



312 Plum Street, Suite 700  
Cincinnati, OH 45202  
(513) 381-2112

May 2, 2024

### ADDENDUM 1

TO THE DRAWINGS, SPECIFICATIONS AND CONTRACT DOCUMENTS FOR:  
(5 pages of Text = / 77 Pages of Attachments/ Drawings / 9 pages of Drawings) Total = 82 Pages

## Jefferson Twp. LSD-HS Ag Ed Facility

FOR

Jefferson Township Local School District  
2625 South Union Road  
Dayton, OH 45417

Comm. No. 2024006.01

#### TO ALL BIDDERS:

This Addendum supplements, amends and takes precedence over the original Drawings and Specifications, and shall be taken into account when preparing proposals, and shall become part of the Contract Documents. Receipt of this Addendum must be entered on the bidder's Bid Form. Bidder is cautioned to read the entire addendum and to check that all pages of the Addendum have been included in the Bidder's copy of the Addendum.

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#### QUESTIONS & ANSWERS

**QUESTION 1** *Do you have any more information/specs for the greenhouse building? Is there a spec for the Greenhouse, approved manufacturers, etc?*

A. Greenhouse specs are included in this addendum.

**QUESTION 2** *Wanted to confirm these documents do not need to be submitted with the bid, only prior to the contract: Campaign Contributions form, Consent to Escrow, and Delinquent Property Tax Affidavit.*

A. The following documents shall be submitted with the Bid Form:

1. 00 43 13 - BID GUARANTY AND CONTRACT BOND
2. 00 45 13 – BIDDER'S QUALIFICATIONS
3. 00 45 15 - DELINQUENT PERSONAL PROPERTY TAX AFFIDAVIT.
4. 00 45 18 - CAMPAIGN CONTRIBUTIONS AFFIDAVIT.

**QUESTION 3** *The building permit has been applied for, correct?*

- A. It has not but will be this week on Friday. The general building permit will be applied for by SHP and paid for by JTLSD. Refer to the Supplementary Conditions document for other permits and fees that are the responsibility of the Bidder/GC.

**GENERAL**

**ITEM 1 – Addenda:**

- A. Pre-Bid Meeting Agenda and Sign-in sheet are attached.  
B. Addendum #2 will be issued no later than Friday, May 3, 2024, at 1:00 PM Local Time.

**SPECIFICATION ITEM**

**ITEM 2 – Specification Document 00 01 10 - Table of Contents:**

- A. Revision. Delete Specification Document 00 01 10 Table of Contents in the Project Manual and replace with attached Specification Document 00 01 10 Table of Contents in the Project Manual.
1. Added specification Section 07 41 13.13 – Formed Metal Roof Panels added to the Table of Contents.
  2. Added specification Section 12 32 16 – Manufactured Plastic-Laminate-Clad Casework added to the Table of Contents.
  3. Added specification Section 12 36 23.13 – Plastic-Laminate-Clad Countertops added to the Table of Contents.
  4. Added specification Section 12 36 23.13 – 12 57 16 – Metal Welding Booth added to the Table of Contents.
  5. Added specification Section 13 34 10 – Glazed Structures added to the Table of Contents.

***SEE ATTACHED REVISED SPECIFICATION DOCUMENT 00 01 10 TABLE OF CONTENTS.***

**ITEM 3 – Specification Document 00 73 01 – Supplementary General Conditions:**

- A. Revision. Delete specification Section 00 73 01 – Supplementary General Conditions in the Project Manual and replace with attached specification Section 00 73 01 – Supplementary General Conditions in the Project Manual.
1. Deleted paragraph 3.5.1.6.

***SEE ATTACHED REVISED SPECIFICATION DOCUMENT 00 73 01 – SUPPLEMENTARY GENERAL CONDITIONS.***

**ITEM 4 – Specification Document 00 73 42 – Contract Provisions For Non-Federal Entity Contracts Under Federal Awards:**

- A. Revision. Delete specification Document 00 73 42 Contract Provisions For Non-Federal Entity Contracts Under Federal Awards in the Project Manual and replace with attached specification Document 00 73 42 Contract Provisions For Non-Federal Entity Contracts Under Federal Awards in the Project Manual.
1. Added the following paragraphs at the end of the document:
    - a. Energy Conservation (34 C.F.R. § 75.616(c)).
    - b. Domestic Preference (2 C.F.R. § 200.322).
    - c. Assurances for Construction and Other Capital Expenditures.
    - d. Health, Safety, and Disability Compliance (34 CFR §§75.609 and 75.610).

***SEE ATTACHED REVISED SPECIFICATION DOCUMENT 00 73 42 – CONTRACT PROVISIONS FOR NON-FEDERAL ENTITY CONTRACTS UNDER FEDERAL AWARDS.***

**ITEM 6 – Specification Section 04 20 00 – Unit Masonry:**

- A. Revision. Delete specification Section 04 20 00 – Unit Masonry in the Project Manual and replace with attached specification Section 04 20 00 – Unit Masonry in the Project Manual.

1. Added Basis of Design: Bowerston Shale Company; Sunset Flash Wirecut.

***SEE ATTACHED REVISED SPECIFICATION SECTION 04 20 00 – Unit Masonry.***

**ITEM 5 – Specification Section 07 41 13.13 – Formed Metal Roof Panels:**

- A. Revision. Add specification Section 07 41 13.13 – Formed Metal Roof Panels to the Project Manual.

***SEE ATTACHED REVISED SPECIFICATION SECTION 07 41 13.13 – FORMED METAL ROOF PANELS.***

**ITEM 6 – Specification Section 07 62 00 – Sheet Metal Flashing and Trim:**

- B. Revision. Delete specification Section 07 62 00 – Sheet Metal Flashing and Trim in the Project Manual and replace with attached specification Section 07 62 00 – Sheet Metal Flashing and Trim in the Project Manual.

2. Added paragraph 2.2 C. “Stainless Steel Sheet: ASTM A240, Type 304, dead soft, fully annealed” to the specification.

***SEE ATTACHED REVISED SPECIFICATION SECTION 07 62 00 – SHEET METAL FLASHING AND TRIM.***

**ITEM 7 – Specification Section 12 32 16 – Manufactured Plastic-Laminate-Clad Casework:**

- B. Revision. Add specification Section 12 32 16 – Manufactured Plastic-Laminate-Clad Casework to the Project Manual.

***SEE ATTACHED REVISED SPECIFICATION SECTION 12 32 16 – MANUFACTURED PLASTIC-LAMINATE-CLAD CASEWORK.***

**ITEM 8 – Specification Section 12 36 23.13 – Plastic-Laminate-Clad Countertops:**

- A. Revision. Add specification Section 12 36 23.13 – Plastic-Laminate-Clad Countertops to the Project Manual.

***SEE ATTACHED REVISED SPECIFICATION SECTION 12 36 23.13 – PLASTIC-LAMINATE-CLAD COUNTERTOPS.***

**ITEM 9 – Specification Section 12 57 16 – Metal Welding Booth:**

- A. Revision. Add specification Section 12 57 16 – Metal Welding Booth to the Project Manual.

***SEE ATTACHED REVISED SPECIFICATION SECTION 12 57 16 – METAL WELDING BOOTH.***

**ITEM 10 – Specification Section 13 34 10 – Glazed Structures:**

- A. Revision. Add specification Section 13 34 10 – Glazed Structures to the Project Manual.

***SEE ATTACHED REVISED SPECIFICATION SECTION 13 34 10 – GLAZED STRUCTURES.***

**DRAWING ITEMS**

**ITEM 11 – Drawing Sheet AD101- FIRST FLOOR DEMO PLAN - AG ED SHOP:**

- A. Revision. Delete Sheet AD101 - FIRST FLOOR DEMO PLAN - AG ED SHOP and replace with attached Sheet AD101 - FIRST FLOOR PLAN - AG ED SHOP.

1. Add General Note K. regarding asbestos abatement and removal.

2. Added Keynote D15 at the existing CMU walls to remain.

3. Added Keynote D16 at the Storage/future IT Room 1108.

***SEE ATTACHED REVISED SHEET AD101 – FIRST FLOOR DEMO PLAN - AG ED SHOP.***

**ITEM 12 – Drawing Sheet A101- FIRST FLOOR PLAN - AG ED SHOP:**

- A. Revision. Delete Sheet A101 - FIRST FLOOR PLAN - AG ED SHOP and replace with attached Sheet A101 - FIRST FLOOR PLAN - AG ED SHOP.
1. Added Keynote A15 at the existing CMU walls to remain.
  2. Added Keynotes A16 and A17 at the existing plumbing supply line.
  3. Added Casework at 1/A101 and 2/A101.
  4. Revised Shop Equipment Key Notes.
  5. Added (2) M8d Marker Boards to Classroom 1102.

***SEE ATTACHED REVISED SHEET A101 – FIRST FLOOR PLAN - AG ED SHOP.***

**ITEM 13 – Drawing Sheet A201- EXTERIOR ELEVATIONS:**

- A. Revision. Delete Sheet A201 - EXTERIOR ELEVATIONS and replace with attached Sheet A201 - EXTERIOR ELEVATIONS.
1. Revised roof slope of Greenhouse from 8/12 to 6/12.
  2. Add Exhaust with grill keynote to the Greenhouse.
  3. Revise Greenhouse gutter by manufacturer, not by Bidder/GC.

***SEE ATTACHED REVISED SHEET A201 – EXTERIOR ELEVATIONS.***

**ITEM 14 – Drawing Sheet A501 - BUILDING SECTIONS:**

- A. Revision. Delete Sheet A501 - BUILDING SECTIONS and replace with attached A501 - BUILDING SECTIONS.
1. Revised roof slope of Greenhouse from 8/12 to 6/12.
  2. Add exhaust fan with grill keynote to the Greenhouse.
  3. Revise Greenhouse gutter by manufacturer, not by Bidder/GC.

***SEE ATTACHED REVISED SHEET A501 – BUILDING SECTIONS.***

**ITEM 15 – Drawing Sheet E001 - ELECTRICAL LEGENDS:**

- A. Revision. Delete Sheet E001 - ELECTRICAL LEGENDS and replace with attached Sheet E001 - ELECTRICAL LEGENDS.
1. Revised basis of design for Axx fixtures from EPANL to CPANL.
  2. Added Lux Dynamics equal to C10 fixture.

***SEE ATTACHED REVISED SHEET E001 - ELECTRICAL LEGENDS.***

**ITEM 16 – Drawing Sheet E100 - LIGHTING PLAN - AG LAB:**

- A. Revision. Delete Sheet E100 - LIGHTING PLAN - AG LAB and replace with attached Sheet E100 - LIGHTING PLAN - AG LAB.
1. Revised layout in 1101 AG ED LAB.

***SEE ATTACHED REVISED SHEET E100 - LIGHTING PLAN - AG LAB.***

**ITEM 17 – Drawing Sheet E200 - POWER PLAN - AG LAB:**

- A. Revision. Delete Sheet E200 - POWER PLAN - AG LAB and replace with attached Sheet E200 - POWER PLAN - AG LAB.
1. Revised layout in 1101 AG ED LAB.

***SEE ATTACHED REVISED SHEET E200 - POWER PLAN - AG LAB.***

**ITEM 18 – Drawing Sheet E201 - POWER PLANS - BARN AND GREENHOUSE:**

A. Revision. Delete Sheet E201 - POWER PLANS - BARN AND GREENHOUSE and replace with attached Sheet E201 - POWER PLANS - BARN AND GREENHOUSE.

1. Revised Greenhouse shade motor to be 120V.

***SEE ATTACHED REVISED SHEET E201 - POWER PLANS - BARN AND GREENHOUSE.***

**ITEM 19 – Drawing Sheet E600 - ELECTRICAL SINGLE LINE DIAGRAM AND PANEL SCHEDULES:**

A. Revision. Delete Sheet E600 - ELECTRICAL SINGLE LINE DIAGRAM AND PANEL SCHEDULES and replace with attached Sheet E600 - ELECTRICAL SINGLE LINE DIAGRAM AND PANEL SCHEDULES.

1. Revised panel schedule GH for 120V shade motor.

***SEE ATTACHED REVISED SHEET E600 - ELECTRICAL SINGLE LINE DIAGRAM AND PANEL SCHEDULES.***

**ATTACHMENTS**

- Specifications
  - 00 01 10 Table of Contents
  - 00 73 01 Supplementary General Conditions
  - 00 73 42 Contract Provisions For Non-Federal Entity Contracts Under Federal Awards
  - 04 20 00 Unit Masonry
  - 07 41 13.13 Formed Metal Roof Panels
  - 07 62 00 – Sheet Metal Flashing and Trim
  - 12 32 16 Manufactured Plastic-Laminate-Clad Casework
  - 12 36 23.13 Plastic-Laminate-Clad Countertops
  - 12 57 16 Metal Welding Booth
  - 13 34 10 Glazed Structures
- Drawings
  - AD101 - FIRST FLOOR DEMO PLAN - AG ED SHOP
  - A101 - FIRST FLOOR PLAN - AG ED SHOP
  - A201 - EXTERIOR ELEVATIONS
  - A501 - BUILDING SECTIONS
  - E001 - ELECTRICAL LEGENDS
  - E100 - LIGHTING PLAN - AG LAB
  - E200 - POWER PLAN - AG LAB
  - E201 - POWER PLANS - BARN AND GREENHOUSE

**End of Addendum 1 items – See attached.**



## PREBID MEETING

**PROJECT:** Jefferson Twp. LSD-HS Ag Ed Facility  
**PROJ. NO.:** 2024006.01  
**DATE:** May 1, 2024 at 11:00 AM  
**LOCATION:** Jefferson Township Local School District Office,  
2625 South Union Road, Dayton, Ohio 45417

### AGENDA

1. **INTRODUCTIONS AND RESPONSIBILITIES:**
  - A. Owner: Jefferson Township Local School District  
Dr. Rusty Clifford, Interim Superintendent  
Craig Jones, Treasurer  
Phone: 937-835-5682  
Email: rclifford@jeffersontwp.k12.oh.us
  - B. Architect: SHP Leading Design  
Sr. Project Architect – Dan Behnfeldt / Email: [dbehnfeldt@shp.com](mailto:dbehnfeldt@shp.com)/ Direct: 513-588-1380  
General Office Phone: 513-381-2112
  - C. MEP Engineers: SHP Leading Design (Office Phone: 513-381-2112)  
HVAC Engineering Contact: David Hammitt / Email: [dhammitt@shp.com](mailto:dhammitt@shp.com)  
Electrical Engineering Contact: Adam Plaver / Email: [aplaver@shp.com](mailto:aplaver@shp.com)  
Plumbing Engineering Contact: Ron Cobb / Email: [rcobb@shp.com](mailto:rcobb@shp.com)
2. **SIGN IN SHEET:** Please provide contact information.
3. **BID DATE AND LOCATION PER NOTICE TO BIDDERS:**  
**Wednesday, May 8, 2024, 1:00 P.M. - LOCAL TIME.**  
**Office of the Treasurer**  
**Jefferson Township Local School District Office,**  
**2625 South Union Road, Dayton, Ohio 45417**
4. **TYPE OF CONTRACT:** Single Prime Contract.
5. **PREVAILING WAGES:** DQ apply to this project.
6. **ESTIMATED COST OF THE BASE BID:** \$2,000,000.
7. **ALTERNATES:**
  - Alternate 1 - Sealed concrete in lieu of Vinyl Sheet Flooring in Rooms 1102 CLASSROOM, 1103 SMALL GROUP ROOM, and 1104 OFFICE.
  - Alternate 2 - Sealed concrete in lieu of Resinous Flooring in Rooms 1101 AG ED LAB and 1106 MECH TECH LAB.
  - Alternate 3 - Provide 225A Rated Busway in lieu of electric drops in Rooms 1101 AG ED LAB.
  - Alternate 4 - Delete the Barn and Manure Storage structure from the Scope of Work.
  - Alternate 5 - Provide ceiling fans in Room 2001 Small Animal Barn.

**8. MILESTONE SCHEDULE**

Notice to Proceed.....	May 17, 2024
Begin Construction.....	May 20, 2024
Last Day of School.....	May 23, 2024
First Day of School.....	August 19, 2024
Substantial Completion-Renovation (15 weeks).....	August 30, 2024
Substantial Completion-Barn, Greenhouse, and Site (17 weeks).....	September 13, 2024
Final Completion- Renovation.....	September 13, 2024
Final Completion-Barn, Greenhouse, and Site.....	September 27, 2024

**9. GENERAL REVIEW OF THE SCOPE OF WORK:**

The Work consists of the renovation of classroom space in the existing High School into an Agriculture Education shop. The work also includes the construction of a new Greenhouse and Livestock Barn with supporting site improvements and other Work indicated in the Contract Documents.

**10. PROJECT STATUS:** Documents will be submitted for permit plan review on May 3.

**11. COMMUNICATION:**

A. All communications during the bid process (RFI, Substitution Requests, clarification requests) shall be submitted via email to Dan Behnfeldt as SHP Representative.  
Email: [dbehnfeldt@shp.com](mailto:dbehnfeldt@shp.com)

**12. QUESTIONS/COMMENTS:**

A. Answers will be addressed via addendum.

**13. ADDENDA:**

A. Addendum 1 will be issued no later than Wednesday, May 1, 2024.  
B. Addendum 2 will be issued no later than Friday, May 3, 2024, at 1 pm and be available through Key Blueprints. Refer to the Notice to Bidders for contact information.

**14. LIQUIDATED DAMAGES:** Refer to 00 73 01 Supplementary General Conditions paragraph 8.4.

**15. TEMPORARY FACILITIES:** Coordinate location of staging areas and office location with Owner.

**16. WORK HOURS:**

A. On-Site work hours shall be generally performed during normal daylight working hours Monday through Friday. Saturday work is permitted if the Contractor determines this necessary to attain the indicated schedule and shall be part of the Work without claim for extra compensation. Sunday and Holiday work may be permitted with advance request and approval.

**17. GUIDED TOUR AT THE AREA OF WORK:**

A. Review possible location for temporary field office.  
B. Review site logistics.

**END OF PRE-BID MEETING**

**DOCUMENT 00 01 10 - TABLE OF CONTENTS**

**PROCUREMENT AND CONTRACTING REQUIREMENTS GROUP**

**Division 00 – Procurement and Contracting Requirements**

00 01 10 ..... Table of Contents  
00 11 13 ..... Notice to Bidders  
00 21 13 ..... Instructions to Bidders AIA Document A701 – 2018  
00 21 14 ..... Supplementary Instructions to Bidders  
00 41 16 ..... Bid Form  
00 43 13 ..... Bid Guaranty and Contract Bond  
00 45 13 ..... Bidder’s Qualifications  
00 45 14 ..... Non-Collusion Affidavit  
00 45 15 ..... Delinquent Personal Property Tax Affidavit  
00 45 17 ..... Unresolved Findings for Recovery Affidavit  
00 45 18 ..... Campaign Contributions Affidavit  
00 52 16 ..... Standard Form of Agreement Between Owner and Contractor AIA A101 – 2017  
00 54 33 ..... Digital Data Licensing Agreement AIA C106 – 2022  
00 72 16 ..... General Conditions of the Contract for Construction AIA A201 – 2017  
00 73 01 ..... Supplementary General Conditions  
00 73 03 ..... Drug-Free Workplace Certification  
00 73 04 ..... Waiver of Escrow Agreement  
00 73 42 ..... Contract Provisions for Non-Federal Entity Contracts Under Federal Awards  
00 73 43 ..... Davis-Bacon Contract Provisions  
00 73 44 ..... Davis-Bacon Wage Determinations

**SPECIFICATIONS GROUP**

**GENERAL REQUIREMENTS SUBGROUP**

**Division 01 – General Requirements**

01 10 00 ..... Summary  
01 23 00 ..... Alternates  
01 25 00 ..... Substitution Procedures  
01 26 00 ..... Contract Modification Procedures  
01 29 00 ..... Payment Procedures  
01 31 00 ..... Project Management and Coordination  
01 32 00 ..... Construction Progress Documentation  
01 32 33 ..... Photographic Documentation  
01 33 00 ..... Submittal Procedures  
01 40 00 ..... Quality Requirements  
01 42 00 ..... References  
01 50 00 ..... Temporary Facilities and Controls  
01 60 00 ..... Product Requirements  
01 73 00 ..... Execution  
01 77 00 ..... Closeout Procedures  
01 78 23 ..... Operation and Maintenance Data  
01 78 39 ..... Project Record Documents  
01 79 00 ..... Demonstration and Training



## FACILITY CONSTRUCTION SUBGROUP

### Division 02 – Existing Conditions

02 41 19 ..... Selective Demolition (Not included for 90% submittal)

### Division 03 – Concrete

03 30 00 ..... Refer to Structural Drawings

### Division 04 – Masonry

04 20 00 ..... Unit Masonry

### Division 05 – Metals

05 50 00 ..... Refer to Structural Drawings

05 52 13 ..... Pipe and Tube Railings

### Division 06 – Wood, Plastics, and Composites

06 10 00 ..... Rough Carpentry

06 16 00 ..... Sheathing

06 10 00 ..... Shop-Fabricated Wood Trusses

### Division 07 – Thermal and Moisture Protection

07 21 00 ..... Thermal Insulation

07 41 13.13 ..... Formed Metal Roof Panels

07 62 00 ..... Sheet Metal Flashing and Trim

07 92 00 ..... Joint Sealants

### Division 08 – Openings

08 11 13 ..... Hollow Metal Doors and Frames

08 36 13 ..... Sectional Overhead Doors

08 71 00 ..... Door Hardware

08 80 00 ..... Glazing

### Division 09 - Finishes

09 22 16 ..... Non-Structural Metal Framing

09 29 00 ..... Gypsum Board

09 51 13 ..... Acoustical Panel Ceilings

09 65 13 ..... Resilient Base and Accessories

09 65 16 ..... Resilient Sheet Flooring

09 91 12 ..... Painting

### Division 10 – Specialties

10 11 00 ..... Visual Display Units

10 14 23 ..... Panel Signage

10 26 00 ..... Wall and Door Protection

### Division 11 – Equipment

NA

**Division 12 – Furnishings**

- 12 32 16 .....Manufactured Plastic-Laminate-Clad-Casework
- 12 36 23.13 .....Plastic-Laminate-Clad-Countertops
- 12 57 16 .....Metal Welding Booth

**Division 13 – Special Construction**

- 13 34 10 .....Glazed Structures

**Division 14 – Conveying Equipment**

NA

**FACILITY SERVICES SUBGROUP**

**Division 21 – Fire Suppression**

NA

**Division 22 – Plumbing**

- 22 05 00 .....Common Work Results for Plumbing
- 22 05 17 .....Sleeves and Sleeve Seals for Plumbing Piping
- 22 05 23 .....General Duty Valves for Plumbing Piping
- 22 05 29 .....Hangers and Supports for Plumbing Piping and Equipment
- 22 05 53 .....Identification for Plumbing Piping, Valves and Equipment
- 22 07 00 .....Plumbing Insulation
- 22 10 13 .....Facility Liquified Petroleum Gas Piping
- 22 10 17 .....Liquified Petroleum Piping
- 22 11 16 .....Domestic Water Piping
- 22 11 19 .....Domestic Water Piping Specialties
- 22 13 16 .....Sanitary Waste and Vent Piping
- 22 13 19 .....Sanitary Waste Piping Specialties
- 22 15 13 .....Compressed Air Piping
- 22 15 19 .....Packaged Air Compressors and Receivers
- 22 40 00 .....Plumbing Fixtures

**Division 23 – Heating, Ventilating, and Air Conditioning (HVAC)**

- 23 05 00 .....Common Work Results for HVAC
- 23 05 13 .....Common Motor Requirements
- 23 05 29 .....Hangers and Supports for HVAC Piping and Equipment
- 23 05 48.....Vibration Controls for HVAC Piping and Equipment
- 23 05 53 .....Identification for HVAC Piping and Equipment
- 23 05 93 .....Testing, Adjusting, and Balancing for HVAC
- 23 07 13 .....Duct Insulation
- 23 07 19 .....HVAC Piping Insulation
- 23 23 00 .....Refrigerant Piping
- 23 31 13 .....Metal Ducts
- 23 33 00 .....Air Duct Accessories
- 23 34 23 .....HVAC Power Ventilators
- 23 37 13 .....Diffusers, Registers, And Grilles

- 23 72 00 .....Air-to-Air Energy Recovery Equipment
- 23 74 16 .....Packaged, Small-Capacity, Rooftop Air-Conditioning Units
- 23 81 26 .....Split-System Air-Conditioners
- 23 81 29 .....Variable-Refrigerant-Flow HVAC Systems
- 23 82 39 .....Unit Heaters

**Division 26 – Electrical**

- 26 00 10 .....Supplemental Requirements for Electrical
- 26 05 19 .....Low-voltage Electrical Power Conductors and Cables
- 26 05 26 .....Grounding and Bonding for Electrical Systems
- 26 05 29 .....Hangers and Supports for Electrical System
- 26 05 33 .....Raceways and Boxes for Electrical Systems
- 26 05 44 .....Sleeves and Sleeve Seals for Electrical Raceways and Cabling
- 26 05 53 .....Identification for Electrical Systems
- 26 05 73 .....Power System Studies
- 26 09 23 .....Lighting Control Devices
- 26 24 16 .....Panelboards
- 26 25 00 .....Low-Voltage Enclosed Bus Assemblies
- 26 27 26 .....Wiring Devices
- 26 28 13 .....Fuses
- 26 28 16 .....Enclosed Switches and Circuit Breakers
- 26 29 13 .....Enclosed Controllers and Starters
- 26 50 00 .....Lighting
- 26 60 00 .....Addressable Fire Alarm Systems

**Division 27 – Communications**

NA

**Division 28 – Electronic Safety and Security**

NA

**SITE AND INFRASTRUCTURE SUBGROUP**

**Division 31 – Earthwork**

- 31 10 00 .....Site Clearing
- 31 20 00 .....Earth Moving

**Division 32 – Exterior Improvements**

- 32 12 16 .....Asphalt Paving
- 32 13 13 .....Concrete Paving

**Division 33 – Utilities**

- 33 11 00 .....Water Distribution
- 33 31 00 .....Sanitary Sewers
- 33 41 00 .....Storm Drainage

**END OF DOCUMENT 00 01 10**

## SECTION 00 73 01 - SUPPLEMENTARY GENERAL CONDITIONS

### NOTE:

This section shall serve to supplement, modify, change and/or clarify provisions of the General Conditions (AIA Document A201, 2017 Edition, "General Conditions of the Contract for Construction"). Where an Article of the General Conditions is not modified or a Section is not modified or deleted by these supplements, the unaltered provisions of that Section shall remain in effect. Where items of this section directly conflict with those of the General Conditions, the provisions of this section shall prevail.

### ARTICLE 1: GENERAL PROVISIONS

#### 1.1.3 The Work

(Add the following text to the end of the Section) "The Contractor shall familiarize himself with the Contract Documents and complete the Work intended to be described to the entire satisfaction of the Owner and Architect and shall not avail himself of any manifest error or omission should such exist. The Contractor acknowledges and agrees that the Contract Documents are sufficient to provide for the completion of the Work and include work, whether or not shown or described, which reasonably may be inferred to be required or useful for the completion of the Work in accordance with applicable laws, codes and customary standards of the construction industry."

#### 1.2 Correlation and Intent of the Contract Documents

1.2.4 (Add) "If the Drawings or Specifications conflict, the Contractor is required to provide the greater quantity or higher quality of Work called for. When a duplication of material, equipment or task occurs in the Drawings or Specifications by assignment of work to separate Prime Contracts, each Prime Contractor shall be deemed to have bid on the basis of each providing such material, equipment or task. The Architect will decide which Prime Contractor shall provide the same and which Prime Contract amount shall be adjusted, for not incorporating such into the Project. However it is highly recommended that these discrepancies be brought to the Architect's attention prior to bidding."

1.2.5 (Add) "It is the intent of the Contract Documents to accomplish a complete and first-grade installation in which there shall be installed new products of the latest and best design and manufacturer, and workmanship shall be thoroughly first class, executed by competent and experienced workmen.

- .1 Details of preparations, construction, installation, and finishing encompassed by the Contract Documents shall conform to the best practices of the respective trades, and that workmanship, construction methods, shall be of quality so as to accomplish a neat and quality finished job.
- .2 Where specific recognized standards are mentioned in the Specifications, it shall be interpreted that such requirements shall be met.
- .3 The intent of the Contract Documents is to include all labor, equipment, and materials necessary for the proper and timely execution and completion of the Work, even though such labor, equipment, and materials are not expressly included in the Contract Documents.
- .4 The Contractor will be required to perform all parts of the Work, regardless of whether the parts of the Work are described in the Contract Documents applicable to other trades."

#### 1.7 Digital Data Use and Transmission

Delete the original text in this section and replace with the following:

1.7.1 (Add) "The Architect, at the Architect's discretion and without obligation, may make the Contract Documents available for use by Contractors for the purpose of facilitating the coordination process in electronic format. These electronic documents remain the Architect's Instruments of Service and shall be for use solely with respect to this Project, as provided in the Standard Form of Agreement Between Owner and Architect and Section 1.5 herein. The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document C106-2022 Digital Data Licensing Agreement, as modified, to establish the protocols for the development, use, transmission, and exchange of digital data."

1.7.2 (Add) "Where the parties come to agreement per Section 1.7.1, the electronic documents shall be made available in RVT or DWG format, as determined by the Architect. They are available through the Architect's office upon request. A sample of the format will be provided by the Architect upon request by the Contractor, for the purpose of testing the compatibility of the format to Contractor's systems."

### SUPPLEMENTARY GENERAL CONDITIONS

00 73 01- 1

- 1.7.3** (Add) "The Architect reserves the right to strip the files of the Project's name and address, the Architect's and the Architect's consultant's name and address, and any professional licenses indicated on the Contract Documents, and all dimensions, verbiage, and statistical information. Use of these electronic documents is solely at the Contractor's risk, and shall in no way alter the Contractor's Contract for Construction."
- 1.7.4** (Add) "The Architect shall not be responsible or liable for errors, defects, inexactitudes, or anomalies in the data, information, or documents (including Drawings and Specifications) caused by the Architect's or its consultant's computer software or hardware defects or errors; the Architect's or its consultant's electronic or disk transmittal of data, information or documents; or the Architect's or its consultant's reformatting or automated conversion of data, information or documents electronically or disk transmitted from the Architect's consultants to the Architect. The Contractor waives all claims against the Architect, its employees, officers and consultants for any and all damages, losses, or expenses the Contractor incurs from such defects or errors in the electronic documents. Furthermore, the Contractor shall indemnify, defend, and hold harmless the Architect, and its consultants together with their respective employees and officers, harmless from and against any claims, suits, demands, causes of action, losses, damages or expenses (including all attorney fees and litigation expenses) attributed to errors or defects in data, information or documents, including Drawings and Specifications, resulting from the Contractor's distribution of electronic documents to other contractors, persons, or entities."
- 1.8** **Building Information Models Use and Reliance**  
Delete this section in its entirety.

## **ARTICLE 2: OWNER**

### **2.3 Information and Services Required of the Owner**

- 2.3.1** (Delete the text in this section and replace with the following) "Except for permits, fees, design review fees, inspections, meter costs, licensing, taxes, and other service fees that are assigned to the Contractor as enumerated in Section 3.7.1, the Owner shall secure and pay for any additional easements, assessments and charges not specifically assigned to the Contractor."
- 2.3.6** (Add the following text to the end of the section) "The cost of Contractor's reproductions shall be borne by the Contractor at no additional cost to the Owner."

### **2.4 Owner's Right to Stop the Work**

Delete the word "repeatedly" from Section 2.4. (Add the following text to the end of the paragraph) "This right shall be in addition to, and not in limitation of, the Owner's rights under Section 12.2."

### **2.5 Owner's Right to Carry Out the Work**

(Delete the text in this section and replace with the following) "If the Contractor defaults or neglects to carry out the Work, in any respect, in accordance with the Contract Documents by either (1) failing to commence to correct such default or neglect within 48 hours after receipt of written notice thereof from the Architect or the Owner, (except such period shall be 7 days if the notice is given after final payment), or (2) fails to use its best efforts to continue to correct such default or neglect to the satisfaction of the Owner and Architect, or (3) fails to fully correct such default or neglect within 30 days of such notice to the satisfaction of the Architect and the Owner, then the Owner may, upon written notice of the Contractor and without prejudice to the other remedies the Owner may have, carry out the Work referenced in the written notice to the Contractor; provided that if such default or neglect results in a threat to the safety of persons or property, the Contractor shall immediately commence to correct such default or neglect upon receipt of written or oral notice thereof. If the notice is given before final payment, an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the costs of correcting such deficiencies, including compensation for the Architect's additional services made necessary by such default, neglect, or failure and the Owner's administrative and legal expense, including the time of the Owner's personnel in dealing with such default. If payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner. The time of the Owner's personnel in dealing with such default will be calculated at the rate of \$65.00 per hour."

## **ARTICLE 3: CONTRACTOR**

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### 3.2 Review of Contract Documents and Field Conditions by Contractor

- 3.2.5 (Add) "Before ordering material or performing any Work, the Contractor shall verify all measurements at the Project site. Any difference between dimensions on the Drawings and actual measurements shall be brought to the Architect's attention for consideration before the Work proceeds. Where actual measurements require more material and work than the Drawings call for, such material and work shall be supplied at the cost of the Contractor. No extra compensation will be allowed because of difference between actual measurements and dimensions indicated on the Drawings. The Contractor shall assume full responsibility for accuracy of measurements obtained at the work site."
- 3.2.6 (Add) "Mechanical and Electrical Drawings are diagrammatic only. Actual work involved shall be installed from approved Shop Drawings with all measurements obtained at the Project Site by the Contractor."
- 3.2.7 (Add) "Dimensions which are lacking from the Drawings shall be obtained from the Architect. In no case will the Contractor assume that the Drawings are scaled."
- 3.2.8 (Add) "All Contractor inquiries of Owner/Architect shall be in writing and in the form of an RFI (Request for Information). RFI forms can be that of Prime Contractors standard or of a form prepared by the Architect. RFI's are to come direct from the Prime Contractor (not Subcontractor or supplier) and all RFI's are to be numbered and tracked by the Prime Contractor."

### 3.5 Warranty

- 3.5.1 (Delete the text in this section and replace with the following) "In addition to any other warranties, guarantees, or obligations set forth in the Contract Documents or applicable as a matter of law and not in limitation of the terms of the Contract Documents, the Contractor warrants and guarantees that:
- .1 The Owner will have good title to the Work and materials and equipment incorporated into the Work will be new.
  - .2 The Work and materials and equipment incorporated into the Work will be free from defects, including defects in workmanship or materials.
  - .3 The Work and equipment incorporated into the Work will be fit for the purpose for which they are intended.
  - .4 The Work and materials and equipment incorporated into the Work will be merchantable.
  - .5 The Work and materials and equipment incorporated into the Work will conform in all respects to the Contract Documents.
  - .6 ~~All work performed under the terms of this contract will be guaranteed for a minimum period of one (1) year from the date of Substantial Completion.~~
  - .7 Partial occupancy of the premises use of the equipment shall not constitute the beginning of the guarantee period(s), unless agreed to by the Owner in writing."
- 3.5.3 (Add) "Upon notice of the breach of the foregoing warranties or guarantees or other warranties or guarantees under the Contract Documents, the Contractor, in addition to other requirements in the Contract Documents, will commence to correct such breach and damage resulting therefrom within 48 hours after receipt of written notice thereof, thereafter will use its best efforts to correct such breach and damage to the satisfaction of the Owner and, except where an extension of time is granted in writing by the Owner, correct such breach and damage to the satisfaction of the Owner within 30 days of such notice; provided that if such notice is given after final payment hereunder, such 48 hour period shall be extended to 7 days. If the Contractor fails to commence to correct such breach and damage, or correct such breach and damage as provided above, the Owner, upon written notice to the Contractor and without prejudice to its other written notice to the Contractor and without prejudice to his other rights or remedies, may correct the deficiencies. The Contractor upon written notice from the Owner shall pay the Owner, within 10 days after the date of such notice, the Owner's costs and expenses incurred in connection with such correction, including without limitation the Owner's administrative and legal expenses. The foregoing warranties and obligations of the Contractor shall survive the final payment and termination of the Contract."

