

**DOCUMENT 00 90 00  
ADDENDUM**

**ADDENDUM NO. [3]                      Date: March 24, 2020**

**RE:                      LA CRESCENT - HOKAH PUBLIC SCHOOLS  
ELEMENTARY SCHOOL ADDITION AND RENOVATION  
504 S OAK ST  
LA CRESCENT, MN 55947  
HSR 19014**

**FROM:                  HSR Associates, Inc  
100 Milwaukee Street  
La Crosse, WI 54603  
(608) 784-1830**

**To:                      Prospective Bidders**

This addendum forms a part of the Contract Documents and modifies the original Bidding Documents dated March 2020. Acknowledge receipt of this Addendum in the space provided on the bid form. Failure to do so may subject the Bidder to disqualification.

This Addendum consists of [6] pages, [7] specification sections and [39] 30 x 42 drawings.

**CHANGES TO BIDDING REQUIREMENTS, CONTRACT FORMS AND CONDITIONS OF THE CONTRACT:**

1. Section 00 11 13 ADVERTISEMENT FOR BIDS
  - a. Bid opening location will be in the cafeteria at the high school. Only one representative from each company should attend to meet current meeting guidelines.
2. Section 00 72 00 GENERAL CONDITIONS and 00 73 00 SUPPLEMENTARY CONDITIONS
  - a. In regards to Article 3.7 of General Conditions and 3.7.1.1 of Supplementary Conditions:
    - i. Contact City of La Crescent for required local permits.
    - ii. The following link is available from State of Minnesota to calculate the required building permit fee. <https://www.dli.mn.gov/business/get-licenses-and-permits/fee-calculator> Ignore the plan review fee. General Contractor shall include the building permit fee and related local fees in their bid.
    - iii. Any required State Plumbing Inspection Fee shall be paid by the Plumbing Contractor and included in Base Bid.

**CHANGES TO SPECIFICATIONS:**

3. Section 03 35 11 CONCRETE FLOOR FINISHES
  - a. Add section attached hereto as part of Contract Documents.
4. Section 04 43 13 STONE MASONRY VENEER
  - a. 2.01, a, 1, a: Delete "or Fond du lac Dimensional clean-split".

- 5. Delete Section 07 14 00 FLUID APPLIED WATERPROOFING.
  - a. Only sheet waterproofing allowed. Sheet needs to be installed below elevator pit floor and wrapped up to tie into wall waterproofing.

- 6. Section 08 71 00 DOOR HARDWARE
  - a. Add the following group for new door 158.1

**HARDWARE GROUP 24A**

EACH SINGLE DOOR TO HAVE:

DR.158.1

3 EA	BUTTS	FBB168 4.5 X 4.5 652	STANLEY
1 EA	STORERM LOCK	ND80RD SPA 626	SCHLAGE
1 EA	CLOSER	4040XP REG 689	LCN
1 EA	KICKPLATE	10 X 2LDW B4E CS US32D	ROCKWOOD
1 EA	WALL STOP	409 US32D	ROCKWOOD
1 EA	GASKET	F797B17	REESE

- 7. Section 09 54 23 LINEAR METAL CEILINGS
  - a. 2.01, A, 1: Add the following product for LMC-2 locations:  
LMC-2: Planx-Mirra System, Finish as selected by A/E from full line, solid. 8" wide with 1" reveal. (9" o.c.)

- 8. Delete Section 14 21 00 ELECTRIC TRACTION ELEVATORS

- 9. Section 14 24 00 HYDRAULIC ELEVATORS
  - a. Add section attached hereto as part of Contract Documents.

- 10. Section 22 11 00 FACILITY WATER DISTRIBUTION
  - a. Add the following:  
Water Meter: Plumbing Contractor shall be responsible for purchase of water meter.  
Coordinate Bluetooth requirements with the City of La Crescent.

- 11. Section 23 08 00 COMMISSIONING OF HVAC
  - a. Add section attached hereto as part of Contract Documents.
  - b. Section includes Appendix C.

- 12. Section 23 09 23 DIRECT DIGITAL CONTROL SYSTEM FOR HVAC
  - a. Revise 2.01 A, 1-8 as follows:
    - 1 Boilers
    - 2. BTU Meters
    - 3. Pumps with Integral VFDs
    - 4. Variable Frequency Drives
    - 5. Air Handling Units
    - 6. Make-Up Air Unit
    - 7. Gas Rooftop Units
    - 8. Energy Recovery Ventilators

- 13. Section 23 09 93 SEQUENCE OF OPERATION
  - a. Revised Section attached hereto. Part 3 revised.

- 14. Section 23 52 16 CONDENSING BOILERS
  - a. Revised Section attached hereto.

15. Section 32 31 13 CHAIN LINK FENCING AND GATES
  - a. Add section attached hereto as part of Contract Documents.
16. Section 32 31 19 ORNAMENTAL FENCE
  - a. Add section attached hereto as part of Contract Documents.

### **CHANGES TO DRAWINGS**

17. Sheet C100 DEMOLITION PLAN 30 x 42 attached hereto
  - a. Revisions clouded on Drawing
  - b. Additional concrete sidewalk removal at south edge of site.
18. Sheet C101 LAYOUT PLAN 30 x 42 attached hereto
  - a. Revisions clouded on Drawing
  - b. Additional concrete sidewalk added at southeast corner of site.
19. Sheet C102 GRADING PLAN 30 x 42 attached hereto
  - a. Revisions clouded on Drawing
  - b. Grade revisions around new concrete sidewalk added at southeast corner of site.
20. Sheet A092 FIRST FLOOR REMOVAL PLAN– SEGMENT A 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Dimensions added to clarify removal extents for new openings.
21. Sheet A094 SECOND FIRST FLOOR REMOVAL PLAN– SEGMENT A 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Dimensions added to clarify removal extents for new openings.
22. Sheet A103 FIRST FLOOR – SEGMENT A 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Door openings revised to meet code requirements. Coordinate new opening requirements in existing walls with new construction.
  - c. Elevator shaft size revised for revision to holeless hydraulic elevator. Access door to shaft equipment added on first floor.
  - d. Section 5A306 added at east end of Commons.
23. Sheet A104 FIRST FLOOR – SEGMENT B 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. North end clearances to stair revised for code clearances.
24. Sheet A105 FIRST FLOOR – SEGMENT C 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Girls 181 wall locations shifted away from exterior wall.
25. Sheet A106 SECOND FLOOR – SEGMENT A 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Door openings revised to meet code requirements. Coordinate new opening requirements in existing walls with new construction.
  - c. Elevator shaft size revised for revision to holeless hydraulic elevator.
26. Sheet A108 SECOND FLOOR – SEGMENT C 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Girls 247 wall locations shifted away from exterior wall.
27. Sheet A110 FIRST FLOOR RCP – SEGMENT A 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Elevator shaft size revised for revision to holeless hydraulic elevator.

28. Sheet A111 FIRST FLOOR RCP - SEGMENT B 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. North end clearances to stair revised for code clearances.
29. Sheet A113 SECOND FLOOR RCP – SEGMENT A 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Elevator shaft size revised for revision to holeless hydraulic elevator.
30. Sheet A120 ROOF PLAN 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Size of elevator shaft extension above roof revised.
31. Sheet A201 ELEVATIONS 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Revision to HVAC equipment support provided by HVAC, not structural.
32. Sheet A202 ELEVATIONS 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Revision to HVAC equipment support provided by HVAC, not structural.
33. Sheet A306 WALL SECTIONS 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. 5A306 added.
34. Sheet A310 WALL SECTIONS 30 x 42 attached hereto
  - a. Revisions clouded on Drawing
  - b. 3A310 Bulkhead added at exterior wall.
  - c. 3A310 Door location shifted at Vestibule 153.
  - d. 4A310 Graphics clarified on detail.
35. Sheet A311 STAIR & ELEVATOR SECTION 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Elevator shaft revision.
  - c. Clarifications at roof hatch and roof ladders.
36. Sheet A400 ENLARGED TOILET ROOM PLANS 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. 1A400 Girls 181 wall locations shifted away from exterior wall.
  - c. Clearances met by shifting accessories and existing wall removal extents.
  - d. Urinal partitions shown deeper.
37. Sheet A500 DETAILS 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Clarified extents of air barrier flashings at top of wall to connect to roof membrane.
  - c. Added rigid insulation at perimeter of openings and at top of walls to protect air barrier flashings from spray foam.
38. Sheet A501 DETAILS 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Wood blocking at some window jambs replaced with CMU. Panning shall cover CMU as well as remaining blocking.
39. Sheet A502 DETAILS 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Clarified extents of air barrier flashings at top of wall to connect to roof membrane.
  - c. Added rigid insulation at perimeter of openings and at top of walls to protect air barrier flashings from spray foam.

40. Sheet A503 DETAILS 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. 12A503: At stoop openings in foundation extend vapor barrier over top of foundation wall minimum 4 inches.
  - c. Added firestopping to top of wall locations.
  - d. Wood blocking at some window jambs replaced with CMU. Panning shall cover CMU as well as remaining blocking.
41. Sheet A601 DOOR SCHEDULE 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Added door 158.1
42. Sheet A604 INTERIOR FRAME TYPES 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Frame width revised.
43. Sheet ID 101 FIRST FLOOR FINISH PLAN SEGMENT A (No drawing attached)
  - a. Art Room114 shall be polished concrete. Refer to Section 03 35 11 in this addendum.
44. Sheet ID600 MASTER COLOR SCHEDULE 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Added LVT-5.
  - c. Added product information for Carpet 3, 4 and 5.
  - d. Revised shades to all manual.
45. Sheet S102 FOUNDATION PLAN SEGMENT A 30 x 42 attached hereto
  - a. Revisions clouded on Drawing
  - b. Revise pier size at A2-AF
  - c. Revise location of stoop near receiving area
  - d. Add stoop for exterior door at library
  - e. Revise size of elevator shaft.
46. Sheet S103 FOUNDATION PLAN SEGMENT B & C 30 x 42 attached hereto
  - a. Revisions clouded on Drawing
  - b. Added a stoop at exterior door in Segment C.
47. Sheet S105 SECOND FLOOR & LOW ROOF FRAMING PLAN SEGMENT A 30 x 42 attached hereto
  - a. Revisions clouded on Drawing
  - b. Revise size of elevator shaft
  - c. Revise detail reference from 11/S800 to 11/S810 at clouded location
  - d. Delete HSS14x4x3/8 (not needed) previously marked on plan along Grid R3, two locations.
48. Sheet S108 ROOF FRAMING PLAN SEGMENT A 30 x 42 attached hereto
  - a. Revisions clouded on Drawing
  - b. Revise size of elevator shaft
  - c. Add framing over elevator shaft
  - d. Add Key Note 8 for elevator hoist beam.

49. Sheet M101 – LEVEL 1 DUCTWORK REMODEL PLAN - AREA A 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Relocate Exhaust Fan EF-4 to avoid plenum return space. New fire damper has been shown due to the relocated exhaust duct.
  - c. Access door symbols have been provided with ducts that have fire dampers.
  - d. Provided transfer grilles for KILN 116.
50. Sheet M106 - LEVEL 2 DUCTWORK REMODEL PLAN - AREA B 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Relocate supply and return duct drops from RTU-2.
51. Sheet M107 – LEVEL 2 DUCTWORK REMODEL PLAN - AREA C 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Relocate exhaust duct from EF-13 to avoid plenum space.
52. Sheet M116 - MECHANICAL ROOF PLAN 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Relocate RTU-2 and ERV-2 to avoid roof elevation difference.
53. Sheet M117 - LEVEL 1 OVERALL PLENUM PLAN 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Revised plenum zones.
54. Sheet M600 – HVAC SCHEDULES 30 x 42 attached hereto
  - a. Revisions clouded on Drawing.
  - b. Additional comments provided to Rooftop Unit Schedule.
55. Sheet M601 – HVAC SCHEDULES 30 x 42 attached hereto
  - a. Exhaust Fans Schedule
    - i. EF-12 has been removed
    - ii. EF-19 data has been provided.
  - b. Air Distribution Device Schedule
    - i. S-13 has been added for transfer grilles in Kiln Room.
56. Sheet M602 – HVAC SCHEDULES 30 x 42 attached hereto
  - a. Additional comments provided to Air Handling Unit Schedule

## **PRIOR APPROVALS**

1. Section 07 13 00 SHEET WATERPROOFING
  - a. Protecto Wrap: Jiffy Seal 140/60 Waterproofing System.
2. Section 23 34 16 FANS
  - a. CaptivAire.
3. Section 23 74 33 OUTDOOR HEATING AND COOLING MAKE-UP AIR
  - a. Under 2.01: CaptivAire.
  - b.

**END OF DOCUMENT 00 90 00**

**SECTION 03 35 11**  
**CONCRETE FLOOR FINISHES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Surface treatments for concrete floors and slabs.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Finishing of concrete surface to tolerance; floating, troweling, and similar operations; curing.
- B. Section 03 30 00 - Cast-in-Place Concrete: Curing compounds that also function as sealers.
- C. Section 07 92 00 - Joint Sealants: Sealants for floor joints other than polished concrete locations.
- D. Section 09 05 61 - Common Work Results for Flooring Preparation: Moisture testing of concrete.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's published data on each finishing product, including information on compatibility of different products and limitations.
- C. Color chart.
- D. Maintenance Data: Provide data on maintenance and renewal of applied finishes.

**1.04 QUALITY ASSURANCE**

- A. Perform Work in accordance with ACI 301.
- B. Polished Concrete Applicator Qualifications:
  - 1. Installer experienced in performing work of this section who has specialized in installation of work similar to that required for the project.
  - 2. Installer trained and holding current certification from manufacturer.
- C. Manufacturer Qualification: Manufacturer capable of providing field service representation during construction and approving application method.

**1.05 PRE-INSTALLATION MEETING**

- A. Conduct a pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Review the following:
  - 1. Environmental requirements.
  - 2. Scheduling and phasing of work.
  - 3. Coordinating with other work and personnel.
  - 4. Protection of adjacent surfaces.
  - 5. Surface preparation.
  - 6. Repair of defects and defective work prior to installation.
  - 7. Installation process.
  - 8. Protection of finished surfaces after installation.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials in manufacturer's sealed packaging, including application instructions.

**1.07 FIELD CONDITIONS**

- A. Maintain light level equivalent to a minimum 200 W light source at 8 feet above the floor surface over each 20 foot square area of floor being finished.
- B. Do not finish floors until interior heating system is operational.
- C. Maintain ambient temperature of 50 degrees F minimum.
- D. Provide ventilation sufficient to prevent injurious gases from temporary heat or other functions affecting concrete.

**PART 2 PRODUCTS**

**2.01 CONCRETE FLOOR FINISH APPLICATIONS**

- A. Unless otherwise indicated, all concrete floors are to be finished using polished concrete finish.

## **2.02 POLISHED CONCRETE SYSTEM**

- A. Polished Concrete System: Materials, equipment, and procedures designed and furnished by a single manufacturer to produce dense polished concrete of the specified sheen.
  - 1. Acceptable Systems:
    - a. ARDEX Engineered Cements: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. Euclid Chemical Company; DOUBLE DIAMOND POLISHED CONCRETE FLOOR SYSTEMS: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
    - c. L&M Construction Chemicals, Inc., a subsidiary of Laticrete International, Inc; FGS Permashine Concrete Polishing System: [www.lmcc.com/#sle](http://www.lmcc.com/#sle).
    - d. PROSOCO, Inc; Consolideck Polished Concrete System: [www.prosoco.com/consolideck/#sle](http://www.prosoco.com/consolideck/#sle).
    - e. W. R. Meadows, Inc; Induroshine and Bellatrix Concrete Enhancer: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
    - f. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Edge finishing shall be 'edge tint', a 4" plus or minus, edge finished to 100 grit and dyed with a complimentary color.
- C. Color: As selected by A/E from manufacturer's standard line.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that floor surfaces are acceptable to receive the work of this section.
- B. Verify that flaws in concrete have been patched and joints filled with methods and materials suitable for further finishes.

### **3.02 GENERAL**

- A. Apply materials in accordance with manufacturer's instructions.

### **3.03 COATING APPLICATION**

- A. Verify that surface is free of previous coatings, sealers, curing compounds, water repellents, laitance, efflorescence, fats, oils, grease, wax, soluble salts, residues from cleaning agents, and other impediments to adhesion.
- B. Verify that water vapor emission from concrete and relative humidity in concrete are within limits established by coating manufacturer per Section 09 05 61.
- C. Protect adjacent non-coated areas from drips, overflow, and overspray; immediately remove excess material.
- D. Apply coatings in accordance with manufacturer's instructions, matching approved mock-ups for color, special effects, sealing and workmanship.

### **3.04 CONCRETE POLISHING**

- A. Execute using materials, equipment, and procedures specified by manufacturer, using manufacturer approved installer.
  - 1. Satin Finish: Honed, 400-800 grit with medium aggregate exposure, reflecting images from side lighting.
- B. Protect finished surface as required and as recommended by manufacturer of polishing system.

**END OF SECTION**



**SECTION 14 24 00**  
**HYDRAULIC ELEVATORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Complete hydraulic elevator systems.
  - 1. Passenger type.
- B. Elevator Maintenance Contract.

**1.02 RELATED REQUIREMENTS**

- A. Applicable provisions of Division 1 shall govern the work of this section.
- B. Section 03 30 00 - Cast-in-Place Concrete: Includes elevator machine foundation and elevator pit.
- C. Section 04 20 00 - Unit Masonry: Masonry hoistway enclosure; building-in and grouting hoistway door frames and thresholds.
- D. Section 05 50 00 - Metal Fabrications: Includes elevator pit ladder, sill supports, divider beams, and overhead hoist beams.
- E. Section 07 13 00 - Sheet Waterproofing: Waterproofing of elevator pit walls and floor. (Contractor's option)
- F. Section 07 14 00 - Fluid-Applied Waterproofing: Waterproofing of elevator pit walls and floor. (Contractor's option)
- G. Section 09 65 00 - Resilient Flooring: Floor finish in car.
- H. Coordination items with Plumbing and/or Fire Suppression Contractor:
  - 1. Motor for sump pump in pit.
  - 2. Sprinkler heads in hoistway
- I. Division 26:
  - 1. Electrical characteristics and wiring connections.
  - 2. Electrical service to main disconnect located in elevator machine room.
  - 3. Electrical power for elevator installation and testing.
  - 4. Electrical service for machine room, convenience outlets, and elevator pit.
  - 5. Lighting in elevator pit.
  - 6. Conduit for telephone service to location(s) as indicated on drawings.
- J. Section Division 31: Excavation for cylinder casing, hydraulic lines, and remote machine room.

**1.03 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.
- B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- C. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- D. AISC 360 - Specification for Structural Steel Buildings; 2010.
- E. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test; 2010.
- F. ASME A17.1 - Safety Code for Elevators and Escalators; 2013.
- G. ASME A17.2 - Guide for Inspection of Elevators, Escalators, and Moving Walks; 2014.
- H. ASME QEI-1 - Standard for the Qualification of Elevator Inspectors; 2013.
- I. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- J. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- K. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- L. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- M. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015 (Errata 2016).

- N. ITS (DIR) - Directory of Listed Products; current edition.
- O. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- P. NEMA MG 1 - Motors and Generators; 2014.
- Q. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- R. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.
- S. PS 1 - Structural Plywood; 2009.
- T. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate work with other installers to provide conduits necessary for installation of wiring including but not limited to:
    - a. Elevator equipment devices remote from elevator machine room or hoistway.
    - b. Telephone service for machine room.
    - c. Elevator pit for lighting and sump pump.
    - d. Fire alarm panel from controller cabinet.
- B. Preinstallation Meeting: Convene meeting at least one week prior to start of this work.
  - 1. Review schedule of installation, proper procedures and conditions, and coordination with related work.
- C. Construction Use of Elevator: Not permitted.

#### **1.05 SUBMITTALS**

- A. Product Data: Submit data on following items:
  - 1. Signal and operating fixtures, operating panels, and indicators.
  - 2. Car design, dimensions, layout, and components.
  - 3. Car and hoistway door and frame details.
  - 4. Electrical characteristics and connection requirements.
- B. Shop Drawings: Include appropriate plans, elevations, sections, diagrams, and details on following items:
  - 1. Elevator Equipment and Machines: Size and location of driving machines, power units, controllers, governors, and other components.
  - 2. Hoistway Components: Size and location of car guide rails, buffers, jack unit and other components.
  - 3. Rail bracket spacing; maximum loads imposed on guide rails requiring load transfer to building structural framing.
  - 4. Clearances and over-travel of car.
  - 5. Locations in hoistway of shaft equipment, of traveling cables and connections for car lighting and telephone.
  - 6. Location and sizes of hoistway and car doors and frames.
  - 7. Electrical characteristics and connection requirements.
  - 8. Indicate arrangement of elevator equipment and allow for clear passage of equipment through access openings.
- C. Samples: Submit samples illustrating car interior finishes, car and hoistway door and frame finishes, and handrail material and finish in the form of cut sheets or finish color selection brochures.
- D. Designer's Qualification Statement.
- E. Installer's Qualification Statement.
- F. Testing Agency's Qualification Statement.
- G. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- H. Initial Maintenance Contract.

- I. Maintenance Contract: Submit proposal to Owner for standard one year continuing maintenance contract agreement in accordance with ASME A17.1 and requirements as indicated, starting on date initial maintenance contract is scheduled to expire.
  - 1. Indicate in proposal the services, obligations, conditions, and terms for agreement period and for renewal options.
- J. Operation and Maintenance Data:
  - 1. Parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.
  - 2. Operation and maintenance manual.
  - 3. Schematic drawings of equipment and hydraulic piping, and wiring diagrams of installed electrical equipment with list of corresponding symbols to identify markings on machine room and hoistway apparatus.

## **1.06 QUALITY ASSURANCE**

- A. Maintain one copy of each quality standard document on site.
- B. Designer Qualifications: Design guide rails, brackets, anchors, and machine anchors under direct supervision of a licensed Professional Structural Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- C. Installer Qualifications: Trained personnel and supervisor on staff of elevator equipment manufacturer.
- D. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of type specified in this section.
- E. Products Requiring Fire Resistance Rating: Listed and classified by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.
- F. Products Requiring Electrical Connection: Listed and classified by UL (DIR) or testing agency acceptable to authorities having jurisdiction as suitable for the purpose indicated in construction documents.

## **1.07 WARRANTY**

- A. Provide manufacturer's warranty for elevator operating equipment and devices for one year from Date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Basis of Design - Hydraulic Elevators: Schumacher Elevator Co.; 3000 lb. Holeless MRL 30 MRLHSS1E14 with rear equipment access door.
- B. Other Acceptable Manufacturers - Hydraulic Elevators:
  - 1. Otis Elevator Company: [www.otis.com/#sle](http://www.otis.com/#sle).
  - 2. Schindler Elevator Corporation: [www.schindler.com/#sle](http://www.schindler.com/#sle).
  - 3. ThyssenKrupp Elevator: [www.thyssenkruppelevator.com/#sle](http://www.thyssenkruppelevator.com/#sle).
- C. Source Limitations: Provide elevator and associated equipment and components produced by the same manufacturer as the other elevator equipment used for this project and obtained from a single supplier .

### **2.02 HYDRAULIC ELEVATORS**

- A. Hydraulic Passenger Elevator:
  - 1. Hydraulic Elevator Equipment:
    - a. Holeless hydraulic with cylinder mounted within hoistway.
  - 2. Drive System:
    - a. Variable voltage variable frequency (VVVF) to modulate motor speed.
  - 3. Operation Control Type: Manufacturer's standard for size, speed and number of stops.
  - 4. Service Control Type:
    - a. Standard service control only.
  - 5. Interior Car Height: 96 inch.
  - 6. Electrical Power: 480 volts; alternating current (AC); three phase; 60 Hz.
  - 7. Rated Net Capacity: 2500 pounds.

8. Rated Speed: 100 feet per minute.
9. Hoistway Size: As indicated on drawings. Coordinate hoistway and platform sizes before starting hoistway construction.
10. Interior Car Platform Size: Manufacturer's standard..
11. Elevator Pit Depth: 48 inch minimum.
12. Overhead Clearance at Top Floor: As noted on Drawings.
13. Travel Distance: As indicated on drawings.
14. Number of Stops: 2.
15. Number of Openings: 2 Front.
16. Hydraulic Equipment Location: Adjacent to bottom of hoistway shaft
17. Rear Equipment Access Door and Frame: By others.

### **2.03 COMPONENTS**

- A. Elevator Equipment:
  1. Motors, Hydraulic Equipment, Controllers, Controls, Buttons, Wiring, Devices, and Indicators: Comply with NFPA 70. Refer to Division 26
  2. Guide Rails, Cables, Buffers, Attachment Brackets and Anchors: Design criteria for components includes safety factors in accordance with applicable requirements of Elevator Code, ASME A17.1.
  3. Buffers:
    - a. Spring type for elevators with speed less than or equal to 200 feet per minute.
  4. Lubrication Equipment:
    - a. Provide grease fittings for periodic lubrication of bearings.
    - b. Grease Cups: Automatic feed type.
    - c. Lubrication Points: Visible and easily accessible.
- B. Electrical Equipment:
  1. Motors: NEMA MG 1.
  2. Boxes, Conduit, Wiring, and Devices: As required by NFPA 70. Refer to Division 26.
  3. Sump Pump in Pit: Refer to Division 22.
  4. Spare Conductors: Provide ten percent in extra conductors and two pairs of shielded audio cables in traveling cables.
  5. Include wiring and connections to elevator devices remote from hoistway. Provide additional components and wiring to suit equipment layout in shaft.. Refer to Division 26.

### **2.04 PERFORMANCE REQUIREMENTS**

- A. Regulatory Requirements: Comply with ASME A17.1, applicable local codes, and authorities having jurisdiction (AHJ).
- B. Accessibility Requirements: Comply with ADA Standards.
- C. Perform structural steel design, fabrication, and installation in accordance with AISC 360.
- D. Perform welding of steel in accordance with AWS D1.1/D1.1M.
- E. Fabricate and install door and frame assemblies in accordance with NFPA 80 and in compliance with requirements of authorities having jurisdiction.
- F. Perform electrical work in accordance with NFPA 70.

### **2.05 OPERATION CONTROLS**

- A. Elevator Controls: Provide landing operating panels and landing indicator panels.
  1. Landing Operating Panels: Metallic type, one for originating "Up" and one for originating "Down" calls, one button only at terminating landings; with illuminating indicators.
  2. Landing Indicator Panels: Illuminating.
  3. Comply with ADA Standards for elevator controls.
- B. Interconnect elevator control system with building security, fire alarm, and smoke alarm systems.
- C. Door Operation Controls:
  1. Program door control to open doors automatically when car arrives at floor landing.
  2. Render "Door Close" button inoperative when car is standing at dispatch landing with doors open.

3. Door Safety Devices: Moveable, retractable safety edges, quiet in operation; equipped with photo-electric light rays.
- D. Lobby Monitoring Panel:
1. Locate status indicator and control panel for each individual elevator.
  2. Mount panel in console.
  3. Coordinate size and style of panel with console manufacturer.
  4. Etch face plate markings in panel, and fill with paint of contrasting color.
  5. Include direction indicator displaying landing "Up" and "Down" calls registered at each landing floor.
  6. Include position and motion display for direction of travel of each elevator. Display appropriate graphic characters on non-glare screen. Indicate position of cars at rest and in motion.
  7. Include a "Remove From In Service" switch for each elevator that then calls car to ground floor and parks car with doors open.
  8. Include "Firefighter's Service Switch" that manually recalls each elevator to main floor.
- E. Provide "Firefighter's Emergency Operation" in accordance with ASME A17.1, applicable building codes, and authorities having jurisdiction (AHJ).
1. Designated Landing: First floor commons.

## **2.06 OPERATION CONTROL TYPE**

- A. Selective Collective Automatic Operation Control: Applies to car in single elevator shaft.
1. Refer to description provided in ASME A17.1.
  2. Automatic operation by means of one button in the car for each landing served and by "UP" and "DOWN" buttons at the landings.
  3. Stops are registered by momentary actuation of landing car buttons without consideration of the number of buttons actuated or the sequence buttons are actuated, but the stops are made in the order that landings are reached in each direction of travel.
  4. All "UP" landing calls are made when car is traveling in the up direction.
  5. All "DOWN" landing calls are made when car is traveling in the down direction.
  6. Uppermost and lowermost calls are answered as soon as they are reached without consideration of the car travel direction.

## **2.07 EMERGENCY POWER**

- A. Set-up elevator operation to run with elevator emergency power supply when the normal building power supply fails, and in compliance with ASME A17.1 requirements.
- B. Elevator Emergency Power Supply: Supplied by battery backup; provide elevator system components as required for emergency power characteristics.
- C. Emergency Lighting: Comply with ASME A17.1 elevator lighting requirements.
- D. Provide operational control circuitry for adapting the change from normal to emergency power.
- E. Upon transfer to emergency power, advance one elevator at a time to a pre-selected landing, stop car, open doors, disable operating circuits, and hold in standby condition.

## **2.08 MATERIALS**

- A. Stainless Steel Sheet: ASTM A666, Type 304; No. 4 Brushed finish unless otherwise indicated.
- B. Extruded Aluminum: ASTM B221 (ASTM B221M), natural anodized finish unless otherwise indicated.
- C. Plywood: PS 1, Structural I, Grade C-D or better, sanded.
- D. Tempered Glass: 3/8 inch minimum thickness, fully tempered in compliance with ASME A17.1, 16 CFR 1201, ANSI Z97.1, and ASTM C1048 tempered glass requirements.
- E. Resilient Flooring: Luxury vinyl tile flooring and base as specified in Section 09 65 00.
- F. Plastic Laminate: NEMA LD 3, Type HGS, color as selected by Architect from manufacturer's standard line of colors.

## 2.09 CAR AND HOISTWAY ENTRANCES

### A. Elevator:

1. Car and Hoistway Entrances:
  - a. Hoistway Fire Rating: 1 Hour.
  - b. Elevator Door Fire Rating: 1 Hour.
  - c. Framed Opening Finish and Material: Brushed stainless steel.
  - d. Car Door Material: Stainless steel, with rigid sandwich panel construction.
  - e. Hoistway Door Material: Stainless steel, with rigid sandwich panel construction.
  - f. Door Type: Double leaf.
  - g. Door Operation: Side opening, two speed.
  - h. Door Width: 42 inch.
  - i. Door Height: 84 inch.
  - j. Sills: Extruded aluminum.

## 2.10 CAR EQUIPMENT AND MATERIALS

### A. Elevator Car:

1. Car Operating Panel: Provide main and auxiliary; flush-mounted applied face plate, with illuminated call buttons corresponding to floors served with "Door Open/Door Close" buttons, "Door Open" button, "Door Close" button, and alarm button.
  - a. Panel Material: Integral with front return; one per car.
  - b. Car Floor Position Indicator: Above door with illuminating position indicators.
  - c. Locate alarm button where it is unlikely to be accidentally actuated; not more than 54 inch above car finished floor.
  - d. Provide matching service cabinet integral with front return panel, with hinged door and keyed lock in each car.
  - e. Provide following within service cabinet as part of car operating panel:
    - 1) Switch for each auxiliary operational control, keyed.
    - 2) Switches for fan, light, and inspection control.
    - 3) Emergency light.
    - 4) Telephone cabinet and hard-wired connection with telephone.
    - 5) Control for each other special feature specified.
    - 6) Convenience outlet receptacle; 110 VAC, 15 amps.
2. Ventilation: Single speed fan with grille in ceiling.
3. Flooring: Luxury vinyl tile specified in Section 09 65 00.
4. Wall Base: Resilient base, 4 inch high.
5. Front Return Panel: Stainless steel.
6. Door Wall: Plastic laminate on plywood.
7. Side Walls: Plastic laminate on plywood.
8. Rear Wall: Plastic laminate on plywood.
9. Hand Rail: Aluminum, at all three sides. Provide open clearance space 1-1/2 inch (38 mm) wide to face of wall.
  - a. Aluminum Finish: Clear anodized.
10. Ceiling:
  - a. Frame Finish: Clear anodized aluminum.
  - b. Lay-in Panel: Aluminum eggcrate.
  - c. Lighting: LED.
11. Provide emergency access panel for egress from car at ceiling.

### B. Car Accessories:

1. Certificate Frame: Stainless steel frame glazed with tempered glass, and attached with tamper-proof screws.

## 2.11 MACHINE ROOM FITTINGS

- A. Hydraulic equipment located at rear of shaft with access door by others.
- B. Wall-Mounted Frames: Glazed with clear plastic; sized as required. Provide one chart each for master electric and hydraulic schematic and for lubrication chart. Install charts.

- C. Key Cabinet: Wall-mounted, lockable, keyed to building keying system, for control and operating panel keys.
  - 1. Provide two key cabinet keys.
- D. Monitoring Device Interface:
  - 1. Fabricate one multiple terminal block in controller relay panel or selector, in location indicated, for connection of monitoring devices for:
    - a. Landing and car registration circuits.
    - b. Motor generator running circuits.
    - c. Load weighing circuits.
    - d. Up and down peak programming circuits.
    - e. Independent service switches.
  - 2. Label terminals for use with alligator test clips.

## **2.12 FINISHES**

- A. Clear Anodized Finish: Class I, AAMA 611 AA-M12C22A41 clear anodic coating with electrolytically deposited organic seal; not less than 0.7 mils, 0.0007 inch thick.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting this work.
- B. Verify that hoistway and pit are ready for work of this section.
- C. Verify hoistway shaft and openings are of correct size and within tolerance.
- D. Verify location and size of machine foundation and position of machine foundation bolts.
- E. Verify that electrical power is available and of correct characteristics.

### **3.02 PREPARATION**

- A. Arrange for temporary electrical power for installation work and testing of elevator components.
- B. Excavate for in-ground hydraulic cylinder casing in accordance with Division 31, and remove subsoil from site.
- C. Maintain in-ground shaft alignment of 1/2 inch maximum from plumb.
  - 1. Fill over-excavated shaft depth with lean concrete.
- D. Maintain elevator pit excavation free of water.

### **3.03 INSTALLATION**

- A. Coordinate this work with installation of hoistway wall construction.
- B. Install system components, and connect equipment to building utilities.
- C. Provide conduit, electrical boxes, wiring, and accessories. Refer to Division 26.
- D. Install hydraulic piping between cylinder and pump unit.
- E. Mount machines, motors, and pumps on vibration and acoustic isolators.
  - 1. Place on structural supports and bearing plates.
  - 2. Securely fasten to building supports.
  - 3. Prevent lateral displacement.
- F. Install hoistway, elevator equipment, and components in accordance with approved shop drawings.
- G. Install guide rails to allow for thermal expansion and contraction movement of guide rails.
- H. Accurately machine and align guide rails, forming smooth joints with machined splice plates.
- I. Bolt brackets to inserts placed in concrete form work.
- J. Field Welds: Chip and clean away oxidation and residue with wire brush; spot prime surface with two coats.
- K. Install hoistway door sills, frames, and headers in hoistway walls; grout sills in place, set hoistway floor entrances in alignment with car openings, and align plumb with hoistway.
- L. Fill hoistway door frames solid with grout in accordance with Section 04 20 00.

- M. Structural Metal Surfaces: Clean surfaces of rust, oil or grease; wipe clean with solvent; prime two coats.
- N. Adjust equipment for smooth and quiet operation.

### **3.04 TOLERANCES**

- A. Guide Rail Alignment: Plumb and parallel to each other in accordance with ASME A17.1 and ASME A17.2.
- B. Car Movement on Aligned Guide Rails: Smooth movement, without any objectionable lateral or oscillating movement or vibration.

### **3.05 FIELD QUALITY CONTROL**

- A. Testing and inspection by regulatory agencies certified in accordance with ASME QEI-1 will be performed at their discretion.
  - 1. Schedule tests with agencies and notify Owner and Architect.
  - 2. Obtain permits as required to perform tests.
  - 3. Document regulatory agency tests and inspections in accordance with requirements.
  - 4. Perform tests required by regulatory agencies.
  - 5. Furnish test and approval certificates issued by authorities having jurisdiction.
- B. Perform testing and inspection in accordance with requirements.
  - 1. Inspectors shall be certified in accordance with ASME QEI-1.
  - 2. Perform tests as required by ASME A17.2.
  - 3. Provide at least two weeks written notice of date and time of tests and inspections.
  - 4. Supply instruments and execute specific tests.
- C. Operational Tests:
  - 1. Perform operational tests in the presence of Owner and Architect.
  - 2. At an agreed time, and the building occupied with normal building traffic, conduct tests to verify performance.
    - a. Furnish event recording of each landing call registrations, time initiated, and response time throughout entire working day.
  - 3. Set period of time elevator takes to travel between typical floor landings at not more than 4 seconds.
    - a. Measure time from moment doors start to close until car has stopped level at next floor landing and doors are opening.

### **3.06 ADJUSTING**

- A. Adjust for smooth acceleration and deceleration of car to minimize passenger discomfort.
- B. Adjust with automatic floor leveling feature at each floor landing to reach 1/4 inch maximum from flush with sill.

### **3.07 CLEANING**

- A. Remove protective coverings from finished surfaces.
- B. Clean surfaces and components in accordance with manufacturers written instructions.

### **3.08 CLOSEOUT ACTIVITIES**

- A. Demonstrate proper operation of equipment to Owner's designated representative.
- B. Demonstration: Demonstrate operation of system to Owner's personnel.
  - 1. Use operation and maintenance data as reference during demonstration.
  - 2. Briefly describe function, operation, cleaning and maintenance of each component.
- C. Training: Train Owner's personnel on cleaning and operation and maintenance of system.
  - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
  - 2. Provide minimum of two hours of training.
  - 3. Instructor: Manufacturer's training personnel.
  - 4. Location: At project site, unless noted otherwise.



### **3.09 PROTECTION**

- A. Do not permit construction traffic within car after cleaning.
- B. Protect installed products until Date of Substantial Completion.
- C. Touch-up, repair, or replace damaged products and materials prior to Date of Substantial Completion.

### **3.10 MAINTENANCE**

- A. Provide Initial Maintenance Contract of elevator system and components in accordance with ASME A17.1 and requirements as indicated for 12 months from Date of Substantial Completion.
- B. Submit proposal for continuation of Maintenance Contract in accordance with ASME A17.1 and requirements as indicated for installed elevator equipment.
- C. Perform maintenance contract services using competent and qualified personnel under the supervision and direct employ of the elevator manufacturer or original installer.
- D. Maintenance contract services shall not be assigned or transferred to any agent or other entity without prior written consent of Owner.
- E. Examine system components periodically.
- F. Include systematic examination, adjustment, and lubrication of elevator equipment.
- G. Maintain and repair or replace parts, whenever required, using parts produced by original equipment manufacturer.
- H. Perform work without removing cars from use during peak traffic periods.
- I. Provide emergency call back service during regular working hours throughout period of this maintenance contract.
- J. Maintain an adequate stock of parts for replacement or emergency purposes, and have personnel available to ensure the fulfillment of this maintenance contract without unreasonable loss of time.

**END OF SECTION**

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## SECTION 23 08 00

### COMMISSIONING OF HVAC

#### PART 1: GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.
- B. The requirements of Section 23 05 00 apply to this Section.

##### 1.02 SECTION INCLUDES

- A. Commissioning requirements of mechanical systems specifically applicable to Division 23.
- B. Commissioning Report form by Contractor

##### 1.03 SUBMITTALS

- A. Submit in accord with Section 01 30 00.
  - 1. Shop drawings and descriptive product data describing all material furnished under Part 2 of this Section.
- B. Submit draft copies of commissioning report for review prior to final acceptance of project.
- C. Provide final copies of report for inclusion in operating and maintenance manuals.

##### 1.04 SEQUENCING AND SCHEDULING

- A. Coordinate work and monitor construction progress to ensure systems are completed and commissioned by date of substantial completion.

##### 1.05 SCOPE OF WORK

- A. Commissioning work of Division 23 shall include, but not be limited to:
  - 1. Start-up and testing of equipment.
  - 2. Providing qualified personnel for participation in commissioning tests, including seasonal tests required after initial testing.
  - 3. Providing required documentation for inclusion in operation and maintenance manuals.
  - 4. Reporting any system deficiencies found during the commissioning process.
- B. Provide a complete evaluation of the operation and performance of all systems and components. The following systems and equipment shall be evaluated:
  - 1. Air handling units, interior and exterior.
  - 2. Boiler systems.
  - 3. Pumps.
  - 4. Hydronic systems.
  - 5. Terminal systems.
  - 6. Fans and exhausters.
  - 7. Variable volume boxes.
  - 8. Variable frequency drives.
  - 9. Temperature controls.
- C. Contractor shall include cost of complete commissioning requirements of Division 23.

## **PART 2: PRODUCTS – NOT USED.**

## **PART 3: EXECUTION**

### **3.01 COMMISSIONING**

- A. Provide written certification that the following work has been completed in accordance with the contract documents and that the equipment and systems are operating as required and designed.
  - 1. HVAC air handling equipment, including all fans, ductwork, dampers and terminal units.
  - 2. HVAC hydronic equipment including boilers, pumps, coils and terminal units. Verify operation of all fill and relief valves.
  - 3. HVAC cooling system compressor operation and safeties.
  - 4. Temperature control systems, including equipment with packaged factory controls. Observe Sequence of Operation for each unit as demonstrated by the Control Trade. Confirm Owner instruction and understanding of the control system.
  - 5. Fire stopping system in fire rated construction, including fire and smoke damper installation, caulking, gasketing and sealing of fire/smoke barriers.
  - 6. Review air and water balancing reports for discrepancies and work with Contractor to resolve issues prior to submission to A/E.
- B. Operating tests and checks shall be performed to verify that all components, equipment, systems and controls operate in accordance with the contract documents under all operating modes, with all interlocks and during both normal and emergency conditions.

### **3.02 SEASONAL COMMISSIONING**

- A. Heating equipment shall be tested during winter design conditions. Cooling equipment shall be tested during summer design conditions. Contractor shall be responsible for initial and alternate peak season tests of the systems as required to demonstrate proper performance.
- B. Initial commissioning work shall be done as soon as contract work is completed, regardless of season. Provide follow-up testing and documentation for commissioning of equipment during alternate peak season as required to demonstrate proper performance.

### **3.03 RECORD DRAWINGS**

- A. Review record drawings for accuracy of installed systems, note and revise any deficiencies required to achieve accurate drawings.
- B. Provide a complete set of as-built record drawings to the Owner.

### **3.04 COMMISSIONING DATA SHEETS**

- A. The data sheet used for documentation of commissioning work shall contain all unit model and serial numbers and performance test results.
- B. Refer to Attachment Appendix C data sheets. Contractor may also use their own data sheets for commissioning reports, with prior form approval from the Engineer.

**END OF SECTION 23 08 00**

# **HSR Commissioning Guideline**

## **Appendix C**

### **Sample Format for System Verification and Start-Up Checklists**

#### **NOTES TO APPENDIX C**

This appendix contains sample systems verification and start-up checklists for a selection of equipment used frequently in typical HVAC systems.

There is no intention in the appendix to provide sample checklists for all possible equipment included in any design. These checklists are intended to illustrate a level of detail that is appropriate in good commissioning practice, and to suggest a practical format. As such, they contain typical items that are often required to be included in the inspections and checks carried out, and documented, prior to and during equipment start-up.

The sample checklists are generic; thus they do not apply to any specific project, and so the list of check items is generic, not specific. Commissioning authorities must develop systems verification and start-up checklists for every piece of equipment within the scope of any commissioning project, and those checklists must include all items included in the specific design that require checking.

There is a Table of Contents on the next page listing the sample checklists included in this appendix.

HSR assumes no responsibility for how the material in this Appendix may be utilized by users of the Guideline; the users assume full responsibility for any and all liability that may arise from any reference to, or use of, this material.

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**HSR Commissioning Guideline  
APPENDIX C**

**TABLE OF CONTENTS**

Air Handling Unit	3
Controls Air Compressor	4
Hot Water Boiler	5
Heating and Cooling Coils	6
Exhaust Fan	7
Pumps	8
Roof Top Unit - Gas Heat/Dx Cooling	9
Supply Fan	10
Variable Air Volume Boxes	11
Point to Point Checks	12

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# HVAC COMMISSIONING SYSTEM VERIFICATION/START-UP CHECKLIST AIR HANDLING UNIT

PROJECT: _____	
Equipment Name/Tag: _____	Location: _____
System/Area Served: _____	Related Equipment: _____

ITEM	√	COMMENTS
<b>PRE-START-UP INSPECTION</b>		
Commissioning lock-out procedures reviewed		
Operation and maintenance information		
Mounting/support system and vibration isolation		
Seismic restraints		
Equipment guards		
Alignment & V-belt tension		
Freedom of rotation		
Lubrication		
Plenums clean and free of loose material		
Temporary start-up filters		
Fire & balance dampers positioned		
Duct system tested and cleaned		
Access doors, Insulation and interior lights		
Local valving/piping (HWS, CHWS, steam, condensate, drains)		
Drain pans		
Heating and cooling coils		
Failed position of heating coil valve-open to coil		
Failed position of cooling coil valve-closed to coil		
Outside air, return air and mixed air dampers		
Humidifier		
Building & fan room cleanliness		
Filter bank, DP switch gauge and photohelics		
Electrical wiring complete		
Motor rated for VSD service		
Overload protection (sized correctly)		
Disconnect switch (tested)		
Instrumentation (temperature, volume, pressure & humidity )		
Control system - point to point checks complete		
<b>START-UP</b>		
VSD Start-up by manufacturer's representative		
Direction of rotation		
Electrical interlocks - stop/start		
Freeze protection operational		
Local air leakage acceptable		
Vibration & noise level acceptable		
Motor Amps - Rated : _____ Actual : _____		
Motor Volts - Rated : _____ Actual : _____		
Final operating filters installed		

Pre-start checks by: _____	Date: _____
Start-up checks by: _____	Date: _____
print name	signature

# HVAC COMMISSIONING SYSTEM VERIFICATION/START-UP CHECKLIST CONTROLS AIR COMPRESSOR

PROJECT: _____	
Equipment Name/Tag: _____	Location: _____
System/Area Served: _____	Related Equipment: _____

ITEM	√	COMMENTS
<b>PRE-START-UP INSPECTION</b>		
Commissioning lock-out procedures reviewed		
Operation and maintenance information		
Mounting/support system and vibration isolation		
Seismic restraints		
Equipment guards		
Alignment & V-belt tension		
Freedom of rotation		
Lubrication		
Local valving/piping (air, condensate, drains)		
Bypass piping around dryer and filter		
Intake air filter		
Inlet and outlet air silencers		
High pressure relief valve		
Status indicators- local/remote.		
Pressure gauges.		
Air receiver with automatic and manual drains		
Duplex oil and particle separators.		
+Duplex Micron discharge filters		
Flexible air connection		
Refrigerated air dryer.		
Pressure reducing valve		
Isolation valve on each high pressure line.		
Electrical wiring complete		
Overload protection (sized correctly)		
Disconnect switch (tested)		
Local starters		
Control system - point to point checks complete		
<b>START-UP</b>		
Start-up by manufacturer's rep. (report attached)		
Direction of rotation		
Electrical interlocks - stop/start		
Local air leakage acceptable		
Vibration & noise level acceptable		
Motor Amps - Rated : <u>   </u> Actual : <u>   </u>		
Motor Volts - Rated : <u>   </u> Actual : <u>   </u>		

Pre-start checks by: _____		Date: _____
Start-up checks by: _____	_____	Date: _____
print name	signature	

# HVAC COMMISSIONING SYSTEM VERIFICATION/START-UP CHECKLIST HOT WATER BOILER

PROJECT: _____	
Equipment Name/Tag: _____	Location: _____
System/Area Served: _____	Related Equipment: _____

ITEM	√	COMMENTS
<b>PRE-START-UP INSPECTION</b>		
Commissioning lock-out procedures reviewed		
Operation and maintenance information		
Boiler certificate / registration (copy attached)		
Mounting/support system		
Seismic restraints		
Maintenance clearance		
Local valving/piping correct (including expansion tanks and make-up water).		
Chemical cleaning and treatment (report attached)		
Temperature and pressure gauges		
Pressure relief valve		
Pressurization and leak tests		
Blowdown system		
Safety interlocks- low water and high temperature		
Combustion air supply and ventilation		
Insulation/lagging		
Stack and breaching		
Combustion chamber inspection		
Fuel system (including emergency shutdown and gas inspection certificate)		
Electrical wiring		
Overload protection (sized correctly)		
Disconnect switch (tested)		
Control system - point to point checks complete		
<b>START-UP</b>		
Start HWS pumps to create load.		
Start boiler circulation pumps.		
Boiler startup by supplier		
Supplier certificate or log provided for start-up and all specified and regulatory tests.		

