

ADDENDUM NO. 02

DATE: April 20th, 2026

TO: ALL BIDDERS

FROM: The Walker Group Architecture, Inc.

RE: Jones County Public Works

The following corrections, clarifications, or supplemental information is to be incorporated into the Contractor(s) bid to perform the Work:

1. Bid day has been extended to May 5th, 2026 at 3:00pm at 110 Market St. Trenton NC. See revised drawings and specifications which include but are not limited to addition of fire sprinkler system and fire alarm system and addition of bid alternates.
2. Note 17 on drawing A101 states the water heaters are provided by the owner. They are also shown in the plumbing schedule. Please clarify. *Response: Water heaters will be provided by owner.*
3. Note 9 on drawing A101 states the hose reels are provided by the owner. The plumbing drawings show them to be provided by the plumbing sub. Please clarify. *Response: Hose reels will be provided by owner.*
4. Please confirm location of pad mount transformer for accurate secondary lengths. *Response: The power company will need to locate the transformer. Account for 75' of secondary in base bid.*
5. Confirm location of BFP/Hot Box. There is a key note (6) on C5 but not shown on plan. *Response: BFP will be provide by owner.*
6. Confirm whether gate power circuit for Hwy 58 side gate should be included in Alternate 1 or under base bid and capped off in below grade enclosure for future connection. *Response: Provide power circuit as part of bid alternate pricing.*
7. Confirm site termination point of 2-4" PVC conduits underground for telephone service. *Response: Plan for termination near road. Approximately 75' length.*

8. Where is the Generator Located? Sheet E-101 references the site plan but there is no reference to the Generator on any of the site plans. *Response: See E-101 drawing for generator location.*
9. I highly suggest going 24 gauge on the roof instead of 26 gauge. 26 gauge is very flimsy for a roof and the savings is not worth it. *Response: Roof panels are revised to 24ga. See revised specifications.*
10. Reviewing your Spec's on that section I see you are asking for 16 gauge galv frames and 14 gauge doors. I don't think PEMB folks offer that as an option, but not 100% sure of that. *Response:*
11. On Drawing page S301 the basic wind speed is 132 MPH, but in spec 084113, Aluminum-Framed Entrances and Storefronts, part 2.1C bases these requirements for Wind Zone 2 (140 MPH-150 MPH). Based on the project location and wind criteria, please clarify if hurricane impact-rated storefront and glazing is required, or if a non-impact (standard) system is acceptable. *Response:*
12. In the addendum a question was asked regarding tile base or the use of Dilex AHK. It is my understanding that we are now bidding for Dilex as our floor to wall transition. Some of the walls however are not getting tile so for those walls Dilex is not the best option since you will still need some form of base to finish off the base of the gypsum board. For this reason I would like to suggest a ceramic cove for the entirety of both bathrooms for the base as I believe this to be the most functional of the options. *Response: Provide 4" tile cove base in both bathrooms for the entire perimeter.*
13. To verify, the underside of the ceiling on the Covered Porch and Covered Shelters will be exposed, correct? No ceiling liner panels/soffit required. *Response: Provide soffit panel by PEMB manufacturer at front porch only. Other porches shall be exposed structure and roof panels.*
14. Talking with building manufacturer, they told me if there isn't insulation over the purlins in the open areas that the thermal blocks will eventually blow out and the panels will rattle since the clips are designed to float to allow roof panels to expand and contract. Or we can install the fabric liner insulation like inside building which will also prevent birds from making nest on the bottom leg of the purlins? *Response: Liner panel insulation is not required on exterior porches. Install roofing per drawings on porches.*
15. Suggest testing allowance be called out to be included with all bids. *Response: Construction materials testing will be provided by owner.*

16. Builders Risk Insurance is a substantial cost with projects in a flood zone. Suggest it to be by Owner, or call out an allowance for this. *Response: Builders Risk is required. The project is not in a flood zone.*
17. Suggest no venting through the metal roof. Exterior wall vents wherever possible. *Response: Providing venting per the drawings.*
18. RFI #17 states Floor and Wall Tile to be Daltile Anchorage (see screenshot below). This is a discontinued product and no longer available for purchase (discontinued a couple of years ago per Daltile Rep). Please advise if you can circle back with Architect for another option. Would also need direction on what they want for TL-3 (which is a 1x3 mosaic backsplash tile). The discontinued product line they chose was only available in 24x24, 12x24, and 12x12. *Response: Provide tile option with similar performance criteria to tile listed in Addendum 01.*
19. I wanted to confirm based on the response or answer given on "addendum #1 - question 10" that the owner wants ALL lights, outlets, occupancy sensors, switches, directly and fully hard piped throughout the project ? Or is there the ability to set boxes and run greenfield or some sort of flex lines to fixtures or to run flexible type cable to loop receptacles in office space or behind panels, which is essentially what "MC" type cable is. If you hard pipe in fixtures that are sitting in an acoustic ceiling then they will never be able to be replaced or serviced without damaging the grid. Just looking for some clarification. Thank you. Also I thought I also would let you know the utility company is not Duke, it's "Jones - Onslow Electric Co-op". *Response: Reference Note #12 on E-401. It states that FMC is allowed from the junction boxes to the light fixtures. All other electrical shall be in conduit.*

END OF ADDENDUM 02

**FORM OF PROPOSAL
JONES COUNTY PUBLIC WORKS BUILDING
TRENTON, NC**

PROPOSAL FOR: SINGLE PRIME GENERAL CONTRACT

PROJECT: Jones County Public Works Building
Trenton, North Carolina

SUBMITTED TO: Attn: Kyle Smith
Jones County
110.S. Market Street
Trenton, NC 28585

SUBMITTED BY: Bidder's Name: _____
Address: _____
License Classification: _____
License Number: _____

In compliance with your request for proposals, the undersigned as Bidder hereby proposes to furnish all labor and materials, equipment, operations and incidentals, and to perform all work for the complete execution of the construction entering into the Single Prime Contract for the construction of a Public Works Building with Additive Alternates for associated Site Improvements and Mechanical System Upgrades for Jones County in strict accordance with plans, specifications, contract documents, codes and regulations to the full and entire satisfaction of the Owner for the consideration of the following amount:

GENERAL CONTRACT: *(Fill in appropriate amounts)*

LUMP SUM BASE BID:

_____ Dollars (\$ _____)

ADD ALTERNATE #01

Price to provide and install site fencing as indicated on Civil Drawings

_____ Dollars (\$ _____)

ADD ALTERNATE #02

Price to provide and install additional 4" concrete apron under canopy in lieu of gravel as per Civil drawings

_____ Dollars (\$ _____)

ADD ALTERNATE #03

Price to provide and install complete HVAC system in shop space in lieu of infrared heaters as per Mechanical drawings

_____ Dollars (\$ _____)

**FORM OF PROPOSAL
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TRENTON, NC**

ADD ALTERNATE #04

Price to provide and install Generator as indicated on Electrical drawings

_____ Dollars (\$ _____)

ADD ALTERNATE #05

Price to provide and install Infrared Heaters in shop space as indicated on Electrical drawings

_____ Dollars (\$ _____)

ADD ALTERNATE #06

Price to provide and install LVT flooring in office 103, Office 104, Office 105, Foyer 106, and Breakroom 107.

_____ Dollars (\$ _____)

ADD ALTERNATE #07

Price to provide and install 8' high pre-finished, pre-engineered metal liner panels at entire perimeter of the shop space.

_____ Dollars (\$ _____)

The Undersigned, as Bidder, hereby declares that the only person or persons interested in this proposal, as principal or principals, is or are named herein, and that no other party or parties than those herein mentioned have any interest in this proposal or in the contract which may be entered into as a result of acceptance of this proposal; and that this proposal is made without connection with any person, company, corporation or parties making a bid or proposal; and that this proposal is in all respects fair and in good faith without collusion or fraud.

The Bidder further declares that he has examined the Site of the Work and informed himself fully with all conditions pertaining to the place where the Work is to be performed; that he has examined the Drawings, Specifications and Instructions for the Work and the Contract Documents relative thereto, and has read all special provisions furnished prior to the Opening of Bids; and that he fully understands and has made every provision to operate under the conditions relative to the Work required by the Contract Documents.

The undersigned further states that he is a duly Licensed Building Contractor in the State of North Carolina under applicable statutes governing his trade, and that all fees, licenses, permits, and charges pertinent to the submission of this Bid have been paid in full.

The undersigned hereby designates the following as his legal address to which such notice of acceptance may be delivered.

**FORM OF PROPOSAL
JONES COUNTY PUBLIC WORKS BUILDING
TRENTON, NC**

The Contractor shall commence work to be performed under this Contract on a date to be specified in written order from the Designer/Owner and shall fully complete all work here under the base bid within Three Hundred Sixty Five (365) consecutive calendar days from the Notice to Proceed. For each day in excess of the above number of days, the Contractor shall pay the Owner the amount of Two Hundred Fifty Dollars (\$250.00) per day as liquidated damages reasonably estimated in advance to cover the losses to be incurred by the Owner should the Contractor fail to complete the Work within the time specified.

In submitting this bid, it is understood that the Owner reserves the unqualified right to reject any and all proposals.

Respectfully submitted this _____ day of _____, 2022.

Firm or Corporation Making Bid:

By: _____
Print Name

Signature

Title: _____
(Owner, Partner or Corporation President or Vice-President Only)

Address:

Telephone Number

E-mail Address:

Contractor Classification:

Contractor License Number:

Contractor Federal Tax Identification Number:
(Corporate Seal)

NOTARY PUBLIC WITNESS:

State of: _____

County of: _____

Subscribed and sworn to before me this _____ day of _____

Notary Public: _____

**FORM OF PROPOSAL
JONES COUNTY PUBLIC WORKS BUILDING
TRENTON, NC**

My Commission expires: _____

The Bidder declares that he has received, reviewed and complied with all instructions issued in the following addenda:

Addenda Received and Considered in Preparing the Bid.
(Initial as appropriate)

Addendum No. 1 Rec'd Date _____ Print Name _____

Signature _____

Addendum No. 2 Rec'd Date _____ Print Name _____

Signature _____

Addendum No. 3 Rec'd Date _____ Print Name _____

Signature _____

Addendum No. 4 Rec'd Date _____ Print Name _____

Signature _____

Addendum No. 5 Rec'd Date _____ Print Name _____

Signature _____

Addendum No. 6 Rec'd Date _____ Print Name _____

Signature _____

Addendum No. 7 Rec'd Date _____ Print Name _____

Signature _____

Addendum No. 8 Rec'd Date _____ Print Name _____

Signature _____

List of Sub-Contractors/Vendors proposed to be used for the Project; include their appropriate license/registration numbers if applicable: (Mark N/A if not applicable)

Subcontractor/Vendor

License/Registration

END OF FORM OF PROPOSAL

SECTION 083323

OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data, Shop Drawings, manufacturer's color charts, and maintenance data.

PART 2 - PRODUCTS

2.1 DOOR ASSEMBLY

- A. Manufacturers:
 - 1. ACME Rolling Doors.
 - 2. Cornell Iron Works, Inc..
 - 3. Overhead Door Corporation.
 - 4. Or equal
- B. Description: Insulated service door.
 - 1. Operation Cycles: Not less than 10,000
 - 2. Coiling doors are labeled by UL for sizes not exceeding 152 sq. ft. (14 sq. m), with no dimension exceeding 13 feet 6 inches (4.11 m).
 - 3. For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
- C. Structural Performance, Exterior Doors: Capable of withstanding **40 lbf/sq. ft. (960 Pa)** design wind load.
- D. Windborne-Debris Impact Resistance: Provide impact-protective overhead coiling doors that pass missile-impact and cyclic-pressure tests according to E 1996 for Wind Zone 2 (for exterior doors).
- E. Curtain Material and Finish: Galvanized steel with baked-enamel finish; color as selected by Architect from manufacturer's standard range.
- F. Curtain Slats: Flat-profile, insulated slats with solid surface.
 - 1. Insulated-Slat Interior Facing: Metal

- G. Hood: Match curtain material and finish.
- H. Manual Door Operator: Chain-hoist operator.
- I. Guide Tracks, Supports, and Hardware: Manufacturer's standard.
- J. Curtain Accessories: Equip door with weather seals.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install door, track, and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports.
- B. Accessibility: Install doors and controls along accessible routes in compliance with regulatory requirements for accessibility.
- C. Test and adjust controls and safeties.

END OF SECTION 083323

SECTION 084113**ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS****PART 1 - GENERAL****1.1 SECTION REQUIREMENTS**

- A. Submittals: Product Data, Shop Drawings, and color Samples.
 - 1. For entrance doors, include hardware schedule.

PART 2 - PRODUCTS**2.1 PERFORMANCE REQUIREMENTS**

- A. Structural Performance: Design, engineer, fabricate, and install aluminum-framed storefronts to withstand structural loads indicated.
 - 1. Limit deflection of framing members normal to wall plane to 1/175 of clear span or an amount that restricts edge deflection of individual glazing lites to **3/4 inch (19 mm)**, whichever is less.
 - 2. Limit deflection of framing members parallel to glazing plane to L/360 of clear span or **1/8 inch (3.2 mm)**, whichever is smaller.
- B. Structural Testing: Systems tested according to ASTM E 330 at **150** percent of inward and outward wind-load design pressures do not evidence material failures, structural distress, deflection failures, or permanent deformation of main framing members exceeding **0.2** percent of clear span.
- C. Windborne-Debris Resistance: Framing system and doors pass **basic**-protection testing requirements in ASTM E 1996 for **Wind Zone 2** when tested according to ASTM E 1886. **DP-30**
- D. Air Infiltration: Limited to **0.06 cfm/sq. ft. (0.03 L/s per sq. m)** of fixed framing and glass area when tested according to ASTM E 283 at a static-air-pressure difference of **1.57 lbf/sq. ft. (75 Pa)**.
- E. Water Penetration: Systems do not evidence water leakage when tested according to ASTM E 331 at minimum differential pressure of 20 percent of positive wind-load design pressure but not less than **6.24 lbf/sq. ft. (300 Pa)**.
- F. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than **0.57 Btu/sq. ft. x h x deg F (3.23 W/sq. m x K)** as determined according to NFRC 100.

2.2 ALUMINUM-FRAMED STOREFRONTS

- A. EFCO Corp.
- B. Kawneer Co. Inc.
- C. Tubelite Architectural Systems
- D. YKK AP America Inc.
- E. Or Equal.
- F. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated; **ASTM B 209 (ASTM B 209M)** sheet; **ASTM B 221 (ASTM B 221M)** extrusions.
- G. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
 - 1. Construction: Thermally broken.
- H. Doors: **1-3/4-inch- (44.5-mm-)** thick glazed doors with minimum **0.125-inch- (3.2-mm-)** thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods. Provide snap-on, extruded-aluminum glazing stops and preformed gaskets.
 - 1. Door Design: Medium stile; **3-1/2-inch (88.9-mm)** nominal width.
 - 2. Accessible Doors: Smooth surfaced for width of door in area within **10 inches (255 mm)** above floor or ground plane.
 - 3. Interior Doors: Provide BHMA A156.16 silencers, three on strike jamb of single-door frames and two on head of double-door frames.
 - 4. Exterior Doors: Provide compression weather stripping at fixed stops. At other locations, provide sliding weather stripping retained in adjustable strip mortised into door edge.
 - 5. Hardware: By Manufacturer.
- I. Glazing: Low Emissivity Insulating Glass (1" Insulated Units).
 - 1. Exterior glass panes for Low-E insulating units shall be Type I annealed flat glass, Class 2-tinted with anti-reflective low-emissivity coating on No. 2 surface (inside surface of exterior pane) Quality q3 - glazing select, conforming to **ASTM C1036**. Glass performance shall be U value maximum of 0.328, Solar Heat Gain Coefficient (SHGC) maximum of 0.195.
 - 2. Unless specified otherwise, in doors and sidelights, provide safety glazing material.
- J. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- K. Fasteners and Accessories: Compatible with adjacent materials, corrosion resistant, nonstaining, and nonbleeding. Use concealed fasteners except for application of door hardware.
- L. Fabrication: Fabricate framing in profiles indicated for flush glazing (without projecting stops). Provide subframes and reinforcing of types indicated or, if not indicated, as required for a complete system. Factory-assemble components to greatest extent possible. Disassemble components only as necessary for shipment and installation.

1. Door Framing: Reinforce to support imposed loads. Factory-assemble door and frame units and factory-install hardware to greatest extent possible. Reinforce door and frame units for hardware indicated. Cut, drill, and tap for factory-installed hardware before finishing components.
- M. Aluminum Finish: Class I, color anodic finish; complying with AAMA 611, color selected by Architect.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Isolate metal surfaces in contact with incompatible materials, including wood, by painting contact surfaces with bituminous coating or primer or by applying sealant or tape recommended by manufacturer.
- B. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
- C. Set continuous sill members and flashing in full sealant bed to produce weathertight installation.
- D. Install framing components true in alignment with established lines and grades to the following tolerances:
 1. Variation from Plane: Limit to **1/8 inch in 12 feet (3 mm in 3.7 m)**; **1/4 inch (6 mm)** over total length.
 2. Alignment: For surfaces abutting in line, limit offset to **1/16 inch (1.5 mm)**. For surfaces meeting at corners, limit offset to **1/32 inch (0.8 mm)**.
 3. Diagonal Measurements: Limit difference between diagonal measurements to **1/8 inch (3 mm)**.
- E. Install doors without warp or rack. Adjust doors and hardware to provide tight fit at contact points and smooth operation.

END OF SECTION 084113

SECTION 08 53 13 - VINYL WINDOWS**PART 1 - GENERAL****1.1 SUMMARY****A. Section Includes:**

1. Vinyl windows.

1.2 WARRANTY**A. Special Warranty: Manufacturer agrees to repair or replace vinyl windows that fail in materials or workmanship within specified warranty period.****1. Failures include, but are not limited to, the following:**

- a. Failure to meet performance requirements.
- b. Structural failures including excessive deflection, water leakage, and air infiltration.
- c. Faulty operation of movable sash and hardware.
- d. Deterioration of materials and finishes beyond normal weathering.
- e. Failure of insulating glass.

2. Warranty Period:

- a. Window: Five years from date of Construction Completion.
- b. Glazing Units: Five years from date of Construction Completion.

PART 2 - PRODUCTS**2.1 SOURCE LIMITATIONS****A. Obtain vinyl windows from single source from single manufacturer.****2.2 PERFORMANCE REQUIREMENTS****A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.****1. Window Certification: FGIA or WDMA certified with label attached to each window.****B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:**

1. Minimum Performance Class: CW.
2. Minimum Performance Grade: 40.

C. Energy Performance: Certified and labeled by manufacturer for energy performance as follows:

1. Solar Heat-Gain Coefficient (SHGC): As determined in accordance with NFRC 200.
- D. Windborne-Debris Impact Resistance: Passes ASTM E1886 ASTM E1996 for Wind Zone 2 for basic protection.
 1. DP-30 rating

2.3 VINYL WINDOWS

- A. Provide manufacturer's standard vinyl window assemblies consisting of frames, sashes, glass, hardware, fasteners, and all components and accessories as required for a complete installation.
- B. Operating Types: Provide the following operating types in locations indicated on Drawings:
 1. Single hung.
 2. Fixed.
- C. Frames and Sashes: Impact-resistant, UV-stabilized PVC complying with AAMA/WDMA/CSA 101/I.S.2/A440.
 1. Finish: Integral color, as selected by Architect from Manufacturers standard colors.
- A. Glazing: Low Emissivity Insulating Glass (1" Insulated Units)
 1. Exterior glass panes for Low-E insulating units shall be Type I annealed flat glass, Class 2-tinted with anti-reflective low-emissivity coating on No. 2 surface (inside surface of exterior pane) Quality q3 - glazing select, conforming to **ASTM C1036**. Glass performance shall be U value maximum of 0.328, Solar Heat Gain Coefficient (SHGC) maximum of 0.195.
- D. Hardware, General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with adjacent materials; designed to smoothly operate, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set units level, plumb, and true to line, without warp or rack of frames and panels. Provide proper support and anchor securely in place.
- B. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E 2112.
- C. Set sill members in bed of sealant or with gaskets, as indicated, to provide weathertight construction.
- D. Adjust operating panels, screens, and hardware to provide a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.

- E. Clean glass and aluminum surfaces immediately after installing windows. Remove nonpermanent labels from glass surfaces.

END OF SECTION 08 53 13

SECTION 099123
INTERIOR PAINTING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals:
 - 1. Product Data.
 - 2. Samples.
- B. Extra Materials: Deliver to Owner **1 gal. (3.8 L)** of each color and type of finish-coat paint used on Project, in containers, properly labeled and sealed.

PART 2 - PRODUCTS

2.1 PAINT

- A. Subject to compliance with requirements, provide one of the products listed below;
 - 1. Duron Paint Mfg. Co.
 - 2. Sherwin Williams
 - 3. Benjamin Moore
 - 4. Approved Equal.
- B. MPI Standards: Provide materials that comply with MPI standards indicated and listed in its "MPI Approved Products List."
 - 1. Primer, Latex, for Interior Gypsum Board: MPI #39.
 - 2. Latex, Interior, (Gloss Level 2): MPI #44.
 - 3. Latex, High-Performance Architectural, Semigloss (Gloss Level 5): MPI #141.
- C. Material Compatibility: Provide materials that are compatible with one another and with substrates.
 - 1. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- D. Paints and coatings shall comply with the following limits for VOC content:
 - 1. Flat Paints and Coatings: 50 g/L.
 - 2. Nonflat Paints, Coatings: 150 g/L.
 - 3. Primers, Sealers, and Undercoaters: 200 g/L.
 - 4. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.

5. Floor Coatings: 100 g/L.

E. Colors: As selected by Architect from Manufacturer's full range of colors.

2.2 CONCRETE SEALER

A. Water based siloxane concrete sealer

B. Subject to compliance with requirements, acceptable manufacturer's include:

1. Sherwin-Williams
2. Valspar
3. Quickcrete
4. Laticrete

C. Application:

1. Ambient air and surface temperatures must be above 40° F during the application and for 72 hours after. Avoid applying in excessive heat (over 90° F) and excessive humidity. New concrete should be allowed to cure for at least 28 days.
2. Follow manufacturer's written instructions for proper coverage and adhesion.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Comply with recommendations in MPI's "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove hardware, lighting fixtures, and similar items that are not to be painted. Mask items that cannot be removed. Reinstall items in each area after painting is complete.
- C. Clean and prepare surfaces in an area before beginning painting in that area. Schedule painting so cleaning operations will not damage newly painted surfaces.

3.2 APPLICATION

- A. Comply with recommendations in MPI's "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Paint exposed surfaces, unless otherwise indicated.
1. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces.
 2. Paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 3. Paint the back side of access panels.
 4. Color-code mechanical piping in accessible ceiling spaces.
 5. Do not paint prefinished items, items with an integral finish, operating parts, and labels unless otherwise indicated.

- C. Apply paints according to manufacturer's written instructions.
 - 1. Use brushes only where the use of other applicators is not practical.
 - 2. Use rollers for finish coat on interior walls and ceilings.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
 - 1. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

3.3 INTERIOR PAINT APPLICATION SCHEDULE

- A. Steel:
 - 1. Semigloss High-Performance Architectural Latex: Two coats over alkyd anticorrosive primer: MPI INT 5.1R.
- B. Gypsum Board: Including ceiling and wall surfaces as indicated on drawings.
 - 1. Gloss Level 2 Latex: Two coats over latex primer/sealer: MPI INT 9.2A.
- C. Concrete Floor:
 - 1. Water based concrete sealer

END OF SECTION 099123

SECTION 133419

METAL BUILDING SYSTEMS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1.1.1 Structural Performance

Provide metal building systems capable of withstanding the effects of gravity loads and the following loads and stresses within the limits and conditions indicated.

1.1.1.1 Engineering

Design metal building systems conforming to procedures described in MBMA MBSM.

1.1.1.2 Design Loads

Conform to the requirements of MBMA MBSM, ASCE 7, and the building code applicable to the project geographical location.

1.1.1.3 Live Loads

Include all vertical loads induced by the building occupancy indicated on the drawings, as well as loads induced by maintenance workers, materials and equipment for roof live loads.

1.1.1.4 Wind Loads

Include horizontal loads induced by a basic wind speed Project site of 130 mph.

1.1.1.5 Collateral Loads

Include additional dead loads other than the weight of metal building system for permanent items such as sprinklers, mechanical systems, electrical systems, and ceilings.

1.1.1.6 Auxiliary Loads

Include dynamic live loads, such as those generated by cranes and materials-handling equipment indicated on detail drawings.

1.1.1.7 Load Combinations

Design metal building systems to withstand the most critical effects of load factors and load combinations as required by MBMA MBSM, ASCE 7, and the building code applicable to the project location.

1.1.1.8 Deflection Limits

Engineer assemblies to withstand design loads with deflections no greater than the following:

- a. Purlins and Rafters; vertical deflection of $1/180$ of the span.
- b. Girts; horizontal deflection of $1/240$ of the span.
- c. Metal Roof Panels; vertical deflection of $1/180$ of the span.
- d. Metal Wall Panels; horizontal deflection of $1/180$ of the span.

Design secondary framing system to accommodate deflection of primary building structure and construction tolerances, and to maintain clearances at openings. Provide metal panel assemblies capable of withstanding the effects of loads and stresses indicated, based on testing according to ASTM E1592.

1.1.2 Seismic Performance

Design and engineer metal building system capable of withstanding the effects of earthquake motions determined according to ASCE 7, AISC 341, and the applicable portions of the building code in the geographic area where the construction will take place.

1.1.3 Thermal Movements

Provide metal panel systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss as follows:

Temperature Change (Range); 120 F, ambient; 180 F, material surfaces.

1.1.4 Thermal Performance

Provide insulated assemblies with the following maximum U-factors and minimum R-values for opaque elements when tested according to ASTM C1363 or ASTM C518.

1.1.4.1 Metal Roof Panel Assemblies

- a. R-Value: 38

1.1.4.2 Metal Wall Panel Assemblies

- a. R-Value: 20

1.1.5 Air Infiltration for Metal Roof Panels

Air leakage through assembly must not exceed 0.06 cfm/sq.ft. of roof area when tested according to ASTM E168 at negative test-pressure difference of 1.57 lb/sq.ft..

1.1.6 Air Infiltration for Metal Wall Panels

Air leakage through assembly of not more than 0.06 cfm/sq.ft. of wall area when tested according to ASTM E283 at static-air-pressure difference of 6.24 lbf/sq.ft..

1.1.7 Water Penetration for Metal Roof Panels

No water penetration when tested according to ASTM E1646 at test-pressure difference of 2.86 lbf/sq.ft..

1.1.8 Water Penetration for Metal Wall Panels

No water penetration when tested according to ASTM E331 at a minimum differential pressure of 20 percent of inward-acting, wind-load design pressure of not less than 6.24 lbf/sq.ft.. and not more than 12 lbf/sq. ft.

1.1.9 Wind-Uplift Resistance

Provide metal roof panel assemblies that comply with ASCE 7.

Drift Provisions

Lateral deflections, or drift, at the roof level of a structure in relation to the floor or slab on grade, caused by deflection of horizontal force resisting elements, shall be less than 0.75 inches.

1.2 DEFINITIONS

ASTM DEFONLINE applies to this definition paragraph.

- a. Bay: Dimension between main frames measured normal to frame (at centerline of frame) for interior bays, and dimension from centerline of first interior main frame measured normal to end wall (outside face of end-wall girt) for end bays.
- b. Building Length: Dimension of the building measured perpendicular to main framing from end wall to end wall (outside face of girt to outside face of girt).
- c. Building Width: Dimension of the building measured parallel to main framing from sidewall to sidewall (outside face of girt to outside face of girt).
- d. Clear Span: Distance between supports of beams, girders, or trusses (measured from lowest level of connecting area of a column and a rafter frame or knee).
- e. Eave Height: Vertical dimension from finished floor to eave (the line along the sidewall formed by intersection of the planes of the roof and wall).

- f. Clear Height under Structure: Vertical dimension from finished floor to lowest point of any part of primary or secondary structure, not including crane supports, located within clear span.
- g. Terminology Standard: Refer to MBMA "Metal Building Systems Manual" for definitions of terms for metal building system construction not otherwise defined in this Section or in referenced standards.

1.3 SYSTEM DESCRIPTION

General: Provide a complete, integrated set of mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water into building interior. Include primary and secondary framing, metal roof panels, metal wall panels, and accessories complying with requirements indicated.

Provide metal building system of size and with spacing, slopes, and spans indicated.

1.3.1 Primary Frame Type

- a. Rigid Clear Span: Solid-member, structural-framing system without interior columns.

1.3.2 Fixed End-Wall Framing

Provide manufacturer's standard fixed end wall, for buildings not required to be expandable, consisting of primary frame, capable of supporting one-half of a bay design load, and end-wall columns.

1.3.3 Secondary Frame Type

Provide manufacturer's standard purlins and joists and flush-framed girts.

1.3.4 Eave Height

Eave height must be as indicated by nominal height on Drawings.

1.3.5 Bay Spacing

Bay Spacing must be as determined by manufacturer.

1.3.6 Roof Slope

Roof slope must be 2 inches per 12 inches.

1.3.7 Roof System

Provide manufacturer's standard metal roof panels with R-38 vinyl reinforced Liner System insulation per Section 07 MINERAL FIBER BATT INSULATION.

1.3.8 Exterior Wall System

Provide manufacturer's field-assembled, insulated (R-20) metal wall panels complete with vapor barrier conforming to ASTM E96/E96M. Provide manufacturer's standard panel profile on exterior.

1.4 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

Preconstruction Submittals

Manufacturer's Qualifications

Shop Drawings

Detail Drawings

Product Data

Manufacturer's catalog data

Samples

Roof Panels

Wall Panels

Fasteners

Metal Closure Strips

Vapor Barrier

Manufacturer's color charts and chips, 4 by 4 inches

Design Data

Manufacturer's descriptive and technical literature

Manufacturer's building design analysis

Test Reports

Test reports

Coatings and base metals

Factory Color Finish Performance Requirements

Certificates

System components

Coil Stock Certification

Aluminized Steel Repair Paint

Galvanizing Repair Paint

Enamel Repair Paint

Qualification of Manufacturer

Qualification of Erector

Manufacturer's Instructions

Installation of Roof and Wall panels

Shipping, handling, and storage

Closeout Submittals

Manufacturer's Warranty

Contractor's Warranty for Installation

1.5 QUALITY ASSURANCE

1.5.1 Pre-Erection Conference

After submittals are received and approved but before metal building system work, including associated work, is performed, the Contractor will hold a pre-erection conference to review the following:

- a. The detail drawings, specifications, and manufacturer's descriptive and technical literature.
- b. Finalize construction schedule and verify availability of materials, erector's personnel, equipment, and facilities needed to make progress and avoid delays.
- c. Methods and procedures related to metal building system erection, including, but not limited to: qualification of manufacturer, qualification of erector, manufacturer's catalog data, building design analysis, written instructions and test reports.
- d. Support conditions for compliance with requirements, including alignment between and erection of structural members.
- e. Flashing, special roofing and siding details, roof and wall penetrations, openings, and condition of other construction that will affect metal building system, including coatings and base metals, factory color finish performance requirements, system components, and certificates for coil stock.
- f. Governing regulations and requirements for, certificates, insurance, tests and inspections if applicable.
- g. Temporary protection requirements for metal panel assembly during and after installation.
- h. Samples of aluminized steel repair paint, galvanizing repair paint, and enamel repair paint.

1.5.1.1 Pre-Roofing and Siding Installation Conference

After structural framing system erection and approval but before roofing, siding, insulation and vapor barrier work, including associated work, is performed; the Contractor will hold a pre-roofing and siding conference to review the following:

- a. Examine purlins, sub-girts and formed shapes conditions for compliance with requirements, including flatness and attachment to structural members.
- b. Review structural limitations of purlins, sub-girts and formed shapes during and after roofing and siding.
- c. Review flashings, special roof and wall details, roof drainage, roof and wall penetrations, roof equipment curbs, and condition of other construction that will affect the metal building system.

- d. Review temporary protection requirements for metal roof and wall panels' assembly during and after installation.
- e. Review roof and wall observation and repair procedures after metal building system erection.

1.5.2 Manufacturer's Technical Representative

The representative must have authorization from manufacturer to approve field changes and be thoroughly familiar with the products, erection of structural framing and installation of roof and wall panels in the geographical area where construction will take place.

1.5.3 Manufacturer's Qualifications

Metal building system manufacturer must have a minimum of five (5) years experience as a qualified manufacturer of metal building systems and accessory products.

Provide engineering services by an authorized currently licensed engineer in the geographical area where construction will take place, having a minimum of four years experience as an engineer knowledgeable in building design analysis, protocols and procedures for the "Metal Building Systems Manual" (MBMA MBSM); ASCE 7, the building code in the geographic area where the construction will take place and ASTM E1592.

Provide certified engineering calculations using the products submitted for:

- a. Roof and Wall Wind Loads with basic wind speed, exposure category, co-efficient, importance factor, designate type of facility, negative pressures for each zone, methods and requirements of attachment.
- b. Roof Dead and Live Loads
- c. Collateral Loads
- d. Foundation Loads
- e. Roof Snow Load
- f. Seismic Loads

1.5.4 Qualification of Erection Contractor

An experienced erector who has specialized in erecting and installing work similar in material, design, and extent to that indicated for this Project and must be approved and certified by the metal building system manufacturer.

1.5.5 Single Source

Obtain primary and secondary components and structural framing members, each type of metal roof, wall and liner panel assemblies, clips, closures and other accessories from the standard products of the single source from a single manufacturer to operate as a complete system for the intended use.

1.5.6 Welding

Qualify procedures and personnel according to AWS A5.1/A5.1M, AWS D1.1/D1.1M, and AWS D1.3/D1.3M.

1.5.7 Structural Steel

Comply with AISC 325, AISC 341 for seismic impacted designs, AISC 360, for design requirements and allowable stresses.

1.5.8 Cold-Formed Steel

Comply with AISC/AISI 121 and AISI SG03-3 for design requirements and allowable stresses.

1.5.9 Fire-Resistance Ratings

Where indicated, provide metal panels identical to those of assemblies tested for fire resistance per ASTM E119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

Indicate design designations from UL Bld Mat Dir or from the listings of another qualified testing agency. Combustion Characteristics must conform to ASTM E136.

1.5.10 Surface-Burning Characteristics

Provide metal panels having insulation and vapor barrier material with the following surface-burning characteristics as determined by testing identical products according to ASTM E84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency showing:

- a. Flame-Spread Index: 25 or less.
- b. Smoke-Developed Index: 450 or less.

1.5.11 Fabrication

Fabricate and finish metal panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes and as necessary to fulfill indicated performance requirements. Comply with indicated profiles with dimensional and structural requirements

Provide metal panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel. Aluminum and aluminum-alloy sheet and plate must conform to ASTM B209.

Fabricate metal panel side laps with factory-installed captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, in a manner that will seal weather-tight and minimize noise from movements within panel assembly.

Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA 1793 that apply to the design, dimensions, metal, and other characteristics of item indicated:

- a. 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.
- b. End Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
- c. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
- d. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
- e. Fabricate cleats and attachment devices of size and metal thickness recommended by SMACNA or by metal building system manufacturer for application, but not less than thickness of metal being secured.

1.5.12 Finishes

Comply with NAAMM AMP 500 for recommendations for applying and designating finishes.

Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

1.6 SHIPPING, HANDLING AND STORAGE

1.6.1 Delivery

Package and deliver components, sheets, metal panels, and other manufactured items so as not to be damaged or deformed and protected during transportation and handling.

Stack and store metal panels horizontally on platforms or pallets, covered with suitable weather-tight and ventilated covering to ensure dryness, with positive slope for drainage of water. Store in a manner to prevent bending, warping, twisting, and surface damage. Do not store metal wall panels in contact with other materials that might cause staining, denting, or other surface damage. Retain strippable protective covering on metal panel for entire period up to metal panel installation.

Complete installation and concealment of plastic materials as rapidly as possible in each area of construction to minimize ultraviolet exposure.

1.7 PROJECT CONDITIONS

1.7.1 Weather Limitations

Proceed with installation preparation only when existing and forecasted weather conditions permit Work to proceed without water entering into existing panel system or building.

1.7.2 Field Measurements

1.7.2.1 Established Dimensions for Foundations

Comply with established dimensions on approved anchor-bolt plans, established foundation dimensions, and proceed with fabricating structural framing. Do not proceed without verifying field measurements. Coordinate anchor-bolt installation to ensure that actual anchorage dimensions correspond to established dimensions.

1.7.2.2 Established Dimensions for Metal Panels

Where field measurements cannot be made without delaying the Work, either establish framing and opening dimensions and proceed with fabricating metal panels without field measurements or allow for field trimming metal panels. Coordinate construction to ensure that actual building dimensions, locations of structural members, and openings correspond to established dimensions.

1.7.2.3 Verification Record

Verify locations of all framing and opening dimensions by field measurements before metal panel fabrication and indicate measurements on Shop Drawings.

1.8 COORDINATION

Coordinate size and location of concrete foundations and casting of anchor-bolt inserts into foundation walls and footings. Concrete, reinforcement, and formwork requirements are specified in Section 03 30 00 CAST-IN-PLACE CONCRETE.

Coordinate installation of HVAC system equipment supports ductwork and supports piping and supports and accessories, which are specified in Division 23 - HEATING, VENTILATING AND AIR-CONDITIONING (HVAC).

Coordinate installation of roof curbs equipment supports and roof penetrations, which are specified in Division 07 - THERMAL AND MOISTURE PROTECTION.

Coordinate metal panel assemblies with rain drainage work, flashing, trim, and construction of supports and other adjoining work to provide a leak-proof, secure, and non-corrosive installation.

1.9 WARRANTY

1.9.1 Building System Warranty

Furnish manufacturer's no-dollar-limit warranty for the metal building system. The warranty period is to be no less than 20 years from the date of acceptance of the work and be issued directly to the Government. The warranty must provide that if within the warranty period, the metal building system shows evidence of deterioration resulting from defective materials and/or workmanship, correcting of any

defects is the responsibility of the metal building system manufacturer. Repairs that become necessary because of defective materials and workmanship while metal building system is under warranty are to be performed within 32 hours after notification, unless additional time is approved by the Owner. Failure to perform repairs within 32 hours of notification will constitute grounds for having emergency repairs performed by others and will not void the warranty.

PART 2 PRODUCTS

2.1 STRUCTURAL FRAMING MATERIALS

2.1.1 W-Shapes

ASTM A992/A992M; ASTM A572/A572M or ASTM A529/A529M.

2.1.2 Channel, Angles, M-Shapes and S-Shapes

ASTM A36/A36M; ASTM A572/A572M or ASTM A529/A529M.

2.1.3 Plate and Bar

ASTM A36/A36M, ASTM A572/A572M or ASTM A529/A529M.

2.1.4 Steel Pipe

ASTM A36/A36M, ASTM A53/A53M, ASTM A572/A572M or ASTM A529/A529M.

2.1.5 Cold-Formed and Hot Formed Hollow Structural Sections

Cold formed: ASTM A500/A500M or ASTM B221, ASTM B221M. Hot-formed: ASTM A501.

2.1.6 Structural-Steel Sheet

Hot-rolled, ASTM A1011/A1011M or cold-rolled, ASTM A1008/A1008M.

2.1.7 Metallic-Coated Steel Sheet

ASTM A653/A653M, ASTM A606/A606M.

2.1.8 Metallic-Coated Steel Sheet Pre-painted with Coil Stock Coating

Steel sheet metallic coated by the hot-dip process and pre-painted by the coil-coating process to comply with ASTM A755/A755M.

a. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, and ASTM A123/A123M.

2.1.9 High-Strength Bolts, Nuts, and Washers

ASTM A325, heavy hex steel structural bolts; ASTM A563 heavy hex carbon-steel nuts; and ASTM F436 hardened carbon-steel washers.

Finish: Mechanically deposited zinc coating, ASTM B695.

Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F1852, heavy-hex-head steel structural bolts with spline.

Finish: Mechanically deposited zinc coating, ASTM B695 .

2.1.10 Non-High-Strength Bolts, Nuts, and Washers

ASTM A307, ASTM A563, and ASTM F844.

Finish: ASTM B695.

2.1.11 Anchor Rods

ASTM F1554.

- a. Configuration: Straight.
- b. Nuts: ASTM A563 hex carbon steel.
- c. Plate Washers: ASTM A36/A36M carbon steel.
- d. Washers: ASTM F436 hardened carbon steel.
- e. Finish: Mechanically deposited zinc coating, ASTM B695.

2.1.12 Threaded Rods

ASTM A193/A193M.

- a. Nuts: ASTM A563 hex carbon steel.
- b. Washers: ASTM F436 hardened carbon steel.
- c. Finish: Mechanically deposited zinc coating, ASTM B695.

2.1.13 Primer

SSPC-Paint 15, Type I, red oxide.

2.2 FABRICATION

2.2.1 General

Comply with MBMA MBSM - "Metal Building Systems Manual": Chapter IV, Section 9, "Fabrication and Erection Tolerances."

2.3 STRUCTURAL FRAMING

2.3.1 General

Clean all framing members to remove loose rust and mill scale. Provide 1 shop coat of primer to an average dry film thickness of 1 mil according to SSPC SP 2. Balance of painting and coating procedures must conform to SSPC Paint 15 and SSPC Painting Manual.

2.3.2 Primary Framing

Manufacturer's standard structural primary framing system includes transverse and lean-to frames; rafter, rakes, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing designed to withstand required loads and specified requirements. Provide frames with attachment plates, bearing plates, and splice members. Provide frame span and spacing indicated.

Shop fabricate framing components by welding or by using high-strength bolts to the indicated size and section with base-plates, bearing plates, stiffeners, and other items required. Cut, form, punch, drill, and weld framing for bolted field erection.

- a. Rigid Clear-Span Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Interior columns are not permitted.
- b. Frame Configuration: Single gable.
- c. Exterior Column Type: Uniform depth and Tapered as indicated on drawings.
- d. Rafter Type: Tapered.

2.3.3 Secondary Framing

Manufacturer's standard secondary framing members, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Fabricate framing from cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet pre-painted with coil coating, unless otherwise indicated.

Shop fabricate framing components by roll-forming or break-forming to the indicated size and section with base-plates, bearing plates, stiffeners, and other plates required for erection. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.

- a. Purlins: C or Z-shaped sections; fabricated from steel sheet, built-up steel plates, or structural-steel shapes; minimum depth as required to comply with system performance requirements.
- b. Girts: C or Z-shaped sections; fabricated from steel sheet, built-up steel plates, or structural-steel shapes. Form ends of Z-sections with stiffening lips angled 40 to 50 degrees to flange minimum depth as required to comply with system performance requirements.

- c. Eave Struts: Unequal-flange, C-shaped sections; fabricated from steel sheet, built-up steel plates, or structural-steel shapes; to provide adequate backup for metal panels.
- d. Flange Bracing: Structural-steel angles or cold-formed structural tubing to stiffen primary frame flanges.
- e. Sag Bracing: Structural-steel angles.
- f. Base or Sill Angles: Zinc-coated (galvanized) steel sheet.
- g. Purlin and Girt Clips: Steel sheet. Provide galvanized clips where clips are connected to galvanized framing members.
- h. Secondary End-Wall Framing: Manufacturer's standard sections fabricated from zinc-coated (galvanized) steel sheet.
- i. Framing for Openings: Channel shapes; fabricated cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings, and head, jamb, and sill of other openings.
- j. Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.

2.3.4 Bracing

Provide adjustable wind bracing as follows:

- a. Angles: Fabricated from structural-steel shapes to match primary framing, of size required to withstand design loads.
- b. Rigid Portal Frames: Fabricate from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.
- c. Fixed-Base Columns: Fabricate from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.
- d. Bracing: Provide wind bracing using any method specified above, at manufacturer's option.

2.4 PANEL MATERIALS

2.4.1 Aluminum Sheet

Roll-form aluminum panels to the specified profile, with $f_y = .032$ inch thickness and depth as indicated. Material must be plumb and true, and within the tolerances listed:

- a. Aluminum Sheet conforming to ASTM B209, AA ADM-105 and AA ASD1.

- b. Individual panels to have continuous length to cover the entire length with no joints or seams and formed without warping, waviness, or ripples that are not part of the panel profile and free of damage to the finish coating system.
- c. Provide panels with thermal expansion and contraction consistent with the type of system specified.
 - 1. Profile and coverage to be a minimum height and width from manufacturer's full line of options.
 - 2. Roof Profile to be a 1-1/2 inch high rib at 12 inches o.c. with small stiffening ribs, 38 inch overall width with 36 inch coverage and exposed fasteners.
 - 4. Wall profile to be a V groove profile at 8 inches o.c. with concealed fasteners.

2.4.2 Steel Sheet

Roll-form steel roof and wall panels to the specified profile, with $f_y = 26$ gauge for wall panels and 24 gauge for roof panels and depth as indicated. Material must be plumb and true, and within the tolerances listed:

- a. Aluminum-Zinc Alloy-coated Steel Sheet conforming to ASTM A792/A792M and AISI SG03-3.
- b. Individual panels to have continuous length to cover the entire length of any unbroken area with no joints or seams and formed without warping, waviness, or ripples that are not part of the panel profile and free of damage to the finish coating system.
- c. Provide panels with thermal expansion and contraction consistent with the type of system specified; profile and coverage to be a minimum height and width from manufacturer's full line of options.

Roof profile to be a 1-1/2 inch high rib at 12 inches o.c. with small stiffening ribs, 38 inch overall width with 36 inch coverage and exposed fasteners.

Wall profile to be a V groove profile at 8 inches o.c. and concealed fasteners.

2.4.3 Finish

All panels are to receive a factory-applied Kynar 500/Hylar 5000 finish consisting of a baked-on top-coat with a manufacturer's recommended prime coat conforming to the following:

- a. Metal Preparation: All metal is to have the surfaces carefully prepared for painting on a continuous process coil coating line by alkali cleaning, hot water rinsing, application of chemical conversion coating, cold water rinsing, sealing with acid rinse, and thorough drying.
- b. Prime Coating: A base coat of epoxy paint, specifically formulated to interact with the top-coat, is to be applied to the prepared surfaces by roll coating to a dry film thickness of 0.20 plus 0.05 mils. This prime coat must be oven cured prior to application of finish coat.

- c. Exterior Finish Coating: Apply the finish coating over the primer by roll coating to dry film thickness of 0.80 plus 5 mils (3.80 plus 0.50 mils for Vinyl Plastisol) for a total dry film thickness of 1.00 plus 0.10 mils (4.00 plus 0.10 mils for Vinyl Plastisol). This finish coat must be oven-cured.
- d. Interior Finish Coating: Apply a wash-coat on the reverse side over the primer by roll coating to a dry film thickness of 0.30 plus 0.05 mils for a total dry film thickness of 0.50 plus 0.10 mils. The wash-coat must be oven-cured.
- e. Color: The exterior finish chosen from the manufacturer's color charts and chips.
- f. Physical Properties: Coating must conform to the industry and manufacturer's standard performance criteria as listed by the following certified test reports:

Chalking: ASTM DEFONLINE

Color Change and Conformity: ASTM D2244

Weatherometer: ASTM G152, ASTM G153 and ASTM D822

Humidity: ASTM D2247 and ASTM D714

Salt Spray: ASTM B117

Chemical Pollution: ASTM D1308

Gloss at 60 degrees: ASTM D523

Pencil Hardness: ASTM D3363

Reverse Impact: ASTM D2794

Flexibility: ASTM D522

Abrasion: ASTM D968

Flame Spread: ASTM E84

2.4.4 Repair Of Finish Protection

Repair paint for color finish enameled metal panel must be compatible paint of the same formula and color as the specified finish furnished by the metal panel manufacturer, conforming to ASTM A780/A780M.

2.5 MISCELLANEOUS METAL FRAMING

2.5.1 General

Cold-formed metallic-coated steel sheet conforming to ASTM A653/A653M unless otherwise indicated.

2.5.2 Fasteners for Miscellaneous Metal Framing

Refer to the following paragraph "FASTENERS".

2.6 FASTENERS

2.6.1 General

Type, material, corrosion resistance, size and sufficient length to penetrate the supporting member a minimum of 1 inch with other properties required to fasten miscellaneous metal framing members to substrates in accordance with the metal panel manufacturer's and ASCE 7 requirements.

2.6.2 Exposed Fasteners

Fasteners for metal panels to be corrosion resistant coated steel, aluminum, stainless steel, or nylon capped steel compatible with the sheet panel or flashing and of a type and size recommended by the manufacturer to meet the performance requirements and design loads. Fasteners for accessories to be the manufacturer's standard. Provide an integral metal washer matching the color of attached material with compressible sealing EPDM gasket approximately 3/32 inch thick.

2.6.3 Screws

Screws to be corrosion resistant coated steel, aluminum and/or stainless steel being the type and size recommended by the manufacturer to meet the performance requirements.

2.6.4 Rivets

Rivets to be closed-end type, corrosion resistant coated steel, aluminum or stainless steel where watertight connections are required.

2.6.5 Attachment Clips

Fabricate clips from steel hot-dipped galvanized in accordance with ASTM A653/A653M or Series 300 stainless steel. Size, shape, thickness and capacity as required meeting the insulation thickness and design load criteria specified.

2.7 FRAMES AND MATERIALS FOR OPENINGS

2.7.1 Doors

Fire-Rated and Non-Fire-Rated Door Assemblies conforming with NFPA 80 and based on testing according to NFPA 252 as specified in Division 08 - OPENINGS unless otherwise indicated.

2.7.2 Windows

Aluminum Window Assemblies conforming to AAMA/WDMA/CSA 101/I.S.2/A440 as specified in Division 08 - OPENINGS unless otherwise indicated.

2.8 ACCESSORIES

2.8.1 General

All accessories to be compatible with the metal panels; sheet metal flashing, trim, metal closure strips, caps and similar metal accessories must not be less than the minimum thickness specified for the metal panels. Exposed metal accessories/finishes to match the panels furnished, except as otherwise

indicated. Molded foam rib, ridge and other closure strips to be non-absorbent closed-cell or solid-cell synthetic rubber or pre-molded neoprene to match configuration of the panels.

2.8.2 Roof and Wall Accessories and Specialties

Aluminum roof curbs, equipment supports, roof hatches, dropout-type heat and smoke vents, hatch-type heat and smoke vents, gravity and roof ridge ventilators, wall louvers and other miscellaneous roof and wall equipment or penetrations conforming to AAMA, ASTM, and UL as specified in Division 07 unless other wise indicated.

2.8.3 Insulation

Faced, Glass-Fiber Blanket Liner System Insulation: ASTM C665, Type II, blankets with non-reflecting coverings; Class A, membrane-faced surface with a flame spread of 25 or less when tested in accordance with ASTM E84.

2.8.3.1 Polyethylene Vapor Retarder

Install polyethylene vapor retarder membrane over entire wall and roof surface. Use fully compatible polyethylene tape to seal the edges of the sheets to provide a vapor tight membrane. Lap sheets not less than 6 inch. Provide sufficient material to avoid inducing stresses in sheets due to stretching or binding. All tears or punctures visible in the finished surface, at anytime during the construction process, must be sealed with polyethylene tape.

2.8.3.2 Wall Liner

Securely fasten wall liner into place in accordance with the manufacturer's recommendation and in a neatly presented appearance.

2.8.4 Rubber Closure Strips

Closed-cell, expanded cellular rubber conforming to ASTM D1056 and ASTM D1667; extruded or molded to the configuration of the specified metal panel and in lengths supplied by the metal panel manufacturer.

2.8.5 Metal Closure Strips

Factory fabricated aluminum closure strips to be the same gauge, color, finish and profile of the specified panel.

2.8.6 2.6.6 Joint Sealants

2.8.6.1 Sealants

Sealants are to be an approved gun type for use in hand or air-pressure caulking guns at temperatures above 40 degrees F (or frost-free application at temperatures above 10 degrees F with minimum solid content of 85 percent of the total volume. Sealant is to dry with a tough, durable surface skin which

permits it to remain soft and pliable underneath, providing a weather-tight joint. No migratory staining is permitted on painted or unpainted metal, stone, glass, vinyl, or wood.

Prime all joints to receive sealants with a compatible one-component or two-component primer as recommended by the metal panel manufacturer.

2.8.6.2 Shop-Applied

Sealant for shop-applied caulking must be an approved gun grade, non-sag one component polysulfide or silicone conforming to ASTM C920, Type II, and with a curing time to ensure the sealant's plasticity at the time of field erection.

2.8.6.3 Field-Applied

Sealant for field-applied caulking must be an approved gun grade, non-sag one component polysulfide or two-component polyurethane with an initial maximum Shore A durometer hardness of 25, and conforming to ASTM C920, Type II. Color to match panel colors.

2.8.6.4 Tape Sealant

Pressure sensitive, 100 percent solid with a release paper backing; permanently elastic, non-sagging, non-toxic and non-staining as approved by the metal panel manufacturer.

2.9 SHEET METAL FLASHING AND TRIM

2.9.1 Fabrication

Shop fabricate sheet metal flashing and trim where practicable to comply with recommendations in SMACNA 1793 that apply to design, dimensions, metal, and other characteristics of item indicated. Obtain field measurements for accurate fit before shop fabrication.

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.

2.10 FINISHES

2.10.1 General

Comply with NAAMM AMP 500 for recommendations for applying and designating finishes.

2.10.2 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 the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 EXECUTION

3.1 EXAMINATION

Before erection proceeds examine with the erector present the concrete foundation dimensions, concrete and/or masonry bearing surfaces, anchor bolt size and placement, survey slab elevation, locations of bearing plates, and other embedment's to receive structural framing with the metal building manufacturer's templates and drawings before erecting any steel components for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

Examine primary and secondary framing to verify that rafters, purlins, angles, channels, and other structural and metal panel support members and anchorages have been installed within alignment tolerances required by metal building manufacturer, UL, ASTM, ASCE 7 and as required by the building code for the geographical area where construction will take place.

Examine roughing-in for components and systems penetrating metal roof or wall panels to verify actual locations of penetrations relative to seam locations of metal panels before metal roof or wall panel installation.

Submit to the Owner a written report, endorsed by Erector, listing conditions detrimental to performance of the Work.

Proceed with erection only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

Provide temporary shoring, guys, braces, and other supports during erection to keep the structural framing secure, plumb, and in alignment against temporary construction loading or loads equal in intensity of the building design loads. Remove temporary support systems when permanent structural framing, connections, and bracing are in place, unless otherwise indicated.

Clean substrates of substances harmful to insulation, including removing projections capable of interfering with insulation attachment and performance.

Miscellaneous Framing: Install sub-purlins, girts, angles, furring, and other miscellaneous support members or anchorage for the metal roof or wall panels, doors, windows, roof curbs, ventilators and louvers according to metal building manufacturer's written instructions.

3.3 ERECTION OF STRUCTURAL FRAMING

Erect metal building system according to manufacturer's written erection instructions, approved shop drawings and other erection documents in accordance with MBMA MBSM - "Metal Building Systems Manual".

Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer and the Architect.

Set structural framing accurately in locations and to elevations indicated and according to AISC 325 specifications. Maintain structural stability of frame during erection.

Clean and roughen concrete and masonry bearing surfaces prior to setting plates. Clean bottom surface of plates.

Align and adjust structural framing before permanent bolt-up and connections. Perform necessary adjustments and alignment to compensate for changes or discrepancies in elevations.

Maintain erection tolerances of structural framing in accordance with AISC 360.

3.4 METAL WALL PANEL INSTALLATION

Provide metal wall panels of full length from sill to eave as indicated, unless otherwise indicated or restricted by shipping limitations. Anchor metal wall panels and other components of the Work securely in place, in accordance with MBMA MBSM.

Erect wall panel system in accordance with the approved erection drawings, the printed instructions and safety precautions of the metal building manufacturer.

Sheets are not to be subjected to overloading, abuse, or undue impact. Do not install bent, chipped, or defective sheets.

Sheets must be erected true and plumb and in exact alignment with the horizontal and vertical edges of the building, securely anchored, and with the indicated eave, and sill.

Work is to allow for thermal movement of the wall panel, movement of the building structure, and to provide permanent freedom from noise due to wind pressure.

Field cutting metal wall panels by torch is not permitted.

3.5 ROOF PANEL INSTALLATION

Provide metal roof panels of full length from eave to ridge or eave to wall as indicated, unless otherwise indicated or restricted by shipping limitations. Anchor metal roof panels and other components of the Work securely in place in accordance with NRCA Roof Man and MBMA MBSM.

Erect roofing system in accordance with the approved erection drawings, the printed instructions and safety precautions of the metal building manufacturer.

Sheets are not to be subjected to overloading, abuse, or undue impact. Do not install bent, chipped, or defective sheets.

Sheets must be erected true and plumb and in exact alignment with the horizontal and vertical edges of the building, securely anchored, and with the indicated rake and eave overhang.

Work must allow for thermal movement of the roofing, movement of the building structure, and provide permanent freedom from noise due to wind pressure.

Field cutting metal roof panels by torch is not permitted.

Roofing sheets must be laid with corrugations in the direction of the roof slope. End laps of exterior roofing must not be less than 8 inches; the side laps of standard exterior corrugated sheets must not be not less than 2-1/2 corrugations.

Do not permit storage, walking, wheeling, and trucking directly on applied roofing materials. Provide temporary walkways, runways, and platforms of smooth clean boards or planks as necessary to avoid damage to the installed roofing materials, and to distribute weight to conform to the indicated live load limits of roof construction.

Install roof panels over 5/8" H thermal blocks per manufacturer's instructions.

3.6 METAL PANEL FASTENER INSTALLATION

Anchor metal panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.

3.7 FLASHING, TRIM AND CLOSURE INSTALLATION

- a. Comply with performance requirements, manufacturer's written installation instructions, and SMACNA 1793. Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
- b. Sheet metalwork is to be accomplished to form weather-tight construction without waves, warps, buckles, fastening stresses or distortion, and allow for expansion and contraction. Cutting, fitting, drilling, and other operations in connection with sheet metal required to accommodate the work of other trades is to be performed by sheet metal mechanics.

3.8 DOOR AND FRAME INSTALLATION

Install doors and frames plumb, rigid, properly aligned, and securely fastened in place according to manufacturer's written instructions. Coordinate installation with metal panel flashings and other components. Caulk and seal perimeter of each door frame with elastomeric sealant compatible with metal panels. Comply with installation requirements in Division 08 - OPENINGS.

3.9 WINDOW INSTALLATION (AS INDICATED)

Install windows plumb, rigid, properly aligned, without warp or rack of frames or sash, and securely fastened in place according to manufacturer's written instructions. Coordinate installation with metal panel flashings and other components. Caulk and seal perimeter of each window frame with elastomeric sealant compatible with for metal panels. Comply with installation requirements in Division 08 - OPENINGS.

3.10 ACCESSORY INSTALLATION

3.10.1 General

Install accessories with positive anchorage to building and weather-tight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

3.10.2 Dissimilar Metals

Where dissimilar metals contact one another or corrosive substrates are present, protect against galvanic action by painting dissimilar metal surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each surface, or by other permanent separation techniques as recommended by the metal building manufacturer.

3.10.3 Gutters and Downspouts

Comply with performance requirements, manufacturer's written installation instructions, and install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA 1793 recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.

3.10.4 Insulation

Comply with performance requirements and manufacturer's written installation instructions. Install insulation concurrently with metal panel installation, in thickness indicated to cover entire roof and wall area, as specified in Division 07 - THERMAL AND MOISTURE PROTECTION.

3.10.5 Roof and Wall Accessories and Specialties

Install roof and wall accessories and specialties complete with necessary hardware, anchors, dampers, weather guards, rain caps, and equipment supports as specified in Division 07 - THERMAL AND MOISTURE PROTECTION, unless otherwise indicated.

3.11 CLEAN-UP AND PROTECTION

3.11.1 Structural Framing

Clean all exposed structural framing at completion of installation. Remove metal shavings, filings, bolts, and wires from work area. Remove grease and oil films, excess sealants, handling marks, contamination from steel wool, fittings and drilling debris and scrub the work clean. Exposed metal surfaces to be free of dents, creases, waves, scratch marks, solder or weld marks, and damage to the finish coating.

3.11.2 Metal Panels

Clean all exposed sheet metal work at completion of installation. Remove metal shavings, filings, nails, bolts, and wires from work area. Remove protective coverings/films, grease and oil films, excess

sealants, handling marks, contamination from steel wool, fittings and drilling debris and scrub the work clean. Exposed metal surfaces to be free of dents, creases, waves, scratch marks, solder or weld marks, and damage to the finish coating.

3.11.3 Touch-Up Painting

After erection, promptly clean, prepare, and prime or re-prime field connections, rust spots, and abraded surfaces of prime-painted structural framing and accessories. Clean and touch-up paint with manufacturer's touch-up paint.

3.12 WARRANTY

3.12.1 MANUFACTURER'S WARRANTY

Submit all manufacturers' signed warranties to the Owner prior to final commissioning and acceptance.

3.12.2 CONTRACTOR'S WARRANTY for INSTALLATION

Submit contractor's warranty for installation to the Owner prior to final commissioning and acceptance.

END OF SECTION 133419

SECTION 210500 - COMMON WORK RESULTS FOR FIRE SUPPRESSION

PART 1 - GENERAL

1.1 SUMMARY

A. The Work of this Section includes:

1. Motors.
2. Sleeves without waterstop.
3. Sleeves with waterstop.
4. Stack-sleeve fittings.
5. Sleeve-seal systems.
6. Grout.
7. Silicone sealants.
8. Escutcheons.

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of product, excluding motors which are included in Part 1 of the fire-suppression equipment Sections.
 - a. Include construction details, material descriptions, and dimensions of components.
 - b. Include operating characteristics and furnished accessories.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.4 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:
1. Motor controllers.
 2. Torque, speed, and horsepower requirements of the load.
 3. Ratings and characteristics of supply circuit and required control sequence.
 4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 MOTORS

A. Motor Requirements, General:

1. Content includes motors for use on alternating-current power systems of up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.
2. Comply with requirements in this Section except when stricter requirements are specified in equipment schedules or Sections.
3. Comply with NEMA MG 1 unless otherwise indicated.