### 3.6 Taxes

- 3.6.1 (Delete the text in this section and replace with the following) "Materials purchased for use or consumption with the proposed work will be exempt from the State of Ohio Sales Tax as provided for in Section 5739.02 of the Revised code of Ohio and also from the State of Ohio Use Tax, Section 5741.01. Purchases by the Contractor of expendable items such as form lumber, tools, oils, grease, fuel, or

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equipment rentals, are subject to the application of Ohio Sales or Use Tax.”

### **3.7 Permits, Fees, Notices and Compliance with Laws**

**3.7.1** (Delete the text in this section and replace with the following:) “The process of reviewing and the subsequent awarding of a Building Permit can take an extended period of time, depending on a Building Department’s current workload. Realizing that a delay in this process may delay the final completion date of the Work if it is not applied for until after the Contractor is awarded the Contract, the Architect shall expedite the Building Permit process by submitting a general Building Permit Application with the required number of Contract Documents to the appropriate Building Department. The submittal for general Building Permit in no way alters the Contract between the Owner and the Contractor, nor does it relieve the Contractor of his or her responsibilities concerning the terms of General Conditions. The Owner shall pay for the General Building Permit. The Contractor shall secure and pay for all other permits, design review fees, inspections, meter costs, licensing, taxes, and other service fees required by authorities having jurisdiction for work related to each specific Contract unless specifically noted otherwise in Contract Documents. Contractor is responsible for scheduling all inspections and must notify Architect in writing of any design modifications required by local jurisdiction. Contractor shall be responsible for all additional costs resulting out of improper notifications as it relates to Owner, Architect, or other Prime Contractors.”

#### **3.7.4 Concealed or Unknown Conditions**

Replace “14 days” with “7 days”.

### **3.9 Superintendent**

**3.9.4** (Add) “The Contractor’s superintendent shall be satisfactory to the Architect and the Owner, and the Architect and Owner shall have the right to require the Contractor to remove a superintendent from the Project whose performance is not satisfactory, and to replace the superintendent with a superintendent who is satisfactory to the Architect and Owner. The Contractor shall be required to have a full time superintendent on the Project every day during the course of the Project.”

### **3.10 Contractor’s Construction and Submittal Schedules**

**3.10.4** (Add) “The construction schedule shall be in form as prescribed or approved by the Architect.”

### **3.12 Shop Drawings, Product Data and Samples**

**3.12.5** (Add the following to the end of this paragraph) “Submittals which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the Architect without action.”

### **3.18 Indemnification**

**3.18.1** (Delete the text in this section and replace with the following) “To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect’s consultants, and agents and employees of them from and against claims, damages, losses and expenses, including but not limited to attorneys’ and consultants’ fees and the cost of their staff, arising out of or related to the performance of the Work, including but not limited to claims for bodily injury, sickness, disease or death, or to injury to or destruction of or loss of use of real or personal property, claims due to delays in or acceleration of the work of other Contractors, claims for loss of productivity, claims for additional storage and handling charges, claims for escalation of the cost of labor and materials, claims for home office overhead, liens against funds, and claims related to the removal, handling or use of hazardous materials. The Owner may set off an amount equal to the sums for which it is entitled to be indemnified from the amounts otherwise due the Contractor under the Contract Documents. The time of the Owner’s personnel in dealing with such default will be calculated at the rate of \$65.00 per hour.”

**3.18.3** (Add) “The Contractor will be held responsible for all damage to the Work under construction during the performance and until Substantial Completion and acceptance, even though partial payments have been made under the Contract. He will be held answerable for all damages that may occur to persons, to property, animals or vehicles from want of proper shoring, bracing, lighting, watching, boarding, or enclosing; and for any accident arising from defective apparatus or any negligence on the part of himself or his employees. The Contractor covenants and agrees to pay all damages for injury to real or personal

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property or for any injury or death sustained by any person growing out of any act or deed of the Contractor or of his employees or any of his Subcontractors or their employees.”

**3.19 (Add) “Underground Utility Facilities”**

“The Contractor, at least two (2) working days prior to commencing construction in an area which may involve underground utility facilities, shall give notice to the Owner, to the registered underground utility protection services, and the Owners of underground utility facilities shown on the Drawings and Specifications. The Contractor shall immediately alert the Owner, the occupants of any premises near the Work, and the Architect as to any emergency that it may create or discover. The Contractor shall notify the Owner, the operator of the underground facility, and the Architect of any break or leak in the utility lines or any dent, gouge, groove, or other damage to such lines or to their rating or cathodic protection, made or discovered in the course of excavation.”

**3.20 (Add) “Lien Waivers and Notices of Commencement”**

“The Contractor will obtain from all its Subcontractors and suppliers, regardless of tier, a lien waiver, at the time they submit for final payment for all labor, materials, equipment, and/or supplies provided for the Project, of all lien rights they have with respect to the Project in the form of the Lien Waiver included in the Contract Documents or in such other form requested by the Architect and immediately deliver a copy of the executed lien waivers to the Architect with Final Request for Payment. The Contractor will provide all Subcontractors and suppliers a copy of its Bid Guaranty and Performance Bond/Contract Bond. By entering into an agreement to provide labor, materials, equipment and/or supplies for the Project, such Subcontractors and suppliers agree to provide such lien waiver to the Contractor. Upon receipt of Notices of Furnishing, the Contractor will deliver copies of the Notices of Furnishing to the Owner.”

**ARTICLE 4: ARCHITECT**

**4.2.1** (Add the following text to the end of the first sentence) “...and with the Owner’s concurrence, from time to time during the one-year period for correction of Work described in Article 12.”

**4.2.4** Delete the last sentence of this paragraph.

**4.2.10** Add the following at the end of the last sentence: “as set forth in the Owner-Architect Agreement.”

**ARTICLE 5: SUBCONTRACTORS**

**5.3.1** (Add) “All subcontracts are to be in writing, and the Contractor shall be responsible to forward copies to the Owner upon request.”

**ARTICLE 6: CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS**

**6.2 Mutual Responsibility**

**6.2.3** (Delete the second sentence and replace with the following) “Claims and other disputes and matters in question between the Contractor and other Contractors shall be subject to the provisions of Article 15. If such other Contractors initiate legal or other proceedings against the Owner on account of damage alleged to have been caused by the Contractor, the Owner shall notify the Contractor who shall defend such proceedings at its own expense, and if judgment or award against the Owner arises therefrom, the Contractor shall pay or satisfy it and shall reimburse the Owner for attorneys’ fees and court or other costs which the Owner has incurred over and above those paid for directly by the Contractor. The Contractor, by execution of this Contract, agrees and fully understands the risks and responsibilities associated with this mutual responsibility and has bid accordingly. All costs incurred by the Owner and/or Architect resulting from Contractors filing claims against the Owner for damages caused by another Contractor, shall be borne by that Contractor filing claim.”

**6.2.4** Delete the word . . . “wrongfully” . . . in this section.

**ARTICLE 7: CHANGES IN THE WORK**

**7.2.2** (Add) “Change orders shall be executed on AIA Document G701-2017. Methods used in determining adjustments to the Contract Sum shall be those listed in Section 7.3.3.”

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- 7.3.5** (Revise the Section 7.3.5 to read as follows) . . . "If the Contractor disagrees with the adjustment in the Contract Sum or Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15."
- 7.3.8** (Revise the last sentence of Section 7.3.8 to read as follows) . . . "When both additions and deletions are involved in any one change, the allowance for overhead and profit shall be figured on the basis of net increase or decrease, if any, with respect to that change."
- 7.3.15** (Add) "In order to facilitate review of quotations for additions or deducts, proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials, and Subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are Subcontracts, they shall be itemized also. In no case will a change involving over \$500 be approved without such itemization. The Contractor shall submit same to the Architect within 14 days after receipt of proposal request."

## **ARTICLE 8: TIME**

### **8.2 Progress and Completion**

- 8.2.4** (Add) "If the Architect determines that the Contractor is not cooperating or coordinating its work properly with other Contractors, not supplying sufficient skilled workers, not cleaning up the Project, not furnishing the necessary materials, equipment, or any temporary services or facilities to perform the Work in strict conformance with the Contract Documents or the Contractor is not on schedule, or is not otherwise performing its obligations under the Contract Documents, THE CONTRACTOR WILL IMMEDIATELY, AND IN NOT MORE THAN FORTY-EIGHT HOURS AFTER RECEIPT OF NOTICE OF SUCH DETERMINATION, OR SUCH OTHER TIME AS MAY BE PROVIDED IN THE CONTRACT DOCUMENTS, (1) COMMENCE SUCH ACTION AS IS NECESSARY TO CORRECT THE DEFICIENCIES NOTED BY THE ARCHITECT, (2) PROCEED TO USE ITS BEST EFFORTS TO CORRECT SUCH DEFICIENCIES TO THE SATISFACTION OF THE ARCHITECT AND THE OWNER, AND (3) IF THE ARCHITECT INSTRUCTS THE CONTRACTOR TO TAKE SPECIFIED CORRECTIVE ACTION, THE CONTRACTOR IMMEDIATELY WILL TAKE SUCH CORRECTIVE ACTION, including, but not limited to, increasing the number of skilled workers, providing temporary services or facilities, and cleaning up the Project. Such action will be taken and continued uninterrupted without waiting to initiate any dispute under the General and Supplementary General Conditions of the Contract for the Project or the resolution of any dispute initiated thereunder."
- 8.2.5** (Add) "The Contractor, (1) will cooperate with the Architect by providing timely information for the scheduling of the times and sequence of the operations required for the Work to be substantially complete as required by the Contract Documents, (2) will continuously monitor the current progress schedule so as to be fully familiar with the timing, phasing, and sequence of the operations of the Work and to the other Work on the Project, and (3) will execute the Work in accordance with the requirements of the current progress schedule."

### **8.3 Delays and Extensions of Time**

- 8.3.1** (Delete the text in this paragraph and replace with the following) "If the Contractor is delayed at any time in its progress of the Work by one of the delays for which an extension of time is permitted and gives the Architect written notice specifically describing the delay within 48 hours of its commencement, the date for the Substantial Completion of the Work will be extended by Change Order for such reasonable time as the Architect may determine. The failure to give such notice will constitute an irrevocable waiver of the Contractor's right to seek an extension for such delay. The only delays for which the Contractor will be entitled to an extension of the time for completion will be delays caused by the, (1) Architect or the Owner, (2) physical damage to the Project over which the Contractor has no control, (3) labor disputes beyond the control of the Contractor, and (4) unusually severe weather conditions not reasonably anticipatable (temperature, rain, or other precipitation within a range of twenty percent of normal amounts for the time of the year covered by the Agreement shall not be considered unusually severe weather conditions). Extensions of time will only be granted pursuant to the procedures for Change Orders set forth in the General Conditions. The Contractor agrees to not make claims for compensation for delays or acceleration in the performance of the Work resulting from acts or failure to act by the Owner, the Architect, or the employees, agents, or representatives of the Owner, or the Architect and agrees that such claim shall be fully compensated by an extension of time to complete the Work, regardless of when

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granted.”

**8.3.3** (Delete the text in this paragraph and replace with the following) “The Contractor’s sole remedy in the event of a delay shall be an extension of time, and in such event, the Contractor shall not be entitled to any damages.”

**8.4** (Add) “**Completion of Work and Liquidated Damages**”

**8.4.1** (Add) “Damages for Delays for Substantial Completion and for Final Completion shall be in accordance with Article 8 and the following provisions: (The length of time for each is noted in the Bid Form).”

**8.4.2** (Add) “Substantial Completion: If the Contractor shall neglect, fail, or refuse to achieve Substantial Completion as herein specified, or fail to secure an extension of time for delays from the Owner, then the Contractor does hereby agree, as a part consideration for the awarding of the Contract, to pay the Owner the amount specified in the Table of Liquidated Damages, not as a penalty, but as liquidated damages for such breach of Contract as hereinafter shall be in default after the time stipulated in the Contract for completing the work.”

**8.4.3** (Add) “Final Completion: Inasmuch as failure to complete Final Completion within the time fixed in the Certificate of Substantial Completion (45 calendar days maximum) will result in substantial injury to the Owner, and as damages arising from such failure cannot be calculated with any degree of certainty, it is hereby agreed that if the Project is not fully and finally completed according to the requirements issued in the Certificate of Substantial Completion including all listed work (punch list) attached to the Certificate and including all project closeout documents listed in the Project Manual, the Contractor shall pay to the Owner the amount specified in the Table of Liquidated Damages, not as a penalty, but as liquidated damages for such breach of Contract as hereinafter shall be in default after the time stipulated in the Contract and Bid Form for completing Final Completion.”

**8.4.4** (Add) “Final Completion liquidated damages shall be paid in addition to any other liquidated damages, penalties, excess expenses or costs payable by the Contractor to the Owner under the provisions of the General Conditions, and shall not exclude the recovery of damages by the Owner under other provisions of the Contract Documents except for Contractor’s delay. This provision of liquidated damages for Final Completion delay shall in no manner affect the Owner’s right to terminate the Contract as provided in the General Conditions or elsewhere in the Contract Documents. The Owner’s exercise of the right to terminate shall not release the Contractor from his obligation to pay said liquidated damages in the amounts set forth in the Table of Liquidated Damages up to the point of termination.”

**8.4.5** (Add) “It is further agreed that the Owner may deduct from the balance retained by the Owner, under the provisions above, all liquidated damages stipulated herein for delay or termination, as the case may be, or such portions thereof as the said retained balance will cover.”

**8.4.6** (Add) “The said amount is fixed and agreed upon by and between the Contractor and the Owner would in such event sustain, and said amount is agreed to be the amount of damages which the Owner would sustain and said amount shall be deducted from any payment due or to become due to the Contractor.”

**8.4.7** (Add) “Table of Liquidated Damages is as follows:

**Table of Liquidated Damages**

<u>Total Contract Amount at time of Substantial Completion</u>	<u>Dollars per Day Substantial Completion Delay</u>	<u>Dollars per day Final Completion Delay</u>
\$ 1.00 to \$ 50,000.00	\$ 200.00	\$ 1,000.00
\$ 50,000.01 to \$ 150,000.00	\$ 350.00	\$ 1,000.00
\$ 150,000.01 to \$ 500,000.00	\$ 500.00	\$ 1,000.00
\$ 500,000.01 to \$ 2,000,000.00	\$ 1,000.00	\$ 1,000.00
\$ 2,000,000.01 to \$ 5,000,000.00	\$ 2,000.00	\$ 1,000.00

\$ 5,000,000.01 to \$ 10,000,000.00	\$ 2,500.00	\$ 1,000.00
\$ 10,000,000.01 or more	\$ 5,000.00	\$ 1,000.00

**ARTICLE 9: PAYMENTS AND COMPLETION**

**9.2 Schedule of Values**

(Add the following to the end of this paragraph) "Progress payments and retainage provisions shall be in accordance with the provisions of the Ohio Revised Code pertaining to this matter. The form of the Contractors' Applications for Payment shall be as approved by the Owner."

**9.3 Applications for Payment**

**9.3.1** (Delete the text in this paragraph and replace with the following) "Applications for Payment shall be made at approximately 30 day intervals in accordance with the dates established in the Standard Form of Agreement Between Owner and Contractor. At least 15 days before each progress payment falls due, the Contractor shall submit to the Architect, in triplicate, an itemized Application for Payment, notarized, and supported by such data substantiating the Contractor's right to payment as the Owner or the Architect may require. The form of Application for Payment shall be AIA Document G702-1992 - Application and Certificate for Payment, supported by AIA Document G703-1992 - Continuation Sheet. No other forms of Application for Payment will be acceptable. Continuation Sheet (G703) shall be prepared the same as in the Schedule of Values submitted by the Contractor. Provided the Contractor's payment application has been submitted on a timely basis and is complete, the Owner will pay the Contractor within thirty (30) days after the Contractor's payment application is approved by the Architect. The Contractor will only be entitled to payment to the extent such approval is given. Payment and retainage shall be as described in the Owner-Contractor Agreement. Such applications may include requests for payment on account of changes in the Work which have been properly authorized by Construction Change Directives but not yet included in Change Orders."

**9.3.1.1** (Delete the text in this paragraph, and replace with the following) "Upon request, the Contractor shall submit with each monthly Application for Payment, 1) an Affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the previous Application, was submitted and the Owner or his property might in any way be responsible, have been paid or otherwise satisfied, and 2) release or waivers of liens arising out of the Contract from each Subcontractor, materialmen, supplier, and laborer of the Contractor in the form of Partial Lien Waiver or such other form as the Architect may require."

**9.3.1.2** (Delete the text in this paragraph, and replace with the following) "Upon request, the Contractor immediately will supply the Architect with such information as may be requested so as to verify the amounts due the Contractor including, but not limited to, original invoices for materials and equipment and documents showing that the Contractor has paid for such materials and equipment, and so as to verify that amounts due laborers, Subcontractors, and materialmen have been paid to them."

**9.3.2** (Add the following to the end of this paragraph) "Payment to Contractor for materials stored off site is discouraged. Where circumstances indicate that the Owner's best interest is served by off-site storage, the Contractor shall make written request to the Architect for approval to include such material costs in his next progress payment. The Contractor's request shall include the following information:

- .1 A list of the fabricated materials consigned to the Project (which shall be clearly identified), giving the place of storage, together with copies of invoices and reasons why materials cannot be delivered to the site.
- .2 Certification that items have been tagged for delivery to the Project and that they will not be used for another purpose.
- .3 A letter from the Bonding Company indicating agreement to the arrangements and that payment to the Contractor shall not relieve either party or their responsibility to complete the Work.
- .4 Evidence of adequate insurance covering the material in storage, which shall name the Owner as additionally insured.
- .5 Evidence that the Architect has visited the Contractor's place of storage and checked all items on the Contractor's certificate. Costs incurred by the Architect to inspect material in off-site storage shall be paid by the Contractor.
- .6 Subsequent Applications for Payment shall itemize the materials and their cost which were

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- approved on previous Applications for Payment and remain in off-site storage.
- .7 When a partial payment is allowed on account of material delivered on the site of the Work or in the vicinity thereof or under possession and control of the Contractor but not yet incorporated therein, such material shall become the property of the Owner, but if such material is stolen, destroyed, or damaged by casualty before being used, the Contractor will be required to replace it at his own expense.
- .a Subsequent Applications for Payment shall itemize the materials and their cost which were approved on previous Applications for Payment and remain in off-site storage.
- .8 Contractors Application for Payment shall reflect an equal percentage amount (within 2 - 3 percent) for labor and materials for Work completed. The Architect may adjust applications where labor exceeds materials or where materials exceed labor quantities in the Work completed columns.
- .9 If the Contractor disputes a determination by Architect with regard to Applications for Payment, and during any related dispute resolution, litigation, or other proceeding, the Contractor nevertheless shall continue to prosecute the Work."

## **9.8 Substantial Completion**

**9.8.1** After the words "Contract Documents", insert the following: ...."and when all required occupancy permits, if any, have been issued".....

**9.8.3** (Add the following at the end of this paragraph) "At the time the Architect commences the Substantial Completion inspection, if the Architect discovers excessive additional items requiring completion or correction, the Architect may decline to continue the inspection, instructing the Contractor as to the general classification of deficiencies which must be corrected before the Architect will resume the Substantial Completion inspection. If the Contractor fails to pursue the Work so as to make it ready for Substantial Completion inspection in a timely fashion, the Architect shall, after notifying the Contractor, conduct inspections and develop a list of items to be completed or corrected. This list of items shall be furnished to the Contractor who shall proceed to correct such items within 14 days. The Architect will conduct additional inspections as required to determine that the Work is ready for Substantial Completion inspection. The Architect will invoice the Owner for (1) The cost of inspections between the termination of the initial Substantial Completion inspection and the commencement of the satisfactory Substantial Completion inspection, (2) The cost of inspection or review after the 14 day period established for the completion of the list by the Contractor. The Contractor shall reimburse the Owner for such cost, and the Owner may offset the amounts payable to the Architect for such services from the amounts due the Contractor under the Contract Documents."

**9.8.4** (Add the following at the end of this section) "The Architect shall stipulate the time for the Contractor to complete all items on the list accompanying the Certificate of Substantial Completion, such time shall not be greater than the number of days in Section 01 10 00 and the Bid Form. The Contractor shall complete items on the list within the stipulated period. If the Contractor fails to do so, the Owner in its discretion may perform the Work by itself or others and the cost thereof shall be charged against the Contractor. If more than one inspection by the Architect for the purpose of evaluating corrected work is required by the subject list of items to be completed or corrected, it will be performed at the Contractor's expense. In addition, liquidated damages shall accrue as stipulated in Sections 8.4.1 through 8.4.7."

**9.8.6** (Add) "The Contractor shall guarantee all work performed under terms of this Contract for a minimum period of one (1) year from the date of Substantial Completion of the Work."

## **9.10 Final Completion and Final Payment**

**9.10.2** (Add the following at the end of this paragraph) "The Contractor shall furnish such evidence as may be necessary to show that any out-of-state Subcontractor or supplier has fully met the requirements of payment of taxes as established in any law of the State or local subdivision thereof which may be in effect at the time of final payment. The Owner will require the submission of such proof or evidence before final payment will be approved or made. The following must be submitted to the Architect before approval of final payment:

- .1 Affidavit of payment as required under this Paragraph shall be in the form of AIA Document G706-1994 - Contractor's Affidavit of Payment of Debt and Claims.
- .2 Release of liens as required under this Paragraph shall be in the form of AIA Document G706A-1994 - Contractor's Affidavit of Release of Liens.
- .3 Consent of Surety as required under this Paragraph shall be in the form of AIA Document G707-1994 - Consent of Surety to Final Payment.

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- .4 Submit releases and final unconditional waivers of lien from major Subcontractor and supplier.
- .5 Submit certification stating that no materials containing asbestos were incorporated into the Work.
- .6 Submit certification that all punch list items have been completed."

## **ARTICLE 10: PROTECTION OF PERSONS AND PROPERTY**

### **10.2 Safety of Persons and Property**

#### **10.2.1** (Add the following after Paragraph 10.2.1, subparagraph .3):

- “.4 Protect excavations, trenches, buildings, and grounds from water damage of any sort. Furnish necessary equipment to provide this protection during the life of the Contract. Construct and maintain necessary temporary drainage to keep excavations free of water.
- .5 Provide protection for the Work against wind, storms, cold, or heat. At the end of each day's work, cover new work likely to be damaged. If low temperatures make it impossible to continue operations safely in spite of cold weather precautions, cease work and notify the Architect.
- .6 Provide shoring and bracing required for safety and for the proper execution of the Work and have same removed when the Work is completed.
- .7 Protect, maintain, and restore benchmarks, monuments, and other reference points affected by this work. If benchmarks, monuments, or other reference points are displaced or destroyed, the benchmarks, monuments, and/or reference points shall be re-established and markers reset under the supervision of a licensed surveyor, who shall furnish certificates of his work."

#### **10.2.9** (Add) "The Contractor acknowledges that the safety of the Owner's students, employees, and guests is of the utmost importance. The Contractor will take no action which would jeopardize the safety of the Owner's students, employees, or guests and, without the Owner's written approval, shall take no action which would interfere with the Owner's activities."

#### **10.2.10** (Add) "The structure is designed to be self-supporting and stable after the Work is fully completed. Except as otherwise provided in Section 3.3.1 with respect to certain sequencing, it is solely the Contractor's responsibility to determine erection procedures and sequence, and to insure the safety of the building and its component parts during erection. This includes, but is not limited to, the addition of whatever temporary bracing, guys, or tie-downs might be necessary. Such material shall be removed and remain the Contractor's property after completion of the Work."

#### **10.2.11** (Add) "Asbestos products of any kind are not allowed in this Project."

### **10.5 (Add) "Project Safety Program"**

#### **10.5.1** (Add) "Each Contractor will develop a written safety and health plan for the Project ("Plan"), applicable to all Contractors and their Subcontractors and suppliers, regardless of tier, and will designate an individual on its staff, who will have responsibility to implement the Plan ("Project Safety Coordinator"). Such implementation will include inspections of the Project Site at least once each week during major construction activity, and notification of employers of hazardous conditions and noncompliance with the Plan. The Plan will conform to all OSHA statutory or regulatory requirements now or hereafter in effect. Each Contractor will provide a copy of the Plan to the Architect for reference."

## **ARTICLE 11: INSURANCE AND BONDS**

### **11.1 Contractor's Insurance and Bonds**

#### **11.1.1** After the word "companies" in Line 4, add the following Phrase. . . "Rated A++, A+, A, or A- by Best's Insurance Reports and ". . .

#### **11.1.1** (After the phrase "Contract Documents" in Line 6 add the following:)

- “.1 Liability insurance shall include all major divisions of coverage and be on a comprehensive basis including:
  - a. Premises' Operations (including X, C, and U coverages as applicable)
  - b. Products and Completed Operations
  - c. Contractual - including specific provisions for the Contractor's obligations under Section 3.18
  - d. Any owned, non-owned, and hired motor vehicles
  - e. Broad Form Property Damage including Completed Operations

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- f. Personal Injury Liability, coverages A, B, and C, with Fellow Employee Exclusion deleted
- g. Stopgap liability for \$100,000.00 limit.
- h. Umbrella Excess Liability. Minimum limit of \$2,000,000.00, except that if the initial Contract Sum is \$300,000 or less, the Contractor does not have to provide umbrella excess liability coverage.
- i. An endorsement (CG2010) including the Owner as an additional insured.
- .2 The Contractor's Commercial Liability Insurance shall be written on an occurrence basis, if reasonable available. However, if the general liability coverages are provided by a Commercial Liability policy on a claims-made basis, the policy date or retroactive date shall predate the contract; the termination date of the policy or applicable extended reporting period shall be no earlier than two years after the termination date of coverages required to be maintained after Final Payment, certified in accordance with Section 9.10.2.
- .3 The Contractor shall furnish to the Owner copies of any endorsements that are subsequently issued amending coverage or limits."
- .4 "The insurance required by Section 11.1.1 shall be written for not less than the following, or as required by law, whichever is greater."
  - .1 Workers' Compensation:
    - a. State: Statutory
    - b. Applicable Federal (e.g., Longshoremen's): Statutory
    - c. Employer's Liability: Statutory
  - .2 COMPREHENSIVE GENERAL LIABILITY INSURANCE INCLUDING CONTRACTUAL LIABILITY INSURANCE AGAINST THE LIABILITY ASSUMED HEREIN ABOVE, and including CONTRACTORS' PROTECTIVE LIABILITY INSURANCE if the Contractor sublets to another all or any portion of the Work, with the following minimum limits:
    - a. \$1,000,000 single limit / \$2,000,000.00 aggregate limit.
  - .3 COMPREHENSIVE AUTOMOBILE LIABILITY INSURANCE covering all owned, non-owned, and hired automobiles used in connection with the Work, with the following minimum limits:
    - a. Bodily injury (including death) and property damage with a combined single limit of \$1,000,000.00.
    - b. The Contractor shall maintain the foregoing coverage for not less than the duration of the warranty period. The foregoing policy limits may be provided in conjunction with an umbrella policy. The Contractor shall continue to provide evidence of coverage to the Owner on an annual basis during the aforementioned period."
- .5 "The Contractor shall submit to the Architect a copy of Certificate of Insurance for the Architect's review and the Owner's approval prior to commencement of the Work, and thereafter upon renewal or replacement of each required policy of insurance. The form of certificate preferred is AIA Document G715, Supplemental Attachment for ACORD Certificate of Insurance. Certificates shall include each and every type of coverage specified. Such certificates shall name the Owner, the Architect, their respective board members, employees, agents, and consultants (and their consultants employees and agents) as additional insureds, and shall contain the following statement: It is hereby agreed that the Owner and the Architect will be notified 60 days prior to the cancellation of, expiration of, material alteration of, and/or the election not to renew any insurance policy evidenced by this certificate."
- .6 "The Contractor shall require all Subcontractors to provide Workers' Compensation, Comprehensive General Liability, and Automobile Liability Insurance with the same minimum limits specified herein."
- .7 "The Contractor shall not commence work under the Contract until he has obtained all insurance required under this heading and such insurance has been approved by the Owner; no such work shall be commenced until the Contractor has filed with the Architect two copies of the necessary certificates evidencing that all required insurance in the requisite amounts, placed with satisfactory carriers, has been obtained. Should any coverage approach expiration during the contract period, it shall be renewed prior to its expiration date and certificates again filed with the Architect. Failure to renew and file new certificates with the Architect shall be just cause to withhold periodic payment request until these requirements are met. All insurance shall be maintained in full force and effect until the Contract has been fully and completely performed."

**11.1.2.1** (Add) "All performance bonds, if required, shall name the Owner as Obligee and shall include the following conditions:

- .1 Each selected Bidder shall provide a bond covering the faithful performance of the Contract. Bond shall be in the amount of 100% of the Principal's bid plus accepted alternates stated in dollars and cents. A percentage is NOT acceptable.

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- .2 For bidders who provided the Bid Guaranty and Contract Bond with their bid, their form of bond shall be the Bid Guaranty and Contract Bond as described in the Supplementary Instructions to Bidders. (Bid Guaranty and Contract Bond Form is attached).
- .3 Bidders who provided a certified check, cashier's check, or irrevocable letter of credit as bid security shall furnish and pay for a Contract Bond in accordance with Ohio Revised Code Section 153.57. The Owner shall be named as Obligee on the Contract Bond.
- .4 Contract Bond shall be supported by credentials showing the power of attorney for the attorney-in-fact of the Surety.
- .5 The Bid Guaranty and Contract Bond and, if used, the Contract Bond, shall be signed by an authorized agent of an acceptable surety bonding company and by the bidder. The bond shall be issued by a surety company authorized by the Ohio Department of Insurance to transact business in the State of Ohio. Provide certification as described in the Instructions to Bidders. It is essential that the bond be issued by a surety company which can adequately demonstrate a record of competent underwriting, efficient management, adequate reserves, and soundness of investments.
- .6 Bond(s) shall be executed on a form specifically meeting all provisions of the Ohio Revised Code Section 153.57 and others as applicable. Said conformance shall be specifically noted clearly on face of the bond.
- .7 Furnish, along with the Bond, a Certificate of Compliance from the Ohio Department of Insurance certifying that the surety is authorized to transact business in the State of Ohio."

## **11.2 Owner's Insurance**

- 11.2.1.1** (Add) "Unless specifically stated otherwise in the Agreement or other Contract Documents, the Owner shall maintain property insurance on the Project. The Owner also shall maintain all-risk "Builder's Risk" insurance, in an amount of 100 percent of the insurable value of the entire structure, on which the Work of this Contract is to be done, against "loss or damage." Such insurance shall be on the "estimated completed value form" including items of labor and materials connected therewith, including materials in place or stored on the site of the structure insured, which are to be used as part of the permanent construction including surplus materials, shanties, protective fences, or temporary structure, miscellaneous materials and supplies, incident to the work and such scaffolding, staging, towers, forms, and equipment as are now owned or rented by the Contractor, the cost of which is included in the cost of the Work. The policy shall insure the Owners and shall also include the interest of the Contractors during course of construction until completed and accepted by the Owners. The Owner will make the property insurance policy available for inspection and copying by the Contractor. This insurance is not intended to cover and will not cover machinery, tools, and equipment which will not be a permanent part of the Project. The Contractor shall bear the entire risk of loss with respect to such machinery, tools, and equipment. Any loss insured under Paragraph 11.2 is to be adjusted with the Owner and made payable to the Owner as trustee for the insureds, as their interests may appear. The Owner, as trustee, will have the power to adjust and settle any loss with its insurers."
- 11.2.1.2** (Add:) "The above policies in Section 11.2 shall carry a deductible up to a maximum of \$5,000 and the deductible shall be paid for by the Contractor."
- 11.2.1.3** (Add) "The above policies in Section 11.2 shall name the following as additionally insured:  
.1 Architect, its employees, its consultants, and their employees."

## **ARTICLE 12: UNCOVERING AND CORRECTION OF WORK**

### **12.2.1 Before Or After Substantial Completion**

(Rename Section heading and delete the text in this Section and replace with the following) "Within 48 hours after written notice from the Architect or the Owner (except such period shall be seven days when notice is given after Final Payment) that the Work does not conform to the Contract Documents, or immediately upon oral notice, if the non-conformance constitutes a threat to the safety of persons or property, the Contractor, without waiting for the resolution of disputes that may exist, 1) shall commence to correct such non-conformance, 2) shall thereafter use its best efforts to correct such non-conformance to the satisfaction of the Architect and the Owner, and 3) except where an extension of time is granted in writing by the Owner, shall complete necessary corrections so that the non-conformance is eliminated to the satisfaction of the Architect, and the Owner within seven days of such notice. The Contractor shall bear all costs of correcting the non-conformance, including additional testing and inspections and additional service fees of the Architect. The notice provided for in this Section 12.2.1 may be given at any time. It is

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the intent that the obligations under this Section 12.2.1 shall continue to apply after Final Completion and Final Payment."

**12.2.2 After Substantial Completion** (Delete this heading and Section 12.2.2.1 in its entirety).

**12.2.2.2** Renumber this section to 12.2.1.2.

**12.2.2.3** Renumber this section to 12.2.1.3

### **ARTICLE 13: MISCELLANEOUS PROVISIONS**

#### **13.1 Governing Law**

**13.1.2** (Add) "Jurisdiction. Any suit, which may be brought to enforce any provision of this Agreement or any remedy with respect hereto, shall be brought in the Common Pleas Court, Montgomery County, Ohio, and each party hereby expressly consents to the jurisdiction of such court."

#### **13.4 Tests and Inspections**

**13.4.4** (Delete the text in this section and replace with the following) "Certificates of inspection, testing, or approval, as required by Sections 13.4.1 or 13.4.2, shall be secured by the Contractor using an independent agency, subject to the approval of the Architect and Owner. The independent agency shall complete field work, testing, and prepare the test reports, logs, and certificates promptly; and deliver the required number of copies directly to the Architect."

**13.5 Interest** (Delete this Paragraph in its entirety. References to Paragraph 13.5 elsewhere in the Contract Documents shall also be deleted).

**13.6** (Add) "**Construction**"

**13.6.1** (Add) "The parties acknowledge that each party has reviewed this Agreement and the other Contract Documents and voluntarily entered into this Agreement."

**13.7** (Add) "**Approvals**"

**13.7.1** (Add) "Except as may be expressly provided herein, the approvals and determinations of the Owner or Architect will be subject to the sole discretion of the respective person and be valid and binding on the Contractor, provided only that they be made in good faith, i.e., honestly. If the Contractor challenges any such approval or determination, the Contractor will have the burden of proving that it was not made in good faith by a preponderance of the evidence."

**13.8** (Add) "**Partial Invalidity**"

**13.8.1** (Add) "If any term or provision of this Agreement is found to be illegal, unenforceable or in violation of any laws, statutes, ordinances, or regulations of any public authority having jurisdiction, then, notwithstanding such term or provision, this Agreement will remain in full force and effect and such term will be deemed stricken; provided this Agreement will be interpreted, when possible, so as to reflect the intentions of the parties as indicated by any such stricken term or provision."

**13.9** (Add) "**Delinquent Personal Property Tax Affidavit**"

**13.9.1** (Add) "The Contractor's affidavit given under Section 5719.024, Ohio Revised Code, is incorporated herein."

**13.10** (Add) "**Entire Agreement**"

**13.10.1** (Add) "This Agreement and the other Contract Documents constitute the entire agreement among the parties with respect to their subject matter and supersede all prior and contemporaneous, oral or written, agreements, negotiations, communications, representations, and understandings with respect to such subject matter, and no person is justified in relying on such agreements, negotiations, communications, representations, or understandings."

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**13.11 (Add) "School District Resolution"**

**13.11.1 (Add)** "No alcohol, drugs, firearms or smoking is permitted on property owned by the School District. Compliance with all Owner policies covering these items is mandatory."

