

ADDENDUM NO. 2

PENDER COUNTY LAW ENFORCEMENT CENTER

PENDER COUNTY
BURGAW, NORTH CAROLINA

Architect's Project Number: 611888

Prepared by

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PENDER COUNTY LAW ENFORCEMENT CENTER
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1
2 **GENERAL:**
3 Planholders are requested to insert this Addendum in the front of their Project Manual. Inform all
4 concerned that the Bidding Documents are modified by this Addendum.
5 The following modifications and clarifications are hereby made a part of the Bidding Documents and
6 supersede or otherwise modify the provisions of the published *Project Manual* and *Drawings*, dated
7 May 01, 2024.
8 Refer to the Drawings, Specification Sections, or other Documents, if any, attached to this Addendum,
9 which are hereby made a part of this Addendum.

10

11 **MODIFICATIONS TO THE PROJECT MANUAL:**

12 SECTION 000110 – TABLE OF CONTENTS

13 REPLACE this entire section

14

15 SECTION 105626 – MOBILE STORAGE SHELVING

16 REPLACE this entire section

17

18 SECTION 122400 – WINDOW SHADES

19 REPLACE this entire section

20

21 SECTION 260533 – RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

22 REPLACE this entire section

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24 SECTION 270528 – PATHWAYS FOR COMM SYSTEMS

25 REPLACE this entire section

26

27 SECTION 271500 – COMMUNICATIONS HORIZONTAL CABLING

28 REPLACE this entire section

29

30 SECTION 280533 – RACEWAYS AND BOXES FOR DIV 28 SYSTEMS

31 ADD this entire section

32

33

34 **MODIFICATIONS TO THE DRAWINGS:**

35 SHEET A2.1.1

36 REPLACE with attached

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37 SHEET A2.1.7
38 REPLACE with attached
39
40 SHEET A3.3.1
41 REPLACE with attached
42
43 SHEET M5.3
44 REPLACE with attached
45
46 SHEET E0.1
47 REPLACE with attached
48
49 SHEET E1.0
50 REPLACE with attached
51
52 SHEET E2.1.2
53 REPLACE with attached
54
55 SHEET E2.1.3
56 REPLACE with attached
57
58 SHEET E2.2.2
59 REPLACE with attached
60
61 SHEET E2.2.3
62 REPLACE with attached
63
64 SHEET E2.6.2
65 REPLACE with attached
66
67 SHEET E2.7.2
68 REPLACE with attached
69
70 SHEET E2.7.3
71 REPLACE with attached
72

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73 SHEET E3.1
74 REPLACE with attached
75
76 SHEET E4.1
77 REPLACE with attached
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79 SHEET E5.1
80 REPLACE with attached

81
82

83 **ATTACHMENTS:**

84 SPECIFICATIONS:

85 000110
86 105626
87 122400
88 260533
89 270528
90 271500
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93 **DRAWINGS:**

94 A2.1.1
95 A2.1.7
96 A3.3.1
97 M5.3
98 E0.1
99 E1.0
100 E2.1.2
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102 E2.2.2
103 E2.2.3
104 E2.6.2
105 E2.7.2
106 E2.7.3
107 E3.1

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108 E4.1

109 E5.1

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END OF ADDENDUM NO. 02

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003132	Geotechnical Report Request Form
004100	Bid Form (*AD 01)
004513	Contractor's Qualification Statement (AIA Document A305) A305 Exhibit A: General Information A305 Exhibit B: Financial and Performance Information A305 Exhibit C: Project Specific Information A305 Exhibit D: Contractor's Past Project Experience A305 Exhibit E: Contractor's Past Project Experience, Continued
005213	Standard Form of Agreement Between Owner and Contractor (AIA Document A101)
005213.01	Form of Agreement Exhibit A – Insurance & Bond Requirements
006113	Performance Bond (AIA Document A312)
006113	Payment Bond (AIA Document A312)
007200	General Conditions of the Contract for Construction (AIA Document A201)
007339	Minority Business Participation Requirements

Prebid Question Form: (Use on-line process. To access go to www.moseleyarchitects.com, at the top of the page select the "Bidding" link, find the appropriate project, and select the "Submit a Question" link).

SPECIFICATIONS

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012200	Unit Prices
012300	Alternates (*AD 01)
012500	Substitution Procedures Substitution Request Form – Prior to Receipt of Bids
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014200	Definitions and Reference Standards
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092900	Gypsum Board
095100	Acoustical Ceilings
096513	Resilient Base and Accessories
096516	Resilient Sheet Flooring
096519	Resilient Tile Flooring
096566	Resilient Athletic Flooring
096700	Fluid-Applied Flooring
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233300	Air Duct Accessories
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233600	Air Terminal Units
233713	Diffusers, Registers, and Grilles
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237413	Packaged Outdoor Central Station Air Handling Units
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238124	Ductless Mini-Split Air Conditioning Units
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DIVISION 25 – INTEGRATED AUTOMATION

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260519	Low-Voltage Electrical Power Conductors and Cables
260526	Grounding and Bonding for Electrical Systems
260529	Hangers and Supports for Electrical Systems
260533	Raceways and Boxes for Electrical Systems (*AD 02)
260543	Underground Ducts and Raceways for Electrical Systems
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260572	Overcurrent Protective Device Short-Circuit Study
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00415	Soil Type Base Course
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00490	Precast Drainage Structures
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02723	Force Mains

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**SECTION 105626
MOBILE STORAGE SHELVING**

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design.
- B. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.
- C. ISO 9001 - Quality Management Systems — Requirements.

1.02 SUBMITTALS

- A. Product Data: Submit manufacturer's data sheets on each product to be used, including:
 - 1. System components.
 - 2. Accessories.
 - 3. Substrate preparation instructions and recommendations.
 - 4. Storage and handling requirements and recommendations.
- B. Shop Drawings: Indicate location, type, and layout of mobile storage shelving system, including lengths, heights, and aisle layout, and relationship to adjacent construction.
 - 1. Indicate location and configuration of rails.
 - 2. Indicate method of installation and configuration for shelving mounted on carriages.
 - 3. Provide location and details of anchorage devices to be embedded in or fastened to the structure.
- C. Selection Samples: For each finish product specified, provide color chips representing manufacturer's full range of available colors and finishes.
- D. Manufacturer's Qualification Statement.
- E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.03 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, ISO 9001 certified for quality control standards for design, production, and installation of complete high density storage system assemblies.
- B. Installer Qualifications: Company specializing in performing the work of this section; certified or authorized by manufacturer for installation of specified products.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Inspect for dents, scratches, or other damage. Replace damaged components.
- B. Store in manufacturer's unopened packaging until ready for installation.
- C. Store under cover and elevated above grade, in an enclosed, weatherproof location.

1.05 FIELD CONDITIONS

- A. Field Measurements: Verify field measurements for locations of mobile storage shelving before preparation of shop drawings and before fabrication to ensure proper dimensions, clearances, and installation.

1.06 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty covering defects of manufacturing and workmanship and rust and corrosion.

PART 2 PRODUCTS

2.01 MOBILE STORAGE SHELVING SYSTEMS - GENERAL

- A. System Description: High-density movable shelving system consisting of shelving units mounted on rail-guided wheeled carriages.
 - 1. Carriage Operation: Mechanically assisted.
 - 2. Carriage Capacity: 1000 pounds per lineal foot.
 - 3. Rail Mounting: Recessed in concrete slab with finished floor flush with top of rails.
 - 4. System Layout: Refer to Drawings, and to Shelving Size Schedule below. Size carriages and system to manufacturer's standards to accommodate shelving units required.
 - 5. Overall System Height: Nominal 84 inches.
- B. Seismic Design: Design for Seismic Zone 3, in accordance with ASCE 7 Section 9.
- C. Accessibility Requirements: Comply with ADA Standards.
- D. Components:
 - 1. Carriages: Rectangular steel frames of type and size required for selected system.
 - a. Provide one fixed end carriage and the remainder movable carriages at each system. Fixed end carriage shall be anchored to rails. Exposed back panel of fixed carriage shall match construction and finish of other exposed panels.
 - b. Carriage frames shall be steel and shall be welded or bolted. Galvanized components and riveted construction are unacceptable.
 - c. Finish: Powder coat paint; color to match shelving.
 - 2. Wheels: Cold rolled steel; dual flanged.
 - 3. Rails: Cold rolled steel; type and size to carry loads imposed by system.
 - 4. Subrails: Aluminum; use as required for recessed rails.
 - 5. Anti-Tip Device: Provide manufacturer's standard rail device to prevent tipping of system.
 - 6. Shelving Units: Provide manufacturer's standard **22 gauge** four-post steel shelving that integrally interlocks into carriage. Provide shelving ~~with 6 levels (bottom shelf and 5 intermediate shelves) and dividers every 12 inches (provide one divider at 24- and 30-inch wide shelving units, and two dividers at 36-inch wide shelving units).~~ **as indicated on Drawings. (*AD-02)**
 - a. Shelving Size Schedule:
 - 1) Shelving at Fixed Carriage:
 - (a) **36 48** inch wide by **15 24** inch deep (single-sided) shelving. **(*AD-02)**
 - (b) **Shelf Capacity: 300lbs (*AD-02)**
 - 2) Shelving at Movable Carriages:
 - (a) **36 48** inch wide by **30 24** inch deep (two-sided) shelving. **(*AD-02)**
 - (b) **Shelf Capacity: 300lbs (*AD-02)**
 - 7. **Shelving Units: Provide manufacturer's standard 22 gauge wide-span steel shelving that integrally interlocks into carriage. Provide shelving as indicated on Drawings. (*AD-02)**

- a. **Shelving Size Schedule:**
 - 1) **Shelving at Fixed Carriage:**
 - (a) **72 inch wide by 24 inch deep (single-sided) shelving.**
 - (b) **Shelf Capacity: As indicated on Drawings (*AD-02)**
 - 2) **Shelving at Movable Carriages:**
 - (a) **84 inch wide by 24 inch deep (two-sided) shelving.**
 - (b) **Shelf Capacity: As indicated on Drawings (*AD-02)**
 8. **Floor Panels: Underlayment grade plywood, 3/4 inch thick. (*AD-02)**
 9. **Ramps: Steel; 4.76 degrees maximum slope (do not exceed 1:12 for accessibility compliance). (*AD-02)**
 - a. **Do not exceed 1/8 inch vertical lip where ramps transition to adjacent finish floor.**
 10. **Floor Covering: Coordinate with flooring installer to provide carpet tile to match adjacent flooring in the space. Coordinate to ensure flooring installation does not affect operation of system. (*AD-02)**
 11. Face Panels: High pressure laminate over particleboard core; full height and width of shelving.
 - a. Color: To be selected from shelving manufacturer's full range of available options.
 12. Grout: Non-shrink hydraulic type cement.
 - a. **Minimum Compressive Strength at 7 Days: 8,000 pounds per square inch when tested according to ASTM C109/C109M. (*AD-02)**
- E. Accessories:
1. Anchors and Leveling Screws: Types and sizes recommended by manufacturer for specified rail mounting and floor system.
 2. Bumpers: Manufacturer's standard rubber stops.
 3. Label Holders: Manufacturer's standard type, attached to face panel at end of each shelving unit.

2.02 MECHANICALLY ASSISTED MOBILE STORAGE SHELVING SYSTEMS

- A. Basis of Design: Spacesaver; Mechanical Assist High Density Mobile Storage System.
- B. Other Acceptable Manufacturers:
 1. Borroughs Corporation; Aisle-Saver; Synergy Series.
 2. Montel; Mobilex Mechanical Assist Storage.
 3. Substitutions: See Section 016000 - Product Requirements.
- C. Drive System: Provide uniform movement of the carriage without drifting or jerking.
 1. Chain and sprocket system with full length torque resistant steel shaft.
 2. Provide two wheels per rail for each carriage, direct-driven on one side.
- D. Control: Three-spoke operating handle with manual locking latch.
 1. Minimum Gear Ratio: 1 lbf to move a load of 6000 lbs.
- E. Safety System: Mechanical safety brake at toe level the full length of the carriage. Light pressure of 1.5 lbf on aluminum bar activates safety mechanism to stop carriage movement.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated on shop drawings.
- B. Verify that substrate is in proper condition to install rails and flooring system per manufacturer's requirements.
 - 1. Do not begin installation until concrete floor slabs are fully cured and prepared, finishes in the space are complete, and the space is conditioned at occupancy levels.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 INSTALLATION

- A. General: Install system components and accessories in accordance with manufacturer's printed instructions.
- B. Position system components level and plumb within manufacturer's specified tolerances.
- C. Anchor rails directly to concrete subfloor.
- D. For recessed rail installation, grout rails the full length of the system.
- E. Maintain a minimum of 1/4 inch of grout between the high points of concrete subfloor and bottom of rails.
- F. Extend rails under stationary shelving units.
- G. Position carriages ensuring wheels align properly on rails. Fasten multiple carriages together forming a single movable base.
- H. Install shelving with shelf surfaces level and vertical supports plumb; fasten to carriage supports with vibration-proof fasteners.

3.03 ADJUSTING

- A. Adjust mobile storage shelving components and accessories to provide for smooth operation of system.

3.04 CLEANING

- A. Clean shelving and surrounding area after installation.

3.05 CLOSEOUT ACTIVITIES

- A. Demonstration: Demonstrate proper operation of system to Owner, and correct deficiencies or make adjustments as directed.
- B. Training: Train Owner's personnel on operation, adjustment, and maintenance of system.
 - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 - 2. Location: At project site.

3.06 PROTECTION

- A. Protect installed system from subsequent construction operations.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION 105626

SECTION 122400
WINDOW SHADES (*AD-02)

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- B. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.
- C. **ANSI/WCMA A100.1 – Standard for Window Covering Products. (*AD-02)**

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week prior to commencing work related to products of this section; require attendance of affected installers.
- B. Sequencing:
 - 1. Do not fabricate shades until field dimensions for each opening have been taken with field conditions in place.
 - 2. Do not install shades until final surface finishes and painting are complete.

1.03 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets, including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.
- B. Shop Drawings: Include shade schedule indicating size, location and keys to details, head, jamb and sill details, mounting dimension requirements for each product and condition, and operation direction.
- C. Source Quality Control Submittals: Provide test reports indicating compliance with specified fabric properties.
- D. Selection Samples: Include fabric samples in full range of available colors and patterns.
- E. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of shop drawings.
- F. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Authorized installation representative of fabricator/manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.
- B. Handle and store shades in accordance with manufacturer's recommendations.

1.06 FIELD CONDITIONS

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.07 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's warranty from Date of Substantial Completion, covering the following minimum terms:
 - 1. Manual Operating Mechanism / Clutch: 10 years, minimum (excludes bead chain).
 - 2. Fabric: 10 years, minimum.
 - 3. Balance of Shade Hardware and Non-Operating Materials and Components: 25 years, minimum.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Interior Manually Operated Roller Shades:
 - 1. Draper, Inc; Clutch Operated FlexShade.
 - 2. Hunter Douglas Architectural; RB500 Manual Roller Shades.
 - 3. Lutron Electronics Co., Inc; Contract Roller Manual Roller Shades.
 - 4. MechoShade Systems LLC; Mecho/5 System.
 - 5. WT Shade; HeliaRise.
 - 6. Substitutions: See Section 016000 - Product Requirements.
- B. Source Limitations: Provide products produced by a single manufacturer and obtained from a single supplier.

2.02 ROLLER SHADES

- A. General:
 - 1. Provide shade system components that are easy to remove or adjust without removal of mounted shade brackets.
 - 2. Provide shade system that operates smoothly when shades are raised or lowered.
- B. Roller Shades:
 - 1. Description - Interior Roller Shades: Single roller, manually operated fabric window shade system complete with mounting brackets, roller tubes, hembars, hardware, and accessories.
 - a. Drop Position: Regular roll.
 - b. Roll Direction: Roll down, closed position is at window sill.
 - c. Mounting: Window jamb mounted - inside, between jambs.
 - d. Size: As indicated on drawings for rough opening sizes; field verify rough openings prior to fabrication.
 - 2. Brackets and Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.
 - 3. Roller Tubes: As required for type of shade operation.
 - a. Material: Extruded aluminum, clear anodized finish or electrogalvanized/epoxy primed steel, as standard with manufacturer.
 - b. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.
 - c. Fabric Attachment: Utilize manufacturer's standard method for attaching shade fabric material to rollers.
 - 4. Hembars: Designed to maintain bottom of shade straight and flat.

- a. Style: Full wrap fabric covered bottom bar, flat profile with heat sealed closed ends.
5. Manual Operation for Interior Shades:
 - a. Clutch Operator: Manufacturer's standard material and design, permanently lubricated.
 - b. Drive Chain: Continuous loop beaded ball chain, 95 pounds minimum breaking strength. Provide upper and lower limit stops.
 - c. **Safety Device: At all chain/loop operators, provide an ANSI/WCMA A100.1 compliant chain tensioning hold-down device. (*AD-02)**
6. Accessories:
 - a. Fascia: Extruded aluminum, size as required to conceal shade mounting, attachable to brackets without exposed fasteners; clear anodized finish.
 - b. End Caps: Provide manufacturer's standard end caps to cover exposed ends of brackets.
 - c. Ceiling Pockets: Premanufactured metal shade pocket for recess mounting shade hardware into ceiling. Provide removable closure panel to conceal underside of brackets and roller tubes.
 - d. Fasteners: Noncorrosive, and as recommended by shade manufacturer.

2.03 SHADE FABRIC

- A. Fabric: Nonflammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
 1. Manufacturers:
 - a. Lutron Electronics Co., Inc; Basketweave 27 - 1% .
 - b. Mermet Corporation; E-Screen - 1%.
 - c. Phifer, Inc; Style 2500 1%.
 - d. Substitutions: See Section 016000 - Product Requirements.
 2. Material: Vinyl coated fiberglass.
 3. Performance Requirements:
 - a. Flammability: Pass NFPA 701 large and small tests.
 - b. Fungal Resistance: No growth when tested according to ASTM G21.
 4. Color: To be selected by Architect from manufacturer's full range.
 5. Fabrication:
 - a. Fabric Orientation: Railroaded, fabric is turned 90 degrees off the roll.
 - b. If height of opening requires multiple panels of railroaded fabric, use manufacturer's standard sewn seams.

2.04 ROLLER SHADE FABRICATION

- A. Field measure finished openings prior to ordering or fabrication.
- B. Dimensional Tolerances: Fabricate shades to fit openings within specified tolerances.
 1. Vertical Dimensions: Fill openings from head to sill with 1/4 inch maximum space between bottom bar and window stool.
 2. Horizontal Dimensions - Inside Mounting: Fill openings from jamb to jamb, with maximum 1/4 inch gap at each edge of jamb.
- C. At openings requiring continuous multiple shade units with separate rollers, locate roller joints at window mullion centers; butt rollers end-to-end.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine finished openings for deficiencies that may preclude satisfactory installation.
- B. Start of installation shall be considered acceptance of substrates.

3.02 PREPARATION

- A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.
- B. Coordinate with window installation and placement of concealed blocking to support shades.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.
- B. Replace shades that exceed specified dimensional tolerances at no extra cost to Owner.
- C. Adjust level, projection, and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

3.04 CLEANING

- A. Clean soiled shades and exposed components as recommended by manufacturer.
- B. Replace shades that cannot be cleaned to "like new" condition.

3.05 PROTECTION

- A. Protect installed products from subsequent construction operations.
- B. Touch-up, repair, or replace damaged products before Substantial Completion.

END OF SECTION 122400

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SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS [*AD-2]

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 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. RGS: Rigid Galvanized Steel conduit.
- C. FMC: Flexible metal conduit.
- D. IMC: Intermediate metal conduit.
- E. LFMC: Liquidtight flexible metal conduit.
- F. LFNC: Liquidtight flexible nonmetallic conduit.
- G. NBR: Acrylonitrile-butadiene rubber.
- H. RNC: Rigid nonmetallic conduit.
- I. PVC: Schedule 40 PVC
- J. ACCESSIBLE: Conduit less than 12' above the finished floor that is capable of being exposed without damaging the building structure or finish or not permanently closed in by the structure or finish of the building. Example: Conduit below 12' AFF that is above a removable ceiling tile is considered "Accessible"
- K. SECURE: Area in which inmates have supervised or non-supervised access on a routine or constant basis. Refer to Architectural drawings for the areas designated as secure. If not clearly defined, the space shall be deemed as secure.
- L. RACEWAY: An enclosed channel of metal or nonmetallic materials designed expressly for holding wires or cables. Raceways include, but are not limited to, rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, liquidtight flexible conduit, flexible metallic tubing, flexible metal conduit, electrical nonmetallic tubing, and electrical metallic tubing.
 - 1. Cables such as MC, AC, or Greenfield are NOT raceways.

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1.3 ACTION SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Allied Tube & Conduit.
 2. O-Z/Gedney; an EGS Electrical Group brand; an Emerson Industrial Automation business.
 3. Robroy Industries.
 4. Thomas & Betts Corporation.
- B. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. GRC: Comply with ANSI C80.1 and UL 6.
- D. IMC: Comply with ANSI C80.6 and UL 1242.
- E. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
1. Comply with NEMA RN 1.
 2. Coating Thickness: 0.040 inch, minimum.
- F. EMT: Comply with ANSI C80.3 and UL 797.
- G. FMC: Comply with UL 1; zinc-coated steel.
- H. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- I. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
1. Fittings for EMT: Steel compression type.
 2. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
 3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.
- J. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

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2.2 NONMETALLIC CONDUITS, AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Electri-Flex Company.
 - 3. RACO; Hubbell.
 - 4. Thomas & Betts Corporation.
- B. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. PVC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.

2.3 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Cooper B-Line, Inc.; a division of Cooper Industries.
 - 2. Hoffman; a brand of Pentair Equipment Protection.
 - 3. Square D.
- B. Description: Sheet metal, complying with UL 870 and NEMA 250, unless otherwise indicated, and sized according to NFPA 70.
 - 1. Metal wireways installed outdoors shall be listed and labeled NEMA 3R, Flanged-and-gasketed type, and marked for intended location and application.
- C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Screw-cover type unless otherwise indicated.
- E. Finish: Manufacturer's standard enamel finish.

2.4 SURFACE RACEWAYS

- A. Listing and Labeling: Surface raceways shall be listed and labeled as defined in NFPA 70, and marked for intended location and application.
- B. Surface Metal Raceways: Galvanized steel with snap-on covers complying with UL 5. Manufacturer's standard enamel finish in color selected by Architect].

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1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. MonoSystems, Inc.
 - b. Panduit Corp.
 - c. Wiremold / Legrand.

2.5 BOXES, ENCLOSURES, AND CABINETS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 1. EGS/Appleton Electric.
 2. Erickson Electrical Equipment Company.
 3. Hoffman; a brand of Pentair Equipment Protection.
 4. Hubbell Incorporated.
 5. O-Z/Gedney; an EGS Electrical Group brand; an Emerson Industrial Automation business.
 6. RACO; Hubbell.
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy or aluminum, Type FD, with gasketed cover.
- E. Metal Floor Boxes:
 1. Material: Cast metal.
 2. Shape: Rectangular.
 3. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- F. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.
- G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- H. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum or galvanized, cast iron with gasketed cover.
- I. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- J. Gangable boxes are not prohibited.

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2.6 FLOOR BOXES AND SERVICE FITTINGS

1. Floor boxes mounted in grade slabs shall be manufactured from cast-iron and be approved for use on grade and above grade floors.
2. Floor boxes not in grade slab shall be manufactured from stamped-steel and be approved for use on above-grade floors.
3. All floor boxes shall have four independent wiring compartments that allow capacity for up to four duplex receptacles and/or communication services. The box shall provide two 1" and two 1 1/4" conduit hubs. The box shall be fully adjustable...
4. Activation covers shall be available in flanged and flangeless versions of cast aluminum. Covers shall be available with options for tile or carpet inserts, flush covers, or furniture feed. Unless indicated otherwise, provide the following cover configurations:
 - 1) Power/Telecom Outlets: Brushed aluminum flanged with blank lid flush with floor and carpet/tile cutouts.
 - 2) Furniture Floor Feed: Brushed aluminum flanged with 1" trade size screw plug opening and one combination 1 1/4" and 2" trade size screw plug openings.
 - 3) Color and materiel shall be selected by the Architect
 - 4) The activation cover shall be listed by UL to meet the applicable U.S. and Canadian safety standards for scrub water exclusion when used on tile, terrazzo, wood, and carpet covered floors.

2.7 POKE-THRU ASSEMBLIES

1. 8" Poke-thru devices provide an interface between power, communication and audio/visual (A/V) cabling in an above grade concrete floor and the workstation or activation location where power, communication and/or A/V device outlets are required. These devices provide recessed device outlets that will not obstruct the floor area.
2. Insert: Insert body shall recess the devices a minimum of 2-3/4 inches (69mm) and have a polyester based backing enamel finished interior; ivory color. Furnish with necessary channels to provide complete separation of power and communication services. Provide compartments that allow for up to four duplex receptacles and/or communication ports
3. Body consists of an intumescent firestop material to maintain fire rating of the floor slab. Provide insert with a retaining feature to hold the poke-thru device in the floor slab without additional fasteners. Poke-thru insert shall also consist of a 3/4-inch trade size conduit stub that is connected to the insert body and a stamped steel junction box for wire splicing and connections. Stamped steel junction box shall also contain the means necessary to electrically ground the poke-thru device to the system ground
4. Activation Cover: Manufactured of die-cast aluminum alloy; finished in powder-coated color selected by the Architect. Provide with gaskets to maintain scrub water tightness. Provide cover with spring-loaded slides to allow cables to egress out of the unit and maintain as small an egress opening as possible.

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PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
1. Exposed Conduit: GRC.
 2. Concealed Conduit, Aboveground: GRC.
 3. Concealed in Masonry: GRC or PVC grouted solid after installation. Convert to metallic conduit per this specification prior to exiting the wall above ground
 4. Concealed in Poured Concrete Walls: GRC or PVC. Convert to metallic conduit per this specification prior to exiting the wall above ground
 5. Underground Conduit: Type PVC, direct buried.
 6. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 7. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R
- B. Indoors Secure Locations: Apply raceway products as specified below unless otherwise indicated:
1. Exposed, GRC.
 2. Concealed in Ceilings and Interior Walls and Partitions: ~~GRC~~ [*AD2] EMT.
 3. Concealed in Masonry: GRC or PVC grouted solid after installation. Convert to metallic conduit per this specification prior to exiting the wall above ground
 4. Concealed in Poured Concrete Walls: GRC or PVC. Convert to metallic conduit per this specification prior to exiting the wall above ground
 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 6. Damp or Wet Locations: GRC.
 7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.
- C. Indoors Non-secure Locations: Apply raceway products as specified below unless otherwise indicated:
1. Exposed, Not Subject to Physical Damage: EMT.
 2. Exposed and Subject to Physical Damage: GRC. Raceway locations include the following:
 - a. Loading dock.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms.
 3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 4. Concealed in Masonry: GRC or PVC grouted solid after installation. Convert to metallic conduit per this specification prior to exiting the wall above ground
 5. Concealed in Poured Concrete Walls: GRC or PVC. Convert to metallic conduit per this specification prior to exiting the wall above ground
 6. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 7. Damp or Wet Locations: GRC.
 8. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.

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- D. Minimum Raceway Size: 3/4-inch trade size.
- E. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 - 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
 - 3. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.
 - 4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
Concealed conduit to the greatest extent possible. For all exposed and accessible conduit within the secure perimeter, provide RGS, IMC unless otherwise noted on the drawings. Refer to Architectural drawings for secure perimeter.
- F. Whips from Junction Box Concealed in Ceilings to Lighting Fixtures:
 - 1. Above non-removeable or security type ceilings, junction boxes are not acceptable. Provide conduit between the fixtures.
 - 2. Within the secure perimeter, above accessible ceilings, provide Interlocked Electrical Flexible Conduit connection whips in maximum length of 4'-0". Standard FMC or MC is not acceptable in this application.
 - 3. Above accessible ceilings outside the secure perimeter provide FMC or MC connection whips in maximum length of 6'-0".
- G. AC is not acceptable in any application
- H. Do not install aluminum conduits, boxes, or fittings.
- I. Install surface raceways only where indicated on Drawings.
- J. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

3.2 INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- B. All conduit shall be tight to the structure and secured with two-hole steel conduit straps. Unless indicated otherwise on the drawings, for all exposed or accessible conduit inside the secure perimeter, the distance between supports shall be one half that specified by NEC. (twice as many supports as required by NEC).
- C. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- D. Complete raceway installation before starting conductor installation.

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- E. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- F. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- G. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- H. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- I. All conduit to be installed on exterior masonry shall not run continuously within the wall cavity.
- J. Support conduit within 6 inches of enclosures to which attached.
- K. Raceways Embedded in Slabs are not permitted, except as required for entry into recessed floor boxes. Conduits shall be routed below the slab within the porous fill and stub-up at the required location. Transition from PVC to RGS with RGS elbow before rising above the floor. After RGS elbow, stub-up conduit shall be type indicated in Part 3.1 above. PVC shall not be permitted exposed above the floor
- L. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.
- M. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
- N. Stub-ups to Above Recessed Ceilings:
 - 1. Use EMT, IMC, or RMC for raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- O. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- P. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- Q. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- R. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.

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- S. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- T. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- U. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- V. Special Fittings and Installations:
 - 1. Install in each run of aboveground RMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F and that has straight-run length that exceeds 100 feet.
 - 2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
 - c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.
 - d. Attics: 135 deg F temperature change.
 - 3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
 - 4. Install expansion fittings at all locations where conduits cross building or structure expansion joints. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- W. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for recessed and semi-recessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- X. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements and also refer to Architectural elevations. Install boxes with height measured to center of box unless otherwise indicated.
- Y. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box. Retain the fire rating of any fire rated wall or assembly
- Z. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

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- AA. Locate boxes so that cover or plate will not span different building finishes.
- BB. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- CC. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- DD. Set metal floor boxes level and flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom for pipe less than 6 inches in nominal diameter.
2. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Section 312000 "Earth Moving."
3. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
 - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete for a minimum of 12 inches on each side of the coupling.
 - b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
4. Underground Warning Tape: Comply with requirements in Section 260553 "Identification for Electrical Systems."

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.
- D. Install handholes with bottom below frost line, below grade.

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3.5 CONDUIT COLOR CODING

- A. All outlet boxes, junction boxes and pull boxes shall have their covers and exterior visible surfaces painted with colors to match the surface color scheme outlined below. This includes covers on boxes above lift-out and other type accessible ceilings, where identification shall also include branch circuit designation. Mark conduit a minimum of each 10'-0"
1. Blue for 120/208-volts normal circuits
 2. Black for 277/480-volts normal circuits
 3. Bright red for all conduit related to fire alarm system.
 4. Dark red (burgundy) for all conduit related to security.
 5. Green for all conduit related to NEC 701 and 702 emergency systems
 6. Orange for all conduit related NEC 700 emergency systems
 7. Brown for all conduit related to data systems.
 8. White for all conduit related to paging systems.
 9. Purple for all conduit related to TV systems or other LV systems.

3.6 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Maintain the fire rating of all fire rated walls and assemblies in which electrical raceway or boxes are installed.

END OF SECTION 260533

SECTION 270528 - PATHWAYS FOR COMMUNICATIONS SYSTEMS (*AD 02)

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 conduits and fittings.
2. Nonmetallic conduits and fittings.
3. Optical-fiber-cable pathways and fittings.
4. Metal wireways and auxiliary gutters.
5. Nonmetallic wireways and auxiliary gutters.
6. Surface pathways.
7. Boxes, enclosures, and cabinets.
8. Handholes and boxes for exterior underground cabling.

B. Related Requirements:

1. Division 26 Section "Underground Ducts and Raceways for Electrical Systems" for exterior duct banks, manholes, and underground utility construction.
2. Division 26 Section "Raceways and Boxes for Electrical Systems" for conduits, wireways, surface raceways, boxes, enclosures, cabinets, hand holes, and faceplate adapters serving electrical systems.

1.3 DEFINITIONS

- A. ARC: Aluminum rigid conduit.
- B. GRC: Galvanized rigid steel conduit.
- C. IMC: Intermediate metal conduit.

1.4 ACTION SUBMITTALS

- A. Product Data: For surface pathways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

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- B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.
- C. Samples: For wire ways, nonmetallic wire ways, and surface pathways and for each color and texture specified, 12 inches (300 mm) long.
- D. Quality Assurance: All field design submittals for Div. 27 specifications shall be done by an RCDD or under the guidance of an RCDD.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Pathway routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:
 - 1. Structural members in paths of pathway groups with common supports.
 - 2. HVAC and plumbing items and architectural features in paths of conduit groups with common supports.
- B. Source quality-control reports.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following provide products by one of the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Allied Tube & Conduit.
 - 3. Alpha Wire Company.
 - 4. Anamet Electrical, Inc.
 - 5. Electri-Flex Company.
 - 6. O-Z/Gedney.
 - 7. Picoma Industries.
 - 8. Republic Conduit.
 - 9. Robroy Industries.
 - 10. Southwire Company.
 - 11. Thomas & Betts Corporation.
 - 12. Western Tube and Conduit Corporation.
 - 13. Wheatland Tube Company.
 - 14. Approved Equal

- B. General Requirements for Metal Conduits and Fittings:
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 2. Comply with TIA-569-B.
- C. GRC: Comply with ANSI C80.1 and UL 6.
- D. ARC: Comply with ANSI C80.5 and UL 6A.
- E. IMC: Comply with ANSI C80.6 and UL 1242.
- F. PVC-Coated Steel Conduit: PVC-coated IMC
 - 1. Comply with NEMA RN 1.
 - 2. Coating Thickness: 0.040 inch (1 mm), minimum.
- G. EMT: Comply with ANSI C80.3 and UL 797.
- H. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
 - 1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
 - 2. Fittings for EMT:
 - a. Material: Steel.
 - b. Type: compression.
 - 3. Expansion Fittings: PVC or steel to match conduit type, complying with UL-467, rated for environmental conditions where installed, and including flexible external bonding jumper.
 - 4. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.
- I. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following: :
 - 1. AFC Cable Systems, Inc.
 - 2. Allied Tube & Conduit.
 - 3. Anamet Electrical, Inc.
 - 4. Arnco Corporation.

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5. CANTEX Inc.
6. CertainTeed Corporation.
7. Condux International, Inc.
8. Electri-Flex Company.
9. Kraloy.
10. Lamson & Sessions; Carlon Electrical Products.
11. Niedax-Kleinhuis USA, Inc.
12. RACO; Hubbell.
13. Thomas & Betts Corporation.
14. Approved Equal

B. General Requirements for Nonmetallic Conduits and Fittings:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Comply with TIA-569-C.

C. RNC: Type EPC-40-PVC complying with NEMA TC 2 and UL 651 unless otherwise indicated.

D. Rigid HDPE: Comply with UL 651A.

E. Continuous HDPE: Comply with UL 651B.

F. RTRC: Comply with UL 1684A and NEMA TC 14.

G. Fittings for RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.

H. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

I. Solvent cements and adhesive primers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 OPTICAL-FIBER-CABLE PATHWAYS AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Alpha Wire Company.
2. Arnco Corporation.
3. Endot Industries Inc.
4. IPEX.
5. Lamson & Sessions; Carlon Electrical Products.
6. Approved Equal

- B. Description: Comply with UL 2024; flexible-type pathway, approved for plenum installation unless otherwise indicated.
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 2. Comply with TIA-569-C.

2.4 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cooper B-Line, Inc.
 - 2. Hoffman.
 - 3. Mono-Systems, Inc.
 - 4. Square D.
 - 5. Approved Equal
- B. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 4 unless otherwise indicated, and sized according to NFPA 70.
 - 1. Metal wire ways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 2. Comply with TIA-569-C.
- C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wire way Covers: Flanged-and-gasketed type unless otherwise indicated.
- E. Finish: Manufacturer's standard enamel finish.

2.5 NONMETALLIC WIREWAYS AND AUXILIARY GUTTERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Allied Moulded Products, Inc.
 - 2. Hoffman.
 - 3. Lamson & Sessions; Carlon Electrical Products.
 - 4. Niedax-Kleinhuis USA, Inc.
 - 5. Approved Equal
- B. General Requirements for Nonmetallic Wire ways and Auxiliary Gutters:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 2. Comply with TIA-569-C.
- C. Description: Fiberglass polyester, extruded and fabricated to required size and shape, without holes or knockouts. Cover shall be gasketed with oil-resistant gasket material and fastened with captive screws treated for corrosion resistance. Connections shall be flanged and have stainless-steel screws and oil-resistant gaskets.
- D. Description: PVC, extruded and fabricated to required size and shape, and having snap-on cover, mechanically coupled connections, and plastic fasteners.
- E. Fittings and Accessories: Couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings shall match and mate with wireways as required for complete system.
- F. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- G. Solvent cements and adhesive primers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.6 SURFACE PATHWAYS

- A. General Requirements for Surface Pathways:
1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 2. Comply with TIA-569-C.
- B. Surface Metal Pathways: Galvanized steel with snap-on covers complying with UL 5. Manufacturer's standard enamel finish in color selected by Architect
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following :
 - a. Mono-Systems, Inc.
 - b. Niedax-Kleinhuis USA, Inc.
 - c. Panduit Corp.
 - d. Wiremold / Legrand.
 - e. Approved Equal
- C. Surface Nonmetallic Pathways: Two- or three-piece construction, complying with UL 5A, and manufactured of rigid PVC with texture and color selected by Architect from manufacturer's

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standard colors. Product shall comply with UL-94 V-0 requirements for self-extinguishing characteristics.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Lamson & Sessions; Carlon Electrical Products.
 - b. Mono-Systems, Inc.
 - c. Panduit Corp.
 - d. Quazite:Hubbell Power Systems, Inc.
 - e. Wiremold / Legrand.
 - f. Approved Equal

2.7 BOXES, ENCLOSURES, AND CABINETS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Adalet.
 2. Cooper Technologies Company; Cooper Crouse-Hinds.
 3. EGS/Appleton Electric.
 4. Erickson Electrical Equipment Company.
 5. Hoffman.
 6. Lamson & Sessions; Carlon Electrical Products.
 7. Milbank Manufacturing Co.
 8. Molex; Woodhead Brand.
 9. Mono-Systems, Inc.
 10. O-Z/Gedney.
 11. Quazite:Hubbell Power Systems, Inc.
 12. RACO; Hubbell.
 13. Robroy Industries.
 14. Spring City Electrical Manufacturing Company.
 15. Stahlin Non-Metallic Enclosures.
 16. Thomas & Betts Corporation.
 17. Wiremold / Legrand.
- B. Approved Equal - General Requirements for Boxes, Enclosures, and Cabinets:
 1. Comply with TIA-569-C.
 2. Boxes, enclosures and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Sheet-Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy Type FD, with gasketed cover.

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- E. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

- F. Metal Floor Boxes:
 - 1. Material: Cast metal or sheet metal.
 - 2. Type: Fully adjustable
 - 3. Shape: Rectangular.
 - 4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

- G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- H. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum galvanized, or cast iron with gasketed cover.

- I. Device Box Dimensions: 4 inches by 2-1/8 inches by 2-1/8 inches deep (100 mm by 60 mm by 60 mm deep)

- J. Gangable boxes are allowed

- K. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.

- L. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 4 with continuous- hinge cover with flush latch unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Nonmetallic Enclosures:
 - a. Material: Fiberglass .
 - b. Finished inside with radio-frequency-resistant paint.
 - 3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

- M. Cabinets:
 - 1. NEMA 250, Type 3R galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 - 2. Hinged door in front cover with flush latch and concealed hinge.
 - 3. Key latch to match panel boards.
 - 4. Metal barriers to separate wiring of different systems and voltage.
 - 5. Accessory feet where required for freestanding equipment.
 - 6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.8 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND COMMUNICATION CABLING

A. General Requirements for Handholes and Boxes:

1. Boxes and hand holes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.
2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. Comply with TIA-569-C.

B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2.
 - a. Armorcast Products Company.
 - b. Carson Industries LLC.
 - c. NewBasis.
 - d. Oldcastle Precast, Inc; Christy Concrete Products.
 - e. Quazite: Hubbell Power System, Inc; Hubbell Power Systems.
 - f. Synertech Moulded Products.
 - g. Approved Equal
3. Standard: Comply with SCTE 77.
4. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
5. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and hand hole location.
6. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
7. Cover Legend: Molded lettering, "COMMUNICATIONS."
8. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
9. Dimensions: 24 Inches Wide by 36 Inches Long.

C. Fiberglass Hand holes and Boxes: Molded of fiberglass-reinforced polyester resin, with frame and covers.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Armorcast Products Company.
 - b. Carson Industries LLC.
 - c. NewBasis.
 - d. Nordic Fiberglass, Inc.

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- e. Oldcastle Precast, Inc; Christy Concrete Products.
- f. Quazite: Hubbell Power System, Inc; Hubbell Power Systems.
- g. Synertech Moulded Products.
- h. Approved Equal

- 3. Standard: Comply with SCTE 77.
- 4. Color of Frame and Cover: Gray
- 5. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
- 6. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and hand hole location.
- 7. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
- 8. Cover Legend: Molded lettering, "COMMUNICATIONS."
- 9. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
- 10. Dimensions: 24 Inches Wide by 36 Inches Long.

2.9 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

- A. Hand hole and Pull-Box Prototype Test: Test prototypes of hand holes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.
 - 1. Tests of materials shall be performed by an independent testing agency.
 - 2. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
 - 3. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012, and traceable to NIST standards.

2.10 FIRESTOP FLOOR AND WALL PENETRATIONS

- A. See specifications in Division 26.

PART 3 - EXECUTION

3.1 PATHWAY APPLICATION [*AD2]

- A. ~~Outdoors: Apply pathway products as specified below unless otherwise indicated:~~ **Refer to 260533.3.1**
 - 1. ~~Exposed Conduit: GRC~~
 - 2. ~~Concealed Conduit, Aboveground: IMC.~~
 - 3. ~~Underground Conduit: RNC, Type EPC 40 PVC concrete encased.~~
 - 4. ~~Boxes and Enclosures, Aboveground: NEMA 250, Type 4.~~
- B. ~~Indoors: Apply pathway products as specified below unless otherwise indicated:~~
 - 1. ~~Exposed, Not Subject to Physical Damage: EMT~~

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- ~~2. Exposed, Not Subject to Severe Physical Damage: EMT~~
 - ~~3. Exposed and Subject to Severe Physical Damage: GRC~~
 - ~~1. Pathway locations include the following:~~
 - ~~a. All spaces within the secure perimeter~~
 - ~~b. Mechanical rooms.~~
 - ~~4. Concealed in Ceilings and Interior Walls and Partitions: EMT~~
 - ~~5. Damp or Wet Locations: GRC~~
 - ~~6. Pathways for Optical Fiber or Communications Cable in Spaces Used for Environmental Air: EMT~~
 - ~~7. Pathways for Optical Fiber or Communications Cable Risers in Vertical Shafts: EMT~~
 - ~~8. Pathways for Concealed General Purpose Distribution of Optical Fiber or Communications Cable: EMT~~
 - ~~9. Boxes and Enclosures: NEMA 250 Type 1, except use NEMA 250 Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations. Minimum Pathway Size: 1-inch (21-mm) trade size. Minimum size for optical fiber cables is 2-inch (27-mm).~~
- C. ~~Pathway Fittings: Compatible with pathways and suitable for use and location.~~
- ~~1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.~~
 - ~~2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.~~
 - ~~3. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.~~
- D. ~~Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.~~
- E. ~~Install surface pathways only where indicated on Drawings.~~
- F. ~~Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F (49 deg C)~~
- 3.2 INSTALLATION
- A. Comply with NECA 1, NECA 101, and TIA-569-C for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum pathways. Comply with NFPA 70 limitations for types of pathways allowed in specific occupancies and number of floors.
 - B. Keep pathways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal pathway runs above water and steam piping.
 - C. Complete pathway installation before starting conductor installation.
 - D. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
 - E. Arrange stub-ups so curved portions of bends are not visible above finished slab.

- F. Install no more than the equivalent of two 90-degree bends in any pathway run. Support within 12 inches (300 mm) of changes in direction. Utilize long radius ells for all optical-fiber cables.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- H. Support conduit within 12 inches (300 mm) of enclosures to which attached.
- I. Pathways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch (27-mm) trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure pathways to reinforcement at maximum 10-foot (3-m) intervals.
 - 2. Arrange pathways to cross building expansion joints at right angles with expansion fittings.
 - 3. Arrange pathways to keep a minimum of 2 inches (50 mm) of concrete cover in all directions.
 - 4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
 - 5. Change from EMT to GRC or before rising above floor.
- J. Stub-ups to Above Recessed Ceilings:
 - 1. Use EMT, IMC, or RMC for pathways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- K. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of pathway and fittings before making up joints. Follow compound manufacturer's written instructions.
- L. Coat field-cut threads on PVC-coated pathway with a corrosion-preventing conductive compound prior to assembly.
- M. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install insulated bushings on conduits terminated with locknuts.
- N. Install pathways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- O. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- P. Cut conduit perpendicular to the length. For conduits of 2-inch (53-mm) trade size and larger, use roll cutter or a guide to ensure cut is straight and perpendicular to the length.

- Q. Install pull wires in empty pathways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Cap underground pathways designated as spare above grade alongside pathways in use.
- R. Surface Pathways:
1. Install surface pathway for surface telecommunications outlet boxes only where indicated on Drawings.
 2. Install surface pathway with a minimum 2-inch (50-mm) radius control at bend points.
 3. Secure surface pathway with screws or other anchor-type devices at intervals not exceeding 48 inches (1200 mm) and with no less than two supports per straight pathway section. Support surface pathway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.
- S. Pathways for Optical-Fiber and Communications Cable: Install pathways, metal and nonmetallic, rigid and flexible, as follows:
1. 3/4-Inch (21-mm) Trade Size and Smaller: Install pathways in maximum lengths of 50 feet (15 m).
 2. 1-Inch (27-mm) Trade Size and Larger: Install pathways in maximum lengths of 75 feet (23 m).
 3. Install with a maximum of two 90-degree bends or equivalent for each length of pathway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.
- T. Install pathway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed pathways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install pathway sealing fittings according to NFPA 70.
- U. Install devices to seal pathway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all pathways at the following points:
1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 2. Where an underground service pathway enters a building or structure.
 3. Where otherwise required by NFPA 70.
- V. Comply with manufacturer's written instructions for solvent welding PVC conduit and fittings.
- W. Expansion-Joint Fittings:

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1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F (17 deg C), and that has straight-run length that exceeds 25 feet (7.6 m). Install in each run of aboveground RMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F (55 deg C) and that has straight-run length that exceeds 100 feet (30 m).
 2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F (70 deg C) temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F (86 deg C) temperature change.
 - c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F (70 deg C) temperature change.
 - d. Attics: 135 deg F (75 deg C) temperature change.
 3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F (0.0115 mm per meter of length of straight run per deg C) of temperature change for metal conduits.
 4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- X. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- Y. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surface to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
- Z. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- AA. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- BB. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- CC. Set metal floor boxes level and flush with finished floor surface.

DD. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Section 312000 "Earth Moving" for pipe less than 6 inches (150 mm) in nominal diameter.
2. Install backfill as specified in Section 312000 "Earth Moving."
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches (300 mm) of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Section 312000 "Earth Moving."
4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through floor unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
 - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete for a minimum of 12 inches (300 mm) on each side of the coupling.
 - b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
6. Warning Planks: Bury warning planks approximately 12 inches (300 mm) above direct-buried conduits, but a minimum of 6 inches (150 mm) below grade. Align planks along centerline of conduit.
7. Underground Warning Tape: Comply with requirements in Section 260553 "Identification for Electrical Systems."

B. Concrete Encased Duct banks

1. See duct bank details on drawings.

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

- A. Install hand holes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from

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1/2-inch (12.5-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.

- C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch (25 mm) above finished grade.
- D. Install hand holes with bottom below frost line, 24" below grade.
- E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in enclosure.
- F. Field cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR COMMUNICATIONS PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 270544 "Sleeves and Sleeve Seals for Communications Pathways and Cabling."

