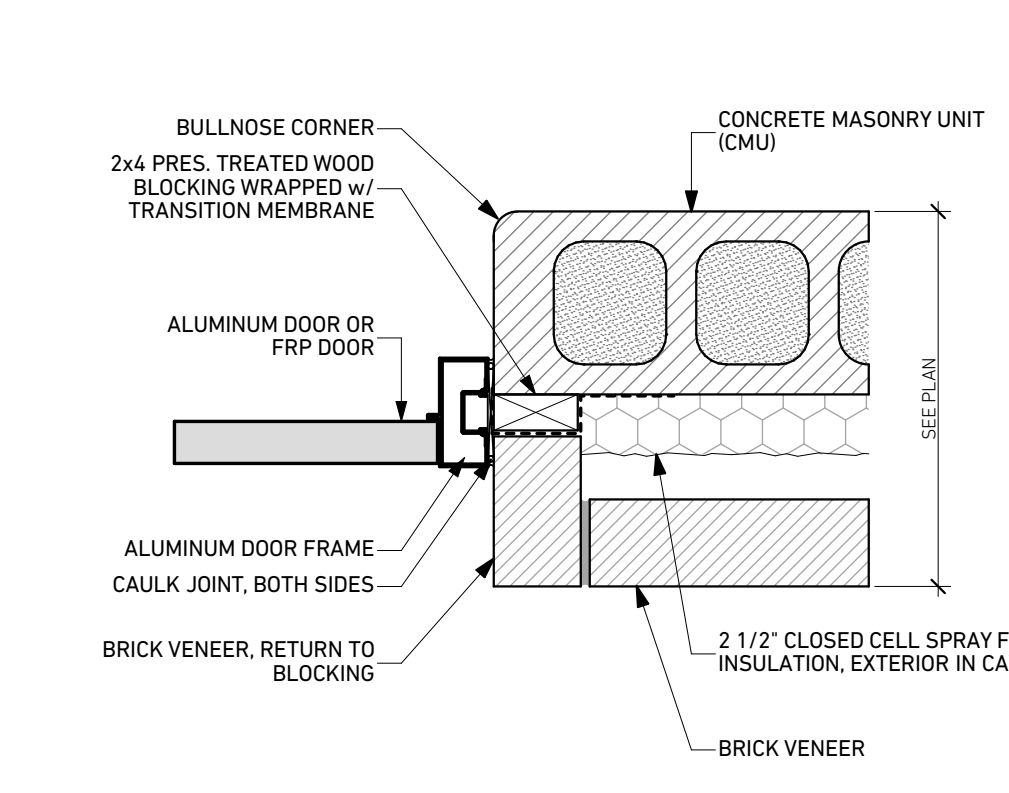
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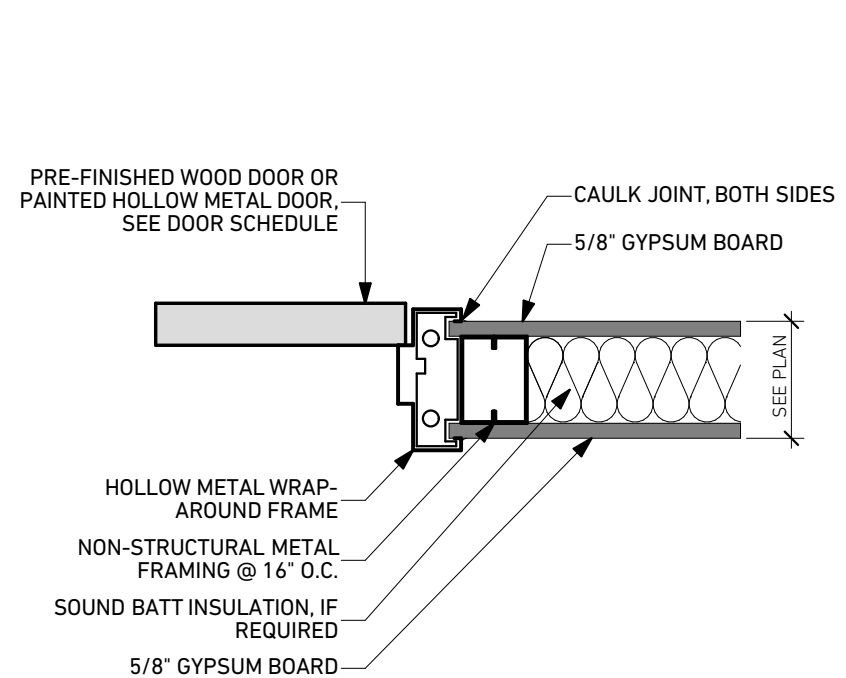
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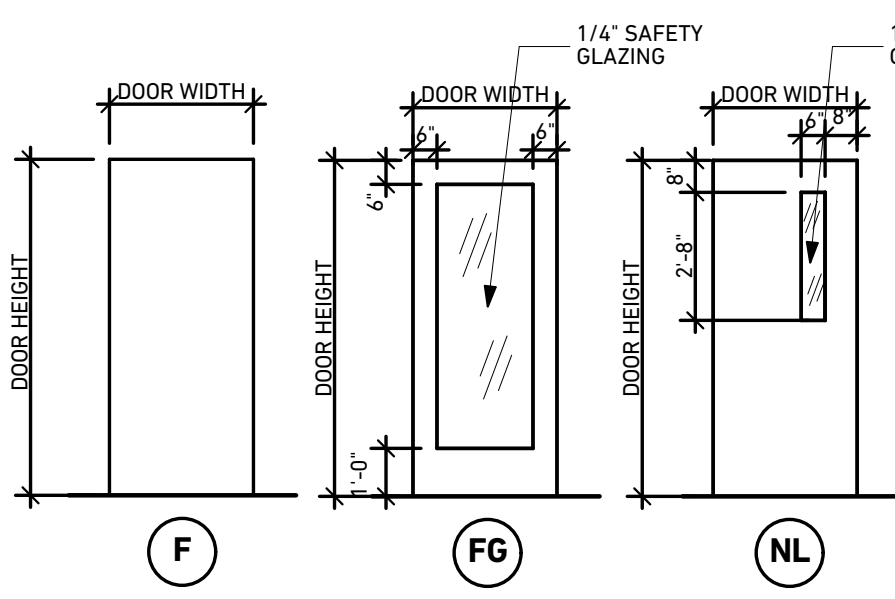
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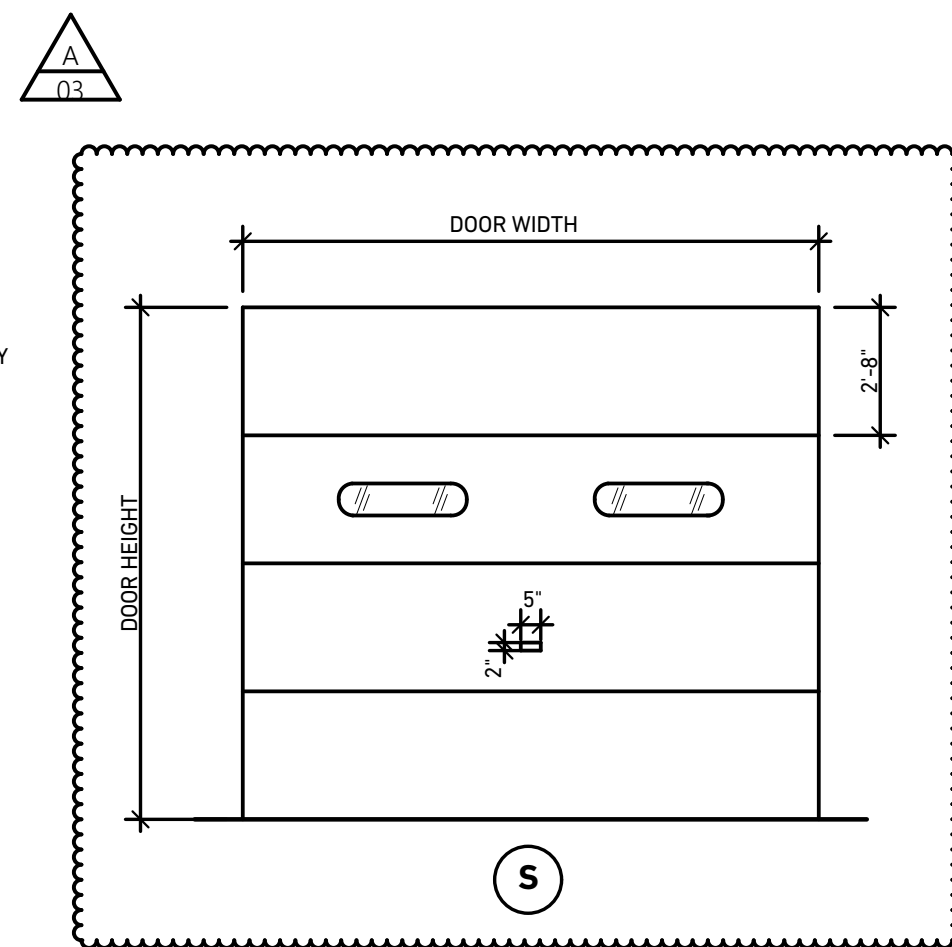
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J-1

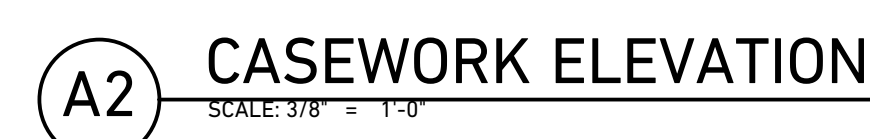
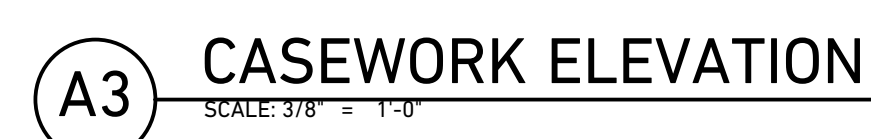
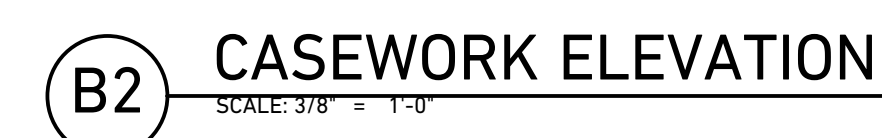
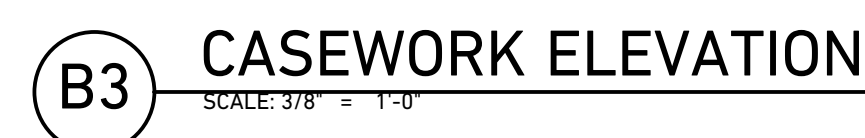
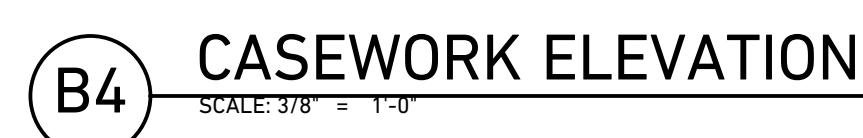
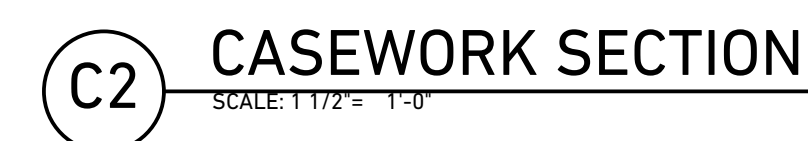
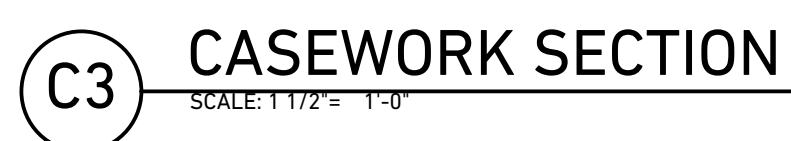
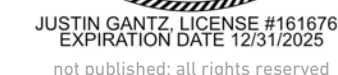


A1 DOOR TYPES
SCALE: 1/4" = 1'-0"