B. Motor Characteristics:

1. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 ft. above sea level.
2. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

C. Polyphase Motors:

1. Description: NEMA MG 1, Design B, medium induction motor.
2. Efficiency: Premium Efficient, as defined in NEMA MG 1.
3. Service Factor: 1.15.
4. Multispeed Motors: Variable torque.
 - a. For motors with 2:1 speed ratio, consequent pole, single winding.
 - b. For motors with other than 2:1 speed ratio, separate winding for each speed.
5. Multispeed Motors, Multiple Winding: Separate winding for each speed.
6. Rotor: Random-wound, squirrel cage.
7. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.
8. Temperature Rise: Match insulation rating.
9. Insulation: Class F.
10. Code Letter Designation:
 - a. Motors 15 HP and Larger: NEMA starting Code F or Code G.
 - b. Motors Smaller Than 15 HP: Manufacturer's standard starting characteristic.
11. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

D. Additional Requirements for Polyphase Motors:

1. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.
2. Motors Used with Variable-Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.
 - a. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time-rise pulses produced by pulse-width-modulated inverters.
 - b. Premium-Efficient Motors: Class B temperature rise; Class F insulation.
 - c. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
 - d. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.

E. Single-Phase Motors:

1. Motors larger than 1/20 hp must suit starting torque and requirements of specific motor application:
2. Multispeed Motors: Variable-torque, permanent-split-capacitor type.
3. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
4. Motors 1/20 HP and Smaller: Shaded-pole type.
5. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device will automatically reset when motor temperature returns to normal range.

2.2 SLEEVES AND SLEEVE SEALS

A. Sleeves without Waterstop:

1. Cast-Iron Pipe Sleeves: Cast or fabricated of cast or ductile iron, with plain ends.
2. Steel Pipe Sleeves: ASTM A53/A53M, Type E, Grade B, Schedule 40, hot-dip galvanized, with plain ends.
3. Steel Sheet Sleeves: ASTM A653/A653M, 24 gauge minimum thickness; hot-dip galvanized, round tube closed with welded longitudinal joint.
4. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange.

B. Sleeves with Waterstop:

1. Description: Manufactured steel, sleeve-type, waterstop assembly made for imbedding in concrete slab or wall.

C. Sleeve-Seal Systems:

1. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
 - a. Hydrostatic Seal: 20 psig minimum.
 - b. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size.

- c. Pressure Plates: Carbon steel.
- d. Connecting Bolts and Nuts: Carbon steel, with ASTM B633 coating of length required to secure pressure plates to sealing elements.

D. Grout:

- 1. Description: Nonshrink, for interior and exterior sealing openings in non-fire-rated walls or floors.
- 2. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- 3. Design Mix: 5000 psi (34.5 MPa), 28-day compressive strength.
- 4. Packaging: Premixed and factory packaged.

2.3 ESCUTCHEONS

A. Escutcheon Types:

- 1. One-Piece, Steel Type: With polished, chrome-plated finish and setscrew fastener.
- 2. One-Piece, Stainless Steel Type: With polished stainless steel finish.
- 3. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.
- 4. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped steel with polished, chrome-plated finish and spring-clip fasteners.

PART 3 - EXECUTION

3.1 INSTALLATION OF PIPE LOOPS AND SWING CONNECTIONS

- A. Install pipe loops and offsets in accordance with NFPA 13 requirements for expansion and contraction compensation.

3.2 INSTALLATION OF SLEEVES, GENERAL

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
- C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
 - 1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
 - 2. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.

3. Using grout, seal space outside of sleeves in floors/slabs/walls without sleeve-seal system. Select to maintain fire-resistance of floor/slab/wall.
- D. Install sleeves for pipes passing through interior partitions.
1. Cut sleeves to length for mounting flush with both surfaces.
 2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
 3. Seal annular space between sleeve and piping or piping insulation; use joint sealants that joint sealant manufacturer's literature indicates is appropriate for size, depth, and location of joint.
- E. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for firestopping and fill materials specified in Section 078413 "Penetration Firestopping."

3.3 INSTALLATION OF SLEEVES WITH WATERSTOP

- A. Install sleeve with waterstop as new walls and slabs are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange centered across width centered in concrete slab or wall.
- C. Secure nailing flanges to wooden concrete forms.
- D. Using grout, seal space around outside of sleeves.

3.4 INSTALLATION OF STACK-SLEEVE FITTINGS

- A. Install stack-sleeve fittings in new slabs as slabs are constructed.
1. Secure flashing between clamping flanges for pipes penetrating floors with membrane waterproofing. Comply with requirements for flashing specified in Section 076200 "Sheet Metal Flashing and Trim."
 2. Install section of cast-iron soil pipe to extend sleeve to 3 inches above finished floor level.
 3. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 4. Using silicone sealant, seal space between top hub of stack-sleeve fitting and pipe.
- B. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of floors at pipe penetrations. Seal pipe penetrations with fire- or smoke-stop materials. Comply with requirements for firestopping specified in Section 078413 "Penetration Firestopping."

3.5 INSTALLATION OF SLEEVE-SEAL SYSTEMS

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building, and passing through exterior walls.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.6 INSTALLATION OF ESCUTCHEONS

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

3.7 FIELD QUALITY CONTROL

- A. Sleeves and Sleeve Seals:
 - 1. Perform the following tests and inspections:
 - a. Leak Test: After allowing for a full cure, test sleeves and sleeve seals for leaks. Repair leaks and retest until no leaks exist.
 - b. Sleeves and sleeve seals will be considered defective if they do not pass tests and inspections.
 - 2. Prepare test and inspection reports.
- B. Escutcheons:
 - 1. Using new materials, replace broken and damaged escutcheons and floor plates.

3.8 SLEEVES APPLICATION

- A. Use sleeves and sleeve seals for the following piping-penetration applications:
 - 1. Exterior Concrete Walls above and below Grade:
 - a. Sleeves with waterstops.
 - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
 - 2. Concrete Slabs-on-Grade:
 - a. Sleeves with waterstops.

- 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
3. Concrete Slabs above Grade:
 - a. Sleeves with waterstops.
4. Interior Walls and Partitions:
 - a. Sleeves without waterstops.

3.9 ESCUTCHEONS APPLICATION

A. Escutcheons for New Piping:

1. Piping with Fitting or Sleeve Protruding from Wall: One piece, deep pattern.
2. Chrome-Plated Piping: One piece, steel with polished, chrome-plated finish.
3. Insulated Piping:
 - a. One piece, steel with polished, chrome-plated finish.
4. Bare Piping at Wall Penetrations in Finished Spaces:
 - a. One piece, steel with polished, chrome-plated finish.
5. Bare Piping at Ceiling Penetrations in Finished Spaces:
 - a. One piece, steel with polished, chrome-plated finish.
6. Bare Piping in Unfinished Service Spaces:
 - a. One piece, steel with polished, chrome-plated finish.
7. Bare Piping in Equipment Rooms:
 - a. One piece, steel with polished, chrome-plated finish.

B. Install floor plates for piping penetrations of equipment room floors.

C. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

1. New Piping: One piece, floor plate.

END OF SECTION 210500

SECTION 210523 - GENERAL-DUTY VALVES FOR WATER-BASED FIRE-SUPPRESSION PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Two-piece ball valves with indicators.
2. Bronze butterfly valves with indicators.
3. Iron butterfly valves with indicators.
4. Check valves.
5. Iron OS&Y gate valves.
6. NRS gate valves.
7. Indicator posts.
8. Trim and drain valves.

1.2 DEFINITIONS

- A. NRS: Nonrising stem.
- B. OS&Y: Outside screw and yoke.
- C. SBR: Styrene-butadiene rubber.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of valve.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, and weld ends.
3. Set valves open to minimize exposure of functional surfaces.

B. Use the following precautions during storage:

1. Maintain valve end protection.
2. Store valves indoors and maintain at higher-than-ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use operating handles or stems as lifting or rigging points.

- D. Protect flanges and specialties from moisture and dirt.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain each type of valve from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. UL Listed: Valves shall be listed in UL's "Online Certifications Directory" under the headings listed below and shall bear UL mark:
 - 1. Fire Main Equipment: HAMV - Main Level.
 - a. Indicator Posts, Gate Valve: HCBZ - Level 1.
 - b. Ball Valves, System Control: HLUG - Level 3.
 - c. Butterfly Valves: HLXS - Level 3.
 - d. Check Valves: HMER - Level 3.
 - e. Gate Valves: HMRZ - Level 3.
 - 2. Sprinkler System and Water Spray System Devices: VDGT - Main Level.
 - a. Valves, Trim and Drain: VQGU - Level 1.
- B. FM Global Approved: Valves shall be listed in its "Approval Guide," under the headings listed below:
 - 1. Automated Sprinkler Systems:
 - a. Indicator posts.
 - b. Valves.
 - 1) Gate valves.
 - 2) Check valves
 - 3) Miscellaneous valves.
- C. ASME Compliance:
 - 1. ASME B1.20.1 for threads for threaded-end valves.
 - 2. ASME B16.1 for flanges on iron valves.
 - 3. ASME B31.9 for building services piping valves.
- D. AWWA Compliance: Comply with AWWA C606 for grooved-end connections.
- E. NFPA Compliance for valves:
 - 1. Comply with NFPA 13, NFPA 14, NFPA 20, and NFPA 24.

- F. Valve Pressure Ratings: Not less than the minimum pressure rating indicated or higher, as required by system pressures.
- G. Valve Sizes: Same as upstream piping unless otherwise indicated.
- H. Valve Actuator Types:
 - 1. Worm-gear actuator with handwheel for quarter-turn valves, except for trim and drain valves.
 - 2. Handwheel: For other than quarter-turn trim and drain valves.
 - 3. Handlever: For quarter-turn trim and drain valves NPS 2 and smaller.

2.3 TWO-PIECE BALL VALVES WITH INDICATORS

- A. Description:
 - 1. UL 1091, except with ball instead of disc and FM Global approved for indicating valves (butterfly or ball type), Class Number 1112.
 - 2. Minimum Pressure Rating: 175 psig.
 - 3. Body Design: Two piece.
 - 4. Body Material: Forged brass or bronze.
 - 5. Port Size: Full or standard.
 - 6. Seats: PTFE.
 - 7. Stem: Bronze or stainless steel.
 - 8. Ball: Chrome-plated brass.
 - 9. Actuator: Worm gear
 - 10. Supervisory Switch: Internal or external.

2.4 IRON BUTTERFLY VALVES WITH INDICATORS

- A. Description:
 - 1. Standard: UL 1091 and FM Global standard for indicating valves, (butterfly or ball type), Class Number 112.
 - 2. Minimum Pressure Rating: 175 psig.
 - 3. Body Material: Cast or ductile iron with nylon, EPDM, epoxy, or polyamide coating.
 - 4. Seat Material: EPDM.
 - 5. Stem: Stainless steel.
 - 6. Disc: Ductile iron, and EPDM or SBR coated.
 - 7. Actuator: Worm gear.
 - 8. Supervisory Switch: Internal or external.

2.5 IRON OS&Y GATE VALVES

- A. Description:
 - 1. Standard: UL 262 and FM Global standard for fire-service water control valves (OS&Y- and NRS-type gate valves).
 - 2. Minimum Pressure Rating: 175 psig.

3. Body and Bonnet Material: Cast or ductile iron.
4. Wedge: Cast or ductile iron, or bronze with elastomeric coating.
5. Wedge Seat: Cast or ductile iron, or bronze with elastomeric coating.
6. Stem: Brass or bronze.
7. Packing: Non-asbestos PTFE.
8. Supervisory Switch: External.

2.6 CHECK VALVES

A. Description:

1. Standard: UL 312 and FM Global standard for swing check valves, Class Number 1210.
2. Minimum Pressure Rating: 175 psig.
3. Type: Single swing check.
4. Body Material: Cast iron, ductile iron, or bronze.
5. Clapper: Bronze, ductile iron, or stainless steel[with elastomeric seal].
6. Clapper Seat: Brass, bronze, or stainless steel.
7. Hinge Shaft: Bronze or stainless steel.
8. Hinge Spring: Stainless steel.
9. End Connections: Flanged, grooved, or threaded.

2.7 INDICATOR POSTS

A. Description:

1. Standard: UL 789 and FM Global standard for indicator posts.
2. Cap: Cast or ductile iron.
3. Operation: Wrench.

2.8 TRIM AND DRAIN VALVES

A. Ball Valves:

1. Description:
 - a. Pressure Rating: 175 psig.
 - b. Body Design: Two piece.
 - c. Body Material: Forged brass or bronze.
 - d. Port size: Full or standard.
 - e. Seats: PTFE.
 - f. Stem: Bronze or stainless steel.
 - g. Ball: Chrome-plated brass.
 - h. Actuator: Handlever.
 - i. End Connections for Valves NPS 1 through NPS 2-1/2: Threaded ends.
 - j. End Connections for Valves NPS 1-1/4 and NPS 2-1/2: Grooved ends.

B. Angle Valves:

1. Description:

- a. Pressure Rating: 175 psig.
- b. Body Material: Brass or bronze.
- c. Ends: Threaded.
- d. Stem: Bronze.
- e. Disc: Bronze.
- f. Packing: Asbestos free.
- g. Handwheel: Malleable iron, bronze, or aluminum.

C. Globe Valves:

1. Description:

- a. Pressure Rating: 175 psig.
- b. Body Material: Bronze with integral seat and screw-in bonnet.
- c. Ends: Threaded.
- d. Stem: Bronze.
- e. Disc Holder and Nut: Bronze.
- f. Disc Seat: Nitrile.
- g. Packing: Asbestos free.
- h. Handwheel: Malleable iron, bronze, or aluminum.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.2 INSTALLATION, GENERAL

- A. Comply with requirements in the following Sections for specific valve-installation requirements and applications:
 - 1. Section 211313 "Wet-Pipe Sprinkler Systems" for application of valves in wet-pipe, fire-suppression sprinkler systems.
 - 2. Section 211316 "Dry-Pipe Sprinkler Systems" for application of valves in dry-pipe, fire-suppression sprinkler systems.

- B. Install listed fire-protection shutoff valves supervised-open, located to control sources of water supply, except from fire-department connections. Install permanent identification signs, indicating portion of system controlled by each valve.
- C. Install double-check valve assembly in each fire-protection water-supply connection.
- D. Install valves having threaded connections with unions at each piece of equipment arranged to allow easy access, service, maintenance, and equipment removal without system shutdown. Provide separate support where necessary.
- E. Install valves in horizontal piping with stem at or above the pipe center.
- F. Install valves in position to allow full stem movement.
- G. Install valve tags. Comply with requirements in Section 210553 "Identification for Fire-Suppression Piping and Equipment" for valve tags and schedules and signs on surfaces concealing valves; and the NFPA standard applying to the piping system in which valves are installed. Install permanent identification signs indicating the portion of system controlled by each valve.

END OF SECTION 210523

SECTION 210529 - HANGERS AND SUPPORTS FOR FIRE-SUPPRESSION PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal pipe hangers and supports.
 - 2. Trapeze pipe hangers.
 - 3. Metal framing systems.
 - 4. Thermal hanger-shield inserts.
 - 5. Fastener systems.
 - 6. Equipment supports.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:[Signed and sealed by a qualified professional engineer.] Show fabrication and installation details and include calculations for the following:
 - 1. Trapeze pipe hangers.
 - 2. Metal framing systems.
 - 3. Equipment supports.
- C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Detail fabrication and assembly of trapeze hangers.
 - 2. Include design calculations for designing trapeze hangers.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Structural-Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M.

- B. Pipe Welding Qualifications: Qualify procedures and operators according to 2015 ASME Boiler and Pressure Vessel Code, Section IX.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design trapeze pipe hangers and equipment supports.
- B. Structural Performance: Hangers and supports for fire-suppression piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
 - 1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
 - 2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- C. NFPA Compliance: Comply with NFPA 13.
- D. UL Compliance: Comply with UL 203.

2.2 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
 - 1. Description: Factory-fabricated components, NFPA approved, UL listed, or FM approved for fire-suppression piping support.
 - 2. Galvanized Metallic Coatings: Pregalvanized or hot-dip galvanized.
 - 3. Hanger Rods: Continuous-thread rod, nuts, and washer made of [carbon steel] [stainless steel] <Insert material>.

2.3 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-58, Type 59, shop- or field-fabricated pipe-support assembly, made from structural-carbon-steel shapes, with NFPA-approved, UL-listed, or FM-approved carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.4 METAL FRAMING SYSTEMS

- A. MFMA Manufacturer Metal Framing Systems:
 - 1. Description: Shop- or field-fabricated pipe-support assembly, made of steel channels, accessories, fittings, and other components for supporting multiple parallel pipes.
 - 2. Standard: Comply with MFMA-4, factory-fabricated components for field assembly.

3. Channels: Continuous slotted carbon-steel channel with inturned lips.
4. Channel Width: Selected for applicable load criteria.
5. Channel Nuts: Formed or stamped nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
6. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
7. Metallic Coating: Hot-dip galvanized.

B. Non-MFMA Manufacturer Metal Framing Systems:

1. Description: Shop- or field-fabricated pipe-support assembly, made of steel channels, accessories, fittings, and other components for supporting multiple parallel pipes.
2. Standard: Comply with MFMA-4, factory-fabricated components for field assembly.
3. Channels: Continuous slotted carbon-steel channel with inturned lips.
4. Channel Width: Select for applicable load criteria.
5. Channel Nuts: Formed or stamped nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
6. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
7. Metallic Coating: Hot-dip galvanized.

2.5 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: NFPA-approved, UL-listed, or FM-approved threaded-steel stud, for use in hardened portland cement concrete, with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
- B. Mechanical-Expansion Anchors: NFPA-approved, UL-listed, or FM-approved, insert-wedge-type anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
1. Indoor Applications: Zinc-coated steel.
 2. Outdoor Applications: Stainless steel.

2.6 EQUIPMENT SUPPORTS

- A. Description: NFPA-approved, UL-listed, or FM-approved, welded, shop- or field-fabricated equipment support, made from structural-carbon-steel shapes.

2.7 MATERIALS

- A. Aluminum: ASTM B221.
- B. Carbon Steel: ASTM A1011.
- C. Structural Steel: ASTM A36, carbon-steel plates, shapes, and bars; black and galvanized.
- D. Stainless Steel: ASTM A240.

- E. Grout: ASTM C1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout, suitable for interior and exterior applications.
 - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation, for penetrations through fire-rated walls, ceilings, and assemblies.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

3.2 INSTALLATION OF HANGERS AND SUPPORTS

- A. Metal Pipe-Hanger Installation: Comply with installation requirements of approvals and listings. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-58. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
 - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size, or install intermediate supports for smaller-diameter pipes as specified for individual pipe hangers.
 - 2. Field fabricate from ASTM A36/A36M carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal strut systems.
- D. Thermal Hanger-Shield Installation: Install in pipe hanger or shield for insulated piping.
- E. Fastener System Installation:
 - 1. Install mechanical-expansion anchors in concrete, after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions. Install in accordance with approvals and listings.
- F. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- G. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

- H. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- I. Install lateral bracing with pipe hangers and supports to prevent swaying.
- J. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms, and install reinforcing bars through openings at top of inserts.
- K. Load Distribution: Install hangers and supports, so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- L. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

3.3 INSTALLATION OF EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment, and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.4 METAL FABRICATIONS

- A. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- B. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Finish welds at exposed connections, so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.5 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.6 PAINTING

A. Touchup:

1. Clean field welds and abraded, shop-painted areas. Paint exposed areas immediately after erecting hangers and supports. Use same materials as those used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - a. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas, and apply galvanizing-repair paint to comply with ASTM A780/A780M.

3.7 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with NFPA requirements for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finishes.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports, metal trapeze pipe hangers, and metal framing systems and attachments for general service applications.
- F. Horizontal-Piping Hangers and Supports: Comply with NFPA requirements. Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
 2. Steel Pipe Clamps (MSS Type 4): For suspension of NPS 1/2 to NPS 24 if little or no insulation is required.
 3. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 4. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8.
 5. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.
 6. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
 7. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.

8. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
 9. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
- G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- H. Hanger-Rod Attachments: Comply with NFPA requirements.
- I. Building Attachments: Comply with NFPA requirements. Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable-Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. C-Clamps (MSS Type 23): For structural shapes.
 3. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
- J. Saddles and Shields: Comply with NFPA requirements. Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 3. Thermal Hanger-Shield Inserts: For supporting insulated pipe.
- K. Comply with NFPA requirements for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- L. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.
- M. Use mechanical-expansion anchors instead of building attachments where required in concrete construction.

END OF SECTION 210529

SECTION 210553 - IDENTIFICATION FOR FIRE-SUPPRESSION PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Equipment labels.
 - 2. Warning signs and labels.
 - 3. Warning tape
 - 4. Pipe labels.
 - 5. Stencils.
 - 6. Valve tags.
 - 7. Warning tags.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment-Label Schedule: Include a listing of all equipment to be labeled and the proposed content for each label.
- D. Valve-numbering scheme.
- E. Valve Schedules: Provide for fire-suppression piping system. Include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Metal Labels for Equipment:
 - 1. Material and Thickness: Brass, 0.032 inch, or stainless steel, 0.025 inch thick, with predrilled or stamped holes for attachment hardware.
 - 2. Letter and Background Color: As indicated for specific application under Part 3.
 - 3. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 - 4. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances of up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 - 5. Fasteners: Stainless steel rivets or self-tapping screws.

6. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, with predrilled holes for attachment hardware.
2. Letter and Background Color: As indicated for specific application under Part 3.
3. Maximum Temperature: Able to withstand temperatures of up to 160 deg F.
4. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
5. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances of up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
6. Fasteners: Stainless steel rivets or self-tapping screws.
7. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

2.2 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, with predrilled holes for attachment hardware.
- B. Letter and Background Color: As indicated for specific application under Part 3.
- C. Maximum Temperature: Able to withstand temperatures of up to 160 deg F.
- D. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- E. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances of up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- F. Fasteners: Stainless steel rivets or self-tapping screws.
- G. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- H. Arc-Flash Warning Signs: Provide arc-flash warning signs in locations and with content in accordance with requirements of OSHA and NFPA 70E, and other applicable codes and standards.
- I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 WARNING TAPE

- A. Material: Vinyl.

- B. Minimum Thickness: 0.005 inch.
- C. Letter, Pattern, and Background Color: As indicated for specific application under Part 3.
- D. Waterproof Adhesive Backing: Suitable for indoor or outdoor use.
- E. Maximum Temperature: 160 deg F.
- F. Minimum Width: 2 inches.

2.4 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color coded, with lettering indicating service and showing flow direction in accordance with ASME A13.1.
- B. Letter and Background Color: As indicated for specific application under Part 3.
- C. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- D. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- E. Pipe-Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings. Also include the following:
 - 1. Pipe size.
 - 2. Flow-Direction Arrows: Include flow-direction arrows on main distribution piping. Arrows may be either integral with label or applied separately.
 - 3. Lettering Size: At least 1/2 inch for viewing distances of up to 72 inches and proportionately larger lettering for greater viewing distances].

2.5 VALVE TAGS

- A. Description: Stamped or engraved with 1/4-inch letters for piping-system abbreviation and 1/2-inch numbers.
 - 1. Tag Material: Brass, 0.04 inch, or stainless steel, 0.024 inch thick, with predrilled or stamped holes for attachment hardware.
 - 2. Fasteners: Brass link chain.
- B. Letter and Background Color: As indicated for specific application under Part 3.
- C. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
 - 1. Include valve-tag schedule in operation and maintenance data.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of incompatible primers, paints, and encapsulants, as well as dirt, oil, grease, release agents, and other substances that could impair bond of identification devices.

3.2 INSTALLATION GENERAL REQUIREMENTS

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be installed.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.
- D. Locate identifying devices so that they are readily visible from the point of normal approach.

3.3 INSTALLATION OF EQUIPMENT LABELS, WARNING SIGNS, AND LABELS

- A. Permanently fasten labels on each item of fire-suppression equipment.
- B. Sign and Label Colors:
 - 1. White letters on an ANSI Z535.1 safety-red background.
- C. Locate equipment labels where accessible and visible.

3.4 INSTALLATION OF PIPE LABELS

- A. Install pipe labels showing service and flow direction with permanent adhesive on pipes.
- B. Pipe-Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 - 1. Within 3 ft. of each valve and control device.
 - 2. At access doors, manholes, and similar access points that permit a view of concealed piping.
 - 3. Within 3 ft. of equipment items and other points of origination and termination.
 - 4. Spaced at maximum intervals of 25 ft. along each run. Reduce intervals to 10 ft. in areas of congested piping and equipment.
- C. Flow- Direction Arrows: Provide arrows to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.

D. Fire-Suppression Pipe Label Color Schedule:

1. Fire-Suppression Pipe Labels: White letters on an ANSI Z535.1 safety-red background.

3.5 INSTALLATION OF VALVE TAGS

- A. Install tags on valves and control devices in fire-suppression piping systems. List tagged valves in a valve-tag schedule in the operating and maintenance manual. Include the identification "FSV" on all fire-suppression system valve tags.

1. Valve-Tag Color: White letters on an ANSI Z535.1 safety-red background.

3.6 INSTALLATION OF WARNING TAGS

- A. Warning Tag Color: Black letters on an ANSI Z535.1 safety-yellow background.

END OF SECTION 210553

SECTION 211119 – FIRE DEPARTMENT CONNECTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Exposed-type fire-department connections.
 - 2. Yard-type fire-department connections.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each fire-department connection.

PART 2 - PRODUCTS

2.1 EXPOSED-TYPE FIRE-DEPARTMENT CONNECTION

- A. Standard: UL 405.
- B. Type: Exposed, projecting, for wall mounting.
- C. Pressure Rating: 175 psig minimum.
- D. Body Material: Corrosion-resistant metal.
- E. Inlets: Brass with threads according to NFPA 1963 and matching local fire-department sizes and threads. Include extension pipe nipples, brass lugged swivel connections, and check devices or clappers.
- F. Caps: Brass, lugged type, with gasket and chain.
- G. Escutcheon Plate: Round, brass, wall type.
- H. Outlet: Back, with pipe threads.

2.2 YARD-TYPE FIRE-DEPARTMENT CONNECTION

- A. Standard: UL 405.
- B. Type: Exposed, freestanding.
- C. Pressure Rating: 175 psig minimum.
- D. Body Material: Corrosion-resistant metal.
- E. Inlets: Brass with threads according to NFPA 1963 and matching local fire-department sizes and threads. Include extension pipe nipples, brass lugged swivel connections, and check devices or clappers.
- F. Caps: Brass, lugged type, with gasket and chain.
- G. Escutcheon Plate: Round, brass, floor type.
- H. Outlet: Bottom, with pipe threads.
- I. Sleeve Height: 18 inches.

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 fire-department connections.
- B. Examine roughing-in for fire-suppression standpipe system to verify actual locations of piping connections before fire-department connection installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install wall-type fire-department connections.
- B. Install yard-type fire-department connections in concrete slab support. Comply with requirements for concrete in Section 033000 "Cast-in-Place Concrete."
- C. Install automatic (ball-drip) drain valve at each check valve for fire-department connection.

END OF SECTION 211119

SECTION 211313 - WET-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel pipe and fittings.
2. Copper tube and fittings.
3. CPVC pipe and fittings.
4. Cover system for sprinkler piping.
5. Specialty valves.
6. Air vent.
7. Sprinkler piping specialties.
8. Sprinklers.
9. Alarm devices.
10. Pressure gauges.

B. Related Requirements:

1. Section 211119 "Fire Department Connections" for exposed-, flush-, and yard-type fire department connections.
2. Section 331415 "Site Water Distribution Piping" for fire water-service backflow prevention devices.

1.2 DEFINITIONS

- ##### A. Standard-Pressure Sprinkler Piping:
- Wet-pipe sprinkler system piping designed to operate at working pressure of 175-psig maximum.

1.3 ACTION SUBMITTALS

A. Product Data:

For each type of product.

1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings:

For wet-pipe sprinkler systems.

1. Include plans, elevations, sections, and attachment details.
2. Include diagrams for power, signal, and control wiring.

- ##### C. Delegated Design Submittals:
- For wet-pipe sprinkler systems indicated to comply with performance requirements and design criteria, including analysis data, signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Sprinkler system plans and sections, or Building Information Model (BIM), drawn to scale, showing the items described in this Section and coordinated with all building trades.
- B. Qualification Data: For qualified Installer.
- C. Design Data: Approved sprinkler piping working plans, prepared according to NFPA 13, including documented approval by authorities having jurisdiction, and including hydraulic calculations if applicable.
- D. Welding certificates.
- E. Field Test Reports:
 - 1. Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."
 - 2. Fire-hydrant flow test report.
- F. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wet-pipe sprinkler systems and specialties to include in emergency, operation, and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Sprinkler Cabinets: Finished, wall-mounted, steel cabinet with hinged cover, and with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler used on Project.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.
 - a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by qualified professional engineer.

- B. Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Sprinkler system equipment, specialties, accessories, installation, and testing to comply with NFPA 13.
- C. Standard-Pressure Piping System Component: Listed for 175-psig minimum working pressure.
- D. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design wet-pipe sprinkler systems.
 - 1. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers.
 - 2. Sprinkler Occupancy Hazard Classifications:
 - a. Automobile Parking and Showrooms: Ordinary Hazard, Group 1.
 - b. Electrical Equipment Rooms: Ordinary Hazard, Group 1.
 - c. Exterior Loading Docks, Only Handling Ordinary Combustibles: Ordinary Hazard, Group 2.
 - d. General Storage Areas: Ordinary Hazard, Group 1.
 - e. Machine Shops: Ordinary Hazard, Group 2.
 - f. Mechanical Equipment Rooms: Ordinary Hazard, Group 1.
 - g. Offices, including Data Processing: Light Hazard.
 - h. Repair Garages: Ordinary Hazard, Group 2.
 - 3. Minimum Density for Automatic-Sprinkler Piping Design:
 - a. Light-Hazard Occupancy: 0.10 gpm/sq. ft. over 1500 sq. ft. area.
 - b. Ordinary-Hazard, Group 1 Occupancy: 0.15 gpm/sq. ft. over 1500 sq. ft. area.
 - c. Ordinary-Hazard, Group 2 Occupancy: 0.20 gpm/sq. ft. over 1500 sq. ft. area.
 - d. Special Occupancy Hazard: As determined by authorities having jurisdiction.
 - 4. Maximum Protection Area per Sprinkler:
 - a. Office Spaces: 225 sq. ft..
 - b. Storage Areas: 130 sq. ft..
 - c. Mechanical Equipment Rooms: 130 sq. ft..
 - d. Electrical Equipment Rooms: 130 sq. ft..

- e. Other Areas: According to NFPA 13 recommendations unless otherwise indicated.
- E. Obtain documented approval of sprinkler system design from authorities having jurisdiction.

2.2 STEEL PIPE AND FITTINGS

- A. Standard-Weight Steel Pipe: black-steel pipe, ASTM A53/A53M, Type E, Grade B. Pipe ends may be factory or field formed to match joining method.
- B. Schedule 10, Black-Steel Pipe: ASTM A135/A135M or ASTM A795/A795M, Schedule 10 in NPS 5 and smaller; and NFPA 13-specified wall thickness in NPS 6 to NPS 10, plain end.
- C. Steel Pipe Nipples: black steel, ASTM A733, made of ASTM A53/A53M, standard-weight, seamless steel pipe with threaded ends.
- D. Steel Couplings: Uncoated steel, ASTM A865/A865M, threaded.
- E. Malleable- or Ductile-Iron Unions: UL 860.
- F. Cast-Iron Flanges: ASME 16.1, Class 125.
- G. Steel Flanges and Flanged Fittings: ASME B16.5, Class 150.
 - 1. Pipe-Flange Gasket Materials: ASME B16.21, nonmetallic and asbestos free or EPDM rubber gasket.
 - a. Class 125 and Class 250, Cast-Iron, Flat-Face Flanges: Full-face gaskets.
 - b. Class 150 and Class 300, Ductile-Iron or -Steel, Raised-Face Flanges: Ring-type gaskets.
 - 2. Metal, Pipe-Flange Bolts and Nuts: Carbon steel unless otherwise indicated.
- H. Steel Welding Fittings: ASTM A234/A234M and ASME B16.9.
 - 1. Welding Filler Metals: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- I. Grooved-Joint, Steel-Pipe Appurtenances:
 - 1. Pressure Rating: 175-psig minimum.
 - 2. Grooved-End Fittings for Steel Piping: Uncoated grooved-end fittings, ASTM A47/A47M, malleable-iron casting or ASTM A536, ductile-iron casting, with dimensions matching steel pipe.
 - 3. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213 rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.
- J. Steel Pressure-Seal Fittings: UL 213, FM Global-approved, 175-psig pressure rating with steel housing, rubber O-rings, and pipe stop; for use with fitting manufacturers' pressure-seal tools.

2.3 SPECIALTY VALVES

- A. Listed in UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
- B. Pressure Rating:
 - 1. Standard-Pressure Piping Specialty Valves: 175-psig minimum.
- C. Body Material: Cast or ductile iron.
- D. Size: Same as connected piping.
- E. End Connections: Flanged or grooved.
- F. Alarm Valves:
 - 1. Standard: UL 193.
 - 2. Design: For horizontal or vertical installation.
 - 3. Include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure gauges, retarding chamber, and fill-line attachment with strainer.
 - 4. Drip cup assembly pipe drain without valves and separate from main drain piping.
 - 5. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- G. Automatic (Ball Drip) Drain Valves:
 - 1. Standard: UL 1726.
 - 2. Pressure Rating: 175-psig minimum.
 - 3. Type: Automatic draining, ball check.
 - 4. Size: NPS 3/4.
 - 5. End Connections: Threaded.

2.4 AIR VENT

- A. Automatic Air Vent:
 - 1. Description: Automatic air vent that automatically vents trapped air without human intervention.
 - 2. Standard: UL listed or FM Global approved for use in wet-pipe fire sprinkler systems.
 - 3. Vents oxygen continuously from system.
 - 4. Float valve to prevent water discharge.
 - 5. Minimum Water Working Pressure Rating: 175 psig.

2.5 SPRINKLER PIPING SPECIALTIES

- A. Branch Outlet Fittings:
 - 1. Standard: UL 213.

2. Pressure Rating: 175-psig minimum.
3. Body Material: Ductile-iron housing with EPDM seals and bolts and nuts.
4. Type: Mechanical-tee and -cross fittings.
5. Configurations: Snap-on and strapless, ductile-iron housing with branch outlets.
6. Size: Of dimension to fit onto sprinkler main and with outlet connections as required to match connected branch piping.
7. Branch Outlets: Grooved, plain-end pipe, or threaded.

B. Flow Detection and Test Assemblies:

1. Standard: UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
2. Pressure Rating: 175-psig minimum.
3. Body Material: Cast- or ductile-iron housing with orifice, sight glass, and integral test valve.
4. Size: Same as connected piping.
5. Inlet and Outlet: Threaded or grooved.

C. Branch Line Testers:

1. Standard: UL 199.
2. Pressure Rating: 175 psig.
3. Body Material: Brass.
4. Size: Same as connected piping.
5. Inlet: Threaded.
6. Drain Outlet: Threaded and capped.
7. Branch Outlet: Threaded, for sprinkler.

D. Sprinkler Inspector's Test Fittings:

1. Standard: UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
2. Pressure Rating: 175-psig minimum.
3. Body Material: Cast- or ductile-iron housing with sight glass.
4. Size: Same as connected piping.
5. Inlet and Outlet: Threaded.

E. Adjustable Drop Nipples:

1. Standard: UL 1474.
2. Pressure Rating: 250-psig minimum.
3. Body Material: Steel pipe with EPDM-rubber O-ring seals.
4. Size: Same as connected piping.
5. Length: Adjustable.
6. Inlet and Outlet: Threaded.

F. Flexible Sprinkler Hose Fittings:

1. Standard: UL 1474.
2. Type: Flexible hose for connection to sprinkler, and with bracket for connection to ceiling grid.
3. Pressure Rating: 175-psig minimum.

4. Size: Same as connected piping, for sprinkler.

2.6 SPRINKLERS

- A. Listed in UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
- B. Pressure Rating for Automatic Sprinklers: 175-psig minimum.
- C. Automatic Sprinklers with Heat-Responsive Element:
 1. Early-Suppression, Fast-Response Applications: UL 1767.
 2. Nonresidential Applications: UL 199.
 3. Characteristics: Nominal 1/2-inch orifice with Discharge Coefficient K of 5.6, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.
- D. Sprinkler Finishes: Chrome plated.
- E. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.
 1. Ceiling Mounting: Chrome-plated steel, one piece, flat.
 2. Sidewall Mounting: Chrome-plated steel, one piece, flat.
- F. Sprinkler Guards:
 1. Standard: UL 199.
 2. Type: Wire cage with fastening device for attaching to sprinkler.

2.7 ALARM DEVICES

- A. Alarm-device types to match piping and equipment connections.
- B. Water-Motor-Operated Alarm:
 1. Standard: UL 753.
 2. Type: Mechanically operated, with Pelton wheel.
 3. Alarm Gong: Cast aluminum with red-enamel factory finish.
 4. Size: 8-1/2-inches diameter.
 5. Components: Shaft length, bearings, and sleeve to suit wall construction.
 6. Inlet: NPS 3/4.
 7. Outlet: NPS 1 drain connection.
- C. Electrically Operated Notification Appliances:
 1. Electric Bell:
 - a. Standard: UL 464.
 - b. Type: Vibrating, metal alarm bell.
 - c. Size: 8-inch minimum-diameter.

- d. Voltage: 24 V dc.
 - e. Finish: Red-enamel or polyester powder-coat factory finish, suitable for outdoor use with approved and listed weatherproof backbox.
 - 2. Strobe/Horn:
 - a. Standard: UL 464.
 - b. Tone: Selectable, steady, Temporal-3 (T-3) in accordance with ISO 8201 and ANSI/ASA S3.41, 2400 Hz, electromechanical, broadband.
 - c. Voltage: 120 V ac, 60 Hz.
 - d. Effective Intensity: 110 cd.
 - e. Finish: Red, suitable for outdoor use with approved and listed weatherproof backbox. White letters on housing identifying device as for "Fire."
 - f. Sign, Integrated: Mount between backbox and strobe/horn with text visible on both sides, above and below strobe/horn. Housing to be shaped to cover surface-mounted weatherproof backbox. Sign is to consist of white lettering on red plastic identifying it as a "Sprinkler Fire Alarm" and instructing viewers to call 911, police, or fire department.
 - D. Water-Flow Indicators:
 - 1. Standard: UL 346.
 - 2. Water-Flow Detector: Electrically supervised.
 - 3. Components: Two single-pole, double-throw circuit switches for isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal if removed.
 - 4. Type: Paddle operated.
 - 5. Pressure Rating: 250 psig.
 - 6. Design Installation: Horizontal or vertical.
 - E. Pressure Switches:
 - 1. Standard: UL 346.
 - 2. Type: Electrically supervised water-flow switch with retard feature.
 - 3. Components: Single-pole, double-throw switch with normally closed contacts.
 - 4. Design Operation: Rising pressure signals water flow.
 - F. Valve Supervisory Switches:
 - 1. Standard: UL 346.
 - 2. Type: Electrically supervised.
 - 3. Components: Single-pole, double-throw switch with normally closed contacts.
 - 4. Design: Signals that controlled valve is in other than fully open position.
 - 5. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- 2.8 PRESSURE GAUGES
- A. Standard: UL 393.

- B. Dial Size: 3-1/2- to 4-1/2-inch diameter.
- C. Pressure Gauge Range: 0- to 250-psig minimum.
- D. Label: Include "WATER" label on dial face.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Perform fire-hydrant flow test according to NFPA 13 and NFPA 291. Use results for system design calculations required in "Quality Assurance" Article.
- B. Report test results promptly and in writing.

3.2 SERVICE-ENTRANCE PIPING

- A. Connect sprinkler piping to water-service piping for service entrance to building. Comply with requirements for exterior piping in Section 331415 "Site Water Distribution Piping" for exterior piping.
- B. Install shutoff valve, backflow preventer, pressure gauge, drain, and other accessories indicated at connection to water-service piping. Comply with requirements for backflow preventers in Section 331415 "Site Water Distribution Piping."

3.3 INSTALLATION OF PIPING

- A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated on approved working plans.
 - 1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.
 - 2. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.
- B. Piping Standard: Comply with NFPA 13 requirements for installation of sprinkler piping.
- C. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
- D. Install unions adjacent to each valve in pipes NPS 2 and smaller.
- E. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.

- F. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, and sized and located according to NFPA 13.
- G. Install sprinkler piping with drains for complete system drainage.
- H. Install sprinkler control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.
- I. Install automatic (ball drip) drain valve at each check valve for fire-department connection, to drain piping between fire-department connection and check valve. Install drain piping to and spill over floor drain or to outside building.
- J. Install alarm devices in piping systems.
- K. Install pressure gauges on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gauges with connection not less than NPS 1/4 and with soft-metal seated globe valve, arranged for draining pipe between gauge and valve. Install gauges to permit removal, and install where they are not subject to freezing.
- L. Fill sprinkler system piping with water.
- M. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 210500 "Common Work Results for Fire Suppression."
- N. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 210500 "Common Work Results for Fire Suppression."
- O. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 210500 "Common Work Results for Fire Suppression."

3.4 JOINT CONSTRUCTION

- A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.
- B. Install unions adjacent to each valve in pipes NPS 2 and smaller.
- C. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.
- D. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- E. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- F. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with gasket and bolts according to ASME B31.9.

- G. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- H. Welded Joints: Construct joints according to AWS D10.12M/D10.12, using qualified processes and welding operators according to "Quality Assurance" Article.
 - 1. Shop weld pipe joints where welded piping is indicated. Do not use welded joints for galvanized-steel pipe.
- I. Steel-Piping, Cut-Grooved Joints: Cut square-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe joints.
- J. Steel-Piping, Roll-Grooved Joints: Roll rounded-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.
- K. Extruded-Tee Connections: Form tee in copper tube according to ASTM F2014. Use tool designed for copper tube; drill pilot hole, form collar for outlet, dimple tube to form seating stop, and braze branch tube into collar.
- L. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.5 INSTALLATION OF VALVES AND SPECIALTIES

- A. Install listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.
- B. Install listed fire-protection shutoff valves supervised open, located to control sources of water supply except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.
- C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water-supply sources.
- D. Specialty Valves:
 - 1. Install valves in vertical position for proper direction of flow, in main supply to system.
 - 2. Install alarm valves with bypass check valve and retarding chamber drain-line connection.
 - 3. Install deluge valves in vertical position, in proper direction of flow, and in main supply to deluge system. Install trim sets for drain, priming level, alarm connections, ball drip valves, pressure gauges, priming chamber attachment, and fill-line attachment.

E. Air Vent:

1. Provide at least one air vent at high point in each wet-pipe sprinkler system in accordance with NFPA 13 requirements. Connect vent into top of fire sprinkler piping.
2. Provide dielectric union for dissimilar metals, ball valve, and strainer upstream of automatic air vent.
3. Pipe from outlet of air vent to drain.

3.6 INSTALLATION OF SPRINKLERS

- A. Install sprinklers in suspended ceilings in center of acoustical ceiling panels.
- B. Install dry-type sprinklers with water supply from heated space. Do not install pendent or sidewall, wet-type sprinklers in areas subject to freezing.
- C. Install sprinklers into flexible, sprinkler hose fittings, and install hose into bracket on ceiling grid.

3.7 IDENTIFICATION

- A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.
- B. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.8 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 3. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
 4. Energize circuits to electrical equipment and devices.
 5. Coordinate with fire-alarm tests. Operate as required.
 6. Coordinate with fire-pump tests. Operate as required.
 7. Verify that equipment hose threads are same as local fire department equipment.
- B. Sprinkler piping system will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.9 CLEANING

- A. Clean dirt and debris from sprinklers.
- B. Only sprinklers with their original factory finish are acceptable. Remove and replace any sprinklers that are painted or have any other finish than their original factory finish.

3.10 PIPING SCHEDULE

- A. Piping between Fire Department Connections and Check Valves: Galvanized, standard-weight steel pipe with grooved ends, grooved-end fittings, grooved-end-pipe couplings, and grooved joints.
- B. Sprinkler specialty fittings may be used, downstream of control valves, instead of specified fittings.
- C. Standard-Pressure, Wet-Pipe Sprinkler System, NPS 2 and Smaller, to Be One of the Following:
 - 1. Standard-weight, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
- D. Standard-Pressure, Wet-Pipe Sprinkler System, NPS 2-1/2 to NPS 4, to Be One of the Following:
 - 1. Schedule 10 black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
- E. Standard-Pressure, Wet-Pipe Sprinkler System, NPS 5 and Larger, to Be One of the Following:
 - 1. Schedule 10 black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

3.11 SPRINKLER SCHEDULE

- A. Use sprinkler types in subparagraphs below for the following applications:
 - 1. Rooms without Ceilings: Upright sprinklers.
 - 2. Rooms with Suspended Ceilings: Recessed sprinklers.
 - 3. Wall Mounting: Sidewall sprinklers.
 - 4. Spaces Subject to Freezing: Pendent, dry sprinklers .
- B. Provide sprinkler types in subparagraphs below with finishes indicated.
 - 1. Concealed Sprinklers: Rough brass, with factory-painted white cover plate.
 - 2. Flush Sprinklers: Bright chrome, with painted white escutcheon.
 - 3. Recessed Sprinklers: Bright chrome, with bright chrome escutcheon.

4. Upright, Pendent, and Sidewall Sprinklers: Chrome plated in finished spaces exposed to view; rough bronze in unfinished spaces not exposed to view; wax coated where exposed to acids, chemicals, or other corrosive fumes.

END OF SECTION 211313

SECTION 211316 - DRY-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel pipe and fittings.
2. Copper tube and fittings.
3. Specialty valves.
4. Sprinkler piping specialties.
5. Sprinklers.
6. Alarm devices.
7. Manual control stations.
8. Control panels.
9. Pressure gauges.

B. Related Requirements:

1. Section 211119 "Fire Department Connections" for exposed-, flush-, and yard-type fire department connections.
2. Section 210523 "Fire Protection Piping" for ball, butterfly, check, gate, post-indicator, and trim and drain valves.

1.2 DEFINITIONS

- A. Standard-Pressure Sprinkler Piping: Dry-pipe sprinkler system piping designed to operate at working pressure of 175-psig maximum.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: For dry-pipe sprinkler systems.

1. Include plans, elevations, sections, and attachment details.
2. Include diagrams for power, signal, and control wiring.

- C. Delegated Design Submittals: For dry-pipe sprinkler systems indicated to comply with performance requirements and design criteria, including analysis data, signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Sprinkler systems plans and sections, or Building Information Model (BIM), drawn to scale, showing the items described in this Section and coordinate with all building trades.
 - 1. Domestic water piping.
 - 2. Compressed air piping.
 - 3. HVAC hydronic piping.
 - 4. Items penetrating finished ceiling including the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
- B. Qualification Data: For qualified Installer.
- C. Design Data: Approved sprinkler piping working plans, prepared according to NFPA 13, including documented approval by authorities having jurisdiction, and including hydraulic calculations if applicable.
- D. Welding certificates.
- E. Field Test Reports:
 - 1. Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."
 - 2. Fire-hydrant flow test report.
- F. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For dry-pipe sprinkler systems and specialties to include in emergency, operation, and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Sprinkler Cabinets: Finished, wall-mounted, steel cabinet with hinged cover, and with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler used on Project.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications:

1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.
 - a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by qualified professional engineer.
- B. Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTIONS

- A. Dry-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing compressed air or nitrogen. Opening of sprinklers releases compressed air or nitrogen and permits water pressure to open dry-pipe valve. Water then flows into piping and discharges from opened sprinklers.

2.2 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Sprinkler system equipment, specialties, accessories, installation, and testing to comply with NFPA 13.
- C. Standard-Pressure Piping System Component: Listed for 175-psig minimum working pressure.
- D. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design dry-pipe sprinkler systems.
 1. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers.
 2. Sprinkler Occupancy Hazard Classifications:
 - a. Electrical Equipment Rooms: Ordinary Hazard, Group 1.
 - b. Exterior Loading Docks, Only Handling Ordinary Combustibles: Ordinary Hazard, Group 2.
 - c. General Storage Areas: Ordinary Hazard, Group 1.
 - d. Machine Shops: Ordinary Hazard, Group 2.
 - e. Mechanical Equipment Rooms: Ordinary Hazard, Group 1
 - f. Offices, including Data Processing: Light Hazard.
 - g. Repair Garages: Ordinary Hazard, Group 2.
 3. Minimum Density for Automatic-Sprinkler Piping Design:
 - a. Light-Hazard Occupancy: 0.10 gpm/sq. ft. over 1500 sq. ft. area.

- b. Ordinary-Hazard, Group 1 Occupancy: 0.15 gpm/sq. ft. over 1500 sq. ft. area.
 - c. Ordinary-Hazard, Group 2 Occupancy: 0.20 gpm/sq. ft. over 1500 sq. ft. area.
 - d. Extra-Hazard, Group 1 Occupancy: 0.30 gpm/sq. ft. over 2500 sq. ft. area.
 - e. Extra-Hazard, Group 2 Occupancy: 0.40 gpm/sq. ft. over 2500 sq. ft. area.
 - f. Special Occupancy Hazard: As determined by authorities having jurisdiction.
- 4. Maximum Protection Area per Sprinkler:
 - a. Office Spaces: 225 sq. ft..
 - b. Storage Areas: 130 sq. ft..
 - c. Mechanical Equipment Rooms: 130 sq. ft..
 - d. Electrical Equipment Rooms: 130 sq. ft..
 - e. Other Areas: According to NFPA 13 recommendations unless otherwise indicated.
- 5. Total Combined Hose-Stream Demand Requirement: According to NFPA 13 unless otherwise indicated:
 - a. Light-Hazard Occupancies: 100 gpm for 30 minutes.
 - b. Ordinary-Hazard Occupancies: 250 gpm for 60 to 90 minutes.
 - c. Extra-Hazard Occupancies: 500 gpm for 90 to 120 minutes.
- E. Obtain documented approval of sprinkler system design from authorities having jurisdiction.

2.3 STEEL PIPE AND FITTINGS

- A. Standard-Weight, Galvanized-Steel Pipe: ASTM A53/A53M, Type E, Grade B. Pipe ends may be factory or field formed to match joining method.
- B. Galvanized-Steel Couplings: ASTM A865/A865M, threaded.
- C. Galvanized, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.
- D. Malleable- or Ductile-Iron Unions: UL 860.
- E. Cast-Iron Flanges: ASME B16.1, Class 125.
- F. Grooved-Joint, Steel-Pipe Appurtenances:
 - 1. Pressure Rating: 175-psig minimum.
 - 2. Galvanized, Grooved-End Fittings for Steel Piping: ASTM A47/A47M, malleable-iron casting or ASTM A536, ductile-iron casting, with dimensions matching steel pipe.
 - 3. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213 rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.

2.4 SPECIALTY VALVES

- A. Listed in UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
- B. Pressure Rating:
 - 1. Standard-Pressure Piping Specialty Valves: 175-psig minimum.
- C. Body Material: Cast or ductile iron.
- D. Size: Same as connected piping.
- E. End Connections: Flanged or grooved.
- F. Dry-Pipe Valves:
 - 1. Standard: UL 260.
 - 2. Design: Differential-pressure type.
 - 3. Include UL 1486, quick-opening devices, trim sets for air supply, drain, priming level, alarm connections, ball drip valves, pressure gauges, priming chamber attachment, and fill-line attachment.
 - 4. Air-Pressure Maintenance Device, Dry-Pipe Valves:
 - a. Standard: UL 260.
 - b. Type: Automatic device to maintain minimum air pressure in piping.
 - c. Include shutoff valves to permit servicing without shutting down sprinkler piping, bypass valve for quick filling, pressure regulator or switch to maintain pressure, strainer, pressure ratings with 14- to 60-psig adjustable range, and 175-psig outlet pressure.
 - 5. Air Compressor, Dry-Pipe Valves:
 - a. Standard: UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
 - b. Motor Horsepower: Fractional.
 - 1) Power: 120-V ac, 60 Hz, single phase.
 - c. Sized for application and capable of achieving system supervisory pressure within 30 minutes in accordance with requirements of NFPA 13. Provide ASME air receiver tank as required to meet requirements on larger systems.
 - d. Include filters, relief valves, coolers, automatic drains, and gauges.
- G. Automatic (Ball Drip) Drain Valves:
 - 1. Standard: UL 1726.
 - 2. Pressure Rating: 175-psig minimum.
 - 3. Type: Automatic draining, ball check.
 - 4. Size: NPS 3/4
 - 5. End Connections: Threaded.

2.5 SPRINKLER PIPING SPECIALTIES

- A. General Requirements for Dry-Pipe System Fittings: UL listed for dry-pipe service.
- B. Branch Outlet Fittings:
 - 1. Standard: UL 213.
 - 2. Pressure Rating: 175-psig minimum.
 - 3. Body Material: Ductile-iron housing with EPDM seals and bolts and nuts.
 - 4. Type: Mechanical-tee and -cross fittings.
 - 5. Configurations: Snap-on and strapless, ductile-iron housing with branch outlets.
 - 6. Size: Of dimension to fit onto sprinkler main and with outlet connections as required to match connected branch piping.
 - 7. Branch Outlets: Grooved, plain-end pipe, or threaded.
- C. Flow Detection and Test Assemblies:
 - 1. Standard: UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
 - 2. Pressure Rating: 175-psig minimum.
 - 3. Body Material: Cast- or ductile-iron housing with orifice, sight glass, and integral test valve.
 - 4. Size: Same as connected piping.
 - 5. Inlet and Outlet: Threaded.
- D. Branch Line Testers:
 - 1. Standard: UL 199.
 - 2. Pressure Rating: 175-psig minimum.
 - 3. Body Material: Brass.
 - 4. Size: Same as connected piping.
 - 5. Inlet: Threaded.
 - 6. Drain Outlet: Threaded and capped.
 - 7. Branch Outlet: Threaded, for sprinkler.
- E. Sprinkler Inspector's Test Fittings:
 - 1. Standard: UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
 - 2. Pressure Rating: 175-psig minimum.
 - 3. Body Material: Cast- or ductile-iron housing with sight glass.
 - 4. Size: Same as connected piping.
 - 5. Inlet and Outlet: Threaded.
- F. Adjustable Drop Nipples:
 - 1. Standard: UL 1474.
 - 2. Pressure Rating: 250-psig.
 - 3. Body Material: Steel pipe with EPDM O-ring seals.
 - 4. Size: Same as connected piping.
 - 5. Length: Adjustable.
 - 6. Inlet and Outlet: Threaded.
- G. Flexible Sprinkler Hose Fittings:

1. Standard: UL 1474.
2. Type: Flexible hose for connection to sprinkler, and with bracket for connection to ceiling grid.
3. Pressure Rating: 175-psig minimum.
4. Size: Same as connected piping, for sprinkler.

2.6 SPRINKLERS

- A. Listed in UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
- B. Pressure Rating for Automatic Sprinklers: 175-psig minimum.
- C. Automatic Sprinklers with Heat-Responsive Element:
 1. Nonresidential Applications: UL 199.
 2. Characteristics: Nominal 1/2-inch orifice with Discharge Coefficient K of 5.6, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.
- D. Sprinkler Finishes: Chrome plate.
- E. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.
 1. Ceiling Mounting: Chrome-plated steel, one piece, flat.
 2. Sidewall Mounting: Chrome-plated steel, one piece, flat.
- F. Sprinkler Guards:
 1. Standard: UL 199.
 2. Type: Wire cage with fastening device for attaching to sprinkler.

2.7 PRESSURE GAUGES

- A. Standard: UL 393.
- B. Dial Size: 3-1/2- to 4-1/2-inch diameter.
- C. Pressure Gauge Range: 0- to 250-psig minimum].
- D. Label: Include "WATER" or "AIR/WATER" label on dial face.
- E. Air System Piping Gauge: Include retard feature and "AIR" or "AIR/WATER" label on dial face.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Perform fire-hydrant flow test according to NFPA 13 and NFPA 291. Use results for system design calculations required in "Quality Assurance" Article.
- B. Report test results promptly and in writing.

3.2 SERVICE-ENTRANCE PIPING

- A. Connect sprinkler piping to water-service piping for service entrance to building. Comply with requirements in Section 331415 "Site Water Distribution Piping" for exterior piping.
- B. Install shutoff valve, backflow preventer, pressure gauge, drain, and other accessories indicated at connection to water-service piping. Comply with requirements for backflow preventers in Section 331415 "Site Water Distribution Piping."

3.3 INSTALLATION OF PIPING

- A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated on approved working plans.
 - 1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.
 - 2. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.
- B. Piping Standard: Comply with NFPA 13 requirements for installation of sprinkler piping.
- C. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
- D. Install unions adjacent to each valve in pipes NPS 2 and smaller.
- E. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.
- F. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, and sized and located according to NFPA 13.
- G. Install sprinkler piping with drains for complete system drainage.
- H. Install sprinkler control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.

- I. Install automatic (ball drip) drain valves to drain piping between fire department connections and check valves. Drain to floor drain or to outside building.
- J. Connect air compressor to the following piping and wiring:
 - 1. Pressure gauges and controls.
 - 2. Electrical power system.
 - 3. Fire-alarm devices, including low-pressure alarm.
- K. Install alarm devices in piping systems.
- L. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with requirements in NFPA 13. In seismic-rated areas, refer to Section 210548 "Vibration and Seismic Controls for Fire-Suppression Piping and Equipment."
- M. Install pressure gauges on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gauges with connection not less than NPS 1/4 and with soft-metal seated globe valve, arranged for draining pipe between gauge and valve. Install gauges to permit removal, and install where they are not subject to freezing.
- N. Drain dry-pipe sprinkler piping.
- O. Pressurize and check dry-pipe sprinkler system piping and air compressors.
- P. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 210500 "Common Work Results for Fire Suppression."
- Q. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 210500 "Common Work Results for Fire Suppression."

3.4 JOINT CONSTRUCTION

- A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.
- B. Install unions adjacent to each valve in pipes NPS 2 and smaller.
- C. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.
- D. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- E. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- F. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with gasket and bolts according to ASME B31.9.

- G. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- H. Steel-Piping, Cut-Grooved Joints: Cut square-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe joints.
- I. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.5 INSTALLATION OF VALVES AND SPECIALTIES

- A. Install listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.
- B. Install listed fire-protection shutoff valves supervised open, located to control sources of water supply except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.
- C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water-supply sources.
- D. Specialty Valves:
 - 1. Install valves in vertical position for proper direction of flow, in main supply to system.
 - 2. Install **dry-pipe** valves with trim sets for air supply, drain, priming level, alarm connections, ball drip valves, pressure gauges, priming chamber attachment, and fill-line attachment.
 - a. Install air compressor and compressed-air-supply piping.

3.6 INSTALLATION OF SPRINKLERS

- A. Install sprinklers in suspended ceilings in center of acoustical ceiling panels.
- B. Install sprinklers with water supply from heated space. Do not install pendent or sidewall sprinklers in areas subject to freezing.
- C. Install sprinklers into flexible, sprinkler hose fittings, and install hose into bracket on ceiling grid.

3.7 IDENTIFICATION

- A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.
- B. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.8 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 3. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
 - 4. Energize circuits to electrical equipment and devices.
 - 5. Start and run air compressors.
 - 6. Coordinate with fire-alarm tests. Operate as required.
 - 7. Coordinate with fire-pump tests. Operate as required.
 - 8. Verify that equipment hose threads are same as local fire department equipment.
- B. Sprinkler piping system will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.9 CLEANING

- A. Clean dirt and debris from sprinklers.
- B. Only sprinklers with their original factory finish are acceptable. Remove and replace any sprinklers that are painted or have any other finish than their original factory finish.

3.10 PIPING SCHEDULE

- A. Piping between Fire Department Connections and Check Valves: Galvanized, standard-weight steel pipe with grooved ends, grooved-end fittings, grooved-end-pipe couplings, and grooved joints.
- B. Sprinkler specialty fittings may be used, downstream of control valves, instead of specified fittings.
- C. Standard-Pressure, Dry-Pipe Sprinkler System, NPS 2 (DN 50) and Smaller, to Be One of the Following:

1. **Standard-weight**, galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
 2. **Standard-weight**, galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
- D. Standard-Pressure, Dry-Pipe Sprinkler System, NPS 2-1/2 to NPS 4, to Be One of the Following:
1. **Standard-weight**, galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
 2. **Standard-weight**, galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
- E. Standard-Pressure, Dry-Pipe Sprinkler System, NPS 5 and NPS 6 (DN 125 and DN 150), to Be One of the Following:
1. **Standard-weight**, galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
 2. **Standard-weight**, galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
- F. Provide sprinkler types in subparagraphs below with finishes indicated.
1. Concealed Sprinklers: Rough brass, with factory-painted white cover plate.
 2. Flush Sprinklers: Bright chrome, with painted white escutcheon.
 3. Recessed Sprinklers: Bright chrome, with bright chrome escutcheon.
 4. Upright, Pendent, and Sidewall Sprinklers: Chrome plated in finished spaces exposed to view; rough bronze in unfinished spaces not exposed to view; wax coated where exposed to acids, chemicals, or other corrosive fumes.

END OF SECTION 211316

SECTION 213113 - ELECTRIC-DRIVE, CENTRIFUGAL FIRE PUMPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. End-suction fire pumps.
 - 2. In-line fire pumps.
 - 3. Vertically mounted, single-stage, split-case fire pumps.
 - 4. Fire-pump accessories and specialties.
 - 5. Grout.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include rated capacities, operating characteristics, performance curves, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: For fire pumps, motor drivers, and fire-pump accessories and specialties.
 - 1. Include plans, elevations, sections, and mounting and attachment details.
 - 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- 1. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 2. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- B. Source quality-control reports.
- C. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire pumps to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. NFPA Compliance: Comply with NFPA 20.
- B. Pump Equipment, Accessory, and Specialty Pressure Rating: 175 psig minimum unless higher pressure rating is indicated.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 GENERAL REQUIREMENTS FOR CENTRIFUGAL FIRE PUMPS

- A. Description: Factory-assembled and -tested fire-pump and driver unit.
- B. Finish: Red paint applied to factory-assembled and -tested unit before shipping.