**ARTICLE 14: TERMINATION OR SUSPENSION OF THE CONTRACT**

(Delete the entire contents of this Article (14.1 through 14.4) and replace with the following:

**14.1 (Add) "Default of the Contractor"**

**14.1.1 (Add)** "Events of Default: Each of the following constitutes an event of default of the Contractor:

- .1 The failure of the Contractor, (1) to perform its obligation under the Contract Documents or under the Contract Documents pertaining to other agreement which the Contractor may have with the Owner and to proceed to commence to correct such failure within 48 hours after written notice thereof from the Owner, or the Architect or such lesser time as is provided in the Contract Documents, or (2) thereafter to use its best efforts to correct such failure to the satisfaction of the Owner, or, (3) except where an extension of time is granted in writing by the Owner, to correct such failure within 30 days after written notice thereof.
- .2 The failure of the Contractor to pay its obligations as they become due, or the insolvency of the Contractor."

**14.1.2 (Add)** "Owner's Remedies: Upon the occurrence of an event of default the Owner will have the following remedies, which will be cumulative:

- .1 To order the Contractor to stop the Work or part of it, in which case the Contractor will do so immediately;
- .2 To perform through others all or part of the Work remaining to be done and to deduct the cost thereof from the unpaid balance of the Contract Sum;
- .3 To terminate this Agreement and take possession, for the purpose of completing the Work or part of it, materials, equipment, scaffolds, tools, appliances, and other items belonging to or possessed by the Contractor, of which the Contractor hereby transfers and assigns to the Owner for such purpose, and to employ a person or persons to complete the Work, including the Contractor's employees, and the Contractor will not be entitled to receive further payment until the Work is completed;
- .4 Other remedies which the Owner may have at law or in equity or otherwise under the Contract Documents."

**14.1.3 (Add)** "Payments Due Contractor: If the unpaid balance of the Contract Sum exceeds the cost of finishing the Work, including compensation of the Architect's additional services and costs, expenses, or damages incurred by the Owner as a result of the event of default, including attorney's fees and the administrative expense of the Owner's staff, such excess will be paid by the Contractor. If such costs exceed the unpaid balance, the Contractor will pay the difference to the Owner. The amounts to be paid by the Owner or the Contractor will be certified by the Architect, and such certification will be the final determination of the amount owed, except for sums coming due thereafter. The obligations under this paragraph will survive the termination of this Agreement."

**14.2 (Add) "Default of the Owner"**

**14.2.1 (Add)** "Events of Default: Except for the failure to pay the Contractor which will be subject to the terms of the General Conditions and Supplementary General Conditions of the Contract, the following constitutes the exclusive event of default of the Owner:

- .1 The failure of the Owner to perform its obligations under the Contract Documents and to correct such failure within 90 days after written notice thereof from the Contractor."

**14.2.2 (Add)** "Contractor's Remedies: Upon the occurrence of an event of default by the Owner, unless the Owner admits in writing that it is in default, except as expressly provided in the General Conditions or the Supplementary General Conditions of the Contract, the Contractor's sole and exclusive remedy will be to submit the dispute to the Architect for its decision under Article 4.2 of the General and Supplementary General Conditions of the Contract for the Project, and then provided the Contractor is entitled to do so under the terms of the Contract Documents to litigate the dispute. If the Owner admits in writing that it is in default, then the Contractor will be entitled to remedies which it would otherwise have at law or in equity."

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- 14.3** (Add) **“Termination for the Convenience of the Owner”**
- 14.3.1** (Add) “The Owner may, in its discretion and without cause, by written notice to the Contractor terminate the Contract for the Owner’s convenience.”
- 14.3.2** (Add) “Upon receipt of a written notice from the Owner terminating the Contract without cause and for the Owner’s convenience, the Contractor will (1) immediately cease performing the Work, unless otherwise directed by the Owner, in which case the Contractor will take the action directed by the Owner, (2) take reasonable and necessary action to protect and preserve the Work, and (3) unless otherwise directed by the Owner, terminate agreements with Subcontractors and suppliers.”
- 14.3.3** (Add) “If the Contract is terminated without cause and for the Owner’s convenience and there exists no event of the Contractor’s default, as defined in Section 14.1 of these Supplementary General Conditions, the Owner will pay the Contractor, (1) for Work performed under the Contract up to the date the notice of termination is received by the Contractor at the rates for Work performed under the Contract, including overhead and profit up to the date of termination, (2) for Work performed at the direction of the Owner on and after the date on which the notice of termination is received by the Contractor, as determined by the procedures applicable to Change Orders under Section 7.3.3, (3) for Work necessary to protect and preserve the Work, as determined by the procedures applicable to Change Orders under Section 7.3.3, (4) the reasonable and necessary costs of terminating the Contractor’s agreements with Subcontractors and suppliers, and other costs incurred by the Contractor directly as a result of the termination of the Contract.”
- 14.3.4** (Add) “If the Contract is terminated without cause and for the Owner’s convenience and there exists an event of the Contractor’s default, as defined in Section 14.2 of these Supplementary General Conditions, the Contractor will be entitled to receive only such sums as it would be entitled to receive following the occurrence of an event of default under Section 14.2.”
- 14.3.5** (Add) “The termination of the Contract shall be with or without prejudice to rights or remedies which exist at the time of termination.”

**ARTICLE 15: CLAIMS AND DISPUTES**

**15.1.6 Claims for Additional Time**

- 15.1.6.1** (Delete the text in this paragraph and replace with the following) “If claims for additional time are submitted by the Contractor and are substantiated as per Contract requirements, a Change Order extending Contract Time only will be issued by the Architect. However, under no circumstances will the Contractor be entitled to any damages or additional compensation related to or for Contract Time extensions or delays.”
- 15.1.6.2** (Delete the text in this paragraph and replace with the following) “Claims for additional time based on adverse weather conditions will be considered only if the Contractor provides evidence that monthly precipitation and temperature averages vary significantly from those of the norm. The norm shall be defined as those monthly precipitation and temperature averages indicated by the National Oceanic and Atmospheric Administration averaged over the past 30 years, at the location closest to the site. Weather conditions will be considered for all months affecting the critical path, and determined once the critical path is no longer affected by weather conditions. Both, months with conditions better than the norm, and those with adverse conditions will be considered in summation of the delay. Notifications of delay to be in accord with related articles of General Conditions.”
- 15.2.6** (Delete this section in its entirety and replace with the following) “Either party may, within 30 days from the date of receipt of an initial decision, make a demand in writing for mediation. If such a demand is not made by either party with 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.”
- 15.2.6.1** Delete this section in its entirety.
- 15.4 Arbitration**  
Delete Section 15.4 in its entirety. Arbitration is not applicable to this Project.

**(Add) “ARTICLE 16: EQUAL OPPORTUNITY”**

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**16.1 (Add) "Policies of Employment"**

**16.1.1** (Add) "The Contractor shall not, and it will ensure that its Subcontractors, regardless of tier, shall not discriminate against employee or applicant for employment because of race, religion, color, sex, or national origin. The Contractor shall take affirmative action to insure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of non-discrimination."

**16.1.2** (Add) "The Contractor shall not, and it will ensure that its Subcontractors, regardless of tier, shall, in solicitations or advertisements for employees placed by them or on their behalf, state that qualified applicants will receive consideration for employment without regard to race, religion, color, sex, or national origin."

**END OF SECTION 00 73 01**

**DOCUMENT 00 73 42 - CONTRACT PROVISIONS FOR NON-FEDERAL ENTITY CONTRACTS UNDER FEDERAL AWARDS**

The Education Department of General Administrative Regulations (EDGAR) are the federal regulations that govern all federal grants awarded by the U.S. Department of Education on or after December 26, 2014 to local districts (LEAs) and charters including State-administered programs. All recipients of federal grant dollars must comply with these rules. All provisions provided below are hereby incorporated by reference into the Owner-Contractor Agreement ("Agreement") and by entering into this Agreement, Contractor certifies the following:

**Appendix II to Part 200 Contract Provisions for Non-Federal Entity Contracts Under Federal Awards**

(A) Contracts for more than the simplified acquisition threshold, currently set at \$250,000, which is the inflation adjusted amount determined by the Civilian Agency Acquisition Council and the Defense Acquisition Regulations Council (Councils) as authorized by 41 U.S.C. 1908, must address administrative, contractual, or legal remedies in instances where contractors violate or breach contract terms, and provide for such sanctions and penalties as appropriate.

*Pursuant to Rule (A) above, the Owner reserves all rights and privileges under the applicable laws and regulations with respect to this procurement process in the event of breach of contract by either party.*

(B) All contracts in excess of \$10,000 must address termination for cause and for convenience by the non-Federal entity including the manner by which it will be effected and the basis for settlement.

*Pursuant to Rule (B) above, Owner reserves the right to terminate any agreement resulting from this procurement process pursuant to Article 14 of Section 00 73 01 - Supplementary General Conditions.*

(C) Equal Employment Opportunity. Except as otherwise provided under 41 CFR Part 60, all contracts that meet the definition of "federally assisted construction contract" in 41 CFR Part 60-1.3 must include the equal opportunity clause provided under 41 CFR 60-1.4(b), in accordance with Executive Order 11246, "Equal Employment Opportunity" (30 FR 12319, 12935, 3 CFR Part, 1964-1965 Comp., p. 339), as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and implementing regulations at 41 CFR part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor."

*Pursuant to Rule (C) above, this provision is hereby incorporated by reference into the Agreement.*

(D) Davis-Bacon Act, as amended (40 U.S.C. 3141-3148). When required by Federal program legislation, all prime construction contracts in excess of \$2,000 awarded by non-Federal entities must include a provision for compliance with the Davis-Bacon Act (40 U.S.C. 3141-3144, and 3146-3148) as supplemented by Department of Labor regulations (29 CFR Part 5, "Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction"). In accordance with the statute, contractors must be required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor. In addition, contractors must be required to pay wages not less than once a week. The non-Federal entity must place a copy of the current prevailing wage determination issued by the Department of Labor in each solicitation. The decision to award a contract or subcontract must be conditioned upon the acceptance of the wage determination. The non-Federal entity must report all suspected or reported violations to the Federal awarding agency. The contracts must also include a provision for compliance with the Copeland "Anti-Kickback" Act (40 U.S.C. 3145), as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in Part by Loans or Grants from the United States"). The Act provides that each contractor or sub-recipient must be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he or she is otherwise entitled. The non-Federal entity must report all suspected or reported violations to the Federal awarding agency.

*Pursuant to Rule (D) above, Contractor will follow all applicable Davis-Bacon Act provisions.*

(E) Contract Work Hours and Safety Standards Act (40 U.S.C. 3701-3708). Where applicable, all contracts awarded by the non-Federal entity in excess of \$100,000 that involve the employment of mechanics or laborers must include a provision for compliance with 40 U.S.C. 3702 and 3704, as supplemented by Department of Labor regulations (29 CFR Part 5). Under 40 U.S.C. 3702 of the Act, each contractor must be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic must be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission

of intelligence.

*Pursuant to Rule (E) above, Contractor certifies that Contractor will follow all applicable provisions of the Contract Work Hours and Safety Standards Act during the term of the Agreement.*

(F) Rights to Inventions Made Under a Contract or Agreement. If the Federal award meets the definition of "funding agreement" under 37 CFR § 401.2 (a) and the recipient or sub-recipient wishes to enter into a contract with a small business firm or nonprofit organization regarding the substitution of parties, assignment or performance of experimental, developmental, or research work under that "funding agreement," the recipient or sub-recipient must comply with the requirements of 37 CFR Part 401, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," and any implementing regulations issued by the awarding agency.

*Pursuant to Rule (F) above, Contractor certifies that during the term of the Agreement, Contractor agrees to comply with all applicable requirements referenced in Rule (F) above.*

(G) Clean Air Act (42 U.S.C. 7401-7671q.) and the Federal Water Pollution Control Act (33 U.S.C. 1251-1387), as amended - Contracts and sub-grants of amounts in excess of \$150,000 must contain a provision that requires the non-Federal award to agree to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).

*Pursuant to Rule (G) above, Contractor certifies that during the term of the Agreement, Contractor agrees to comply with all applicable requirements as referenced in Rule (G) above.*

(H) Debarment and Suspension (Executive Orders 12549 and 12689) - A contract award (see 2 CFR 180.220) must not be made to parties listed on the government wide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR 180 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689 (3 CFR part 1989 Comp., p. 235), "Debarment and Suspension." SAM Exclusions contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549.

*Pursuant to Rule (H) above, Contractor certifies that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation by any federal department or agency.*

(I) Byrd Anti-Lobbying Amendment (31 U.S.C. 1352) - Contractors that apply or bid for an award exceeding \$100,000 must file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier must also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the non-Federal award.

*Pursuant to Rule (I) above, as applicable, Contractor agrees to file all certifications and disclosures required by, and otherwise comply with, the Byrd Anti-Lobbying Amendment (31 USC 1352).*

### **Record Retention Requirements**

*Contractor certifies that during the term of the Agreement, Contractor will comply with the record retention requirements detailed in 2 CFR § 200.333. The Contractor further certifies that all records will be retained as required by 2 CFR § 200.333 for a period of three years after grantees or sub-grantees submit final expenditure reports or quarterly or annual financial reports, as applicable, and all other pending matters are closed.*

### **Energy Policy and Conservation Act Compliance**

*To the extent applicable, Contractor certifies that during the term of the Agreement, Contractor will comply with the mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act.*

### **Buy American Provisions Compliance**

*To the extent Contractor has agreed to comply with applicable provisions of the Buy American Act with a particular public entity, Contractor certifies that Contractor is in compliance with all applicable provisions of the Buy American Act. Purchases made in accordance with the Buy American Act shall follow the applicable procurement rules calling for free and open competition.*

**Recovered Materials (2 C.F.R. § 200.322)**

*Contractor agrees to the extent practical it complies with section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act.*

**Access to Records (2 C.F.R. § 200.336)**

*Contractor agrees that duly authorized representatives of the Agency shall have access to any books, documents, papers and records of Contractor that are directly pertinent to Contractor's discharge of its obligations under the Contract for the purpose of making audits, examinations, excerpts, and transcriptions. The right also includes timely and reasonable access to Contractor's personnel for the purpose of interview and discussion relating to such documents.*

**Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment**

*Contractor, nor its subcontractors shall provide or install equipment, services, or systems that uses "covered telecommunications equipment or services" as a substantial or essential component of any system, or as critical technology as part of any system. As described in Public Law 115-232, section 889, "covered telecommunications equipment" is telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities); video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities); telecommunications or video surveillance services provided by such entities or using such equipment; or telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country.*

**Complying with Federal, State, and Local Laws**

*Contractor agrees to comply with federal, state, and local laws, rules, regulations, and ordinances, as applicable. It is further acknowledged that Contractor certifies compliance with provisions, laws, acts, regulations, etc. as noted above.*

*This certification shall be effective through the term of the Contractor's Agreement.*

**Energy Conservation (34 C.F.R. § 75.616(c))**

*Contractor agrees to comply with US Department of Education regulation at 34 CFR 75.616(c) which requires the use of American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) standards for Heating, Ventilation, and Air Conditioning (HVAC) projects.*

**Domestic Preference (2 C.F.R. § 200.322)**

*Contractor agrees to comply with the requirements for Domestic Preference in construction materials and supplies where applicable (2 CFR 200.322).*

**Assurances for Construction and Other Capital Expenditures**

*Contractor agrees that the project will begin in a reasonable time period and Contractor will have the final plans approved before the construction is advertised or placed on the market for bidding (34 CFR 75.605). Contractor agrees the project will be completed in a reasonable time period consistent with the approved plans and specification (34 CFR 75.606). Contractor represents that the proposed construction is functional, economical, and not elaborate in design or extravagant in the use of materials as compared to other facilities in the State or other applicable geographic area (34 CFR § 75.607).*

**Preservation of Historic Sites (34 CFR § 75.602)**

*Contractor represents it has considered the probable effects of proposed construction on any district, site, building, or structure that is included or eligible for inclusion in the National Register of Historic Places.*



**Health, Safety, and Disability Compliance (34 CFR §§75.609 and 75.610)**

Contractor represents that it has reviewed the plans and designs for the improvement against Federal, State, and local health standards including Federal requirements regarding access by persons with disabilities, and it confirms project plans and designs comply with applicable Federal, State and local health and safety standards, as well as Federal requirements regarding access by persons with disabilities, as required by (34 CFR §§75.609 and 75.610).

This certification shall be effective through the term of the Contractor's Agreement.

**END OF DOCUMENT 00 73 42**

## SECTION 04 20 00 - UNIT MASONRY

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units (CMU).
2. Clay face brick.
3. Mortar and grout.
4. Steel reinforcing bars.
5. Ties and anchors.
6. Embedded flashing.
7. Miscellaneous masonry accessories.

B. Products furnished, but not installed, under this Section:

1. Anchor sections of adjustable masonry anchors for connecting to structural steel frame and steel lintels, installed under Section 05 50 00 "Metal Fabrications."

C. Products installed, but not furnished, under this Section:

1. Hollow-metal frames in unit masonry openings furnished under Section 08 11 13 "Hollow Metal Doors and Frames."

D. Related Requirements:

1. Section 07 21 00 "Thermal Insulation" for cavity wall insulation.

#### 1.2 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

#### 1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

#### 1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For the following:

1. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.
2. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

C. Samples for Initial Selection:

- 1.
2. Weep holes/cavity vents.

D. Samples for Verification and subject to final acceptance as part of mock-up panel review: For each type and color of the following:

1. Weep holes and cavity vents.

#### 1.5 Clay face brick, in the form of straps of five or more bricks. INFORMATIONAL SUBMITTALS

A. Material Certificates: For each type and size of the following:

1. Masonry units.
  - a. Include data on material properties.
  - b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
  - c. For exposed brick, include test report for efflorescence according to ASTM C67.



- d. For masonry units, include data and calculations establishing average net-area compressive strength of units.
- B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C109 for compressive strength, ASTM C1506 for water retention, and ASTM C91 for air content.
  2. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.
- C. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.
- 1.6 QUALITY ASSURANCE
- A. Testing Agency Qualifications: Qualified according to ASTM C1093 for testing indicated.
- B. Sample Panels: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 01 40 00 "Quality Requirements" for mockups.
1. Build sample panels for each type of exposed unit masonry construction in sizes approximately 48 inches long by 48 inches high by full thickness.
  2. Build sample panels facing south.
  3. Clean one-half of exposed faces of panels with masonry cleaner indicated.
  4. Protect approved sample panels from the elements with weather-resistant membrane.
  5. Architect's review of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
    - a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless Architect specifically approves such deviations in writing.
  6. Demolish and remove sample panel only when authorized by Architect.
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store packaged cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store masonry sand on protective membrane that separates sand from the ground moisture and contaminants and does not retain water.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.
- 1.8 FIELD CONDITIONS
- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.
  2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe, and hold cover in place.
  3. If covering is temporarily removed to perform certain wall operations, restore complete covering as soon as operations are complete and at end of workday; allow NO water intrusion into the masonry or the cavity.

- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
  - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
  - 2. Protect sills, ledges, and projections from mortar droppings.
  - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
  - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

### 2.2 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.

### 2.3 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
  - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
  - 2. Provide square-edged units for outside corners unless otherwise indicated.
- B. CMUs: ASTM C90.
  - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
  - 2. Density Classification:
    - a. Lightweight, maximum density not more than 105 lbs. per cubic foot, typical throughout building for interior work.
    - b. Normal weight for below grade work and work exposed to the exterior.
  - 3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
  - 4. Exposed Faces: Manufacturer's standard color and texture.

2.4 BRICK

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
  2. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
  3. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
  4. Provide 100% solid units at outside corners at soldier courses.
- B. Clay Face Brick: Facing brick complying with ASTM C216, Grade SW, Type FBS or better.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3350 psi.
  2. Initial Rate of Absorption: Less than 20 g/30 sq. in. per minute when tested in accordance with ASTM C67.
  3. Efflorescence: Provide brick that has been tested in accordance with ASTM C67 and is rated "not effloresced."
  4. Size (Actual Dimensions): 3-5/8 inches wide by 3-5/8 inches high by 11-5/8 inches long.
  5. Brick shall be a minimum 75 percent solid, unless noted otherwise on Drawings.
  6. See Drawings for special shapes.
  7. Application: See Drawings for locations of each brick type. Request clarification from Architect in the case of any uncertainty of brick type intended for a particular location or use.
  8. Clay Face Brick Types.
    - a. Masonry Veneer:
      - 1) Products: Subject to compliance with requirements, provide one of the following:
        - a) Beldin Brick.
        - b) Bowerston Shale Company; Basis of Design: Sunset Flash Wirecut.
        - c) Taylor Clay Products, Inc.
        - d) Interstate Brick.
      - 2) Color and texture: Match existing building.

2.5 MORTAR FOR UNIT MASONRY

- A. Masonry Cement: ASTM C91/C91M.
1. Subject to compliance with requirements, provide one of the following:
    - a. Cemex S.A.B. de C.V.; Richmortar Masonry Cement.
    - b. Fairborn Cement Company; MIAMI Masonry Cement.
    - c. LafargeHolcim; Masonry Cement.
    - d. Lehigh Hanson HeidelbergCement Group; Lehigh Masonry Cement.
  2. Aggregate for Mortar: Masonry sand, ASTM C144.
  3. Mortar Mixing: Provide one of the following mortar mixes.
    - a. Add masonry cement to mixer in full bag quantities. Measure dry masonry sand in box with volume of one cubic foot as often as necessary to maintain consistent proportions and at least once daily and every 4 hours of mixing. Add water and mix for 3-5 minutes.
    - b. Add preblended, dry mortar mix to the mixer. Furnish dry mortar ingredients (masonry cement and sand) in form of a preblended mix, ASTM C1714. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site. Add water and mix for 3-5 minutes.
  4. Application: Provide for all standard cmu work and where non-pigmented mortar is required.
- B. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C1384 or water-reducing and accelerating admixture complying with ASTM C494, Type E, and recommended by manufacturer for use in masonry mortar of composition indicated.
1. Use of cold-weather admixtures in mortar is not a substitution for compliance with TMS 602/ACI 530.1/ASCE 6 cold weather construction requirements.
  2. Cold-weather admixture (if used) shall be factory blended into the mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
  3. Products: Subject to compliance with requirements, provide one of the following:
    - a. Euclid Chemical Company (The); Accelguard 80.
    - b. GCP Applied Technologies; Morset.
    - c. Spec Mix, LLC; Spec Mix Non-Chloride Accelerator.

- C. Water: Potable.
- D. Mortar for Unit Masonry: Comply with ASTM C270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated.
  - 1. For all masonry unless otherwise noted, use Type S.
  - 2. For masonry veneer above grade, use Type N.

## 2.6 GROUT FOR UNIT MASONRY

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
  - 1. Do not use calcium chloride in grout.
- B. Grout for Unit Masonry: Comply with ASTM C476.
  - 1. Use grout that has been factory pre-blended and delivered to project site.
    - a. On-site field mixing of Portland cement and fine or coarse aggregate will NOT be permitted.
    - b. On-site field mixing of factory pre-blended grout for mixing with water only is acceptable.
  - 2. Use grout of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
    - a. Use fine grout in grout spaces less than 2 inches in horizontal dimension, unless otherwise indicated.
    - b. Use coarse grout in grout spaces 2 inches or more in least horizontal dimension, for filling bond beams, and for grouting cores of CMU with reinforcing bars.
  - 3. Proportion grout in accordance with ASTM C476, paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2500 psi.
- C. Aggregate for Grout: ASTM C 404.
- D. Water: Potable.

## 2.7 REINFORCEMENT

- A. Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60.

## 2.8 TIES AND ANCHORS

- A. General: Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
  - 1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82/A82M, with ASTM A153/A153M, Class B-2 coating.
  - 2. Galvanized-Steel Sheet: ASTM A653/A653M, Commercial Steel, G60 zinc coating.
- C. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
  - 1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch-diameter, hot-dip galvanized steel wire.
  - 2. Tie Section: Triangular-shaped wire tie made from 0.187-inch-diameter, hot-dip galvanized steel wire. Where column web ties are indicated, provide 0.187-inch-diameter x 12-inches long ties made from hot-dip galvanized steel wire.
- D. Adjustable Masonry-Veneer Anchors for Connecting to Cold-Formed Metal Framing:
  - 1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.
  - 2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.075-inch-thick steel sheet, galvanized after fabrication.
  - 3. Fabricate wire ties from 0.187-inch-diameter, hot-dip galvanized-steel wire unless otherwise indicated.

4. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a corrosion-resistant, self-drilling, eye-screw designed to receive wire tie. Eye-screw has spacer that seats directly against framing and is same thickness as sheathing and insulation and has gasketed washer head that covers hole in insulation.
    - a. Products: Subject to compliance with requirements, provide one of the following:
      - 1) Heckmann Building Products, Inc.; #75 Original Pos-I-Tie with Triangle Wire Tie.
      - 2) Hohmann & Barnard, Inc.; 2-Seal Tie with 2-Seal Byna-Lok Wire.
      - 3) Wire-Bond; #4520 SureTie, #4590 Thermal Grip Washer, and #4510 SureTie Triangle.
  5. Polymer-Coated, Steel Drill Screws for Steel Studs: ASTM C954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 diameter by length required to penetrate steel stud flange with not less than three exposed threads, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours according to ASTM B117.
- E. Wire Mesh Ties: 1/2-inch mesh, 16 gage steel wire, hot dip galvanized.

## 2.9 EMBEDDED FLASHING MATERIALS

- A. Flexible Flashing: Use one of the following:
1. Stainless Steel-Laminated Flashing: 2 mil, Type 304 stainless-steel sheet bonded to a polymeric fabric on one face. Use only where flashing is fully concealed in masonry.
    - a. Product: Subject to compliance with requirements, provide products by one of the following:
      - 1) Hohmann & Barnard, Inc.; Mighty-Flash SS Fabric Flashing.
      - 2) Wire-Bond; Bond-N-Flash.
      - 3) York Flashings; Multi-Flash SS.
  2. Copper-Laminated Flashing: 3-oz./sq. ft. copper sheet bonded to a polymeric fabric on both faces. Use only where flashing is fully concealed in masonry.
    - a. Product: Subject to compliance with requirements, provide products by one of the following:
      - 1) Advanced Building Products Inc., Copper Sealite 2000.
      - 2) Hohmann & Barnard, Inc.; Copper-Fabric NA Copper Fabric Flashing.
      - 3) Wire-Bond; Copper Seal Flashing.
      - 4) York Flashings; Multi-Flash 500.
  3. Unitized Flashing and Cavity Drainage System: Masonry cavity wall flashing system consisting of a stainless steel- or copper-laminated flashing (meeting requirements for flashings in preceding paragraphs), mortar dropping collection drainage mat, and drainage mesh weep tabs factory-assembled into a single unit in lieu of individual components.
    - a. Product: Subject to compliance with requirements, provide products by one of the following:
      - 1) Mortar Net Solutions; TotalFlash Roll Masonry Cavity Wall Drainage Solution.
      - 2) York Flashings; Flash-Vent.
- B. Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other.

## 2.10 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
- B. Bond-Breaker Strips: Dense neoprene rubber (ASTM D2000, Grade BC610) bearing pad; 1/8-inch thick. Use at steel wide flange beam and precast concrete / masonry lintel bearing end coinciding with control joint location.
- C. Weep/Cavity Vent Products:
1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard.
    - a. Products: Subject to compliance with requirements, provide one of the following:
      - 1) Advanced Building Products Inc.; Mortar Maze Weep Vents.
      - 2) Heckmann Building Products Inc.; #85 Cell Vent.
      - 3) Hohmann & Barnard, Inc.; QV - Quadro-Vent.
      - 4) Wire-Bond; #3601 Cell Vent.

- D. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Advanced Building Products Inc.; Mortar Break.
    - b. CavClear/Archoventions Inc.; CavClear Masonry Mat.
    - c. Hohmann & Barnard, Inc.; Mortar Web.
    - d. Keene Building Products; Driwall Mortar Deflection.
    - e. Mortar Net Solutions; MortarNet.
    - f. Wire-Bond; Cavity Net.
  2. Configuration: Provide one of the following:
    - a. Strips, full depth of cavity and 10 inches high, with dovetail-shaped notches 7 inches deep that prevent clogging with mortar droppings.
    - b. Strips, not less than 3/4 inch thick and 10 inches high, with dimpled surface designed to catch mortar droppings and prevent weep holes from clogging with mortar.
    - c. Provide thinner strips where required at reduced cavity widths and no thicker than cavity width less 1/4 inch.
- E. Adhesive Anchor: Injectable, two-component epoxy adhesive, complying with ICC-ES AC308 for use in cracked concrete, for installation of reinforcing steel dowels into concrete, ONLY when doweling into footing was not completed per plan or misaligned.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. DeWalt "PURE110+".
    - b. Hilti, Inc. "HIT-RE 500-V3".
    - c. ITW Red Head "G5+ High Strength Epoxy".
    - d. Simpson Strong-Tie Company Inc.; "SET-3G".

## 2.11 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Diedrich Technologies, Inc.; a Hohmann & Barnard company.
    - b. EaCo Chem, Inc.
    - c. ProSoCo, Inc.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
  2. Verify that foundations are within tolerances specified.
  3. Verify that reinforcing dowels are properly placed.
  4. Verify that substrates are free of substances that impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.



- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

### 3.3 TOLERANCES

- A. Dimensions and Locations of Elements:
  - 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
  - 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
  - 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.
- B. Lines and Levels:
  - 1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
  - 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
  - 3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
  - 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
  - 5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
  - 6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet or 1/2-inch maximum.
  - 7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.
- C. Joints:
  - 1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
  - 2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
  - 3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
  - 4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
  - 5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

### 3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
  - 1. Exterior Veneer: One-third running bond for utility-sized units.
  - 2. Interior CMU: Standard running bond.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

- D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- I. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
  - 1. Maintain a one-inch joint between partition and penetrating structural framing. Install compressible filler in joint between top of partition and underside of structure above.
  - 2. Laterally brace partitions with brake-formed metal angles as detailed.
  - 3. At fire-rated and smoke rated partitions, treat joint between top of partition and underside of structure above and between partitions and penetrating structural framing to comply with Drawings.
- J. Grout solid all cores of CMU below floor line, and grout solid all collar joints in CMU work below floor line, whether or not indicated on drawings.
- K. Ease the exterior corners of all square-edged CMU walls and partitions in occupied rooms and corridors, by rubbing with an abrasive stone, removing sharp corners and providing an approximate 1/4-inch radius.

### 3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
  - 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
  - 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
  - 3. Bed webs in mortar in grouted masonry, including starting course on footings.
  - 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
  - 5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.
- B. Lay solid masonry and veneer units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- D. Cut joints flush where indicated to cavity wall insulation unless otherwise indicated.

### 3.6 COMPOSITE MASONRY

- A. Bond wythes of composite masonry together as follows:
  - 1. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.
    - a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
- B. Corners: Provide interlocking masonry unit bond in each wythe and course at corners unless otherwise indicated.
  - 1. Provide continuity with masonry-joint reinforcement at corners by using prefabricated L-shaped units as well as masonry bonding.



- C. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, bond walls together as follows:
  - 1. Provide individual wire mesh ties not more than 16 inches o.c. as detailed on Drawings.

### 3.7 CAVITY WALLS

- A. Bond wythes of cavity walls together as follows:
  - 1. Masonry-Joint Reinforcement: Installed in horizontal mortar joints.
    - a. Use adjustable-type (two-piece-type) reinforcement to allow for differential movement regardless of whether bed joints align.
  - 2. Masonry-Veneer Anchors: Comply with requirements for anchoring masonry veneers.
- B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.
- C. Seal all openings between cavity and building interior with masonry, mortar, joint sealant, or tightly-packed mineral-wool insulation (in that order of preference). Maintain specified clearances at structural members and fill openings with mineral-wool insulation.
  - 1. Tightly pack mineral-wool insulation into steel tube and other hollow sections penetrating cavity walls. Insulation plug shall extend from face of cavity wall insulation a minimum distance of 6 inches towards building interior.

### 3.8 ANCHORED MASONRY VENEERS

- A. Anchor masonry veneers to CFMF wall framing with masonry-veneer anchors to comply with the following requirements:
  - 1. Fasten screw-attached anchors through sheathing to wall framing with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
  - 2. Embed tie sections in masonry joints.
  - 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
  - 4. Space anchors as indicated, but not more than 16 inches o.c. vertically and 24 inches o.c. horizontally, with not less than one anchor for each 2.67 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 16 inches vertically, around perimeter.
- B. Keep airspace clean of mortar droppings and other materials during construction. Bevel beds away from airspace, to minimize mortar protrusions into airspace. Do not attempt to trowel or remove mortar fins protruding into airspace.

### 3.9 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
  - 1. Space reinforcement not more than 16 inches o.c.
  - 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
  - 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at corners by using prefabricated L-shaped units.
- D. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, and other special conditions.

### 3.10 CONTROL AND EXPANSION JOINTS

- A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

- B. Form control joints in concrete masonry as follows:
  - 1. Install preformed control-joint gaskets designed to fit standard sash block.
  - 2. Install temporary foam-plastic filler in head joints, and remove filler when unit masonry is complete for application of sealant.
  - 3. Install sealant and backer rod, specified in Section 07 92 00 "Joint Sealants", at interior face of cavity wall CMU wythe full height from floor slab to underside of deck above, including above-ceiling portions of joints and joints concealed in pipe chases or similar inaccessible spaces.
- C. Form expansion joints in brick as follows:
  - 1. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Section 07 92 00 "Joint Sealants."

### 3.11 FLASHING, WEEP HOLES, AND CAVITY VENTS

- A. General: Install embedded flashing and weep holes in masonry at lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install cavity vents at obstructions to upward flow of air in cavities, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
  - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on bed of sealant and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
  - 2. Allow no penetrations through flashings. Coordinate in advance with all trades to ensure placement of all wall-penetrating work to be above or below flashings. Do not flash and/or seal around such items if discovered when installing flashings; notify Architect and have such work relocated.
  - 3. At cavity walls, extend flashing through outer wythe, across airspace behind veneer, and up face of backup wythe at least 8 inches. Fasten upper edge of flashing to backup wythe through termination bar.
  - 4. At masonry-veneer walls, extend flashing through veneer, across airspace behind veneer, and up face of sheathing at least 8 inches. Where applicable, tuck under water-resistive barrier, lapping at least 4 inches. Fasten upper edge of flexible flashing to sheathing through termination bar.
  - 5. At lintels, extend flashing full length of lintel bearing into masonry at ends and turn up not less than 2 inches to form end dams.
  - 6. At sills, where skyward facing joints between units are exposed, install flashing one course below sill and extend through outer wythe, across air space behind veneer, and up face of backup wythe at least 8 inches. Fasten upper edge of flashing to backup wythe through termination bar.
  - 7. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
  - 8. Special condition for flashing of walls above adjacent roof, roof edges and parapets:
    - a. Extend all through-wall flashings located above roof lines at least 6-inches beyond the roof edge and not less distance than the projection of roof edge metal trim, fascia, coping, or gutter.
    - b. Overlap flashing steps 6-inches minimum.
    - c. Do not terminate through wall flashings or provide a flashing step at inside or outside wall corners; wrap around corners at least 6-inches.
    - d. At abutting parapet walls, step through-wall flashings around and above parapet in a manner that enables proper roof membrane flashing and termination.
- C. Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.
  - 1. Use specified weep/cavity vent products to form weep holes.
  - 2. Space weep holes 24 inches o.c. at modular- and utility-sized units and 32 inches o.c. at monarch-sized units.
  - 3. Provide a minimum of two weeps above openings.
- D. Place cavity drainage material in airspace behind veneers to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.
- E. Install cavity vents in head joints in exterior wythes at spacing to match weeps. Use specified weep/cavity vent products to form cavity vents.
- F. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.

- G. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
  - 1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
  - 2. Limit height of vertical grout pours to not more than 56 inches.

3.12 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
  - 3. Protect adjacent nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
  - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
  - 5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
  - 6. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.13 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

**END OF SECTION 04 20 00**

## SECTION 07 41 13.13 - FORMED METAL ROOF PANELS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Tapered-rib-profile, exposed-fastener metal roof panels.
2. Substrate board.
3. Underlayment.