DOOR SCHEDULE,
DOOR TYPES &
WINDOW DETAILS

8.3



DRAWING LIST - HVAC	
NUMBER	NAME
H01	HVAC LEGEND AND GENERAL NOTES
H02	HVAC SCHEDULES
H03	HVAC SCHEDULES
H11	FIRST FLOOR HVAC PLAN
H12	SECOND FLOOR HVAC PLAN
H31	FIRST FLOOR HVAC PIPING PLAN
H32	SECOND FLOOR HVAC PIPING PLAN
H61	HVAC DETAILS AND DIAGRAMS
H62	HVAC DETAILS AND DIAGRAMS
H63	HVAC DETAILS AND DIAGRAMS
H64	HVAC PIPING DIAGRAMS
H65	HVAC PIPING DIAGRAMS
H71	TEMPERATURE CONTROL DIAGRAMS
H72.1	TEMPERATURE CONTROL DIAGRAMS
H72.2	TEMPERATURE CONTROL DIAGRAMS
H74	TEMPERATURE CONTROL DIAGRAMS
H75	TEMPERATURE CONTROL DIAGRAMS
H76	TEMPERATURE CONTROL DIAGRAMS
H77	TEMPERATURE CONTROL DIAGRAMS
H78	TEMPERATURE CONTROL DIAGRAMS
H79	TEMPERATURE CONTROL DIAGRAMS

HVAC SYMBOLS	
SYMBOL	DESCRIPTION
	TURNING VANES
	VOLUME DAMPER
	FIRE DAMPER (1 1/2 HR)
	FIRE DAMPER (3 HR)
	FIRE/SMOKE DAMPER (1 1/2 HR)
	FIRE/SMOKE DAMPER (3 HR)
	SMOKE DAMPER (NOT RATED)
	DUCT SMOKE DETECTOR
	MOTOR OPERATED DAMPER
	DUCT TEMPERATURE SENSOR
	DUCT HUMIDITY SENSOR
	DUCT STATIC PRESSURE SENSOR
	HUMIDIFIER
	SUPPLY DUCT
	RETURN OR EXHAUST DUCT
	FLEXIBLE DUCT CONNECTION
	ACOUSTICALLY LINED DUCTWORK
	EXISTING DUCTWORK & EQUIPMENT
	EXISTING DUCTWORK & EQUIPMENT TO BE REMOVED
	BALANCING VALVE
	BACKFLOW PREVENTER
	CHECK VALVE
	CONTROL VALVE (2-WAY)
	CONTROL VALVE (3-WAY)
	EXISTING PIPING
	EXISTING PIPING TO BE REMOVED
	EXPANSION JOINT/COMPENSATOR
	FLEXIBLE PIPE CONNECTION
	PRESSURE REDUCING VALVE
	REMOVE TO POINT AND CAP
	REMOVE TO POINT FOR RECONNECTION
	SHUT OFF VALVE
	STEAM TRAP
	Y-STRAINER WITH BLOW DOWN
	UNION
	PIPE BRANCH TAKE-OFF FROM BOTTOM
	PIPE BRANCH TAKE-OFF FROM TOP
	PIPE DROP
	PIPE RISE
	PIPING DIFFERENTIAL PRESSURE SENSOR
	CARBON DIOXIDE SENSOR
	HUMIDISTAT/HUMIDITY SENSOR
	THERMOSTAT/TEMPERATURE SENSOR
	LOUVERED DOOR
	UNDERCUT DOOR
	AIRFLOW DIRECTION
	TEST PLUG
	PRESSURE GAUGE
	RELIEF OR SAFETY VALVE
	THERMOMETER

GENERAL HVAC ABBREVIATIONS	
ABBREVIATION	DESCRIPTION
AAT	AMBIENT AIR TEMPERATURE
AC	AIR CONDITIONING
AD	ACCESS DOOR
AF	AIRFOIL
AFF	ABOVE FINISHED FLOOR
AL	ACOUSTICAL LINING
ALUM	ALUMINUM
APD	AIR PRESSURE DROP
ATR	AIR TEMPERATURE RISE
AV	AIR VENT
AWT	AVERAGE WATER TEMPERATURE
BAS	BUILDING AUTOMATION SYSTEM
BFP	BACKFLOW PREVENTER
BI	BACKWARD INCLINED
CABF	CABINET FAN
CEIL	CEILING
CENT	CENTRIFUGAL
CF	CEILING FAN
CO	CLEAN OUT
CTE	CONNECT TO EXISTING
DCV	DEMAND CONTROL VENTILATION
DDC	DIRECT DIGITAL CONTROL
DSO	DUCT SMOKE DETECTOR
DV	DRAIN VALVE
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
ESP	EXTERNAL STATIC PRESSURE
ETR	EXISTING TO REMAIN
EWT	ENTERING WATER TEMPERATURE
EXC	EXPANSION COMPENSATOR
FC	FORWARD CURVED
FPC	FIRE PROTECTION CONTRACTOR
FZP	FREEZE PROTECTION CABLE
F & T	FLOAT & THERMOSTATIC TRAP
GC	GENERAL CONTRACTOR
HTM	HEAT TRANSFER MODULE
IC	IN-LINE-CENTRIFUGAL
LAT	LEAVING AIR TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
MC	MECHANICAL CONTRACTOR
MCA	MINIMUM CIRCUIT AMPACITY
MOP	MAXIMUM OVERCURRENT PROTECTION
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OA	OUTSIDE AIR
OV	OUTLET VELOCITY
PC	PLUMBING CONTRACTOR
PLEN	PLENUM
PPH	POUNDS PER HOUR
PRE	POWER ROOF EXHAUSTER (DOWNBLAST)
PROP	PROPELLER
RLA	RELIEF AIR
RLF	RELIEF FAN
REX	REMOVE EXISTING
RF	RETURN FAN
RR	REMOVE AND RELOCATE
RV	RELIEF VALVE
SF	SUPPLY FAN
SP	STATIC PRESSURE
SS	STAINLESS STEEL
STR	STRAINER
SV	SAFETY VALVE (STEAM)
T	TRANSFER GRILLE
TC	TUBULAR CENTRIFUGAL
TCC	TEMPERATURE CONTROL CONTRACTOR
TH	TOTAL HEAD
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
UF	UTILITY FAN
ULH	ULTRA LOW HARMONIC
UPRE	POWER ROOF EXHAUSTER (UPBLAST)
VA	VANE AXIAL
VFD	VARIABLE FREQUENCY DRIVE
VTR	VENT THRU ROOF
VVT	VARIABLE VOLUME VARIABLE TEMPERATURE
WPD	WATER PRESSURE DROP

EQUIPMENT TAGGING LEGEND	
ABBREVIATION	TAGGING DESCRIPTION
S,R,E,T	ABBREVIATION TYPE DUCT CONNECTION SIZE - SEE GRILLE AND DIFFUSER SCHEDULE FOR ADDITIONAL INFORMATION. QUANTITY CFM
CONV	ABBREVIATION TYPE LENGTH TYPE
FTR, RP	ABBREVIATION MARK
ACC, ACH, ACU, AHU, AS, B, BDE, BDS, BT, CB, CC, CH, CRAC, GT, GTP, CU, CUA, CUW, DA, DC, DF, DT, EACC, EF, EHC, ERC, ERU, ERV, ET, F, FOP, OV, H, HC, HE, HVI, HX, MAU, P, PRV, RTU, SAT, SEP, ST, TGP, TYP	ABBREVIATION MARK FLOOR SERVICING EQUIPMENT TAG SPECIFIC COMPONENT DESIGNATION
ADU, CHB, CUH, EAV, EOH, EHU, FCU, FD, FFU, FVAV, FSD, GUH, HAV, PTAC, RHC, SAV, SD, UH, UV, VAV, WHP	ABBREVIATION MARK FLOOR SERVICING EQUIPMENT TAG SPECIFIC COMPONENT DESIGNATION
VFD	VFD-XX-XXXX

TEMPERATURE/HUMIDITY DESIGN PARAMETERS	
OUTSIDE SUMMER: WINTER:	95°F DB, 75°F WB -9°F
INSIDE (SUMMER): OFFICE AREAS: CLASSROOMS:	75°F, 60% RH MAXIMUM 75°F, 60% RH MAXIMUM
INSIDE (WINTER): OFFICE AREAS: CLASSROOMS:	70°F, NO MINIMUM % RH 70°F, NO MINIMUM % RH

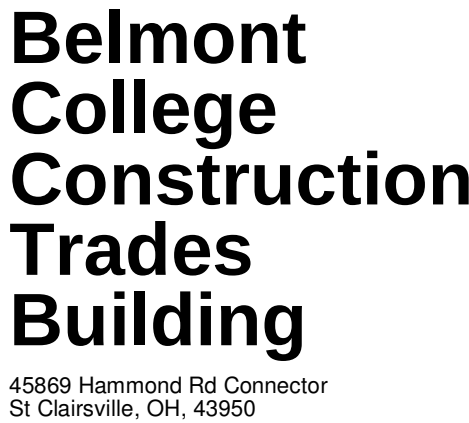
DUCT SYSTEM ABBREVIATIONS	
ABBREVIATION	DESCRIPTION
CAI	COMBUSTION AIR INTAKE
DC	DUST COLLECTION
EA	EXHAUST AIR
FLUE	FLUE
OA	OUTDOOR AIR
RA	RETURN AIR
RLA	RELIEF AIR
SA	SUPPLY AIR

PIPE SYSTEM ABBREVIATIONS	
ABBREVIATION	DESCRIPTION
CWR	CHILLED WATER RETURN PIPING
CWS	CHILLED WATER SUPPLY PIPING
HVRF-WSR	HYBRID VRF WATER SUPPLY/RETURN PIPING
HWR	HEATING WATER RETURN PIPING
HWS	HEATING WATER SUPPLY PIPING
RL	REFRIGERANT LIQUID PIPING
RS	REFRIGERANT SUCTION PIPING

HVAC ABBREVIATIONS	
ABBREVIATION	DESCRIPTION
ACH	AIR COOLED CHILLER
AHP	AIR SOURCE HEAT PUMP
AHU	AIR HANDLING UNIT
AS	AIR SEPARATOR
BC	Generic Box Placeholder
BT	BUFFER TANK
CB	BOILER (NON-CONDENSING HYDRONIC)
CSF	CHEMICAL SHOT FEEDER
CUH	CABINET UNIT HEATER
DC	DUST COLLECTOR
DOAS	ROOFTOP UNIT
E	EXHAUST GRILLE
EF	EXHAUST FAN
ERU	ENERGY RECOVERY UNIT
ET	EXPANSION TANK
FCU	FAN COIL UNIT
GMP	GLYCOL MAKE-UP PACKAGE
L	LOUVER
MOD	MOTOR OPERATED DAMPER
PCWP	PRIMARY CHILLED WATER PUMP
PHWP	PRIMARY HEATING WATER PUMP
R	RETURN GRILLE
S	SUPPLY GRILLE OR DIFFUSER
SHWP	SECONDARY HEATING WATER PUMP
TEMP-BAAC	TEMPERATURE CONTROL PANEL
UH	UNIT HEATER
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE

GENERAL HVAC NOTES:

- THE HVAC SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH APPLICABLE CODES AND STANDARDS.
- DRAWINGS ARE DIAGRAMMATIC. INDICATED POSITIONS SHALL BE FOLLOWED AS CLOSELY AS POSSIBLE. EXACT EQUIPMENT LOCATIONS AND DUCTWORK AND PIPING ROUTING SHALL BE SUBJECT TO BUILDING CONSTRUCTION AND INTERFERENCES WITH OTHER TRADES. WHERE THE LOCATION OF A SPECIFIC PIPE, DUCT, OR DEVICE IS DIMENSIONED, ITS INSTALLED LOCATION SHALL BE AS DIMENSIONED UNLESS COORDINATED OTHERWISE WITH THE ARCHITECT OR ENGINEER.
- CUTTING AND PATCHING OF WALLS AND FLOORS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR PERFORMING THE WORK REQUIRING THE PENETRATION. IF THE MC DEFACES OR DAMAGES WALLS, CEILINGS, FLOORS, OR FINISHES, THE MC SHALL BE RESPONSIBLE FOR PATCHING, REPAIRING, AND REFINISHING. PATCHING MATERIALS SHALL MATCH THE NEW CONDITIONS AS APPLICABLE. FINISH PAINTING SHALL BE BY THE GENERAL CONTRACTOR.
- PROVIDE FIRESTOPPING AT PENETRATIONS OF FIRE-RATED ASSEMBLIES. REFER TO THE ARCHITECTURAL LIFE SAFETY PLANS FOR THE LOCATION OF FIRE-RATED ASSEMBLIES. FIRESTOPPING SHALL BE PERFORMED BY THE CONTRACTOR PERFORMING THE WORK REQUIRING THE PENETRATION.
- EXCEPT FOR SLAB ON GRADE, PROVIDE FIRESTOPPING AT PENETRATIONS OF NON-FIRE-RATED FLOORS. FIRESTOPPING SHALL BE PERFORMED BY THE CONTRACTOR PERFORMING THE WORK REQUIRING THE PENETRATION.
- WHERE DUCTS, CONDUITS, OR PIPES ARE REMOVED THRU FIRE-RATED FLOORS OR WALLS, THE CONTRACTOR REMOVING THE DEVICE/MATERIAL SHALL SEAL THE REMAINING OPENING TO MAINTAIN FIRE RATING.
- INSTALL EQUIPMENT REQUIRING AN ELECTRICAL CONNECTION IN SUCH A MANNER SO THAT PROPER CLEARANCE IS PROVIDED FOR SERVICING PER THE NATIONAL ELECTRIC CODE.
- PROVIDE SEISMIC RESTRAINT OF HVAC SYSTEMS AS INDICATED IN THE SPECIFICATIONS.
- EQUIPMENT LAYOUT IS BASED ON SCHEDULED EQUIPMENT. ACTUAL INSTALLED EQUIPMENT SIZE, CONFIGURATION, AND DUCTWORK/PIPING CONNECTIONS SHALL BE COORDINATED WITH THE BUILDING AND DUCTWORK/PIPING LAYOUT.
- EQUIPMENT SCHEDULES CONTAIN BOTH NOTES AND REMARKS. NOTES APPLY TO ALL EQUIPMENT SCHEDULED. REMARKS APPLY ONLY TO SPECIFIC EQUIPMENT AS INDICATED.
- EQUIPMENT, VALVES, DAMPERS, CONTROL DEVICES, ETC. SHALL BE ACCESSIBLE. IF LOCATED ABOVE DRYWALL CEILING OR BEHIND FINISHED WALL, PROVIDE AN ACCESS DOOR. COORDINATE ACCESS DOOR LOCATIONS WITH ARCHITECT.
- HVAC SYSTEM PIPING AND DUCTWORK SHALL NOT BE INSTALLED IN ELEVATOR SHAFTS, ELEVATOR MACHINE ROOMS, ELECTRICAL ROOMS, OR INFORMATION TECHNOLOGY (LOW VOLTAGE) ROOMS. EXCEPTION - PIPING AND DUCTWORK DIRECTLY RELATED TO HVAC EQUIPMENT CONDITIONING THE ROOM. ROUTE PIPING AND DUCTWORK INTO THE ROOM OVER THE DOOR AND NOT OVER PANELS OR EQUIPMENT. CONTACT ARCHITECT/ENGINEER PRIOR TO INSTALLATION OF ANY OTHER PIPING OR DUCTWORK.
- DO NOT SUPPORT DUCTWORK OR PIPING FROM ANOTHER DUCT, PIPE, OR CONDUIT. DO NOT SUPPORT ANY ITEM FROM METAL ROOF DECK.
- NO EXPOSED PIPING OR DUCTWORK SHALL BE INSTALLED BELOW 7'-6" IN AN EGRESS CORRIDOR.
- ATTENTION IS CALLED TO THE LIMITED CEILING SPACE. COORDINATE ALL WORK WITH CEILING HEIGHTS, SOFFITS, STRUCTURE, AND LIGHTS. HOLD DUCTWORK AS HIGH AS POSSIBLE TO DECK BETWEEN BEAMS IF REQUIRED, AND TIGHT TO STRUCTURE. PROVIDE ANY AND ALL OFFSETS AND EFFORT REQUIRED TO FACILITATE THE INSTALLATION OF OTHER EQUIPMENT AND SYSTEMS. COORDINATE CLOSELY WITH OTHER TRADES. NOTE WHERE DUCT AND PIPE ELEVATIONS ARE INDICATED ON PLAN.
- REFER TO EQUIPMENT DRAWINGS FOR OWNER FURNISHED EQUIPMENT LOCATIONS AND CONNECTION REQUIREMENTS. PROVIDE PIPING/DUCTWORK CONNECTIONS AS REQUIRED. ROUGH-INS SHALL BE FIELD COORDINATED WITH ACTUAL EQUIPMENT PURCHASED.
- UNLESS NOTED OTHERWISE, STANDARD ROOM SENSOR/THERMOSTAT MOUNTING HEIGHT SHALL BE 44" ABOVE THE FINISHED FLOOR TO THE CENTERLINE OF THE DEVICE. REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION.
- DO NOT LOCATE THERMOSTATS OR SENSORS ON AN EXTERIOR WALL, BEHIND OPEN DOORS, OR IN CONFLICT WITH FURNITURE OR WALL HUNG DEVICES. COORDINATE EXACT LOCATION WITH OWNER/ARCHITECT.
- CONTROL WIRING SHOWN ON PLAN DOES NOT INDICATE ROUTING OR SCOPE OF WORK BETWEEN EQUIPMENT AND SENSOR/STAT. CONTROL WIRING SHOWN INDICATES EQUIPMENT ZONING.
- DUCTWORK DIMENSIONS SHOWN ARE GROSS (OUTSIDE SHEETMETAL SIZE). NET FREE AREA OF LINED OR DOUBLE WALL DUCTWORK IS REDUCED BY THE DUCT LINING OR INSULATION THICKNESS.
- DURING CONSTRUCTION, COVER SUPPLY, RETURN, AND EXHAUST DUCTWORK OPENINGS TO PREVENT CONSTRUCTION DUST FROM ENTERING THE DUCTWORK. IF DUST COLLECTS INSIDE DUCTWORK, DUCTWORK SHALL BE CLEANED PRIOR TO PROJECT TURNOVER.
- DUCTWORK SHALL BE PRESSURE TESTED AS INDICATED IN THE SPECIFICATIONS. IF A SECTION OF DUCTWORK FAILS THE TEST, THE SECTION SHALL BE SEALED AND RETESTED UNTIL IT PASSES.
- RADIUS ELBOWS SHALL BE UTILIZED THROUGHOUT THE DUCTWORK SYSTEM. UNLESS SPECIFICALLY SHOWN, DO NOT USE 90° ELBOWS WITH TURNING VANES WITHOUT PRIOR APPROVAL OF THE ENGINEER.
- STRAIGHT BRANCH INLET DUCTS TO VAV TERMINAL UNITS WITHIN FIVE FEET OF THE SUPPLY MAIN SHALL BE THE VAV TERMINAL UNIT CONNECTION SIZE UNLESS NOTED OTHERWISE. IF BRANCH INLET DUCT INCLUDES ELBOWS OR IS GREATER THAN FIVE FEET LONG, DUCT SIZE SHALL BE INCREASED 2" TO A POINT TWO FEET FROM THE VAV TERMINAL UNIT INLET.
- REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR CEILING TYPES, GRID LAYOUT, AND EXACT LOCATIONS OF CEILING DIFFUSERS AND GRILLES.
- DUCT RUNOUT SIZE SHALL BE THE SAME AS THE DIFFUSER OR GRILLE CONNECTION SIZE UNLESS NOTED OTHERWISE.
- INSTALL AND PROPERLY SUPPORT FLEXIBLE DUCTWORK TO AVOID AIRFLOW RESTRICTIONS. NO KINKS OR CRIMPS ARE PERMITTED.
- FLEXIBLE DUCTWORK SHALL NOT PENETRATE THRU WALLS. RIGID SHEETMETAL DUCTWORK IS REQUIRED AT WALL PENETRATIONS.
- FLEXIBLE DUCTWORK SHALL NOT BE USED IN EXPOSED LOCATIONS.
- PROVIDE A VOLUME DAMPER FOR EACH DIFFUSER AND GRILLE. LOCATE THE DAMPER AT THE BRANCH DUCTWORK CONNECTION TO THE MAIN. EXCEPTION - FOR A VAV TERMINAL UNIT SERVING A SINGLE SUPPLY AIR DIFFUSER, A VOLUME DAMPER IS NOT REQUIRED AT THE CONNECTION TO THE DIFFUSER OR GRILLE.
- PROVIDE VOLUME DAMPER HANDLE EXTENSIONS FOR VOLUME DAMPERS INSTALLED IN INSULATED DUCTWORK.
- PROVIDE FIRE DAMPERS AND FIRE/SMOKE DAMPERS WHERE INDICATED AND WHERE REQUIRED BY CODE. REFER TO THE ARCHITECTURAL LIFE SAFETY PLANS FOR THE LOCATION OF FIRE AND SMOKE-RATED ASSEMBLIES. WHERE THE LOCATION OF A DAMPER (INDICATING A RATED ASSEMBLY), CONFLICTS WITH THE LIFE SAFETY PLAN, NOTIFY THE ARCHITECT OR ENGINEER.
- DUCT MOUNTED SMOKE DETECTORS SHALL BE FURNISHED BY DIV. 26. INSTALLED BY DIV. 23. AND WIRED BY DIV. 26. MECHANICAL CONTRACTOR SHALL COORDINATE EXACT DETECTOR LOCATION WITH ELECTRICAL CONTRACTOR.
- PROVIDE DUCTWORK ACCESS DOORS FOR MOTOR OPERATED DAMPERS, FIRE DAMPERS, SMOKE DAMPERS, FIRE/SMOKE DAMPERS, SMOKE DETECTORS, HUMIDIFIERS, AND REHEAT COIL INLETS AND OUTLETS. WHERE REHEAT COIL IS INTEGRAL WITH A VAV TERMINAL UNIT, TERMINAL UNIT SHALL INCLUDE A BOTTOM ACCESS DOOR. IMPORTANT THAT DUCTWORK ACCESS DOORS ARE ACCESSIBLE. IF LOCATED ABOVE DRYWALL CEILING OR BEHIND FINISHED WALL, PROVIDE ACCESS DOOR. COORDINATE ACCESS DOOR LOCATIONS WITH ARCHITECT.
- PROVIDE AIR VENTS IN PIPING SYSTEMS AS REQUIRED FOR COMPLETE AIR ELIMINATION. PROVIDE HOSE END DRAIN VALVES AS REQUIRED TO ALLOW COMPLETE SYSTEM DRAINING. NOTE LOCATIONS ON AS-BUILT DRAWINGS.
- BRANCH PIPING CONNECTIONS TO EQUIPMENT SHALL BE 3/4" MINIMUM UNLESS NOTED OTHERWISE.
- INTER-CONNECTING PIPING BETWEEN RADIANT CEILING PANELS SHALL BE 1/2" USING A COMBINATION OF HARD COPPER PIPE AND SOFT COPPER TUBING TO ALLOW FOR EXPANSION AS RECOMMENDED BY THE MANUFACTURER.
- BULLHEAD PIPING CONFIGURATIONS IN PIPING ARE PROHIBITED.
- PROVIDE TRAPPED AIR CONDITIONING CONDENSATION DRAINS FOR COOLING COILS. SIZE TRAPS PER DETAIL. PIPE COOLING COIL CONDENSATE DRAIN PIPING TO NEAREST FLOOR DRAIN. PROVIDE AIR GAP AT TERMINATION.



EDA AWARD NUMBER: 06-01-06458

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1	Addendum No 3	01/10/25

KEY PLAN

HVAC LEGEND AND
GENERAL NOTES

H01



A circular professional engineer seal for the State of Ohio. The outer ring contains the text "STATE OF OHIO" at the top and "PROFESSIONAL ENGINEER" at the bottom, separated by two stars. The inner circle contains the name "FRANKLIN A. EISENHOWER" and the license number "E-65457". The word "REGISTERED" is written in a smaller arc below the license number. A copyright symbol (©) is located at the bottom right of the seal.