3.6 FIRESTOPPING

- A. Install fire stopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Fire stopping."

3.7 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage or deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 270528

SECTION 271500 - COMMUNICATIONS HORIZONTAL CABLING [*AD2]

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.
- B. Section 270526 "Grounding and Bonding for Communication Systems"

1.2 SUMMARY

A. Section Includes:

- 1. UTP cabling.
- 2. Cable connecting hardware, patch panels, and cross-connects.
- 3. Telecommunications outlet/connectors.
- 4. Cabling system identification products.
- 5. Cable management system.

B. Related Requirements:

- 1. Section 271300 "Communications Backbone Cabling" for voice and data cabling associated with system panels and devices.
- 2. Section 280513 "Conductors and Cables for Electronic Safety and Security" for voice and data cabling associated with system panels and devices.

C. All cable types shall be CMP or MPP plenum rated.

1.3 DEFINITIONS

- A. BICSI: Building Industry Consulting Service International.
- B. Consolidation Point (CP): A location for interconnection between horizontal cables extending from building pathways and horizontal cables extending into furniture pathways.
- C. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.
- D. EMI: Electromagnetic interference.
- E. IDC: Insulation displacement connector.

- F. LAN: Local area network.
- G. MUTOA: Multiuser telecommunications outlet assembly, a grouping in one location of several telecommunications' outlet/connectors.
- H. Outlet/Connectors: A connecting device in the work area on which horizontal cable or outlet cable terminates.
- I. RCDD: Registered Communications Distribution Designer.
- J. UTP: Unshielded twisted pair.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate layout and installation of telecommunications cabling with Owner's telecommunications and LAN equipment and service suppliers.
- B. Coordinate telecommunications outlet/connector locations with location of power receptacles at each work area.

1.5 ACTION SUBMITTALS

- A. Product Data: Submit product data for all UTP cabling, patch panels, faceplates, jacks, fiber shelves, termination blocks, equipment cords, patch cords, labeling components, and miscellaneous accessories for all cabling and connectivity.
 - 1. For cable, include the following data for each type used:
 - a. Nominal OD.
 - b. Minimum bending radius.
 - c. Maximum pulling tension.
 - d. Color coding.
- B. Shop Drawings:
 - 1. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by Owner.
 - 2. Cabling administration drawings and printouts.
 - 3. Wiring diagrams to show typical wiring schematics, including the following:
 - a. Cross-connects.
 - b. Patch panels.
 - c. Patch cords.
 - 4. Cross-connects and patch panels. Detail mounting assemblies and show elevations and physical relationship between the installed components.
- C. Samples: For workstation outlets, jacks, jack assemblies, and faceplates for color selection and evaluation of technical features.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, qualified layout technician, installation supervisor, and field inspector.
- B. Source quality-control reports.
- C. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For splices and connectors to include in maintenance manuals.
- B. Software and Firmware Operational Documentation:
 - 1. Software operating and upgrade manuals.
 - 2. Program Software Backup: On magnetic media or compact disk, complete with data files.
 - 3. Device address list.
 - 4. Printout of software application and graphic screens.

1.8 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.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
 - 1. Layout Responsibility: Preparation of Shop Drawings Cabling Administration Drawings, and field-testing program development by an RCDD.
 - 2. Installation Supervision: Installation shall be under the direct supervision of Registered Technician who shall be present at all times when Work of this Section is performed at Project site.
 - 3. Testing Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.
- B. Testing Agency Qualifications: An NRTL.
 - 1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.
- C. All telecommunication type cabling (UTP) installed under this contract shall be wholly manufactured and assembled in the United States of America. Wholly or partially manufactured cable or cabling assembly from any other country shall NOT be allowed and entire cabling solution shall be removed, replaced and retested at contractor's expense.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Test cables upon receipt at Project site.
 - 1. Test each pair of UTP cable for open and short circuits.

1.11 WARRANTY

- A. Materials shall have a minimum of 25-year warranty after acceptance by Owner.
- B. Warranty shall include all labor, material, and travel time.

PART 2 - PRODUCTS

2.1 HORIZONTAL CABLING DESCRIPTION

- A. UTP cabling shall be premium CAT 6A with capability for 1 Gbps data transmission speed over Ethernet protocol.
- B. Approved premium cabling (Manufacturer's best CAT 6A cable, minimally compliant CAT 6A will not be approved: submit for approval prior to bid) and connectivity systems manufacturers for this project are:
 - 1. **Basis of Design: Panduit**
 - 2. Commscope Systimax.
 - 3. Tyco.
 - 4. Belden.
 - 5. Leviton
 - 6. BerkTek
 - 7. [\[*AD2\]Superior Essex Communications](#)
- C. Description: 100-ohm, four-pair UTP, formed into 4-pair, groups covered with a colored thermoplastic jacket. See color coding for various uses on drawings.
 - 1. Comply with ICEA S-90-661 for mechanical properties.
 - 2. Comply with TIA/EIA-568-C.1 for performance specifications.
 - 3. Comply with ANSI/TIA/EIA-568-C.2-10568-C.2, Category 6A.
 - 4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70.
- D. Communications Plenum Rated: Type CMP or MPP, complying with NFPA 262.
- E. Color Coding: All CAT 6A horizontal cable serving the equipment, patch cords, equipment cords, and jacks shall conform to the following color coding (verify color coding with Owner):
 - 1. Standard Data: Blue
 - 2. Wireless Access Points: Gray.

3. Building Automation HVAC & Controls: Orange.
 4. Lighting: Yellow.
 5. AV: Blue.
 6. Security, access controls, camera: Refer to Div 28 specifications.
- F. Horizontal cable and its connecting hardware provide the means of transporting signals between the telecommunications outlet/connector and the horizontal cross-connect located in the communications equipment room. This cabling and its connecting hardware are called a "permanent link," a term that is used in the testing protocols.
1. Horizontal cabling shall contain no more than one transition point or consolidation point between the horizontal cross-connect and the telecommunications outlet/connector.
 2. Bridged taps and splices shall not be installed in the horizontal cabling.
- G. The maximum allowable horizontal cable length shall be 295 feet (90 m). This maximum allowable length does not include an allowance for the length of 16 feet (4.9 m) to the workstation equipment or in the horizontal cross-connect.
- H. Install service loops at both ends of each data and voice cable as follows:
1. Tel/data outlet: 1 meter in length at underfloor boxes in access floor (except 4 meters in EOC area) and 1 meter above wall mounted boxes (at conduit stubbed into accessible ceiling space).
 2. IT rooms: Provide 2 meters above cable tray.
 3. EOC: Provide 4-meter coiled loop under access floor for each outlet to allow for potential relocation of outlet in floor.

2.2 UTP PERFORMANCE REQUIREMENTS

- A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA/EIA-568-C.1 when tested according to test procedures of this standard.
- B. All UTP cable shall be plenum rated cable.
- C. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Flame-Spread Index: 25 or less.
 2. Smoke-Developed Index: 450 or less.
- D. 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.
- E. Grounding: Comply with J-STD-607-B.

2.3 BACKBOARDS

- A. Backboards: Plywood, fire-retardant treated, 3/4 by 48 by 96 inches (19 by 1220 by 2440 mm) mounted with long dimension vertical. Provide plywood sheets on all walls of each data room. Comply with requirements in Section 061000 "Rough Carpentry" for plywood backing panels.

2.4 UTP CABLE HARDWARE

- A. Manufacturers:
 - a **Basis of Design: Panduit**
 - b Commscope Systimax.
 - c Tyco.
 - d Belden.
 - e Leviton
 - f BerkTek
- B. General Requirements for Cable Connecting Hardware: Comply with TIA/EIA-568-C.2, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.
- C. Connecting Blocks: 110-style IDC for Category 6A Provide blocks for the number of cables terminated on the block, plus 25 percent spare. Integral with connector bodies, including plugs and jacks where indicated. Blocks shall be 100 pair, or 300 pair as shown on drawings.
- D. Cross-Connect: Modular array of connecting blocks arranged to terminate building cables and permit interconnection between cables.
- E. Patch Panel: Modular panels housing multiple-numbered jack units with IDC-type connectors at each jack for permanent termination of pair groups of installed cables. Provide CAT 6A, 48 port patch panels for all horizontal cable connectivity.
- F. Jacks and Jack Assemblies: Modular, color-coded, eight-position modular receptacle units with integral IDC-type terminals.
- G. Patch Cords: Factory-made, four-pair cables with lengths as shown below, terminated with eight-position modular plug at each end.
 - 1. Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure Category 6A performance. Patch cords shall have latch guards to protect against snagging.
 - 2. Patch cords shall have color-coded boots for circuit identification.
 - 3. Patch cord quantities: Provide a patch cord for each port in each patch panel.
 - 4. Patch cord lengths: 1 meter (for ½ of patch cords), 2 meter (for ½ of patch cords).
- H. Equipment cords:
 - 1. Provide one 3-meter equipment cord for each jack in each telecom outlet.
 - 2. Provide one 3-meter equipment cord for each of the 12 jacks in each 24 port patch panel consolidation point.

2.5 CONSOLIDATION POINTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. American Technology Systems Industries, Inc.
 - 2. Belden Inc.
 - 3. Chatsworth Products, Inc.
 - 4. Dynacom Inc.
 - 5. Hubbell Premise Wiring.
 - 6. Molex Premise Networks; a division of Molex, Inc.
 - 7. Ortronics, Inc.; a subsidiary of Legrand Group.
 - 8. Panduit Corp.
 - 9. Siemon Co. (The).
- B. Description: Consolidation points shall comply with requirements for cable connecting hardware.
 - 1. Number of Terminals per Field: One for each conductor in assigned cables.
 - 2. Coordinate "Number of Connectors per Field" Subparagraph below with Drawings for quantity of connectors.
 - 3. Mounting: Furniture
 - 4. NRTL listed as complying with UL 50 and UL 1863.
 - 5. When installed in plenums used for environmental air, NRTL listed as complying with UL 2043.

2.11 TELECOMMUNICATIONS OUTLET/CONNECTORS

- A. Jacks: 100-ohm, balanced, twisted-pair connector; four-pair, eight-position modular. Comply with TIA/EIA-568-C.1.
- B. Workstation Outlets: Two or Four port-connector assemblies shall be provided as noted on the drawings and shall be mounted in a single faceplate.
 - 1. Stainless steel plate:
 - 2. For use with snap-in jacks accommodating any combination of UTP
 - a. Flush mounting jacks, positioning the cord at a 45-degree angle.
 - 3. Legend: Factory labeled by silk-screening or engraving for faceplates.
 - 4. Legend: Machine printed, in the field, using adhesive-tape label.
 - 5. Legend: Snap-in, clear-label covers and machine-printed paper inserts.

2.12 GROUNDING

- A. Comply with requirements in Section 260526 and 270526 "Grounding and Bonding for Electrical Systems" for grounding conductors and connectors.
- B. Comply with J-STD-607-B.

2.13 IDENTIFICATION PRODUCTS

- A. Comply with TIA/EIA-606-A and UL969 for labeling materials, including label stocks, laminating adhesives, and inks used by label printers.
- B. Comply with requirements in Section 260553 "Identification for Electrical Systems."

2.14 SOURCE QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to evaluate cables.
- B. Factory test UTP cables according to TIA/EIA-568-C.2.
- C. Cable will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 ENTRANCE FACILITIES

- A. Coordinate backbone cabling with the protectors and demarcation point provided by communications service provider. Service providers to extend their D-marcs to the network closet.

3.2 WIRING METHODS

- A. Install cables in pathways and cable trays except within consoles, cabinets, desks, and counters Conceal pathways and cables except in unfinished spaces.
 - 1. Install plenum cable in environmental air spaces, including plenum ceilings.
 - 2. Comply with requirements in Section 270528 "Pathways for Communications Systems."
 - 3. Comply with requirements in Section 270536 "Cable Trays for Communications Systems."
- B. Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
- C. Wiring within Enclosures:
 - 1. Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.
 - 2. Install lacing bars and distribution spools.
 - 3. Install conductors parallel with or at right angles to sides and back of enclosure.

3.3 INSTALLATION OF CABLES

- A. Comply with NECA 1.
- B. General Requirements for Cabling:
 - 1. Comply with TIA/EIA-568-C.1.
 - 2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
 - 3. Install 110-style IDC termination hardware unless otherwise indicated.
 - 4. MUTOA shall not be used as a cross-connect point.
 - 5. Consolidation points may be used only for making a direct connection to telecommunications outlet/connectors:
 - a. Do not use consolidation point as a cross-connect point, as a patch connection, or for direct connection to workstation equipment.
 - b. Locate consolidation points for UTP at least 49 feet (15 m) from communications equipment room.
 - 6. Terminate conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
 - 7. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
 - 8. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
 - 9. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
 - 10. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
 - 11. Cold-Weather Installation: Bring cable to room temperature before de-reeling. Heat lamps shall not be used for heating.
 - 12. In the communications equipment room, install a 10-foot- (3-m-) long service loop on each end of cable.
 - 13. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
- C. UTP Cable Installation:
 - 1. Comply with TIA/EIA-568-C.2.
 - 2. Do not untwist UTP cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.

3.4 FIRESTOPPING

- A. Comply with requirements in Section 078413 "Penetration Firestopping."
- B. Comply with TIA-569-C, Annex A, "Firestopping."
- C. Comply with BICSI TDMM, "Firestopping Systems" Article.

3.5 GROUNDING

- A. Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.
- B. Comply with J-STD-607-B.
- C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.
- D. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

3.6 IDENTIFICATION

- A. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
 - 1. Administration Class: 3
 - 2. Color-code cross-connect fields. Apply colors to voice and data service backboards, connections, covers, and labels.
- B. Comply with requirements in Section 099123 "Interior Painting" for painting backboards. For fire-resistant plywood, do not paint over manufacturer's label.
- C. Paint and label colors for equipment identification shall comply with TIA/EIA-606-A or Class 3 level of administration, including optional identification requirements of this standard.
- D. Cable Schedule: Post in prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.
- E. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, backbone pathways and cables entrance pathways and cables, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors. Follow convention of TIA/EIA-606-A. Furnish electronic record of all drawings, in software and format selected by Owner.
- F. Cable and Wire Identification:

1. Label each cable within 4 inches (100 mm) of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
 2. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.
 3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet (4.5 m).
 4. Label each terminal strip and screw terminal in each cabinet, rack, or panel.
 - a. Individually number wiring conductors connected to terminal strips and identify each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with name and number of particular device as shown.
 - b. Label each unit and field within distribution racks and frames.
 5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.
 6. Uniquely identify and label work area cables extending from the MUTOA to the work area. These cables may not exceed the length stated on the MUTOA label.
- G. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA/EIA-606-A.
1. Cables use flexible vinyl or polyester that flex as cables are bent.

3.7 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 1. Visually inspect UTP cable jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments and inspect cabling connections for compliance with TIA/EIA-568-C.1.
 2. Visually confirm Category 6A, marking of outlets, cover plates, outlet/connectors, and patch panels.
 3. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.

4. Test UTP backbone copper cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.
 - a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-C.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
6. UTP Performance Tests:
 - a. Test for each outlet and MUTOA. Perform the following tests according to TIA/EIA-568-C.1 and TIA/EIA-568-C.2.
7. Final Verification Tests: Perform verification tests for UTP and after the complete communications cabling and workstation outlet/connectors are installed.
 - a. Data Tests: These tests assume the Information Technology Staff has a network installed and is available to assist with testing. Connect to the network interface device at the demarcation point. Log onto the network to ensure proper connection to the network.
- D. Document data for each measurement. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.
- E. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.

3.8 SOFTWARE SERVICE AGREEMENT

- A. Technical Support: Beginning with Substantial Completion, provide software support for two years.
 1. Provide 30 days' notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

3.9 DEMONSTRATION

- A. Train Owner's maintenance personnel in cable-plant management operations, including changing signal pathways for different workstations, rerouting signals in failed cables, and keeping records of cabling assignments and revisions when extending wiring to establish new workstation outlets. Include training in cabling administration software.

END OF SECTION 271500

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SECTION 280533 - RACEWAYS AND BOXES FOR DIVISION 28 SYSTEMS (*AD 02)

PART 1 - GENERAL

1.1 APPLICATION

- A. This specification shall be used for all Division 28 work and supersedes any other direction or typical NEC application unless said application is more stringent than the information provide herein.

1.2 RELATED DOCUMENTS

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

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. RGS: Rigid Galvanized Steel conduit.
- C. FMC: Flexible metal conduit.
- D. IMC: Intermediate metal conduit.
- E. LFMC: Liquidtight flexible metal conduit.
- F. LFNC: Liquidtight flexible nonmetallic conduit.
- G. NBR: Acrylonitrile-butadiene rubber.
- H. RNC: Rigid nonmetallic conduit.
- I. PVC: Schedule 40 PVC
- J. ACCESSIBLE: Conduit less than 12' above the finished floor that is capable of being exposed without damaging the building structure or finish or not permanently closed in by the structure or finish of the building. Example: Conduit below 12' AFF that is above a removable ceiling tile is considered "Accessible"
- K. SECURE: Area in which inmates have supervised or non-supervised access on a routine or constant basis. Refer to Architectural drawings for the areas designated as secure. If not clearly defined, the space shall be deemed as secure.
- L. RACEWAY: An enclosed channel of metal or nonmetallic materials designed expressly for holding wires or cables. Raceways include, but are not limited to, rigid metal conduit, rigid

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nonmetallic conduit, intermediate metal conduit, liquidtight flexible conduit, flexible metallic tubing, flexible metal conduit, electrical nonmetallic tubing, and electrical metallic tubing.

1. Cables such as MC, AC, or Greenfield are NOT raceways.

1.4 ACTION SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 1. Allied Tube & Conduit.
 2. O-Z/Gedney; an EGS Electrical Group brand; an Emerson Industrial Automation business.
 3. Robroy Industries.
 4. Thomas & Betts Corporation.
- B. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. GRC: Comply with ANSI C80.1 and UL 6.
- D. IMC: Comply with ANSI C80.6 and UL 1242.
- E. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
 1. Comply with NEMA RN 1.
 2. Coating Thickness: 0.040 inch, minimum.
- F. EMT: Comply with ANSI C80.3 and UL 797.
- G. FMC: Comply with UL 1; zinc-coated steel.
- H. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- I. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
 1. Fittings for EMT: Steel compression type.
 2. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
 3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.

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- J. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS, AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Electri-Flex Company.
 - 3. RACO; Hubbell.
 - 4. Thomas & Betts Corporation.
- B. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. PVC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.

2.3 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Cooper B-Line, Inc.; a division of Cooper Industries.
 - 2. Hoffman; a brand of Pentair Equipment Protection.
 - 3. Square D.
- B. Description: Sheet metal, complying with UL 870 and NEMA 250, unless otherwise indicated, and sized according to NFPA 70.
 - 1. Metal wireways installed outdoors shall be listed and labeled NEMA 3R, Flanged-and-gasketed type, and marked for intended location and application.
- C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Screw-cover type unless otherwise indicated.
- E. Finish: Manufacturer's standard enamel finish.

2.4 SURFACE RACEWAYS

- A. Listing and Labeling: Surface raceways shall be listed and labeled as defined in NFPA 70, and marked for intended location and application.

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- B. Surface Metal Raceways: Galvanized steel with snap-on covers complying with UL 5. Manufacturer's standard enamel finish in color selected by Architect].
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. MonoSystems, Inc.
 - b. Panduit Corp.
 - c. Wiremold / Legrand.

2.5 BOXES, ENCLOSURES, AND CABINETS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. EGS/Appleton Electric.
 2. Erickson Electrical Equipment Company.
 3. Hoffman; a brand of Pentair Equipment Protection.
 4. Hubbell Incorporated.
 5. O-Z/Gedney; an EGS Electrical Group brand; an Emerson Industrial Automation business.
 6. RACO; Hubbell.
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy or aluminum, Type FD, with gasketed cover.
- E. Metal Floor Boxes:
1. Material: Cast metal.
 2. Shape: Rectangular.
 3. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- F. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.
- G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- H. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum or galvanized, cast iron with gasketed cover.
- I. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

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- J. Gangable boxes are not prohibited.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
1. Exposed Conduit: GRC.
 2. Concealed Conduit, Aboveground: GRC.
 3. Concealed in Masonry: GRC or PVC grouted solid after installation. Convert to metallic conduit per this specification prior to exiting the wall above ground.
 4. Concealed in Poured Concrete Walls: GRC or PVC. Convert to metallic conduit per this specification prior to exiting the wall above ground.
 5. Underground Conduit: Type PVC, direct buried.
 6. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 7. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R
- B. Indoors Secure Locations: Apply raceway products as specified below unless otherwise indicated:
1. Exposed, GRC.
 2. Concealed in Ceilings Above 12' and Interior Walls and Partitions: EMT.
 3. Concealed in Masonry: GRC or PVC grouted solid after installation. Convert to metallic conduit per this specification prior to exiting the wall above ground.
 4. Concealed in Poured Concrete Walls: GRC or PVC. Convert to metallic conduit per this specification prior to exiting the wall above ground.
 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 6. Damp or Wet Locations: GRC.
 7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.
 8. Concealed in Ceilings below 12': GRC. [*AD4]
- C. Indoors Non-secure Locations: Apply raceway products as specified below unless otherwise indicated:
1. Exposed, Not Subject to Physical Damage: EMT.
 2. Exposed and Subject to Physical Damage: GRC. Raceway locations include the following:
 - a. Loading dock.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms.
 3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 4. Concealed in Masonry: GRC or PVC grouted solid after installation. Convert to metallic conduit per this specification prior to exiting the wall above ground.
 5. Concealed in Poured Concrete Walls: GRC or PVC. Convert to metallic conduit per this specification prior to exiting the wall above ground.

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6. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 7. Damp or Wet Locations: GRC.
 8. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.
- D. Minimum Raceway Size: 3/4-inch trade size.
- E. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
 3. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.
 4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- Concealed conduit to the greatest extent possible. For all exposed and accessible conduit within the secure perimeter, provide RGS, IMC unless otherwise noted on the drawings. Refer to Architectural drawings for secure perimeter.
- F. AC is not acceptable in any application.
- G. Do not install aluminum conduits, boxes, or fittings.
- H. Install surface raceways only where indicated on Drawings.
- I. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

3.2 INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- B. All conduit shall be tight to the structure and secured with two-hole steel conduit straps. Unless indicated otherwise on the drawings, for all exposed or accessible conduit inside the secure perimeter, the distance between supports shall be one half that specified by NEC. (twice as many supports as required by NEC).
- C. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- D. Complete raceway installation before starting conductor installation.

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- E. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- F. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- G. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- H. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- I. All conduit to be installed on exterior masonry shall not run continuously within the wall cavity.
- J. Support conduit within 6 inches of enclosures to which attached.
- K. Raceways Embedded in Slabs are not permitted, except as required for entry into recessed floor boxes. Conduits shall be routed below the slab within the porous fill and stub-up at the required location. Transition from PVC to RGS with RGS elbow before rising above the floor. After RGS elbow, stub-up conduit shall be type indicated in Part 3.1 above. PVC shall not be permitted exposed above the floor.
- L. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.
- M. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
- N. Stub-ups to Above Recessed Ceilings:
 - 1. Use EMT, IMC, or RMC for raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- O. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- P. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- Q. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- R. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.

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- S. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- T. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- U. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- V. Special Fittings and Installations:
 - 1. Install in each run of aboveground RMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F and that has straight-run length that exceeds 100 feet.
 - 2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
 - c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.
 - d. Attics: 135 deg F temperature change.
 - 3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
 - 4. Install expansion fittings at all locations where conduits cross building or structure expansion joints. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- W. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for recessed and semi-recessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- X. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements and also refer to Architectural elevations. Install boxes with height measured to center of box unless otherwise indicated.
- Y. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box. Retain the fire rating of any fire rated wall or assembly.
- Z. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

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- AA. Locate boxes so that cover or plate will not span different building finishes.
- BB. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- CC. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- DD. Set metal floor boxes level and flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom for pipe less than 6 inches in nominal diameter.
2. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Section 312000 "Earth Moving."
3. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
 - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete for a minimum of 12 inches on each side of the coupling.
 - b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
4. Underground Warning Tape: Comply with requirements in Section 260553 "Identification for Electrical Systems."

3.4 CONDUIT COLOR CODING

- #### A. All outlet boxes, junction boxes and pull boxes shall have their covers and exterior visible surfaces painted with colors to match the surface color scheme outlined below. This includes covers on boxes above lift-out and other type accessible ceilings, where identification shall also include branch circuit designation. Mark conduit a minimum of each 10'-0"
1. Blue for 120/208-volts normal circuits
 2. Black for 277/480-volts normal circuits
 3. Bright red for all conduit related to fire alarm system.
 4. Dark red (burgundy) for all conduit related to security.
 5. Green for all conduit related to NEC 701 and 702 emergency systems.
 6. Orange for all conduit related NEC 700 emergency systems
 7. Brown for all conduit related to data systems.

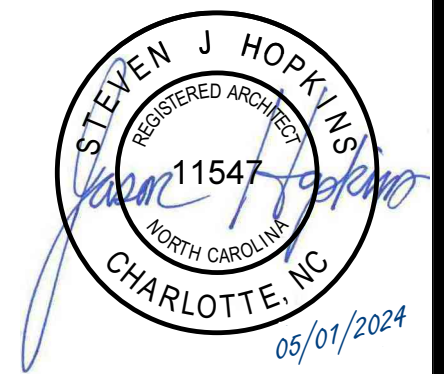
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8. White for all conduit related to paging systems.
9. Purple for all conduit related to TV systems or other LV systems.

3.5 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Maintain the fire rating of all fire rated walls and assemblies in which electrical raceway or boxes are installed.

END OF SECTION 270533

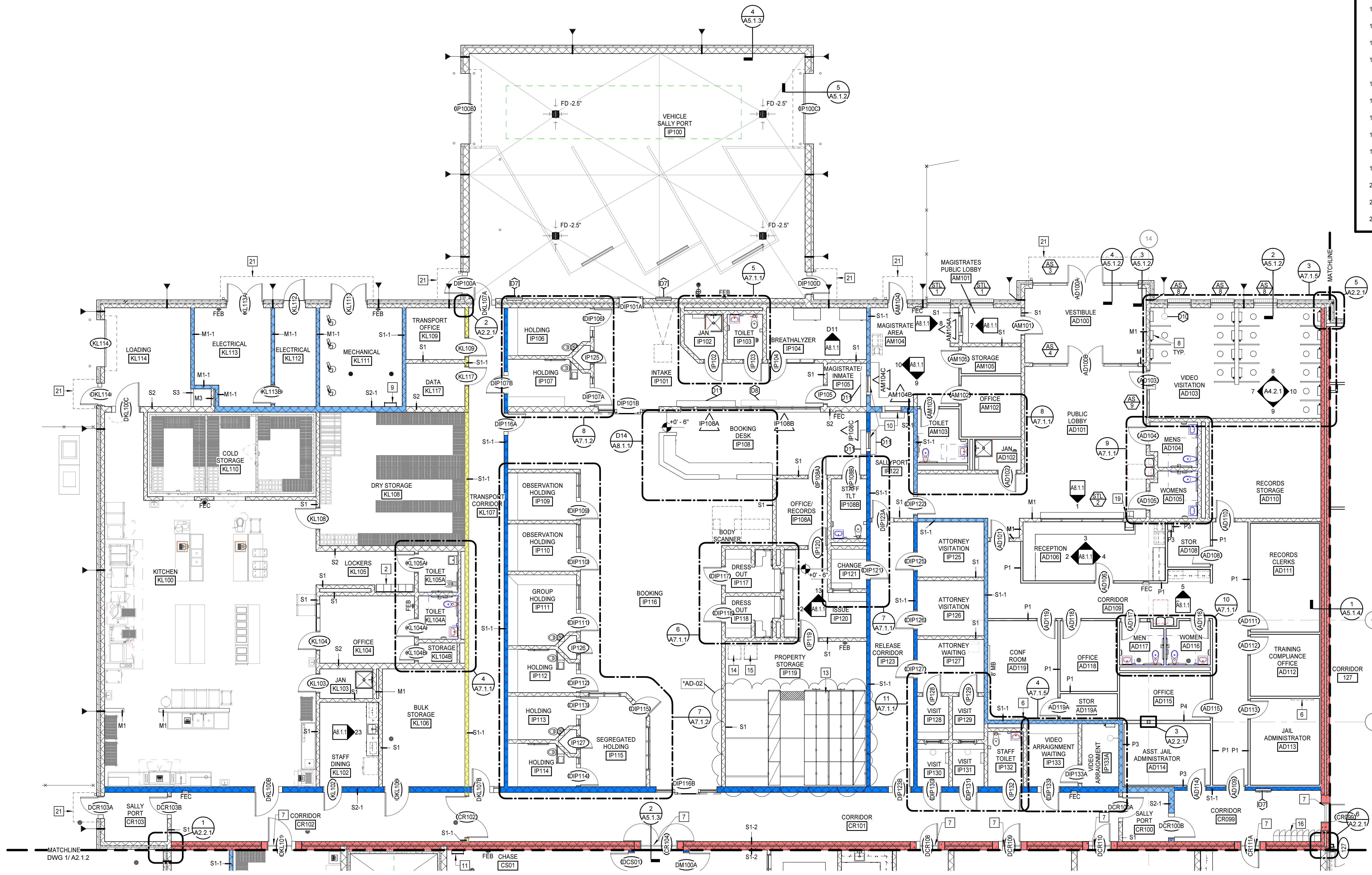
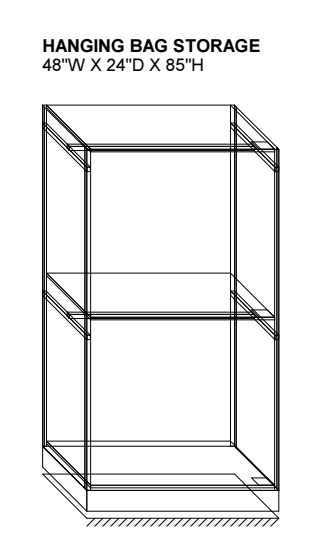


PROJECT NO:	611688
DATE:	05/10/2024
REVISIONS:	
DATE:	DESCRIPTION
06/04/24	*AD-02

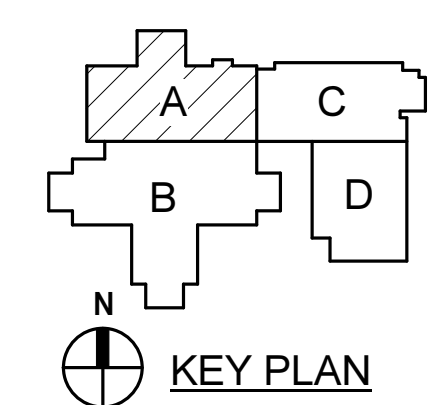
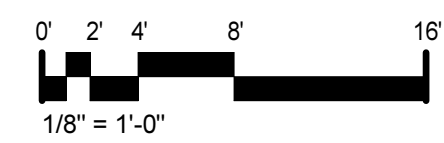
FLOOR PLAN GENERAL NOTES	
A	PROVIDE CONT. SILICONE CAULK AT ALL DOOR FRAMES WHERE GYP. BOARD AND FRAMES MEET BEFORE PAINTING OCCURS.
B	PROVIDE PAINTED METAL FINISH ON ALL CEILING AND WALL ACCESS PANELS FOR ACCESS TO MECHANICAL, ELECTRICAL, AND PLUMBING SPACES.
C	"MIN." FOR DIMENSIONS INDICATED MINIMUM ACCEPTABLE DIMENSION. IF "MIN." DIMENSIONS FALL SHORT OF WHAT IS SHOWN ON DRAWINGS, GC IS TO NOTIFY THE ARCHITECT IMMEDIATELY SO AS TO NOT DELAY THE PROJECT.

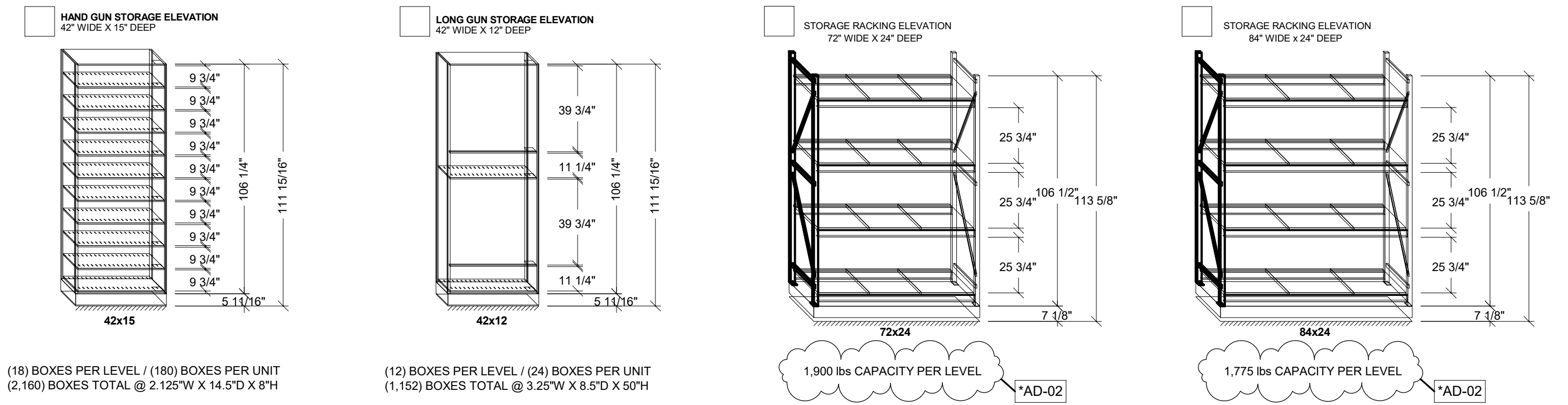
FLOOR PLAN KEYNOTES	
APPLIES TO DRAWINGS A2.1.1 - A2.1.7	
REPRESENTED BY [Symbol]	
1	CMU LOW WALL PER DETAIL 1/A5.2.1
2	DOUBLE TIER METAL LOCKERS 15'x15'x72"
3	INMATE PHONE (NIC)
4	KIOSK (NIC)
5	MIRROR - 48"W X 72"H
6	50" MONITOR (NIC) - MOUNT AT 66" AFF TO CENTER OF SCREEN
7	FLOOR EXPANSION JOINT
8	VIDEO VISITATION STATION
9	WALL MOUNTED, STEEL ROOF ACCESS LADDER
10	AUTOMATIC FIRE SHUTTER @ THIS LOCATION
11	WALL MOUNTED CHASE LADDER
12	CHAIN LINK FENCE - EXTEND TO UNDERSIDE OF CEILING
13	MECHANICALLY ASSISTED MOBILE STORAGE SHELVING SYSTEM - REFER TO ELEVATION ON A2 DRAWINGS.
14	WASHER (NIC)
15	DRYER (NIC)
16	FOUR-TIER METAL LOCKERS 12'x12'x72"
17	DOUBLE-TIER PHENOLIC Z-CONFIGURATION LOCKERS 12'x12'x72"
18	DOUBLE TIER METAL LOCKERS 12'x12'x72"
19	PACKAGE PASS - REFER TO DETAIL ON A2.1.
20	PASS-THRU EVIDENCE LOCKERS
21	DASHED LINE INDICATES A PRE-MANUFACTURED PROTECTIVE COVER ABOVE
22	REFRIGERATED PASS-THRU LOCKER COMPARTMENT

SHELVING SYSTEM - PROPERTY STORAGE
 1/4" = 1'-0"



FLOOR PLAN - PART A
 1/8" = 1'-0"





EVIDENCE STORAGE ELEVATIONS
1/4" = 1'-0"

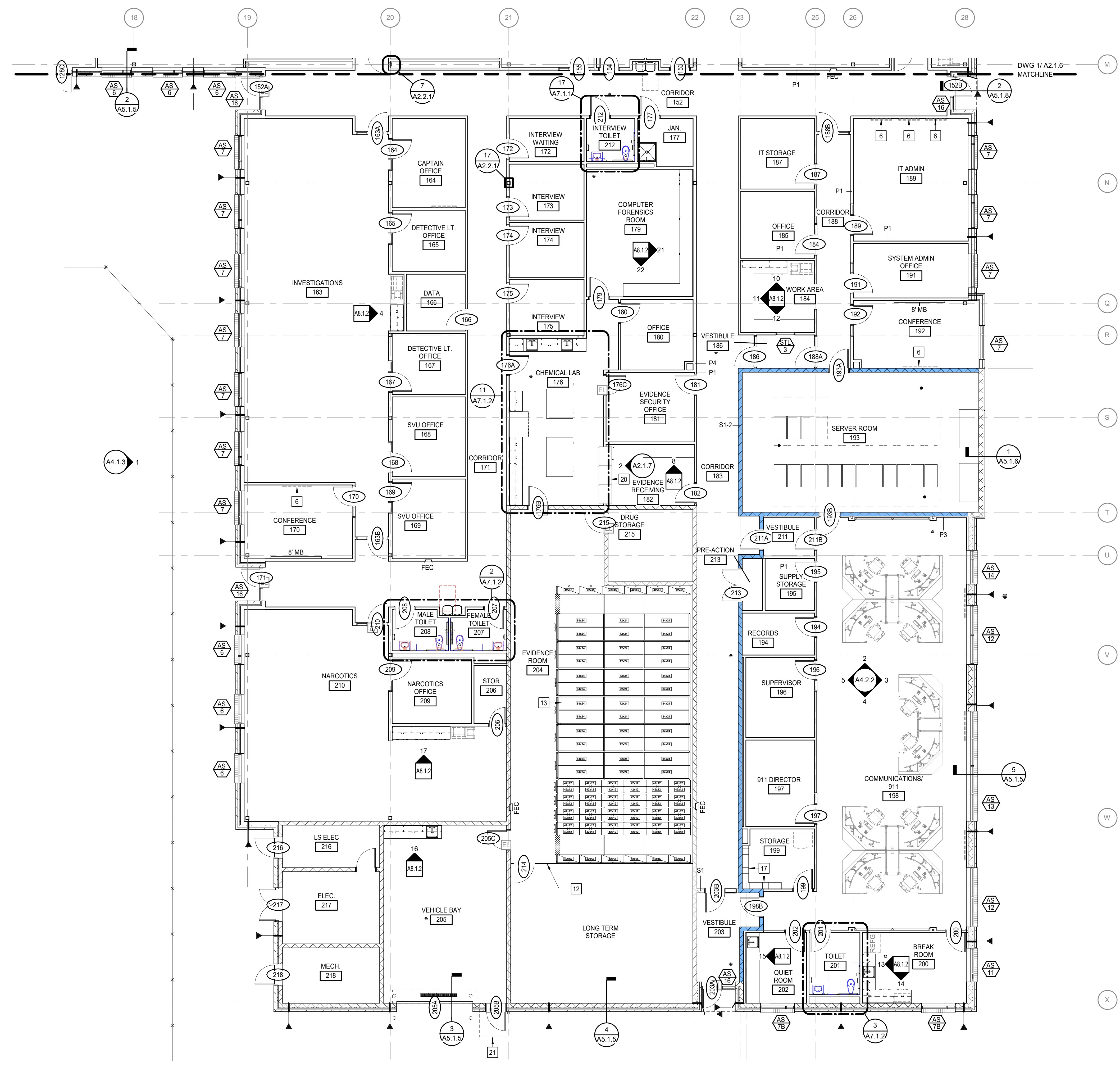
EVIDENCE LOCKERS ELEVATION
1/4" = 1'-0"

FLOOR PLAN GENERAL NOTES

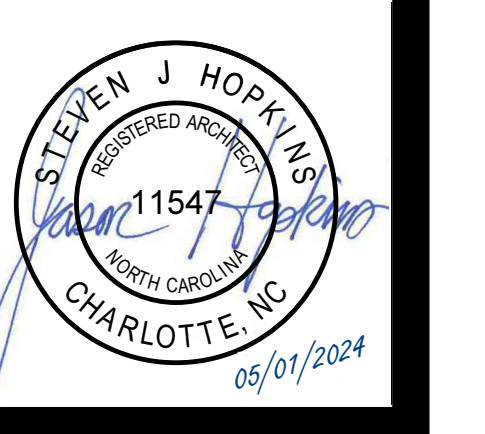
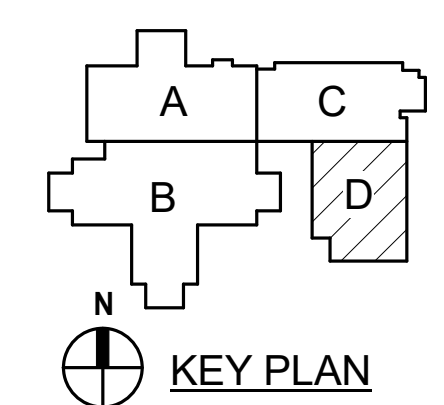
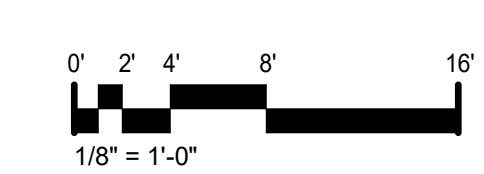
- A. PROVIDE CONT. SILICONE CAULK AT ALL DOOR FRAMES WHERE GYP. BOARD AND FRAMES MEET BEFORE PAINTING OCCURS.
- B. PROVIDE PAINTED METAL FINISH ON ALL CEILING AND WALL ACCESS PANELS FOR ACCESS TO MECHANICAL, ELECTRICAL, AND PLUMBING SPACES.
- C. "MIN" FOR DIMENSIONS INDICATED MINIMUM ACCEPTABLE DIMENSION. IF "MIN" DIMENSIONS FALL SHORT OF WHAT IS SHOWN ON DRAWINGS, GC IS TO NOTIFY THE ARCHITECT IMMEDIATELY SO AS TO NOT DELAY THE PROJECT.

FLOOR PLAN KEYNOTES
APPLIES TO DRAWINGS A2.1.1 - A2.1.7
REPRESENTED BY [A]

- 1 CMU LOW WALL PER DETAIL 1/A5.2.1
- 2 DOUBLE TIER METAL LOCKERS 15"x15"x72"
- 3 INMATE PHONE (NIC)
- 4 KIOSK (NIC)
- 5 MIRROR - 48"W X 72"H
- 6 50" MONITOR (NIC) - MOUNT AT 60" AFF TO CENTER OF SCREEN
- 7 FLOOR EXPANSION JOINT
- 8 VIDEO VISITATION STATION
- 9 WALL MOUNTED, STEEL ROOF ACCESS LADDER
- 10 AUTOMATIC FIRE SHUTTER @ THIS LOCATION
- 11 WALL MOUNTED CHASE LADDER
- 12 CHAIN LINK FENCE - EXTEND TO UNDERSIDE OF CEILING
- 13 MECHANICALLY ASSISTED MOBILE STORAGE SHELVING SYSTEM - REFER TO ELEVATION ON A2 DRAWINGS.
- 14 WASHER (NIC)
- 15 DRYER (NIC)
- 16 FOUR-TIER METAL LOCKERS 12"x12"x72"
- 17 DOUBLE-TIER PHENOLIC Z-CONFIGURATION LOCKERS 12"x12"x72"
- 18 DOUBLE TIER METAL LOCKERS 12"x12"x72"
- 19 PACKAGE PASS - REFER TO DETAIL ON A2.2.1.
- 20 PASS-THRU EVIDENCE LOCKERS
- 21 DASHED LINE INDICATES A PRE-MANUFACTURED PROTECTIVE COVER ABOVE
- 22 REFRIGERATED PASS-THRU LOCKER COMPARTMENT



FLOOR PLAN - PART D
1/8" = 1'-0"



PROJECT NO:	611888
DATE:	05/11/2024
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DATE	DESCRIPTION
06/04/24	*AD-02

DETENTION DOOR SCHEDULE-BASE BID

Table with columns: NUMBER, HWDR SET NO., TYPE, SIZE (NOMINAL), MATL, SECURITY GLAZING TYPE, FRAME, HEAD DETAIL, JAMB DETAIL, JAMB DETAIL, SILL DETAIL, SECURITY, MASTER, FIRE RATING, SHUTTER, FOOD PASS, NOTES. Contains 1000+ rows of door specifications.

DETENTION DOOR SCHEDULE-BASE BID

Table with columns: NUMBER, HWDR SET NO., TYPE, SIZE (NOMINAL), MATL, SECURITY GLAZING TYPE, FRAME, HEAD DETAIL, JAMB DETAIL, JAMB DETAIL, SILL DETAIL, SECURITY, MASTER, FIRE RATING, SHUTTER, FOOD PASS, NOTES. Contains 24 rows of door specifications.

DETENTION DOOR SCHEDULE-ALTERNATE

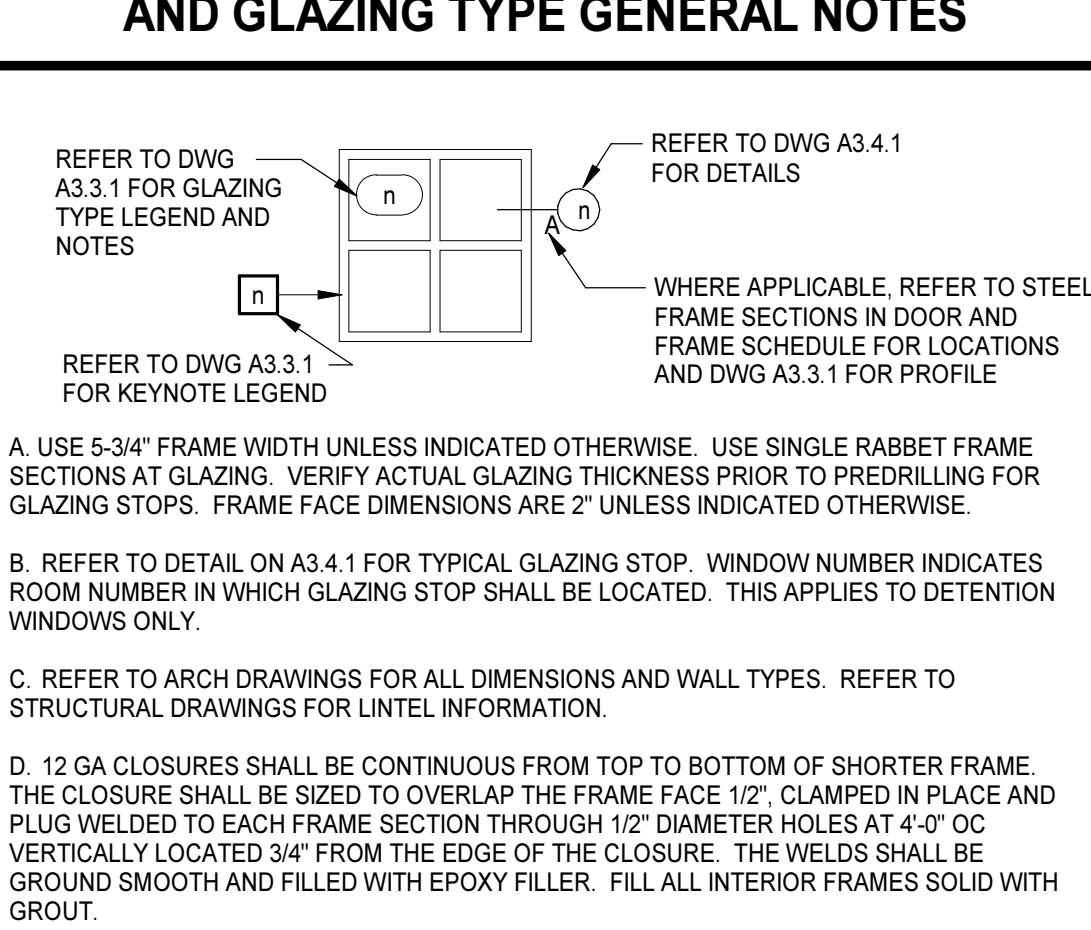
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DETENTION WINDOW SCHEDULE

Table with columns: NO., GLAZING TYPE, STOP SIDE (INSIDE, OUTSIDE), FRAME (HEAD, JAMB 1, JAMB 2, SILL), FIRE RATING, NOTES. Contains 24 rows of window specifications.