Pre-start checks by: _____		Date: _____
Start-up checks by: _____	_____	Date: _____
<small>print name</small>	<small>signature</small>	



# HVAC COMMISSIONING SYSTEM VERIFICATION /START-UP CHECKLIST EXHAUST FAN

PROJECT: _____	
Equipment Name/Tag: _____	Location: _____
System/Area Served: _____	Related Equipment: _____

ITEM	√	COMMENTS
<b>PRE-START-UP INSPECTION</b>		
Commissioning lock-out procedures reviewed		
Operation and maintenance information		
Mounting/support system and vibration isolation		
Flexible connections		
Seismic restraints		
Equipment guards		
Alignment & V-belt tension		
Freedom of rotation		
Lubrication		
Plenum/volute clean and free of loose material		
Duct system tested and cleaned		
Fire & balance dampers positioned		
Exhaust louvers tested (gravity or motorized)		
Building & fan room cleanliness		
Electrical wiring		
Motor rated for VSD service		
Overload protection (sized correctly)		
Disconnect switch (tested)		
Control system - point to point checks complete		
<b>START-UP</b>		
Start-up by manufacturer's rep. (report attached)		
Direction of rotation		
Electrical interlocks - stop/start		
Local air leakage acceptable		
Vibration & noise level acceptable		
Motor Amps - Rated : <u>    </u> Actual : <u>    </u>		
Motor Volts - Rated : <u>    </u> Actual : <u>    </u>		

Pre-start checks by: _____		Date: _____
Start-up checks by: _____	signature	Date: _____
print name		



# HVAC COMMISSIONING SYSTEM VERIFICATION/START-UP CHECKLIST ROOF TOP UNIT - GAS HEAT/DX COOLING

PROJECT: _____
Equipment Name/Tag: _____ Location: _____
System/Area Served: _____ Related Equipment: _____

ITEM	√	COMMENTS
<b>PRE-START-UP INSPECTION</b>		
Commissioning lock-out procedures reviewed		
Operation and maintenance information		
Mounting/support system and vibration isolation		
Seismic restraints		
Equipment guards		
Alignment & V-belt tension		
Freedom of rotation		
Lubrication		
Plenums clean and free of loose material		
Temporary start-up filters		
Fire & balance dampers positioned		
Access doors, Insulation and interior lights		
Filter bank, DP switch gauge and photohelics		
Local valving/piping (gas, condensate, pans, drains)		
Motorized dampers		
D/X expansion (cooling) coil and compressor		
D/X condensing coil and fans		
Gas piping and valving complete		
Gas inspection certificate		
Regulatory authority approved installation and burner control (certificate available)		
Building cleanliness		
Electrical wiring complete		
Overload protection (sized correctly)		
Disconnect switch (tested)		
Local control module with DDC interface		
Control system - point to point checks complete		
<b>START-UP</b>		
Start-up by manufacturer's representative with report and certificate or log provided		
Direction of rotation		
Electrical interlocks - stop/start		
Local air leakage acceptable		
Vibration & noise level acceptable		
Motor Amps - Rated : _ Actual : _____		
Motor Volts - Rated : _ Actual : _____		
Final operating filters installed		

Pre-start checks by: _____	Date: _____
Start-up checks by: _____ <span style="font-size: small; display: block; text-align: center;">print name</span>	Date: _____ <span style="font-size: small; display: block; text-align: center;">signature</span>

# HVAC COMMISSIONING SYSTEM VERIFICATION/START-UP CHECKLIST SUPPLY FAN

PROJECT: _____	
Equipment Name/Tag: _____	Location: _____
System/Area Served: _____	Related Equipment: _____

ITEM	√	COMMENTS
<b>PRE-START-UP INSPECTION</b>		
Commissioning lock-out procedures reviewed		
Operation and maintenance information		
Electrical wiring		
Motor rated for VSD service		
Overload protection (sized correctly)		
Disconnect switch (tested)		
Mounting/support system and vibration isolation		
Seismic restraints		
Flexible connections		
Equipment guards		
Alignment & V-belt tension		
Freedom of rotation		
Lubrication		
Plenums clean and free of loose material		
Temporary start-up filters		
Fire & balance dampers positioned		
Inlet louvers tested (gravity or motorized)		
Duct system tested and cleaned		
Access doors, Insulation and interior lights		
Building & fan room cleanliness		
Filter bank, DP switch gauge and photohelics		
Instrumentation (temperature, volume, pressure & humidity )		
Control system - point to point checks complete		
<b>START-UP</b>		
VSD Start-up by manufacturer's rep. (report attached)		
Direction of rotation		
Electrical interlocks - stop/start		
Freeze protection operational		
Local air leakage acceptable		
Vibration & noise level acceptable		
Motor Amps - Rated :__ Actual : _____		
Motor Volts - Rated :__ Actual : _____		
Final operating filters installed		

Pre-start checks by: _____	Date: _____
Start-up checks by: _____	Date: _____
print name	signature



# HVAC COMMISSIONING SYSTEM VERIFICATION /START-UP CHECKLIST VARIABLE AIR VOLUME BOXES

PROJECT: \_\_\_\_\_

Equipment Name/Tag: \_\_\_\_\_ Location: \_\_\_\_\_

System/Area Served: \_\_\_\_\_ Related Equipment: \_\_\_\_\_

- PRE-START-UP INSPECTION**
- Check the following equipment for:
- local valving and piping
  - local ductwork
  - mounting support and seismic system
  - maintenance access
  - valve operation
  - damper operation
  - sensor location and operation
  - Control system - point to point checks complete
  - Building cleanliness

- START-UP**
- Start air handling system (see separate checklist)
  - Local air leakage acceptable

Unit ID	Room	Reheat	Ducting	Valving & Piping	Mounting Support Seismic	Maint. access	Valve operation	Damper operation	Airflow Sensor	Temp. Sensor

Pre-start checks by: \_\_\_\_\_ Date: \_\_\_\_\_

Start-up checks by: \_\_\_\_\_ Date: \_\_\_\_\_

print name

signature

# HVAC COMMISSIONING SYSTEM VERIFICATION /START-UP CHECKLIST CONTROLS POINT TO POINT CHECKS

PROJECT: \_\_\_\_\_

Equipment/System: \_\_\_\_\_ Location: \_\_\_\_\_

Point		Output				Input		Accept	Comment
Description	Name	DO	AI 0%	AI 50%	AI 100%	DI	AI	Y/N	

Checked by: \_\_\_\_\_ Date: \_\_\_\_\_

Verified by: \_\_\_\_\_ Date: \_\_\_\_\_

print name signature

## SECTION 23 09 93

### SEQUENCE OF OPERATIONS

#### PART 1: GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.
- B. The requirements of Section 23 05 00 apply to this Section.

##### 1.02 RELATED WORK

- A. Electric Instrumentation and Control Devices for HVAC: 23 09 14
- B. Direct Digital Control System for HVAC: 23 09 23
- C. Testing: 23 05 92
- D. Balancing Systems: 23 05 93

##### 1.03 SUMMARY

- A. This Section includes control sequences for HVAC systems, subsystems, and equipment.

##### 1.04 DEFINITIONS

- A. DDC: Direct digital control.
- B. VAV: Variable air volume.
- C. Adjustable: As used in this section means that the referenced setpoint can be changed from the user interface device by the system operator.
- D. Ventilation Zone: The areas of the building served by a particular ventilation system. The start/stop of the fans of these zones are to be independent of the start/stop of the Day/Night Setback Zone.
- E. Day/Night Setback Zone: The areas of the building that are served by thermostats that are dual pressure and off the same pressure reducing valve/pressure selector switch.
- F. Zone Occupancy: The time of the day that the space served by a ventilation system is physically occupied by individuals, i.e. when the majority of the students are present.
- G. Occupied Cycle: The time of day that the building is predominantly occupied and that the outside air must be introduced into the building. It does not include the time it takes the building to warm up.
- H. Partial Occupancy Cycle: The time of day that the building is predominantly unoccupied with only a few people in zone. Occupied room temperature would be maintained but outside air is not required to be introduced into the building.

- I. Optimal Start: Prior to scheduled occupancy while the ventilation systems and the day/night setback zones are in the un-occupied mode, the day/night zone's temperature setpoints are changed to the occupied setting at an optimum time prior to scheduled occupancy such that the building will finish warming up at the same time the scheduled occupancy begins. The ventilation systems actually stay in the un-occupied mode, cycling as required, OA dampers closed, etc., until the scheduled time of occupancy, i.e. when school begins. The temperature control system will calculate the optimum time to switch the thermostats based on outside air temperature and historic warm up time.

## **PART 2: PRODUCTS**

### **2.01 MATERIALS AND EQUIPMENT**

- A. Reference Sections 23 09 14 and 23 09 23.

## **PART 3: EXECUTION**

### **3.01 DAMPER INTERLOCKS FOR FANS WITH STARTERS:**

- A. For fan systems with magnetic starters and shutoff dampers specified with end switches, the damper interlock shall be hardwired in such a way that the damper shall open if the fan starter hand / off / auto switch is in the hand or in the auto position and being called to start. After the damper end switch has proven the damper open, a hardwire interlock from the end switch to the starter holding coil for the fan shall cause the fan to start. For fan systems that are ducted in parallel, see specific sequence for fan system on interlock requirements.

### **3.02 DAMPER INTERLOCKS FOR FANS WITH VFD'S:**

- A. For fan systems with VFD's and shutoff dampers specified with end switches, the damper end switches shall be hardwire interlocked to the safety circuit(s) of the VFD to prevent the fan from starting until the damper is proven open. This interlock shall prevent the fan from running in either the VFD or bypass (if provided) mode. The damper end switch shall also be monitored by the DDC system. For fan systems that are ducted in parallel, see specific sequence for fan system on additional interlock requirements.

### **3.03 DIRECT RADIATION CONTROL (HOT WATER)**

- A. Control direct radiation, as per schedules on Drawings, having dual setpoint for the occupied areas and single setpoint for the storage areas, equipment rooms, and entries.
- B. Thermostat shall modulate the 2-way or 3-way control valve to maintain temperature setting for the occupied areas.

### **3.04 CABINET HEATER AND UNIT HEATER CONTROL (HOT WATER)**

- A. Provide a temperature sensor (DDC), 2-way or 3-way hot water valve and strap on thermostat for each unit.
- B. The control valve shall open when the space temperature drops below the space temperature setpoint. Setpoint temperature shall be set with the BAS and shall be user adjustable with the BAS. An aquastat/strap on thermostat shall cycle the fan on when the return water temperature from the unit reaches 110°F. When the setpoint temperature is met. The control valve shall close. The fan shall cycle off.

- C. Set thermostat to maintain a minimum space temperature of 60°F (adjustable).
- D. Send alarm to the BAS if space temperature falls 10°F (adjustable) below setpoint.
- E. All points and alarms listed above shall be displayed graphically on BAS.

### **3.05 HOT WATER CIRCULATING PUMP CONTROL**

- A. The lead hot water circulating pump shall be started by the BAS system and run continuously on a call for heat or reheat within the system. A system differential pressure switch shall monitor pump operation and shall automatically start the back-up pump if the lead pump should fail to maintain system differential pressure. A current sensor may be used for sensing pump failure or pump status. A pump "reset to normal" switch shall be provided to restart normal operation after pump failure problem is corrected.
- B. BAS system shall alternate the pumps lead/lag on a weekly basis to equalize runtime hours. Only one pump shall be wired to emergency power. When on emergency power, only that pump shall start and run. When normal power is resumed, previous running pump shall run.
- C. Variable frequency drives shall control the Building Loop Pumps. Differential pressure controller shall be installed in the water piping to control the pump speed to maintain the controller setpoint of 10 psig (adjustable). See drawings for differential pressure controller location. Coordinate signal requirements with variable frequency drive vendor. Drives shall be provided under Section 23 05 13 Motors.
  - 1. DP transmitter signal shall be wired directly to the controller serving pump VFD (signal shall not be transmitted across the BAS network).
- D. Minimum Hot Water Flow Control:
  - 1. BAS shall modulate the hot water bypass control valve as required to maintain minimum flow for the pumps. Verify the minimum flow limit of the pumps with equipment manufacturer. Adequate flow through the pumps shall be determined by the flow meter (under this section). If minimum flow rate is met, the control valve shall be closed.
  - 2. Size valve to flow minimum GPM as required by pump manufacturer at a maximum of 10 PSIG differential pressure across valve. Provide actuator capable of full close to full open position (monitoring) within 30 seconds.
  - 3. Minimum flow through the chiller shall be maintained at all times.
- E. Pump Optimization:
  - 1. The BAS shall continually monitor the hot water control valve position of all valves in the hot water system.
  - 2. At hot water system startup, the hot water pressure setpoint is 100% of the maximum pressure setpoint, 10 psig (adjustable). When all hot water valves are less than 85% open, the hot water differential pressure setpoint shall be lowered by 0.1 psig (adj.) of the current hot water differential pressure setpoint. This occurs every 5 minutes until at least one valve is more than 85% open, or if the setpoint is equal to the minimum hot water differential pressure setpoint, or if the pump VFD's are at a minimum speed setting (22 Hz).

3. When any hot water valve is more than 95% open, the hot water pressure setpoint shall increase by 0.1 psig (adj.) of the current hot water differential setpoint. This occurs every 5 minutes until no valve is more than 95% open, or if the hot water differential pressure setpoint has risen to the system's maximum setting, 10 psig (adjustable), or if the pump VFD's are at the maximum setting (60 Hz).

F. Alarms shall be provided as follows:

1. Failure: Commanded on, but the status is off.
2. Running in Hand: Commanded off, but the status is on.
3. Runtime Exceeded: Status runtime exceeds a user definable limit.
4. VFD Fault.

G. All points and alarms listed above shall be displayed graphically.

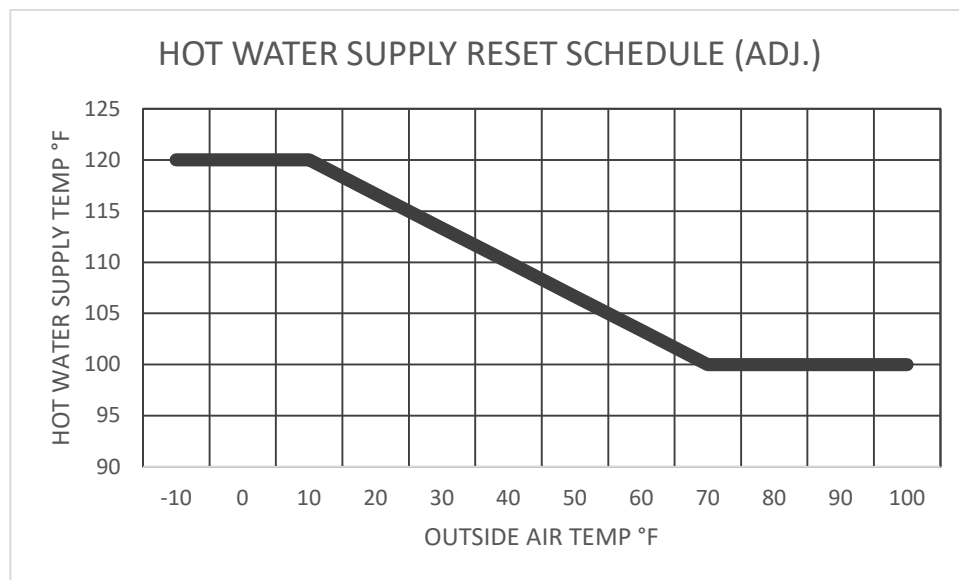
1. Pump VFD start/stop
2. Pump VFD speed
3. Pump VFD status
4. Pump VFD faults
5. Run hours: [numerical]
6. Hot water differential pressure setpoint
7. Hot water differential pressure
8. Hot water valve position summary (all valves)
9. Critical valve position
10. Critical valve location
11. Bypass valve position
12. Hot water system flow
13. Hot water BTU meter

### **3.06 BOILER CONTROL**

- A. Boilers B-1 & B-2: (Master Boiler Controller, provided by boiler manufacturer).
- B. Provide integration of system as stated in Section 23 09 23.
- C. Heating water boilers shall have unit mounted controls and a master boiler controller provided by the boiler manufacturer. BAS shall interface with boiler manufacturer controls as described in this sequence of operation.
- D. Coordinate all operating, safety, and interlock requirements with boiler manufacturer, refer to Section 23 52 16.
- E. On a call for heat or reheat in the building hot water heating system, after the building loop circulating pumps (HWP-1 or HWP-2) will be started, the BAS shall enable the master boiler controller to run. The master boiler controller shall enable the lead boiler. The motorized isolation valves provided with each boiler module shall be opened and closed by the controller on the boiler. One motorized valve shall be kept open at all times to prevent deadheading the system.

F. The following master boiler controller points shall be controlled by the BAS and displayed graphically on BAS:

1. Boiler System Status: Enable/Disable.
2. Hot Water Temperature Setpoint: Based on hot water supply reset schedule below (adjustable).
  - a) Boiler supply water temperature warm-up offset
    - 1) Provide an additional offset capability programmed into the supply water outdoor air reset so that the supply water temperature can be increased temporarily to decrease distribution warm up cycle time.
    - 2) The boiler supply water temperature reset offset for the warm up shall have a start time, duration, and number of degrees of offset that shall be customer adjustable.
  - b) Boiler supply water temperature unoccupied setback offset
    - 1) The boiler control shall have an additional offset capability programmed into the supply water outdoor air reset so that the supply water temperature can be decreased temporarily while the building is unoccupied to better match the heating needs of the facility.
    - 2) The boiler supply water temperature reset offset for the unoccupied setback shall have a start time, duration, and number of degrees of offset that shall be customer adjustable.
  - c) Warm weather shut-down of boiler system
    - 1) The boilers control shall have an outdoor air temperature point at which above this point the boiler system will automatically shut-down or revert to the unoccupied schedule that shall be customer adjustable.
    - 2) Boiler system shall not automatically shut-down if boilers are necessary for reheating.



G. The following master boiler controller points shall be monitored by the BAS and displayed graphically on BAS for each boiler:

1. Boiler status: disabled/standby/manual operation/remote operation/auto/fault
2. Firing rate input: [0 - 100%]
3. Boiler outlet water temp: [°F]
4. System primary HWR temp: [°F]
5. System primary HWS temp: [°F]
6. Fault message display code: [numerical]
7. Run cycles: [numerical]
8. Run hours: [numerical]
9. Boiler Isolation valve status
10. Boiler Isolation valve open/close command

H. Alarms shall be provided as follows:

1. Any alarm from the boiler control or master boiler controller.
2. System HWS Temperature drops more than 10°F (adj.) below setpoint (auto reset)
3. System HWS Temperature rises more than 10°F (adj.) above setpoint (auto reset)
4. Failure: Commanded on, but status is off

I. Boiler (B-1) is on emergency power, all controls shall be fed from emergency power sources.

J. All points and alarms listed above shall be displayed graphically on BAS.

### **3.07 DESTRATIFICATION FAN CONTROL (DF-\_)**

A. Provide a space temperature sensor located at/near the ceiling and a space temperature sensor located at 48" A.F.F. If multiple fans serve same space, all fans shall be controlled together so receive same speed signal. Balancer and this contractor to determine max speed of fan to prevent excessive noise. BAS shall monitor each fan status.

B. Fans shall be disabled above 50°F (adjustable) outside air temperature.

C. Fans shall be enabled to run in both occupied and unoccupied periods.

D. All points and alarms listed above shall be displayed graphically on BAS.

### **3.08 SYSTEM FEEDER UNIT**

A. SYSTEM PRESSURE CONTROL: Built in controls shall maintain system pressure at 12 psig, adjustable from 10 psig to 25 psig.

B. LOW LEVEL ALARM: Alarm panel provided with system feeder shall be tied into BAS and send alarm to BAS on a low level condition.

1. Temperature and alarm listed above shall be displayed graphically.

### **3.09 EQUIPMENT HEAT REMOVAL (ELECTRICAL ROOMS, SERVER/IT ROOMS)**

A. Minisplit cooling units will maintain space temperature at 75°F (adj.) with thermostat provided with cooling unit.



- B. Provide temperature sensor in each room with minisplit unit that is tied into BAS for monitoring purposes. Send alarm to BAS when space temperature rises above 90°F (adj.).
- C. Temperature and alarm listed above shall be displayed graphically.

### **3.10 MAKE UP AIR UNITS (MAU-\_)**

#### **A. System:**

- 1. The make-up air unit is a single zone variable air volume unit.
- 2. The make-up air unit is controlled by direct digital controller (DDC).
- 3. The blower coil system shall contain:
  - a) Direct Drive Supply fan
  - b) Modulating Hot Water Reheat Valve
  - c) Filter Bank

#### **B. Supply fan start/stop control:**

- 1. The supply fan start/stop request shall be issued based on the calls from the MAU's controller. If a fan alarm occurs, a stop request is issued and the fans are locked out. This alarm must be manually reset.

#### **C. Supply Fan Speed Control:** The purpose of the supply fan speed control is to maintain temperature within the space. See discharge air temperature control sequence below.

#### **D. Occupied cycle:**

- 1. Supply fan runs continuously on the occupied cycle. The occupancy schedule of the blower coil system shall normally be determined by the BAS. On loss of communications, the fan system shall revert to a back-up time schedule for occupied/unoccupied control.

#### **E. Discharge Air Control:**

- 1. Discharge Air Temperature Setpoint Reset from Zone Temperature (Heating Unit): Reset the discharge air temperature setpoint based on the zone temperature between 55° F (adj.) and 90° F (adj.) to maintain a zone setpoint. Hot water control valves shall modulate to maintain discharge air setpoint.
- 2. Supply Fan Speed Control: The purpose of the supply fan speed control is to maintain temperature within the space. The DDC system shall modulate the supply fan to maintain space temperature as follows:
  - a) On call for heating after the heating valves are fully open or maintaining maximum discharge air reset temperature setpoint, the supply fan shall modulate from minimum to maximum flow to maintain the zone heating setpoint. The heating valve shall modulate to maintain the maximum reset discharge temperature setpoint.

#### **F. Filter Status:**

- 1. Install a differential static pressure sensor across each filter bank. Ensure that the static probes do not impede filter removal.
- 2. For filter bank, provide an alarm to the operator interface when the differential static pressure exceeds 1.0" W.C. (adj.).

#### **G. All points and alarms listed above shall be displayed graphically on BAS (including but not limited to).**

- 1. Operating Schedule

2. Supply Fan start/stop
3. Supply Fan speed
4. Supply Fan status
5. Supply Fan faults
6. Zone Temperature
7. Zone Temperature Setpoint
8. Discharge Air Temperature
9. Discharge Air Temperature Setpoint
10. Hot Water Valve Position
11. Filter Status
12. Smoke Status

### **3.11 RELIEF DAMPER CONTROL**

- A. Air handling units utilize relief hoods to relieve excess air during their respective economizer modes.
- B. Provide a motorized exhaust air damper, actuator and a building differential static pressure sensor for each of these hoods. DDC shall modulate each damper open in response to an increase in its building differential static pressure, to limit this pressure to + 0.05 inches w.c.
- C. Locate pressure transmitter at Air Handling System DDC controller. Extend 1/4" fire rated poly sensing tubes to space and outdoor reference. Space wall mounted static pressure sensors shall be Dwyer A-465 or equal. Outdoor static pressure sensors shall be Dwyer A-306 or equal.
- D. All points and alarms listed above shall be displayed graphically on BAS.

### **3.12 VENTILATION CONTROLS**

- A. Air handler Discharge Air Temperature reset for heating and cooling seasons:
  1. A customer adjustable return air temp or room temperature reset schedule will be implemented into the DAT controls based on cooling/heating season.
- B. AHU schedule occupied/unoccupied
  1. The AHU sequence controls will be programmed into customer adjustable occupied and unoccupied schedules.
- C. Duct static pressure reset for VAV systems and CV systems with VFDs
  1. A customer adjustable fan speed reset based on duct static pressure will be implemented on appropriate supply fan systems (those with VFDs).
- D. Scheduled occupancy based ventilation
  1. Customer adjustable occupancy schedules for zones served by an AHU device will control the amount of OA introduced into that zone to comply with WI state ventilation requirements.
- E. Closed OA damper position during non-occupied times
  1. The OA damper will be controlled to the closed position during scheduled unoccupied, warm-up and cool-down times.

F. Economizer Operation

1. Economizer operation based on OA temp and chiller operation parameters.
2. Building cooling will be accomplished by economizer operation controlled by a customer adjustable OA temp setpoint.

G. Exhaust Fan Operation

1. Schedules for control of exhaust fans to run based on space usage
2. Exhaust fans in spaces with special use (such as workshops and garages) will have customer adjustable occupied and unoccupied schedules
3. Exhaust/return fan operation coupled with supply fan operation to maintain building pressure control
4. Exhaust fans that are part of a supply/return fan air distribution system shall be controlled to maintain building pressure based on supply fan operation.

**3.13 EXHAUST FAN CONTROL**

- A. For each exhaust fan, provide a start-stop point in the automation system. Starting and stopping of all exhaust fans and status shall be monitored by the BAS. An auxiliary relay shall be used to monitor status of fans started and stopped by manual switch. Manually started exhausters shall have the manual switch provided under this Section. Manual indication shall start the exhauster through the BAS. BAS shall have the ability to cycle off the exhauster during the unoccupied cycle.
- B. The exhauster shall be energized on the occupied cycle by the control system and operate the exhaust fan continuously during the occupied cycle.

<u>EXHAUSTER</u>	<u>SERVES</u>	<u>CONTROL</u>
EF-1	TOILETS	RTU-3*
EF-2	TOILET	MANUAL SWITCH
EF-3	TOILET	MANUAL SWITCH
EF-4	TOILETS	MANUAL SWITCH
EF-5	TOILET	MANUAL SWITCH
EF-6	TOILET	MANUAL SWITCH
EF-7	TOILET / JANITOR	MANUAL SWITCH
EF-8	KITCHEN HOOD	SWITCH / HEAT
EF-9	KITCHEN HOOD	SWITCH / HEAT
EF-10	DISHWASHER	SWITCH / HEAT
EF-11	TOILETS	AHU-2
EF-13	TOILET	MANUAL SWITCH
EF-14	TOILET	MANUAL SWITCH
EF-15	TOILET	MANUAL SWITCH
EF-16	TOILETS	AHU-2
EF-17	ELEVATOR EQUIPMENT RM	RTU-5
EF-18	JANITOR	MANUAL SWITCH
EF-19	TOILETS	RTU-4*

\* Indicates local control with wall switch, see schedule on plans.

- C. All points and alarms listed above shall be displayed graphically on BAS.

### 3.14 KITCHEN EXHAUST FANS (EF-8, EF-9 AND EF-10)

- A. Fan shall cycle on and off through control relay from local hood switch or hood control panel.
- B. BAS shall have the ability to cycle off the exhauster during the unoccupied cycle.
- C. An auxiliary relay shall be used to monitor status of fans started and stopped by manual switch.

### 3.15 AIR HANDLING UNITS (AHU-1 THRU AHU-3) & ROOFTOP UNITS (RTU-1 THRU 7)

#### A. System:

- 1. Unit shall be variable volume with variable frequency drives on the supply fan arrays, hot water coil heating with an inline pump, DX cooling, economizer cycle, relief hoods, and outdoor air damper (under this section), return and relief dampers (under this section) (all actuators provided under this section).

#### B. Supply fan start/stop control:

The supply fan and return fan start/stop request shall be issued based on the calls from the AHU's controller. If a fan alarm occurs, a stop request is issued and the fans are locked out. This alarm must be manually reset.

#### C. Occupied cycle:

- 1. Supply and return fans run continuously on the occupied cycle. The occupancy schedule of the air handling system shall normally be determined by the BAS. On loss of communications, the fan system shall revert to a back-up time schedule for occupied/unoccupied control.

#### D. Supply fan static pressure control:

- 1. The supply fan's volume shall be modulated from the duct static pressure sensor to maintain the pressure setpoint. Static pressure setpoint shall be initially at 1.0" w.g. and be later field adjusted for actual VAV box requirements. (Coordinate with Section 23 05 93). All adjustments shall be the responsibility of this Contractor. Adjust all for accurate control with no cycling.
- 2. Controls will send a signal to supply fan VFD, furnished under 23 05 13, to maintain static pressure setpoint (adjustable) measured 2/3 length of supply duct.
- 3. If the supply fan fails to prove status for 30 seconds (adj.) by current sensor, the fan shall be commanded off and alarm sent to BAS.
- 4. **Fan Pressure Optimization**: BAS shall monitor the current position of each VAV modulating damper. The fan static pressure setpoint shall be reset to provide just enough static pressure so that at least one damper is nearly wide open. BAS shall monitor the airflow requirement of the VAV boxes and shall increase the static pressure setpoint as necessary to satisfy the VAV box calling for 100% air volume. The controller shall measure duct static pressure and modulate the supply fan VFD speed to maintain a duct static pressure setpoint. The VFD speed shall not drop below 30% (adj.). Allowances are typically made for disregarding "extreme zones".

- a) When the fan is off, the setpoint shall be reset to 1 in. w.c. (adj.) and this setpoint shall be used on system start up. Every VAV box is sampled every 5 minutes (adjustable). If no box is more than 95% open, reduce duct static pressure set point by 0.05" w.c. (adjustable) down to minimum static pressure setpoint. If one or more boxes exceed 95% open, increase static pressure set point by 0.05" w.c. (adjustable) up to maximum static pressure setpoint.
- b) Provide minimum and maximum static pressure setpoints.
  - 1) Final maximum setpoint shall be determined by the Balancing Contractor to satisfy the worst case zone at maximum design condition.

E. Building Pressure Control (Relief Hoods)

- 1. A differential pressure transducer shall actively monitor the difference in pressure between the building (indoors) and outdoors. If the building pressure increases above the differential pressure setpoint, the unit controller shall modulate return and exhaust dampers to control building pressure to the differential pressure setpoint + 0.05" w.c. (adjustable). If the building pressure decreases below the differential pressure setpoint, the controller shall close the exhaust damper.
- 2. The motorized relief damper shall be started whenever economizer cycle is initiated. The minimum outdoor air is exhausted by exhaust fans and not by the relief air path.
- 3. Locate pressure transmitter at BAS controller. Extend 1/4" fire rated poly sensing tubes to space and outdoor reference. Space wall mounted static pressure sensors shall be Dwyer A-465 or equal. Outdoor static pressure sensors shall be Dwyer A-306 or equal.

F. Relief Fan Control

- 1. The relief fan shall be enabled only as needed, independently from supply fan, to maintain desired airflow/pressure relationship with respect to ambient. Before fan starts, associated motorized damper shall open. The relief air fan shall be started at minimum speed when the space pressure is greater than 0.05" (adj.).
- 2. Relief fan airflows will be determined by balancing contractor, this contractor to coordinate fan speeds and setpoints.

G. Cooling Mode:

- 1. The unit controller shall use the discharge air temperature sensor and discharge air temperature cooling setpoint to determine when to initiate requests for cooling. Discharge air setpoint shall be maintained by modulating the economizer as required to maintain the discharge air setpoint.
- 2. Cooling coil shall be locked out below 50°F (adj.) outside air temperature.

H. Heating Mode:

- 1. Modulate the heating coil control valve as sequenced under discharge air control.
- 2. Heating coil shall be locked out above 50°F (adj.) outside air temperature.
- 3. Pumped Hot Water Heating Coil Control: Modulate the hot water control valve as sequenced under discharge air control. Start hot water pump whenever mixed air temperature is below 45° F (adj.). Stop hot water pump whenever mixed air temperature is above 48° F (adj.).

I. Discharge Air Control:

- 1. Discharge air temperature setpoint shall be 55° F (adj.).

2. Supply air temperatures shall be determined by discharge air sensor. 2-way hot water valve, economizer outside, return and relief air dampers shall be sequenced to maintain supply air setpoint. At no time shall the heating coil be operating when the mixed air dampers are economizing.
3. Whenever the discharge air temperature is above the setpoint, the following shall occur in sequence: The heating coil control shall modulate closed as sequenced below. When heating is completely off and the economizer sequence is enabled, the outside air damper, return air damper, and relief damper will be modulated together in sequence to maintain discharge air temperature setpoint. When the discharge air setpoint is below setpoint the reverse shall occur.
4. **DAT Reset:** The supply air temperature setpoint shall be reset to the optimal setpoint communicated by the BAS. The BAS shall reset the supply air temperature setpoint based on the current outside air temperature, but shall override this reset function and return the supply air temperature setpoint to 55.0 deg. F (adj.) if more than two (adj.) zones begin to overheat. Also, the BAS shall override this reset function whenever return air humidity is higher than 60% RH (adj.). If the supply air temperature drops below the minimum limit, 50 deg. F (adj.), a low temperature alarm shall be annunciated and the unit shall shut down. If the supply air temperature rises above the maximum limit, 65 deg. F (adj.), a high temperature alarm shall be annunciated.

<u>Outdoor Temp</u>	<u>Discharge Temp</u>
0°F	62°F
70°F	55°F

J. Minimum Outside Air Control:

1. The minimum outside air path shall maintain the minimum outdoor airflow (see schedule) at all times by airflow measuring station.
2. Provide a calculated data point for outside airflow for all fans that have return and outside air mixing dampers and the points required to allow for the following equation:

$$\text{Outside Airflow} = \text{Supply CFM} \times (\text{MAT}-\text{RAT})/(\text{OAT}-\text{RAT})$$

3. Where Supply CFM is measured either on variable volume fans or as balanced on constant volume units, MAT is Mixed Air Temperature, RAT is Return Air Temperature, and OAT is Outside Air Temperature. This point is designed as a check for outside air flow stations accuracy and outside air ventilation minimum damper positions. It should be noted that the accuracy of the calculated outside airflow will diminish as outside air temperature approaches return air temperature. It should be used as a check only when the RAT and OAT are greater than 20 DegF and the accuracy of the RAT and OAT temperature sensors are assured.
4. Outdoor air damper position can be overridden if cooling requirements exceed capacity of coil.

K. CO2 Sensing: (RTU-7, AHU-2 & AHU-3)

1. The minimum outdoor air damper position shall be modulated further open from a signal from the CO2 sensor. As the level of the CO2 increases, the outdoor air damper shall be modulated open to the maximum setpoint. CO2 sensor setpoint shall be 800 ppm. Also provide for manual adjustment of the setpoint in the BAS. Damper position will be overridden if the heating or cooling requirements exceed the coil capacity and during periods of extreme heating and cooling conditions outdoors. Airflow shall be measured by a flow sensor in the outdoor air path. Airflow monitoring shall be under this Section.
- L. MAU-1 minimum outdoor air shall also change when the Kitchen Range Hood exhaust fan is manually started. BAS shall monitor the current sensor of the particular exhaust fan to adjust quantity of outdoor air from MAU-1. Refer to exhaust fans (EF-8, EF-9 and EF-10) for appropriate air quantities.
- M. Economizer cycle:
1. The outdoor air damper and relief air damper shall be modulated open, and return air dampers closed, from the discharge air temperature sensor to maintain setpoint. The AHU controller shall control damper positioning. The supply air sensor shall measure the dry bulb temperature of the air leaving the cooling coil while economizing. When economizing is enabled and the unit is operating in the cooling mode, the outside air damper shall be modulated between its minimum position and 100% to maintain the discharge air temperature setpoint. The outside air damper shall modulate toward minimum position in the event the mixed air temperature falls below the low limit temperature setting.
  2. Reference Dry Bulb:
    - a) Outside air (OA) temperature shall be compared with return dry bulb. The economizer shall enable when the OA temperature is less than return dry bulb AND OA temperature is less than 65°F (adj.) AND supply fan status is on.
- N. Morning warm-up/cool down:
1. The optimum start program shall determine the actual fan start time with outdoor and relief dampers closed. Based on a calculated minimum warm-up or cool down time, utilizing outdoor air temperature and zone temperature for the calculations. The associated VAV's shall be 100% open until occupied setpoint is approached and then assume normal control. The heating coil or cooling coil, as required, shall operate at the high or the low limit respectively. Normal ventilation mode shall start at a fixed interval ahead of actual occupancy time.
- O. Mixed Air Low Limit:
1. The initial damper opening rate shall be limited to 2% per minute (adj.) until the damper has reached its minimum ventilation position. The outside air damper shall modulate to a position less than the minimum damper position if the mixed air temperature drops below 40.0 deg. F (adj.). If the mixed air temperature sensor fails an alarm shall be annunciated at the BAS and the outside air damper shall return to the minimum position.
- P. Freeze protection:

1. A hardwired, low limit temperature switch shall be electrically interlocked with the variable speed drive. If the low limit temperature switch is tripped 38.0 deg. F (adj.), the outside air damper shall close, all valves shall open to 100%, and an alarm shall be annunciated at the BAS. A manual reset of the low limit temperature switch shall be required to restart the fan.

Q. Dehumidification Mode:

1. If the return air relative humidity is greater than 50% (adj.), the chilled water valve shall open 100% (adj.) to maintain return air relative humidity setpoint of 50% (adj.) and the VAV reheat valve shall modulate to maintain space setpoint. Mode shall terminate when the space relative humidity falls below the relative humidity setpoint of 50% (adj.) minus 3% (adj.). If the return air relative humidity sensor fails, the dehumidification sequence shall be terminated and an alarm shall be annunciated at the BAS. Lockout this control when outside air is below 55° F (adj.).
2. AHU-1, AHU-2, AHU-3, RTU-1 thru RTU-7, the hot water reheat coil within the unit shall modulate to maintain space setpoint.

R. Unoccupied cycle:

1. Supply and return fans shall be OFF.
2. When the space temperature is below the unoccupied heating setpoint of 60.0 deg. F (adj.) the supply and return fan shall start, the outside air damper shall remain closed and the hot water valve shall open. When the space temperature rises above the unoccupied heating setpoint of 60.0 deg. F (adj.) plus the unoccupied differential of 4.0 deg. F (adj.) the supply and return fan shall stop and the hot water valve shall close.
3. When the space temperature is above the unoccupied cooling setpoint of 80.0 deg. F (adj.) the supply and return fan shall start, the outside air damper shall open if economizing is enabled and remain closed if economizing is disabled. When the space temperature falls below the unoccupied cooling setpoint of 80.0 deg. F (adj.) minus the unoccupied differential of 4.0 deg. F (adj.) the supply and return fan shall stop and the outside air damper shall close.
4. When individual VAV zones are returned to occupied control and remaining system remains on unoccupied control, any VAV zone with temperatures above or below occupancy setpoint, shall be able to cycle the supply fan to maintain setpoint. Exhaust fans shall remain off.

S. Filter Status:

1. Install a differential static pressure sensor across each filter bank. Ensure that the static probes do not impede filter removal.
2. For filter bank, provide an alarm to the operator interface when the differential static pressure exceeds 1.0" W.C. (adj.).

T. Static pressure high limit:

1. All safeties shall be hard wired to the supply and return fan starters or VFD safety circuits. Starters shall not function in the "Hand" or "Auto" and VFD's shall be disabled if they are indexed to the "Auto" or "Hand" position in either the VFD or bypass modes.



2. Supply Fan High Pressure Limit: Install a static pressure probe located in the air handling unit main discharge duct at least six feet or as far as physically possible downstream of the fan and upstream of any dampers and pipe to a differential pressure switch located in the temperature control panel. Wire in series with the safety circuit of the supply and return fan. Differential pressure switch shall be a manual reset type and the BAS system shall monitor the status of the differential pressure switch. Initial setpoint shall be +4.0" w.c. (adj.) (this setpoint should be set to 0.5" w.c. less than the pressure class of the ductwork)
3. Supply Fan Low Pressure Limit: Install a static pressure probe located in the air handling unit immediately upstream of the prefilter and pipe to a differential pressure switch located in the temperature control panel. Wire in series with the safety circuit of the supply and return fans. Differential pressure switch shall be a manual reset type and the DDC system shall monitor the status of the differential pressure switch. Initial setpoint shall be -2.0" w.c. (adj.).

#### U. Unit Shutdown

1. Whenever the air handling unit is indexed off, the supply and return fans shall stop. If the return fan fails off, the supply fan shall be indexed off. On a failure of either the supply or return fan, an alarm will be sent through the DDC system. Whenever both supply and return fans are off for any reason the following shall occur:
  - a) The outside air dampers and relief air dampers shall close and the return dampers shall open.
  - b) The heating coil control valve(s) shall remain under control from the mixed air sensor to maintain 55 °F (adj.). Freezestat shall override heating control valve(s) open.
  - c) All fire/smoke dampers associated with the air handling system shall close.

#### V. All points and alarms listed above shall be displayed graphically on BAS (including but not limited to).

1. AHU Operating Mode: Occupied/Unoccupied, Heating, Cooling, Economizing, Dehumidification
2. AHU Operating Schedule
3. Supply Fan VFD start/stop
4. Supply Fan VFD speed
5. Supply Fan status
6. Supply Fan VFD alarms
7. Outdoor air, return air and exhaust damper actuation (% open),
8. Hot water valve actuation
9. Hot water coil pump status
10. Hot water coil pump start/stop
11. Hot water coil pump fault
12. Hot water coil supply temperature
13. Hot water coil return temperature
14. Discharge Cooling Coil air temperature
15. Hot water REHEAT valve actuation
16. Hot water REHEAT coil supply temperature

17. Hot water REHEAT coil return temperature
18. Return air temperature
19. Return air humidity
20. Return air CO2
21. Mixed air temperature
22. Economizer mixed air temperature setpoint
23. Discharge temperature
24. Discharge temperature setpoint
25. Discharge humidity
26. Freeze status
27. Smoke status
28. Filter status
29. Supply Fan Static pressure high limit status
30. Supply Fan Static pressure low limit status
31. Supply Fan airflow rate
32. Outdoor airflow rate
33. Calculated outdoor airflow rate
34. System ductwork static pressure setpoint
35. System ductwork static pressure
36. Building pressure differential setpoint
37. Building pressure differential readings
38. All alarms and points listed in above sequence.

### **3.16 SMOKE DETECTION AND/OR SMOKE PURGE**

- A. Air handling unit fan(s) shall shut down based upon receipt of a signal from the duct smoke detection/fire alarm system provided under Division 26, Electrical. BAS shall fully close the outdoor air and relief dampers, return air damper shall fully open, cooling shall be disabled, and heating shall remain under control from the mixed air sensor to maintain 55°F (adj.). Freezestat shall override heating control valve(s) open. An alarm shall be annunciated at the BAS, "Smoke Status Alarm".
- B. Wiring from duct smoke detector/fire alarm panel to starter/VFD safety circuit under this section, coordinate with Division 26, Electrical.

### **3.17 PRESSURE INDEPENDENT VAV CONTROL (VAV-#)**

- A. Control systems shall provide digital control for variable air volume terminal units.
- B. Systems shall control pressure independent variable air volume terminal boxes serving individual zones. Systems shall be designed to provide variable air volume cooling with heating capabilities. VAV boxes shall be cooling with duct coil.

- C. VAV box controller shall modulate damper and hot water reheat coil to maintain space setpoint based on signal from wall mounted temperature sensor. Spaces with adjustable sensors will allow a  $\pm 3^{\circ}\text{F}$  (adj.) offset from the BAS setpoint.
1. Adjustable sensors may be enabled/disabled from BAS, coordinate with owner.
  2. See VAV box schedule for sensor types.
- D. Provide temperature indication of air leaving VAV box.
- E. VAV boxes with duct coil:
1. When temperature is below setpoint of space sensor the VAV box will modulate to heating minimum air volume and then modulate reheat valve towards an open position. When temperatures are above setpoint, the opposite sequence will occur and boxes will modulate up towards a maximum air volume position as required.
  2. At full cooling, the VAV box shall be open to maximum cfm position. The reheat coil control valve shall be closed.
  3. Upon a fall in space temperature, the VAV box shall modulate closed until space setpoint is maintained, or until it reaches its minimum scheduled cfm position per the VAV box schedule. The reheat coil control valve shall be closed.
  4. For zones with radiant ceiling panels. Upon a further fall in space temperature, the radiant heating panel control valve shall modulate open to maintain space setpoint.
  5. Upon a further fall in space temperature, the reheat coil control valve shall modulate open to maintain space setpoint until the supply air temperature is  $20^{\circ}\text{f}$  (adj.) above room temperature setpoint.
  6. Upon a further fall in space temperature, VAV shall open to maintain setpoint until VAV airflow reaches its maximum heating setting. The reheat control valve shall continue to modulate open to maintain maximum delta t listed above.
  7. Upon a rise in space temperature, the reverse shall occur.
  8. The BAS shall utilize output from all VAV box positions to reset the supply duct differential static pressure.
    - a) For VAV boxes in systems that use damper position in a static pressure set point reset optimization strategy, close the damper each day at midnight (adj.) to re-zero the damper position indicator, then reopen to last position and resume normal operation.
  9. Include the programming necessary to allow any VAV or group of VAV's to function with an "open-cooling minimum-heating cfm" control methodology if the space thermostat is not satisfied in the heating mode with the hot water valve 100% open. If the space thermostat is still not satisfied send a signal to the BAS control to increase the leaving hot water temperature from the heating system. The function shall be initially established for all perimeter spaces with the heating setpoint at 60%, although any VAV can be field programmed to function accordingly. Include all field programming required during warranty period.
  10. When no hot water is available to reheat coils and space temperatures are equal to or below space sensor setpoint, the VAV box shall modulate to their cooling minimum air volume position. If the space temperature continues to drop below the space thermostat, send an alarm to activate the heating system. If space temperatures rise above setpoint, the VAV box will modulate towards a maximum air volume position as required.

#### F. Zone Sensors

1. The zone sensor shall be accurate to within 0.5 F. The sensor shall be a product of the VAV box controls manufacturer and designed specifically for the installed controller.
2. The zone sensor shall have the following features:
  - a) Zone setpoint adjustment
  - b) Night setback temperature override button to provide occupied conditions during unoccupied times.
3. Night setback override cancel button to end the override condition.
4. VACANCY/OCCUPANCY SENSORS: Connect to vacancy/occupancy sensor auxiliary contact (vacancy/occupancy sensor provided under Division 26 Electrical), see VAV schedule. Whenever vacancy/occupancy sensor indicates that the space is unoccupied during occupied mode, reset the minimum heating and cooling air volumes to zero and control to occupied standby temperature setpoints. Unoccupied space temperature shall be maintained at setpoint by duty cycling VAV box back to minimum air volumes for heating or cooling.

#### G. Unoccupied System:

1. The individual VAV box controller shall be automatically indexed to occupied/unoccupied control from the central processing unit. When indexed to unoccupied control, the VAV shall be capable of being returned to occupied control through thermostat. Provide the necessary hardware and software to permit any zone to be returned from unoccupied control to occupied control, overriding the central processing unit from a pushbutton or other signal at the zone thermostat. When an override to occupancy is required, local individually adjustable timer for each VAV controller shall be initiated with the system returning to occupied state at the end of the interval. Program as Owner required for designated groups of rooms.
2. Systems shall have individual adjustments for zone setpoint, (internal) dead band, heating/cooling proportional bank, setup/setback and minimum and maximum airflow. A velocity sensor measures airflow through the terminal unit and compares this value to the airflow control point. Based on these inputs, the controller shall adjust the outputs to the air valve motor to increase or decrease airflow as necessary. This allows the controller to provide pressure independent control, accommodating systems where fluctuations in duct static pressure would cause unwanted variations in airflow.
3. Systems shall use pressure transducers that measure velocity pressure at the terminal unit to control discharge CFM.
4. Systems shall provide an occupied mode to set-up the cooling setpoint and set back the heating setpoint during unoccupied periods.
5. System shall provide a shutdown mode that positions the damper actuator full closed and locks out any reheat functions. When space sensor calls for night operation, damper will open to maintain setback or setup temperatures as required.
6. VAV dampers shall be capable of tight shut-off when the space no longer requires heating or cooling to maintain the setback or setup temperatures as required.
7. Systems shall provide capability to adjust the zone setpoint at the zone sensor location or at the VAV controller.

- H. The variable air volume units shall include the following components to be supplied under Section 23 36 00.
1. Air valve with motor shaft for actuator operation (electric). Coordinate actuator type with this Section.
  2. Flow sensing ring.
- I. Items furnished under this section:
1. VAV hot water control valves shall be furnished under this section and installed under Section 23 36 00.
  2. Damper actuator.
  3. Control power transformer shall be provided and wired to circuits under this Section. Additional 20 amp dedicated branch circuits from panel to transformer for control of VAV boxes shall be provided. Verify connection locations at VAV boxes with box manufacturer. Wiring from transformer to VAV box controller shall be under this Section.
  4. VAV box damper/actuator control checkout shall be the responsibility of this section.
  5. Discharge temperature from VAV box shall be monitored by the BAS.
- J. The Control Contractor shall be responsible for low voltage wiring of box digital controls. Wiring shall be in conduit or NEC plenum approved low voltage cable if ceiling is used for return plenum. Electrical power to VAV boxes shall be supplied under this section.
- K. Alarm if space temperature is 10°F (adj.) above or below space temperature setpoint.
- L. All points and alarms listed above shall be displayed graphically on BAS (including but not limited to).
1. VAV box airflow
  2. Supply air temperature into box
  3. Discharge air temperature from box
  4. Hot water reheat valve position
  5. VAV damper position
  6. Space temperature
  7. Occupied/Unoccupied/Occupied Standby for Heating/Cooling temperature setpoints
  8. Min/Max Heating/Cooling airflow setpoints
  9. Occupied bypass timer
  10. Space temperature alarm
  11. All alarms and points listed in above sequence.

### **3.18 RADIATION TERMINAL BAS CONTROL WITH REHEAT COILS**

- A. Modulate electronic control hot water valve in sequence (simultaneously) with reheat coil to maintain space temperature when associated AHU is running. When space temperature is below setpoint modulate the hot water valve open. The reverse shall occur when space temperature is above setpoint. When the associated AHU is off, the radiation valve will be modulated to maintain heating setpoint and the associated reheat valve shall be closed. Lock hot water valve closed whenever outside air is above 50° F (adj.).

### **3.19 TREND LOGGING**

- A. Long term historical trending for all applicable points on all systems shall be configured for commissioning efforts, installation and testing performance evaluations, and for the facilities long term use. Coordinate trend requirements with A/E and owner. Trend data shall be saved to the BAS network hard drive.
- B. Program the trend logs at minimum:
  - 1. Air Handling Units, Rooftop Units and Make-Up Air Unit
    - a) Supply air flow CFM
    - b) Outdoor air flow CFM
    - c) Supply air temperature
    - d) Supply air humidity
  - 2. Heating Hot Water System
    - a) Heating hot water supply temperature
    - b) Heating hot water return temperature
    - c) Heating hot water flow
    - d) Heating hot water BTU

### **3.20 ADJUSTMENTS**

- A. Upon completion of the control work, completely adjust, ready for use, all sensors, valves, damper motors, electronic devices and relays, installed under this work.
- B. Furnish to the owner a complete instruction manual covering the function, operation, and adjustment procedure for all control components, including "As Built" control drawings. Also provide 24 hours of personal instructions and training in operation of the system to the building operator(s) during the commissioning phase. After about 6 months after final completion, provide additional training as required (12 hours). The training hours on site shall not commence until the programming by the contractor is complete.
- C. Demonstrate sequence of operation for commissioning purposes. Refer to Section 23 08 00, Commissioning of HVAC Systems.
- D. Install within the Operation and Maintenance Manual, a copy of the "As-Built" control drawing(s) for the particular system (reduced if necessary). Include printed maintenance and lubrication schedule for equipment as applicable.
  - 1. Include a CD with a copy of the "As-Built" control drawings. Any necessary software to view the files on the CD shall be provided on the BAS computer.
  - 2. Part of the training instruction shall include a demonstration of using the software to view the CD.
- E. Contractor shall maintain internet contact and be available to troubleshoot any problems during the one year warranty period. System acceptance shall not occur until computer is installed and operational, including graphics, and the operators have received their initial training.

### **3.21 POINT LIST**

- A. Provided by Control Contractor as part of the Shop Drawing submittal.

**END OF SECTION 23 09 93**

## SECTION 23 52 16

### CONDENSING BOILERS

#### PART 1: GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Conditions of the Contract and portions of Division One of this Project Manual apply to this Section as though repeated herein.
- B. The requirements of Section 23 05 00 apply to this Section.

##### 1.02 SUBMITTALS

- A. Submit in accord with Section 01 30 00.
  - 1. Shop drawings and descriptive product data describing all material furnished under Part 2 of this Section.
- B. Product Data: Submit capacities and accessories included with boiler. Include general layout, dimensions, size and location of water, fuel, electric, air inlet and vent connections, electrical characteristics, weight and mounting loads. Provide wiring diagrams that are specific to this project.
  - 1. Manufacturer's Installation Instructions: Submit assembly, support details, connection requirements, and include start-up instructions.
  - 2. End Assembly Drawing: Detail overall dimensions, connection sizes, connection locations, and clearance requirements.
  - 3. Wiring Diagrams: Detail electrical requirements for the boiler including ladder type wiring diagrams for power, interlock and control wiring. Clearly differentiate between portions of wiring that are factory installed and portions to be field installed.
  - 4. Certificate of Product Rating: Submit AHRI Certificate indicating Thermal Efficiency, Combustion Efficiency, Materials of Construction, Input, and Gross Output conform to the design basis.
  - 5. Thermal efficiency curves: Submit thermal efficiency curves for a minimum of 5 input rates between and including minimum and maximum rated capacities, for return water temperatures ranging from 80°F to 180°F.
  - 6. Water side pressure drop curve.
  - 7. Flue gas temperature curves: Submit flue gas temperature curves for minimum and maximum boiler capacity, for return water temperatures ranging from 80°F to 160°F.
  - 8. Source quality-control test reports.
  - 9. Field quality-control test reports: Start-up by a factory authorized service company.
  - 10. Operation and Maintenance Data: Data to be included in Installation and Operation Manual.
  - 11. Warranty: Standard warranty specified in this Section.