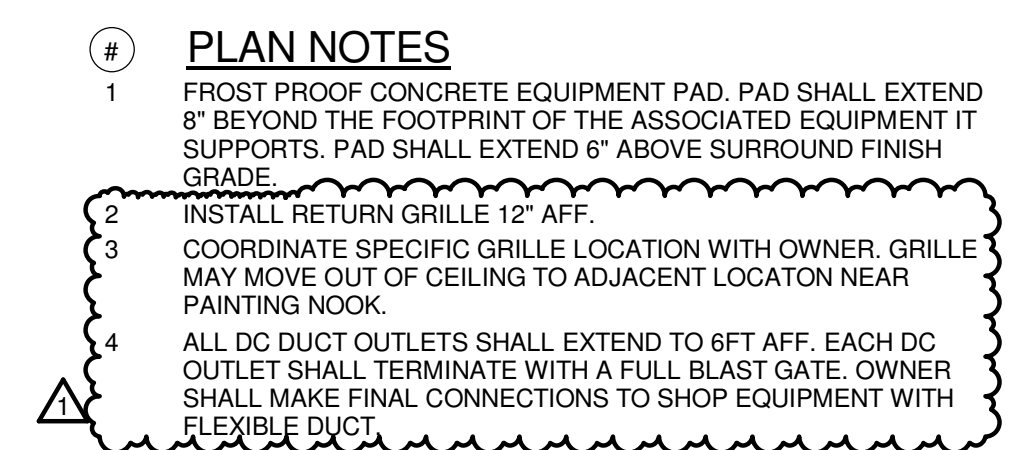
H03

15869 Hammond Rd Connector
St Clairsville, OH, 43950

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FIRST FLOOR HVAC PLAN

SCALE: 1/8" = 1'-0"





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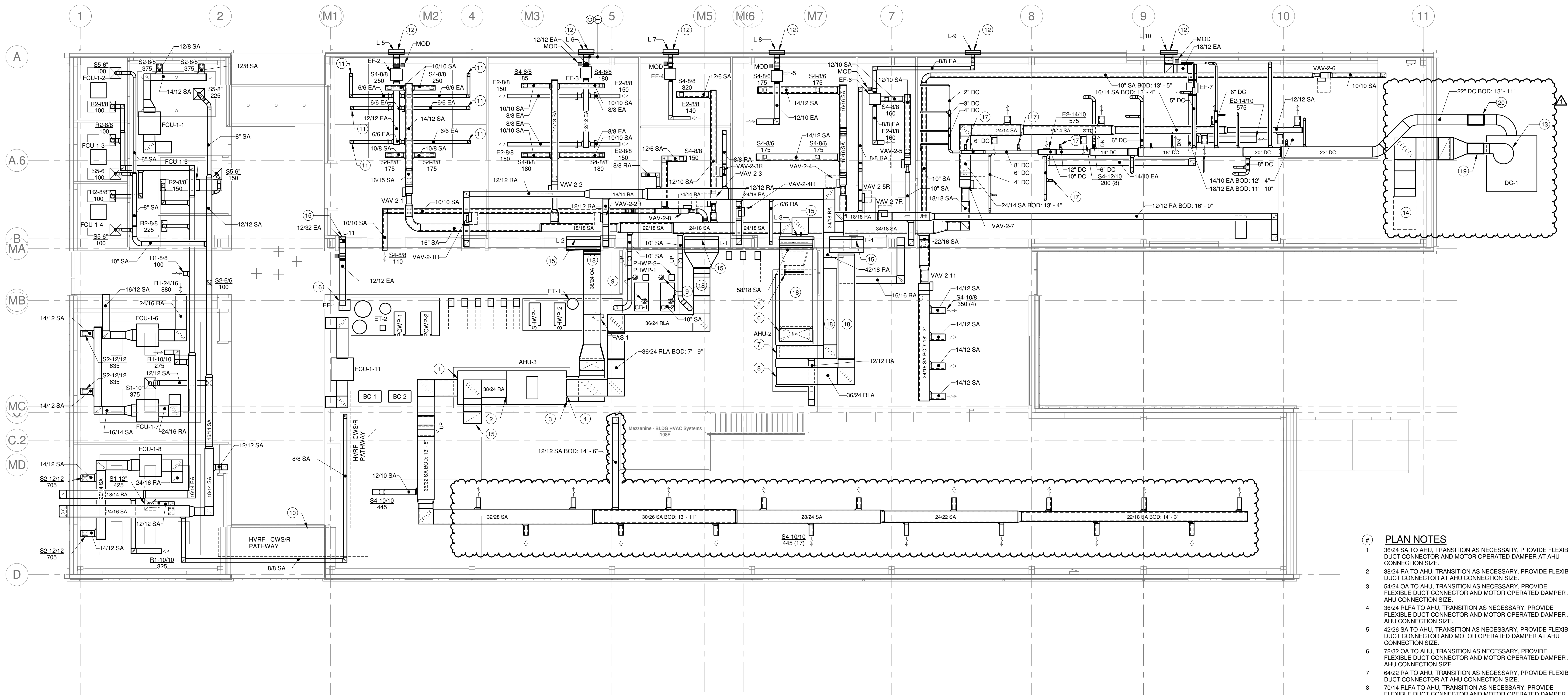
**Belmont College
Construction
Trades
Building**

45869 Hammond Rd Connector
St. Clairsville, OH, 43950

EDA AWARD NUMBER: 06-01-06458

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CONSTRUCTION
DOCUMENTS
07/08/2024**

DRAWING UPDATES
1 Addendum No 3 01/10/25



PLAN NOTES

- 36/24 SA TO AHU, TRANSITION AS NECESSARY, PROVIDE FLEXIBLE DUCT CONNECTOR AND MOTOR OPERATED DAMPER AT AHU CONNECTION SIZE.
- 38/24 RA TO AHU, TRANSITION AS NECESSARY, PROVIDE FLEXIBLE DUCT CONNECTOR AT AHU CONNECTION SIZE.
- 54/24 OA TO AHU, TRANSITION AS NECESSARY, PROVIDE FLEXIBLE DUCT CONNECTOR AND MOTOR OPERATED DAMPER AT AHU CONNECTION SIZE.
- 36/24 RLFA TO AHU, TRANSITION AS NECESSARY, PROVIDE FLEXIBLE DUCT CONNECTOR AND MOTOR OPERATED DAMPER AT AHU CONNECTION SIZE.
- 42/26 SA TO AHU, TRANSITION AS NECESSARY, PROVIDE FLEXIBLE DUCT CONNECTOR AND MOTOR OPERATED DAMPER AT AHU CONNECTION SIZE.
- 72/32 OA TO AHU, TRANSITION AS NECESSARY, PROVIDE FLEXIBLE DUCT CONNECTOR AND MOTOR OPERATED DAMPER AT AHU CONNECTION SIZE.
- 64/22 RA TO AHU, TRANSITION AS NECESSARY, PROVIDE FLEXIBLE DUCT CONNECTOR AT AHU CONNECTION SIZE.
- 70/14 RLFA TO AHU, TRANSITION AS NECESSARY, PROVIDE FLEXIBLE DUCT CONNECTOR AND MOTOR OPERATED DAMPER AT AHU CONNECTION SIZE.
- 8" FLUE & 8" CAI UP THROUGH ROOF, REFER TO DETAIL FOR TERMINATION REQUIREMENTS.
- MAINTAIN CLEAR PATHWAY FOR HVRF CWS/R PIPING TO BE ROUTED FROM BC(S) TO FCU(S).
- 6/8 EA DN TO GRILLE AT DEMONSTRATION CEILING.
- LOUVERS IN STOREFRONT, RUN DUCTWORK AS HIGH AS POSSIBLE AND ELBOW DOWN AT EXTERIOR WALL, EXTEND PLENUM 12" FROM BACK OF LOUVER, CONNECT DUCT TO PLENUM.
- DUST COLLECTOR DC-1 FOR CONFIGURATION REFER TO DETAIL.
- DUST COLLECTION RECIRCULATION OUTLET CONFIGURED PER MANUFACTURER REQUIREMENTS.
- MOUNT LOUVER IN CLERESTORY PROVIDE MINIMUM 18" PLENUM WITH MOD. PLENUM SHALL BE INSULATED AS OUTSIDE AIR PLENUM. COORDINATE LOUVER & PLENUM CONSTRUCTION WITH WINDOW INSTALLER.
- MOUNT EF-1 60" AFF, SUPPORT FROM WALL, EXTEND 14/10 EA DN FROM EF-1 THROUGH MEZZANINE FLOOR TO 1ST FLOOR CEILING CAVITY, EXTEND 12/12 EA UP FROM EF-1 TO L-11 PLENUM, ROUTE OVERHEAD EA DUCT TIGHT TO ROOF STRUCTURE.
- 4" DC, CAPPED FOR FUTURE USE, 348 CFM.
- SLOPE DUCT PARALLEL TO ROOF, INSTALL DUCT TIGHT TO STRUCTURE.
- HIGH SPEED ABORT VALVE.
- STINGER EXPLOSION ISOLATION VALVE.