NOTE: DETENTION WINDOW SCHEDULE INDICATES ONLY INTERIOR DETENTION WINDOWS. FIXED EXTERIOR DETENTION WINDOWS (WINDOW FRAMES DWM m & DWM m) ARE INDICATED ON FLOOR PLANS.

DETENTION DOOR, FRAME AND GLAZING TYPE GENERAL NOTES



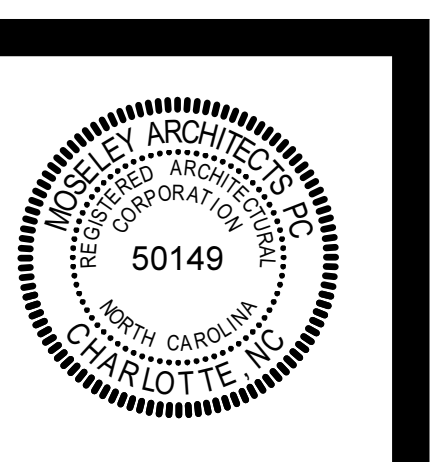
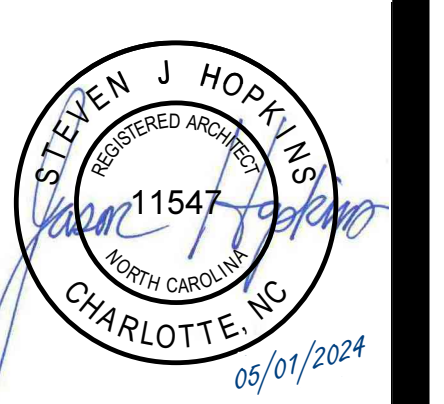
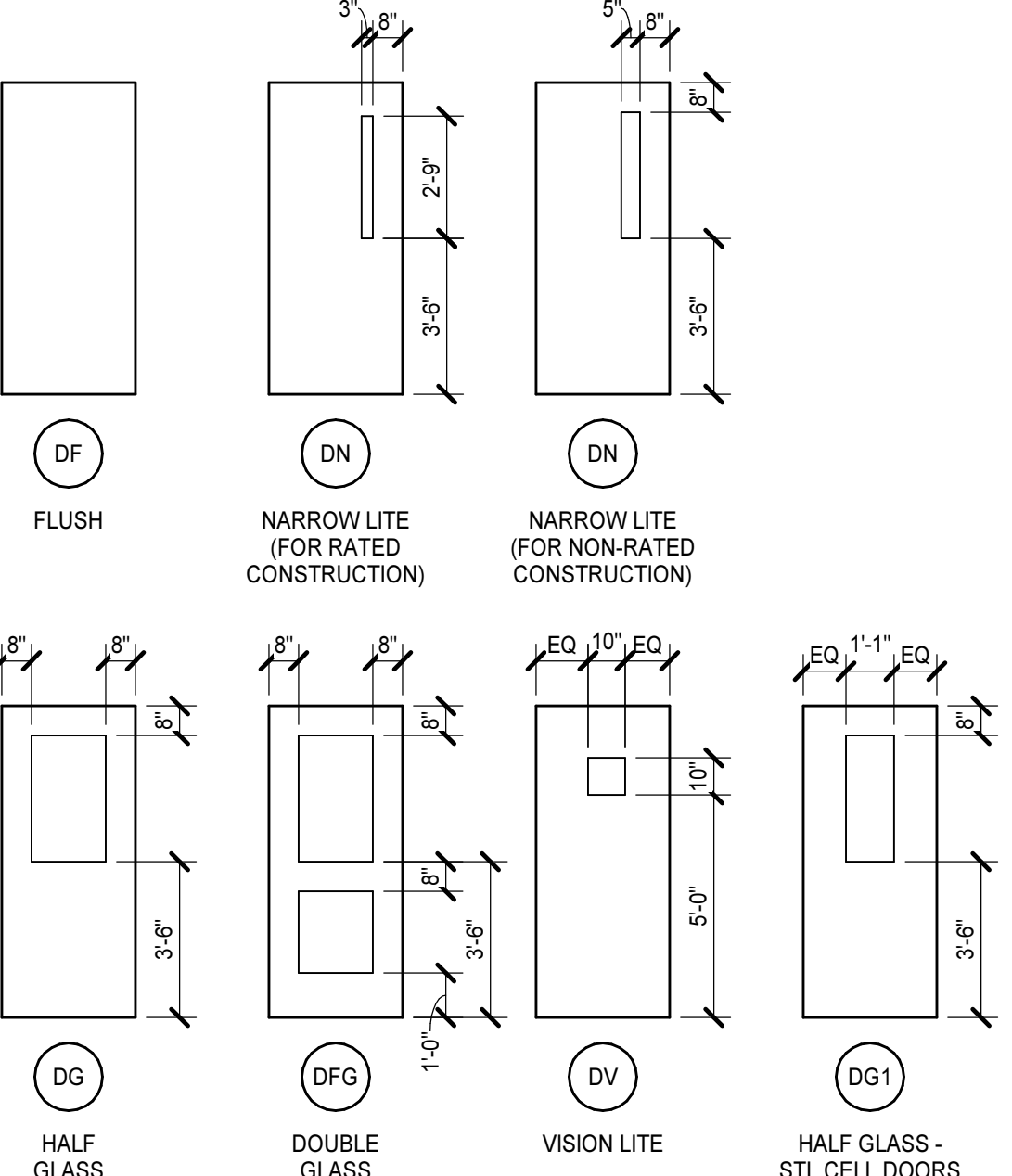
- A. USE 3/4" FRAME WIDTH UNLESS INDICATED OTHERWISE. USE SINGLE RABBIT FRAME SECTIONS IN DOOR AND FRAME SECTIONS IN DOOR AND FRAME SCHEDULES. VERIFY ACTUAL GLAZING THICKNESS PRIOR TO ORDERING FOR GLAZING STOPS. FRAME FACE DIMENSIONS ARE 2" UNLESS INDICATED OTHERWISE.
- B. REFER TO DETAIL ON A3.3.1 FOR TYPICAL GLAZING STOP WINDOW NUMBER INDICATES ROOM NUMBER IN WHICH GLAZING STOP SHALL BE LOCATED. THIS APPLIES TO DETENTION WINDOWS ONLY.
- C. REFER TO ARCH DRAWINGS FOR ALL DIMENSIONS AND WALL TYPES. REFER TO STRUCTURAL DRAWINGS FOR LINTEL INFORMATION.
- D. 12 GA CLOSURES SHALL BE CONTINUOUS FROM TOP TO BOTTOM OF SHORTER FRAME. THE CLOSURE SHALL BE SIZED TO OVERLAP THE FRAME FACE 1/2". CLAMPED IN PLACE AND PLUG WELDED TO EACH FRAME SECTION THROUGH 1/2" DIAMETER HOLES AT 4'-0" OC VERTICALLY LOCATED 3/4" FROM THE EDGE OF THE CLOSURE. THE WELDS SHALL BE SMOOTH AND FILLED WITH EPOXY FILLER. FILL ALL INTERIOR FRAMES SOLID WITH GROUT.
- E. REFER TO SPECIFICATION SECTION 111950 FOR SECURITY GLAZING TYPES.
- F. REFER TO DETENTION FRAME SECTIONS ON A3.3.1 INDICATED BY UPPERCASE LETTERS ("A", "B", "C") AS REFERENCED FROM DETENTION DOOR FRAME TYPES AND DETENTION WINDOW FRAME TYPES.
- G. THE DEC SHALL FIELD VERIFY AND COORDINATE ALL DIMENSIONS AND MOUNTING CONDITIONS PRIOR TO INSTALLATION OF DWM.
- H. DWM AND SHM SHALL BE USED INTERCHANGEABLY TO REFER TO SECURITY HOLLOW METAL AND DETENTION HOLLOW METAL. REFER TO SPECIFICATION SECTION 111910.
- I. REFER TO SECURITY HARDWARE SPECIFICATION SECTION 111960 FOR HARDWARE SET NUMBERS REFERENCED ON A3.3.1.
- J. REFER TO A3.4.1 FOR ALL HEAD, JAMB, AND SILL DETAILS REFERENCED IN DETENTION DOOR AND DETENTION WINDOW SCHEDULE, UNLESS INDICATED OTHERWISE.
- K. PROVIDE FOOD PASS AT ALL DOORS WITH • INDICATED IN FOOD PASS COLUMN. PROVIDE FOOD PASS PER DETAIL ON A3.4.1.
- L. ALL CONTROL ROOM GLAZING TO HAVE SHADING FILM PER SPECIFICATION SECTION 111950.
- M. DOOR AND FRAME DETAILS INDICATE GENERAL CHARACTERISTICS OF DOOR AND FRAME SIZES AND COMPONENTS AND MAY NOT INDICATE EXACT FIELD CONDITIONS OR REQUIREMENTS. COORDINATE DETAILS WITH OTHER DRAWINGS AND SPECS TO DETERMINE ALL COMPONENTS (E.G. SEALANTS, ANCHORS, HARDWARE, LINTELS, CLIPS) REQUIRED FOR COMPLETE AND FUNCTIONAL INSTALLATION.
- N. DOOR SWINGS ON FLOOR PLANS TAKE PRECEDENCE OVER SWINGS INDICATED ELSEWHERE (E.G. ELEVATIONS).

DETENTION DOOR & FRAME KEYNOTES

- 1. NOT USED
- 2. NOT USED
- 3. NOT USED
- 4. NOT USED

DETENTION GLAZING TYPES

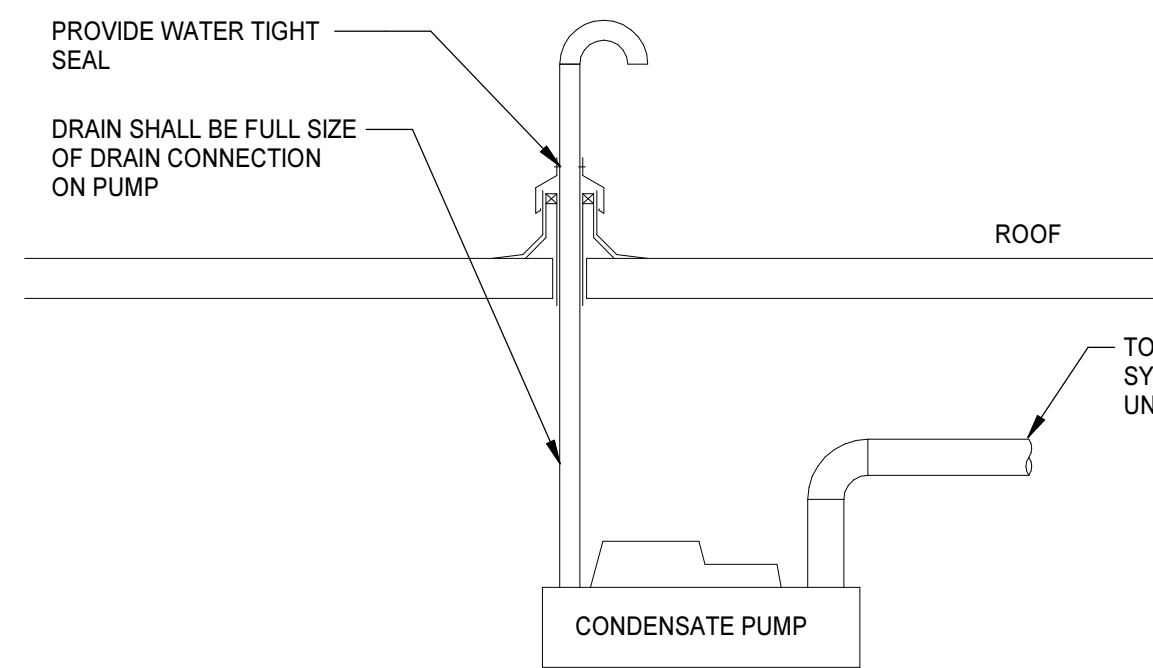
- SG-1P = 3/4" ± THICK MULTI-PLY POLYCARBONATE GLAZING, ASTM F1915 GRADE 1
- SG-2P = 1/2" ± THICK MULTI-PLY POLYCARBONATE GLAZING, ASTM F1915 GRADE 2
- SG-3P = 3/8" ± THICK MULTI-PLY POLYCARBONATE GLAZING, ASTM F1915 GRADE 3
- SG-10 = 1" ± THICK MULTI-PLY GLASS CLAD POLYCARBONATE GLAZING, ASTM F1915 GRADE 1 + SHADING FILM
- SG-11 = 1" ± THICK MULTI-PLY GLASS CLAD POLYCARBONATE GLAZING, ASTM F1915 GRADE 1
- SG-12 = 1" ± THICK MULTI-PLY GLASS CLAD POLYCARBONATE GLAZING, ASTM F1915 GRADE 2 + MIRRORPANE
- SG-13F = 1 1/8" ± THICK MULTI-PLY GLASS CLAD POLYCARBONATE GLAZING, ASTM F1915 GRADE 1, UL FIRE 45 MIN. + SHADING FILM
- SG-14F = 1 1/8" ± THICK MULTI-PLY GLASS CLAD POLYCARBONATE GLAZING, ASTM F1915 GRADE 1, UL FIRE 90 MIN.
- SG-15F = 1 1/8" ± THICK MULTI-PLY GLASS CLAD POLYCARBONATE GLAZING, ASTM F1915 GRADE 1, UL FIRE 90 MIN.
- SG-16F = 1 1/8" ± THICK MULTI-PLY GLASS CLAD POLYCARBONATE GLAZING, ASTM F1915 GRADE 2, UL FIRE 45 MIN.
- SG-20 = 1 1/8" THICK MULTI-PLY GLASS CLAD POLYCARBONATE GLAZING, UL 752, LEVEL 3 BALLISTICS RATED
- INSG-1 = 1 7/8" THICK MULTI-PLY GLASS CLAD POLYCARBONATE INSULATED GLASS UNIT, OUTER LITE 1/4" GLASS, 1/2" AIR SPACE, & INNER LITE SG-11



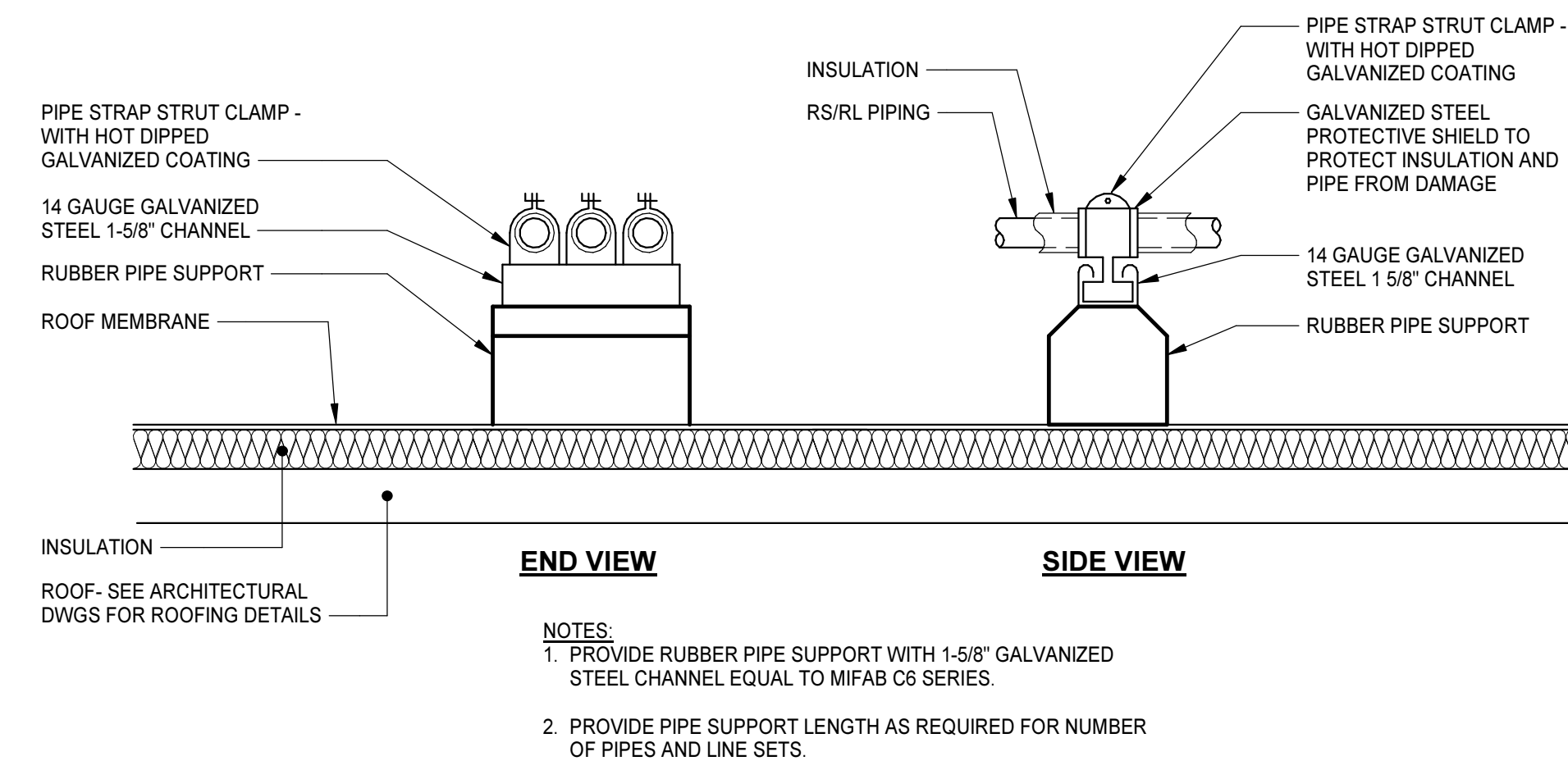
PENDER COUNTY LEG
DHSR# J-368 / FID# 220537
PENDER COUNTY, NORTH CAROLINA
1417 OLD SAVANNAH ROAD BURGAW, NC

Table with columns: PROJECT NO., DATE, REVISIONS, DATE, DESCRIPTION. Includes project number 611888, date 05/10/2024, and revision 1 dated 06/04/24.

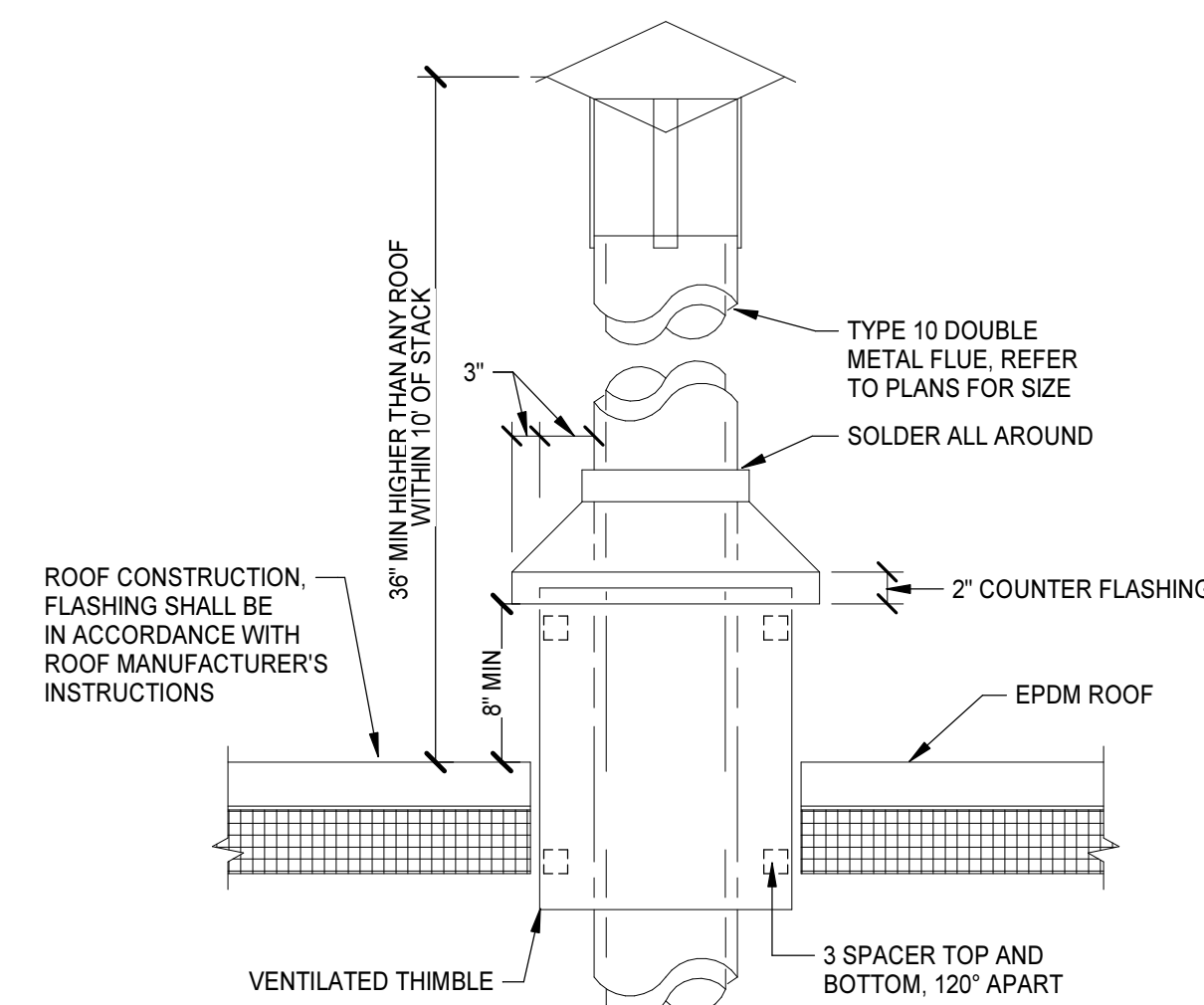
DETENTION DOOR & WINDOW SCHEDULES



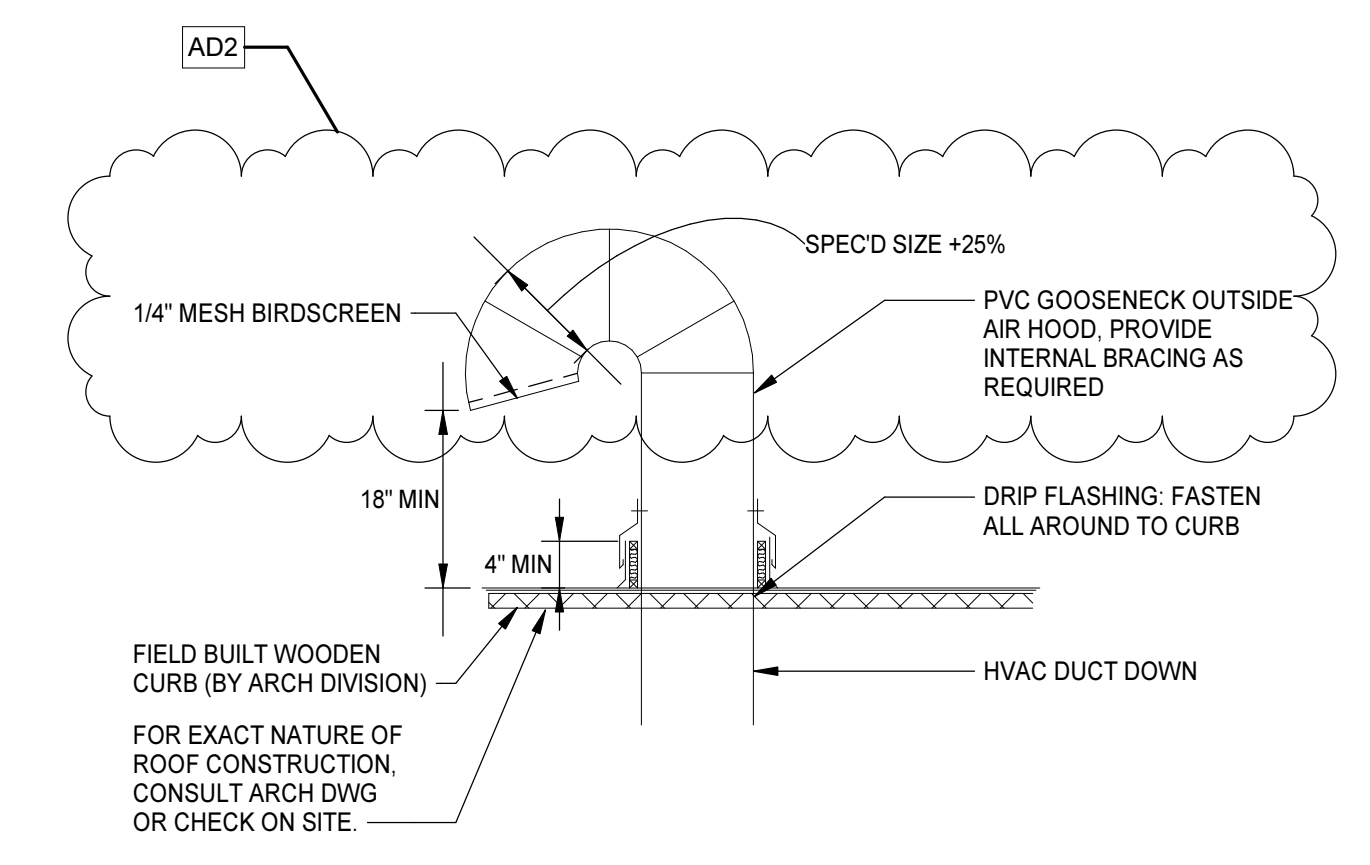
CONDENSATE DRAIN DETAIL TO ROOF
1" = 1'-0"



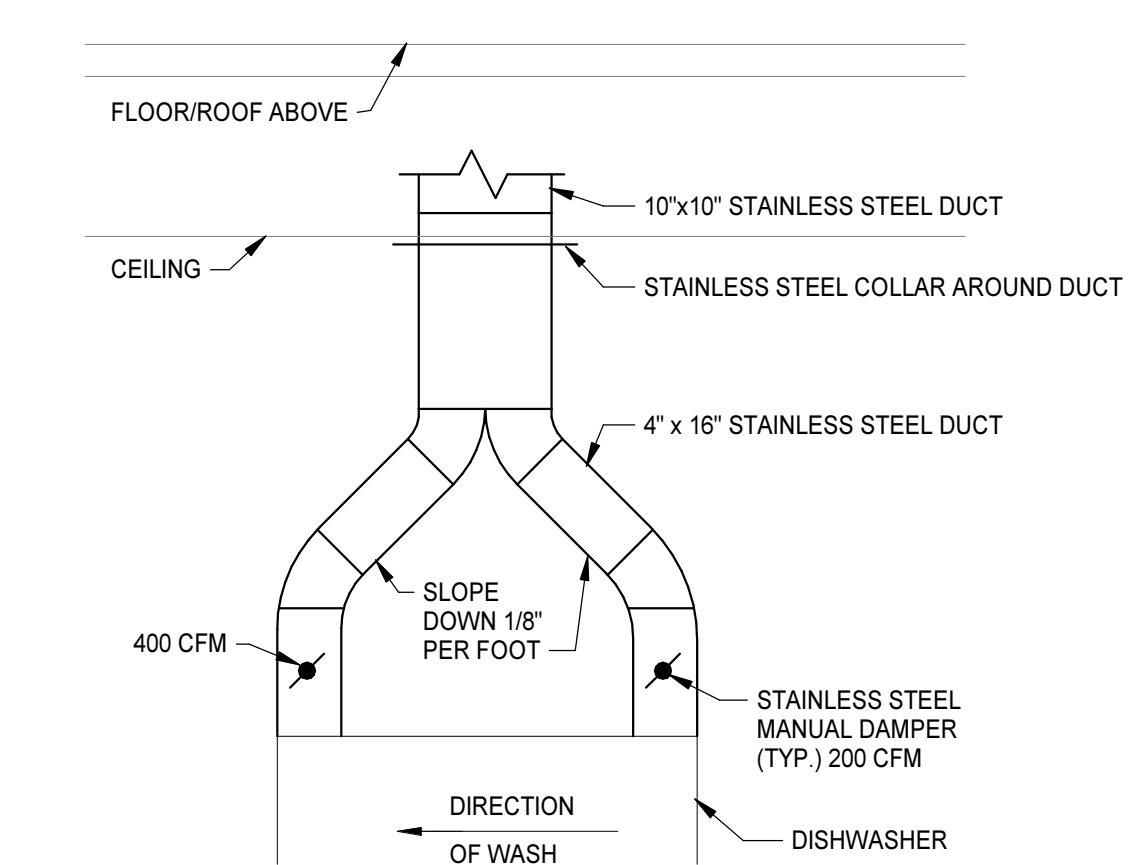
REFRIGERANT ROOF PIPE SUPPORT DETAIL
1 1/2" = 1'-0"



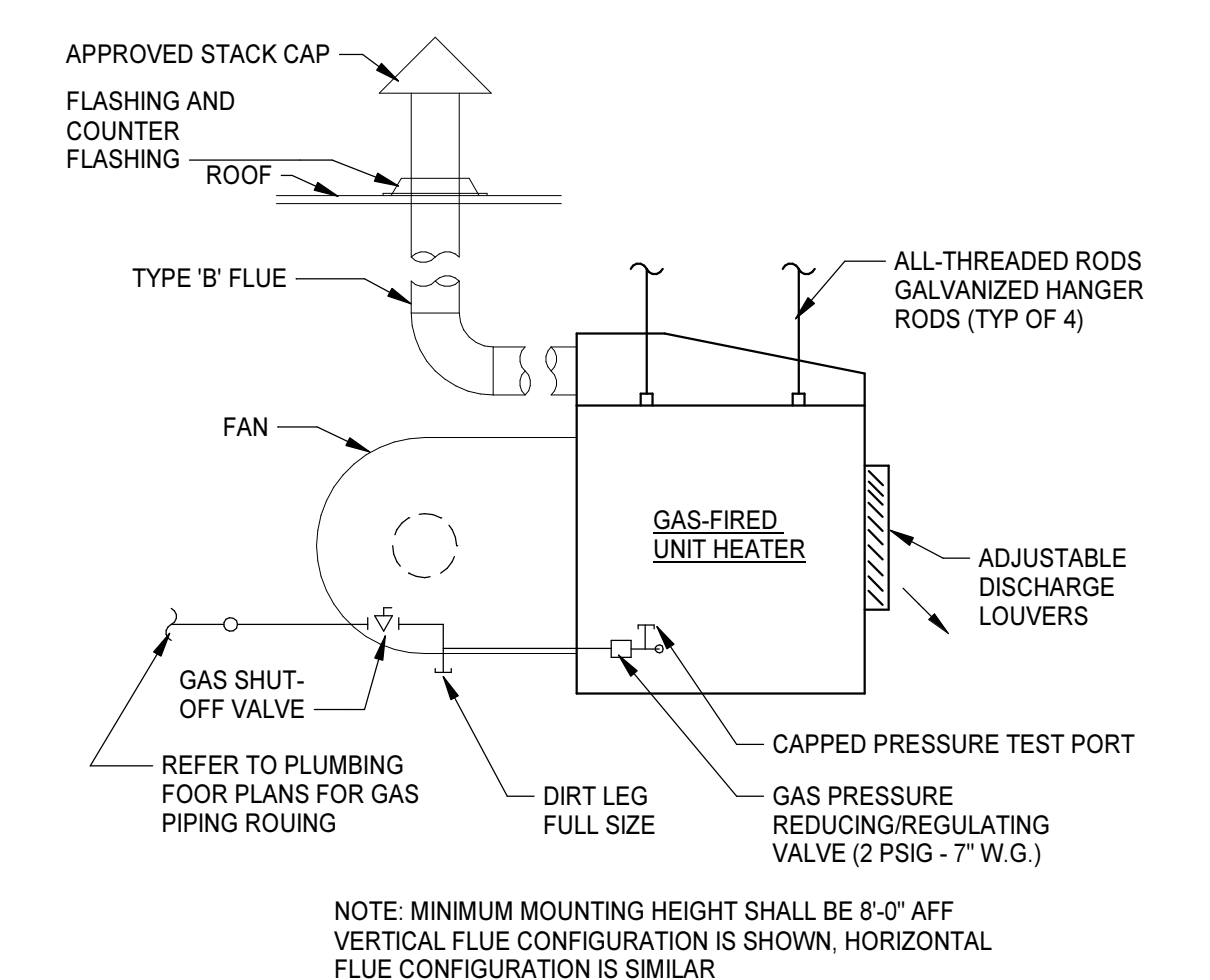
WATER HEATER FLUE TERMINATION DETAIL
NO SCALE



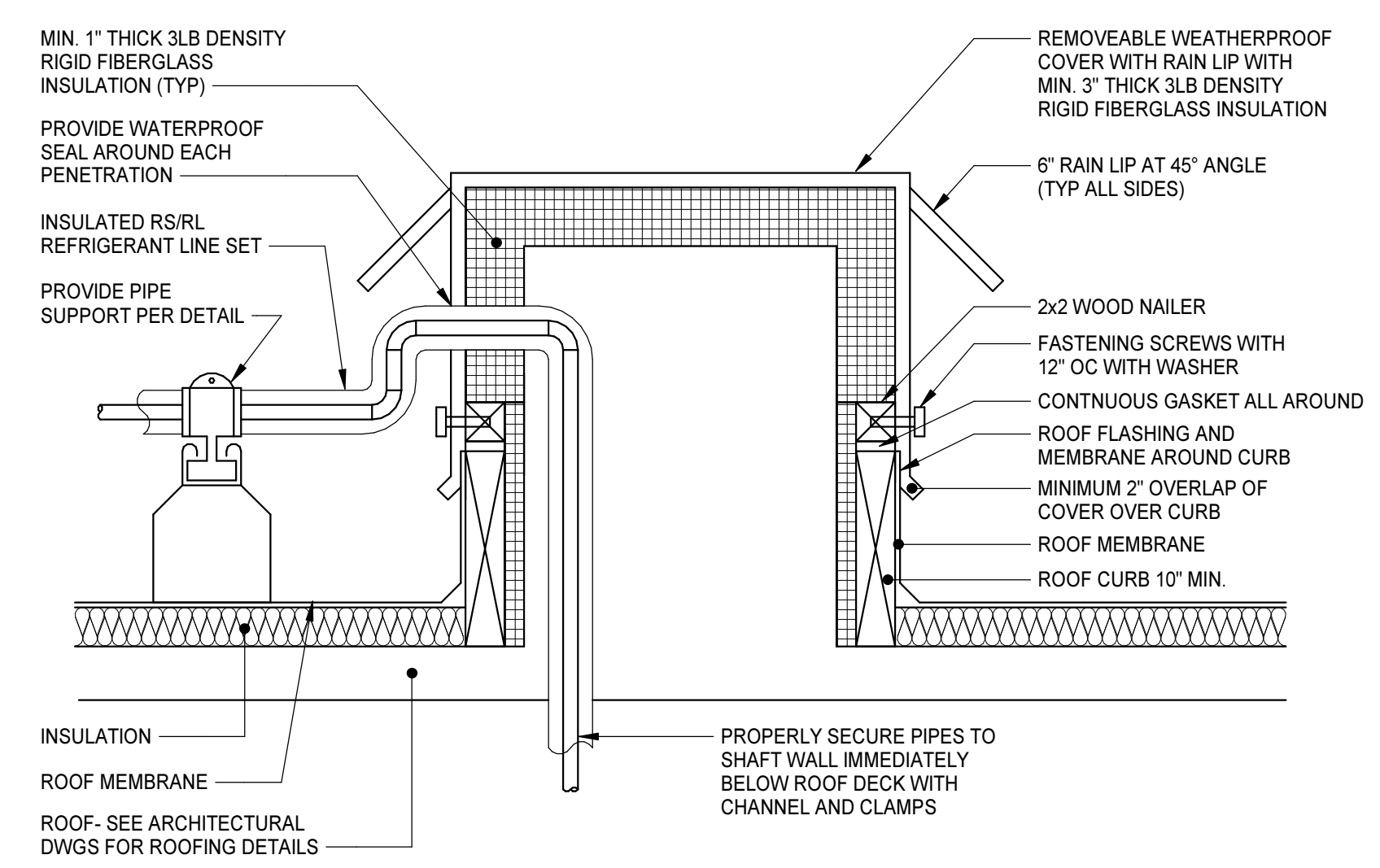
WATER HEATER OUTSIDE AIR INTAKE DETAIL
NO SCALE



DISHWASHER EXHAUST DETAIL
NO SCALE



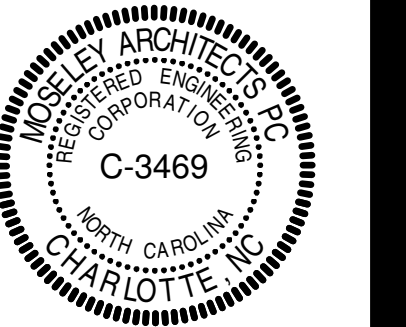
GAS UNIT HEATER DETAIL
1" = 1'-0"



REFRIGERANT PIPE PENETRATION DETAIL
1 1/2" = 1'-0"



PROJECT NO:	811888
DATE:	MAY 01, 2024
REVISIONS	
DATE	DESCRIPTION
6/4/24	AD2



PROJECT NO: 611888
DATE: MAY 01, 2024
REVISIONS
DATE DESCRIPTION
5/24/24 AD1
6/04/24 AD2

LEGENDS,
ABBREVIATIONS AND
GENERAL NOTES

GENERAL NOTES

- A. THE CONTRACT DOCUMENTS ARE COMPLEMENTARY AND WHAT IS REQUIRED BY ONE SHALL BE AS BINDING AS IF REQUIRED BY ALL. IN THE CASE OF A CONFLICT, DISAGREEMENT, OR AMBIGUITY, PROVIDE THE BETTER QUALITY. IN THE CASE OF A CONFLICT, DISAGREEMENT, OR AMBIGUITY, PROVIDE THE GREATER QUANTITY OF WORK.
B. FOLLOW MOUNTING HEIGHTS INDICATED IN THE ELECTRICAL LEGEND UNLESS OTHERWISE INDICATED. MEASURE ALL MOUNTING HEIGHTS FROM THE DEVICE CENTER LINE UNLESS OTHERWISE INDICATED.
C. FIELD VERIFY EXACT FEEDER LOCATIONS FOR MECHANICAL EQUIPMENT PRIOR TO ROUGH-IN.
D. EQUIPMENT CONNECTIONS ARE INDICATED IN THEIR APPROXIMATE LOCATIONS. VERIFY EXACT LOCATIONS OF ALL CONNECTIONS WITH OTHER TRADES SUPPLYING EQUIPMENT TO AVOID CONFLICTS AT INSTALLATION.
E. LOCATED ALL SWITCHES FOR LOCAL CONTROL OF LIGHTING ON STRIKE SIDE OF SINGLE DOORS UNLESS OTHERWISE INDICATED.
F. PROVIDE SPECIFIC BREAKER ARRANGEMENT FOR THE PANEL BOARDS WHEREVER PHYSICALLY POSSIBLE. PROVIDE AS-BUILT DRAWINGS INDICATING ACTUAL BRANCH CIRCUIT ARRANGEMENT. PROVIDE TYPE WRITTEN PANELBOARD DIRECTORIES INDICATING ACTUAL BRANCH CIRCUIT ARRANGEMENT.
G. PROVIDE AS-BUILT DRAWINGS INDICATING ACTUAL BRANCH CIRCUIT ARRANGEMENT. PROVIDE TYPEWRITTEN PANELBOARD DIRECTORIES INDICATING ACTUAL BRANCH CIRCUIT ARRANGEMENT. HAND WRITTEN SCHEDULES ARE NOT ACCEPTABLE.
H. ALL CONDUIT RUNS INDICATED ARE DIAGRAMMATIC. COORDINATE ROUTING IN ALL SPACES WITH OTHER TRADES.
I. ALL PANELBOARDS INDICATED ARE HOUSED IN A SINGLE WIDTH ENCLOSURE. UNO. THE CONTRACTOR SHALL FIELD VERIFY ROOM LAYOUT AND ADJUST ACCORDINGLY, AT NO COST TO THE OWNER, IF PROVIDING ANY PANELBOARD ENCLOSURES.
J. WHERE POWER AND COMMUNICATION OUTLETS ARE INDICATED IN CLOSE PROXIMITY ON THE DRAWINGS, FIELD COORDINATE THE LOCATIONS TO PLACE THE OUTLETS ADJACENT TO EACH OTHER.
K. ALL EXTERIOR RECEPTACLES SHALL BE LABELED "WF" - WEATHER RESISTANT.
L. WHEN GROUPING MULTIPLE LINE TO NEUTRAL BRANCH CIRCUITS IN A CONDUIT, PROVIDE DEDICATED COLOR CODED NEUTRAL CONDUCTORS FOR EACH CIRCUIT. DO NOT USE BREAKER TIES AND SHARED NEUTRALS EVEN THOUGH PERMITTED BY NEC.
M. PROVIDE A 2" WIDE YELLOW LINE PAINTED ON THE FLOOR INDICATING THE ELECTRICAL WORKING SPACE. IN FRONT OF ALL ELECTRICAL PANELS IN ELECTRICAL ROOMS. REFER TO PLANS FOR ELECTRICAL WORKING SPACE DETAILS. STENCIL "NO STORAGE" IN 2" HIGH, YELLOW LETTERS CENTERED IN THE OUTLINED AREA.

ABBREVIATIONS

Table with 2 columns: SYMBOL, DESCRIPTION. Includes abbreviations like 1P (SINGLE PHASE), 3P (THREE PHASE), 3R (WEATHERPROOF), A (AMPS), AFF (ABOVE FINISHED FLOOR), AL (ALUMINUM), ATS (AUTOMATIC TRANSFER SWITCH), BFC (BELOW FINISHED CEILING), BFG (BELOW FINISHED GRADE), BKR (BREAKER), C (COMMUNITY ANTENNA TELEVISION (CABLE)), CATV (CIRCUIT BREAKER), CB (CABLE), CBL (CLOSED CIRCUIT TELEVISION), CMT (CIRCUIT), CLR (CLEAR), CO (COMPANY), COMB (COMBINATION), COMM (COMMUNICATIONS), COPPER (COPPER), DIA (DIAMETER), DISC (DISCONNECT), DIV (DIVISION), DWG (DRAWING), EC (EMPTY CONDUIT), ELEC (ELECTRICAL), ELEV (ELEVATOR), EPO (EMERGENCY POWER OFF), EQP (EQUIPMENT), ETR (EXISTING TO REMAIN), EWC (ELECTRIC WATER COOLER), EX (EXISTING), EXT (EXTERIOR), FA (FIRE ALARM), FAAP (FIRE ALARM ANNUNCIATOR PANEL), FACP (FIRE ALARM CONTROL PANEL), FAGP (FIRE ALARM GRAPHIC PANEL), FAEP (FIRE ALARM EXTENDER PANEL), FFSCP (FIRE FIGHTERS SMOKE CONTROL PANEL), FLA (FULL LOAD AMPS), FPMR (FUSE PER MANUFACTURERS RECOMMENDATIONS/RECOMMENDATIONS), FPNR (FUSE PER NAMEPLATE DATA), G (GROUND), GE (GROUND FAULT PROTECTION FOR EQUIPMENT, 6.50mA PER NEC 427.22 (PROVIDE ACCESSORY FOR INDICATED BREAKER)), GFCI (GROUND FAULT CIRCUIT INTERRUPT), GFP (GROUND FAULT PROTECTION FOR PERSONNEL, 4.6mA (PROVIDE ACCESSORY FOR INDICATED BREAKER)), HRP (HOUSEKEEPING PAD), HP (HORSEPOWER), HZ (HERTZ), IAW (IN ACCORDANCE WITH), IG (ISOLATED GROUND), J-BOX (JUNCTION BOX), KHFS (KITCHEN HOOD FIRE SUPPRESSION SYSTEM), KHZ (KILOHERTZ), KVA (KILOVOLT AMPS), KW (KILOWATTS), KWH (KILOWATT HOURS), L (LOCKOUT TO PREVENT UNAUTHORIZED SWITCHING (PROVIDE ACCESSORY FOR INDICATED BREAKER)), LC (LOCKOUT TAG AND TRIP VIA LIGHTING CONTACTOR, REFER TO LC SCHEDULE), LED (LIGHT EMITTING DIODE), LTG (LIGHTING), LTS (LIGHTS), MAX (MAXIMUM), MCA (MINIMUM CIRCUIT AMPACITY), MCB (MAIN CIRCUIT BREAKER), MH (METAL HALIDE), MHZ (MEGAHERTZ), MIN (MINIMUM), MLO (MAIN LUG ONLY), MOPP (MAXIMUM OVER CURRENT PROTECTION), MTD (MOUNTED), N (NEUTRAL), NC (NORMALLY CLOSED), NO (NORMALLY OPEN), NO. (NUMBER), OEC (OWNER FURNISHED CONTRACTOR INSTALLED), OF (OUTLET (AT THE SWITCH HANDLE)), PBB (PRIMARY BONDING BUS), PBD (PANELBOARD), PD (PROTECTIVE DEVICE), RCP (RECEPTACLE), REC (RECEPTACLE), SBB (SECONDARY BONDING BUS), SEC (SECURITY), SPD (SURGE PROTECTIVE DEVICE), SPEC. (SPECIFICATIONS), ST (SHUNT TRIP, 120V COIL (PROVIDE ACCESSORY FOR INDICATED BREAKER)), SW (SWITCH), SWBD (SWITCHBOARD), TBB (TELECOMMUNICATIONS BONDING BACKBONE), TC (TELECOMMUNICATIONS CLOSET), TELECOM (TELECOMMUNICATIONS), TGB (TELECOMMUNICATIONS GROUNDING BUS BAR), TMGB (TELECOMMUNICATIONS MAIN GROUNDING BUS BAR), TYP (TYPICAL), UNO (UNLESS NOTED (INDICATED) OTHERWISE), VOLTS (VOLTS), VFD (VARIABLE FREQUENCY DRIVE), W (WATTS), W/ (WITH), WG (WIRE GUARD), WP (WEATHERPROOF), XFER (TRANSFER), XFMR (TRANSFORMER).