##### 1.03 REGULATORY REQUIREMENTS

- A. Boilers and controls shall comply with applicable regulations and codes.

##### 1.04 MODIFICATIONS REQUIRED BY CONTRACTOR

- A. Make changes in piping arrangements, room layout, breeching and stack arrangements, motor horsepower, controls, wiring and location required for boiler, as it varies from Base Unit. Any additional costs must be reflected in Bid; no additional payments for piping, breeching or wiring changes will be allowed.

B. The A/E will determine if system is equal to base specifications.

### **1.05 REGISTRATION**

A. Complete Boiler and Unfired Pressure Vessel (UPV) Installation Registration and forward to the Department of Safety and Professional Services in accordance with the Wisconsin Administrative Code Chapter SPS 341.24.

### **1.06 WARRANTY**

A. Warranty Period for the Pressure Vessel and Heat Exchanger: The boiler manufacturer shall warranty against failure due to thermal shock, flue gas condensate corrosion, and/or defective material or workmanship for a period of 10 years, non-prorated, from the date of shipment from the factory provided the boiler is installed, controlled, operated and maintained in accordance with the Installation, Operation and Maintenance Manual.

B. Warranty Period for the Burner: The boiler manufacturer shall warranty the burner against defective material or workmanship for a period of five (5) years, non-prorated, from the date of shipment from the factory.

C. Warranty Period for all other components: The boiler manufacturer will repair or replace any part of the boiler that is found to be defective in workmanship or material within eighteen (18) months of shipment from the factory or twelve (12) months from start-up, whichever comes first.

D. Contractor shall confirm the boiler(s) is installed, controlled, operated and maintained in accordance with the Installation, Operation and Maintenance Manual to maintain and not void any warranties.

### **1.07 EQUIPMENT START-UP**

A. Provide system start-up; the equipment manufacturer's representative will provide supervision and be in attendance during unit start-up.

1. Equipment shall not be placed in operation until a competent installation and service representative of the manufacturer has inspected the installation and certified that the equipment is properly installed, adjusted and lubricated; that preliminary operating instructions have been given; and that the equipment is ready for operation. Submit four copies of a written startup report following the initial start up to be included to O&M manuals. Include in the report: work done to the system, all readings taken, a statement certifying that the unit(s) have been placed in proper running condition as recommended by the manufacturer and as intended in the drawings and specifications.

## **PART 2: PRODUCTS**

### **2.01 MODULAR BOILER UNITS – CONDENSING, STAINLESS STEEL, FIRE TUBE, VARIABLE PRIMARY FLOW**

A. Based on product by Fulton Endura+.

1. Aerco – Benchmark Standard, Camus – Advantus, Cleaver Brooks – Clear Fire CE, RBI – Flexcore, Viessmann – Vitocrossal 200, Raypack – XVers, Laars – Magnatherm FT, equals, are acceptable.

a) Provide necessary revisions required to operate system as specified herein and according to the manufacturer's recommendations.

b) Provide a condensate neutralizer in the condensate drain line prior to the floor drain for condensing boiler installations.



- B. Boilers shall be constructed to conform to the requirements in the latest edition of the ASME Code, Section IV, "Rules of Construction of Low-Pressure Heating Boilers". The boilers shall be stamped with the ASME Code symbol; catalog number along with the rating information including the heating surface as hereinafter specified shall be cast on boiler or stamped on metal plate permanently attached to boiler. Construction and fitting of boilers such as with safety valves, gauges, etc., shall also comply with State and Municipal regulations and Codes.
1. Boiler heating system shall be "modular" multiple type consisting of a series of boilers connected in parallel to a common primary main.
- C. Factory-packaged unit, complete with jacket, gas manifold, burner and controls mounted and wired, as specified in this Section.
1. The complete boiler shall be factory fire tested by the manufacturer and a copy of the fire test report shall be supplied with the unit.
  2. Factory-fabricated, -assembled, and -pressure tested, duplex stainless steel firetube condensing boiler with heat exchanger sealed pressure tight, built on a steel base; including flue gas vent; combustion air intake connections, water supply, water return, condensate drain, and controls. The boiler, burner and controls shall be completely factory assembled as a self-contained unit. Each boiler shall be neatly finished, thoroughly tested, and properly packaged for shipping. Closed-loop water heating service only.
- D. Heat Exchanger
1. The heat exchanger is defined as the surfaces of the pressure vessel where flue gases transfer sensible and latent heat to the hydronic fluid. The heat exchanger shall be a three-pass firetube design constructed using duplex alloys of stainless steel.
  2. **There will be no minimum return water flow or temperature.**
    - a) The boiler shall be a firetube design, such that all combustion chamber components are within water-backed areas. Watertube boilers will not be accepted.
    - b) Furnace: First pass of the combustion chamber shall be constructed of duplex alloy stainless steel with a minimum wall thickness of 0.25" and a minimum bottom head thickness of 0.625".
    - c) Firetubes: Second and third passes of the combustion chamber shall be constructed of duplex alloys of stainless steel having a minimum wall thickness of [EDR-750/1000: 0.083"] [EDR-1500/2000: 0.109"].
    - d) Furnace to tube connections shall be constructed with low weld intensity, a tube to tube minimum spacing of 2" center to center, minimum 5/8" tube to tube ligament, and shall not contain any overlapping welds.
    - e) Heat exchange capability shall be maximized within the heat exchanger via the use of corrugated firetube technology. The corrugation process shall not remove any material from the tubes. Aluminum heat transfer enhancements are dissimilar metals and are unacceptable.
- E. Pressure Vessel
1. The shell shall be minimum [EDR-750/1000: 0.25"] [EDR-1500/2000: 0.3125"] thick steel, SA-790 or SA-516 Grade 70.
  2. The top head shall be a minimum 0.375" thick steel, SA-790 or SA-516 Grade 70.
  3. The water side of the pressure vessel shall be a counter-flow design with internal water-baffling plates.
  4. The boiler return and supply water connections shall be [EDR-750/1000: 2" threaded male NPT] [EDR-1500/2000: 4" 150# ANSI flanged]. The water connections shall not be designed to support an external structural load from the piping system.
  5. The water volume of the boiler shall not be less than [EDR-750/1000: 50 Gallons] [EDR-1500: 104 Gallons] [EDR-2000: 102 Gallons].

a) For boilers with a lower water volume, the boiler manufacturer shall provide a buffer tank and all associated buffer tank ancillaries to make equivalent to the total volume of the design basis.

6. The maximum water pressure drop across the boiler inlet and outlet connections, shall not exceed [EDR-750: 0.5 PSID at 75 GPM] [EDR-1000: 0.8 PSID at 100 GPM] [EDR-1500: 0.9 PSID at 150 GPM] [EDR-2000: 1.6 PSID at 200 GPM].

#### F. Fuel Burning System

1. Standard natural gas, forced draft
2. Burner Head: Shall be a woven fiber premix design.
3. Excess Air: The burner shall operate at no greater than 7.0% excess O<sub>2</sub> over the entire turndown range. Due to significant reductions in combustion efficiency at high levels of excess O<sub>2</sub>, boilers exceeding 7.0% excess O<sub>2</sub> at any operating condition shall not be accepted.
4. Emissions: When operating on natural gas, the boiler shall maintain a NO<sub>x</sub> level of <20 ppm, and CO emissions less than 50 ppm, over the complete combustion range at a 3% O<sub>2</sub> correction.

#### G. Blower

1. Variable speed, non sparking, hardened aluminum impeller centrifugal fan to operate during each burner firing sequence and to pre-purge and post-purge the combustion chamber.
2. Motor: Brushless DC variable speed motor with hall effect sensor feedback; internal electronic commutation controller with built in speed control and protection features; long life, sealed, ball bearing with high temperature grease.
3. Variable speed blower: PWM signal input with tachometer output.

#### H. Gas Train

1. Gas train shall be UL/FM/CSD-1 compliant.
2. The boiler shall have a pre-mix combustion system, capable of operating at a minimum 4" W.C. incoming natural gas pressure while simultaneously achieving emissions performance, full modulation, and full rated input capacity. Maximum natural gas pressure allowed to the inlet of the fuel train shall be no less than 28" W.C.
3. A factory mounted main fuel train shall be supplied. The fuel train shall be fully assembled complete with high and low gas pressure switches, wired, and installed on the boiler and shall comply with CSD-1 code. The fuel train components shall be enclosed within the boiler cabinet.
4. A lock up regulator upstream of the fuel train shall be furnished by the boiler manufacturer as a standard component integral to the boiler cabinet. Factory test fire of the boiler with the provided lock up regulator is required.
5. Standard CSD-1 fuel train shall comply with IRI, which has been replaced by XL GAPS.
6. Manual shut off valve upstream of burner and downstream of last gas valve.

#### I. Ignition

1. Direct spark ignition with transformer. A UV scanner shall be utilized to ensure precise communication of flame status back to the flame programmer.

#### J. Enclosure

1. Sealed Cabinet: Jacketed steel enclosure with left hinged full height front access door, fully removable latching access panels, gasketed seams to maintain sealed combustion, mounted on a steel skid with steel plate decking.
2. Control Enclosure: NEMA 250, Type 1.
3. Finish: Internally and externally primed and painted finish.
4. Combustion Air: Drawn from the inside of the sealed cabinet, preheating the combustion air.
5. Rigging and Placement: The boiler shall come with lifting eyes and fork hole accessibility for rigging.
6. Exhaust Manifold: Shall be constructed of stainless steel, with an area for the collection and disposal of flue gas condensate.

#### K. Characteristics and Capacities

1. Heating Medium: Closed loop hot water with up to 50% propylene or ethylene glycol by volume. Standard capacities shall be based on 100% water.
2. Design Water Pressure Rating: 160 psig.
3. Minimum Return Water Temperature: No minimum temperature required.
4. Maximum Allowable Water Temperature: 210°F.
5. Minimum Water Flow Rate: No minimum flow rate required to protect the heat exchanger.
6. Maximum Water Flow Rate: No maximum flow rate requirement.
7. Minimum Delta-T: No minimum delta-T required.
8. Maximum Delta-T: 100°F
9. Minimum Side Clearance: 1" between any number of boilers.
10. Maximum Allowable Operating Setpoint: 200°F
11. Jacket Losses: External convection and radiation heat losses to the boiler room from the boiler shall comply with IAW ASHRAE 103-2007, and shall not exceed 0.2% of the rated boiler input at maximum capacity.
12. The boiler shall have its efficiency witnessed and certified by an independent third party, and the efficiency must be listed on the AHRI directory ([www.ahridirectory.org](http://www.ahridirectory.org)) for natural gas operation. The test parameters for efficiency certification shall be the BTS-2000 standard. The certified thermal efficiency for natural gas firing shall not be less than 93%
13. A zero flow or low flow condition shall not cause any harm to the pressure vessel or heat exchanger of the boiler. Flow switches, dedicated circulator pumps, or primary-secondary arrangements shall not be required to protect the boiler from thermal shock. Boilers requiring the use of flow switches or primary-secondary piping arrangements are unacceptable.

#### L. Electrical Input

1. Single-Point Field Power Connection: Factory-installed and factory-wired switches, transformers, control and safety devices and other devices shall provide a single-point field power connection to the boiler.
  - a) 120v/1ph/60hz

#### M. Water Trim and Controls

1. ASME rated pressure relief valve set at 60 psig.
2. Motorized Isolation Valve for each boiler
  - a) 2-position NO with End Switch, Handwheel Override, 120/1
  - b) Provided and sized by boiler manufacturer.
  - c) Boiler controls shall always leave 1 valve open for heating water flow.
3. Pressure and Temperature Gauge: Minimum 3-1/2" diameter, combination pressure and temperature gauge. Gauges shall have operating-pressure and -temperature ranges so normal operating range is about 50 percent of full range.
  - a) Mounted in the field in the boiler supply water piping prior to the first isolation valve by the boiler installer.
4. Boiler return water thermometer
5. Combustion Air Inlet Filter: 50 Micron.
6. An adjustable high limit temperature controller with manual reset to prevent water temperature from exceeding a safe system temperature.
7. Flue Gas Condensate Drain Trap: A flue gas condensate drain trap shall be provided to prevent positive pressure exhaust gases from entering the boiler room.
8. Flue Gas Condensate Neutralization Kit: pH neutralization accommodations.
9. Drain Valve with hose connection and high pressure cap.
10. Stack Thermometer

#### N. Venting Options:

1. Metal venting shall be AL29-4C or 316L stainless steel, positive pressure type vent material manufactured by Schebler.
  - a) The flue gas exhaust stack shall be listed and labeled to UL-1738 / C-UL S636 for use with Category II/IV appliances, guaranteed appropriate for the application by the manufacturer and supplier of the venting.
  - b) SAF-T, SAF-T CI, DuraVent, Heat Fab, Lennox, ProTech FasNSeal Systems, or equal are acceptable. Components shall be capable for cold-start condensate. Vent boilers individually in accordance with National Fuel Gas Code/NFPA 541, ANSI Z222.3, Part 7, or Local Building Codes.
  - c) Provide the proper temperature sealant for the boiler firing temperature.
  - d) If metal venting with gaskets is utilized, provide a 5 year parts and labor warranty for the gasket ring failure.
2. Polypropylene venting shall be manufactured by Centrotherm, InnoFlue, Polyflue or equal.
  - a) This venting system may only be used if approved by manufacturer. Provide documentation with shop drawing for acceptance.
  - b) Venting shall be UL-1738 listed. The product is an EPDM gasketed installation that is safe up to 230F flue gas temperatures and is listed for zero clearance to combustibles. Provide all necessary fittings, support and termination outlets for a complete installation.
  - c) Polypropylene venting shall be an acceptable alternative provided the venting can handle 180F boiler leaving water temperatures and approved for use by the boiler vendor.
  - d) The polypropylene venting uses 100% recyclable for LEED Compliance. There is no solvent based PVC or CPVC adhesives per IE credit 4.1.
  - e) Polypropylene venting shall have a 10 year limited manufacturer's warranty.
3. Provide drip tees at connection to boiler vent outlet from each boiler and at the point that the venting extends vertical after a horizontal section. Venting shall pitch upward at 3/8" per foot for the horizontal section.

4. Barometric dampers are not allowed unless multiple boilers are combined into the same common vent.

#### O. Air Intake Piping

1. It can be PVC or CPVC that is sealed and pressure tight. Pipe must be at least the same size as the connection on the unit. Terminate with 1/2" x 1/2" mesh bird screen as recommended by manufacturer.
2. Intake dampers and vacuum relief dampers are not required for sealed combustion/direct venting. Vacuum relief dampers can violate the intent of sealed combustion/direct vent applications.

#### P. Controls

1. Boiler Control of multiple heating boiler units shall be from the **Master Boiler Controller**, provided by boiler manufacturer. The controller shall be wired to each of the modules for control of firing.
2. The boiler electrical control panel shall include the following devices and features:
  - a) 7" color touch screen control display factory mounted on the front cabinet panel door.
    - 1) The control display shall serve as a user interface for programming parameters, boiler control and monitoring; and shall feature a screen saver, screen disable for cleaning, contrast control, volume control for alarm features, boiler status, configuration, history and diagnostics.
  - b) The boiler control panel shall be constructed in a UL 508 approved panel shop.
  - c) 24 VAC control transformer.
  - d) Control relay for 120 VAC motorized isolation valve control.
  - e) The flame safeguard control on the boiler shall be integrated with temperature control and lead/lag sequencing modular boiler plant functionality.
  - f) All controls are to be cabinet, vessel or panel mounted and so located on the boiler as to provide ease of servicing the boiler without disturbing the controls. All controls shall be mounted and wired according to UL requirements.
3. Burner Operating Controls: To maintain safe operating conditions, factory mounted and wired burner safety controls limit burner operation:
  - a) High Limit: A single UL 353 temperature probe shall function as a dual-element outlet temperature sensor and shall comply with CSD-1 CW-400 requirements for 2 independent temperature control devices.
    - 1) High limit sensor shall be NTC resistive 10KOhm +/- 1% at 77°F. Sensor shall have brass material bulb with 1.181 +/- 0.015" insertion and 0.370 +/- 0.005" bulb diameter.
    - 2) Manual reset stops burner if operating conditions rise above maximum boiler design temperature.
  - b) Low-Water Cut Off: Electronic probe type mounted in the pressure vessel shall prevent burner operation on low water alarm.
  - c) Air Safety Switch: Prevent operation unless sufficient combustion air is proven.
  - d) High Condensate Probe: Prevent operation in the event of a blocked condensate drain.
  - e) Blocked Exhaust: Prevent operation in the event of a blocked flue gas exhaust stack.

4. Boiler Operating Controls and Features:
  - a) Proportional Integral Derivative (PID) temperature load control capability for up to two loops, central heat and domestic hot water.
  - b) Operating temperature limit for automatic start and stop.
  - c) Flue gas exhaust temperature monitoring.
  - d) Return water temperature monitoring.
  - e) Time of day display.
  - f) Customizable boiler name display.
  - g) Alarm history for 15 most recent alarms including equipment status at time of lockout.
  - h) Password protection options.
  - i) Indirect domestic hot water priority.
  
5. Sequencing Control of Modular Boiler Plants: Sequencing capabilities (lead/lag) shall be integral to the boiler controller for up to 8 boilers installed in the same hydronic loop and shall not require an external panel.
  - a) The boiler manufacturer shall provide a supply water header temperature sensor.
    - 1) The sensor shall be NTC resistive 10KOhm +/- 1% at 77°F, field installed in the common supply water piping, and field wired to the master boiler.
  - b) One (1) boiler in the system shall be field programmed as the master and subsequent boilers will be programmed as lag units.
  - c) Sequence of Operation:
    - 1) BAS shall enable the master boiler controller to run, the master boiler controller shall enable the lead boiler.
    - 2) Upon call for heat and demand in the system, a boiler will be enabled at low fire and will modulate according to demand and PID settings up to the base load common value. The base load common shall be field adjustable with a default setting of 40%.
    - 3) If the heating load exceeds the output at the base load common firing rate, the next boiler in the sequence will be enabled at low fire. Modular boilers will modulate up and down in parallel as a cohesive unit with infinite modulation points to meet heating load requirements.
    - 4) This process continues until all available boilers are enabled, at which point they are released to modulate up to full fire if required.
    - 5) As the load decreases, the boilers will be sequentially disabled.
    - 6) Boiler sequence order shall be rotated on a programmable number of run hours.
    - 7) A boiler in lockout alarm shall be automatically removed from the sequence order.
    - 8) Lag boilers shall default to local control if the master boiler is fully powered off or removed.
    - 9) Each individual boiler shall enable and disable a water circulation control device. The enable of the device, for example a motorized isolation valve or boiler circulator, will be simultaneous with the heat demand for that boiler. The disable of each device will be based on a programmable time delay when the heat demand is no longer present. In variable primary arrangements, the control shall hold the lead boiler isolation valve open at all times.
  
6. Building Automation System Interface: Hardware and software to enable building automation system (BAS) to monitor, control, and display boiler status and alarms.
  - a) Hardwired Contacts:
    - 1) Monitoring: Boiler Status, Burner Demand, General Alarm, Firing Rate.
    - 2) Control with Factory Installed Jumper: Safety Interlock for External Device, Remote Boiler Enable, Remote Lead/Lag Enable, Emergency Stop (E-Stop)
    - 3) Remote Setpoint Signal: 4-20 mA.
  - b) Communication Protocol: A communication interface with BAS shall enable BAS operator to remotely enable and monitor the boiler plant from an operator workstation.

- 1) The boilers will communicate with each other and the Building Automation System via a daisy chain addressed Modbus network. Field wiring between nodes shall be twisted pair low voltage with shielded ground.
  - 2) A BACnet MSTP and IP protocol communication gateway shall be provided. The BACnet gateway is field installed on the MASTER boiler. Lag boilers shall not require a dedicated BACnet gateway for the BAS to monitor status. The BAS shall only be required to communicate through the MASTER boiler. A communication point mapping list shall be provided.
7. Boiler manufacturer shall furnish electrical drawings and shall supervise the wiring of the boiler system. Boiler manufacturer shall be responsible for, and shall correct any problems of polarity in the wiring of the boiler system.

## **2.02 CONDENSATE NEUTRALIZATION**

- A. Based on product by Axiom Industries.
1. Equal products by other manufacturers are acceptable.
- B. Provide Condensate Neutralization Kit manufactured out of corrosion resistant materials and filled with neutralizing media to neutralize condensate coming from high efficiency condensing gas fired equipment. Size per boiler manufacturer's listed condensate flow rate.
1. NC-1 NeutraPal for flows up to 1.6 Gal/hr, approximately 400,000 BTUH @ 93% efficiency.
  2. NC-2 NeutraPal for flows up to 4.0 Gal/hr, approximately 1,000,000 BTUH @ 93% efficiency.
  3. NC25 NeutraPro for flows up to 45 Gal/hr, approximately 7,000,000 BTUH @ 96% efficiency.

## **2.03 BOILER KILL SWITCH**

- A. Kele WPS-MP-BS-CLM with auxiliary contacts Kele PILNCCB or equal. Switch shall have be a push-pull maintained switch with auxiliary contacts for DDC monitoring and each boiler. Labeling shall be provided to indicate switch is for Emergency Boiler Shut-Down and action required to reset.
- B. Switch shall have engraved nameplate to read "BOILER EMERGENCY SHUTOFF"

## **PART 3: EXECUTION**

### **3.01 GENERAL REQUIREMENTS FOR CONDENSING BOILERS**

- A. Complete installation of modular boiler-burner system shall be as recommended by manufacturer. Refer to Installation and Operations Manual provided by the manufacturer. The manufacturer shall make available a field engineer, who can be contacted for questions or supervision of the installation, as desired by Contractor.
1. All boilers must be CSD-1 compliant from the factory. CSD-1 is part of the ASME code and stands for Controls and Safety Devices for Automatically Fired Boilers.
  2. Installing contractors shall obtain from the boiler manufacturer pertinent operating, testing, servicing, and cleaning instructions for the controls and safety devices. It is the responsibility of the installing contractor to deliver these instructions, together with complete wiring and piping diagrams, and a written precaution that the operating, testing, and servicing only be performed by a qualified individual to the owner/user and to obtain a receipt for the instructions. The receipt shall be filed with the installation report (reference: ASME CSD-1 CG-510).

3. Install gas-fired boilers according to NFPA 54. Equipment and materials shall be installed in an approved manner and in accordance with the boiler manufacturer's installation requirements.
- B. Include one field trip by manufacturer's startup representative for final check out, start-up, and instruction of Owner's maintenance personnel in system operation. This trip shall be scheduled by the Contractor.
  - C. Boiler Manuals
    1. The boiler(s) shall be provided with complete instruction manuals for each building separately, including:
      - a) Boiler Installation Manual.
      - b) User's Manual.
      - c) Gas Conversion Supplement.
      - d) Venting Supplements and Instructions.
      - e) Wall Mount Instructions.
  - D. Set each boiler module in place on concrete pad. Revise the concrete pad as required to fit the size of the boilers provided. Level each boiler before connecting external piping, breechings, gas venting, combustion air and electrical wiring.
  - E. Make all piping connections required including hot water supply and return, relief valves piped to floor drain and fuel connections.
  - F. Condensate and condensate overflow shall be piped to floor drain. Common horizontal drain pipes shall be used where possible, increasing size and maintaining total free area, as each new pipe is added.
  - G. The burner shall be setup using a standard CO<sub>2</sub> or oxygen tester. The readings shall be within tolerances recommend by the manufacturer. Submit test readings in O&M Manual. If multiple fuels are involved, provide readings for each fuel type.
  - H. Electric current for power supply to fuel firing equipment with its related items and combustion and heat controls shall be brought to a point in the boiler room and terminated with a fused disconnect switch for each module, under this Division. Wiring and connections shall continue from this point, under this Section, to all the above devices and shall be installed connected and ready for operation. Electrical materials, equipment and workmanship shall conform to the applicable requirements in Division 26, Electrical. Switches, relays and applicable control devices shall be mounted on one central boiler control panel.
  - I. All control wiring from the sequence panel and other controls to boilers is low voltage (24 V.A.C.) and shall be installed under this Section. Combustion air intake controls shall be tied into sequence panel controls.
  - J. Extend combustion air and exhaust venting individually to exterior per manufacturer's recommendations. Gas venting and combustion air components shall be as described previously under Products. Maintain manufacturer's recommended pitch in horizontal runs to prevent condensate from attacking vent seals.
  - K. Wire and pipe all hot water boiler accessories and boiler module circulating pump as per manufacturer's recommendations.
  - L. Power wiring of boiler is included under Division 26, Electrical.
  - M. Mounting and wiring of all boiler accessories including gas valves, low water cutoffs, high limits, operating controls, flow switches other accessories not specifically mentioned and factory mounted accessories not pre-wired at the factory shall be done under this section.
  - N. Set safety relief valves for 60 p.s.i.
  - O. Provide a condensate neutralizer to be installed in condensate drain lines prior to floor drain. Maintain manufacturer's recommended drain pitch from boiler to neutralizer.



### **3.02 BOILER CONDENSATE DRAIN PIPING**

- A. Provide boiler drain piping from boiler to nearest floor drain, pipe each boiler separately with a siphon/pigtail or trap to prevent flue gases from escaping. Piping shall maintain a minimum 1-percent slope.
- B. Piping for condensing boilers shall be schedule 80 PVC or continuous Teflon high temperature silicone tubing.

### **3.03 FUEL GAS PIPING**

- A. Gas piping is by the Plumbing Contractor.
- B. Install gas pressure gauges downstream of gas pressure regulators.

### **3.04 REMOTE SHUTDOWN**

- A. A manually operated remote heating plant shutdown switch or circuit breaker shall be located just outside the boiler room door and marked for easy identification. Consideration shall be also given to the type and location of the switch to safeguard against tampering. If the boiler room door is on the building exterior, the switch shall be located just inside the door. If there is more than one door to the boiler room, there shall be a switch at each door.
  - 1. The boiler shutdown switch shall be an emergency stop to disable all boilers and shall be wired to the boiler burner safety control circuit to interrupt burner operation.

### **3.05 START-UP**

- A. After installation of heating system is completed and before boilers are operated, the Contractor shall thoroughly wash out boilers to remove all oil, grease, etc., which has accumulated during construction. Flush out piping system. Fill boilers and system with clean water. Clean heating system as per heating system/cleaning described under Section 23 21 14 and 23 22 14. Provide additional boiler cleaning as recommended by manufacturer. Use only boiler cleaning solutions as directed by the boiler manufacturer.

### **3.06 TRAINING**

- A. Contractor to provide factory authorized representative and/or field personnel knowledgeable with the operations, maintenance and troubleshooting of the system and/or components defined within this section for a minimum period of 10 hours.

**END OF SECTION 23 52 16**

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**SECTION 32 31 13**  
**CHAIN LINK FENCING AND GATES**

**PART 1: GENERAL**

**1.1 SECTION INCLUDES**

- A. 8' Tall Chain Link Fencing
- B. Service Gates

**1.2 SHOP DRAWINGS AND PRODUCT DATA**

- A. Submit shop drawings and product data.
- B. Clearly indicate plan layout, grid, spacing of components, accessories, fittings, and anchorage.
- C. Submit manufacturer's installation instructions and procedures.

**1.3 REFERENCES**

- A. ASTM A491 -Standard Specification for Aluminum Coated Steel Chain Link Fence Fabric
- B. ASTM A392 -Standard Specification for Hot Dipped Zinc Coated Galvanized Steel Chain Link Fence Fabric
- C. ASTM 1428 -Standard Test Method for Weight of Coating on Aluminum-Coated Iron or Steel Articles
- D. ASTM A120 -Standard Specification for Pipe, Steel, Black and Hot-Dipped Zinc-Coated (galvanized) Welded and Seamless, for Ordinary Uses
- E. ASTM E8 -Tension Testing of Metallic Materials
- F. ASTM F552 -Standard Definitions of Terms Relating to Chain Link Fencing
- G. ASTM F567 -Standard Practice for Installation of Chain Link Fence
- H. ASTM F626 -Standard Specification for Fence Fittings
- I. ASTM F669 -Standard Specification for Strength Requirements of Metal Posts and Rails for Industrial Chain Link Fence
- J. FS RR-F-191J -Fencing, Wire and Post, Metal (and Gates, Chain Link Fence Fabric, and Accessories)
- K. RFS RR-F-00191 0 -Fencing, Wire and Post

**PART 2: PRODUCTS**

**2.1 MATERIALS, ALUMINUM COATED OR GALVANIZED**

- A. ASTM A569 SS-40 Pipe.
- B. Chain Link Fence:
  - 1. Aluminum-coated steel, in accordance with ASTM A491. Thoroughly degrease, rinse, and coat fabric with clear acrylic lacquer by the complete immersion process in line with the weaving process before taking up into rolls for shipment. Minimum weight of aluminum coating is 0.40 oz/ft for 6 and 9 gauge, as measured in accordance with ASTM A428.
  - 2. Hot dipped, zinc coated, steel (galvanized) in accordance with ASTM A392. Minimum weight of coating shall be 2 oz. per sq. ft.
- C. Tension Wire: Aluminized-coated steel, in a marcelled or coil spring configuration to provide stretch ability.
- D. Fittings: In compliance with ASTM F626, galvanized steel.

**2.2 COMPONENTS**

- A. Posts:
  - 8' Tall Fence: SS-40 3.12 lbs/ft 2.375" outside diameter
- B. Corner and Terminal Posts:
  - 8' Tall SS-40 4.64 lbs./ft 2.875" outside diameter.
- C. Corner and terminal posts for service gates:
  - 25' Wide or Less SS-40 6.56 lbs./ft 4" outside diameter
  - 26' Wide or Greater Sch 40 18.97 lbs/ft 6.625" outside diameter
- D. Top and Brace Rail (Straight Run): SS-40 1.84 lbs/ft 1.66" outside diameter tubular section.  
Top Rail (Curves): SS-30 1.59 lbs/ft 1.66" outside diameter tubular section
- E. Chain Link Fabric:
  - 2" mesh woven from 9 gauge aluminized steel wire, top selvage knuckled bottom selvage knuckled in accordance with ASTM A491 (General Fence Areas)
- F. Bottom Tension Wire: 7 gauge galvanized or aluminized steel.

- G. Tie Wires for securing chain link fabric to horizontal rails and to line posts over 2.375" OD: 6 gauge aluminum alloy wire.
- H. Hog Rings for securing chain link fabric to tension wire: 12 gauge aluminum alloy wire.
- I. Vertical vinyl slatting shall be bottom or top locking fence slats w/ approx 75% privacy as manufactured by Privacy Link or as approved equal.

**PART 3: EXECUTION**

**3.1 INSTALLATION**

- A. Landscape finish grading shall be completed prior to setting line posts.
- B. Install line posts, corner posts, terminal posts and horizontal rails with brace bands, rail ends, rail sleeves, line post caps, tension bands, tension bars, chain link fabric and gates to provide a rigid structure for fence. Use manufacturer's standard fittings, fasteners and hardware.
- C. Space line posts uniformly and on 8' foot maximum centers (8' fence)
- D. Line posts driven a minimum of 5' deep 8' tall fencing.
- E. Set posts plumb and true to line and grade.
- F. Corner and terminal posts set in 48" x 12" concrete footings or as indicated on the plan set documents. Hold concrete 3" below finish grade.
- G. Position bottom of fabric 1.5" above finished grade with tension wire stretched taut between terminal posts 2" to 3" above bottom of fabric.
- H. Knuckle top and bottom standards of all fabric.
  - I. Pass top rail through line post caps and attach securely to terminal posts.
- J. Install brace rail and adjustable truss rod between end, corner and gate posts and first line post.
- K. Stretch chain link fabric taut between terminal posts, supporting its weight as necessary with temporary tie wires.
- L. Attach fabric to end, corner and gate posts with tension bars and tension bands, using one less band than height of fabric of feet, or approximately 14" on center.
- M. Attach fabric to horizontal rails and line posts with tie tires and to tension wire with hog rings, five (5) tie wires, or hog rings per 10' bay, or approximately 24" on center. Fence fabric shall be placed on the inside of posts around track and placed on the outside of posts along perimeter fence.
- N. Install gates and adjust true to fence line and grade.

**3.2 CLEAN UP**

- A. Dispose of excessive material to certified landfill.
- B. All pipe, concrete, fabric and miscellaneous parts shall be removed from site.
- C. Grade subgrade to within 1" of finish subgrade after work is completed.

**3.3 UTILITY LOCATES**

- A. All required Diggers Hotline locates and private utility locates shall be ordered and paid for by each contractor requiring the locate service.

**END OF SECTION 32 31 13**

**SECTION 32 31 19**  
**ORNAMENTAL FENCE**

**PART 1 – GENERAL**

**1.1 WORK INCLUDED**

- A. The contractor shall provide all labor, materials and appurtenances necessary for installation of the welded ornamental steel fence system defined herein.

**1.2 RELATED WORK**

- A. Section 312000- Earth Moving  
B. Section 321313 – Portland Cement Concrete Paving

**1.3 SYSTEM DESCRIPTION**

- A. The manufacturer shall supply a total fence system of Montage Plus® *Welded and Rackable* (ATF – All Terrain Flexibility) Ornamental Steel (Genesis™) design-4' High. Ornamental Steel (Genesis) design-6' High. The system shall include all components (i.e., panels, posts, gates and hardware) required.

**1.4 QUALITY ASSURANCE**

- A. The contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

**1.5 REFERENCES**

- ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
- ASTM B117 - Practice for Operating Salt-Spray (Fog) Apparatus.
- ASTM D523 - Test Method for Specular Gloss.
- ASTM D714 - Test Method for Evaluating Degree of Blistering in Paint.
- ASTM D822 - Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.
- ASTM D1654 - Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.
- ASTM D2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
- ASTM D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
- ASTM D3359 - Test Method for Measuring Adhesion by Tape Test.
- ASTM F2408 – Ornamental Fences Employing Galvanized Steel Tubular Pickets.

**1.6 SUBMITTAL**

- A. The manufacturer's literature shall be submitted prior to installation.

**1.7 PRODUCT HANDLING AND STORAGE**

- A. Upon receipt at the job site, all materials shall be checked to ensure that no damage occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism and theft.

**1.8 PRODUCT WARRANTY**

- A. All structural fence components (i.e. rails, pickets, and posts) shall be warranted within specified limitations, by the manufacturer for a period of 20 years from date of original purchase. Warranty shall cover any defects in material finish, including cracking, peeling, chipping, blistering or corroding.
- B. Reimbursement for labor necessary to restore or replace components that have been found to be defective under the terms of manufactures warranty shall be guaranteed for five (5) years from date of original purchase.

**PART 2 – MATERIALS**

**2.1 MANUFACTURER**

- A. The fence system shall conform to Montage Plus® *Welded and Rackable* (ATF – All Terrain Flexibility) Ornamental Steel, (Genesis™) design, (standard picket) bottom rail treatment, (3-Rail)-4' high fence style as manufactured by Ameristar Fence Products, Inc., in Tulsa, Oklahoma.

**2.2 MATERIAL**

- A. Steel material for fence panels and posts shall conform to the requirements of ASTM A653/A653M, with a minimum yield strength of 45,000 psi (310 MPa) and a minimum zinc (hot-dip galvanized) coating weight of 0.60 oz/ft<sup>2</sup> (184 g/m<sup>2</sup>), Coating Designation G-60.
- B. Material for pickets shall be 3/4" square x 18 Ga. tubing. The rails shall be steel channel, 1.5" x 1.4375" x 14 Ga. Picket holes in the rail shall be spaced (specify 4.675" o.c. for standard picket space or 3.500" o.c. for 3" air space). Fence posts and gate posts shall meet the minimum size requirements of Table 1.

## **2.3 FABRICATION**

- A. Pickets, rails and posts shall be pre-cut to specified lengths. Rails shall be pre-punched to accept pickets.
- B. Pickets shall be inserted into the pre-punched holes in the rails and shall be aligned to standard spacing using a specially calibrated alignment fixture. The aligned pickets and rails shall be joined at each picket-to-rail intersection by Ameristar's proprietary fusion welding process, thus completing the rigid panel assembly (Note: The process produces a virtually seamless, spatter-free good-neighbor appearance, equally attractive from either side of the panel).
- C. The manufactured panels and posts shall be subjected to an inline electrode position coating (E-Coat) process consisting of a multi-stage pretreatment/wash, followed by a duplex application of an epoxy primer and an acrylic topcoat. The minimum cumulative coating thickness of epoxy and acrylic shall be 2 mils (0.058 mm). The color shall be (specify Black or Bronze). The coated panels and posts shall be capable of meeting the performance requirements for each quality characteristic shown in Table 2 (Note: The requirements in Table 2 meet or exceed the coating performance criteria of ASTM F2408).
- D. The manufactured fence system shall be capable of meeting the vertical load, horizontal load, and infill performance requirements for Commercial weight fences under ASTM F2408.
- E. Gates with an out to out leaf dimension less than and including 72 inches shall be fabricated using Montage Plus ornamental panel material and 1-3/4" sq. x 14ga. gate ends. Gate leafs greater than 72 inches shall be fabricated using ForeRunner rails, 17 gauge pickets, intermediate uprights, gussets and 1-3/4" sq. x 14ga. gate ends. All rail and upright intersections shall be joined by welding. All picket and rail intersections shall also be joined by welding.

## **PART 3 – EXECUTION**

### **3.1 PREPARATION**

- A. All new installation shall be laid out by the contractor in accordance with the construction plans.

### **3.2 FENCE INSTALLATION**

- A. Fence post shall be spaced according to Table 3, plus or minus 1/2". For installations that must be raked to follow sloping grades, the post spacing dimension must be measured along the grade. Fence panels shall be attached to posts with brackets supplied by the manufacturer. Posts shall be set in concrete footers having a minimum depth of 48" and diameter of 12" (Note: In some cases, local restrictions of freezing weather conditions may require a greater depth). The "Earthwork" and "Concrete" sections of this specification shall govern material requirements for the concrete footer. Posts setting by other methods such as plated posts or grouted core-drilled footers are permissible only if shown by engineering analysis to be sufficient in strength for the intended application.

### **3.3 FENCE INSTALLATION MAINTENANCE**

- A. When cutting/drilling rails or posts adhere to the following steps to seal the exposed steel surfaces; 1) Remove all metal shavings from cut area. 2) Apply zinc-rich primer to thoroughly cover cut edge and/or drilled hole; let dry. 3) Apply 2 coats of custom finish paint matching fence color. Failure to seal exposed surfaces per steps 1-3 above will negate warranty. Ameristar spray cans or paint pens shall be used to prime and finish exposed surfaces; it is recommended that paint pens be used to prevent overspray. Use of non-Ameristar parts or components will negate the manufactures' warranty.

### **3.4 GATE INSTALLATION**

- A. Gate posts shall be spaced according to the manufacturers' gate drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected. Type and quantity of gate hinges shall be based on the application; weight, height, and number of gate cycles. The manufacturers' gate drawings shall identify the necessary gate hardware required for the application. Gate hardware shall be provided by the manufacturer of the gate and shall be installed per manufacturer's recommendations.

### 3.5 CLEANING

A. The contractor shall clean the jobsite of excess materials; post-hole excavations shall be scattered uniformly away from posts.

The contractor shall clean the jobsite of excess materials; post-hole excavations shall be scattered uniformly away from posts.

<b>Table 1 – Minimum Sizes for Montage Plus Posts</b>		
<u>Fence Posts</u>	<u>Panel Height</u>	
2-1/2" x 16 Ga.	Up to & Including 6' Height	
<u>Gate Leaf</u>	<u>Gate Height</u>	
	<u>Up to &amp; Including 4'</u>	<u>Over 4' Up to &amp; Including 6'</u>
Up to 4'	2-1/2" x 14 Ga.	3" x 12 Ga.
4'1" to 6'	3" x 12 Ga.	3" x 12 Ga.
6'1" to 8'	3" x 12 Ga.	4" x 12 Ga.

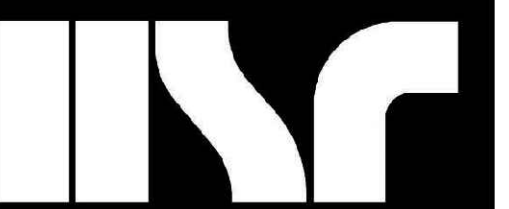
<b>Table 2 – Coating Performance Requirements</b>		
<u>Quality Characteristics</u>	<u>ASTM Test Method</u>	<u>Performance Requirements</u>
Adhesion	D3359 – Method B	Adhesion (Retention of Coating) over 90% of test area (Tape and knife test).
Corrosion Resistance	B117, D714 & D1654	Corrosion Resistance over 1,500 hours (Scribed per D1654; failure mode is accumulation of 1/8" coating loss from scribe or medium #8 blisters).
Impact Resistance	D2794	Impact Resistance over 60 inch lb. (Forward impact using 0.625" ball).
Weathering Resistance	D822 D2244, D523 (60° Method)	Weathering Resistance over 1,000 hours (Failure mode is 60% loss of gloss or color variance of more than 3 delta-E color units).

<b>Table 3 – Montage Plus – Post Spacing By Bracket Type</b>						
Span	For CLASSIC, GENESIS, MAJESTIC, & WARRIOR 8' Nominal (91.95" Rail)					
Post Size	2-1/2"	2-1/2"	2-1/2"	3"	2-1/2"	3"
Bracket Type	Montage Plus Universal (BB112)	Montage Plus Line Blvd. (BB114)	Montage Plus Flat Mount (BB111)		Montage Plus Swivel (BB113)*	
Post Settings ± 1/4" O.C.	95"	95"	95"	95-1/2"	*95"	*95-1/2"
*Note: When using BB113 swivel brackets on either or both ends of a panel installation, care must be taken to ensure the spacing between post and adjoining pickets meets applicable codes. This will require trimming one or both ends of the panel.						

**END OF SECTION 32 31 19**

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Landscape Architecture  
4941 Kirsching Court  
Stevens Point, WI 54481  
715.344.9999(PH) 715.344.9922(FX)

Project Title: **LA CRESCENT - HOKAH PUBLIC SCHOOLS  
ELEMENTARY SCHOOL**  
Project Location: 604 SOUTH OAK STREET  
LA CRESCENT, MINNESOTA 55947  
Sheet Title: **DEMOLITION PLAN**

HSR Project Number: 1904  
Project Date: 3.5.2020  
Drawn By: JJJ

Date: \_\_\_\_\_  
James J. Lundberg, P.E.  
Registration No. 44630

I hereby certify that this plan, specification, or report was prepared by me, or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

**BID DOCUMENTS**

No.	Description	Date
1	ADDENDUM #1	3/16/2020
2	ADDENDUM #3	3/24/2020

Graphic Scale: 1" = 30'  
Last Update: 3.24.2020

**C100**

**GENERAL NOTES:**

- CONTACT GOPHER STATE ONE CALL (651-454-0002) 5 WORKING DAYS PRIOR TO THE START OF DEMOLITION/CONSTRUCTION.
- ALL DEMOLITION MATERIALS SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LEGAL MANNER EXCEPT FOR THOSE ITEMS NOTED TO BE SALVAGED, WHICH SHOULD BE TURNED OVER TO THE OWNER.
- INSTALL ALL REQUIRED EROSION CONTROL MEASURES FOR PERIMETER PROTECTION PRIOR TO THE START OF DEMOLITION/CONSTRUCTION.
- ALL BIDDERS PLANNING ON SUBMITTING A BID SHALL VISIT THE SITE AND REVIEW THE EXISTING CONDITIONS PRIOR TO THE BID DATE.
- COORDINATE WITH THE OWNER AND LOCAL UTILITY COMPANIES TO LOCATE ANY EXISTING PRIVATE UTILITIES ON SITE PRIOR TO THE START OF WORK.
- ANY EXISTING UTILITIES NOT SHOWN ON THIS DOCUMENT WHICH NEED TO BE REMOVED, RELOCATED AND OR ADJUSTED SHALL BE THE RESPONSIBILITY OF THE SITE GRADING CONTRACTOR AND INCLUDED IN THE BASE BID CONTRACT.
- VERIFY THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO THE START OF WORK.
- ALL EROSION CONTROL MEASURES INSTALLED SHALL BE MAINTAINED IN ACCORDANCE WITH THE LOCAL AND STATE GOVERNING AUTHORITIES.
- STRIP TOPSOIL WITHIN THE PROJECT LIMITS IN ACCORDANCE WITH THE PROJECT MANUAL SPECIFICATIONS.
- STOCKPILE STRIPPED TOPSOIL ON SITE. PLACE SILT FENCE AROUND THE BASE OF THE STOCKPILE TO PREVENT EROSION.
- PRIOR TO PERFORMING WORK WITHIN PUBLIC RIGHT OF WAYS, NOTIFY AND COORDINATE WORK WITH THE LOCAL MUNICIPALITY.