#### 1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of roof accessories and roof-mounted equipment.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review structural loading limitations of supporting structure during and after roofing.
6. Review flashings, special details, drainage, penetrations, equipment curbs, and condition of other construction that affect metal panels.
7. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
8. Review temporary protection requirements for metal panel systems during and after installation.
9. Review procedures for repair of metal panels damaged after installation.
10. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

#### 1.3 ACTION SUBMITTALS

A. Product Data:

1. For formed metal roof panels. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Shop Drawings:

1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
2. Accessories: Include details of flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.

C. Samples for Initial Selection: Manufacturer's standard color charts, showing full range of available colors for each type of exposed finish.

1. Include similar Samples of trim and accessories involving color selection.

D. Samples for Verification: Actual sample of finished products for each type of exposed finish for metal panels, clips, fasteners, closures, and other metal panel accessories.

1. Size: Manufacturers' standard size.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For formed metal roof panels, for tests performed by a qualified testing agency.
- B. Qualification Statements: For roof installers.
- C. Sample warranties.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal panels.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

#### 1.7 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed in accordance with manufacturers' written installation instructions and warranty requirements.

#### 1.8 COORDINATION

- A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.
- B. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

#### 1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:
    - a. Structural failures, including rupturing, cracking, or puncturing.
    - b. Deterioration of metals and other materials beyond normal weathering.
  2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
  - a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
  - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
  - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 20 years from date of Substantial Completion.

## **PART 2 - PRODUCTS**

### **2.1 PERFORMANCE REQUIREMENTS**

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing in accordance with ASTM E1592:
  1. Wind Loads: As indicated on Drawings.
  2. Other Design Loads: As indicated on Drawings.
  3. Deflection Limits: For wind loads, no greater than 1/180 of the span.
- B. Water Penetration under Static Pressure: No water penetration when tested in accordance with ASTM E1646 at the following test-pressure difference:
- C. Watertightness: No water penetration when tested in accordance with ASTM E2140 for hydrostatic-head resistance.
- D. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
  1. Uplift Rating: UL 90.
- E. FM Approvals Listing: Provide metal roof panels and component materials that comply with requirements in FM Approvals 4471 as part of a panel roofing system and that are listed in FM's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals markings.
  1. Fire/Windstorm Classification: Class 1A- 90.
- F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
  1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

### **2.2 EXPOSED-FASTENER METAL ROOF PANELS, GENERAL**

- A. Provide factory-formed metal roof panels designed to be installed by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners. Include accessories required for weathertight installation.

### **2.3 TAPERED-RIB-PROFILE, EXPOSED-FASTENER METAL ROOF PANELS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Berridge Manufacturing Company.
  2. Butler Manufacturing Company; a division of BlueScope Buildings North America, Inc.
  3. MBCI; Cornerstone Building Brands.
  4. McElroy Metal, Inc.
  5. Metal Sales Manufacturing Corporation.
  6. PAC-CLAD; Petersen; a Carlisle company.

- B. Panels: Formed with raised, trapezoidal ribs spaced at regular intervals.
  - 1. Structural Support: Over solid deck.
  - 2. Material: Metallic-coated steel.
  - 3. Panel Profile: Intermediate stiffening ribs, symmetrically spaced between major ribs.
  - 4. Rib Spacing: 12 inches o.c.
  - 5. Panel Height: 1 inches minimum.
  - 6. Fasteners: Manufacturer's standard screw fasteners.

#### 2.4 SUBSTRATE BOARD

- A. Plywood. Refer to specification Section 06 16 00.

#### 2.5 UNDERLAYMENT

- A. Felt Underlayment: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felts.

#### 2.6 PANEL MATERIALS

- A. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with minimum ASTM A653, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with minimum ASTM A792, Class AZ50 coating designation; structural quality. Sheet prepainted by coil-coating process to comply with ASTM A755.

- 1. Nominal Thickness: 0.028 inch 0.034 inch 0.040 inch 0.052 inch.

#### 2.7 MISCELLANEOUS MATERIALS

- A. Panel Accessories: Provide components required for a complete, weathertight panel system, including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

- 1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
- 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
- 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

- B. Flashing and Trim: Refer to specification Section 07 62 00 Sheet Metal Flashing and Trim.

- C. Gutters: Fabricate in minimum 96-inch-long sections, of size and metal thickness in accordance with manufacturer's recommendations. Furnish gutter supports spaced a maximum of 36 inches o.c., fabricated from same metal as gutters. Provide wire ball strainers of compatible metal at outlets. Finish gutters to match roof fascia and rake trim.

- D. Downspouts: Fabricate in 10-foot-long sections, complete with formed elbows and offsets, of size and metal thickness in accordance with manufacturer's recommendations. Finish downspouts to match gutters.

- E. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

- F. Panel Sealants: Provide sealant types recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.



1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
2. Joint Sealant: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

## 2.8 FABRICATION

- A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate in accordance with equipment manufacturer's written instructions and to comply with details shown.
- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations that apply to design, dimensions, metal, and other characteristics of item indicated.
  1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
  2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
  3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
  4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with manufacturer's recommendations.
  5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
  6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
    - a. Size: As recommended by metal panel manufacturer for application, but not less than thickness of metal being secured.

## 2.9 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within range of approved Samples and are assembled or installed to minimize contrast.
- C. Steel Panels and Accessories:
  1. Two-Coat Fluoropolymer: Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
  1. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.
  2. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.
    - a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.2 PREPARATION**

- A. Miscellaneous Supports: Install miscellaneous panel support members and anchorages in accordance with ASTM C754 and metal panel manufacturer's written recommendations.

#### **3.3 INSTALLATION OF SUBSTRATE BOARD**

- A. Install substrate board with long joints in continuous straight lines, with end joints staggered not less than 24 inches in adjacent rows.
  1. Tightly butt substrate boards together.
  2. Cut substrate board to fit tightly around penetrations and projections, and to fit tightly to intersecting sloping roof decks.
  3. Fasten substrate board in accordance with roofing system manufacturers' written installation instructions.

#### **3.4 INSTALLATION OF UNDERLAYMENT**

- A. Felt Underlayment: Apply at locations indicated on Drawings, in shingle fashion to shed water, and with lapped joints of not less than 2 inches.
  1. Apply over the entire roof surface.
  2. Apply on roof not covered by self-adhering sheet underlayment. Lap over edges of self-adhering sheet underlayment not less than 3 inches, in shingle fashion to shed water.
- B. Flashings: Install flashings to cover underlayment to comply with requirements specified in Section 07 62 00 "Sheet Metal Flashing and Trim."

### 3.5 INSTALLATION OF METAL ROOF PANELS

- A. Install metal panels in accordance with manufacturer's written instructions in orientation, sizes, and locations indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
1. Shim or otherwise plumb substrates receiving metal panels.
  2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that are concealed by metal panels are installed.
  3. Install screw fasteners in predrilled holes.
  4. Locate and space fastenings in uniform vertical and horizontal alignment.
  5. Install flashing and trim as metal panel Work proceeds.
  6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
  7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
  8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
1. Steel Panels: Use stainless steel fasteners for surfaces exposed to exterior; use galvanized-steel fasteners for surfaces exposed to interior.
  2. Aluminum Panels: Use aluminum or stainless steel fasteners for surfaces exposed to exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to interior.
  3. Copper Panels: Use copper, stainless steel, or hardware-bronze fasteners.
  4. Stainless Steel Panels: Use stainless steel fasteners.
- C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- D. Exposed-Fastener, Metal Roof Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
  2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
  3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
  4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
  5. Flash and seal panels with weather closures at perimeter of all openings.
  6. Watertight Installation:
    - a. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels and elsewhere as needed to make panels watertight.
    - b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
    - c. At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.
- E. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal panel system, including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal panel manufacturer; or, if not indicated, provide types recommended in writing by metal panel manufacturer.

- F. Flashing and Trim: Comply with performance requirements and manufacturer's written installation instructions. Provide concealed fasteners where possible, and set units true to line and level. Install work with laps, joints, and seams that are permanently watertight.
  - 1. Install exposed flashing and trim that are without buckling and tool marks, and that are true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof performance.
  - 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 ft., with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- G. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 36 inches o.c., using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.
- H. Downspouts: Join sections with telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.
  - 1. Provide elbows at base of downspouts to direct water away from building.
  - 2. Connect downspouts to underground drainage system indicated.
- I. Roof Curbs: Install flashing around bases where they meet metal roof panels.

### 3.6 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align metal panel units within installed tolerance of 1/4 inch in 20 ft. on slope and location lines and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

### 3.7 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal panel installation, including accessories. Report results in writing.
- B. Remove and replace applications where tests and inspections indicate that they do not comply with specified requirements.
- C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- D. Prepare test and inspection reports.

### 3.8 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

**END OF SECTION 07 41 13.13**

## SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Sheet metal fabrications.
  - 2. Sheet metal materials
- B. Related Requirements:
  - 1. Section 04 20 00 "Unit Masonry" for membrane flashing specified as part of masonry work.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Include the following:
  - 1. Identify material, thickness, weight, and finish for each item and location in Project.
  - 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
  - 3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
  - 4. Details of expansion-joint covers, including showing direction of expansion and contraction.
- C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
  - 1. 8-inch square samples of specified sheet materials to be exposed as finished surfaces.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sheet metal flashing, trim, and accessories to include in maintenance manuals.

#### 1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Engage an experience Installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- C. SMACNA and NRCA: Except as otherwise indicated, the workmanship of sheet metal work, method for forming joints, thickness requirements, anchoring, cleating, and provisions for expansion shall conform to the standard details and recommendation of the SMACNA - Architectural Sheet Metal Manual, Sixth Edition and NRCA – Roofing and Waterproofing Manual. If there is a discrepancy between these references and the project specifications and drawings, the stricter requirements shall govern.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

#### 1.7 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

#### 1.8 COORDINATION

- A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leak-proof, secure, and noncorrosive installation.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

#### 2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.
- B. Prepainted, Metallic-Coated Steel Sheet: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A755.
  - 1. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A792, Class AZ50 coating designation, Grade 40; structural quality.
  - 2. Surface: Smooth, flat.
  - 3. Exposed Coil-Coated Finish:
    - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
    - a. Color and Gloss: As selected by Architect from full range of industry colors and color densities, but not less than 40.
  - 4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

C. Stainless Steel Sheet: ASTM A240, Type 304, dead soft, fully annealed.

1. Nominal Thickness: 0.0500 inch (18 ga.).

2. Surface: Smooth, flat.

3. Exterior Finish: ASTM A480, No. 2B (bright, cold rolled) or ASTM A480, No. 2D (dull, cold rolled).

a. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.
- B. Fasteners: Same metal as sheet metal flashing or other noncorrosive metal as recommended by sheet metal manufacturer designed to withstand design loads.
  - 1. Exposed Fasteners: Heads matching color of sheet metal by means of factory-applied coating.
- C. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
- B. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
- C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
- D. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.
- E. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Blind rivet joints where necessary for strength.
- F. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim.

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.
  - 1. Verify compliance with requirements for installation tolerances of substrates.
  - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- B. Verify wood blocking is in-place, secure and in proper relationship to face of wall below.
- C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Coordinate installation fully with roof membrane and membrane flashings; do not install metal trims on irregular, missing, or improper membranes.



- B. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
  - 1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
  - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
  - 3. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
  - 4. Torch cutting of sheet metal flashing and trim is not permitted.
  - 5. Do not use graphite pencils to mark metal surfaces.
- C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.
  - 1. Bed flanges in thick coat of asphalt roofing cement where required for waterproof performance.
- D. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
- E. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
  - 1. Prepainted, Metallic-Coated Steel: Use stainless-steel fasteners.
- F. Seal joints with elastomeric sealant as required for watertight construction.
  - 1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Apply sealant manufacturer approved/recommended primer to both sides of metal joint prior to application of sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.

### 3.3 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

### 3.4 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean off excess sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

**END OF SECTION 07 62 00**

## **SECTION 12 32 16 - MANUFACTURED PLASTIC-LAMINATE-CLAD CASEWORK**

### **PART 1 - GENERAL**

#### 1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-clad casework.
2. Hardware and accessories.

B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for wood blocking for anchoring casework.
2. Section 09 65 13 "Resilient Base and Accessories" for resilient base applied to plastic-laminate-clad casework.
3. Section 12 36 23.13 "Plastic-Laminate-Clad Countertops" for plastic laminate-clad countertops and backsplashes.

#### 1.2 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.

#### 1.3 ACTION SUBMITTALS

A. Product Data:

1. Plastic-laminate-clad casework.
2. Hardware and accessories.

B. Shop Drawings: For plastic-laminate-clad casework.

1. Include plans, elevations, sections, and attachments to other work including blocking and reinforcements required for installation.
2. Indicate types and sizes of casework.
3. Indicate manufacturer's catalog numbers for casework.
4. Show fabrication details, including types and locations of hardware.
5. Indicate locations of and clearances from adjacent walls, doors, windows, other building components, and equipment.
6. Include details for utility spaces showing supports for conduit and piping.

C. Samples for Verification: For the following:

1. Plastic Laminates: 8 by 10 inches, for each type, color, pattern, and surface finish required.
  - a. Provide one Sample applied to core material with specified edge material applied to one edge.
2. Thermally Fused Laminate Panels: 8 by 10 inches, for each color, pattern, and surface finish.
  - a. Provide edge banding on one edge.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

- B. Sample Warranty: For special warranty.

#### 1.5 MATERIALS MAINTENANCE SUBMITTALS

- A. Furnish complete touchup kit for each type and finish of manufactured casework provided. Include scratch filler, stains, finishes, and other materials necessary to perform permanent repairs to damaged casework finish.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or other suitable material.

1.7 FIELD 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 levels planned for building occupants during remainder of construction period. Maintain temperature and relative humidity during remainder of construction period.
- B. Established Dimensions: Where casework is indicated to fit to other construction, establish dimensions for areas where casework is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.
- C. Locate concealed framing, blocking, and reinforcements that support casework by field measurements before enclosing them, and indicate measurements on Shop Drawings.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of casework that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Delamination of components or other failures of glue bond.
    - b. Warping of components.
    - c. Failure of operating hardware.
  - 2. Warranty Period: Five years from date of Substantial Completion.

**PART 2 - PRODUCTS**

2.1 PLASTIC-LAMINATE-CLAD CASEWORK

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.
  - 1. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard.
- B. Architectural Woodwork Standards Grade: Custom.
- C. Source Limitations: Obtain from single source from single manufacturer.
- D. Design: Face-frame cabinet construction with the following door and drawer-front style:
  - 1. Reveal overlay.
- E. Exposed Materials:
  - 1. Plastic-Laminate Grade: VGS.
    - a. Colors and Patterns: As indicated by manufacturer's designations.
  - 2. Edgebanding: PVC.
    - a. PVC Edgebanding Color: To match adjacent Plastic-Laminate.
- F. Semiexposed Materials:
  - 1. Thermally Fused Laminate (TFL) Panels: Provide thermally fused laminate panels for semiexposed surfaces unless otherwise indicated.
    - a. Colors and Patterns: As indicated by manufacturer's designations.
    - b. Provide plastic laminate of same grade as exposed surfaces for interior faces of doors and drawer fronts and other locations where opposite side of component is exposed.
  - 2. Edgebanding: PVC or polyester edgebanding matching thermoset decorative panels.
- G. Concealed Materials:
  - 1. Plastic Laminate: Grade BKL. Balanced construction of all laminated panels is mandatory. Unfinished core stock surfaces, even on concealed surfaces (excluding edges), are not permitted.

## 2.2 HARDWARE AND ACCESSORIES

- A. Hardware: Unless otherwise indicated, provide manufacturer's standard satin-finish, commercial-quality, heavy-duty hardware.
  - 1. Use threaded metal or plastic inserts with machine screws for fastening to particleboard except where hardware is through-bolted from back side.
- B. Butt Hinges: Chrome-plated, semiconcealed, five-knuckle hinges complying with ANSI/BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide two hinges for doors less than 48 inches high, and provide three hinges for doors more than 48 inches high.
- C. Wire Pulls: Solid aluminum wire pulls, fastened from back with two screws.
  - 1. Provide two pulls for drawers more than 24 inches wide.
- D. Door Catches: Nylon-roller spring catch. Provide two catches on doors more than 48 inches high.
- E. Door and Drawer Bumpers: Self-adhering, clear silicone rubber.
  - 1. Doors: Provide one bumper at top and bottom of closing edge of each swinging door.
  - 2. Drawers: Provide one bumper on back side of drawer front at each corner.
- F. Drawer Slides: ANSI/BHMA A156.9.
  - 1. Standard Duty (Grade 1): Side mount.
  - 2. Heavy Duty (Grade 1HD-100): Side mount.
    - a. Type: Full extension.
    - b. Material: Zinc-plated steel slides.
  - 3. General-purpose drawers; provide 100 lb load capacity.
  - 4. File drawers; provide 150 lb load capacity.
- G. Drawer and Hinged-Door Locks: Cylindrical (cam) type, five-pin tumbler, brass with chrome-plated finish, and complying with ANSI/BHMA A156.11, Grade 1.
  - 1. Provide a minimum of two keys per lock and six master keys. Each room shall be keyed differently. Provide master keying for all locks.
  - 2. Provide locks on every door and drawer.
    - a. Master key for up to 500 key changes.
  - 3. Provide chain bolts on inactive door of locking cabinets 72 inches or greater in height.
- H. Sliding-Door Hardware Sets: Manufacturer's standard, to suit type and size of sliding-door unit.
- I. Adjustable Shelf Supports: 2-pin locking plastic shelf rests complying with BHMA A156.9, Type B04013.
- J. Grommets for Cable Passage through Countertops: 3-inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.
- K. Coat Hanger Rods: 1-inch diameter, 14 gauge, chrome plated tubular steel supported in undershelf captive mounting hardware.
- L. File Suspension Rails: All file drawers shall be provided with an integral file suspension rail system. File drawers shall be capable of accepting legal size file hangers in a lateral attitude if so desired.

## 2.3 MATERIALS

- A. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.
- B. Softwood Plywood: DOC PS 1.
- C. Particleboard: ANSI A208.1, Grade M-2.
- D. MDF: Medium-density fiberboard, ANSI A208.2; made with binder containing no urea formaldehyde.
- E. Hardboard: ANSI A135.4, Class 1 tempered.

- F. Plastic Laminate: High-pressure decorative laminate complying with ISO 4586-3.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Formica Corporation.
    - b. Pionite; a Panolam Industries International, Inc. brand.
    - c. Wilsonart LLC.
  - 2. Source Limitations: Obtain from single source from single manufacturer.
- G. PVC Edgebanding for Plastic Laminate: Rigid PVC extrusions, through color with satin finish, 3.0 mm thick at doors and drawer fronts, 1.0 mm thick elsewhere.
- H. Thermally Fused Laminate Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of ISO 4586.
  - 1. Edgebanding for Thermally Fused Laminate (TFL) Panels: PVC or polyester edgebanding matching thermally fused laminate panels.

## 2.4 FABRICATION

- A. Plastic-Laminate-Faced Cabinet Construction: As required by referenced quality standard, but not less than the following:
  - 1. Bottoms and Tops of Wall Cabinets: 3/4-inch particleboard, plastic-laminate faced on exposed surfaces, thermoset decorative panels on semiexposed surfaces, laminate backing sheet on concealed surfaces.
  - 2. Bottoms and Tops of Base Cabinets and Tall Cabinets: 3/4-inch particleboard, plastic-laminate faced on exposed surfaces, thermoset decorative panels on semiexposed surfaces, laminate backing sheet on concealed surfaces. Base cabinets shall have a full sub top.
  - 3. Ends of Cabinets: 3/4-inch particleboard, plastic-laminate faced on exposed surfaces, thermoset decorative panels on semiexposed surfaces, laminate backing sheet on concealed surfaces.
  - 4. Toe Base: Individual applied base, each constructed of four (4) 3/4-inch plywood panels (2 sides, front and back), factory attached to base and tall cabinets, 4-inch high and inset from cabinet front and back edges.
  - 5. Shelves: 3/4-inch particleboard shelves up to 36 inches wide, 1-inch particleboard, shelves over 36-inches wide, plastic-laminate faced on exposed surfaces, thermoset decorative panels on semiexposed surfaces.
  - 6. Backs of Cabinets: 1/2-inch-thick particleboard or MDF, plastic-laminate faced where exposed, thermoset decorative panels on semiexposed surfaces, laminate backing sheet on concealed surfaces.
  - 7. Drawer Fronts: 3/4-inch particleboard, plastic-laminate faced.
  - 8. Drawer Sides, Backs and Sub Fronts: 1/2-inch thermoset decorative panels, with glued dovetail or multiple-dowel joints.
  - 9. Drawer Bottoms: 1/2-inch thermoset decorative panels glued and dadoed into front, back, and sides of drawers.
  - 10. Doors: 3/4-inch particleboard or MDF plastic-laminate faced.
- B. Filler and Closure Panels: Provide as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as cabinets.
  - 1. Provide closure panels at top and bottom of wall cabinets where a gap exists at wall-corners and between cabinet ends and walls where a filler panel is used at the face.
  - 2. Provide closure panels at ends of utility spaces where utility space would otherwise be exposed.
  - 3. Match face material of adjacent surface; provide balancing ply on concealed face.
  - 4. Scribe fit to irregular adjacent surfaces where normal bead of sealant would vary in size.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of framing and reinforcements, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Grade: Install casework to comply with same quality standard grade as item to be installed.
- B. Install casework level, plumb, and true in line; shim as required using concealed shims. Where casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- C. Base Cabinets: Set cabinets straight, level, and plumb. Adjust subtops within 1/16 inch of a single plane. Align similar adjoining doors and drawers to a tolerance of 1/16 inch. Bolt adjacent cabinets together with joints flush, tight, and uniform.
- D. Wall Cabinets: Hang cabinets straight, level, and plumb. Adjust fronts and bottoms within 1/16 inch of a single plane. Fasten cabinets to hanging strips, masonry, framing, wood blocking, or reinforcements in walls and partitions. Align similar adjoining doors to a tolerance of 1/16 inch.
- E. Fasten casework to adjacent units and to masonry, framing, wood blocking, or reinforcements in walls and partitions to comply with the AWI/AWMAC/WI's "Architectural Woodwork Standards."
- F. Install hardware uniformly and precisely. Set hinges snug and flat in mortises unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.
- G. Adjust operating hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

3.3 CLEANING

- A. Repair or remove and replace defective work as directed on completion of installation.
- B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

**END OF SECTION 12 32 16**

**SECTION 12 36 23.13 - PLASTIC-LAMINATE-CLAD COUNTERTOPS**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. Section Includes:
  - 1. Plastic-laminate-clad countertops.

1.2 ACTION SUBMITTALS

- A. Product Data:
  - 1. Plastic-laminate-clad countertops.
  - 2. Accessories.
- B. Shop Drawings: For plastic-laminate-clad countertops.
  - 1. Include plans, sections, details, and attachments to other work. Detail fabrication and installation, including field joints.
  - 2. Show locations and sizes of cutouts and holes for items installed in plastic-laminate-clad countertops.
  - 3. Apply AWI Quality Certification Program label to Shop Drawings.
- C. Samples for Verification: As follows:
  - 1. Plastic Laminates: For each type, color, pattern, and surface finish required, 8 by 10 inches in size.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and fabricator.
- B. Product Certificates: For the following:
  - 1. Composite wood products.
  - 2. High-pressure decorative laminate.
  - 3. Adhesives.
- C. Quality Standard Compliance Certificates: AWI Quality Certification Program.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
  - 1. Shop Certification: AWI's Quality Certification Program accredited participant.
- B. Installer Qualifications: Fabricator of products.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver countertops only after casework and supports on which they will be installed have been completed in installation areas.
- B. Store countertops in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.
- C. Keep surfaces of countertops covered with protective covering during handling and installation.

1.6 FIELD CONDITIONS

- A. Environmental Limitations without Humidity Control: Do not deliver or install countertops until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.



- B. Field Measurements: Where countertops are 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.
- C. Established Dimensions: Where countertops are indicated to fit to other construction, establish dimensions for areas where countertops are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

## **PART 2 - PRODUCTS**

### **2.1 PLASTIC-LAMINATE-CLAD COUNTERTOPS**

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of plastic-laminate-clad countertops indicated for construction, finishes, installation, and other requirements.
  - 1. Provide inspections of fabrication and installation together with labels and certificates from AWI certification program indicating that countertops comply with requirements of grades specified.
  - 2. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.
- B. Grade: Custom.
- C. High-Pressure Decorative Laminate: ISO 4586-3, Grade HGS.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Formica Corporation.
    - b. Pionite; a Panolam Industries International, Inc. brand.
    - c. Wilsonart LLC.
- D. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
  - 1. As selected by Architect from manufacturer's full range in the following categories:
    - a. Solid colors, matte finish.
    - b. Wood grains, matte finish with grain running parallel to length of countertop.
    - c. Patterns, matte finish.
- E. Edge Treatment: PVC to match laminate cladding on horizontal surfaces.
- F. Core Material: Particleboard.
- G. Core Material at Sinks: Moisture Resistant (MR) particleboard.
- H. Core Thickness: 1-1/8 inch.
- I. Backer Sheet: Provide plastic-laminate backer sheet, ISO 4586-3, grade to match exposed surface, on underside of countertop substrate.

### **2.2 WOOD MATERIALS**

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard unless otherwise indicated.
- B. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of countertop and quality grade specified unless otherwise indicated.
  - 1. Particleboard: ANSI A208.1, Grade M-2.
    - a. Use Grade M-2-Exterior Glue at Sinks
  - 2. Softwood Plywood: DOC PS 1.

### 2.3 ACCESSORIES

- A. Wire-Management Grommets: Circular, molded-plastic grommets and matching plastic caps with slot for wire passage.
  - 1. Outside Diameter: 2 inches.
  - 2. Color: Black

### 2.4 MISCELLANEOUS MATERIALS

- A. Adhesive for Bonding Plastic Laminate: Type I, waterproof type as selected by fabricator to comply with requirements.

### 2.5 FABRICATION

- A. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch over base cabinets.
  - 1. Provide all countertops and work surfaces with 180-degree bullnosed, post-formed edge except provide laminate self-edge at custom secretarial workstation.
  - 2. Where backsplash and endsplash are indicated, fabricate with 3mm PVC trim at top.
- B. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
  - 1. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended, and check measurements of assemblies against field measurements before disassembling for shipment.
- C. Shop cut openings to maximum extent possible to receive appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
  - 1. Seal edges of cutouts by saturating with varnish.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.
- B. Before installing countertops, examine shop-fabricated work for completion and complete work as required, including removal of packing.

### 3.2 INSTALLATION

- A. Grade: Install countertops to comply with same grade as item to be installed.
- B. Assemble countertops and complete fabrication at Project site to the extent that it was not completed in the shop.
  - 1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
  - 2. Seal edges of cutouts by saturating with varnish.
- C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.
  - 1. Secure field joints in countertops with concealed clamping devices located within 6 inches of front and back edges and at intervals not exceeding 24 inches. Tighten in accordance with manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.
- D. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

- E. Countertop Installation: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
  - 1. Install countertops level and true in line. Use concealed shims as required to maintain not more than a 1/8-inch-in-96-inches variation from a straight, level plane.
  - 2. Secure endsplashes to tops with concealed metal brackets at 16 inches o.c. and to walls with adhesive.
  - 3. Seal joints between countertop and backsplash, if any, and joints where countertop and backsplash abut walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

### 3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects. Where not possible to repair, replace countertops. Adjust joinery for uniform appearance.
- B. Clean countertops on exposed and semiexposed surfaces.
- C. Protection: Provide Kraft paper or other suitable covering over countertop surfaces, taped to underside of countertop at a minimum of 48 inches o.c. Remove protection at Substantial Completion.

**END OF SECTION 12 36 23.13**

## **SECTION 12 57 16 - METAL WELDING BOOTH**

### **PART 1 - GENERAL**

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Welding booth.
  - 2. Quench tank.
  - 3. Welding curtain and curtain rod.

#### 1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

#### 1.3 COORDINATION

- A. Coordinate layout and installation of framing and reinforcements for support of welding booths.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For welding booth.
  - 1. Include plans, elevations, sections, and attachments to other work including blocking and reinforcements required for installation.
  - 2. Show fabrication details, including types and locations of hardware.
- C. Samples: For welding booth finishes and materials requiring color selection.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Product Test Reports:
  - 1. Welding booth: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating compliance of welding booth with requirements of specified product standard.

#### 1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish complete touchup kit for each type and color of welding booth finish provided. Include fillers, primers, paints, and other materials necessary to perform permanent repairs to damaged welding booth finish.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or other suitable material.

#### 1.8 FIELD CONDITIONS

- A. Established Dimensions: Where welding booth is indicated to fit to other construction, establish dimensions for areas where welding booth is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.
- B. Field Measurements: Where welding booth is indicated to fit to existing construction, verify dimensions of existing construction by field measurements before fabrication and indicate measurements on Shop Drawings. Provide fillers and scribes to allow for trimming and fitting.

- C. Locate concealed framing, blocking, and reinforcements that support welding booth by field measurements before enclosing them, and indicate measurements on Shop Drawings.

## **PART 2 - PRODUCTS**

### **2.1 SOURCE LIMITATIONS**

- A. Obtain welding booth from single source from single manufacturer unless otherwise indicated.
- B. Product Designations: Drawings indicate sizes and configurations of welding booth by referencing designated manufacturer's catalog numbers. Other manufacturers' welding booth of similar sizes and similar door and drawer configurations and complying with Specifications may be considered. See Section 01 60 00 "Product Requirements."

### **2.2 METAL WELDING BOOTH**

- A. Steel Sheet: Cold-rolled, commercial steel (CS) sheet, complying with ASTM A1008; suitable for exposed applications.
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
  - 1. Lincoln Electric (Basis of Design).
  - 2. Clean Air Industries
  - 3. IAP Products.
- C. Nominal Metal Thickness:
  - 1. Side and back panels: Minimum 14 gauge.

### **2.3 METAL WELDING BOOTH FABRICATION**

- A. General: Assemble and finish units at point of manufacture.

### **2.4 WELDING BOOTH SYSTEMS**

- A. Provide welding booth manufacturer's standard integrated system that, wall panels, corner support posts, and fittings needed to assemble system. System includes hardware and fasteners for securing support
- B. Support Framing: Welding booth manufacturer's standard system consisting connecting braces and rails as follows:
  - 1. Vertical supports rest on adjustable leveling bases.
  - 2. Vertical supports are installed with braces and rails, connecting them to each other and to permanent building walls to create a stable, rigid structure with framed utility spaces where indicated.

### **2.5 METAL FINISH**

- A. General: Prepare, treat, and finish welded assemblies after assembling. Prepare, treat, and finish components that are to be assembled with mechanical fasteners before assembling. Prepare, treat, and finish concealed surfaces same as exposed surfaces.
- B. Preparation: After assembly, clean surfaces of mill scale, rust, oil, and other contaminants. After cleaning, apply a conversion coating suited to organic coating to be applied over it.
- C. Colors for Metal Welding booth Finish: As selected by Architect from manufacturer's full range.

### **2.6 WELDING BOOTH ACCESSORIES**

- A. Quench Tank: Manufacturer's standard quench tank.
- B. Welding Curtain and Curtain Rod: Manufacturer's standard curtain and curtain rod.

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcements, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF WELDING BOOTHS

- A. Fasten welding booths to adjacent walls and as recommended by the manufacturer.
- B. Install hardware uniformly and precisely.

3.3 CLEANING AND PROTECTING

- A. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

**END OF SECTION 12 57 16**

## SECTION 13 34 10 GLAZED STRUCTURES

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Greenhouses.
  - 2. Accessories.
  - 3. Glass and Glazing.
  
- B. RELATED SECTIONS
  - 1. Section 03 30 00 – Cast-In-Place Concrete: Cast-in-place concrete foundations, slabs, and walls.
  - 2. Section 07 90 00 – Joint Sealers.
  - 3. Section 08 11 13 – Hollow Metal Doors and Frames.
  - 4. Division 22 – Plumbing
  - 5. Division 23 – HVAC
  - 6. Division 26 – Electrical

#### 1.2 REFERENCES

- A. AAMA 611 – Voluntary Specification for Anodized Architectural Aluminum.
- B. ASTM A 36 – Standard Specification for Carbon Structural Steel.
- C. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
- D. ASTM B 308 – Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles.
- E. ASTM C 864 – Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
- F. AWS D1 – Structural Welding Code.
- G. NGMA - National Greenhouse Manufacturer's Association, Standards - 1998 Edition

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design the greenhouse.
- B. Submit structural calculations for the greenhouse signed and sealed by a Professional Engineer licensed in Ohio for review by the Architect.
- C. Seismic Performance: The metal building system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- D. Include certification that gutter and downspout are sized to comply with SMACNA guidelines. Coordinate downspout with downspout boot size specified in Section 05 55 00 "Metal Fabrications."
- E. Design Loads:
  - 1. Refer to Sheet S000 for the Design Loads.
  - 2. Structural Performance: Except as noted, and at the minimum, conform to the requirements and recommendations of both the "Standard for Design Loads in Greenhouse Structures" and its "Commentary" published by the National Greenhouse Manufacturers Association, 1998 Edition (NGMA Standards).
- F. Greenhouse frame shall be designed in accordance with the American Institute of Steel Construction Specifications, American Iron and Steel Institute Specifications and/or (Name of Building Code).

#### 1.4 SUBMITTALS

- A. General: Comply with provisions of Section 01 33 00 Submittal Procedures of these specifications.
- B. Product data: Within 30 days after award of the contract, submit Manufacturer's product specifications, technical product data, standard data, and installation recommendations for each component.
- C. Shop drawings: Submit shop drawings for fabrication and installation of greenhouse, including the following:
  - 1. Elevations.
  - 2. Detail section of typical framing members.
  - 3. Hardware, mounting heights.
  - 4. Anchorage and reinforcements.
  - 5. Glazing details.
  - 6. Placement of all components for heating, cooling, and ventilation.

#### 1.5 GENERAL

- A. It is the intent of this portion of the specifications to include the furnishing and erection of the greenhouse superstructure including all glazing, doors & door hardware and ventilation as shown on plans and/or hereinafter described such work to be the responsibility of the Greenhouse Manufacturer. Greenhouse installation is the responsibility of the Greenhouse Manufacturer and shall be included with bid on bid day. Material only bids will not be accepted. Bids received after the bid date shall be considered non-responsive and shall not be accepted.
- B. It is not the intent of this portion of the specifications to cover concrete, grouting, masonry work, plumbing, electrical work (power and control wiring), utility connections, final cleaning of glazing or counter flashing. This portion of the work shall be the responsibility of the General Contractor or his selected Subcontractors other than the Greenhouse Manufacturer.
- C. No masonry of foundation installation shall be made prior to approval of greenhouse drawings. Approved greenhouse drawings shall be used to make all masonry and foundation installations. Dimensions may vary slightly from contract drawings to accommodate manufacturer's standard, but total area shall not be less than 98% of that shown.
- D. Related Work Specified Elsewhere:
  - 1. Concrete floors, grouting of sills and base plates, and masonry walls: Division 03 and 04
  - 2. Plumbing rough-in work and hook-up of greenhouse plumbing systems, and downspouts described in this section: Division 22
  - 3. Electrical power wiring, environmental control system wiring, lighting, conduit and hook-ups of greenhouse electrical equipment provided under this section: Division 26

#### 1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer shall have a minimum of 5 years experience in fabrication and erection of glazed structures for similar projects.
- B. Installer Qualifications: Greenhouse installer shall have a minimum of 5 years experience in the erection of glazed structures for similar projects.

#### 1.7 DELIVERY, STORAGE AND HANDLING

- A. Protect materials during delivery, storage and handling to comply with manufacturer's directions and as required to prevent damage or deterioration.

### **PART 2 PRODUCTS**

#### 2.1 GREENHOUSE MANUFACTURER



- A. Must be a member, in good standing, of the National Greenhouse Manufacturer's Association (NGMA).
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Vail, Steel Greenhouse by Prospiant, Inc., (Basis of Design).
    - a) Contact: Park Pittman; (Mobile: 937-336-3366; Email: PPittman@prospiant.com).
  - 2. Ceres Greenhouse Solutions.
  - 3. Sun-Mate Greenhouses by Winandy Greenhouse Company.