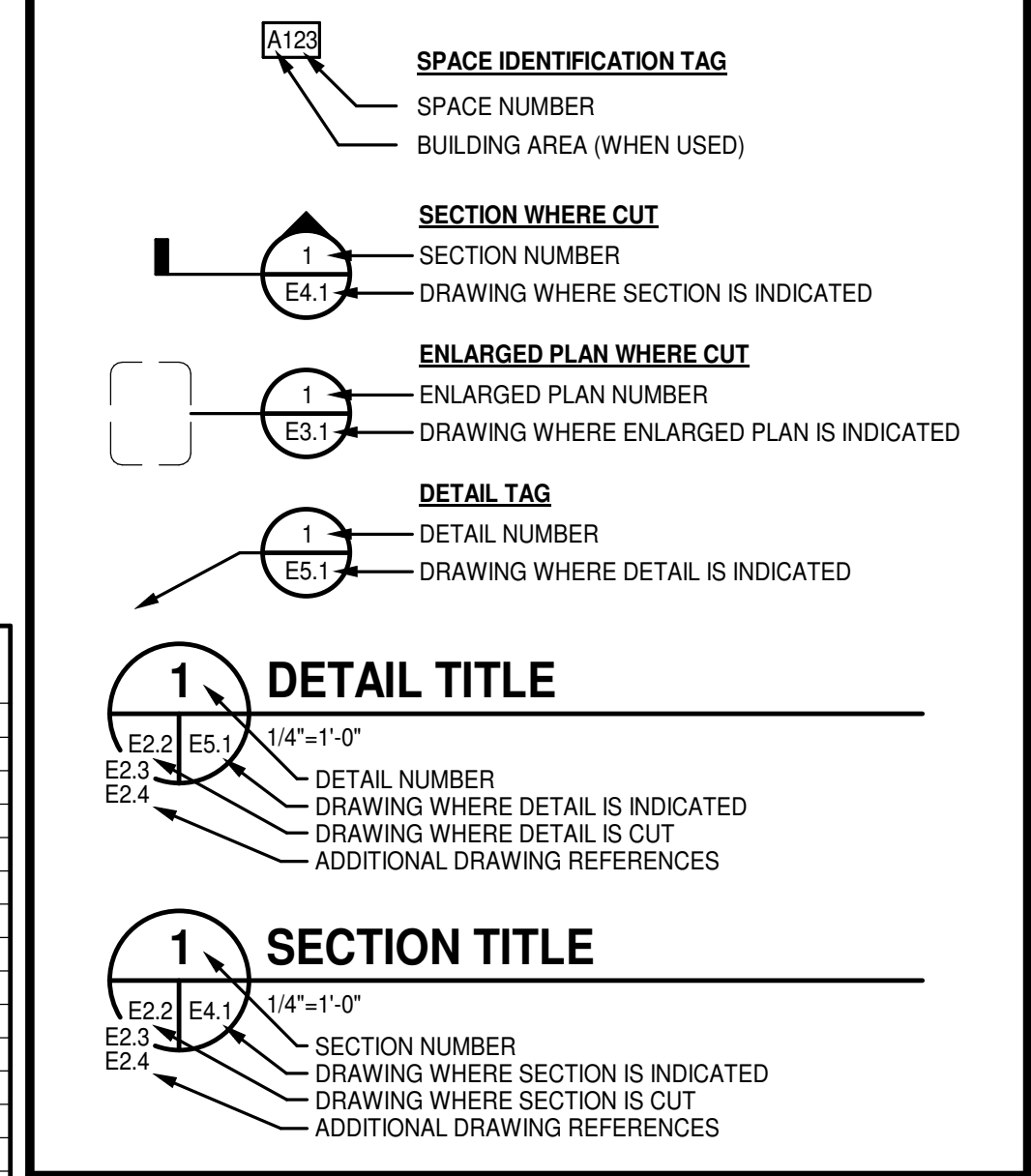
COMMUNICATIONS LEGEND

- NOTE: REFER TO TYPICAL COMMUNICATION OUTLET DETAIL FOR BOX & CONDUIT REQUIREMENTS. REFER TO TELECOMMUNICATION DEVICE DETAILS FOR CABELING AND TERMINAL JACK REQUIREMENTS.
SYMBOL DESCRIPTION: TELECOMMUNICATIONS OUTLET, MOUNT AT +3'-10" AFF. UNO; TELECOMMUNICATIONS OUTLET, MOUNT AT +1'-6" AFF. UNO; RECESSED FLOOR MOUNT DEVICE COMPLETE WITH FITTINGS FOR FLOOR COVERING; VIDEO VISIT STATION, MOUNT AT INDICATED ON ARCHITECTURAL SET; CATV OUTLET, REFER TO ARCHITECTURAL DRAWING FOR MOUNTING HEIGHT AND EXACT LOCATION; MONITOR OUTLET, REFER TO ARCHITECTURAL DRAWING FOR MOUNTING HEIGHT AND EXACT LOCATION; MICROPHONE OUTLET, WALL MOUNT AT +1'-6" AFF., PROVIDE OUTLET BOX WITH 1" EO TO AV CLOSET; CLERK PANEL, WALL MOUNT ABOVE CLERK DESK, PROVIDE 2" EO TO AV CLOSET; SOUND SYSTEM SPEAKER, RECESS CEILING MOUNT, PROVIDE BACKBOX AND 1" EO TO AV CLOSET; TELECOMMUNICATIONS RECESSED FLOOR BOX; SYSTEM FURNITURE COMMUNICATIONS CONNECTION VIA FLUSH WALL BOX MOUNTED +4" AFF. PROVIDE 2" CONDUIT WITH BUSHING FROM BOX TO ABOVE CEILING. PROVIDE TWO CAT 6a CABLES TO EACH POSITION COORDINATE WITH FURNITURE PROVIDER PRIOR TO ROUGH-IN; WIRELESS ACCESS POINT, PROVIDE TWO CAT 6a CABLES. DEVICE BY OWNER; TELECOMMUNICATIONS EQUIPMENT RACK; 2" EMT CONDUIT SLEEVE WITH NYLON BUSHING EACH END UNO, THRU WALL AT +6" ABOVE FINISHED CEILING; TELECOMMUNICATIONS GROUND BUS BAR, MOUNT AT +1'-6" AFF.; TELECOMMUNICATIONS MAIN GROUND BUS BAR, MOUNT AT +1'-6" AFF.; 24" WIDE CABLE TRAY, MOUNT AT +6" ABOVE FINISHED CEILING.

LIGHTING LEGEND

- SYMBOL DESCRIPTION: LIGHT SWITCH, RATED 120/277 VOLTS, 20 AMPS, MOUNT AT +3'-10" AFF. SUBSCRIPT/SUPERSUBSCRIPT LETTERS, NUMBERS, AND SYMBOLS INDICATES SWITCH TYPE AS FOLLOWS: S3 (INDICATES 3-WAY LIGHT SWITCH), S4 (INDICATES 4-WAY LIGHT SWITCH), SD (INDICATES DIMMER SWITCH), SDP (INDICATES PULS LIGHT ON WHEN SWITCH IS ON), SK (INDICATES KEY OPERATED LIGHT SWITCH), SOS (INDICATES SWITCH WITH INTEGRAL OCCUPANCY SENSOR), XSD (INDICATES DIMMER SWITCH WITH INTEGRAL OCCUPANCY SENSOR); LOWER CASE LETTER INDICATES LIGHT FIXTURE CONTROL DESIGNATION: OMNI-DIRECTIONAL LIGHTING CONTROL, OCCUPANCY DETECTOR, CEILING MOUNT; PHOTOELECTRIC CELL FOR LIGHTING CONTROL, WALL MOUNT AT +10'-0" AFF., AM NORTH; LIGHT FIXTURE, CEILING MOUNT; LIGHT FIXTURE ON EMERGENCY POWER, CEILING MOUNT; LIGHTING FIXTURE; LIGHTING FIXTURE ON EMERGENCY POWER; LIGHT FIXTURE, WALL MOUNT, HEIGHT AS INDICATED; EXIT SIGN, CEILING MOUNT, DIRECTIONAL ARROWS AS INDICATED. SHADING INDICATES FACE(S) OF SIGN; EXIT SIGN, WALL MOUNT, DIRECTIONAL ARROWS AS INDICATED. SHADING INDICATES FACE(S) OF SIGN; LIGHT FIXTURE, POLE MOUNT.

GRAPHICS SYMBOLS LEGEND



POWER LEGEND

- SYMBOL DESCRIPTION: APPLIANCE RECEPTACLE, MOUNT AT +1'-6" AFF. PROVIDE NEMA CONFIGURATION TO MATCH PLUG FOR EQUIPMENT SERVED; DUPLEX RECEPTACLE, NEMA 5-20R, MOUNT AT +1'-6" AFF.; DUPLEX RECEPTACLE, NEMA 5-20R, MOUNT AT +3'-10" AFF.; DUPLEX RECEPTACLE, NEMA 5-20R, MOUNT AT +7'-6" AFF.; DUPLEX RECEPTACLE, NEMA 5-20R, RECESS FLOOR MOUNT; GFCI DUPLEX RECEPTACLE, NEMA 5-20R, MOUNT AT +1'-6" AFF. PROVIDE NEMA 3R "WHILE IN USE" ENCLOSURE; GFCI DUPLEX RECEPTACLE, NEMA 5-20R, MOUNT AT +3'-10" AFF.; GFCI DUPLEX RECEPTACLE, NEMA 5-20R, MOUNT AT +7'-6" AFF.; DOUBLE DUPLEX RECEPTACLE, NEMA 5-20R, MOUNT AT +1'-6" AFF.; DOUBLE DUPLEX RECEPTACLE, NEMA 5-20R, MOUNT AT +3'-10" AFF.; DOUBLE DUPLEX RECEPTACLE, NEMA 5-20R, RECESS FLOOR MOUNT; POWER/COMMUNICATIONS RECESSED FLOOR BOX; POWER TO VIDEO VISIT STATION, MOUNT DUPLEX OUTLET ADJACENT TO COMM OUTLET; POWER TO CATV OUTLET, MOUNT DUPLEX OUTLET ADJACENT TO COMM OUTLET; POWER TO MONITOR OUTLET, MOUNT DUPLEX OUTLET ADJACENT TO COMM OUTLET; POWER TO CLERK PANEL; METALLIC SURFACE RACEWAY, DEVICES AS INDICATED, MOUNT AT +1'-6" AFF. UNO; JUNCTION BOX, CONCEALED ABOVE CEILING, UNO; ENCLOSED CIRCUIT BREAKER, CHARACTERISTICS AS INDICATED; MUSHROOM SWITCH, HEAVY DUTY WITH LEGEND PLATE, MOUNT WHANDLE AT +3'-10" AFF. UNO; MANUAL MOTOR STARTER, OVERLOAD PROTECTION AS REQUIRED PER NAME PLATE RATINGS, WITH 'ON' INDICATOR PILOT LIGHT, FLUSH MOUNT WHANDLE AT +3'-10" AFF. UNO; DISCONNECT SWITCH, FUSIBLE OR NON-FUSIBLE AS INDICATED. MOUNT WHANDLE AT +4'-6" AFF. UNO; MAGNETIC MOTOR STARTER, WITH OVERLOAD RELAYS AS REQUIRED TO SERVE MANUFACTURER REQUIREMENTS OF EQUIPMENT SERVED, PROVIDE WITH HAND-OFF-AUTOMATIC SELECTOR SWITCH AND INDICATOR LIGHTS, MOUNT WHANDLE AT +4'-6" AFF. UNO; COMBINATION MAGNETIC STARTER AND DISCONNECT SWITCH, WITH OVERLOAD ELEMENTS AND FUSING AS REQUIRED TO SERVE MANUFACTURER REQUIREMENTS OF EQUIPMENT SERVED, PROVIDE WITH HAND-OFF-AUTOMATIC SELECTOR SWITCH AND INDICATOR LIGHTS, MOUNT WHANDLE AT +4'-6" AFF. UNO; EQUIPMENT POWER CONNECTION; MOTOR CONNECTION; MOTOR TO DIV 23 MOTORIZED DAMPER, VERIFY LOCATION; POWER FOR ELECTRIC DOOR LOCK CONNECTION; EMERGENCY GENERATOR; BRANCH CIRCUIT RUN CONCEALED, UNO. DASHED INDICATES CIRCUITRY REQUIRED TO BE RUN BELOW SLAB; BRANCH CIRCUIT HOME RUN TO PANELBOARD AND CIRCUIT INDICATED; PANELBOARD; TRANSFORMER, PROVIDE CONCRETE HOUSEKEEPING PAD UNLESS NOTED OTHERWISE; FEEDER TAG. REFER TO FEEDER SCHEDULE ON DWG 5.1.

FIRE ALARM LEGEND

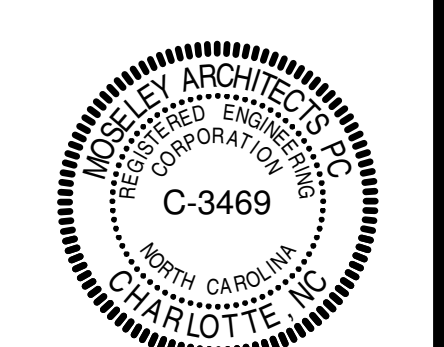
- SYMBOL DESCRIPTION: FIRE ALARM AUDIO/VISUAL NOTIFICATION DEVICE, MOUNT AT 80" AFF AND NOT MORE THAN 96". SUBSCRIPT NUMBER INDICATES STROBE CANDELA RATING; FIRE ALARM VISUAL STROBE NOTIFICATION DEVICE, 80" AFF AND NOT MORE THAN 96". SUBSCRIPT NUMBER INDICATES STROBE CANDELA RATING; FIRE ALARM AUDIO/VISUAL NOTIFICATION DEVICE WITH DEVICE GUARD, 80" AFF AND NOT MORE THAN 96". SUBSCRIPT NUMBER INDICATES STROBE CANDELA RATING. # / # INDICATES STROBE SETTING AND REDUCED EFFECTIVE OUTPUT WHEN DEVICE GUARD IS PRESENT; FIRE ALARM VISUAL STROBE NOTIFICATION DEVICE, 80" AFF AND NOT MORE THAN 96". SUBSCRIPT NUMBER INDICATES STROBE CANDELA RATING. # / # INDICATES STROBE SETTING AND REDUCED EFFECTIVE OUTPUT WHEN DEVICE GUARD IS PRESENT; FIRE ALARM AUDIO/VISUAL NOTIFICATION DEVICE, CEILING MOUNTED. SUBSCRIPT NUMBER INDICATES STROBE CANDELA RATING; FIRE ALARM VISUAL STROBE NOTIFICATION DEVICE, CEILING MOUNTED. SUBSCRIPT NUMBER INDICATES STROBE CANDELA RATING; FIRE ALARM AUDIO/VISUAL NOTIFICATION DEVICE WITH DEVICE GUARD, CEILING MOUNTED. SUBSCRIPT NUMBER INDICATES STROBE CANDELA RATING. # / # INDICATES STROBE SETTING AND REDUCED EFFECTIVE OUTPUT WHEN DEVICE GUARD IS PRESENT; FIRE ALARM VISUAL STROBE NOTIFICATION DEVICE, CEILING MOUNTED. SUBSCRIPT NUMBER INDICATES STROBE CANDELA RATING. # / # INDICATES STROBE SETTING AND REDUCED EFFECTIVE OUTPUT WHEN DEVICE GUARD IS PRESENT; FIRE ALARM MANUAL PULL STATION, MOUNT AT +3'-10" AFF.; FIRE ALARM KEY OPERATED MANUAL PULL STATION, MOUNT AT +3'-10" AFF.; FIRE ALARM DUCT SMOKE DETECTOR, FURNISH AND CONNECT UNDER DIVISION 28. INSTALL UNDER DIVISION 23. VERIFY LOCATION WITH DIVISION 23 PRIOR TO ROUGH-IN. PROVIDE ACCESSIBLE KEY OPERATED REMOTE TEST SWITCH FOR EACH DETECTOR; SMOKE DETECTOR, CEILING MOUNT; HEAT DETECTOR, CEILING MOUNT; CARBON MONOXIDE DETECTOR, CEILING MOUNT; DETECTOR, CEILING MOUNT. PROVIDE DEVICE GUARD. SYMBOL MAY VARY; FIRE ALARM TAMPER SWITCH, PROVIDE UNDER DIVISION 23, MONITOR UNDER DIVISION 28; FIRE ALARM FLOW SWITCH, PROVIDE UNDER DIVISION 23, MONITOR UNDER DIVISION 28; POST INDICATOR VALVE SWITCH, PROVIDE UNDER DIVISION 23, MONITOR UNDER DIVISION 28; FIRE ALARM PRESSURE SWITCH, PROVIDE UNDER DIVISION 23, MONITOR UNDER DIVISION 28; FIRE ALARM REMOTE INDICATOR, CEILING MOUNT; FIRE ALARM MONITOR MODULE, NOT ALL MONITOR MODULES ARE INDICATED ON DRAWINGS. PROVIDE QUANTITY AND IN LOCATIONS REQUIRED TO ACCOMPLISH SPECIFIED MONITORING FUNCTIONS; FIRE ALARM CONTROL MODULE, NOT ALL CONTROL MODULES ARE INDICATED ON DRAWINGS. PROVIDE QUANTITY AND IN LOCATIONS REQUIRED TO ACCOMPLISH SPECIFIED CONTROL FUNCTIONS; FIRE ALARM SPRINKLER BELL, MOUNT AT +10'-0" AFF.; FIRE ALARM MAGNETIC DOOR HOLDER, WALL MOUNT DEVICE AT 6" BELOW TOP OF DOOR, PROVIDE HINGED MAGNETIC CATCH PLATE ON DOOR TO MATE WITH DEVICE. COORDINATE LOCATION AND LENGTH WITH DIVISION 08. PROVIDE CONCEALED 120-VOLT POWER CONNECTION AND FIRE ALARM CONTROL MODULE IF REQUIRED FOR PROPER OPERATION; FIRE ALARM DOOR HOLDER/CLOSER HARDWARE UNDER DIVISION 08, MONITOR AND CONTROL INTERFACE WITH FIRE ALARM UNDER DIVISION 28; FIRE ALARM POWER CONNECTION TO DIVISION 23 SMOKE OR FIRE/SMOKE DAMPER. COORDINATE WITH DIVISION 23. REFER TO TYPICAL FIRE/SMOKE DAMPER DIAGRAM.

ONE LINE DIAGRAM LEGEND

Table with 2 columns: SYMBOL, DESCRIPTION. Includes symbols for circuit breaker, fused switch, transformer, transfer switch, feeder designation, current transformer, and potential transformer.

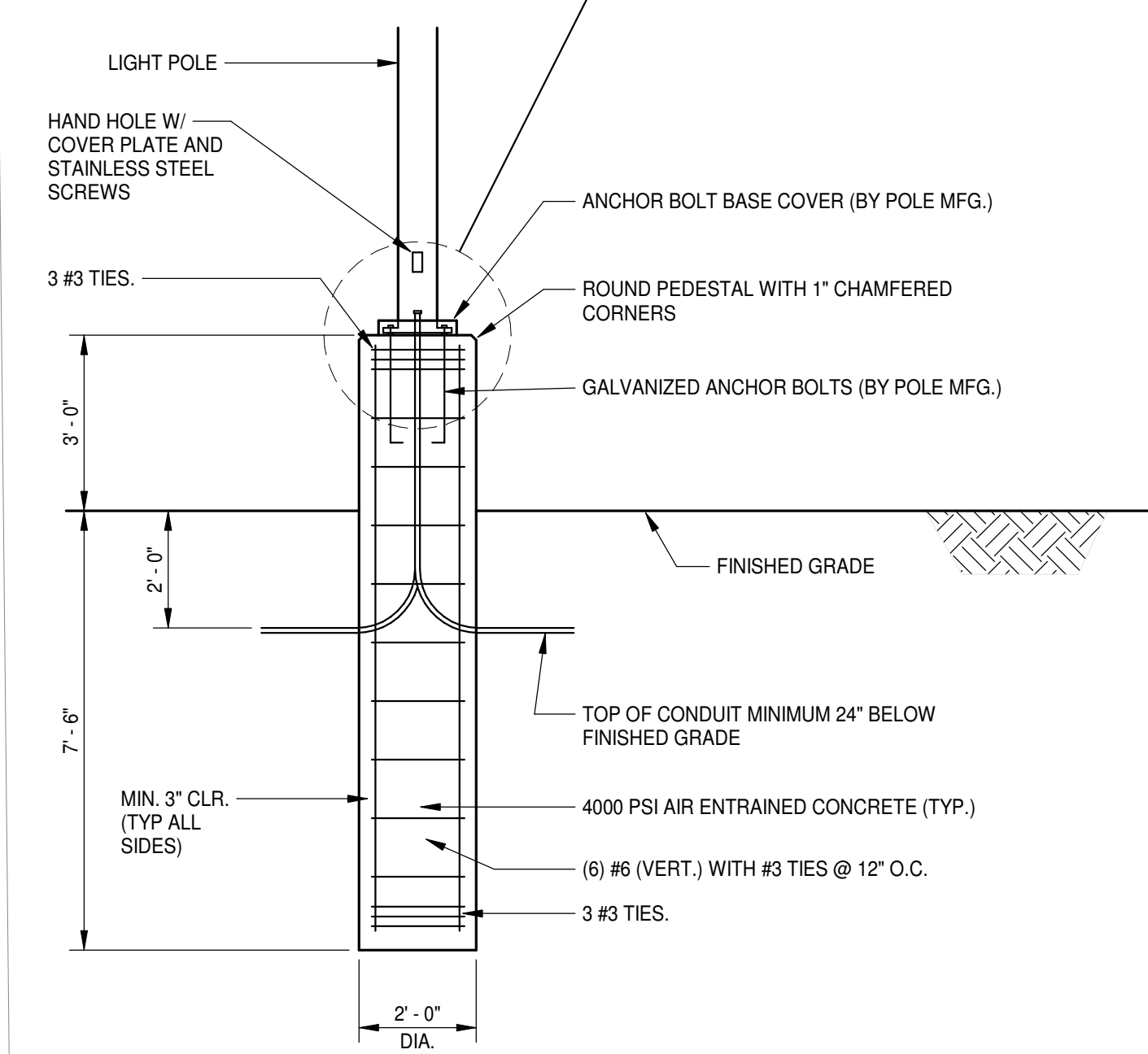
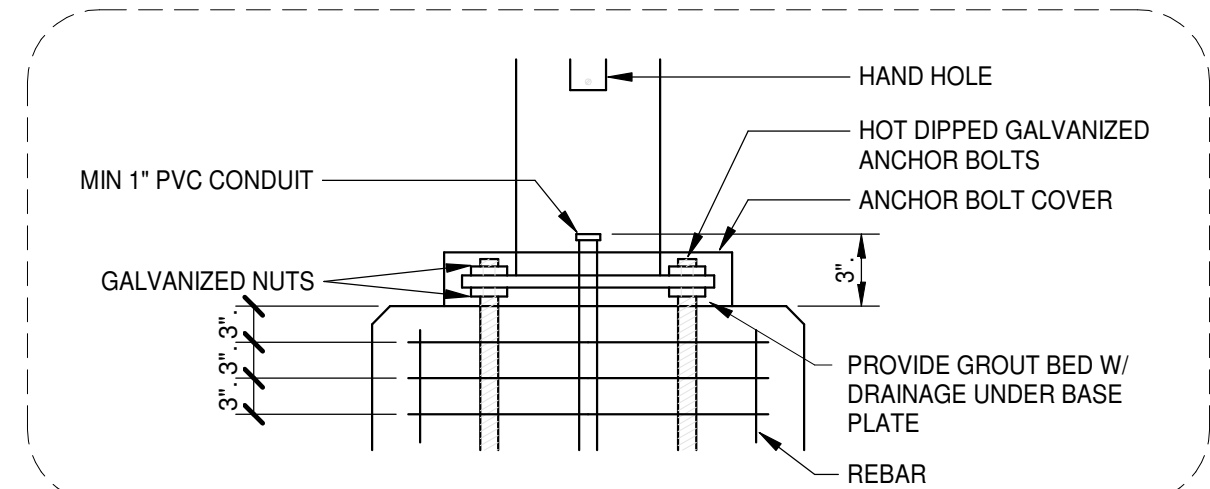
LIGHT FIXTURE SCHEDULE

Table with columns: TYPE, DESCRIPTION, MANUFACTURER, SERIES NO., VOLTAGE, WATTAGE, LUMENS, TYPE, COLOR TEMP., MOUNTING, OPTIONS, COMMENTS. Lists various lighting fixtures like 2X4 VOLUMETRIC LIGHTING, 2X4 VANDAL RESISTANT LENS, 4" MAX SECURITY, etc.

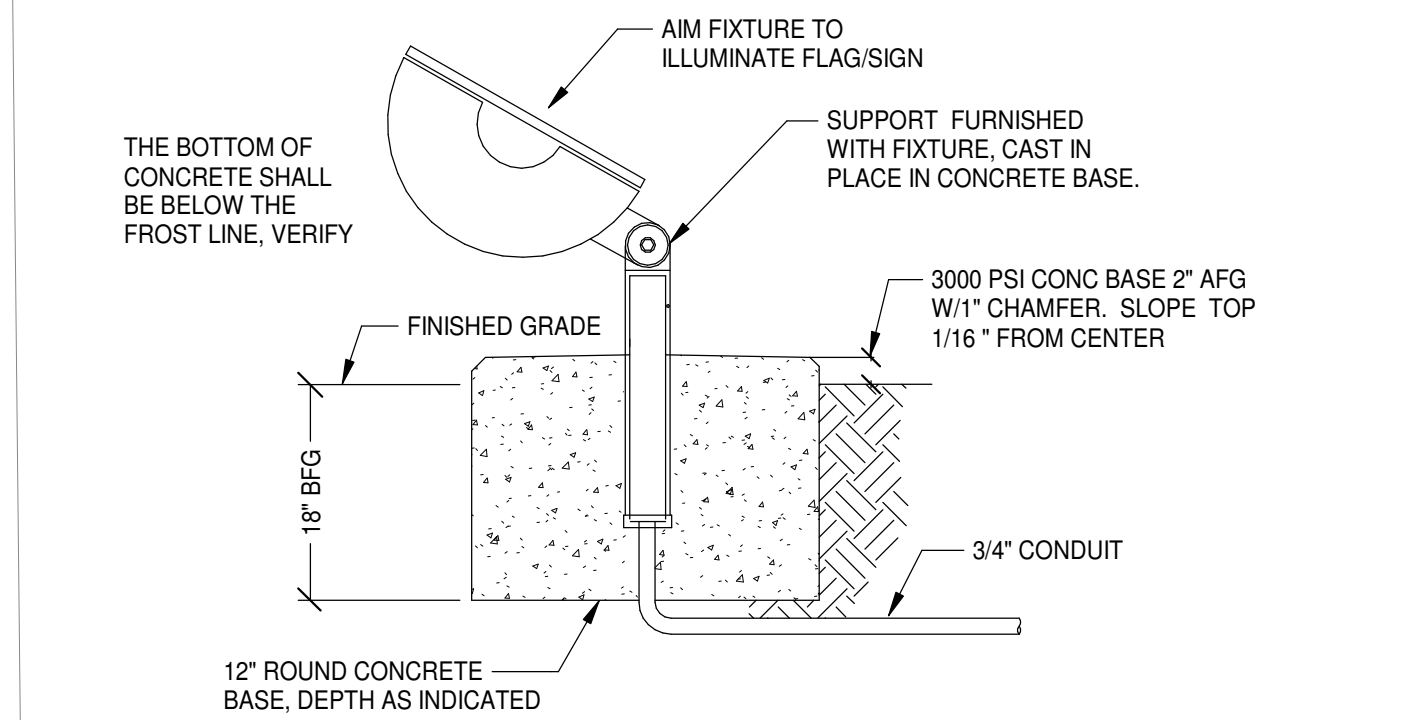


PROJECT NO:	611888
DATE:	MAY 01, 2024
REVISIONS	
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5/24/24	AD1
6/04/24	AD2

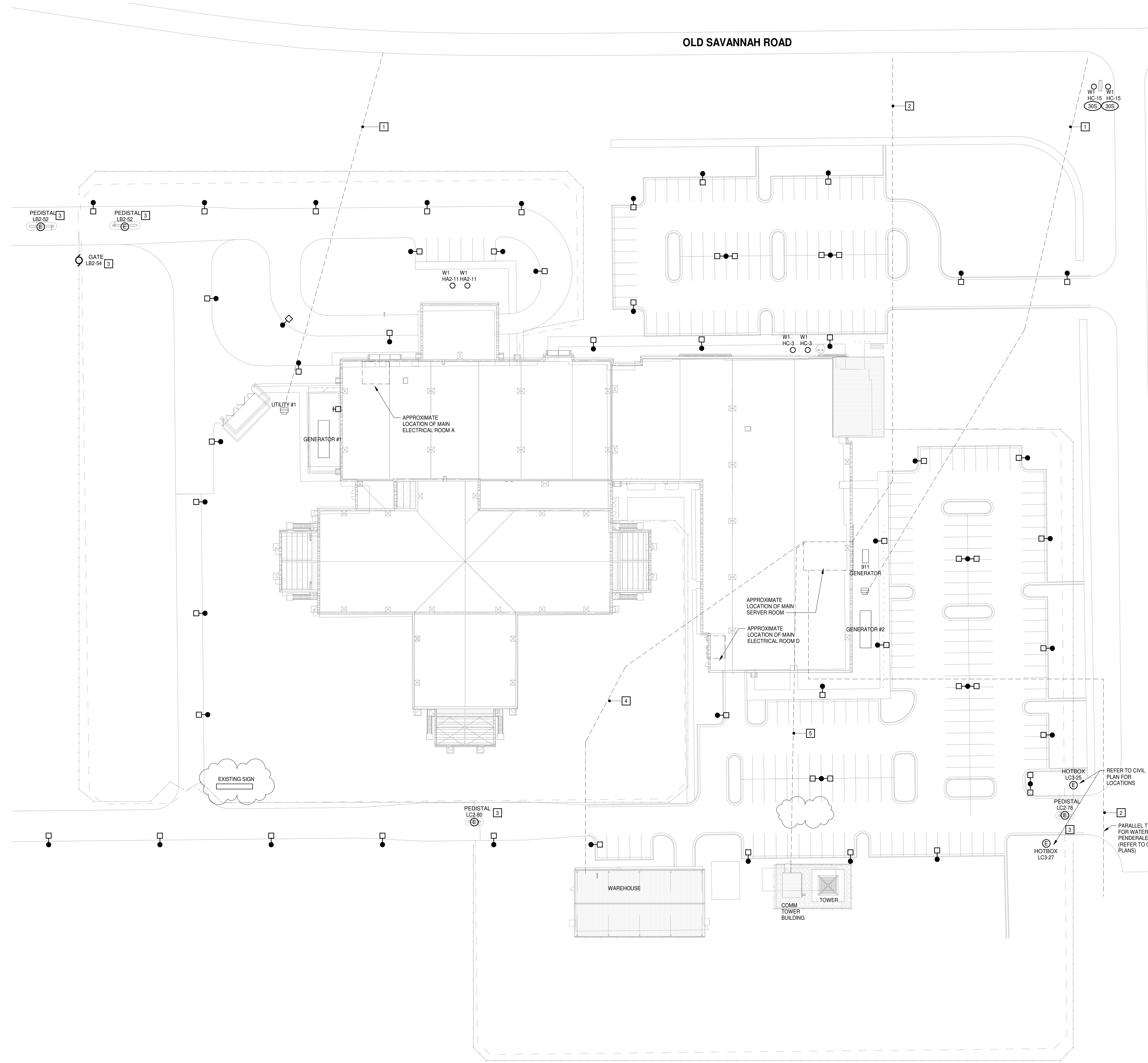
- KEYNOTES**
 APPLIES TO DRAWINGS E1.0
 REPRESENTED BY [n]
1. PROVIDE 4" 2" UNDERGROUND FOR POWER COMPANY PRIMARY FOR EACH SERVICE. COORDINATION CONNECTION POINT WITH UTILITY PRIOR TO INSTALLATION.
 2. PROVIDE 4" 4" UNDERGROUND FOR COMMUNICATIONS COORDINATION WITH UTILITY PRIOR TO INSTALLATION.
 3. PROVIDE A 1" C WITH PULL STRING IN ADDITION TO POWER INDICATED.
 4. TWO UNDERGROUND 2" C WITH WATER RESISTANT 12-STRAND SINGLE MODE FIBER IN ONE. OTHER IS SPARE WITH PULL STRING. CAPPED ON BOTH ENDS.
 5. FOUR UNDERGROUND 2" C WITH WATER RESISTANT 24-STRAND SINGLE MODE FIBER IN TWO. OTHER TWO SPARE WITH PULL STRING. CAPPED ON BOTH ENDS.
- GENERAL NOTES**
- A. SITE POLE FIXTURES AND CABLING ARE PROVIDED BY FOUR COUNTY ELECTRIC. PROVIDE 1" EC UNDER HARDSCAPING FOR THEIR CABLING. ALSO PROVIDE THE POLE BASE DETAIL PER THE DETAIL ON THIS SHEET. COORDINATE WITH THE POWER COMPANY PRIOR TO INSTALLATION.
 - B. POLE LOCATED INSIDE THE SECURITY PERIMETER SHALL BE 10' MINIMUM FROM THE FENCE.



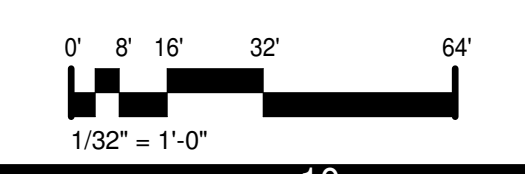
POLE BASE DETAIL
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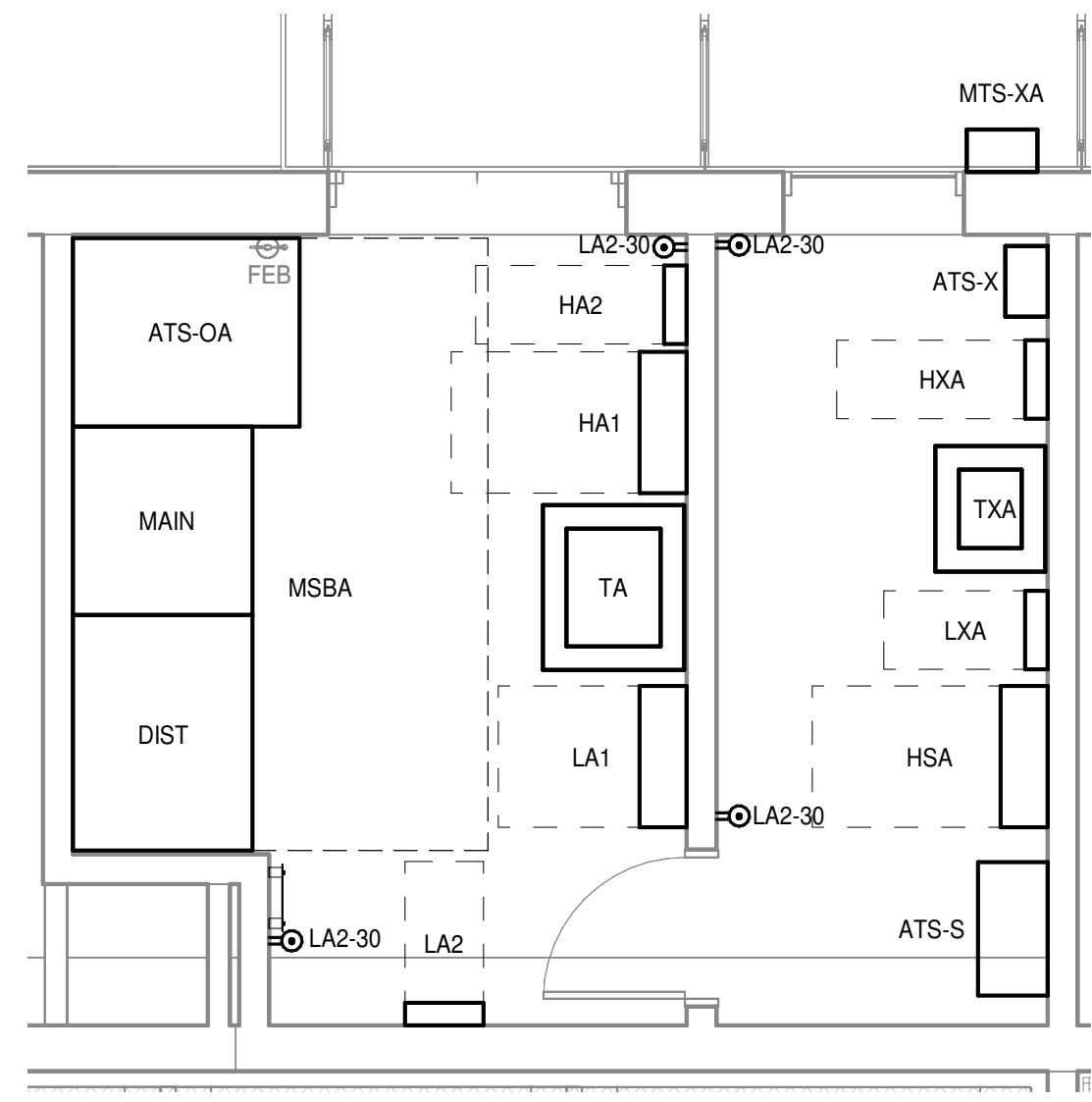


FLAG LIGHT DETAIL
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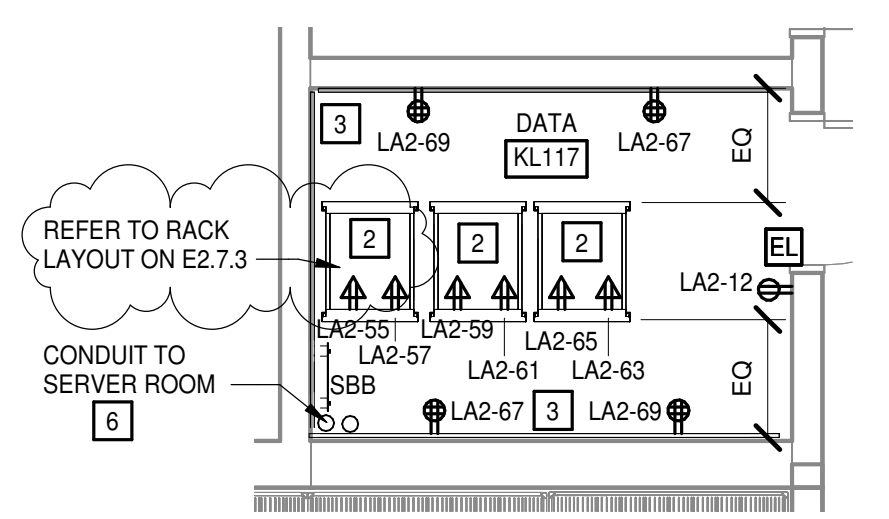


ELECTRICAL SITE PLAN.
 1/32" = 1'-0"

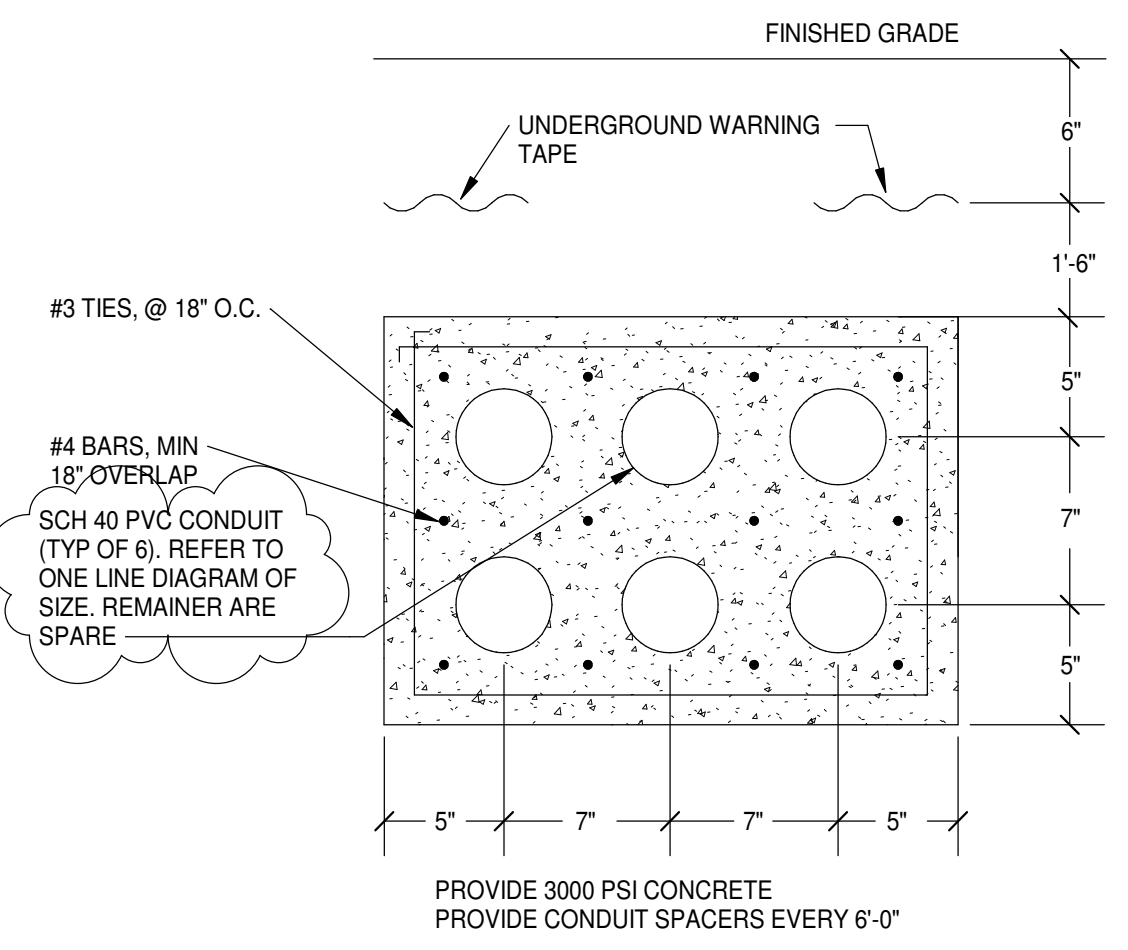




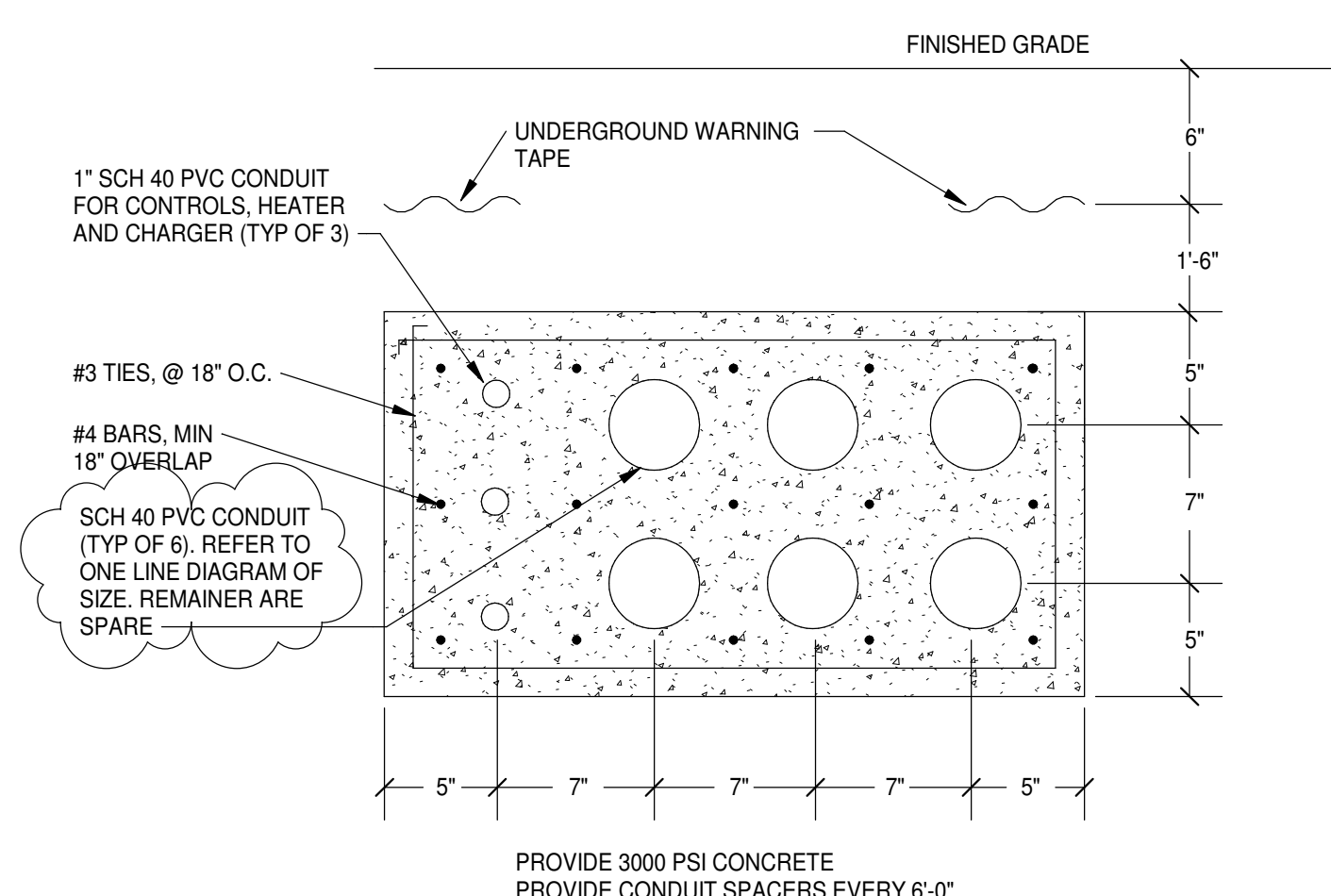
1 ELECTRICAL ROOM A



2 DATA ROOM A



3 TRANSFORMER DUCTBANK DETAIL #1



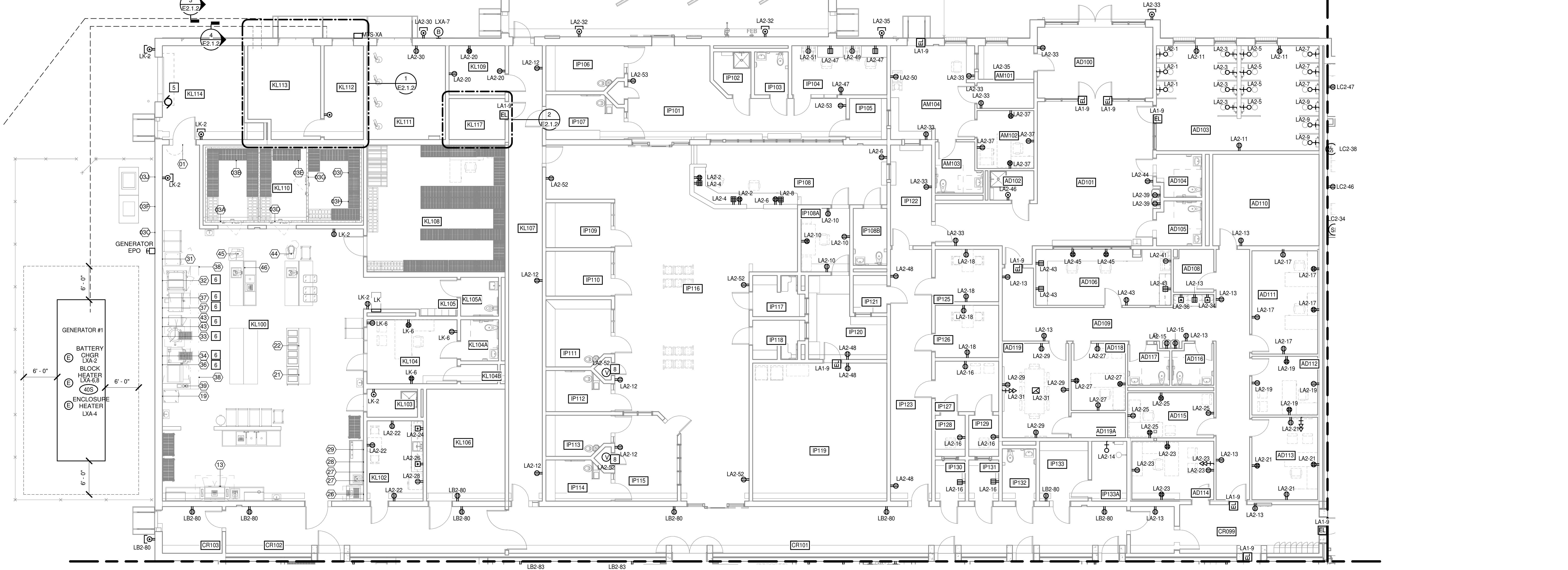
4 GENERATOR #1 DUCTBANK DETAIL

KEYNOTES	
APPLIES TO E2.X.2 SERIES DRAWINGS REPRESENTED BY []	
1.	COORDINATE OUTLET LOCATION WITH COMPUTER STATIONS INDICATED ON THE ARCHITECTURAL PLANS.
2.	PROVIDE TWO DUPLEX OUTLETS MOUNTED TO THE EACH COMMUNICATION RACK. DROP CIRCUITRY FROM JB OVER THE RACK VIA FLEXIBLE CONDUIT. PROVIDE DEDICATED 3/12 IN 3/4" PER CIRCUIT.
3.	PROVIDE 4"x8"x3/4" FIRE RESISTANT PLYWOOD ON WALLS INDICATED COVERED WITH TWO COATS OF WHITE PAINT. DO NOT COVER FIRE RESISTANT STAMP. ADHERE TO WALL WITH SCREWS IN THE WALL STRUCTURE.
4.	POWER CIRCUITS IN THIS SPACE ARE RELAY CONTROLLED. REFER TO THE RELAY SCHEDULE FOR THE RELAY NUMBER.
5.	COORDINATE LOCATION OF OVERHEAD DOOR CONTROLLER WITH OWNER PRIOR TO CONSTRUCTION. PROVIDE CONDUIT, WIRING, AND BOXES AS NEEDED FOR COMPLETE INSTALLATION.
6.	CONNECT BREAKER SHUNT TRIP MODULES FOR EQUIPMENT UNDER THE HOOD TO THE HOOD FIRE SUPPRESSION SYSTEM.
7.	PROVIDE CEILING MOUNTED OUTLET FOR METAL DETECTOR POWER AND FINAL CONNECTION TO EQUIPMENT IN GRS CONDUIT. COORDINATE POWER REQUIREMENTS WITH THE PROVIDER AND FIELD ADJUST AS REQUIRED.
8.	PROVIDE A SINGLE POLE RELAY CONTROLLED BY THE SECURITY SYSTEM TO CONTROL THE VALVES IN THIS AREA.
9.	FIELD COORDINATE THE ELECTRICAL CONNECTION IN THIS ROOM AS DIRECTED BY THE SE CONTRACTOR.
10.	TERMINATE EACH CIRCUIT IN A QUAD BOX BELOW THE FLOOR AND PROVIDE A FLEXIBLE CONDUIT WHIP TO EXTEND FROM THE UNDER-FLOOR BOX THROUGH THE RAISED FLOOR AND INTO THE INDIVIDUAL CONSOLE FURNITURE POSITION.