**KEYNOTES:**

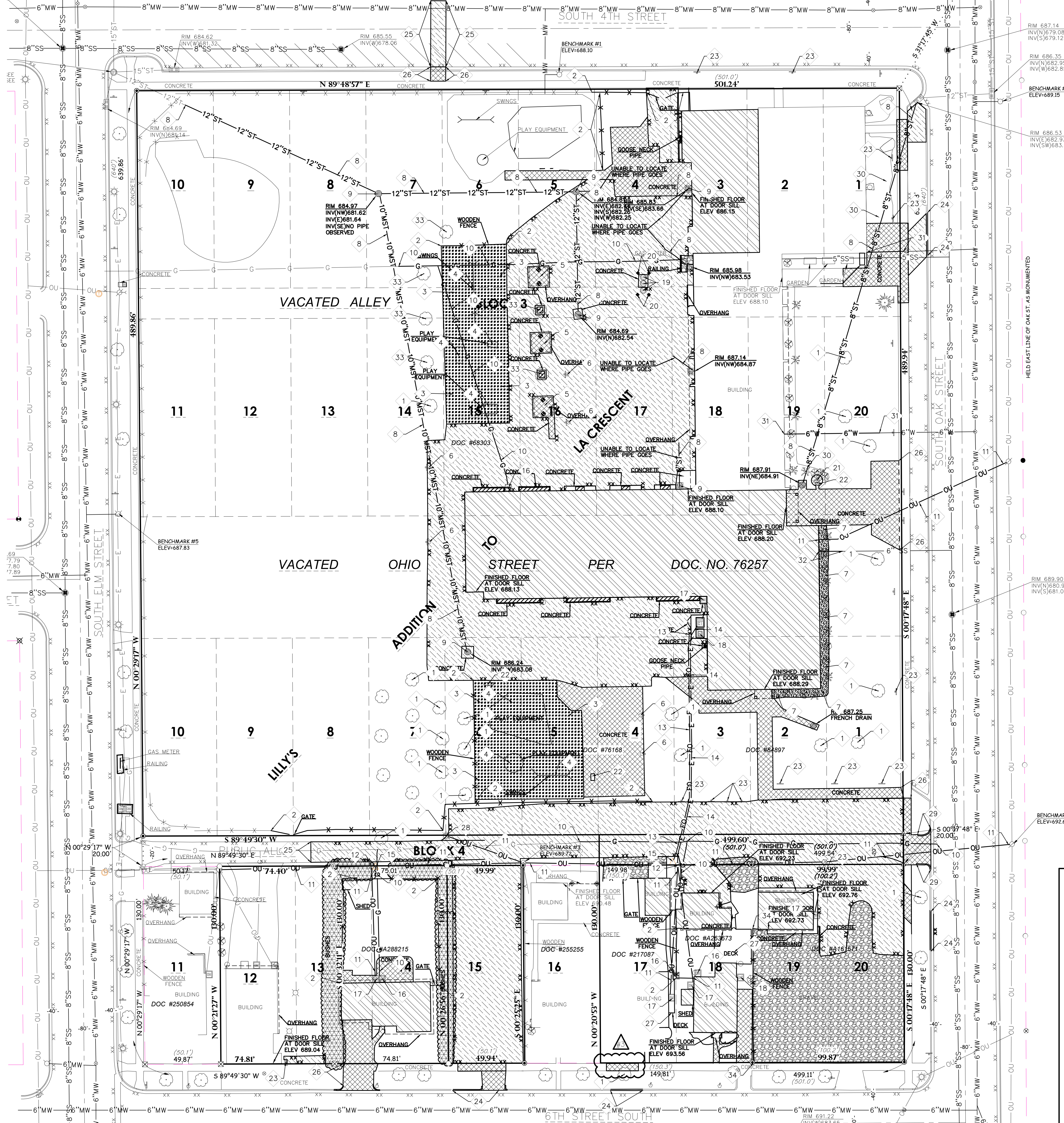
- |  |  |
|--|--|
| 1 REMOVE EXISTING TREE   | 16 REMOVE GAS METER (COORDINATE WITH GAS COMPANY)  |
| 2 REMOVE EXISTING FENCE  | 17 REMOVE ELECTRIC METER (COORDINATE WITH ELECTRIC COMPANY)  |
| 3 REMOVE PLAYGROUND TIMBER AND RUBBER CHIPS                      | 18 REMOVE AIR CONDITIONING UNIT  |
| 4 REMOVE PLAYGROUND EQUIPMENT AND RETURN TO OWNER                | 19 REMOVE UTILITY MANHOLE (COORDINATE WITH UTILITY COMPANY)  |
| 5 REMOVE OVERHANG  | 20 REMOVE EXISTING BOLLARD   |
| 6 REMOVE BASKETBALL HOOP   | 21 REMOVE EXISTING FLAG POLE   |
| 7 REMOVE LANDSCAPING SHRUB, BEDDING, AND WEED BARRIER            | 22 REMOVE EXISTING BENCH   |
| 8 REMOVE STORM SEWER   | 23 REMOVE EXISTING SIGN  |
| 9 REMOVE STORM STRUCTURE   | 24 CUT DOWN EXISTING CURB FOR PROPOSED DRIVEWAY  |
| 10 REMOVE GAS LINE (COORDINATE WITH GAS COMPANY)                 | 25 SAWCUT EXISTING ASPHALT   |
| 11 REMOVE OVERHEAD UTILITY (COORDINATE WITH UTILITY COMPANY)     | 26 SAWCUT EXISTING CONCRETE  |
| 12 REMOVE POWER POLE (COORDINATE WITH UTILITY COMPANY)           | 27 REMOVE EXISTING DECK  |
| 13 REMOVE FIBER OPTIC (COORDINATE WITH UTILITY COMPANY)          | 28 REMOVE EXISTING LIGHT POLE  |
| 14 REMOVE BURIED ELECTRIC (COORDINATE WITH ELECTRIC COMPANY)     | 29 REMOVE EXISTING CURB  |
| 15 REMOVE TELEPHONE PEDESTAL (COORDINATE WITH TELEPHONE COMPANY) | 30 RESTORE PLANTING AREA UPON COMPLETION OF STORM SEWER REMOVAL/REPLACEMENT  |
|  | 31 REMOVE EXISTING WATER LINE  |
|  | 32 REMOVE EXISTING SANITARY SEWER  |
|  | 33 REMOVE AND TRANSPLANT EXISTING TREE (COORDINATE WITH OWNER FOR PROPOSED LOCATION)   |
|  | 34 REMOVE AND RELOCATE EXISTING FENCE TO EAST SIDE OF PROPERTY LOCATED AT 420 SOUTH 6TH STREET. SEE C101 FOR PROPOSED LOCATION |

**DEMOLITION HATCH PATTERNS:**

- BITUMINOUS REMOVAL
- CONCRETE REMOVAL
- BUILDING REMOVAL
- GRAVEL REMOVAL
- CLEAR AND GRUB EXISTING TREES

**SURVEY LEGEND**  
These standard symbols will be found in the drawing.

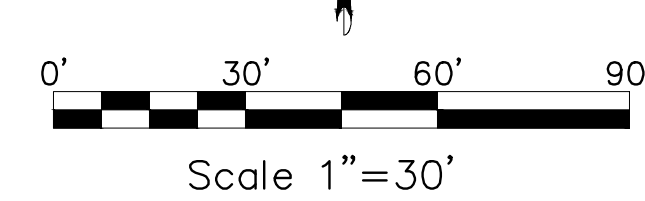
	SANITARY SEWER
	STORM SEWER
	OVERHEAD UTILITIES
	BURIED ELECTRIC
	BURIED GAS
	BURIED TELEPHONE
	WATER MAIN
	FIBER OPTIC
	CHAIR LINE FENCE LINE (UNLESS NOTED OTHERWISE)
	EDGE OF BITUMINOUS CONTOUR LINE
	F.F.E. = FINISHED FLOOR ELEVATION
	RECTANGULAR CATCH BASIN
	CIRCULAR CATCH BASIN
	SQUARE CATCH BASIN
	STORM MANHOLE
	SANITARY MANHOLE
	UTILITY MANHOLE
	WATER VALVE
	HYDRANT
	ELECTRIC METER
	ELECTRIC TRANSFORMER
	ELECTRIC BOX
	LIGHT POLE
	POWER POLE
	GUY WIRE
	GAS METER
	TELEPHONE MANHOLE
	TELEPHONE PEDESTAL
	GUARD POST/BOLLARD
	METAL POST
	GOOSE NECK PIPE
	CLEAN OUT
	AIR CONDITIONING UNIT
	SIGN
	FLAGPOLE
	MAILBOX
	ROOF DRAIN
	BASKETBALL HOOP
	BUSH/SHRUB
	HEDGE
	TREE
	PINE TREE
	GRAVEL AREA
	LANDSCAPE AREA
	RIP RAP AREA
	GRATE

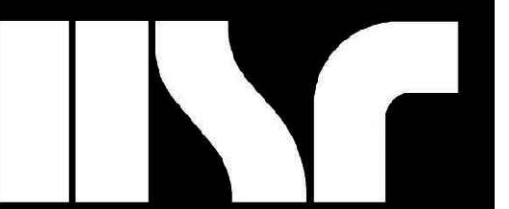


**BENCH MARK**  
ELEVATIONS ARE REFERENCED TO NAVD 88 DATUM.  
BENCHMARK #1  
SURVEY BOLT ON HYDRANT  
SOUTH EDGE OF SOUTH 4TH ST APPROXIMATELY 250FT EAST OF SOUTH OAK ST  
ELEVATION = 688.10  
BENCHMARK #2  
TOP OF FLANGE BOLT ON HYDRANT  
EAST EDGE OF SOUTH OAK ST APPROXIMATELY 45 FT SOUTH OF SOUTH 4TH ST  
ELEVATION = 688.15  
BENCHMARK #3  
600 SPIKE IN POWER POLE  
SOUTHEAST OF SCHOOL, SOUTH EDGE OF ALLEY APPROX. 290 FT WEST OF S. OAK ST  
ELEVATION = 689.72  
BENCHMARK #4  
600 SPIKE IN POWER POLE  
EAST EDGE OF SOUTH OAK ST APPROXIMATELY 180 FT NORTH OF 6TH ST SOUTH  
ELEVATION = 692.68  
BENCHMARK #5  
TOP OF FLANGE BOLT ON HYDRANT  
EAST EDGE OF SOUTH ELM ST APPROXIMATELY 320 FT SOUTH OF SOUTH 4TH STREET  
ELEVATION = 687.83

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Stevens Point, WI 54481  
715.344.9999(PH) 715.344.9922(FX)

Project Title: LA CRESCENT - HOKAH PUBLIC SCHOOLS  
 ELEMENTARY SCHOOL  
 Project Location: 604 SOUTH OAK STREET  
 LA CRESCENT, MINNESOTA 55947  
 Sheet Title: LAYOUT PLAN

Project Number: 1904  
Project Date: 3.5.2020  
Drawn By: JJJ

Date: \_\_\_\_\_  
James J. Lundberg, P.E.  
Registration No. 44630

I hereby certify that this plan, specification, or report was prepared by me, or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

**BID DOCUMENTS**

No.	Description	Date
1	ADDENDUM #1	3/16/2020
2	ADDENDUM #3	3/24/2020


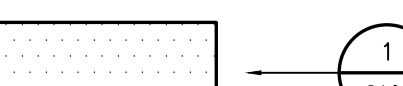



Graphic Scale: 1" = 30'  
Last Update: 3/24/2020

**C101**

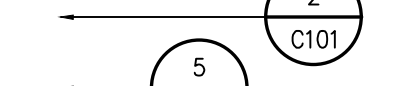
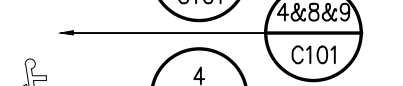
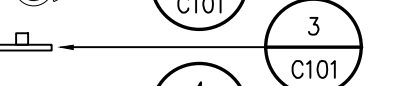
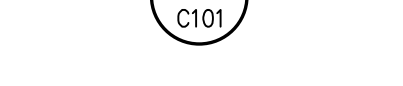

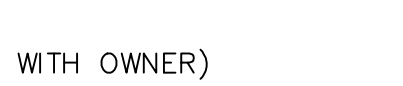
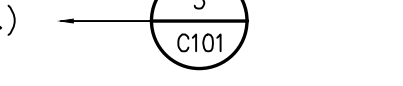

**GENERAL NOTES:**

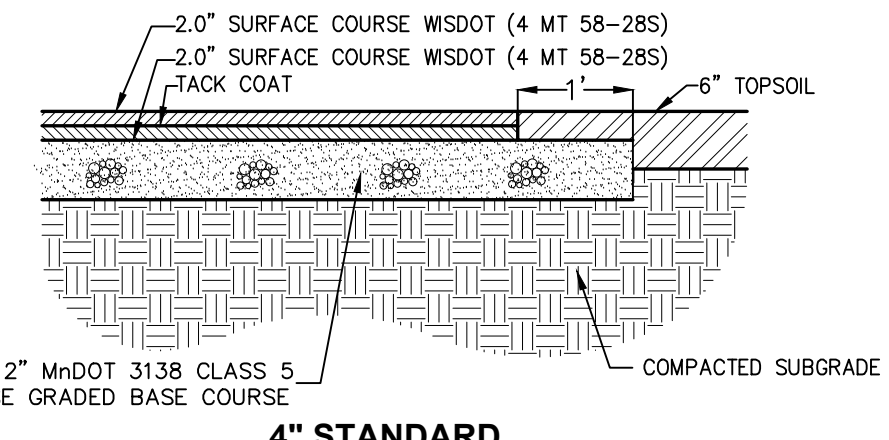
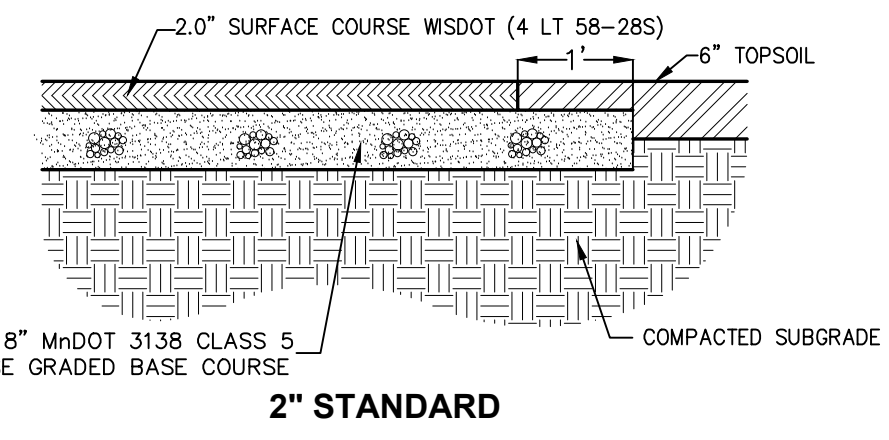
- CONTACT GOPHER STATE ONE CALL (651-454-0002) 5 WORKING DAYS PRIOR TO THE START OF DEMOLITION/CONSTRUCTION.
- GRADE, LINE, AND LEVEL TO BE REVIEWED IN THE FIELD BY THE CONSTRUCTION MANAGER.
- PRIOR TO THE START OF CONSTRUCTION INSTALL ALL REQUIRED EROSION CONTROL MEASURES IN ACCORDANCE WITH LOCAL MUNICIPAL AND MINNESOTA POLLUTION CONTROL AGENCY REGULATIONS.
- ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED IN ACCORDANCE WITH THE MINNESOTA POLLUTION CONTROL AGENCY AND LOCAL AUTHORITIES.
- SEE SHEET C103 FOR ALL REQUIRED EROSION CONTROL ELEMENTS.
- ANY EXISTING UTILITIES NOT SHOWN ON THIS DOCUMENT WHICH NEED TO BE REMOVED, RELOCATED AND OR ADJUSTED SHALL BE THE RESPONSIBILITY OF THE SITE GRADING CONTRACTOR AND INCLUDED IN THE BASE BID CONTRACT.
- VERIFY THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO THE START OF DEMOLITION/CONSTRUCTION.
- ALL BIDDERS PLANNING ON SUBMITTING A BID SHALL VISIT THE SITE AND REVIEW THE EXISTING CONDITIONS PRIOR TO THE BID DATE.
- PRIOR TO THE START OF WORK VERIFY WITH THE LOCAL AUTHORITIES THAT ALL REQUIRED PERMITS HAVE BEEN ACQUIRED.
- COORDINATE CONSTRUCTION IN THE RIGHT OF WAY WITH THE LOCAL AUTHORITIES.
- PROVIDE PROPER BARRICADES, SIGNS AND TRAFFIC CONTROL TO MAINTAIN THRU TRAFFIC ALONG ADJACENT STREETS IN ACCORDANCE WITH LOCAL MUNICIPAL REQUIREMENTS.
- ALL GENERAL LANDSCAPE AREAS SHALL BE SEEDED/FERTILIZED/CRIMP HAY MULCHED OR HYDROSEEDED WITH TACKIFIER IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
- CONTRACTOR TO ALLOW VEHICULAR ACCESS TO RESIDENTIAL HOME AT ALL TIMES TO 420 SOUTH 6TH STREET RESIDENCE THROUGH PUBLIC ALLEY.

**PAVEMENT HATCH PATTERNS:**

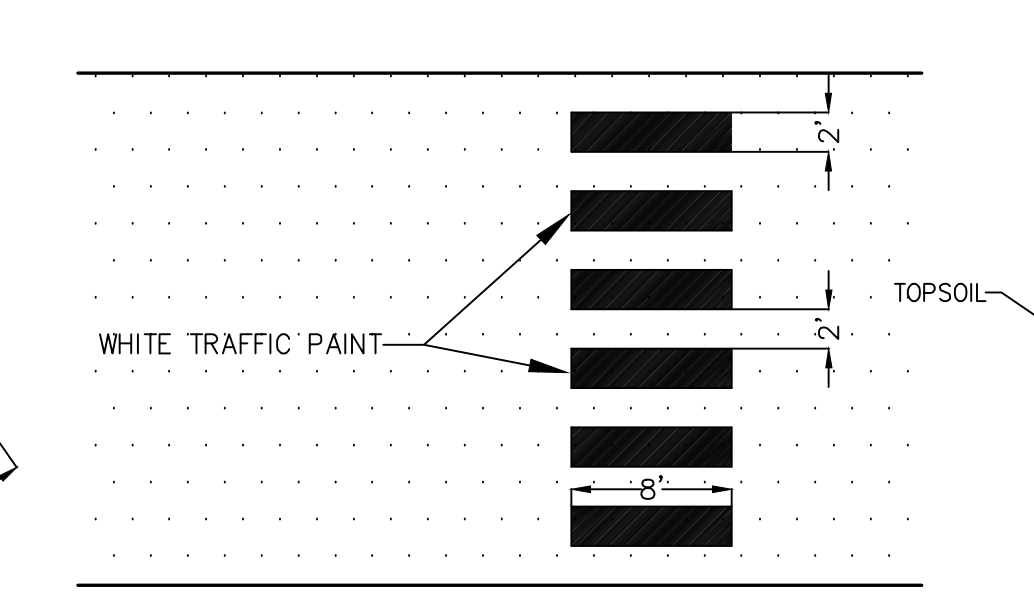
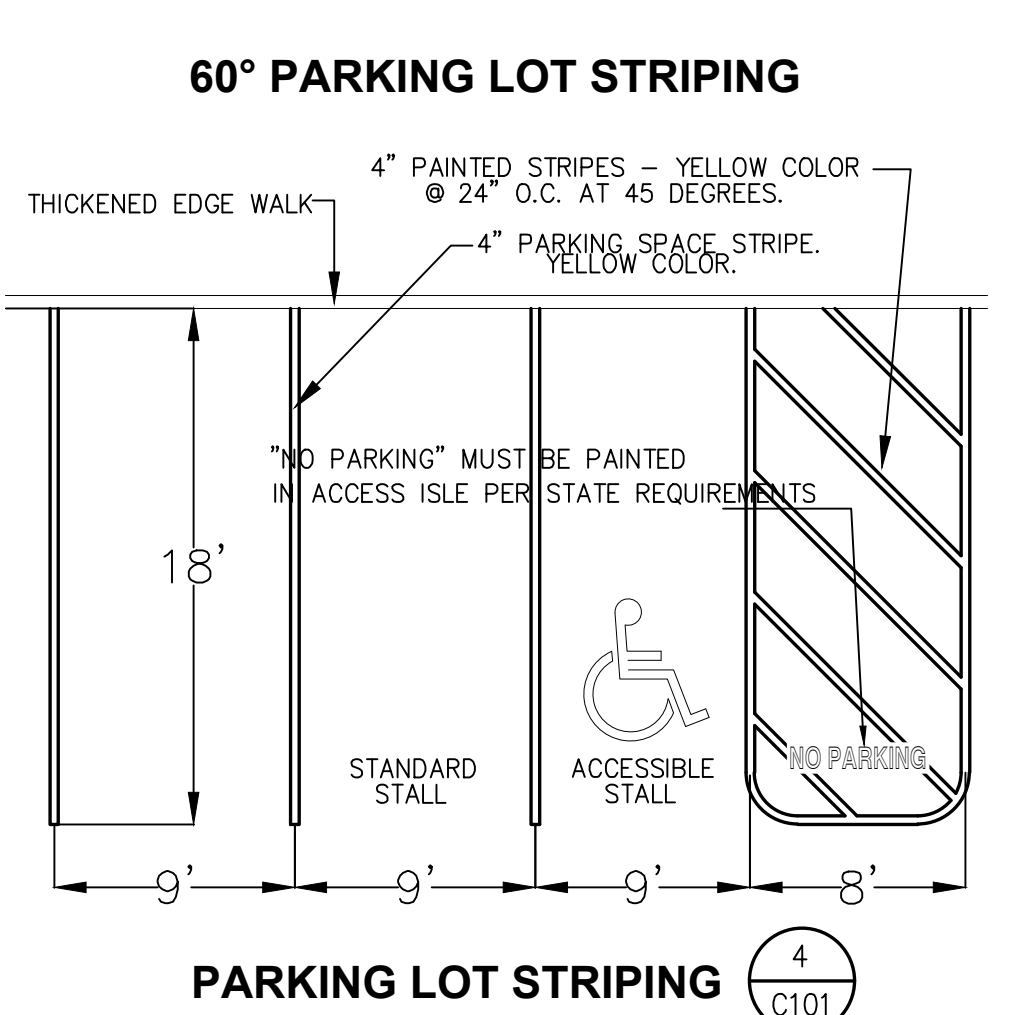
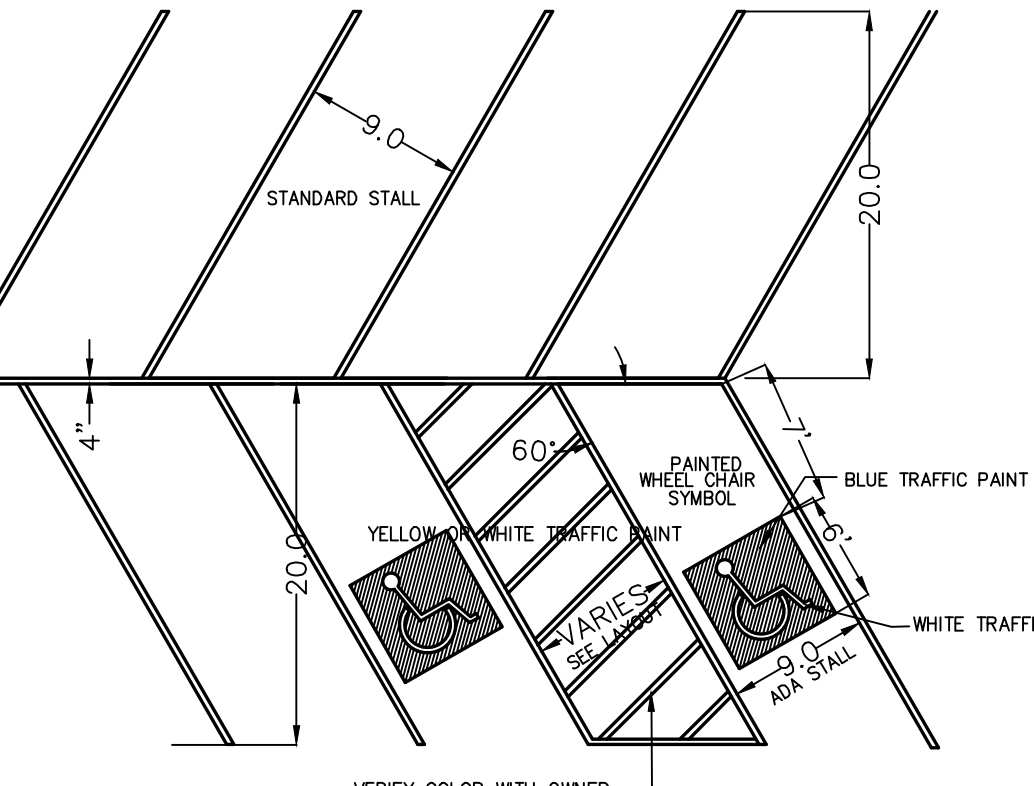
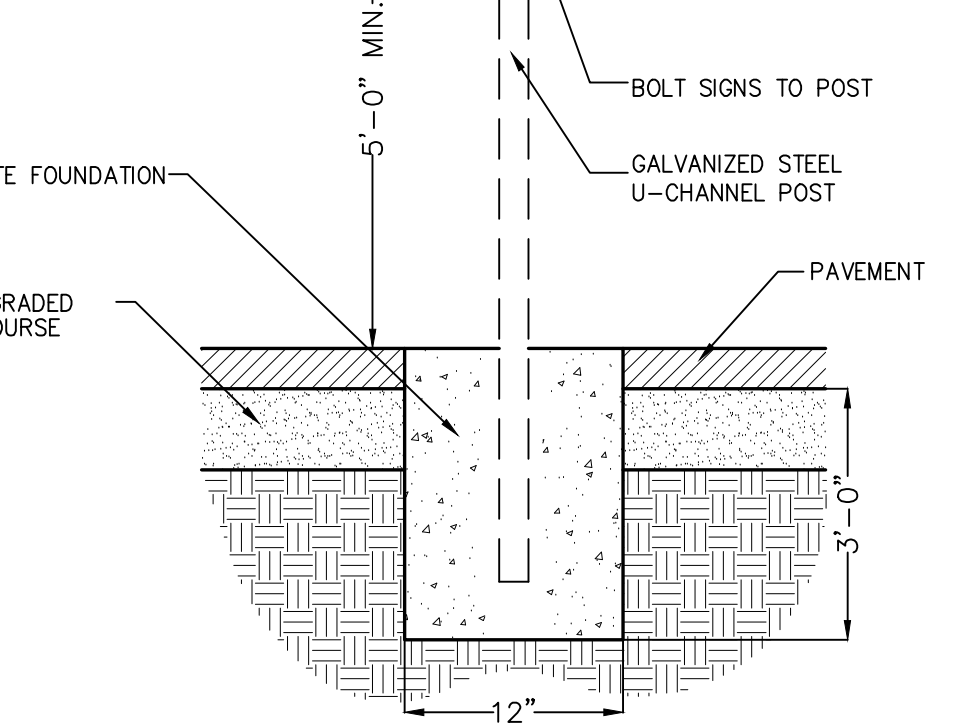
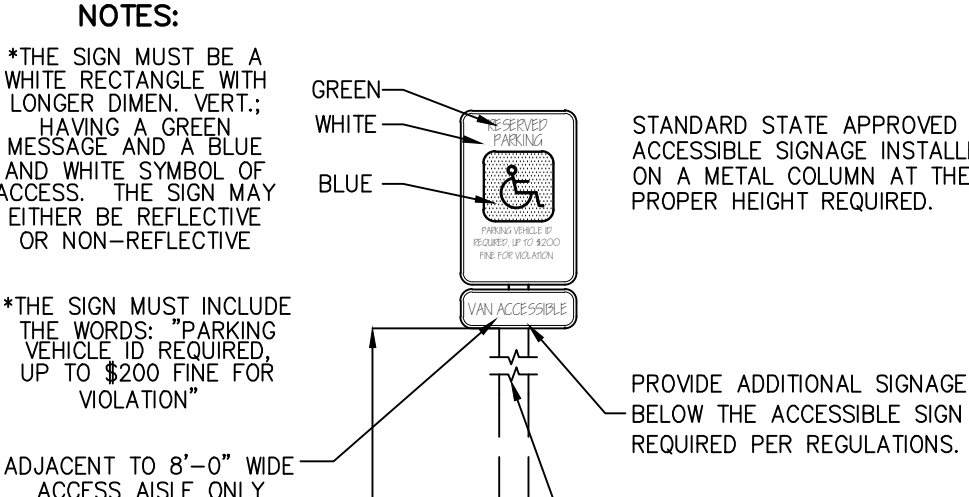
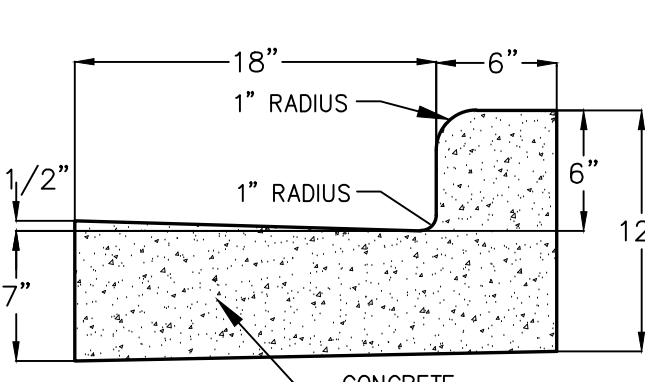
- PROPOSED 2" ASPHALTIC CONCRETE PAVEMENT W/ 8" BASE COURSE  (1) C101
- PROPOSED 4" ASPHALTIC CONCRETE PAVEMENT W/ 12" BASE COURSE  (2) C101
- PROPOSED 4" CONCRETE PAVEMENT  (3) C101
- PROPOSED 6" REINFORCED CONCRETE PAVEMENT  (4) C101
- WOOD CHIPS APPROVED FOR PLAYGROUND USE (COLOR TO BE SELECTED BY OWNER AND ARCHITECT)  (5) C101

**KEYNOTES:**

- 1 24" CURB AND GUTTER  (1) C101
- 2 ACCESSIBLE RAMP  (2) C101
- 3 PARKING LOT STRIPING  (3) C101
- 4 ACCESSIBLE PARKING STALL  (4) C101
- 5 ACCESSIBLE PARKING SIGN  (5) C101
- 6 ADA ACCESS ROUTE  (6) C101
- 7 RECONSTRUCT CURB  (7) C101
- 8 PLAYGROUND TRACK STRIPING (VERIFY WITH OWNER)
- 9 CHAIN LINK FENCE
- 10 DECORATIVE FENCE (VERIFY WITH OWNER)
- 11 DETECTABLE WARNING (TYP.)  (11) C101
- 12 RELOCATED EXISTING PRIVACY FENCE

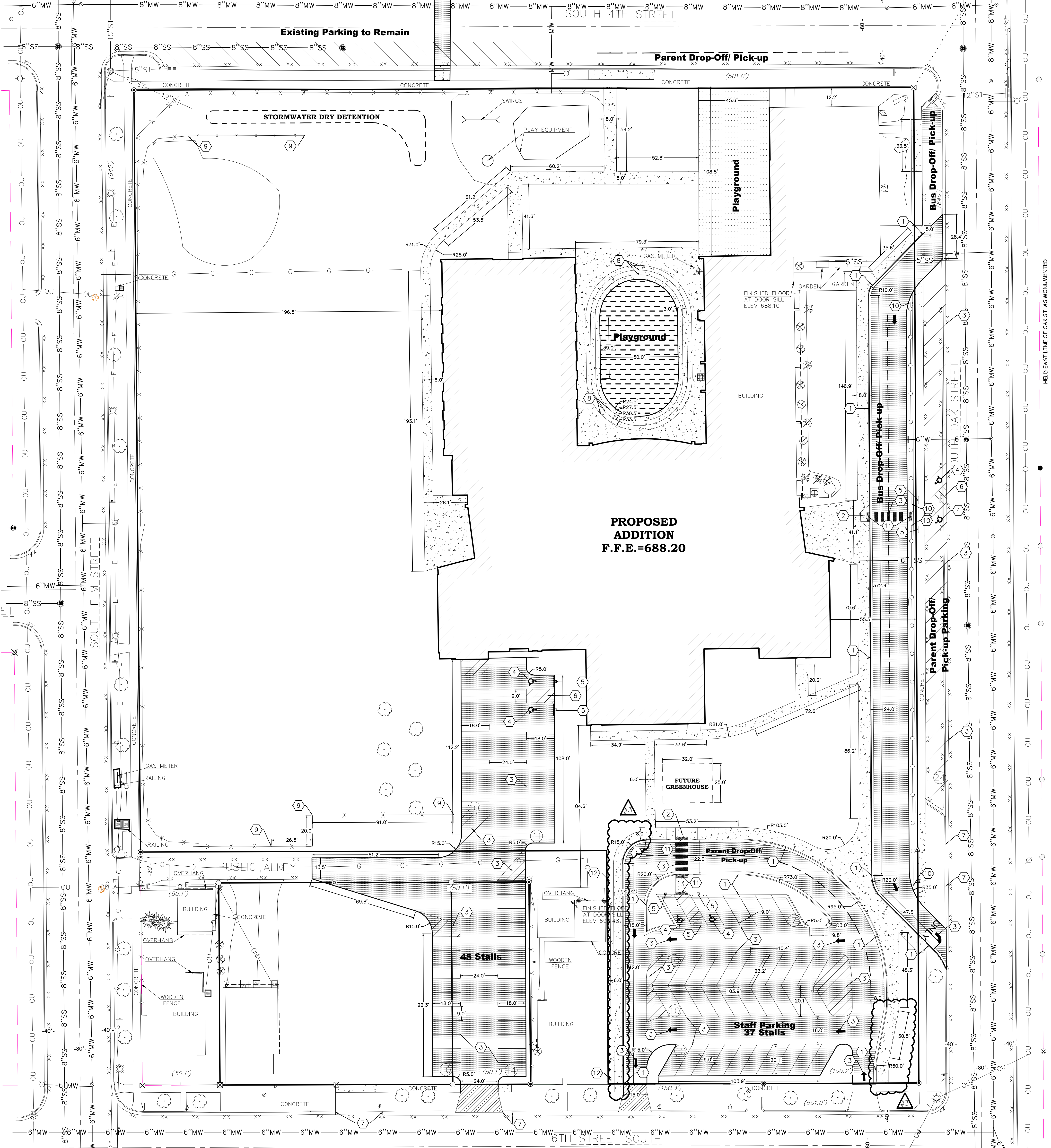


**ASPHALT PAVEMENT**



**SIDEWALK**

Scale 1" = 30'



**BENCH MARK**

- BENCHMARK #1: TOP OF BLANCE BOLT ON HYDRANT EAST EDGE OF SOUTH 4TH ST APPROXIMATELY 250 FT EAST OF SOUTH OAK ST ELEVATION = 688.10
- BENCHMARK #2: TOP OF BLANCE BOLT ON HYDRANT SOUTH EDGE OF SOUTH OAK ST APPROXIMATELY 45 FT SOUTH OF SOUTH 4TH ST ELEVATION = 688.15
- BENCHMARK #3: 602 SPIKE IN POWER POLE SOUTHWEST OF SCHOOL, SOUTH EDGE OF ALLEY APPROX. 290 FT WEST OF S. OAK ST ELEVATION = 689.72
- BENCHMARK #4: 602 SPIKE IN POWER POLE EAST EDGE OF SOUTH OAK ST APPROXIMATELY 180 FT NORTH OF 6TH ST SOUTH ELEVATION = 692.68
- BENCHMARK #5: TOP OF BLANCE BOLT ON HYDRANT EAST EDGE OF SOUTH 4TH ST APPROXIMATELY 320 FT SOUTH OF SOUTH 4TH STREET ELEVATION = 687.83

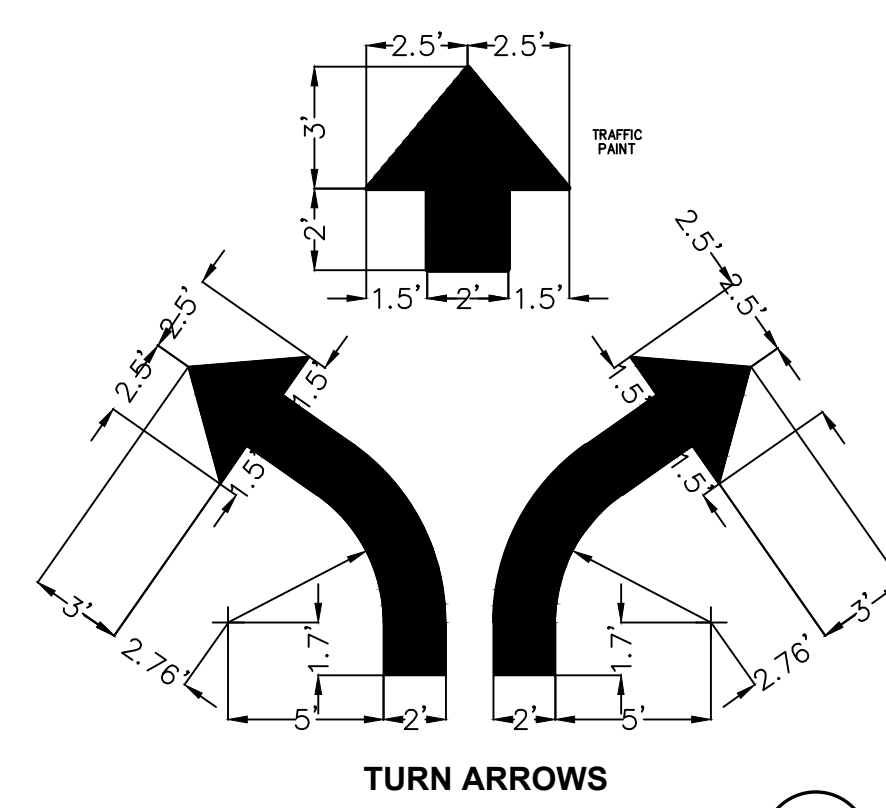
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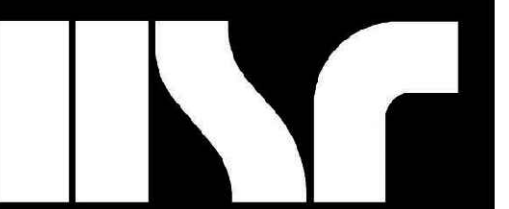
**SITE PARKING RE-CAP**

- EXISTING AND PROPOSED ZONING = R-1B
- OFF-STREET PARKING PROPOSED: 42 PARKING STALLS PROPOSED
- 15 DROP-OFF/PICK-UP STALLS PROPOSED
- ON-STREET PARKING-PROPOSED: 43 PARKING STALLS PROPOSED

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**CROSSWALK STRIPING**



I hereby certify that this plan, specification, or report was prepared by me, or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Date: \_\_\_\_\_  
James J. Lundberg, P.E.  
Registration No. 44630

BID DOCUMENTS

No.	Description	Date
1	ADDENDUM #1	3/16/2020
2	ADDENDUM #3	3/24/2020

Graphic Scale: 1" = 30'

Last Update: 3/24/2020

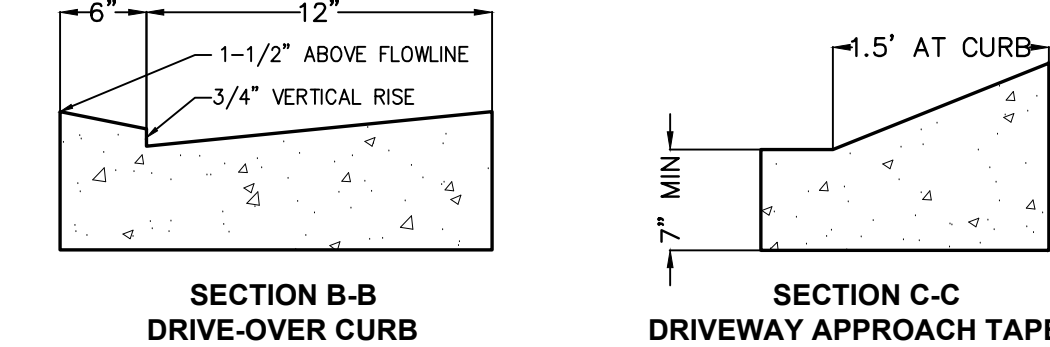
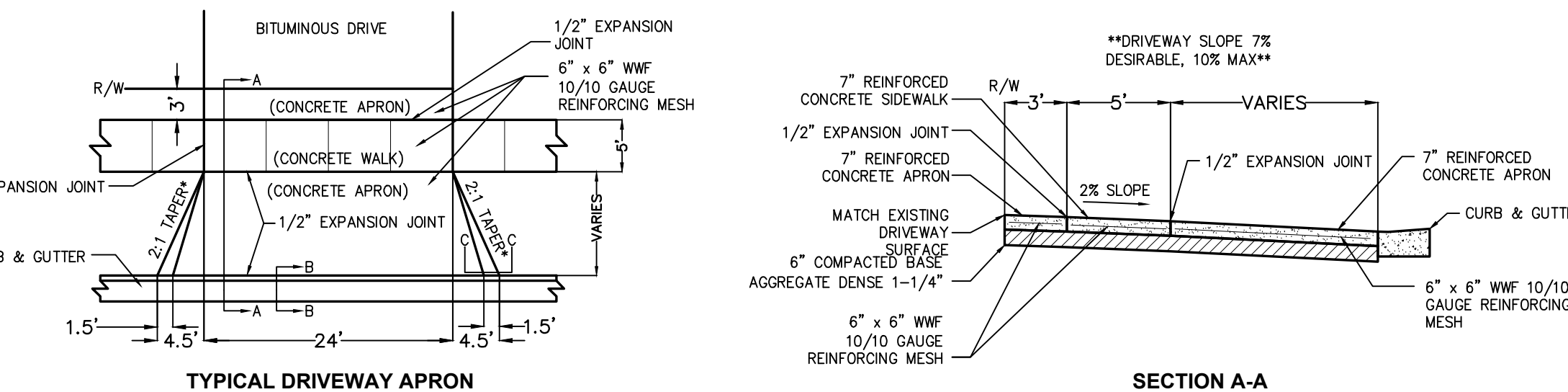
C102

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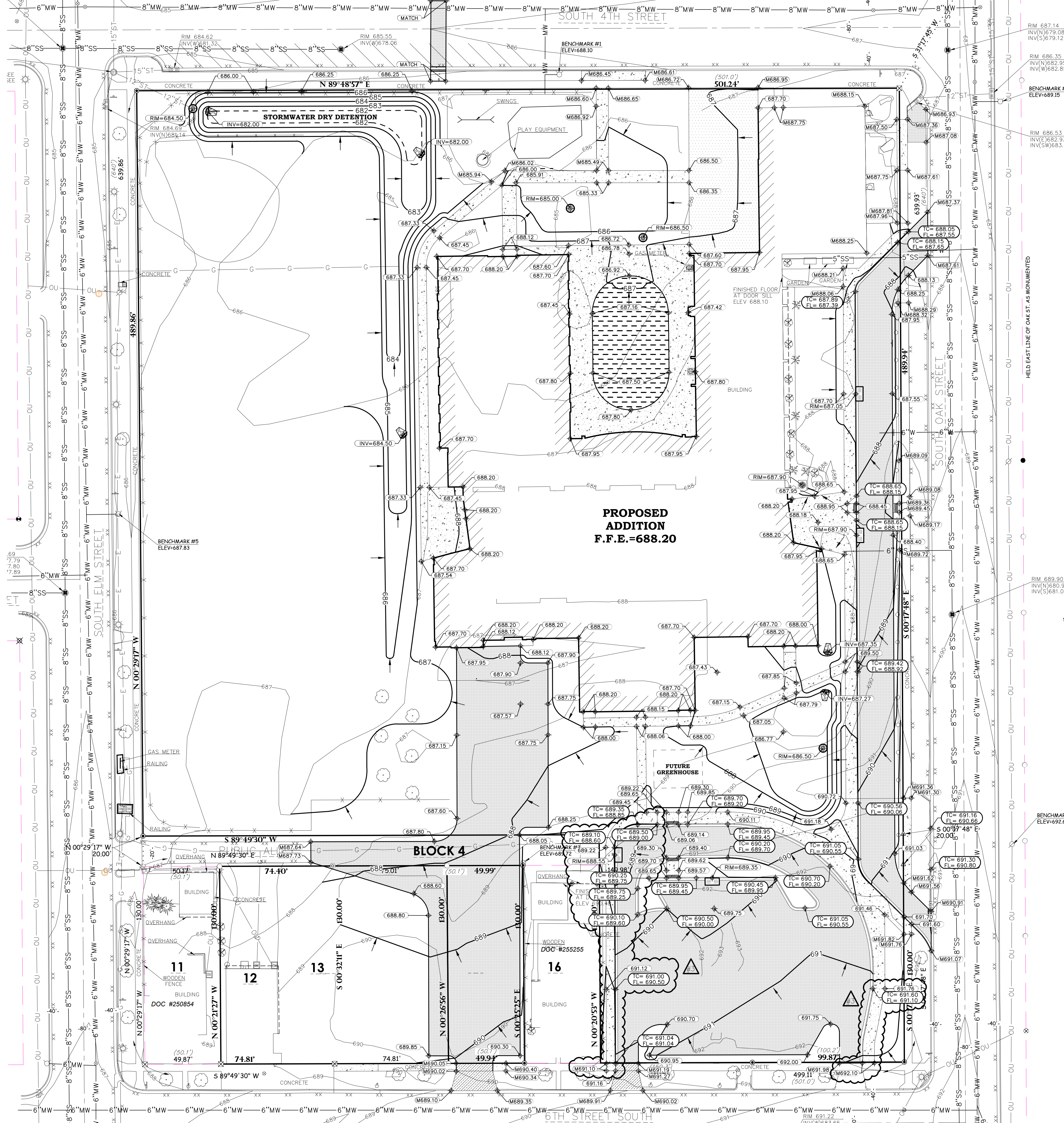
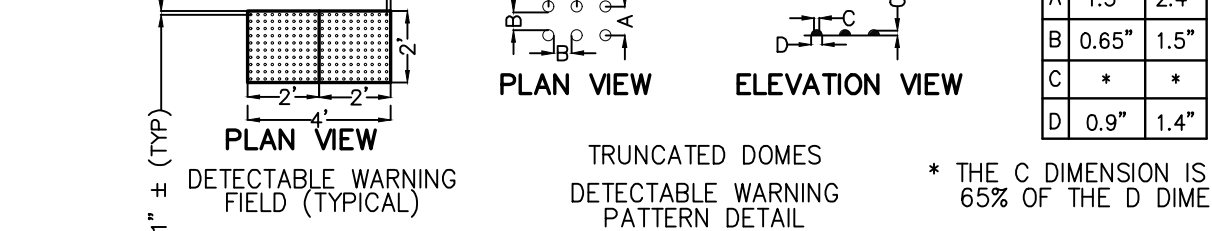
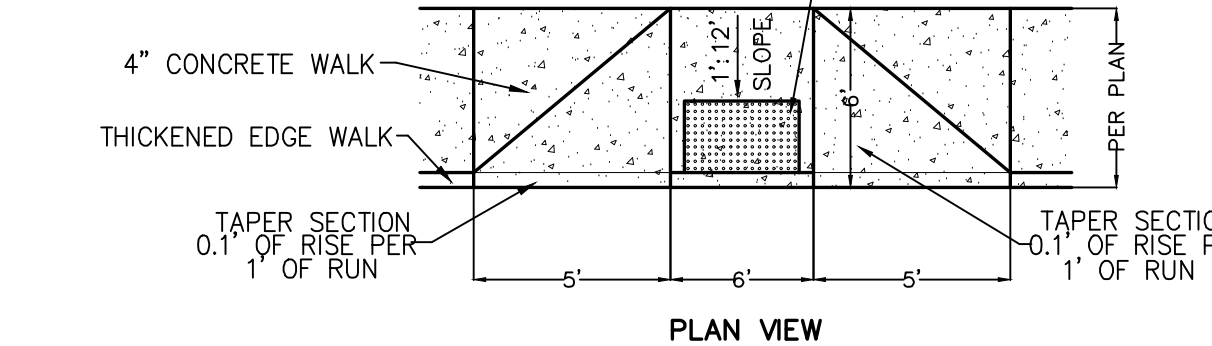
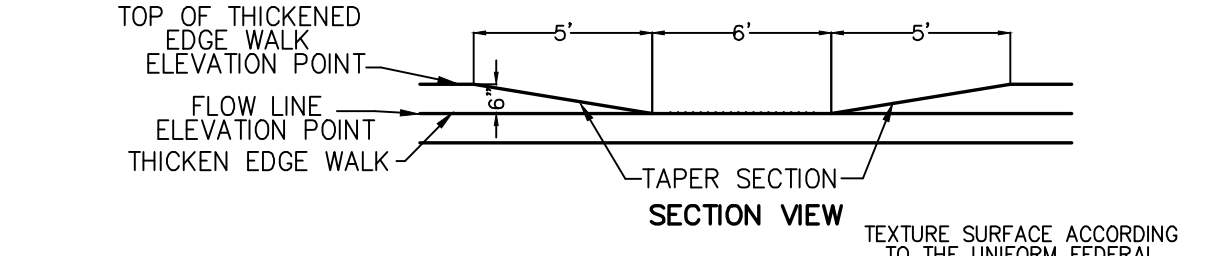
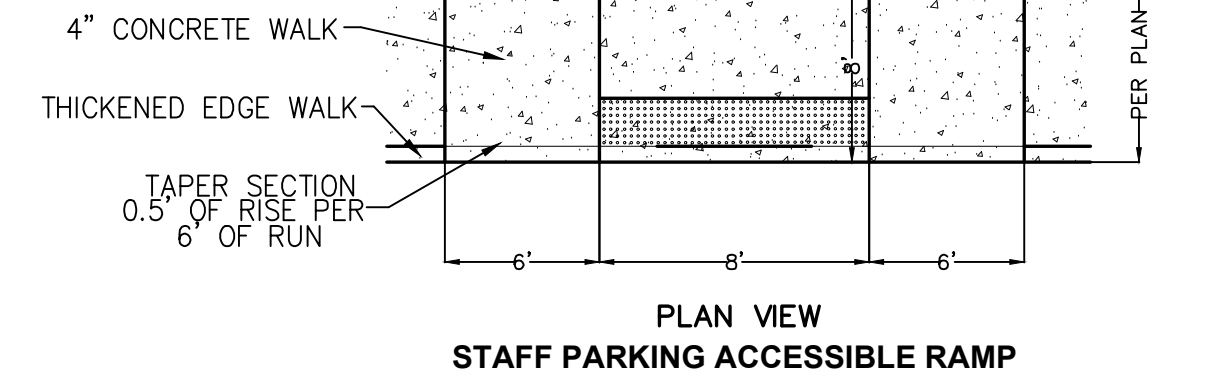
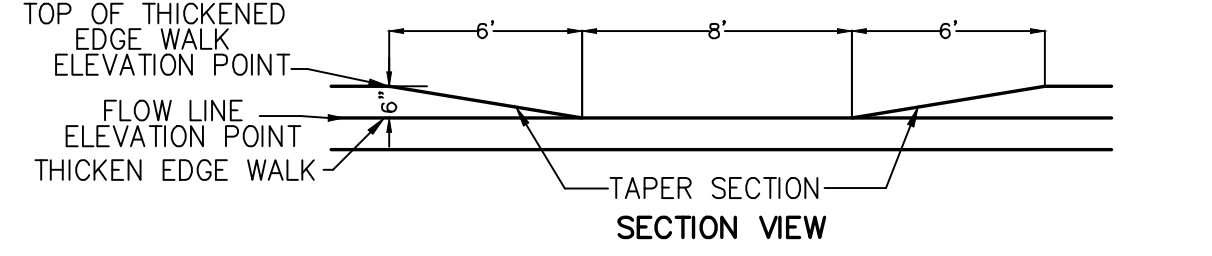
- CONTACT GOPHER STATE ONE CALL (651-454-0002) 5 WORKING DAYS PRIOR TO THE START OF DEMOLITION/CONSTRUCTION.
- THE PROPOSED SITE PLAN FINISH FLOOR ELEVATION OF 688.20' EQUALS THE PROPOSED BUILDING ARCHITECTURAL FINISH FLOOR ELEVATION OF 100.00'.
- GRADE, LINE, AND LEVEL TO BE REVIEWED IN THE FIELD BY THE CONSTRUCTION MANAGER.
- ANY EXISTING UTILITIES NOT SHOWN ON THIS DOCUMENT WHICH NEED TO BE REMOVED, RELOCATED AND OR ADJUSTED SHALL BE COORDINATED WITH THE APPLICABLE UTILITY COMPANY.
- INSTALL ALL REQUIRED EROSION CONTROL MEASURES IN ACCORDANCE WITH LOCAL AUTHORITIES AND MINNESOTA POLLUTION CONTROL AGENCY REGULATIONS.
- ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED IN ACCORDANCE WITH THE MINNESOTA POLLUTION CONTROL AGENCY AND LOCAL AUTHORITIES REGULATIONS.
- 6" OF TOPSOIL SHALL BE PROVIDED IN ALL GENERAL LAWN AREAS AND 12" SHALL BE PROVIDED IN ALL PLANTING BED AREAS.
- SEE SHEET C103 FOR ALL REQUIRED EROSION CONTROL ELEMENTS.
- REFER TO THE PROPOSED BUILDING MECHANICAL/PLUMBING PLANS FOR EXACT CONNECTION LOCATIONS AND VERIFY SANITARY SEWER LATERAL.
- COORDINATE ALL EARTHWORK AND UTILITY ACTIVITIES WITH GAS, ELECTRIC, (INCLUDING MAIN SERVICE, SITE LIGHTING, CONDUITS AND SIGNAGE) CABLE AND TELEPHONE CONSTRUCTION AND RESPECTIVE TRADES FOR THE INSTALLATION OF SAID UTILITIES.
- PROVIDE RIP RAP AT ALL ENDWALL STRUCTURES OF THE PROPOSED CULVERTS TO PREVENT WASHOUT AND EROSION.
- RIP RAP SHALL HAVE FILTER FABRIC PLACED BENEATH.
- EXCESS TOPSOIL SHALL BE STOCKPILED AND STORED ON SITE FOR FUTURE USE, UNLESS OTHERWISE DIRECTED BY THE OWNER.
- THE LOCAL MUNICIPALITY SHALL BE CONTACTED PRIOR TO ANY EXCAVATION IN THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR SHALL HAVE HIS TRAFFIC CONTROL PLAN APPROVED PRIOR TO WORK COMMENCING. THE LOCAL MUNICIPALITY SHALL OPERATE ALL EXISTING WATER VALVES IF NEEDED.
- GRADES AT BUILDING EDGE SHALL BE 6" BELOW FINISHED FLOOR ELEVATION EXCEPT AT DOOR WAY ENTRANCES OR UNLESS OTHERWISE NOTED.