## 2.2 GREENHOUSE

- B. Components
  - 1. Primary structural members shall be fabricated from square galvanized steel tubing with a minimum 45,000 p.s.i. tensile strength. No roll formed sections allowed.
  - 2. Aluminum extrusions used for bars, vents and other secondary framing members shall be 6063-T6 alloy.
  - 3. Roof trusses shall be factory welded using square galvanized tubing. Minimum sizing are 2" square, 15 ga. top and bottom chord and 1 ½" square, 18 ga. secondary members. Welds will be re-galvanized with a flame spray process. No painting of welded areas.
  - 4. Columns shall be fabricated from 4" square galvanized steel tubing.
  - 5. Truss to column connection will be made with a column cap and gutter saddle assembly made from Tenzaloy, a high strength alloy.
  - 6. Roof purlins shall be fabricated from 2" square 15 ga. galvanized steel tubing as a minimum. The purlins shall have a swaged end for a continuous purlin connection. Purlins shall be bolted to truss top chords. No screw attachments are allowed.
  - 7. Gutters shall be galvanized steel with a baked-on enamel paint on the exterior side as an extra coating. The gutter will be designed for water drainage only. No fixed truss or bow attachments are allowed.
  - 8. Horizontal and vertical framing shall be fabricated from 2" square, 15 ga. tube minimum.
  - 9. Glazing extrusions for structured sheeting shall be made of aluminum and consistent with manufacturer's standard shapes. A two-piece gasketed extrusion shall be used on roof areas and a one-piece extrusion on vertical areas. Extrusions are complete with necessary accessories for greenhouse construction.

## 2.3 MATERIALS

- A. Steel:
  - 1. Square Galvanized Tubing: ASTM A500
  - 2. Sheets: Roll Formed ASTM A36
  - 3. Plates: ASTM A36
- B. Aluminum:
  - 1. Extrusions: Alloy 6063-T6 or 6063-HS
  - 2. Sheet: Alloy 3003-H14.
  - 3. Plates: Alloy 6061-T6 or 6063-HS.
- C. Fasteners:
  - 1. Bolts: ASTM A307
  - 2. Self Drill Screws: AISI C 1022
  - 3. Self Tapping Cap Screws: AISI C 1018SS
  - 4. Anchor Bolts: ASTM A304 Stainless Steel All-Thread Rod with Epoxy Adhesive or Expansion Anchor
- D. Glazing:
  - 1. Glazing panels shall be 8mm clear twin wall polycarbonate.
  - 2. Panels shall be furnished in continuous sections on each slope of the roof and on sidewall and gable end areas.
- E. Glazing System:
  - 1. Glazing extrusions for structured sheeting shall be made of aluminum and consistent with Manufacturer's standard shapes.
  - 2. A two piece gasketed aluminum extrusion shall be used on roof areas. Glazing caps shall be

gasketed and extend in one piece from the eave to the ridge. One piece, non-gasketed, aluminum extrusions may be used on vertical areas.

3. Extrusions are to be provided and installed complete with necessary accessories for greenhouse construction.

F. Glazing Seals for Polycarbonate Covering:

1. External glazing tape shall be applied to the polycarbonate sheets as recommended by Manufacturer.
2. EPDM rubber gasket of type recommended by Manufacturer shall be installed in the glazing caps.
3. GE silicone sealant or equivalent shall be applied in accordance with Manufacturer's recommendations.

- G. Insect Screens (If applicable to project requirements): Provide aluminum frames with woven aluminum insect screen, 18x16 mesh with brushes at vent rack arm locations.

## 2.4 MECHANICAL EQUIPMENT

- A. Vents (If applicable to project requirements): Provide sash of size indicated on drawings, designed to open out in a continuous operation from end to end and with a weather tight hinge and weather tight fit between sash and vent header.

- B. Vent Motors (If applicable to project requirements): Motors to operate each vent indicated on drawings and as recommended by Manufacturer.

- C. Exhaust Fans (If applicable to project requirements): Fans will use heavy duty totally enclosed motors and be AMCA approved.

- D. Intake Shutters (If applicable to project requirements): Mechanically operated intake shutters of size indicated on drawings and as recommended by Manufacturer.

- E. Horizontal Airflow Fans (If applicable to project requirements): Mechanically operated fans indicated on drawings and as recommended by Manufacturer.

F. Heating Systems (If applicable to project requirements):

1. Unit Heaters: A minimum of an 80% high efficiency unit shall be used. A stainless-steel tubular heat exchanger with a 15 year warranty is required. The model shall use direct drive fans for air distribution.

- G. Energy/Shade Curtains (If applicable to project requirements): A truss to truss (or frame to frame), push/pull system using a rack and pinion drive will be used. The curtain will have a slope/flat/slope profile (can also be other profiles) following the roofline and creating an "attic" space above the middle of the house for energy efficiency. The curtain is to be supported by guidewires, not suspension hooks. No wire or cable drives are allowed.

## 2.5 FABRICATION

- A. Fabricate components in accordance with shop drawings. Shop fabricates to greatest extent practical to minimize field cutting, splicing, and assembly.

B. Welding:

1. Comply with recommendations of American Welding Society.
2. Welds shall be re-galvanized with a flame spray process, no painting of welded areas.

- C. Fabricate components to allow for accurate fit of joints and corners.

## PART 3 EXECUTION

### 3.1 PREPARATION

#### GLAZED STRUCTURES

- A. Examine areas and conditions under which greenhouse work is to be installed. Notify Contractor in writing of conditions detrimental to proper and timely installation of work.
- B. Coordinate and furnish anchorages, setting diagrams, templates and directions for installation of anchorages. Coordinated delivery of such items to project site.

### 3.2 ERECTION

- A. Drilling and setting of anchor bolts is to be by Greenhouse Installer.
- B. Erect greenhouse and related components in accordance with Manufacturer's written instructions and final shop and erection drawings.
- C. Greenhouse Installer is responsible for all unloading of greenhouse materials, systems, equipment and to provide any lift or installation equipment required.
- D. Greenhouse Installer shall have not less than 5 years experience installing work of similar size and scope.

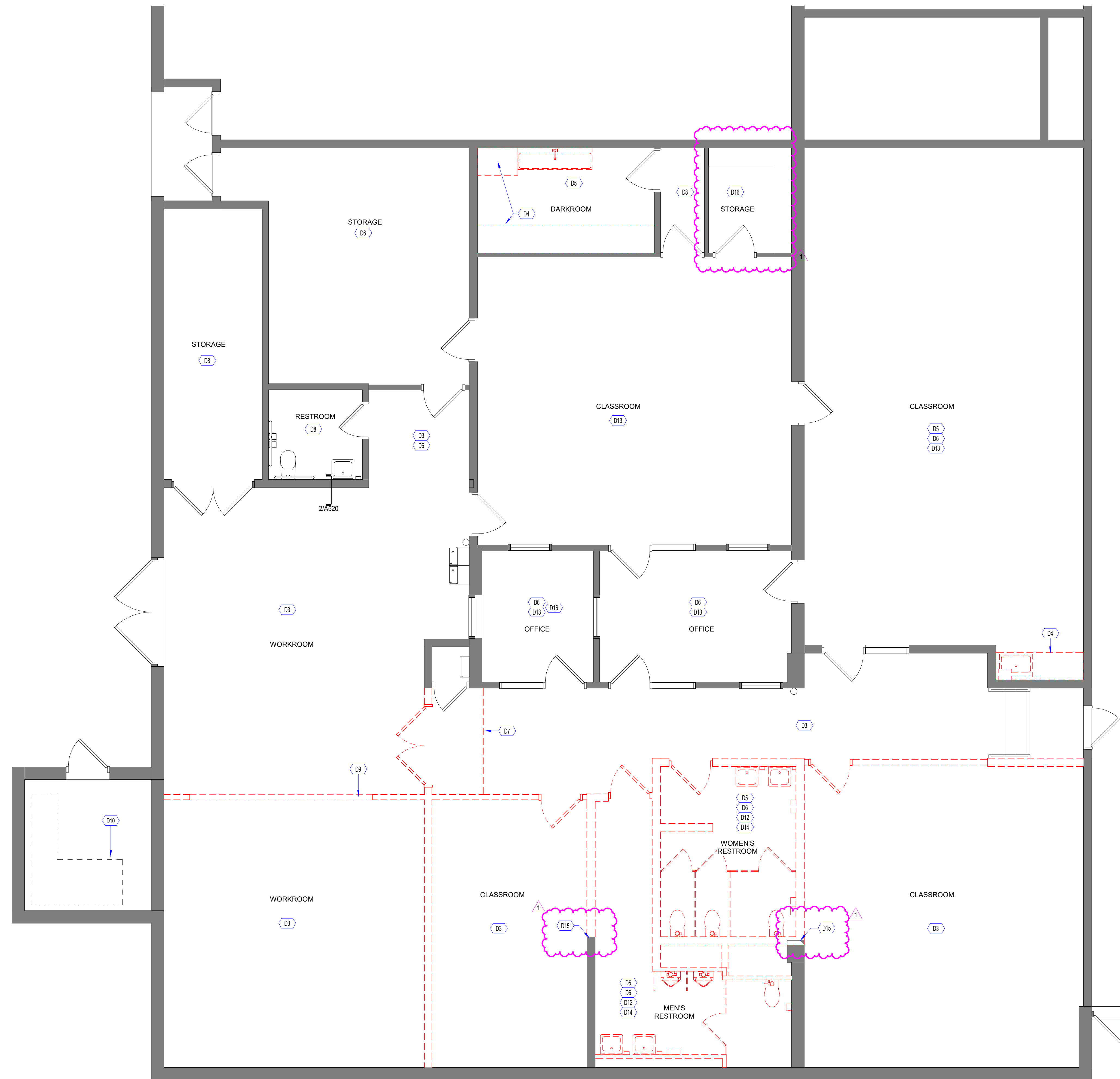
### 3.3 INSTALLATION OF EQUIPMENT

- A. General: Install equipment in accordance with Manufacturer's installation instructions and recognized industry practices to insure intended function.
- B. Equipment will be installed in place by the Greenhouse Installer.
- C. All mechanical connections (electrical or plumbing) will be performed by electrical, plumbing, or mechanical contractors.

### 3.4 WARRANTY

- A. Structural: All products manufactured by Greenhouse Manufacturer shall be new and guaranteed free from defects in material and workmanship for one year from customer receipt. (Manufacturer shall submit warranty for approval with bid.)
- B. Equipment: All supplied coverings and equipment will carry their manufacturer's respective warranties.

**END OF SECTION 13 34 10**



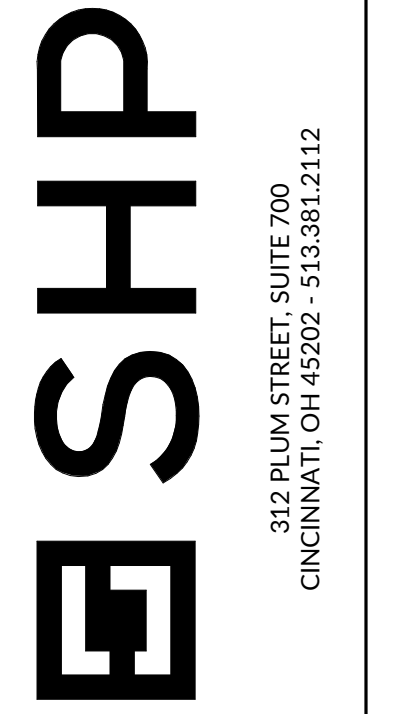
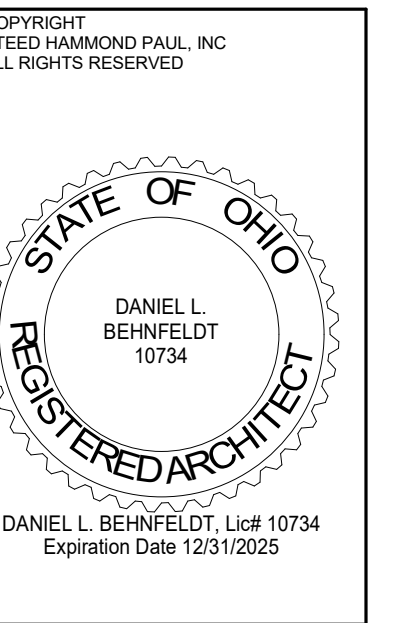
**1** FIRST FLOOR DEMO PLAN - AG ED SHOP  
AD101 1/4" = 1'-0"

**GENERAL NOTES - DEMOLITION PLAN**

- A. REPAIR EXISTING SURFACES WHERE DEMOLITION HAS OCCURED FOR NEW CONSTRUCTION. GENERAL TRADES CONTRACTOR SHALL PATCH/REPAIR WALL, FLOOR AND CEILING SURFACES AFFECTED BY DEMOLITION WORK. PATCHING/CUTTING OF EXISTING SURFACES FOR NEW WORK SHALL BE THE RESPONSIBILITY OF THE RESPECTIVE CONTRACTOR PERFORMING THE WORK. ALL REPAIRS SHALL MATCH EXISTING ADJACENT SURFACES IN MATERIAL, FINISH, TEXTURE, ETC. THIS WORK IS TO BE INCLUDED IN BASE BID AND IS NOT TO BE INCLUDED IN THE QUANTITY ALLOWANCE.
- B. UNLESS DIRECTED BY OWNER, ALL MISCELLANEOUS ITEMS ATTACHED TO FLOORS, WALLS, OR CEILINGS ARE TO BE REMOVED THAT INTERFERE WITH INSTALLATION OR ALIGNMENT OF NEW WORK. THIS INCLUDES BUT NOT LIMITED TO: SHELVES, BRACKETS, POSTERS, PAINTINGS, ART OR OTHER DISPLAYS, PROJECTION SCREENS, AND VISUAL DISPLAY BOARDS. OWNER WILL REMOVE ALL LOOSE FURNITURE/APPLIANCES IN ROOMS PRIOR TO THE COMMENCEMENT OF DEMOLITION.
- C. AT ALL EXISTING SURFACES SCHEDULED TO RECEIVE A NEW PAINT FINISH REMOVE ANY EXISTING FASTENERS, BRACKETS, ETC. IN WALLS THAT ARE NOT BEING USED AND PATCH TO MATCH EXISTING ADJACENT SURFACES IN MATERIALS, FINISH, TEXTURE, ETC. PATCH CHIPPED PAINT SURFACES ON PLASTER WALLS TO MATCH ADJACENT SURFACE TEXTURE. SAND CHIPPED EDGES ON WOOD AND METAL SURFACES SMOOTH.
- D. NOT ALL ROOM MATERIAL/FINISH DEMOLITION INDICATED. WHERE NEW MATERIAL/FINISH IS INDICATED IN ROOM FINISH SCHEDULE, REMOVE EXISTING MATERIALS/FINISH INCLUDING FLOOR AND BASE. ADHESIVES/MASTICS, FLOOR SEALERS AND CURING COMPOUNDS, AND FLOOR PAINT WHETHER OR NOT SHOWN TO BE REMOVED ON DEMOLITION FLOOR PLANS.
- E. REFER TO PLUMBING, MECHANICAL, AND ELECTRICAL DRAWINGS FOR ADDITIONAL ITEMS TO BE DEMOLISHED.
- F. REMOVE EXISTING WOOD BASE WHERE NEW CASEWORK EXTENDS TO FLOOR.
- G. WHERE FLOOR SLABS TO REMAIN ARE DISCONTINUOUS AT WALLS AND PARTITIONS NOTED TO BE REMOVED, REMOVE WALL/PARTITION TO BELOW FLOOR SLAB AND PATCH SLAB THROUGH OPENING.
- H. WHERE NEW OPENINGS OCCUR WHERE EXISTING WALLS HAVE BEEN REMOVED, FEATHER CEMENT-BASED UNDERLAYMENT AT A DISTANCE OF 8 FEET FROM EACH JAMB TO PROVIDE A SMOOTH TRANSITION BETWEEN EXISTING FLOOR FINISHES ON EACH SIDE OF THE OPENING. FLOOR SURFACE SHALL BE FLAT WITHIN 3/16" IN 10 FEET IN ACCORDANCE WITH ASTM F710.
- I. THE GENERAL CONTRACTOR SHALL HIRE A STATE OF OHIO LICENSED ASBESTOS ABATEMENT CONTRACTOR TO REMOVE ALL VINYL ASBESTOS TILE AND ALL MASTIC RELATED TO THE TILE AND RESILIENT BASE. ALL POTENTIALLY ASBESTOS CONTAINING MATERIALS SHALL BE REMOVED IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS. THREE COPIES OF THE ASBESTOS ABATEMENT REPORT COMPLETED BY THE ABATEMENT CONTRACTOR SHALL BE PROVIDED TO THE OWNER. THE REPORT MUST BE PREPARED IN FULL COMPLIANCE WITH OAC 3746-29 WHICH INCORPORATES THE NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP) CODIFIED UNDER 40 CFR 61.140-61.157.

**KEY NOTES - DEMOLITION PLANS**

- D3 REMOVE FLOORING, BASE, AND ADHESIVES
- D4 REMOVE CASEWORK
- D5 REMOVE ALL PLUMBING FIXTURES IN ROOM
- D6 REMOVE CEILING, LIGHT FIXTURES, AND OTHER CEILING DEVICES
- D7 REMOVE METAL GATE AND FRAME
- D8 NO WORK, THIS ROOM
- D9 REMOVE PARTITION WITH ACCORDIAN DOOR
- D10 REMOVE DUST COLLECTION SYSTEM. PATCH FLOOR.
- D12 REMOVE RESINOUS FLOORING AND BASE AS REQUIRED TO ALLOW FOR NEW RESINOUS FLOORING
- D13 REMOVE HAZARDOUS MATERIAL FLOORING, REFER TO SPECIFICATIONS FOR MORE INFORMATION
- D14 REMOVE WALL TILE ENTIRELY AT WALLS SHOWN TO REMAIN
- D15 REMOVE CMU AS NEEDED TO TOOTH IN NEW BULLNOSE CMU
- D16 REMOVE ALL WOOD SHELVING.



JEFFERSON TOWNSHIP HIGH SCHOOL  
**AGRICULTURE EDUCATION FACILITY**  
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 JEFFERSON TOWNSHIP LOCAL SCHOOL DISTRICT  
 2625 SOUTH UNION ROAD, DAYTON OH 45417

**ISSUANCES**

03-01-24	DESIGN DEVELOPMENT
04-09-24	10% CD
A 04-18-24	BID/PERMIT SET
1 05-02-24	ADDENDUM 1

FIRST FLOOR DEMO PLAN - AG ED SHOP

COMM NO. 2024006.01

AD101



**ISSUANCES**

03-01-24	DESIGN DEVELOPMENT
04-09-24	100% CD
04-18-24	BID/PERMIT SET
05-02-24	ADDENDUM 1

- FLOOR PLAN LEGEND**
- NO WORK THIS AREA
  - NEW WALL/PARTITION
  - EXISTING CONSTRUCTION TO REMAIN
  - NEW DOOR AS SCHEDULED
  - EXISTING DOOR AND FRAME TO REMAIN

- GENERAL NOTES - FLOOR PLAN**
- A. SEE A001 FOR SYMBOLS LEGEND.
  - B. ALL PARTITIONS TYPE M1 UNLESS NOTED OTHERWISE.
  - C. ALL DIMENSIONS ARE TO FACE OF MASONRY, FACE OF STUD, OR FACE OF EXISTING FINISH UNLESS NOTED OTHERWISE.
  - D. SEE PLANS FOR BOARD LOCATIONS/DIMENSIONS - IF A BOARD IS NOT DIMENSIONED IT SHOULD BE CENTERED ON THE WALL.

- KEY NOTES - FLOOR PLAN**
- A7 ALIGN FINISH FACE
  - A8 PROVIDE WALL PROTECTION (WP-1) AT ENTIRE LENGTH OF THIS WALL
  - A15 TOOTH IN NEW CMU FULL HEIGHT OF WALL WHERE EXISTING CMU WALL IS DEMOLISHED
  - A16 18 GA. STAINLESS STEEL SHEET METAL SHROUD TO PROTECT EXISTING PLUMBING SUPPLY LINE. EXTEND HORIZONTALLY AS INDICATED. EXTEND VERTICALLY TO 5'-0" ABOVE THE FLOOR (BELOW VALVE). ATTACH TO FLOOR AND WALL WITH TAPCONS 10" OC MIN.
  - A17 EXISTING PLUMBING SUPPLY LINE TO REMAIN

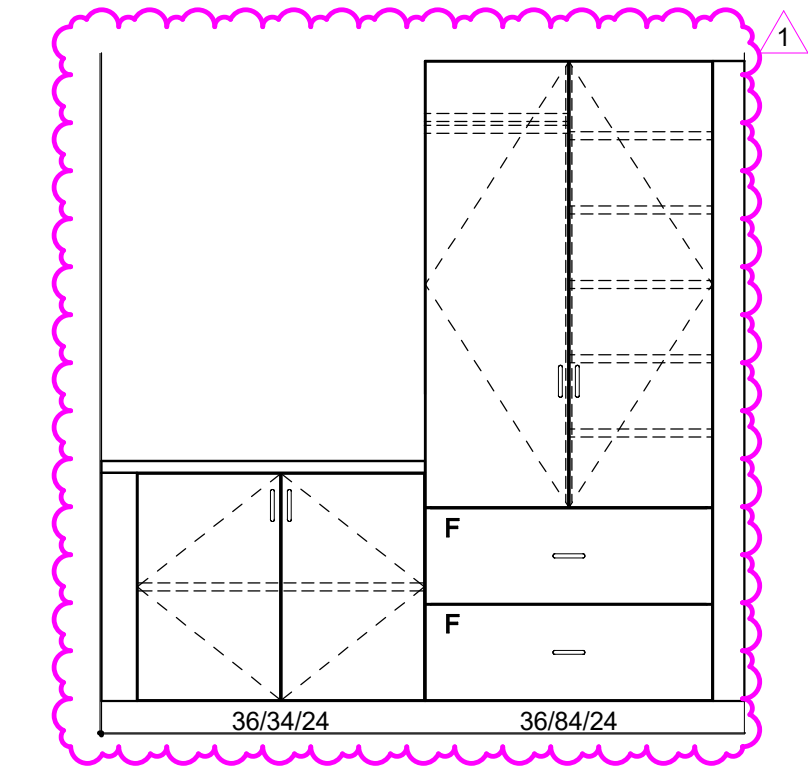
- KEY NOTES - SHOP EQUIPMENT**
- SE1 MITER SAW WITH ROLLING MITER STAND (NIC)
  - SE2 DRILL PRESS (NIC)
  - SE3 LINCOLN POWER MIG (NIC)
  - SE4 CANTILEVER RACK SINGLE SIDED - 48"W X 33"D X 6'H, (NIC)
  - SE5 DUST COLLECTOR (NIC)
  - SE6 BAND SAW (NIC)
  - SE7 GRINDER (NIC)
  - SE8 SANDER (NIC)
  - SE9 PLANER (NIC)
  - SE10 PRO WELDING BENCH - 36" X 24" (NIC)
  - SE11 AIR COMPRESSOR (NIC)
  - SE12 METAL BAND SAW (NIC)
  - SE13 TABLE SAW (NIC)
  - SE14 STORAGE CABINET 36" X 24" X 71 3/4" (NIC)
  - SE15 WORK BENCH - BASIS OF DESIGN: GLOBAL WG183410 INDUSTRIAL WORK BENCH - 72"X36"X36"X4" (NIC)
  - SE16 GLOBAL FLAMMABLE CABINET - 34"W X 34"D X 65"H (NIC)
  - SE17 WORK BENCH - BASIS OF DESIGN: GLOBAL WGB336118 FOUR STATION WORK BENCH (NIC)
  - SE18 ROUND STOOL - BASIS OF DESIGN: ZORO.COM G4759921 - HEIGHT RANGE 25" TO 33" (NIC)
  - SE21 QUENCH TANK
  - SE22 WELDING BOOTH WITH CURTAIN ROD AND CURTAIN

- KEY TO CASEWORK NUMBERS**
- LETTER INDICATES CASEWORK TYPE:  
 (L= LABORATORY, M=MUSIC, NO DESIGNATION INDICATES STANDARD EDUCATIONAL CASEWORK)  
 INDICATES ADA ACCESSIBLE CABINET
- L 36/72/30 WIDTH/HEIGHT/DEPTH (NOMINAL DIMENSIONS BASED ON CABINET WITH COUNTERTOP)  
 ADA

- GENERAL NOTES - CASEWORK**
- D. ALL PLASTIC LAMINATE CASEWORK TO BE PLAM-1 UNLESS NOTED OTHERWISE. ALL PLASTIC LAMINATE COUNTERTOPS TO BE PLAM-2
  - H. UNLESS NOTED OTHERWISE, ALL SHELVES ARE TO BE ADJUSTABLE UNLESS A FIXED SHELF IS REQUIRED FOR CABINET STABILITY.
  - J. DRAWERS WITH AN "F" ON THEM ARE TO BE FILE DRAWERS. SIZE DRAWER AND PROVIDE HARDWARE FOR FRONT-TO-BACK LETTER-SIZE FILING.

**FINISH LISTING - LAMINATES**

PLAM-1	WILSONART, FOSSIL SHALE D504-60
PLAM-2	WILSONART, PEARL SOAPSTONE 4886-60

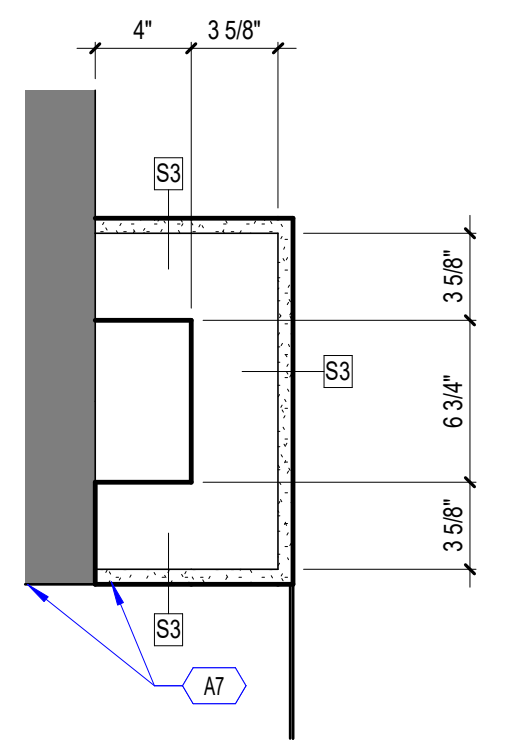


**2 1102 CLASSROOM**  
 A101 1/2" = 1'-0"

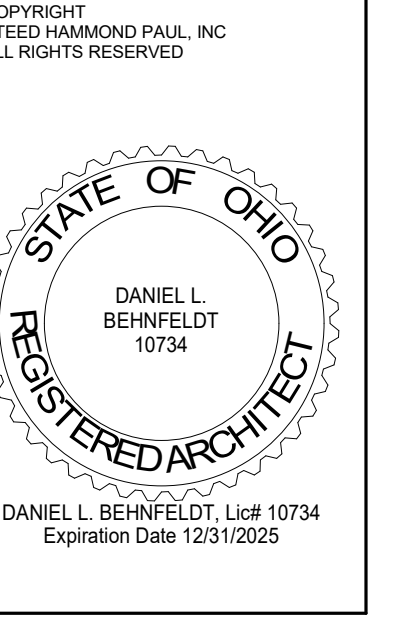


**1 FIRST FLOOR PLAN - AG ED SHOP**  
 A101 1/4" = 1'-0"

**3 PLAN DETAIL - PLUMBING CHASE**  
 A101 1 1/2" = 1'-0"







**SHP**  
312 PLUM STREET, SUITE 700  
CINCINNATI, OH 45202 - 513.981.2112

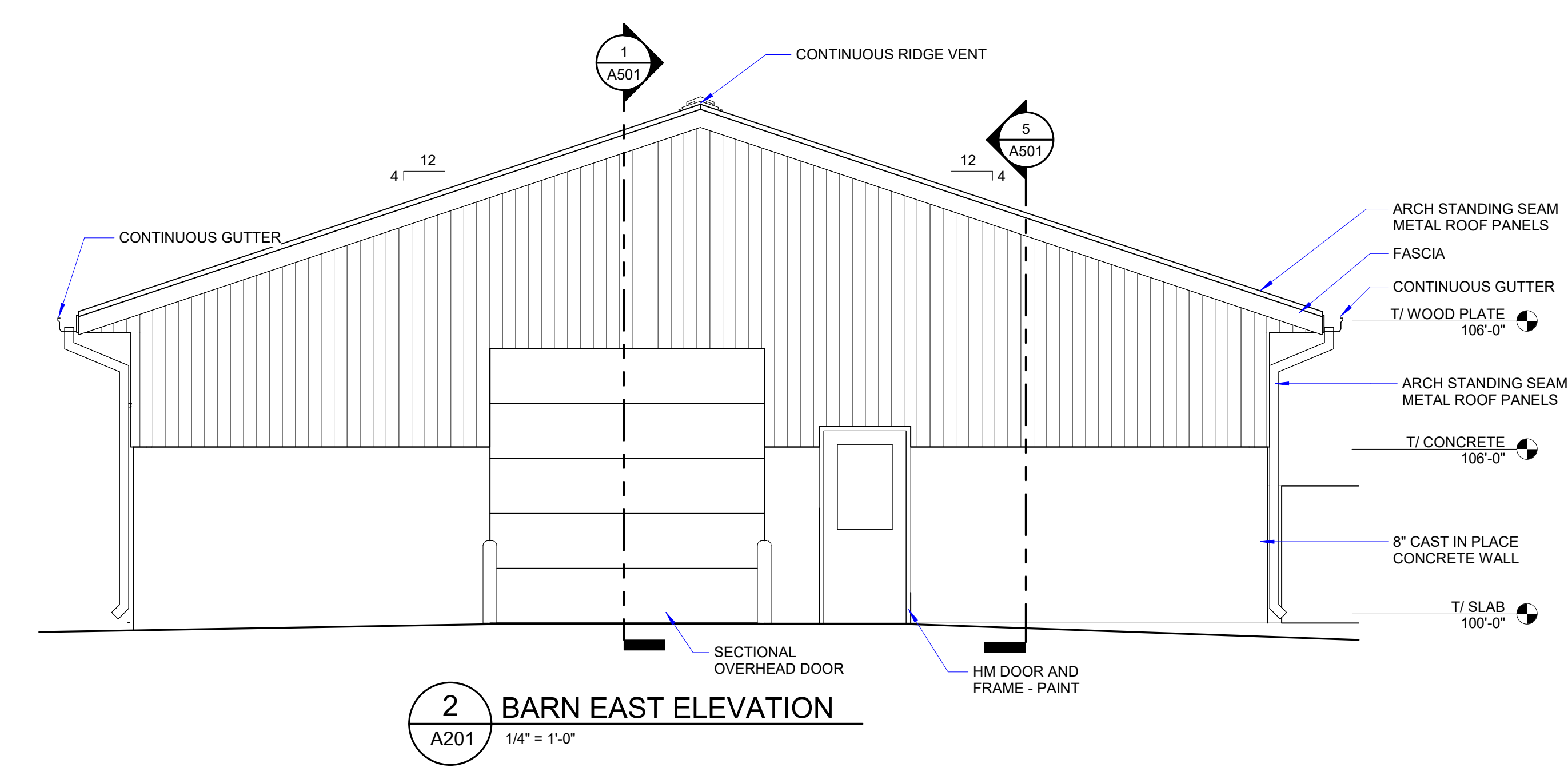
**JEFFERSON TOWNSHIP HIGH SCHOOL  
AGRICULTURE EDUCATION FACILITY**  
2701 SOUTH UNION ROAD, DAYTON OH 45417  
**JEFFERSON TOWNSHIP LOCAL SCHOOL DISTRICT**  
2625 SOUTH UNION ROAD, DAYTON OH 45417