2.3 IN-LINE FIRE PUMPS

- A. Pump:
 - 1. Standard: UL 448, for in-line pumps for fire service.
 - 2. Casing: Radially split case, cast iron, with ASME B16.1 pipe-flange connections.
 - 3. Impeller: Cast bronze, statically and dynamically balanced, and keyed to shaft.
 - 4. Wear Rings: Replaceable bronze.
 - 5. Shaft and Sleeve: Steel shaft with bronze sleeve.
 - a. Shaft Bearings: Grease-lubricated ball bearings in cast-iron housing.
 - b. Seals: Stuffing box with minimum of four rings of graphite-impregnated braided yarn and bronze packing gland.
 - 6. Mounting: Pump and driver shaft is vertical, with motor above pump and pump on base. Motor and pump rotating assembly shall be removable from top without removing the pump casing from the piping.
- B. Coupling: None or rigid.
- C. Driver:
 - 1. Standard: UL 1004A.
 - 2. Type: Electric motor; NEMA MG 1, polyphase Design B.

D. Capacities and Characteristics:

1. Electrical Characteristics:

- a. Volts: 208 V.
- b. Phase: Three.
- c. Hertz: 60.

2.4 VERTICALLY MOUNTED, SINGLE-STAGE, SPLIT-CASE FIRE PUMPS

A. Pump:

- 1. Standard: UL 448, for split-case pumps for fire service.
- 2. Casing: Axially split case, cast iron, with ASME B16.1 pipe-flange connections.
- 3. Impeller: Double suction, cast bronze, statically and dynamically balanced, and keyed to shaft.
- 4. Wear Rings: Replaceable bronze.
- 5. Shaft and Sleeve: Alloy steel shaft with bronze sleeve.
 - a. Shaft Bearings: Grease-lubricated ball bearings in cast-iron housing.
 - b. Seals: Stuffing box with minimum of four rings of graphite-impregnated braided yarn and bronze packing gland.
- 6. Mounting: Pump and driver shafts are vertical, with motor above pump and pump on base.

B. Coupling: Flexible and capable of absorbing torsional vibration and shaft misalignment. Include metal coupling guard.

C. Driver:

- 1. Standard: UL 1004A.
- 2. Type: Electric motor; NEMA MG 1, polyphase Design B.

D. Capacities and Characteristics:

1. Electrical Characteristics:

- a. Volts: 208 V.
- b. Phase: Three.
- c. Hertz: 60.

2.5 FIRE-PUMP ACCESSORIES AND SPECIALTIES

- A. Automatic Air-Release Valves: Comply with NFPA 20 for installation in fire-pump casing.
- B. Circulation Relief Valves: UL 1478, brass, spring loaded; for installation in pump discharge piping.
- C. Relief Valves:

1. Description: UL 1478, bronze or cast iron, spring loaded; for installation in fire-suppression water-supply piping.
- D. Inlet Fitting: Eccentric tapered reducer at pump suction inlet.
- E. Outlet Fitting: Concentric tapered reducer at pump discharge outlet.
- F. Hose Valve Manifold Assembly:
 1. Standard: Comply with requirements in NFPA 20.
 2. Header Pipe: ASTM A53/A53M, Schedule 40, galvanized steel, with ends threaded according to ASME B1.20.1.
 3. Header Pipe Fittings: ASME B16.4, galvanized cast-iron threaded fittings.
 4. Automatic Drain Valve: UL 1726.
 5. Manifold, Exposed-Type Body:
 - a. Test Connections: Comply with UL 405; however, provide outlets without clappers instead of inlets.
 - b. Body: Exposed type, brass, with number of outlets required by NFPA 20.
 - c. Escutcheon Plate: Brass or bronze; round.
 - d. Exposed Parts Finish: chrome plated.
 - e. Escutcheon Plate Marking: Equivalent to "FIRE PUMP TEST."

2.6 GROUT

- A. Standard: ASTM C1107, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink and recommended for interior and exterior applications.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

2.7 SOURCE QUALITY CONTROL

- A. Testing: Test and inspect fire pumps according to UL 448 requirements for "Operation Test" and "Manufacturing and Production Tests."
 1. Verification of Performance: Rate fire pumps according to UL 448.
- B. Fire pumps will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine equipment bases and anchorage provisions, with Installer present, for compliance with requirements for installation tolerances, and other conditions affecting performance of fire pumps.
- B. Examine roughing-in for fire-suppression piping systems to verify actual locations of piping connections before fire-pump installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Fire-Pump Installation Standard: Comply with NFPA 20 for installation of fire pumps, relief valves, and related components.
- B. Install fire-pump suction and discharge piping equal to or larger than sizes required by NFPA 20.
- C. Support piping and pumps separately, so weight of piping does not rest on pumps.
- D. Install valves that are same size as connecting piping. Comply with requirements for fire-protection valves specified in Section 211313 "Wet-Pipe Sprinkler Systems."
- E. Install pressure gages on fire-pump suction and discharge flange pressure-gageappings. Comply with requirements for pressure gages specified in Section 211313 "Wet-Pipe Sprinkler Systems."
- F. Install piping hangers and supports, anchors, valves, gages, and equipment supports according to NFPA 20.
- G. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not factory mounted. Furnish copies of manufacturers' wiring diagram submittals to electrical Installer.
- H. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

3.3 ALIGNMENT

- A. Align pump and driver shafts after complete unit has been leveled on concrete base, grout has set, and anchor bolts have been tightened.
- B. After alignment is correct, tighten anchor bolts evenly. Fill baseplate completely with grout, with metal blocks and shims or wedges in place. Tighten anchor bolts after grout has hardened. Check alignment and make required corrections.
- C. Align piping connections.

- D. Align pump and driver shafts for angular and parallel alignment according to HI 1.4 and to tolerances specified by manufacturer.

3.4 CONNECTIONS

- A. Comply with requirements for piping and valves specified in Section 211313 "Wet-Pipe Sprinkler Systems." Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to pumps and equipment to allow service and maintenance.
- C. Connect relief-valve discharge to drainage piping or point of discharge.
- D. Connect flowmeter-system meters, sensors, and valves to tubing.
- E. Connect fire pumps to their controllers.

3.5 IDENTIFICATION

- A. Identify system components. Comply with requirements for fire-pump marking according to NFPA 20.

3.6 FIELD QUALITY CONTROL

- A. Test each fire pump with its controller as a unit. Comply with requirements for electric-motor-driver fire-pump controllers specified in Section 262933 "Controllers for Fire-Pump Drivers."
- B. Perform the following tests and inspections.
 - 1. After installing components, assemblies, and equipment, including controller, test for compliance with requirements.
 - 2. Test according to NFPA 20 for acceptance and performance testing.
 - 3. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 4. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - 5. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Components, assemblies, and equipment will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.
- E. Furnish fire hoses in number, size, and length required to reach storm drain or other acceptable location to dispose of fire-pump test water. Hoses are for tests only and do not convey to Owner.

3.7 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.

3.8 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire pumps.

END OF SECTION 213113

SECTION 213413 - PRESSURE-MAINTENANCE PUMPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Vertical, multistage, pressure-maintenance pumps.

B. Related Requirements:

1. Section 262933 "Controllers for Fire-Pump Drivers" for pressure-maintenance-pump controllers.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rated capacities, operating characteristics, performance curves, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: For pumps, accessories, and specialties.

1. Include plans, elevations, sections, and attachment details.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For pumps to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 VERTICAL, MULTISTAGE, PRESSURE-MAINTENANCE PUMPS

A. Description: Factory-assembled and -tested, multistage, barrel-type vertical pump as defined in HI 2.1-2.2 and HI 2.3; designed for surface installation with pump and motor direct coupled and mounted vertically.

B. Pump Construction:

1. Barrel: Stainless steel.
2. Suction and Discharge Chamber: Cast iron with flanged inlet and outlet.
3. Pump Head/Motor Mount: Cast iron.
4. Impellers: Stainless steel, balanced, and keyed to shaft.
5. Pump Shaft: Stainless steel.
6. Seal: Mechanical type with carbon rotating face and silicon-carbide stationary seat.
7. Wear Rings: Teflon.
8. Intermediate Chamber Bearings: Aluminum-oxide ceramic or bronze.
9. Chamber-Base Bearing: Tungsten carbide.
10. O-Rings: EPDM.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Motor: Single speed with permanently lubricated ball bearings and rigidly mounted to pump head. Comply with requirements in Section 210513 "Common Motor Requirements for Fire Suppression Equipment."

E. Power Cord: Factory-connected to motor for field connection to controller and at least 10 feet long.

F. Nameplate: Permanently attached to pump and indicating capacity and characteristics.

2.2 MOTORS

A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 210500 "Common Work Results for Fire Suppression."

1. Motor Sizes: Minimum size as indicated; if not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

PART 3 - EXECUTION

3.1 INSTALLATION OF EQUIPMENT

A. NFPA Standard: Comply with NFPA 20 for installation of pressure-maintenance pumps.

B. Equipment Mounting:

1. Install regenerative-turbine, pressure-maintenance pumps according to HI 1.4.
2. Install isolation valves in both inlet and outlet pipes near the pump. Comply with requirements for valves specified in Section 211313 "Wet-Pipe Sprinkler Systems."

3.2 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 3. Pressure-maintenance pumps will be considered defective if they do not pass tests and inspections.
- B. Prepare test and inspection reports.

3.3 ADJUSTING

- A. Lubricate pumps as recommended by manufacturer.
- B. Set field-adjustable pressure-switch ranges as indicated.

END OF SECTION 213413

SECTION 262933 - CONTROLLERS FOR FIRE PUMP DRIVERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Full-service controllers.
2. Controllers for pressure-maintenance pumps.
3. Remote alarm panels.
4. Enclosures.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.

1.2 DEFINITIONS

- A. ECM: Electronic control module.
- B. MCCB: Molded-case circuit breaker.
- C. PID: Proportional integral derivative.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: For each type of product indicated.
1. Include plans, elevations, sections, and attachment details.
 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 3. Show tabulations of the following:
 - a. Each installed unit's type and details.
 - b. Enclosure types and details for types other than NEMA 250, Type 2.
 - c. Factory-installed devices.
 - d. Nameplate legends.
 - e. Short-circuit current (withstand) rating of integrated unit.
 - f. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices.

4. Include diagrams for power, signal, alarm, control wiring, and pressure-sensing tubing.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of product indicated, from manufacturer.
- B. Source quality-control reports.
- C. Field quality-control reports.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Indicating Lights: Two of each type and color of lens installed; two of each type and size of lamp installed.
 2. Auxiliary Contacts: One for each size and type of magnetic contactor installed.
 3. Power Contacts: Three for each size and type of magnetic contactor installed.
 4. Contactor Coils: One for each size and type of magnetic controller installed.
 5. Relay Boards: One for each size and type of relay board installed.
 6. Operator Interface: One microprocessor board(s), complete with display and membrane keypad.

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain fire-pump controllers and associated equipment from single source or producer.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with NFPA 20.
- B. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by a qualified electrical testing laboratory, and marked for intended location and application.

2.2 FULL-SERVICE CONTROLLERS

- A. General Requirements for Full-Service Controllers:
 1. Comply with NFPA 20 and UL 218.
 2. Combined automatic and nonautomatic operation.
 3. Factory assembled, wired, and tested; continuous-duty rated.

- B. Method of Starting:
 - 1. Pressure-switch actuated.
 - a. Water-pressure-actuated switch and pressure transducer with independent high- and low-calibrated adjustments responsive to water pressure in fire-suppression piping.
 - b. System pressure recorder, electric ac driven, with spring backup.
 - c. Programmable minimum-run-time relay to prevent short cycling.
 - d. Programmable timer for weekly tests.
 - 2. Magnetic Controller: Wye-delta (open transition) type.
 - 3. Emergency Start: Mechanically operated start handle that closes and retains the motor RUN contactor independent of electric or pressure actuators.
- C. Capacity: Rated for fire-pump-driver horsepower and short-circuit-current (withstand) rating equal to or greater than short-circuit current available at controller location.
- D. Method of Isolation and Overcurrent Protection: Interlocked isolating switch and nonthermal MCCB; with a common, externally mounted operating handle, and providing locked-rotor protection.
- E. Door-Mounted Operator Interface and Controls:
 - 1. Monitor, display, and control the devices, alarms, functions, and operations listed in NFPA 20 as required for drivers and controller types used.
 - 2. Method of Control and Indication:
 - a. Microprocessor-based logic controller, with multiline digital readout.
 - b. Membrane keypad.
 - c. LED alarm and status indicating lights.
 - 3. Local Alarm and Status Indications:
 - a. Controller power on.
 - b. Motor running condition.
 - c. Loss-of-line power.
 - d. Line-power phase reversal.
 - e. Line-power single-phase condition.
 - 4. Audible alarm, with silence push button.
 - 5. Nonautomatic START and STOP push buttons or switches.
- F. ATS:
 - 1. Complies with NFPA 20, UL 218, and UL 1008.
 - 2. Integral with controller as a listed combination fire-pump controller and power transfer switch.
 - 3. Automatically transfers fire-pump controller from normal power supply to alternate power supply in event of power failure.
 - 4. Allows manual transfer from one source to the other.
 - 5. Alternate-Source Isolating and Disconnecting Means:

- a. Mechanically interlocked isolation switch and circuit breaker rated at a minimum of 115 percent of rated motor full-load current, with an externally mounted operating handle; circuit breaker must be provided with nonthermal sensing, instantaneous-only short-circuit overcurrent protection to comply with available fault currents.
6. Local Alarm and Status Indications:
 - a. Normal source available.
 - b. Alternate source available.
 - c. In normal position.
 - d. In alternate position.
 - e. Isolating means open.
7. Audible alarm, with silence push button.
8. Nonautomatic (manual, nonelectric) means of transfer.
9. Engine test push button.
10. Start generator output contacts.
11. Timer for weekly generator tests.

2.3 CONTROLLERS FOR PRESSURE-MAINTENANCE PUMPS

A. General Requirements for Pressure-Maintenance-Pump Controllers:

1. Type: UL 508, factory-assembled, -wired, and -tested, across-the-line controller; for combined automatic and manual operation.
2. Enclosure: UL 508 and NEMA 250, Type 2 for wall-mounting.
3. Factory assembled, wired, and tested.
4. Finish: Manufacturer's standard color paint.

B. Rate controller for scheduled horsepower and include the following:

1. Fusible disconnect switch.
2. Pressure switch.
3. Hand-off-auto selector switch.
4. Pilot light.
5. Running period timer.

2.4 REMOTE ALARM PANELS

A. General Requirements for Remote Alarm Panels: Factory assembled, wired, and tested; and complying with NFPA 20 and UL 218.

B. Supervisory and Normal Control Voltage: 120 V(ac); single source.

C. Audible and Visual Alarm and Status Indications for Electric-Driven Pump Controllers:

1. Driver running.
2. Loss of phase.
3. Phase reversal.
4. Supervised power on.

5. Common trouble on the controller.
 6. Controller connected to alternate power source.
- D. Audible and Visual Alarm and Status Indications for Diesel-Driven Pump Controllers: Manufacturer's standard indicating lights.
1. Engine running.
 2. Controller main switch turned to the off or manual position.
 3. Supervised power on.
 4. Common trouble on the controller or engine.
 5. Common pump room trouble.
 6. Controller connected to alternate power source.
- E. Audible alarm, with silence push button.

2.5 ENCLOSURES

- A. Fire-Pump Controllers, ATS, and Remote Alarm Panels: NEMA 250, to comply with environmental conditions at installed locations and NFPA 20.
1. Indoor, Dry and Clean Locations: Type 1.
 2. Indoor Locations Subject to Dripping Noncorrosive Liquids: Type 2.
 3. Outdoor Locations: Type 3R.
 4. Other Wet or Damp, Indoor Locations: Type 4.
 5. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: Type 12 (IEC IP12).
- B. Enclosure Color: Manufacturer's standard "fire-pump-controller red".
- C. Nameplates: Comply with NFPA 20; complete with capacity, characteristics, approvals, listings, and other pertinent data.
- D. Optional Features:
1. Floor stands, 12 inch high, for floor-mounted controllers.

2.6 SOURCE QUALITY CONTROL

- A. Testing: Test and inspect fire-pump controllers in accordance with requirements in NFPA 20 and UL 218.
1. Verification of Performance: Rate controllers in accordance with operation of functions and features specified.
- B. Fire-pump controllers will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and surfaces to receive equipment, with Installer present, for compliance with requirements and other conditions affecting performance.
- B. Examine equipment before installation. Reject equipment that is wet or damaged by moisture or mold.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF CONTROLLERS

- A. Coordinate installation of controllers with other construction including conduit, piping, fire-pump equipment, and adjacent surfaces. Maintain required clearances for workspace and equipment access doors and panels. Ensure that controllers are within sight of fire-pump drivers.
- B. Coordinate sizes and locations of concrete bases with actual equipment provided.
- C. Install controllers within sight of their respective drivers.
- D. Connect controllers to their dedicated pressure-sensing lines.
- E. Floor-Mounting Controllers: Install controllers on concrete base(s), using floor stands high enough so that the bottom of enclosure cabinet is not less than **12 inches** above finished floor. Comply with requirements for concrete bases specified in Section 260529 "Hangers and Supports for Electrical Systems."
 - 1. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base, and anchor into structural concrete floor.
 - 2. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 3. Install anchor bolts to elevations required for proper attachment to supported equipment.
- F. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- G. Comply with NEMA ICS 15.

3.3 INSTALLATION OF POWER WIRING

- A. Install power wiring between controllers and their services or sources, and between controllers and their drivers. Comply with requirements in NFPA 20, NFPA 70, and Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.4 IDENTIFICATION

- A. Comply with requirements in NFPA 20 for marking fire-pump controllers.
- B. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification in NFPA 20 and as specified in Section 260553 "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

- A. Acceptance Testing Preparation:
 - 1. Inspect and Test Each Component:
 - a. Inspect wiring, components, connections, and equipment installations. Test and adjust components and equipment.
 - b. Test insulation resistance for each element, component, connecting supply, feeder, and control circuits.
 - c. Test continuity of each circuit.
 - 2. Verify and Test Each Electric-Drive Controller:
 - a. Verify that voltages at controller locations are within plus 10 or minus 1 percent of motor nameplate rated voltages, with motors off. If outside this range for motor, notify Engineer before starting the motor(s).
 - b. Test each motor for proper phase rotation.
 - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Representatives from manufacturers of fire-pump controllers and ATS must be present during acceptance tests and inspections in accordance with NFPA 20.
- C. Acceptance tests and inspections must be witnessed by authorities having jurisdiction.
- D. Acceptance Tests and Inspections:
 - 1. Do not begin field acceptance testing until suction piping has been flushed and hydrostatically tested and the certificate for flushing and testing has been submitted to Architect and authorities having jurisdiction.
 - 2. Prior to starting, notify authorities having jurisdiction of the time and place of the acceptance testing.
 - 3. Engage manufacturer's factory-authorized service representative to be present during the testing.
 - 4. Perform field acceptance tests as outlined in NFPA 20.
- E. Nonconforming Work:
 - 1. Controllers will be considered defective if they do not pass tests and inspections.
 - 2. Remove and replace defective units and retest.

- F. Prepare test and inspection reports.

3.6 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks in accordance with manufacturer's written instructions.

3.7 ADJUSTING

- A. Adjust controllers to function smoothly and as recommended by manufacturer.
- B. Set field-adjustable switches, auxiliary relays, time-delay relays, and timers.
- C. Program microprocessors for required operational sequences, status indications, alarms, event recording, and display features. Clear events memory after final acceptance testing and prior to Substantial Completion.
- D. Set field-adjustable pressure switches.

3.8 PROTECTION

- A. Temporary Heating: Apply temporary heat to maintain temperature in accordance with manufacturer's written instructions until enclosed controllers are ready to be energized and placed into service.
- B. Replace controllers whose interiors have been exposed to water or other liquids prior to Substantial Completion.

END OF SECTION 262933

SECTION 283111 - DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Addressable fire-alarm system.
2. Fire-alarm control unit (FACU).
3. Manual fire-alarm boxes.
4. System smoke detectors.
5. Duct smoke detectors.
6. Carbon monoxide detectors.
7. Heat detectors.
8. Multicriteria and multisensor fire detectors.
9. Notification appliances.
10. Fire-alarm remote annunciators.
11. Fire-alarm addressable interface devices.
12. Digital alarm communicator transmitters (DACTs).
13. Cellular communications

- B. The fire alarm system shall comply with applicable provisions of the NC Building Code (available for sale at NCDol), and the 2013 National Fire Alarm Code (NFPA 72). The Contractor shall furnish all parts, materials, and labor required for a complete and operating system in accordance with all the applicable requirements, even if each needed item is not specifically shown or described in the project plans or specs.

1.2 DEFINITIONS

- A. DACT: Digital alarm communicator transmitter.
- B. NICET: National Institute for Certification in Engineering Technologies.
- C. Voltage Class: For specified circuits and equipment, voltage classes are defined as follows:
1. Control Voltage: Listed and labeled for use in remote-control, signaling, and power-limited circuits supplied by a Class 2 or Class 3 power supply having rated output not greater than 150 V and 5 A, allowing use of alternate wiring methods complying with NFPA 70, Article 725.
 2. Low Voltage: Listed and labeled for use in circuits supplied by a Class 1 or other power supply having rated output not greater than 1000 V, requiring use of wiring methods complying with NFPA 70, Article 300, Part I.
- D. Authority Having Jurisdiction (AHJ), Building Permits, Submittal Approval. For private sector, Community College or local government projects the AHJ is the local government entity that approves project plans, issues building permits and inspects construction.

1.3 SUBMITTALS

A. General Submittal Requirements:

1. Shop Drawings shall be prepared by persons with the following qualifications:

- a. Trained and certified by manufacturer in fire-alarm system design.

B. Product Data: For each type of product indicated. Submittals shall provide the mA draw for each device submitted and the listed minimum voltage required to operate.

C. Shop Drawings: For fire-alarm system. Include plans, details, and attachments to other work. Engineer's approval (with or without corrections) of contractor's Shop Drawings, cut sheets, etc., is for general conformance with the contract documents and design concept. It shall not relieve the contractor of responsibility of full compliance with the project plans and specifications, EXCEPT for any specific non-compliant features for which the engineer gives written authorization.

1. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72.
2. Include voltage drop calculations for notification appliance circuits.
3. Include battery-size calculations.
 - a. Use manufacturer's battery discharge curve to determine expected battery voltage after 60/24 hours of providing standby power. Then use calculated Notification Appliance Circuit current draw in the alarm mode to determine expected voltage drop at End of the Line Resistor (EOL), based on conductor resistance per manufacturer's data sheet or NEC.
 - b. The voltage drop at EOL must not exceed 14% of the expected battery voltage, after the required standby time plus alarm time. (Typically, for a 24 volt system, this limits the voltage drop from the battery to the EOL to 3 volts). Determine "worst case" voltage at far end of each NAC, by subtracting its calculated V-drop from the expected battery voltage. The result must be no less than the minimum listed operating voltage for the alarm notification appliances used.
 - c. Calculations shall be placed on a dedicated sheet of as-built drawings for future reference by fire alarm service technicians. NAC voltage drop shall be verified during system test.
4. Include input/output matrix with any non-compliant features clearly described.
5. System riser diagram with device addresses, candela rating, conduit sizes, and cable and wire types and sizes.
6. Provide control wiring diagrams for fire-alarm interface to HVAC; coordinate location of duct smoke detectors and access to them.
 - a. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators.
 - b. Show field wiring and equipment required for HVAC unit shutdown on alarm.
 - c. Locate detectors in accordance with manufacturer's written instructions.
 - d. Show air-sampling detector pipe routing.
7. Include performance parameters and installation details for each detector, verifying that each detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.

8. Manufacturer's detailed installation instructions for the Fire Alarm Control Panel and all duct mounted smoke detectors, flow switches, tamper switches, supervisory switches, and similar items which require mechanical installation.
 9. Include alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
 10. Provide floor plans with audible alarm device sound power and alarm sound level for each space or contractor shall certify that design meets NFPA 72 for sound levels. Any additional devices required while verifying the system shall be at the contractor's expense
 11. Provide plans showing each device and device identification number. Wire type, color and size between devices shall be shown with proposed conduit routing. The distance and route for each NAC shall be shown.
- D. Qualification Data: For qualified Installer. Copies of the training and certification within the last 24 months, except that a NICET Level III certification shall extend this to 36 months, must be submitted to the Designer prior to installation. Submittals will not be approved without this information.
- E. Field quality-control reports.
- F. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
 2. Provide hard copies of the "Record of Completion Documents" according to NFPA 72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter to the Owner, Architect, and Authorities having jurisdiction.
 3. Record copy of site-specific software.
 4. Provide "Maintenance, Inspection and Testing Records" according to NFPA 72 article of the same name and include the following:
 - a. Frequency of testing of installed components.
 - b. Frequency of inspection of installed components.
 - c. Requirements and recommendations related to results of maintenance.
 - d. Manufacturer's user training manuals.
 5. Manufacturer's required maintenance related to system warranty requirements.
 6. Abbreviated operating instructions for mounting at fire-alarm control unit.
 7. Copy of NFPA 25.

1.4 CLOSEOUT SUBMITTALS

- A. In addition to the Shop Drawing submittal described above, the fire alarm system contractor shall provide the engineer two bound copies of the following technical information, for transmittal to the owner:
1. As-Built wiring diagram showing all loop numbers and device addresses, plus terminal numbers where they connect to control equipment.

2. As-Built wiring and conduit layout diagrams, including wire color code and/or label numbers, and showing all interconnections in the system.
 3. Electronic circuit diagrams of all control panels, modules, annunciators, communications panels, etc.
 4. Manufacturer's detailed maintenance requirements.
 5. Technical literature on all control equipment, isolation modules, power supplies, batteries, detectors, manual stations, alarm/supervisory signal initiating devices, alarm notification appliances, relays, remote alarm transmission means, etc.
 6. The as-built "calculations" sheet
- B. Electronic Archive: Complete configuration data (site-specific programming) for the system must be stored on electronic media and archived by the fire alarm system manufacturer or authorized distributor. A diskette or CD copy of this data shall be submitted to the engineer for transmission to the owner on the day the system is commissioned
- C. The manufacturer, or authorized distributor, must maintain software version (VER) records on the system installed. The system software shall be upgraded free of any charge if a new VER is released during the warranty period. For new VER to correct operating problems, free upgrade shall apply during the entire life of the system.
- D. The contractor shall provide the owner with one copy of the following:
1. All software required, both for the installed fire alarm system necessary to access the fire alarm system for trouble shooting, programming, modifications, monitoring, de-bugging, or similar functions.
 2. Complete documentation for all software for both the installed fire alarm system and for any interface PC software necessary for system functions as described above.
 3. Interconnection cable where such is required to connect the fire alarm system to a PC.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project. The company shall specialize in performing the required work and making the final terminations. Minimum of 5 years documented experience installing fire detection and alarm systems similar in size and scope to this project. Only the installer (original programmer) may make program changes and must be present for the 100% test, Designer's pre-final review and Owner inspections. All connections to the FACP and the system's programming shall be done only by the manufacturer, or by an authorized distributor.
- B. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer. Components shall be compatible with, and operate as, an extension of existing system.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by third-party testing agencies shall be amongst those accredited by the NCBC (North Carolina Building Code Council) to Label Electrical and Mechanical Equipment

[http://www.ncdoi.com/osfm/Engineering_and_Codes/default.aspx?field1=Code Enforcement - Third Party Testing agencies&user=Code Enforcement Resources](http://www.ncdoi.com/osfm/Engineering_and_Codes/default.aspx?field1=Code_Enforcement - Third Party Testing agencies&user=Code Enforcement Resources)

- D. NFPA Certification: Obtain certification according to NFPA 72 by a UL-listed alarm company.

1.6 EXTRA MATERIALS

- A. Furnish extra materials that match existing products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Lamps for Remote Indicating Lamp Units: Quantity equal to 10 percent of amount installed, but no fewer than one unit.
 - 2. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but no fewer than one unit.
 - 3. Smoke Detectors: Quantity equal to 10 percent of amount of each type installed, but no fewer than one unit of each type.
 - 4. Detector Bases: Quantity equal to two percent of amount of each type installed, but no fewer than one unit of each type.
 - 5. Keys and Tools: One extra set for access to locked or tamperproofed components.
 - 6. Audible and Visual Notification Appliances: Two of each type installed.
 - 7. Fuses: Two of each type installed in system. Provide in box or cabinet with compartments marked with fuse types and sizes.
 - 8. Filters for Air-Sampling Detectors: Quantity equal to two percent of amount of each type installed, but no fewer than one unit of each type.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment and components that fail because of defects in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

- A. Cable Manufactures:
 - 1. Comtran Corporation.
 - 2. Atlas
 - 3. Helix/HiTemp Cables, Inc.; a Draka USA Company.
 - 4. Rockbestos-Suprenant Cable Corporation; a Marmon Group Company.
 - 5. West Penn Wire/CDT; a division of Cable Design Technologies.

2.2 ADDRESSABLE FIRE-ALARM SYSTEM

- A. Description:

1. Noncoded, UL-certified addressable system, with multiplexed signal transmission and horn-and-strobe notification for evacuation.
- B. Performance Criteria:
1. Regulatory Requirements:
 - a. Fire-Alarm Components, Devices, and Accessories: Listed and labeled by a NRTL in accordance with NFPA 70 for use with selected fire-alarm system and marked for intended location and application.
 2. General Characteristics:
 - a. Automatic sensitivity control of certain smoke detectors.
 - b. Fire-alarm signal initiation must be by one or more of the following devices:
 - 1) Manual stations.
 - 2) Heat detectors.
 - 3) Smoke detectors.
 - 4) Duct smoke detectors.
 - 5) Carbon monoxide detectors.
 - 6) Automatic sprinkler system water flow.
 - c. Fire-alarm signal must initiate the following actions:
 - 1) Continuously operate alarm notification appliances.
 - 2) Identify alarm and specific initiating device at FACU and remote annunciators.
 - 3) Transmit alarm signal to remote alarm receiving station.
 - 4) Unlock electric door locks in designated egress paths.
 - 5) Release fire and smoke doors held open by magnetic door holders.
 - 6) Activate voice/alarm communication system.
 - 7) Switch HVAC equipment controls to fire-alarm mode.
 - 8) Close smoke dampers in air ducts of designated air-conditioning duct systems.
 - 9) Activate emergency lighting control.
 - 10) Record events in system memory.
 - 11) Record events by system printer.
 - 12) Indicate device in alarm on graphic annunciator.
 - d. Supervisory signal initiation must be by one or more of the following devices and actions:
 - 1) Valve supervisory switch.
 - 2) Alert and Action signals of air-sampling detector system.
 - 3) Independent fire-detection and -suppression systems.
 - 4) Zones or individual devices have been disabled.
 - 5) FACU has lost communication with network.
 - e. System trouble signal initiation must be by one or more of the following devices and actions:
 - 1) Open circuits, shorts, and grounds in designated circuits.
 - 2) Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
 - 3) Loss of communication with addressable sensor, input module, relay, control module, remote annunciator, printer interface, or Ethernet module.

- 4) Loss of primary power at FACU.
- 5) Ground or single break in internal circuits of FACU.
- 6) Abnormal ac voltage at FACU.
- 7) Break in standby battery circuitry.
- 8) Failure of battery charging.
- 9) Abnormal position of switch at FACU or annunciator.

f. System Supervisory Signal Actions:

- 1) Initiate notification appliances.
- 2) Identify specific device initiating event at FACU[, connected network control panels, off-premises network control panels,] [and remote annunciators].
- 3) Record event on system printer.
- 4) After time delay of 200 seconds, transmit trouble or supervisory signal to remote alarm receiving station.
- 5) Transmit system status to building management system.

2.3 FIRE-ALARM CONTROL UNIT (FACU)

A. Description: Field-programmable, microprocessor-based, modular, power-limited design with electronic modules.

B. MANUFACTURERS

1. FACP and Equipment Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, limited to the following:
 - a. Gamewell-FCI.
 - b. NOTIFIER; a Honeywell company.
 - c. Firelight
 - d. Silent Knight.

C. Performance Criteria:

1. Regulatory Requirements: Comply with NFPA 72 and UL 864.
2. General Characteristics:
 - a. System software and programs must be held in nonvolatile flash, electrically erasable, programmable, read-only memory, retaining information through failure of primary and secondary power supplies.
 - b. Include real-time clock for time annotation of events on event recorder and printer.
 - c. Provide communication between FACU and remote circuit interface panels, annunciators, and displays.
 - d. FACU must be listed for connection to central-station signaling system service.
 - e. Provide nonvolatile memory for system database, logic, and operating system and event history. System must require no manual input to initialize in the event of complete power down condition. FACU must provide minimum 500-event history log.
 - f. Addressable Initiation Device Circuits: FACU must indicate which communication zones have been silenced and must provide selective silencing of alarm notification appliance by building communication zone.

- 1) Addressable Control Circuits for Operation of Notification Appliances and Mechanical Equipment: FACU must be listed for releasing service.
- g. Fire-Alarm Annunciator: Arranged for interface between human operator at FACU and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and programming and control menu.
 - 1) Annunciator and Display: LCD, two lines of 80 characters, minimum.
 - 2) Keypad: Arranged to permit entry and execution of programming, display, and control commands.
- h. Initiating-Device, Notification-Appliance, and Signaling-Line Circuits:
 - 1) Pathway Class Designations: NFPA 72, Class B.
 - 2) Install no more than 50 addressable devices on each signaling-line circuit.
 - 3) Install fault circuit isolators to comply with circuit performance requirements of NFPA 72 or with manufacturer's written instructions, whichever is more conservative.
- i. Notification-Appliance Circuit:
 - 1) Audible appliances must sound in three-pulse temporal pattern, as defined in NFPA 72.
 - 2) Where notification appliances provide signals to sleeping areas, alarm signal must be 520 Hz square wave with intensity 15 dB above average ambient sound level or 5 dB above maximum sound level, or at least 75 dB(A-weighted), whichever is greater, measured at pillow.
 - 3) Visual alarm appliances must flash in synchronization where multiple appliances are in same field of view, as defined in NFPA 72.
- j. Water-flow alarm connected to sprinkler in elevator shaft and elevator machine room must shut down elevators associated with location without time delay.
 - 1) Water-flow switch associated with sprinkler in elevator pit may have delay to allow elevators to move to designated floor.
- k. Remote Smoke-Detector Sensitivity Adjustment: Controls must select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory, and print out final adjusted values on system printer.
- l. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to remote alarm station.
- m. Indicate number of alarm channels for automatic, simultaneous transmission of different announcements to different zones or for manual transmission of announcements by use of central-control microphone. Amplifiers must comply with UL 1711.
 - 1) Allow application of, and evacuation signal to, indicated number of zones and simultaneously allow voice paging to other zones selectively or in combination.
 - 2) Programmable tone and message sequence selection.
 - 3) Standard digitally recorded messages for "Evacuation" and "All Clear."
 - 4) Generate tones to be sequenced with audio messages of type recommended by NFPA 72 and that are compatible with tone patterns of notification-appliance circuits of FACU.

- n. Status Annunciator: Indicate status of various voice/alarm speaker zones and status of firefighters' two-way telephone communication zones.
- o. Primary Power: 24 V(dc) obtained from 120 V(ac) service and power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, must be powered by 24 V(dc) source.
- p. Alarm current draw of entire fire-alarm system must not exceed 80 percent of power-supply module rating.
- q. Secondary Power: 24 V(dc) supply system with batteries, automatic battery charger, and automatic transfer switch.

2.4 MANUAL FIRE-ALARM BOXES

- A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
 - 1. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit. Glass-break rods are not allowed. Mount operating mechanism between 42-inches and 48-inches above finished floor.
 - 2. Station Reset: Key-operated switch.
 - 3. Indoor Protective Shield: Factory-fabricated clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation.
 - 4. Weatherproof Protective Shield: Factory-fabricated clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm.

2.5 SYSTEM SMOKE DETECTORS

- A. General Requirements for System Smoke Detectors:
 - 1. Comply with UL 268; operating at 24-V dc, nominal.
 - 2. Unless suitably protected against dust, paint, etc., spot type smoke detectors shall not be installed until the final construction clean-up has been completed. In the event of contamination during construction, the detectors must be replaced.
 - 3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
 - 4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
 - 5. Sounder Base: Provide bases with a built-in (local) sounder rated at 85 dBA minimum, measured at 10ft. Configure sounder bases such that sounders are activated under conditions as described in the Matrix. Provide low frequency sounder bases in sleeping areas.
 - 6. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
 - 7. Integral Visual-Indicating Light: Addressable initiation devices shall provide dual alarm and power LEDs. Both LEDs shall flash under normal conditions, indicating

that the device is operational and in regular communication with the control panel. Both LEDs shall be placed into steady illumination by the FACP to indicate that an alarm condition has been detected. The flashing mode operation of the detector LEDs shall be optional through the system field program. An output connection shall also be provided in the device base to connect an external remote alarm LED.

8. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually, automatically, adjustable for sensitivity by fire-alarm control unit due to ambient conditions and dust build-up within the detectors.
 - a. Rate-of-rise temperature characteristic shall be selectable at fire-alarm control unit for 15 or 20 deg F per minute.
 - b. Fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit to operate at 135 or 155 deg F.
 - c. Provide multiple levels of detection sensitivity for each sensor. Sensitivity shall be set through the FACP and shall be adjustable in the field through field programming of the system. Sensitivity shall be capable of being automatically adjusted by the FACP on a time-of-day basis.
9. Spot type smoke detector shall have a built-in locking device to secure the head to the base, for tamper resistance. For detectors mounted within 12 feet of the floor, activate this lock after the system has been inspected and given final acceptance.
10. Detectors shall store an internal identifying type code that the control panel shall use to identify the type of device

B. Photoelectric Smoke Detectors:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.
 - d. Present sensitivity selected.
 - e. Sensor range (normal, dirty, etc.).

C. Ionization Smoke Detector:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.
 - d. Present sensitivity selected.
 - e. Sensor range (normal, dirty, etc.).

3. Shall use the dual-chamber ionization principal to measure products of combustion and shall, on command from the control pane, send data to the panel representing the analog level of products of combustion.

2.6 DUCT SMOKE DETECTORS

A. Description: Photoelectric-type, duct-mounted smoke detector.

B. Performance Criteria:

1. Regulatory Requirements:

- a. NFPA 72.
- b. UL 268A.

2. General Characteristics:

- a. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to FACU.
- b. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
- c. Integral Visual-Indicating Light: LED type, indicating detector has operated and power-on status.
- d. Detector address must be accessible from FACU and must be able to identify detector's location within system and its sensitivity setting.
- e. Operator at FACU, having designated access level, must be able to manually access the following for each detector:
 - 1) Primary status.
 - 2) Device type.
 - 3) Present average value.
 - 4) Present sensitivity selected.
 - 5) Sensor range (normal, dirty, etc.).
- f. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with supplied detector for smoke detection in HVAC system ducts.
- g. Each sensor must have multiple levels of detection sensitivity.
- h. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
- i. Relay Fan Shutdown: Fully programmable relay rated to interrupt fan motor-control circuit.

2.7 CARBON MONOXIDE DETECTORS

A. Description: Carbon monoxide detector listed for connection to fire-alarm system.

B. Performance Criteria:

1. Regulatory Requirements:

- a. NFPA 72
- b. NFPA 720.
- c. UL 2075.

2. General Characteristics:

- a. Mounting: Adapter plate for outlet box mounting.
- b. Testable by introducing test carbon monoxide into sensing cell.
- c. Detector must provide alarm contacts and trouble contacts.
- d. Detector must send trouble alarm when nearing end-of-life, power supply problems, or internal faults.
- e. Locate, mount, and wire in accordance with manufacturer's written instructions.
- f. Provide means for addressable connection to fire-alarm system.
- g. Test button simulates alarm condition.

2.8 HEAT DETECTORS

- A. General Requirements for Heat Detectors: Comply with UL 521.
- B. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F or a rate of rise that exceeds 15 deg F per minute unless otherwise indicated. Up to 99 intelligent heat detectors may connect to one SLC loop.
 - 1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
 - 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
- C. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of 190 deg F. Non-rate of rise detectors is indicated by NRR adjacent to the thermal detector symbol. Where used in elevator machine rooms or hoist ways, select temperature rating nominal 10 degrees F less than the adjacent fire sprinkler
 - 1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
 - 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

2.9 MULTICRITERIA AND MULTISENSOR FIRE DETECTORS

- A. Description: Fire-sensing detectors using multiple means of detection.
- B. Performance Criteria:
 - 1. Regulatory Requirements:
 - a. NFPA 72.
 - 2. General Characteristics:
 - a. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to FACU.

- b. Automatically adjusts its sensitivity by means of drift compensation and smoothing algorithms. Detector must send trouble alarm if it is incapable of compensating for existing conditions.
- c. Test button tests sensors in detector.
- d. Operator at FACU, having designated access level, must be able to manually access the following for each detector:
 - 1) Primary status.
 - 2) Device type.
 - 3) Present sensitivity selected.
 - 4) Sensor range (normal, dirty, etc.).
- e. Detector must have functional humidity range within 10 to 90 percent relative humidity.
- f. Color: White.
- g. Comply with UL requirements.
- h. Sensors (Multisensor Type): Detector must be comprised of four sensing elements including smoke sensor and carbon monoxide sensor.
 - 1) Smoke sensor must be photoelectric type as described in "System Smoke Detectors" Article.
 - 2) Carbon monoxide sensor must be as described in "Carbon Monoxide Detectors" Article.
 - 3) Each sensor must be separately listed in accordance with requirements for its detector type.

2.10 NOTIFICATION APPLIANCES

- A. General Requirements for Notification Appliances: Connected to notification appliance signal circuits, zoned as indicated, equipped for mounting as indicated and with screw terminals for system connections.
 - 1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated and with screw terminals for system connections.
- B. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464. Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet from the horn, using the coded signal prescribed in UL 464 test protocol.
- C. Visible Notification Appliances: Xenon strobe lights comply with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch-high letters.
 - 1. Mounting: Wall mounted unless otherwise indicated.
 - 2. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
 - 3. Flashing shall be synchronized with other units, with duration of 2/10ths of one second. Minimum intensity Candela (Cd) rating of 15 Cd, or greater as indicated on Drawings. Notify the designer of any coverage deficiencies.
 - 4. Strobe Leads: Factory connected to screw terminals.

5. Mounting Faceplate: Factory finished, white.

2.11 FIRE-ALARM REMOTE ANNUNCIATORS

- A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.
 1. Mounting: Flush cabinet, NEMA 250, Type 12.
 2. Annunciator shall communicate with the fire alarm control panel via an EIA-485 communications loop (four-wire) and shall individually annunciate all zones in the system. System zones shall be as indicated on the Drawings. Up to 10 annunciators may be connected to the EIA-485 communications loop
- B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.
 1. The annunciator shall provide a red Alarm LED per zone, and a yellow Trouble LED per zone. The annunciator shall also have an "ON-LINE" LED, local piezo sounder, local acknowledge/lamp test switch, and custom zone/function identification labels. Annunciator switches may be used for System control such as, Global Acknowledge, Global Signal Silence, and Global System Reset. All annunciator switches and indicators shall be software programmable
 2. The Alphanumeric Display Annunciator shall be a supervised, remotely located back-lit LCD display containing a minimum of eighty (80) characters for alarm annunciation in clear English text. The LCD Annunciator shall display all alarms and trouble conditions in the system
 3. The system shall allow a minimum of four LCD annunciators. In addition to annunciation functions, each LCD annunciator shall be capable of the following software programmed system functions: Acknowledge, Signal Silence and Reset.
 4. The annunciator shall connect to a two-wire EIA-485 interface. The two-wire connection shall be capable operation at distances of 6,000 feet. Provide interface to fiber optic cable systems and/or repeater units where such are indicated on the Drawings

2.12 FIRE-ALARM ADDRESSABLE INTERFACE DEVICES

- A. General: These devices either monitor a set of dry contacts, or provide contacts for control of equipment. All devices may not be shown on the drawings for the required system configuration, however contractor shall provide quantity required for complete operation
 1. Include address-setting means on the module utilizing dip switches.
 2. Store an internal identifying code for control panel use to identify the module type.
 3. Listed for controlling HVAC fan motor controllers.
 4. Indication of Operation: An LED shall be provided that shall flash under normal conditions, indicating that the Monitor Module is operational and in regular communication with the control panel.

5. A magnetic test switch shall be provided to test the module without opening or shorting its NAC wiring.
- B. Description: Microelectronic monitor module, NRTL listed for use to connect one supervised zone (either Style D or Style B) of non-addressable Alarm Initiating Devices (any Normally Open [N.O.] dry contact device) to one of the Fire Alarm Control Panel Signaling Line Circuit Loops.
- C. Addressable Control Module: Addressable Control Modules shall be provided to supervise and control the operation of one conventional Notification Appliance Circuit (NAC) of compatible, 24 VDC powered, polarized Audio/Visual (A/V) Notification Appliances. For fan shutdown and other auxiliary control functions, the control module may be set to operate as a dry contact relay. The control module shall provide address-setting means.
 1. Configuration: The control module NAC circuit may be wired for (Class A/B) with up to 1 Amp of inductive A/V signal, or 2 Amps of resistive A/V signal operation, or as a dry contact (Form C) relay. The control module shall be suitable for pilot duty applications and rated for a minimum of 0.6 amps at 30 VDC. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to ensure that 100% of all auxiliary relay or NACs may be energized at the same time on the same pair of wires.
 2. Power Source: Audio/visual power shall be provided by a separate supervised power loop from the main fire alarm control panel or from a supervised, 3rd party listed remote power supply. A/V power sources and connections are not shown on the Drawings.
- D. Integral Relay: Capable of providing a direct signal to elevator controller to initiate elevator recall.
 1. Allow the control panel to switch the relay contacts on command.
 2. Have a minimum of two normally open and two normally closed contacts available for field wiring.
- E. Isolator Module: Isolator Modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC loop. The Isolator Module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC Loop to 20 addressable devices. Modules must be readily accessible (not above ceiling) and clearly labeled.
 1. Operation: Isolator Modules shall operate such that if a wire-to-wire short occurs, the Isolator module shall automatically open-circuit (disconnect) the SLC loop. When the short circuit condition is corrected, the Isolator Module shall automatically reconnect the isolated section. The Isolator Module shall not require any address-setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an Isolator Module after its normal operation.
 2. The Isolator Modules shall provide a single LED that shall flash to indicate that the Isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.
- F. Water Flow Switch: Flow switches shall be integral, mechanical, non-coded, non-accumulative retard type. Flow switches shall have an alarm transmission delay time that is conveniently adjustable from 0 to 60 seconds. Initial settings shall be 30-45

seconds. Flow switches shall be located a minimum of one (1) foot from a fitting that changes the direction of the flow and a minimum of three (3) feet from a valve as required per NFPA 13. Installation: Water Flow Switches shall be connected by the Division 26 (Electrical) Contractor but furnished and installed by the Division 23 (Mechanical) Contractor.

- G. Sprinkler and Standpipe Valve Supervisory Switch: Supervisory switch mechanisms shall be contained in a weatherproof housing that shall provide a 3/4-inch tapped conduit entrance and shall incorporate the necessary facilities for attachment to the valves. Switch housing shall be finished in red baked enamel. Mounting: Mount switch so as not to interfere with the normal operation of the valve and adjust to operate within two revolutions toward the closed position of the valve control, or when the stem has moved no more than one-fifth of the distance from its normal position.

2.13 DIGITAL ALARM COMMUNICATOR TRANSMITTERS (DACTs)

A. Performance Criteria:

1. Regulatory Requirements:

- a. NFPA 72.

2. General Characteristics:

- a. DACT must be acceptable to remote central station and must be listed for fire-alarm use with UL 632 and be listed and labeled by an NRTL.
- b. Functional Performance: Unit must receive alarm, supervisory, or trouble signal from FACU and automatically capture one telephone line(s) and dial preset number for remote central station. When contact is made with central station(s), signals must be transmitted. If service on either line is interrupted for longer than 45 seconds, transmitter must initiate local trouble signal and transmit signal indicating loss of telephone line to remote alarm receiving station over remaining line. Transmitter must automatically report telephone service restoration to central station. If service is lost on both telephone lines, transmitter must initiate local trouble signal.
- c. Local functions and display at DACT must include the following:
 - 1) Verification that both telephone lines are available.
 - 2) Programming device.
 - 3) LED display.
 - 4) Manual test report function and manual transmission clear indication.
 - 5) Communications failure with central station or FACU.
- d. Digital data transmission must include the following:
 - 1) Address of alarm-initiating device.
 - 2) Address of supervisory signal.
 - 3) Address of trouble-initiating device.
 - 4) Loss of ac supply or loss of power for at least 1 hour but not more than 3 hours.
 - 5) Low battery.
 - 6) Abnormal test signal.

7) Communication bus failure.

- e. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

2.14 CELLULAR COMMUNICATIONS

- A. Provide cellular communications device for fire-alarm system with the following:
1. 97 second supervisory heartbeat
 2. 60 minute supervision window
 3. SIM card included
 4. UL listed power supply with backup battery and transformer.
 5. Available with remote antenna option
 6. Operates over the following communication protocols: HSPA+ (4G), HSPA (HSDPA & HSUPA) (3G), EDGE (2G), GPRS (2G).
 7. Provide signal strength and status indicators.
 8. UL 864 listed – Standard for Control Units and Accessories for Fire Alarm Systems.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

- A. Comply with NFPA 72 for installation of fire-alarm equipment.
- B. Smoke- or Heat-Detector Spacing:
1. Comply with NFPA 72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.
 2. Comply with NFPA 72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for heat-detector spacing.
 3. HVAC: Locate detectors not closer than 3 feet from air-supply diffuser or return-air opening.
 4. Lighting Fixtures: Locate detectors not closer than 12 inches from any part of a lighting fixture.
- C. Smoke Detectors: Photo type detectors shall be installed in all areas shown on plans with the exception that Ionization type shall be installed in the elevator equipment rooms. Smoke detectors shall not be installed in non-conditioned spaces.
- D. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct.
- E. Remote Status and Alarm Indicators: Install near each smoke detector that is not readily visible from normal viewing position.
- F. Audible Alarm-Indicating Devices: Install not less than 6 inches below the ceiling. Install horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille.

- G. Visible Alarm-Indicating Devices: Install adjacent to each or alarm horn and at least 6 inches below the ceiling.
- H. Device Location-Indicating Lights: Locate in public space near the device they monitor.
- I. Fire-Alarm Control Unit: Surface mounted, with tops of cabinets not more than 72 inches above the finished floor. Provide framed and protected floor plan with device numbering and layout near FACP location. The unique device number shall match those represented on the as-built plans and those reported at the FACP and Annunciator.
- J. Annunciator: Install with top of panel not more than 60 inches above the finished floor. Provide framed and protected floor plan with device numbering and layout near Annunciator location. The unique device number shall match those represented on the as-built plans and those reported at the FACP and Annunciator.
- K. In multistory buildings, all circuits leaving the riser on each floor shall feed through a labeled terminal block in a hinged enclosure accessible from the floor. If building layout requires the terminal cabinet to be above a drop ceiling, its location must be clearly and permanently identified with a placard readable from the floor. Terminal block screws shall have pressure wire connectors of the self-lifting or box lug type.
- L. All fire alarm system wiring shall be in **RED** metal conduit with compression fittings. All junction boxes shall be painted red prior to pulling the wire; interior shall not be painted. Or, junction box covers may be painted on both sides. Those installed in finished areas are permitted to be painted outside to match the finish color. Box covers shall be labeled using an electronic labeling system with black letters on white background to indicate the circuit(s) or function of the conductors contained therein. Handwritten labels or labels made from embossed tape are not acceptable. There shall be no splices in the system other than at device terminal blocks, or on terminal blocks in cabinets. "Wire nuts" and crimp splices will **NOT** be permitted. Permanent wire markers shall be used to identify all connections at the FACU and other control equipment, at power supplied, in terminal cabinets, and junction boxes. Provide enough wiring excess to pull devices out of junction boxes for testing.
- M. All wiring shall be checked for grounds, opens, and shorts, prior to termination at panels and installation of detector heads. The minimum resistance to ground or between any two conductors shall be ten (10) megaohms, as verified with a megger. Provide advance notice to the Engineer of record of these tests.
- N. The system shall be electrically supervised for open or (+/-) ground fault conditions in SLC, alarm circuits, and control circuits. Removal of any detection device, alarm appliance, plug-in relay, system module, or standby battery connection shall also result in a trouble signal. Fire alarm signal shall override trouble signals, but any pre-alarm trouble signal shall reappear when the panel is reset.
- O. Addressable loop (signaling line) circuits shall be wired with type FPL/FPLR/FPLP fire alarm cable, AWG 18 minimum, low capacitance, twisted shielded copper pair. Cable shield drain wires are to be connected at each device on the loop to maintain continuity, taped to insulate from ground, and terminated at the FACU. The cable jacket color shall be red, with red (+) and black (-) conductor insulation. Acceptable cables included Atlas 228-18-1-1STP, BSCC S1802s19, West Penn D975, D991 (16 AWG),

D995 (14 AWG), or equal wire having capacitance of 30pf/ft. maximum between conductors. Belden 5320FJ acceptable if only FPL rating needed. Unshielded cable, otherwise equal to the above, is permitted to be used if the manufacture's installation manual requires, or states preference for, unshielded cables. In underground conduit, use Type TC or PLTC cable (PE insulated) to avoid problems from moisture.

- P. All wiring shall be color coded. All other circuits in the system shall be wired with AWG 14, solid copper, THHN/THWN conductors, installed in conduit. Color code as shown below throughout the system, without color change in any wire run:
1. Initiating Circuits, General...Red (+)/White (-)
 2. Initiating Circuits, Smoke Only...Violet (+)/Gray (-)
 3. Signal Line Circuit cable...Red jacket with Red(+)/Black(-)
 4. Alarm notification Appliance Circuits (horns/strobes)...Blue (+)/Black (-)
 5. Separate 24vdc Operating Power (for equipment)...Yellow (+)/Brown (-)
 6. AHU Shutdown Circuits...Yellow (+)/Brown (-)
 7. Door Control Circuits...Orange
 8. Elevator Capture Circuits...Brown
 9. Circuits from ZAM's to Monitored Devices (AWG 14/16)...Violet (+)/Grey (-)
- Q. All conduits that penetrate outside walls from air-conditioned space must have internal sealing (duct-seal), to prevent condensation from infiltrating humid air.
- R. Junction box covers shall be labeled to indicate the circuit(s) or function of the conductors contained therein. Labels shall be neatly applied black lettering on a clear background. Handwritten labels or labels made from embossed tape are not acceptable.
- S. The branch circuit breaker(s) supplying the system must be physically protected by panelboard lock or handle lock and each must be identified with a 1/4" permanent red dot applied to handle or exposed body area.
- T. Provide an engraved label at each fire alarm system control unit, system sub-panel or data gathering panel, supplementary notification appliance (SNAC) panel, digital alarm communicator, etc., identifying its 120vac power source, as follows: Panelboard location, Panelboard identification, and branch circuit number.

3.2 CONNECTIONS

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Division 08 Section "Door Hardware." Connect hardware and devices to fire-alarm system.
1. Verify that hardware and devices are NRTL listed for use with fire-alarm system in this Section before making connections.
- B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 3 feet from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
1. Smoke dampers in air ducts of designated air-conditioning duct systems.

2. Alarm-initiating connection to elevator recall system and components.
3. Alarm-initiating connection to activate emergency shutoffs for gas and fuel supplies.
4. Security door release at the security control panel.

3.3 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
- B. Install framed instructions in a location visible from fire-alarm control unit. Provide floor plans with device numbers with a separate sheet provided for each floor. Plans shall be reduced in size from engineering plans in order to fit on 11 x 14 sheets. All device addresses shall be clearly labeled on plans. Indicate locations of all cabinets, modules and end of line devices. Sheets shall be laminated. Provide legend for symbols. Provide holder for plan book in FACP or in a locked box adjacent to panel keyed to match FACP. Provide label for box and book. Plans shall include the following:
 1. Name of building or business
 2. Address of building or business
 3. North Arrow
 4. Fire Alarm symbol legend
 5. Date when plans were installed
- C. Requirements for fire alarm plan color coding of symbols:
 1. Manual fire alarm pull stations shall be colored Red
 2. Water flow switches shall be colored Dark Blue
 3. Smoke Detectors shall be colored Pink
 4. Duct Detectors shall be colored Purple
 5. Heat Detectors shall be colored Orange
 6. Beam Smoke Detectors shall be colored Brown
 7. Fire Alarm Control Panels and Remote Annunciators shall be Red
 8. Tamper Switches, High and Low-Pressure Switches shall be colored Cyan
 9. Fire Dampers shall be colored Yellow.
- D. Identification of individual detectors is required. Assign each a unique number as follows, in sequence starting at the FACU: (Addressable Loop # -- Device #) Show on the as-built plans, and also permanently mount on each detectors base so that it's readable standing on the floor. Loop 1 shall be assigned to the first floor devices and loop number shall increase with floor number. Device numbering starts in the same location on each floor and increases accordingly as circuit location increases.

3.4 GROUNDING

- A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

3.5 FIELD QUALITY CONTROL

- A. Field tests shall be witnessed by authorities having jurisdiction.
- B. All connections to the FACU and the system's programming shall be done only by the manufacturer, or by an authorized distributor that stocks a full compliment of spare parts for the system. The technicians who do this are required to be trained and individually certified by the manufacturer, for the FACU model/series being installed. This training and certification must have occurred within the most recent 24 months, except that a NICET Level III certification will extend this to 36 months.
- C. When programming the system, activate the automatic drift compensation feature for all spot-type smoke detectors. Systems with alarm verification are **not** to have this feature activated without written direction for the owner's representative or the AHJ. Alarm verification must **not** be used with mulit-sensor / mulit-criteria detectors under any circumstances.
- D. Set spot-type smoke detector sensitivities to normal/medium, unless directed otherwise by the design engineer / owner's rep.
- E. Print a complete "System Status and Programming Report", after the above steps have been done. This must include the program settings for each alarm initiating device and the current sensitivity of each analog addressable smoke detector. The manufacturer or authorized installer and the Contractor shall conduct a 100% performance test of each and every alarm initiating device and confirm address identification at the FACP. The system shall operate 48 hours prior to the start of the test. Contractor shall be present for the full 100% test. Submit in writing to the engineer a detailed report or check list showing the system's operational matrix. This document must be part of the "System Status and Programming Report".
- F. Upon completion of the installation and its programming, the installer's technician shall test every alarm initiating device for proper response and indication, and all alarm notification appliances for effectiveness. Contractor shall provide two-way radios, ladders, suitable smoke source, and other materials required for testing of the system.
- G. Tests and Inspections:
 - 1. Visual Inspection: Conduct visual inspection prior to testing.
 - a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
 - b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
 - 2. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
 - 3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.

4. Test audible appliances for the private operating mode according to manufacturer's written instructions.
 5. Test visible appliances for the public operating mode according to manufacturer's written instructions.
 6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
 7. The digital communicator shall be on-line and tested for proper communication with the receiving station.
- H. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances. All testing shall be repeated in the event that subsequent software or wiring modifications are determined necessary to meet the requirements of the contract documents. Such re-testing shall be included as part of the base bid and provided at no additional cost to the owner.
- I. Test Documentation: The installer must fill out and submit the following documentation to the owner, through the engineer, prior to the AHJ's system acceptance inspection.
1. Written verification that this 100% system test was done with copy of print out generated during test.
 2. The NFPA 72, "Record of Completion" Form. Use this form (no substitutes) to detail the system installation and also to certify that: (a.) It was done per Code, and (b.) The Code-required 100% test was performed. The fire alarm installer (manufacturer or authorized distributor's technician) must sign this form. If a representative of the AHJ, owner, or engineer witnesses the tests, in whole or in part, they must also sign the form to signify that fact only (annotating the form as needed to clarify their limited role).
 3. For buildings with a smoke control or smoke purge system, an HVAC balance report, in the smoke control / smoke purge mode.
 4. The System Status and Programming Report described in NFPA 72. This must be generated on the day of the system acceptance inspection and shall include the measured sensitivity of each smoke detector.
 5. The purpose of doing Item (iv) on the day of the inspection is to assure detector sensitivity has not been affected by construction dust. Prudent contractors will have taken measures to prevent detector contamination during construction, and will also have had the system do a detector sensitivity test and printout prior to the day of the inspection, to make certain all devices are properly programmed and operating within their limits.
- J. After completion of the 100% system test and submission of documentation as described above the installer is to request the local fire marshal to set up an inspection. The system must operate for at least two days prior to this inspection. The responding Fire Department shall be notified of this, for pre-fire planning purposes.
- K. **Pre-final Inspection:** At the Owner's request and after passing the Designer's pre-final inspection, the Contractor and Manufacturer's authorized installer will conduct system test in the presence of the Owner.