GRADING LEGEND:

EXISTING CONTOUR	688
PROPOSED CONTOUR	688
PROPOSED SPOT ELEVATION	688.00
PROPOSED ENDWALL INVERT ELEVATION	INV=688.00
PROPOSED RIM ELEVATION	RIM=688.00
PROPOSED TOP OF CURB ELEVATION	TC=688.00
PROPOSED FLOW LINE ELEVATION	FL=688.00
PROPOSED MATCH ELEVATION (CONTRACTOR TO VERIFY)	M688.00
PROPOSED ENDWALL STRUCTURE WITH RIP RAP	2 C104
PROPOSED STORM INLET	1 C104
PROPOSED CURB STORM INLET	1 C104



CONCRETE ENTRANCE APRON



BENCH MARK

- ELEVATIONS ARE REFERENCED TO NAVD 88 DATUM.
- BENCHMARK #1  
SURF BOLT ON HYDRANT  
SOUTH EDGE OF SOUTH 4TH ST APPROXIMATELY 250FT EAST OF SOUTH OAK ST  
ELEVATION = 688.10
- BENCHMARK #2  
TOP OF FLANGE BOLT ON HYDRANT  
EAST EDGE OF SOUTH OAK ST APPROXIMATELY 45 FT SOUTH OF SOUTH 4TH ST  
ELEVATION = 688.15
- BENCHMARK #3  
800 SPIRE IN POWER POLE  
SOUTHWEST CORNER OF S. OAK ST  
ELEVATION = 689.72
- BENCHMARK #4  
600 SPIRE IN POWER POLE  
EAST EDGE OF SOUTH OAK ST APPROXIMATELY 180 FT NORTH OF 6TH ST SOUTH  
ELEVATION = 692.68
- BENCHMARK #5  
TOP OF FLANGE BOLT ON HYDRANT  
EAST EDGE OF SOUTH ELM ST APPROXIMATELY 320 FT SOUTH OF SOUTH 4TH STREET  
ELEVATION = 687.83

UTILITY DISCLAIMER

THE LOCATIONS, SIZES, AND TYPES OF UNDERGROUND PUBLIC AND PRIVATE UTILITIES OR SUBSTRUCTURES SHOWN HEREON WERE OBTAINED FROM VISUAL INSPECTION, FIELD MEASUREMENTS, AND/OR AS-BUILT PLANS. SANITARY SEWER AND STORM SEWER PIPE SIZES, INVERTS, DIRECTION, AND LOCATIONS BETWEEN MANHOLES ARE SUPPLEMENTED BY AS-BUILT PLANS AND/OR ESTIMATED BASED ON FIELD OBSERVATIONS. PRIOR TO CONSTRUCTION IN THE MIDDLE OF ANY UTILITIES SHOWN HEREON, IT IS RECOMMENDED THAT THE LOCATIONS, DEPTHS, AND SIZES BE FIELD VERIFIED. THE LOCATIONS SHOWN HEREON ARE ONLY APPROXIMATE WITH PROSPECT THAT ADDITIONAL UTILITY LINES NOT DISCOVERED, OR MARKED, DURING THE SEARCH OF RECORDS AND THE FIELD SURVEY MAY EXIST. ANY CONTRACTOR USING THE INFORMATION SHOWN HEREON IS HEREBY FOREWARNED THAT ANY EXCAVATION UPON THIS SITE MAY RESULT IN THE DISCOVERY OF ADDITIONAL UNDERGROUND UTILITIES NOT SHOWN HEREON. IN GENERAL, UNDERGROUND UTILITY LOCATIONS ARE SHOWN FROM UTILITY MARKINGS BY OTHERS, AND/OR AS-BUILT PLANS PROVIDED BY OTHERS. POINT OF BEGINNING MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH RESPECT TO THE UTILITIES SHOWN HEREON, AND BELIEVES THAT THE INFORMATION CONTAINED HEREIN IS RELIABLE AND GENERALLY ACCURATE FOR THE PURPOSE INTENDED.

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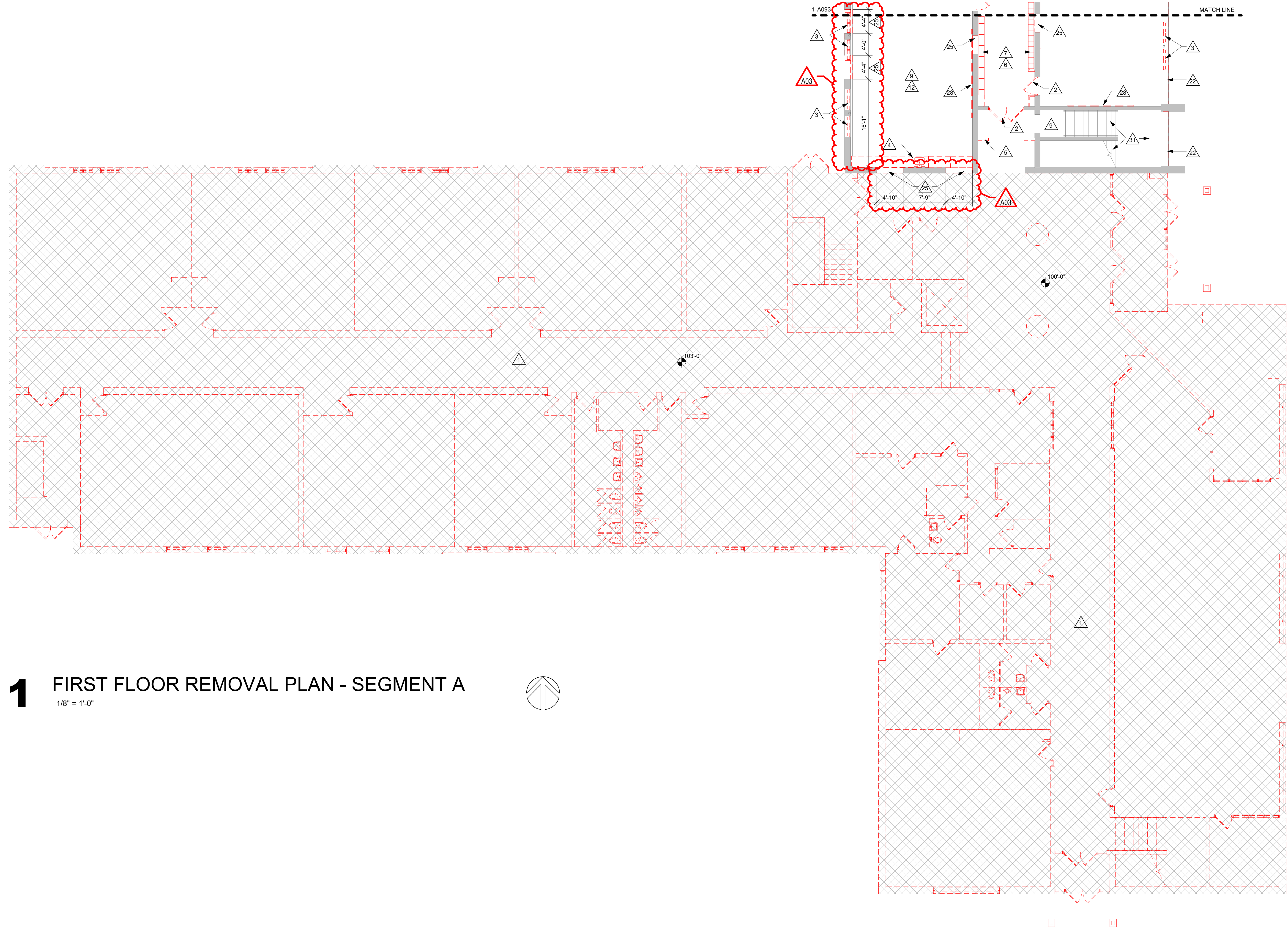


Consultant:

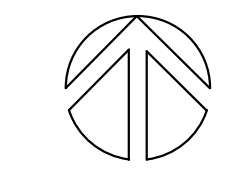
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**1 FIRST FLOOR REMOVAL PLAN - SEGMENT A**  
1/8" = 1'-0"

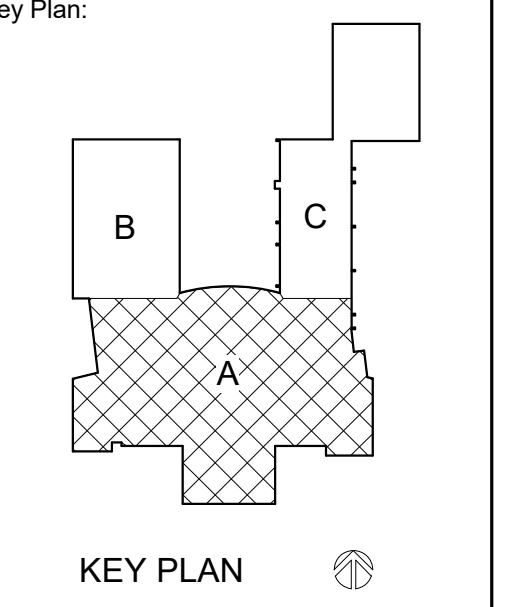


Project Title: **LA CRESCENT - HOKAH PUBLIC SCHOOLS  
ELEMENTARY SCHOOL ADDITION AND  
RENOVATION**  
Project Location: **504 SOUTH OAK STREET  
LA CRESCENT, MINNESOTA**  
Sheet Title: **FIRST FLOOR REMOVAL PLAN - SEGMENT A**

HSR Project Number: **19014**

Project Date: **3.5.2020**

Drawn By: **DJH**



**BID  
DOCUMENTS**

Revisions:

No.	Description	Date
A03	ADDENDUM 3	3.24.20



Last Update: **3/24/2020 1:10:32 PM**

**A092**



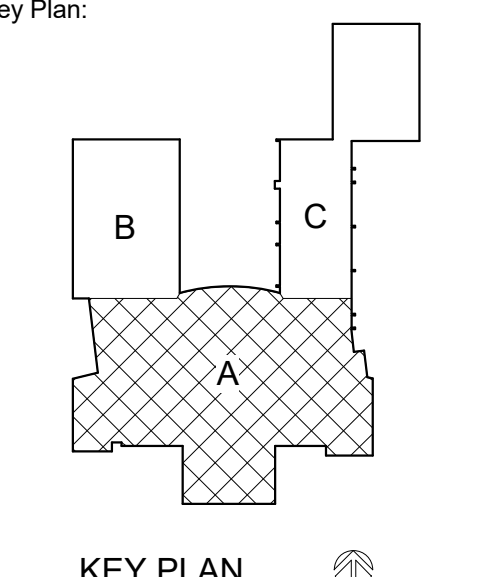
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Project Title:  
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19014  
Project Date:  
3.5.2020

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BID  
DOCUMENTS

Revisions:

No.	Description	Date
A03	ADDENDUM 3	3.24.20

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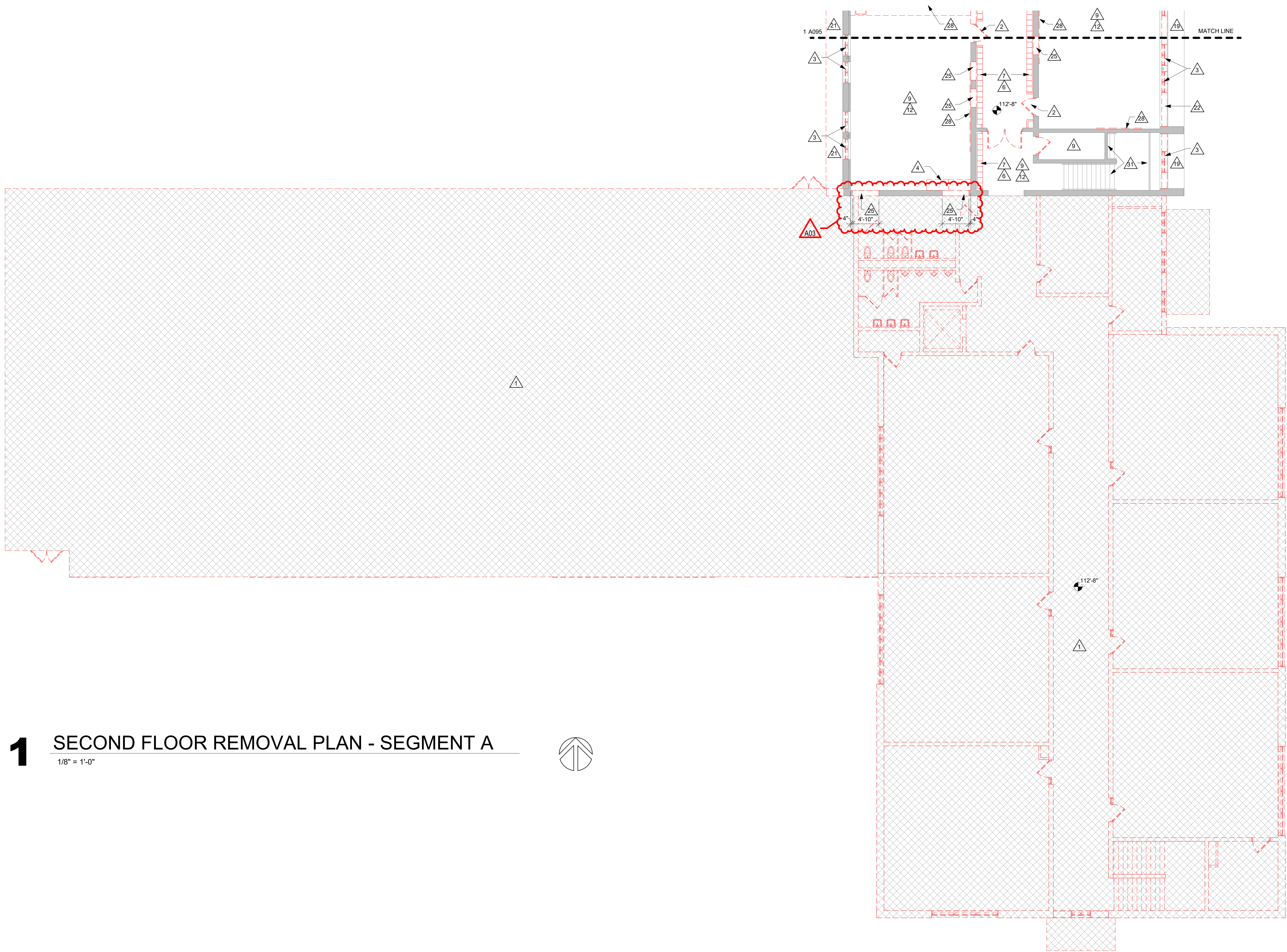
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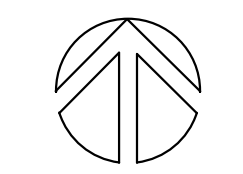
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**1 SECOND FLOOR REMOVAL PLAN - SEGMENT A**  
1/8" = 1'-0"





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100 MILWAUKEE STREET  
LA CROSSE, WISCONSIN  
PHONE: 608.784.1830  
FAX: 608.782.5844  
www.hsrassociates.com

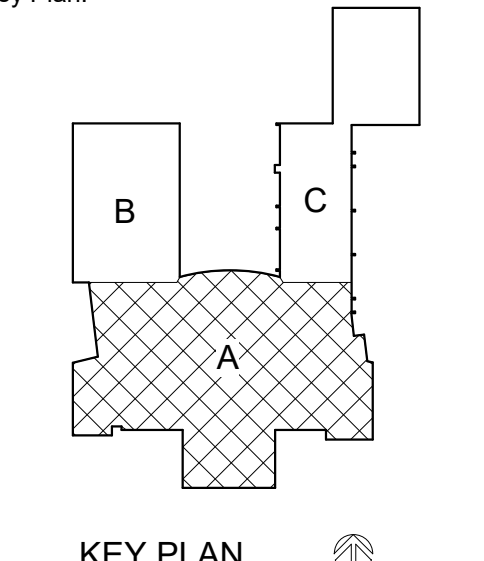
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RENOVATION  
504 SOUTH OAK STREET  
LA CRESCENT, MINNESOTA  
FIRST FLOOR - SEGMENT A

Project Title:  
HSR Project Number:  
Project Date:  
Drawn By:  
Key Plan:

19014  
3.5.2020  
DJH

DJH



KEY PLAN

BID  
DOCUMENTS

No.	Description	Date
A03	ADDENDUM 3	3.24.20

Graphic Scale:

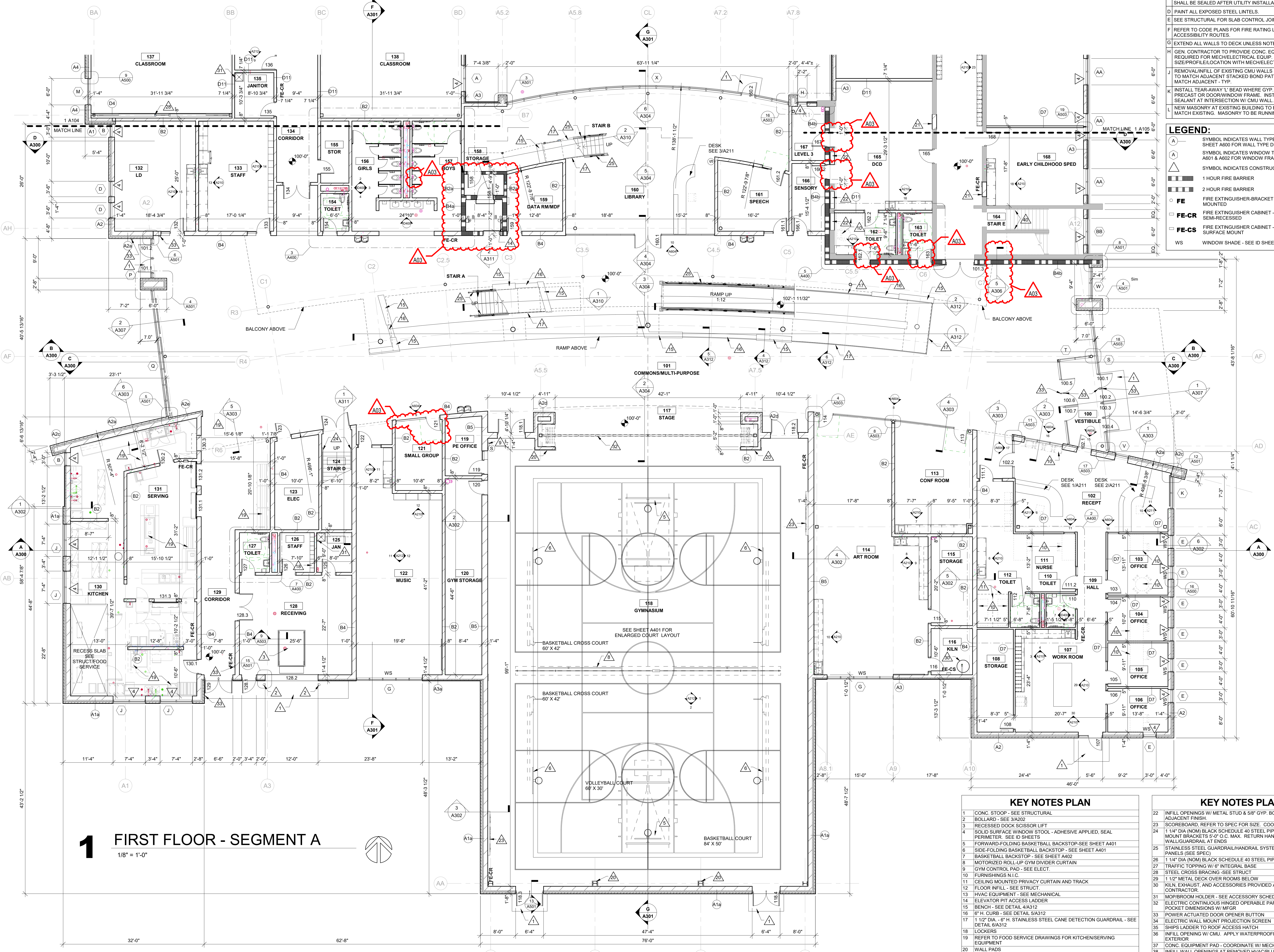
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3/23/2020 12:45:11 PM

A103

- GENERAL NOTES:**
- A SEE ID SHEETS FOR FLOOR AND WALL FINISH LAYOUTS.
  - B LOOSE FURNISHINGS EXCEPT AS NOTED SHALL BE PROVIDED AND INSTALLED BY THE OWNER.
  - C VERIFY EXACT SIZE AND LOCATION OF ALL MECHANICAL / PLUMB AND ELEC. OPENINGS - GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FINISH AT ALL VISIBLE AREAS. ALL OPENING SHALL BE SEALED AFTER UTILITY INSTALLATION.
  - D PAINT ALL EXPOSED STEEL LINTELS.
  - E SEE STRUCTURAL FOR SLAB CONTROL JOINTS.
  - F REFER TO CODE PLANS FOR FIRE RATING LOCATIONS AND ACCESSIBILITY ROUTES.
  - G EXTEND ALL WALLS TO DECK UNLESS NOTED OTHERWISE.
  - H GEN. CONTRACTOR TO PROVIDE CONC. EQUIP. PADS/CURBS AS REQUIRED FOR MECH/ELECTRICAL EQUIP. - VERIFY SIZE/PROFILE/LOCATION WITH MECH/ELECTRICAL.
  - I REMOVAL/INFILL OF EXISTING CMU WALLS SHALL BE "TOOTHED" IN TO MATCH ADJACENT STACKED BOND PATTERN. PATCH WALL TO MATCH ADJACENT - 1" P.
  - J INSTALL TEAR-AWAY "L" BEAD WHERE GYP. BOARD ABUTS PRECAST OR DOOR/WINDOW FRAME. INSTALL EDGE TRIM AND SEALANT AT INTERSECTION W/ CMU WALL.
  - K NEW MASONRY AT EXISTING BUILDING TO BE STACK BOND TO MATCH EXISTING. MASONRY TO BE RUNNING BOND ELSEWHERE.
- LEGEND:**
- A SYMBOL INDICATES WALL TYPE - SEE SHEET A600 FOR WALL TYPE DETAILS.
  - A SYMBOL INDICATES WINDOW TYPE. SEE SHEET A601 & A602 FOR WINDOW FRAME ELEVATIONS.
  - SYMBOL INDICATES CONSTRUCTION NOTE THIS SHEET
  - 1 HOUR FIRE BARRIER
  - 2 HOUR FIRE BARRIER
  - FE FIRE EXTINGUISHER-BRACKET MOUNTED
  - FE-CR FIRE EXTINGUISHER CABINET - SEMI-RECESSED
  - FE-CS FIRE EXTINGUISHER CABINET - SURFACE MOUNT
  - WS WINDOW SHADE - SEE ID SHEETS



**1** FIRST FLOOR - SEGMENT A  
1/8" = 1'-0"

- KEY NOTES PLAN**
- 1 CONC. STOOP - SEE STRUCTURAL
  - 2 BOLLARD - SEE 3/A202
  - 3 RECESSED DOCK SCISSOR LIFT
  - 4 SOLID SURFACE WINDOW STOOL - ADHESIVE APPLIED, SEAL PERIMETER. SEE ID SHEETS
  - 5 FORWARD-FOLDING BASKETBALL BACKSTOP-SEE SHEET A401
  - 6 SIDE-FOLDING BASKETBALL BACKSTOP - SEE SHEET A401
  - 7 BASKETBALL BACKSTOP - SEE SHEET A402
  - 8 MOTORIZED ROLL-UP GYM DIVIDER CURTAIN
  - 9 GYM CONTROL PAD - SEE ELEC.
  - 10 FURNISHINGS N.I.C.
  - 11 CEILING MOUNTED PRIVACY CURTAIN AND TRACK
  - 12 FLOOR INFILL - SEE STRUCT.
  - 13 HVAC EQUIPMENT - SEE MECHANICAL
  - 14 ELEVATOR PIT ACCESS LADDER
  - 15 BENCH - SEE DETAIL 4/A312
  - 16 6" H. CURB - SEE DETAIL 5/A312
  - 17 1 1/2" DIA. - 6" H. STAINLESS STEEL CANE DETECTION GUARDRAIL - SEE DETAIL 6/A312
  - 18 LOCKERS
  - 19 REFER TO FOOD SERVICE DRAWINGS FOR KITCHEN/SERVING EQUIPMENT
  - 20 WALL PADS
  - 21 INFILL OPENINGS W/ CMU. TOOTH IN AT JAMBS.

- KEY NOTES PLAN**
- 22 INFILL OPENINGS W/ METAL STUD & 5/8" GYP. BOARD - MATCH ADJACENT FINISH.
  - 23 SCOREBOARD, REFER TO SPEC FOR SIZE. COORDINATE W/ ELEC.
  - 24 1 1/4" DIA (NOM) BLACK SCHEDULE 40 STEEL PIPE HANDRAIL W/ WALL MOUNT BRACKETS 5'-0" O.C. MAX. RETURN HANDRAIL TO WALL/GUARDRAIL AT ENDS
  - 25 STAINLESS STEEL GUARDRAIL/HANDRAIL SYSTEM W/ WIRE MESH PANELS (SEE SPEC)
  - 26 1 1/4" DIA (NOM) BLACK SCHEDULE 40 STEEL PIPE GUARDRAIL
  - 27 TRAFFIC TOPPING W/ 6" INTEGRAL BASE
  - 28 STEEL CROSS BRACING - SEE STRUCT
  - 29 1 1/2" METAL DECK OVER ROOMS BELOW
  - 30 KILN EXHAUST, AND ACCESSORIES PROVIDED AND INSTALLED BY CONTRACTOR.
  - 31 MOP/BROOM HOLDER - SEE ACCESSORY SCHEDULE SHEET A400
  - 32 ELECTRIC CONTINUOUS HINGED OPERABLE PARTITION - VERIFY POKET DIMENSIONS W/ MFR
  - 33 POWER ACTUATED DOOR OPENER BUTTON
  - 34 ELECTRIC WALL MOUNT PROJECTION SCREEN
  - 35 SHIPS LADDER TO ROOF ACCESS HATCH
  - 36 INFILL OPENING W/ CMU. APPLY WATERPROOFING MEMBRANE TO EXTERIOR
  - 37 CONC. EQUIPMENT PAD - COORDINATE W/ MECH.
  - 38 INFILL WALL OPENINGS AT REMOVED HVAC/PLUMBING. MATCH ADJACENT WALL CONSTRUCTION.
  - 39 PATCH METAL PANEL AT REMOVED MECHANICAL EXHAUST. (BASE BID)
  - 40 EXISTING HANDRAILS TO REMAIN



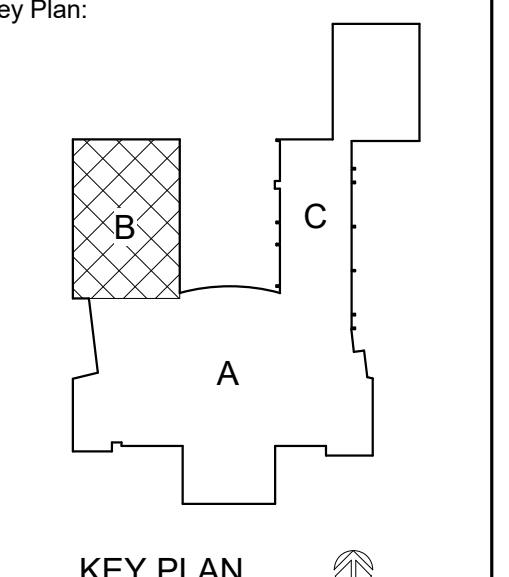
Consultant:

LA CRESCENT - HOKAH PUBLIC SCHOOLS  
ELEMENTARY SCHOOL ADDITION AND  
RENOVATION  
504 SOUTH OAK STREET  
LA CROSSE, MINNESOTA  
FIRST FLOOR - SEGMENT B

Project Title:  
HSR Project Number:  
19014

Project Date:  
3.5.2020  
Drawn By:  
DJH

Key Plan:



KEY PLAN

**BID DOCUMENTS**

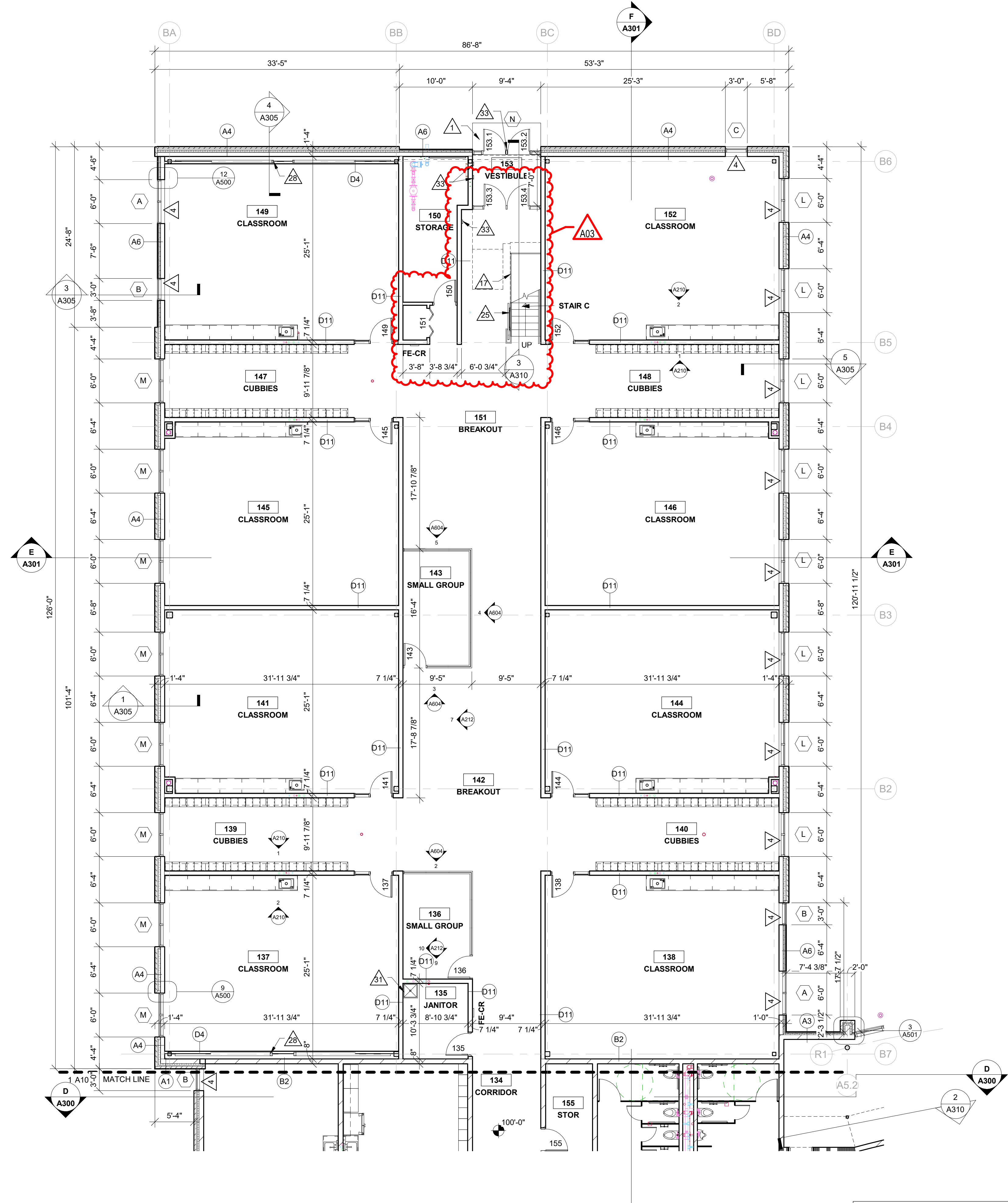
Revisions:

No.	Description	Date
A03	ADDENDUM 3	3.24.20

Graphic Scale:  
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Last Update:  
3/23/2020 12:47:47 PM

**A104**

- GENERAL NOTES:**
- A SEE ID SHEETS FOR FLOOR AND WALL FINISH LAYOUTS.
  - B LOOSE FURNISHINGS EXCEPT AS NOTED SHALL BE PROVIDED AND INSTALLED BY THE OWNER.
  - C VERIFY EXACT SIZE AND LOCATION OF ALL MECHANICAL / PLUMB AND ELEC. OPENINGS - GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FINISH AT ALL VISIBLE AREAS. ALL OPENING SHALL BE SEALED AFTER UTILITY INSTALLATION.
  - D PAINT ALL EXPOSED STEEL LINTELS.
  - E SEE STRUCTURAL FOR SLAB CONTROL JOINTS.
  - F REFER TO CODE PLANS FOR FIRE RATING LOCATIONS AND ACCESSIBILITY ROUTES
  - G EXTEND ALL WALLS TO DECK UNLESS NOTED OTHERWISE.
  - H GEN. CONTRACTOR TO PROVIDE CONC. EQUIP. PADS/CURBS AS REQUIRED FOR MECH/ELECTRICAL EQUIP. - VERIFY SIZE/PROFILE/LOCATION WITH MECH/ELECTRICAL.
  - J REMOVAL/FILL OF EXISTING CMU WALLS SHALL BE "TOOTHED" IN TO MATCH ADJACENT STACKED BOND PATTERN. PATCH WALL TO MATCH ADJACENT - TYP.
  - K INSTALL TEAR-AWAY "L" BEAD WHERE GYP. BOARD ABUTS PRECAST OR DOOR/WINDOW FRAME. INSTALL EDGE TRIM AND SEALANT AT INTERSECTION W/ CMU WALL.
  - L NEW MASONRY AT EXISTING BUILDING TO BE STACK BOND TO MATCH EXISTING. MASONRY TO BE RUNNING BOND ELSEWHERE.
- LEGEND:**
- A SYMBOL INDICATES WALL TYPE - SEE SHEET A600 FOR WALL TYPE DETAILS.
  - A SYMBOL INDICATES WINDOW TYPE. SEE SHEET A601 & A602 FOR WINDOW FRAME ELEVATIONS.
  - △ SYMBOL INDICATES CONSTRUCTION NOTE THIS SHEET
  - 1 HOUR FIRE BARRIER
  - 2 HOUR FIRE BARRIER
  - FE FIRE EXTINGUISHER-BRACKET MOUNTED
  - FE-CR FIRE EXTINGUISHER CABINET - SEMI-RECESSED
  - FE-CS FIRE EXTINGUISHER CABINET - SURFACE MOUNT
  - WS WINDOW SHADE - SEE ID SHEETS



**1 FIRST FLOOR - SEGMENT B**  
1/8" = 1'-0"

**KEY NOTES PLAN**

1	CONC. STOOP - SEE STRUCTURAL
2	BOLLARD - SEE 3/A202
3	RECESSED DOCK SCISSOR LIFT
4	SOLID SURFACE WINDOW STOOL - ADHESIVE APPLIED, SEAL PERIMETER. SEE ID SHEETS
5	FORWARD-FOLDING BASKETBALL BACKSTOP-SEE SHEET A401
6	SIDE-FOLDING BASKETBALL BACKSTOP - SEE SHEET A401
7	BASKETBALL BACKSTOP - SEE SHEET A402
8	MOTORIZED ROLL-UP GYM DIVIDER CURTAIN
9	GYM CONTROL PAD - SEE ELECT.
10	FURNISHINGS N.I.C.
11	CEILING MOUNTED PRIVACY CURTAIN AND TRACK
12	FLOOR INFILL - SEE STRUCT.
13	HVAC EQUIPMENT - SEE MECHANICAL
14	ELEVATOR PIT ACCESS LADDER
15	BENCH - SEE DETAIL 4/A312
16	6" H. CURB - SEE DETAIL 5/A312
17	1 1/2" DIA. - 6" H. STAINLESS STEEL CANE DETECTION GUARDRAIL - SEE DETAIL 6/A312
18	LOCKERS
19	REFER TO FOOD SERVICE DRAWINGS FOR KITCHEN/SERVING EQUIPMENT
20	WALL PADS
21	INFILL OPENINGS W/ CMU. TOOTH IN AT JAMBS.

**KEY NOTES PLAN**

22	INFILL OPENINGS W/ METAL STUD & 5/8" GYP. BOARD - MATCH ADJACENT FINISH.
23	SCOREBOARD. REFER TO SPEC FOR SIZE. COORDINATE W/ ELECT.
24	1 1/4" DIA (NOM) BLACK SCHEDULE 40 STEEL PIPE HANDRAIL W/ WALL MOUNT BRACKETS 5'-0" O.C. MAX. RETURN HANDRAIL TO WALL/GUARDRAIL AT ENDS
25	STAINLESS STEEL GUARDRAIL/HANDRAIL SYSTEM W/ WIRE MESH PANELS (SEE SPEC)
26	1 1/4" DIA (NOM) BLACK SCHEDULE 40 STEEL PIPE GUARDRAIL
27	TRAFFIC TOPPING W/ 6" INTEGRAL BASE
28	STEEL CROSS BRACING - SEE STRUCT.
29	1 1/2" METAL DECK OVER ROOMS BELOW
30	KLN. EXHAUST, AND ACCESSORIES PROVIDED AND INSTALLED BY CONTRACTOR.
31	MOP/BROOM HOLDER - SEE ACCESSORY SCHEDULE A400
32	ELECTRIC CONTINUOUS HINGED OPERABLE PARTITION - VERIFY POCKET DIMENSIONS W/ MFR
33	POWER ACTUATED DOOR OPENER BUTTON
34	ELECTRIC WALL MOUNT PROJECTION SCREEN
35	SHIPS LADDER TO ROOF ACCESS HATCH
36	INFILL OPENING W/ CMU. APPLY WATERPROOFING MEMBRANE TO EXTERIOR.
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39	PATCH METAL PANEL AT REMOVED MECHANICAL EXHAUST. (BASE BID)
40	EXISTING HANDRAILS TO REMAIN



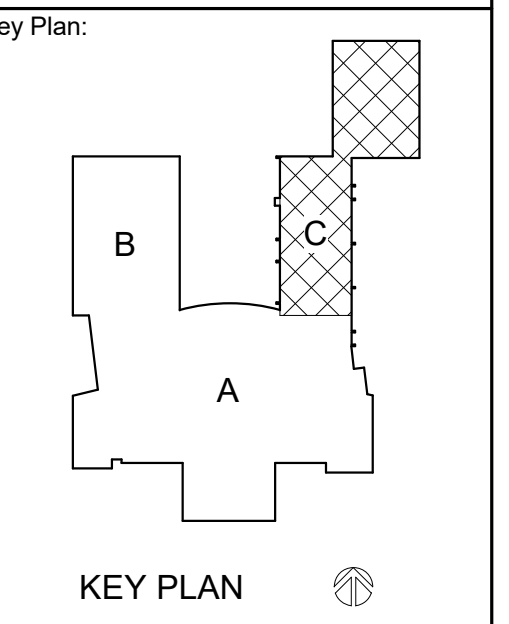
Consultant:

Project Title:  
HSR Project Number:  
Project Date:  
Drawn By:  
Key Plan:

19014

3.5.2020

DJH



KEY PLAN

BID  
DOCUMENTS

Revisions:

No.	Description	Date
A03	ADDENDUM 3	3.24.20

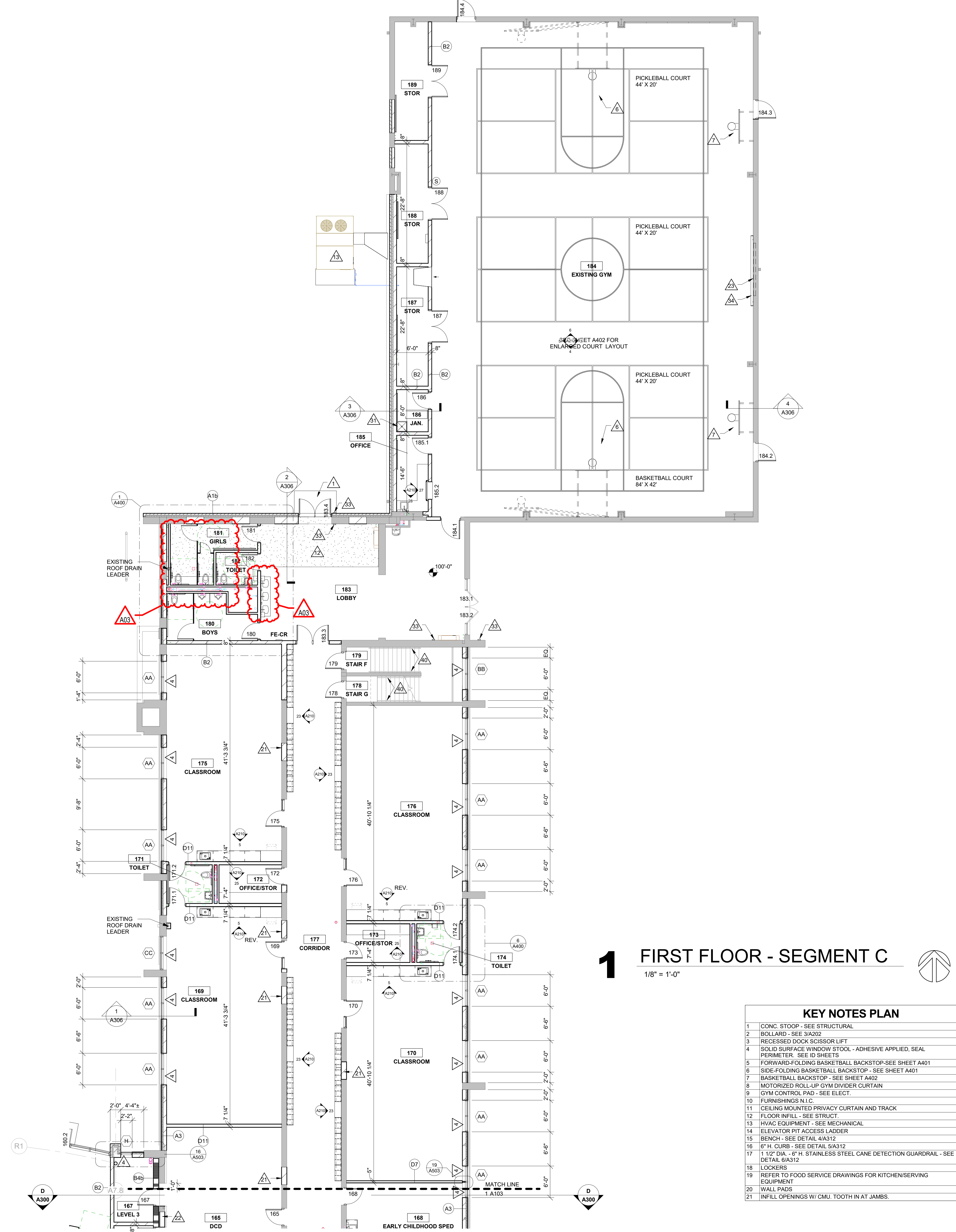
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**A105**

- GENERAL NOTES:**
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  - B LOOSE FURNISHINGS EXCEPT AS NOTED SHALL BE PROVIDED AND INSTALLED BY THE OWNER.
  - C VERIFY EXACT SIZE AND LOCATION OF ALL MECHANICAL / PLUMB AND ELEC OPENINGS - GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FINISH AT ALL VISIBLE AREAS. ALL OPENING SHALL BE SEALED AFTER UTILITY INSTALLATION.
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  - F REFER TO CODE PLANS FOR FIRE RATING LOCATIONS AND ACCESSIBILITY ROUTES.
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  - H GEN. CONTRACTOR TO PROVIDE CONC. EQUIP. PADS/CURBS AS REQUIRED FOR MECH/ELECTRICAL EQUIP. - VERIFY SIZE/PROFILE/LOCATION WITH MECH/ELECTRICAL.
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  - K INSTALL TEAR-AWAY 'L' BEAD WHERE GYP. BOARD ABUTS PRECAST OR DOOR/WINDOW FRAME. INSTALL EDGE TRIM AND SEALANT AT INTERSECTION W/ CMU WALL.
  - L NEW MASONRY AT EXISTING BUILDING TO BE STACK BOND TO MATCH EXISTING. MASONRY TO BE RUNNING BOND ELSEWHERE.

- LEGEND:**
- (A) SYMBOL INDICATES WALL TYPE - SEE SHEET A600 FOR WALL TYPE DETAILS.
  - (A) SYMBOL INDICATES WINDOW TYPE. SEE SHEET A601 & A602 FOR WINDOW FRAME ELEVATIONS.
  - (A) SYMBOL INDICATES CONSTRUCTION NOTE THIS SHEET
  - 1 HOUR FIRE BARRIER
  - 2 HOUR FIRE BARRIER
  - FE FIRE EXTINGUISHER-BRACKET MOUNTED
  - FE-CR FIRE EXTINGUISHER CABINET - SEMI-RECESSED
  - FE-CS FIRE EXTINGUISHER CABINET - SURFACE MOUNT
  - WS WINDOW SHADE - SEE ID SHEETS



**1** FIRST FLOOR - SEGMENT C  
1/8" = 1'-0"

**KEY NOTES PLAN**

1	CONC. STOOP - SEE STRUCTURAL
2	BOLLARD - SEE 3/A202
3	RECESSED DOCK SCISSOR LIFT
4	SOLID SURFACE WINDOW STOOL - ADHESIVE APPLIED, SEAL PERIMETER. SEE ID SHEETS
5	FORWARD-FOLDING BASKETBALL BACKSTOP-SEE SHEET A401
6	SIDE-FOLDING BASKETBALL BACKSTOP - SEE SHEET A401
7	BASKETBALL BACKSTOP - SEE SHEET A402
8	MOTORIZED ROLL-UP GYM DIVIDER CURTAIN
9	GYM CONTROL PAD - SEE ELECT.
10	FURNISHINGS N.I.C
11	CEILING MOUNTED PRIVACY CURTAIN AND TRACK
12	FLOOR INFILL - SEE STRUCT.
13	HVAC EQUIPMENT - SEE MECHANICAL
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15	BENCH - SEE DETAIL 6/A312
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33	POWER ACTUATED DOOR OPENER BUTTON
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35	SHIPS LADDER TO ROOF ACCESS HATCH
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40	EXISTING HANDRAILS TO REMAIN

**KEY NOTES PLAN**

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32	ELECTRIC CONTINUOUS HINGED OPERABLE PARTITION - VERIFY POCKET DIMENSIONS W/ MFG
33	POWER ACTUATED DOOR OPENER BUTTON
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40	EXISTING HANDRAILS TO REMAIN





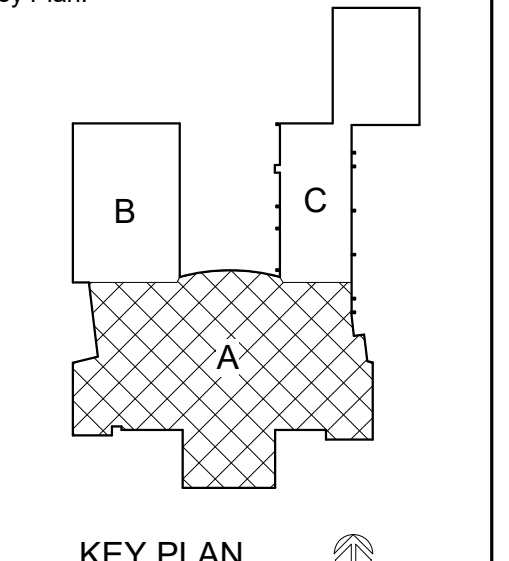
Consultant:

LA CRESCENT - HOKAH PUBLIC SCHOOLS  
ELEMENTARY SCHOOL ADDITION AND  
RENOVATION  
504 SOUTH OAK STREET  
LA CROSSE, MINNESOTA  
SECOND FLOOR - SEGMENT A

Project Title:  
HSR Project Number:  
Project Date:  
Drawn By:  
Key Plan:

19014  
3.5.2020  
DJH

DJH



KEY PLAN

BID  
DOCUMENTS

No.	Description	Date
A03	ADDENDUM 3	3.24.20

Revisions:

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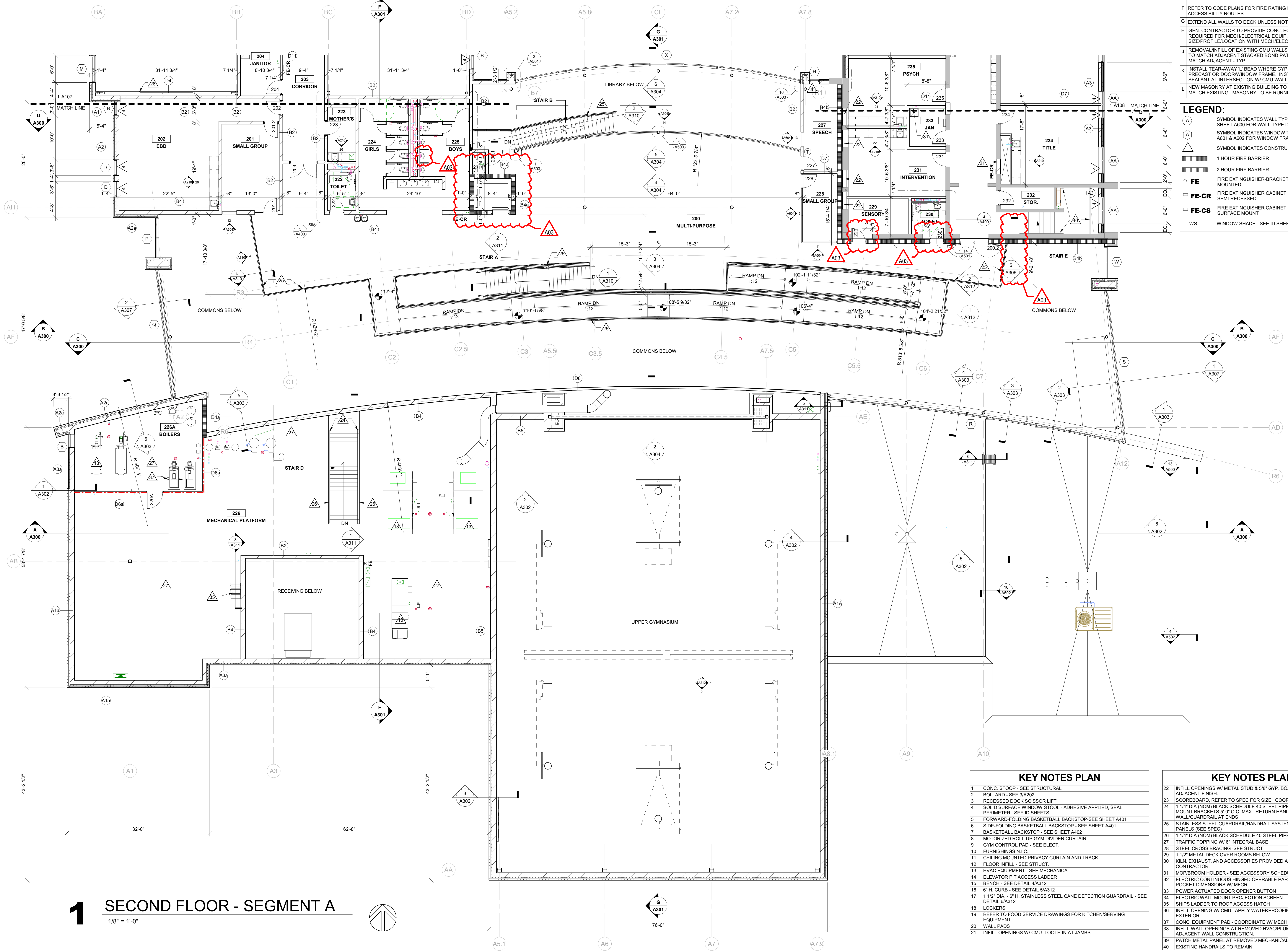
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A106

- GENERAL NOTES:**
- A) SEE ID SHEETS FOR FLOOR AND WALL FINISH LAYOUTS.
  - B) LOOSE FURNISHINGS EXCEPT AS NOTED SHALL BE PROVIDED AND INSTALLED BY THE OWNER.
  - C) VERIFY EXACT SIZE AND LOCATION OF ALL MECHANICAL / PLUMB AND ELEC. OPENINGS - GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FINISH AT ALL VISIBLE AREAS. ALL OPENING SHALL BE SEALED AFTER UTILITY INSTALLATION.
  - D) PAINT ALL EXPOSED STEEL LINTELS.
  - E) SEE STRUCTURAL FOR SLAB CONTROL JOINTS.
  - F) REFER TO CODE PLANS FOR FIRE RATING LOCATIONS AND ACCESSIBILITY ROUTES.
  - G) EXTEND ALL WALLS TO DECK UNLESS NOTED OTHERWISE.
  - H) GEN. CONTRACTOR TO PROVIDE CONC. EQUIP. PADS/CURBS AS REQUIRED FOR MECH/ELECTRICAL EQUIP. - VERIFY SIZE/PROFILE/LOCATION WITH MECH/ELECTRICAL.
  - J) REMOVAL/INFILL OF EXISTING CMU WALLS SHALL BE "TOOTHED" IN TO MATCH ADJACENT STACKED BOND PATTERN. PATCH WALL TO MATCH ADJACENT - TYP.
  - K) INSTALL TEAR-AWAY "I" BEAD WHERE GYP. BOARD ABUTS PRECAST OR DOOR/WINDOW FRAME. INSTALL EDGE TRIM AND SEALANT AT INTERSECTION W/ CMU WALL.
  - L) NEW MASONRY AT EXISTING BUILDING TO BE STACK BOND TO MATCH EXISTING. MASONRY TO BE RUNNING BOND ELSEWHERE.