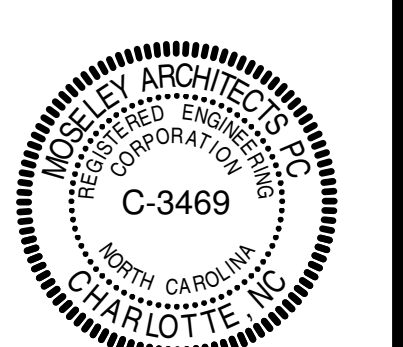
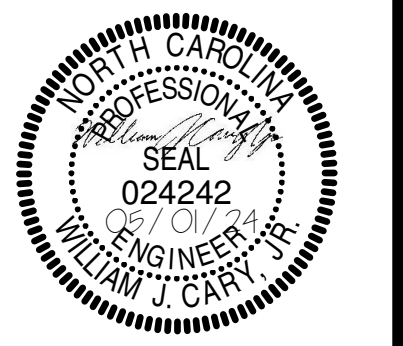
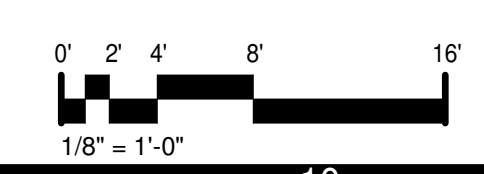
GENERAL NOTES

- COORDINATE OUTLET LOCATIONS IN CHASES AND MECHANICAL SPACES WITH OTHER TRADE AND RELOCATE AS REQUIRED SUCH THAT OUTLET WILL NOT BE BLOCKED.
- REFER TO "FS" SERIES DRAWINGS FOR ELECTRICAL ROUGH-IN TYPE AND MOUNTING HEIGHTS OF ALL KITCHEN EQUIPMENT LOCATIONS.
- ALL OUTLETS SUPPLIED BY A UPS PANEL SHALL BE BLUE IN COLOR. ALL OUTLETS SUPPLIED BY PANEL "LE" SHALL BE RED IN COLOR.

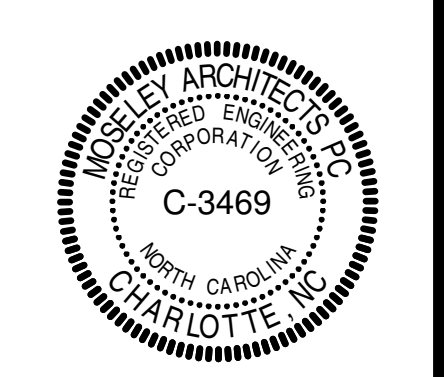
TAG	DESCRIPTION	VOLTAGE	POLES	LOAD	PANEL	CCT #	FEEDER	REMARK
01	AIR CURTAIN	120 V	1	1.00 KVA	LK	8	2#12.#12G.3/4"	
03A	LIGHTS, COOLER A	120 V	1	0.30 KVA	LK	10	2#12.#12G.3/4"	
03B	EVAP COIL, COOLER A	120 V	1	0.24 KVA	LK	12	2#12.#12G.3/4"	
03C	COND UNIT, COOLER A	208 V	3	2.52 KVA	LK	31,33,35	3#12.#12G.3/4"	
03D	LIGHTS, COOLER B	120 V	1	0.30 KVA	LK	14	2#12.#12G.3/4"	
03E	EVAP COIL, COOLER B	120 V	1	1.24 KVA	LK	16	2#12.#12G.3/4"	
03F	COND UNIT, COOLER B	208 V	3	2.52 KVA	LK	37,39,41	3#12.#12G.3/4"	
03G	LIGHTS & HEAT, FREEZER	120 V	1	0.70 KVA	LK	18	2#12.#12G.3/4"	
03H	HEAT TAPE, FREEZER	120 V	1	1.50 KVA	LK	20	2#12.#12G.3/4"	
03I	EVAP COIL, FREEZER	208 V	2	0.50 KVA	LK	15,17	2#12.#12G.3/4"	
03J	COND UNIT, FREEZER	208 V	3	4.25 KVA	LK	43,45,47	3#12.#12G.3/4"	
13	DISHWASHER, CONVEYOR TYPE	480 V	3	19.80 KVA	HA1	19,21,23	3#10.#10G.1"	30
19	REACH-IN REFRIGERATOR	120 V	1	0.26 KVA	LK	22	2#12.#12G.3/4"	15
21	SERVING COUNTER, COLD FOOD	120 V	1	0.70 KVA	LK	24	2#12.#12G.3/4"	15
22	HOT FOOD SERVING COUNTER /TABLE	208 V	2	6.00 KVA	LK	19,21	3#8.#10G.1"	50
26	ICE MAKER, CUBE STYLE	120 V	1	2.14 KVA	LK	26	2#10.#10G.3/4"	25
27	BEVERAGE DISPENSER	120 V	1	1.00 KVA	LK	28	2#12.#12G.3/4"	
28	BEVERAGE DISPENSER	120 V	1	1.00 KVA	LK	30	2#12.#12G.3/4"	
29	TEA BREWER	120 V	1	1.80 KVA	LK	32	2#12.#12N.#12G.3/4"	40
29	COFFEE MAKER / BREWER URN	208 V	2	5.82 KVA	LK	23,25	3#8.#8N.#10G.1"	40
31	REACH-IN HEATED CABINET	208 V	2	1.23 KVA	LK	27,29	2#12.#12G.3/4"	
32	COMBI OVEN, ELECTRIC	480 V	3	16.45 KVA	HA1	20,22,24	3#10.#10N.#10G.1"	25
33	KETTLE, GAS, STATIONARY	120 V	1	0.48 KVA	LK	34	2#12.#12G.3/4"	
34	TILTING SKILLET BRAISING PAN	120 V	1	0.36 KVA	LK	36	2#12.#12G.3/4"	
36	RANGE GRIDDLE	120 V	1	0.48 KVA	LK	40	2#12.#12G.3/4"	
37	CONVECTION OVEN, ELECTRIC	120 V	1	1.80 KVA	LK	42	2#12.#12G.3/4"	
37	CONVECTION OVEN, ELECTRIC	120 V	1	1.80 KVA	LK	44	2#12.#12G.3/4"	
38	EXHAUST HOOD	120 V	1	1.00 KVA	LK	46	2#12.#12G.3/4"	
38	EXHAUST HOOD	120 V	1	1.00 KVA	LK	48	2#12.#12G.3/4"	
39	FIRE SUPPRESSION SYSTEM	120 V	1	1.00 KVA	LK	50	2#12.#12G.3/4"	
43	CONVECTION STEAMER, ELECTRIC	208 V	3	10.80 KVA	LK	49,51,53	3#8.#10G.1"	40
43	CONVECTION STEAMER, ELECTRIC	208 V	3	10.80 KVA	LK	55,57,59	3#8.#10G.1"	40
44	PLANETARY MIXER	208 V	2	1.00 KVA	LK	11,13	2#12.#12G.3/4"	
45	FOOD SLICER, ELECTRIC	120 V	1	0.65 KVA	LK	52	2#12.#12G.3/4"	
46	FOOD PROCESSOR, BENCHTOP	120 V	1	0.86 KVA	LK	38	2#12.#12G.3/4"	
51	WASHER/EXTRACTOR	480 V	3	3.32 KVA	HB	26,28,30	3#12.#12G.3/4"	
51	WASHER/EXTRACTOR	480 V	3	3.32 KVA	HB	31,33,35	3#12.#12G.3/4"	
52	TUMBLE DRYER	480 V	3	37.40 KVA	HB	32,34,36	3#4.#10G.1"	60
52	TUMBLE DRYER	480 V	3	37.40 KVA	HB	38,40,42	3#4.#10G.1"	60



FIRST FLOOR PLAN - PART A - POWER
1/8" = 1'-0"

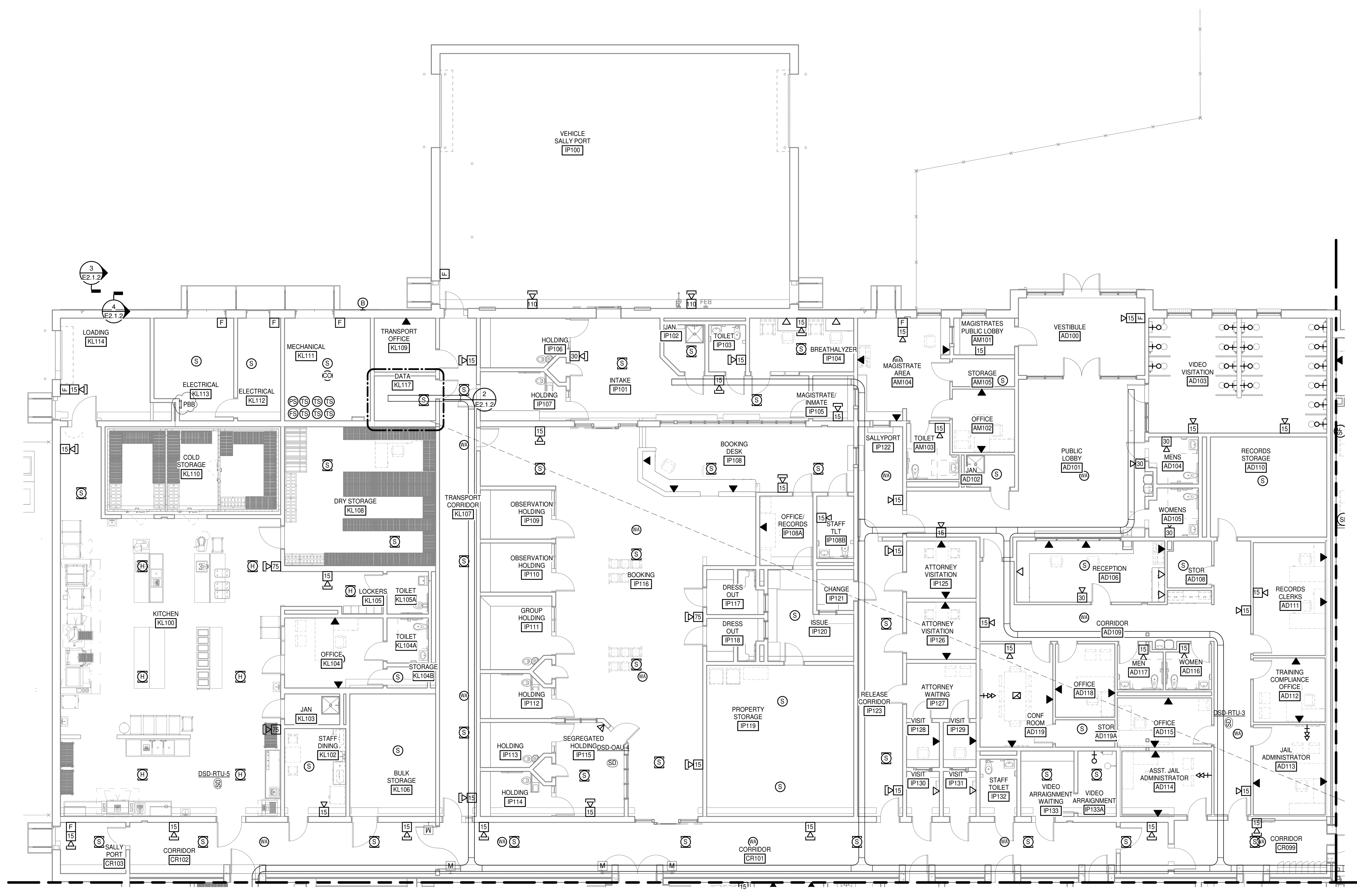


PROJECT NO:	611888
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6/04/24	AD2

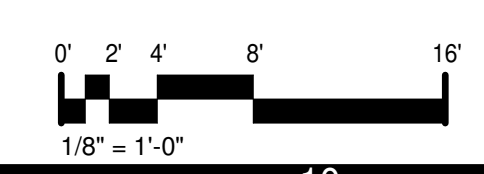


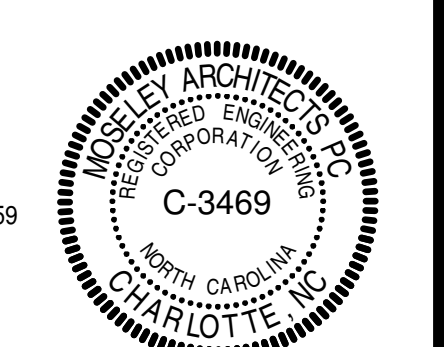
PROJECT NO:	611888
DATE:	MAY 01, 2024
REVISIONS	
DATE	DESCRIPTION
6/04/24	AD2

- KEYNOTES**
 APPLIES TO E2.X.3 SERIES DRAWINGS
 REPRESENTED BY [A]
- COORDINATE OUTLET LOCATION WITH COMPUTER STATIONS INDICATED ON THE ARCHITECTURAL PLANS.
 - COORDINATE LOCATION OF SMOKE DETECTOR ABOVE CELLS IN CHASE SPACES WITH OTHER TRADES AND RELOCATE AS REQUIRED SUCH THAT DETECTOR WILL BE ACCESSIBLE.
 - ADJUST DEVICE MOUNTING HEIGHTS FOR PLATFORM IN THIS AREA
 - PROVIDE A FIRE ALARM MONITOR MODULE TO INTERFACE THE HOOD WITH THE FIRE ALARM.
 - PROVIDE TWELVE (12) CAT 6A DATA CABLES TO EACH CONSOLE. 4 CABLES EACH TERMINATING IN THE RADIO, PHONE AND DATA RACK. CABLES SHALL TERMINATE INTO A PATCH PANEL LOCATED IN EACH FURNITURE OPERATOR POSITION AND TERMINATE INTO PATCH PANELS LOCATED IN THE RELATED SERVICE EQUIPMENT RACK CABINET(S) OF THE 911 DATA CENTER. THE EXACT CABINET FOR EACH CABLE SET (RADIO, PHONE, & DATA) SHALL BE FIELD DETERMINED TO ALLOW CABLEING VENDOR END-TO-END TESTING ONCE INSTALLED. FIELD COORDINATE WITH SERVICE VENDOR/PROVIDER PRIOR TO INSTALLATION. EACH CABLE SET (RADIO, PHONE, DATA), SHALL BE COLOR CODED FOR EASE IN IDENTIFICATION PER THE OWNERS/INSTALLER'S RECOMMENDATION
 - TWO UNDERGROUND 2" C WITH WATER RESISTANT 24-STRAND SINGLE MODE FIBER IN ONE, OTHER IS SPARE CAPPED ON BOTH ENDS.
- GENERAL NOTES**
- PROVIDE BONDING POINTS (OSBB) UNDER THE RAISED FLOOR AS INDICATED AND BOND TO EVERY OTHER RAISED FLOOR SUPPORT POST WITH A #8 BARE COPPER CONDUCTOR TO THE MAIN SERVICE GROUND.
 - PROVIDE AN INDIVIDUAL #8 GREEN COPPER CONDUCTOR FROM THE OSBB INTO EACH CONSOLE POSITION AND CONNECT/BOND TO THE OPERATOR POSITION SECONDARY BONDING BAR.

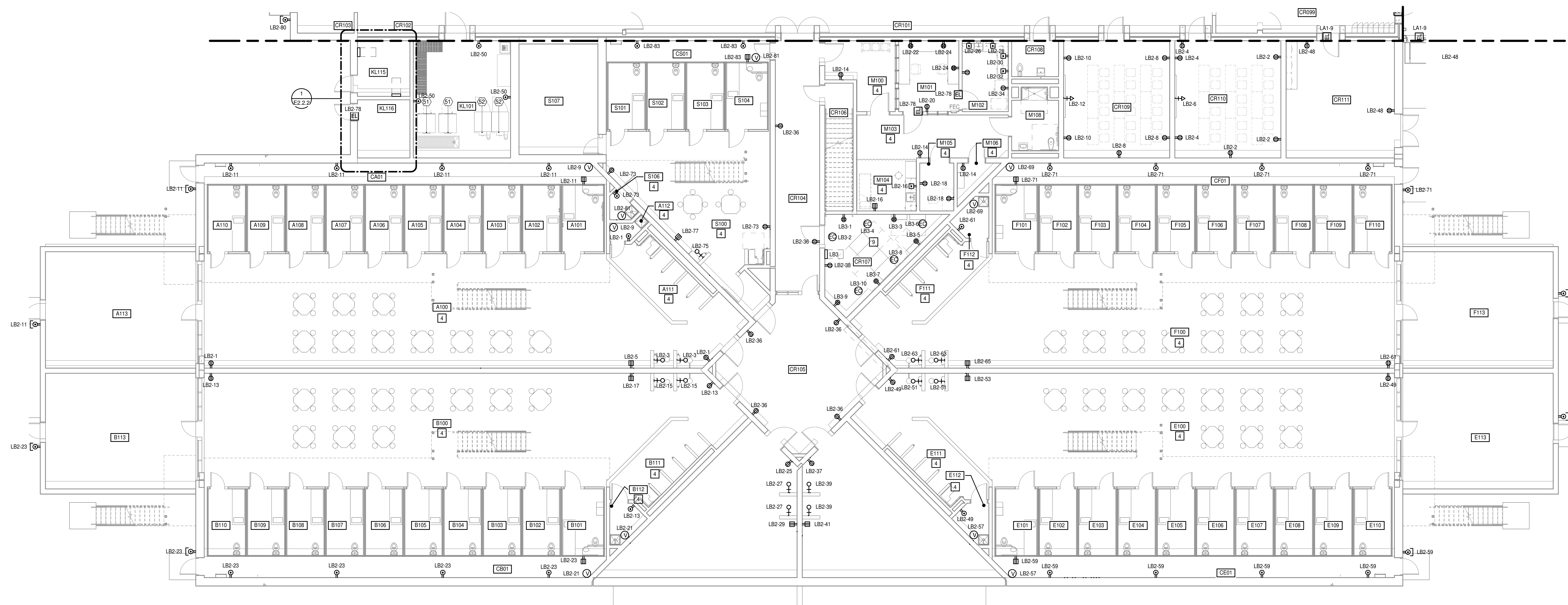


FIRST FLOOR PLAN - PART A - COMMUNICATIONS
 1/8" = 1'-0"





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5/24/24	AD1
6/04/24	AD2



FIRST FLOOR PLAN - PART B - POWER

1/8" = 1'-0"

120V RELAY SCHEDULE - RLB					
RELAY	PANEL	CIRCUIT #	CIRCUIT DESCRIPTION	CONTROL MEANS	NOTES
RLB-1	LB2	1	REC A100	SECURITY SYSTEM	
RLB-2	LB2	3	VIDEO VISIT A100	SECURITY SYSTEM	
RLB-3	LB2	5	KIOSK A100	SECURITY SYSTEM	
RLB-4	LB2	7	TV A100	SECURITY SYSTEM	
RLB-5	LB2	9	WATER A100	SECURITY SYSTEM	
RLB-6	LB2	13	REC B100	SECURITY SYSTEM	
RLB-7	LB2	15	VIDEO VISIT B100	SECURITY SYSTEM	
RLB-8	LB2	17	KIOSK B100	SECURITY SYSTEM	
RLB-9	LB2	19	TV B100	SECURITY SYSTEM	
RLB-10	LB2	21	WATER B100	SECURITY SYSTEM	
RLB-11	LB2	25	REC C100	SECURITY SYSTEM	
RLB-12	LB2	27	VIDEO VISIT C100	SECURITY SYSTEM	
RLB-13	LB2	29	KIOSK C100	SECURITY SYSTEM	
RLB-14	LB2	31	TV C100	SECURITY SYSTEM	
RLB-15	LB2	33	WATER C100	SECURITY SYSTEM	
RLB-16	LB2	37	REC D100	SECURITY SYSTEM	
RLB-17	LB2	39	VIDEO VISIT D100	SECURITY SYSTEM	
RLB-18	LB2	41	KIOSK D100	SECURITY SYSTEM	
RLB-19	LB2	43	TV D100	SECURITY SYSTEM	
RLB-20	LB2	45	WATER D100	SECURITY SYSTEM	
RLB-21	LB2	49	REC E100	SECURITY SYSTEM	
RLB-22	LB2	51	VIDEO VISIT E100	SECURITY SYSTEM	
RLB-23	LB2	53	KIOSK E100	SECURITY SYSTEM	
RLB-24	LB2	55	TV E100	SECURITY SYSTEM	
RLB-25	LB2	57	WATER E100	SECURITY SYSTEM	
RLB-26	LB2	61	REC F100	SECURITY SYSTEM	
RLB-27	LB2	63	VIDEO VISIT F100	SECURITY SYSTEM	
RLB-28	LB2	65	KIOSK F100	SECURITY SYSTEM	
RLB-29	LB2	67	TV F100	SECURITY SYSTEM	
RLB-30	LB2	69	WATER F100	SECURITY SYSTEM	
RLB-31	LB2	73	REC S100	SECURITY SYSTEM	
RLB-32	LB2	75	VIDEO VISIT S100	SECURITY SYSTEM	
RLB-33	LB2	77	KIOSK S100	SECURITY SYSTEM	
RLB-34	LB2	79	TV S100	SECURITY SYSTEM	
RLB-35	LB2	81	WATER S100	SECURITY SYSTEM	
RLB-36	LB2	14	REC M100, M103, M106	SECURITY SYSTEM	
RLB-37	LB2	16	REC 104	SECURITY SYSTEM	
RLB-38	LB2	18	REC M105	SECURITY SYSTEM	
RLB-39			SPARE	SECURITY SYSTEM	
RLB-40			SPARE	SECURITY SYSTEM	
RLB-41			SPARE	SECURITY SYSTEM	
RLB-42			SPARE	SECURITY SYSTEM	
RLB-43			SPARE	SECURITY SYSTEM	
RLB-44			SPARE	SECURITY SYSTEM	
RLB-45			SPARE	SECURITY SYSTEM	
RLB-46			SPARE	SECURITY SYSTEM	
RLB-47			SPARE	SECURITY SYSTEM	
RLB-48			SPARE	SECURITY SYSTEM	

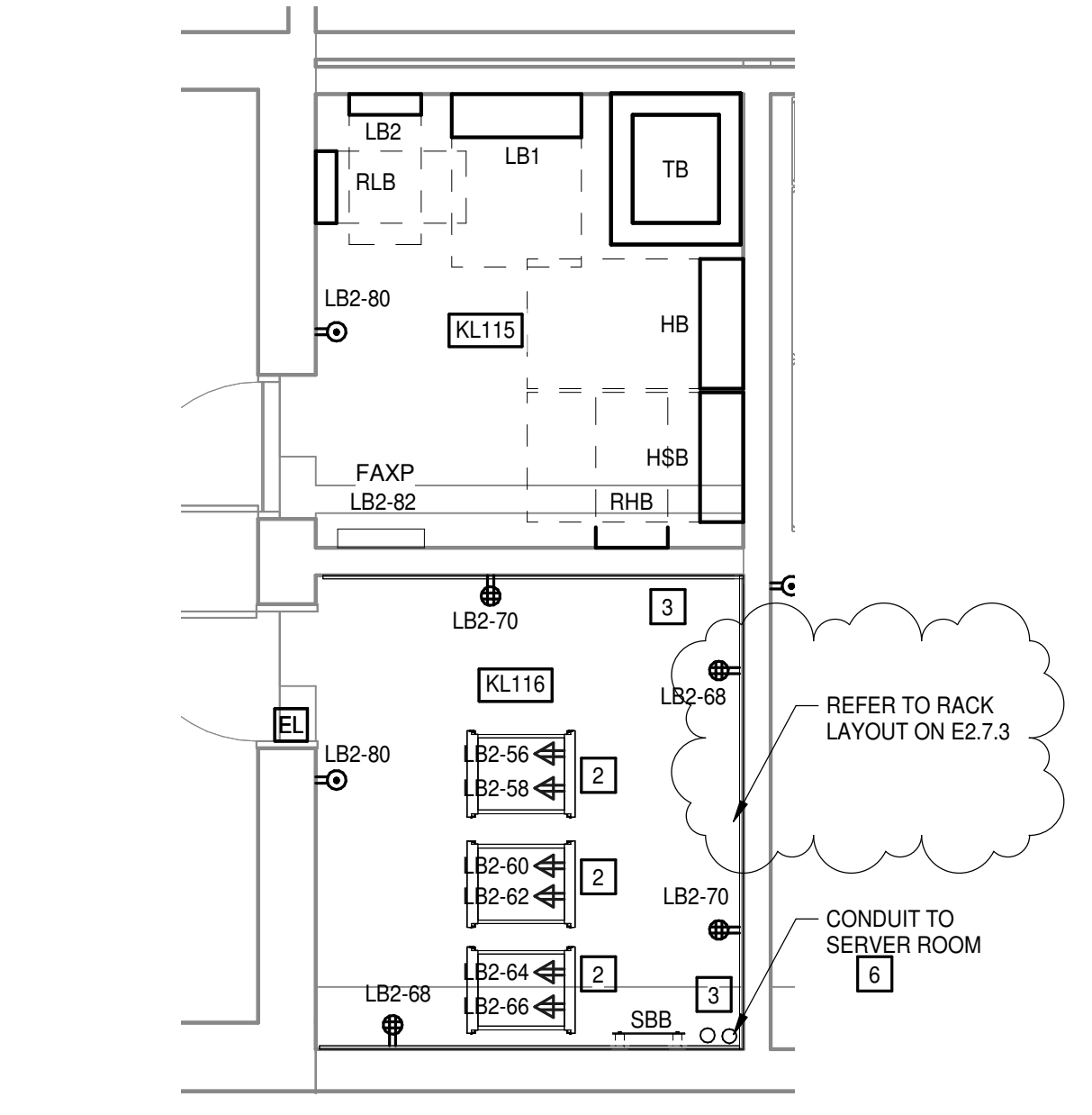
KEYNOTES

APPLIES TO E2.X.2 SERIES DRAWINGS REPRESENTED BY [N]

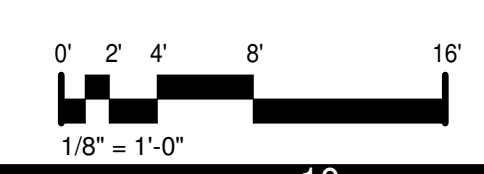
- COORDINATE OUTLET LOCATION WITH COMPUTER STATIONS INDICATED ON THE ARCHITECTURAL PLANS.
- PROVIDE TWO DUPLEX OUTLETS MOUNTED TO THE EACH COMMUNICATION RACK. DROP CIRCUITRY FROM JB OVER THE RACK VIA FLEXIBLE CONDUIT. PROVIDE DEDICATED 3/12 IN 3/4" PER CIRCUIT.
- PROVIDE 4"x8"x3/4" FIRE RESISTANT PLYWOOD ON WALLS INDICATED COVERED WITH TWO COATS OF WHITE PAINT. DO NOT COVER FIRE RESISTANT STAMP. ADHERE TO WALL WITH SCREWS IN THE WALL STRUCTURE.
- POWER CIRCUITS IN THIS SPACE ARE RELAY CONTROLLED. REFER TO THE RELAY SCHEDULE FOR THE RELAY NUMBER.
- COORDINATE LOCATION OF OVERHEAD DOOR CONTROLLER WITH OWNER PRIOR TO CONSTRUCTION. PROVIDE CONDUIT, WIRING, AND BOXES AS NEEDED FOR COMPLETE INSTALLATION.
- CONNECT BREAKER SHUNT TRIP MODULES FOR EQUIPMENT UNDER THE HOOD TO THE HOOD FIRE SUPPRESSION SYSTEM.
- PROVIDE CEILING MOUNTED OUTLET FOR METAL DETECTOR POWER AND FINAL CONNECTION TO EQUIPMENT IN GRS CONDUIT. COORDINATE POWER REQUIREMENTS WITH THE PROVIDER AND FIELD ADJUST AS REQUIRED.
- PROVIDE A SINGLE POLE RELAY CONTROLLED BY THE SECURITY SYSTEM TO CONTROL THE VALVES IN THIS AREA.
- FIELD COORDINATE THE ELECTRICAL CONNECTION IN THIS ROOM AS DIRECTED BY THE SE CONTRACTOR.
- TERMINATE EACH CIRCUIT IN A QUAD BOX BELOW THE FLOOR AND PROVIDE A FLEXIBLE CONDUIT WHIP TO EXTEND FROM THE UNDER-FLOOR BOX THROUGH THE RAISED FLOOR AND INTO THE INDIVIDUAL CONSOLE FURNITURE POSITION.

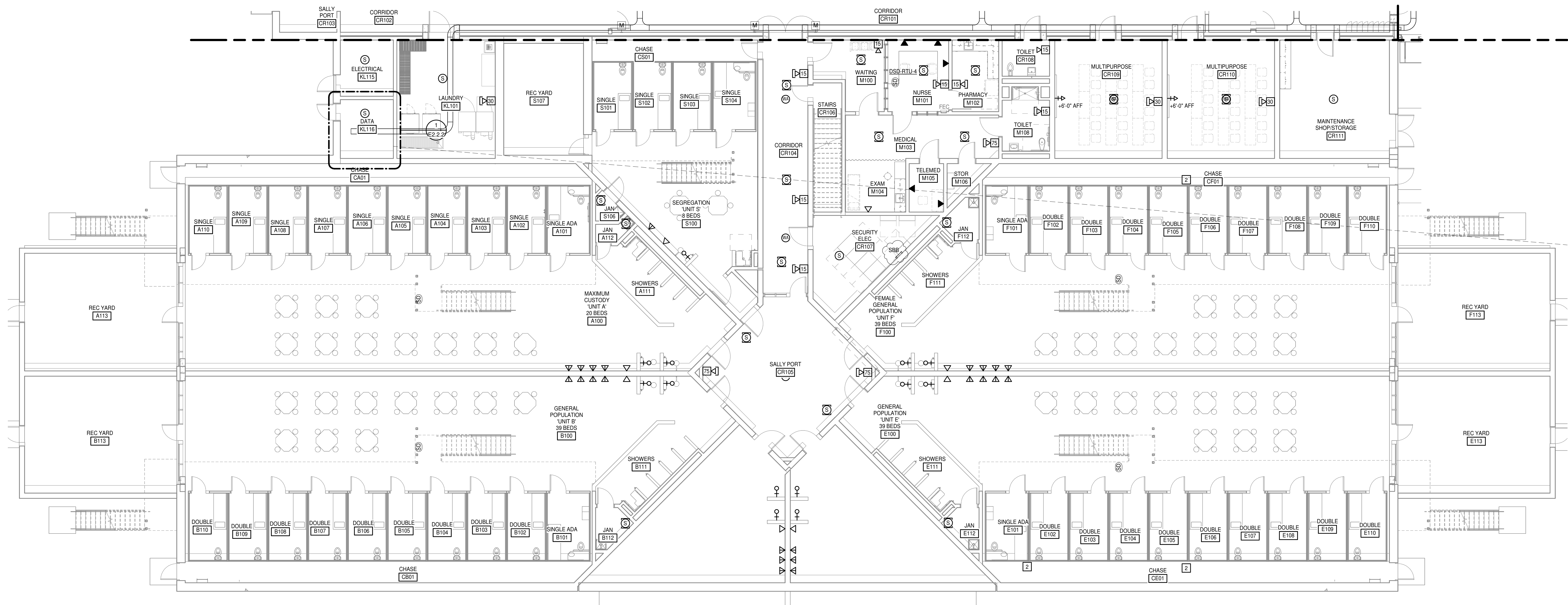
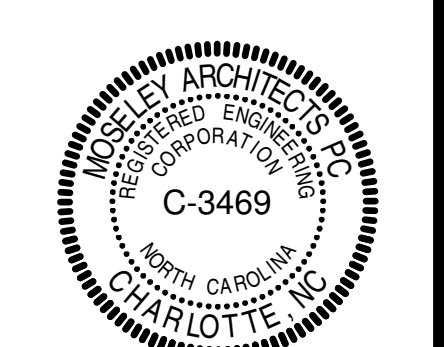
GENERAL NOTES

- COORDINATE OUTLET LOCATIONS IN CHASES AND MECHANICAL SPACES WITH OTHER TRADE AND RELOCATE AS REQUIRED SUCH THAT OUTLET WILL NOT BE BLOCKED.
- REFER TO 'FS' SERIES DRAWINGS FOR ELECTRICAL ROUGH-IN TYPE AND MOUNTING HEIGHTS OF ALL KITCHEN EQUIPMENT LOCATIONS.
- ALL OUTLETS SUPPLIED BY A UPS PANEL SHALL BE BLUE IN COLOR. ALL OUTLETS SUPPLIED BY PANEL 'LE' SHALL BE RED IN COLOR.



1 ELECTRICAL AND DATA ROOMS B
 E2.1.3, E2.2.2 1/4" = 1'-0"



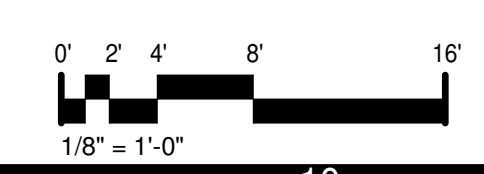


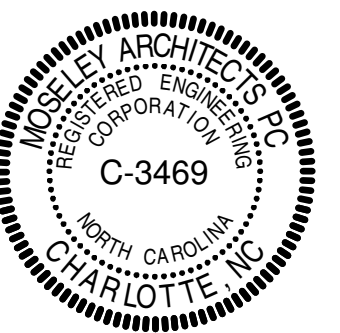
FIRST FLOOR PLAN - PART B - COMMUNICATIONS
 1/8" = 1'-0"

KEYNOTES	
APPLIES TO E2.X.3 SERIES DRAWINGS REPRESENTED BY [n]	
1.	COORDINATE OUTLET LOCATION WITH COMPUTER STATIONS INDICATED ON THE ARCHITECTURAL PLANS.
2.	COORDINATE LOCATION OF SMOKE DETECTOR ABOVE CELLS IN CHASE SPACES WITH OTHER TRADES AND RELOCATE AS REQUIRED SUCH THAT DETECTOR WILL BE ACCESSIBLE.
3.	ADJUST DEVICE MOUNTING HEIGHTS FOR PLATFORM IN THIS AREA
4.	PROVIDE A FIRE ALARM MONITOR MODULE TO INTERFACE THE HOOD WITH THE FIRE ALARM.
5.	PROVIDE TWELVE (12) CAT 6A DATA CABLES TO EACH CONSOLE. 4 CABLES EACH TERMINATING IN THE RADIO, PHONE AND DATA RACK. CABLES SHALL TERMINATE INTO A PATCH PANEL LOCATED IN EACH FURNITURE OPERATOR POSITION AND TERMINATE INTO PATCH PANELS LOCATED IN THE RELATED SERVICE EQUIPMENT RACK CABINET(S) OF THE 911 DATA CENTER. THE EXACT CABINET FOR EACH CABLE SET (RADIO, PHONE, & DATA) SHALL BE FIELD DETERMINED TO ALLOW CABLING VENDOR END-TO-END TESTING ONCE INSTALLED. FIELD COORDINATE WITH SERVICE VENDOR/PROVIDER PRIOR TO INSTALLATION. EACH CABLE SET (RADIO, PHONE, DATA), SHALL BE COLOR CODED FOR EASE IN IDENTIFICATION PER THE OWNER'S INSTALLER'S RECOMMENDATION.
6.	TWO UNDERGROUND 2" C WITH WATER RESISTANT 24-STRAND SINGLE MODE FIBER IN ONE, OTHER IS SPARE CAPPED ON BOTH ENDS

GENERAL NOTES	
A.	PROVIDE BONDING POINTS (OSBB) UNDER THE RAISED FLOOR AS INDICATED AND BOND TO EVERY OTHER RAISED FLOOR SUPPORT POST WITH A #8 BARE COPPER CONDUCTOR TO THE MAIN SERVICE GROUND.
B.	PROVIDE AN INDIVIDUAL #8 GREEN COPPER CONDUCTOR FROM THE OSBB INTO EACH CONSOLE POSITION AND CONNECT/BOND TO THE OPERATOR POSITION SECONDARY BONDING BAR.

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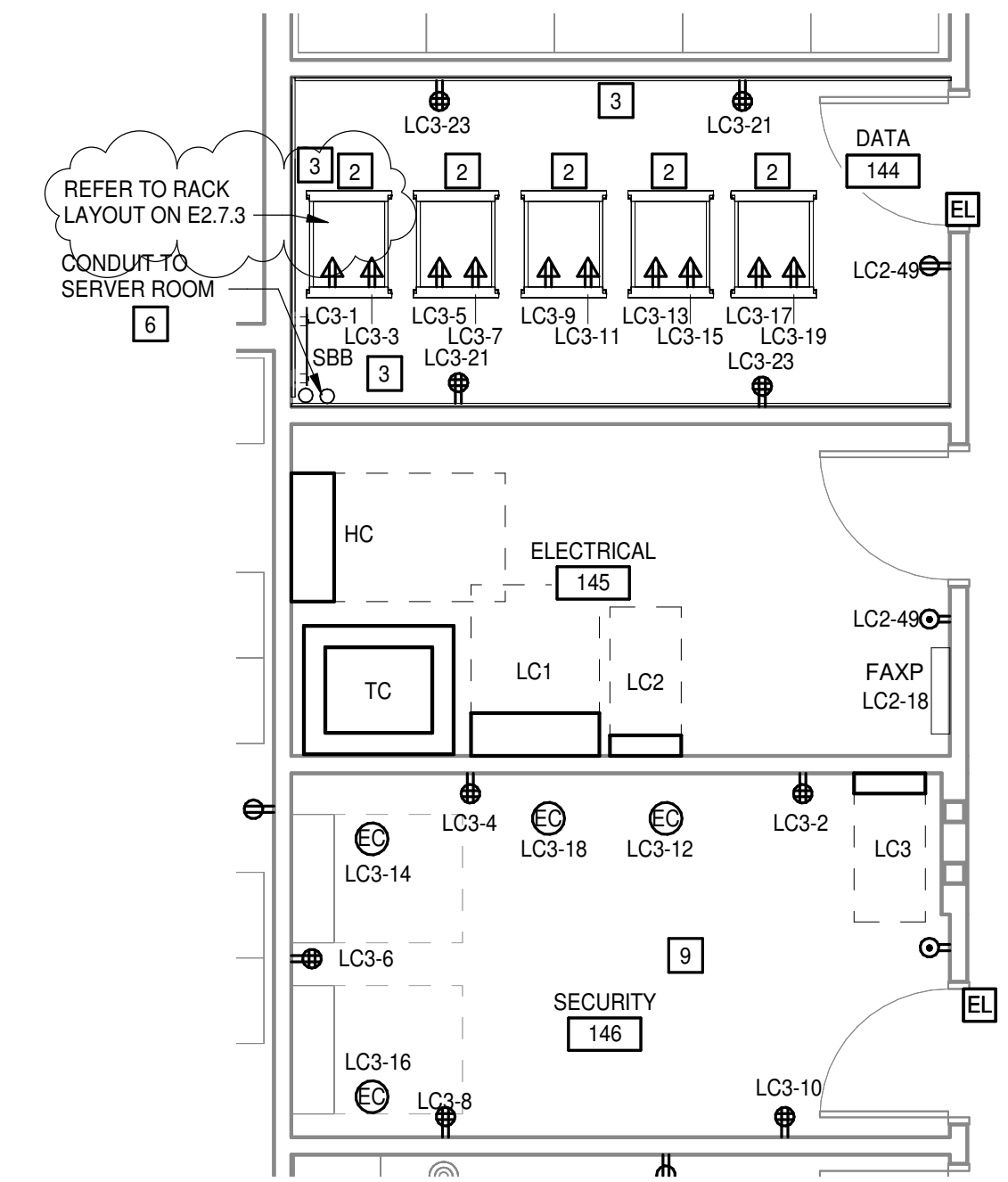
KEYNOTES

APPLIES TO E2.X.2 SERIES DRAWINGS
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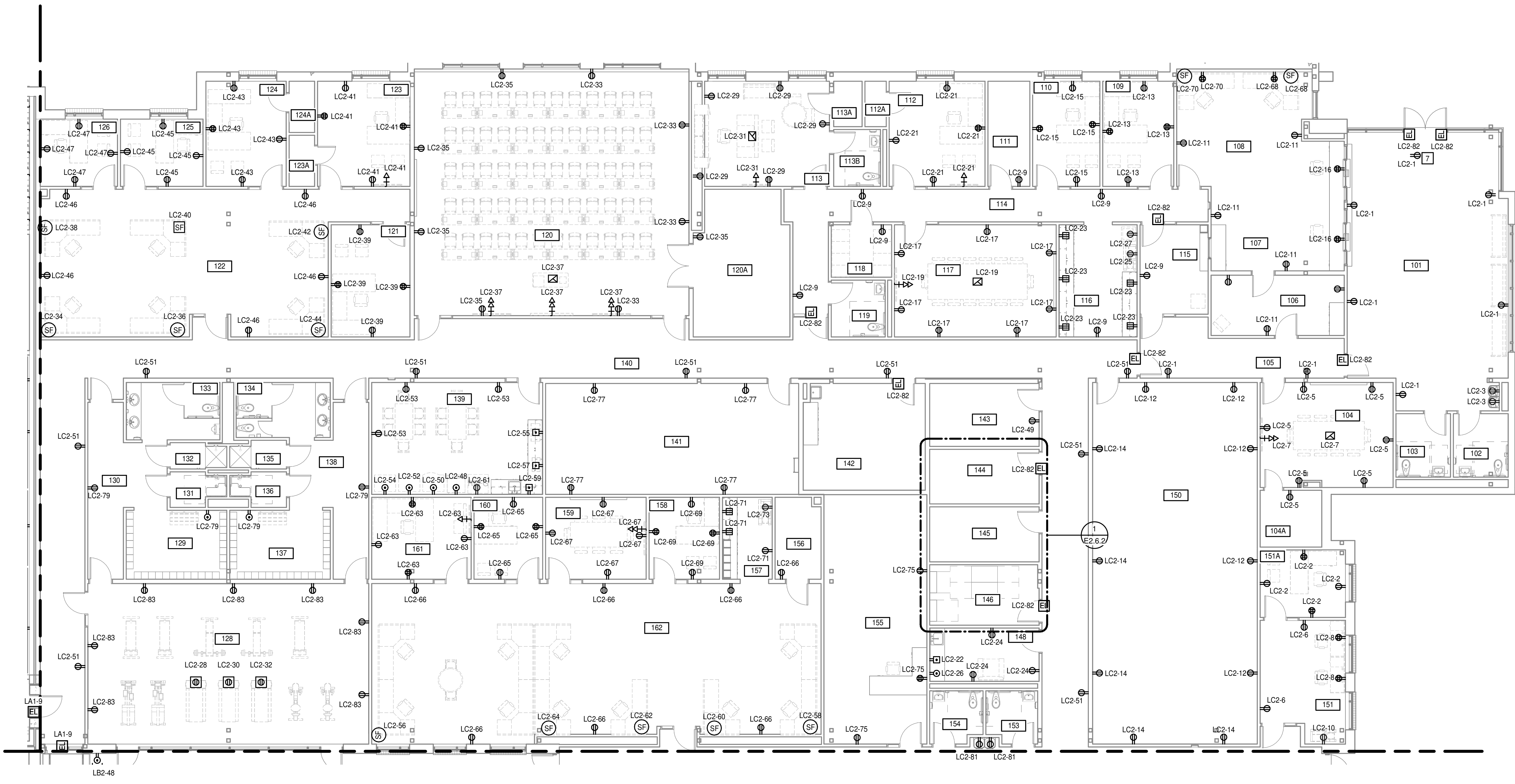
- COORDINATE OUTLET LOCATION WITH COMPUTER STATIONS INDICATED ON THE ARCHITECTURAL PLANS.
- PROVIDE TWO DUPLEX OUTLETS MOUNTED TO EACH COMMUNICATION RACK. DROP CIRCUITRY FROM JB OVER THE RACK VIA FLEXIBLE CONDUIT. PROVIDE DEDICATED 3P/2 IN 34°C PER CIRCUIT.
- PROVIDE 4'X8'X3/4" FIRE RESISTANT PLYWOOD ON WALLS INDICATED COVERED WITH TWO COATS OF WHITE PAINT. DO NOT COVER FIRE RESISTANT STAMP. ADHERE TO WALL WITH SCREWS IN THE WALL STRUCTURE.
- POWER CIRCUITS IN THIS SPACE ARE RELAY CONTROLLED. REFER TO THE RELAY SCHEDULE FOR THE RELAY NUMBER.
- COORDINATE LOCATION OF OVERHEAD DOOR CONTROLLER WITH OWNER PRIOR TO CONSTRUCTION. PROVIDE CONDUIT, WIRING, AND BOXES AS NEEDED FOR COMPLETE INSTALLATION.
- CONNECT BREAKER SHUNT TRIP MODULES FOR EQUIPMENT UNDER THE HOOD TO THE HOOD FIRE SUPPRESSION SYSTEM.
- PROVIDE CEILING MOUNTED OUTLET FOR METAL DETECTOR POWER AND FINAL CONNECTION TO EQUIPMENT IN GRS CONDUIT. COORDINATE POWER REQUIREMENTS WITH THE PROVIDER AND FIELD ADJUST AS REQUIRED.
- PROVIDE A SINGLE POLE RELAY CONTROLLED BY THE SECURITY SYSTEM TO CONTROL THE VALVES IN THIS AREA.
- FIELD COORDINATE THE ELECTRICAL CONNECTION IN THIS ROOM AS DIRECTED BY THE SE CONTRACTOR.
- TERMINATE EACH CIRCUIT IN A QUAD BOX BELOW THE FLOOR AND PROVIDE A FLEXIBLE CONDUIT WHIP TO EXTEND FROM THE UNDER-FLOOR BOX THROUGH THE RAISED FLOOR AND INTO THE INDIVIDUAL CONSOLE FURNITURE POSITION.

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- ALL OUTLETS SUPPLIED BY A UPS PANEL SHALL BE BLUE IN COLOR. ALL OUTLETS SUPPLIED BY PANEL "LE" SHALL BE RED IN COLOR.