- L. **Final Inspection:** The fire alarm system will be inspected, with portions of it functionally tested. This will normally include the use of appropriate means to simulate smoke for testing detectors, as well as functionally testing the system interface with building controls, fire extinguishing systems and any off-premises supervising station. Operation of any smoke removal system will be checked as instructed by the AHJ. This statistical (sampling) inspection is intended to assure that the contractor has properly installed the system and performed the 100% operational test as required by NFPA 72. The electrical contractor shall provide two-way radios, ladders, and any other materials needed for testing the system, including a suitable smoke source.
1. Smoke control and smoke management systems are normally tested by measuring air flow rates and pressure differentials, plus observing any effect the system has on the operation of exit, elevator, and stairway doors. Testing with smoke "bombs" (smoke candles) is NOT appropriate because they produce cold chemical smoke that lacks buoyancy and, therefore, does not rise like the smoke from a fire.
 2. The test will be conducted entirely by the Contractor. A copy of the final database software must be presented to the Owner before this test. The software shall be loaded from these disks into the system in the presence of the Owner. The review will then be conducted using this software. Any deficiencies shall be recorded and corrected. After the items have been corrected, the system shall be tested again.
 3. In the event of malfunctions or excessive nuisance alarms, the Contractor must take prompt corrective action. The Owner may require a repeat of the Contractor's 100% system test, or other inspections.
 4. Test Report: Upon successful completion of the Inspection and after the correction of all efficiencies, the manufacturer's authorized representative shall issue a test report to the Engineer and Owner, detailing and certifying the test.
 5. System Acceptance: After successful completion of the Final Inspection and recommendation of the Engineer, the system will be accepted by the Owner. At this time the warranty period begins.
- M. **Maintenance Test and Inspection:** Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.
- N. **Annual Test and Inspection:** One year after date of final acceptance, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.6 TRAINING

- A. The manufacturer's authorized representative must instruct the owner's designated employees in operation of the system, and in all required periodic maintenance. A minimum of 8 hours on-site time will be allocated for this purpose. Two copies of a written, bound summary will be provided for future reference.
1. Scheduling of training must be arranged to meet the Owner's schedule. Additional training shall be available at a cost to be mutually agreed upon by the Owner and the Contractor.
 2. Training shall be in the Owner's provided classroom

3. The training may not be waived, deleted or reduced in the number of hours required.
4. Training shall cover as minimum the following topics:
 - a. Preventive maintenance service techniques and schedules, including historical data trending of alarm and trouble records.
 - b. Overall system concepts, capabilities, and functions. Training shall be in depth, so that the owner shall be able to take any device out of service and return any device to service without need of Manufacture's approval or assistance.
 - c. Explanation of all control functions, including training to program and operate the system software.
 - d. Methods and means of troubleshooting and replacement of all field wiring devices.
 - e. Methods and procedures for troubleshooting the main fire alarm control panel, including field peripheral devices at the programming, bussing systems, internal panel and unit wiring, circuitry and interconnections.
 - f. Manuals, drawings, and technical documentation. Actual system software used for training shall be provided in digital form and shall be left with the Owner at the completion of training for the Owner's use in the future.

END OF SECTION 283111

2018 APPENDIX B
BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS

Name of Project: Jones County Public Works Building
Address: 1539 NC Highway 58, Trenton, NC Zip Code: 28585
Owner or Authorized Agent: Chris Walker Phone #: 252-636-8778 Email: chris@wagarc.com
Owned By: City/County Private State
Code Enforcement Jurisdiction: City County Jones County State

CONTACT
DESIGNER FIRM NAME LICENSE # TELEPHONE # EMAIL
Architectural The Walker Group Architecture, Inc. Chris Walker 15616 252-636-8778 chris@wagarc.com
Civil Avelis Engineering Joe Avelis 15380 252-633-0088 Joe@aveliseng.com
Electrical Etech Engineering Derrick Ham 31466 919-775-9064 dham@etech-gms.com
Fire Alarm Etech Engineering Derrick Ham 31466 919-775-9064 dham@etech-gms.com
Plumbing Etech Engineering Derrick Ham 31466 919-775-9064 dham@etech-gms.com
Mechanical Etech Engineering Derrick Ham 31466 919-775-9064 dham@etech-gms.com
Sprinkler Standpipe
Structural
Retaining Walls > 5' High
Other
("Other" should include firms and individuals such as truss, precast, pre-engineered, interior designers, etc.)

2018 NC BUILDING CODE: New Building Addition Renovation
Is Time Interest Completion
Shell/Core - Contact the local inspection jurisdiction for possible additional procedures and requirements
Planned Construction-Shell/Core - Contact the local inspection jurisdiction for possible additional procedures and requirements

2015 NC EXISTING BUILDING CODE: Prescriptive Repair Chapter 14
Level I Level II Level III
Historic Property Change of Use

CONSTRUCTED: (date) CURRENT OCCUPANCY(S): (Ch.3):
RENOVATED: (date) PROPOSED OCCUPANCY(S): (Ch.3): .00 Business
RISK CATEGORY: (Table 1604.5) Current: I II III IV
Proposed: I II III IV

BASIC BUILDING DATA
Construction Type: I-A II-A III-A IV V-A
(Check all that apply) I-B II-B III-B V-B

Sprinkler: No Partial Yes NFPA 13 NFPA 13R NFPA 13D
Standpipes: No Yes Class I II III Wet Dry
Fire District: No Yes Flood Hazard Area: No Yes
Special Inspections Required: No Yes (Contact the local inspection jurisdiction for additional procedures and requirements.)

Gross Building Area Table		
FLOOR	EXISTING (SQ.FT)	NEW (SQ.FT)
1st Floor		
2nd Floor		
Mezzanine		
1st Floor		10,000 SF
Basement		
TOTAL		10,000 SF

ALLOWABLE AREA
Primary Occupancy Classifications(s):
Assembly A-1 A-2 A-3 A-4 A-5
Business X
Educational
Factory F-1 Moderate F-1 Low
Hazardous H-1 Detonate H-2 Deflagrate H-3 Combust H-4 Health H-5 HPM
Institutional I-1 Condition I-1 I-2 I-2 Condition I-1 I-2 I-4
Mercantile
Residential R-1 R-2 R-3 R-4
Storage S-1 Moderate S-2 Low High-Piled
Parking Garage Open Enclosed Repair Garage
Utility & Miscellaneous
Accessory Occupancy Classifications(s):
Incidental Uses (Table 509):
Special Uses (Chapter 4 - List Code Sections):
Special Provisions (Chapter 5 - List Code Sections):
Mixed Occupancy: No X Yes Separation: 0 Hr. Exception:

Non-Separated Use (508.3) - The required type of construction for the building shall be determined by applying the height and area limitations for each of the applicable occupancies to the entire building. The most restrictive type of construction, so determined, shall apply to the entire building.
Separated Use (503.3.2) - See below for area calculations for each story; the area of the occupancy shall be such that the sum of the ratios of the actual floor area of each use divided by the allowable floor area for each use shall not exceed 1.
Actual Area of Occupancy A + Actual Area of Occupancy B Allowable Area of Occupancy A Allowable Area of Occupancy B <= 1.00

STORY NO.	DESCRIP. & USE	(A) BLDG. AREA PER STORY (ACTUAL)	(B) TABLE 506.2 AREA	(C) AREA FOR FRONTAGE INCREASE	(D) ALLOWABLE AREA PER STORY OR UNLIMITED
1st Floor	Business (B)	2,200 SF	23,000 SF	17,250 SF	40,250 SF
1st Floor	Shop (S-1)	7,800 SF	17,500 SF	13,125 SF	36,625 SF

1 Frontage area increases from Section 506.2 are computed thus:
a. Perimeter which fronts a public way or open space having 20 feet minimum width = 400' (F)
b. Total Building Perimeter = 400' (P)
c. Ratio (F/P) = 1 (F/P)
d. W = Minimum width of public way = 20' (W)
e. Percent of frontage increase 1 = 100 [(F/P) x 25] x W/30 = 75 (%)
2 Unlimited area applicable under conditions of Section 507.
3 Maximum Building Area = total number of stories in the building x D (maximum 3 stories) (506.2).
4 The maximum area of parking garages must comply with Table 406.5.4.
5 Frontage increase is based on the unobstructed area value in Table 506.2.

ALLOWABLE HEIGHT			
	ALLOWABLE	SHOWN ON PLAN	CODE REFERENCE
Building Height in Feet (Table 504.3)	39'	31'4"	503
Building Height in Stories (Table 504.4)	2		503

1 Provide code reference if the "Shown on Plans" quantity is not based on Table 504.3 or 504.4.
2 The maximum height of air traffic control towers must comply with Table 412.3.1.
3 The maximum height of open parking garages must comply with Table 406.5.4.

FIRE PROTECTION REQUIREMENTS
Life Safety Plan Sheet #, if Provided: .0003
BUILDING ELEMENT FIRE SEPARATION DISTANCE (FEET) RATING REQ'D PROVIDED (W/2HR REDUCTION) DETAIL AND SHEET # DESIGN # FOR RATED ASSEMBLY DESIGN # FOR RATED PENETRATION DESIGN # FOR RATED JOINTS
Structural Frame including columns, girders, trusses
Bearing walls
Exterior
North
East
West
South
Interior
Nonbearing walls and partitions
Exterior
North
East
West
South
Interior
Floor construction including supporting beams and joists
Floor Ceiling Assembly
Columns Supporting Floors
Roof Construction including supporting beams and joists
Roof Ceiling Assembly
Columns Supporting Roof
Shaft Enclosures-Exit
Shaft Enclosures-Other
Corridor Separation
Occupancy/Fire Barrier Separation
Fire Area Separation
Smoke Barrier Separation
Smoke Partition
Tenant/Drivell Unit/Sleeping Unit Separation
Incidental Use Separation 2HR 1HR SEE 0003. SEE PLUMBING AND MECHANICAL FOR PENETRATION DETAILS.

PERCENTAGE OF WALL OPENING CALCULATIONS			
FIRE SEPARATION DISTANCE (FEET FROM PROPERTY LINES)	DEGREE OF OPENINGS PROTECTION (TABLE 705.8)	ALLOWABLE AREA (%)	ACTUAL SHOWN ON PLANS (%)
N/A	N/A	N/A	N/A

LIFE SAFETY SYSTEM REQUIREMENTS
Emergency Lighting: No X Yes
Exit Signs: No X Yes
Fire Alarm system: No X Yes
Smoke Detection Systems: X No Yes Partial
Carbon Monoxide Detection: X No Yes

LIFE SAFETY PLAN REQUIREMENTS
Life Safety Plan Sheet # .0003
X Fire and/or smoke rated wall locations (Chapter 7).
X Assumed and real property line locations (if not on the site plan)
X Exterior wall opening area with respect to distance to assumed property lines (705.8)
X Occupancy Use for each area as it relates to occupant load calculations (Table 1004.1.2)
X Occupant loads for each area
X Exit access travel distances (1017)
X Common path of travel distances (Tables 1006.2.1 and 1006.3.2(1))
X Dead end lengths (1020.4)
X Clear exit widths for each exit door
X Maximum calculated occupant load capacity each exit door can accommodate based on egress width (1005.3)
X Actual occupant load for each exit door
X A separate schematic plan indicating where fire rated floor/ceiling and/or roof structure is provided for purposes of occupancy separation
X Location of doors with panic hardware (1010.1.10)
X Location of doors with delayed egress locks and the amount of delay (1010.1.9.7)
X Location of doors with electromagnetic egress locks (1010.1.9.9)
X Location of doors equipped with hold-open devices
X Location of emergency escape windows (1030)
X The square footage of each fire area (202)
X The square footage of each smoke compartment for Occupancy Classification I-2 (407.5)
Note any code exceptions or table notes that may have been utilized regarding the items above

ACCESSIBLE DWELLING UNITS (SECTION 1107) (NOT APPLICABLE)						
TOTAL UNITS	ACCESSIBLE UNITS REQUIRED	ACCESSIBLE UNITS PROVIDED	TYPE A UNITS REQUIRED	TYPE A UNITS PROVIDED	TYPE B UNITS REQUIRED	TYPE B UNITS PROVIDED

ACCESSIBLE PARKING (SECTION 1106)					OPEN GRAVEL LOT WITH PARKING BY OWNER, (I) HANDICAP PARKING SPACES ARE PROVIDED.	
LOT OR PARKING AREA	TOTAL # OF PARKING SPACES REQUIRED	PROVIDED	# OF ACCESSIBLE SPACES PROVIDED REGULAR WITH 5' ACCESS AISLE	VAN SPACES WITH 132" ACCESS AISLE	8' ACCESS AISLE	TOTAL # ACCESSIBLE PROVIDED
TOTAL			2			

PLUMBING FIXTURE REQUIREMENT (TABLE 2902.1) (48 TOTAL BUILDING OCCUPANTS)									
SPACE	EXISTING	WATERCLOSETS		URINALS		LAVATORIES		SHOWERS	
		MALE	FEMALE	UNISEX	MALE	FEMALE	UNISEX	TUBS	REGULAR ACCESSIBLE
NEW									
REQUIRED	1	1		2	2	1	1	2	0

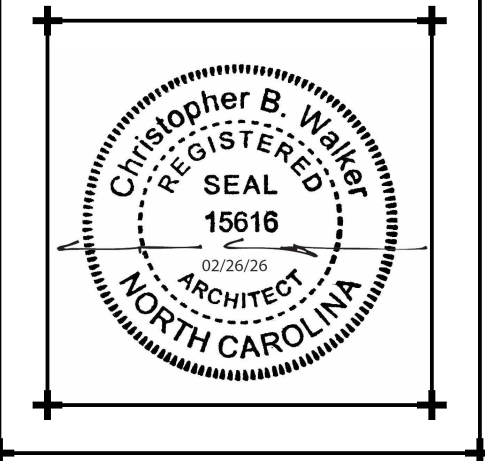
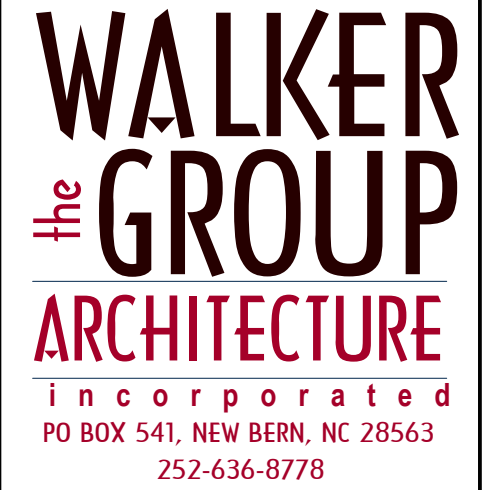
SPECIAL APPROVALS
Special Approval: (Local Jurisdiction, Department of Insurance, OSC, DPI, DHHS, etc., describe below)

ENERGY SUMMARY
Energy Requirements:
The following data shall be considered minimum and any special attribute required to meet the energy code shall also be provided. Each Designer shall furnish the required portions of the project information for the plan data sheet. If performance method, state the annual energy cost for the standard reference design vs annual energy cost for the proposed design.
Existing building envelope complies with code: No Yes (The remainder of this section is not applicable)
Exempt Building: X No Yes (Provide code or statutory reference):
Climate Zone: 3A 4A 5A
Method of Compliance: Energy Code Performance X Prescriptive
ASHRAE 90.1 Performance X Prescriptive
(If "other" specify source here)
THERMAL ENVELOPE: (Prescriptive method only)
Roof/Ceiling Assembly (each assembly)
Description of assembly: Pre-engineered metal roof panels, batt insulation, vinyl reinforcing
U-Value of total assembly: 0.026
R-Value of insulation: 25
U-Value of skylight: N/A
Total square footage of skylights in each assembly
Exterior Walls (each assembly)
Description of assembly: Pre-engineered metal roof panels, batt insulation, vinyl reinforcing
U-Value of total assembly: 0.053
R-Value of insulation: 10
Openings (windows or doors with glazing)
U-Value of assembly: 0.60
Solar heat gain coefficient: 0.25
Projection factor: 0.15
Door R-Values: R-0.75 for new personnel door, R-0 for new ceiling door.
Walls below grade (each assembly)
Description of assembly: N/A
U-Value of total assembly: N/A
R-Value of insulation: N/A
Floors over unconditioned space (each assembly)
Description of assembly: 4" CONCRETE SLAB
U-Value of total assembly: 0.06
R-Value of insulation: N/A
Horizontal/vertical requirement: N/A
Slab heated: N/A

STRUCTURAL DESIGN (SEE STRUCTURAL DRAWINGS)
DESIGN LOADS:
Importance Factors: Snow (R_s) Seismic (I_e)
Live Loads: Roof Merzantine Floor
Ground Snow Load: psf
Wind Load: Ultimate Wind Speed mph (ASCE 7-10) Exposure Category
SEISMIC DESIGN CATEGORY:
Provides the following Seismic Design Parameters:
Occupancy Category (Table 1604.5) I II III IV
Spectral Response Acceleration S_s S₁
Site Classification (ASCE 7) A B C D E F
Date Source: Field Test Presumptive Historical Data
Basic Structural System: Bearing Wall Building Frame Moment Frame
Analysis Procedure: Simplified Equivalent Lateral Force Dynamic
Architectural/Mechanical/Components anchored? Yes No
LATERAL DESIGN CONTROL: Earthquake Wind
SOIL BEARING CAPACITY:
Field Test (provide copy of test report) psf
Presumptive bearing capacity psf
Pile size, type and capacity

MECHANICAL DESIGN (SEE MECHANICAL DRAWINGS)
MECHANICAL SUMMARY
MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT
Thermal Zone: winter dry bulb summer dry bulb
Interior Design Conditions: winter dry bulb summer dry bulb relative humidity
Building Heating Load
Building Cooling Load
Mechanical Spacing Conditioning System: Unitary
description of unit heating efficiency cooling efficiency size category of unit
Boiler: size category. If oversized, state reason.
Chiller: size category. If oversized, state reason.
List Equipment efficiencies

ELECTRICAL DESIGN (SEE ELECTRICAL DRAWINGS)
ELECTRICAL SUMMARY
ELECTRICAL SYSTEM AND EQUIPMENT
Method of Compliance: Energy Code Prescriptive Performance
ASHRAE 90.1 Prescriptive Performance
Lighting Schedule (each fixture type)
lamp type required in fixture
number of lamps in fixture
ballast type used in fixture
number of ballast in fixture
total wattage per fixture
total interior wattage specified vs. allowed (whole building or space by space)
total exterior wattage specified vs. allowed
Additional Efficiency Package Options
When using the 2018 NEC/C, not required for ASHRAE 90.1)
C406.2 More Efficient HVAC Equipment Performance
C406.3 Reduced Lighting Power Density
C406.4 Enhanced Digital Lighting Controls
C406.5 On-Site Renewable Energy
C406.6 Dedicated Outdoor Air System
C406.7 Reduced Energy Use in Service Water Heating



Jones County
Public Works
Building

1539 NC HWY 58
TRENTON, NC 28585

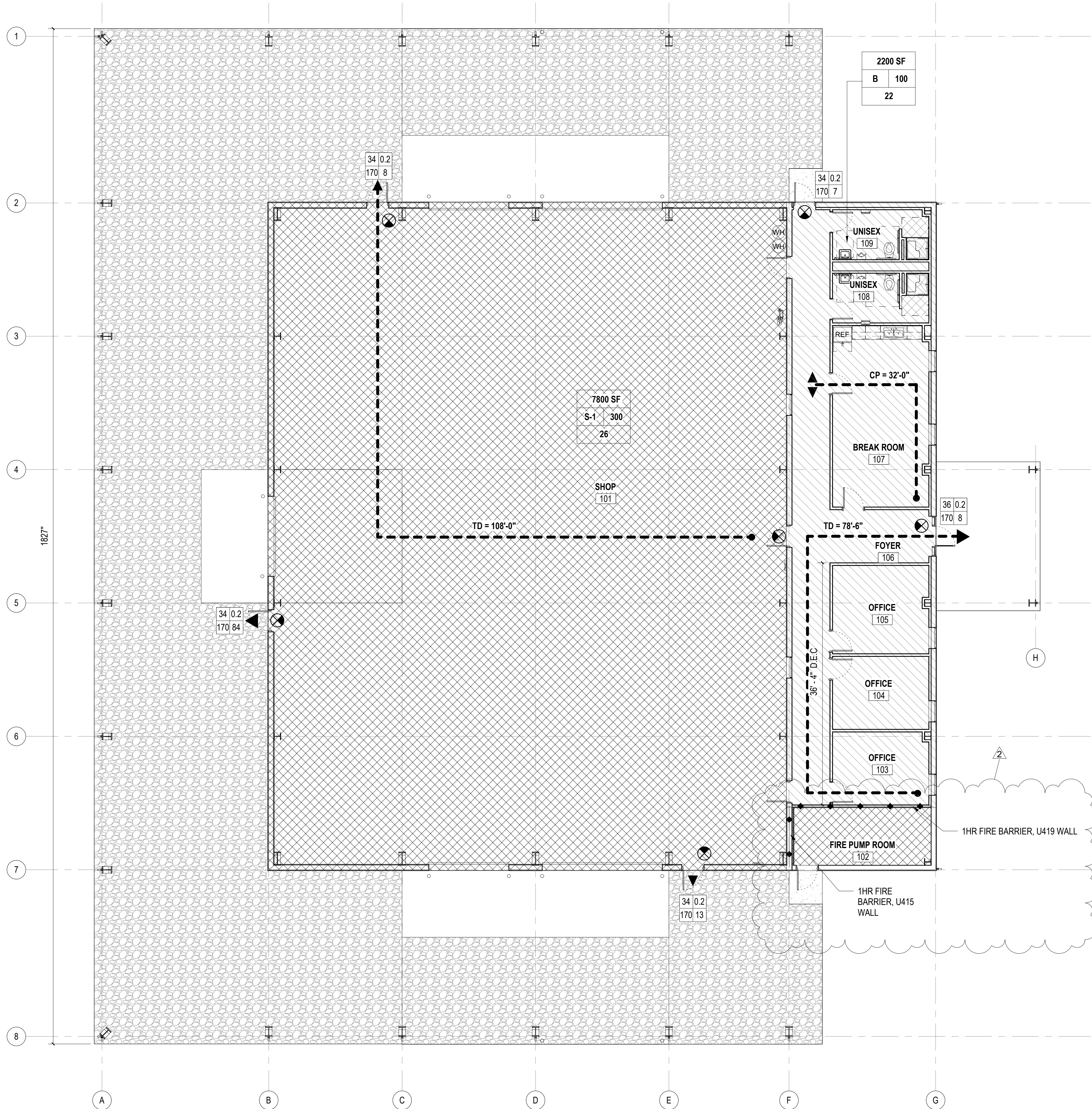
REVISIONS	DATE	DESCRIPTION
2	04/16/26	Addendum 02 Revisions

Project Number 2523.JCPW Date 02/26/26
Drawn Checked
Author Checker
Scale
AS NOTED
Drawing Title

CODE ANALYSIS

Sheet Number 2 Of 45
Drawing Number

G1002



LIFE SAFETY PLAN LEGEND							
SYMBOL	DESCRIPTION						
	1/2 HOUR FIRE WALL						
	1 HOUR FIRE WALL						
	2 HOUR FIRE WALL						
	3 HOUR FIRE WALL						
	SMOKE PARTITION						
	CPT = X'-XX" COMMON PATH OF TRAVEL						
	DE = X'-XX" DEAD-END CORRIDOR						
	TD = X'-XX" TRAVEL DISTANCE						
<table><tr><td>W</td><td>P</td></tr><tr><td>C</td><td>A</td></tr></table>	W	P	C	A	W: NET EXIT WIDTH (INCHES) C: CAPACITY (PEOPLE) P: EXIT WIDTH PER PERSON A: ACTUAL EGRESS (PEOPLE)		
W	P						
C	A						
OCCUPANCY, TYPE A - ASSEMBLY B - BUSINESS S - STORAGE	<table><tr><td>1500 SF</td><td>ROOM / ZONE AREA</td></tr><tr><td>B 150</td><td>OCCUPANCY, ALLOWABLE AREA PER OCCUPANT</td></tr><tr><td>10</td><td>OCCUPANCY LOAD (PEOPLE)</td></tr></table>	1500 SF	ROOM / ZONE AREA	B 150	OCCUPANCY, ALLOWABLE AREA PER OCCUPANT	10	OCCUPANCY LOAD (PEOPLE)
1500 SF	ROOM / ZONE AREA						
B 150	OCCUPANCY, ALLOWABLE AREA PER OCCUPANT						
10	OCCUPANCY LOAD (PEOPLE)						
	BUSINESS (B)						
	SHOP (S-1)						

DESIGN NO. UL U419

FIRE RATING: 1 HOUR
STC RATING: 49
SOUND TEST: USG-190432
SYSTEM THICKNESS: 4-7/8" [124 MM]
LOCATION: INTERIOR
FRAMING TYPE: STEEL STUD (NONLOAD-BEARING)

2' - 0"

ASSEMBLY REQUIREMENTS:

GYPSUM PANELS: ONE LAYER 5/8" [15.9 MM] SHEETROCK® GYPSUM PANEL (UL TYPE SCX)
STEEL STUDS: 3-5/8" [92 MM] STEEL STUDS, EQ25 (0.015"), 24" [610 MM] O.C.
INSULATION: 3-1/2" [89 MM] FIBERGLASS INSULATION
GYPSUM PANELS: ONE LAYER 5/8" [15.9 MM] SHEETROCK® GYPSUM PANEL (UL TYPE SCX)

U419 DETAIL
SCALE: 1 1/2" = 1'-0"

DESIGN NO. UL U415 UL System A

FIRE RATING: 1 HOUR
STC RATING: 33
SOUND TEST: USG-170524
SYSTEM THICKNESS: 3 1/8" [79 MM]
LOCATION: CORE-SHAFT
FRAMING TYPE: STEEL STUD (NONLOAD-BEARING)

24" [610 mm] 24" [610 mm]

ASSEMBLY REQUIREMENTS:

GYPSUM PANELS: ONE LAYER 1" [25.4 MM] SHEETROCK® GYPSUM LINER PANELS (UL TYPE SLX)
STEEL STUDS: 2-1/2" [64 MM] CH STUDS, 20 GA. (0.033"), 24" [610 MM] O.C.
GYPSUM PANELS: ONE LAYER 5/8" [15.9 MM] SHEETROCK® ECOSMART GYPSUM PANEL (UL TYPE ULX™)

U415 DETAIL
SCALE: 1 1/2" = 1'-0"

WALKER
the **GROUP**
ARCHITECTURE
incorporated
PO BOX 541, NEW BERN, NC 28563
252-636-8778

Christopher B. Walker
REGISTERED
SEAL
15616
02/26/26
ARCHITECT
NORTH CAROLINA

**Jones County
Public Works
Building**

1539 NC HWY 58
TRENTON, NC 28585

REVISIONS	
DATE	04/16/26
DESCRIPTION	
2	Addendum 02 Revisions
1	MARK

Project Number
2523.JCPW

Date
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Drawn
Author

Checked
Checker

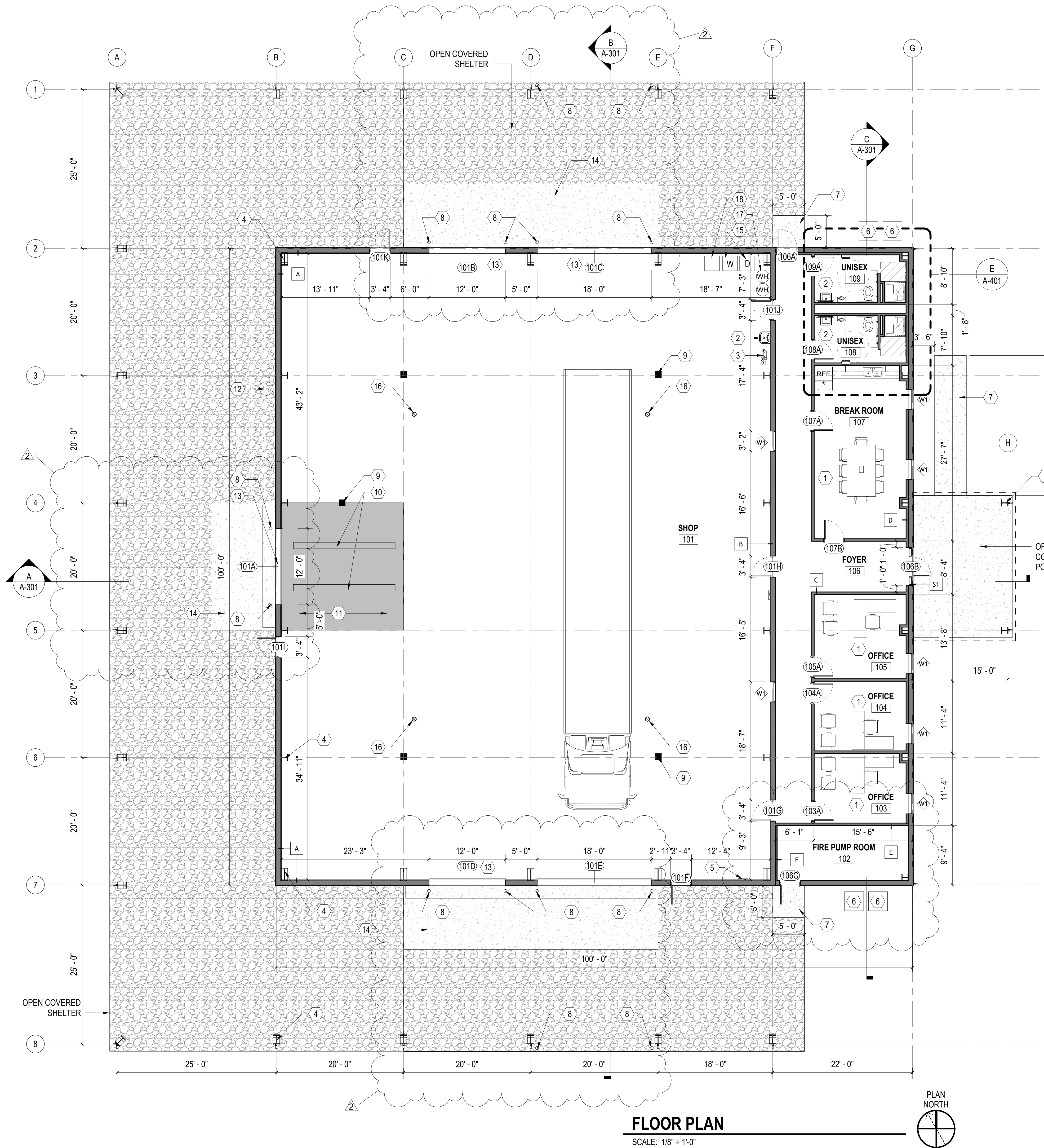
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Drawing Title

Sheet Number
3 Of 45

Drawing Number
G1003

LIFE SAFETY PLAN



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

GENERAL SHEET NOTES

- 1. REFERENCE SHEET A-001 FOR SYMBOL & MATERIAL LEGEND.
- 2. REFERENCE SHEET A-002 FOR WALL ASSEMBLY TYPES.
- 3. ALL DOOR FRAMES ARE TO BE INSTALLED 4" AWAY OF ADJACENT PERPENDICULAR WALLS UNLESS NOTED OTHERWISE.
- 4. SEE SCHEDULES FOR WALL TYPES, DOOR/FRAME/WINDOW TYPES AND SIZES, AND FLOOR/WALL/CEILING FINISHES.
- 5. SEE CIVIL, STRUCTURAL, MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR ADDITIONAL NOTES.

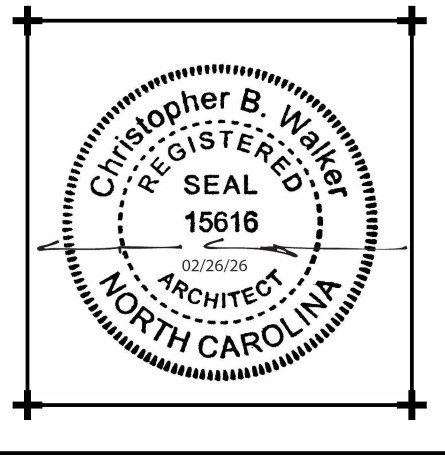
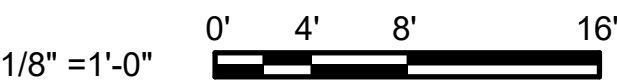
KEYNOTES

#	DESCRIPTION
1	FURNITURE PROVIDED BY OWNER, TYPICAL.
2	PLUMBING FIXTURES, SEE PLUMBING.
3	SAFETY SHOWER AND EYEWASH STATION, SEE PLUMBING.
4	STEEL COLUMNS/ BENTS, BY PRE-ENGINEERED METAL BUILDING MANUFACTURER. PROVIDE FACTORY PAINTED BUILDING STRUCTURE ON BUILDING EXTERIOR.
5	ELECTRICAL EQUIPMENT, SEE ELECTRICAL.
6	MECHANICAL EQUIPMENT, SEE MECHANICAL.
7	CONCRETE SIDEWALK/SLOOP, SEE CIVIL.
8	CONCRETE BOLLARDS. FIELD VERIFY LOCATIONS 7" MIN. FROM EDGE OF WALL/EQUIPMENT.
9	HOSE REEL EQUIPMENT PROVIDED BY OWNER.
10	2 POST LIFT, PROVIDED BY OWNER.
11	8" CONCRETE SLAB, SEE STRUCTURAL.
12	LOCATION OF AIR COMPRESSOR AND 240V ELECTRIC PANEL, UNIT PROVIDED BY OWNER. PROVIDE POER AT LOCATION. SEE ELECTRICAL.
13	OVERHEAD COILING DOOR, SEE DOOR SCHEDULE.
14	CONCRETE APRON, SEE CIVIL.
15	LAUNDRY EQUIPMENT PROVIDED BY OWNER.
16	FLOOR DRAIN, SEE PLUMBING.
17	WATER HEATERS, PROVIDED BY OWNER. SEE MECHANICAL.
18	ICEMAKER MACHINE, PROVIDED BY OWNER. SEE MECHANICAL.

WALL TYPES LEGEND

MARK	NOTES
A	26 GA. PRE-ENGINEERED METAL BUILDING WALL PANEL OVER 8" BYPASS GIRTS, R-20 VINYL REINFORCED LINER SYSTEM BATT INSULATION. PRE-FINISHED INTERIOR LINER PANELS ON INTERIOR SIDE TO 8'-0" A.F.F.
B	26 GA PRE-ENGINEERED METAL BUILDING WALL PANEL OVER 8" BYPASS GIRTS, R-20 VINYL REINFORCED LINER SYSTEM BATT INSULATION FROM UPPER ROOF TO LEAN TO ROOF. PROVIDE 6" 20GA METAL STUDS AT 24" O.C. BELOW WITH SOUND BATT INSULATION AND 5/8" GYPSUM BOARD EACH SIDE. PROVIDE PRE-FINISHED INTERIOR LINER PANELS ON SHOP SIDE TO 8'-0" A.F.F. PROVIDE HORIZONTAL STEEL STUD SUPPORTS FOR LINER PANELS AT 2'-0" INTERVALS.
C	3-5/8" 24GA METAL STUDS @ 24" O.C. WITH 5/8" GYPSUM BOARD EACH SIDE. TAPE, TEXTURE AND PAINT. FULL HEIGHT TO 6" ABOVE CEILING.
D	3 5/8" 24GA METAL STUDS FURRING WALL @ 24" O.C. WITH 5/8" GYPSUM BOARD ON ONE SIDE. TAPE, TEXTURE, AND PAINT. FULL HEIGHT TO 6" ABOVE CEILING.
E	U419 1HR FIRE RATED WALL. FULL HEIGHT TO THE BOTTOM OF ROOF DECK. SEE SHEET G1003. TAPE, TEXTURE, AND PAINT
F	U415 1HR FIRE RATED WALL WALL TO BE INSTALLED ON THE INSIDE OF THE FIRE PUMP ROOM ADJACENT TO THE WALL OF THE SHOP. FULL HEIGHT TO THE BOTTOM OF ROOF DECK. SEE SHEET G1003. TAPE, TEXTURE, AND PAINT

GRAPHIC SCALE(S)



Jones County
Public Works
Building

1539 NC HWY 58
TRENTON, NC 28585

REVISIONS	
MARK	DESCRIPTION
2	Addendum 02 Revisions
04/16/26	DATE

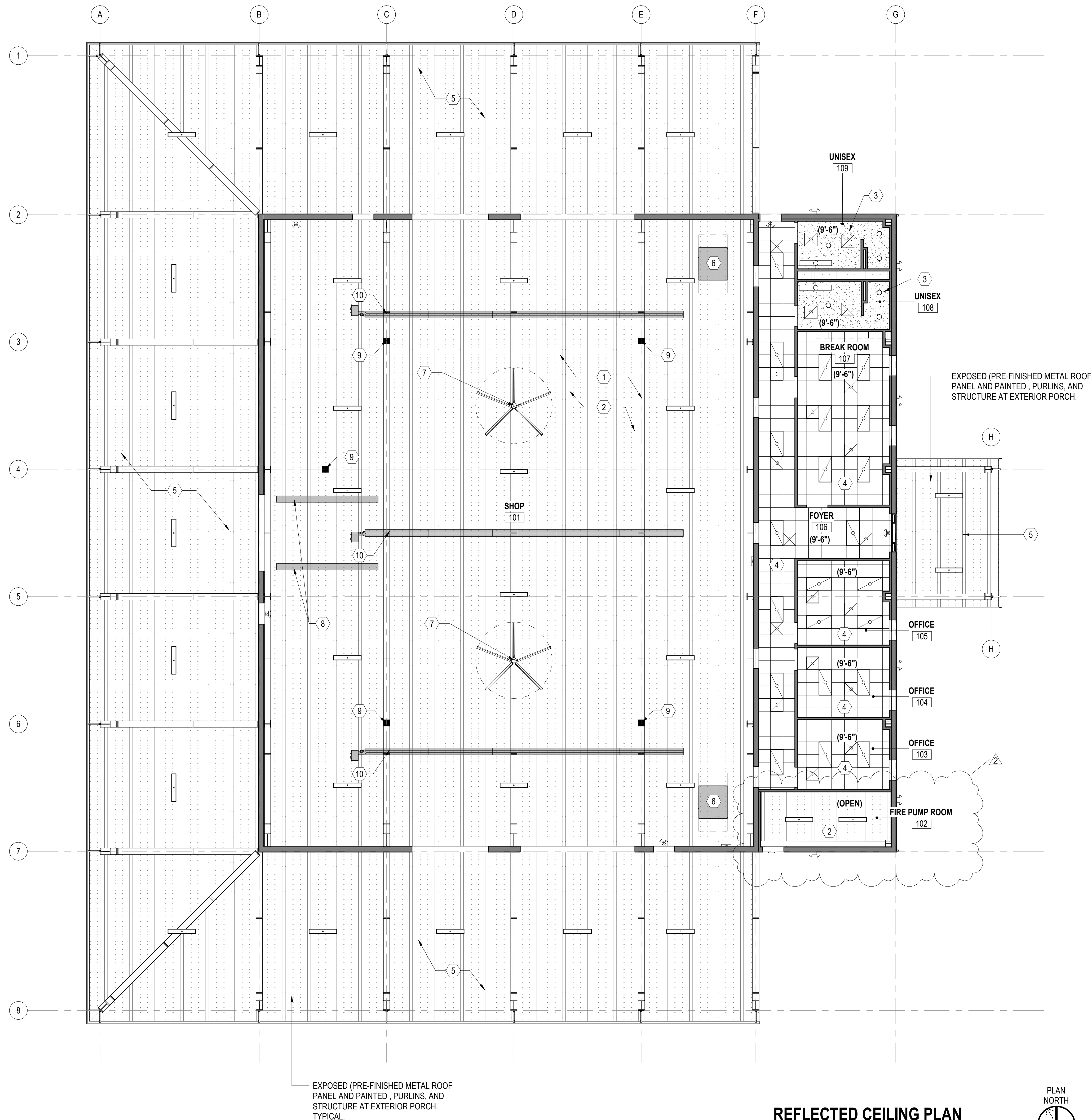
Project Number
2523.JCPW
Drawn
CBW
Scale
AS NOTED
Drawing Title

Date
02/26/26
Checked
BBW

FLOOR PLAN

Sheet Number
13 Of 45
Drawing Number

A-101



REFLECTED CEILING PLAN

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



GENERAL SHEET NOTES

1. REFERENCE SHEET A-001 FOR SYMBOL & MATERIAL LEGEND.
2. REFERENCE SHEET A-002 FOR WALL ASSEMBLY TYPES.
3. ALL DOOR FRAMES ARE TO BE INSTALLED 4" AWAY OF ADJACENT PERPENDICULAR WALLS UNLESS NOTED OTHERWISE.
4. SEE SCHEDULES FOR WALL TYPES, DOOR/FRAME/WINDOW TYPES AND SIZES, AND FLOOR/WALL/CEILING FINISHES.
5. SEE CIVIL, STRUCTURAL, MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR ADDITIONAL NOTES.

KEYNOTES

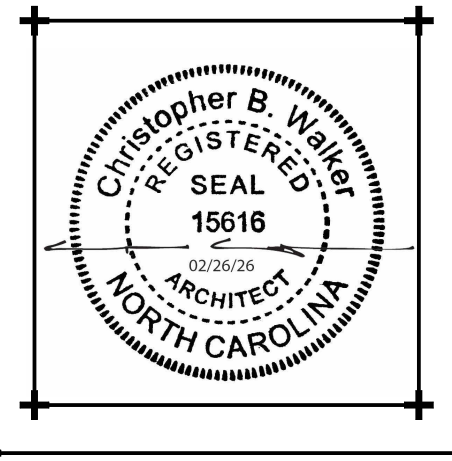
MARK	DESCRIPTION
1	OPEN TO ROOF STRUCTURE ABOVE.
2	R-38 LINER SYSTEM INSULATION.
3	SUSPENDED GYPSUM BOARD CEILING.
4	SUSPENDED 2' X 2' ACOUSTIC GRID CEILING.
5	OPENED COVERED SHELTER.
6	INDOOR HEAT PUMP UNIT, SEE MECHANICAL. SEE BID ALTERNATES ON SHEET G1001.
7	CEILING FAN PROVIDED BY OWNER, SEE ELECTRICAL.
8	2 POST LIFT, PROVIDED BY OWNER.
9	HOSE REEL EQUIPMENT PROVIDED BY OWNER.
10	OVERHEAD INFRARED HEATER, PROVIDED BY OWNER. SEE MECHANICAL. SEE BID ALTERNATES ON SHEET G1001.

REFLECTED CEILING PLAN LEGEND

SYMBOL	DESCRIPTION
	2' - 0" X 2' - 0" ACOUSTICAL CEILING TILE.
	GYPSUM BOARD CEILING.
(X'-X")	FINISHED CEILING HEIGHT ABOVE FINISHED FLOOR
	LIGHT FIXTURE. REFER TO ELECTRICAL DRAWINGS.
	CEILING RETURN OR EXHAUST. REFER TO MECHANICAL DRAWINGS.
	CEILING SUPPLY DIFFUSER. REFER TO MECHANICAL DRAWINGS.
	CEILING EXHAUST FAN. REFER TO MECHANICAL DRAWINGS.

GRAPHIC SCALE(S)

1/8" = 1'-0" 0' 4' 8' 16'



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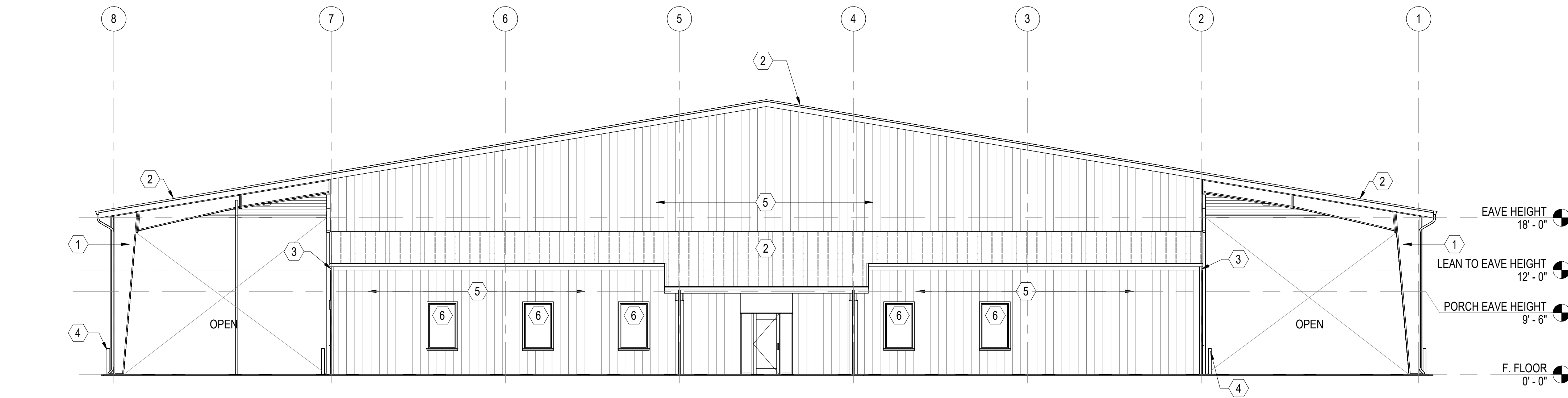
REVISIONS	DATE
2	04/16/26
1	02/26/26

Project Number
2523.JCPW
Date
02/26/26
Drawn
Author
Checked
Checker
Scale
AS NOTED
Drawing Title

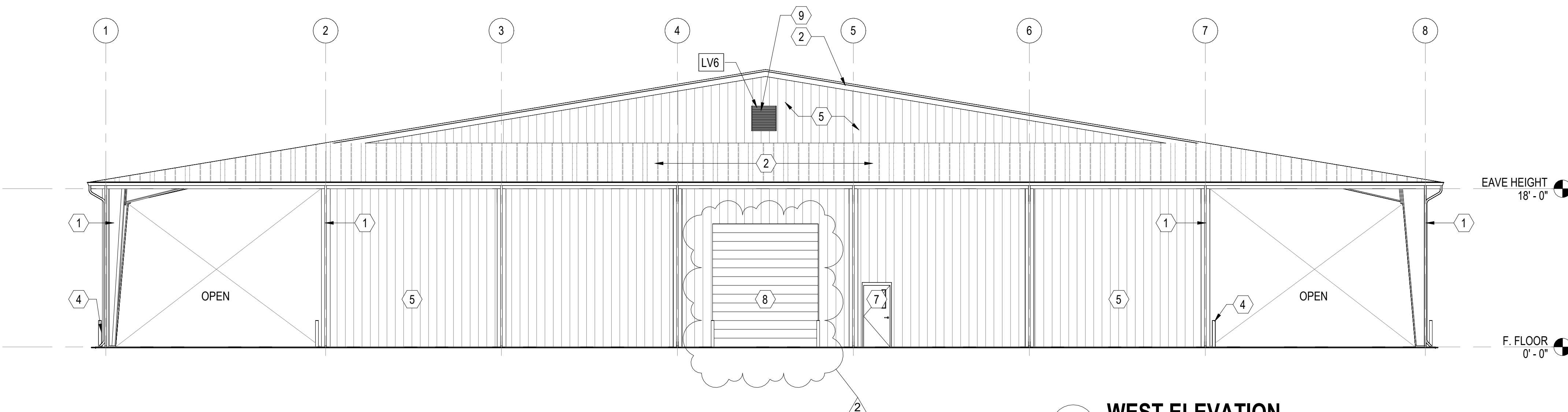
REFLECTED CEILING
PLAN

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Drawing Number

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A EAST ELEVATION
SCALE: 1/8" = 1'-0"



B WEST ELEVATION
SCALE: 1/8" = 1'-0"

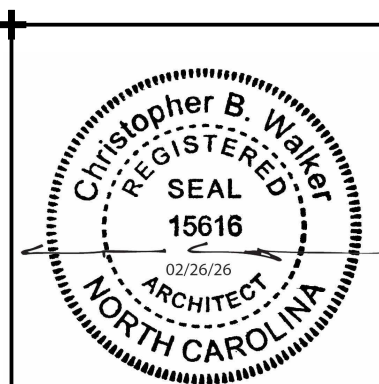
GENERAL SHEET NOTES

- REFERENCE SHEET A-001 FOR SYMBOL & MATERIAL LEGEND.
- REFERENCE SHEET A-002 FOR WALL ASSEMBLY TYPES.
- ALL DOOR FRAMES ARE TO BE INSTALLED 4" AWAY OF ADJACENT PERPENDICULAR WALLS UNLESS NOTED OTHERWISE.
- SEE SCHEDULES FOR WALL TYPES, DOOR/FRAME/WINDOW TYPES AND SIZES, AND FLOOR/WALL/CEILING FINISHES.
- SEE CIVIL, STRUCTURAL, MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR ADDITIONAL NOTES.

KEYNOTES

MARK	DESCRIPTION
1	STEEL COLUMNS/ BENTS, BY PRE-ENGINEERED METAL BUILDING MANUFACTURER. PROVIDE FACTORY PAINTED BUILDING STRUCTURE ON BUILDING EXTERIOR.
2	26 GA. PRE-ENGINEERED METAL BUILDING ROOF PANELS.
3	6"x6" ALUMINUM GUTTERS WITH 4"x4" DOWNSPOUTS. DOWNSPOUTS ARE INDICATED ON ROOF PLAN AS (D.S.) INSTALL PER MANUFACTURERS INSTRUCTIONS. PROVIDE CONCRETE SPLASH BLOCKS AT DOWNSPOUTS.
4	CONCRETE BOLLARDS.FIELD VERIFY LOCATIONS 7" MIN. FROM EDGE OF WALL/EQUIPMENT.
5	26 GA' PRE-ENGINEERED METAL BUILDING WALL PANELS. SEE WALL TYPES A-101.
6	ALUMINUM WINDOW. SILL HEIGHT AT 3'-0". SEE WINDOW SCHEDULE.
7	HOLLOW METAL DOOR AND FRAME, SEE DOOR SCHEDULE.
8	OVERHEAD COILING DOOR, SEE DOOR SCHEDULE.
9	METAL WALL LOUVER, SEE MECHANICAL.

WALKER
the **GROUP**
ARCHITECTURE
incorporated
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252-636-8778



**Jones County
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Building**

**1539 NC HWY 58
TRENTON, NC 28585**

REVISIONS	DATE
2	04/16/26
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2523.JCPW

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02/26/26

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Drawing Title

**EXTERIOR
ELEVATIONS**

Sheet Number

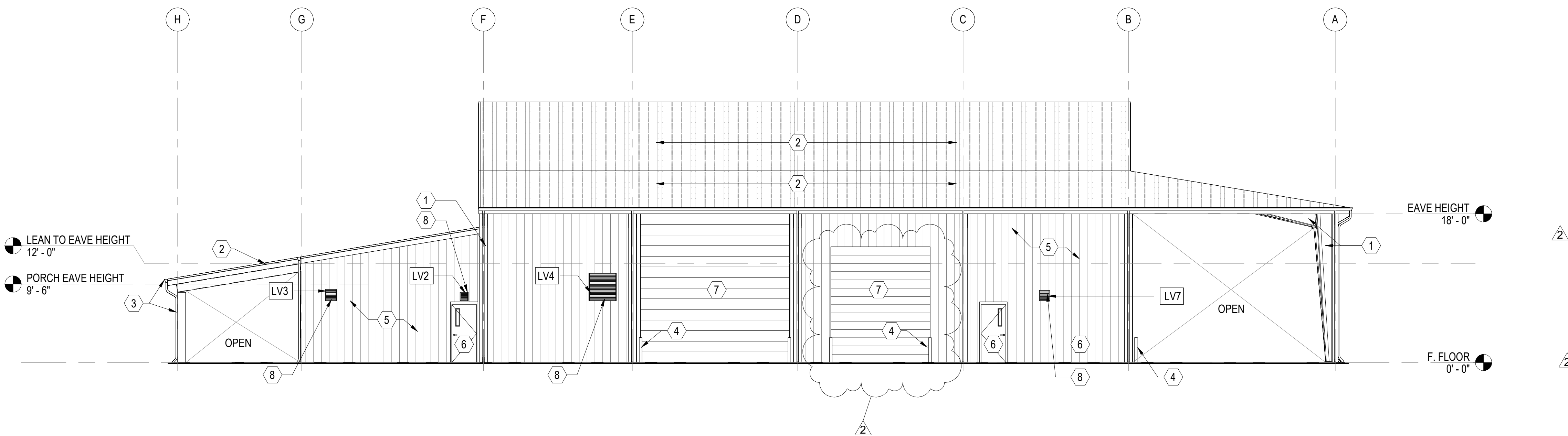
16 Of 45

Drawing Number

A-201

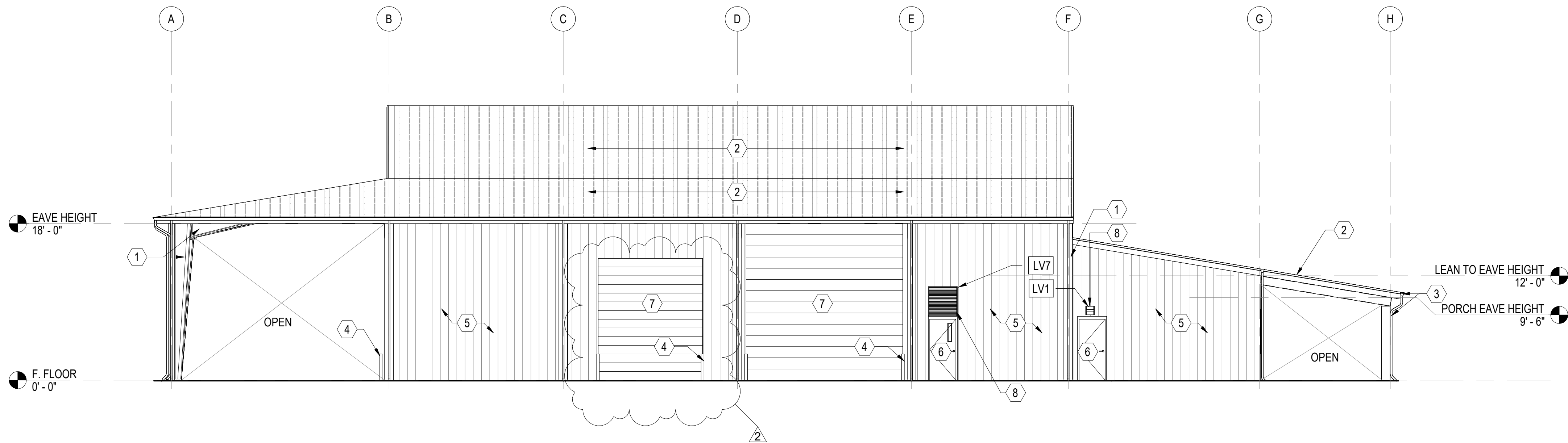
GRAPHIC SCALE(S)

1/8" = 1'-0" 0' 4' 8' 16'



A NORTH ELEVATION

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



B SOUTH ELEVATION

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

GENERAL SHEET NOTES

1. REFERENCE SHEET A-001 FOR SYMBOL & MATERIAL LEGEND.
2. REFERENCE SHEET A-002 FOR WALL ASSEMBLY TYPES.
3. ALL DOOR FRAMES ARE TO BE INSTALLED 4" AWAY OF ADJACENT PERPENDICULAR WALLS UNLESS NOTED OTHERWISE.
4. SEE SCHEDULES FOR WALL TYPES, DOOR/FRAME/WINDOW TYPES AND SIZES, AND FLOOR/WALL/CEILING FINISHES.
5. SEE CIVIL, STRUCTURAL, MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR ADDITIONAL NOTES.

KEYNOTES

MARK	DESCRIPTION
1	STEEL COLUMNS/ BENTS, BY PRE-ENGINEERED METAL BUILDING MANUFACTURER. PROVIDE FACTORY PAINTED BUILDING STRUCTURE ON BUILDING EXTERIOR.
2	26 GA. PRE-ENGINEERED METAL BUILDING ROOF PANELS.
3	6"x6" ALUMINUM GUTTERS WITH 4"x4" DOWNSPOUTS. DOWNSPOUTS ARE INDICATED ON ROOF PLAN AS (D.S.) INSTALL PER MANUFACTURERS INSTRUCTIONS. PROVIDE CONCRETE SPLASH BLOCKS AT DOWNSPOUTS.
4	CONCRETE BOLLARDS. FIELD VERIFY LOCATIONS 7" MIN. FROM EDGE OF WALL/EQUIPMENT.
5	26 GA. PRE-ENGINEERED METAL BUILDING WALL PANELS. SEE WALL TYPES A-101.
6	HOLLOW METAL DOOR AND FRAME, SEE DOOR SCHEDULE.
7	OVERHEAD COILING DOOR, SEE DOOR SCHEDULE.
8	METAL WALL LOUVER, SEE MECHANICAL.

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**Jones County
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**1539 NC HWY 58
TRENTON, NC 28585**

REVISIONS

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2523.JCPW

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02/26/26

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Scale
AS NOTED

Drawing Title

**EXTERIOR
ELEVATIONS**

Sheet Number

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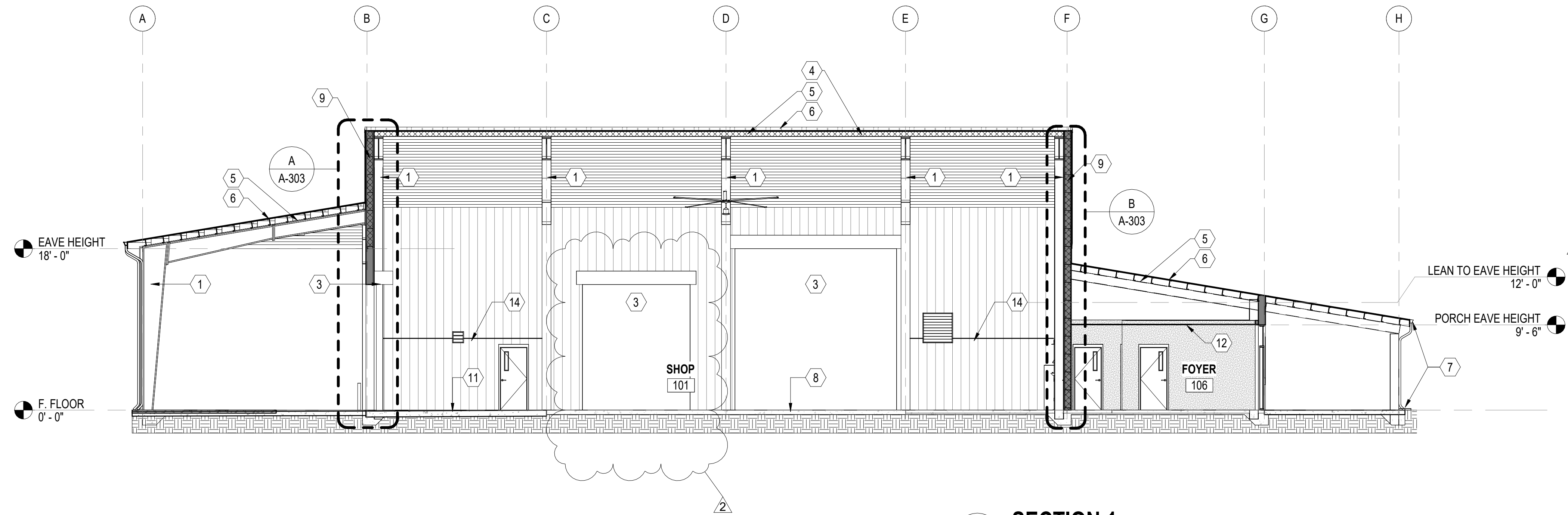
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A-202

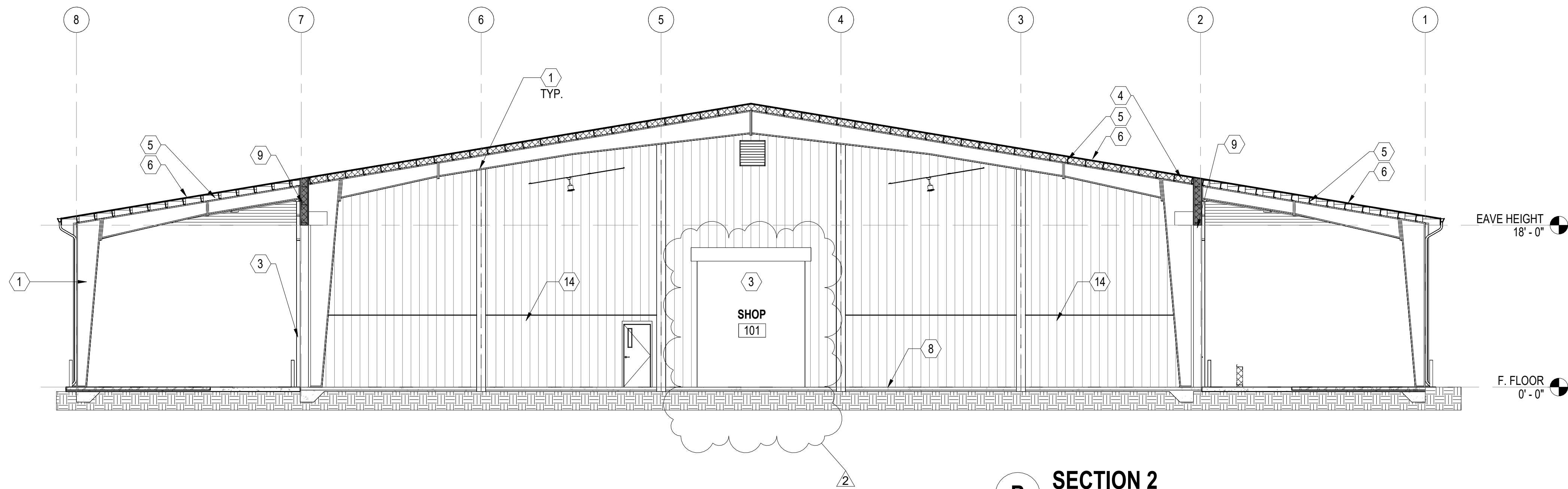
GRAPHIC SCALE(S)

1/8" = 1'-0"

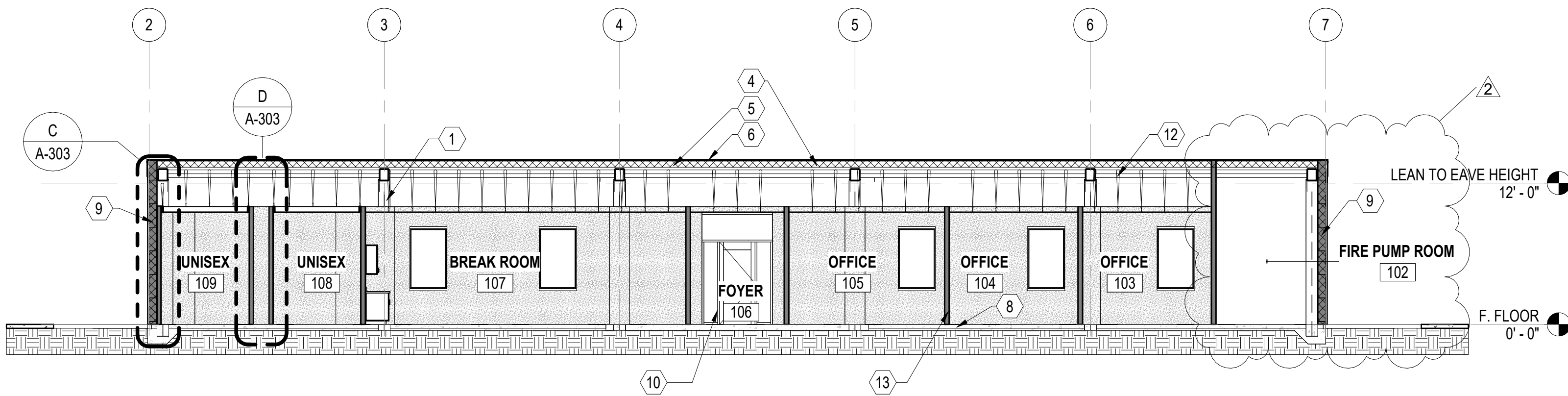
0' 4' 8' 16'



SECTION 1
SCALE: 1/8" = 1'-0" (A-101)



SECTION 2
SCALE: 1/8" = 1'-0" (A-101)



SECTION 3
SCALE: 1/8" = 1'-0" (A-101)

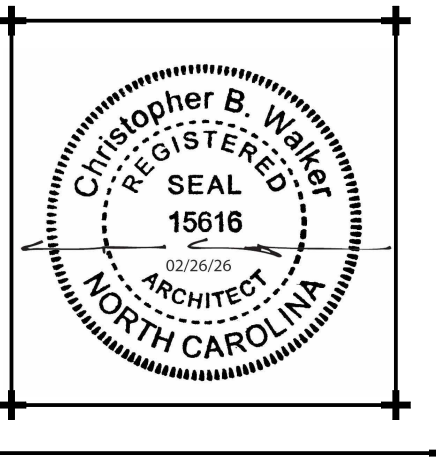
GENERAL SHEET NOTES

1. REFERENCE SHEET A-001 FOR SYMBOL & MATERIAL LEGEND.
2. REFERENCE SHEET A-002 FOR WALL ASSEMBLY TYPES.
3. ALL DOOR FRAMES ARE TO BE INSTALLED 4" AWAY OF ADJACENT PERPENDICULAR WALLS UNLESS NOTED OTHERWISE.
4. SEE SCHEDULES FOR WALL TYPES, DOOR/FRAME/WINDOW TYPES AND SIZES, AND FLOOR/WALL/CEILING FINISHES.
5. SEE CIVIL, STRUCTURAL, MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR ADDITIONAL NOTES.