- LEGEND:**
- (A) SYMBOL INDICATES WALL TYPE - SEE SHEET A600 FOR WALL TYPE DETAILS.
  - (A) SYMBOL INDICATES WINDOW TYPE - SEE SHEET A601 & A602 FOR WINDOW FRAME ELEVATIONS.
  - (A) SYMBOL INDICATES CONSTRUCTION NOTE THIS SHEET
  - 1 HOUR FIRE BARRIER
  - 2 HOUR FIRE BARRIER
  - FE FIRE EXTINGUISHER-BRACKET MOUNTED
  - FE-CR FIRE EXTINGUISHER CABINET - SEMI-RECESSED
  - FE-CS FIRE EXTINGUISHER CABINET - SURFACE MOUNT
  - WS WINDOW SHADE - SEE ID SHEETS



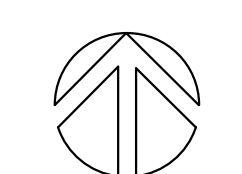
**KEY NOTES PLAN**

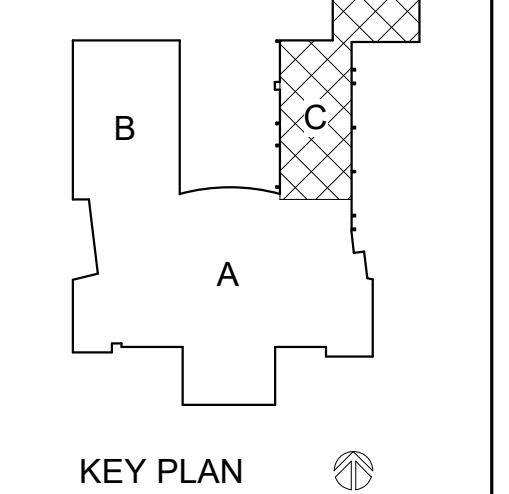
- 1 CONC. STOOP - SEE STRUCTURAL
- 2 BOLLARD - SEE 3/A202
- 3 RECESSED DOCK SCISSOR LIFT
- 4 SOLID SURFACE WINDOW STOOL - ADHESIVE APPLIED, SEAL PERIMETER. SEE ID SHEETS
- 5 FORWARD-FOLDING BASKETBALL BACKSTOP-SEE SHEET A401
- 6 SIDE-FOLDING BASKETBALL BACKSTOP - SEE SHEET A401
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- 8 MOTORIZED ROLL-UP GYM DIVIDER CURTAIN
- 9 GYM CONTROL PAD - SEE ELEC.
- 10 FURNISHINGS N I C
- 11 CEILING MOUNTED PRIVACY CURTAIN AND TRACK
- 12 FLOOR INFILL - SEE STRUCT.
- 13 HVAC EQUIPMENT - SEE MECHANICAL
- 14 ELEVATOR PIT ACCESS LADDER
- 15 BENCH - SEE DETAIL 4/A312
- 16 6" H. CURB - SEE DETAIL 5/A312
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- 18 LOCKERS
- 19 REFER TO FOOD SERVICE DRAWINGS FOR KITCHEN/SERVING EQUIPMENT
- 20 WALL PADS
- 21 INFILL OPENINGS W/ CMU. TOOTH IN AT JAMBS.

**KEY NOTES PLAN**

- 22 INFILL OPENINGS W/ METAL STUD & 5/8" GYP. BOARD - MATCH ADJACENT FINISH.
- 23 SCOREBOARD. REFER TO SPEC FOR SIZE. COORDINATE W/ ELEC.
- 24 1 1/4" DIA (NOM) BLACK SCHEDULE 40 STEEL PIPE HANDRAIL W/ WALL MOUNT BRACKETS 5'-0" O.C. MAX. RETURN HANDRAIL TO WALL/GUARDRAIL AT ENDS
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- 30 KILN, EXHAUST, AND ACCESSORIES PROVIDED AND INSTALLED BY CONTRACTOR
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- 39 PATCH METAL PANEL AT REMOVED MECHANICAL EXHAUST. (BASE BID)
- 40 EXISTING HANDRAILS TO REMAIN

**1 SECOND FLOOR - SEGMENT A**  
1/8" = 1'-0"





BID  
DOCUMENTS

No.	Description	Date
A03	ADDENDUM 3	3.24.20

No.	Description	Date
A03	ADDENDUM 3	3.24.20

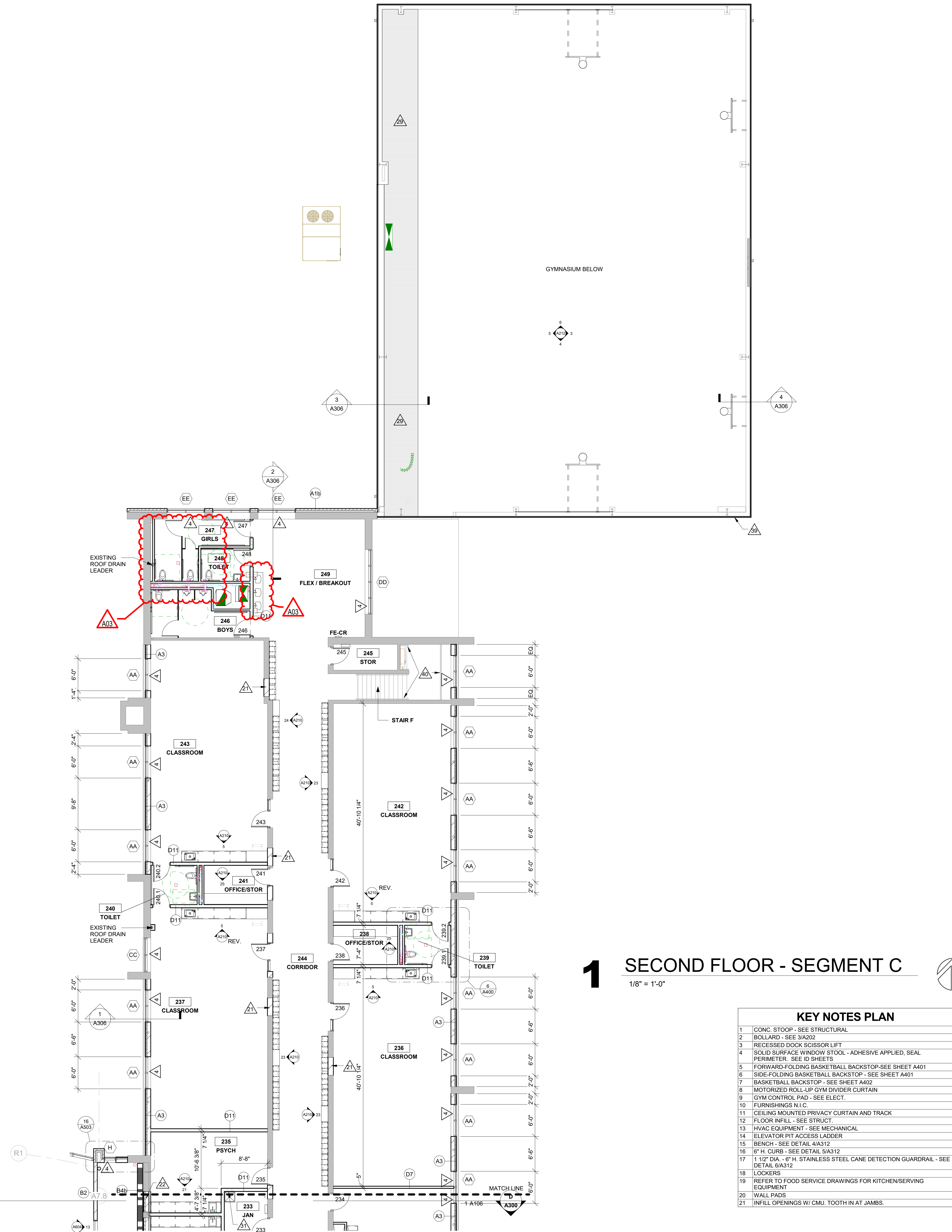
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A108

- GENERAL NOTES:**
- A SEE ID SHEETS FOR FLOOR AND WALL FINISH LAYOUTS.
  - B LOOSE FURNISHINGS EXCEPT AS NOTED SHALL BE PROVIDED AND INSTALLED BY THE OWNER.
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1 SECOND FLOOR - SEGMENT C  
1/8" = 1'-0"

**KEY NOTES PLAN**

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**KEY NOTES PLAN**

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32	ELECTRIC CONTINUOUS HINGED OPERABLE PARTITION - VERIFY POCKET DIMENSIONS W/ MFR
33	POWER ACTUATED DOOR OPENER BUTTON
34	ELECTRIC WALL MOUNT PROJECTION SCREEN
35	SHIPS LADDER TO ROOF ACCESS HATCH
36	INFILL OPENING W/ CMU. APPLY WATERPROOFING MEMBRANE TO EXTERIOR
37	CONC. EQUIPMENT PAD - COORDINATE W/ MECH
38	INFILL WALL OPENINGS AT REMOVED HVAC/PLUMBING. MATCH ADJACENT WALL CONSTRUCTION.
39	PATCH METAL PANEL AT REMOVED MECHANICAL EXHAUST. (BASE BID)
40	EXISTING HANDRAILS TO REMAIN

D A300



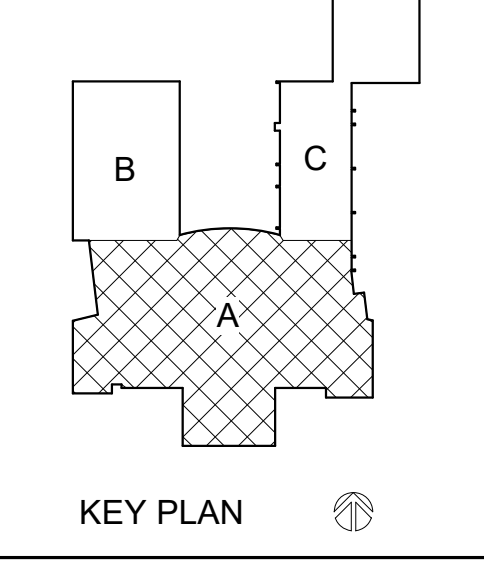
Consultant:

Project Title:  
HSR Project Number:  
Project Date:  
Drawn By:  
Key Plan:

19014

3.5.2020

DJH



KEY PLAN

BID  
DOCUMENTS

No.	Description	Date
A03	ADDENDUM 3	3.24.20

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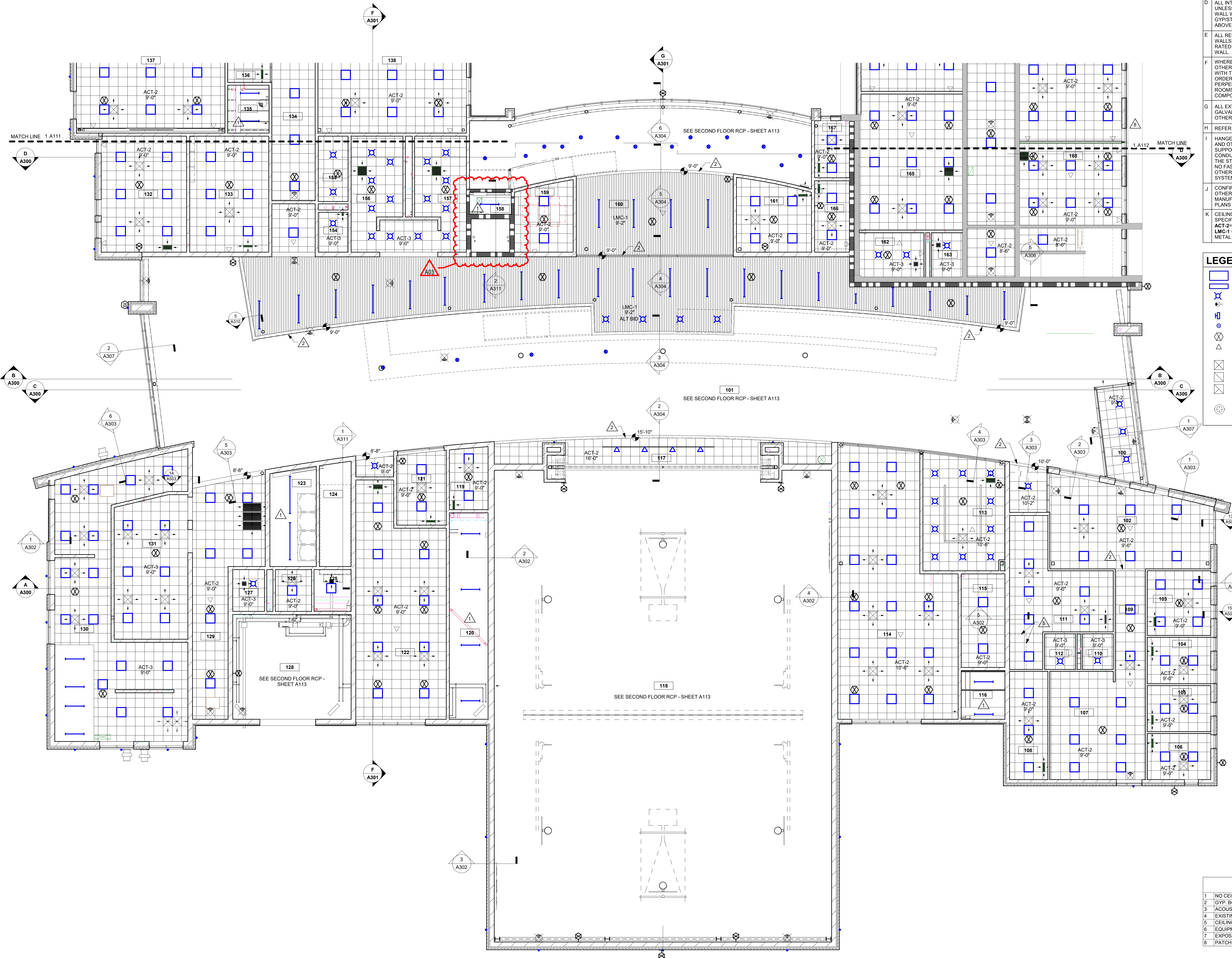
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A110

- GENERAL NOTES:**
- A REFER TO MECHANICAL AND PLUMBING CEILING ACCESS PANEL LOCATIONS & SIZES.
  - B SEE MECHANICAL FOR CEILING GRILLE INFORMATION
  - C SEE ELECTRICAL FOR LIGHTING TYPES
  - D ALL INTERIOR PARTITIONS TO EXTEND TO BOTTOM OF DECK UNLESS OTHERWISE NOTED. CLOSE DECK FLITES AT TOP OF WALL WITH NEOPRENE FILLER OR FIRESTOPPING SYSTEM. IN GYPSTUD PARTITIONS SEE SPECIFICATION FOR LEVEL OF FINISH ABOVE FINISHED CEILING.
  - E ALL REMAINING ANNULAR SPACE AROUND ITEMS PENETRATING WALLS SHALL BE NEATLY SEALED. PENETRATIONS OF FIRE RATED WALLS SHALL BE FIRESTOPPED WITH THE SAME AS THE WALL.
  - F WHERE NO CEILING EXPOSED STRUCTURE UNLESS NOTED OTHERWISE, CONTRACTOR SHALL KEEP ALL MEP ABOVE OR EVEN WITH THE LEVEL OF THE LIGHTS. MEP SHALL RUN IN NEAT ORDERLY APPEARANCE GENERALLY PARALLEL OR PERPENDICULAR TO FINISHED STRUCTURE WALLS IN THESE ROOMS TO RUN TO DECK AND ALL STRUCTURE / MEP COMPONENTS ARE TO BE PAINTED.
  - G ALL EXTERIOR EXPOSED STEEL LINTELS/HEADERS SHALL BE GALVANIZED, PRIMED AND PAINTED UNLESS NOTED OTHERWISE.
  - H REFER TO INTERIOR DESIGN SHEETS FOR OTHER FINISHES
  - I HANGERS AND SUPPORTS: MECHANICAL, PLUMBING, ELECTRICAL AND OTHER CASING CONTRACTORS SHALL NOT HANG OR SUPPORT THE WORK FROM THE ROOF DECK IN ANY FASHION. CONDUIT RUNS SHALL NOT BE LAID ON ROOF DECK NOR LAID ON THE STRUCTURAL SUPPORT THAT SUPPORTS THE ROOF DECK. NO FASTENERS SHALL PENETRATE ROOF DECK BY ANY TRADE OTHER THAN THE ROOFING CONTRACTOR FOR THE NEW ROOF SYSTEM.
  - J CONFIRM EXACT LOCATION OF OVERHEAD PROJECTORS AND OTHER CEILING MOUNTED EQUIPMENT WITH OWNER / MANUFACTURER PRIOR TO INSTALLATION. SEE EQUIPMENT PLANS FOR ADDITIONAL EQUIPMENT.
  - K CEILING TYPES INSTALLED AS NOTED ON PLANS. SEE SPECIFICATIONS FOR ADDITIONAL SYSTEM INFORMATION. ACT-2=REGULAR EDGE, ACT-3=VINYL FACED GYP, LMC-1 = LINEAR METAL CEILING SYSTEM, LMC-2 = LINEAR METAL SOFFIT SYSTEM

- LEGEND:**
- [Symbol] LIGHT FIXTURE - SEE ELECTRICAL
  - [Symbol] LIGHT FIXTURE - SEE ELECTRICAL
  - [Symbol] LIGHT FIXTURE - SEE ELECTRICAL
  - [Symbol] LIGHT FIXTURE - SEE ELECTRICAL
  - [Symbol] LIGHT FIXTURE - SEE ELECTRICAL
  - [Symbol] SPEAKER - SEE ELECTRICAL
  - [Symbol] WIRELESS ACCESS POINT - SEE ELECTRICAL
  - [Symbol] SUPPLY - SEE MECHANICAL
  - [Symbol] RETURN - SEE MECHANICAL
  - [Symbol] EXHAUST - SEE MECHANICAL
  - [Symbol] DESTRAT FAN - SEE MECHANICAL

- KEY NOTES RCP**
- 1 NO CEILING - EXPOSED STRUCTURE (PAINT)
  - 2 GYP BOARD SOFFIT (PAINT)
  - 3 ACOUSTIC TILE CEILING CLOUDS W/ 6" PERIMETER TRIM
  - 4 EXISTING EXPOSED STRUCTURE (PAINT)
  - 5 CEILING MOUNTED PRIVACY CURTAIN AND TRACK
  - 6 EQUIPMENT MOUNTED TO ROOF STRUCTURE ABOVE
  - 7 EXPOSED DUCTWORK - SEE MECHANICAL
  - 8 PATCH CRACKS AND PAINT EXISTING CONC. ROOF OVERHANG



**1** FIRST FLOOR REFLECTED CEILING - SEGMENT A  
1/8" = 1'-0"



G  
A301



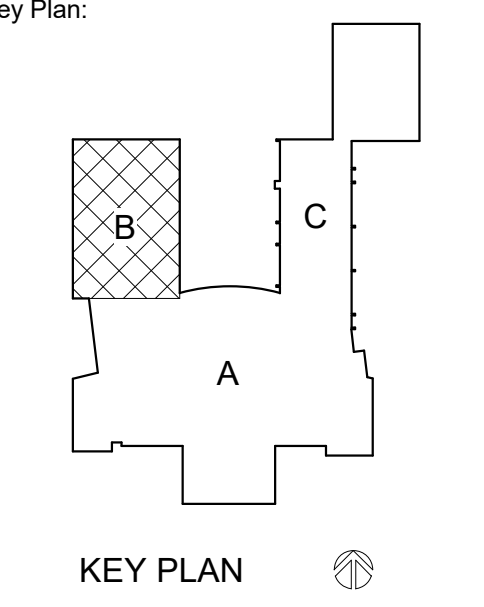
Consultant:

Project Title:  
Project Number:  
Project Date:  
Drawn By:  
Key Plan:

HSR Project Number:  
**19014**

Project Date:  
**3.5.2020**

Drawn By:  
**DJH**



**BID DOCUMENTS**

No.	Description	Date
A03	ADDENDUM 3	3.24.20

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Last Update:  
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**A111**

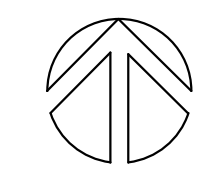
- GENERAL NOTES:**
- A REFER TO MECHANICAL AND PLUMBING CEILING ACCESS PANEL LOCATIONS & SIZES.
  - B SEE MECHANICAL FOR CEILING GRILLE INFORMATION
  - C SEE ELECTRICAL FOR LIGHTING TYPES
  - D ALL INTERIOR PARTITIONS TO EXTEND TO BOTTOM OF DECK UNLESS OTHERWISE NOTED. CLOSE DECK FLUTES AT TOP OF WALL WITH NEOPRENE FILLER OR FIRESTOPPING SYSTEM. IN GYPSUM PARTITIONS SEE SPECIFICATION FOR LEVEL OF FINISH ABOVE FINISHED CEILING.
  - E ALL REMAINING ANNULAR SPACE AROUND ITEMS PENETRATING WALLS SHALL BE NEATLY SEALED. PENETRATIONS OF FIRE RATED WALLS SHALL BE FIRESTOPPED WITH THE SAME AS THE WALL.
  - F WHERE NO CEILING EXPOSED STRUCTURE UNLESS NOTED OTHERWISE, CONTRACTOR SHALL KEEP ALL MEP ABOVE OR EVEN WITH THE LEVEL OF THE LIGHTS. MEP SHALL RUN IN NEAT ORDERLY APPEARANCE GENERALLY PARALLEL OR PERPENDICULAR TO FINISHED STRUCTURE WALLS IN THESE ROOMS TO RUN TO DECK AND ALL STRUCTURE / MEP COMPONENTS ARE TO BE PAINTED.
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  - H REFER TO INTERIOR DESIGN SHEETS FOR OTHER FINISHES
  - I HANGERS AND SUPPORTS: MECHANICAL, PLUMBING, ELECTRICAL AND OTHER CABLING CONTRACTORS SHALL NOT HANG OR SUPPORT THE WORK FROM THE ROOF DECK IN ANY FASHION. CONDUIT RUNS SHALL NOT BE LAID ON ROOF DECK NOR LAID ON THE STRUCTURAL SUPPORT THAT SUPPORTS THE ROOF DECK. NO FASTENERS SHALL PENETRATE ROOF DECK BY ANY TRADE OTHER THAN THE ROOFING CONTRACTOR FOR THE NEW ROOF SYSTEM.
  - J CONFIRM EXACT LOCATION OF OVERHEAD PROJECTORS AND OTHER CEILING MOUNTED EQUIPMENT WITH OWNER MANUFACTURER PRIOR TO INSTALLATION. SEE EQUIPMENT PLANS FOR ADDITIONAL EQUIPMENT.
  - K CEILING TYPES INSTALLED AS NOTED ON PLANS. SEE SPECIFICATIONS FOR ADDITIONAL SYSTEM INFORMATION.  
ACT-1 = REGULAR EDGE, ACT-2 = VINYL FACED GYP.  
LMC-1 = LINEAR METAL CEILING SYSTEM, LMC-2 = LINEAR METAL SOFFIT SYSTEM

- LEGEND:**
- [Symbol] LIGHT FIXTURE - SEE ELECTRICAL
  - [Symbol] LIGHT FIXTURE - SEE ELECTRICAL
  - [Symbol] LIGHT FIXTURE - SEE ELECTRICAL
  - [Symbol] LIGHT FIXTURE - SEE ELECTRICAL
  - [Symbol] LIGHT FIXTURE - SEE ELECTRICAL
  - [Symbol] SPEAKER - SEE ELECTRICAL
  - [Symbol] WIRELESS ACCESS POINT - SEE ELECTRICAL
  - [Symbol] SUPPLY - SEE MECHANICAL
  - [Symbol] RETURN - SEE MECHANICAL
  - [Symbol] EXHAUST - SEE MECHANICAL
  - [Symbol] DESTRAT FAN - SEE MECHANICAL

- KEY NOTES RCP**
- 1 NO CEILING - EXPOSED STRUCTURE (PAINT)
  - 2 GYP. BOARD SOFFIT (PAINT)
  - 3 ACOUSTIC TILE CEILING CLOUDS W/ 6" PERIMETER TRIM
  - 4 EXISTING EXPOSED STRUCTURE (PAINT)
  - 5 CEILING MOUNTED PRIVACY CURTAIN AND TRACK
  - 6 EQUIPMENT MOUNTED TO ROOF STRUCTURE ABOVE
  - 7 EXPOSED DUCTWORK - SEE MECHANICAL
  - 8 PATCH CRACKS AND PAINT EXISTING CONC. ROOF OVERHANG



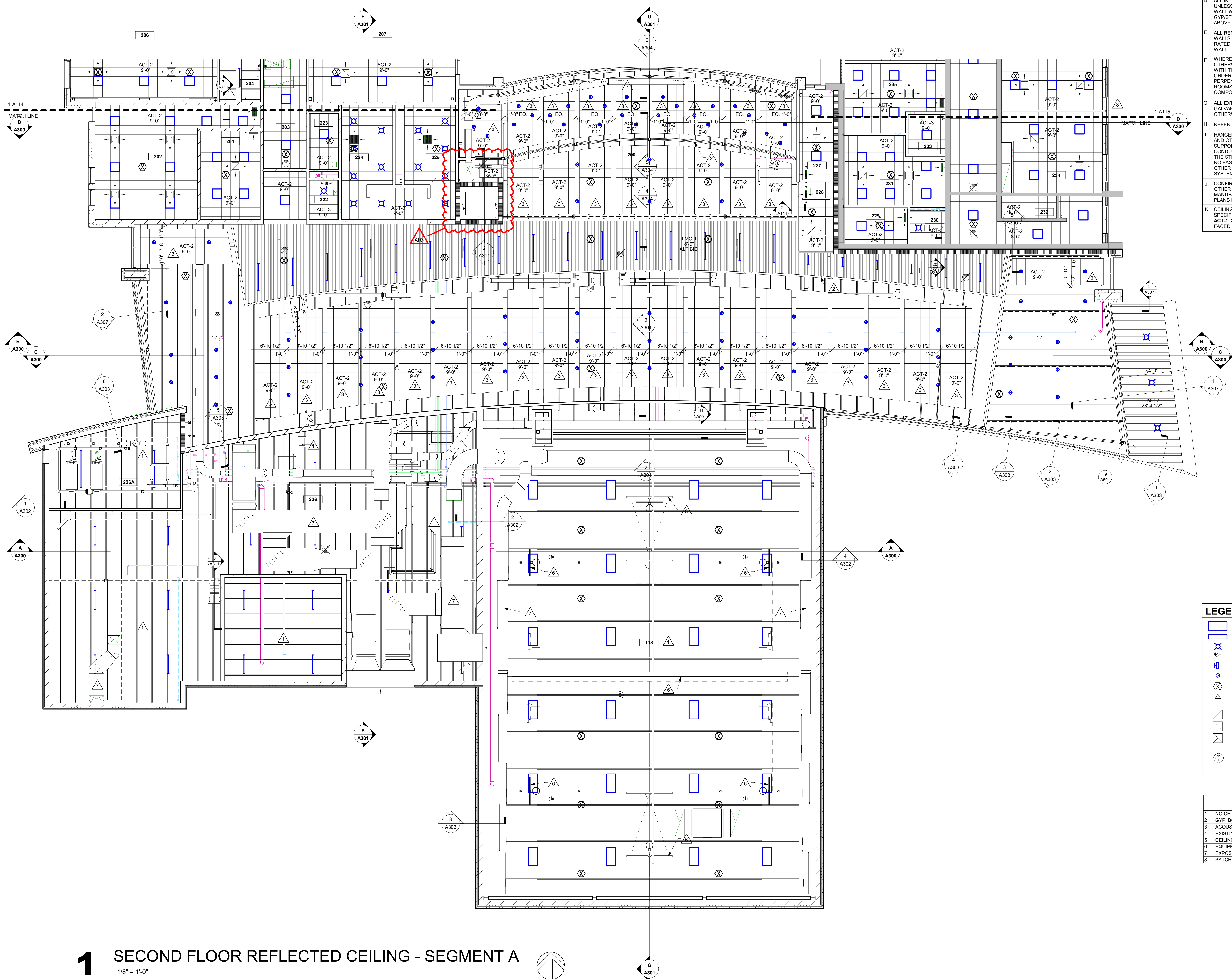
**1** FIRST FLOOR REFLECTED CEILING - SEGMENT B  
1/8" = 1'-0"





Consultant:

- GENERAL NOTES:**
- A REFER TO MECHANICAL AND PLUMBING CEILING ACCESS PANEL LOCATIONS & SIZES.
  - B SEE MECHANICAL FOR CEILING GRILLE INFORMATION
  - C SEE ELECTRICAL FOR LIGHTING TYPES
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  - G ALL EXTERIOR EXPOSED STEEL LINTEL/SHEADERS SHALL BE GALVANIZED, PRIMED AND PAINTED UNLESS NOTED OTHERWISE.
  - H REFER TO INTERIOR DESIGN SHEETS FOR OTHER FINISHES
  - I HANGERS AND SUPPORTS, MECHANICAL, PLUMBING, ELECTRICAL AND OTHER CABLING CONTRACTORS SHALL NOT HANG OR SUPPORT THE WORK FROM THE ROOF DECK IN ANY FASHION. CONDUIT RUNS SHALL NOT BE LAID ON ROOF DECK NOR LAID ON THE STRUCTURAL SUPPORT THAT SUPPORTS THE ROOF DECK. NO FASTENERS SHALL PENETRATE ROOF DECK BY ANY TRADE OTHER THAN THE ROOFING CONTRACTOR FOR THE NEW ROOF SYSTEM.
  - J CONFIRM EXACT LOCATION OF OVERHEAD PROJECTORS AND OTHER CEILING MOUNTED EQUIPMENT WITH OWNER MANUFACTURER PRIOR TO INSTALLATION. SEE EQUIPMENT PLANS FOR ADDITIONAL EQUIPMENT.
  - K CEILING TYPES INSTALLED AS NOTED ON PLANS. SEE SPECIFICATIONS FOR ADDITIONAL SYSTEM INFORMATION. ACT-1= SQUARE EDGE. ACT-2= TEGULAR EDGE. ACT-3= VINYL FACED GYP. LMC-1 = LINEAR METAL CEILING SYSTEM

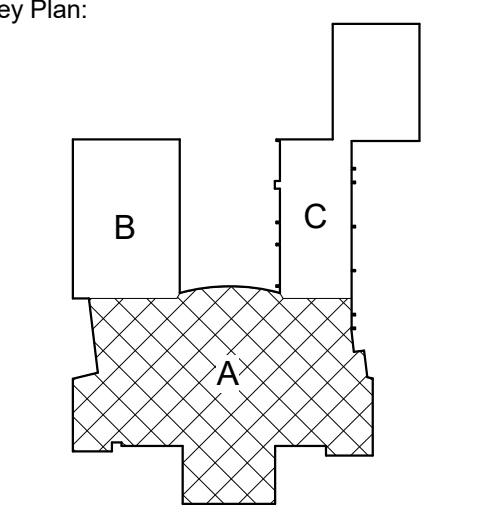


LA CRESCENT - HOKAH PUBLIC SCHOOLS  
ELEMENTARY SCHOOL ADDITION AND  
RENOVATION  
504 SOUTH OAK STREET  
LA CROSSE, MINNESOTA  
SECOND FLOOR RCP - SEGMENT A

Project Title:  
Project Number:  
Project Date:  
Drawn By:  
Key Plan:

HSR Project Number: 19014  
Project Date: 3.5.2020  
Drawn By: DJH

Key Plan:



KEY PLAN

BID DOCUMENTS

No.	Description	Date
A03	ADDENDUM 3	3.24.20

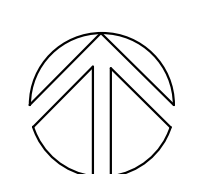
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Last Update: 3/23/2020 12:54:03 PM

**A113**

**1 SECOND FLOOR REFLECTED CEILING - SEGMENT A**

1/8" = 1'-0"



G  
A301

- LEGEND:**
- [Symbol] LIGHT FIXTURE - SEE ELECTRICAL
  - [Symbol] LIGHT FIXTURE - SEE ELECTRICAL
  - [Symbol] LIGHT FIXTURE - SEE ELECTRICAL
  - [Symbol] LIGHT FIXTURE - SEE ELECTRICAL
  - [Symbol] LIGHT FIXTURE - SEE ELECTRICAL
  - [Symbol] LIGHT FIXTURE - SEE ELECTRICAL
  - [Symbol] SPEAKER - SEE ELECTRICAL
  - [Symbol] WIRELESS ACCESS POINT - SEE ELECTRICAL
  - [Symbol] SUPPLY - SEE MECHANICAL
  - [Symbol] RETURN - SEE MECHANICAL
  - [Symbol] EXHAUST - SEE MECHANICAL
  - [Symbol] DESTRAT FAN - SEE MECHANICAL

- KEY NOTES RCP**
- 1 NO CEILING - EXPOSED STRUCTURE (PAINT)
  - 2 GYP BOARD SOFFIT (PAINT)
  - 3 ACOUSTIC TILE CEILING CLOUDS W/ 6" PERIMETER TRIM
  - 4 EXISTING EXPOSED STRUCTURE (PAINT)
  - 5 CEILING MOUNTED PRIVACY CURTAIN AND TRACK
  - 6 EQUIPMENT MOUNTED TO ROOF STRUCTURE ABOVE
  - 7 EXPOSED DUCTWORK - SEE MECHANICAL
  - 8 PATCH CRACKS AND PAINT EXISTING CONC. ROOF OVERHANG

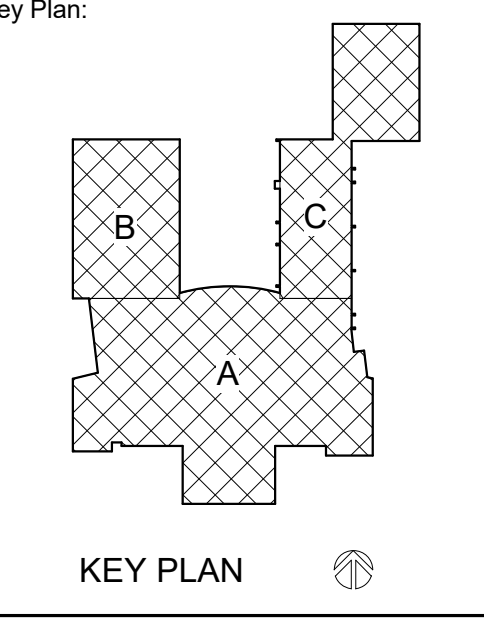


Consultant:

LA CRESCENT - HOKAH PUBLIC SCHOOLS  
ELEMENTARY SCHOOL ADDITION AND  
RENOVATION  
504 SOUTH OAK STREET  
LA CRESCENT, MINNESOTA  
ROOF PLAN

Project Title:  
Project Number:  
Project Date:  
Drawn By:

19014  
3.5.2020  
DJH



BID  
DOCUMENTS

Revisions:

No.	Description	Date
A03	ADDENDUM 3	3.24.20

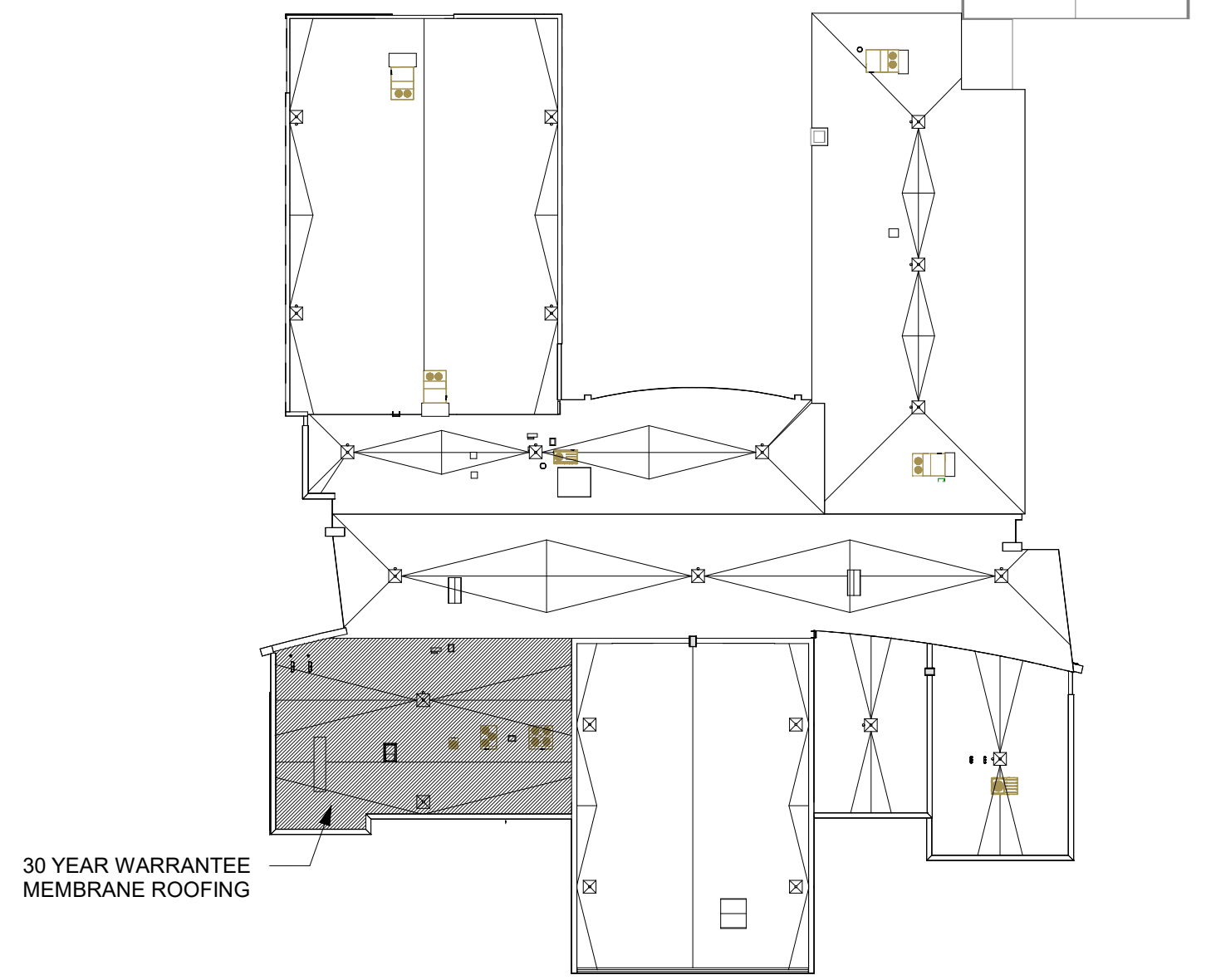
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3/24/2020 1:29:57 PM

A120

- GENERAL ROOF NOTES:**
- SEE ROOF SYSTEM NOTES FOR MINIMUM AND AVERAGE INSULATION VALUES.
  - ROOFING CONTRACTOR TO VERIFY ALL TAPERED INSULATION DRAWING PLAN DRAIN LOCATIONS WITH PHYSICAL LOCATION OF ROOF DRAIN AS INSTALLED BY PLUMBING TRADE PRIOR TO APPROVAL OF TAPERED INSULATION SUBMITTAL DRAWING ONLY.
  - VERIFY ROOF EQUIPMENT AND PENETRATIONS WITH ALL TRADES. EQUIPMENT SHOWN IS GRAPHIC ONLY.
  - ALL METAL ITEMS AT ROOF TOPS, UNLESS REQUIRED OTHERWISE BY EQUIPMENT MANUFACTURER, SHALL BE PAINTED TO MATCH OTHER TRIM BY THE G.C. - PREPARE, PRIME AND PAINT AS REQUIRED. PROVIDE FACTORY PRIMED PRODUCTS WHERE POSSIBLE.
  - ROOF PENETRATIONS FOR DRAINS, VENTS, ETC. SHALL BE COMPLETED AS PER CURRENT SMACNA REQUIREMENTS AND THE ROOF MANUFACTURERS APPROVED DETAILS FOR WARRANTY SATISFACTION. COORDINATE QUANTITY AND LOCATIONS WITH MEP CONTRACTOR. PROVIDE CURBS WHERE REQUIRED.
  - ALL METAL ROOF AND FLASHING, SHALL MEET CURRENT SMACNA REQUIREMENTS AND MANUFACTURER'S SPECIFIED WARRANTY.
  - WHERE MEMBRANE IS SHOWN OVER TOP OF WALL EXTEND DOWN OPPOSITE SIDE AND SECURE TO BLOCKING.
  - TOP OF WALL BLOCKING SHOWN IS GRAPHIC. PROVIDE BLOCKING THAT SHALL BE ANCHORED TO WALL BELOW AS RECOMMENDED BY ROOFING SYSTEM MANUFACTURER TO WITHSTAND WIND UPLIFT AS STATED IN CODE. TOP OF WALLS SHALL SLOPE TOWARDS ROOF.
  - INSTALL BOND BREAK BETWEEN ALL WOOD BLOCKING AND CMU OR CONCRETE.
  - WHERE ROOF DRAINS PENETRATE ABOVE ROOMS W/ NO CEILING CARE SHALL BE TAKEN TO ENSURE TIGHT CUTS IN THE DECK AND PIPING/INSULATION SHALL BE CUT AND ANCHORED NEATLY @ RIGHT ANGLES TO STRUCTURE.
  - THE GENERAL CONTRACTOR, ROOFING CONTRACTOR AND MEP CONTRACTORS SHALL MEET TO PLAN AND DISCUSS FINAL ROOF DRAIN LOCATIONS. TAPERED INSULATION DRAWING SHALL BE RE-SUBMITTED TO THE A/E AFTER DRAIN LOCATIONS ARE APPROVED BY ALL IN WRITING. TAPERED INSULATION INSTALLED CONTRARY TO THE LOW POINT OF THE DRAIN OVER FLOW OR SCUPPER LOCATIONS SHALL BE CAUSE FOR REJECTION OF WORK.
  - THE GENERAL CONTRACTOR, ROOFING CONTRACTOR AND PLUMBING CONTRACTORS SHALL MEET TO PLAN AND DISCUSS FINAL ROOF DRAIN LOCATIONS. TAPERED INSULATION DRAWING SHALL BE RE-SUBMITTED TO THE A/E AFTER DRAIN LOCATIONS ARE APPROVED BY ALL IN WRITING. TAPERED INSULATION INSTALLED CONTRARY TO THE LOW POINT OF THE DRAIN OVER FLOW OR SCUPPER LOCATIONS SHALL BE CAUSE FOR REJECTION OF WORK.

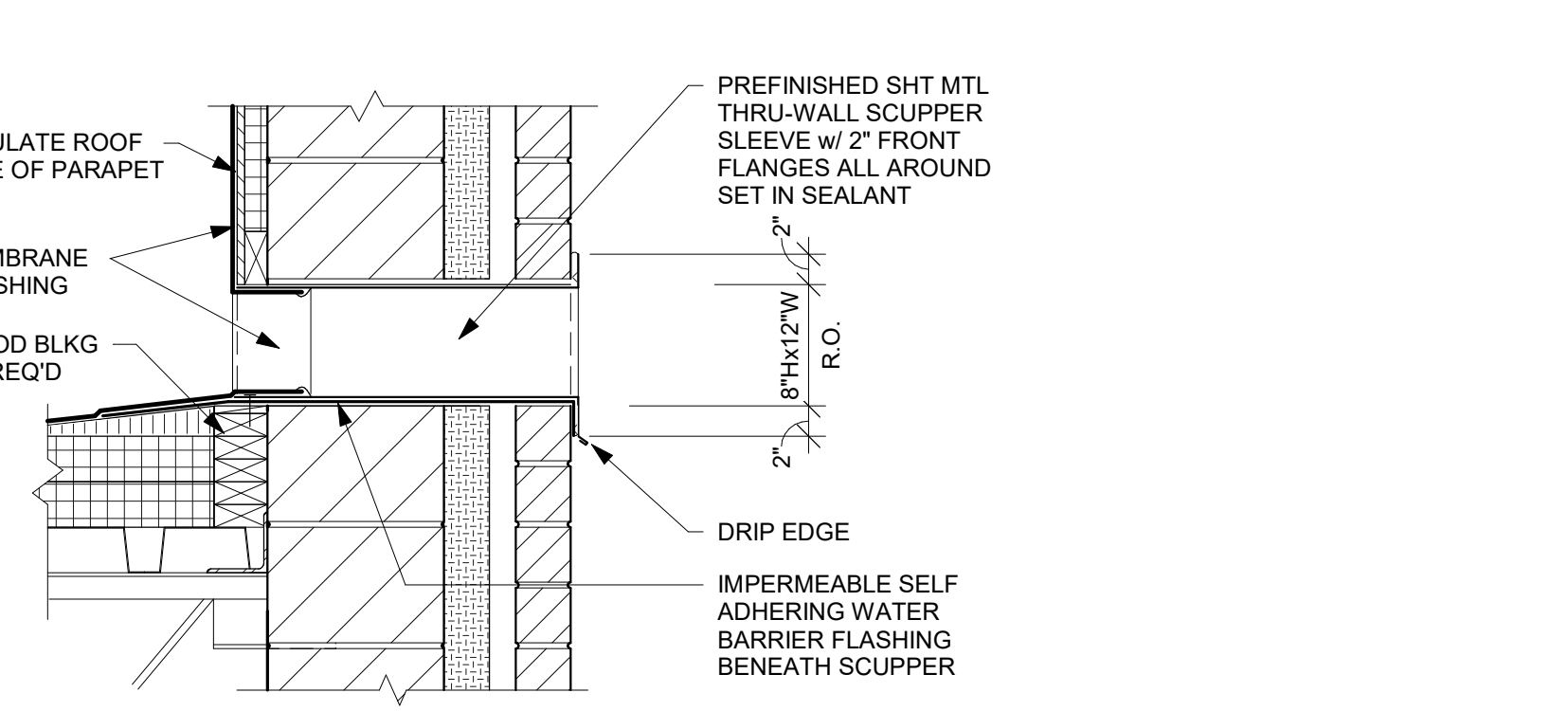
- ROOF SYSTEM DESCRIPTIONS:**
- FLAT ROOF STRUCTURE: ADHERED, SINGLE MEMBRANE ROOFING SYSTEM ON 1/4" PER FOOT TAPERED POLYISOCYANURATE INSULATION SYSTEM CONSISTING OF TAPERED INSUL OVER MINIMUM 5 1/2" BASE LAYER. INSULATION R VALUE = 5.7 PER INCH. INSTALL INSULATION OVER VAPOR BARRIER OVER METAL DECK.
  - SLOPED ROOF STRUCTURE: ADHERED, SINGLE MEMBRANE ROOFING SYSTEM ON 6" (MINIMUM 2 LAYERS) POLYISOCYANURATE INSULATION. INSULATION R VALUE = 5.7 PER INCH. INSTALL INSULATION W/ STAGGERED JOINTS OVER VAPOR BARRIER OVER METAL DECK. SLOPED ROOF STRUCTURE AREA IS INDICATED BY CROSSHATCH.
  - EXISTING FLAT ROOF STRUCTURE. EXISTING ROOFING AND INSULATION TO BE REMOVED. ADHERED, SINGLE MEMBRANE ROOFING SYSTEM ON 1/4" PER FOOT TAPERED POLYISOCYANURATE INSULATION SYSTEM CONSISTING OF TAPERED INSUL OVER MINIMUM 5 1/2" BASE LAYER. INSULATION R VALUE = 5.7 PER INCH. INSTALL INSULATION OVER VAPOR BARRIER OVER EXISTING DECK. (ALT. BID)
- \* VAPOR BARRIER SHALL LAP UP AT PERIMETER AND OVERLAP JOINTS.

- ROOF EQUIPMENT LEGEND:**
- RTU ACU ROOFTOP MECHANICAL UNIT-SEE MECHANICAL.
  - VENT HOOD-SEE MECHANICAL.
  - AIR INTAKE/EXHAUST VENT-SEE MECHANICAL.
  - PLUMBING VENT-SEE PLUMBING.
  - RD ROOF DRAIN WITH 4" SQUARE SUMP - SEE DETAIL 2/A120. INSTALL TO MEET ROOF WARRANTY REQUIREMENT - SEE PLUMBING.
  - ORD OVERFLOW ROOF DRAIN. INSTALL TO MEET ROOF WARRANTY REQUIREMENT - SEE PLUMBING.