1 ELECTRICAL AND DATA ROOMS C
 E2.1.3) E2.6.2 1/4" = 1'-0"



FIRST FLOOR PLAN - PART C - POWER
 1/8" = 1'-0"

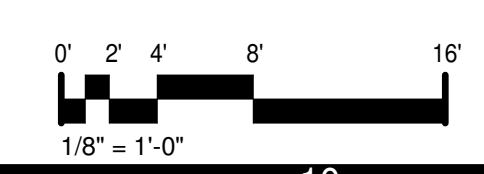
PENDER COUNTY LEC

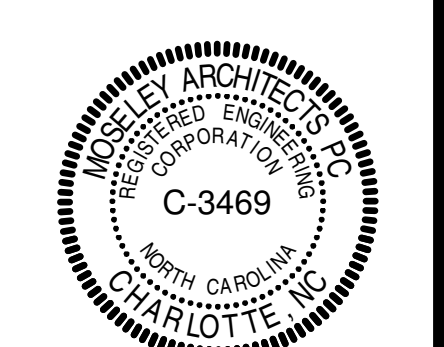
PENDER COUNTY, NORTH CAROLINA
 OLD SAVANNAH ROAD BURGAW, NC

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FIRST FLOOR PLAN - PART C - POWER

E2.6.2





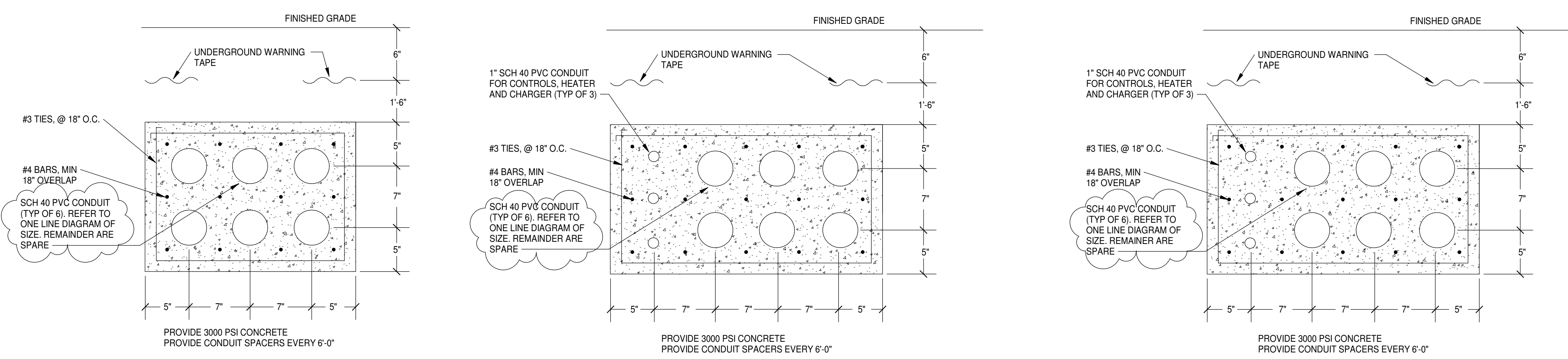
PROJECT NO:	611888
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REVISIONS	
DATE	DESCRIPTION
5/24/24	AD1
6/04/24	AD2

KEYNOTES
 APPLIES TO E2.X.2 SERIES DRAWINGS REPRESENTED BY [1]

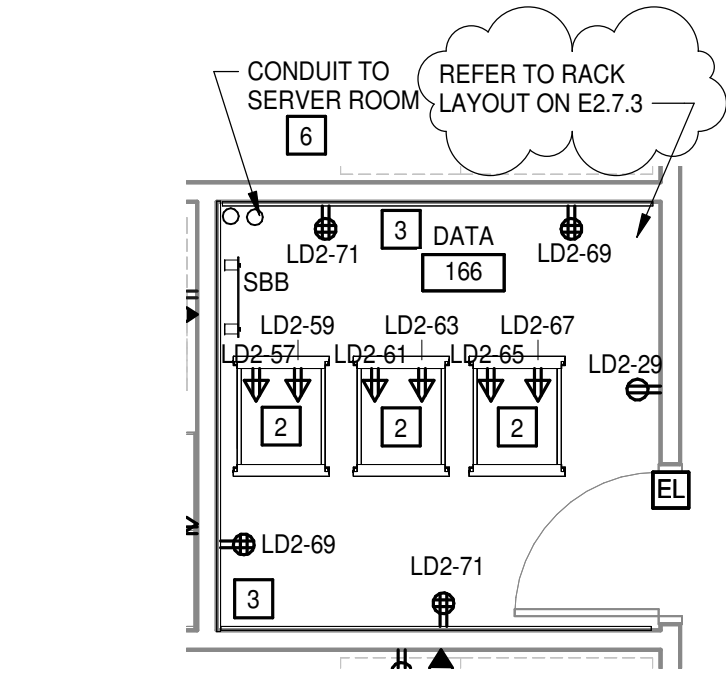
- COORDINATE OUTLET LOCATION WITH COMPUTER STATIONS INDICATED ON THE ARCHITECTURAL PLANS.
- PROVIDE TWO DUPLEX OUTLETS MOUNTED TO EACH COMMUNICATION RACK. DROP CIRCUITRY FROM JB OVER THE RACK VIA FLEXIBLE CONDUIT. PROVIDE DEDICATED 3P/2 IN 34°C PER CIRCUIT.
- PROVIDE 4"x8"x3/4" FIRE RESISTANT PLYWOOD ON WALLS INDICATED COVERED WITH TWO COATS OF WHITE PAINT. DO NOT COVER FIRE RESISTANT STAMP. ADHERE TO WALL WITH SCREWS IN THE WALL STRUCTURE.
- POWER CIRCUITS IN THIS SPACE ARE RELAY CONTROLLED. REFER TO THE RELAY SCHEDULE FOR THE RELAY NUMBER.
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- PROVIDE A SINGLE POLE RELAY CONTROLLED BY THE SECURITY SYSTEM TO CONTROL THE VALVES IN THIS AREA.
- FIELD COORDINATE THE ELECTRICAL CONNECTION IN THIS ROOM AS DIRECTED BY THE SE CONTRACTOR.
- TERMINATE EACH CIRCUIT IN A QUAD BOX BELOW THE FLOOR AND PROVIDE A FLEXIBLE CONDUIT WHIP TO EXTEND FROM THE UNDER-FLOOR BOX THROUGH THE RAISED FLOOR AND INTO THE INDIVIDUAL CONSOLE FURNITURE POSITION.

GENERAL NOTES

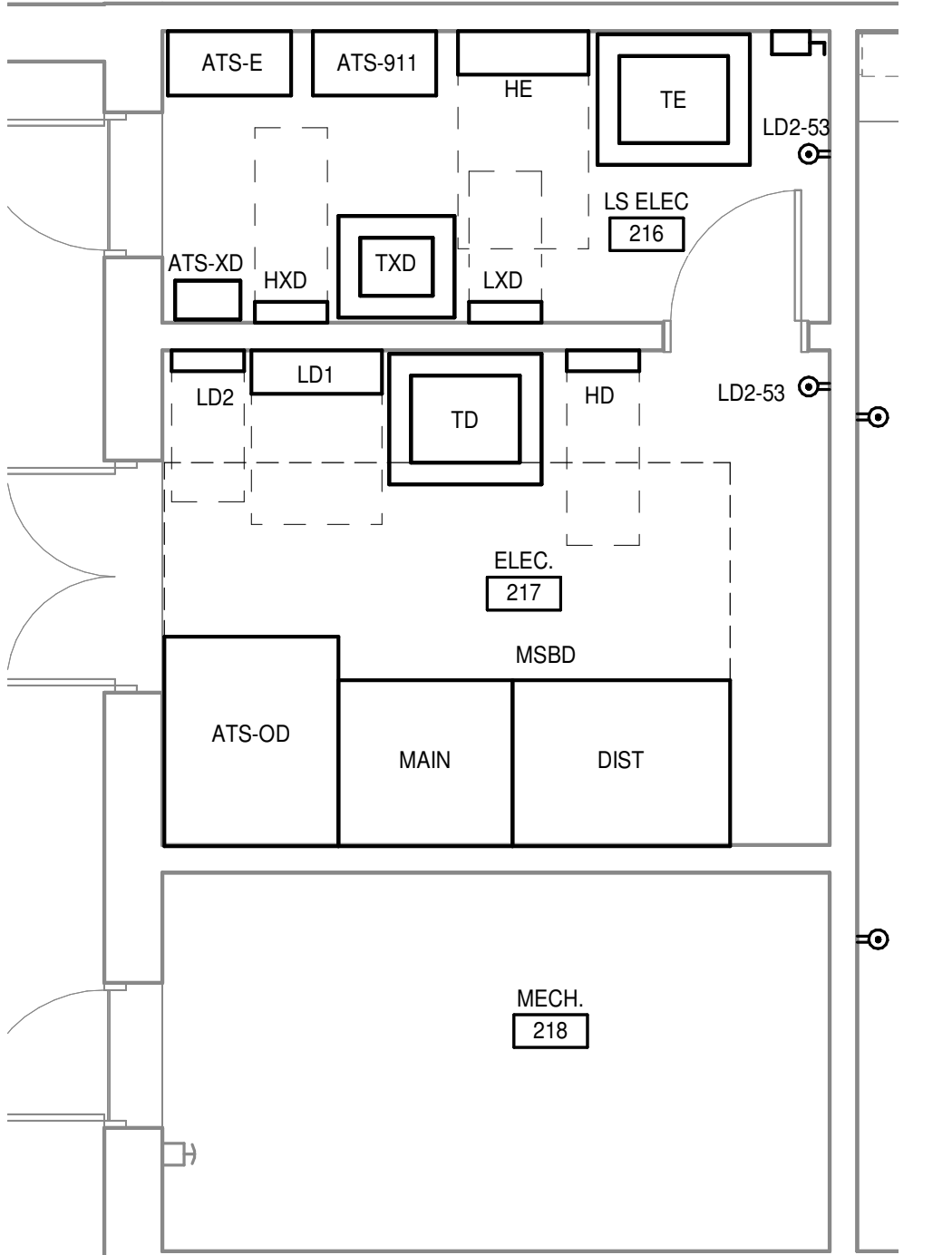
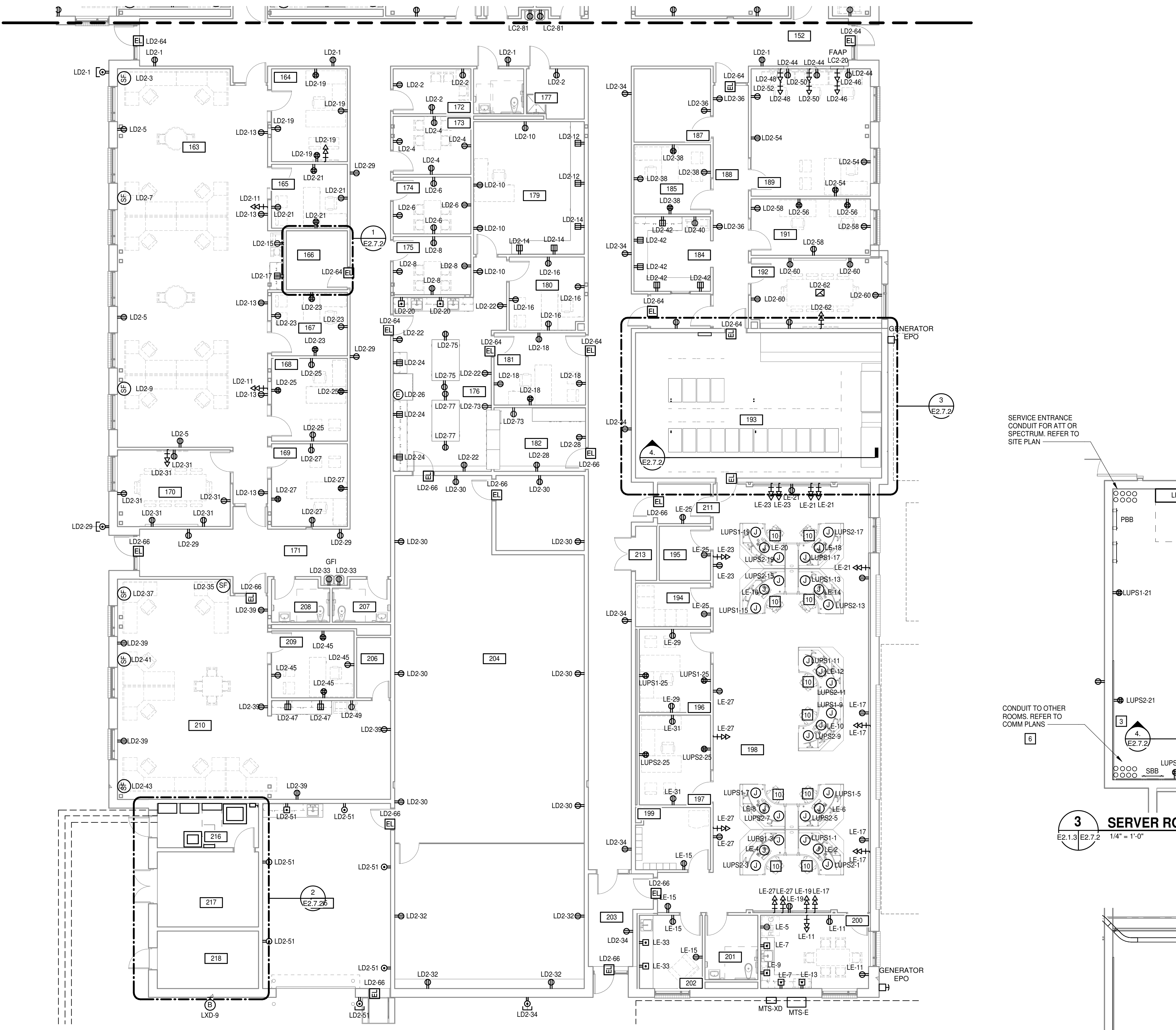
- COORDINATE OUTLET LOCATIONS IN CHASES AND MECHANICAL SPACES WITH OTHER TRADE AND RELOCATE AS REQUIRED SUCH THAT OUTLET WILL NOT BE BLOCKED.
- REFER TO "FS" SERIES DRAWINGS FOR ELECTRICAL ROUGH-IN TYPE AND MOUNTING HEIGHTS OF ALL KITCHEN EQUIPMENT LOCATIONS.
- ALL OUTLETS SUPPLIED BY A UPS PANEL SHALL BE BLUE IN COLOR. ALL OUTLETS SUPPLIED BY PANEL "LE" SHALL BE RED IN COLOR.



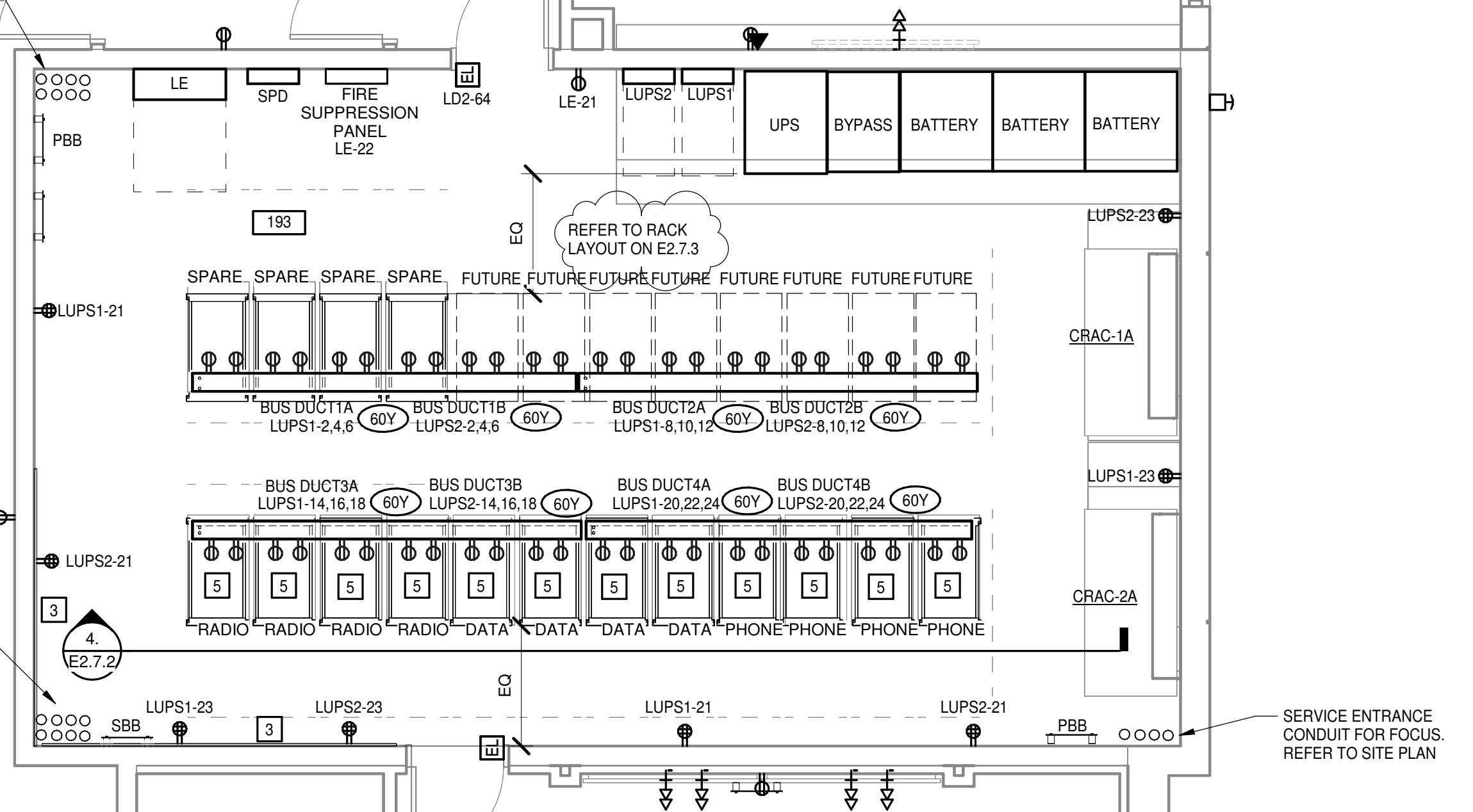
4 TRANSFORMER DUCTBANK DETAIL #2 E2.7.2 12" = 1'-0"
5 GENERATOR #2 DUCTBANK DETAIL E2.7.2 12" = 1'-0"
6 911 GENERATOR DUCTBANK DETAIL E2.7.2 12" = 1'-0"



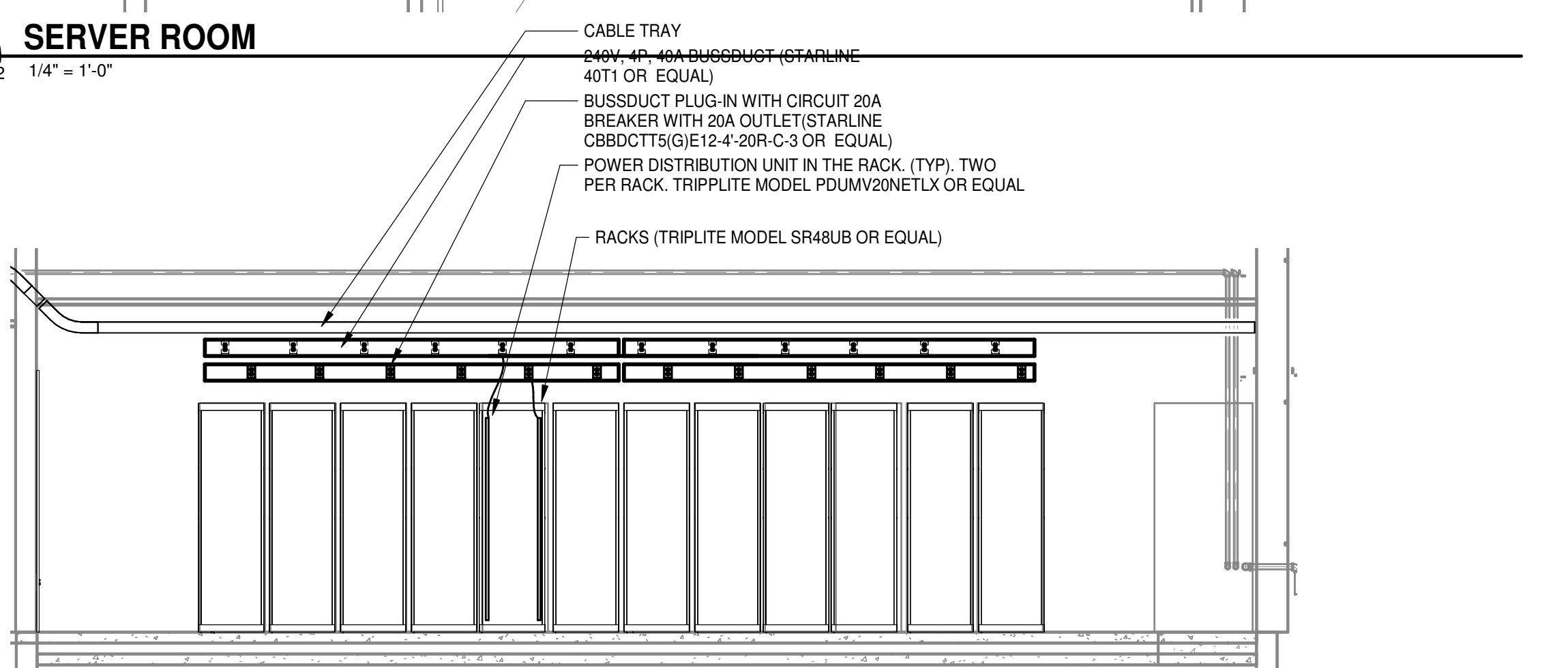
1 DATA ROOM D E2.1.3, E2.7.2 1/4" = 1'-0"



2 ELECTRICAL ROOM D E2.7.2, E2.7.2 1/4" = 1'-0"

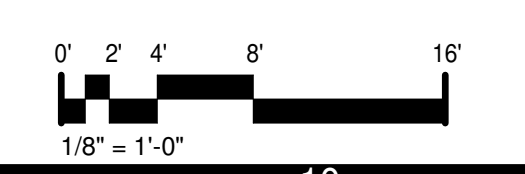


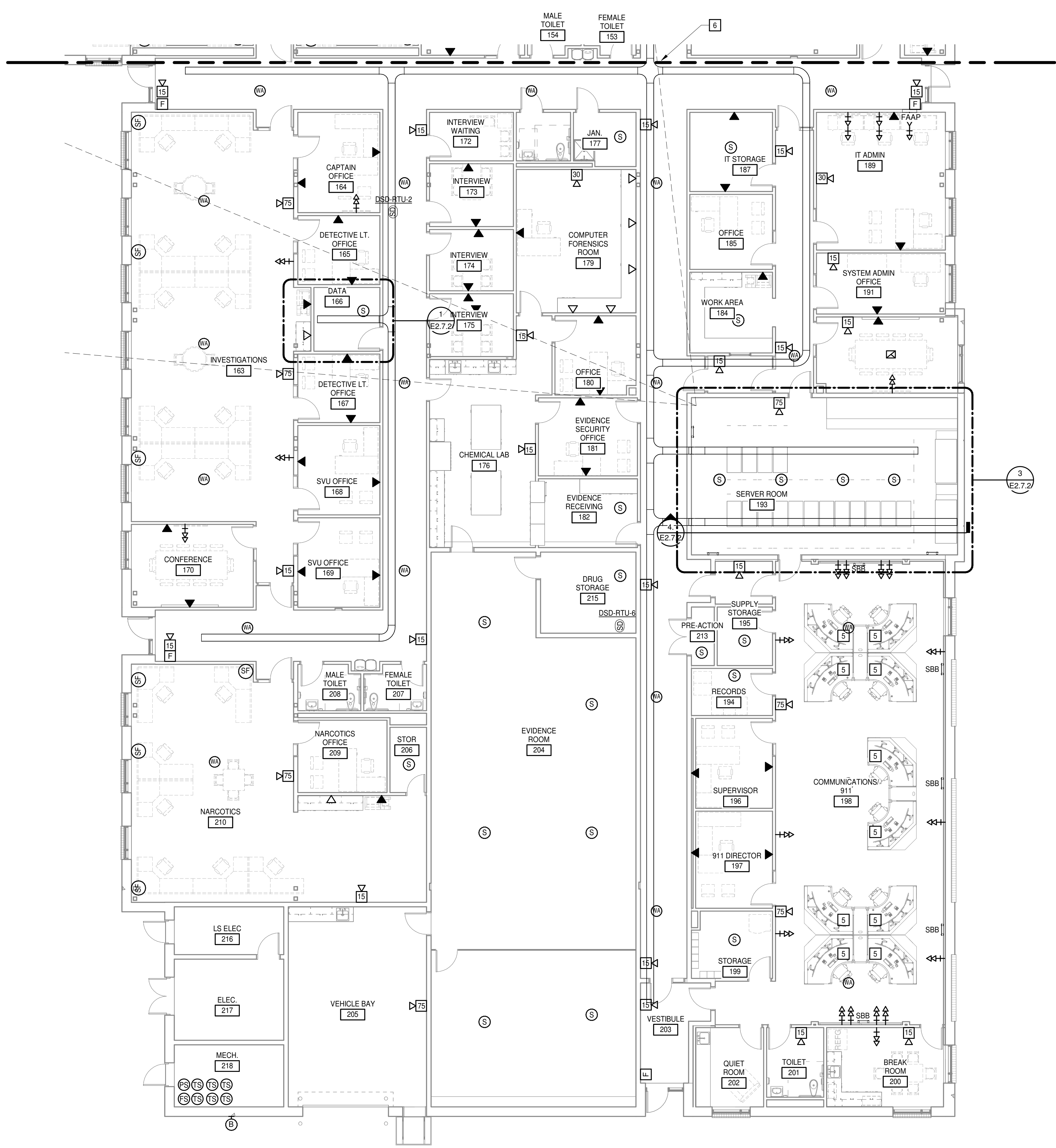
3 SERVER ROOM E2.1.3, E2.7.2 1/4" = 1'-0"



4 BUSDUCT AND RACK ELEVATION E2.7.1, E2.7.2 NO SCALE

FIRST FLOOR PLAN - PART D - POWER 1/8" = 1'-0"





FIRST FLOOR PLAN - PART D - COMMUNICATIONS
1/8" = 1'-0"

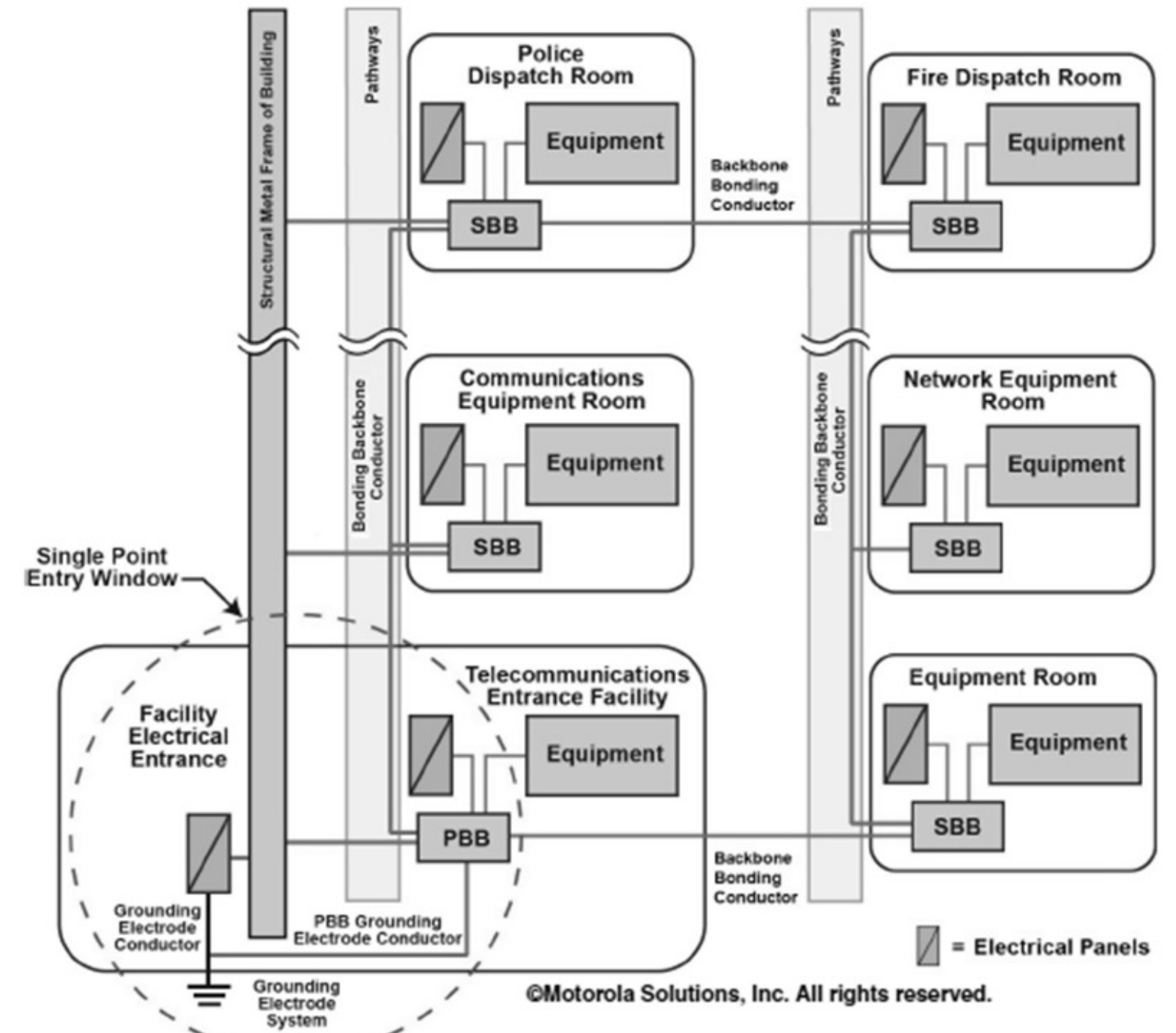


Figure 5-1 Example of Internal Bonding and Grounding System for Multi-Story Large Commercial Building

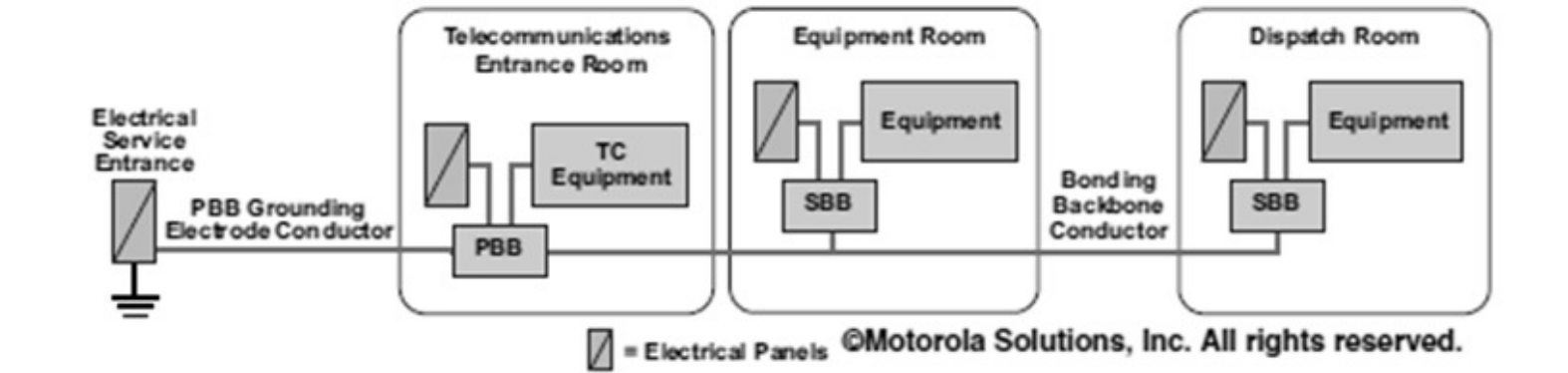


Figure 5-2 Example of Internal Bonding and Grounding System for Single-Story Large Commercial Building

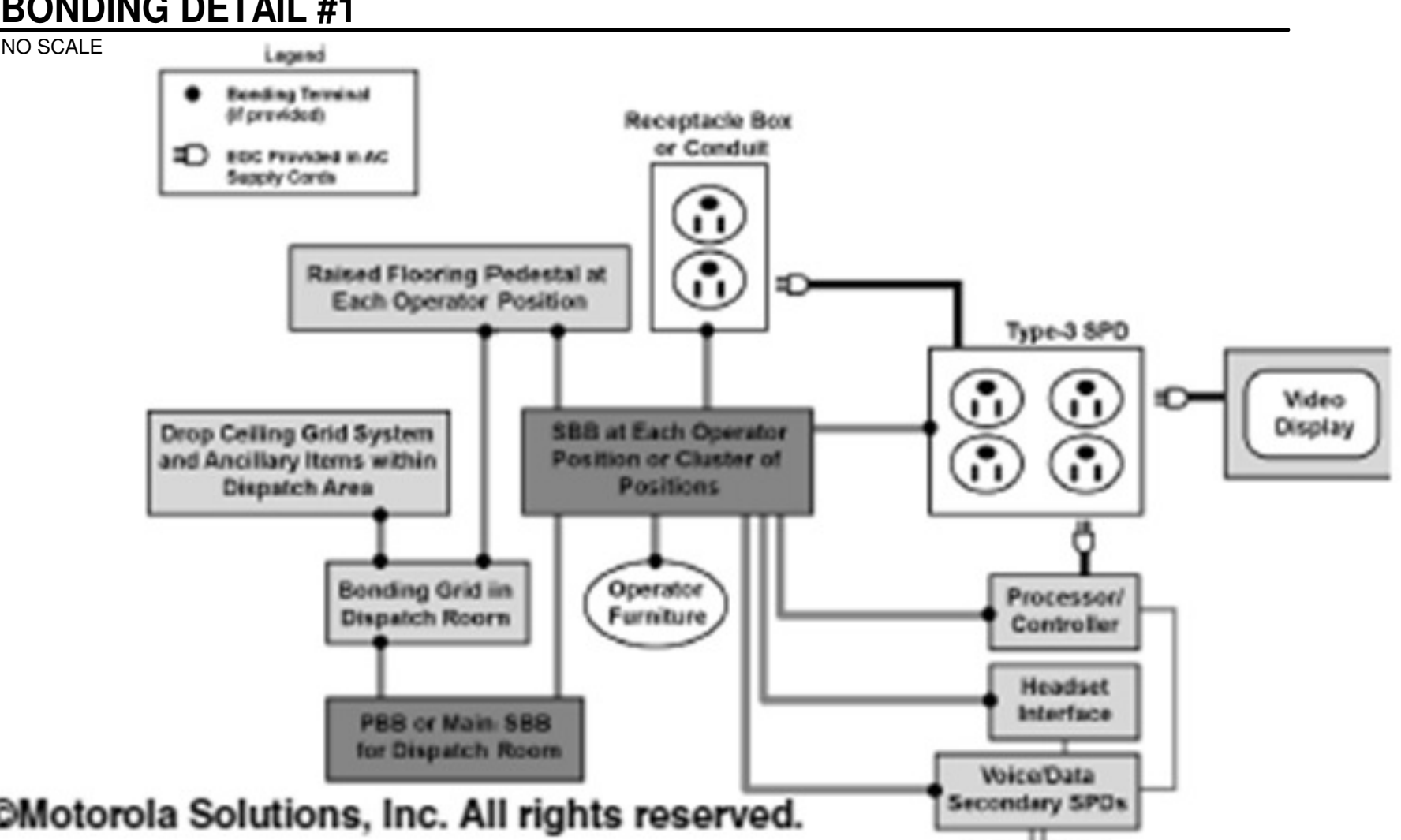


Figure 5-141 Example of Network Operator Position Bonding

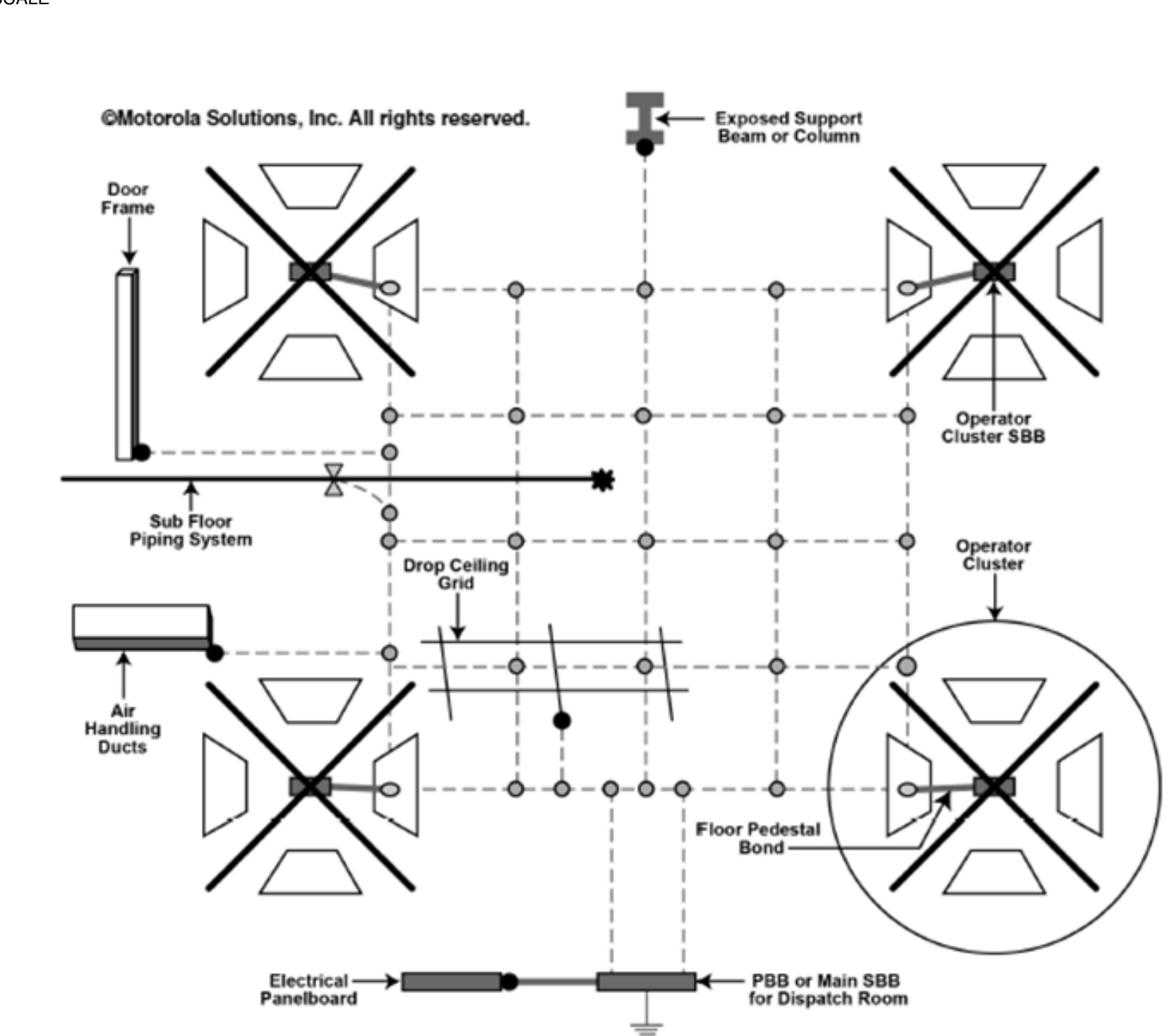


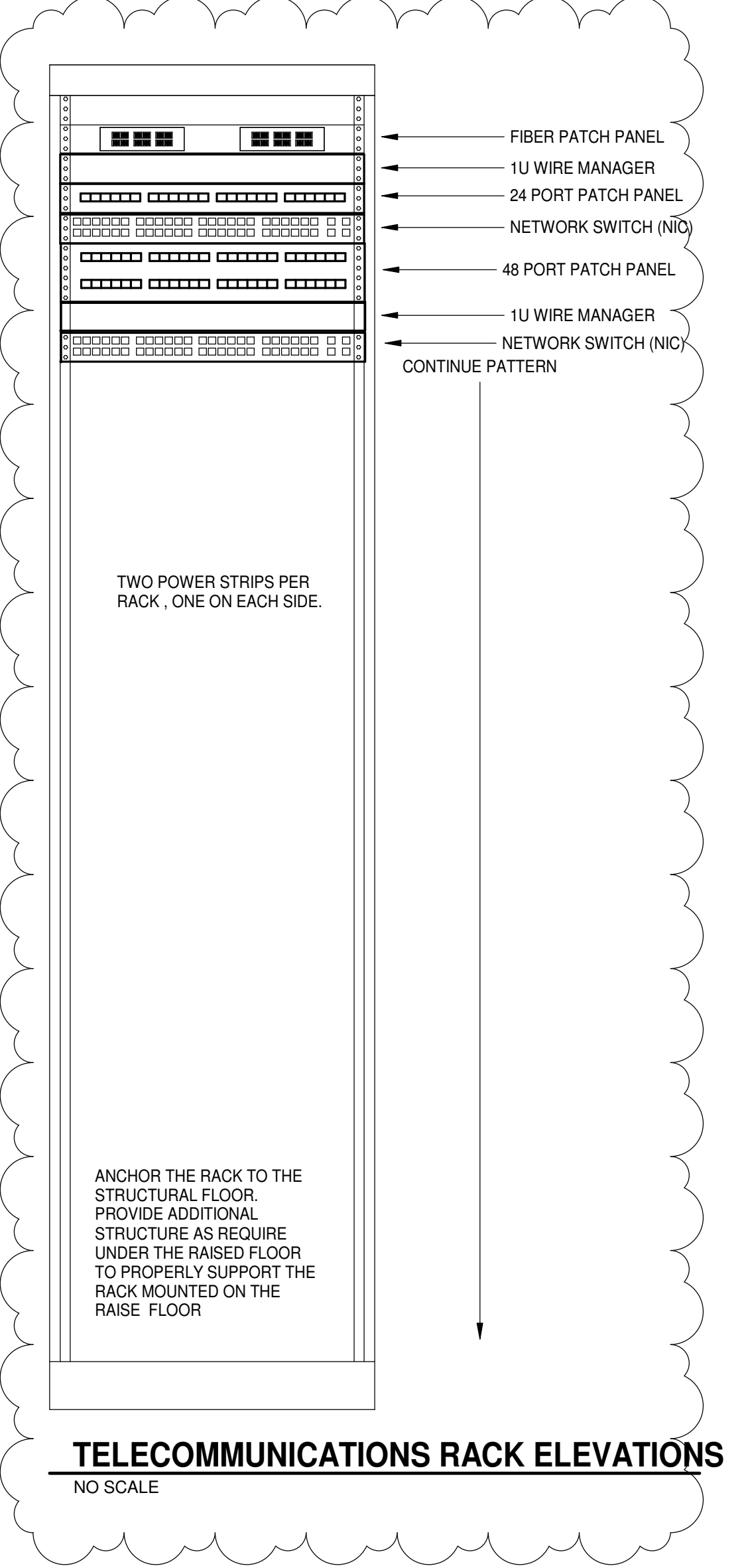
Figure 5-139 Example of Bonding Grid in Dispatch Area

KEYNOTES
APPLIES TO E2.X.3 SERIES DRAWINGS
REPRESENTED BY [Symbol]

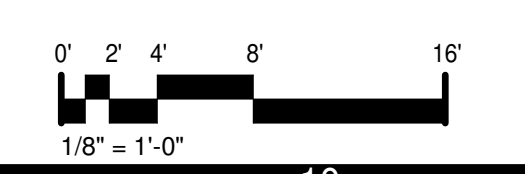
- COORDINATE OUTLET LOCATION WITH COMPUTER STATIONS INDICATED ON THE ARCHITECTURAL PLANS.
- COORDINATE LOCATION OF SMOKE DETECTOR ABOVE CELLS IN CHASE SPACES WITH OTHER TRADES AND RELOCATE AS REQUIRED SUCH THAT DETECTOR WILL BE ACCESSIBLE.
- ADJUST DEVICE MOUNTING HEIGHTS FOR PLATFORM IN THIS AREA
- PROVIDE A FIRE ALARM MONITOR MODULE TO INTERFACE THE HOOD WITH THE FIRE ALARM.
- PROVIDE TWELVE (12) CAT 6A DATA CABLES TO EACH CONSOLE. 4 CABLES EACH TERMINATING IN THE RADIO, PHONE AND DATA RACK. CABLES SHALL TERMINATE INTO A PATCH PANEL LOCATED IN EACH FURNITURE OPERATOR POSITION AND TERMINATE INTO PATCH PANELS LOCATED IN THE RELATED SERVICE EQUIPMENT RACK CABINET(S) OF THE 911 DATA CENTER. THE EXACT CABINET FOR EACH CABLE SET (RADIO, PHONE, & DATA) SHALL BE FIELD DETERMINED TO ALLOW CABLEING VENDOR END-TO-END TESTING ONCE INSTALLED. FIELD COORDINATE WITH SERVICE VENDOR/PROVIDER PRIOR TO INSTALLATION. EACH CABLE SET (RADIO, PHONE, DATA) SHALL BE COLOR CODED FOR EASE IN IDENTIFICATION PER THE OWNERS/INSTALLER'S RECOMMENDATION
- TWO UNDERGROUND 2" C WITH WATER RESISTANT 24-STRAND SINGLE MODE FIBER IN ONE. OTHER IS SPARE CAPPED ON BOTH ENDS.

GENERAL NOTES

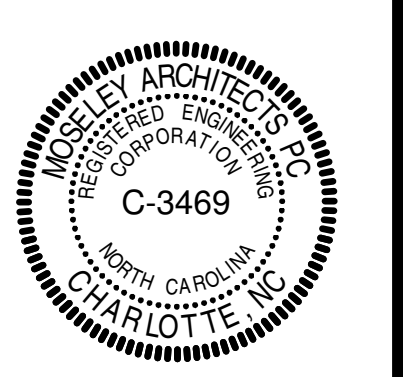
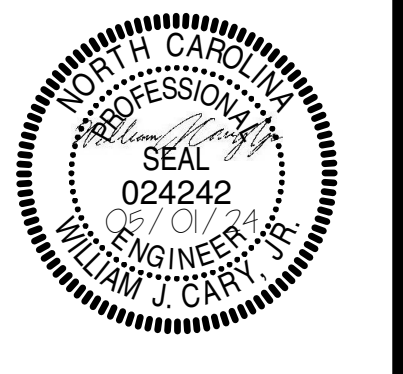
- PROVIDE BONDING POINTS (OSBB) UNDER THE RAISED FLOOR AS INDICATED AND BOND TO EVERY OTHER RAISED FLOOR SUPPORT POST WITH A #8 BARE COPPER CONDUCTOR TO THE MAIN SERVICE GROUND.
- PROVIDE AN INDIVIDUAL #8 GREEN COPPER CONDUCTOR FROM THE OSBB INTO EACH CONSOLE POSITION AND CONNECT/BOND TO THE OPERATOR POSITION SECONDARY BONDING BAR.