KEYNOTES

MARK	DESCRIPTION
1	STEEL COLUMNS/ BENTS, BY PRE-ENGINEERED METAL BUILDING MANUFACTURER. PROVIDE FACTORY PAINTED BUILDING STRUCTURE ON BUILDING EXTERIOR.
3	COILING DOOR, TYPICAL
4	R-38 LINER SYSTEM INSULATION SYSTEM.
5	STEEL PURLINS, BY PRE-ENGINEERED METAL BUILDING MANUFACTURER. PROVIDE FACTOR PAINTED PURLINS AT EXTERIOR CONDITIONS.
6	26 GA. PRE-ENGINEERED METAL BUILDING ROOF PANELS.
7	6"x6" ALUMINUM GUTTERS WITH 4"x4" DOWNSPOUTS. DOWNSPOUTS ARE INDICATED ON ROOF PLAN AS (D.S.) INSTALL PER MANUFACTURERS INSTRUCTIONS. PROVIDE CONCRETE SPLASH BLOCKS AT DOWNSPOUTS.
8	CONCRETE SLAB AND FOUNDATION. SEE STRUCTURAL FOR ADDITIONAL NOTES.
9	26 GA. PRE-ENGINEERED METAL BUILDING WALL PANELS. SEE WALL TYPES A-101.
10	ALUMINUM STOREFRONT SYSTEM AND DOOR. SEE DOOR SCHEDULE.
11	8" CONCRETE SLAB.
12	2' X 2' ACOUSTIC CEILING GRID, HANGERS AND TILES. SEE CEILING PLAN.
13	METAL STUD WALL. SEE A-101 FOR WALL TYPES.
14	PREFINISHED PRE-ENGINEERED LINER PANELS TO 8'-0" A.F.F.

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**Jones County
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**1539 NC HWY 58
TRENTON, NC 28585**

REVISIONS	DATE
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1	02/26/26

Project Number
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Date
02/26/26

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Scale
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Drawing Title

BUILDING SECTIONS

GRAPHIC SCALE(S)

1/8" = 1'-0" 0' 4' 8' 16'

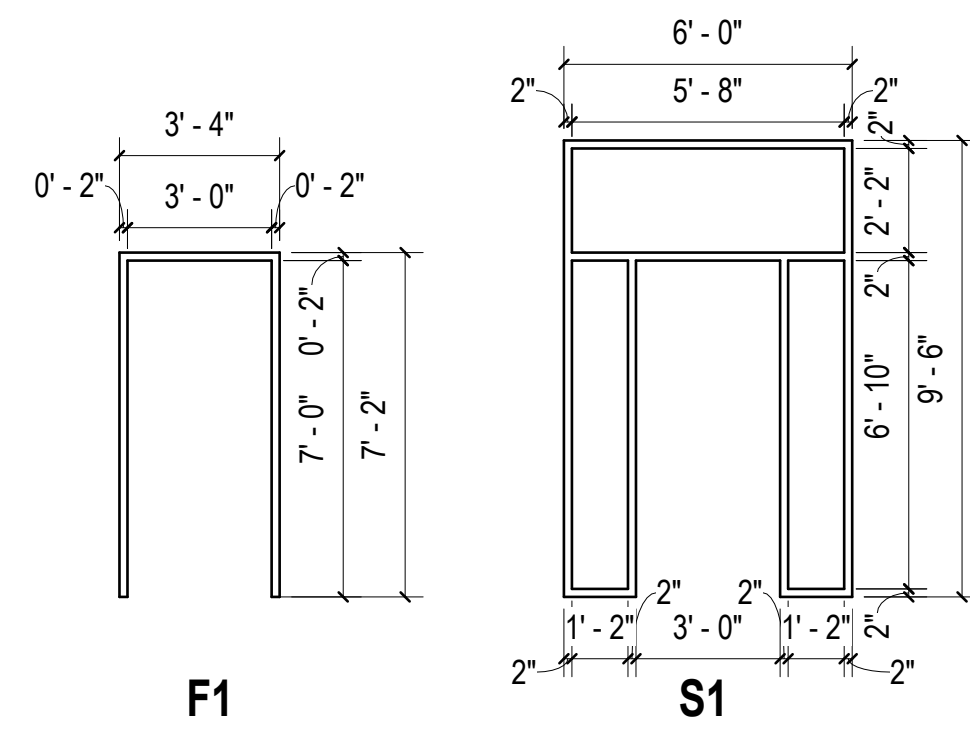
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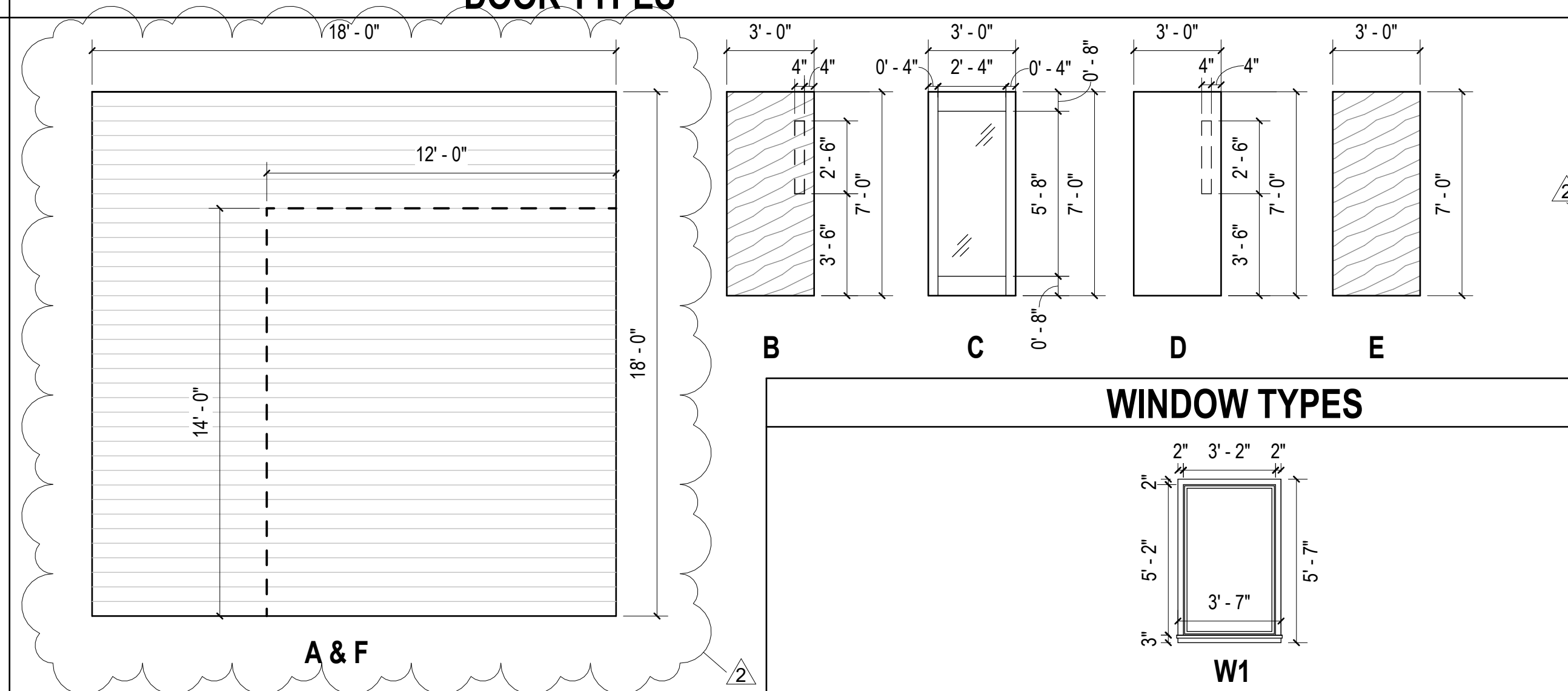
Drawing Number

A-301

FRAME TYPES



DOOR TYPES



DOOR SCHEDULE

DOOR NO.	TYPE	DOOR		MATERIAL	FRAME		DETAILS		HARDWARE SET NO.	REMARKS
		SIZE			TYPE	MATERIAL				
		WIDTH	HEIGHT				HEAD	JAMB		
101A	F	12' - 0"	14' - 0"	-	MANUF.	-	C/A-602	C/A-602	7	
101B	F	12' - 0"	14' - 0"	-	MANUF.	-	C/A-602	C/A-602	7	
101C	A	18' - 0"	18' - 0"	-	MANUF.	-	C/A-602	C/A-602	7	
101D	F	12' - 0"	14' - 0"	-	MANUF.	-	C/A-602	C/A-602	7	
101E	A	18' - 0"	18' - 0"	-	MANUF.	-	C/A-602	C/A-602	7	
101F	D	3' - 0"	7' - 0"	HM.	F1	HM.	B/A-602	B/A-602	3	PROVIDE 4" x 30" VISION PANEL
101G	D	3' - 0"	7' - 0"	HM.	F1	HM.	B/A-602	B/A-602	6	PROVIDE 4" x 30" VISION PANEL
101H	D	3' - 0"	7' - 0"	HM.	F1	HM.	B/A-602	B/A-602	6	PROVIDE 4" x 30" VISION PANEL
101I	D	3' - 0"	7' - 0"	HM.	F1	HM.	B/A-602	B/A-602	3	PROVIDE 4" x 30" VISION PANEL
101J	D	3' - 0"	7' - 0"	HM.	F1	HM.	B/A-602	B/A-602	6	PROVIDE 4" x 30" VISION PANEL
101K	D	3' - 0"	7' - 0"	HM.	F1	HM	B/A-602	B/A-602	3	PROVIDE 4" x 30" VISION PANEL
103A	B	3' - 0"	7' - 0"	WOOD	F1	HM	C/A-601	C/A-601	2	PROVIDE 4" x 30" VISION PANEL
104A	B	3' - 0"	7' - 0"	WOOD	F1	HM	C/A-601	C/A-601	2	PROVIDE 4" x 30" VISION PANEL
105A	B	3' - 0"	7' - 0"	WOOD	F1	HM	C/A-601	C/A-601	2	PROVIDE 4" x 30" VISION PANEL
106A	B	3' - 0"	7' - 0"	HM.	F1	HM.	A/A-601	A/A-601	3	PROVIDE 4" x 30" VISION PANEL
106B	C	3' - 0"	7' - 0"	ALUM.	S1	ALUM.	A/A-602	A/A-602	1	
106C		3' - 0"	7' - 0"	WOOD						
107A	B	3' - 0"	7' - 0"	WOOD	F1	HM.	D/A-601	D/A-601	4	PROVIDE 4" x 30" VISION PANEL
107B	B	3' - 0"	7' - 0"	WOOD	F1	HM.	D/A-601	D/A-601	4	PROVIDE 4" x 30" VISION PANEL
108A	E	3' - 0"	7' - 0"	WOOD	F1	HM.	D/A-601	D/A-601	5	
109A	E	3' - 0"	7' - 0"	WOOD	F1	HM.	D/A-601	D/A-601	5	

WINDOW SCHEDULE

MARK	WIDTH	HEIGHT	MATERIAL	FINISH	GLAZING	HEAD DETAIL	JAMB DETAIL	SILL DETAIL	COMMENTS
W1	3' - 2"	5' - 2"	VINYL	PREFINISHED	INSULATED	B/A-601	B/A-601	B/A-601	

STOREFRONT SCHEDULE

MARK	WIDTH	HEIGHT	MATERIAL	FINISH	GLAZING	HEAD DETAIL	JAMB DETAIL	SILL DETAIL	COMMENTS
S1	6'-0"	9' - 6"	ALUM.	ANODIZED	1" INSUL.	B/A-601	B/A-601	A/A-602	

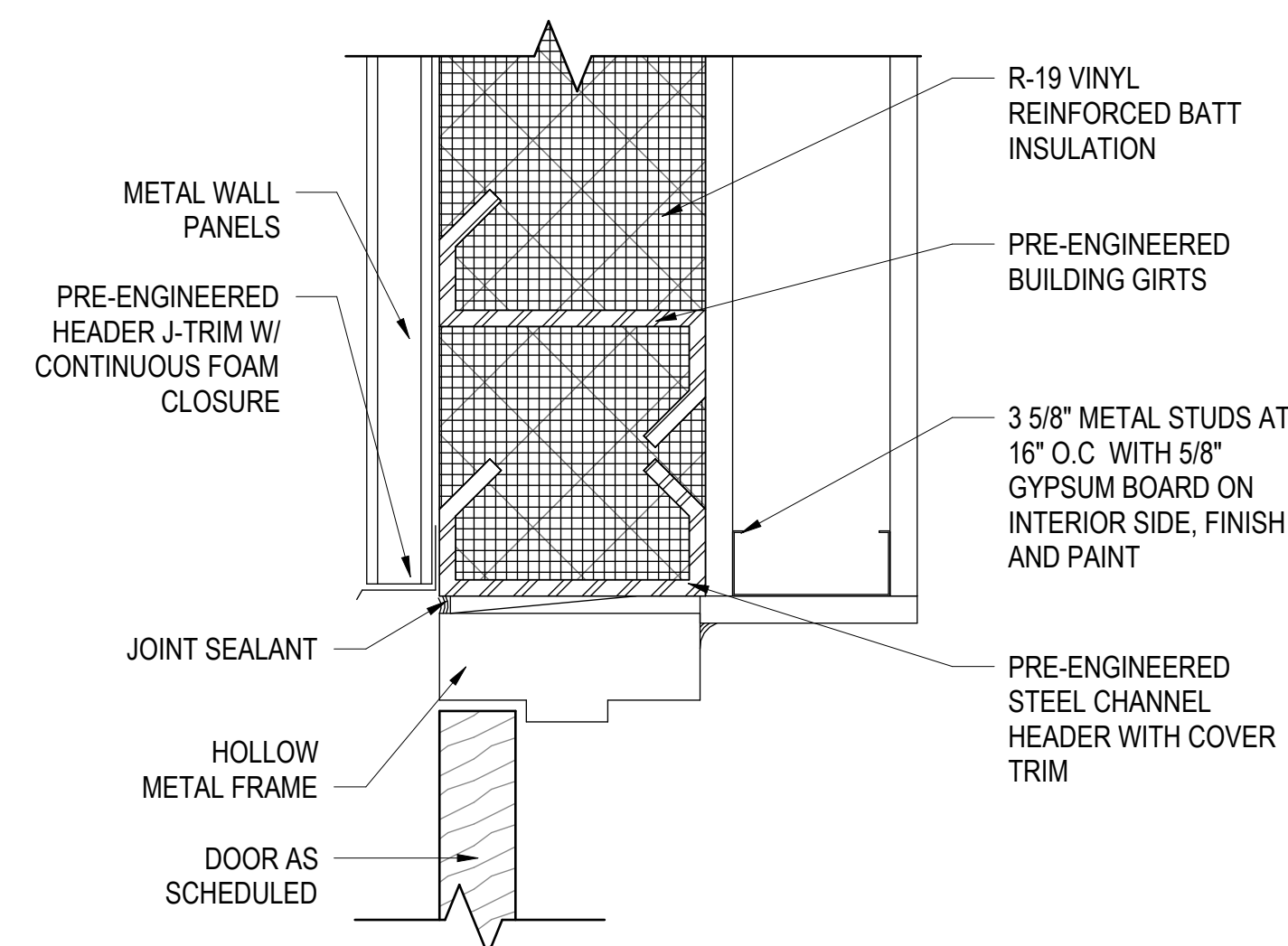
FINISH SCHEDULE

NUMBER	NAME	FLOOR	BASE	WALL FINISHES				CEILING	COMMENTS
				NORTH	SOUTH	EAST	WEST		
101	SHOP	S. CONC	-	MANUF.	MANUF.	MANUF.	MANUF.	EXPOSED	8' PEMB LINER PANELS
102	FIRE PUMP ROOM	S. CONC	4" RUBBER	GYP. BD.	GYP. BD.	GYP. BD.	GYP. BD.	GYP. BD.	
103	OFFICE	S. CONC	4" RUBBER	GYP. BD.	GYP. BD.	GYP. BD.	GYP. BD.	ACT.	
104	OFFICE	S. CONC	4" RUBBER	GYP. BD.	GYP. BD.	GYP. BD.	GYP. BD.	ACT.	
105	OFFICE	S. CONC	4" RUBBER	GYP. BD.	GYP. BD.	GYP. BD.	GYP. BD.	ACT.	
106	FOYER	S. CONC	4" RUBBER	GYP. BD.	GYP. BD.	MANUF.	GYP. BD.	ACT.	
107	BREAK ROOM	S. CONC	4" RUBBER	GYP. BD.	GYP. BD.	GYP. BD.	GYP. BD.	ACT.	
108	UNISEX	TILE	TILE	GYP. BD.	GYP. BD.	GYP. BD.	GYP. BD.	GYP. BD.	PROVIDE 5' TILE WAINSCOT.
109	UNISEX	TILE	TILE	GYP. BD.	GYP. BD.	GYP. BD.	GYP. BD.	GYP. BD.	PROVIDE 5' TILE WAINSCOT.

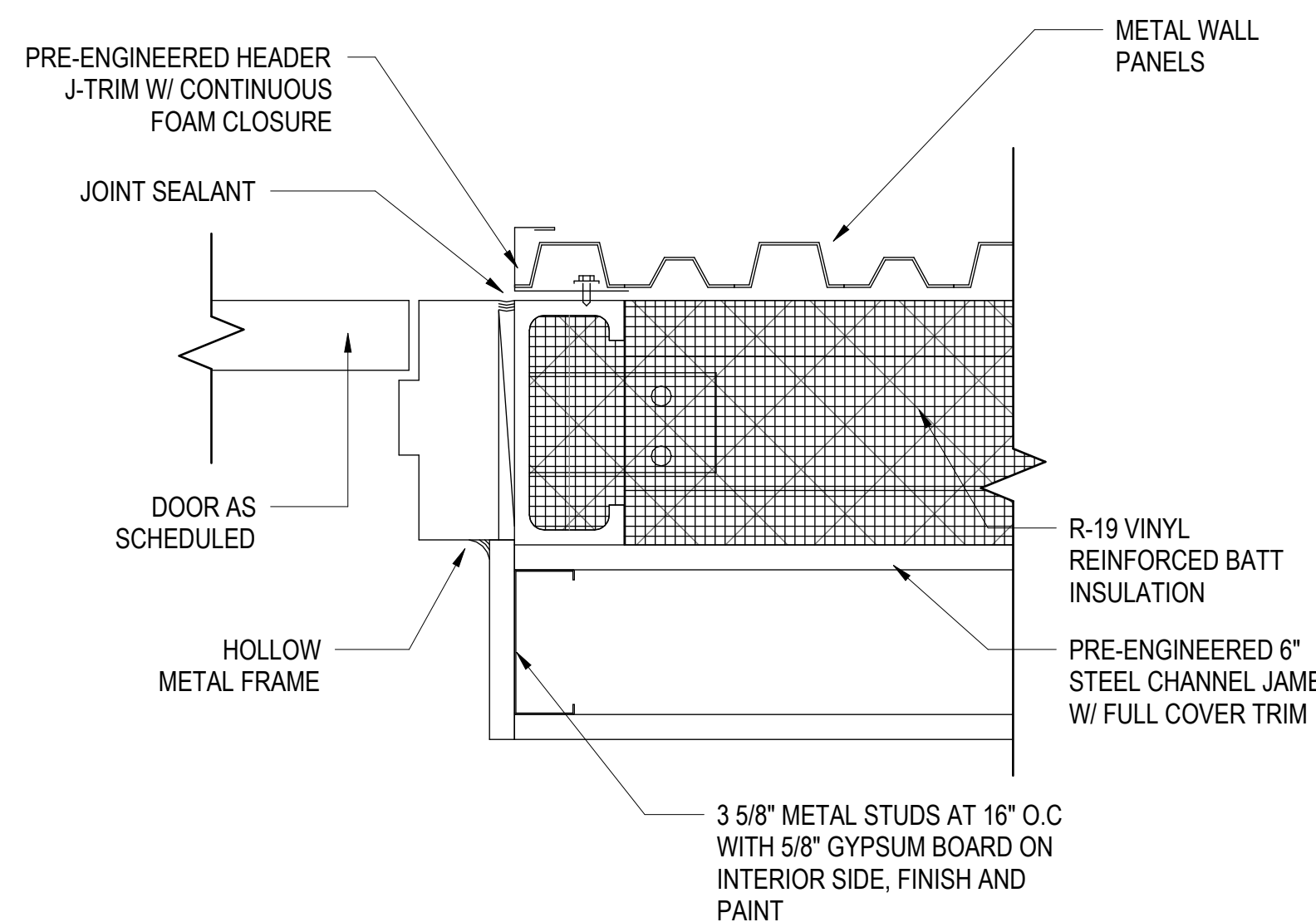
LOUVER SCHEDULE

MARK	WIDTH	HEIGHT	HEAD/JAMB DETAIL	SILL DETAIL	COMMENTS
LV1	1' - 0"	1' - 0"	D/A-602	D/A-602	
LV2	1' - 0"	1' - 0"	D/A-602	D/A-602	
LV3	1' - 4"	1' - 4"	D/A-602	D/A-602	
LV4	3' - 4"	3' - 4"	D/A-602	D/A-602	
LV5	3' - 4"	3' - 4"	D/A-602	D/A-602	
LV6	2' - 10"	2' - 10"	D/A-602	D/A-602	
LV7	1' - 3"	1' - 3"	D/A-602	D/A-602	

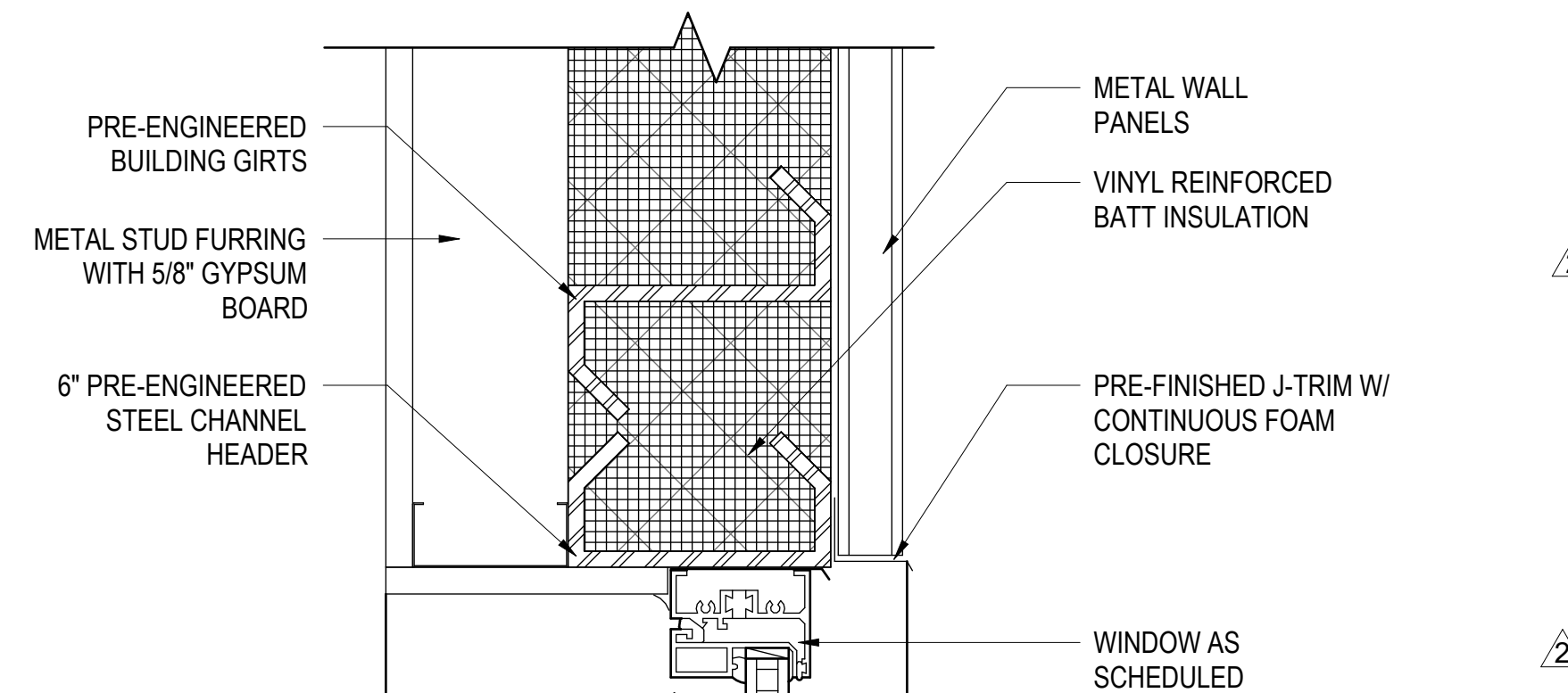
HEAD



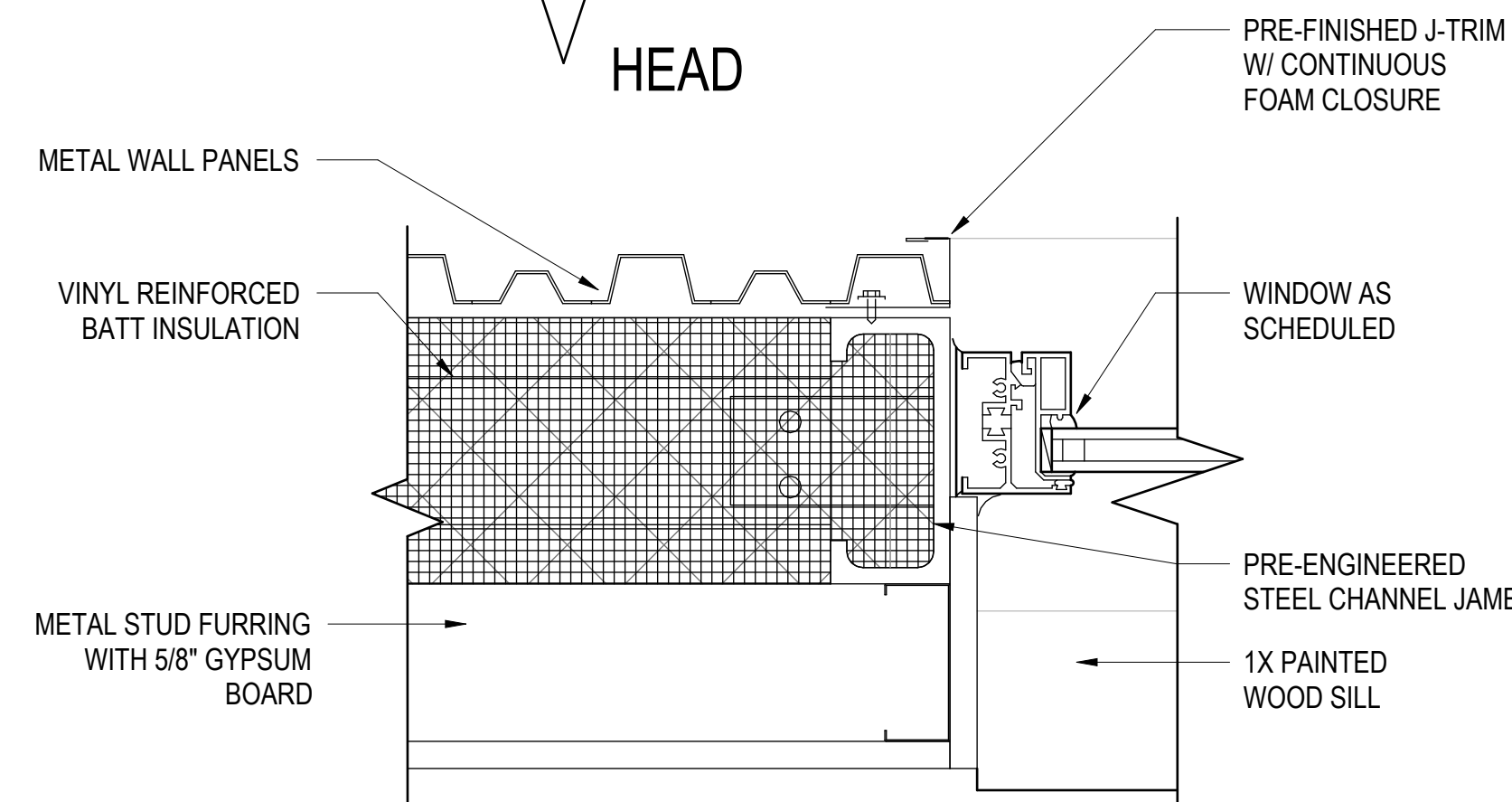
JAMB



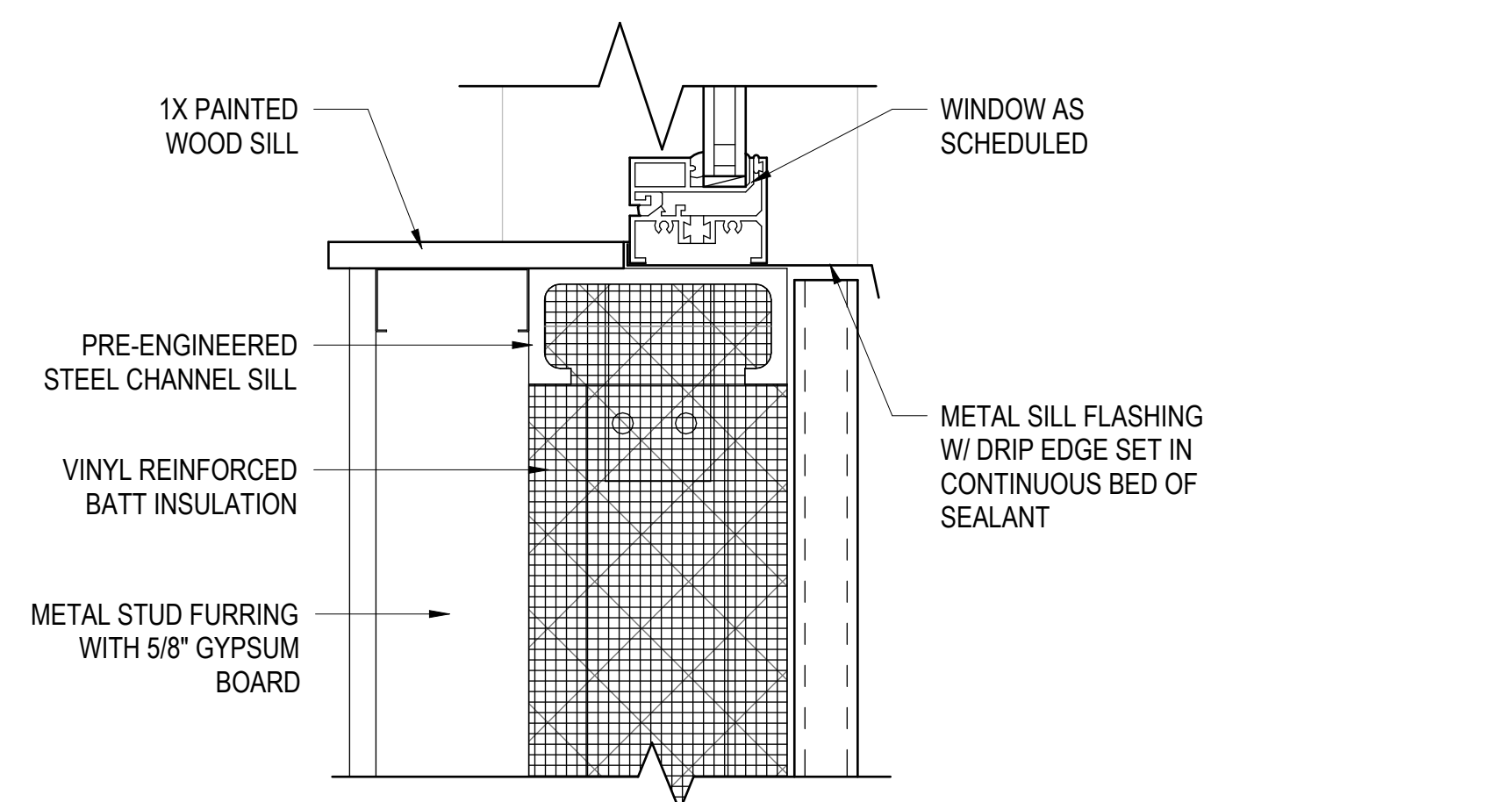
HEAD



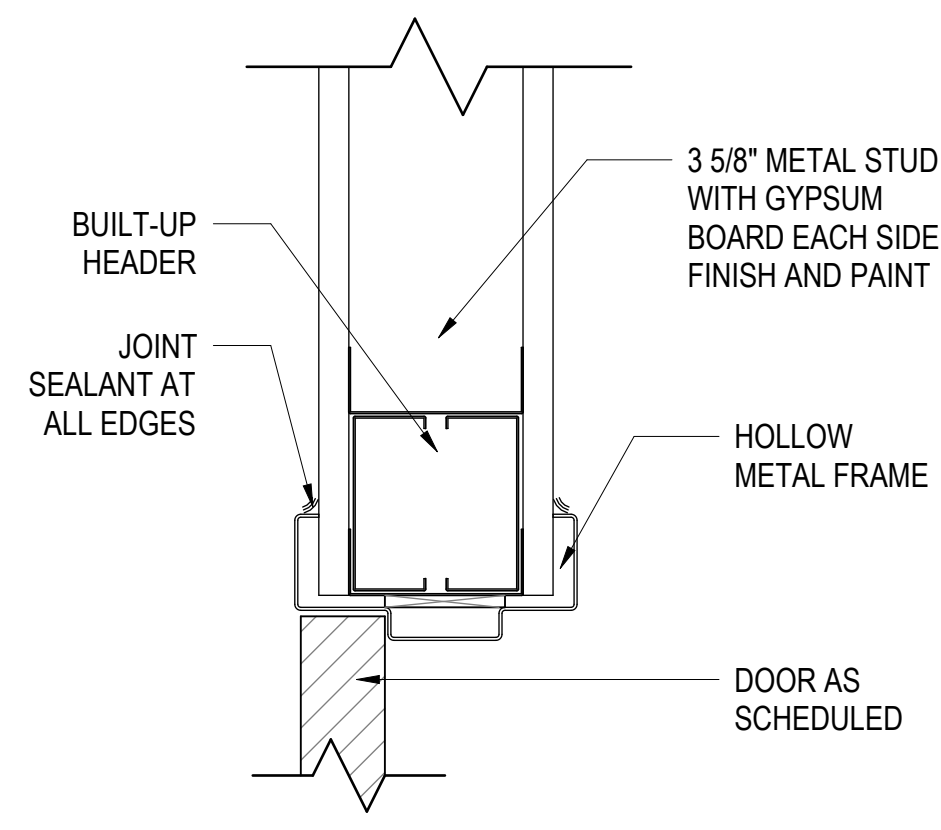
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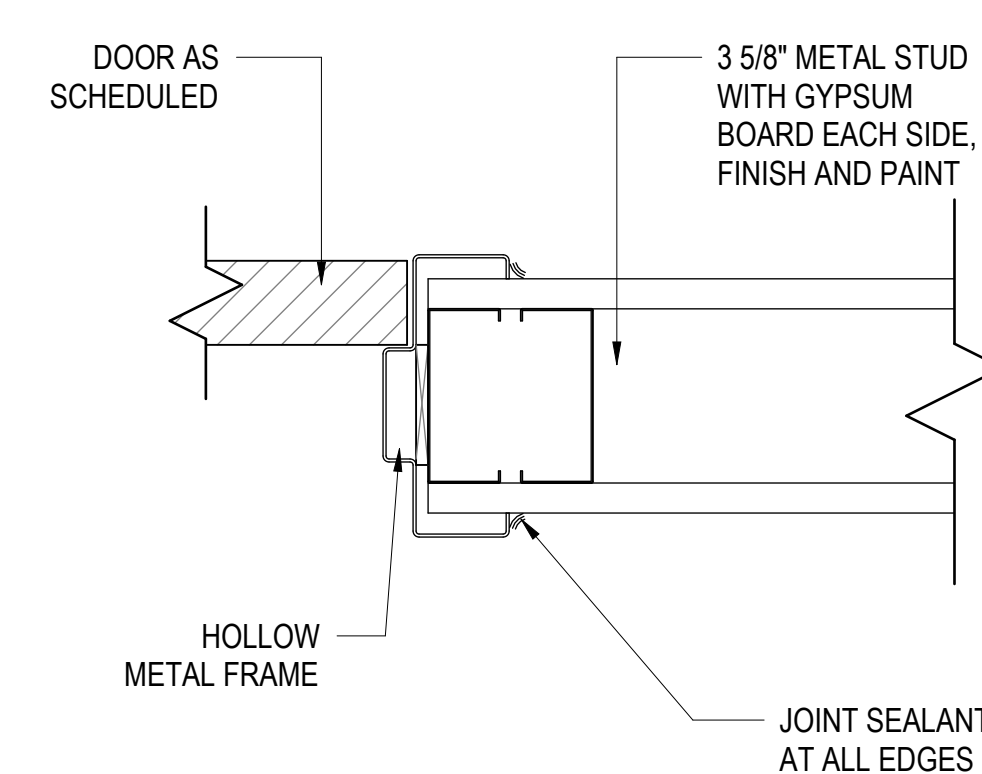
SILL



HEAD



JAMB



A

DOOR DETAIL @ PEMB WALL W/METAL STUD

SCALE: 3" = 1'-0"

B

WINDOW DETAIL@ PEMB WALL

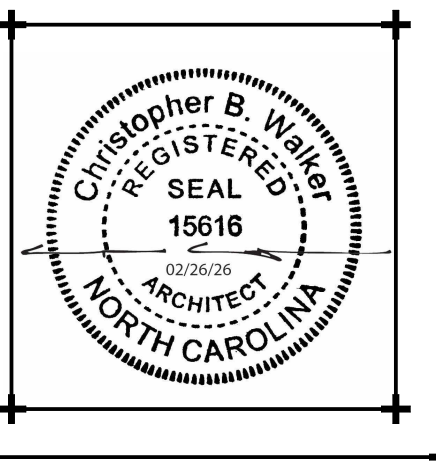
SCALE: 3" = 1'-0"

C

DOOR DETAIL @ INTERIOR WALL

SCALE: 3" = 1'-0"

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Jones County Public Works Building

1539 NC HWY 58
TRENTON, NC 28585

[illegible]

Project Number	Date
2523.JCPW	02/26/26
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Author	Checker
Scale	
AS NOTED	
Drawing Title	

SCHEDULES & DETAILS

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Drawing Number

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A 6

A-601

No.	Date	Revisions
2	04/16/2026	ADDENDUM 02

Project Number 2523.JCPW Date 2/27/26
Drawn Checked

Scale AS NOTED
Drawing Title

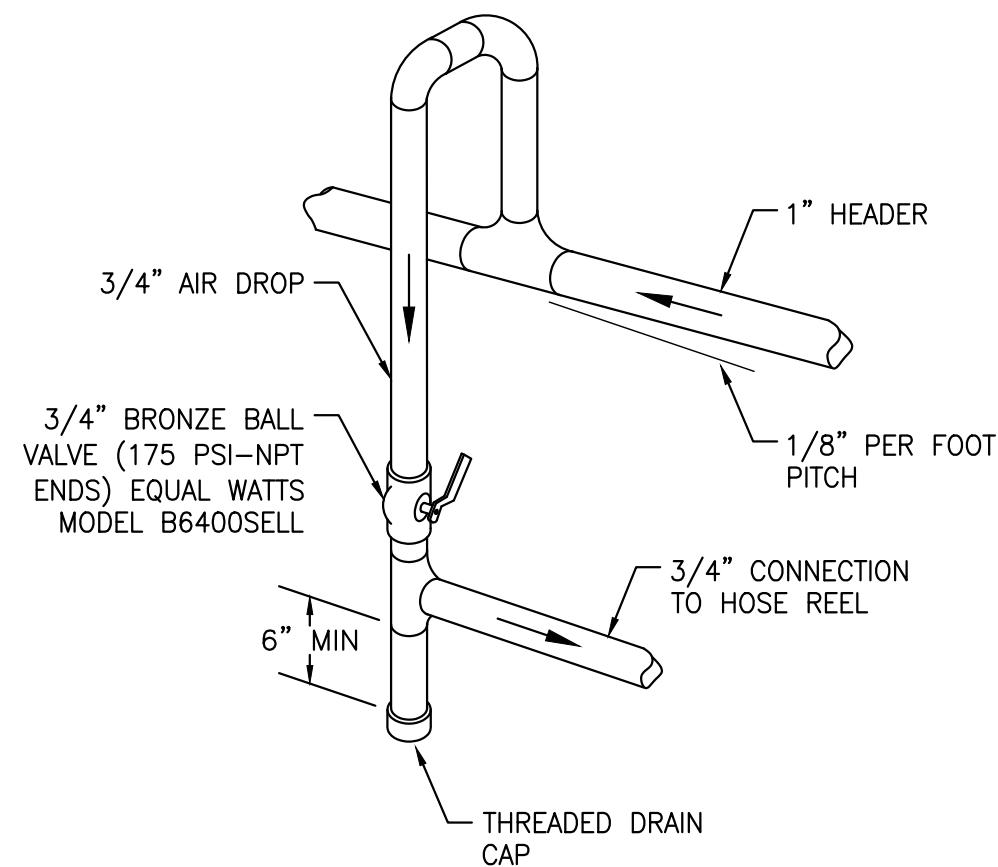
OVERALL
PLUMBING PLAN

Sheet Number 1 of 5
Drawing Number

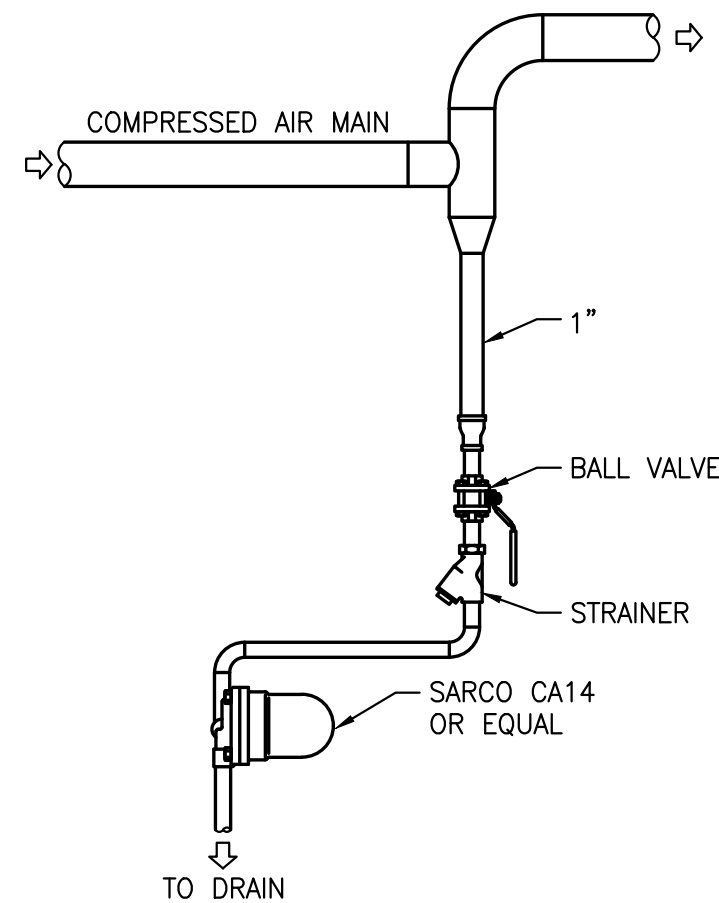
P-101

INSTALLATION KEYED NOTES "A":

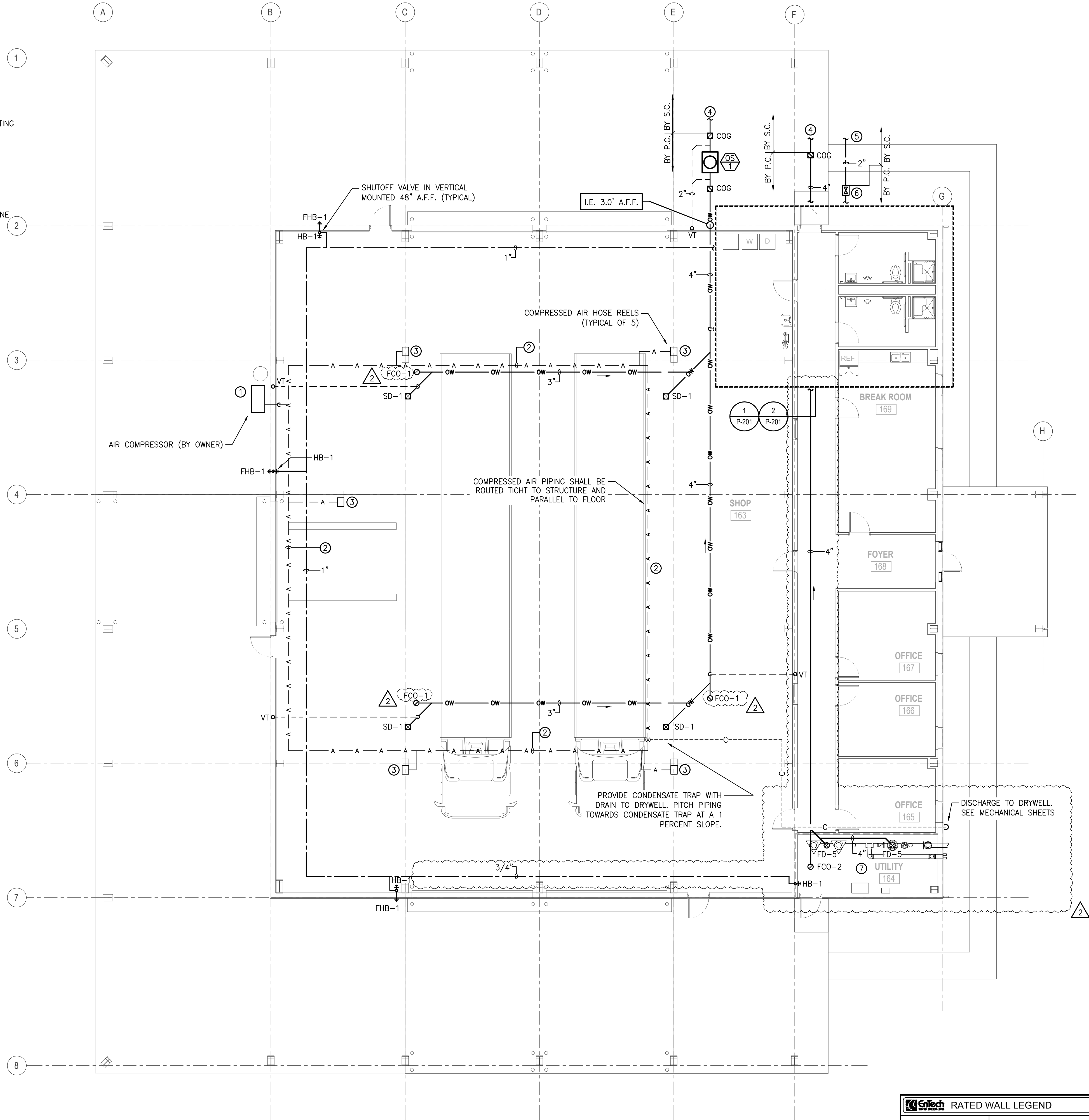
1. PROVIDE FLEXIBLE PIPE CONNECTION TO OWNER FURNISHED AIR COMPRESSOR. VERIFY SIZE.
2. PROVIDE 1 1/4" COMPRESSED AIR LOOP. PITCH PIPING TOWARDS CONDENSATE TRAPS AT 1 PERCENT DROP.
3. PROVIDE COMPRESSED AIR HOSE REEL EQUAL TO REELCRAFT MODEL 83050-0-P WITH 75 FEET OF 3/4" HOSE (250 PSI RATED). COORDINATE HOSE REEL MOUNTING WITH ELECTRICAL DEVICES. PROVIDE SLOTTED CHANNEL SUPPORTS FROM ROOF BEAMS.
4. BUILDING OIL/WASTE. SEE SITE PLAN FOR CONTINUATION.
5. SEE SITE PLAN FOR CONTINUATION. BACKFLOW ON SITE.
6. MAIN BUILDING SHUT-OFF VALVE IN VALVE BOX.
7. FIELD COORDINATE FINAL INSTALL LOCATION WITH SPRINKLER SHOP DRAWINGS. ONE FLOOR DRAIN SHALL BE PLACED UNDER THE FIRE PUMP AND ONE SHALL BE PLACED UNDER THE WET/DRY RISERS.



2 COMPRESSED AIR DROP DETAIL
SCALE: N.T.S.



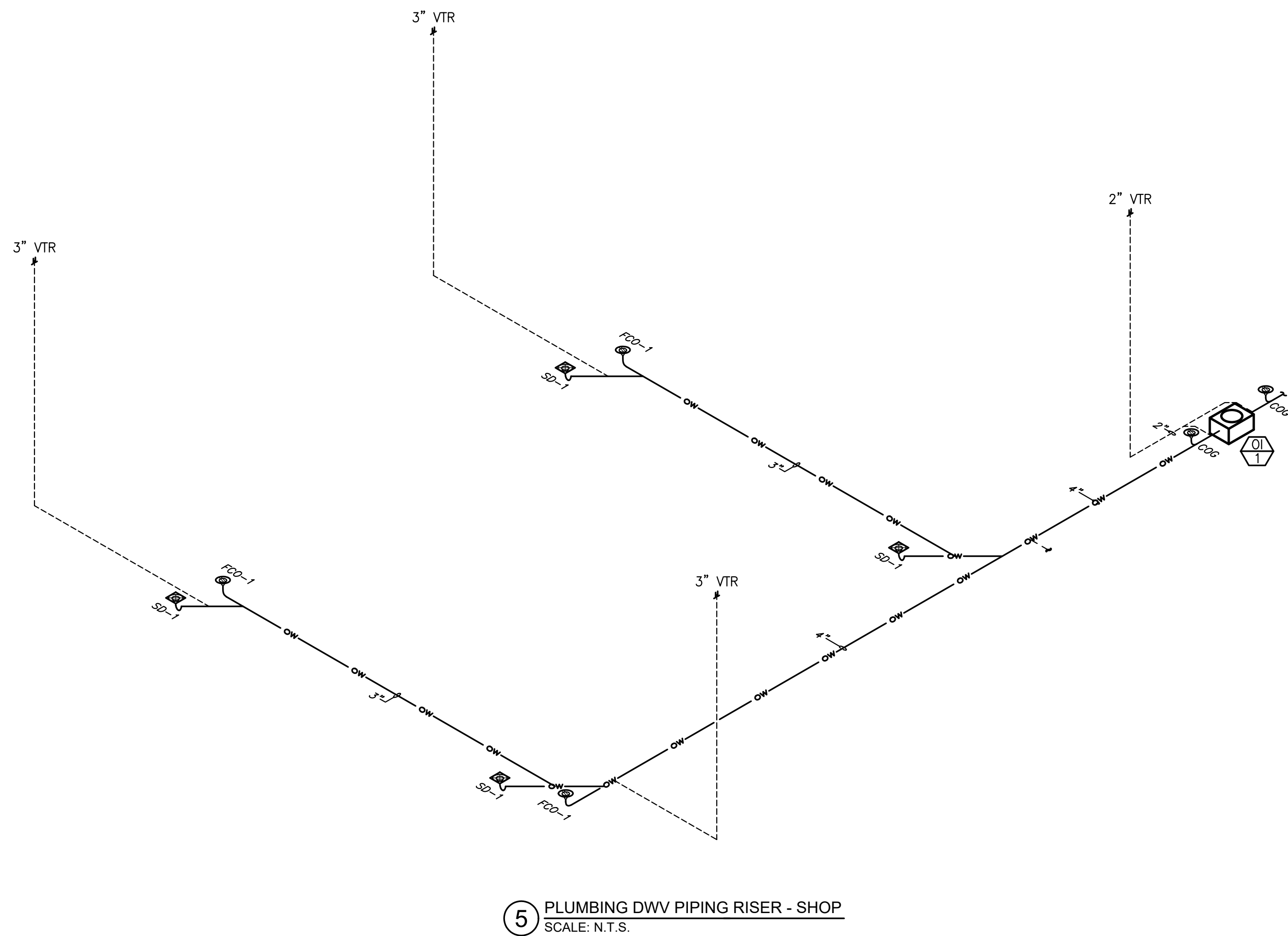
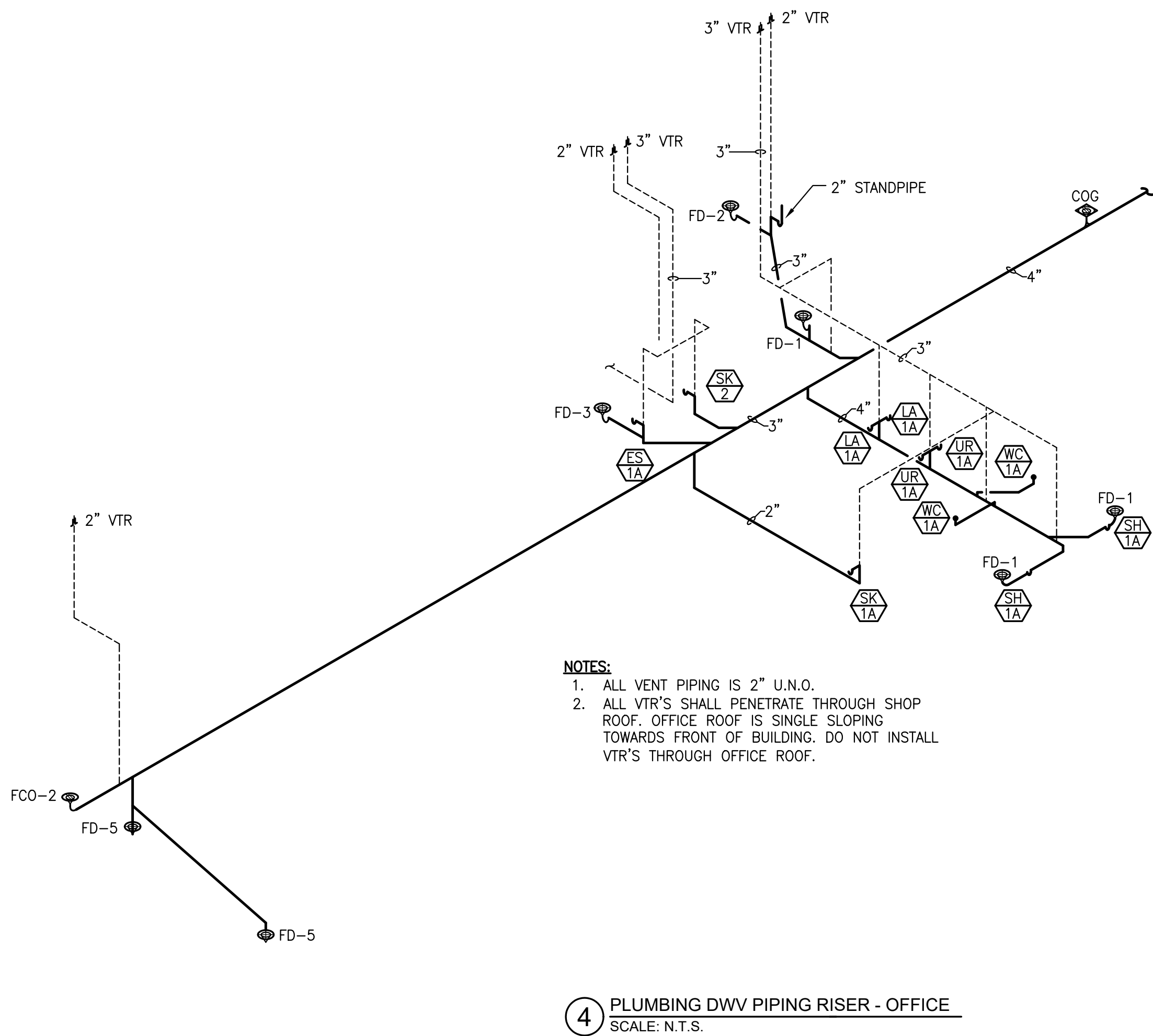
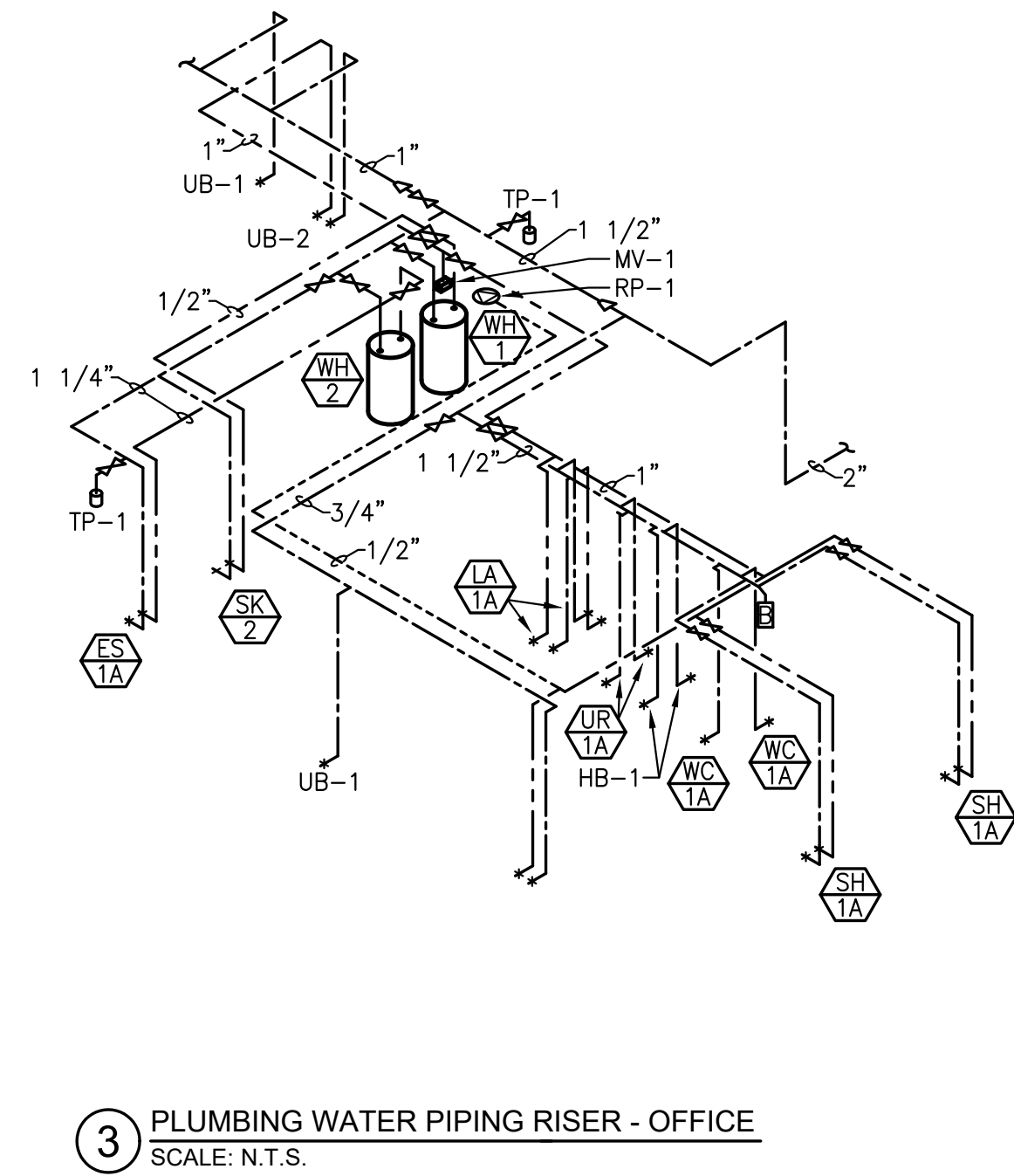
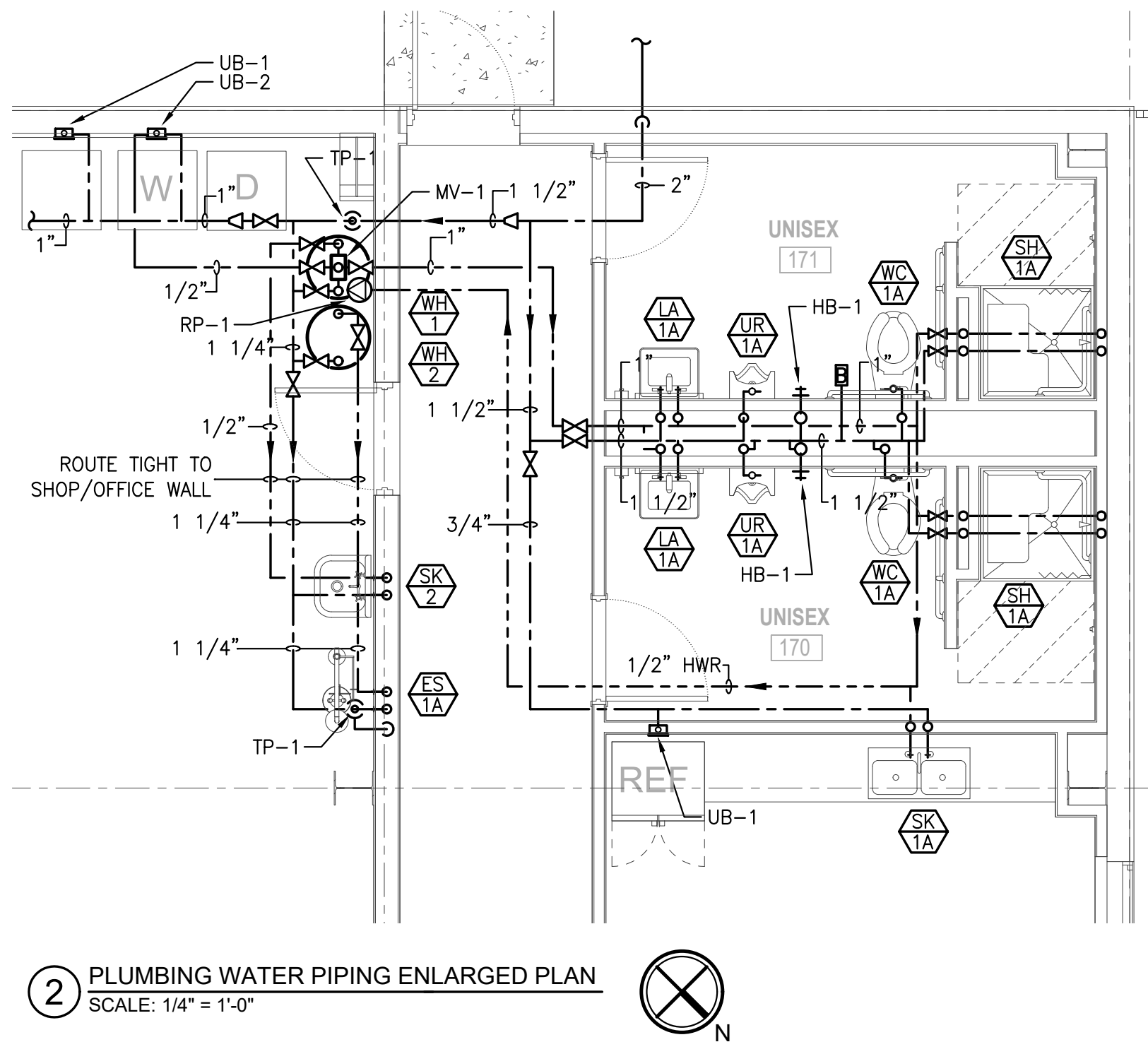
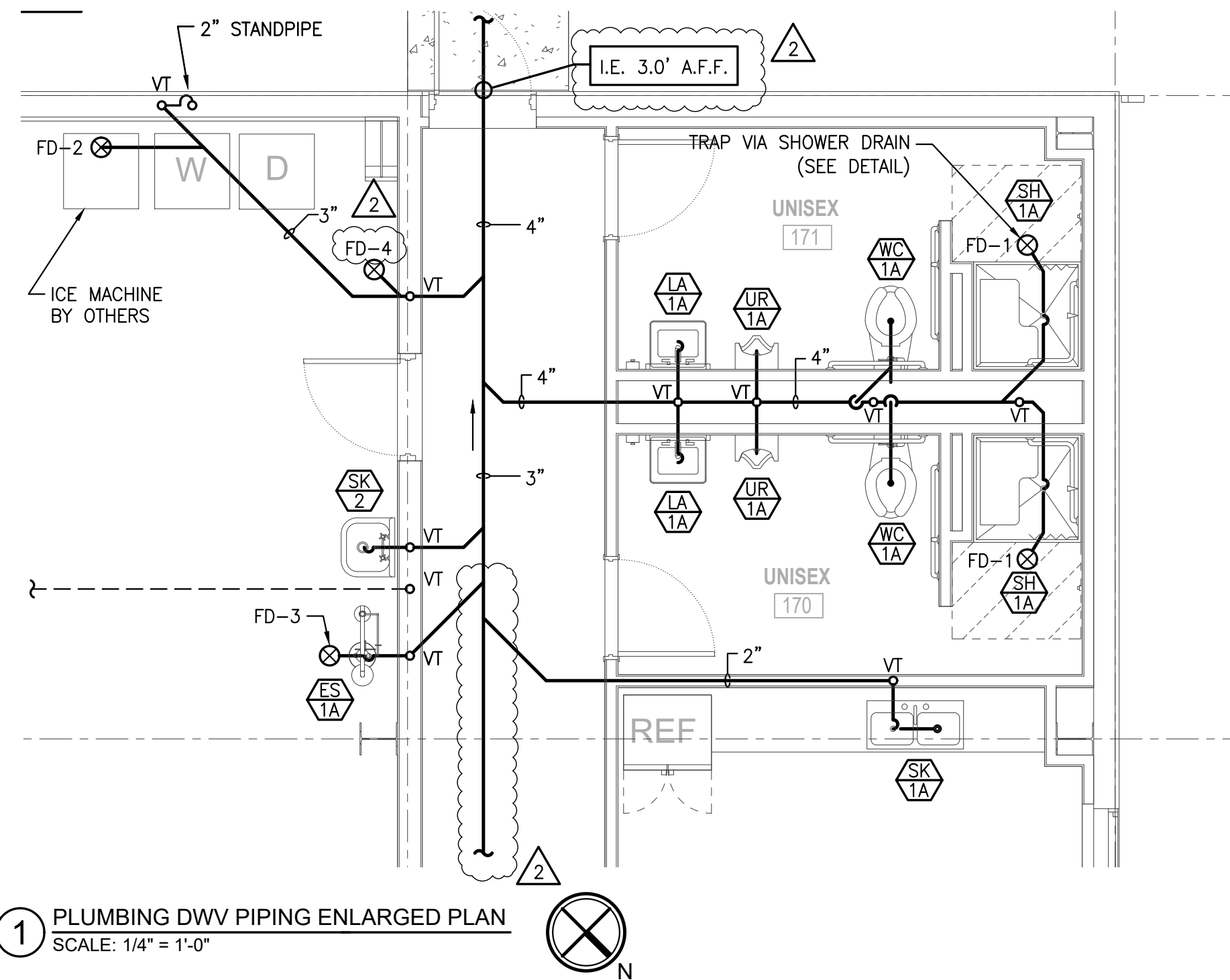
3 COMPRESSED AIR CONDENSATE TRAP DETAIL
SCALE: N.T.S.