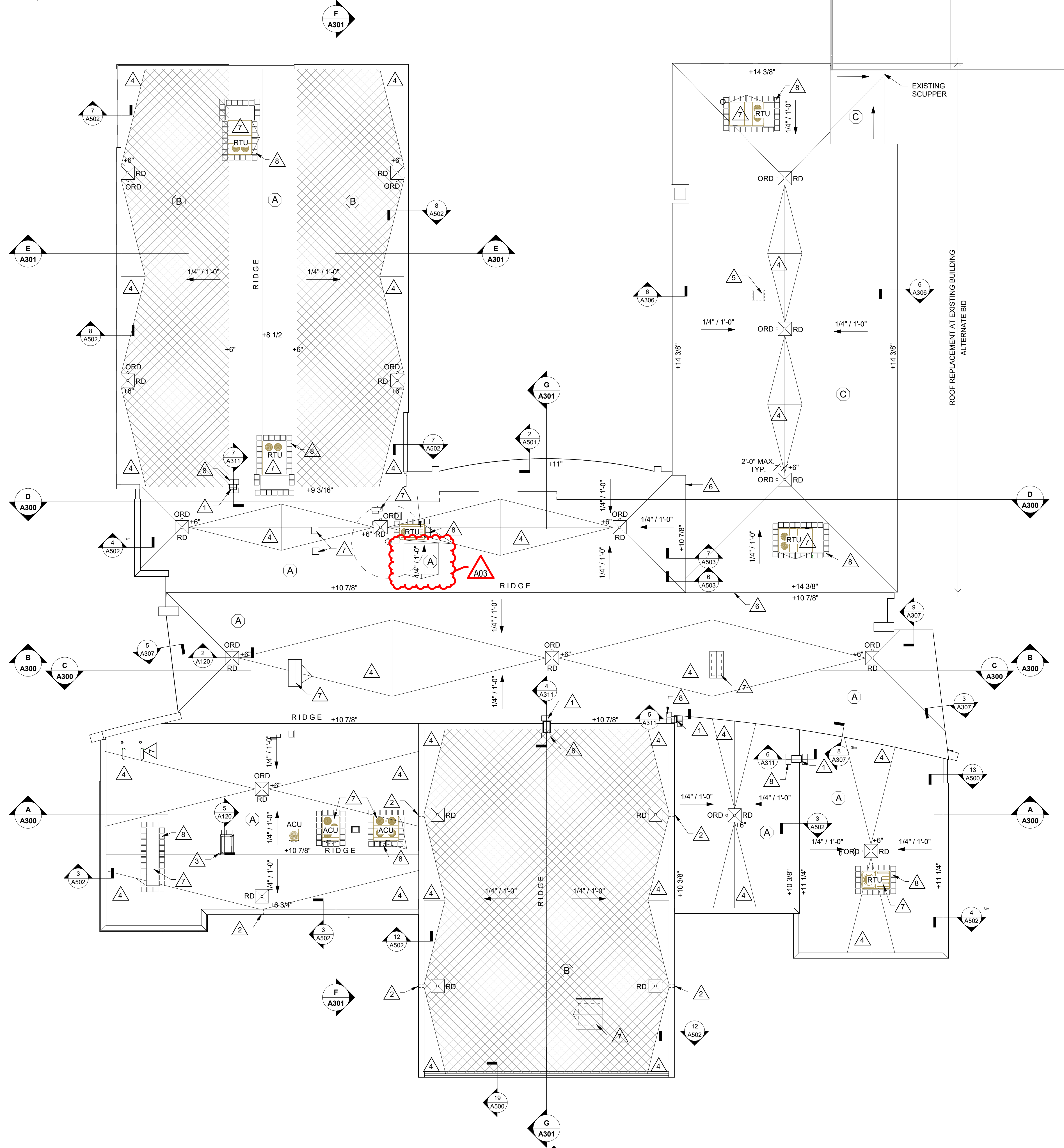


**KEY NOTES ROOF**

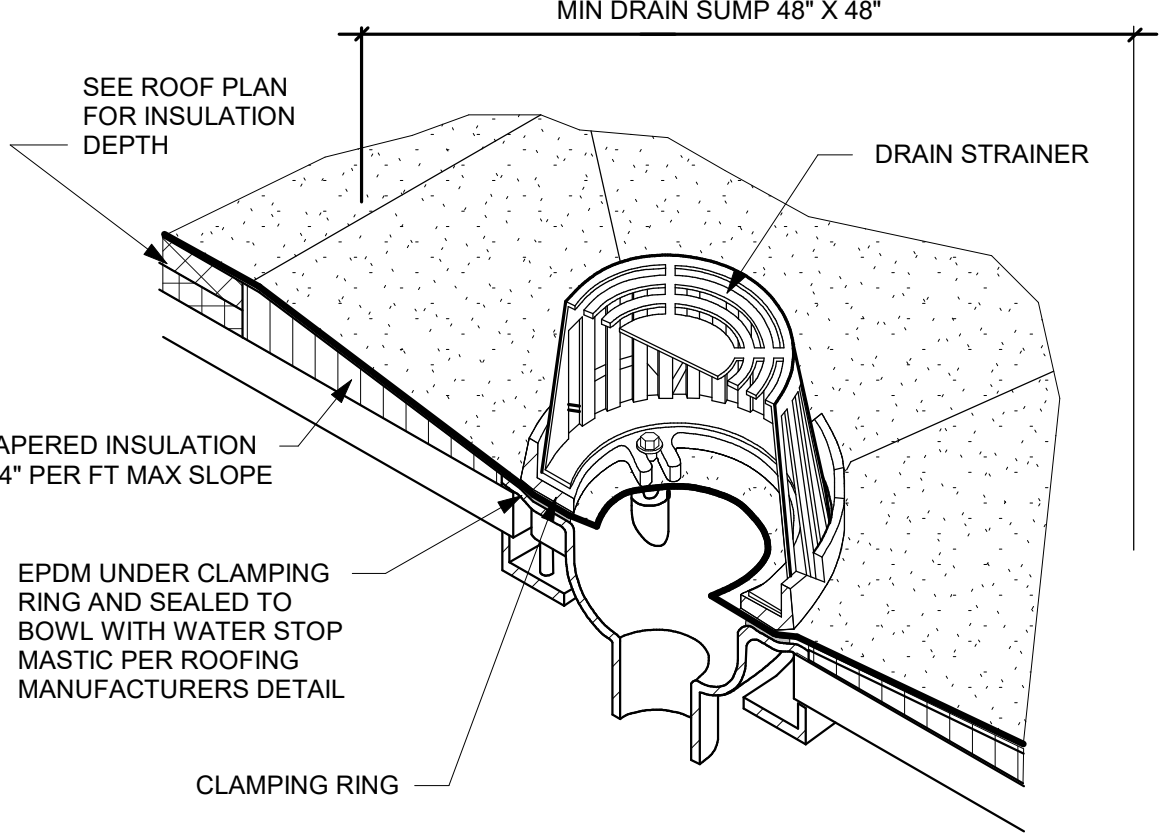
- ROOF ACCESS LADDER
- 12" WIDE X 9" HIGH PREFINISHED SHEET METAL THRU-WALL OVERFLOW ROOF SCUPPER
- 30" X 54" ROOF ACCESS HATCH - PAINT COVER
- TAPERED INSULATION CRICKET
- INFILL ROOF OPENING AT REMOVED HATCH
- ROOF EXPANSION JOINT
- MECHANICAL EQUIPMENT - SEE MECHANICAL SHEETS. REFER TO 4/A120 FOR CURB DETAIL.
- WALKWAY PADS



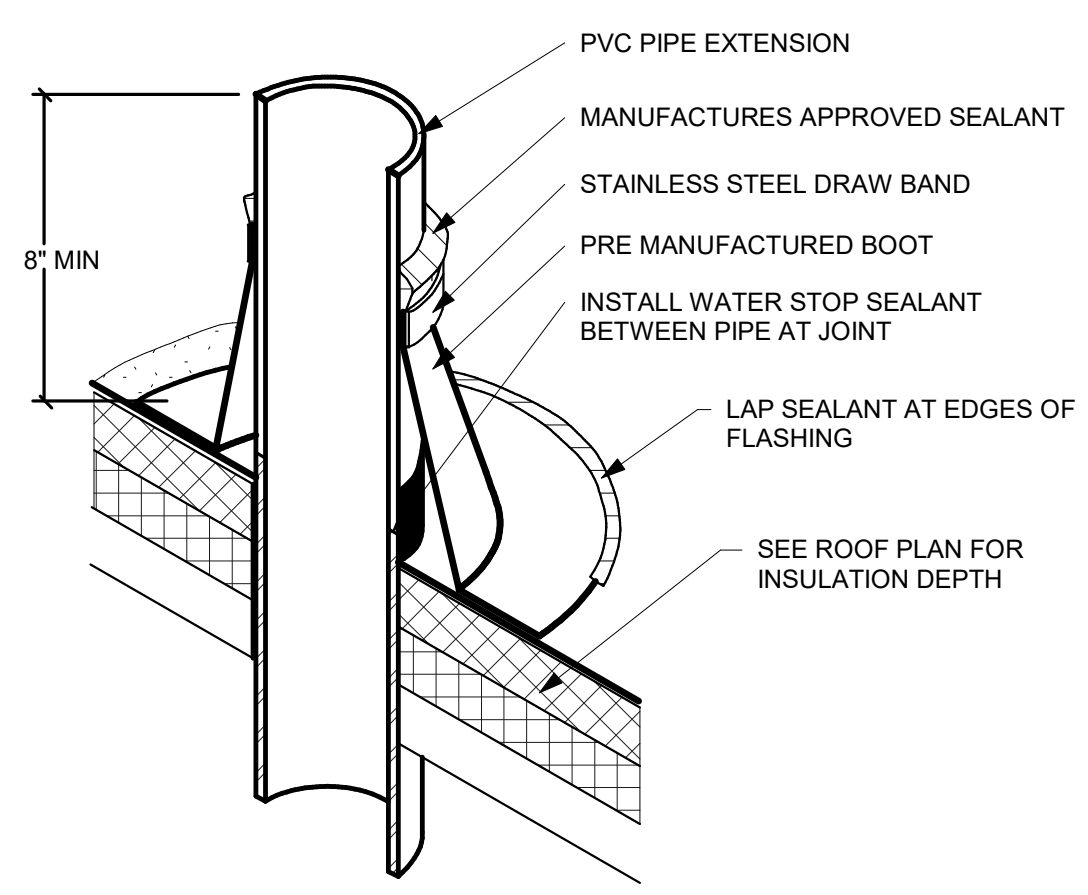
**6 OVERFLOW SCUPPER**  
1" = 1'-0"



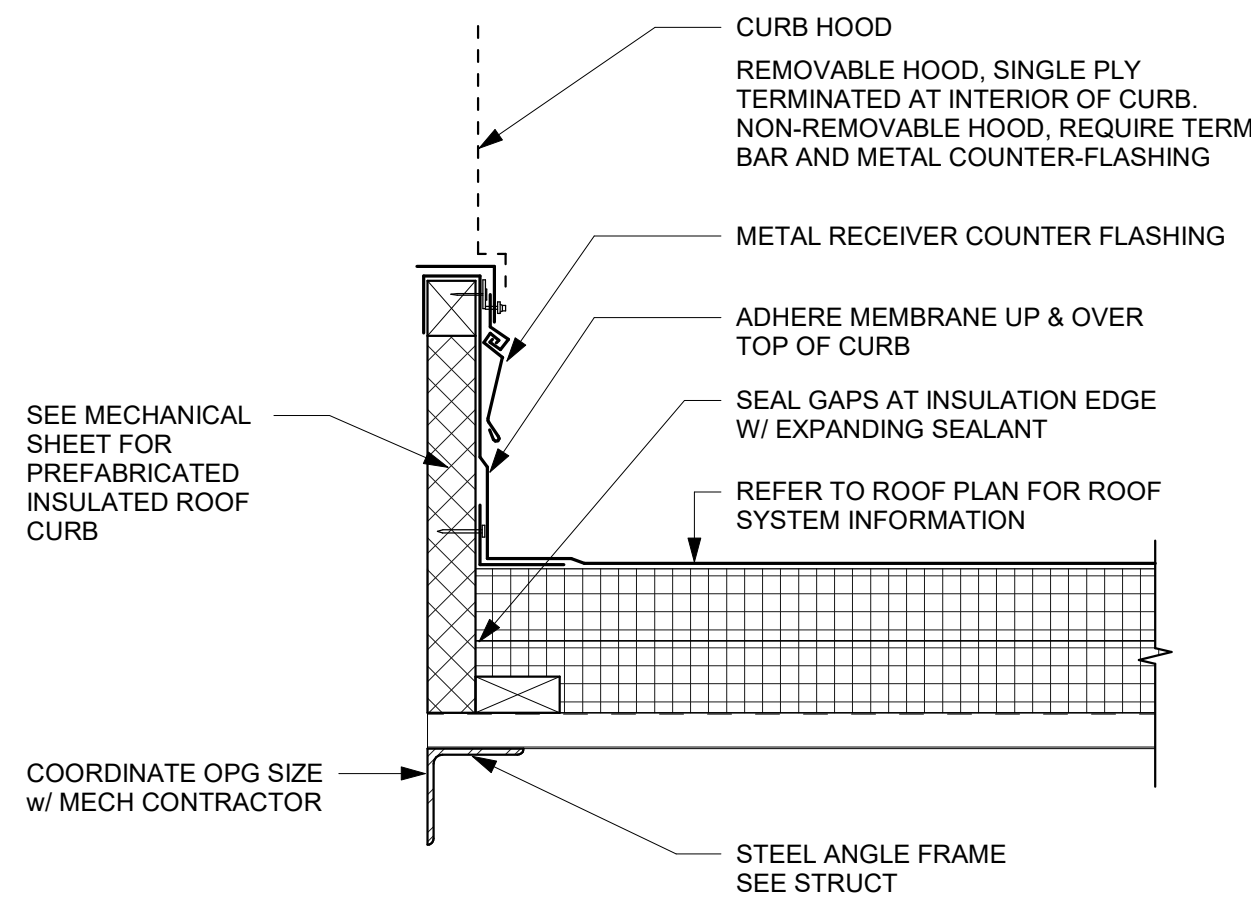
**1 ROOF PLAN**  
1/16" = 1'-0"



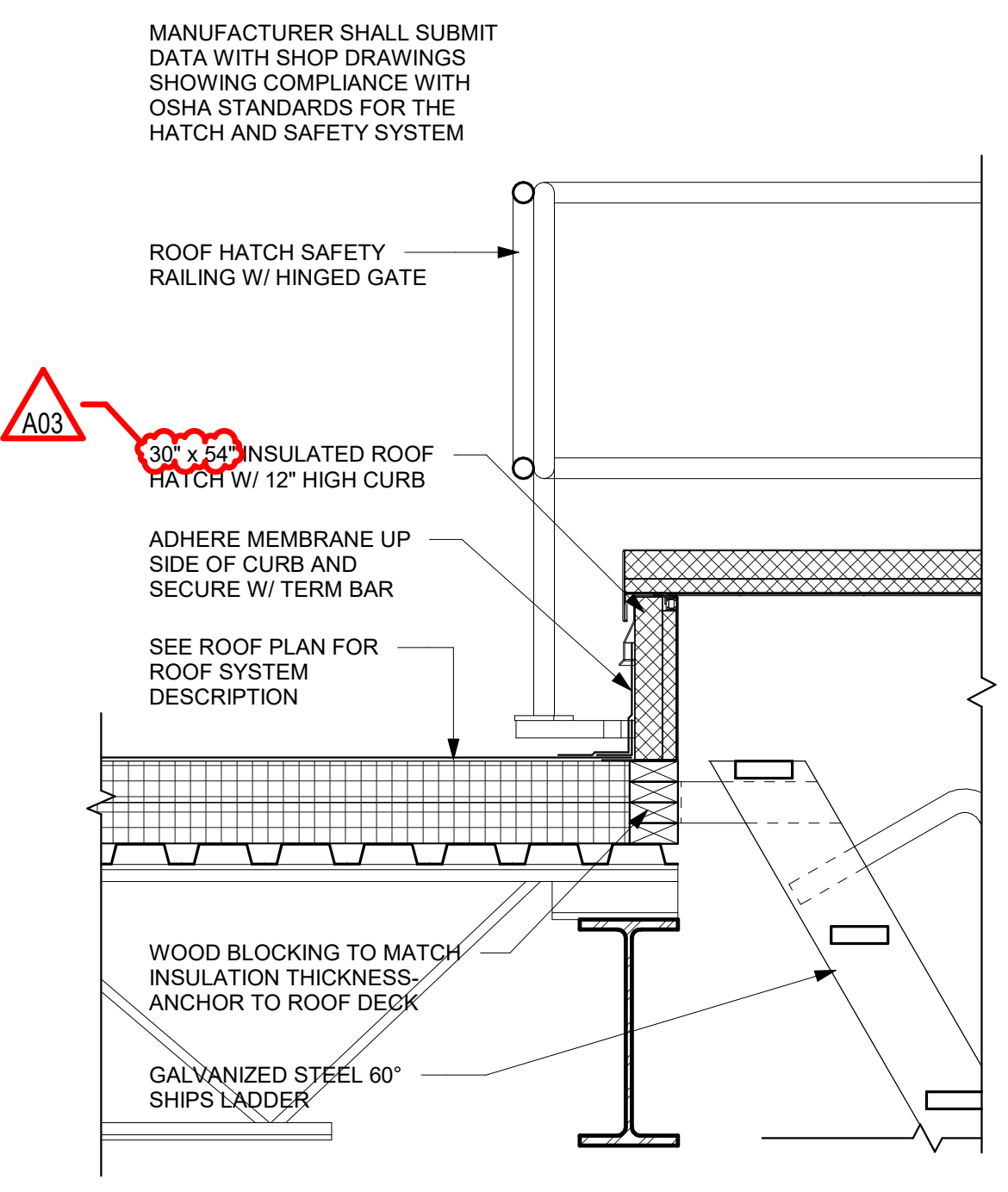
**2 TYP ROOF DRAIN**



**3 PIPE FLASHING**

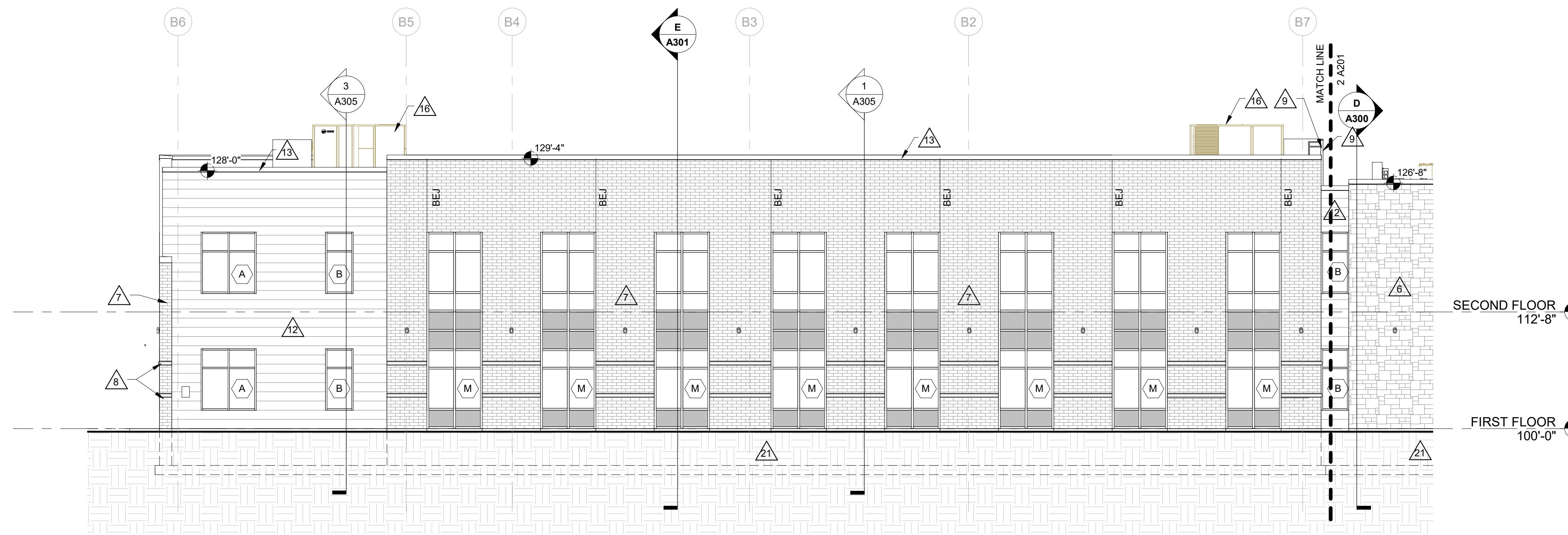


**4 CURB FLASHING**  
1 1/2" = 1'-0"



**5 ROOF HATCH**  
1" = 1'-0"

**7 ROOF WARRANTY**  
1" = 50'-0"



**1 WEST ELEVATION - SEGMENT B**  
1/8" = 1'-0"

**GENERAL NOTES:**

A SEE DETAILS A510 FOR CONTROL JOINT (CJ) AND BRICK CONTROL JOINT (BCJ) INFORMATION.

B BRICK COURSEING: RUNNING BOND TYPICAL.

C SEE SPECIFICATION FOR MATERIAL TYPE.

**LEGEND:**

KEYNOTE TAG

WINDOW TAG, SEE SHEET A600 FOR FRAME ELEVATIONS

CJ THROUGH WALL CONTROL JOINT - SEE DETAILS A510

BCJ BRICK VENEER CONTROL JOINT - SEE DETAILS A510

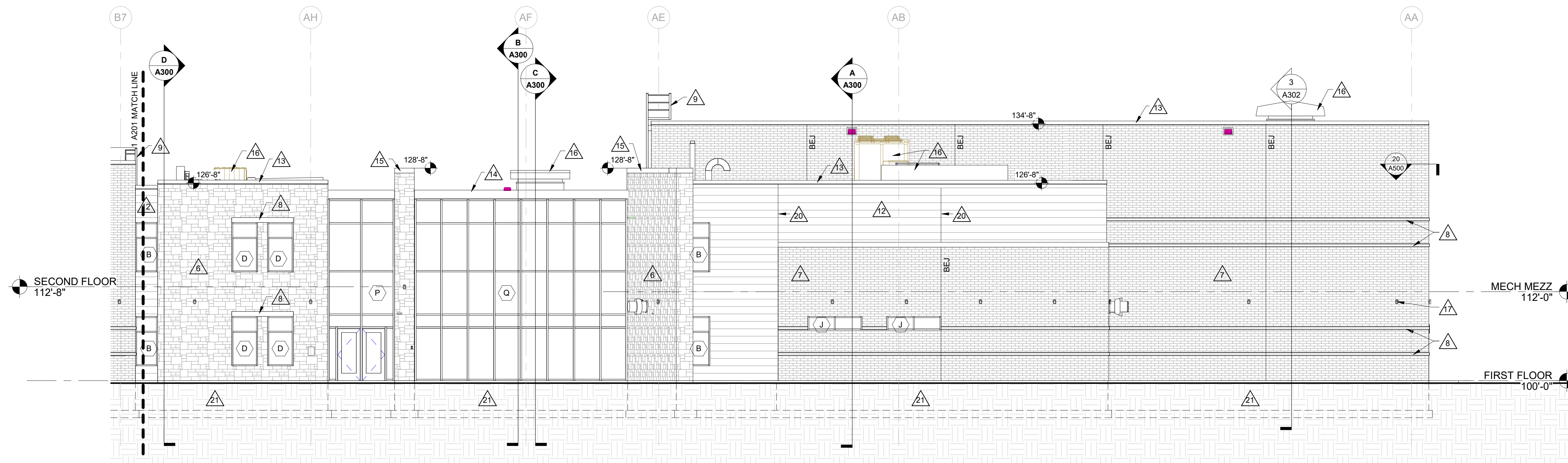
FACE BRICK

STONE

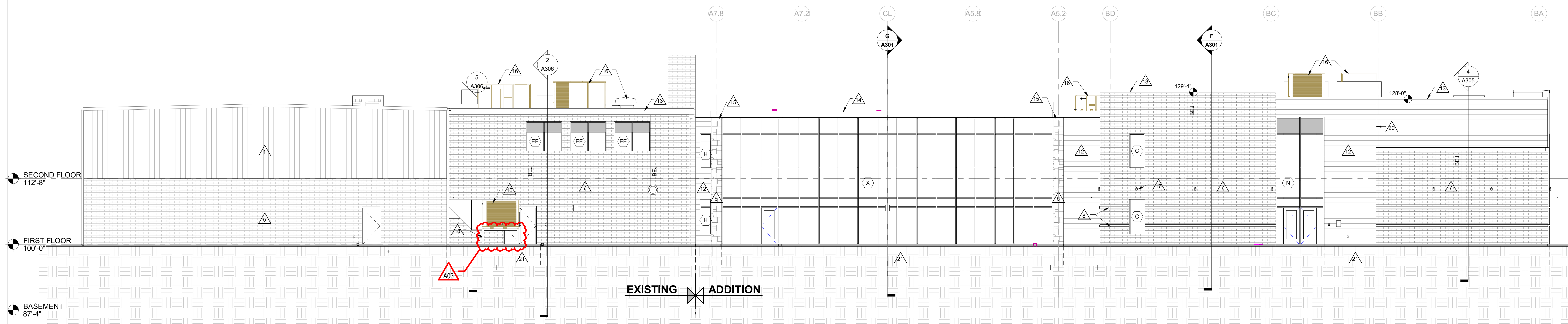
METAL PANEL

**KEY NOTES ELEVATION**

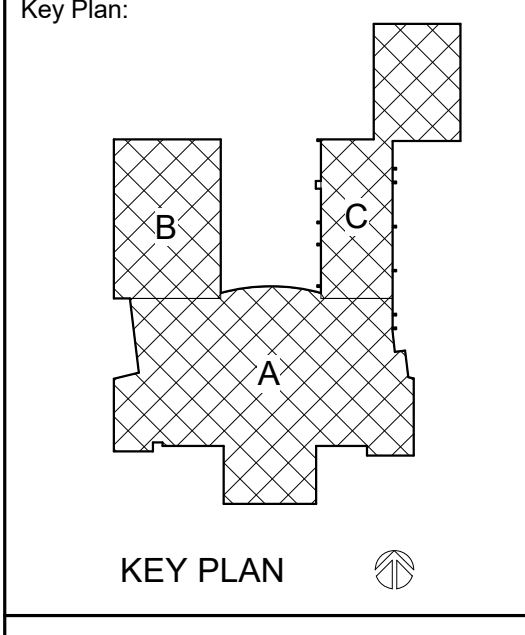
- BASE BID. PREP AND REPAINT EXISTING METAL WALL PANELS. ALTERNATE BID REMOVE EXISTING INSULATED METAL WALL PANELS. REPLACE WITH NEW ARCH METAL WALL PANELS.
- REMOVE EXISTING DOWNSPOUT FOR INSTALLATION OF NEW WALL PANELS. REINSTALL DOWNSPOUT AFTER PANELS ARE INSTALLED.
- NEW OPENFACE DOWNSPOUT W/ SPLASH BLOCK - CONNECT TO EXISTING GUTTER
- EXISTING BRICK - WASH PRIOR TO WINDOW INSTALLATION
- EXISTING BRICK - WASH AND TUCKPOINT
- STONE
- FACE BRICK
- CAST STONE
- ROOF ACCESS LADDER
- 12" WIDE X 8" HIGH PREFINISHED SHEET METAL THRU-WALL OVERFLOW ROOF SCUPPER - SEE DETAIL 9A120
- INFILL WALL OPENING AT REMOVED DOOR AND FRAME W/ BRICK AND CMU. TOOTH IN BRICK.
- METAL WALL PANEL
- PREFINISHED SHEET METAL COPING
- PREFINISHED SHEET METAL FASCIA
- CAST STONE CAP
- MECHANICAL EQUIPMENT - SEE MECHANICAL DRAWINGS
- JACK BOLTS - SEE MECHANICAL DRAWINGS
- MECHANICAL EQUIPMENT STAND - SEE MECHANICAL DRAWINGS
- COVER - SEE MECHANICAL DRAWINGS
- ROOF ACCESS HATCH RAILING
- CONC FOUNDATION AND FOOTING - SEE STRUCTURAL



**2 WEST ELEVATION - SEGMENT A**  
1/8" = 1'-0"

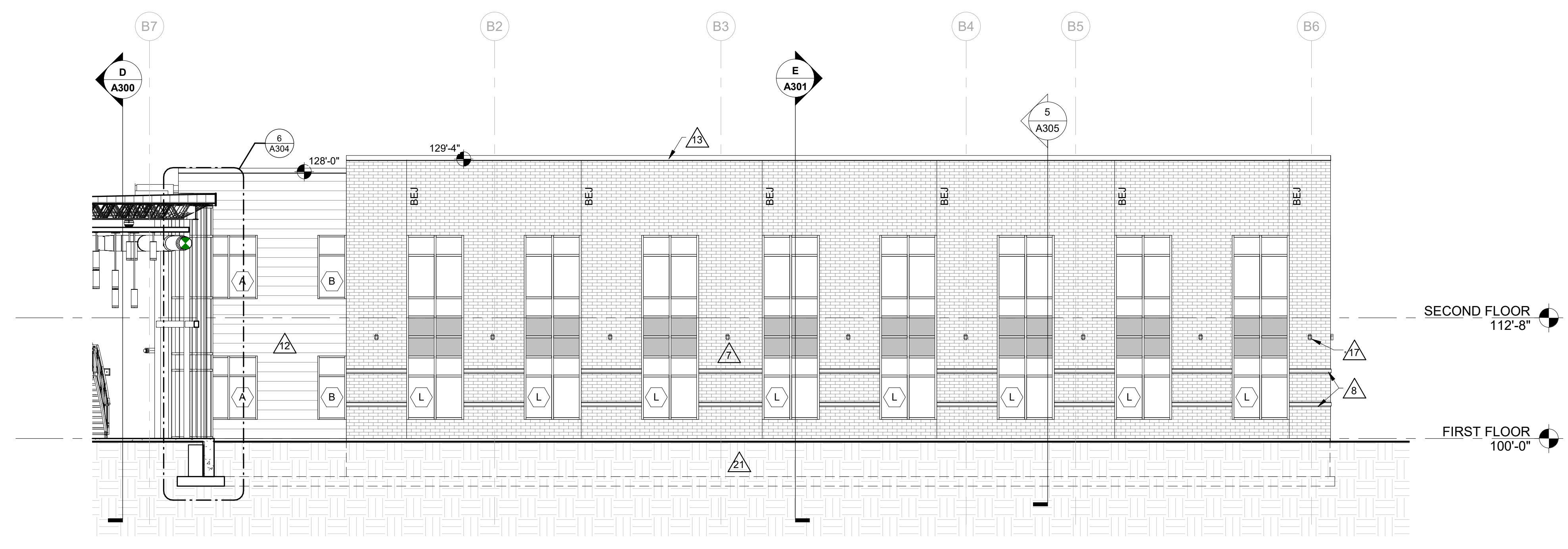


**3 NORTH ELEVATION**  
1/8" = 1'-0"

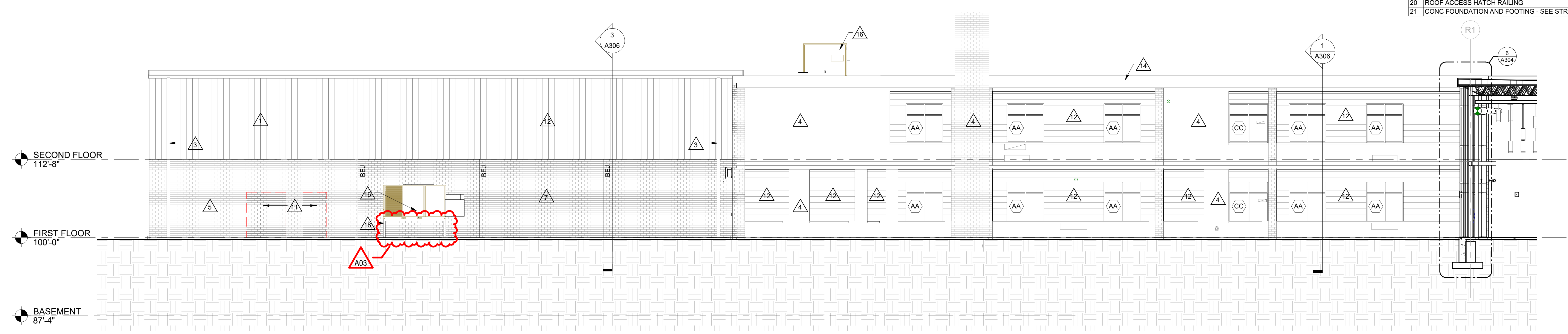


No.	Description	Date
A03	ADDENDUM 3	3.24.20

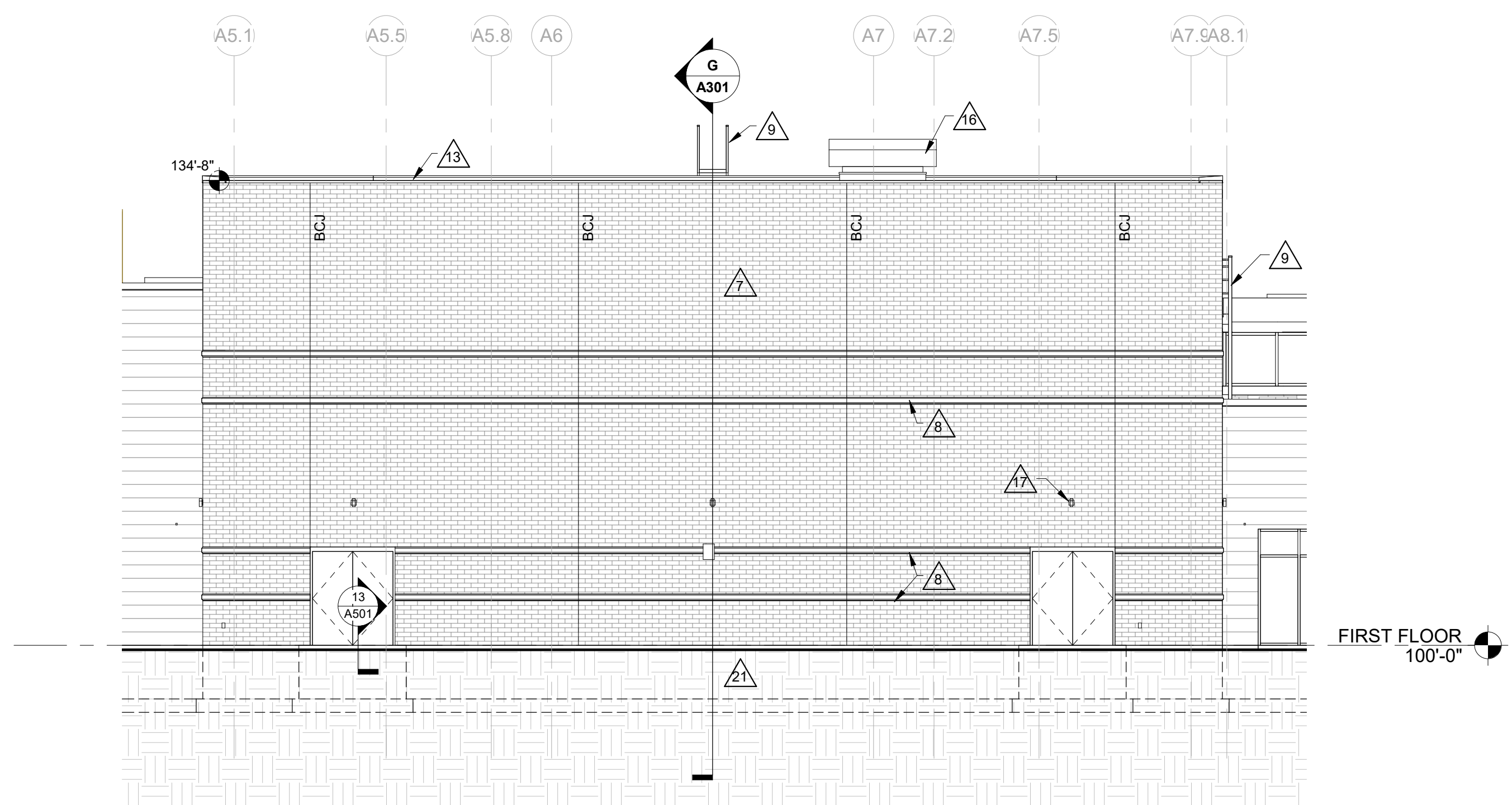




**1 EAST ELEVATION / SEGMENT B**  
1/8" = 1'-0"



**2 WEST ELEVATION / SEGMENT C**  
1/8" = 1'-0"



**4 SOUTH GYM ELEVATION - BASE BID**  
1/8" = 1'-0"

**GENERAL NOTES:**

A SEE DETAILS A510 FOR CONTROL JOINT (CJ) AND BRICK CONTROL JOINT (BCJ) INFORMATION.

B BRICK COURSING: RUNNING BOND TYPICAL.

C SEE SPECIFICATION FOR MATERIAL TYPE.

**LEGEND:**

KEYNOTE TAG

WINDOW TAG, SEE SHEET A600 FOR FRAME ELEVATIONS

CJ THROUGH WALL CONTROL JOINT - SEE DETAILS A510

BCJ BRICK VENEER CONTROL JOINT - SEE DETAILS A510

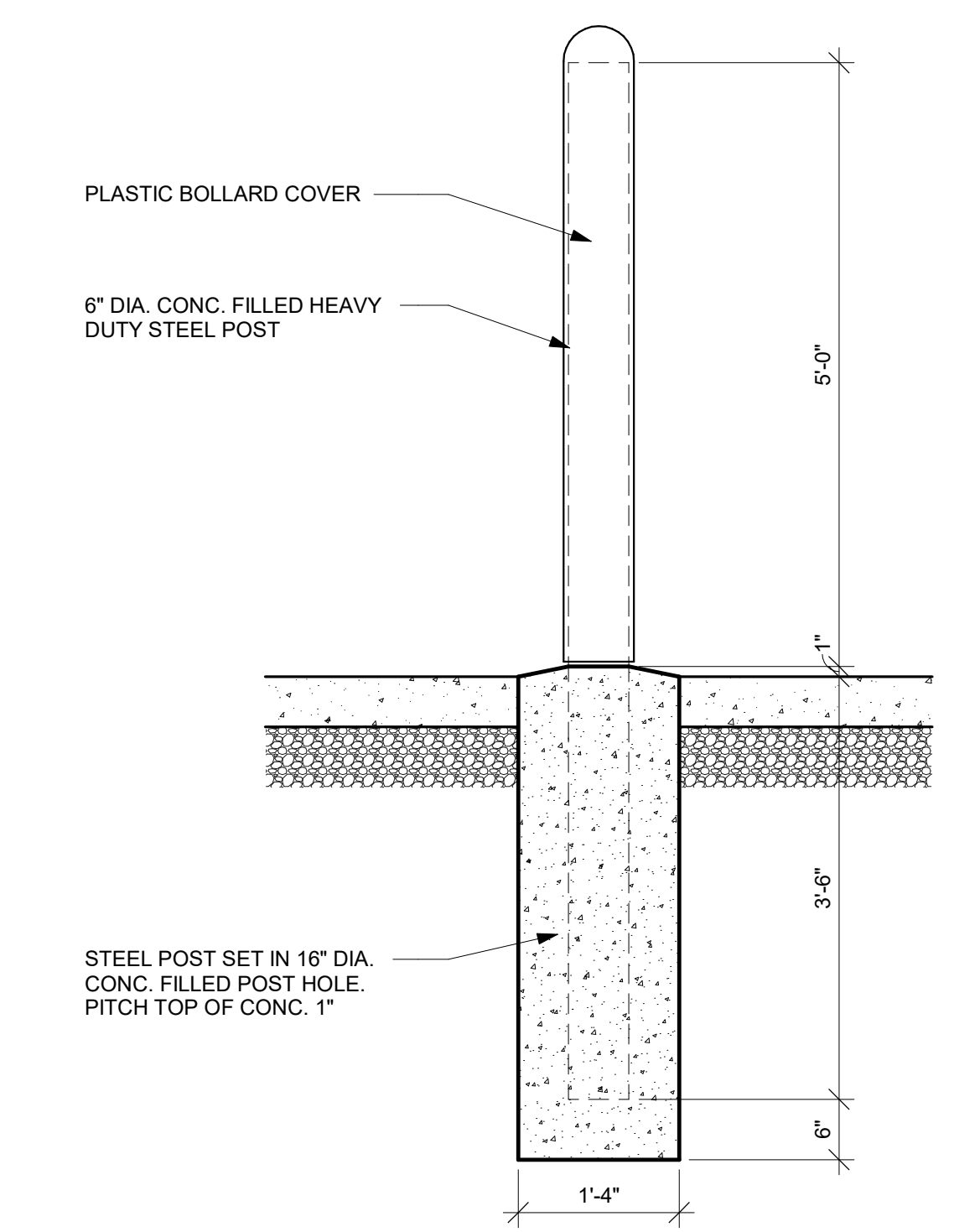
FACE BRICK

STONE

METAL PANEL

**KEY NOTES ELEVATION**

- BASE BID. PREP AND REPAINT EXISTING METAL WALL PANELS. ALTERNATE BID REMOVE EXISTING INSULATED METAL WALL PANELS. REPLACE WITH NEW ARCH METAL WALL PANELS.
- REMOVE EXISTING DOWNSPOUT FOR INSTALLATION OF NEW WALL PANELS. REINSTALL DOWNSPOUT AFTER PANELS ARE INSTALLED.
- NEW OPENFACE DOWNSPOUT W/ SPLASH BLOCK - CONNECT TO EXISTING GUTTER
- EXISTING BRICK - WASH PRIOR TO WINDOW INSTALLATION
- EXISTING BRICK - WASH AND TUCKPOINT
- STONE
- FACE BRICK
- CAST STONE
- ROOF ACCESS LADDER
- 12" WIDE X 8" HIGH PREFINISHED SHEET METAL THRU-WALL OVERFLOW ROOF SCUPPER - SEE DETAIL 9A120
- INFILL WALL OPENING AT REMOVED DOOR AND FRAME W/ BRICK AND CMU. TOOTH IN BRICK.
- METAL WALL PANEL
- PREFINISHED SHEET METAL COPING
- PREFINISHED SHEET METAL FASCIA
- CAST STONE CAP
- MECHANICAL EQUIPMENT - SEE MECHANICAL DRAWINGS
- MECHANICAL EQUIPMENT - SEE MECHANICAL DRAWINGS
- MECHANICAL EQUIPMENT STAND - SEE MECHANICAL DRAWINGS
- LOUVER - SEE MECHANICAL DRAWINGS
- ROOF ACCESS HATCH RAILING
- CONC FOUNDATION AND FOOTING - SEE STRUCTURAL



**3 PIPE BOLLARD**  
3/4" = 1'-0"



**ARCHITECTURE  
ENGINEERING  
INTERIOR DESIGN**

**HSR ASSOCIATES INC.**  
100 MILWAUKEE STREET  
LA CROSSE, WISCONSIN  
PHONE: 608.784.1830  
FAX: 608.782.5844  
www.hsrassociates.com

Consultant:

**KEY NOTES ELEVATION**

- BASE BID. PREP AND REPAINT EXISTING METAL WALL PANELS. ALTERNATE BID REMOVE EXISTING INSULATED METAL WALL PANELS. REPLACE WITH NEW ARCH METAL WALL PANELS.
- REMOVE EXISTING DOWNSPOUT FOR INSTALLATION OF NEW WALL PANELS. REINSTALL DOWNSPOUT AFTER PANELS ARE INSTALLED.
- NEW OPENFACE DOWNSPOUT W/ SPLASH BLOCK - CONNECT TO EXISTING GUTTER
- EXISTING BRICK - WASH PRIOR TO WINDOW INSTALLATION
- EXISTING BRICK - WASH AND TUCKPOINT
- STONE
- FACE BRICK
- CAST STONE
- ROOF ACCESS LADDER
- 12" WIDE X 8" HIGH PREFINISHED SHEET METAL THRU-WALL OVERFLOW ROOF SCUPPER - SEE DETAIL 9A120
- INFILL WALL OPENING AT REMOVED DOOR AND FRAME W/ BRICK AND CMU. TOOTH IN BRICK.
- METAL WALL PANEL
- PREFINISHED SHEET METAL COPING
- PREFINISHED SHEET METAL FASCIA
- CAST STONE CAP
- MECHANICAL EQUIPMENT - SEE MECHANICAL DRAWINGS
- MECHANICAL EQUIPMENT - SEE MECHANICAL DRAWINGS
- MECHANICAL EQUIPMENT STAND - SEE MECHANICAL DRAWINGS
- LOUVER - SEE MECHANICAL DRAWINGS
- ROOF ACCESS HATCH RAILING
- CONC FOUNDATION AND FOOTING - SEE STRUCTURAL

**LA CRESCENT - HOKAH PUBLIC SCHOOLS  
ELEMENTARY SCHOOL ADDITION AND  
RENOVATION**

504 SOUTH OAK STREET  
LA CRESCENT, MINNESOTA

**ELEVATIONS**

Project Title:

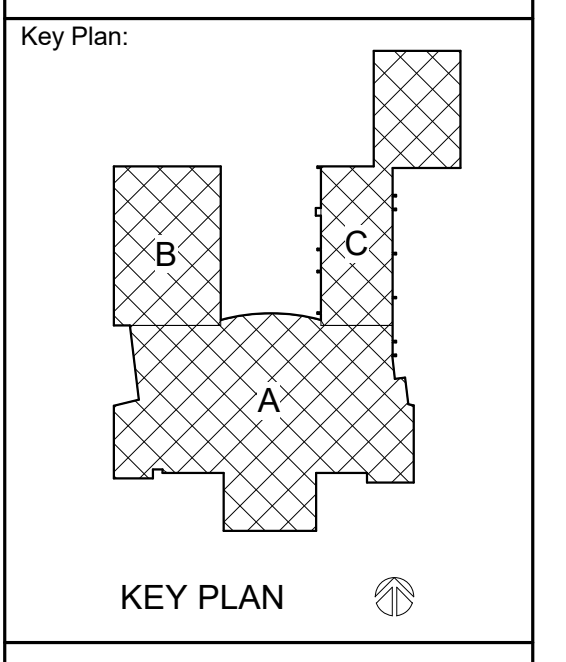
Project Location:

Sheet Title:

HSR Project Number: **19014**

Project Date: **3.5.2020**

Drawn By: **DJH**



**BID DOCUMENTS**

No.	Description	Date
A03	ADDENDUM 3	3.24.20

Graphic Scale: **VARIES**

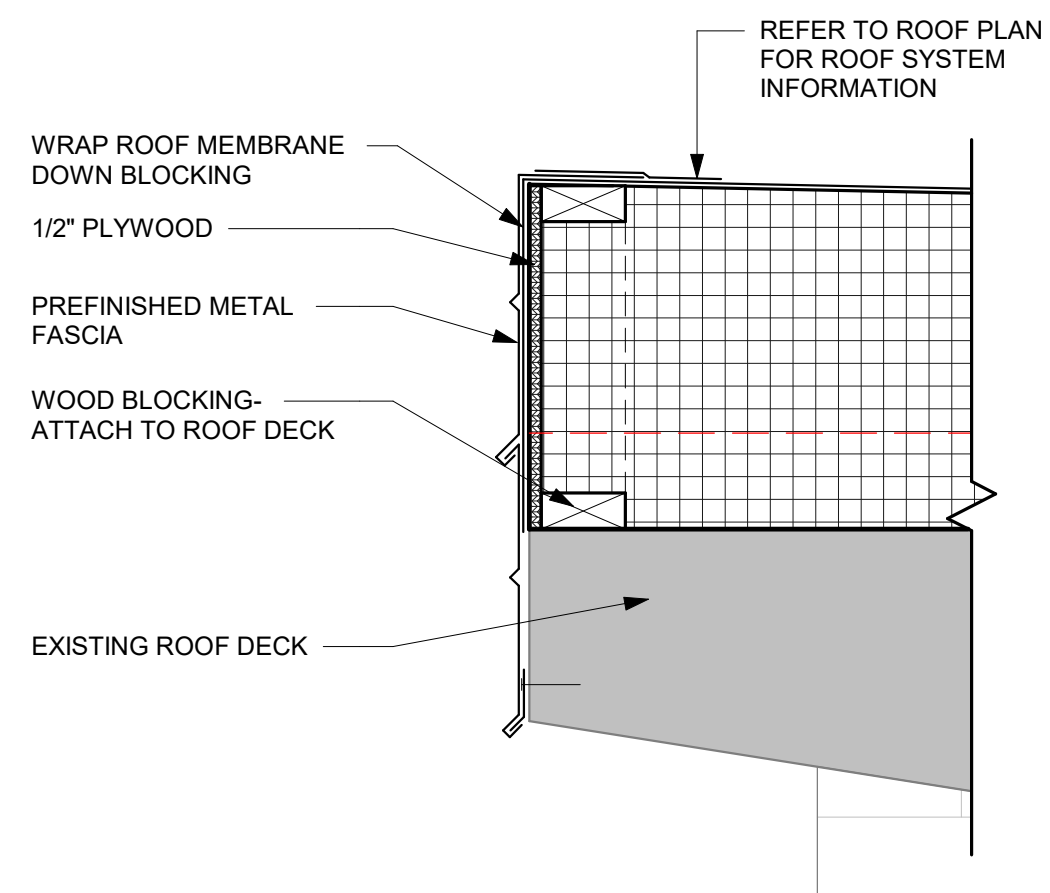
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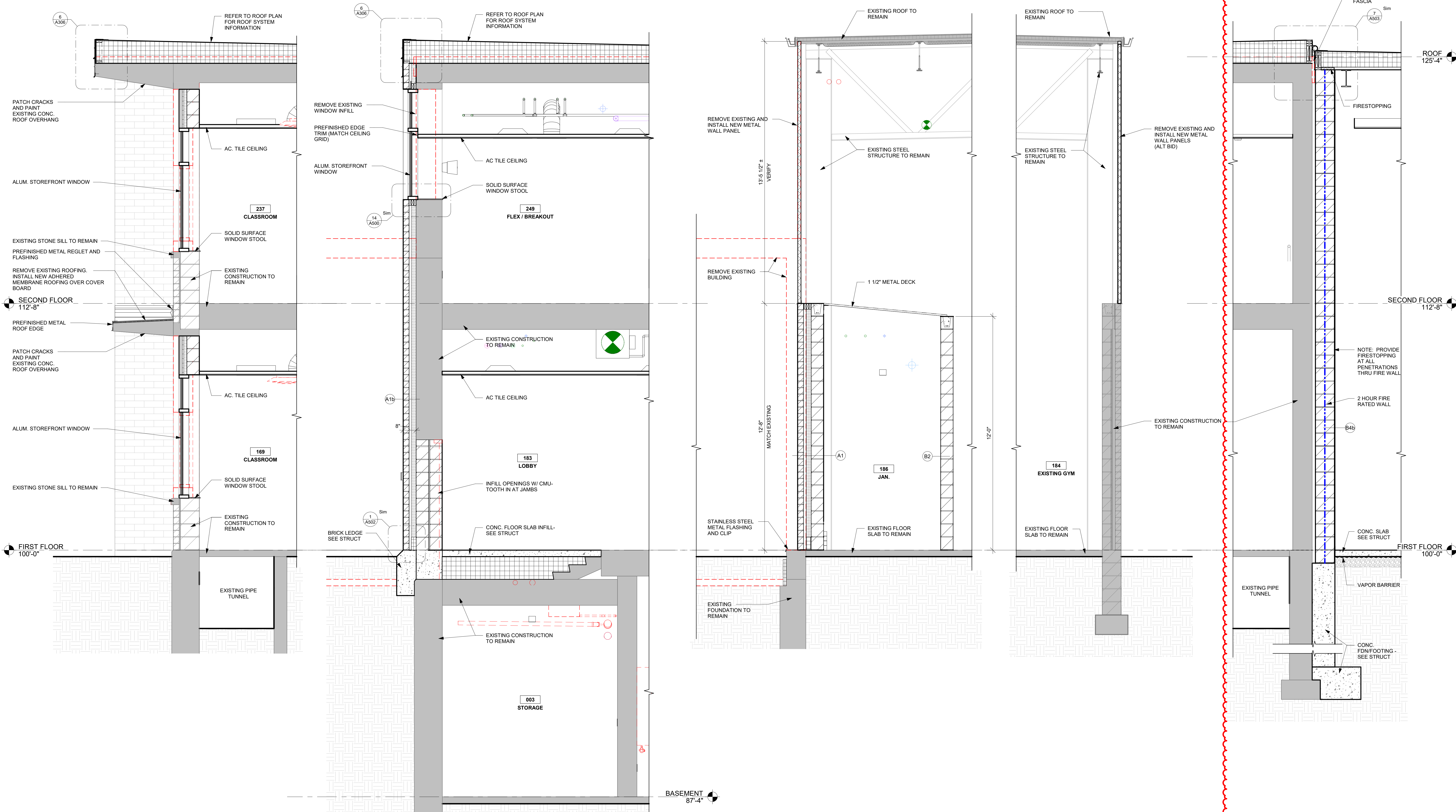