ISSUANCES	
03-01-24	DESIGN DEVELOPMENT
04-09-24	10% CD
A 04-18-24	BID/PERMIT SET
1 05-02-24	ADDENDUM 1

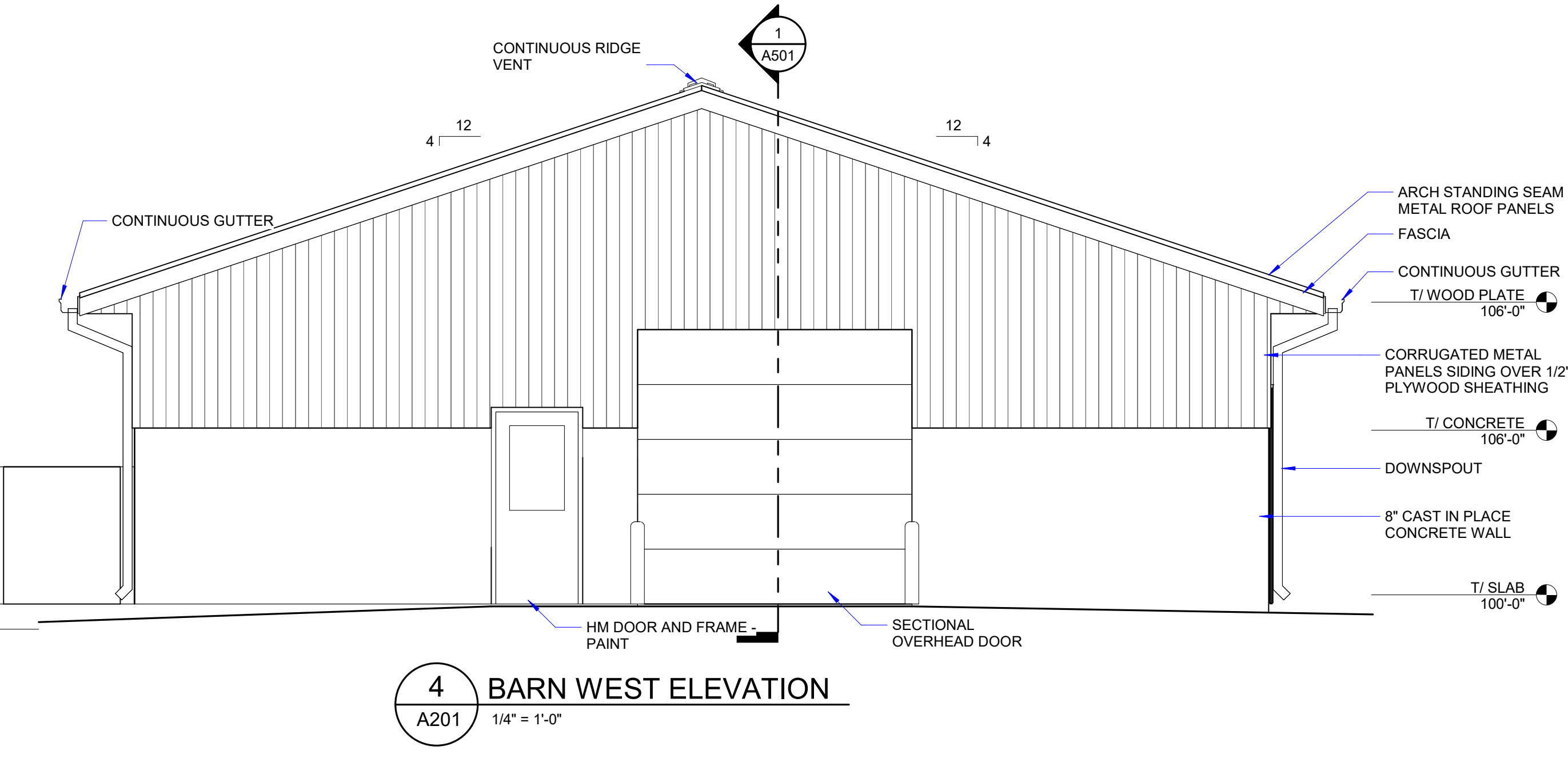
**EXTERIOR ELEVATIONS**

COMM NO. 2024006.01

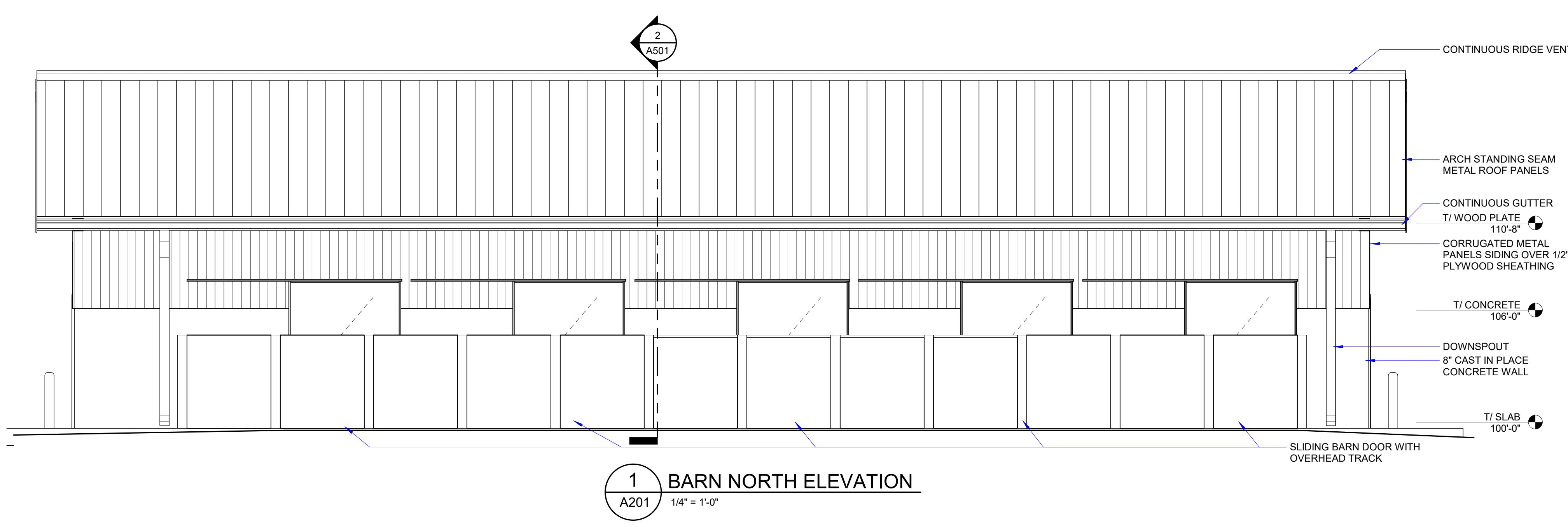
**A201**



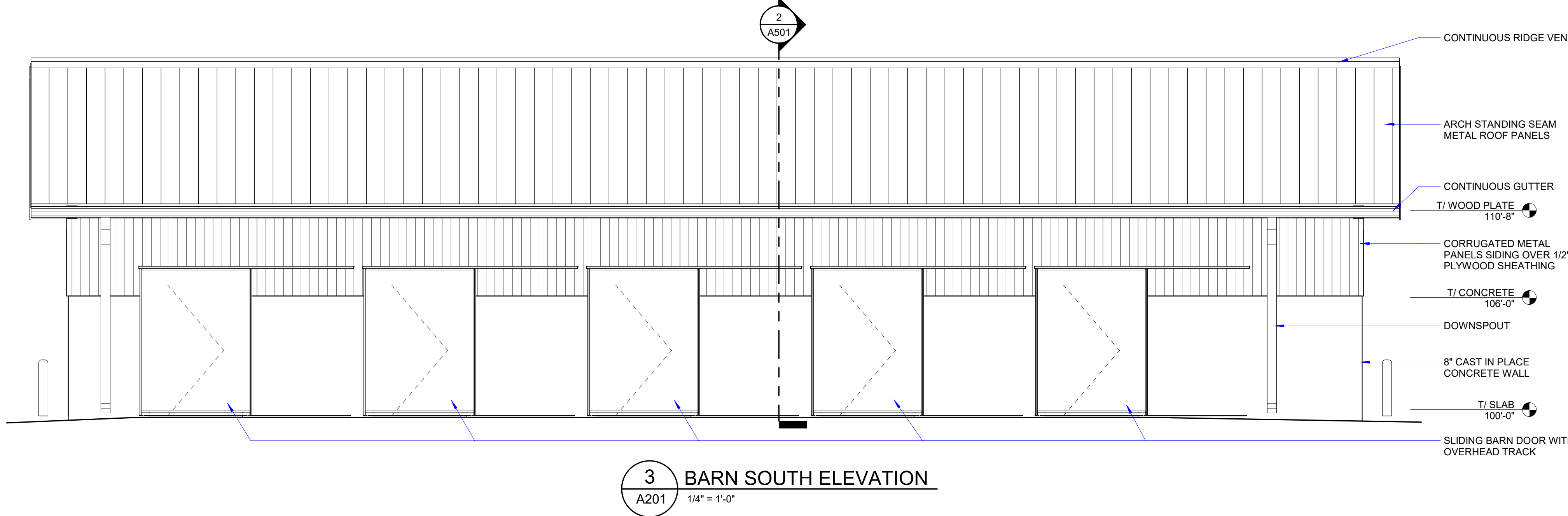
**2 BARN EAST ELEVATION**  
A201 1/4" = 1'-0"



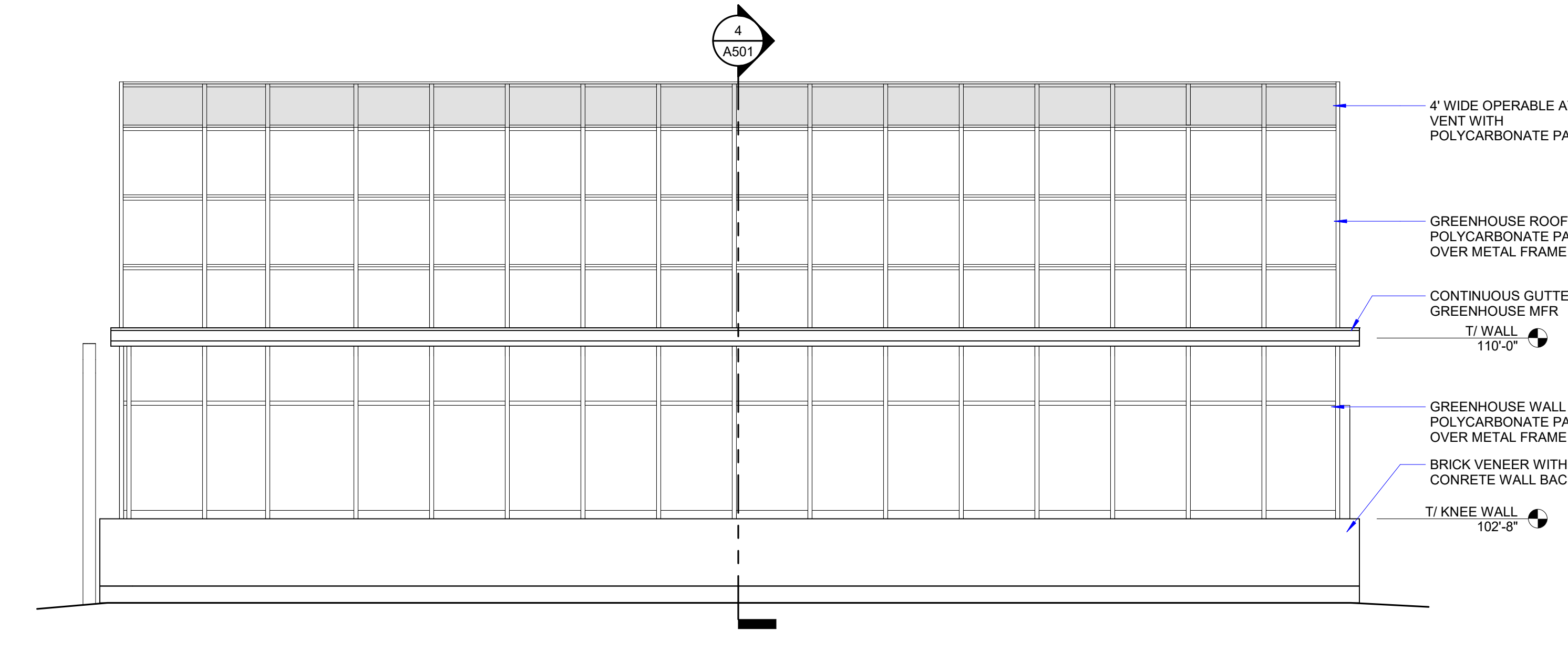
**4 BARN WEST ELEVATION**  
A201 1/4" = 1'-0"



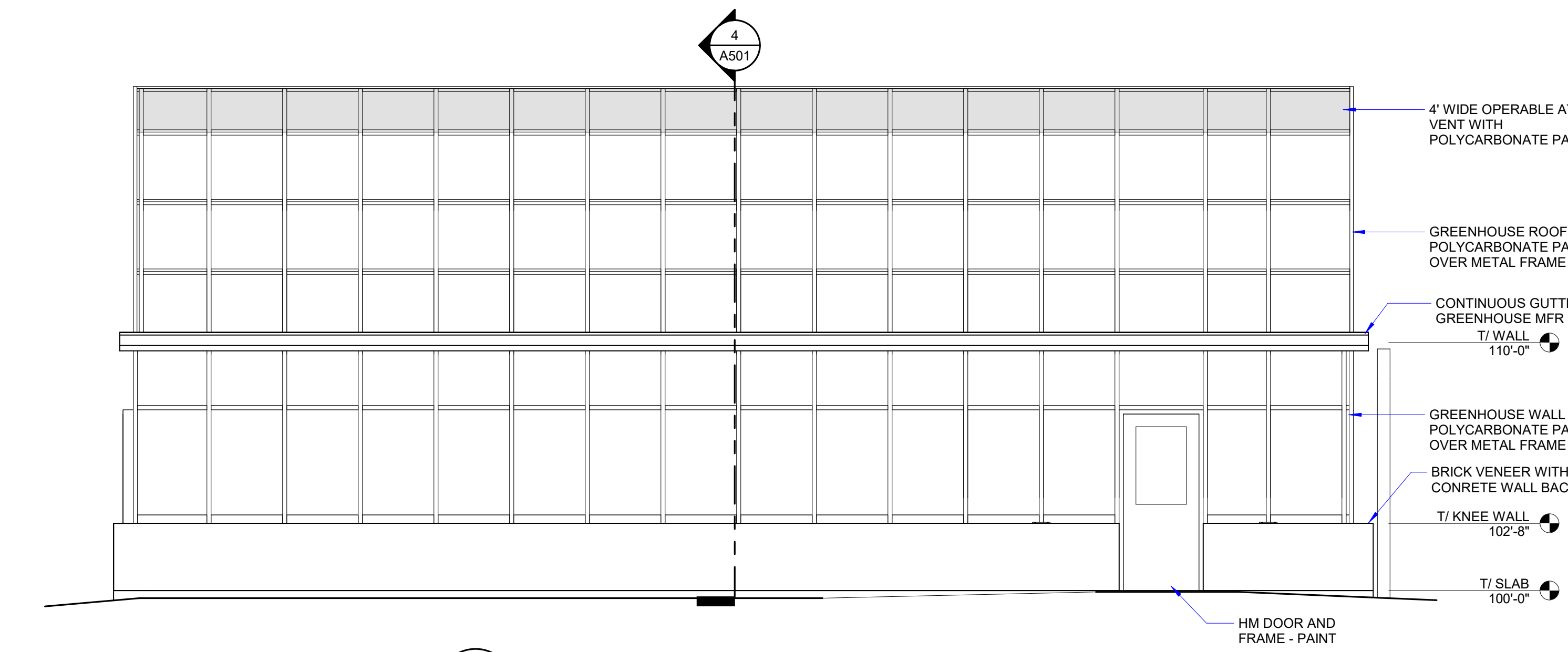
**1 BARN NORTH ELEVATION**  
A201 1/4" = 1'-0"



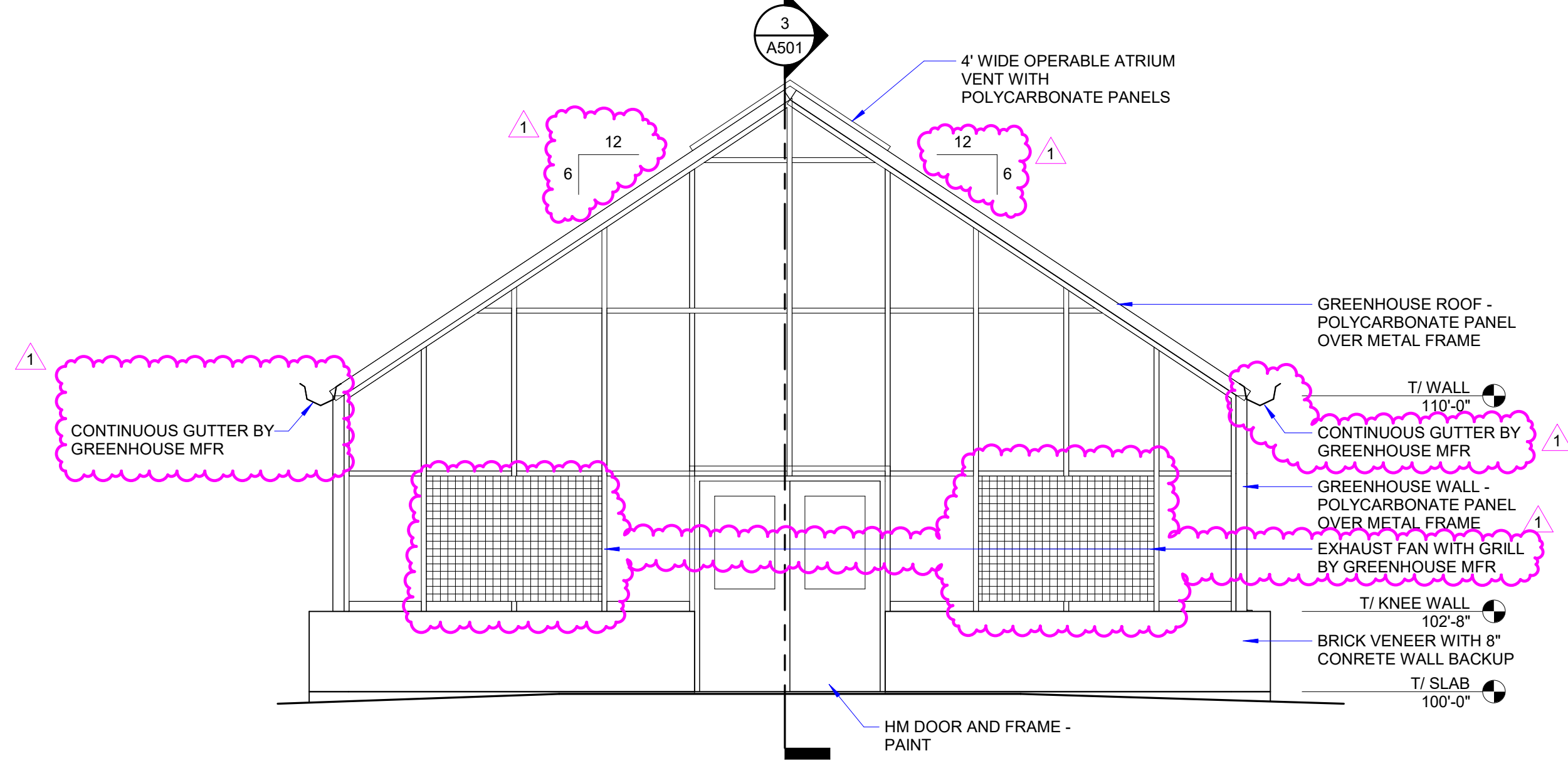
**3 BARN SOUTH ELEVATION**  
A201 1/4" = 1'-0"



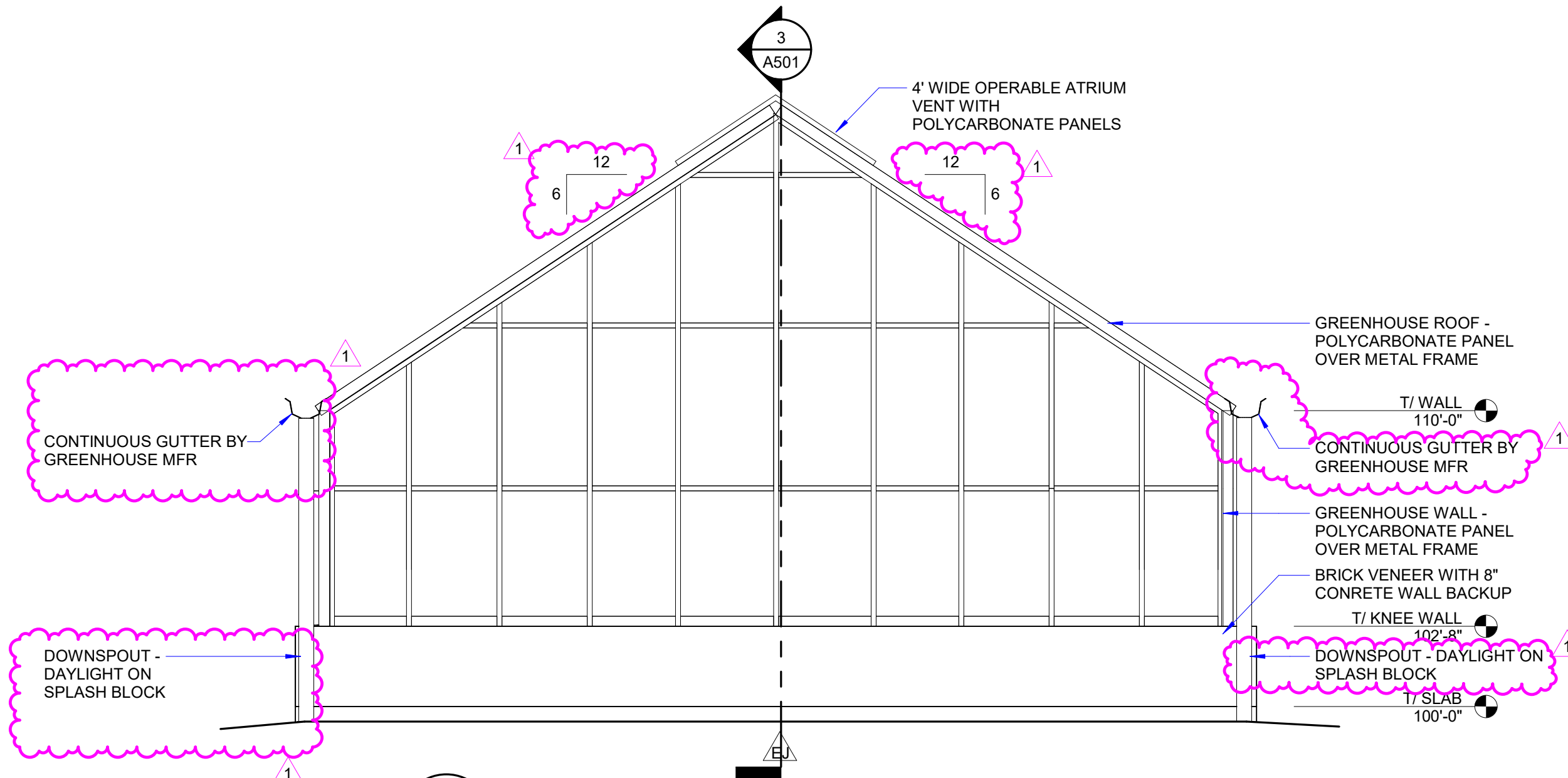
**6 GREENHOUSE EAST ELEVATION**  
A201 1/4" = 1'-0"



**8 GREENHOUSE WEST ELEVATION**  
A201 1/4" = 1'-0"



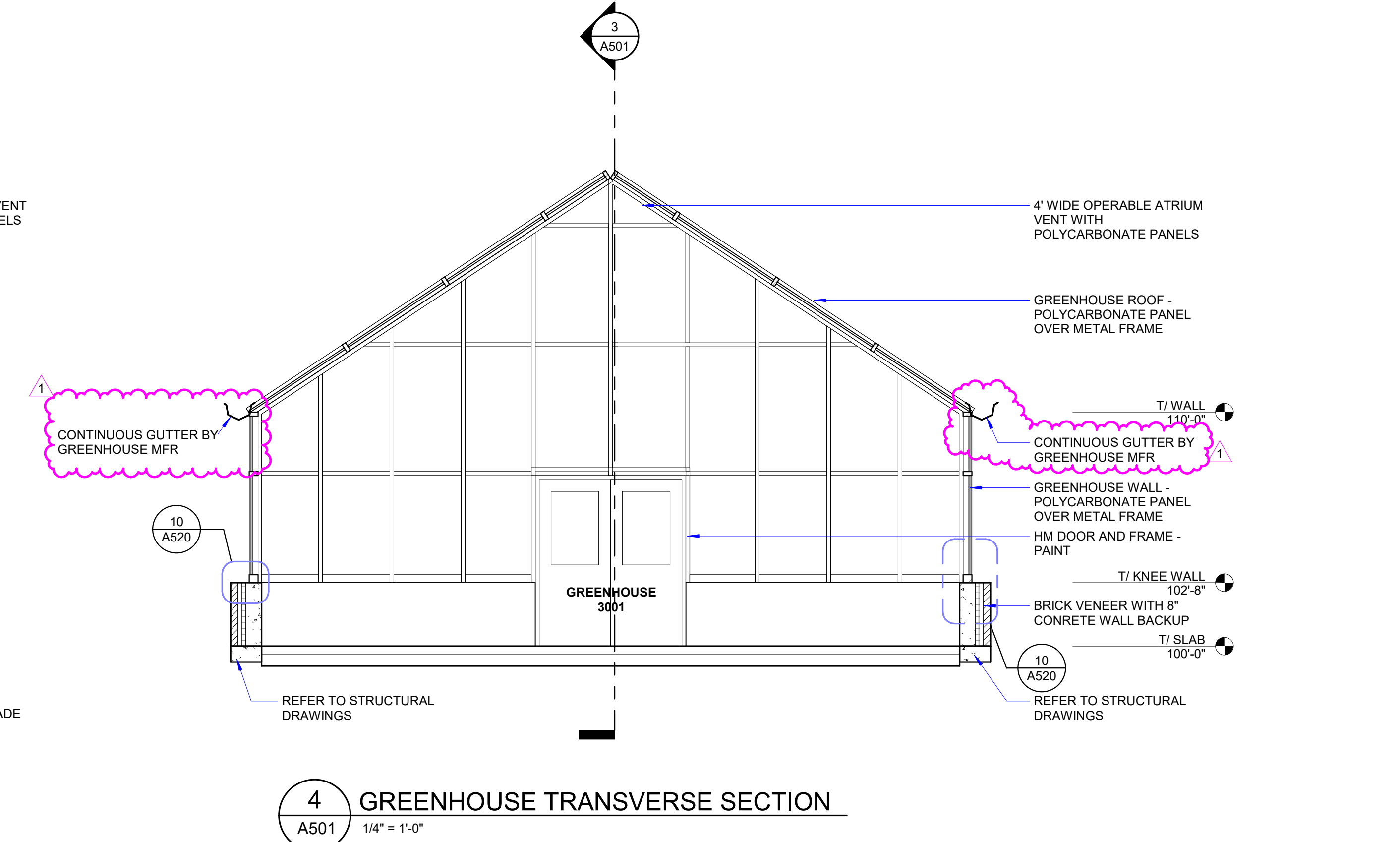
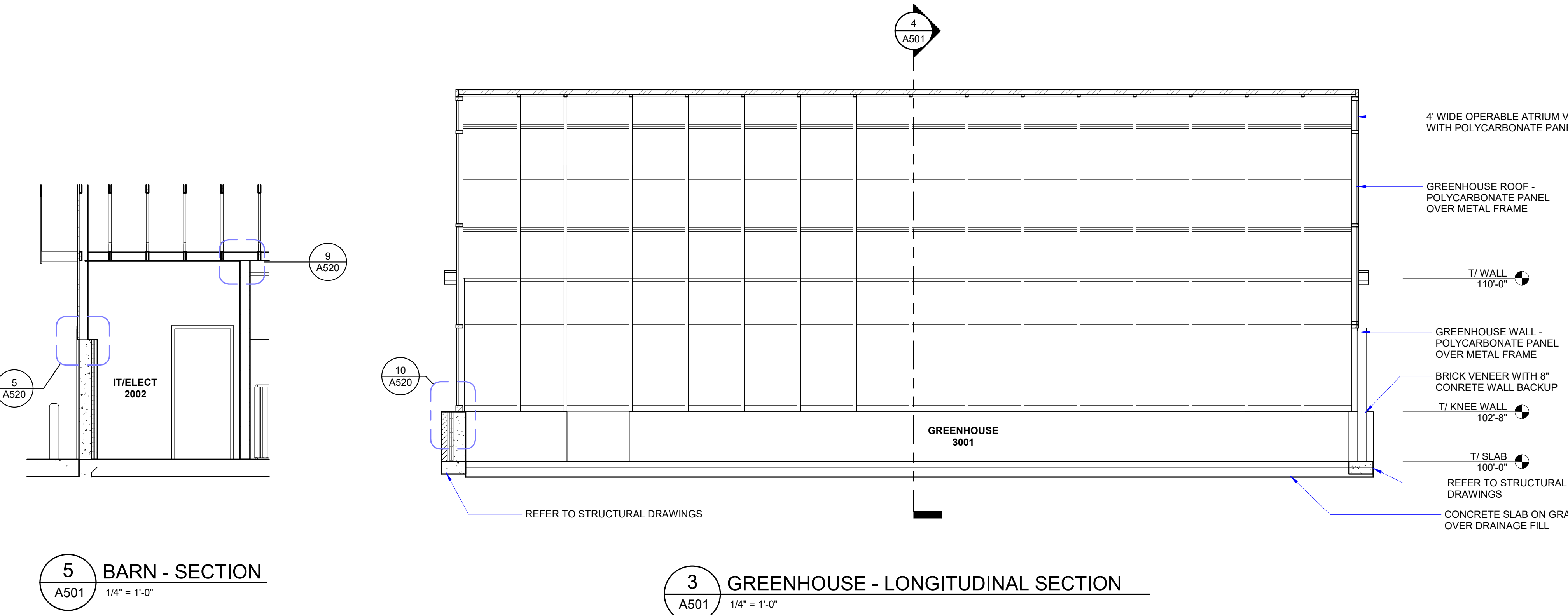
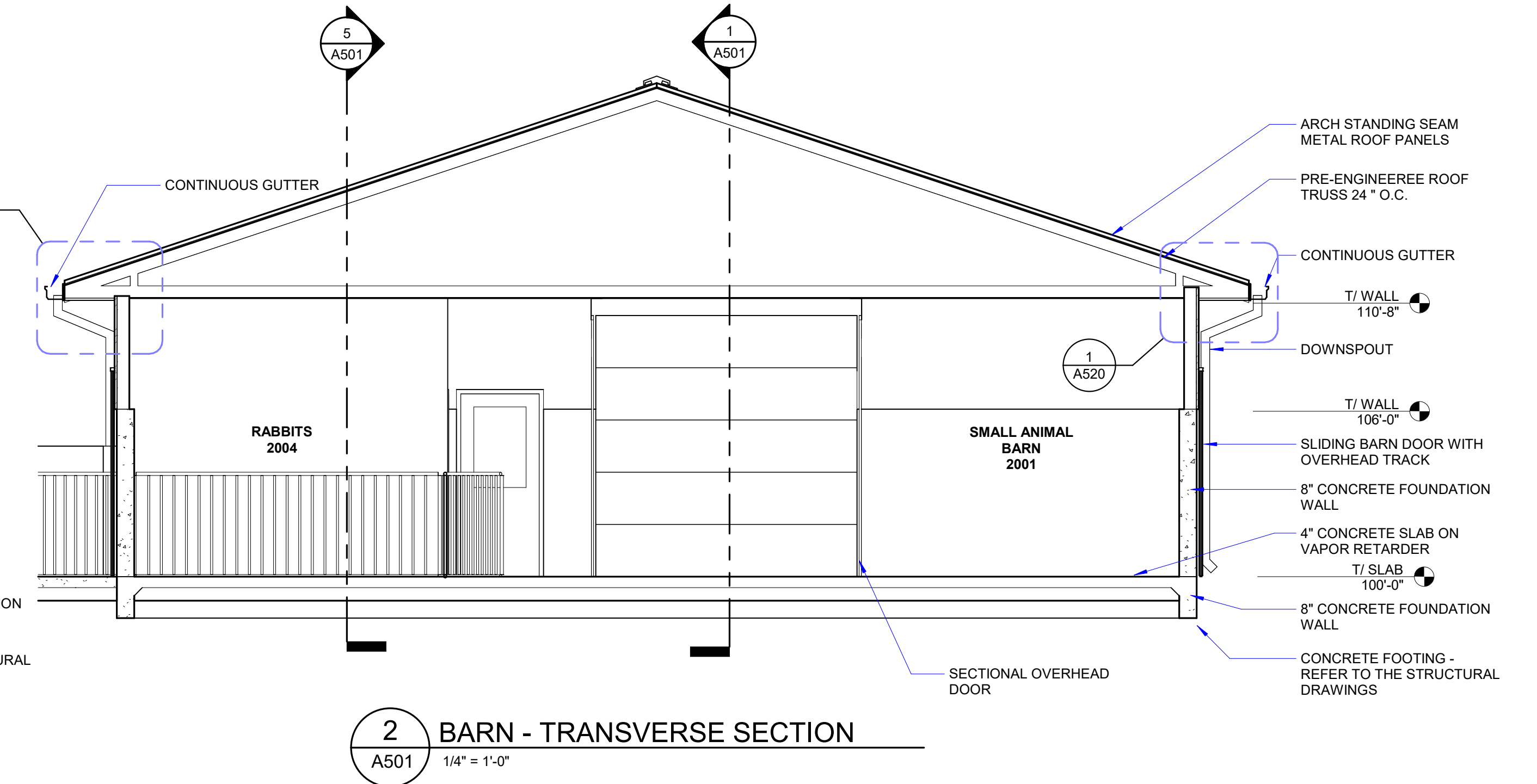
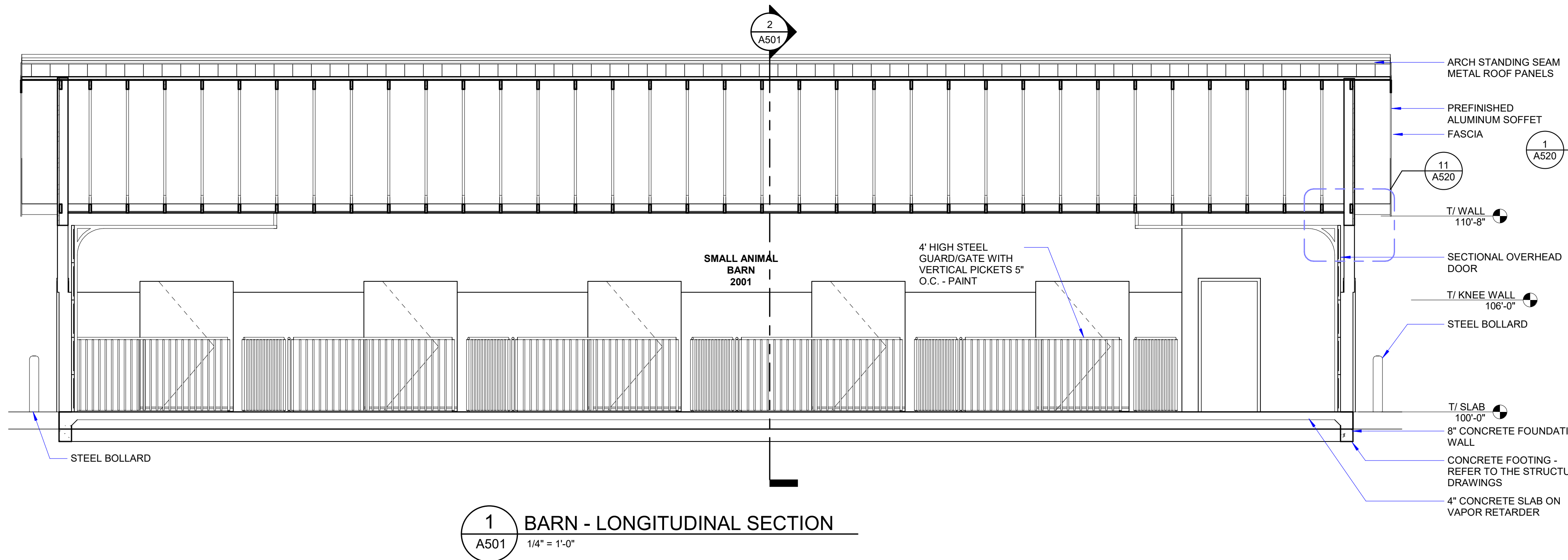
**5 GREENHOUSE NORTH ELEVATION**  
A201 1/4" = 1'-0"



**7 GREENHOUSE SOUTH ELEVATION**  
A201 1/4" = 1'-0"

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1'-0" REFERENCE LINE



**ISSUANCES**

03-01-24	DESIGN DEVELOPMENT
04-09-24	10% CD
A 04-18-24	BID/PERMIT SET
1 05-02-24	ADDENDUM 1

**BUILDING SECTIONS**

COMM NO.	2024006.01
<b>A501</b>	

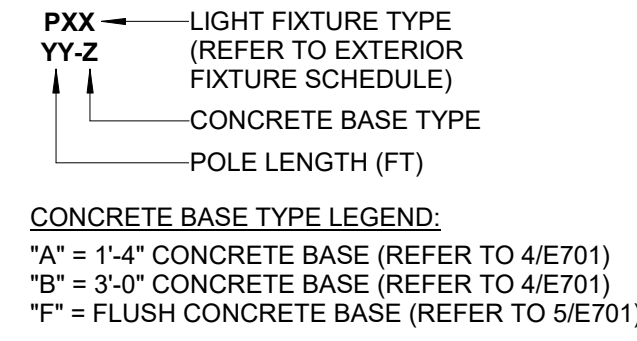


**LIGHTING FIXTURE LEGEND**

**LIGHTING FIXTURE TAGS**

- CAPITAL LETTER WITH NUMBER DENOTES FIXTURE TYPE - REFER TO LIGHT FIXTURE SCHEDULE BELOW.
- SMALL LETTER DENOTES SWITCH LEG/RELAY NUMBER - REFER TO E100 SERIES DRAWINGS FOR TYPICAL ROOM LAYOUTS.