TELECOMMUNICATIONS RACK ELEVATIONS
NO SCALE



MOSELEY ARCHITECTS
6210 ARDREY KELL ROAD • THE HUB AT WAVERLY, SUITE 425 • CHARLOTTE, NC 28277
PHONE (704) 540-3755 FAX (704) 540-3754
MOSELEYARCHITECTS.COM



PENDER COUNTY LEC
PENDER COUNTY, NORTH CAROLINA
OLD SAVANNAH ROAD BURGAW, NC

PROJECT NO:	611888
DATE:	MAY 01, 2024
REVISIONS	
DATE	DESCRIPTION
6/04/24	AD2

FIRST FLOOR PLAN - PART D - COMMUNICATION

E2.7.3

KEYNOTES

APPLIES TO THIS DRAWING ONLY
REPRESENTED BY □

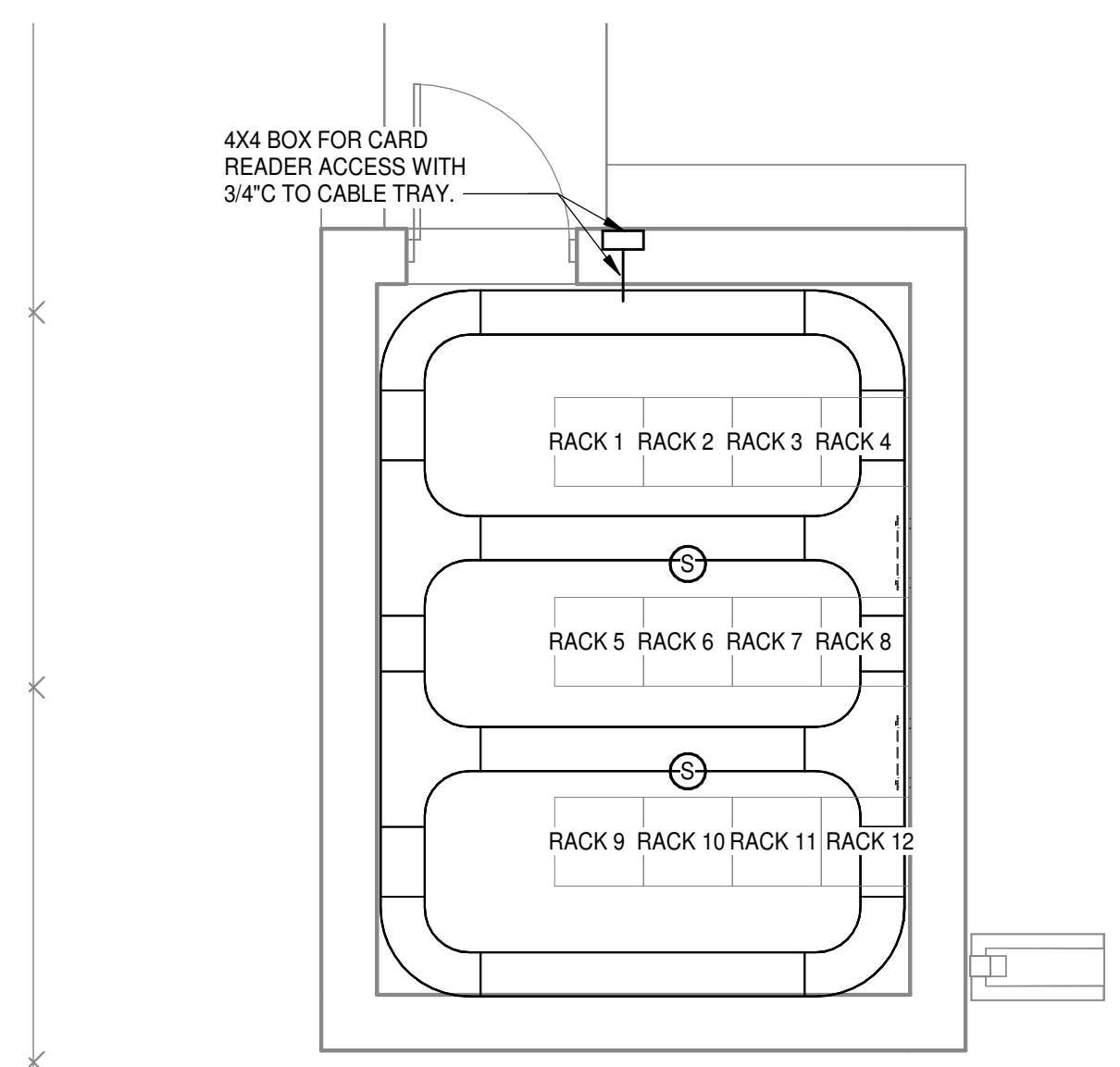
1. PROVIDE A 3/8" GROUND RING AROUND THE COMM BUILDING AND ANOTHER AROUND THE COMM TOWER INTERCONNECTED TO EACH OTHER AND CONNECTED TO PANEL GROUND IN ACCORDANCE TO MOTOROLA 56 STANDARDS. PROVIDE A 3/4"x10" GROUND ROD AT ALL FOUR CORNERS.
2. PROVIDE 3/0 FROM THE PANEL GROUND TO EACH GROUND BARS (SBB).
3. PROVIDE 4"x4"x3/4" FIRE RESISTANT PLYWOOD ON WALL NEAR THE CEILING COVERED WITH TWO COATS OF WHITE PAINT. DO NOT COVER FIRE RESISTANT STAMP. ADHERE TO WALL WITH SCREWS IN THE WALL STRUCTURE. PROVIDE A WALL MOUNTED ENCLOSED DATA RACK (18U) OR BETTER WITH A FIBER PATCH PANEL, 24 PORT PATCH PANEL AND 1U WIRE MANAGER, MOUNTED ON THE BACKBOARD.
4. AIR COMPRESSOR, ADJUST ELECTRICAL CONNECTION TO MATCH UNIT PROVIDED. COORDINATE LOCATION WITH PLUMBING DRAWINGS PRIOR TO ROUGH IN.
5. COORDINATE LOCATION OF OVERHEAD DOOR CONTROLLER WITH OWNER PRIOR TO CONSTRUCTION. PROVIDE CONDUIT, WIRING, AND BOXES AS NEEDED FOR COMPLETE INSTALLATION.

GENERAL NOTES

A. ALL EXTERIOR METALLIC EQUIPMENT, E.G. FENCE, METALLIC ENCLOSURES, GENERATOR HOUSING, ETC. SHALL BE BONDED TO THE GROUND RING.
B. INSTALL RADIALS OFF THE TOWER STRUCTURE AS REQUIRED BY TIA 222-H AND RECOMMENDED BY R56 AND TIA 607.
C. PROVIDE AN INDIVIDUAL #8 GREEN COPPER CONDUCTOR FROM THE OSBB INTO EACH RACK POSITION AND BOND.

DIV 23 ELECTRICAL CONNECTION SCHEDULE - WH

TAG	VOLTAGE	# POLES	LOAD	PANEL	CCCT#	FEEDER	DISCONNECTING MEANS	REMARKS
DSS-6A	208 V	2	0.2 kVA			PER MANUFACTURER	PER MANUFACTURER	CONNECT TO OUTDOOR UNIT
DSS-6B	208 V	2	5.0 kVA	LCB	39.41	(30S)	240V, 3ØA, 3P, NEMA 3R DISC, FPNP	
DSS-7A	208 V	2	0.2 kVA			PER MANUFACTURER	PER MANUFACTURER	CONNECT TO OUTDOOR UNIT
DSS-7B	208 V	2	5.0 kVA	LCB	40.42	(30S)	240V, 3ØA, 3P, NEMA 3R DISC, FPNP	
EH-WH	115 V	2	1.0 kVA	LW	17	(20S)	MOTOR RATED SWITCH	
EUH-1	208 V	3	7.5 kVA	LW	50,52,54	(30S)	PROVIDE WITH UNIT	
EUH-2	208 V	3	7.5 kVA	LW	37,39,41	(30S)	PROVIDE WITH UNIT	
EUH-3	208 V	3	7.5 kVA	LW	43,45,47	(30S)	PROVIDE WITH UNIT	
EUH-4	208 V	3	7.5 kVA	LW	55,56,60	(30S)	PROVIDE WITH UNIT	
F-1	120 V	1	1.5 kVA	LW	38	(20S)	PROVIDE WITH UNIT	
F-2	120 V	1	0.5 kVA	LW	40	(20S)	PROVIDE WITH UNIT	
F-3	120 V	1	0.1 kVA	LW	42	(20S)	PROVIDE WITH UNIT	
FSD-2F	120 V	1	0.1 kVA	LW	15	(20S)	MOTOR RATED SWITCH	
FSD-2L	120 V	1	0.1 kVA	LW	15	(20S)	MOTOR RATED SWITCH	
FSD-44	120 V	1	0.1 kVA	LW	15	(20S)	MOTOR RATED SWITCH	
SSI-01	208 V	3	1.0 kVA			PER MANUFACTURER	PER MANUFACTURER	CONNECT TO OUTDOOR UNIT
SSO-01	208 V	3	11.5 kVA	LW	44,46,48	(40)	240V, 6ØA, 3P, NEMA 3R DISC, FPNP	
WH-W	208 V	3	55.57,59	LW	(30)	BREAKER		



COMM TOWER BLDG - COMMUNICATIONS
1/4" = 1'-0"

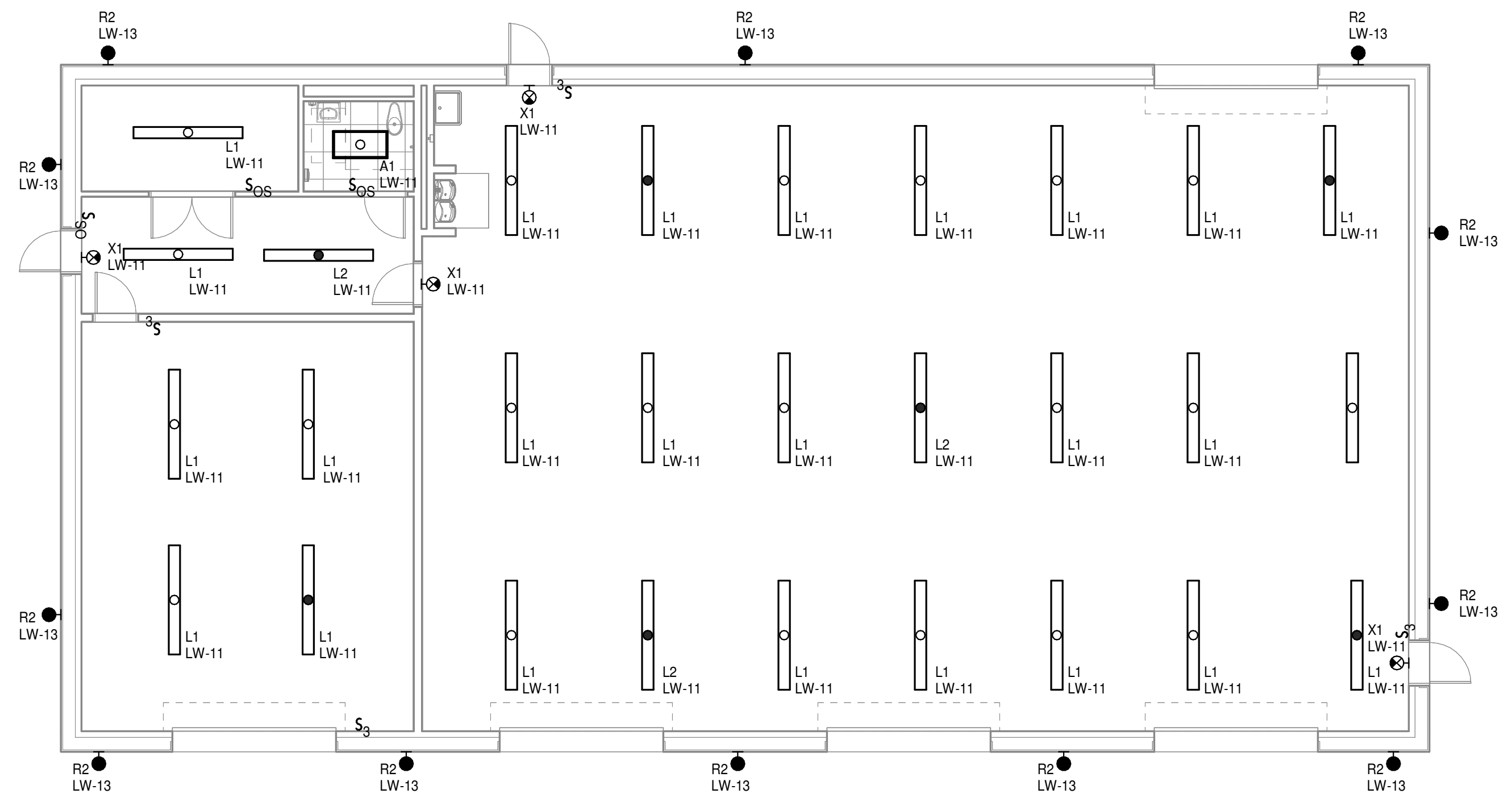
PANELBOARD SCHEDULE LW

LOCATION: CORRIDOR W105 FED FROM: LD1
225 AMP MCB 120/208 Wye 3 PH 4 W MOUNT: RECESSED PANEL ASSEMBLY RATED (KAIC): 10 KAIC

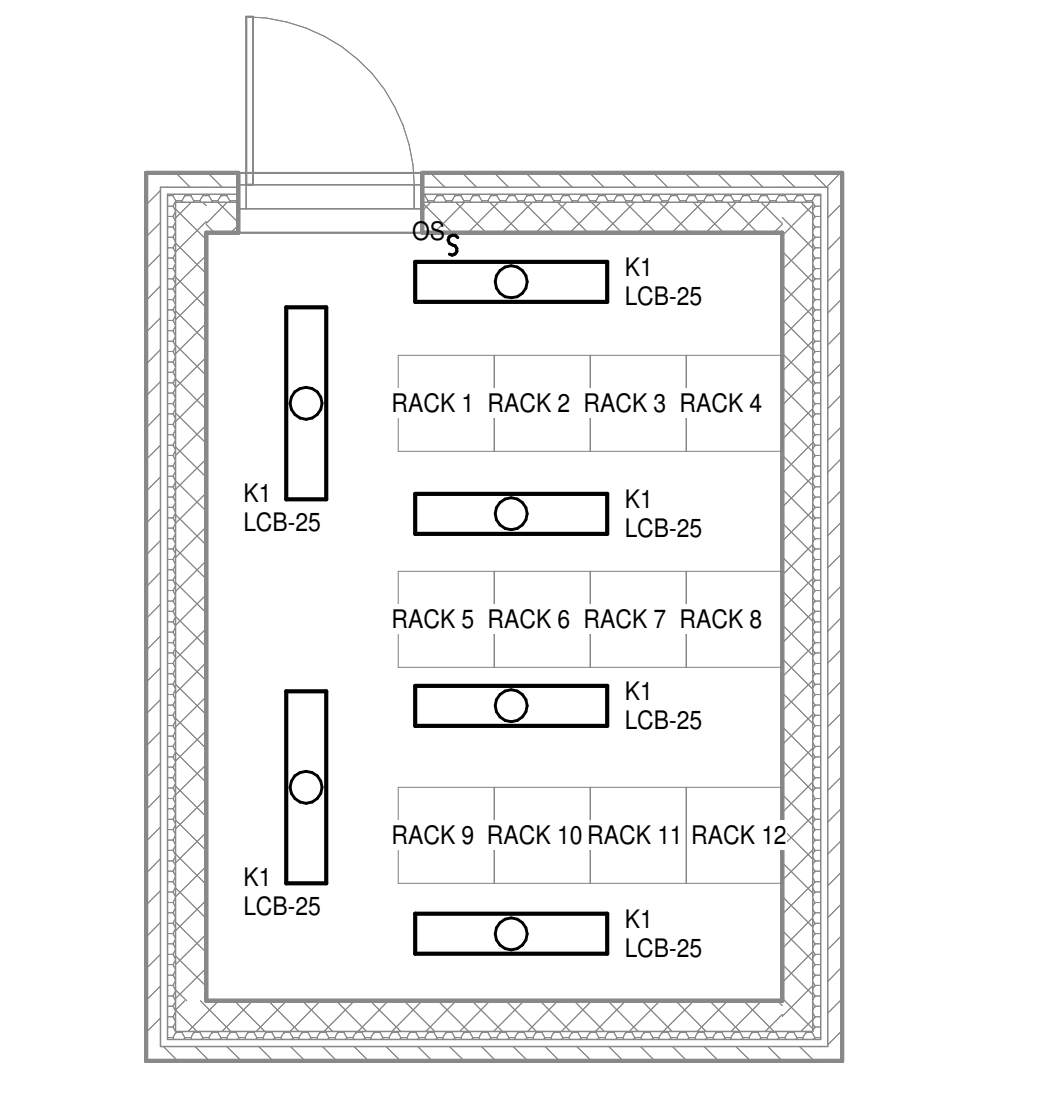
CKT	BRKR	POLE	LOAD	A	B	C	LOAD	POLE	BRKR	CKT	
1	20 A	1	REC WAREHOUSE W101	0.7	0.7		REFRIG W101	1	20 A	2	
3	20 A	1	REC WAREHOUSE W101		0.9	0.4	EWG W101 (GP)	1	20 A	4	
5	20 A	1	REC SRT. BAY 1 W104-1			0.5	MOTOR DOOR W101	1	20 A	6	
7	20 A	1	REC SRT. BAY 1 W104-1	0.4	0.5		MOTOR DOOR W101	1	20 A	8	
9	20 A	1	REC. W105, W103, W102		0.5	0.5	MOTOR DOOR W101	1	20 A	10	
11	20 A	1	LIGHTING			1.0	MOTOR DOOR W101	1	20 A	12	
13	20 A	1	EXTERIOR LIGHTING	0.6	0.5		MOTOR DOOR W104	1	20 A	14	
15	20 A	1	DAMPERS (L)		0.3	--	SPACE ONLY	1	--	16	
17	20 A	1	EH-WH (ML)			1.0	SPACE ONLY	1	--	18	
19	20 A	1	DATA CABINET W103	0.2	--	--	SPACE ONLY	1	--	20	
21	20 A	1	SPARE		0.0	--	SPACE ONLY	1	--	22	
23	20 A	1	SPARE			0.0	SPACE ONLY	1	--	24	
25	20 A	1	SPARE	0.0	--	--	SPACE ONLY	1	--	26	
27	20 A	1	SPARE		0.0	--	SPACE ONLY	1	--	28	
29	20 A	1	SPARE			0.0	SPACE ONLY	1	--	30	
31	20 A	1	SPARE	0.0	--	--	SPACE ONLY	1	--	32	
33	20 A	1	SPARE		0.0	--	SPACE ONLY	1	--	34	
35	20 A	1	SPARE			0.0	SPACE ONLY	1	--	36	
37				2.5	1.5		F-1 (ML)	1	20 A	38	
39	30 A	3	EUH-2 (ML)		2.5	0.5	F-2 (ML)	1	20 A	40	
41						2.5	F-3 (ML)	1	20 A	42	
43				2.5	3.8		SSO-01 (ML)	3	40 A	44	
45	30 A	3	EUH-3 (ML)		2.5	3.8				46	
47						2.5				48	
49				0.2	2.5					50	
51	20 A	3	AIR COMPRESSOR SRT. BAY-1 W104-1		0.2	2.5		EUH-1 (ML)	3	30 A	52
53						0.2				54	
55				2.0	2.8					56	
57	30 A	3	WATER HEATER (ML)		2.0	2.5		EUH-4 (ML)	3	30 A	58
59						2.0				60	
				20 LVA	18 kVA	13 kVA					
				168 A	153 A	158 A					

(GE) = PROVIDE GFCI BREAKER FOR EQUIPMENT, 6-50mA PER NEC 427.22 DED. NEUTRAL.
(GP) = PROVIDE GFCI BREAKER FOR PERSONNEL, 4-6mA PER NEC 210.8, DED. NEUTRAL.
(L) = PROVIDE LOCKOUT BREAKER TO PREVENT UNAUTHORIZED SWITCHING.
(LO) = ROUTE TO LOAD VIA LIGHTING CONTACTOR, REF DETAIL ON DWG E4.X.
(ML) = PROVIDE BREAKER WITH MAINTENANCE LOCKOUT, LOCKABLE OFF.

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
INTERIOR LIGHTING	1.0 kVA	125.00%	1.3 kVA	Total Conn. Load: 57.3 kVA Total Est. Demand: 57.6 kVA Total Conn. Current: 159 A Total Est. Demand.. 160 A	
EXTERIOR LIGHTING	0.6 kVA	125.00%	0.8 kVA		
RECEPTACLES	3.8 kVA	100.00%	3.8 kVA		
AC/ HEAT PUMP	13.5 kVA	100.00%	13.5 kVA		
ELECTRIC HEAT	35.8 kVA	100.00%	35.8 kVA		
KITCHEN	0.0 kVA	0.00%	0.0 kVA		
MISCELLANEOUS	3.7 kVA	100.00%	3.7 kVA		



FIRST FLOOR - WAREHOUSE - LIGHTING
1/8" = 1'-0"



FIRST FLOOR - COMM TOWER BLDG - LIGHTING
1/4" = 1'-0"

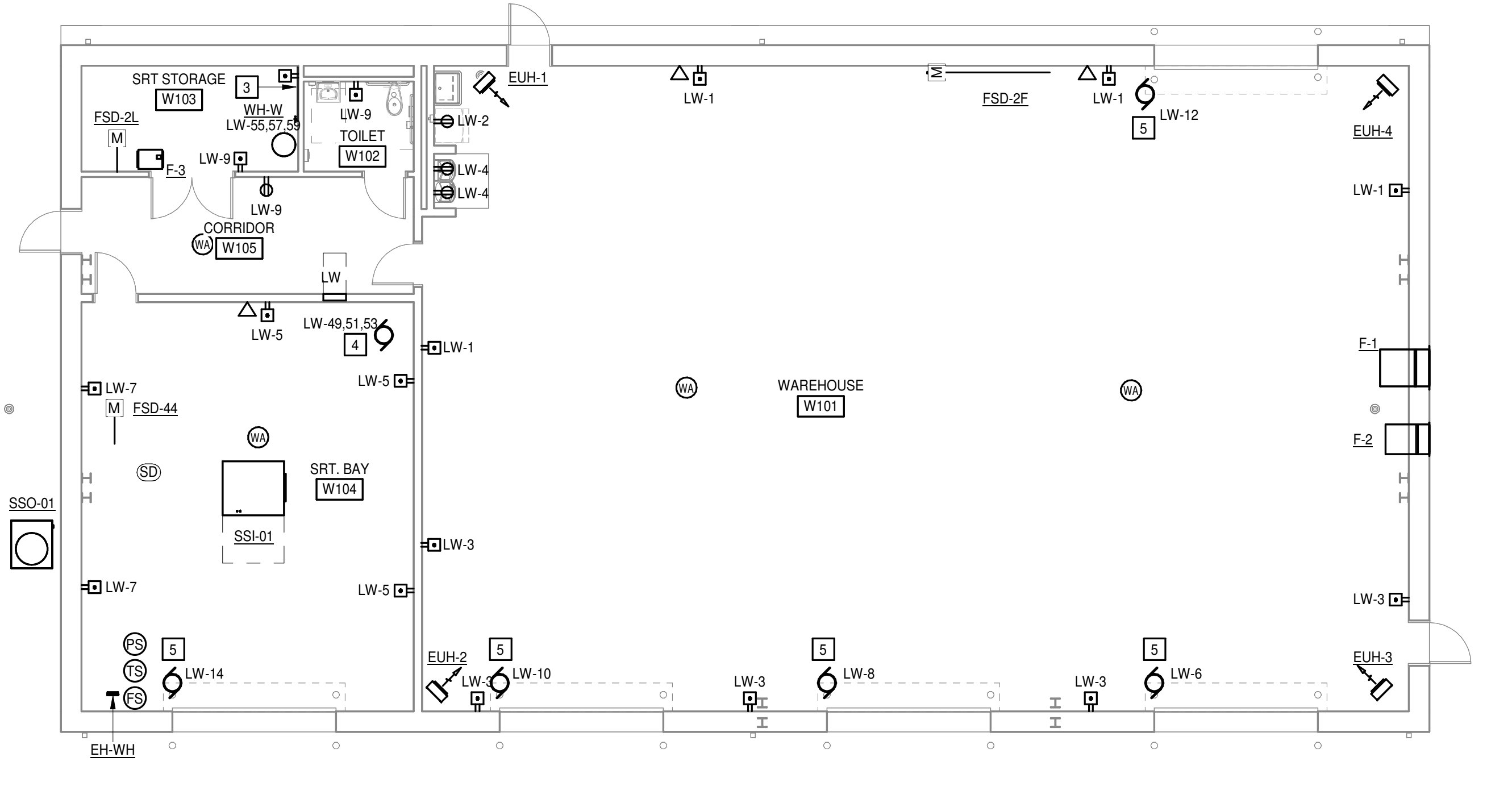
PANELBOARD SCHEDULE LCB

LOCATION: HOUSE COMMUNIC... FED FROM: UPS- CB
100 AMP MCB 120/208 Wye 3 PH 4 W MOUNT: SURFACE PANEL ASSEMBLY RATED (KAIC): 10 KAIC

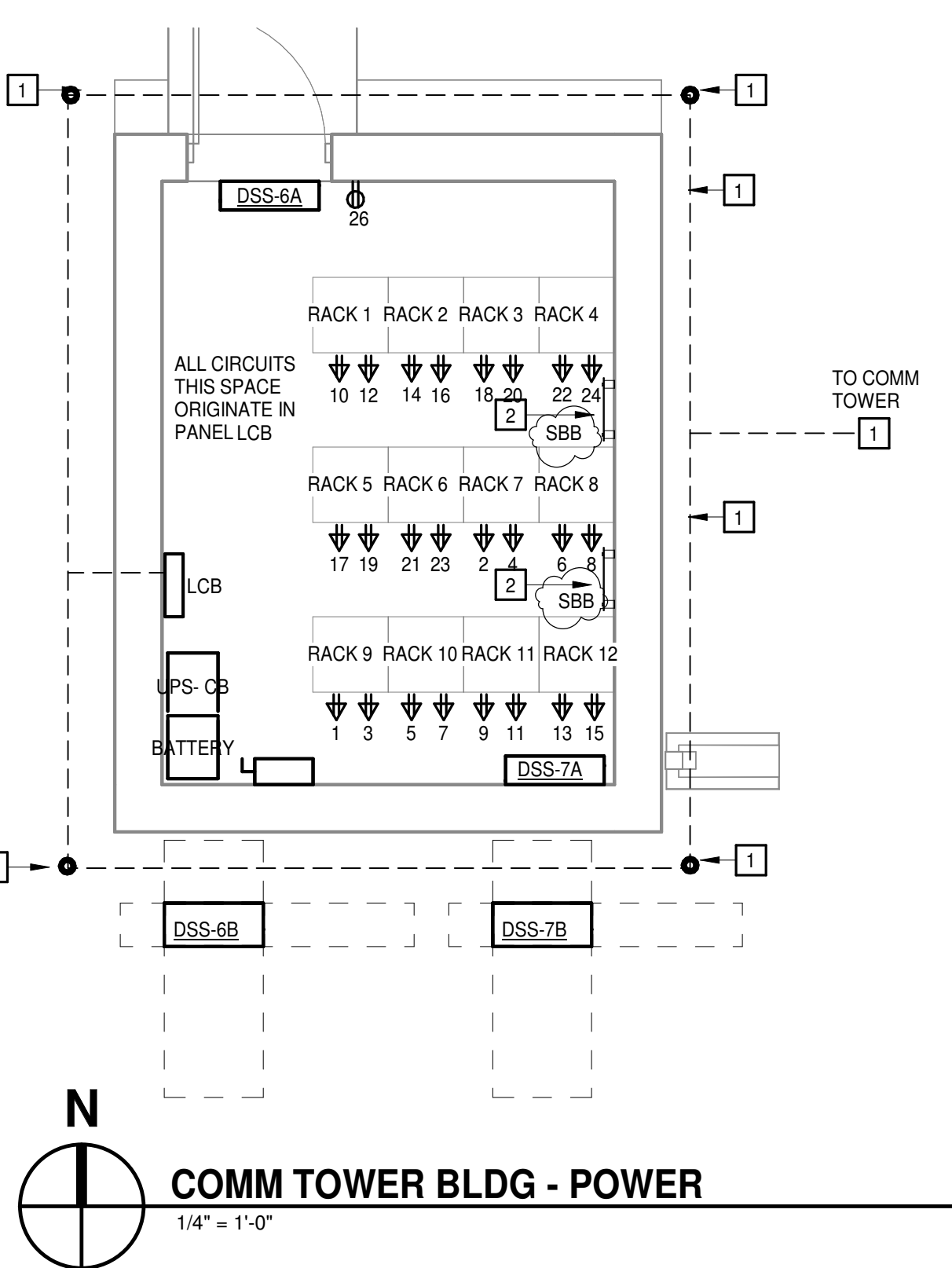
CKT	BRKR	POLE	LOAD	A	B	C	LOAD	POLE	BRKR	CKT
1	20 A	1	RACK REC	0.5	0.5		RACK REC	1	20 A	2
3	20 A	1	RACK REC		0.5	0.5	RACK REC	1	20 A	4
5	20 A	1	RACK REC			0.5	RACK REC	1	20 A	6
7	20 A	1	RACK REC	0.5	0.5		RACK REC	1	20 A	8
9	20 A	1	RACK REC		0.5	0.5	RACK REC	1	20 A	10
11	20 A	1	RACK REC			0.5	RACK REC	1	20 A	12
13	20 A	1	RACK REC	0.5	0.5		RACK REC	1	20 A	14
15	20 A	1	RACK REC		0.5	0.5	RACK REC	1	20 A	16
17	20 A	1	RACK REC		0.5	0.5	RACK REC	1	20 A	18
19	20 A	1	RACK REC	0.5	0.5		RACK REC	1	20 A	20
21	20 A	1	RACK REC		0.5	0.5	RACK REC	1	20 A	22
23	20 A	1	RACK REC	13.5	13.5		RACK REC	1	20 A	24
25	20 A	1	LIGHTING	0.2	0.2		CONV REC	1	20 A	26
27	20 A	1	SPARE		0.0	--	SPACE ONLY	1	--	28
29	20 A	1	SPARE			0.0	SPACE ONLY	1	--	30
31	20 A	1	SPARE	0.0	--	--	SPACE ONLY	1	--	32
33	20 A	1	SPARE		0.0	--	SPACE ONLY	1	--	34
35	20 A	1	SPARE			0.0	SPACE ONLY	1	--	36
37	20 A	1	SPARE	0.0	--	--	SPACE ONLY	1	--	38
39				0.0	--	2.5	CU4-DSS4 (ML)	2	30 A	40
41	30 A	2	CU3/DSS3 (ML)		2.5	2.5				42
				4 kVA	9 kVA	9 kVA				
				37 A	81 A	81 A				

(GE) = PROVIDE GFCI BREAKER FOR EQUIPMENT, 6-50mA PER NEC 427.22 DED. NEUTRAL.
(GP) = PROVIDE GFCI BREAKER FOR PERSONNEL, 4-6mA PER NEC 210.8, DED. NEUTRAL.
(L) = PROVIDE LOCKOUT BREAKER TO PREVENT UNAUTHORIZED SWITCHING.
(LO) = ROUTE TO LOAD VIA LIGHTING CONTACTOR, REF DETAIL ON DWG E4.X.
(ML) = PROVIDE BREAKER WITH MAINTENANCE LOCKOUT, LOCKABLE OFF.

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
INTERIOR LIGHTING	0.2 kVA	125.00%	0.3 kVA	Total Conn. Load: 22.4 kVA Total Est. Demand: 21.4 kVA Total Conn. Current: 62 A Total Est. Demand.. 59 A	
EXTERIOR LIGHTING	0.0 kVA	0.00%	0.0 kVA		
RECEPTACLES	12.9 kVA	91.05%	11.1 kVA		
AC/ HEAT PUMP	10.0 kVA	100.00%	10.0 kVA		
ELECTRIC HEAT	0.0 kVA	0.00%	0.0 kVA		
KITCHEN	0.0 kVA	0.00%	0.0 kVA		
MISCELLANEOUS	0.0 kVA	0.00%	0.0 kVA		



WAREHOUSE - ELECTRICAL
1/8" = 1'-0"



COMM TOWER BLDG - POWER
1/4" = 1'-0"

PROFESSIONAL ENGINEER
SEAL 024242
J. CAROL MOSELEY
ARCHITECTS, P.C.

ARCHITECTS, P.C.
SEAL C-3469
J. CAROL MOSELEY
ARCHITECTS, P.C.

PENDER COUNTY LEC

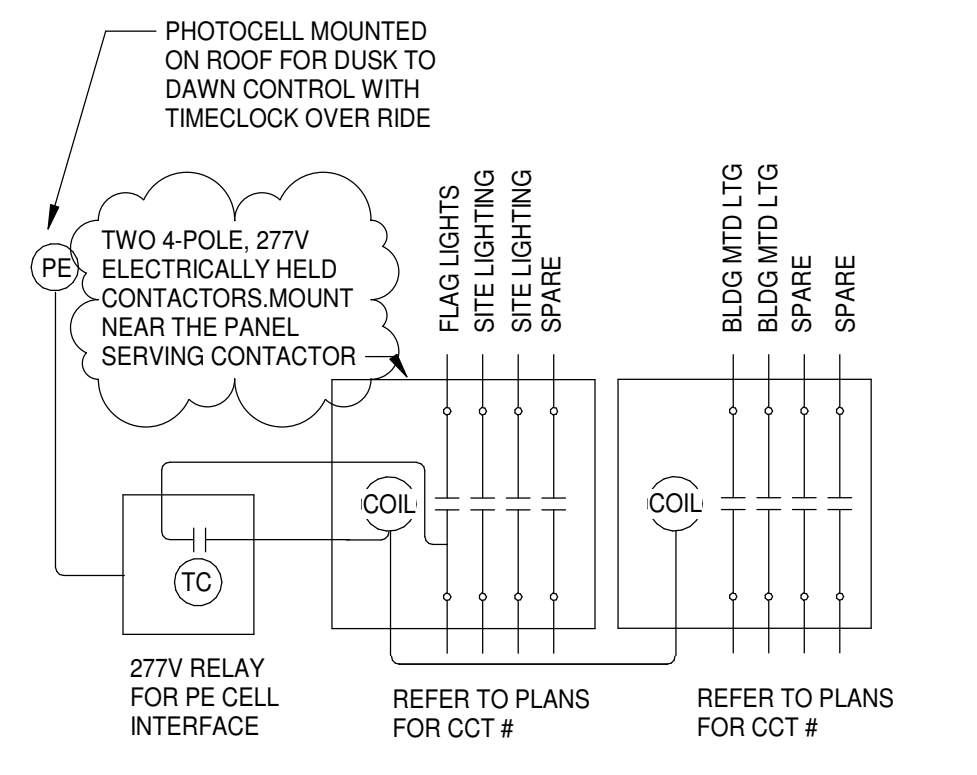
PENDER COUNTY, NORTH CAROLINA
OLD SAVANNAH ROAD BURGAW, NC

PROJECT NO: 811888
DATE: MAY 01, 2024

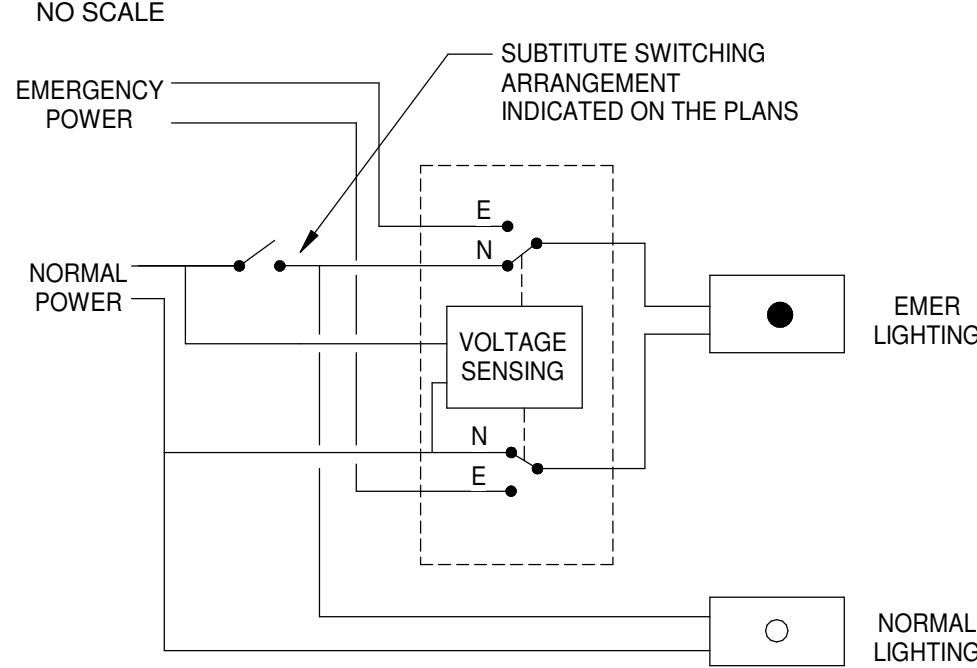
DATE	REVISIONS	DESCRIPTION
5/24/24	AD1	
6/04/24	AD2	

PARTIAL PLANS

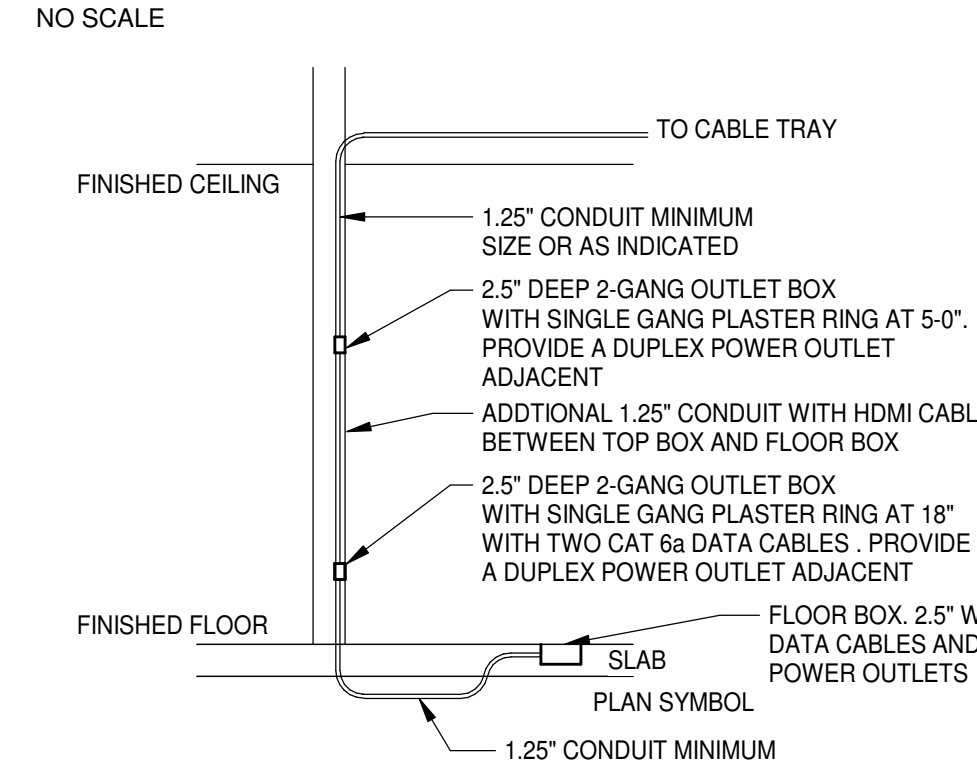
E3.1



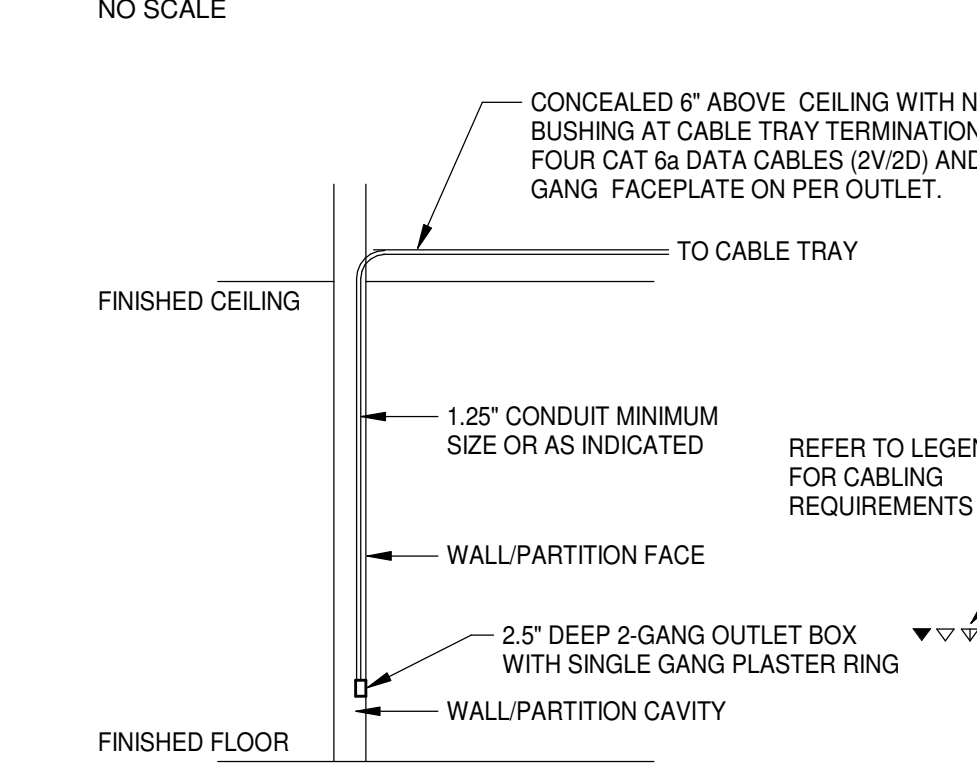
EXTERIOR LIGHTING CONTACTOR DETAIL



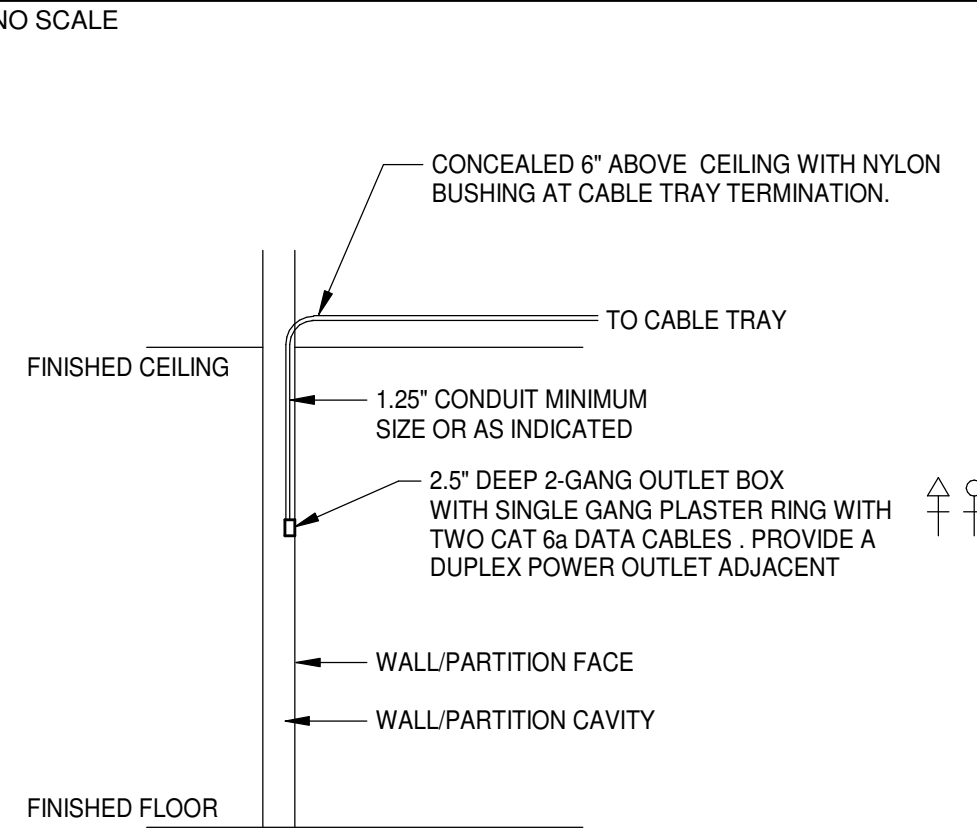
GENERATOR TRANSFER DEVICE DETAIL



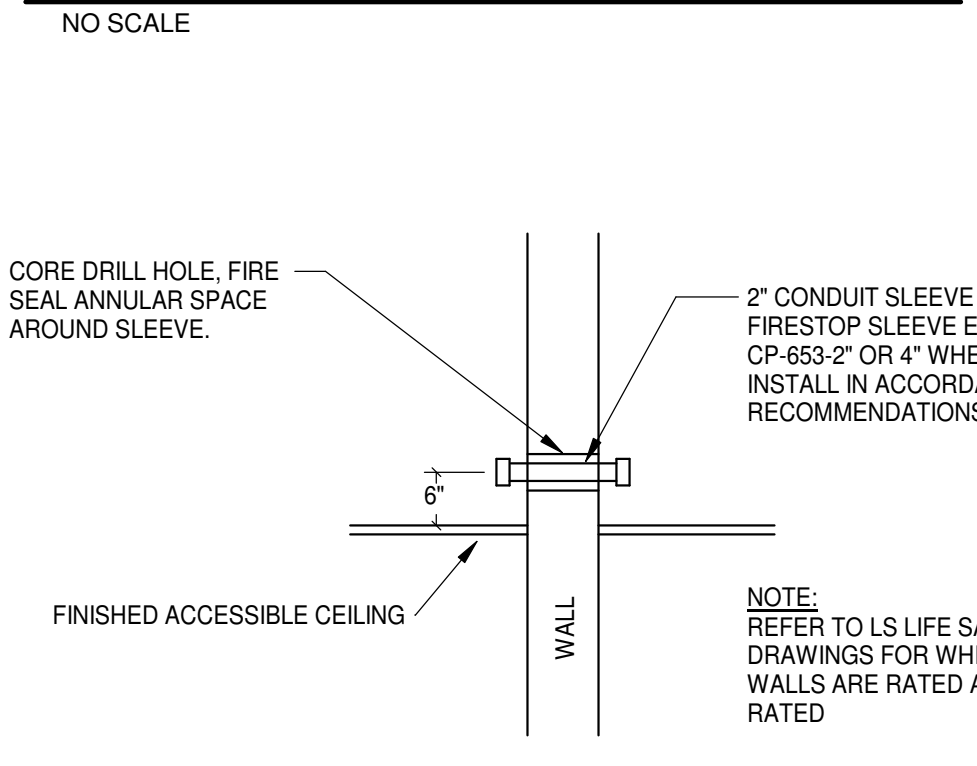
MONITOR CONDUIT DETAIL



TELECOMMUNICATIONS OUTLET CONDUIT DETAIL

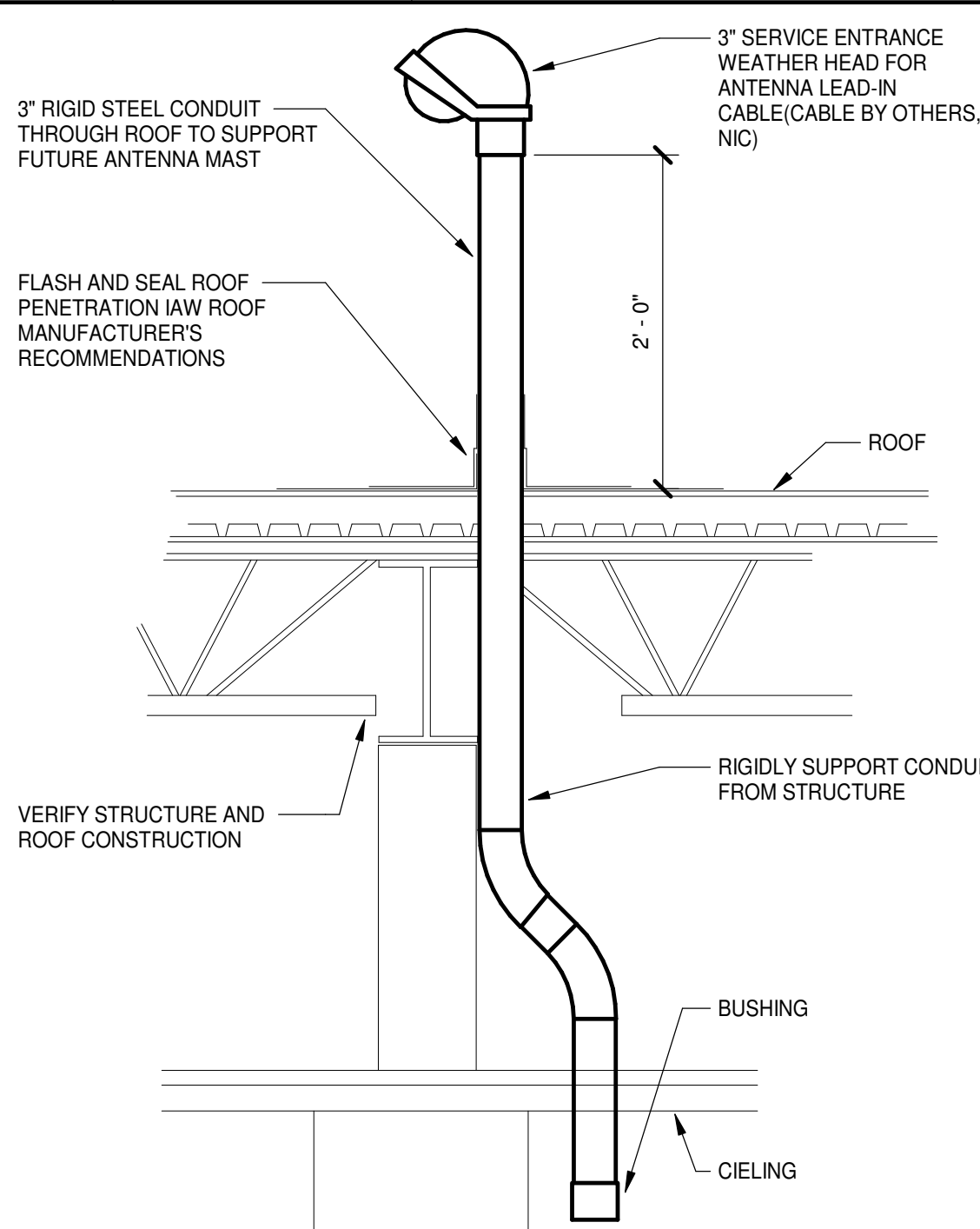


TELEVISION OUTLET CONDUIT DETAIL



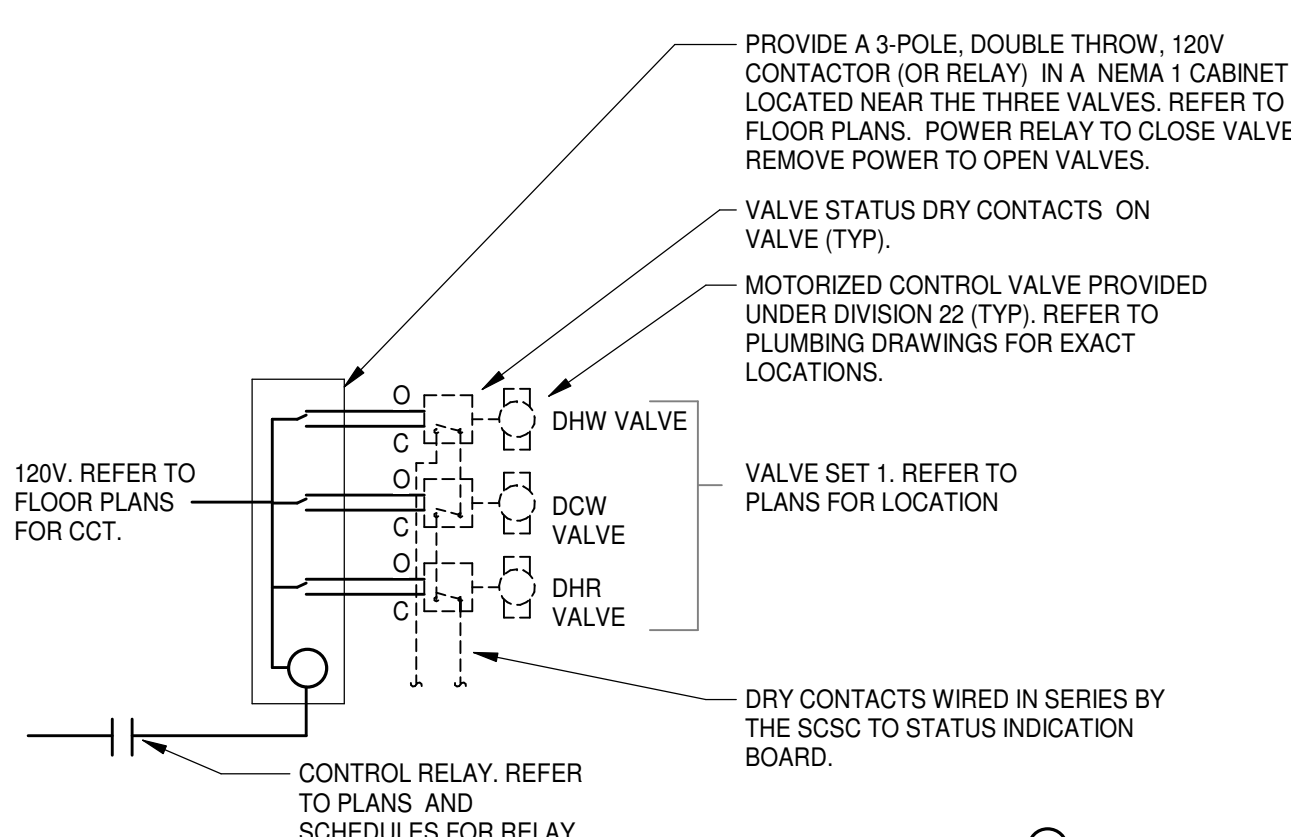
RATED WALL CONDUIT SLEEVE DETAIL

EVENT ZONE	SMOKE DETECTOR SYSTEM ID TAG(S)	DUCT SMOKE DETECTOR SYSTEM ID TAG(S)	FLOW SWITCH SYSTEM ID TAG(S)	DAMPER		EQUIPMENT	
				FAN DAMPERS OPEN	SMOKE DAMPERS CLOSE	ON	OFF
SMOKE ZONE 1	REFER TO PLANS		FS-1-1	D-SSF-12 & D-SEF-12	REFER TO PLANS	SSF-12 & SEF-12	RTU-5, MAU-1, EF-DISH, KEF-1, KEF-2, F-28
SMOKE ZONE 2	REFER TO PLANS		FS-2-1	D-SSF-10, 11 & D-SEF-10, 11	D-OAU-4	SSF-10, 11 & SEF-10, 11	OAU-4, RTU-3
SMOKE ZONE 3	REFER TO PLANS	DSD-OAU-1 (2), DSD-OAU-5 (2)	FS-3-1	D-SSF-1, 2, 6, 7 & D-SEF-1, 2, 6, 7	FSD-1A, FSD-1B, FSD-5A, FSD-5B	SSF-1, 2, 6, 7 & SEF-1, 2, 6, 7	OAU-1, OAU-5, F-27, 28
SMOKE ZONE 4	REFER TO PLANS	DSD-OAU-2 (2), DSD-OAU-3 (2), DSD-RTU-4	FS-4-1	D-SSF-3, 4, 5, 8, 9, 13 & D-SEF-3, 4, 5, 8, 9, 13	FSD-2A, FSD-2	SSF-3, 4, 5, 8, 9, 13 & SEF-3, 4, 5, 8, 9, 13	OAU-2, OAU-3, RTU-4