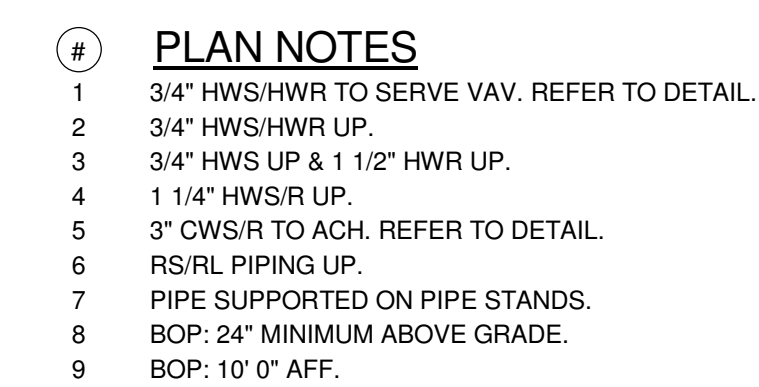
KEY PLAN



**SECOND FLOOR HVAC
PLAN**

SCALE: 1/8" = 1'-0"
0 2 4 6 8 10 12 14 16

H12



DATA AWARD NUMBER: 06-01-06458

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CONSTRUCTION

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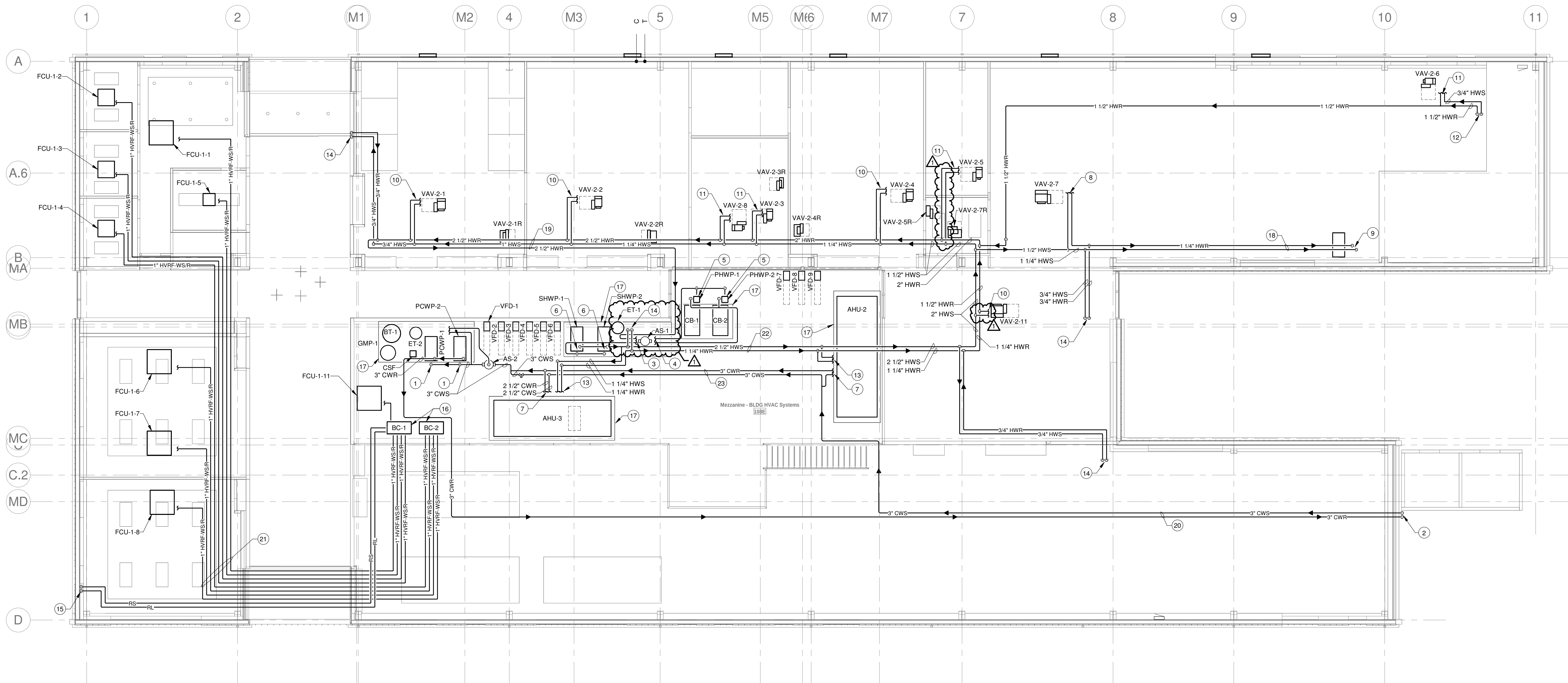
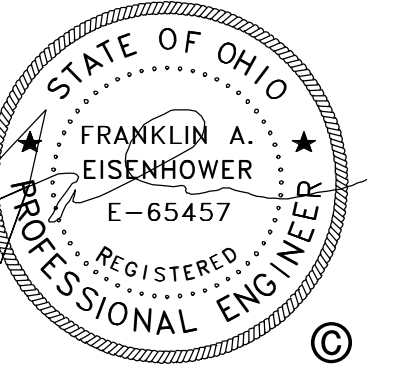
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SCALE: 1/8" = 1'-0"

-31

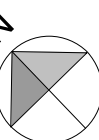


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- PLAN NOTES**
- 3" CWS/R DN TO PCWP. REFER TO DETAIL.
 - 3" CWS/R DN.
 - 2 1/2" HWS/R (SECONDARY LOOP) TO AS.
 - 2 1/2" HWS/R (PRIMARY LOOP) TO AS.
 - 2 1/2" HWS/R TO CB. PROVIDE FULL SIZE PIPE TO BOILER CONNECTION. REFER TO DETAIL.
 - 2 1/2" HWS/R DN TO SHWP. REFER TO DETAIL.
 - 2 1/2" CWS/R TO AHU. REFER TO DETAIL.
 - 1 1/4" HWS/R TO SERVE VAV. REFER TO DETAIL.
 - 1 1/4" HWS/R DN.
 - 1" HWS/R TO SERVE VAV. REFER TO DETAIL.
 - 3/4" HWS/R TO SERVE VAV. REFER TO DETAIL.
 - 3/4" HWS & 1 1/2" HWR DN.
 - 3/4" HWS/R TO AHU. REFER TO DETAIL.
 - 3/4" HWS/R DN.
 - RL/S DN.
 - MOUNT BC UNITS ON UNSTRUCT STANDS SUPPORTED BY THE FLOOR. COORDINATE STAND FABRICATION WITH BC MANUFACTURER TO ENSURE PROPER OPERATION AND THAT ALL CLEARANCES ARE MAINTAINED. BOTTOM OF BC SHALL BE 48" AFF.
 - 4" CONCRETE EQUIPMENT PAD.
 - BOP: 19' 5" AFF.
 - BOP: 18' 10" AFF.
 - BOP: 16' 4" AFF.
 - BOP: 14' 5" AFF.
 - BOP: 8' 11" AFF.
 - BOP: 6' 4" AFF.

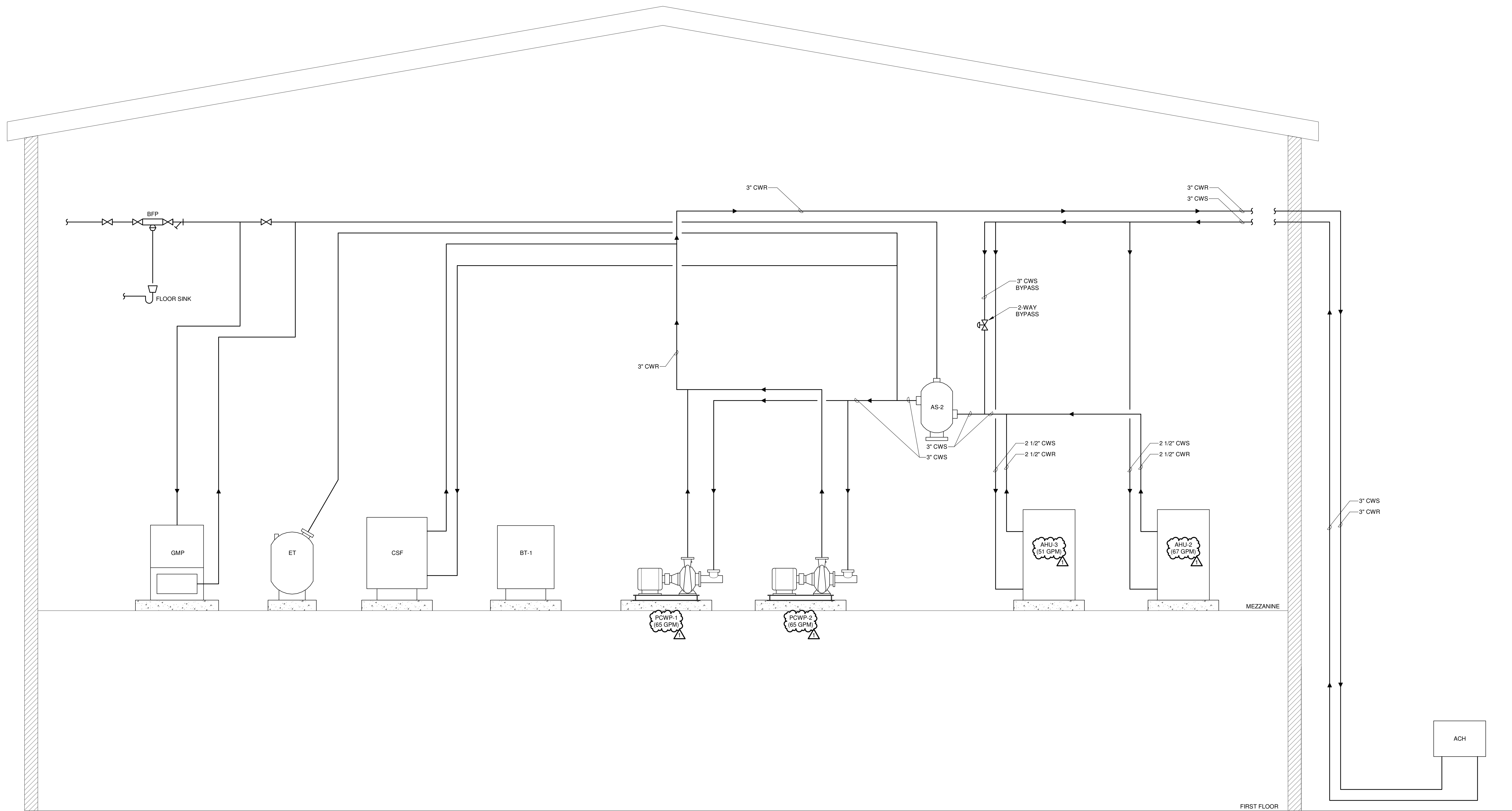
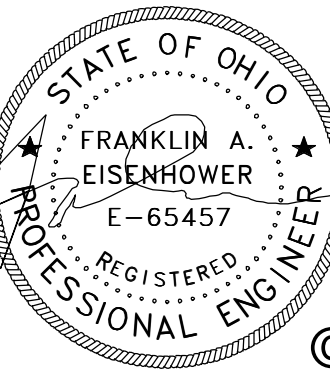
KEY PLAN



**SECOND FLOOR HVAC
PIPING PLAN**

H32

SCALE: 1/8" = 1'-0"



CHILLED WATER SYSTEM DIAGRAM
SCALE: NONE

Belmont
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Building

45869 Hammond Rd Connector
St Clairsville, OH, 43080

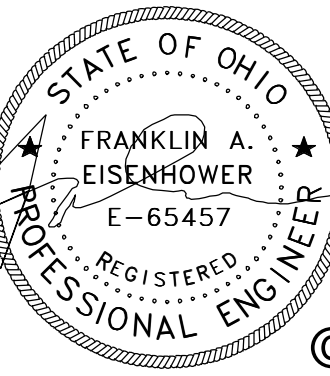
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KEY PLAN

HVAC PIPING
DIAGRAMS



Belmont
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45869 Hammond Rd Connector
St Charlesville, OH, 43090

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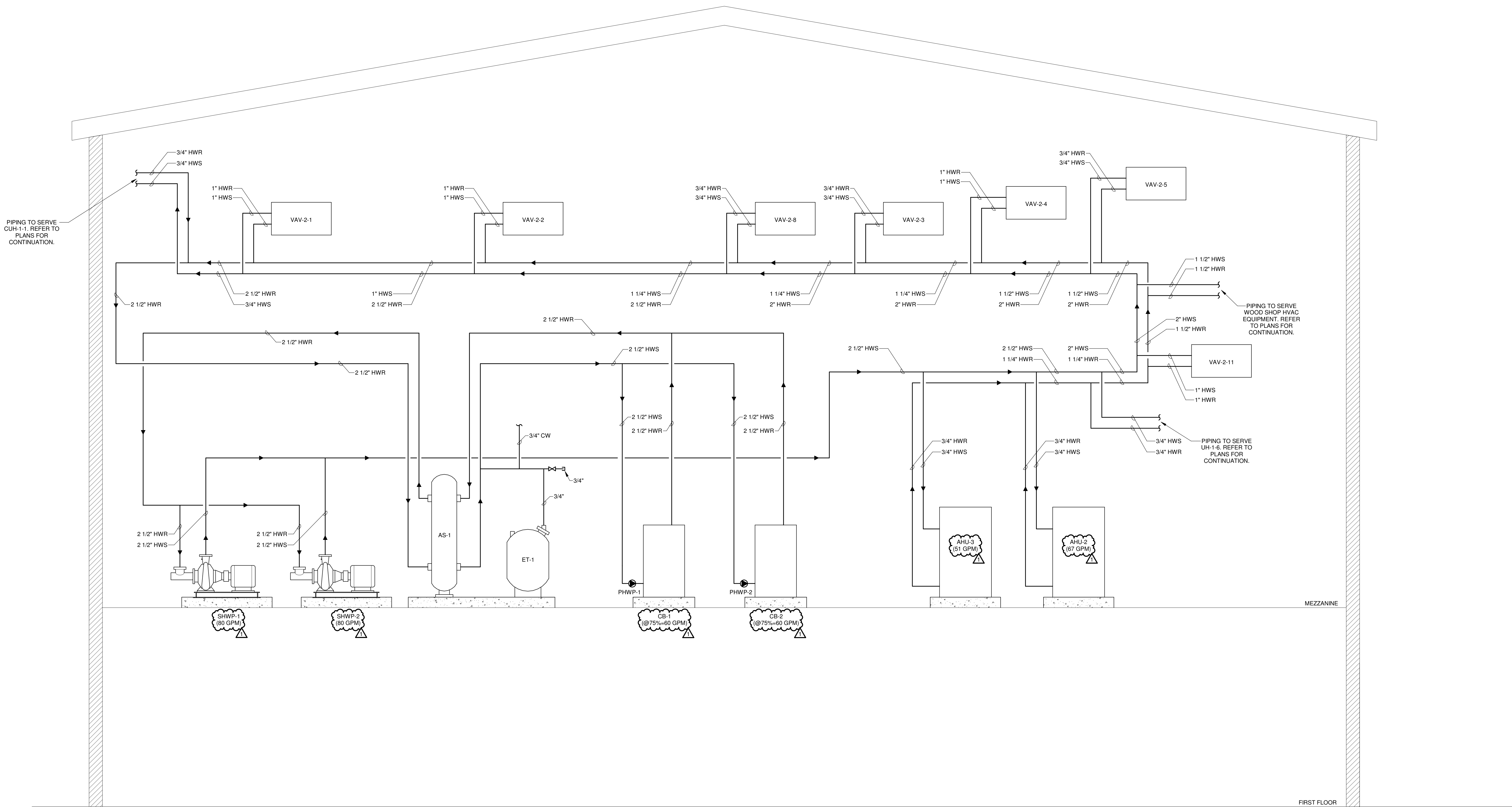
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KEY PLAN