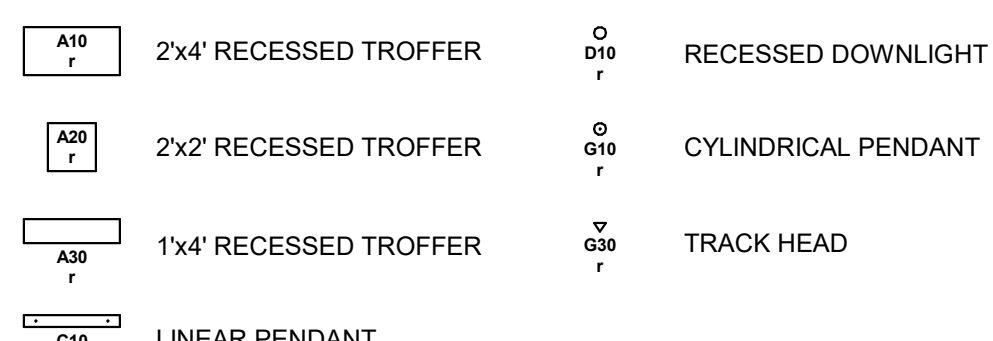
**EXTERIOR LIGHTING FIXTURE TAGS**



**CONCRETE BASE TYPE LEGEND:**  
 "A" = 1'-4" CONCRETE BASE (REFER TO 4/E701)  
 "B" = 3'-0" CONCRETE BASE (REFER TO 4/E701)  
 "F" = FLUSH CONCRETE BASE (REFER TO 5/E701)

**EXAMPLE TAG:**  
 P20 | P20 LIGHT FIXTURE W/ A 25FT POLE ON A 3FT CONCRETE BASE

**STANDARD LIGHTING FIXTURE SYMBOLS**



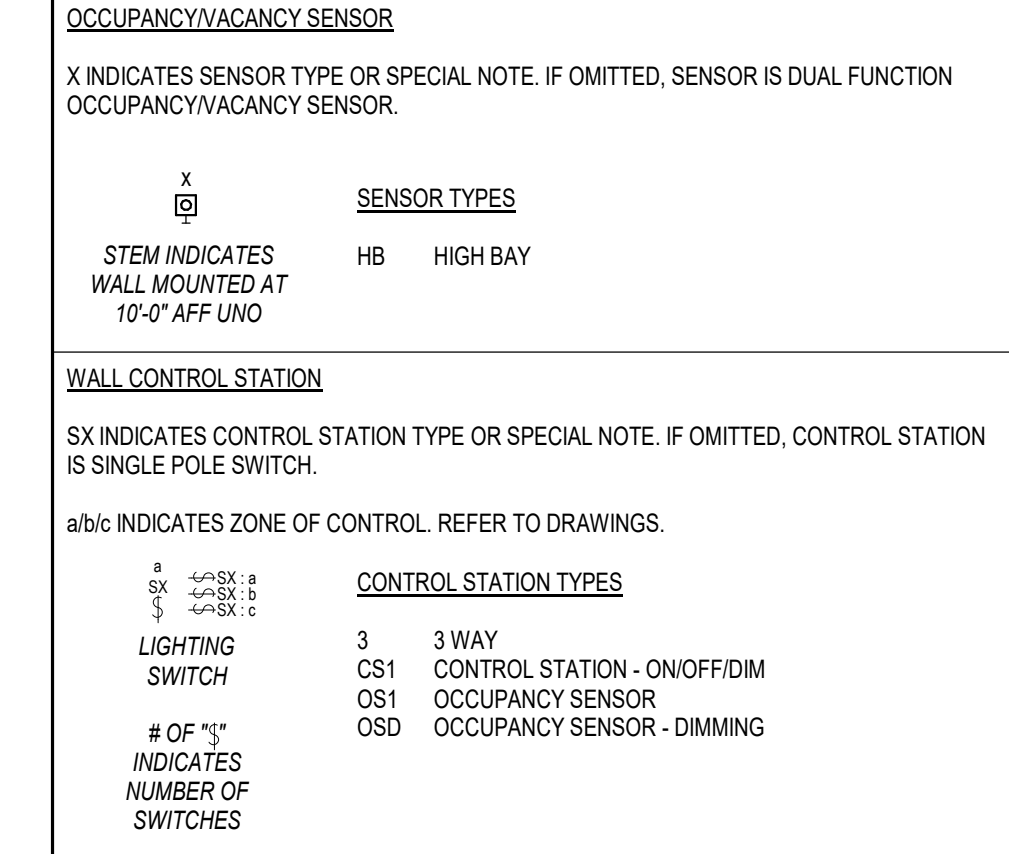
**EMERGENCY LIGHTING FIXTURES**

- GRAY FILLED IN AREA DENOTES EMERGENCY FIXTURE
- CONNECT TO EMERGENCY POWER CIRCUIT AHEAD OF SWITCHING.
- NL DENOTES NIGHT LIGHT.

**GENERAL NOTES - LIGHTING FIXTURES**

- ALL FIXTURES MARKED 'ED' ARE EXISTING TO BE DEMOLISHED. VERIFY SERVING PANEL AND CIRCUIT NUMBER PRIOR TO DISCONNECTION. REMOVE LIGHTING BRANCH CIRCUITING ABOVE FINISHED CEILING. MAINTAIN HOME RUN CONDUIT FOR CONNECTION TO NEW FIXTURES.
- ALL FIXTURES MARKED 'ER' WITHIN AREA OF WORK ARE EXISTING TO REMAIN.
- ALL FIXTURES MARKED 'ERL' WITHIN AREA OF WORK ARE EXISTING TO BE RELOCATED. FIXTURES SHALL BE CLEANED AND RELAMPED.
- REFER TO LIGHTING CONTROL SCHEMATICS AND LIGHTING CIRCUIT SCHEDULES ON E500 SERIES DRAWINGS.

**LIGHTING CONTROL SYMBOL LEGEND**



LIGHT FIXTURE SCHEDULE - INTERIOR														
FIXTURE TYPE	FIXTURE BASIS OF DESIGN	ALTERNATE MANUFACTURERS	FIXTURE DESCRIPTION	LAMP	LIGHT DISTRIBUTION	MIN LUMEN OUTPUT	COLOR TEMPERATURE	MIN CRI	DRIVER	VOLTAGE	MAX WATTAGE	MOUNTING METHOD	REG OCCUPIED SPACE	TYPE COMMENTS
A30	LITHONIA CPANL	COLUMBIA CFP, LSI SFP, PHILIPS FXP, RAB EZPAN	RECESSED TROFFER, FLAT PANEL, EDGE-LIT, STEEL CONSTRUCTION, DLC RATED, 2' x 4' x 2'-1/4"	LED	STANDARD	3000 lm	4000 K	80	LED DRIVER WITH 0-10V DIMMING	120 V	29 VA	CEILING GRID		
A32	LITHONIA CPANL	COLUMBIA CFP, LSI SFP, PHILIPS FXP, RAB EZPAN	RECESSED TROFFER, FLAT PANEL, EDGE-LIT, STEEL CONSTRUCTION, DLC RATED, 2' x 4' x 2'-1/4"	LED	STANDARD	4800 lm	4000 K	80	LED DRIVER WITH 0-10V DIMMING	120 V	45 VA	CEILING GRID		
A33	LITHONIA CPANL	COLUMBIA CFP, LSI SFP, PHILIPS FXP, RAB EZPAN	RECESSED TROFFER, FLAT PANEL, EDGE-LIT, STEEL CONSTRUCTION, DLC RATED, 2' x 4' x 2'-1/4"	LED	STANDARD	6000 lm	4000 K	80	LED DRIVER WITH 0-10V DIMMING	120 V	50 VA	CEILING GRID		
C31	COOPER SKYBAR	LUMINATION ELEMENTAIRE LUX BASELINE ELAPPROVED EQUALS	LINEAR PENDANT, COLOR TO BE SELECTED BY ARCHITECT, 4" WIDE x 8" LONG	LED	WIDE	6000 lm	4000 K	80	LED DRIVER WITH 0-10V DIMMING	120 V	52 VA	CABLE MOUNTED		MOUNT AT HEIGHT SHOWN ON PLANS.
D50	COLUMBIA LIGHTING VTH	APPROVED EQUALS	CEILING MOUNTED VAPORITTE, CLASS 1 DIV. 2 RATED	LED	STANDARD	3000 lm	4000 K	70	LED DRIVER	120 V	25 VA	CEILING SURFACE		
E10	DUAL-LITE L22	BARRON LED-80, LSI EAS, LITHONIA ELM2, SURE-LITES SEL25	EMERGENCY LIGHT, DUAL HEAD, THERMOPLASTIC, WHITE FINISH, INTEGRAL BATTERY PACK	LED	N/A				N/A	120 V	6 VA	CEILING / WALL MOUNTED		
F20	LITHONIA WL4	COLUMBIA MPS4, LSI SDL, METALUX 4SNLED, PHILIPS FSSEZ	INDUSTRIAL LINEAR STRIP, STEEL HOUSING, 4" LONG	LED	STANDARD	4000 lm	4000 K	80	LED DRIVER	120 V	40 VA	CEILING MOUNTED		
V20	LITHONIA DMW2	METALUX V74, DAY-BRITE DW, LSI EGG	INDUSTRIAL VAPOR TIGHT LINEAR, WET LOCATION, HIGH IMPACT DIFFUSER, SST LATCHES, 4" LONG	LED	STANDARD	5000 lm	4000 K	80	LED DRIVER	120 V	50 VA	WALL MOUNTED		MOUNT AT HEIGHT SHOWN ON PLANS.
W10	LITHONIA TWR	APPROVED EQUALS	EXTERIOR WALL PACK, SINGLE PIECE ALUMINUM HOUSING, WEATHERPROOF, VANDAL RESISTANT, INTEGRAL PHOTOCELL, FINISH SELECTED BY ARCHITECT	LED	MEDIUM	1500 lm	3000 K	70	LED DRIVER	120 V	12 VA	WALL MOUNTED		MOUNT AT HEIGHT SHOWN ON PLANS.
X23	DUAL-LITE EVE	LITHONIA LQM, APPROVED EQUALS	EXIT SIGN, SINGLE FACE, RED LETTERS, THERMOPLASTIC, DIRECTIONAL ARROWS AS SHOWN ON PLANS, WHITE HOUSING, EMERGENCY BATTERY BACKUP, DUAL LIGHT HEADS	LED	N/A				N/A	120 V	10 VA	CEILING/WALL MOUNTED		WIRED TO UNSWITCHED CIRCUIT

**POWERED EQUIPMENT LEGEND**

- COORDINATE ALL ELECTRICAL REQUIREMENTS, INCLUDING ROUGH-IN LOCATION, CONNECTION TYPE, AND POWER REQUIREMENTS WITH EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN.
- WIRING TERMINATIONS TO EQUIPMENT SHALL BE DONE PER MANUFACTURER'S WRITTEN INSTRUCTIONS.
- LOCATIONS OF DEVICES SHOWN ON DRAWINGS ARE SCHEMATIC IN NATURE. COORDINATE LOCATIONS WITH EQUIPMENT INSTALLER.
- BRANCH WIRING TO EQUIPMENT SHALL BE COPPER.
- CONNECTIONS, LOCAL DISCONNECTS, STARTERS, AND VFDS SHALL BE COORDINATED WITH MECHANICAL AND PLUMBING CONTRACTORS TO ENSURE ACCESS AND WORKING CLEARANCE IS MAINTAINED PER NEC.

**CONTROL SYMBOLS**

- HVAC CONTROL DEVICES ARE SHOWN FOR COORDINATION PURPOSES. REFER TO POWER PLANS FOR ANY ADDITIONAL RESPONSIBILITIES THE EC MAY HAVE FOR THESE DEVICES.
- THERMOSTAT
- VOC SENSOR
- CARBON DIOXIDE SENSOR
- COMBINATION THERMOSTAT / HUMIDITY SENSOR
- HUMIDITY SENSOR
- CARBON MONOXIDE SENSOR

**26-POWERED EQUIPMENT SCHEDULE**

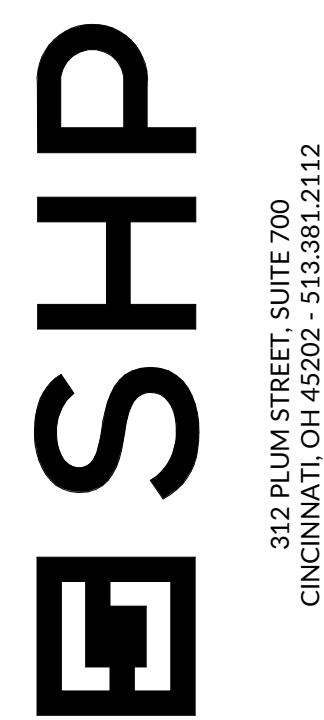
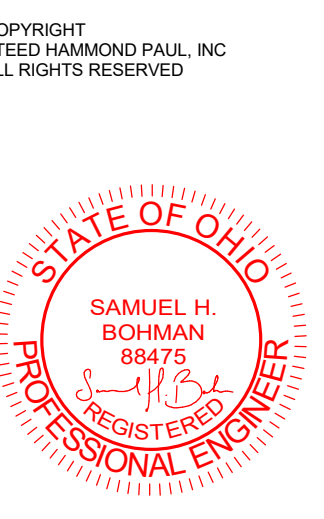
MARK	DESCRIPTION	SPECIFICATION SECTION	TYPE	STARTING MEANS			LOCATION	TYPE	DISCONNECTING MEANS			LOCATION	ELECTRICAL					WIRING NOTES
				PROVIDED BY	INSTALLED BY	INTEGRAL TO UNIT			PROVIDED BY	INSTALLED BY	INTEGRAL TO UNIT		VOLTS	POLES	AMPS	OCPD	PANEL	
AC-1	AIR COMPRESSOR	22	CONTROL PANEL	DIV. 22	DIV. 22	INTEGRAL TO UNIT	DISCONNECT SWITCH	DIV. 26	DIV. 26	NEAR UNIT	208 V	3	17.5 A	35.0 A	P10	44,46,48		
CF	CEILING FAN	23	N/A	N/A	N/A	INTEGRAL TO UNIT	MRTS	DIV. 26	DIV. 26	NEAR UNIT	120 V	1	0.4 A	15.0 A	BR	3		
CF	CEILING FAN	23	N/A	N/A	N/A	INTEGRAL TO UNIT	MRTS	DIV. 26	DIV. 26	NEAR UNIT	120 V	1	0.4 A	15.0 A	BR	3		
CF	CEILING FAN	23	N/A	N/A	N/A	INTEGRAL TO UNIT	MRTS	DIV. 26	DIV. 26	NEAR UNIT	120 V	1	0.4 A	15.0 A	BR	3		
CF	CEILING FAN	23	N/A	N/A	N/A	INTEGRAL TO UNIT	MRTS	DIV. 26	DIV. 26	NEAR UNIT	120 V	1	0.4 A	15.0 A	BR	5		
CF	CEILING FAN	23	N/A	N/A	N/A	INTEGRAL TO UNIT	MRTS	DIV. 26	DIV. 26	NEAR UNIT	120 V	1	0.4 A	15.0 A	BR	5		
CF	CEILING FAN	23	N/A	N/A	N/A	INTEGRAL TO UNIT	MRTS	DIV. 26	DIV. 26	NEAR UNIT	120 V	1	0.4 A	15.0 A	BR	3		
CF	CEILING FAN	23	N/A	N/A	N/A	INTEGRAL TO UNIT	MRTS	DIV. 26	DIV. 26	NEAR UNIT	120 V	1	0.4 A	15.0 A	BR	5		
CF	CEILING FAN	23	N/A	N/A	N/A	INTEGRAL TO UNIT	MRTS	DIV. 26	DIV. 26	NEAR UNIT	120 V	1	0.4 A	15.0 A	BR	5		
CU-1	DUCTLESS MINI SPLIT (OUTDOOR)	23	CONTROL PANEL	DIV. 23	DIV. 23	INTEGRAL TO UNIT	DISCONNECT SWITCH	DIV. 26	DIV. 26	NEAR UNIT	208 V	2	11.0 A	25.0 A	BR	13,15	EXTEND POWER AND CONTROL WIRING TO ASSOCIATED INDOOR UNIT.	
CU-2	DUCTLESS MINI SPLIT (OUTDOOR)	23	CONTROL PANEL	DIV. 23	DIV. 23	INTEGRAL TO UNIT	DISCONNECT SWITCH	DIV. 26	DIV. 26	NEAR UNIT	208 V	2	19.0 A	25.0 A	P10	19,21	EXTEND POWER AND CONTROL WIRING TO ASSOCIATED INDOOR UNIT.	
DS-1	DUCTLESS MINI SPLIT (INDOOR)	23	CONTROL PANEL	DIV. 23	DIV. 23	INTEGRAL TO UNIT	MRTS	DIV. 26	DIV. 26	NEAR UNIT	208 V	2	1.0 A	25.0 A	BR	13,15	EXTEND POWER AND CONTROL WIRING FROM ASSOCIATED OUTDOOR UNIT.	
DS-2	DUCTLESS MINI SPLIT (INDOOR)	23	CONTROL PANEL	DIV. 23	DIV. 23	INTEGRAL TO UNIT	MRTS	DIV. 26	DIV. 26	NEAR UNIT	208 V	2	1.0 A	25.0 A	P10	19,21	EXTEND POWER AND CONTROL WIRING FROM ASSOCIATED OUTDOOR UNIT.	
EF-1	EXHAUST FAN	23	STARTER	DIV. 26	DIV. 26	NEAR UNIT	MRTS	DIV. 26	DIV. 26	NEAR UNIT	120 V	1	9.8 A	20.0 A	P10	6		
ERV-1	AIR HANDLER ENERGY RECOVERY UNIT	23	CONTROL PANEL	DIV. 23	DIV. 23	INTEGRAL TO UNIT	DISCONNECT SWITCH	DIV. 26	DIV. 26	NEAR UNIT	120 V	1	20.0 A	40.0 A	P10	18		
FC-1	VRF CASSETTE	23	CONTROL PANEL	DIV. 23	DIV. 23	INTEGRAL TO UNIT	MRTS	DIV. 26	DIV. 26	NEAR UNIT	208 V	2	2.0 A	15.0 A	P10	13,15		
FC-2	VRF CASSETTE	23	CONTROL PANEL	DIV. 23	DIV. 23	INTEGRAL TO UNIT	MRTS	DIV. 26	DIV. 26	NEAR UNIT	208 V	2	2.0 A	15.0 A	P10	13,15		
FC-3	DUCTLESS MINI SPLIT (INDOOR)	23	CONTROL PANEL	DIV. 23	DIV. 23	INTEGRAL TO UNIT	MRTS	DIV. 26	DIV. 26	NEAR UNIT	208 V	2	1.0 A	25.0 A	P10	14,16	EXTEND POWER AND CONTROL WIRING FROM ASSOCIATED OUTDOOR UNIT.	
FE-1A	WELDING BOOTH EXHAUST	23	STARTER	DIV. 23	DIV. 26	NEAR UNIT	STARTER	DIV. 23	DIV. 26	NEAR UNIT	120 V	1	16.0 A	30.0 A	P10	35		
FE-1B	WELDING BOOTH EXHAUST	23	STARTER	DIV. 23	DIV. 26	NEAR UNIT	STARTER	DIV. 23	DIV. 26	NEAR UNIT	120 V	1	16.0 A	30.0 A	P10	37		
FE-2A	WELDING BOOTH EXHAUST	23	STARTER	DIV. 23	DIV. 26	NEAR UNIT	STARTER	DIV. 23	DIV. 26	NEAR UNIT	120 V	1	16.0 A	30.0 A	P10	39		
FE-2B	WELDING BOOTH EXHAUST	23	STARTER	DIV. 23	DIV. 26	NEAR UNIT	STARTER	DIV. 23	DIV. 26	NEAR UNIT	120 V	1	16.0 A	30.0 A	P10	41		
FE-3A	WELDING BOOTH EXHAUST	23	STARTER	DIV. 23	DIV. 26	NEAR UNIT	STARTER	DIV. 23	DIV. 26	NEAR UNIT	120 V	1	16.0 A	30.0 A	P10	43		
FE-3B	WELDING BOOTH EXHAUST	23	STARTER	DIV. 23	DIV. 26	NEAR UNIT	STARTER	DIV. 23	DIV. 26	NEAR UNIT	120 V	1	16.0 A	30.0 A	P10	45		
ODU-1	DUCTLESS MINI SPLIT (OUTDOOR)	23	CONTROL PANEL	DIV. 23	DIV. 23	INTEGRAL TO UNIT	DISCONNECT SWITCH	DIV. 26	DIV. 26	NEAR UNIT	208 V	2	11.0 A	25.0 A	P10	14,16	EXTEND POWER AND CONTROL WIRING TO ASSOCIATED INDOOR UNIT.	
RTU-2	AIR HANDLER	23	CONTROL PANEL	DIV. 23	DIV. 23	INTEGRAL TO UNIT	DISCONNECT SWITCH	DIV. 26	DIV. 26	NEAR UNIT	208 V	3	32.0 A	45.0 A	P10	2,4,6		
UH-1	ELECTRIC HEATER	23	CONTROL PANEL	DIV. 23	DIV. 23	INTEGRAL TO UNIT	DISCONNECT SWITCH	DIV. 26	DIV. 26	NEAR UNIT	208 V	2	24.0 A	30.0 A	P10	32,34		
UH-2	ELECTRIC HEATER	23	CONTROL PANEL	DIV. 23	DIV. 23	INTEGRAL TO UNIT	DISCONNECT SWITCH	DIV. 26	DIV. 26	NEAR UNIT	208 V	2	24.0 A	30.0 A	P10	36,38		
UH-3	ELECTRIC HEATER	23	CONTROL PANEL	DIV. 23	DIV. 23	INTEGRAL TO UNIT	DISCONNECT SWITCH	DIV. 26	DIV. 26	NEAR UNIT	208 V	2	24.0 A	30.0 A	P10	40,42		

**SKILLED TRADES LAB EQUIPMENT LEGEND**

- COORDINATE ALL ELECTRICAL REQUIREMENTS, INCLUDING ROUGH-IN LOCATION, CONNECTION TYPE, AND POWER REQUIREMENTS WITH EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN.
- WIRING TERMINATIONS TO EQUIPMENT SHALL BE DONE PER MANUFACTURER'S WRITTEN INSTRUCTIONS.
- LOCATIONS OF DEVICES SHOWN ON DRAWINGS ARE SCHEMATIC IN NATURE. COORDINATE LOCATIONS WITH EQUIPMENT INSTALLER.
- COORDINATE FINAL LOCATION OF CORD AND PENDANT DROPS IN FIELD TO ALIGN WITH DEVICE ELECTRICAL CONNECTION.
- REFER TO PLANS FOR DETAILS OF ALTERNATE 3.

**26-SKILLED TRADES LAB EQUIPMENT**

RECEPTACLE TYPE	DEVICE TYPE	DESCRIPTION	ELECTRICAL					WIRING NOTES
			VOLTS	POLES	AMPS	PANEL	CIRCUIT	
BS	NEMA 5-20R	BAND SAW	120 V	1	16.0 A	P11	19	PROVIDE CORD REEL
DC	NEMA 5-20R	DUST COLLECTOR	120 V	1	16.0 A	P11	16	
DC	NEMA 5-20R	DUST COLLECTOR	120 V	1	16.0 A	P11	17	
DP	NEMA 5-20R	DRILL PRESS	120 V	1	8.0 A	P11	8	
DP	NEMA 5-20R	DRILL PRESS	120 V	1	8.0 A	P11	8	
GR	NEMA 5-20R	GRINDER	120 V	1	1.5 A	P11	1	
GR	NEMA 5-20R	GRINDER	120 V	1	1.5 A	P11	3	
JT	NEMA 5-20R	JOINTER	208 V	2	18.7 A	P11	11,13	PROVIDE PENDANT CORD DROP.
MS	NEMA 5-20R	MITTER SAW TABLE	120 V	1	13.3 A	P11	2	PROVIDE PENDANT CORD DROP.
MS	NEMA 5-20R	MITTER SAW TABLE	120 V	1	13.3 A	P11	9	PROVIDE PENDANT CORD DROP.
PL	NEMA 5-20R	PLANER	208 V	2	44.0 A	P11	10,12	PROVIDE PENDANT CORD DROP.
SN	NEMA 5-20R	SANDER	120 V	1	12.0 A	P11	4	
SN	NEMA 5-20R	SANDER	120 V	1	12.0 A	P11	5	
TS	NEMA 5-20R	TABLE SAW	120 V	1	15.0 A	P11	7	PROVIDE CORD REEL
WD	NEMA 6-50R	WELDER	208 V	2	14.7 A	P11	21,23	
WD	NEMA 6-50R	WELDER	208 V	2	14.7 A	P11	18,20	
WD	NEMA 6-50R	WELDER	208 V	2	14.7 A	P11	22,24	
WD	NEMA 6-50R	WELDER	208 V	2	14.7 A	P11	29,31	
WD	NEMA 6-50R	WELDER	208 V	2	14.7 A	P11	25,27	
WD	NEMA 6-50R	WELDER	208 V	2	14.7 A	P11	26,28	



JEFFERSON TOWNSHIP LOCAL SCHOOL DISTRICT  
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 2701 SOUTH UNION ROAD, DAYTON, OH 45417  
 JEFFERSON TOWNSHIP LOCAL SCHOOL DISTRICT  
 2625 South Union Road, Dayton, OH 45417

**ISSUANCES**

NO.	DATE	DESCRIPTION
03-01-24	DESIGN DEVELOPMENT	
04-09-24	10% CD	
A	04-18-24	BID/PERMIT SET
B	04-30-24	ADDENDUM 1

**ELECTRICAL LEGENDS**

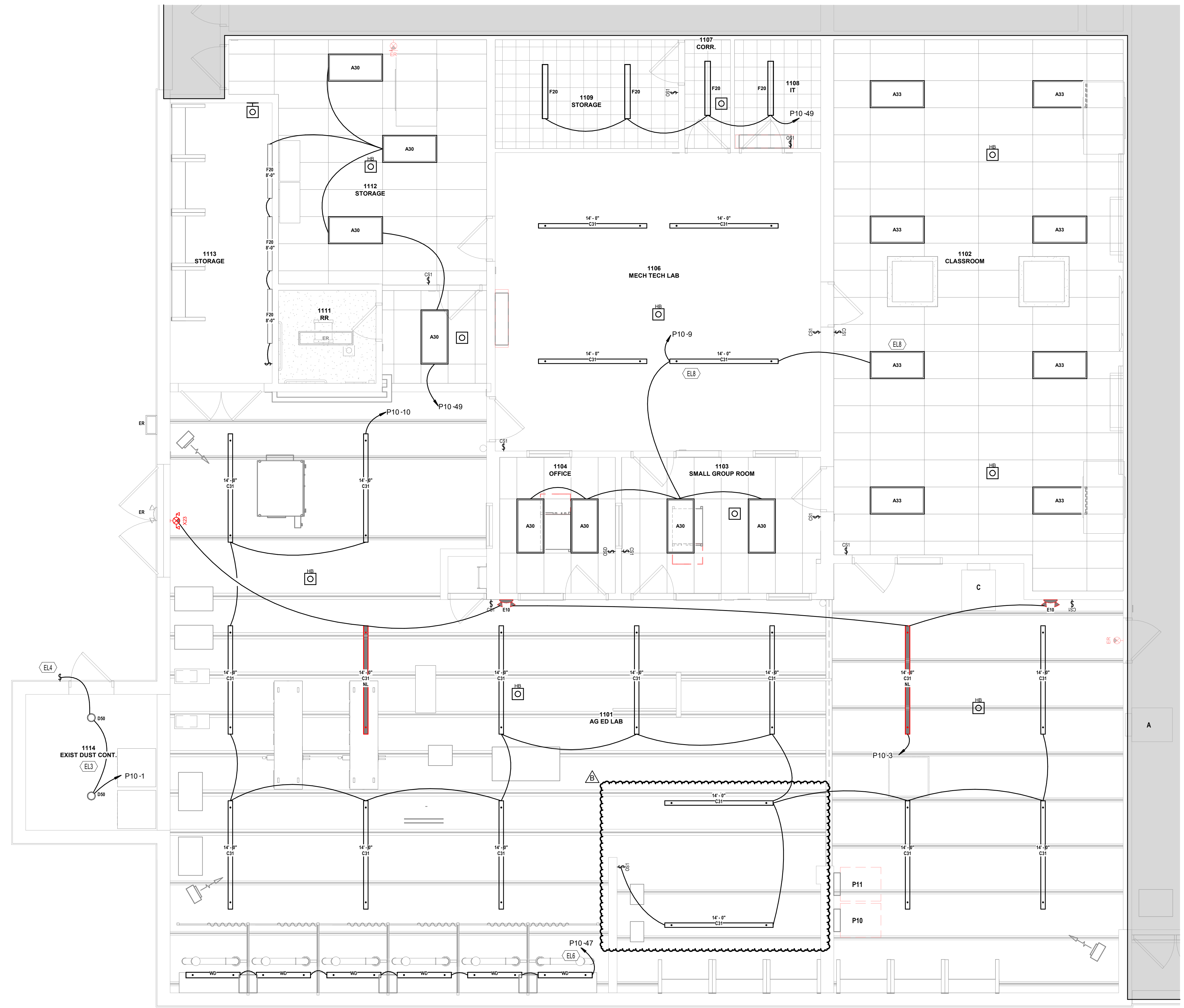
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E001



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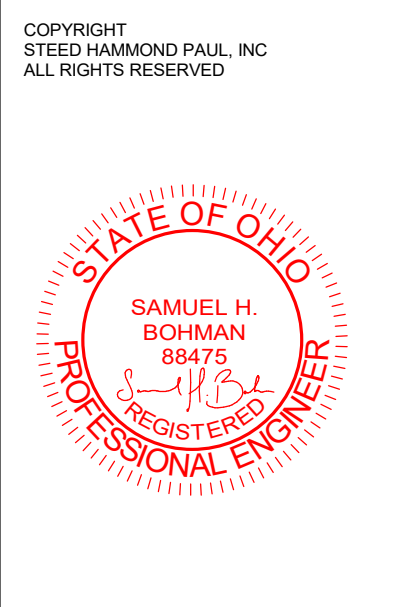
1 LIGHTING PLAN - AG LAB  
 E100 1/4" = 1'-0"

**GENERAL LIGHTING NOTES:**

- A. EXIT SIGNS AND EMERGENCY LIGHTING SHALL BE CONNECTED AHEAD OF ALL SWITCHING.
- B. POWER FOR EXIT SIGNS MOUNTED AT LOCATIONS WITH GLAZING, SUCH AS CURTAINWALLS OR STOREFRONT, SHALL BE CONCEALED THROUGH THE MULLION.

**KEYNOTES**

- EL3 ALL CONDUIT ENTERING CLASS 1, DIV. 2 BOUNDARY SHALL BE SEALED IN ACCORDANCE WITH NEC 514. USE IMC WITHIN BOUNDARY. FOR FINAL CONNECTIONS TO LIGHT FIXTURES, PROVIDE LMFC.
- EL4 PROVIDE WEATHERPROOF SINGLE GANG BOX AND TOGGLE SWITCH COVER FOR LIGHT SWITCH.
- EL6 LIGHTING FIXTURES AND LIGHTING CONTROLS TO BE PROVIDED WITH WELDING BOOTHS, ETC SHALL INSTALL LIGHTING FIXTURES AND LIGHTING CONTROLS PER MANUFACTURER'S INSTRUCTIONS.
- EL8 EXTEND WIRING TO ALL FIXTURES WITHIN ROOM AND WIRE THROUGH LOCAL LIGHTING CONTROLS. REFER TO E510 SERIES DRAWINGS FOR LIGHTING CONTROL DETAILS.



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 2625 South Union Road, Dayton, OH 45417

**ISSUANCES**

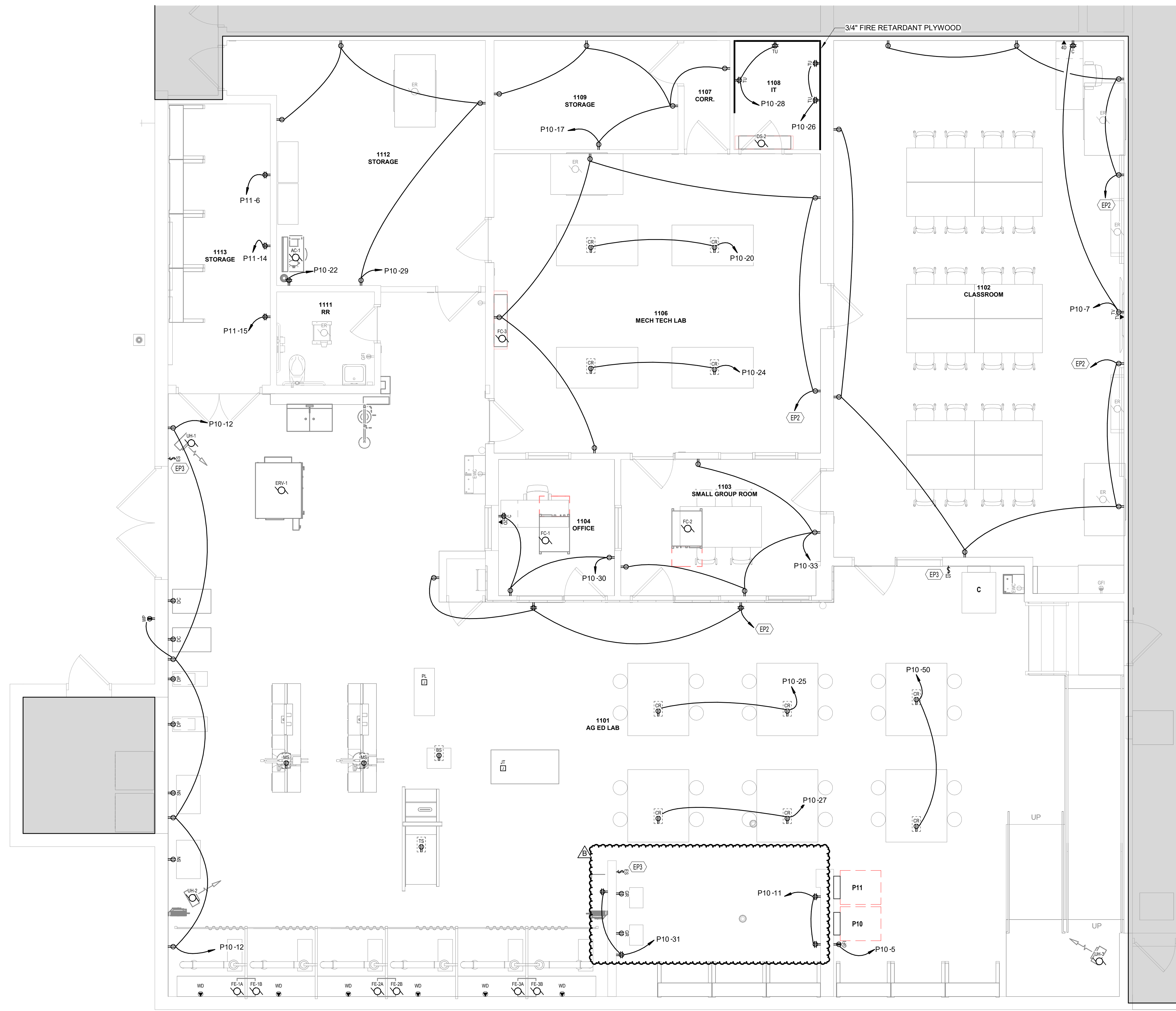
	03-01-24	DESIGN DEVELOPMENT
	04-09-24	100% CD
A	04-18-24	BID/PERMIT SET
B	04-30-24	ADDENDUM 1