1 PLUMBING OVERALL PIPING PLAN
SCALE: 1/8" = 1'-0"



EnTech	RATED WALL LEGEND
---	1-HOUR RATED WALL



NOTES:
1. ALL VENT PIPING IS 2" U.N.O.
2. ALL VTR'S SHALL PENETRATE THROUGH SHOP ROOF. OFFICE ROOF IS SINGLE SLOPING TOWARDS FRONT OF BUILDING. DO NOT INSTALL VTR'S THROUGH OFFICE ROOF.

Revisions	No.	Date	Description
1	2	04/16/2026	ADDENDUM 02

Project Number 2523.JCPW Date 2/27/26
Drawn Checked

Scale AS NOTED
Drawing Title

ENLARGED PLUMBING PLAN

Sheet Number 2 OF 5
Drawing Number

P-201

INSTALLATION KEYED NOTES * (#):

1. PROVIDE DRYER BOX CENTERED BEHIND APPLIANCE. BOTTOM OF DRYER BOX SHALL BE NO MORE THAN 2" A.F.F. TERMINATE AT EXTERIOR MINIMUM 12" A.F.G. WITH WALL CAP WITH GRAVITY BACKDRAFT DAMPER.
2. TOXIC GAS MONITORING CONTROL PANEL. SEE DETAIL 1/M-202.
3. DOOR SWITCH CONTROLLER. SEE DETAIL 4/M202 FOR ADDITIONAL DETAILS.
4. 4" FLUE PIPING THROUGH ROOF.
5. HVLS FAN CONTROLLERS.
6. OPEN-ENDED RETURN DUCT. PROVIDE ELBOW UP AND COVER WITH HARDWARE CLOTH.
7. HIGH PRESSURE GAS LINE (10 PSIG) FROM TANK. TANK AND HIGH PRESSURE REGULATOR BY OTHERS. FIELD CONFIRM FINAL LOCATION OF TANK.
8. GAS RISE TO STRUCTURE.
9. CONDENSATE DRYWELL.
10. COORDINATE FINAL INSTALL LOCATION WITH SPRINKLER SHOP DRAWINGS. HEATER SHALL NOT INTERFERE WITH RISER, FIRE PUMP, OR CONTROL PANEL CLEARANCE REQUIREMENTS.

BID ALTERNATE 03:

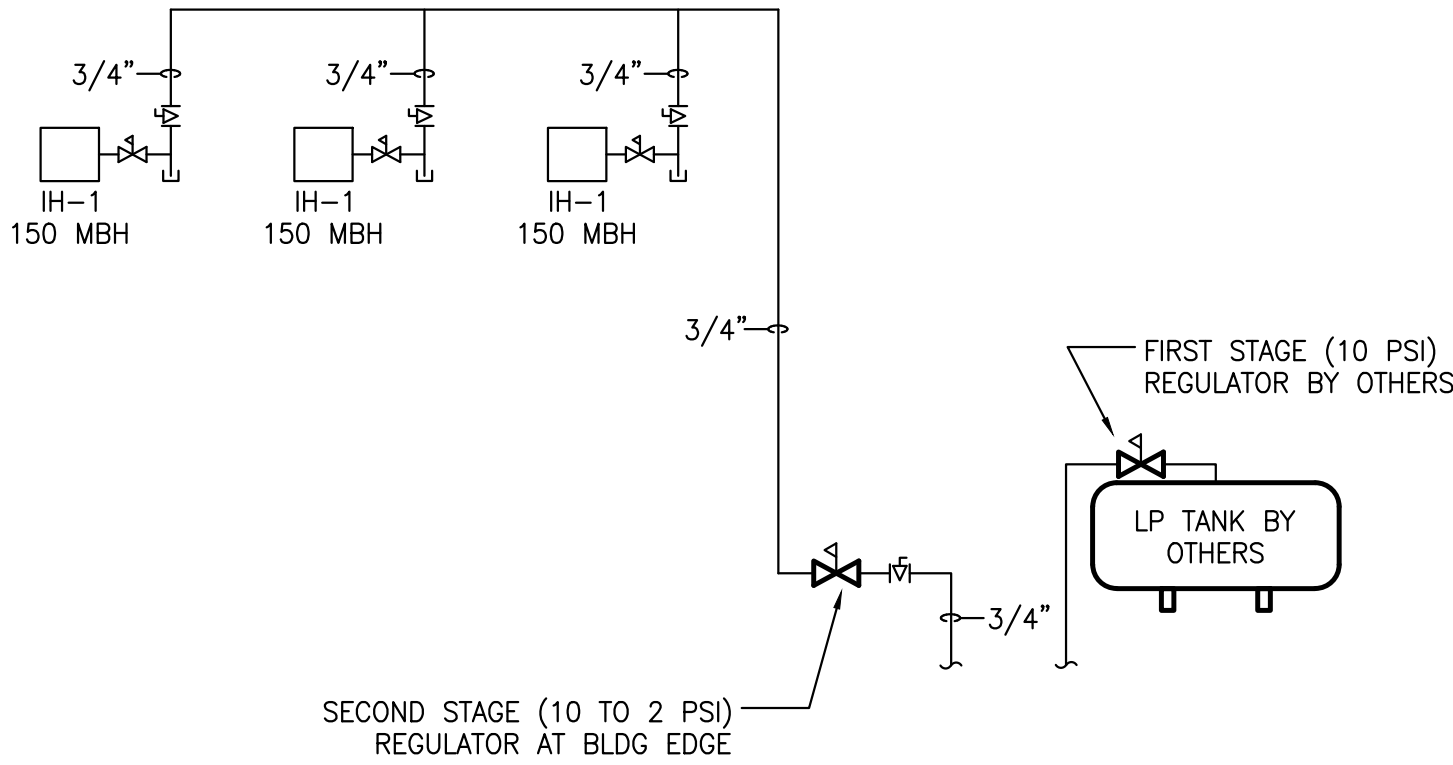
- PROVIDE COMPLETE HVAC SYSTEM IN SHOP SPACE.

BID ALTERNATE 05:

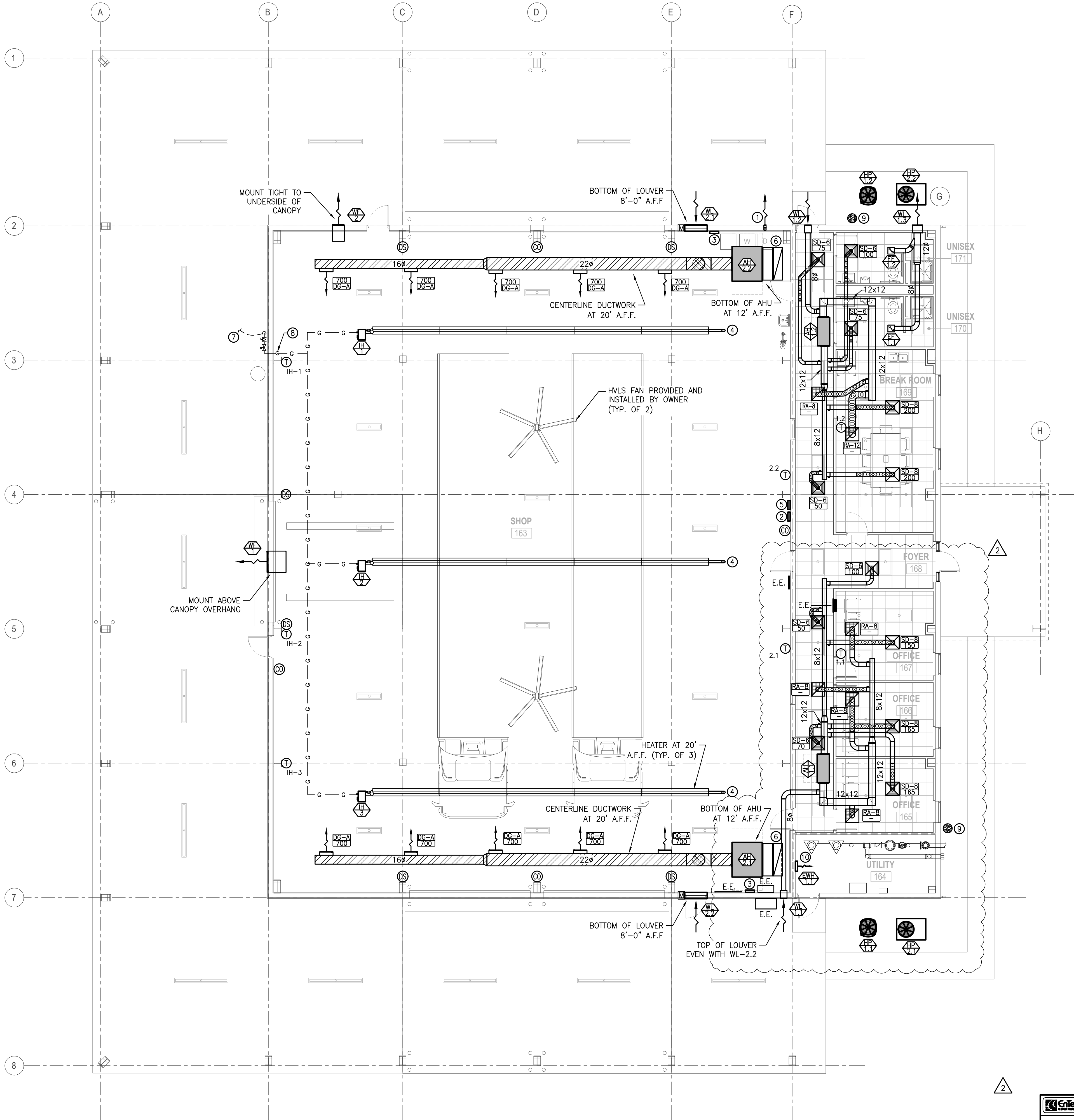
- PROVIDE INFRARED HEATERS IN SHOP SPACE. INCLDUES ASSOCIATED GAS PIPING. BASE BID IS NO HEATING IN THE SHOP.

GAS PIPING DESIGN TABLE				
PIPING MATERIAL:	SCH 40 BLACK IRON	RADIANT HEATERS	450 MBH	
DEVELOPED LENGTH:	125'			
REQ'D HEADER SIZE:	3/4"			
		TOTAL CAPACITY:	450 MBH	
SERVICE TYPE	SYSTEM PRESSURE	PRESSURE DROP	INPUT CAPACITY	
PROPANE	2 PSI	1.0 PSI	450 MBH	179 CFH

NOTE: GAS PIPING ON PLANS SIZED BASED ON NC FUEL GAS CODE TABLE 402.4(25) AND 402.4(27).



2 GAS PIPING SCHEMATIC
SCALE: N.T.S.



1 MECHANICAL DUCT & EQUIPMENT PLAN
SCALE: 1/8" = 1'-0"

EnTech ENGINEERING	
1-HOUR RATED WALL	

WALKER GROUP
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PROJECT NO. 226002 PROJECT MGR. D. HAM DRAWN BY NGB

Jones D. Ham
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 31466
JAMES D. HAM
4/16/26

Jones County
Public Works
Building

1539 NC HWY 58
TRENTON, NC 28585

Revisions		
No.	Date	Description
1	03/23/2026	ADDENDUM 01
2	04/16/2026	ADDENDUM 02

Project Number 2523.JCPW Date 2/27/26
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Scale AS NOTED
Drawing Title

MECHANICAL
PLAN

Sheet Number 1 of 5
Drawing Number

M-101

2

EnTechHEAT PUMP (INDOOR UNIT) SCHEDULE																
MARK	SUPPLY FAN				NOMINAL COOLING CAPACITY			AUX. HEAT	ELECTRICAL				BASIS OF DESIGN		WEIGHT	
	SA CFM	OA CFM	EXT SP	MTR HP	EAT(DB/WB)	TOT CAP	SEN CAP	⊙ 208V	VOLT/PH	FLA	MCA	MOCP	MANF.	MODEL		
AH-1.1	700	110	0.5"	1/3	78°/65°	22.2 MBH	16.7 MBH	3.6 kW	208/1⌀	17.3	25	25	TRANE	5TEM4B02	120 LBS	
AH-1.2	700	100	0.5"	1/3	78°/65°	22.2 MBH	16.7 MBH	3.6 kW	208/1⌀	17.3	25	25	TRANE	5TEM4B02	120 LBS	
AH-2.1	3500	400	0.5"	2.0	78°/65°	127.6 MBH	95.3 MBH	18.7 kW	208/3⌀	—	78	80	TRANE	TWE120K3	900 LBS	
AH-2.2	3500	400	0.5"	2.0	78°/65°	127.6 MBH	95.3 MBH	18.7 kW	208/3⌀	—	78	80	TRANE	TWE120K3	900 LBS	

- NOTES:
- PROVIDE THE FOLLOWING OPTIONS AND ACCESSORIES:
 - SINGLE POINT WIRING CONNECTION
 - TXV MATCHING CONDENSER CAPACITY
 - 7-DAY PROGRAMMABLE THERMOSTAT
 - ECM FAN MOTORS
 - MERV 8 FILTERS AND FILTER RACK
 - 2 STAGE ELECTRIC HEAT (AH-2.1, 2.2)

 HEAT PUMP (OUTDOOR UNIT) SCHEDULE											
MARK	EAT(DB)	NOM CAP	ELECTRICAL			EFFICIENCY		BASIS OF DESIGN		WEIGHT	
			VOLT/PH	MCA	MOCP	COOLING	HEATING	MANF.	MODEL		
HP-1.1	95°	2.0 TONS	208/1Ø	13	20	14.3 SEER2	7.5 HSPF2	TRANE	5TWR4024	180 LBS	
HP-1.2	95°	2.5 TONS	208/1Ø	16	25	14.3 SEER2	7.5 HSPF2	TRANE	5TWR4030	180 LBS	
HP-2.1	95°	10.0 TONS	208/3Ø	39	50	14.1 IEER	2.25 COP	TRANE	TWA120K3D	500 LBS	
HP-2.2	95°	10.0 TONS	208/3Ø	39	50	14.1 IEER	2.25 COP	TRANE	TWA120K3D	500 LBS	

- NOTES:
- PROVIDE THE FOLLOWING OPTIONS AND ACCESSORIES:
 - 5 YEAR COMPRESSOR WARRANTY
 - COMPRESSOR ANTI SHORT CYCLE DELAY
 - CRANKCASE HEATERS
 - HIGH AND LOW PRESSURE SWITCHES
 - OUTDOOR THERMOSTAT
 - TWO STAGE COOLING (HP-2.1, 2.2)
 - LOW AMBIENT CONTROL TO 30° OPTION
 - M.C. SHALL COORDINATE PRODUCT SPECIFIC ELECTRICAL REQUIREMENTS WITH E.C..

EnTechCABINET EXHAUST FAN SCHEDULE											
MARK	TYPE	SERVICE	CFM	RPM	ESP	WATTS	VOLT/PH	REF. MANUF.	REF. MODEL	NOTES	CONTROL
EF-1.1	DIRECT DR.	GANG TLT	200	779	0.15"	36	120/1⌀	GREENHECK	SP-A200	1-3	A
EF-1.2	DIRECT DR.	GANG TLT	200	779	0.15"	36	120/1⌀	GREENHECK	SP-A200	1-3	A

- NOTES:
- PROVIDE WITH BACKDRAFT DAMPER.
 - PROVIDE WITH ELEC. COMMUTATED MOTOR WITH POTENTIOMETER INTERNALLY MOUNTED.

CONTROL TYPE DESCRIPTION:
A. INTERLOCK WITH ROOM LIGHTING CONTROL BY EC.

EnTechWALL EXHAUST FAN SCHEDULE													
MARK	TYPE	SERVICE	CFM	RPM	ESP	TSP	MTR HP	FLA	VOLT/PH	WALL OPENING	REF. MANUF.	REF. MODEL	WEIGHT
WF-1	DIRECT DR.	SHOP	6,000	1154	0.25"	0.46"	2.0	12.5	208/1⌀	34"x34"	GREENHECK	AER-24-02-0625-VG	250 LBS
WF-2	DIRECT DR.	MIN. VENT.	500	1246	0.25"	0.31"	1/4	2.9	120/1⌀	15"x15"	GREENHECK	SE1-12-432-VG	50 LBS

- NOTES:
- PROVIDE WITH THE FOLLOWING.
 - PREMIUM EFFICIENT ELECTRICALLY COMMUTATED MOTOR CAPABLE OF 80% TURNDOWN
 - 4-20MA AND 0-10VDC INPUT FOR SPEED CONTROL
 - MOTOR OPERATED DISCHARGE DAMPER
 - WALL HOUSING FLUSH WITH BLDG EXTERIOR
 - NEMA-1 DISCONNECT SHIPPED WITH UNIT
 - FAN SHALL BE SIZED ON TOTAL STATIC PRESSURE OF THE SYSTEM, NOT FAN STATIC

ESP - STATIC PRESSURE EXTERNAL TO THE FAN ASSEMBLY
TSP - TOTAL STATIC PRESSURE INCLUDING FAN ACCESSORIES & LOUVERS

CONTROL TYPE DESCRIPTION:
A. INTERLOCK WITH MOTORIZED INTAKE LOUVER AND CONTROL VIA TOXIC GAS MONITORING SYSTEM.
B. CONTROL VIA WALL SWITCH BY E.C. FAN SHALL RUN CONTINUOUSLY FOR MINIMUM VENTILATION.

EnTechLOUVER SCHEDULE									
MARK	SERVICE	SIZE	CFM	SP	FREE AREA	MATERIAL	REF. MANF.	REF. MODEL	NOTES
WL-2.1	INTAKE	12"Wx12"H	100	0.09"	0.2 SQFT	ALUMINUM	GREENHECK	EHV-550	1,2,4
WL-2.2	INTAKE	12"Wx12"H	110	0.09"	0.2 SQFT	ALUMINUM	GREENHECK	EHV-550	1,2,4
WL-2.3	EXHAUST	18"Wx18"H	400	0.12"	0.7 SQFT	ALUMINUM	GREENHECK	EHV-550	1,2,4
WL-2.1	INTAKE	40"Wx40"H	3000	0.12"	5.3 SQFT	ALUMINUM	GREENHECK	EHV-550	1-4
WL-2.2	INTAKE	40"Wx40"H	3000	0.12"	5.3 SQFT	ALUMINUM	GREENHECK	EHV-550	1-4

- NOTES:
- PROVIDE WITH BIRD SCREEN, EXTENDED SILL & 2 COATS OF KYNAR FINISH (AAMA 2605).
 - SUBMIT LOUVER TYPE & COLOR PALLET TO ARCHITECT FOR COLOR SELECTION.
 - PROVIDE WITH PARALLEL BLADE DAMPER AND 120V ACTUATOR AT REAR OF LOUVER INTERLOCKED WITH ASSOCIATED FAN.
 - LOUVERS SHALL BE LICENSED TO BEAR THE AMCA CERTIFIED RATINGS PROGRAM SEAL FOR AIR PERFORMANCE, WINDDRIVEN RAIN AND WATER PENETRATION IN ACCORDANCE WITH AMCA PUBLICATION 511.
 - HURRICANE LOUVERS SHALL BE AMCA 540 AND 550 CERTIFIED.

EnTechINFARED HEATER SCHEDULE										
MARK	QTY.	LENGTH	MTG HEIGHT	INPUT(HI/LO)	FUEL	VOLT/PH	RLA	MAX AMPS	REF. MANF.	REF. MODEL
IH-1	1	50'	20'	150/100 MBH	LP	120/1⌀	1.1	4.8	DETROIT	HL3-50-150
IH-2	1	50'	20'	150/100 MBH	LP	120/1⌀	1.1	4.8	DETROIT	HL3-50-150
IH-3	1	50'	20'	150/100 MBH	LP	120/1⌀	1.1	4.8	DETROIT	HL3-50-150

- NOTES:
- PROVIDE WITH:
 - DIRECT SPARK IGNITION
 - POLISHED ALUMINUM REFLECTOR
 - 120 VOLT TWO STAGE WALL THERMOSTAT
 - TWO STAGE GAS VALVE
 - WALL VENT KIT - AIR INTAKE FROM SPACE
 - FOLLOW ALL MANUFACTURER'S INSTRUCTIONS FOR VENTING
 - PROVIDE WITH ACCESORIES FOR PROPANE FUEL
 - 3-YEAR COMBUSTION AND TUBE WARRANTY, 5-YEAR BURNER WARRANTY

EnTechAIR DISTRIBUTION SCHEDULE											
MARK	CFM RANGE	MANUF.	MODEL	TYPE		MNT.	SIZE	NECK	PATTERN	MAT'L	FINISH
SD-6	0-100	PRICE	SCD 4 CONE	LOUVERED FACE SUPPLY DIFFUSER		LAY-IN	24"x24"	6"⌀	4-WAY	ALUM.	WHITE
SD-8	105-200	PRICE	SCD 4 CONE	LOUVERED FACE SUPPLY DIFFUSER		LAY-IN	24"x24"	8"⌀	4-WAY	ALUM.	WHITE
DG-A	600-850	PRICE	HCD	HIGH CAPACITY DRUM LOUVER		DUCT	10"x24"	N/A	4-WAY	ALUM.	PNT. GRP.
RA	0-800	PRICE	80	RETURN EGGRATE FACE		LAY-IN	24"x24"	6"⌀ TO 12"⌀	-	ALUM.	WHITE

- NOTES:
- VERIFY AIR DISTRIBUTION TYPE WITH ARCHITECTURAL REFLECTED CEILING PLAN.
 - PROVIDE WITH REMOVABLE CORE.
 - PROVIDE WITH INSULATED BACKPAN.
 - PROVIDE WITH INSULATED, BLACK BACK PAN.
 - PROVIDE WITH SPIRAL DUCT FRAME.
 - PROVIDE WITH ROTATEABLE DRUM AND SINGLE BLADE VERTICAL DISCHARGE VANES.

Ventilation Sizing Summary Based on ASHRAE 62.1-2016											
for Constant Volume Systems serving multiple spaces											
	Req. Supply Air (CFM)	Space Area (ft²)	Area Outdoor Air Rate (CFM/ft²)	Time Avg Occ	People Rate (CFM/person)	Space Air Eff	Space Outdoor Air (CFM)	Breathing Zone (CFM)	Space Vent Eff		
Zone 1.1-Breakroom, Corridor, Restroom											
Space Name	Mult.	(Vpz)	(Az)	(Ra)	(Pz)	(Rp)	(Ez)	(Voz)	(Vou)	(Evz)	
162 Corridor N	1	125	329	0.06	0	5	0.8	25	20	0.948	
169 Breakroom	1	400	440	0.06	8	5	0.8	83	66	0.938	
170 Unisex	1	75	125	0.06	0	5	0.8	9	8	1.021	
171 Unisex	1	100	140	0.06	0	0	0.8	11	8	1.041	
Totals (incl. Space Mult)		700							102	0.938	
									OA Required for unit		109
									OA CFM Provided		110
Zone 1.2-Offices, Corridor											
Space Name	Mult.	(Vpz)	(Az)	(Ra)	(Pz)	(Rp)	(Ez)	(Voz)	(Vou)	(Evz)	
162 Corridor S	1	120	329	0.06	0	0	0.5	39	20	0.781	
165 Office	1	165	180	0.06	1	5	0.7	23	16	0.974	
166 Office	1	165	180	0.06	1	5	0.8	20	16	0.991	
167 Office	1	150	217	0.06	1	5	0.8	23	18	0.960	
168 Foyer	1	100	132	0.06	0	5	0.8	10	8	1.011	
Totals (incl. Space Mult)		700							77	0.781	
									OA Required for unit		99
									OA CFM Provided		100

- NOTES:
- VENTILATION FOR THE SHOP IS PROVIDED VIA MECHANICAL VENTILATION THROUGH EXHAUST FANS AND INTAKE LOUVERS WHICH EXCEEDS THE REQUIRED 0.75 CFM/SQFT PER NORTH CAROLINA MECHANICAL CODE 404.

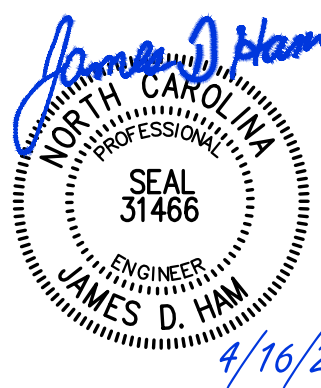
EnTechELECTRIC UNIT HEATER SCHEDULE									
MARK	SERVICE	CFM	CAPACITY	KW	VOLT/PH	FLA	REF. MANF.	REF. MODEL	NOTES
EW-1.1	RISER ROOM	175	7680 MBH	2.25	208/1⌀	10.8	MARKEL	HF3315	1-3

- NOTES:
- PROVIDE WITH DISCONNECT SWITCH
 - PROVIDE WITH INTEGRAL THERMOSTAT.
 - PROVIDE WITH SURFACE WALL MOUNT KIT.

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PROJECT NO. 226002 PROJECT MGR. D. HAM DRAWN BY NGB



Jones County
Public Works
Building

1539 NC HWY 58
TRENTON, NC 28585

Revisions											
No.	Date	1	2	3	4	5	6	7	8	9	10
1	03/23/2026	ADDENDUM 01									
2	04/16/2026	ADDENDUM 02									

Project Number 2523.JCPW Date 2/27/26
Drawn Checked

Scale AS NOTED
Drawing Title

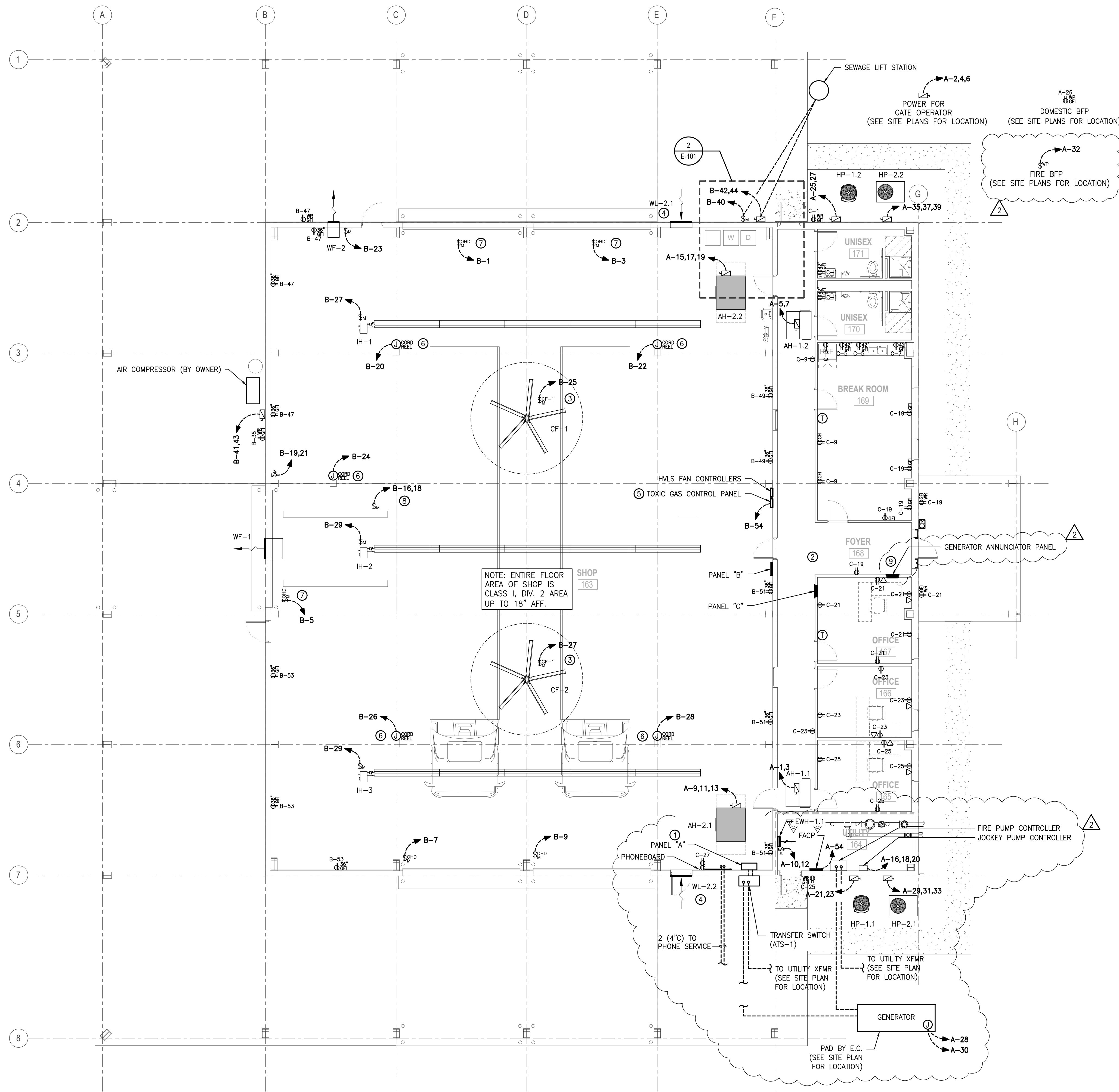
MECHANICAL
SCHEDULES

Sheet Number

4 OF 5

Drawing Number

M-301

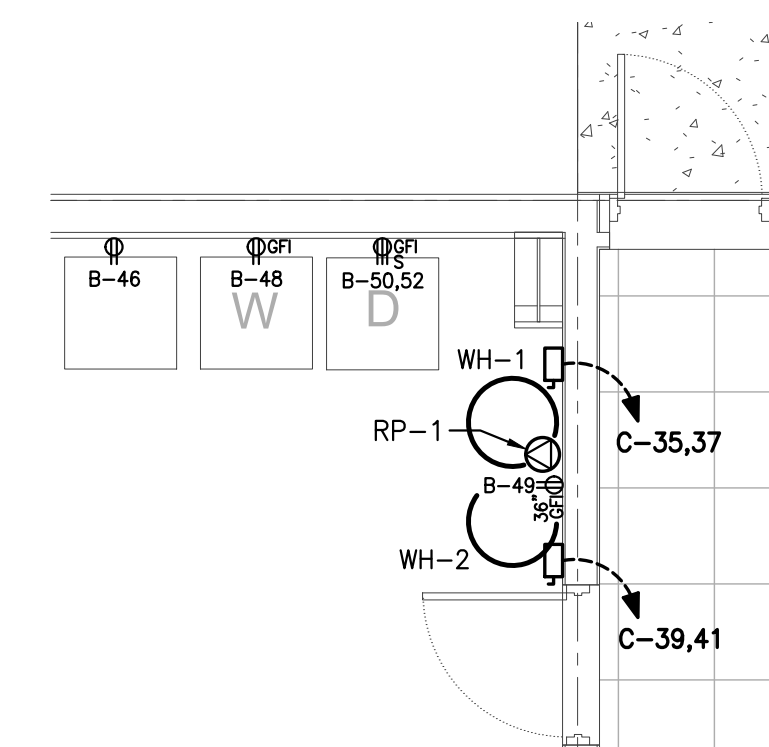


1 ELECTRICAL POWER & RECEPTACLE PLAN
SCALE: 1/8" = 1'-0"



INSTALLATION KEYED NOTES "E-101":

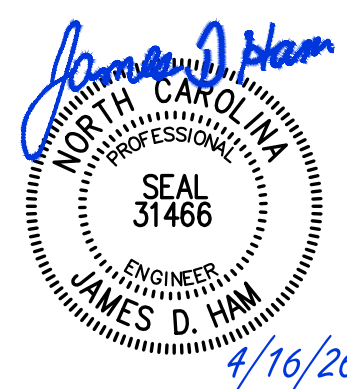
1. PROVIDE (3) SPARE 1" C FROM PANEL A TO EXTERIOR OF BUILDING. RACEWAYS SHALL BE ROUTED DOWN FROM PANEL AND INTO BUILDING SLAB, THROUGH FOOTING AND CAPPED UNDERGROUND.
2. PROVIDE (2) SPARE 2" C FROM PANEL C. PROVIDE AS-BUILT PLANS SHOWING TERMINATION LOCATION OF RACEWAYS.
3. PROVIDE 1" C FROM CONTROLLER TO NEAR CEILING JOIST FOR CONTROL WIRING TO HVLS FAN (CF-1 AND CF-2).
4. PROVIDE 2#14 & 1#14G IN 3/4" C FROM LOUVER TO GAS DETECTION PANEL. PROVIDE DISCONNECT NEXT TO LOUVER MOTOR. 120V POWER FOR LOUVER SHALL COME FROM SAME CIRCUIT AS GAS DETECTION PANEL. GAS DETECTION PANEL HAS A RELAY FOR DAMPER CONTROL. PROVIDE CONTROL WIRING FROM FAN TO GAS DETECTION SYSTEM.
5. REFERENCE MECHANICAL DRAWINGS FOR WIRING REQUIREMENTS OF GAS DETECTION SYSTEM. PROVIDE WIRING AND RACEWAYS FOR SENSORS, ALARM STROBE/HORN, AND FAN/DAMPER CONTROL PANEL AND SENSORS. PROVIDED BY M.C..
6. PROVIDE HEAVY DUTY CORD REEL MODEL "L 70075 123 3A" AS MANUFACTURED BY REELCRAFT, OR EQUAL. REEL SHALL HAVE 75' OF 12/3 CABLE WITH 5-20R SINGLE OUTLET. COORDINATE LOCATIONS WITH OWNER AND ARCHITECT BEFORE INSTALLATION.
7. PROVIDE CONTROL WIRING AS SUGGESTED BY MANUFACTURER OF OVERHEAD DOOR IN 1/2" CONDUIT TO THE DOOR CONTROLLER. INSTALL DOOR CONTROLLER AT 48" A.F.F. ADJACENT TO THE DOOR. INSTALL THE MOTOR DISCONNECTS EITHER AT 60" A.F.F. OR NEAR THE MOTOR.
8. LIFT IS FUTURE. INSTALL DISCONNECT AT CEILING.
9. PROVIDE 1" C. AND WIRING AS REQUIRED BY MANUFACTURER FROM GENERATOR ANNUNCIATOR PANEL TO GENERATOR.



2 ENLARGED ELECTRICAL POWER & RECEPTACLE PLAN
SCALE: 1/4" = 1'-0"



EnTech	RATED WALL LEGEND
	1-HOUR RATED WALL



**Jones County
Public Works
Building**

1539 NC HWY 58
TRENTON, NC 28585

Revisions	No.	Date	Description
	1	03/23/2026	ADDENDUM 01
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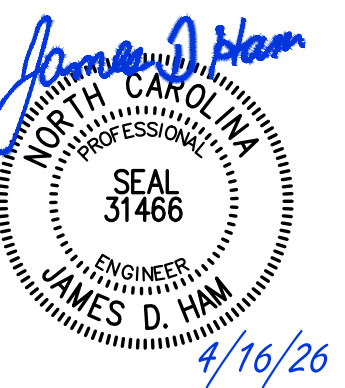
Project Number 2523.JCPW Date 2/27/26
Drawn Checked

Scale AS NOTED
Drawing Title

**ELECTRICAL
PLANS**

Sheet Number 1 of 7
Drawing Number

E-101



Jones County
Public Works
Building

1539 NC HWY 58
TRENTON, NC 28585

Revisions	
No.	Date
2	04/16/2026
ADDENDUM 02	

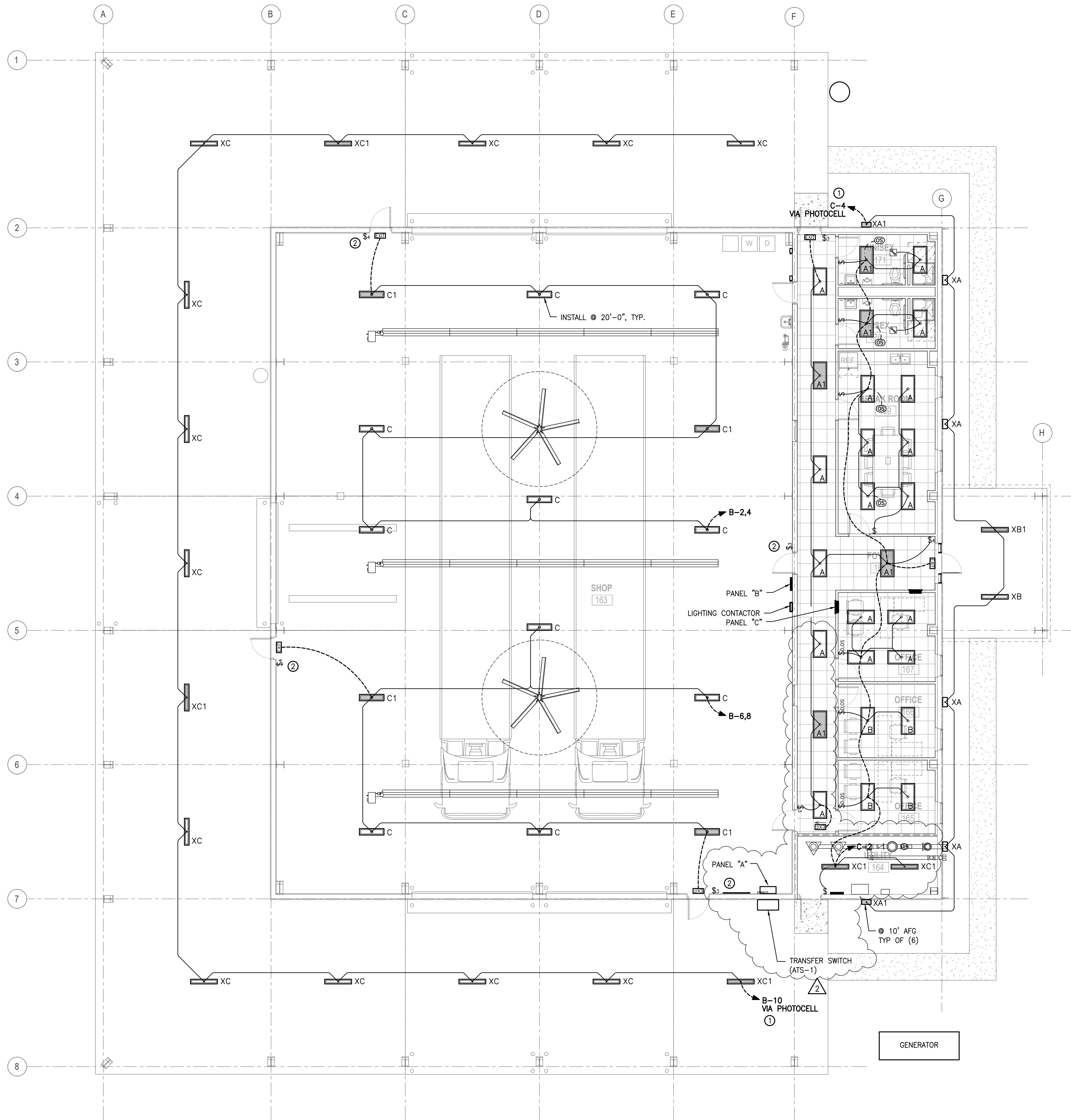
Project Number 2523.JCPW Date 2/27/26
Drawn AS NOTED Checked

Scale AS NOTED
Drawing Title

ELECTRICAL
PLANS

Sheet Number 2 of 7
Drawing Number

E-102

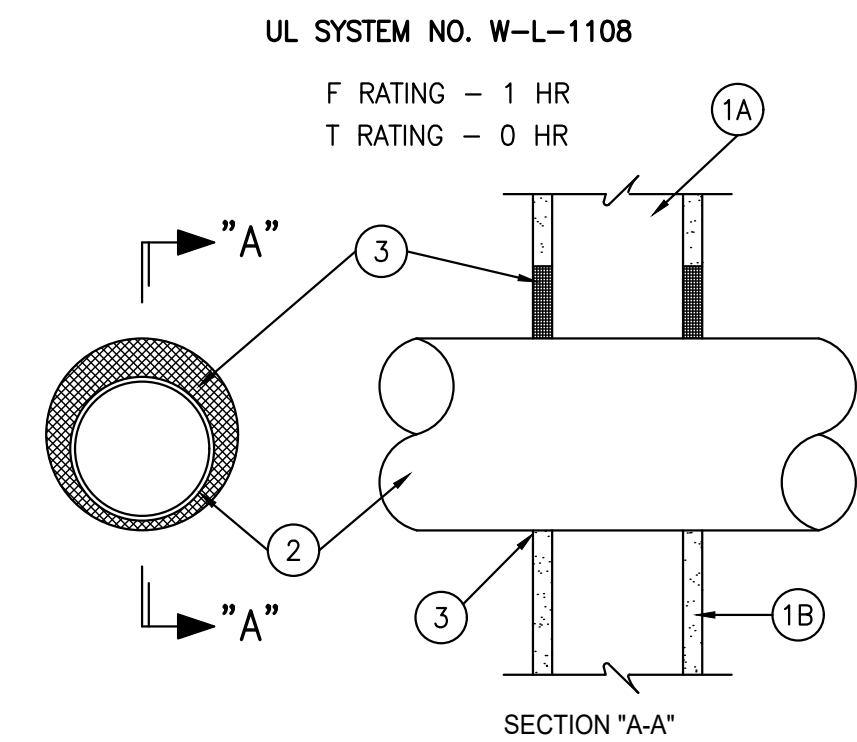


1 ELECTRICAL LIGHTING PLAN
SCALE: 1/8" = 1'-0"



INSTALLATION KEYED NOTES "A":

1. INSTALL PHOTOCELL HIGH ON NORTH WALL. COORDINATE WITH OWNER AND ARCHITECT FOR FINAL LOCATION.
2. PROVIDE WALL SWITCHES AS SHOWN FOR SHOP LIGHTS.



1. WALL ASSEMBLY - THE FIRE-RATED GYPSUM WALLBOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES WALL AND PARTITION DESIGNS IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:
 - A. STUDS - WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM. 2 BY 4 IN. LUMBER SPACED 16 IN. O.C. STEEL STUDS TO BE MIN 2-1/2 IN. WIDE AND SPACED MAX 24 IN. O.C.
 - B. WALLBOARD, GYPSUM* - ONE LAYER OF NOM 5/8 IN. THICK GYPSUM WALLBOARD, AS SPECIFIED IN THE INDIVIDUAL WALL AND PARTITION DESIGN. MAXIMUM DIAMETER OF OPENING IS 11-3/4 IN.
2. THROUGH PENETRANTS - ONE METALLIC PIPE, CONDUIT OR TUBING TO BE INSTALLED EITHER CONCENTRICALLY OR ECCENTRICALLY WITHIN THE FIRESTOP SYSTEM. PIPE, CONDUIT OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES, CONDUITS OR TUBING MAY BE USED:
 - A. STEEL PIPE - NOM 10 IN. DIA. (OR SMALLER) SCHEDULE 20 (OR HEAVIER) STEEL PIPE. THE ANNULAR SPACE SHALL BE MIN 0 IN. TO MAX 1 IN.
 - B. IRON PIPE - NOM 10 IN. DIA. (OR SMALLER) CAST OR DUCTILE IRON PIPE. THE ANNULAR SPACE SHALL BE MIN 0 IN. TO MAX 1 IN.
 - C. CONDUIT - NOM 2 IN. DIA. (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING OR STEEL CONDUIT. THE ANNULAR SPACE SHALL BE MIN 0 IN. TO MAX 1 IN.
 - D. COPPER TUBING - NOM 2 IN. DIA. (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING. THE ANNULAR SPACE SHALL BE MIN 0 IN. TO MAX 1 IN.
 - E. COPPER PIPE - NOM 2 IN. DIA. (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE. THE ANNULAR SPACE SHALL BE MIN 0 IN. TO MAX 1 IN.
3. FILL, VOID OR CAVITY MATERIAL - CAULK - MIN 1/2 IN. THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH WITH BOTH SURFACES OF WALL AT THE POINT CONTACT LOCATION BETWEEN PIPE AND WALL, A MIN 1/4 IN. DIA. BEAD OF FILL MATERIAL SHALL BE APPLIED AT THE WALL/PIPE INTERFACE ON BOTH SURFACES OF WALL.

THE RECTORSEAL CORP.-METACAULK 1000 *BEARING THE UL CLASSIFICATION MARKING

FIRESTOP MATERIALS BY 3M AND SPECSEAL ARE ACCEPTABLE WHERE TESTED & ACCEPTED BY U.L. FOR THIS APPLICATION.

1 UL 1 HOUR GYPBOARD WALL PENETRATION DETAIL
SCALE: N.T.S.

RATED WALL LEGEND	
-----	1-HOUR RATED WALL

SERVICE LOAD SUMMARY					
OCCUPANCY TYPE – AUTOMOTIVE FACILITY/OFFICE			BUILDING AREA – 9,700 SQUARE FEET		
CONTINUOUS LOAD DESCRIPTION	LOAD (KVA)	NEC REFERENCE	DEMAND FACTOR	NEC REFERENCE	LOAD (KVA)
INDOOR LIGHTING (1.5W/SF)	14.5	TABLE 220.12	100%	TABLE 220.42	14.5
OUTDOOR LIGHTING	0.5	---	100%	---	0.5
AIR HANDLER FANS (SPLIT SYSTEMS)	6.0	ARTICLE 440	100%	---	6.0
AIR HANDLER ELECTRIC HEAT	46.8	422.12	100%	---	46.8
HVAC OUTDOOR UNIT	31.2	ARTICLE 440	100%	---	31.2
CIRCULATION FANS	0.5	ARTICLE 430	100%	---	0.5
WATER HEATERS	12.0	422.13	100%	---	12.0
SUBTOTAL CONTINUOUS LOADS					111.5
					230.42 A 1
					x 125%
					139.4
CONT. LOAD TOTAL					139.4
NON CONTINUOUS LOAD DESCRIPTION					
RECEPTACLES UP TO 10 KVA	7.3	220.14 1	100% OF 1st 10 KVA		7.3
RECEPTACLES OVER 10 KVA	0.0	220.14 1	50% ABOVE 10 KVA		0.0
LAUNDRY EQ.	5.5	---	NONCONTINUOUS LOAD x 100%		5.5
WELDERS	8.7	ARTICLE 630	60% DUTY CYCLE = 0.78%		6.8
AIR COMPRESSOR	10.0	ARTICLE 430	NONCONTINUOUS LOAD x 100%		10.0
OVERHEAD DOORS	2.0	---	NONCONTINUOUS LOAD x 100%		2.0
MISC. LOADS	2.0	---	NONCONTINUOUS LOAD x 100%		2.0
SUBTOTAL NON-CONTINUOUS LOADS					33.6
TOTAL CONTINUOUS AND NON CONTINUOUS LOADS					173.0
FAULT CURRENT @ TRANSFORMER SECONDARY TERMINALS (POLE MOUNT)			SERVICE LOAD		
$\frac{150 \text{ KVA (TRANSFORMER)}}{0.208 \times \sqrt{3} \times 1.5\%Z} = 27,800 \text{ AMPS}$			$\frac{173 \text{ KVA}}{0.208 \times \sqrt{3}} = 481 \text{ AMPS}$		

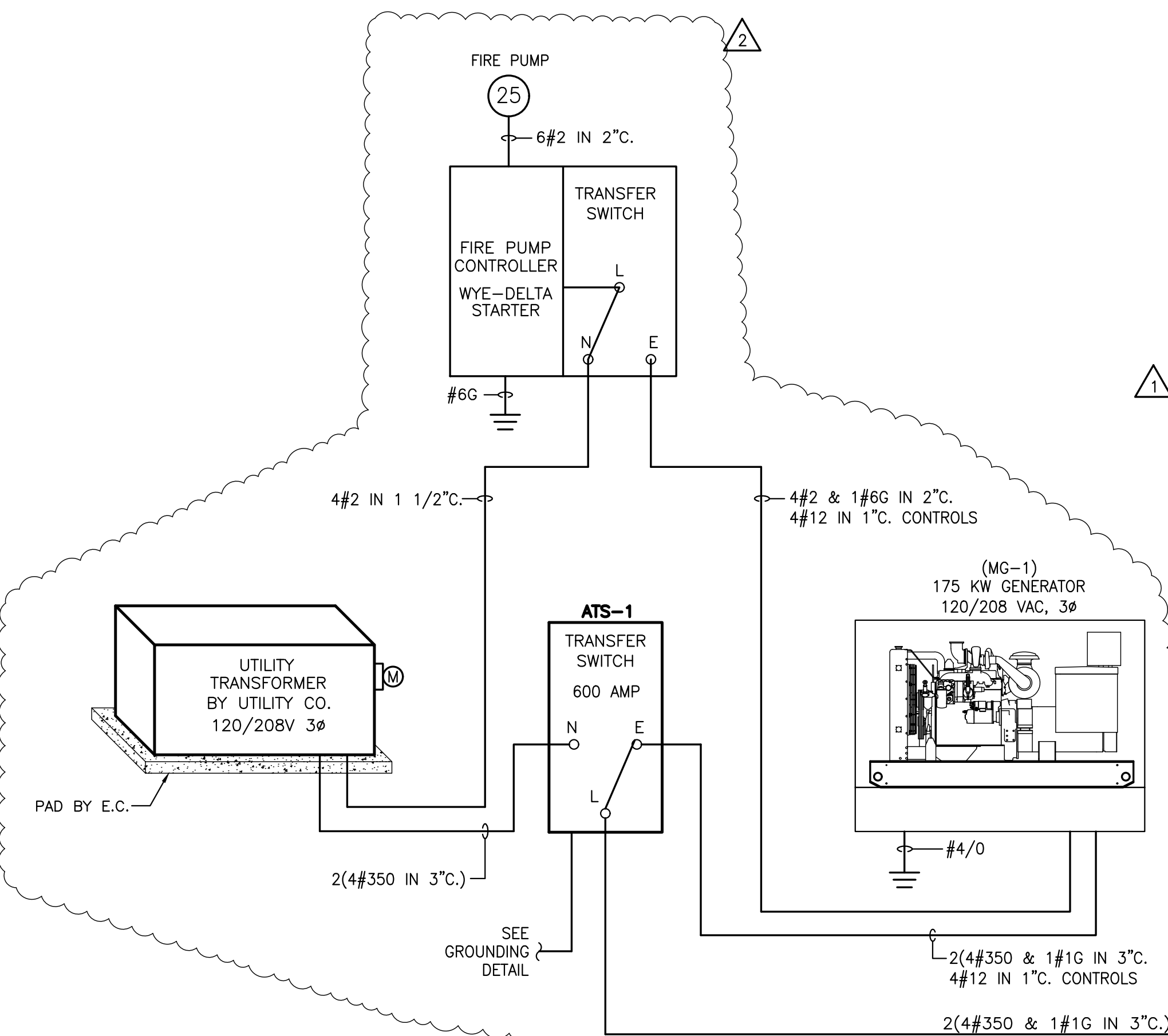
NOTE: CONTRACTOR SHALL PROVIDE LABEL AT THE SERVICE EQUIPMENT INDICATING THE AVAILABLE FAULT CURRENT PER NEC 110.24. ENGINEER WILL PROVIDE CONTRACTOR LABEL DATA FOR FAULT CURRENT AFTER RECEIVING THE FOLLOWING: FINAL UTILITY TRANSFORMER SIZE AND IMPEDANCE VALUE (%Z), SERVICE CONDUCTOR LENGTH, QUANTITY PER PHASE, AND CONDUCTOR MATERIAL (COPPER OR ALUMINUM).

AUTOMATIC TRANSFER SWITCH SCHEDULE							
MARK	TRANSITION TYPE	VOLTS/PH/WIRES	RATING	ENCLOSURE	S.C. WITHSTAND	NO. POLES	S.E. RATED
ATS-1	OPENED TRANSITION	120/208 3Ø 4W	600A	NEMA 3R	35 KAIC	3	YES

- NOTES:
- PROVIDE THE FOLLOWING OPTIONS AND ACCESSORIES:
 - MICROPROCESSOR BASED CONTROLLER
 - 128 X 64 GRAPHICAL LED DISPLAY W/ SOFT KEYPAD
 - SOURCE AVAILABILITY AND SWITCH POSITION
 - 3 POSITION CONTACTOR
 - WITHSTAND/CLOSING RATING BASED ON ANY UPSTREAM BREAKER – TIME BASED UL 489 COORDINATION WITH 0.05 SECONDS.
 - UL1008 LISTED
 - GENERATOR AND UTILITY UNDER VOLTAGE CONTROL SETPOINT
 - UTILITY RETURN TIMER
 - ENGINE START CONTACT
 - SHORT CIRCUIT RATING BASED ON ANY UPSTREAM BREAKER
 - 5 YEAR WARRANTY
 - PROVIDE A SIGN ON THE TRANSFER SWITCH INDICATING THE LOCATION AND TYPE OF ON-SITE OPTIONAL STANDBY SOURCE PER STATE CONSTRUCTION OFFICE AND NEC 702.7. NOTE SHALL READ, "DIESEL GENERATOR POWER SOURCE LOCATED 30 FEET TO THE RIGHT."