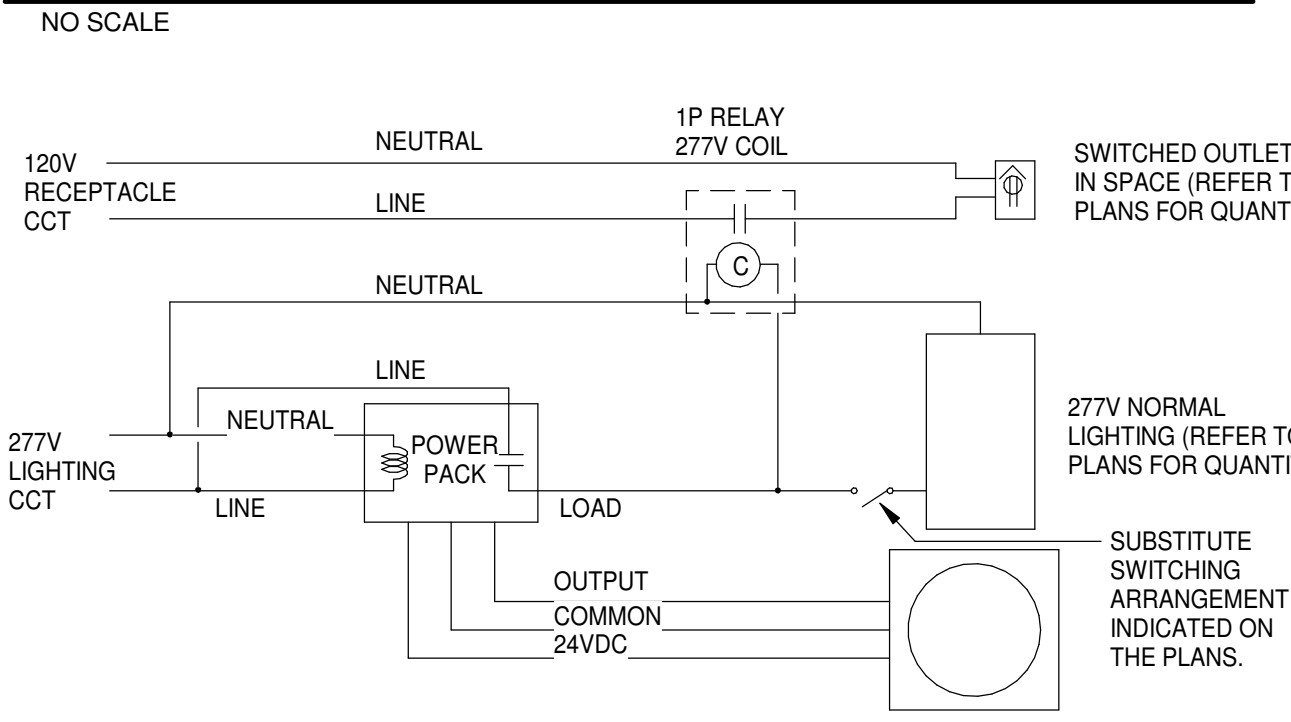


WEATHERHEAD ROOF PENETRATION DETAIL

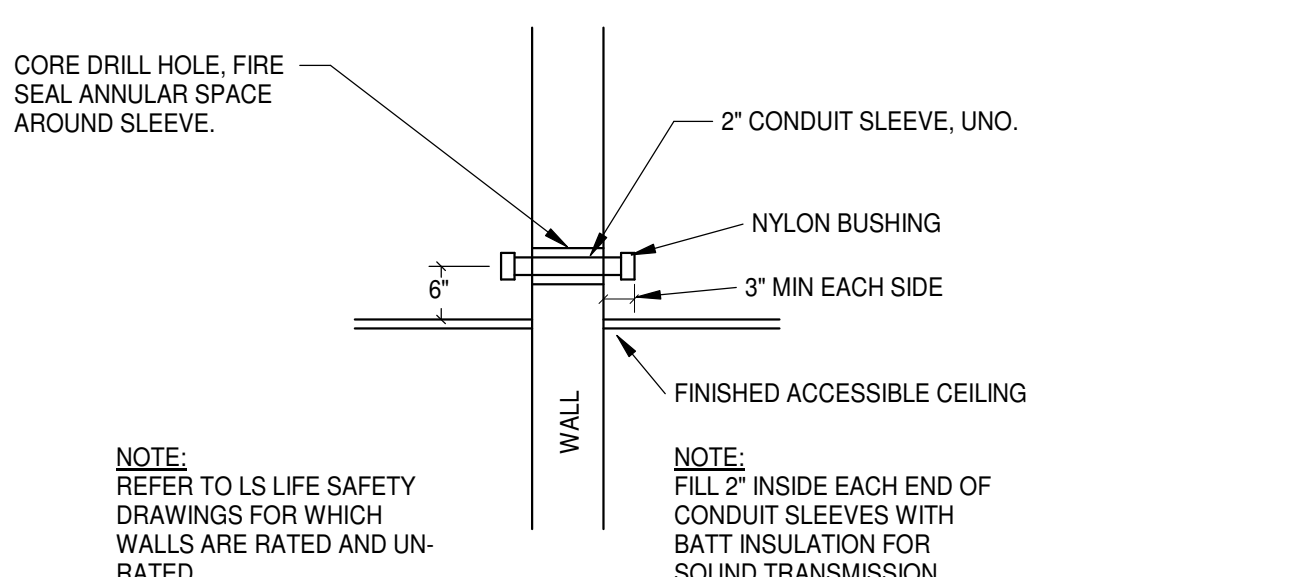
FIRE ALARM RISER DIAGRAM



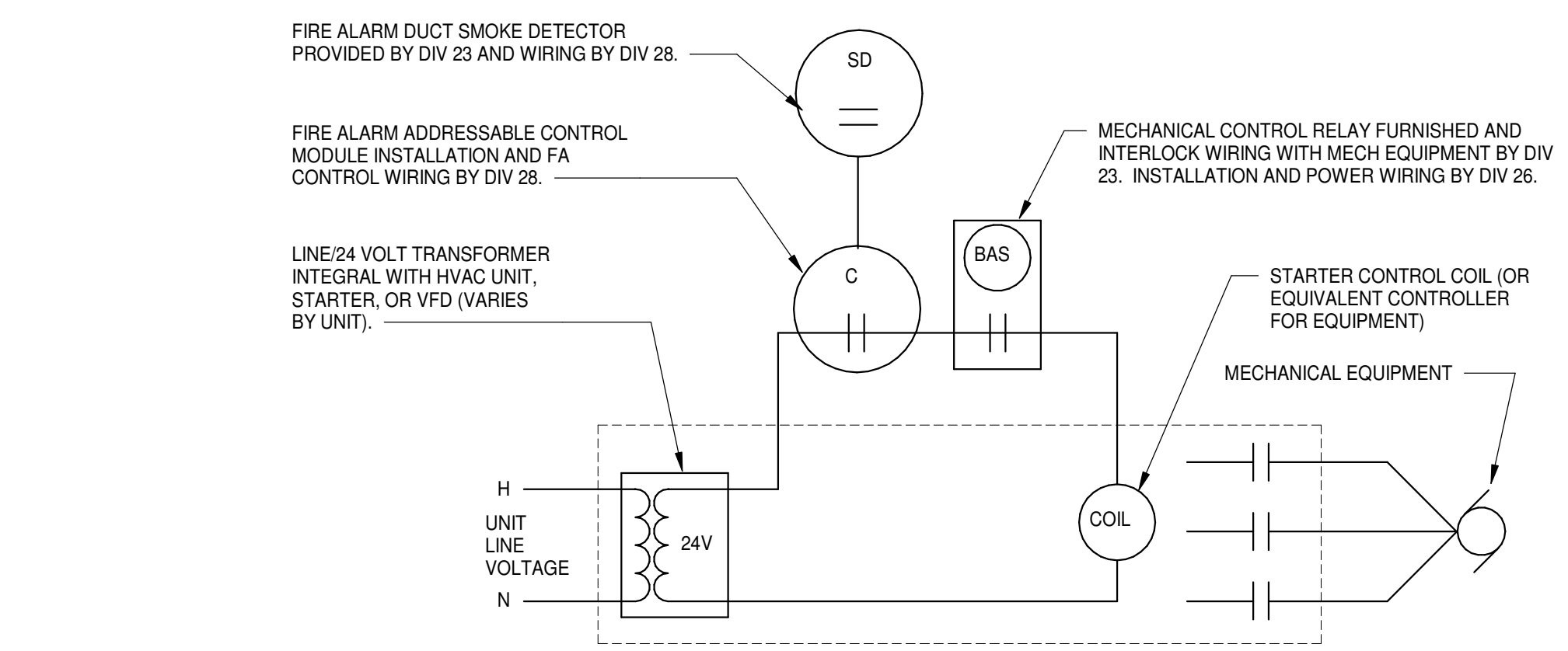
ISOLATION VALVE CONTROL DETAIL



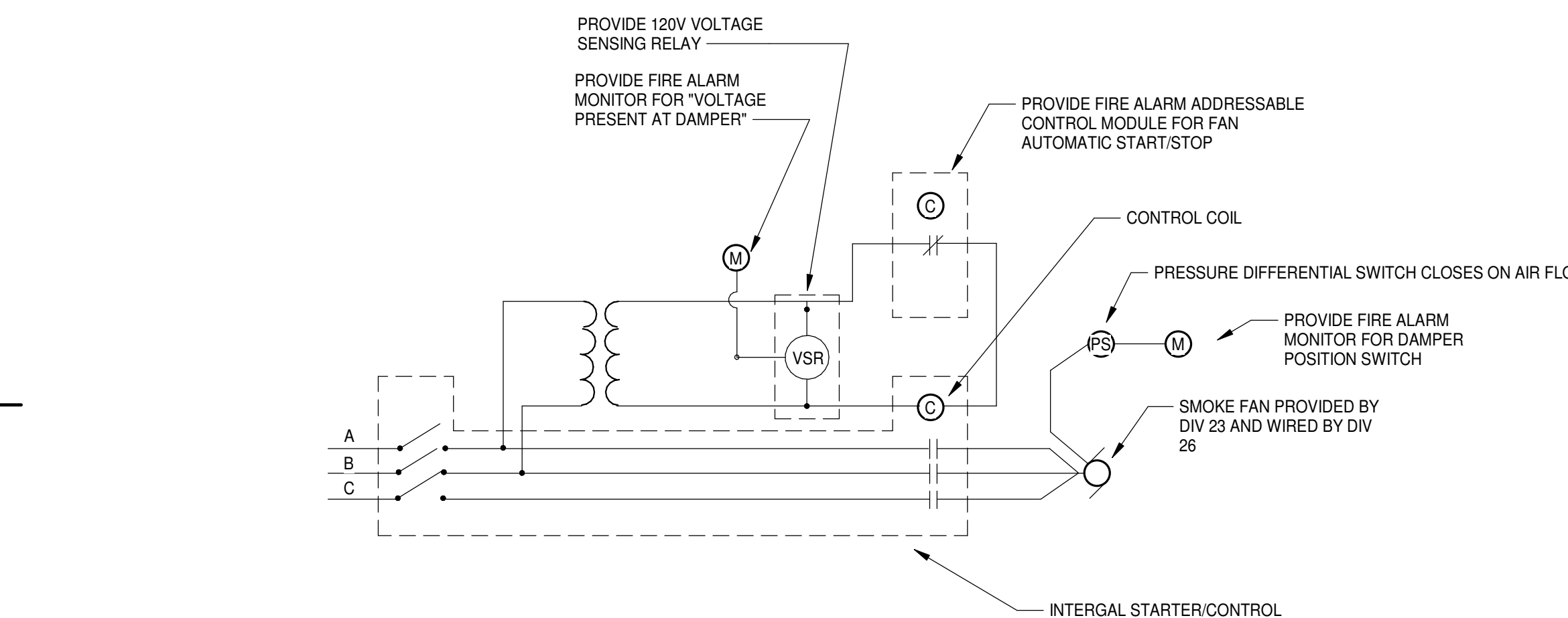
OCCUPANCY SENSOR DIAGRAM DETAIL



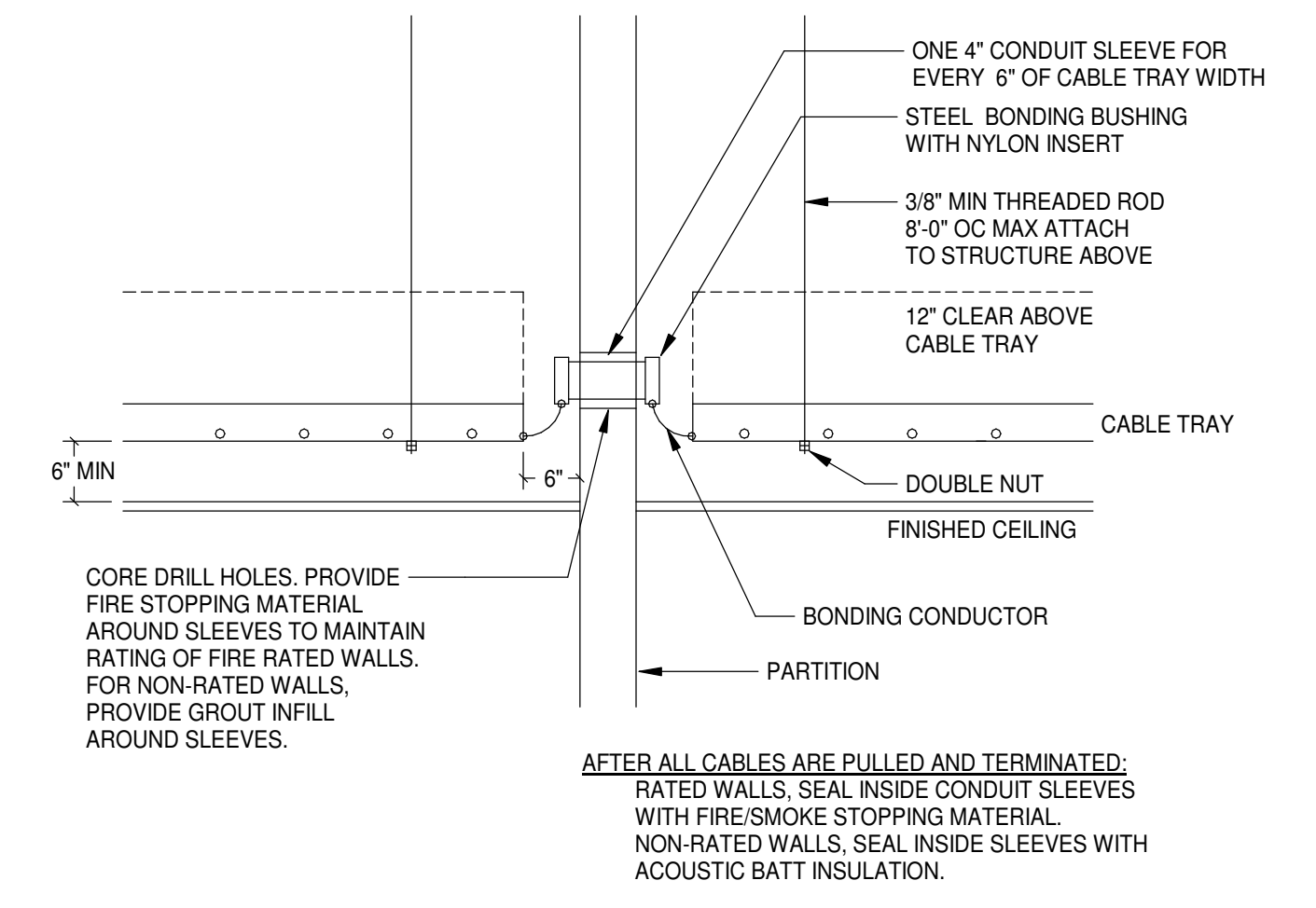
UN-RATED WALL CONDUIT SLEEVE DETAIL



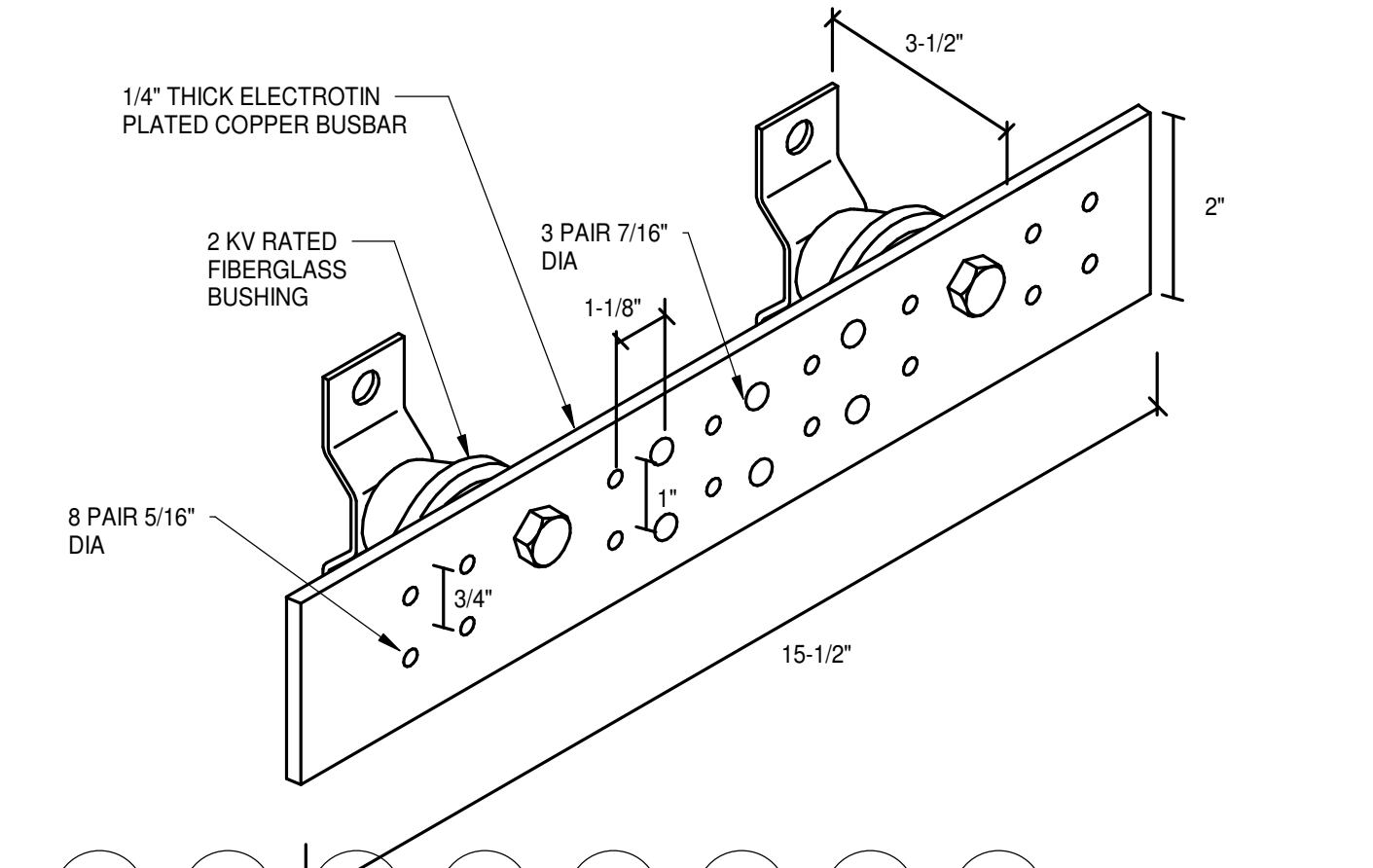
FIRE ALARM HVAC UNIT SHUTDOWN WIRING DIAGRAM



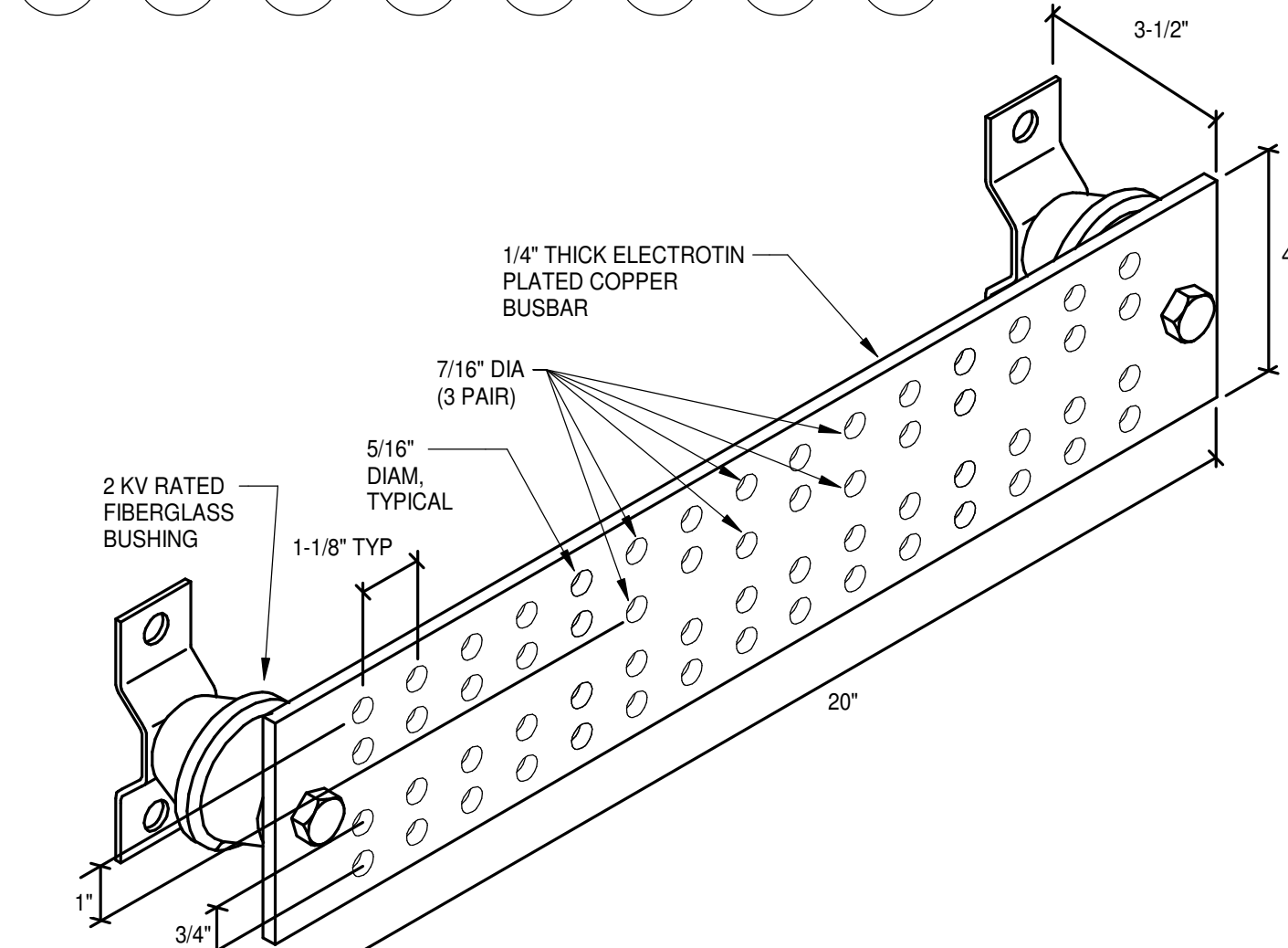
SMOKE CONTROL FAN WIRING DIAGRAM



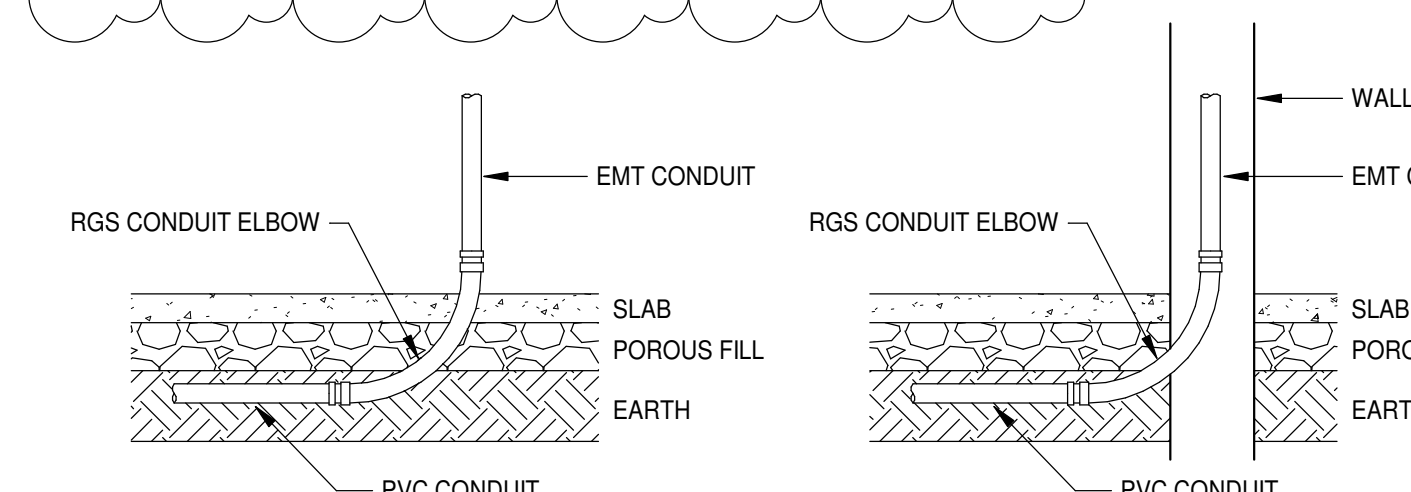
CABLE TRAY WALL PENETRATION DETAIL



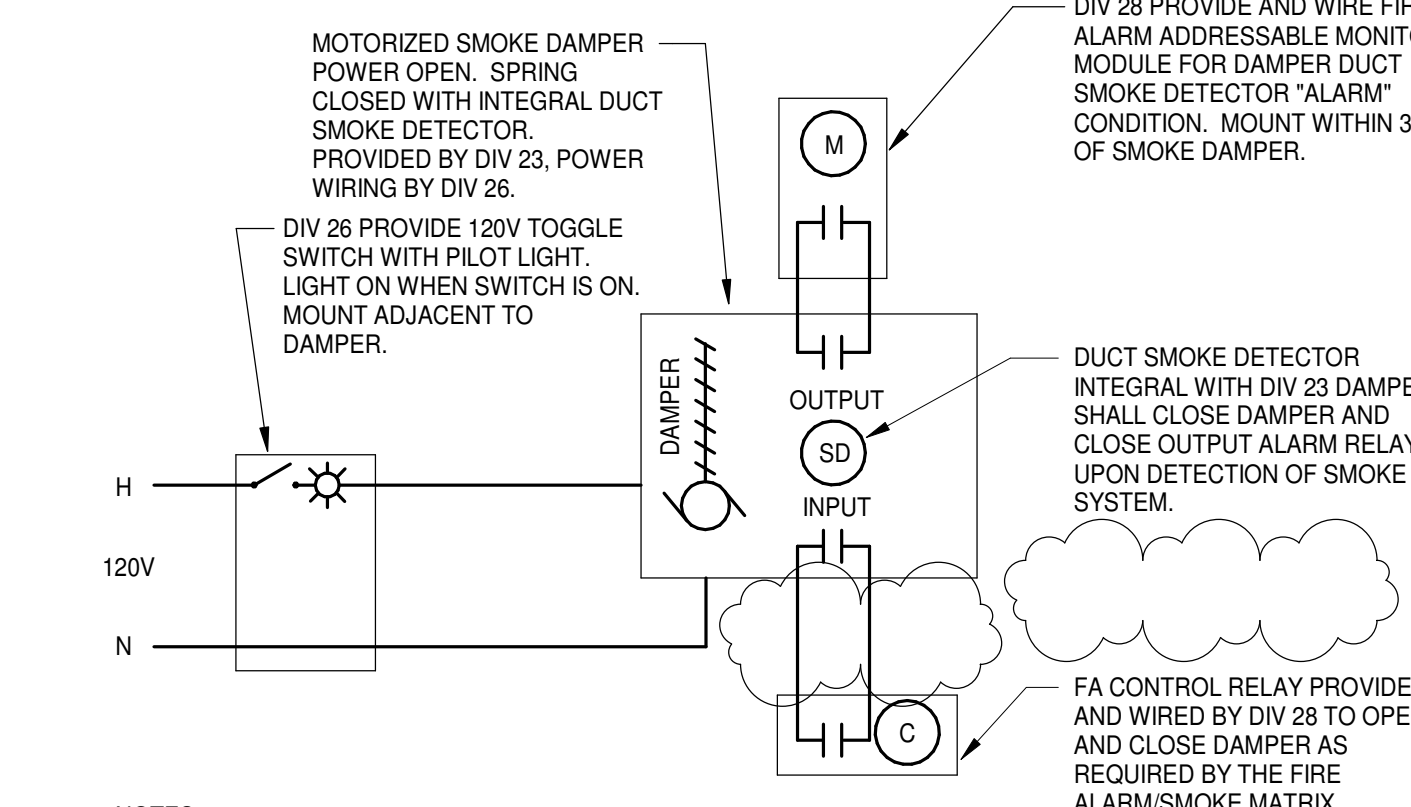
SECONDARY BONDING BUS (SBB & TGB)



PRIMARY BONDING BUS (PSB & TMGB)

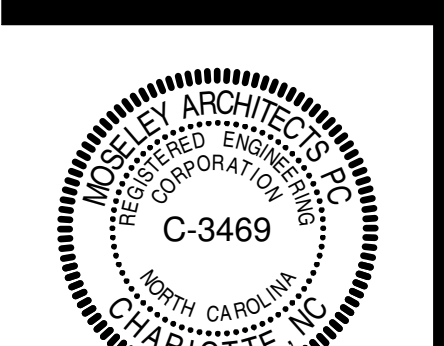


PVC TO EMT TRANSITION DETAIL



FIRE/SMOKE DAMPER & SMOKE DAMPER WIRING DIAGRAM

MOSELEY ARCHITECTS



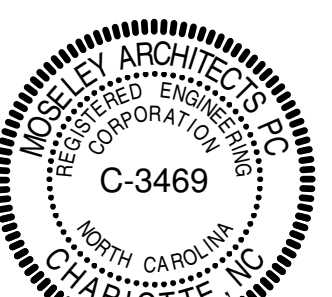
PENDER COUNTY LEC
PENDER COUNTY, NORTH CAROLINA
OLD SAVANNAH ROAD BURGAW, NC

PROJECT NO:	611888
DATE:	MAY 01, 2024
REVISIONS:	
DATE:	DESCRIPTION:
6/04/24	AD2

ELECTRICAL DETAILS

E4.1

6/4/2024 3:32:46 PM



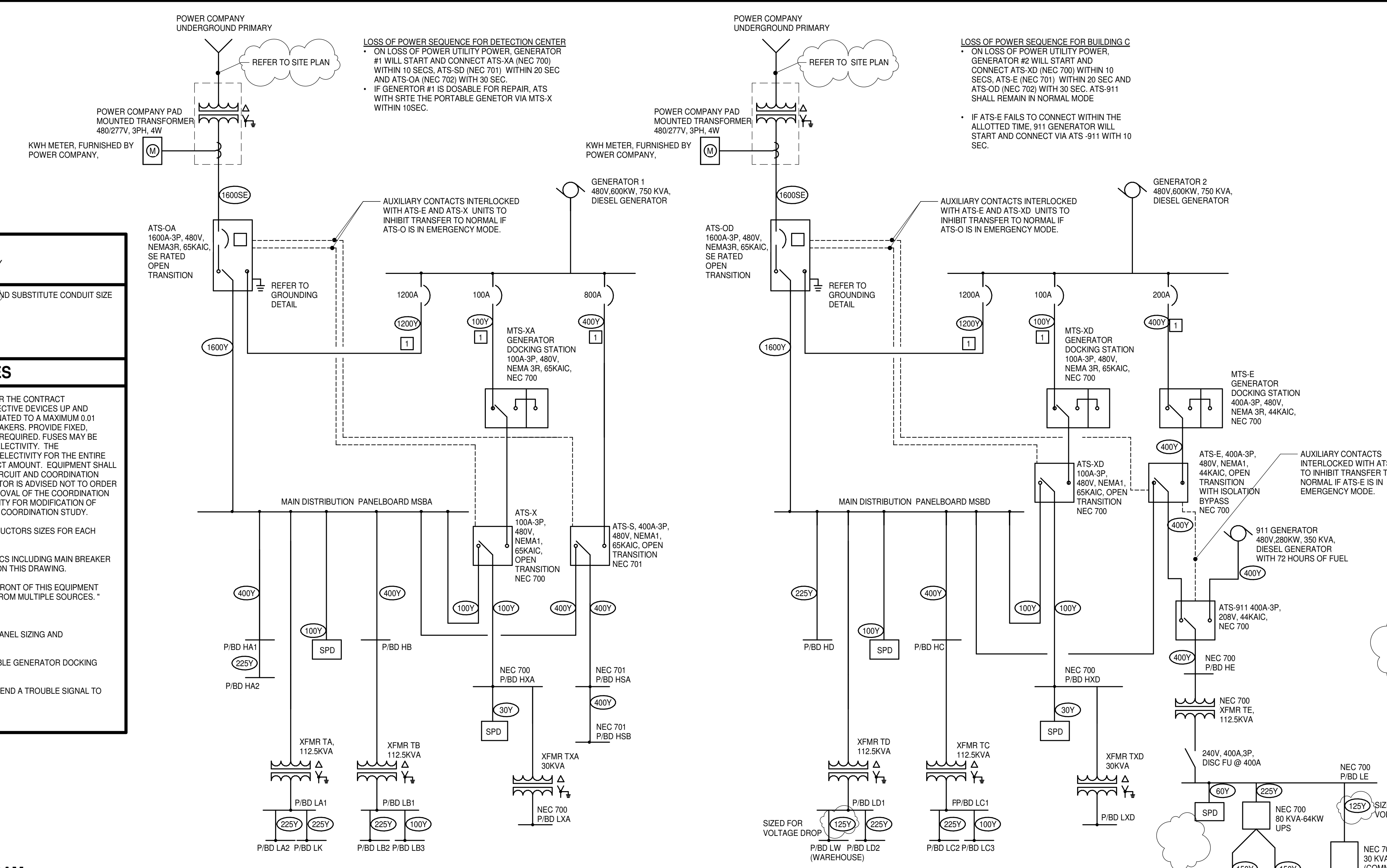
PROJECT NO: 611888
DATE: MAY 01, 2024
REVISIONS:
DATE DESCRIPTION

9/04/24 AD2

COPPER FEEDER SCHEDULE table with columns: FEEDER ID, # OF SETS, BUILDING WIRE QUANTITY & SIZE TYPE, THHN - DRY, MINIMUM CONDUIT SIZE. Includes feeder details for 20S through 1500S.

NOTES:
1. ELECTRICAL CONTRACTOR TO VERIFY CONDUIT SIZE REQUIRED IF WIRE TYPES OTHER THAN THOSE LISTED ABOVE ARE USED.
2. FEEDER SIZES BASED ON TABLE 310.15(B)(16), 75° C.
3. SIZES ADJUSTED PER NEC 110.14.

TRANSFORMER SCHEDULE table with columns: KVA, TYPE, PRIMARY, SECONDARY, COPPER PRIMARY FEEDER, COPPER SECONDARY FEEDER, BONDING CONDUCTOR. Includes transformer details for 15 kVA through 500 kVA.

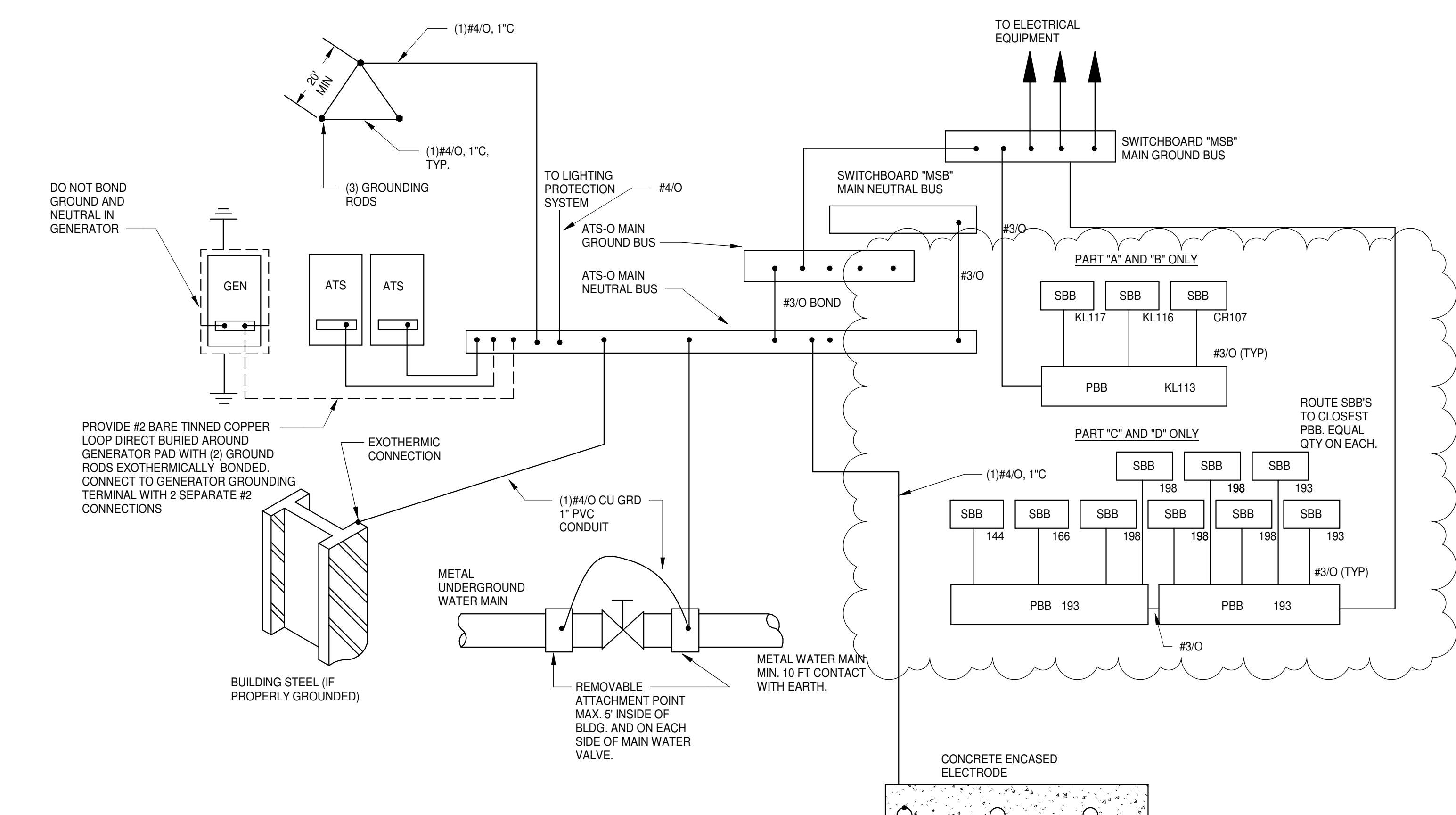


KEYNOTES APPLIES TO ONLINE ONLY REPRESENTED BY [Symbol]
1. REFER TO THE DUCTBANK DETAILS ON PLAN DRAWINGS AND SUBSTITUTE CONDUIT SIZE INDICATED THEREIN.
GENERAL NOTES
A. PROVIDE A SHORT CIRCUIT AND COORDINATION STUDY PER THE CONTRACT DOCUMENTS...
B. REFER TO TRANSFORMER SCHEDULE FOR BONDING CONDUCTOR SIZES FOR EACH TRANSFORMER.
C. REFER TO PANEL SCHEDULES FOR PANEL CHARACTERISTICS INCLUDING MAIN BREAKER REQUIREMENTS...
D. PROVIDE A RED PLAQUE WITH WHITE LETTERING ON THE FRONT OF THIS EQUIPMENT STATING: "THIS PANEL IS CAPABLE OF BEING ENERGIZED FROM MULTIPLE SOURCES."
E. PROVIDE DISCONNECTING MEANS LABEL PER NEC.
F. REFER TO PANELBOARD SPEC FOR REQUIREMENTS FOR PANEL SIZING AND COORDINATION.
G. EXTEND THE START CONTROLS FOR ATS-X TO THE PORTABLE GENERATOR DOCKING STATION.
H. PROVIDE A FIRE ALARM CONTROL/MONITOR MODULE TO SEND A TROUBLE SIGNAL TO THE FACP IF PERMANENT GENERATOR IS DISCONNECTED.

POWER ONE-LINE DIAGRAM
NO SCALE

SWITCHBOARD SCHEDULE MSBA table with columns: HORIZONTAL, VERTICAL, NEUTRAL BUS, DEVC E NO., DESCRIPTION, A, B, C, NUMBER OF POLES, RATING, NOTES. Includes load type summary and notes.

SWITCHBOARD SCHEDULE MSBD table with columns: HORIZONTAL, VERTICAL, NEUTRAL BUS, DEVC E NO., DESCRIPTION, A, B, C, NUMBER OF POLES, RATING, NOTES. Includes load type summary and notes.



GROUNDING SYSTEM DIAGRAM
NO SCALE