**LIGHTING PLAN - AG LAB**

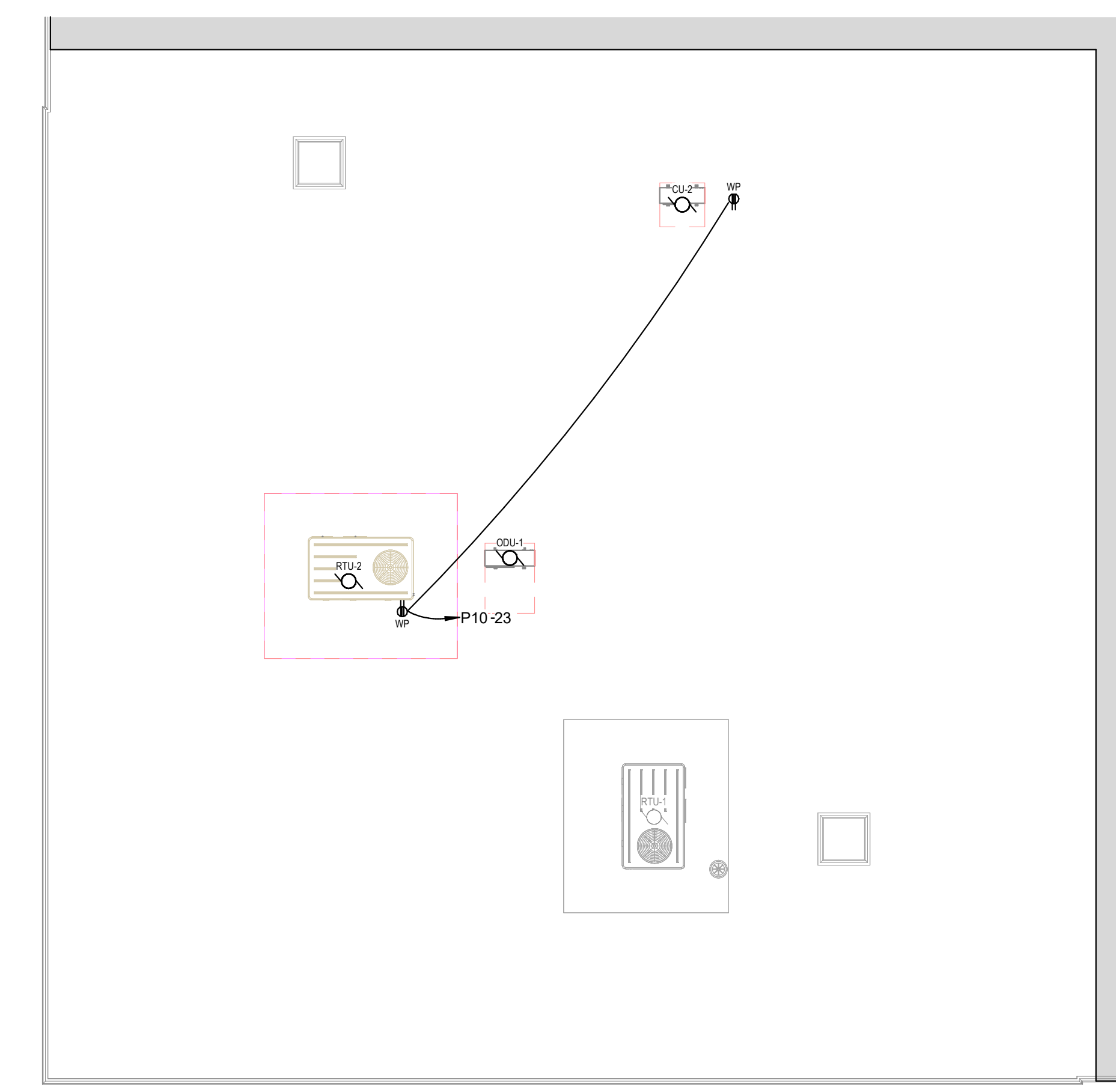
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E100

1/4" REFERENCE LINE



1 POWER PLAN - AG LAB  
E200 1/4" = 1'-0"



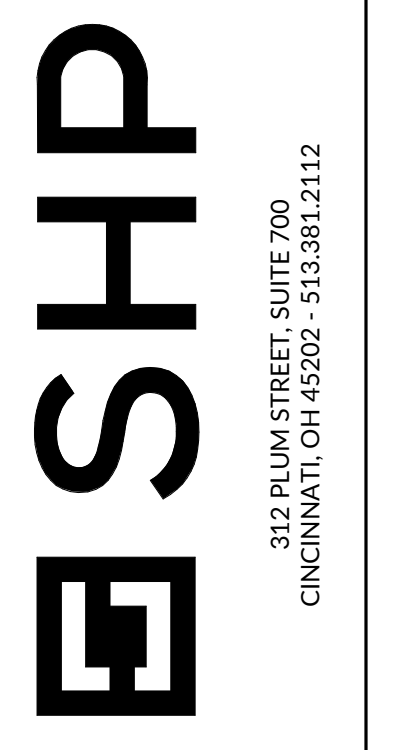
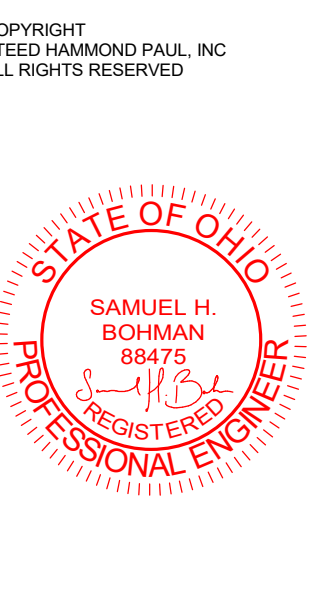
2 ELECTRICAL POWER PLAN - ROOF  
E200 1/8" = 1'-0"

**GENERAL POWER NOTES:**

- A. REFER TO E000 SERIES SHEETS FOR PANEL AND CIRCUIT NUMBERS FOR MECHANICAL AND PLUMBING EQUIPMENT.
- B. REFER TO E000 SERIES SHEETS FOR STARTER AND DISCONNECT TYPES AND CONTRACTOR RESPONSIBILITIES. STARTER AND DISCONNECT LOCATIONS TO BE NEAR EQUIPMENT WITH PROPER CLEARANCE AND WORKING SPACE PER NEC. COORDINATE MOUNTING WITH OTHER DISCIPLINES.
- C. EC SHALL BE RESPONSIBLE TO INSTALL A SWITCH BOX AND 3/4" CONDUIT TO ABOVE THE ACCESSIBLE CEILING IN EACH ROOM FOR TEMPERATURE CONTROL THERMOSTAT. DEVICES SHOWN ON ELECTRICAL DRAWINGS ARE FOR REFERENCE ONLY. REFER TO THE M SERIES DRAWINGS FOR THERMOSTAT LOCATIONS.
- D. EC SHALL BE RESPONSIBLE FOR TECHNOLOGY ROUGH-IN LOCATIONS. REFER TO SPECIFICATIONS FOR REQUIREMENTS.
- E. ALL 15A AND 20A, 125V AND 250V, NON-LOCKING TYPE RECEPTACLES IN LOCATIONS AS REQUIRED BY NEC 406.12 SHALL BE TAMPER-RESISTANT RECEPTACLES.
- F. COORDINATE ALL ELECTRICAL REQUIREMENTS, INCLUDING ROUGH-IN LOCATION, CONNECTION TYPE, AND POWER REQUIREMENTS WITH EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN.
- G. PRIOR TO DEVICE ROUGH-IN, REFER TO E000 SERIES SHEETS FOR DEVICE LEGENDS AND SPECIALTY INFORMATION.
- H. PRIOR TO DEVICE ROUGH-IN, REFER TO E500 SERIES SHEETS FOR SPECIALTY MOUNTING DETAILS.

**KEYNOTES**

- EP2 CONNECT TO CIRCUIT MADE AVAILABLE THROUGH DEMOLITION. REFER TO E010 SERIES SHEETS.
- EP3 PROVIDE EMERGENCY STOP SWITCH FOR SHUNT TRIP IN P11. COORDINATE EXACT LOCATION IN FIELD.



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 2625 South Union Road, Dayton, OH 45417

**ISSUANCES**

03-01-24	DESIGN DEVELOPMENT
04-09-24	100% CD
A	04-18-24 BID/PERMIT SET
B	04-30-24 ADDENDUM 1

**POWER PLAN - AG LAB**

COMM NO. 2024006.01

**E200**



**GREENHOUSE EQUIPMENT**

A. COORDINATE ALL ELECTRICAL REQUIREMENTS, INCLUDING ROUGH-IN LOCATION, CONTROL WIRING, STARTERS, CONNECTION TYPE, AND POWER REQUIREMENTS WITH GREENHOUSE SUPPLIER PRIOR TO ROUGH-IN.

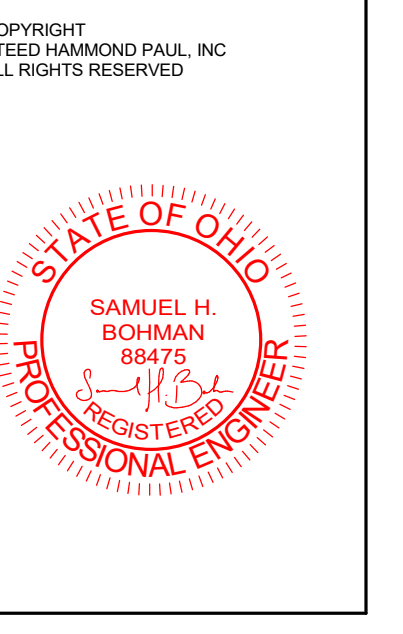
26-GREENHOUSE EQUIPMENT SCHEDULE												
MARK	DESCRIPTION	TYPE	DISCONNECTING MEANS		LOCATION	VOLTS	POLES	ELECTRICAL				WIRING NOTES
			PROVIDED BY	INSTALLED BY				AMPS	MOCB	PANEL	CIRCUIT	
AV	ATRIUM VENT	DISCONNECT SWITCH	DIV. 26	DIV. 26	NEAR UNIT	208 V	3	7.8 A	15.0 A	GH	8,10,12	
EF	EXHAUST FAN	NF DISCONNECT SWITCH	DIV. 26	DIV. 26	NEAR UNIT	208 V	3	11.0 A	20.0 A	GH	20,22,24	
EF	EXHAUST FAN	NF DISCONNECT SWITCH	DIV. 26	DIV. 26	NEAR UNIT	208 V	3	11.0 A	20.0 A	GH	15,17,19	
HF	HAF FANS	DISCONNECT SWITCH	DIV. 26	DIV. 26	NEAR UNIT	120 V	1	1.0 A	15.0 A	GH	2	
HF	HAF FANS	DISCONNECT SWITCH	DIV. 26	DIV. 26	NEAR UNIT	120 V	1	1.0 A	15.0 A	GH	2	
SM	SHADE MOTOR	NF DISCONNECT SWITCH	DIV. 26	DIV. 26	NEAR UNIT	120 V	1	7.8 A	15.0 A	GH	3	
SV	SIDE VENT	DISCONNECT SWITCH	DIV. 26	DIV. 26	NEAR UNIT	208 V	3	7.8 A	15.0 A	GH	14,16,18	
UH	UNIT HEATER	MRTS	DIV. 23	DIV. 23	INTEGRAL TO UNIT	120 V	1	1.0 A	15.0 A	GH	3	
UH	UNIT HEATER	MRTS	DIV. 23	DIV. 23	INTEGRAL TO UNIT	120 V	1	1.0 A	15.0 A	GH	3	

**GENERAL POWER NOTES:**

- A. REFER TO E000 SERIES SHEETS FOR PANEL AND CIRCUIT NUMBERS FOR MECHANICAL AND PLUMBING EQUIPMENT.
- B. REFER TO E000 SERIES SHEETS FOR STARTER AND DISCONNECT TYPES AND CONTRACTOR RESPONSIBILITIES. STARTER AND DISCONNECT LOCATIONS TO BE NEAR EQUIPMENT WITH PROPER CLEARANCE AND WORKING SPACE PER NEC. COORDINATE MOUNTING WITH OTHER DISCIPLINES.
- C. EC SHALL BE RESPONSIBLE TO INSTALL A SWITCH BOX AND 3/4" CONDUIT TO ABOVE THE ACCESSIBLE CEILING IN EACH ROOM FOR TEMPERATURE CONTROL THERMOSTAT. DEVICES SHOWN ON ELECTRICAL DRAWINGS ARE FOR REFERENCE ONLY. REFER TO THE M SERIES DRAWINGS FOR THERMOSTAT LOCATIONS.
- D. EC SHALL BE RESPONSIBLE FOR TECHNOLOGY ROUGH-IN LOCATIONS. REFER TO SPECIFICATIONS FOR REQUIREMENTS.
- E. ALL 15A AND 20A, 125V AND 250V, NON-LOCKING TYPE RECEPTACLES IN LOCATIONS AS REQUIRED BY NEC 406.12 SHALL BE TAMPER-RESISTANT RECEPTACLES.
- F. COORDINATE ALL ELECTRICAL REQUIREMENTS, INCLUDING ROUGH-IN LOCATION, CONNECTION TYPE, AND POWER REQUIREMENTS WITH EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN.
- G. PRIOR TO DEVICE ROUGH-IN, REFER TO E000 SERIES SHEETS FOR DEVICE LEGENDS AND SPECIALTY INFORMATION.
- H. PRIOR TO DEVICE ROUGH-IN, REFER TO E500 SERIES SHEETS FOR SPECIALTY MOUNTING DETAILS.

**KEYNOTES**

- EP5 PROVIDE CEILING FAN BOXES, AND CONDUIT WITH PULLSTRING TO CONTROL STATION FOR FUTURE INSTALLATION OF CEILING FANS. PROVIDE WIRING AND FULL INSTALLATION OF CEILING FANS AS PART OF ALTERNATE 5.
- EP6 PROVIDE WEATHERPROOF BOX AND MULTI-USE COVERS FOR CEILING FAN CONTROLLERS.
- EP7 COORDINATE FINAL LOCATION OF MOTOR AND DISCONNECT WITH GREENHOUSE MANUFACTURER PROVIDED DRAWINGS.
- EP8 COORDINATE FINAL LOCATION OF HEATER WITH GREENHOUSE MANUFACTURER PROVIDED DRAWINGS.
- EP9 COORDINATE FINAL LOCATION OF GREENHOUSE CONTROLLERS AND CONTACTOR PANELS WITH GREENHOUSE INSTALLER PRIOR TO INSTALLATION. PROVIDE CONTROL AND POWER WIRING TO ACCESSORIES, MOTORS, EQUIPMENT, AND DEVICES PER MANUFACTURER'S INSTRUCTIONS.
- EP10 PROVIDE WEATHERPROOF BOX WITH MULTI-USE COVER FOR MOTOR RATED TOGGLE SWITCH.



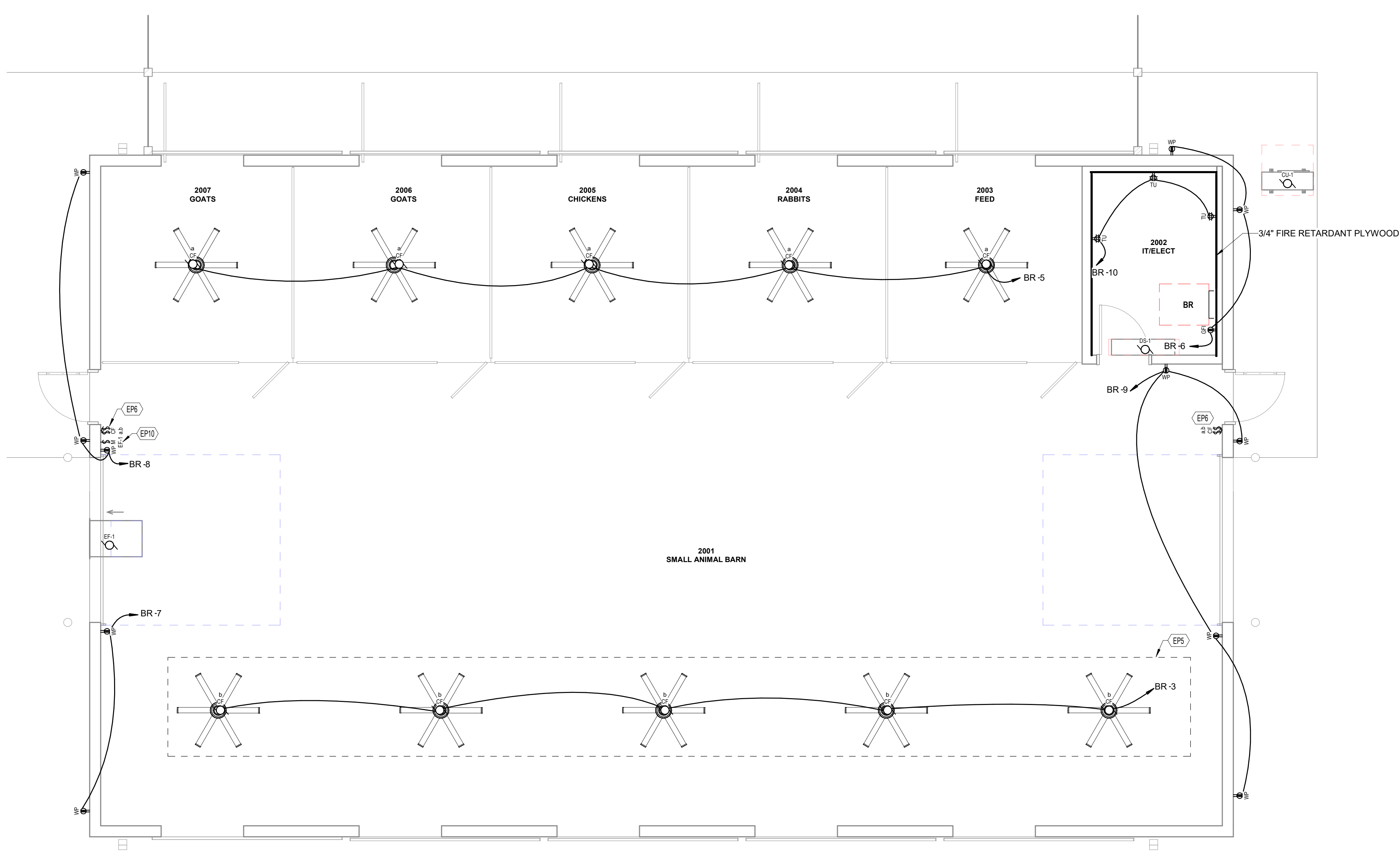
JEFFERSON TOWNSHIP LOCAL SCHOOL DISTRICT  
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ISSUANCES	
03-01-24	DESIGN DEVELOPMENT
04-09-24	10% CD
A	04-18-24 BID/PERMIT SET
B	04-30-24 ADDENDUM 1

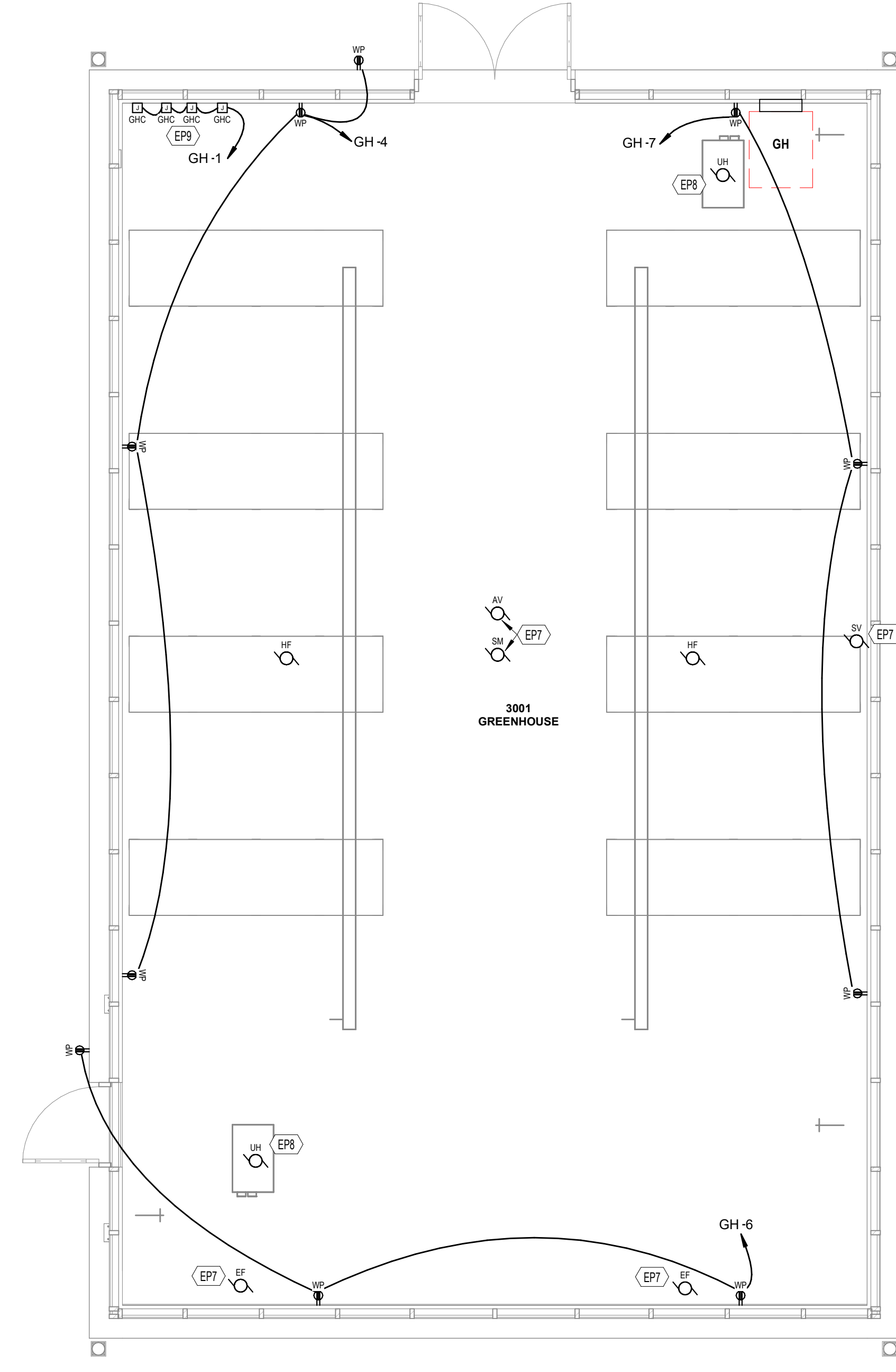
POWER PLANS - BARN AND GREENHOUSE

COMM NO. 2024006.01

E201



1 POWER PLAN - BARN  
 E201 1/4" = 1'-0"



2 POWER PLAN - GREENHOUSE  
 E201 1/4" = 1'-0"

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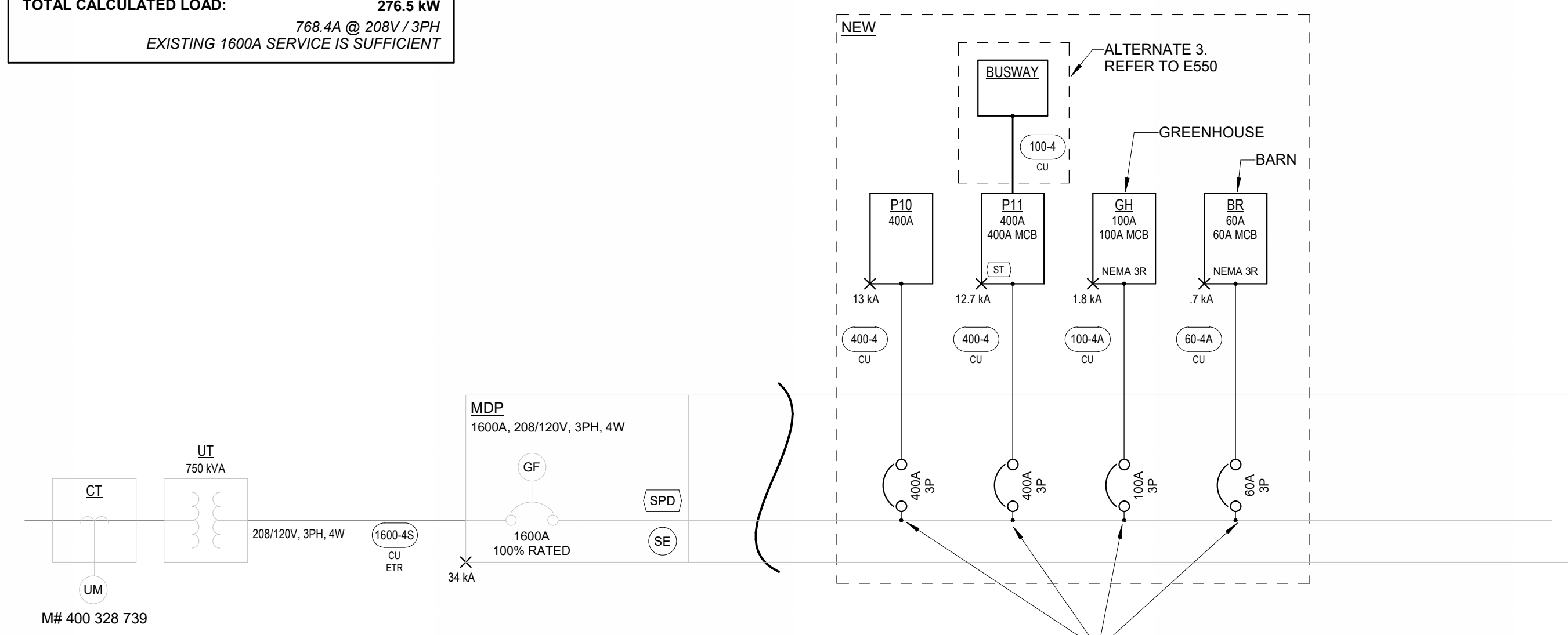
1/4" REFERENCE LINE



SINGLE LINE DIAGRAM SYMBOL LEGEND	
<b>GENERAL NOTES:</b>	
1. NOTE THAT SYMBOLS IN THIS LEGEND MAY NOT ALL APPEAR IN THE DRAWINGS.	2N 200% NEUTRAL
2. NOT ALL EQUIPMENT OPTIONS AND REQUIREMENTS ARE INDICATED ON THE SINGLE LINE DIAGRAM.	FTL FEED THRU LUGS
3. REFER TO DIV. 26 SPECIFICATION SECTIONS FOR DETAILED REQUIREMENTS FOR ELECTRICAL DISTRIBUTION INFRASTRUCTURE.	GF GROUND FAULT PROTECTION
	PLR PHASE LOSS PROTECTION
	SE SERVICE ENTRY RATED
	SM INTEGRAL MAINS SUBMETERING
	SPD INTEGRAL SURGE PROTECTION DEVICE
	ST SHUNT TRIP MAIN BREAKER
	UM UTILITY METERING
<b>GENERIC SYMBOLS</b>	
CIRCUIT BREAKER TRIP RATING NUMBER OF POLES	SWITCH RATING NUMBER OF POLES
CALCULATED FAULT CURRENT POINT	FUSE TRIP RATING
ELECTRICAL METER	EQUIPMENT GROUND
ELECTRIC MOTOR	ELECTRIC GENERATOR
<b>FEEDER SYMBOL</b>	
FEEDER SYMBOL REFER TO FEEDER SCHEDULE FOR DETAILS	FEEDER NOTES 2HR FEEDER SHALL BE 2HR FIRE RATED BY MEANS OF ENCASUREMENT IN A MINIMUM OF 2" CONCRETE ED EXISTING FEEDER TO BE DEMOLISHED ER EXISTING FEEDER TO REMAIN UG UNDERGROUND
<b>SPECIFIC EQUIPMENT</b>	
<b>SWITCHBOARD / DISTRIBUTION PANELBOARD</b>	<b>PANELBOARD</b>
OPTIONAL CT CABINET AND UTILITY CO. METERING	EQUIPMENT NAME, RATING, AND VOLTAGE SYSTEM
CT CABINET	MAIN BREAKER RATING
MP 1200A, 480/277V, 3PH, 4W	BUS/ENCLOSURE RATING
PLP 200A MCB	PX 200A MCB
SPD 2N	SE 2N
SE 1200A, 100% RATED	INDICATES FEED THRU LUGS
OVERCURRENT PROTECTION DEVICE RATING	OPTIONS

FEEDER SCHEDULE						
FEEDER TAG	CONDUCTOR MATERIAL	PARALLEL SETS	FEEDER CONDUCTORS QTY	FEEDER CONDUCTORS SIZE	EGC SIZE	CONDUIT SIZE
60-4A	CU	1	4	#1/0	#8	2"
100-4	CU	1	4	#1	#8	1 1/2"
100-4A	CU	1	4	#2/0	#8	2"
400-4	CU	1	4	600 KCMIL	#3	3 1/2"
1600-4S	CU	4	4	600 KCMIL	N/A	3 1/2"

ELECTRICAL SERVICE CALCULATIONS	
MODIFICATIONS TO AN EXISTING SERVICE	
EXISTING BUILDING LOADS	112.5 kW
PEAK 12-MONTH DEMAND	28.1 kW
ADD 25% (PER NEC 220.87)	
<b>TOTAL EXISTING DEMAND LOAD:</b>	<b>140.63 kW</b>
ADDED LOADS	
UTILITY POWER	51.7 kW
LIGHTING	3.8 kW
MECHANICAL	80.6 kW
<b>TOTAL NEW CALCULATED LOAD:</b>	<b>135.9 kW</b>
<b>TOTAL CALCULATED LOAD:</b>	<b>276.5 kW</b>
	768.4A @ 208V / 3PH
	EXISTING 1600A SERVICE IS SUFFICIENT



1 SINGLE LINE DIAGRAM  
E600

PANEL SCHEDULE NOTES:	
GF1	PROVIDE GFI BREAKER. IF GFI BREAKER IS UNAVAILABLE, PANEL MANUFACTURER SHOULD SUBSTITUTE GFI PROTECTION VIA GFI RELAY MODULE
LOD	PROVIDE LOCK ON/OFF DEVICE
SPD	PROVIDE SURGE PROTECTION DEVICE
EX	EXISTING CIRCUIT
EB	EXISTING CIRCUIT BREAKER

Panelboard: GH		Location: GREENHOUSE 3001		Volts: 208Y/120V		A.I.C. Rating: 10,000						
Supply From: MDP		Phases: 3		Mains Type: MCB		Panel & MCB Rating: 100.0 A						
Mounting: Wall Mounted		Wires: 4										
Enclosure: NEMA 3R												
CKT	Circuit Description	Device Notes	Trip	Poles	A	B	C	Poles	Trip	Device Notes	Circuit Description	CKT
1	R - 3001		20	1	192	240					M - 3001 - HF, HF	2
3	M - 3001 - UH-X, UH-X		20	1		240	720				R - 3001, EXTERIOR	4
5	L - 3001		20	1			450	540			R - 3001, EXTERIOR	6
7	R - 3001		20	1	540	937					M - 3001 - AV	8
9	M - SHADE MOTOR		20	1		936	937					10
11							937					12
13					937						M - 3001 - SV	14
15	M - 3001 - EF-X		20	3		1321	937					16
17					1321	1321					M - 3001 - EF-X	20
19							1321	937				18
21								1321				22
23								1321				24
25	Spare		20	1	0	0					Spare	26
27	Spare		20	1			0	0			Spare	28
29	Spare		20	1			0	0			Spare	30
<b>Total Load:</b>					5487 VA	6411 VA	5505 VA					
<b>Total Amps:</b>					45.7 A	53.5 A	45.9 A					
<b>Panel Totals</b>												
L = LIGHTS												
R = RECEPTACLES												
M = MECHANICAL EQUIPMENT												
P = PLUMBING EQUIPMENT												
Total Conn. Load: 17404 VA												
Total Est. Demand: 17404 VA												
Total Conn. Current: 48.3 A												
Total Est. Demand Current: 48.3 A												

Panelboard: BR		Location: TELELECT 2002		Volts: 208Y/120V		A.I.C. Rating: 10,000						
Supply From: MDP		Phases: 3		Mains Type: MCB		Panel & MCB Rating: 60.0 A						
Mounting: Wall Mounted		Wires: 4										
Enclosure: NEMA 3R												
CKT	Circuit Description	Device Notes	Trip	Poles	A	B	C	Poles	Trip	Device Notes	Circuit Description	CKT
1	L - EXTERIOR		20	1	24	306					L - 2002, 2003, 2004, 2005, 2006, 2007	2
3	M - 2001		20	1		228	300				L - 2001	4
5	M - 2003, 2004, 2005, 2006, 2007		20	1				228	540		R - 2002, EXTERIOR	6
7	R - 2001, EXTERIOR		20	1	360	540					R - 2001, EXTERIOR	8
9	R - 2001, EXTERIOR		20	1		720	1080				R - 2002	10
11	L - 2001		20	1			600					12
13	M - CU-1, DS-1		25	2	1248							14
15						1248						16
17												18
19												20
21												22
23												24
25	Spare		20	1	0	0					Spare	26
27	Spare		20	1			0	0			Spare	28
29	Spare		20	1			0	0			Spare	30
<b>Total Load:</b>					2478 VA	3576 VA	1368 VA					
<b>Total Amps:</b>					22.1 A	31.2 A	11.4 A					
<b>Panel Totals</b>												
L = LIGHTS												
R = RECEPTACLES												
M = MECHANICAL EQUIPMENT												
P = PLUMBING EQUIPMENT												
Total Conn. Load: 7422 VA												
Total Est. Demand: 7422 VA												
Total Conn. Current: 20.6 A												
Total Est. Demand Current: 20.6 A												

Panelboard: P10		Location: AG ED LAB 1101		Volts: 208Y/120V		A.I.C. Rating: 18,000						
Supply From: MDP		Phases: 3		Mains Type: MCB		Panel & MCB Rating: 400.0 A						
Mounting: Wall Mounted		Wires: 4										
Enclosure: NEMA 1												
CKT	Circuit Description	Device Notes	Trip	Poles	A	B	C	Poles	Trip	Device Notes	Circuit Description	CKT
1	L - 1114		20	1	50	3843					M - RTU-2	2
3	L - 1101, 1106		20	1		126	3843					4
5	R - 1101 - GFI		20	1			180	3843				6
7	R - 1102		20	1	540	1176					M - 2001 - EF-1	8
9	L - 1102, 1103, 1104, 1106		20	1		724	728				L - 1101	10
11	R - 1101		20	1			720	900			R - 1101	12
13	M - 1103, 1104 - FC-1, FC-2		20	2	416	1248					M - CU-2	14
15						416	1248					16
17	R - 1109		20	1			900	2400			M - ERV-1	18
19	M - CU-3		25	2	2080	360					R - 1106	20
21						2080	360				R - 1112	22
23	R - ROOFTOP		20	1			360	360			R - 1106	24
25	R - 1101		20	1	360	720					R - 1108	26
27	R - 1101		20	1		360	720				R - 1108	28
29	R - 1112		20	1			720	720			R - 1104	30
31	R - 1101		20	1	720	2500					M - UH-1	32
33	R - 1103		20	1		720	2500					34
35	M - FE-1A		30	1			1920	2500			M - UH-2	36
37	M - FE-1B		30	1	1920	2500						38
39	M - FE-2A		30	1		1920	2500				M - UH-3	40
41	M - FE-2B		30	1		1920	2500					42
43	M - FE-3A		30	1	1920	2102					P - AC-1	44
45	M - FE-3B		30	1		1920	2102					46
47	L - 1101 - WELDING BOOTHS		20	1			240	2102				48
49	L - 1107, 1108, 1109, 1111, 1112, 27		20	1	396	360					R - 1101	50
51												52
53												54
55	Spare		20	1	0	0					Spare	56
57	Spare		20	1		0	0				Spare	58
59	Spare		20	1		0	0				Spare	60
<b>Total Load:</b>					23211 VA	22267 VA	22285 VA					
<b>Total Amps:</b>					193.4 A	185.6 A	185.7 A					
<b>Panel Totals</b>												
L = LIGHTS												
R = RECEPTACLES												
M = MECHANICAL EQUIPMENT												
P = PLUMBING EQUIPMENT												
Total Conn. Load: 67782 VA												
Total Est. Demand: 67722 VA												
Total Conn. Current: 188.1 A												
Total Est. Demand Current: 188.0 A												

Panelboard: P11		Location: AG ED LAB 1101		Volts: 208Y/120V		A.I.C. Rating: 18,000						
Supply From: MDP		Phases: 3		Mains Type: MCB		Panel & MCB Rating: 400.0 A						
Mounting: Wall Mounted		Wires: 4										
Enclosure: NEMA 1												
CKT	Circuit Description	Device Notes	Trip	Poles	A	B	C	Poles	Trip	Device Notes	Circuit Description	CKT
1	R - 1101 - GRINDER		20	1	180	1600					R - 1101 - MITTER SAW	2
3	R - 1101 - GRINDER		20	1	180	1440					R - 1101 - SANDER	4
5	R - 1101 - SANDER		20	1		1440	360				R - 1113	6
7	R - 1101 - TABLE SAW		20	1	1800	1920					R - 1101	8
9	R - 1101 - MITTER SAW		20	1	1600	4576					R - 1101 - PLANAR	10
11	R - 1101 - JOINTER		30	2			1945	4576				12
13						1945	360				R - 1113	14
15	R - 1113		20	1		360	1920				R - 1101 - DUST COLLECTOR	16
17	R - 1101 - DUST COLLECTOR		20	1			1920	1529			R - 1101 - WELDER	18
19	R - 1101 - BAND SAW		20	1	1920	1529						20
21	R - 1101 - WELDER		40	2		1529	1529				R - 1101 - WELDER	22
23												