PACKAGE GENERATOR SYSTEM SCHEDULE								
MARK	VOLTS/PH	KW RATING	ALTERNATOR	RATING	NFPA 110	NFPA 110	FUEL TYPE	TANK SIZE
MG-1	120/208 3Ø	175 KW	200 KW	STANDBY	LEVEL 1	TYPE 10	DIESEL	24 HOUR

- NOTES:
- PROVIDE THE FOLLOWING OPTIONS AND ACCESSORIES:
 - PROVIDE LOW FUEL ALARM TO FIRE ALARM PANEL
 - GENERATOR SHALL MEET THE REQUIREMENTS OF NFPA 110, LEVEL 1, TYPE 10, CLASS 8. IT SHALL START AND PROVIDE POWER WITHIN 10 SECOND PER NFPA 20 FOR FIRE PUMPS.
 - ALTERNATOR SHALL BE PROTECTED PER THE REQUIREMENTS OF NFPA 70 SECTION 445.12
 - THE GENERATOR SET SHALL BE PROVIDED WITH AN OVERCURRENT PROTECTIVE DEVICE THAT IS COORDINATED WITH THE ALTERNATOR TO PREVENT DAMAGE ON ANY POSSIBLE OVERLOAD OR OVERCURRENT CONDITION EXTERNAL TO THE MACHINE. THE PROTECTIVE DEVICE SHALL BE LISTED AS A UTILITY GRADE PROTECTIVE DEVICE UNDER UL CATEGORY NRGU
 - PERMANENT MAGNET EXCITATION
 - STARTING KW CALCULATED WITH 25% VOLTAGE DROP AT SINGLE STEP CONNECTED FULL LOAD.
 - THE GENERATOR SET SHALL PICK UP A BLOCK LOAD EQUAL TO THE SPECIFIED KW AT 0.8 POWER FACTOR AT RATED SITE CONDITIONS AND RECOVER TO RATED VOLTAGE AND FREQUENCY
 - MIN. 6 AMP BATTERY CHARGER, AUTOMATIC FLOAT CHARGE
 - 24V STARTING SYSTEM (175KW AND LARGER)
 - MIN. 10 AMP BATTERY CHARGER, AUTOMATIC, SOLID-STATE, CURRENT LIMITING, FLOAT/EQUALIZING CHARGER WITH 4-STATE CHARGING ALGORITHM, 120-VOLT INPUT, OVERLOAD PROTECTION, D.C. AMMETER, D.C. VOLTMETER, LOW D.C. VOLTAGE ALARM RELAY, AND BE NCBC APPROVED THIRD-PARTY LISTED AND LABELED.
 - CLASS H INSULATION (150 DEG C.)
 - SYNCHRONOUS, FOUR POLE, WITH 2/3 PITCH WINDING.
 - DUAL WALL SUB-BASE FUEL TANK, UL142 LISTED AND LABELED WITH FILL SPILL BUCKET AND VENT.
 - MICROPROCESSOR-BASED CONTROL FOR AUTOMATIC STARTING, MONITORING, AND CONTROL FUNCTIONS
 - CONTROL SHALL ALLOW FOR REMOTE MONITORING
 - PROVIDE REMOTE ANNUNCIATOR PANEL MEETING NFPA 110, LEVEL 1 REQUIREMENTS
 - PROVIDE REMOTE SHUTDOWN BUTTON LOCATED ON EXTERIOR OF BUILDING.
 - DIGITAL METERING SET, 100% ACCURACY, TO INDICATE RMS VOLTAGE AND CURRENT, FREQUENCY, OUTPUT KW, OUTPUT KVA, AND POWER FACTOR
 - MOUNTED MAIN LINE CIRCUIT BREAKER, SIZED TO CARRY RATED OUTPUT OF GENERATOR SET. 6
 - SECONDARY FIRE PUMP CIRCUIT BREAKER IN SEPARATE ENCLOSURE FROM OTHER GENERATOR DISCONNECTING MEANS AND LOCKABLE IN THE CLOSED POSITION PER NEC 695.4(B)(3)(B). LABEL DISCONNECT PER NEC 695.4(B)(3)(C). COORDINATE FIRE PUMP BREAKER WITH PUMP SUBMITTAL.
 - BREAKER SHALL BE SIZED NO GREATER THAN 250% OF MOTOR FULL LOAD AMPS. GENERATOR VOLTAGE SHALL NOT DROP BELOW 15 PERCENT BELOW NORMAL UNDER MOTOR-STARTING CONDITIONS (NFPA 20-9.4.1).
 - OUTDOOR WEATHER-PROTECTIVE AND LEVEL 2 SOUND ATTENUATED ENCLOSURE WITH CRITICAL GRADE SILENCER, NOT TO EXCEED 75dB @ 23 FEET FROM ENCLOSURE. ENCLOSURE SHALL BE RATED FOR ASCE/SEI 7 WIND LOAD OF 110MPH.
 - THE ENGINE-GENERATOR ASSEMBLY SHALL BE FASTENED TO A WELDED STEEL BASE WHICH SHALL ALLOW MOUNTING TO A RAISED CONCRETE PAD OR THE SUB-BASE FUEL TANK. ANCHOR BOLTS AND VIBRATION ISOLATORS SHALL BE USED TO MOUNT THE HEAVY STEEL BASE TO THE CONCRETE PAD. VIBRATION ISOLATORS, EITHER INTEGRAL OR EXTERNAL, SHALL BE PROVIDED AND INSTALLED AS RECOMMENDED BY THE MANUFACTURER. VIBRATION ISOLATORS SHALL BE ONE-PIECE UNITS, RESISTANT TO CORROSION AND ENVIRONMENTAL DEGRADATION. WHEN SUB-BASE TANKS ARE SPECIFIED, VIBRATION ISOLATORS SHALL BE LOCATED BETWEEN THE GENERATOR SET AND THE FUEL TANK
 - A THERMOSTATICALLY CONTROLLED, IMMERSION TYPE ENGINE COOLANT HEATER SHALL BE PROVIDED. MINIMUM COOLANT TEMPERATURE SHALL NOT BE LESS THAN 120 DEGREES F. EACH HEATER SHALL BE PROVIDED WITH CONTACTOR IN A RATED NEMA ENCLOSURE. HEATER(S) SHALL NOT OPERATE WHILE THE ENGINE IS RUNNING.
 - 120 VAC GFCI DUPLEX RECEPTACLE
 - AC/DC INTERIOR LED LIGHTING KIT WITH BACK-UP POWER FROM GENERATOR BATTERY
 - ISO 8528 RATED
 - 5 YEAR COMPREHENSIVE WARRANTY
 - UL2200 LISTED FOR STATIONARY ENGINE GENERATOR ASSEMBLY.
 - SIGN AT SERVICE ENTRANCE: PROVIDE ENGRAVED NAMEPLATE TYPE SIGN AT BUILDING AND FIRE PUMP ROOM SERVICE ENTRANCES INDICATING TYPE AND LOCATION OF ON-SITE ALTERNATE SOURCE OF POWER.



1 ELECTRICAL PANEL RISER
SCALE: N.T.S.

NOTE: E.C. SHALL PROVIDE ALTERNATE PRICING FOR GENERATOR (BID ALTERNATE 04). TRANSFER SWITCH SHALL BE BASE BID.

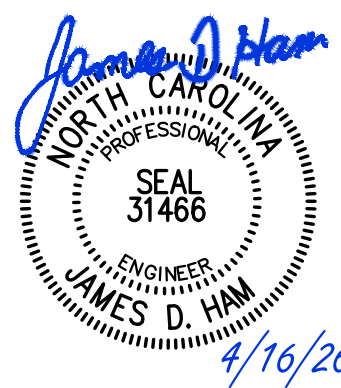
PANELBOARD SCHEDULE											
PANEL A		SURFACE MOUNTED						600 AMP (FEEDER SIZE)		3Ø, 4 WIRE	
MAIN BREAKER		BOTTOM FEED				22K AIC		120/208 VOLT		BOLT ON BREAKER	
NEMA 1		COPPER BUS						600 AMP (BUS RATING)		---	
LOAD SERVED	WIRE SIZE	CONDUIT SIZE	LOAD (AMPS)	CKT NO.	PHASE	CONDUIT SIZE	LOAD (AMPS)	CONDUIT SIZE	WIRE SIZE	LOAD SERVED	
AH-1.1	2#12 & 1#10G	3/4"	17	1	25	2	7	1"	3#12 & 1#12G	GATE OPERATOR	③
AH-1.2	2#10 & 1#8G	3/4"	17	3	25	4	7	1"	3#12 & 1#12G	SPARE	
AH-2.1	3#4 & 1#8G	1"	72	9	80	8	11	3/4"	2#12 & 1#12G	EWB-1	③
AH-2.2	3#4 & 1#8G	1"	72	11	80	10	11	3/4"	2#12 & 1#12G	FIRE PRO AIR COMP	③
HP-1.1	2#12 & 1#12G	3/4"	72	13	20	14	4	3/4"	2#12 & 1#12G	JOCKEY PUMP	③
HP-1.2	2#12 & 1#10G	3/4"	72	15	20	16	7	3/4"	2#12 & 1#12G	SPARE	
HP-2.1	3#8 & 1#10G	3/4"	10	21	20	20	7	2"	4#3/0 & 1#6G	PANEL B	①
HP-2.2	3#8 & 1#10G	3/4"	10	23	25	24	17	1"	2#8 & 1#8G	PANEL C	①
SPARE	---	---	14	25	20	26	12	1"	2#8 & 1#8G	DOMESTIC BFP	①
SPARE	---	---	14	27	50	28	2	3/4"	2#12 & 1#12G	GEN BATT	②
SPARE	---	---	32	29	200	30	12	3/4"	2#12 & 1#12G	GEN HEATER	②
SPARE	---	---	32	31	50	32	134	2"	4#3/0 & 1#6G	SPARE	
SPARE	---	---	32	33	200	34	109	2"	4#3/0 & 1#6G	SPARE	
SPARE	---	---	32	35	20	36	110	2"	4#3/0 & 1#6G	SPARE	
SPARE	---	---	32	37	20	38	64	2"	4#3/0 & 1#6G	SPARE	
SPARE	---	---	32	39	20	40	52	2"	4#3/0 & 1#6G	SPARE	
SPARE	---	---	---	41	20	42	68	---	---	SPARE	
SPARE	---	---	---	43	20	44	---	---	---	SPARE	
SPARE	---	---	---	45	20	46	---	---	---	SPARE	
SPARE	---	---	---	47	20	48	---	---	---	SPARE	
SPARE	---	---	---	49	20	50	---	---	---	SPARE	
SPARE	---	---	---	51	20	52	---	---	---	SPARE	
SPARE	---	---	---	53	20	54	2	3/4"	2#12 & 1#12G	FACP	④

- COORDINATE HVAC BREAKERS AND WIRE SIZES WITH HVAC SUBMITTALS
COORDINATE BREAKERS AND WIRE SIZES FOR OWNER FURNISHED EQUIPMENT WITH SUBMITTALS
PROVIDE SEPARATE NEUTRALS FOR ALL CIRCUITS.
- PROVIDE 30mA GFPE BREAKER FOR EQUIPMENT PROTECTION (UL 1053)
 - PROVIDE UNDER BID ALTERNATE 04.
 - HORSEPOWER UNKNOWN. CONTRACTOR TO VERIFY WIRE AND BREAKER SIZES.
 - PROVIDE WITH LOCKING BREAKER & IDENTIFY WITH A RED MARKING PER NFPA 72-10.6.5.2 (2013).

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PROJECT NO. 226002 PROJECT MGR. D. HAM DRAWN BY BLT



Jones County
Public Works
Building

1539 NC HWY 58
TRENTON, NC 28585

Revisions			
No.	Date	Description	By
1	03/23/2026	ADDENDUM 01	
2	04/16/2026	ADDENDUM 02	

Project Number 2523.JCPW Date 2/27/26
Drawn Checked

Scale AS NOTED
Drawing Title

ELECTRICAL
SCHEDULES

Sheet Number 5 of 7
Drawing Number

E-301

LIGHT FIXTURE SCHEDULE																			
MARK	DESCRIPTION	REF MANF	MODEL NUMBER FOR FIXTURE REFERENCE QUALITY AND APPEARANCE	SOURCE	LED LUMENS	COLOR TEMP	CRI	FIXTURE INPUT WATTS	VOLTS	MULTI-VOLT INF.	DIMMING TO 10%	STEP LEVEL DIM.	BATTERY BACK-UP	BATTERY BACK-UP	DAMP LOCATION	WET LOCATION	STANDARD COLOR	CUSTOM COLOR	REMARKS
A	2x4 LED FLAT PANEL	LITHONIA	CPX 2X4 AL08 80CRI SWW7 SWL MVOLT	LED	4,000	40K	80	25	120	●	●								
A1	2x4 LED FLAT PANEL (EMERGENCY)	LITHONIA	CPX 2X4 ALO8 80CRI SWW7 SWL MVOLT E10W	LED	4,000	40K	80	25	120	●	●		●						
B	2x4 LED FLAT PANEL	LITHONIA	CPX 2X4 AL08 80CRI SWW7 SWL MVOLT	LED	5,000	40K	80	34	120	●	●								
C	LED HIGH BAY	LITHONIA	CPHB 48000LM SEF GCL MD MVOLT GZ10 40K 80CRI IBAC120 M100	LED	48,000	40K	80	324	120	●	●								
C1	LED HIGH BAY (EMERGENCY)	LITHONIA	CPHB 48000LM SEF GCL MD MVOLT GZ10 40K 80CRI E10WCP IBAC120 M100	LED	48,000	40K	80	324	120	●	●		●						
EXIT	EXIT LIGHT	LITHONIA	LQM S 3 R MVOLT EL N	LED	-	-	-	4	120	●							●		
EXTERIOR LIGHTS																			
XA	EXTERIOR WALL PACK	LITHONIA	WDGE1 LED P1 40K 80CRI VW MVOLT	LED	2,000	40K	80	15	120	●						●	●		
XA1	EXTERIOR WALL PACK (EMERGENCY)	LITHONIA	WDGE1 LED P1 40K 80CRI VW MVOLT E4WH	LED	2,000	40K	80	15	120	●			●			●	●		
XB	EXTERIOR 4' LED STRIP LIGHT	LITHONIA	CLX L48 3000LM SEF RDL MVOLT GZ1 40K 80CRI	LED	3,000	40K	80	19	120	●				●		●			
XB1	EXTERIOR 4' LED STRIP LIGHT (EMERGENCY)	LITHONIA	CLX L48 3000LM SEF RDL MVOLT GZ1 40K 80CRI E10W	LED	3,000	40K	80	19	120	●			●		●	●			
XC	EXTERIOR 4' LED STRIP LIGHT	LITHONIA	CLX L48 5000LM SEF RDL MVOLT GZ1 40K 80CRI	LED	5,000	40K	80	32	120	●				●		●			
XC1	EXTERIOR 4' LED STRIP LIGHT (EMERGENCY)	LITHONIA	CLX L48 5000LM SEF RDL MVOLT GZ1 40K 80CRI E10W	LED	5,000	40K	80	32	120	●			●		●	●			

1. PROVIDE EXIT LIGHTS WITH SINGLE OR DOUBLE-FACE AS REQUIRED, CHEVRON DIRECTIONAL INDICATORS, MOUNTING BRACKETS AND NICKEL CADMIUM BATTERY BACKUP.
2. BATTERIES SHALL BE UL924 LISTED FOR 90 MINUTES PER NC FIRE CODE SECTION 1006.3 & 1011.5.3. BATTERIES SHALL BE TESTED PER NEC 700.12(A).
3. PRODUCTS LISTED ARE DESIGN BASIS. EQUAL SUBSTITUTIONS SUBMITTALS WILL BE EVALUATED.

1. ELECTRICAL PLANS ARE INTENDED TO PROVIDE INFORMATION FOR INSTALLATION OF A COMPLETE ELECTRICAL SYSTEM. PROVIDE ALL ESSENTIAL LABOR, MATERIALS & DEVICES REQUIRED TO PRODUCE A QUALITY END PRODUCT. THIS INCLUDES ALL REQUIRED CONTROL WIRING OR WIRING CALLED FOR BY THE MANUFACTURER AND OTHER MISCELLANEOUS ITEMS REQUIRED FOR THE OPERATION OF THE SYSTEM, WHETHER SPECIFICALLY CALLED OUT OR NOT. INSTALLATION SHALL FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS.
2. CONTRACTOR SHALL REVIEW & BECOME FAMILIAR WITH THE WORK OF ALL TRADES FOR PURPOSES OF COORDINATION AND ROUTING. CONTRACTOR SHALL PROVIDE REQUIRED PLANNING, COORDINATION AND SEQUENCING OF ELECTRICAL INSTALLATION WITH BUILDING COMPONENTS AND OTHER TRADES.
3. ALL WORK SHALL COMPLY WITH THE 2020 VERSION OF THE NATIONAL ELECTRICAL CODE (NEC). WORKMANSHIP SHALL MEET OR EXCEED INDUSTRY STANDARDS.
4. BEFORE SUBMITTING SHOP DRAWINGS TO ENGINEER FOR REVIEW, ELECTRICAL CONTRACTOR SHALL REVIEW, STAMP, AND COORDINATE SUBMITTAL (SHOP DRAWINGS) WITH OTHER SUBMITTALS AND WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS. BY APPROVAL AND SUBMITTAL OF SHOP DRAWINGS, PRODUCT DATA, SAMPLES AND SIMILAR SUBMITTALS TO THE ENGINEER, THE CONTRACTOR REPRESENTS THAT IT HAS DETERMINED AND VERIFIED AND CHECKED THE INFORMATION WITHIN THE SUBMITTAL WITH THE REQUIREMENTS OF THE WORK AND THE CONTRACT DOCUMENTS. CONTRACTOR IS RESPONSIBLE FOR AND SHALL DETERMINE AND VERIFY ALL FIELD MEASUREMENTS, QUANTITIES, DIMENSIONS, AND INSTALLATION REQUIREMENTS. PROVIDE WRITTEN NOTICE ON SUBMITTAL OF ANY DEVIATIONS. THE CONTRACTOR SHALL NOT BE RELIEVED OF RESPONSIBILITY FOR DEVIATIONS FROM CONTRACT DOCUMENTS REQUIREMENTS BY THE ARCHITECT'S APPROVAL OF SHOP DRAWINGS OR OTHER SUBMITTALS UNLESS THE CONTRACTOR HAS SPECIFICALLY INFORMED THE ENGINEER IN WRITING OF SUCH DEVIATION AT THE TIME OF THE SUBMITTAL AND SUCH DEVIATION HAS BEEN APPROVED IN WRITING. ALL OPTIONS AND ACCESSORIES SHALL BE CLEARLY MARKED ON THE CUTSHEETS.
5. PROTECT ALL NEW MATERIALS FROM THE WEATHER IN STORAGE TRAILERS OR PROVIDE SUITABLE COVERING.
6. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL DISCONNECTS, STARTERS, DEVICES AND ELECTRICAL COMPONENTS UNLESS SPECIFICALLY NOTED AS PROVIDED BY OTHERS. COORDINATE LOCATION AND WIRING OF DEVICES WITH OTHER TRADES OR SUPPLIERS OF EQUIPMENT SUCH AS: ELEVATOR, FIRE PUMP AND FIRE PROTECTION PLANS, KITCHEN HOOD, KITCHEN COOLER, ETC. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR ALL FIELD WIRING OF SPECIALTY ITEMS UNLESS NOTED OTHERWISE.
7. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL LINE AND LOAD SIDE WIRING INCLUDING ALL TERMINATIONS TO EQUIPMENT PROVIDED UNDER OTHER TRADES. POWER WIRING TO CONTROL DEVICES SHALL BE PROVIDED BY E.C.. INTERLOCK WIRING SHALL BE PROVIDED BY THE CONTRACTOR INSTALLING THE CONTROL DEVICE.
8. ALL WIRING, PANELBOARDS, DEVICES AND OTHER LIKE MATERIALS SHALL BE UL LISTED & LABELED. ALL MATERIALS SHALL MEET THE NEC FOR THE INTENDED USE AND INSTALLED IN ACCORDANCE WITH THE NEC.

11. PROVIDE LABELS ON ALL RECEPTACLES IDENTIFYING PANEL AND CIRCUIT NUMBER. LABELS SHALL BE BRADY CLEAR POLYESTER 1"W X 0.375"H OR PANDUIT EQUAL, WITH BLACK LETTERING. MARK ALL JUNCTION BOXES ABOVE CEILING INDICATING PANEL AND CIRCUIT NUMBER USING PERMANENT MARKER. PROVIDE PHENOLIC LABEL ON EXTERIOR BOXES WITH EQUIPMENT DESCRIPTION, AND PANEL AND CIRCUIT NUMBER. BOXES SHALL NOT BE INSTALLED IN AN INACCESSIBLE LOCATION.

12. PROVIDE MINIMUM 3/4" CONDUIT FOR ALL WIRING. ALL RACEWAYS SHALL BE INSTALLED WITHIN WALLS, INCLUDING BLOCK, UNLESS NOTED OTHERWISE. FLEXIBLE METAL CONDUIT WITH A MAXIMUM LENGTH OF 6' MAY BE USED FOR THE CONNECTION OF LIGHT FIXTURES TO JUNCTION BOXES. EMT OR RIGID SHALL BE USED WHERE EXPOSED TO PHYSICAL DAMAGE. CONDUIT ABOVE GRADE SHALL BE STEEL. EMT SHALL NOT BE USED IN DIRECT CONTACT WITH THE EARTH, EXTERIOR LOCATIONS, OR WHERE EXPOSED TO SEVERE PHYSICAL DAMAGE. RIGID CONDUIT SHALL BE INSTALLED BETWEEN FLOOR AND 15 FEET AFT. ABOVE 15' EMT MAY BE INSTALLED. SERVICE RACEWAYS/SHOR-ARM RACEWAYS ON EXTERIOR WALLS SHALL BE COMPRESSION TYPE. FINISHES ON IMC OR RIGID SHALL BE THREADED. MOTOR CONNECTIONS SHALL BE MADE WITH FMC, MIN 18" LONG AND MAX 36". USE PVC PAKETED FLEXIBLE LIGHT TIGHT CONDUIT TYPE UA FOR CONNECTIONS IN WET LOCATIONS. LOCATE JUNCTION AND PULL BOXES SUCH THAT THEY REMAIN ACCESSIBLE AFTER ALL CONSTRUCTION WORK IS COMPLETE.

16. PROVIDE ONE-INCH EMPTY CONDUITS EXTENDING ABOVE CEILING FOR ALL TELEPHONE AND DATA OUTLETS SHOWN ON PLANS. PROVIDE PROTECTIVE BUSHINGS ON ENDS OF CONDUIT. ALL CABLING IS PROVIDED BY OTHERS.

17. PANELBOARDS FOR SERVICE ENTRANCE SHALL BE SERVICE ENTRANCE RATED. PROVIDE NEMA 3R PANELBOARDS WHERE LOCATED OUTSIDE. PROVIDE COPPER NEUTRAL AND GROUNDING BARS IN ALL PANELBOARDS UNLESS NOTED OTHERWISE (ALUMINUM IS NOT ALLOWED). GROUND ALL SERVICE ENTRANCE PANELS AND RACEWAYS (BONDING BUSHINGS) IN ACCORDANCE WITH THE NEC. PROVIDE BOLT-IN BREAKERS UNLESS NOTED OTHERWISE. PROVIDE A MINIMUM OF THREE SPARE 3/4" CONDUITS TO ABOVE CEILING FOR ALL FLUSH MOUNTED PANELBOARDS. PANELS SHALL BE FULLY RATED FOR SHORT CIRCUIT CURRENT, SERIES RATINGS ARE NOT ALLOWED. IF PANEL FEEDER SUPPLY LOCATION IS NOT EVIDENT, PROVIDE LABEL ON PANEL STATING, "POWER SUPPLY FOR PANEL "XX" ORIGINATES AT "XX." PANEL TRIMS SHALL BE HINGED OR DOOR-IN-DOOR TO ALLOW ACCESS TO WIRING WITHOUT REMOVING TRIM. CIRCUIT BREAKERS ADDED TO EXISTING PANELBOARDS SHALL MATCH THE A.I.C. RATING AND BE UL LISTED FOR USE IN THAT PANEL.

18. PROVIDE MACHINE TYPE PANEL SCHEDULES IN EACH PANEL INDICATING THE SPECIFIC LOAD DESCRIPTION FOR EACH BREAKER PER NEC 408.4 (GENERAL DESCRIPTIONS SUCH AS "RECEPTACLE" ARE NOT ALLOWED. INDICATE ROOM NUMBERS FOR EACH LOAD.) LABEL PANELS ON PANEL FACE WITH PHENOLIC LABELS INDICATING PANEL NUMBER OR LETTER DESIGNATION, VOLTAGE, CURRENT RATING AND PHASE. PROVIDE ALL PANELBOARDS, SWITCHBOARDS, CONTROL PANELS, ETC. WITH WARNING SIGN FOR POTENTIAL ELECTRIC ARC FLASH HAZARDS PER NEC 110.16. PROVIDE PHENOLIC LABEL FOR SUB-PANELS DENOTING POWER SOURCE PER NEC 408.4(B) READING "FED FROM PANEL "-"

19. GROUND RODS SHALL BE COPPER CLAD STEEL, DIAMETER OF 3/4" x 10' LENGTH MINIMUM. SPACE RODS SUCH THAT THERE IS A MINIMUM OF 10 FEET SPACING BETWEEN RODS. DRIVE RODS 6 INCHES BELOW GRADE. CONNECTIONS TO RODS SHALL BE BY EXOTHERMIC WELDS OR COMPRESSION CONNECTORS. GROUNDING TO BUILDING STEEL FOR SERVICE CONNECTION AND ANY SEPARATELY DERIVED SYSTEM SHALL BE BY EXOTHERMIC WELD.

20. ALL CIRCUITS REQUIRE A SEPARATE EQUIPMENT GROUNDING CONDUCTOR. CIRCUITS SHALL NOT SHARE NEUTRALS

21. PROVIDE HEAVY DUTY FUSED AND NON-FUSED DISCONNECT SWITCHES AS INDICATED ON PLANS. DISCONNECTS LOCATED OUTSIDE SHALL BE NEMA-3R. PROVIDE REJECTION CLIPS IN FUSED DISCONNECTS. LABEL DISCONNECT WITH PHENOLIC LABEL INDICATING THE IDENTIFICATION AND LOCATION OF CIRCUIT SOURCE SUPPLYING THE DISCONNECT. PROVIDE LABEL STATING THE PURPOSE OF THE DISCONNECT UNLESS IT IS EVIDENT PER NEC 110.22.

22. PROVIDE LIGHTING AS SCHEDULED IN THE FIXTURE SCHEDULE OR OTHERWISE NOTED ON PLANS. LIGHTING INSTALLED IN SUSPENDED CEILINGS SHALL BE SUPPORTED INDEPENDENTLY OF THE CEILING GRID SYSTEM WITH #12 WIRE. SECURE FIXTURES TO CEILING FRAMING MEMBER BY MECHANICAL MEANS PER NEC 410.36. LIGHTING CIRCUITS SHALL NOT SHARE NEUTRALS. LED FIXTURES SHALL CONTAIN COMPONENTS THAT ARE MODULAR IN DESIGN AND EASILY REPLACEABLE/UPGRADABLE. COORDINATE LOCATION OF EXTERIOR FIXTURES WITH ARCHITECTURAL ELEVATION DRAWINGS. THE E.C. SHALL BE RESPONSIBLE FOR ENSURING ALL COMPONENTS (FIXTURES, LED DRIVERS, AND CONTROLS) ARE FULLY COMPATIBLE PRIOR TO ORDERING. PROVIDE ALL REQUIRE MOUNTING HARDWARE, CONNECTORS, AND FIXTURE OPTIONS TO PROVIDE A COMPLETE AND OPERATIONAL INSTALLATION.

23. PROVIDE EMERGENCY AND EXLIGHTS AS SHOWN ON PLANS. PER NFPA 101 SECTION 7.10.1.9, POWER SHALL BE PROVIDED FROM LIGHTING CIRCUITS ON THE UNSWITCHED LEG OF THE CIRCUIT SUCH THAT THE EMERGENCY AND EXIT LIGHTS IS NOT DISCONNECTED WHEN NORMAL LIGHTING IS OFF. EXTERIOR EMERGENCY LIGHTS SHALL BE WIRED SUCH THAT PHOTOCCELL AND/OR TIME CLOCK OPERATION DOES NOT DISCONNECT POWER TO BATTERIES. EMERGENCY UNIT EQUIPMENT AND BATTERIES SHALL BE UL924 LISTED FOR 90 MINUTES. BATTERIES SHALL BE TESTED PER NEC 700.12(A).

24. OCCUPANCY SENSORS IN RESTROOMS, CORRIDORS AND OPEN OFFICE AREAS SHALL BE ULTRASONIC ONLY. SENSOR LOCATIONS ARE APPROXIMATE; REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS. ULTRASONIC SENSORS SHALL NOT BE LOCATED CLOSER THAN 4 FEET FROM AIR SUPPLY/RETURN REGISTERS. VERIFY ALL COVERAGE AREAS OF SENSORS AS THEY VARY BETWEEN MANUFACTURERS. PROVIDE SENSORS WITH 24 HOUR POWER SUPPLY. SENSORS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION RECOMMENDATIONS. ALL REQUIRED POWER PACKS AND OTHER ACCESSORIES SHALL BE PROVIDED FOR A COMPLETE OPERATIONAL SYSTEM. INSTALL CONTROL DEVICES/POWER PACKS IN ACCESSIBLE J-BOX. OCCUPANCY SENSOR DEVICES INDICATED ON THE PLANS SHOW THE INTENT FOR LIGHTING CONTROL AND MINIMUM DEVICE REQUIREMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE OCCUPANCY SENSOR MANUFACTURER TO DETERMINE PROPER TECHNOLOGY AND PLACEMENT OF THE DEVICES. ADDITIONAL DEVICES MAY BE REQUIRED AND SHOWN ON THE PLANS TO PROVIDE COMPLETE COVERAGE OF THE SPACE, WHICH SHALL BE PROVIDED AT NO COST TO THE OWNER.

25. RECEPTACLES SHALL BE FEDERAL SPECIFICATION GRADE, 20 AMP, 120V, AND MOUNTED VERTICALLY UNLESS NOTED OTHERWISE.

26. RECEPTACLES WITHIN 6 FT. OF THE EDGE OF SINKS & LAVATORIES SHALL BE GROUND FAULT CIRCUIT-INTERRUPTING. ALL KITCHEN RECEPTACLES, INDOOR WET LOCATIONS, LOCKER ROOMS WITH SHOWERS, GARAGES, SERVICE BAYS AND THOSE RECEPTACLES FEEDING VENDING MACHINES AND WATER COOLERS SHALL BE PROVIDED WITH GROUND FAULT CIRCUIT-INTERRUPTER PROTECTION.

27. RECEPTACLES INSTALLED OUTSIDE OR IN WET LOCATIONS SHALL BE LISTED AS WEATHER-RESISTANT TYPE AND HAVE GROUND FAULT CIRCUIT-INTERRUPTER PROTECTION. PROVIDE WITH "IN USE", CAST ALUMINUM WEATHERPROOF COVERS IDENTIFIED AS "EXTRA DUTY" PER NEC 406.9(B).

28. WALL SWITCHES SHALL BE SINGLE POLE, 20 AMP, 120/277V.

29. PROVIDE STANDARD SIZE WALL PLATES FOR ALL DEVICES AND BLANK WALL PLATES FOR JUNCTION BOXES. WALL PLATES SHALL BE HIGH IMPACT, SMOOTH NYLON, COLOR TO MATCH DEVICE.

30. THOROUGHLY REVIEW AND COORDINATE ALL CASEWORK AND CABINET DRAWINGS AND ARCHITECTURAL ELEVATIONS FOR DEVICE LOCATIONS PRIOR TO ROUGH-IN OF OUTLETS. COORDINATE WITH OWNER FOR SIGN-OFF OF JUNCTION BOX ROUGH-IN FOR RECEPTACLES AND DATA OUTLETS. SHEETWORK SHALL NOT BE INSTALLED BEFORE OWNER SIGN-OFF IS COMPLETED.

31. OBTAIN CUT SHEETS, INSTALLATION DATA, AND ROUGH-IN REQUIREMENTS FOR OWNER FURNISHED, CONTRACTOR INSTALLED EQUIPMENT. COORDINATE ROUGH-IN AND POWER REQUIREMENTS WITH THE OWNER'S REPRESENTATIVE PRIOR TO STARTING ANY ASSOCIATED WORK.

32. PROVIDE 4" HIGH REINFORCED CONCRETE EQUIPMENT PADS WITH CHAMFERED EDGES FOR ALL FREE STANDING ELECTRICAL EQUIPMENT LOCATED ON FLOORS OR SLABS. PROVIDE ALL NECESSARY ANCHOR BOLTS, CHANNEL IRON SILLS, ETC. PADS SHALL BE REINFORCED WITH 6X6 W1.4/W1.4 WELDED WIRE MESH.

33. FIRE ALARM PANEL BREAKER: PER NFPA 72 – 10.5.5.2.1, THE LOCATION OF THE DEDICATED BRANCH CIRCUIT DISCONNECTING MEANS SHALL BE PERMANENTLY IDENTIFIED ON THE CONTROL UNIT. SYSTEM CIRCUIT DISCONNECTING MEANS SHALL BE PERMANENTLY IDENTIFIED AS TO ITS PURPOSE SUCH AS "FIRE ALARM CIRCUIT" OR "EMERGENCY COMMUNICATIONS" PER 10.5.5.2.2. THE DISCONNECT SHALL HAVE A RED MARKING AND PROVIDED WITH A LISTED BREAKER LOCKING DEVICE PER 10.5.5.2.3. MARKING SHALL NOT OBSCURE MANUFACTURES MARKINGS.

34. PROVIDE SIGNAGE AT THE SERVICE EQUIPMENT THAT INDICATES THE TYPE AND LOCATION OF EACH POWER SOURCE.

35. CONTRACTOR SHALL PROVIDE BUILDING OWNER WITH A COMPLETE OPERATING & MAINTENANCE MANUAL AS REQUIRED BY THE NC ENERGY CODE 408.2.5.2 INCLUDING EQUIPMENT BASIC SUBMITTAL DATA, CONTROL INFORMATION, MANUFACTURER'S OPERATION MANUALS AND MAINTENANCE MANUAL FOR EACH PIECE OF EQUIPMENT, ROUTINE MAINTENANCE ACTIONS AND SERVICE AGENCIES NAME, PHONE NUMBER & ADDRESS.

36. ALL ELECTRICAL COMPONENTS AND FIXTURES SHALL BE CLEANED & POLISHED. PAINTED SURFACES SHALL BE TOUCHED UP TO MATCH FACTORY APPLIED FINISHES.

37. GUARANTEE ALL EQUIPMENT, MATERIALS AND INSTALLATION FREE OF DEFECTS FOR A PERIOD OF 1-YEAR AFTER RECEIVING CERTIFICATE OF OCCUPANCY. PROVIDE THE OWNER WITH AN OPERATING AND MAINTENANCE MANUAL FOR ALL EQUIPMENT.

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PROJECT NO.	PROJECT MGR.	DRAWN BY
226002	D. HAM	BLT

A circular professional engineer seal for the State of North Carolina. The outer ring contains the text "NORTH CAROLINA" at the top and "ENGINEER" at the bottom. Inside the ring, the word "PROFESSIONAL" is written in a smaller arc. In the center, the word "SEAL" is above the number "31466". Below the seal number, the name "JAMES D. HAM" is printed. A handwritten signature "James D. Ham" in blue ink is written across the top of the seal. A handwritten date "4/16/26" in blue ink is written at the bottom right of the seal.

**Jones County
Public Works
Building**

1539 NC HWY 58
TRENTON, NC 28585

[illegible]

Project Number 2523.JCPW	Date 2/27/26
Drawn	Checked

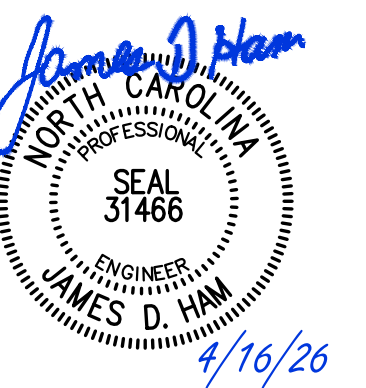
Scale
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Drawing Title

ELECTRICAL NOTES

Sheet Number
7 Of 7

Drawing Number
1001

E-401



Jones County
Public Works
Building

1539 NC HWY 58
TRENTON, NC 28585

Revisions	
No.	Date
2	04/16/2026
ADDENDUM 02	

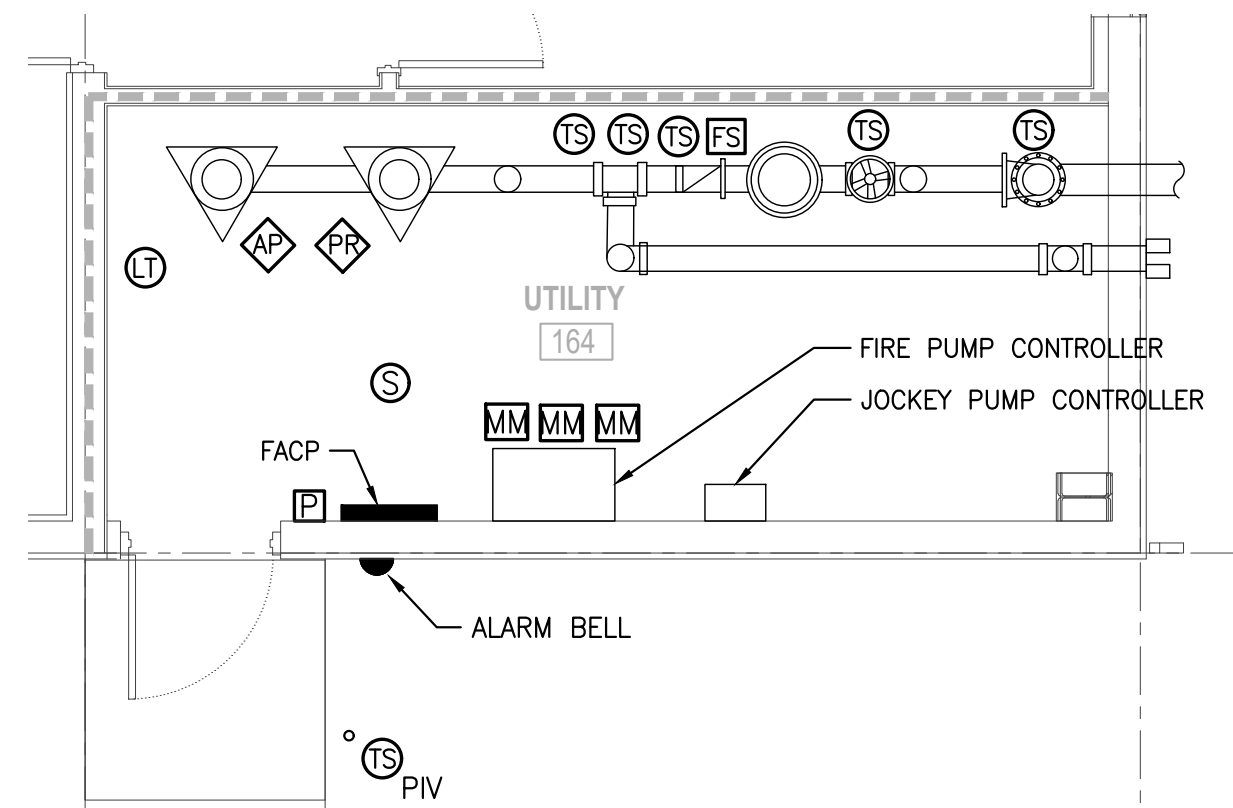
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Drawn Checked

Scale AS NOTED
Drawing Title

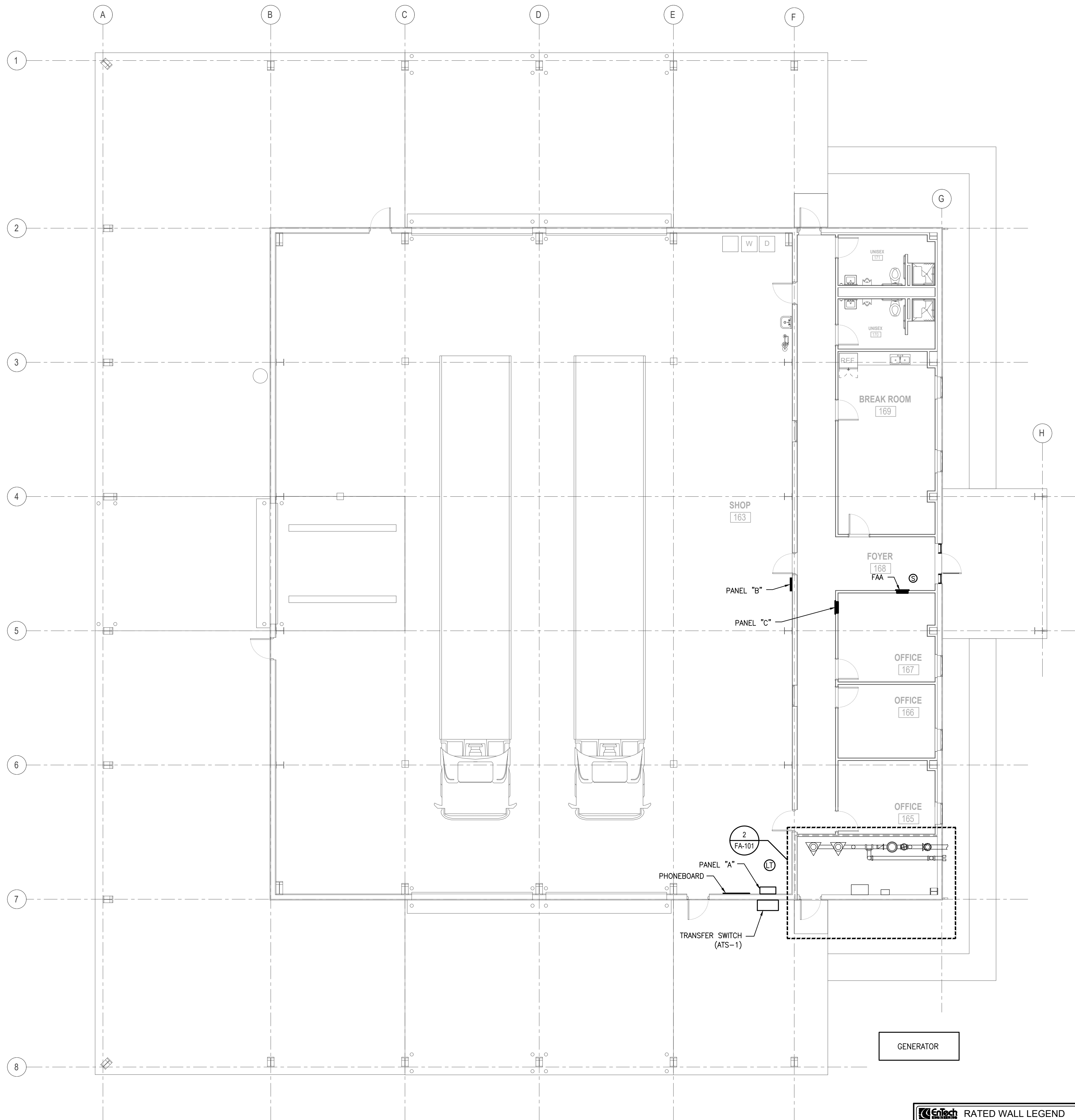
OVERALL FIRE
ALARM PLAN

Sheet Number 1 of 2
Drawing Number

FA-101



2 FIRE ALARM ENLARGED PLAN
SCALE: 1/4" = 1'-0"



1 FIRE ALARM PLAN
SCALE: 1/8" = 1'-0"



EnTech	RATED WALL LEGEND
---	1-HOUR RATED WALL

1. FIRE ALARM PLANS ARE INTENDED TO PROVIDE INFORMATION FOR INSTALLATION OF A COMPLETE SYSTEM, PROVIDE ALL ESSENTIAL LABOR, MATERIALS & DEVICES REQUIRED TO PRODUCE A QUALITY END PRODUCT.
2. FIRE ALARM CONTRACTOR SHALL REVIEW & BECOME FAMILIAR WITH THE WORK OF ALL TRADES FOR PURPOSES OF COORDINATION AND ROUTING. CONTRACTOR SHALL PROVIDE REQUIRED PLANNING, COORDINATION AND SEQUENCING OF FIRE ALARM INSTALLATION WITH BUILDING COMPONENTS AND OTHER TRADES.
3. ALL WORK SHALL COMPLY WITH THE LOCAL FIRE CODE, THE 2017 NATIONAL ELECTRICAL CODE (NEC) AND 2013 NFPA 72. WORKMANSHIP SHALL MEET OR EXCEED INDUSTRY STANDARDS.
4. PROTECT ALL NEW MATERIALS FROM THE WEATHER IN STORAGE TRAILERS OR PROVIDE SUITABLE COVERING.
5. FIRE ALARM CONTRACTOR SHALL PROVIDE BATTERY CALCULATIONS VERIFYING THAT SECONDARY SUPPLY HAS SUFFICIENT CAPACITY TO OPERATE FOR 24 HOURS WHEN SYSTEM IS FUNCTIONING IN A NON-ALARM CONDITION. AT THE END OF THAT PERIOD, THE SECONDARY SUPPLY SHALL BE CAPABLE OF OPERATING IN ALARM MODE FOR 5 MINUTES. FIRE ALARM INSTALLER SHALL CERTIFY CALCULATED CAPACITY TO DRIVE THE SYSTEM PER NFPA 72 ON FORM FOR RECORD OF COMPLETION.
6. ALL WIRING, DEVICES AND OTHER LIKE MATERIALS SHALL BE UL LISTED & LABELED.
7. PER NFPA 72 - 10.6.5.2.1, THE LOCATION OF THE DEDICATED BRANCH CIRCUIT DISCONNECTING MEANS SHALL BE PERMANENTLY IDENTIFIED ON THE CONTROL UNIT. SYSTEM CIRCUIT DISCONNECTING MEANS SHALL BE PERMANENTLY IDENTIFIED AS TO ITS PURPOSE SUCH AS "FIRE ALARM CIRCUIT" OR "EMERGENCY COMMUNICATIONS" PER 10.6.5.2.2. THE DISCONNECT SHALL HAVE A RED MARKING AND PROVIDED WITH A LISTED BREAKER LOCKING DEVICE PER 10.6.5.2.3. PER SCO GUIDELINES, MARK SHALL BE 1/4" PERMANENT RED DOT APPLIED TO THE HANDLE OR EXPOSED BODY AREA. MARKING SHALL NOT OBSCURE MANUFACTURERS MARKINGS.
8. CONDUIT SHALL BE RED EMT WITH COMPRESSION TYPE FITTINGS WHERE EXPOSED OR AS REQUIRED BY LOCAL AUTHORITY HAVING JURISDICTION. ALL JUNCTION BOX COVERS SHALL BE PAINTED RED. ALL RACWAYS TERMINATING AT SHEET METAL BOXES OR CABINETS SHALL UTILIZE INSULATING BUSHINGS. I/CM OR RGS SHALL BE USED IN ANY OUTDOOR LOCATION.
9. FIRE ALARM CONTRACTOR SHALL PROVIDE A PROJECT SPECIFIC RISER DIAGRAM WITH DEVICE ADDRESSES AT ANNUNCIATOR AND MAIN FACP LOCATIONS. PROVIDE FRAMED OPERATING INSTRUCTIONS AT MAIN FACP. INSTALL FRAMED INSTRUCTIONS IN A LOCATION VISIBLE FROM FIRE-ALARM CONTROL UNIT. PROVIDE FLOOR PLANS WITH DEVICE NUMBERS WITH A SEPARATE SHEET PROVIDED FOR EACH FLOOR. PLANS SHALL BE REDUCED IN SIZE FROM ENGINEERING PLANS IN ORDER TO FIT ON 11 X 14 SHEETS PER FLOOR. ALL DEVICE ADDRESSES SHALL BE CLEARLY LABELED ON PLANS. INDICATE LOCATIONS OF ALL CABINETS, MODULES AND END OF LINE DEVICES. SHEETS SHALL BE LAMINATED. PROVIDE LEGEND FOR SYMBOLS. PLANS SHALL INCLUDE THE FOLLOWING: NAME OF BUILDING OR BUSINESS, ADDRESS OF BUILDING OR BUSINESS, NORTH ARROW, FIRE ALARM SYMBOL LEGEND, AND DATE WHEN PLANS WERE INSTALLED.
10. ALL AUDIBLE AND VISUAL NOTIFICATION APPLIANCES SHALL BE OFF-WHITE IN COLOR.
11. VISUAL NOTIFICATION APPLIANCES MUST BE SYNCHRONIZED WHERE MORE THAN TWO APPLIANCES CAN BE VIEWED AT THE SAME TIME.
12. INITIATING DEVICES SHALL HAVE A LABEL INDICATING THE UNIQUE DEVICE ADDRESS. THE LABEL SHALL BE READABLE FROM THE FLOOR LEVEL. ADDRESS MUST MATCH THE AS-BUILT PLANS.
13. NOTIFICATION CIRCUIT BOOSTER POWER SUPPLIES OR 24VDC POWER CIRCUITS SERVING ADDRESSABLE CONTROL RELAYS SHALL BE INDIVIDUALLY MONITORED FOR INTEGRITY.
14. AUDIBLE NOTIFICATION APPLIANCE SOUND LEVELS SHALL BE FIELD-TESTED. SOUND LEVEL SHALL BE 15 dBA MINIMUM ABOVE AMBIENT SOUND LEVEL IN ROOM OR SPACE; OR 5 dBA ABOVE ANY MAXIMUM SOUND LEVEL HAVING A 60 SECOND MINIMUM DURATION - WHICHEVER IS LOUDER. SOUND PATTERN SHALL BE OF THREE BEAT TEMPORAL PATTERN.
15. AREA HEAT AND SMOKE DETECTORS SHALL BE LOCATED NO CLOSER THAN 3'-FT. FROM SUPPLY AIR DIFFUSERS. ADJUST LOCATIONS IN FIELD AS REQUIRED AND MAINTAIN MAXIMUM SPACING LIMITATIONS PER NFPA 72.
16. UL LISTED DUCT SMOKE DETECTORS & REMOTE ALARM INDICATOR LIGHT (RAIL) SWITCHES SHALL BE FURNISHED & WIRED BY THE FIRE ALARM CONTRACTOR AND DUCT SMOKE DETECTORS INSTALLED BY THE M.C. RAIL SWITCHES SHALL BE REQUIRED WHERE DETECTORS ARE NOT READILY ACCESSIBLE. FIRE ALARM AHU SHUT DOWN CIRCUITS SHALL BE WIRED FROM THE FACP TO A TERMINATION POINT, ADJACENT TO THE FACP BY THE FIRE ALARM CONTRACTOR. AHU CONTROL WIRE FROM THE TERMINATION POINT TO THE FACP SHALL BE BY THE M.C. THE FIRE ALARM CONTRACTOR SHALL TEST ALL SMOKE DETECTORS.
17. ACCEPTANCE TEST OF THE FIRE ALARM SYSTEM SHALL BE WITNESSED PRIOR TO OCCUPANCY OF BUILDING. PROVIDE A SMOKE MACHINE FOR TESTING DUCT SMOKE DETECTORS AND AREA SMOKE DETECTORS. THE USE OF SMOKE BOMBS AND MAGNETS IS NOT ACCEPTABLE. PROVIDE LADDERS, TWO-WAY RADIOS AND SUFFICIENT PERSONNEL TO CONDUCT ALL TEST WITH MINIMAL AMOUNT OF TIME.
18. GUARANTEE ALL EQUIPMENT, MATERIALS AND INSTALLATION FREE OF DEFECTS FOR A PERIOD OF 1-YEAR AFTER RECEIVING CERTIFICATE OF OCCUPANCY.
19. THE TECHNICIANS WHO MAKE CONNECTIONS TO (OR PERFORM ANY PROGRAMMING FOR) THE FIRE ALARM SYSTEM ARE REQUIRED TO BE TRAINED AND INDIVIDUALLY CERTIFIED BY THE MANUFACTURER, FOR THE FACU MODEL & SERIES BEING INSTALLED. THIS TRAINING AND CERTIFICATION MUST HAVE OCCURRED WITHIN THE MOST RECENT 24 MONTHS.
20. AT THE CONCLUSION OF THIS PROJECT, THE FIRE ALARM SYSTEM WILL BE TESTED AND RE-CERTIFIED IN ACCORDANCE WITH THE 2013 EDITION OF NFPA 72 SECTION 14.4.2, INCLUDING THE REQUIREMENT FOR TESTS OF RANDOMLY SELECTED EXISTING DEVICES LOCATED OUTSIDE THE AREA OF CONSTRUCTION.

This diagram illustrates the installation requirements for fire alarm devices in a room. Key components and their placement are as follows:

- Smoke/Heat Detector:** Located on the ceiling, with a minimum clearance of 0'-4" from the wall and 3'-0" from the door frame.
- Air Supply Diffuser or Return Air Grille:** Also on the ceiling, with a minimum clearance of 0'-6" from the wall and 0'-4" from the door frame.
- Horn/Strobe:** Mounted on the wall, with a minimum clearance of 0'-6" from the wall and 0'-4" from the door frame.
- Strobe:** Mounted on the wall, with a minimum clearance of 0'-6" from the wall and 0'-4" from the door frame.
- Graphic Annunciator:** Mounted on the wall, with a minimum clearance of 0'-4" from the wall and 3'-0" from the door frame.
- Control Panel:** Mounted on the wall, with a minimum clearance of 0'-4" from the wall and 3'-0" from the door frame.
- Manual Pull Station:** Mounted on the wall, with a minimum clearance of 0'-4" from the wall and 3'-0" from the door frame.
- Door:** Labeled "HINGED SIDE" and "EXIT".
- Floor:** Labeled "FINISHED FLOOR".

Clearance dimensions are specified as follows:

- 0'-4" MINIMUM (from wall to smoke/heat detector)
- 3'-0" MINIMUM (from door frame to smoke/heat detector)
- 0'-6" MINIMUM (from wall to horn/strobe)
- 0'-4" MINIMUM (from door frame to horn/strobe)
- 1'-0" MAXIMUM (from ceiling to smoke/heat detector)
- 96" MAXIMUM TOP OF DEVICE (from floor to top of control panel)
- 86" RECOMMENDED BOTTOM OF DEVICE (from floor to bottom of control panel)
- 80" MINIMUM BOTTOM OF DEVICE (from floor to bottom of manual pull station)
- 5'-0" MAXIMUM (from door frame to manual pull station)
- 4'-0" (from floor to bottom of manual pull station)
- 5'-6" (from floor to bottom of control panel)

1. SECURELY MOUNT SURGE SUPPRESSOR IN ACCESSIBLE JUNCTION BOX OR OTHER PROPER METAL ENCLOSURE ADJACENT TO THE PANELBOARD AND PROVIDE ENGRAVED LABEL INDICATING ITS LOCATION.
2. SURGE SUPPRESSOR SHALL BE FEED THROUGH (NOT SHUNT-TYPE) SUCH AS DI-TECH DTK-TSS4D, LEVITON 51020-WM-DN, NORTHERN TECHNOLOGIES TCS-HW, TRANSACTOR ACP100BWN3, OR EQUIVALENT UL 1449 - 4TH EDITION LISTED DEVICE.

"FIRE SPRINKLER MONITORING PANEL"

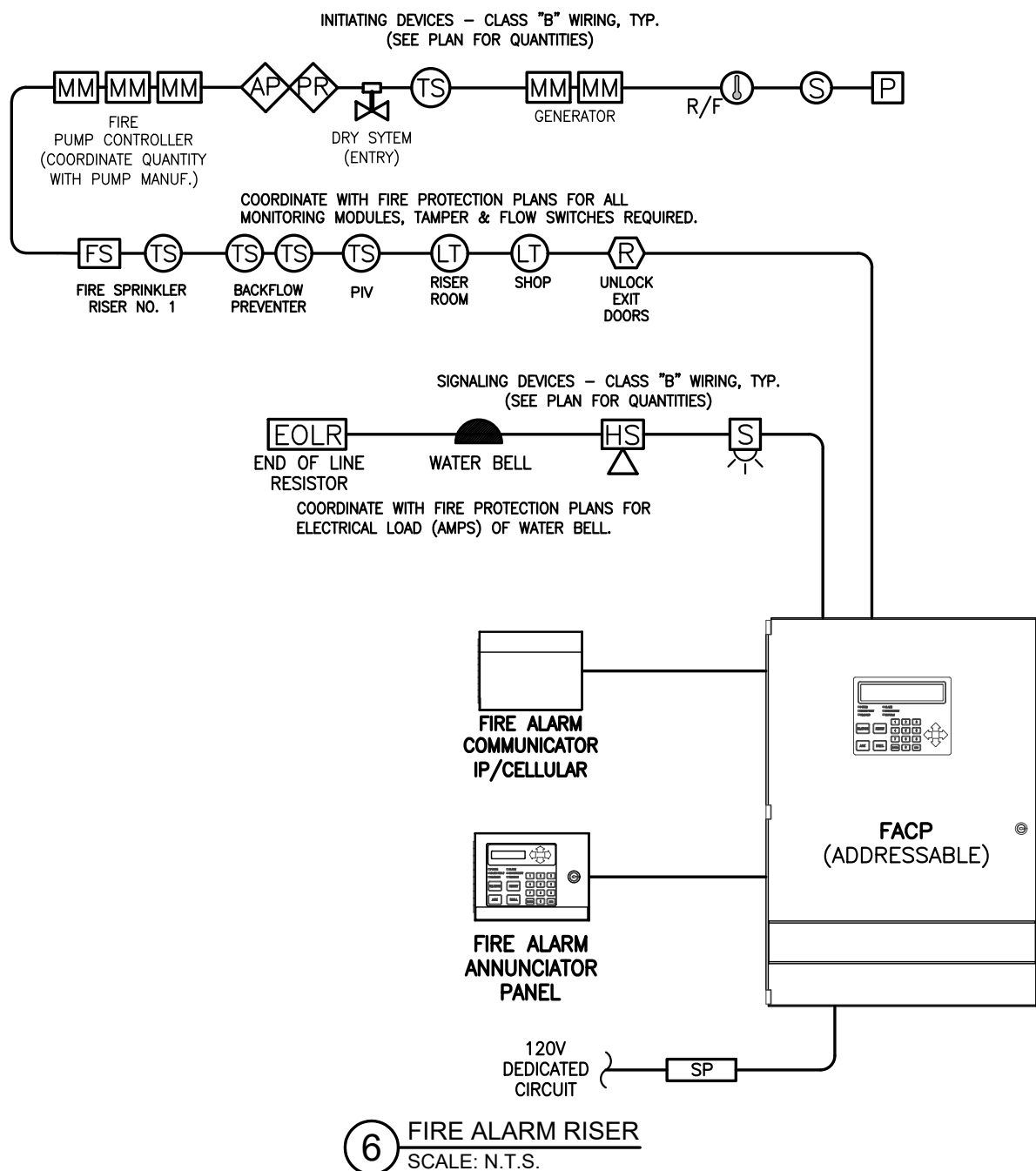
FED BY PANEL "X"
CIRCUIT NO. "XX"

1. PHENOLIC LABEL, 4" WIDE x 3" IN HEIGHT,
SUPPLIED BY THE ELECTRICAL CONTRACTOR,
RED IN COLOR WITH WHITE LETTERING (1/2" HIGH).

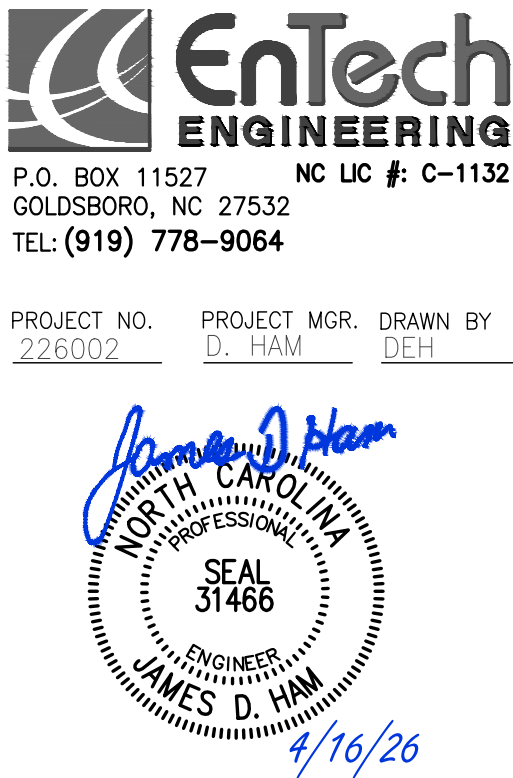
2. INSERT PANEL DESIGNATION AT "X" LOCATION.
AND BLACK LETTERING (1/4" HIGH).
3. INSERT CIRCUIT DESIGNATION AT "XX" LOCATION.
AND BLACK LETTERING (1/4" HIGH).