HVAC PIPING
DIAGRAMS

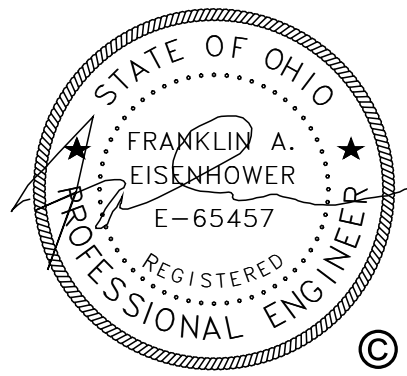
H65

HEATING HOT WATER SYSTEM DIAGRAM
SCALE: NONE





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PLUMBING SYMBOLS	
SYMBOL	DESCRIPTION
	CALIBRATED MANUAL BALANCING VALVE
	BACKFLOW PREVENTER
	CHECK VALVE
	PRESSURE REDUCING VALVE
	SHUT OFF VALVE
	STRAINER
	UNION
	RECIRCULATING HOT WATER CIRCUIT VALVING
	CLEANOUT IN FLOOR OR AT GRADE
	CLEANOUT IN SUSPENDED PIPE
	CLEANOUT IN WALL
	FLOOR DRAIN / FLOOR SINK
	TRAP SERVING DRAIN ABOVE
	PIPE BRANCH TAKE-OFF FROM BOTTOM
	PIPE BRANCH TAKE-OFF FROM TOP
	PIPE DROP
	PIPE RISE
	ROOF DRAIN/SANITARY VENT
	ROOF DRAIN ABOVE
	VENT THRU ROOF
	HOSE BIB / FROSTPROOF HYDRANT
	PRESSURE GAUGE
	TEMPERATURE AND PRESSURE RELIEF VALVE
	TEMPERING VALVE
	THERMOMETER

GENERAL PLUMBING ABBREVIATIONS	
ABBREVIATION	DESCRIPTION
AFF	ABOVE FINISHED FLOOR
CB	CATCH BASIN
CDV	COMBINATION DRAIN AND VENT
CEIL	CEILING
CI	CAST IRON
CSR	CURRENT SENSING RELAY
CTE	CONNECT TO EXISTING
DF	DRINKING FOUNTAIN
DS	DOWNSPOUT (BUILDING EXTERIOR)
DV	DRAIN VALVE
EC	ELECTRICAL CONTRACTOR
EEW	EMERGENCY EYE / FACE WASH FOUNTAIN
EL	ELEVATION
ES	EMERGENCY SHOWER
ESE	EMERGENCY SHOWER/EYEWASH
EWG	ELECTRIC WATER COOLER
FH	FIRE HYDRANT
FPC	FIRE PROTECTION CONTRACTOR
GC	GENERAL CONTRACTOR
INV	INVERT
IW	INDIRECT WASTE
L	LAVATORY
LT	LAUNDRY TUB
MB	MOP BASIN
MC	MECHANICAL CONTRACTOR
MH	MANHOLE
PC	PLUMBING CONTRACTOR
POC	POINT OF CONNECTION
PVC	POLYVINYL CHLORIDE
S	SINK
SH	SHOWER
SS	SERVICE SINK
SW	SAFE WASTE
TMV	THERMOSTATIC MIXING VALVE
TMV-E	EMERGENCY THERMOSTATIC MIXING VALVE
TYP	TYPICAL
U	URINAL
VT	VITREOUS TILE
VS	VENT STACK
WC	WATER CLOSET
WF	WASH FOUNTAIN
WS	WASTE STACK

PLUMBING PIPE SYSTEM ABBREVIATIONS		
ABBREVIATION	LINE TYPE	DESCRIPTION
140° HW		140° HOT WATER PIPING
CA		COMPRESSED AIR PIPING
CDV		COMBINATION DRAIN/VENT (ABOVE GROUND)
CW		COLD WATER PIPING
CW		COLD WATER PIPING (UNDERGROUND/UNDERFLOOR)
G		NATURAL GAS PIPING
HW		HOT WATER PIPING
RHW		RECIRCULATED HOT WATER PIPING
SAN		SANITARY SEWER (ABOVE GROUND)
SAN		SANITARY SEWER (UNDERGROUND/UNDERFLOOR)
V		SANITARY VENT PIPING

PLUMBING ABBREVIATIONS	
ABBREVIATION	DESCRIPTION
AC	GENERAL PURPOSE AIR COMPRESSOR
BFP	BACKFLOW PREVENTER
CO	CLEANOUT
DWH	DOMESTIC WATER HEATER
ET	EXPANSION TANK
FD	FLOOR DRAIN
FPWH-RB	FROSTPROOF WALL HYDRANT
FS	FLOOR SINK
MB	MOP BASIN
RHWP	RECIRCULATING HOT WATER PUMP
TD	TRENCH DRAIN
TMV	TEMPERATURE MIXING VALVE
VTR	VENT THRU ROOF
WB	WALL BOX

DRAWING LIST - PLUMBING	
NUMBER	NAME
P01	PLUMBING SYMBOL LEGEND AND GENERAL NOTES
P02	PLUMBING SCHEDULES
P10	UNDERGROUND PLUMBING PLAN
P11	FIRST FLOOR PLUMBING PLAN
P50	ENLARGED PLUMBING PLANS
P61	PLUMBING DETAILS AND DIAGRAMS
P62	PLUMBING DETAILS AND DIAGRAMS
P72	PLUMBING STACK & GAS DIAGRAMS

GENERAL PLUMBING NOTES:

- A. THE PLUMBING SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH APPLICABLE CODES AND STANDARDS.
- B. DRAWINGS ARE DIAGRAMMATIC. INDICATED POSITIONS SHALL BE FOLLOWED AS CLOSELY AS POSSIBLE. EXACT EQUIPMENT LOCATIONS AND PIPING ROUTING SHALL BE SUBJECT TO BUILDING CONSTRUCTION AND INTERFERENCES WITH OTHER TRADES. WHERE THE LOCATION OF A SPECIFIC PIPE OR DEVICE IS DIMENSIONED, ITS INSTALLED LOCATION SHALL BE AS DIMENSIONED UNLESS COORDINATED OTHERWISE WITH THE ARCHITECT OR ENGINEER.
- C. CUTTING AND PATCHING OF WALLS AND FLOORS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR PERFORMING THE WORK REQUIRING THE PENETRATION. IF THE PC DEFACES OR DAMAGES WALLS, CEILINGS, FLOORS, OR FINISHES, THE PC SHALL BE RESPONSIBLE FOR PATCHING, REPAIRING, AND REFINISHING. PATCHING MATERIALS SHALL MATCH THE NEW CONDITIONS AS APPLICABLE. FINISH PAINTING SHALL BE BY THE GENERAL CONTRACTOR.
- D. PROVIDE FIRESTOPPING AT PENETRATIONS OF FIRE-RATED ASSEMBLIES. REFER TO THE ARCHITECTURAL LIFE SAFETY PLANS FOR THE LOCATION OF FIRE-RATED ASSEMBLIES. FIRE-STOPPING SHALL BE PERFORMED BY THE CONTRACTOR PERFORMING THE WORK REQUIRING THE PENETRATION.
- E. EXCEPT FOR SLAB ON GRADE, PROVIDE FIRESTOPPING AT PENETRATIONS OF NON-FIRE-RATED FLOORS. FIRESTOPPING SHALL BE PERFORMED BY THE CONTRACTOR PERFORMING THE WORK REQUIRING THE PENETRATION.
- F. WHERE PIPES ARE REMOVED THROUGH FIRE-RATED FLOORS OR WALLS, THE CONTRACTOR REMOVING THE DEVICE/MATERIAL SHALL SEAL THE REMAINING OPENING TO MAINTAIN FIRE RATING.
- G. INSTALL EQUIPMENT REQUIRING AN ELECTRICAL CONNECTION IN SUCH A MANNER SO THAT PROPER CLEARANCE IS PROVIDED FOR SERVICING PER THE NATIONAL ELECTRIC CODE.
- H. EQUIPMENT LAYOUT IS BASED ON SCHEDULED EQUIPMENT. ACTUAL INSTALLED EQUIPMENT SIZE, CONFIGURATION, AND PIPING CONNECTIONS SHALL BE COORDINATED WITH THE BUILDING AND PIPING LAYOUT.
- I. VALVES SHALL BE ACCESSIBLE. IF LOCATED ABOVE DRYWALL CEILING OR BEHIND FINISHED WALL, PROVIDE AN ACCESS DOOR. COORDINATE ACCESS DOOR LOCATIONS WITH ARCHITECT.
- J. PLUMBING SYSTEM PIPING SHALL NOT BE INSTALLED IN ELEVATOR SHAFTS, ELEVATOR MACHINE ROOMS, ELECTRICAL ROOMS, OR INFORMATION TECHNOLOGY (LOW VOLTAGE) ROOMS. EXCEPTION - ELEVATOR SUMP DISCHARGE PIPING IN ELEVATOR SHAFTS. EXCEPTION - CW PIPING TO HVAC EQUIPMENT HUMIDIFIERS CONDITIONING THE ROOM. ROUTE PIPING INTO THE ROOM OVER THE DOOR AND NOT OVER PANELS OR EQUIPMENT. CONTACT ARCHITECT/ENGINEER PRIOR TO INSTALLATION OF ANY OTHER PIPING.
- K. DO NOT SUPPORT PIPING FROM ANOTHER PIPE, DUCT, OR CONDUIT. DO NOT SUPPORT ANY ITEM FROM METAL ROOF DECK.
- L. NO EXPOSED PIPING SHALL BE INSTALLED BELOW 7'-6" IN AN EGRESS CORRIDOR.
- M. ATTENTION IS CALLED TO THE LIMITED CEILING SPACE. COORDINATE ALL WORK WITH CEILING HEIGHTS, SOFFITS, STRUCTURE, DUCTWORK, AND LIGHTS. HOLD SUSPENDED SANITARY AND STORM SEWER PIPING HIGH AS POSSIBLE, TO DECK BETWEEN BEAMS IF REQUIRED, AND TIGHT TO STRUCTURE. PROVIDE ANY AND ALL OFFSETS AND EFFORT REQUIRED TO FACILITATE DUCT ROUTING AND THE INSTALLATION OF OTHER EQUIPMENT AND SYSTEMS. COORDINATE CLOSELY WITH OTHER TRADES. NOTE WHERE ELEVATIONS ARE INDICATED ON PLAN, REVIEW OWNER EQUIPMENT LOCATIONS AND SIZES PRIOR TO COORDINATION WITH OTHER TRADES.
- N. REFER TO EQUIPMENT DRAWINGS FOR OWNER FURNISHED EQUIPMENT LOCATIONS AND CONNECTION REQUIREMENTS. PROVIDE PIPING CONNECTIONS AS REQUIRED. ROUGH-INS SHALL BE FIELD COORDINATED WITH ACTUAL EQUIPMENT PURCHASED.
- O. REFER TO ARCHITECTURAL INTERIOR ELEVATIONS FOR EXACT LOCATIONS AND MOUNTING HEIGHTS OF PLUMBING FIXTURES.
- P. ATTENTION IS CALLED TO ROUGH-IN REQUIREMENTS FOR FIXTURES INSTALLED IN CASEWORK FURNISHED BY ANOTHER DIVISION. PROVIDE ROUGH-INS OUT OF WALL WITH ENOUGH LENGTH TO ALLOW FOR SUPPLY STOPS AND WASTES TO HAVE ESCUTCHEONS AT THE REAR BACKING OF THE CASEWORK AND NOT AT THE WALL ACCESSIBLE THROUGH FIELD CUT HOLES IN THE CASEWORK BACKING.
- Q. UNLESS NOTED OTHERWISE VERTICAL PIPING DROPS TO FIXTURES, HOSE BIBS, FAUCETS, ETC. SHALL BE CONCEALED IN THE WALL.
- R. INSTALLATION OF WATER AND/OR DRAIN PIPING IN EXTERIOR BUILDING WALLS SHOULD BE AVOIDED. HOWEVER, IF NECESSARY, INSTALL PIPING ON INTERIOR SIDE OF WALL INSULATION WITH CONTINUOUS FULL THICKNESS PIPE INSULATION APPLIED TO ALL PORTIONS OF WATER PIPING.
- S. DO NOT INSTALL WATER AND/OR DRAIN PIPING IN UNHEATED ATTICS, CRAWL SPACES, OVERHANGS, OR OTHER AREAS SUBJECT TO FREEZING UNLESS PIPING FREEZE PROTECTION CABLE SYSTEM IS SPECIFICALLY CALLED FOR ON THE DRAWINGS. CONTRACTOR SHALL CHECK FINAL INSTALLATION AND REPORT ANY SUSPECT CONDITIONS WHERE FREEZING MAY OCCUR TO CONSTRUCTION MANAGER AND/OR ARCHITECT/ENGINEER.
- T. NEW POTABLE WATER PIPING SHALL BE CLEANED AND DISINFECTED PER THE SPECIFICATIONS. INSTALL VALVES AND FITTINGS AS REQUIRED TO ACCOMPLISH THE PROCESS. CLEANING AND DISINFECTING SHALL BE DOCUMENTED AND SUBMITTED BY THE PLUMBING CONTRACTOR. DOCUMENTATION SHALL BE INCLUDED IN THE OPERATING AND MAINTENANCE MANUAL.
- U. BULLHEAD PIPING CONFIGURATIONS IN WATER PIPING ARE PROHIBITED.
- V. INSTALL BRANCH WATER PIPING HORIZONTALLY WITHIN WALL OR PIPE CHASE FOR FIXTURE GROUPINGS. REFER TO FIXTURE CONNECTION SCHEDULE FOR SIZING REQUIREMENTS.
- W. CW PIPING TO ELECTRIC WATER COOLERS, COFFEE MAKERS, AND ICE MACHINES SHALL INCLUDE IN-LINE WATER FILTERS AND WATER HAMMER ARRESTORS. INSTALL FILTER WITH ISOLATION VALVES AND UNIONS FOR FILTER CHANGING. FILTER LOCATION SHALL BE ACCESSIBLE. PIPE FROM FILTER WITHIN WALL TO EQUIPMENT WITH A SUPPLY STOP AND FLEXIBLE CONNECTION. PROVIDE ESCUTCHEONS FOR WALLS AND/OR CASEWORK AND GROMMETS FOR COUNTER SURFACES.
- X. HW TO PUBLIC TOILET ROOM LAVATORIES SHALL BE TEMPERED TO 110°F MAX USING A LOCAL ASSE 1070 MIXING VALVE INSTALLED WHERE INDICATED.
- Y. IN-LINE CHECK VALVES ARE REQUIRED AT CW AND HW CONNECTIONS TO MOP BASINS AND SERVICE SINKS.
- Z. STORM SEWER PIPING SHALL BE SLOPED 1% MINIMUM UNLESS NOTED OTHERWISE. SANITARY SEWERS AND DRAINS SHALL BE SLOPED PER THE PLUMBING CODE.
- AA. MINIMUM STARTING SANITARY INVERT FOR ANY LATERAL BRANCH DRAIN SHALL BE 1'-6" BELOW TOP OF SLAB.
- AB. SANITARY STACKS, VENT STACKS, AND STORM INTERIOR DOWNSPOUTS SHALL BE INSTALLED TIGHT TO STRUCTURE AT LOCATIONS DROPPING ALONG SIDE COLUMNS, CORNERS, ETC.
- AC. PROVIDE CLEAN-OUTS AT BASES OF AND AT HORIZONTAL OFFSETS OF SANITARY STACKS AND STORM DOWNSPOUTS/LEADERS.
- AD. INDIRECT DRAINS AND PUMPED DISCHARGE TERMINATIONS SHALL HAVE A 45 DEGREE ANGLE CUT AT OUTLET.
- AE. THE MINIMUM UNDER SLAB SANITARY DRAIN PIPE SIZE SHALL BE 3" UNLESS OTHERWISE REQUIRED TO BE LARGER BY LOCAL CODE OR ORDINANCE.
- AF. REFER TO INDIVIDUAL STACK DIAGRAMS FOR WASTE AND VENT PIPING RUN WITHIN WALLS/CHASES, AND FOR ANY PIPE SIZING NOT INDICATED ON PLANS FOR DRAWING CLARITY. REFER TO THE PLUMBING FIXTURE CONNECTION SCHEDULE FOR TYPICAL FIXTURE WASTE AND VENT PIPE SIZING.
- AG. 2-1/2" VENT PIPING INDICATED COMPLIES WITH THE PLUMBING CODE, HOWEVER, 3" MAY BE SUBSTITUTED DUE TO NON-AVAILABILITY.
- AH. PLUMBING VENT TERMINATIONS SHALL BE LOCATED AT LEAST 10 FEET FROM HVAC EQUIPMENT OUTSIDE AIR INTAKES.
- AI. WHERE A FLOOR DRAIN OR FLOOR SINK IS INSTALLED ADJACENT TO EQUIPMENT FOR DRAINING PURPOSES, ITS EXACT LOCATION SHALL BE COORDINATED IN THE FIELD WITH THE EQUIPMENT TO BE INSTALLED. EXACT ELEVATIONS OF FLOOR DRAINS OR FLOOR SINKS SHALL BE COORDINATED IN THE FIELD WITH FINISHED FLOOR LEVELS AND SLOPES.
- AJ. FLOOR DRAINS SHALL HAVE TRAP PRIMERS EXCEPT FOR THOSE RECEIVING A CONTINUOUS WATER SOURCE SUCH AS INDIRECT WASTE FROM PREP SINKS OR WALK-IN COOLER/FREEZER COIL CONDENSATE DRAIN WATER.
- AK. INSULATE ABOVE GROUND SANITARY SEWER PIPING AND TRAPS CARRYING ONLY AC CONDENSATE OR ICE MACHINE DRAINAGE. PROVIDE INSULATION FROM FLOOR DRAIN OR WASTE RECEPTOR UNTIL PIPE IS TIED INTO SANITARY CARRYING WASTE FROM OTHER SOURCES.
- AL. COVER FLOOR DRAINS, FLOOR SINKS, ROOF DRAINS, AND OVERFLOW ROOF DRAINS DURING CONSTRUCTION TO PREVENT DEBRIS FROM ENTERING PIPE AND TO PROTECT GRATES FROM DAMAGE.
- AM. PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR ALL LOW VOLTAGE WIRING REQUIRED FOR PROPER OPERATION OF HARDWIRED PLUMBING FIXTURES. ALL WIRING SHALL BE INSTALLED IN CONDUIT PER DIVISION 26 REQUIREMENTS.

**Belmont
College
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Building**

45869 Hammond Rd Connector
St Clairsville, OH, 43080

EDA AWARD NUMBER: 06-01-06458

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07/08/2024**

DRAWING UPDATES		
1	Addendum No 3	01/10/2025

KEY PLAN

**PLUMBING SYMBOL
LEGEND AND
GENERAL NOTES**

P01



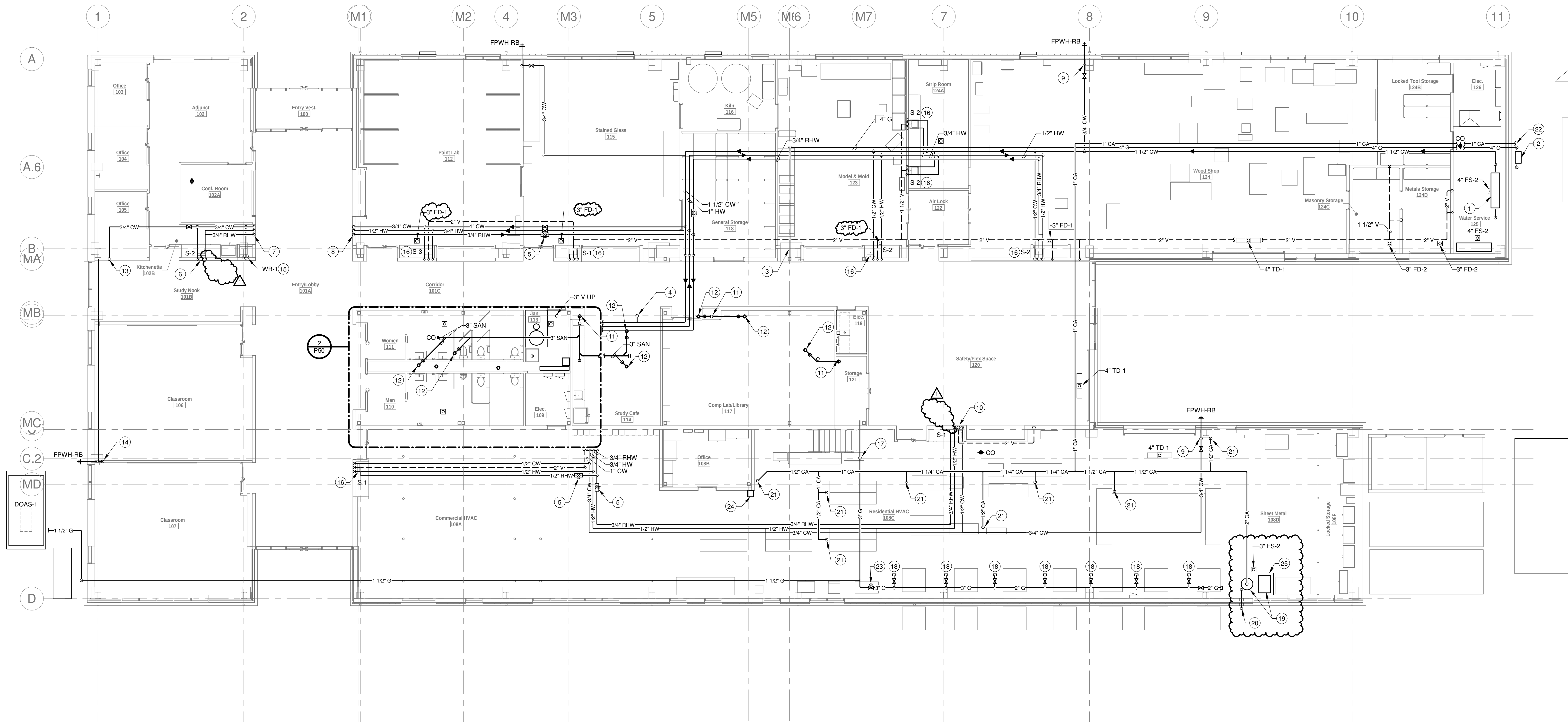
**Belmont College
Construction
Trades
Building**

45869 Hammond Rd Connector
St Clairsville, OH, 43090

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DRAWING UPDATES
1 | Addendum No 3 | 01/10/25