5 FIRE SPRINKLER MONITORING PANEL LABEL DETAIL
SCALE: N.T.S.

FIRE ALARM SYSTEM INPUT/OUTPUT MATRIX		SYSTEM OUTPUTS																						
		FACP					ANNUNCIATION					NOTIFICATION					REQUIRED FIRE SAFETY CONTROL							
		ACTIVATE COMMON ALARM SIGNAL INDICATOR ACTIVATE AUDIBLE ALARM SIGNAL ACTIVATE AUDIBLE SUPERVISORY SIGNAL ACTIVATE COMMON TROUBLE SIGNAL INDICATOR ACTIVATE AUDIBLE TROUBLE SIGNAL ACTIVATE ONE OR DEVICE ADDRESS DISPLAY GENERAL EVACUATION SIGNAL TRANSMIT FIRE ALARM SIGNAL TO CENTRAL STATION TRANSMIT SUPERVISORY SIGNAL TO CENTRAL STATION UNLOCK EXITS AND CONTROLS DOORS SHUT DOWN RESPECTIVE AIR HANDLING EQUIPMENT TURN ON BUILDING LIGHTS (RELAY CONTROL PANEL)																						
SYSTEM INPUTS		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	
1	FIRE ALARM SYSTEM AC POWER FAILURE			•	•						•	•												1
2	FIRE ALARM SYSTEM LOW BATTERY						•						•											2
3	BATTERIES DISCONNECTED			•	•							•		•										3
4	OPEN CIRCUIT																							4
5	GROUND FAULT						•	•						•										5
6	NOTIFICATION APPLIANCE CIRCUIT SHORT						•	•						•										6
7	BUILDING MANUAL PULL STATIONS		•	•					•	•	•	•			•	•	•							7
8	AREA SMOKE DETECTORS		•	•												•	•							8
9	TAMPER SWITCH – ZONE CONTROL ASSEMBLY				•	•					•		•											9
10	TAMPER SWITCH – BACK FLOW PREVENTER				•	•					•		•											10
11	TAMPER SWITCH – POST INDICATOR VALVE (EXT.)				•	•					•		•											11
12	TAMPER SWITCH – DRY PIPE VALVE CABINET				•	•					•		•											12
13	SPRINKLER WATER FLOW IN BUILDING		•	•					•	•		•			•		•							13
14	SPRINKLER HIGH/LOW AIR PRESSURE				•	•							•											14
15	SPRINKLER DRY PIPE PRESSURE FLOW SWITCH		•	•					•	•		•			•		•							15
16	FIRE PUMP POWER FAILURE/PHASE REVERSAL				•	•							•											16
17	FIRE PUMP RUNNING		•	•											•									17
18	FIRE PUMP SYSTEM NOT IN AUTOMATIC				•	•							•											18
19	FIRE PUMP CONNECTED TO ALTERNATE SOURCE				•	•							•											19
20	LEGALLY REQUIRED GENERATOR SYSTEM LOW FUEL				•	•							•											20
21	LEGALLY REQUIRED GENERATOR NOT IN AUTOMATIC				•	•							•											21
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	



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Jones County Public Works Building

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TRENTON, NC 28585**

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Project Number	Date
2523.JCPW	2/27/20
Drawn	Checked

Scale
AS NOTED
Drawing Title

FIRE ALARM DETAILS

Sheet Number
2 Of 2

Drawing Number

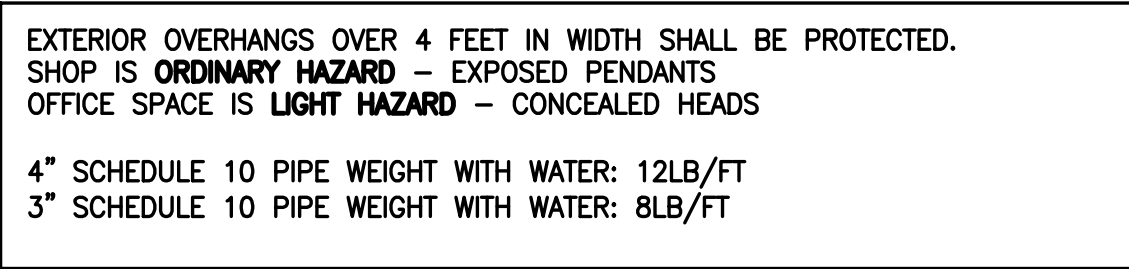
FA-201

NOTES:

1. COORDINATE SPRINKLER INSTALLATION WITH ALARM INSTALLATION SHOWN ON ELECTRICAL SHEETS.
2. SEE SPECIFICATIONS FOR PIPE, SPRINKLER AND SPECIALTY REQUIREMENTS.
3. K-VALUE AND QUANTITY MAY VARY WITH FINAL DESIGN AND LAYOUT AND IS LISTED HERE FOR REFERENCE ONLY.

NOTE: NOT ALL SYMBOLS INDICATED MAY
APPEAR ON THESE CONTRACT DRAWINGS

ABV	ABOVE	FIN	FINISHED	RAC	RUN ABOVE CEILING
ABV	ABOVE FINISHED FLOOR	FP	FIRE PROTECTION	RACBJ	RUN ABOVE CEILING
ALT	ALTERNATE	FT	FEET		BETWEEN JOISTS
APPROX	APPROXIMATE	GA	GAGE	PAF	RUN ABOVE FLOOR
ARRANG	ARRANGEMENT	GALL	GALLON	RATC	RUN AT CEILING
BLDG	BUILDING	GALV	GALVANIZED	RBC	RUN BELOW CEILING
BLW	BELOW	GC	GENERAL CONTRACTOR	RBF	RUN BELOW FLOOR
	BUTTERFLY VALVE (DOUBLE	GD	GALLONS PER DAY	RGB	RUN BELOW GRADE
	LINE PIPING ONLY)	GPH	GALLONS PER HOUR	RBJ	RUN BETWEEN JOISTS
C	COMMON	GP	GALLONS PER MINUTE	REQ	REQUIRED
CB	CABINET	GR	GRADE	ROH	RUN OVERHEAD
CAP	CAPACITY	HP	HORSEPOWER	SCH	SCHEDULE
CI	CAST IRON	HZ	HERTZ	SCHEM	SCHEMATIC
CL	CENTER LINE	KW	KILOWATT	SP	STATIC PRESSURE
CLG	CEILING	L	LENGTH	SPEC	SPECIFICATION
COL	COLUMN	LAT	LEAVING AIR TEMPERATURE	SS	STAINLESS STEEL
COMP	COMPRESSOR	LB	POUND	STL	SUPPORT STEEL
CONN	CONNECTION	MC	MECHANICAL CONTRACTOR	STD	STANDARD
CONTR	CONTRACTOR	MIN	MINIMUM	STL	STEEL
DEPT	DEPARTMENT	MISC	MISCELLANEOUS	SUCT	SUCTION
DETAL	DETAIL	MTD	MOUNTED	SUR	SURFACE
DIA	DIAMETER	NIC	NOT IN CONTRACT	SYS	SYSTEM
DIAG	DIAGRAM	NO	NUMBER	TDH	TOTAL DYNAMIC HEAD
DIFF	DIFFERENTIAL	NOM	NOMINAL	TEMP	TEMPERATURE
DIV	DIVISION	NTS	NOT TO SCALE	TP	TOTAL PRESSURE
DWG	DRAWING	OC	ON CENTER	TPY	TYPICAL
EA	EACH	OC	OCCUPIED	UNOC	UNOCCUPIED
EC	ELECTRICAL CONTRACTOR	OGH	OUTSIDE GROUND HYDRANT		
ETC	AND SO FORTH	PART	PARTIAL	W	WIDTH
F	° DEGREES FAHRENHEIT	PRESS	PRESSURE	W/	WITH
FA	FROM ABOVE	PSI	POUNDS PER INCH	W/O	WITHOUT
FB	FROM BELOW	PSIG	POUNDS PER INCH GAUGE	WC	WATER COLUMN
FEC	FIRE EXTINGUISHER			WG	WATER GAUGE
FEC	FIRE EXTINGUISHER CABINET			WIS	WIRE IN SERIES
FLTR	FILTER ORIFICE				
FHRL	FIRE HOSE REEL W/HOSE VALVE				



DESIGN AREA #1:
DESIGN AREA LOCATION: SHOP
HAZARD/OCCUPANCY: ORDINARY HAZARD (GROUP 2)
DENSITY (GPM/FT²): 0.20
COVERAGE PER SPRINKLER: 100SF
DESIGN AREA: 1500FT² * 1.3 FOR SLOPED CEILINGS = 1950FT²
ACTUAL DESIGN AREA: 1950FT²
NUMBER OF SPRINKLERS IN DESIGN AREA: 20
HOSE ALLOWANCE: 250GPM
ESTIMATED SYSTEM FLOW: 674GPM

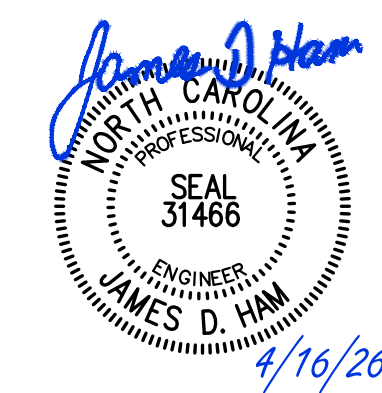
DESIGN AREA #2:
DESIGN AREA LOCATION: OFFICE
HAZARD/OCCUPANCY: LIGHT HAZARD
DENSITY (gpm/ft²): 0.10
REQUIRED DESIGN AREA: 1500FT²
DESIGN AREA: 1500FT²
NUMBER OF SPRINKLERS IN DESIGN AREA: 20
HOSE ALLOWANCE: 100GPM
ESTIMATED SYSTEM FLOW: 370GPM

DESIGN AREA #3:
DESIGN AREA LOCATION: EXTERIOR CANOPY
HAZARD/OCCUPANCY: ORDINARY HAZARD (GROUP 2)
DENSITY (gpm/ft²): 0.20
REQUIRED DESIGN AREA: 1500FT² * 1.3 FOR SLOPED CEILINGS
AND 30% INCREASE FOR DRY PIPE SYSTEM.
DESIGN AREA: 2535FT²
NUMBER OF SPRINKLERS IN DESIGN AREA: 20
HOSE ALLOWANCE: 250GPM
ESTIMATED SYSTEM FLOW: 667GPM

THESE PLANS ARE SCHEMATIC IN NATURE AND SHOW GENERAL LAYOUTS, ESTIMATED PIPE SIZES, AND CALCULATIONS FOR GENERAL COORDINATION AND INFORMATION ONLY. FINAL LAYOUT AND CALCULATIONS PERFORMED BY FIRE PROTECTION CONTRACTOR/ENGINEER.

 RATED WALL LEGEND	
	1-HOUR RATED WALL

PROJECT NO.	PROJECT MGR.	DRAWN BY
26002	D. HAM	NGB



Jones County Public Works Building

1539 NC HWY 58
TRENTON, NC 28585

[illegible]

Project Number	Date
2523.JCPW	2/27/26
Drawn	Checked

Scale
AS NOTED
Drawing Title

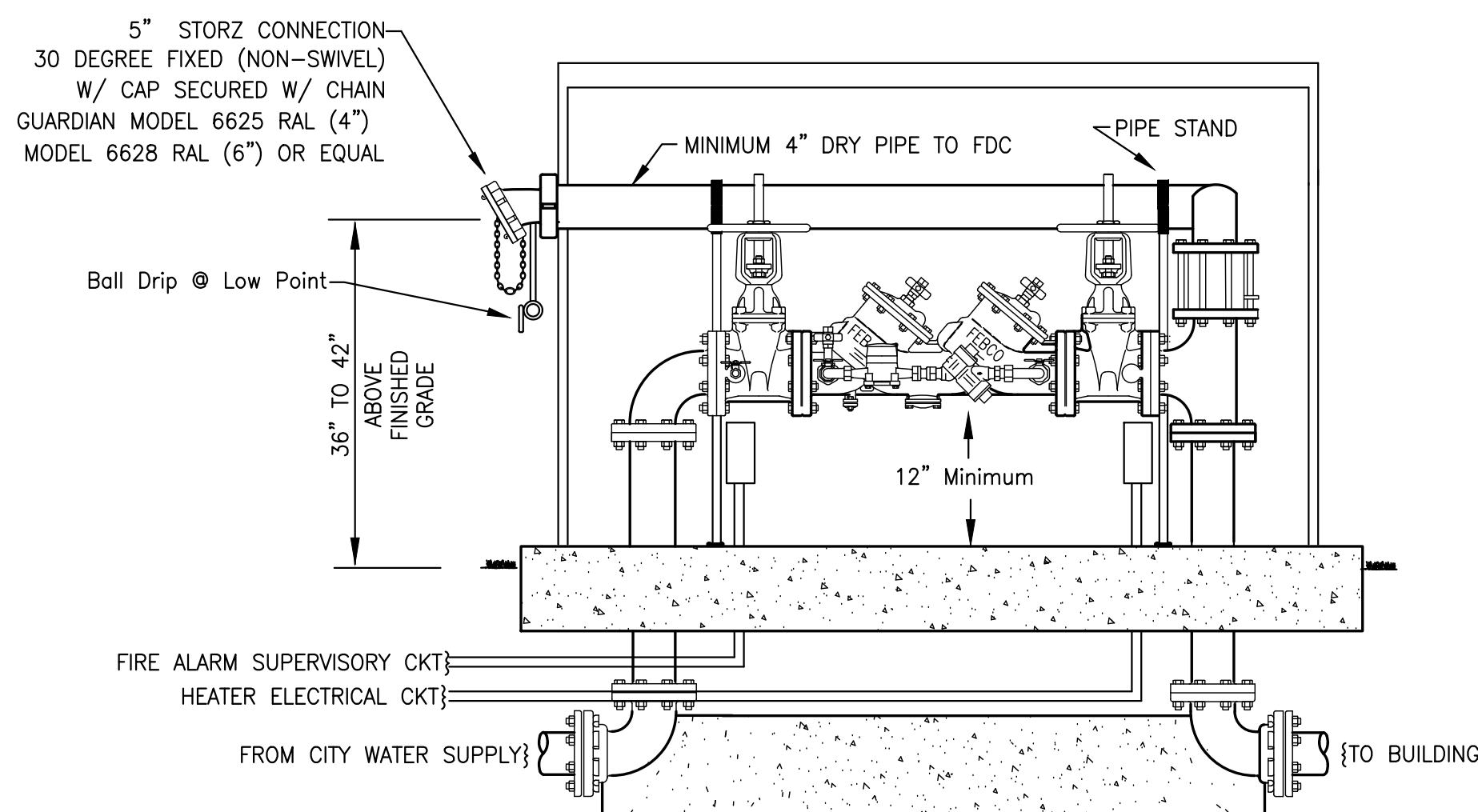
FIRE PROTECTION PLAN

Sheet Number

1 Of 3
+ Drawing Number

FP-101

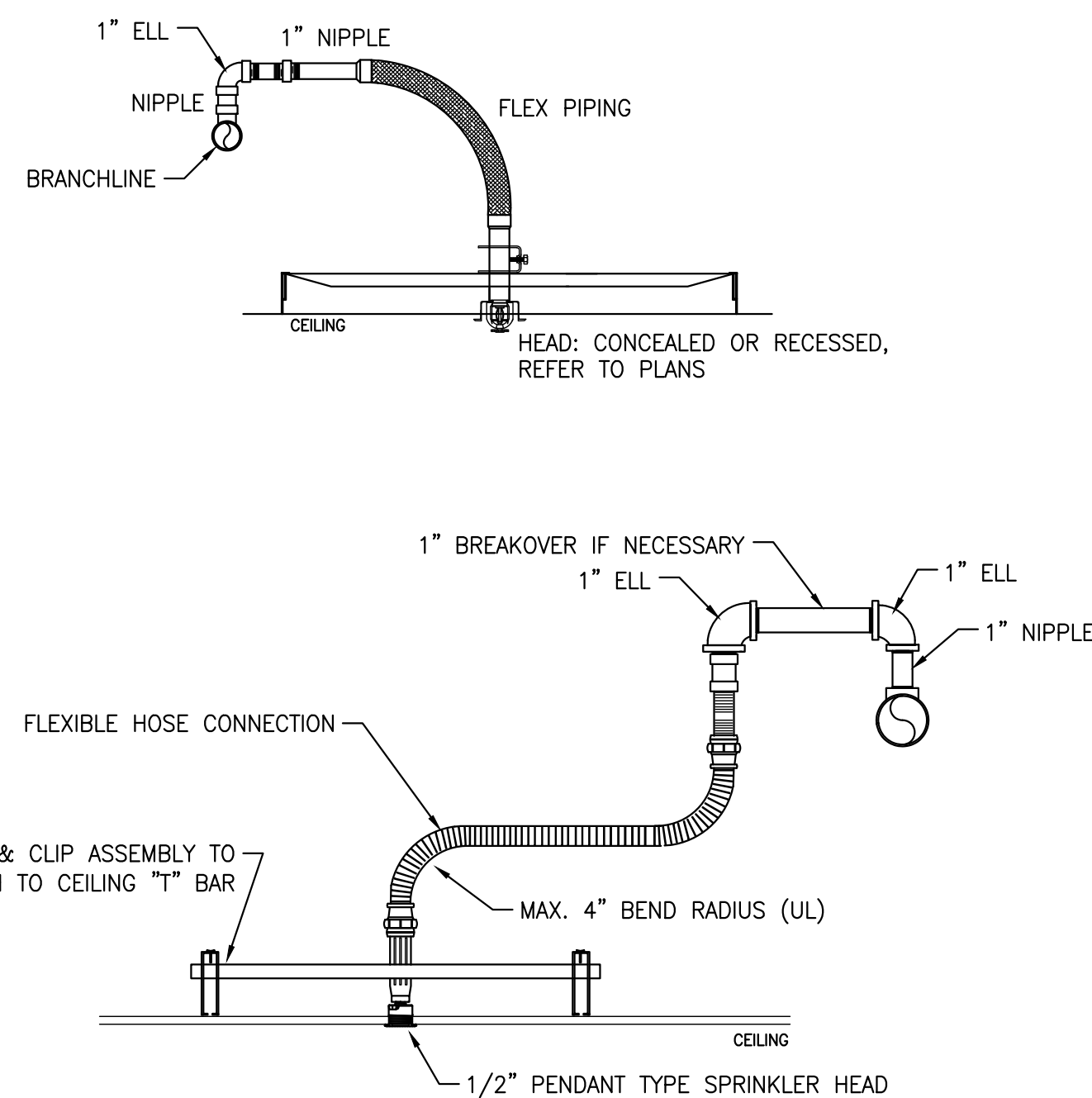




4" MAX.

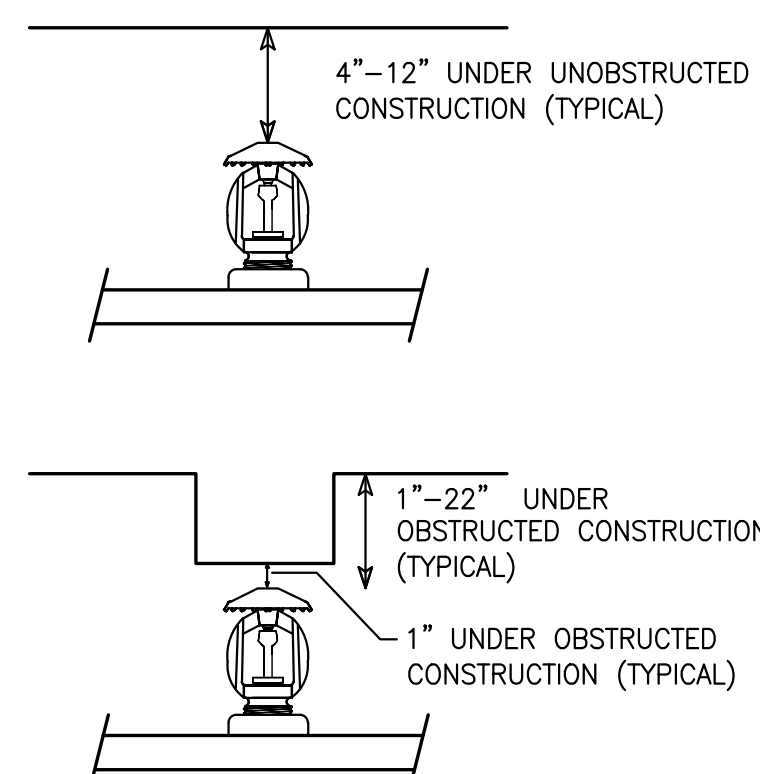
QUARTER TURN BALL VALVE

2 BACKFLOW PREVENTOR AND FDC CONNECTION
SCALE: NTS



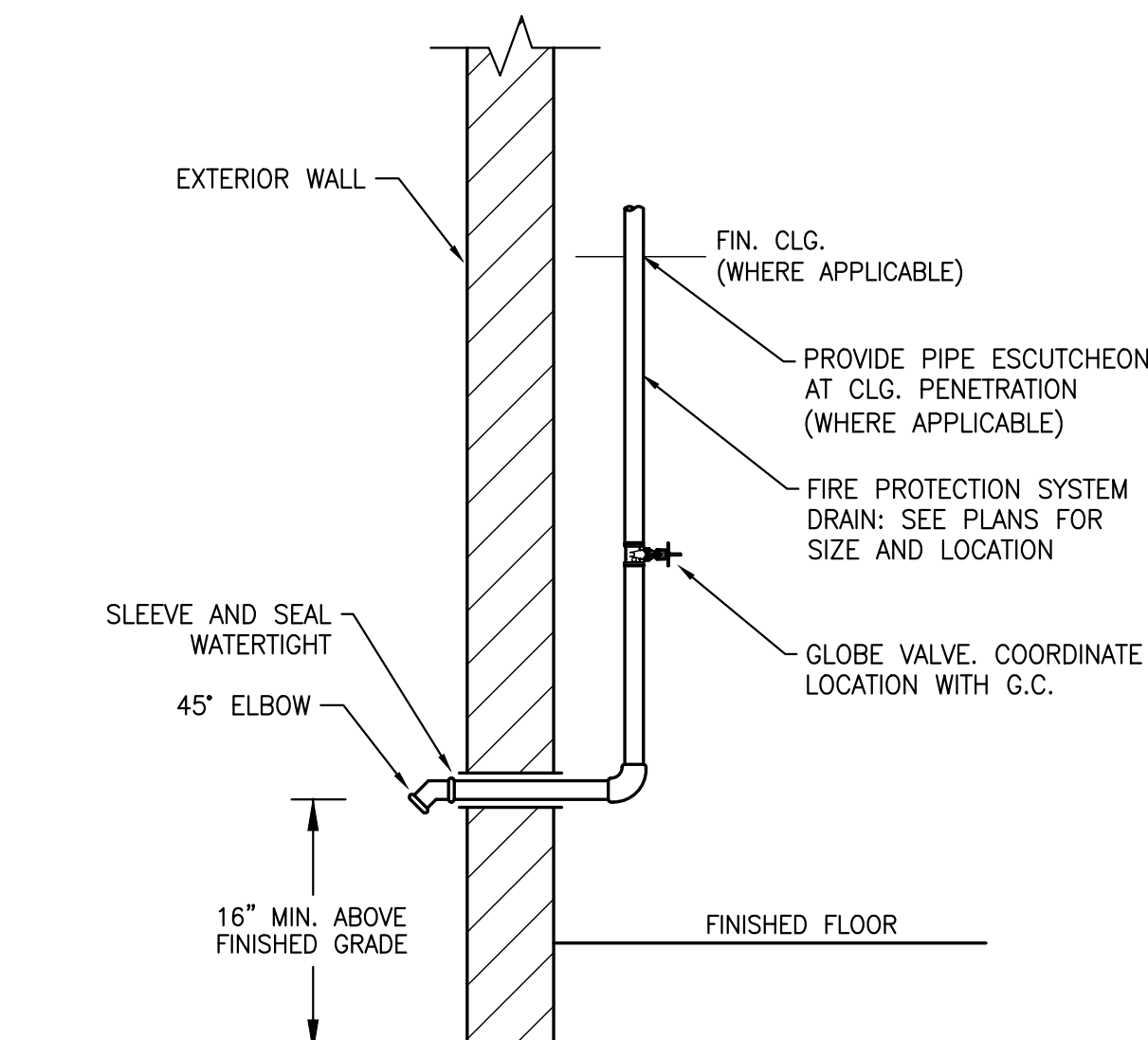
5 UG PIPE FLOOR PENETRATION
SCALE: N.T.S.

⑥ FLEXIBLE PIPING
SCALE: N.T.S.

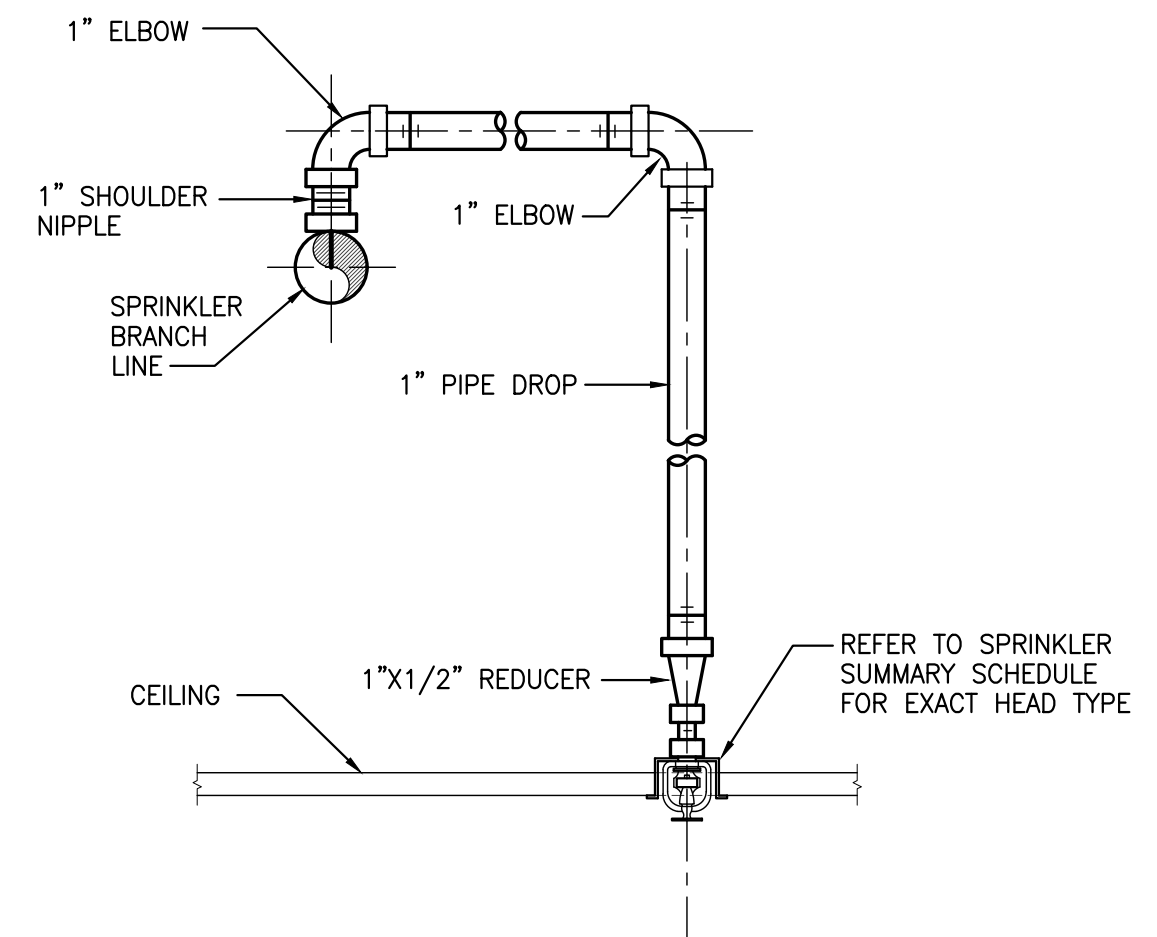


9 TYPICAL SPRINKLER HEAD UPRIGHT DETAIL
SCALE: N.T.S.

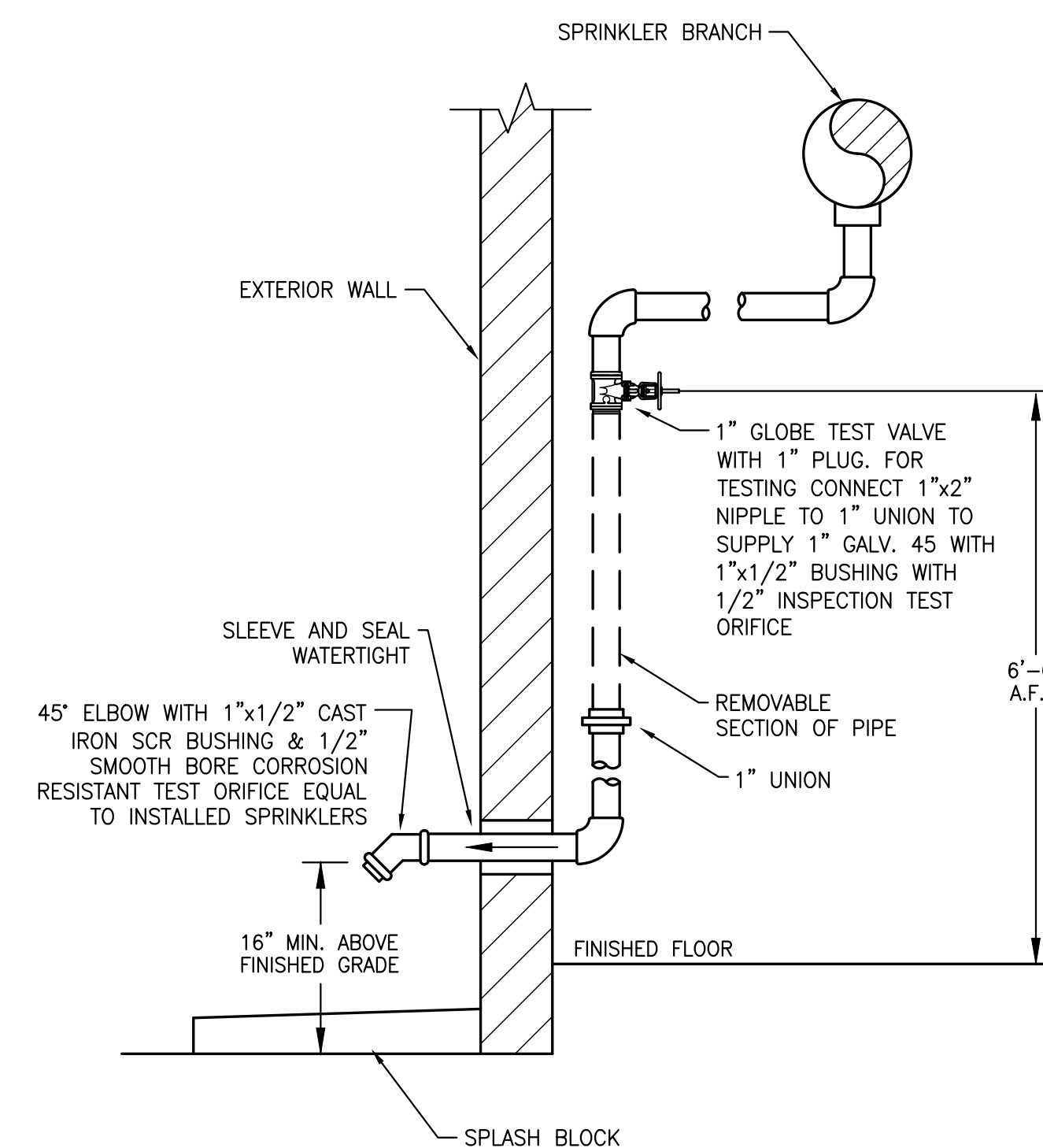
10 SPRINKLER CLEARANCES OBSTRUCTIONS
SCALE: N.T.S.



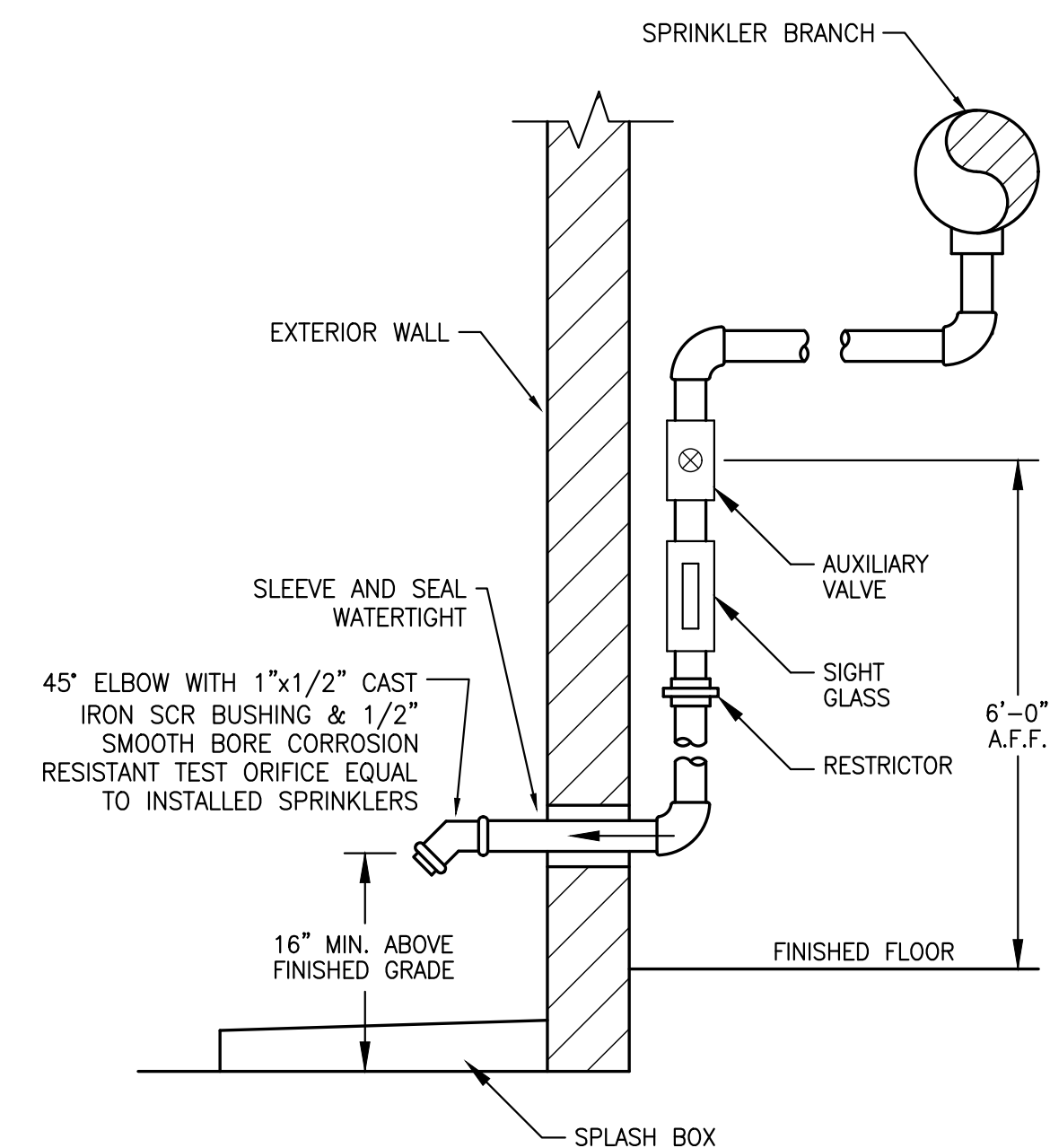
③ TYPICAL DRAIN DETAIL
SCALE: N.T.S.



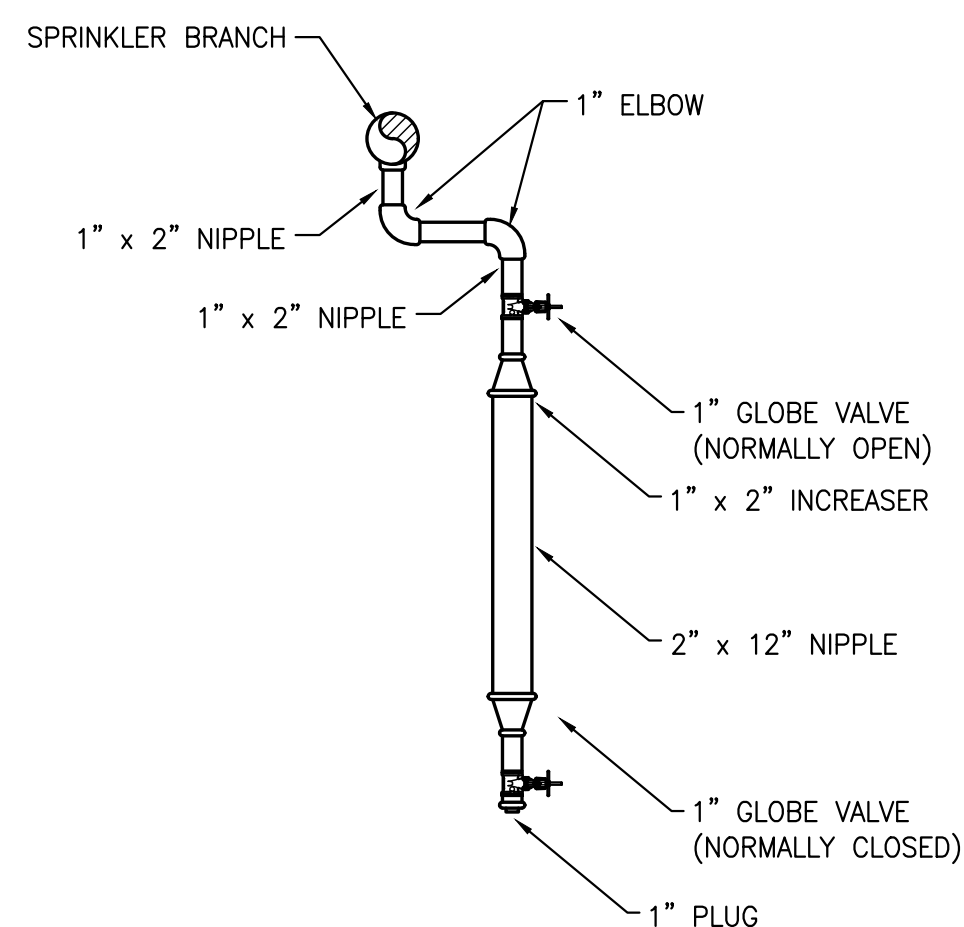
4 TYPICAL SPRINKLER DROP DETAIL
SCALE: N.T.S.



7 DRY SYSTEM INSPECTORS TEST STATION DETAIL
SCALE: N.T.S.



8 WET SYSTEM INSPECTORS TEST STATION DETAIL
SCALE: N.T.S.



11 DRIP DRUM DETAIL
SCALE: N.T.S.

[illegible]

Drawing Number

FP-201

FIRE PUMP NOTES:

1. FIRE PUMP SYSTEM: PROVIDE MAIN ELECTRICAL WORK IN STRICT COMPLIANCE WITH ARTICLE 695 OF NFPA 70. THE PACKAGED FIRE PUMP SYSTEM, FURNISHED AND INSTALLED BY OTHERS, INCLUDES FIRE PUMP CONTROLLER, SERVICE DISCONNECT OVERCURRENT PROTECTIVE DEVICE, AUTOMATIC TRANSFER SWITCH, FIRE PUMP, JOCKEY PUMP AND PRESSURE MAINTENANCE PUMP. COORDINATE WITH INSTALLING VENDOR/CONTRACTOR REGARDING ALL ELECTRICAL REQUIREMENTS PRIOR TO INSTALLATION. PROVIDE ALL FIELD—WIRING, CONDUIT, TERMINATIONS, CONNECTIONS, AND OTHER WORK AS REQUIRED FOR A COMPLETE WORKING SYSTEM, AND IN STRICT COMPLIANCE WITH NFPA 70 INCLUDING ARTICLE 695 AND WITH REQUIREMENTS OF ALL PREVAILING CODES AND ORDINANCES, AND ALL AUTHORITIES HAVING JURISDICTION. PROVIDE ALL REQUIRED FIRE ALARM SYSTEM DEVICES, WIRING AND PROGRAMMING (INCLUDING CONTROL AND MONITOR MODULES) AS NECESSARY TO ACCOMMODATE SUPERVISORY MONITORING, INCLUDING, BUT NOT LIMITED TO: LOSS OF AC POWER (EMERGENCY SOURCE ISOLATION SWITCH OPEN, NORMAL POWER NOT AVAILABLE, EMERGENCY POWER NOT AVAILABLE), TRANSFER SWITCH POSITION AND STATUS (MULTIPLE POINTS), PHASE REVERSAL CONDITION, POWER/PHASE FAILURE, PUMP OVERLOAD, PUMP FAILURE TO START, INDICATION OF PUMP RUNNING, AND OTHER APPLICABLE TROUBLE CONDITIONS. PROVIDE REMOTE ANNUNCIATOR WITH STATUS INDICATORS FOR THIS MONITORING IN THE FIRE COMMAND CENTER, LABELED "FIRE PUMP STATUS". SUBMIT ALL FIRE PUMP RELATED MEANS AND METHODS TO AUTHORITIES HAVING JURISDICTION FOR REVIEW AND COMMENT BEFORE FURNISHING ANY RELATED SUBMITTALS OR COMMENCING WITH ANY RELATED WORK. INCORPORATE ALL SUCH COMMENTS INTO DESIGN, FABRICATION AND INSTALLATION OF ALL FIRE PUMP RELATED WORK (EQUIPMENT, MATERIALS, SEQUENCING, ETC.) PRIOR TO COMMENCING WITH ANY OF THE WORK.
2. SERVICE ENTRANCE CONDUCTORS: INSTALL FIRE PUMP SERVICE SERVICE ENTRANCE CONDUCTOR CONDUITS BELOW EXTERIOR GRADE FROM THE FIRE PUMP MAIN CIRCUIT BREAKER SERVICE DISCONNECT DIRECTLY TO THE SECONDARY OF UTILITY TRANSFORMER UT4, COMPLIANT WITH ARTICLES 230.6(1) AND 695.6(A)(1) OF NFPA 70. SEE OTHER FIRE PUMP NOTES FOR FURTHER INFORMATION.
3. EMERGENCY SYSTEMS STATUS ALARM: PROVIDE MANUAL TRANSFER SWITCHES (ULSE RATED AS SERVICE DISCONNECT), WITH AUXILIARY CONTACTS THAT OPERATE WHEN THE SWITCH LEAVES ITS NORMAL POSITION. PROVIDE FLUSH WALL MOUNTED RED WARNING LIGHT ADJACENT TO REMOTE GENERATOR ANNUNCIATOR WITH NAMEPLATE ATTACHED TO OR ABOVE THE DEVICE WALL PLATE THAT READS: "PERMANENT EMERGENCY POWER SOURCE IS DISCONNECTED FROM THE EMERGENCY SYSTEM". PROVIDE ALL POWER, WIRING, ACCESSORIES, DEVICES AND CONNECTIONS AS REQUIRED FOR A FULLY OPERATIONAL REMOTE ANNUNCIATION DEVICE. INTEGRATING THIS FUNCTIONALITY INTO THE REMOTE GENERATOR ANNUNCIATOR IS ACCEPTABLE SUBJECT TO COMPLIANCE WITH ARTICLE 700.3(F) OF NFPA 70 AND WITH AUTHORITIES HAVING JURISDICTION.
4. GENERATOR OUTPUT BREAKER: PROVIDE DEDICATED TEST ENCLOSURE FOR THE GENERATOR OUTPUT BREAKER THAT FEEDS THE FIRE PUMP AUTOMATIC TRANSFER SWITCH. DETERMINE EXACT BREAKER FRAME AND TRIP RATINGS REQUIRED FOR FIRE PUMP FROM FIRE PUMP INSTALLER PRIOR TO COMMENCING WITH ANY RELATED WORK.
5. MONITORING & CONTROL: PROVIDE WIRING IN CONDUIT (1-1/2" MINIMUM) FROM GENERATOR SETS TO FIRE PUMP TRANSFER SWITCH, AS REQUIRED FOR COMPLETELY OPERATIONAL MONITORING AND CONTROL OF GENERATOR SET AND TRANSFER SWITCH. DETERMINE SPECIFIC REQUIREMENTS FROM GENERATOR SET AND FIRE PUMP MANUFACTURER. CONTROL CONDUCTORS INSTALLED BETWEEN THE TRANSFER EQUIPMENT AND THE GENERATOR SHALL BE KEPT ENTIRELY INDEPENDENT OF ALL OTHER WIRING AND SHALL MEET THE CONDITIONS OF ARTICLES 695.14 AND 700.10(D)(1) OF NFPA 70. THE INTEGRITY OF THE COLLECTIVE GENERATOR SYSTEM, INCLUDING GENERATOR CONTROL WIRING, SHALL BE CONTINUOUSLY MONITORED. ANY MALFUNCTION OF THE COLLECTIVE GENERATOR SYSTEM, INCLUDING LOSS OF INTEGRITY OF THE REMOTE START CIRCUITS, SHALL INITIATE VISUAL AND AUDIBLE ANNUNCIATION OF GENERATOR MALFUNCTION AT THE GENERATOR LOCAL AND REMOTE ANNUNCIATORS. LOSS OF INTEGRITY OF A REMOTE START CIRCUIT SHALL START THE GENERATOR. SEE OTHER FIRE PUMP NOTES FOR FURTHER INFORMATION.
6. SURGE PROTECTION DEVICE: THE FIRE PUMP CONTROLLER WILL INCLUDE AN INTEGRAL FACTORY—INSTALLED LATEST SURGE PROTECTION DEVICE, COMPLIANT WITH ARTICLE 695.15 OF NFPA 70.

GENERAL NOTES:

- THE SCOPE OF WORK SHALL INCLUDE BUT NOT LIMITED TO THE FOLLOWING: THE DESIGN AND INSTALLATION OF A WET TYPE SPRINKLER SYSTEM. SCOPE OF WORK FOR THE SPRINKLER CONTRACTOR BEGINS 12" ABOVE FINISHED FLOOR. INFORMATION PROVIDED ON THESE PLANS ARE A GENERAL GUIDE TO THE LAYOUT AND ARRANGEMENT DESIRED IN THE FINAL DESIGN. SIZES AND LAYOUTS ARE FOR ESTIMATING PURPOSES ONLY AND SHALL BE VALIDATED AND ADJUSTED AS NEEDED IN THE FINAL DESIGN. COMPONENTS SHOWN ARE A MINIMUM. ANY ADDITIONAL DEVICES, ETC. REQUIRED SHALL BE INCLUDED.
- IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO VERIFY ALL BUILDING CONDITIONS AND NECESSARY INFORMATION AT THE JOB SITE TO PERFORM AND EXECUTE THE REQUIRED WORK. COORDINATE EXACT PIPE LOCATIONS AND ROUTING WITH OBSTRUCTIONS AND PROVIDE ADDITIONAL PIPING, OFFSETS, FITTINGS, TO FACILITATE PROPER INSTALLATION.
- WORK SHALL COMPLY WITH ALL REQUIREMENTS OF NC DOI AUTOMATIC SPRINKLER SYSTEMS.
- WORK SHALL COMPLY WITH ALL APPLICABLE NFPA STANDARDS. ALL MATERIALS SHALL BE UL/FM APPROVED FOR FIRE SERVICE.
- PRIOR TO STARTING SHOP DRAWINGS, OBTAIN A FLOW TEST WITHIN 12 MONTHS ON WATER SUPPLY INDICATING STATIC PRESSURE AND INSTANTANEOUS GALLONS PER MINUTE (GPM) WITH RESULTANT RESIDUAL PRESSURE PER 2013 NFPA 13 23.2.1.1. SPRINKLER DESIGN DATA IS BASED ON RESULTS OF RECENT NEARBY TESTS. HOWEVER UPGRADES TO THE MUNICIPAL WATER SYSTEM ARE EXPECTED AND MAY BE IN PLACE PRIOR TO THE COMPLETION OF THIS PROJECT THAT MAY AFFECT FIRE PUMP SIZING. A SAFETY FACTOR SHALL BE TAKEN TO ACCOUNT FOR FLUCTUATIONS IN WATER SUPPLY AS FOLLOWS: THE DESIGN CALCULATIONS SHALL BE BASED ON AN AVAILABLE WATER SUPPLY OF 10 PSI LESS STATIC PRESSURE, 10 PSI LESS RESIDUAL PRESSURE AND 10% LESS RESIDUAL FLOW THAN MEASURED.
- CONTRACTOR SHALL COORDINATE THE SPRINKLER SYSTEM DESIGN WITH ALL OTHER TRADES (I.E. ARCHITECTURAL, STRUCTURAL, HVAC, PLUMBING AND ELECTRICAL ETC.) AND ASSIST IN DEVELOPMENT OF DESIGN COORDINATION DRAWINGS. INCLUDE MODIFICATIONS REQUIRED TO RESOLVE CONFLICTS WITH OTHER SYSTEMS.
- CONTRACTOR (MINIMUM NICET III CERTIFICATION) SHALL SUBMIT TO THE ENGINEER ALL SIGNED HYDRAULIC CALCULATIONS, SPRINKLER PLANS, CUTSHEETS FOR ALL EQUIPMENT AND PIPING, AND ANY ADDITIONAL INFORMATION REQUIRED FOR APPROVAL. PLANS SHALL IDENTIFY THE WORST CASE AREA AND LABEL THE PIPE NODES FROM THE CALCULATIONS. PROVIDE A LEGEND ON THE PLANS. A LICENSED PROFESSIONAL ENGINEER MAY ALSO PROVIDE SHOP DRAWINGS. THE CONSTRUCTION DOCUMENTS ARE A PERFORMANCE DESIGN. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE SPECIFYING ENGINEER (PE).
- METHODS OF HANGING PIPES, HEADERS AND BRANCHES SHALL BE IN ACCORDANCE WITH 2013 NFPA 13 SECTION 9.1 & 9.2 FOR SEISMIC DESIGN CATEGORY A & B. FOR SEISMIC CATEGORY C, THE SPRINKLER DRAWINGS SHALL STATE THAT "SEISMIC REQUIREMENTS APPLY TO THIS PROJECT. HANGING, BRACING, AND RESTRAINT OF FIRE SPRINKLER PIPING SHALL BE IN ACCORDANCE WITH SECTION 9.3 OF NFPA 13. SHOP DRAWINGS MUST INCLUDE DETAILS AND SIGNIFY APPROXIMATE LOCATIONS OF ALL SEISMIC BRACING. CALCULATIONS AND LAYOUT OF RESTRAINTS SHALL BE SUBMITTED.
- ALL VALVES FOR FIRE SERVICE SHALL BE LISTED BY THE UNDERWRITERS LABORATORIES, INC. AND THE FACTORY MUTUAL LABORATORIES. VALVES SHALL BE FACTORY MARKED "UL" AND "FM" WITH 175 P.S.I. WORKING PRESSURE.
- A HYDRAULIC DATA PLATE SHALL BE PLACED ON THE SYSTEM RISER STATING THE REQUIRED DESIGN CRITERIA FOR EACH HYDRAULICALLY DESIGNED SYSTEM.
- ALL SPRINKLER HEADS MOUNTED IN THE CEILING SHALL BE A MINIMUM OF 4" AWAY FROM WALLS, CEILING HEIGHT CHANGES, OR ANY VERTICAL INTERSECTING SURFACE.
- MAINTAIN A MINIMUM OF 18" FROM THE BOTTOM OF THE SPRINKLER DEFLECTOR TO THE TOP OF STORAGE/FILE STORAGE.
- PROVIDE SPRINKLER HEADS OVER AND UNDER ALL EXPOSED DUCTWORK AND EQUIPMENT 48" AND GREATER IN WIDTH (SEE MECHANICAL PLANS).
- ALL PENETRATIONS THRU RATED WALL/FLOOR SHALL BE SEALED TO EQUAL THE RATING OF THE WALL OR FLOOR BEING PENETRATED.
- FLEXIBLE HOSE CONNECTORS SHALL MEET FM 1637 OR BE UL 2443 LISTED. FLEXIBLE CONNECTIONS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURER WRITTEN INSTALLATION INSTRUCTIONS. ONLY 304 STAINLESS STEEL, CORRUGATED HOSE WITH FULLY BRANDED COVER SHALL BE USED. HOSE ASSEMBLY SHALL BE LIMITED TO 5 FEET MAXIMUM. HEAD SHALL BE PERMANENTLY ATTACHED TO THE CEILING USING TAMPER RESISTANT SCREWS. HYDRAULIC CALCULATIONS SHALL BE BASED ON ACTUAL PRESSURE LOSS PUBLISHED BY THE MANUFACTURER. HOSE SHALL HAVE TRUE 1" INTERNAL BORE CORRUGATED HOSE DIAMETER. PLANS SHALL CLEARLY INDICATE MAXIMUM BENDS ALLOWED TO MATCH HYDRAULIC CALCULATIONS.
- CONTRACTOR SHALL PROVIDE FOR SPRINKLER PIPING 2 1/2" AND LARGER, PIPE MARKERS EVERY TEN FEET (10'-0") INDICATING DIRECTION OF FLOW. COMPLY WITH IDENTIFICATION SPECIFICATIONS 15075 FOR TYPES AND SIZES.
- CONTRACTOR SHALL TEST SYSTEM WITH PRESSURIZED AIR PRIOR TO FINAL TESTING. FINAL TESTING SHALL BE IN ACCORDANCE WITH NFPA 13 AND STATE CONSTRUCTION OFFICE REQUIREMENTS. NEWLY INSTALLED SPRINKLER SYSTEMS MUST BE HYDROSTATICALLY TESTED TO CHECK FOR LEAKS AT A PRESSURE OF AT LEAST 200 PSI (14 BAR) FOR A PERIOD OF AT LEAST 2 HOURS. WHEN EXISTING SYSTEMS ARE MODIFIED SUCH THAT THE WORK AFFECTS LESS THAN 20 SPRINKLERS, THE SYSTEM ONLY REQUIRES TESTING AT THE SYSTEM WORKING PRESSURE. WHERE THE MODIFICATION AFFECTS MORE THAN 20 SPRINKLERS, THAT PORTION OF THE SYSTEM MUST BE ISOLATED AND TESTED AT 200 PSI (14 BAR) FOR 2 HOURS. IF THE NEW WORK CANNOT BE ISOLATED, THE TESTING CAN BE DONE AT SYSTEM WORKING PRESSURE EVEN IF THE MODIFICATIONS INVOLVED MORE THAN 20 SPRINKLERS.
- NECESSARY SPARE SPRINKLERS TO BE SUPPLIED AND INSTALLED IN SPARE SPRINKLER HEAD CABINET AS PER NFPA STANDARDS.
- SMALL ROOM RULE - NFPA 13 (2013) 8.6.2.1.2 - THE REQUIREMENTS OF 8.6.2.1.1 SHALL NOT APPLY WITH SMALL ROOMS AS DEFINED IN 3.3.21. (SMALL ROOMS: A COMPARTMENT OF LIGHT HAZARD OCCUPANCY CLASSIFICATION HAVING UNOBSTRUCTED CONSTRUCTION AND A FLOOR AREA NOT EXCEEDING 800 SQ FT.) THE PROTECTION AREA OF COVERAGE FOR EACH SPRINKLER IN THE SMALL ROOM SHALL BE THE AREA OF THE ROOM DIVIDED BY THE NUMBER OF SPRINKLERS IN THE ROOM. 8.6.3.2.4 - THE REQUIREMENTS OF 8.6.3.2.1 SHALL NOT APPLY WITHIN SMALL ROOMS AS DEFINED IN 3.3.21.
- REFER TO SPECIFICATION SECTIONS 211313 FOR ADDITIONAL FIRE PROTECTION SYSTEM REQUIREMENTS.
- HEADS TO BE PLACED IN CENTER OF CEILING TILE UNLESS OTHERWISE NOTED.
- SPRINKLER HEADS IN ROOMS CONTAINING A SHOWER SHALL HAVE A CORROSION RESISTANT COATING. SPRINKLER HEADS IN JANITOR'S CLOSETS SHOULD BE PROVIDED WITH APPROVED HEAD GUARD.
- FLOOR CONTROL VALVES SHALL BE IN ACCESSIBLE AND VISIBLE LOCATION. ACCESSIBLE LOCATIONS CAN BE ABOVE CEILINGS AS LONG AS A LADDER CAN SAFELY BE INSTALLED BELOW WITH LABELED CEILING PANEL OR ACCESS PANEL.
- MANUAL OR AUTOMATIC AIR VENTS AT HIGH POINTS ARE RECOMMENDED.

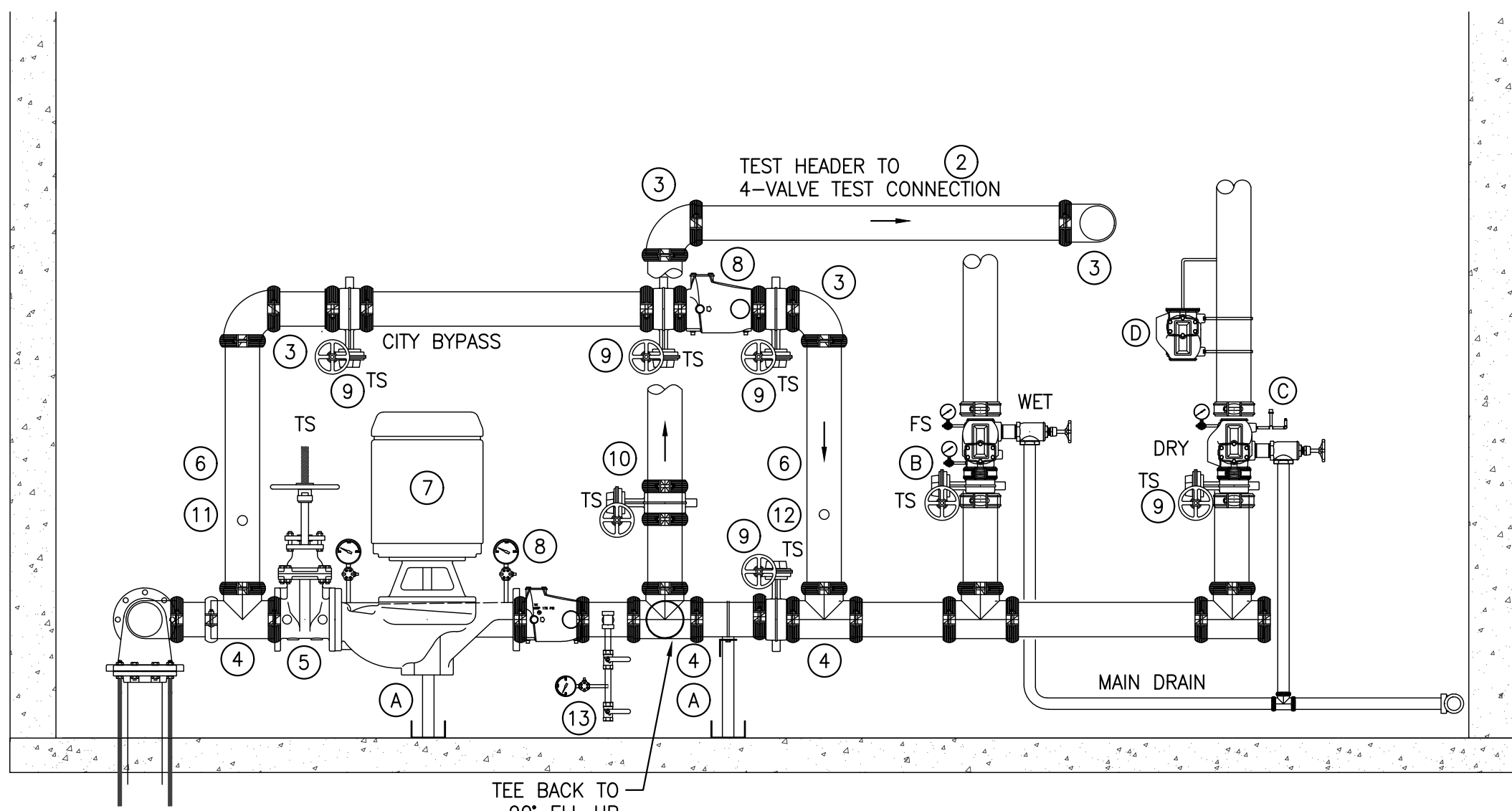
TABLE 17.4.2.1(a) MAXIMUM DISTANCE BETWEEN HANGERS (FT. IN.)

NOMINAL PIPE SIZE (IN.)	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	3-1/2"	4"	5"	6"	8"
STEEL PIPE EXCEPT THREADED LIGHTWALL	N/A	12-0	12-0	15-0	15-0	15-0	15-0	15-0	15-0	15-0	15-0	15-0
THREADED LIGHTWALL STEEL PIPE	N/A	12-0	12-0	12-0	12-0	12-0	12-0	N/A	N/A	N/A	N/A	N/A
COPPER TUBE	8-0	8-0	10-0	10-0	12-0	12-0	12-0	15-0	15-0	15-0	15-0	15-0
CPVC	5-6	6-0	6-6	7-0	8-0	9-0	10-0	N/A	N/A	N/A	N/A	N/A
POLYBUTYLENE (IPS)	N/A	3-9	4-7	5-0	5-11	N/A	N/A	N/A	N/A	N/A	N/A	N/A
POLYETHYLENE (CTS)	2-11	3-4	3-11	4-5	5-5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DUCTILE IRON PIPE	N/A	N/A	N/A	N/A	N/A	N/A	15-0	N/A	15-0	N/A	15-0	15-0

100 PSI STATIC PRESSURE ON SSYTEM REQUIRES UP-LIFT RESTRAINT WITHIN 12 INCHES
HORIZONTALLY OF HEAD FOR ARM-OVERS AND END OF BRANCH LINE

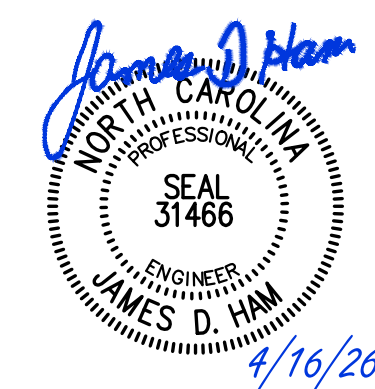
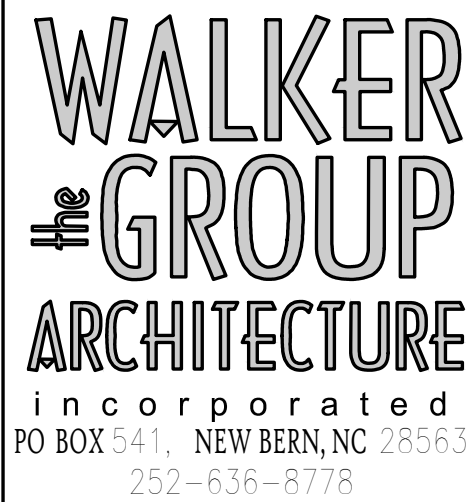
THE UNSUPPORTED LENGTH BETWEEN THE END SPRINKLER AND THE LAST HANGER ON THE LINE SHALL NOT EXCEED 36" FOR 1" PIPE, 48" FOR 1 1/4" PIPE, AND 60" FOR 1 1/2" PIPE OR LARGER.

THE CUMULATIVE HORIZONTAL LENGTH OF AN UNSUPPORTED ARMOVER TO A SPRINKLER, SPRINKLER DRIP, OR SPRIG-UP SHALL NOT EXCEED 24"



② FIRE PUMP ELEVATION SCHEMATIC
SCALE: NOT TO SCALE

NOTE: FIRE PUMP PLAN AND ELEVATION ARE PROVIDED TO SHOW ONE POSSIBLE ARRANGEMENT AND COORDINATE OVERALL SPACE REQUIREMENTS. FIRE SUPPRESSION DESIGNER SHALL PROVIDE FINAL LAYOUT IN COORDINATION WITH OTHER EQUIPMENT IN THE ROOM.



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Project Number	Date
2523.JCPW	2/27/26
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Scale
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FIRE PROTECTION PLAN

Sheet Number
3 Of 3

Drawing Number

FP-202