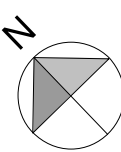
GENERAL NOTES

A. TOP OF FIRST FLOOR SLAB ELEVATION: 1203.00 FT

PLAN NOTES

- 3" DOMESTIC WATER SERVICE BUILDING ENTRY. REFER TO DETAIL.
- NATURAL GAS METER SET.
- 4" G UP TO MECHANICAL ROOM.
- 1 1/2" CW UP TO MECHANICAL ROOM.
- RHW CIRCUIT VALVE ASSEMBLY. REFER TO DETAIL. CARTRIDGE FLOW RATE: 1.0 GPM.
- 1 1/2" V UP TO 3" VTR.
- 3/4" CW, 1/2" HW, & 1/2" RHW UP FROM BELOW SLAB.
- 3/4" CW, 1/2" HW, & 1/2" RHW DN TO BELOW SLAB.
- 3/4" CW DN EXPOSED ALONG COLUMN.
- 2" V UP TO 3" VTR.
- 3" SAN DN IN CHASE.
- 3" SAN UP TO FDI'S.
- 3/4" CW UP TO CEILING. RUN PIPING TIGHT TO CEILING TO SERVE HB OUTSIDE CLASSROOM 106.
- 3/4" CW UP TO CEILING. RUN PIPING TIGHT TO CEILING OVER TO OFFICE 105. REFER TO PLUMBING PLAN FOR CONTINUATION.
- 1/2" CW DN TO WB SERVING REFRIGERATOR. REFER TO DETAIL.
- PROVIDE UNDER LAV TYPE TRAP PRIMER. EXTEND TRAP PRIMING FEED TO FLOOR DRAIN IN SPACE. REFER TO DETAIL.
- 3" G UP.
- 1" G DROP WITH VALVE AND CAP TERMINATION. END USER SHALL CONNECT EQUIPMENT AS REQUIRED.
- AIR COMPRESSOR AND DRYER PROVIDED BY OWNER. REFER TO DETAIL FOR INSTALLATION.
- EXTEND COMPRESSED AIR RELIEF VALVE DISCHARGE PIPE THROUGH EXTERIOR WALL & TERMINATE WITH ELBOW DN. SEAL WALL PENETRATION IN ACCORDANCE WITH ARCHITECTURAL DRAWINGS AND SPECIFICATIONS.
- 1/2" CA DN TO COMPRESSED AIR OUTLET PROVIDED AND INSTALLED BY OWNER: 30 SCFM @ 90 PSIG.
- EXTEND CA PIPING TO CONNECT TO 1" CA HEADER ON DUST COLLECTOR: 30CFM @ 90 PSI.
- EMERGENCY GAS SHUT OFF VALVE (NORMALLY CLOSED), AMERICAN GAS SAFETY MODEL "MERLIN1080" OR APPROVED EQUAL.
- EMERGENCY GAS SHUT OFF SWITCH/BUTTON, BY AMERICAN GAS SAFETY OR APPROVED EQUAL.

KEY PLAN



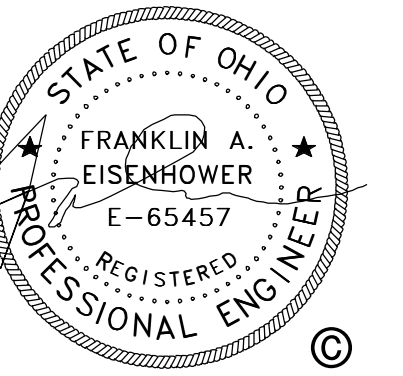
**FIRST FLOOR
PLUMBING PLAN**

SCALE: 1/8" = 1'-0"
0 2 4 6 8 10 12 14 16

P11



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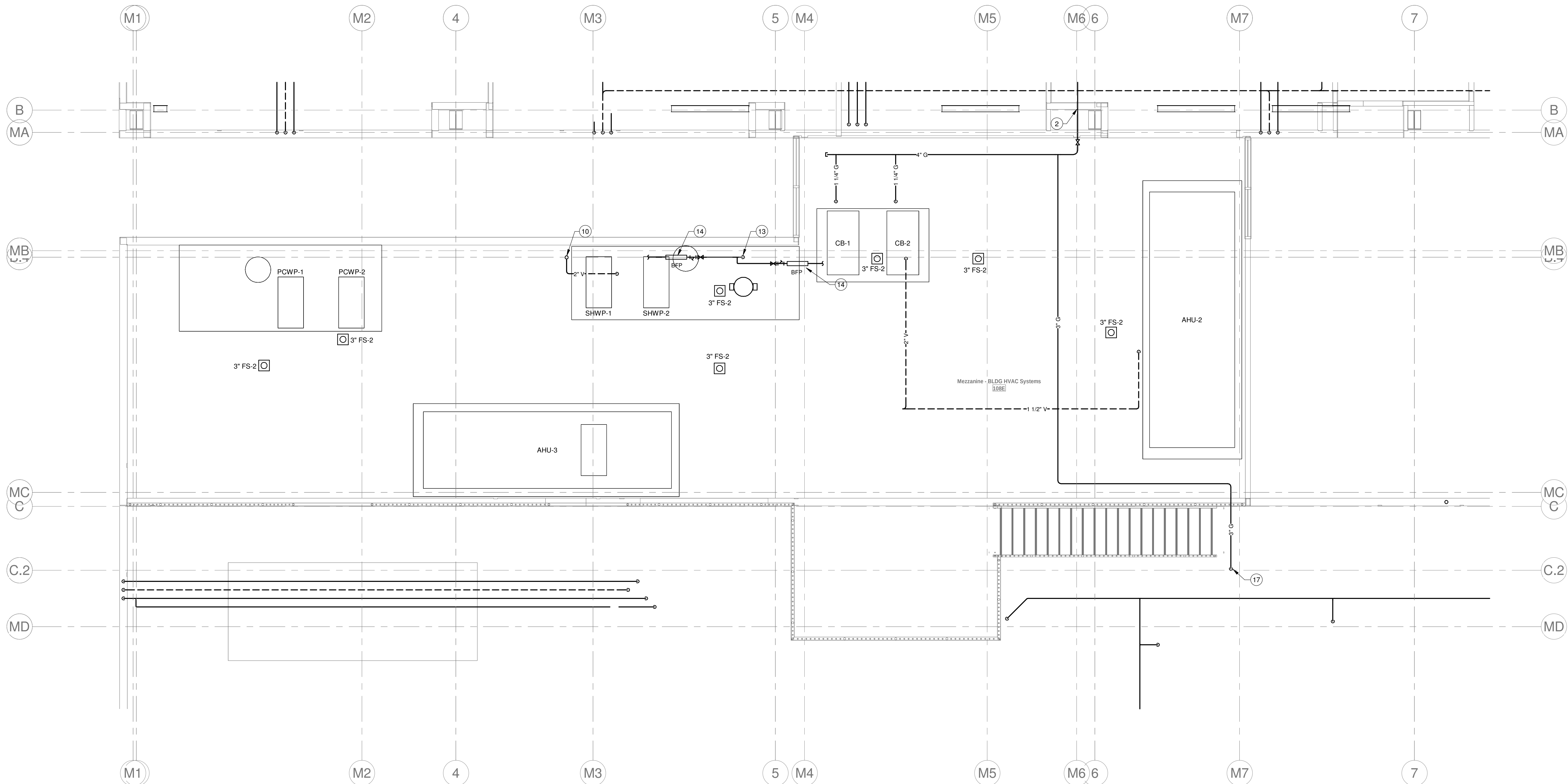
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1 Addendum No 3 01/10/25

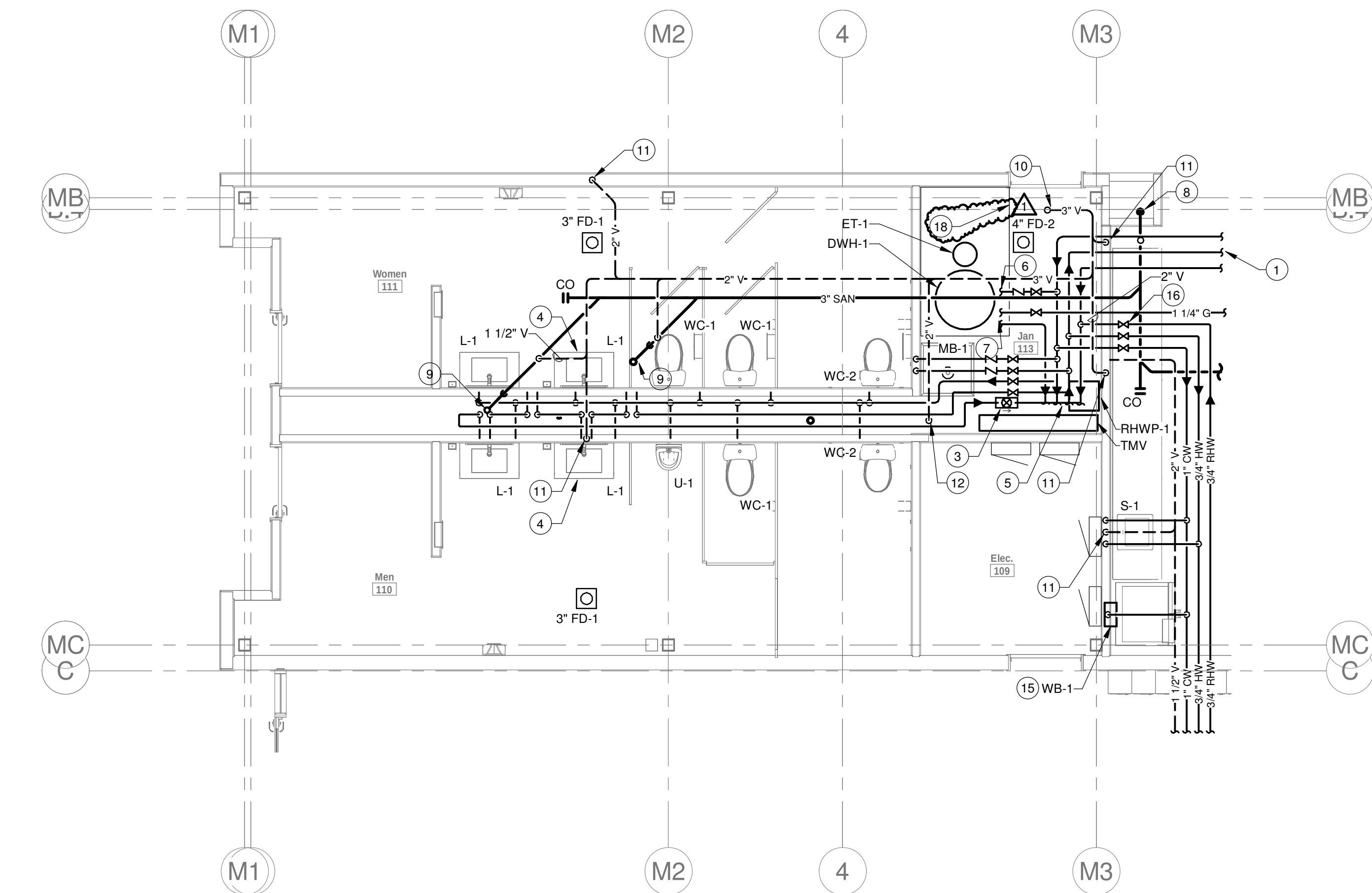
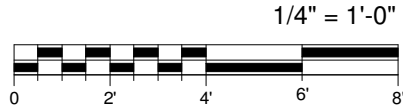
KEY PLAN

**ENLARGED PLUMBING
PLANS**

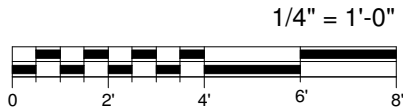
P50



2. SECOND FLOOR PLUMBING PLAN



1. FIRST FLOOR ENLARGED PLUMBING PLAN



PLAN NOTES

- 3\"/>
- 4\"/>
- RHW CIRCUIT VALVE ASSEMBLY. REFER TO DETAIL. CARTRIDGE FLOW RATE: 1.0 GPM.
- PROVIDE UNDER LAV TYPE TRAP PRIMER, EXTEND TRAP PRIMING FEED TO DRAIN IN SPACE. REFER TO DETAIL.
- 1 1/4\"/>
- 1 1/4\"/>
- 1 1/4\"/>
- 1 1/4\"/>
- 3\"/>
- 3\"/>
- 3\"/>
- 2\"/>
- 2\"/>
- 2\"/>
- 1 1/2\"/>
- 1\"/>
- 1/2\"/>
- VALVES SHALL BE INSTALLED IN JANITOR'S CLOSET FOR EASY ACCESS. SHOWN HERE FOR CLARITY.
- 3\"/>
- 4\"/>

18 4\"/>