Consultant:



**6** ROOF DETAIL  
1 1/2" = 1'-0"



**1** WALL SECTION  
1/2" = 1'-0"

**2** WALL SECTION  
1/2" = 1'-0"

**3** WALL SECTION  
1/2" = 1'-0"

**4** WALL SECTION  
1/2" = 1'-0"

**5** WALL SECTION  
1/2" = 1'-0"

Project Title: **LA CRESCENT - HOKAH PUBLIC SCHOOLS  
ELEMENTARY SCHOOL ADDITION AND  
RENOVATION**  
Project Location: **504 SOUTH OAK STREET  
LA CRESCENT, MINNESOTA**  
Sheet Title: **WALL SECTIONS**

HSR Project Number: **19014**  
Project Date: **3.5.2020**  
Drawn By: **DJH**

Key Plan:

**BID  
DOCUMENTS**

No.	Description	Date
A03	ADDENDUM 3	3.24.20

Graphic Scale: **VARIES**

Last Update: **3/23/2020 12:59:25 PM**

**A306**



Consultant:

Project Title:  
**LA CRESCENT - HOKAH PUBLIC SCHOOLS  
ELEMENTARY SCHOOL ADDITION AND  
RENOVATION**  
Project Location:  
504 SOUTH OAK STREET  
LA CRESCENT, MINNESOTA  
Sheet Title:  
**STAIR SECTIONS**

HSR Project Number:  
**19014**

Project Date:  
**3.5.2020**

Drawn By:  
**DJH**

Key Plan:

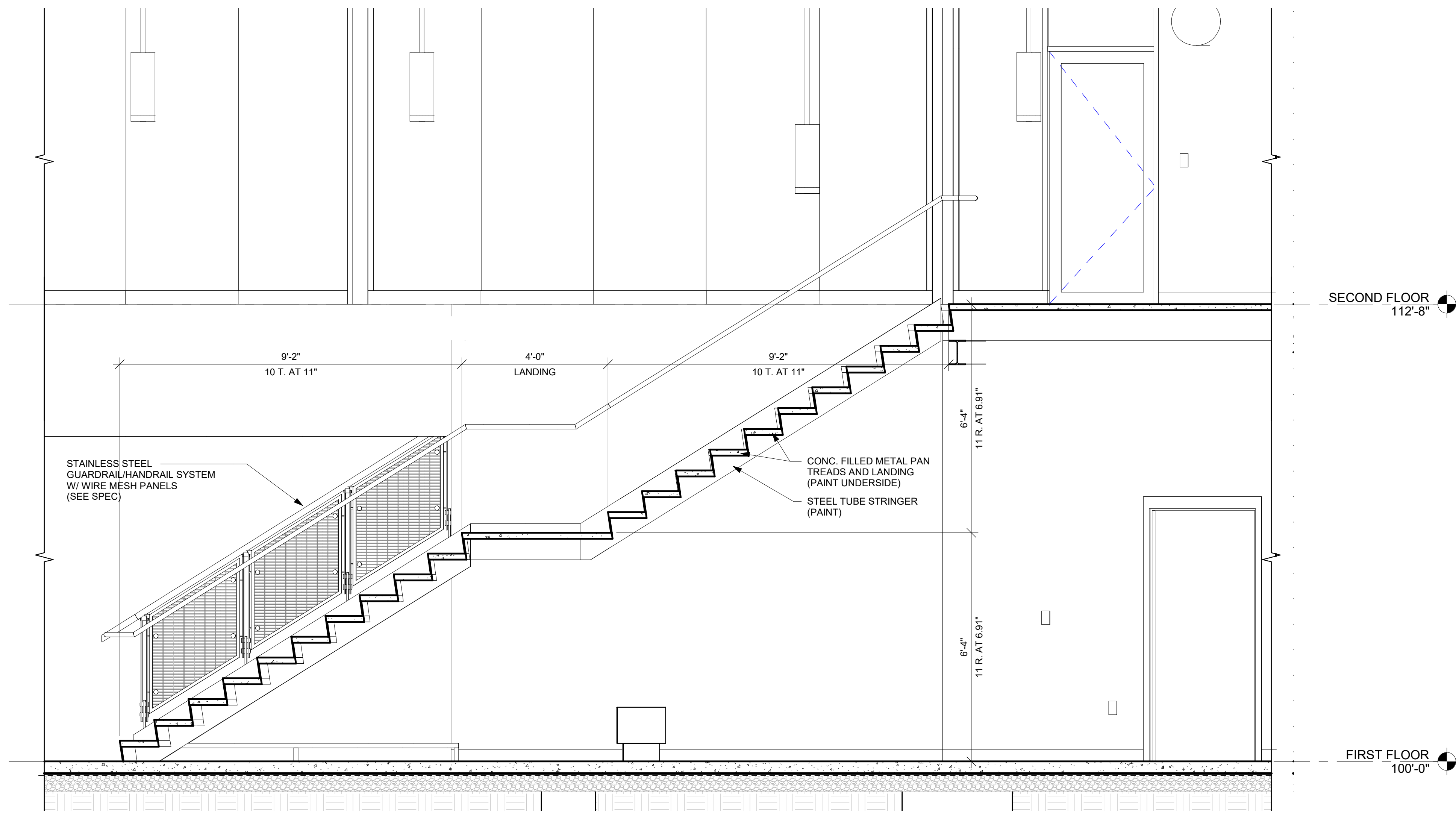
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DOCUMENTS**

No.	Description	Date
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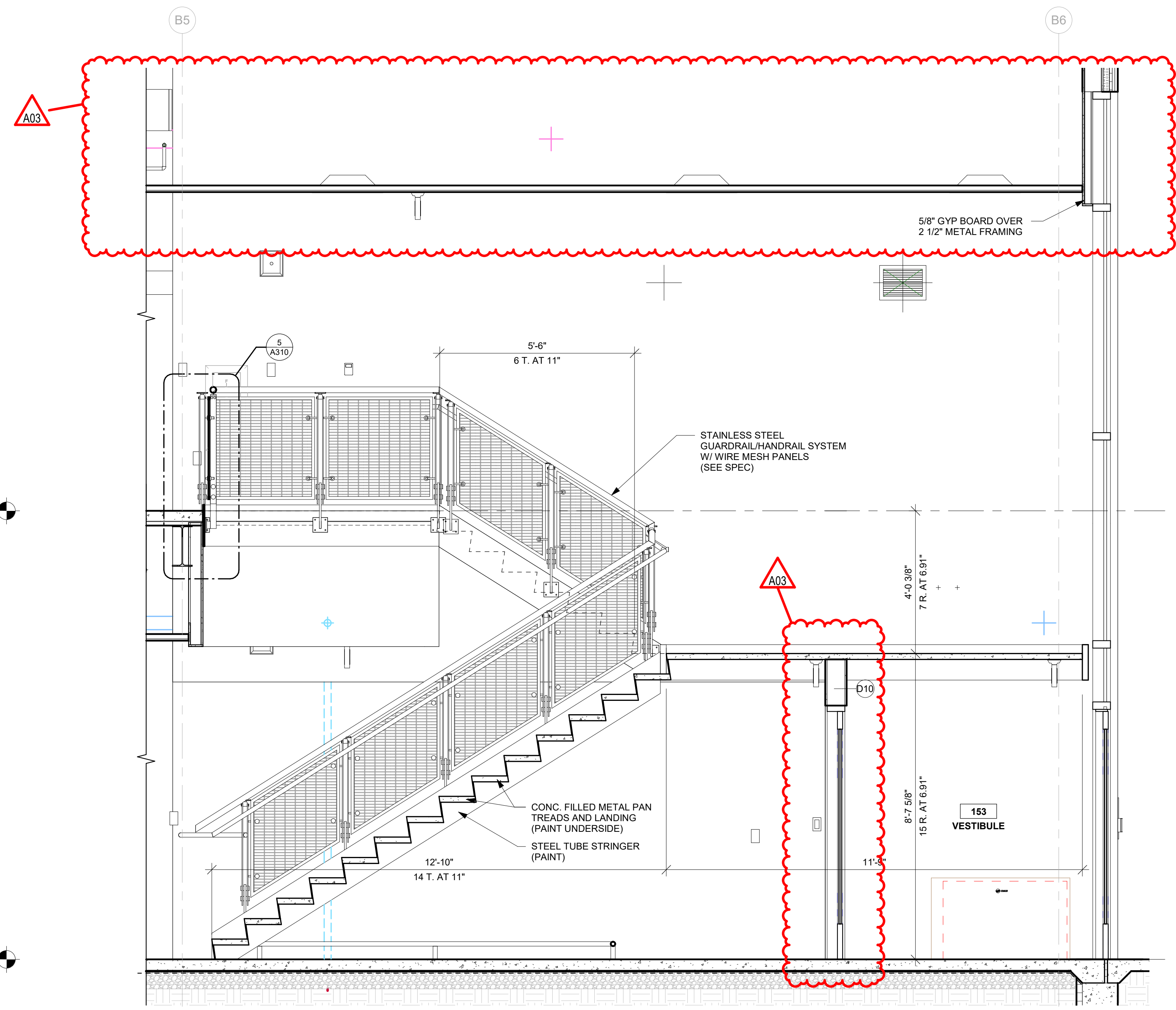
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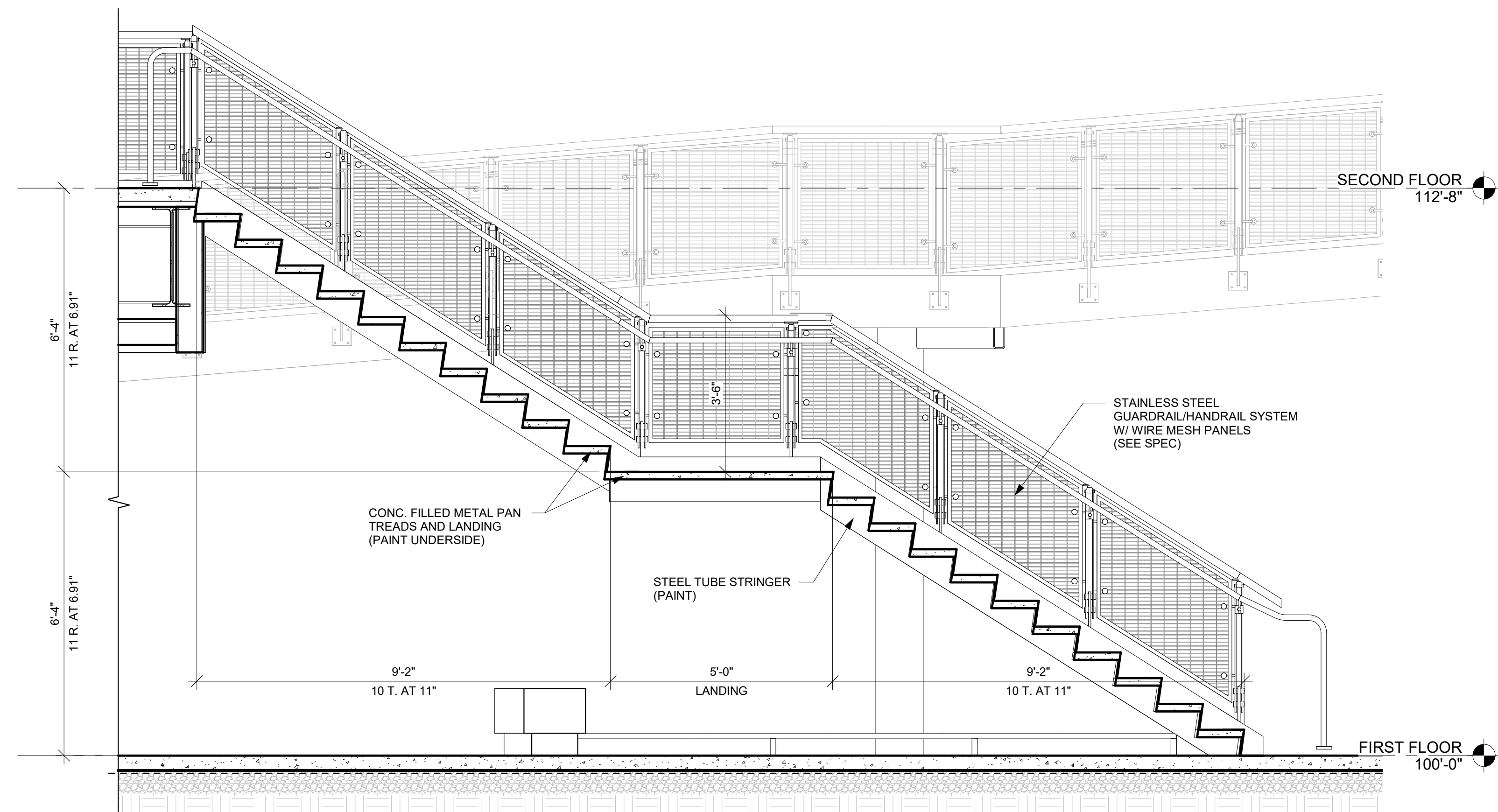
**A310**



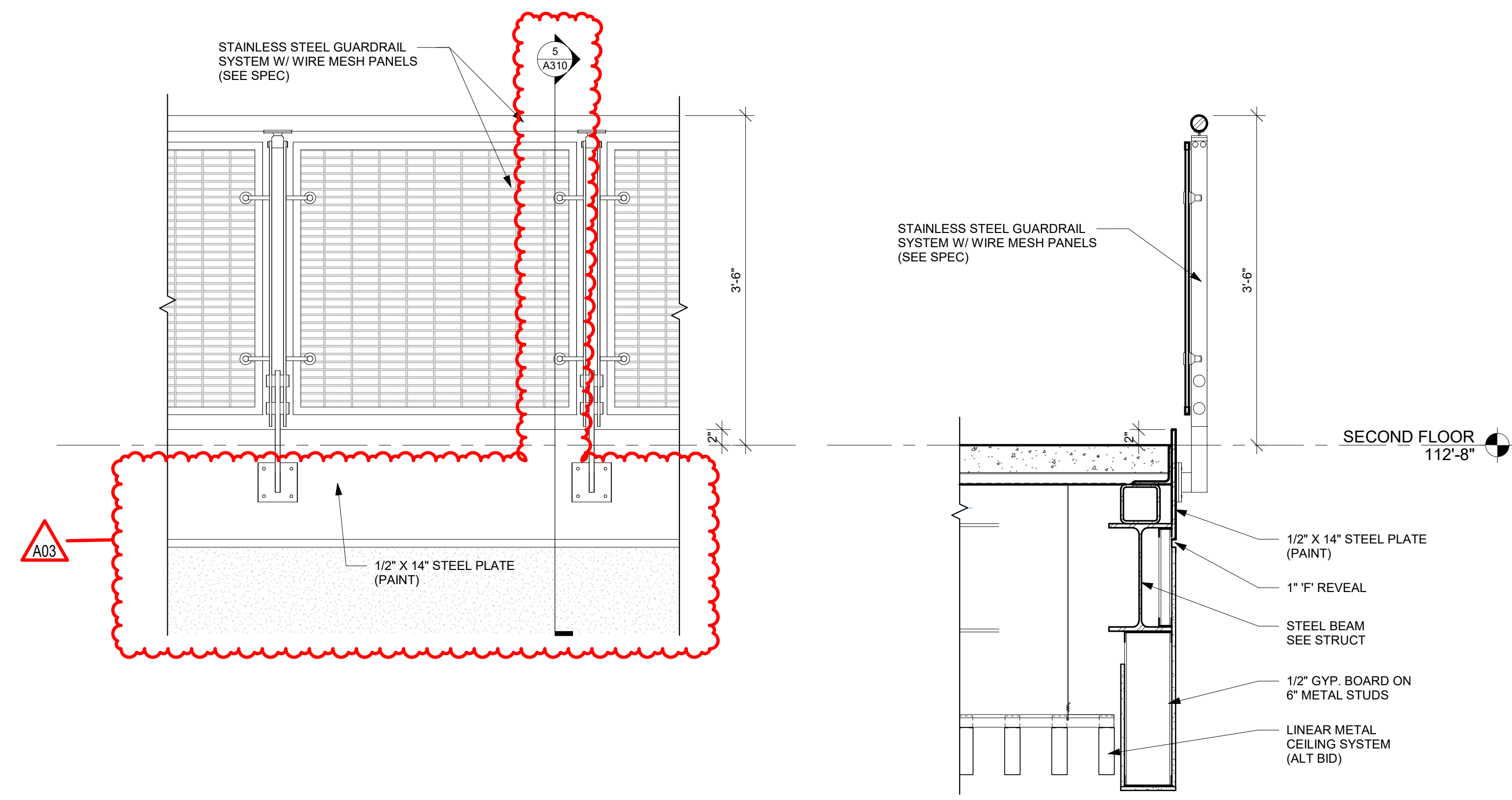
**2 SECTION - STAIR B**  
1/2" = 1'-0"



**3 SECTION - STAIR C**  
1/2" = 1'-0"



**1 SECTION - STAIR A**  
1/2" = 1'-0"



**4 TYP RAIL ELEVATION**  
1" = 1'-0"

**5 RAILING SECTION**  
1" = 1'-0"



Consultant:

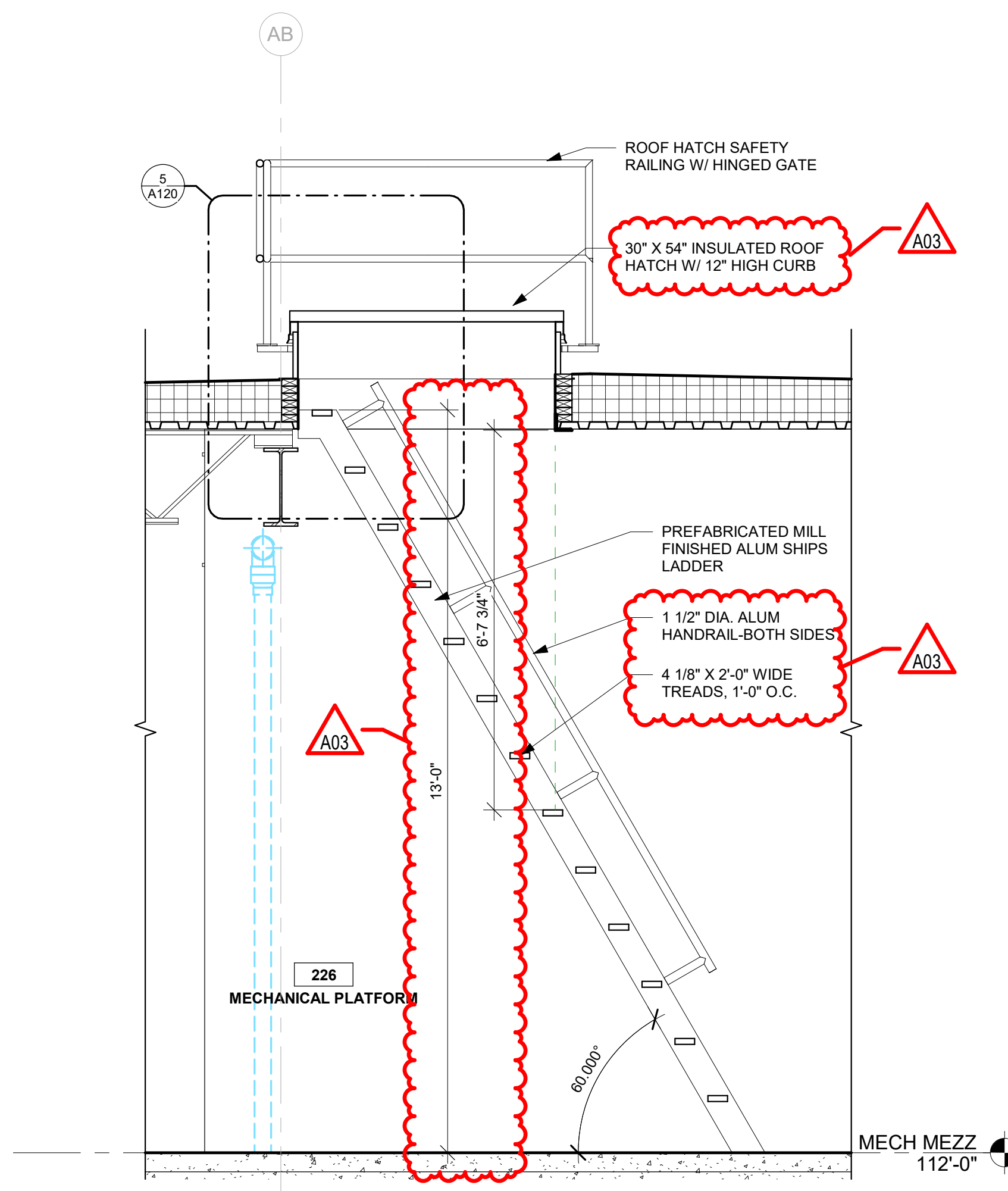
Project Title:  
HSR Project Number:  
Project Date:  
Drawn By:  
Key Plan:

19014  
3.5.2020  
DJH

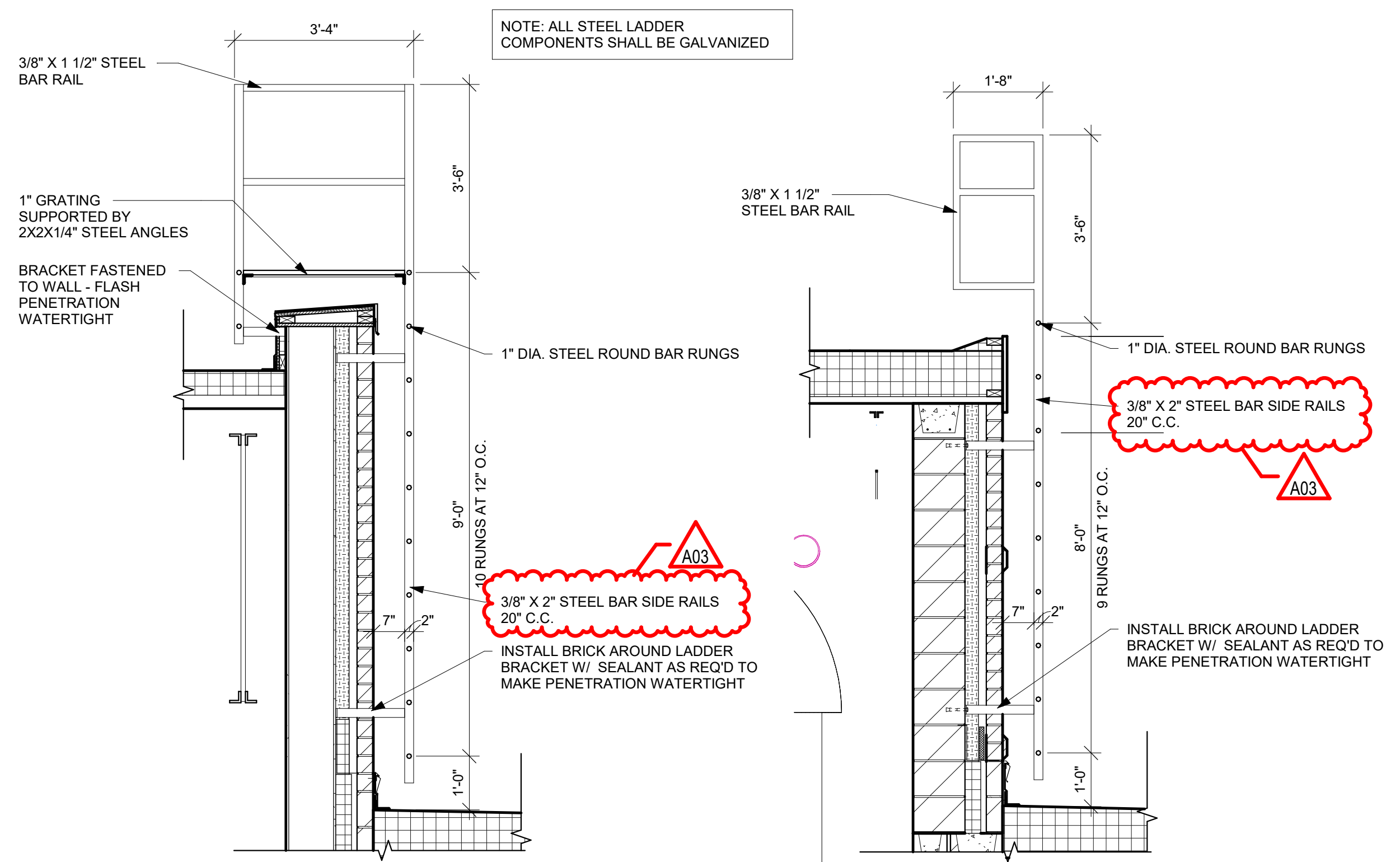
BID DOCUMENTS

No.	Description	Date
A03	ADDENDUM 3	3.24.20

Graphic Scale:  
VARIES  
Last Update:  
3/24/2020 10:55:35 AM



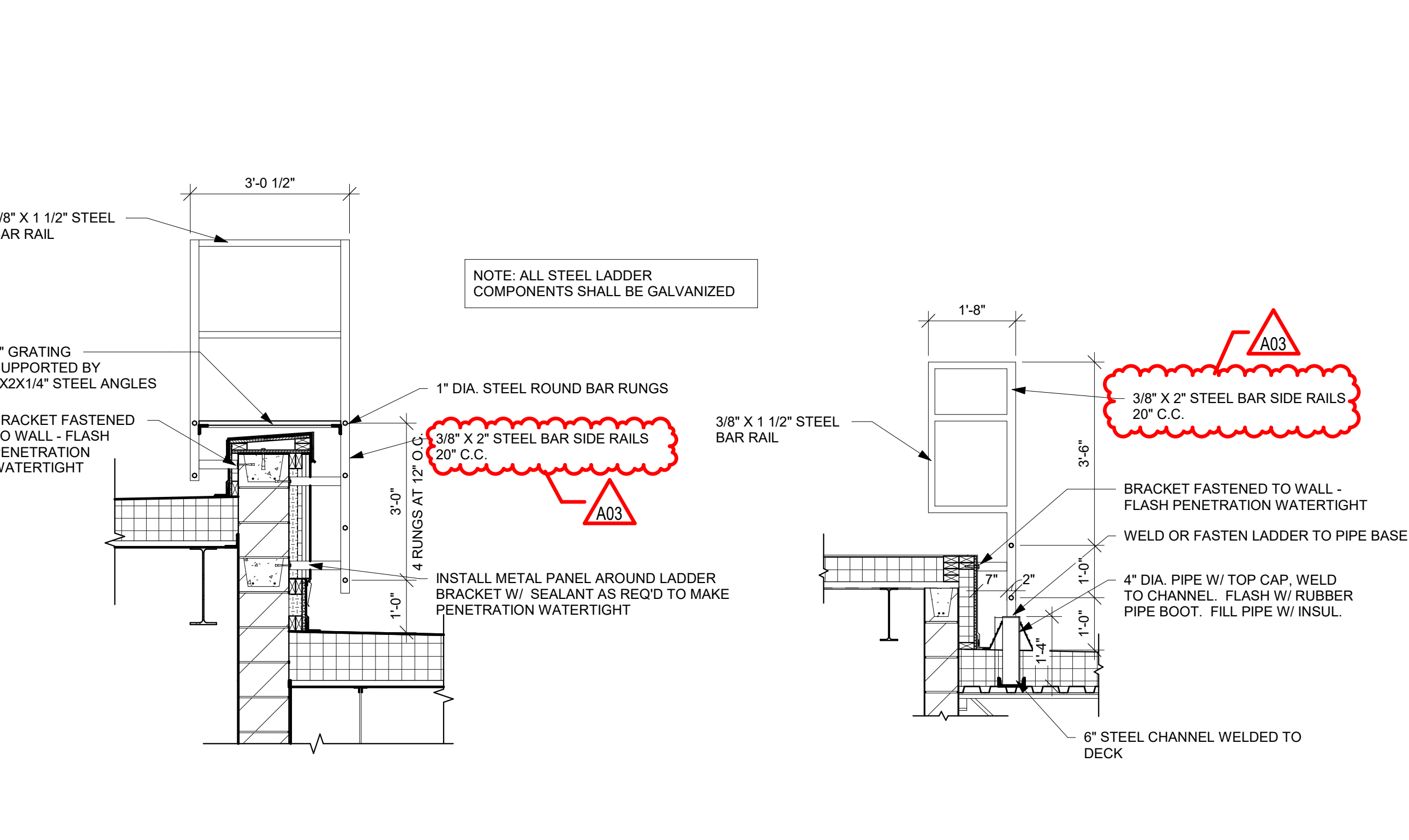
**3 SHIPS LADDER**  
1/2" = 1'-0"



**4 ROOF ACCESS LADDER**  
1/2" = 1'-0"



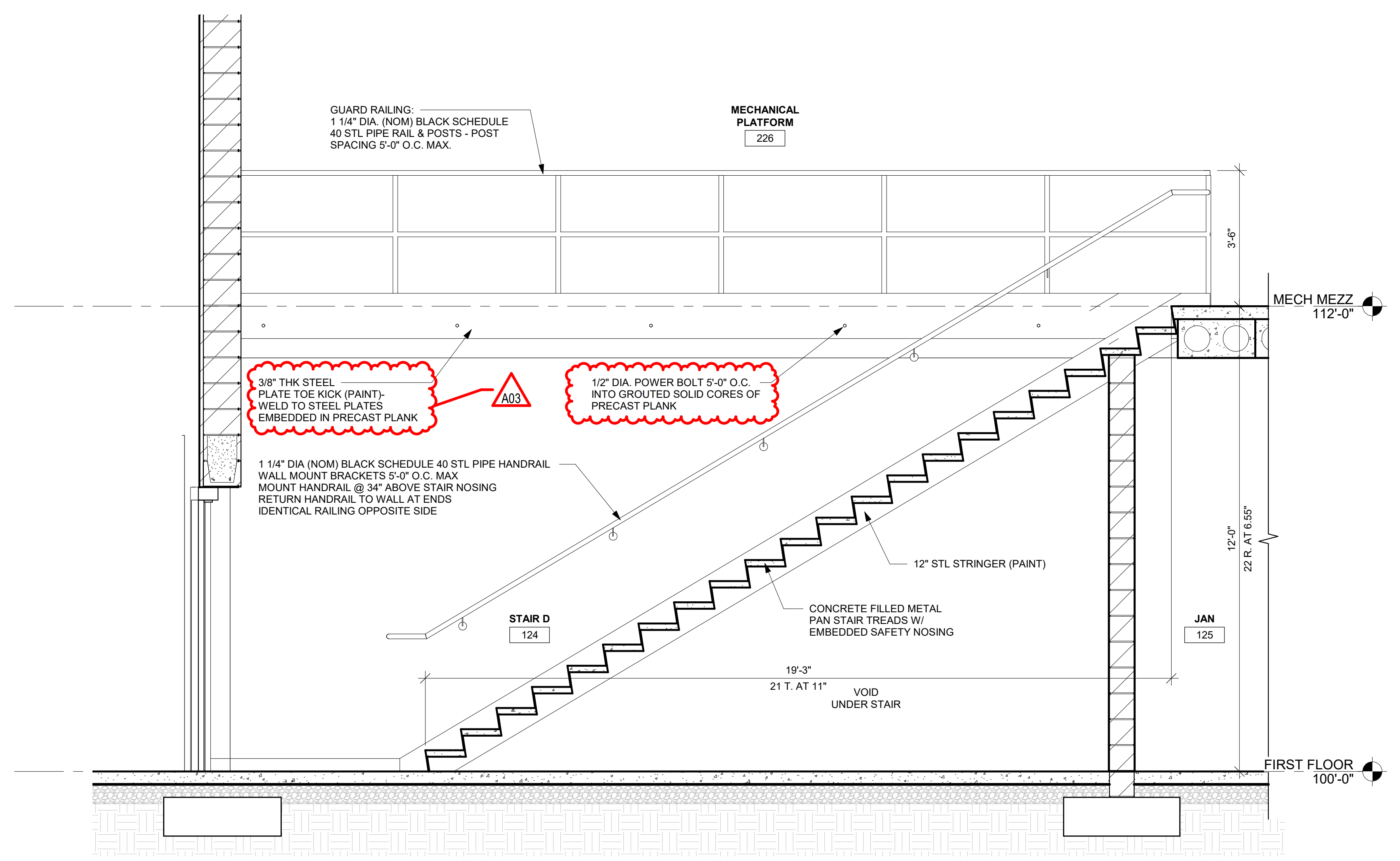
**5 ROOF ACCESS LADDER**  
1/2" = 1'-0"



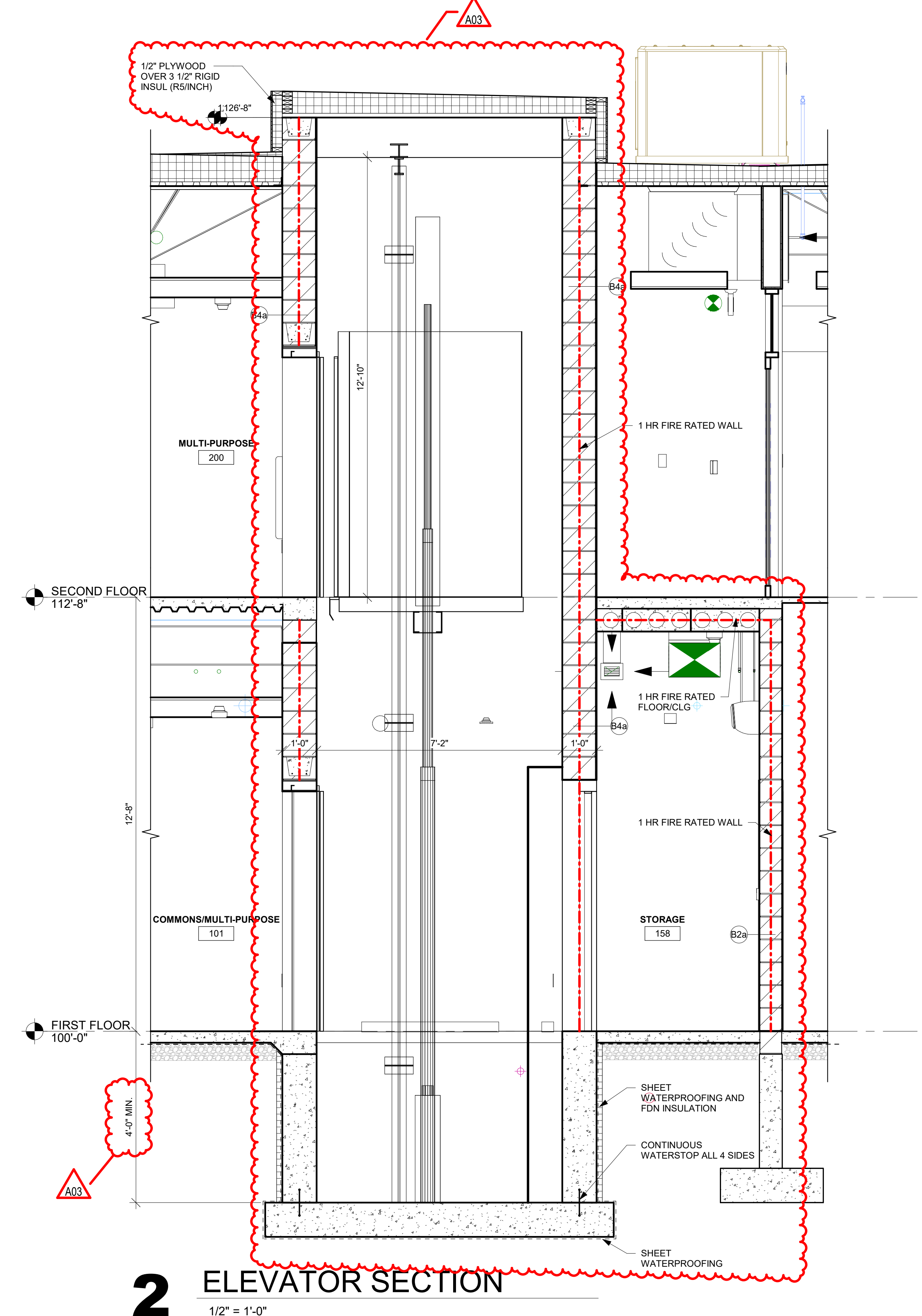
**6 ROOF ACCESS LADDER**  
1/2" = 1'-0"



**7 ROOF ACCESS LADDER**  
1/2" = 1'-0"



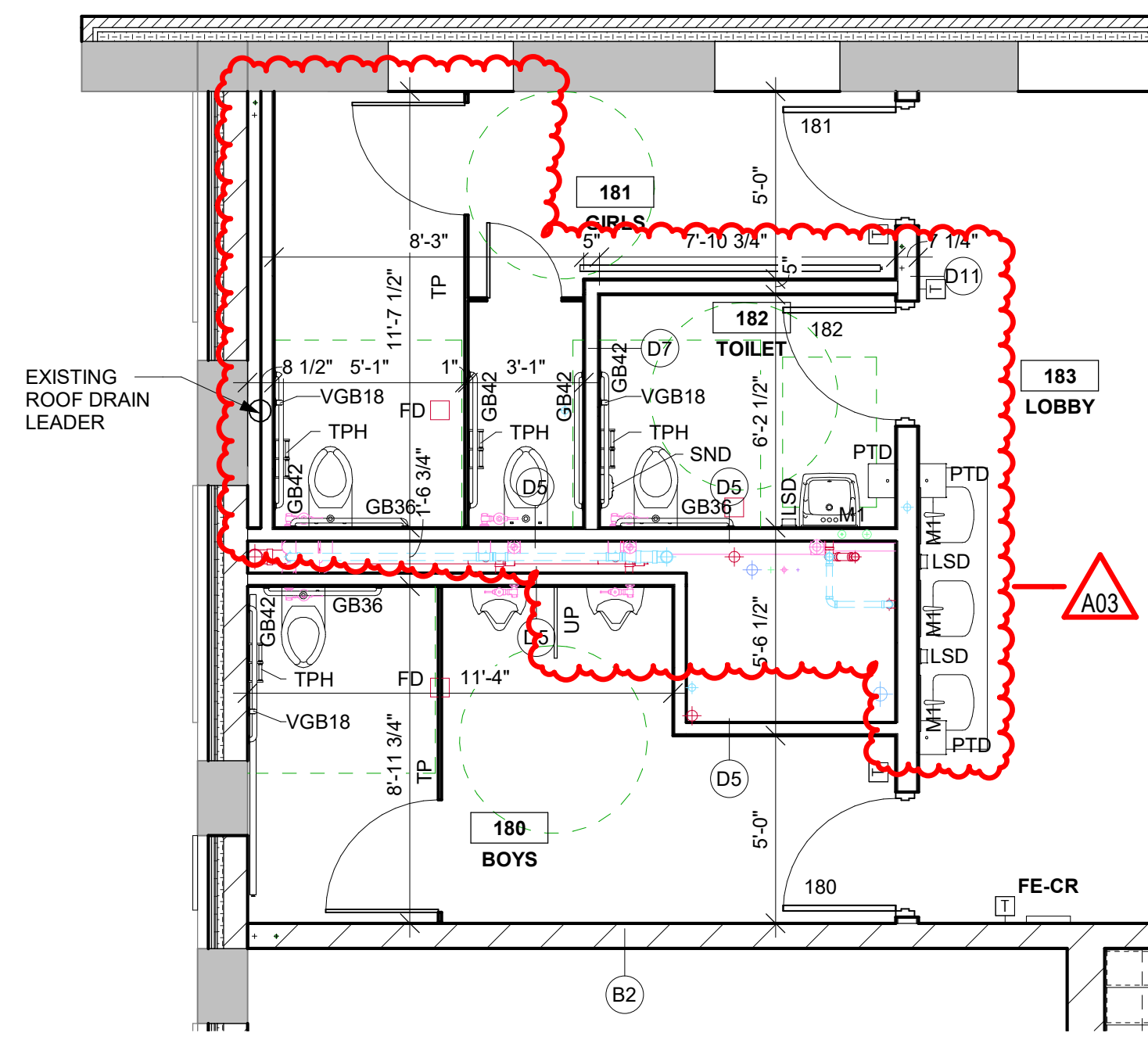
**1 SECTION - STAIR D**  
1/2" = 1'-0"



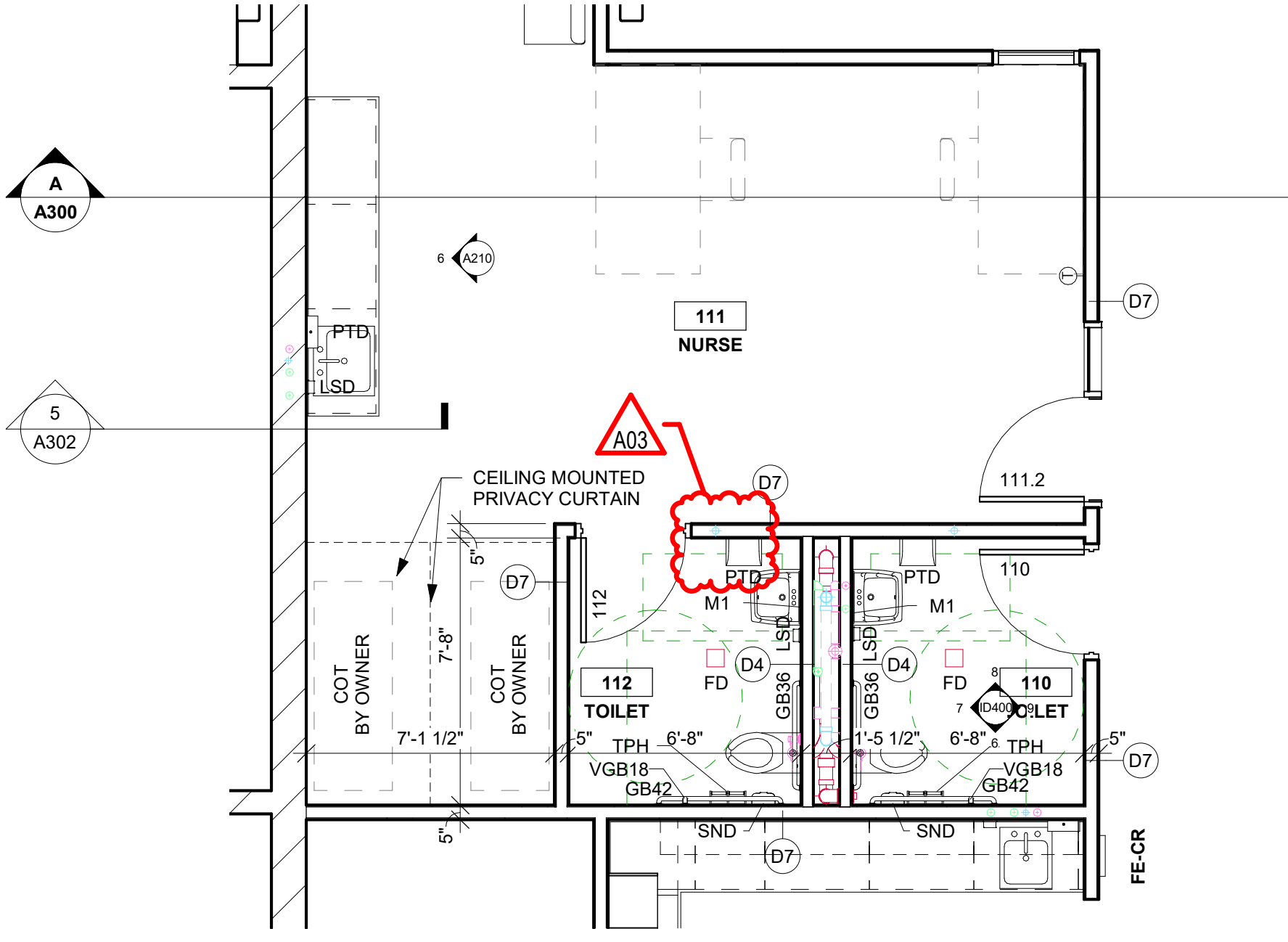
**2 ELEVATOR SECTION**  
1/2" = 1'-0"



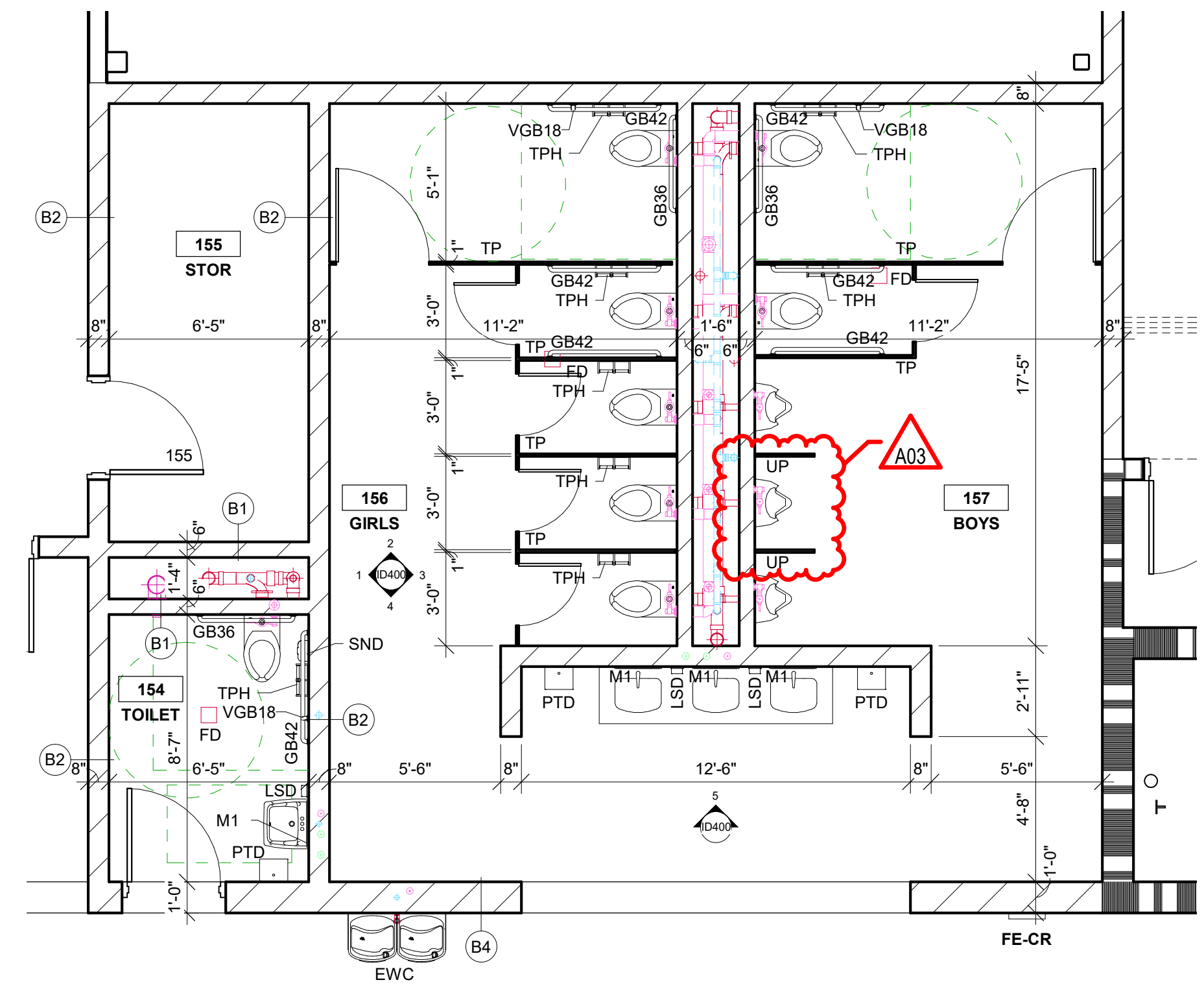
Consultant:



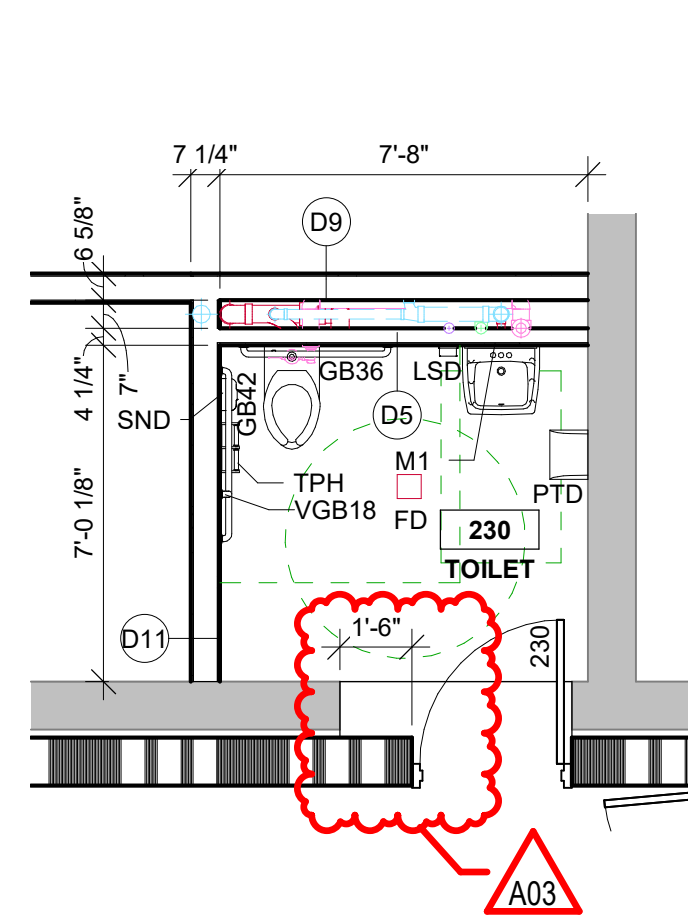
**1** ENLARGED TOILET ROOM PLAN  
1/4" = 1'-0"  
FIRST FLOOR SHOWN  
SECOND FLOOR SIMILAR



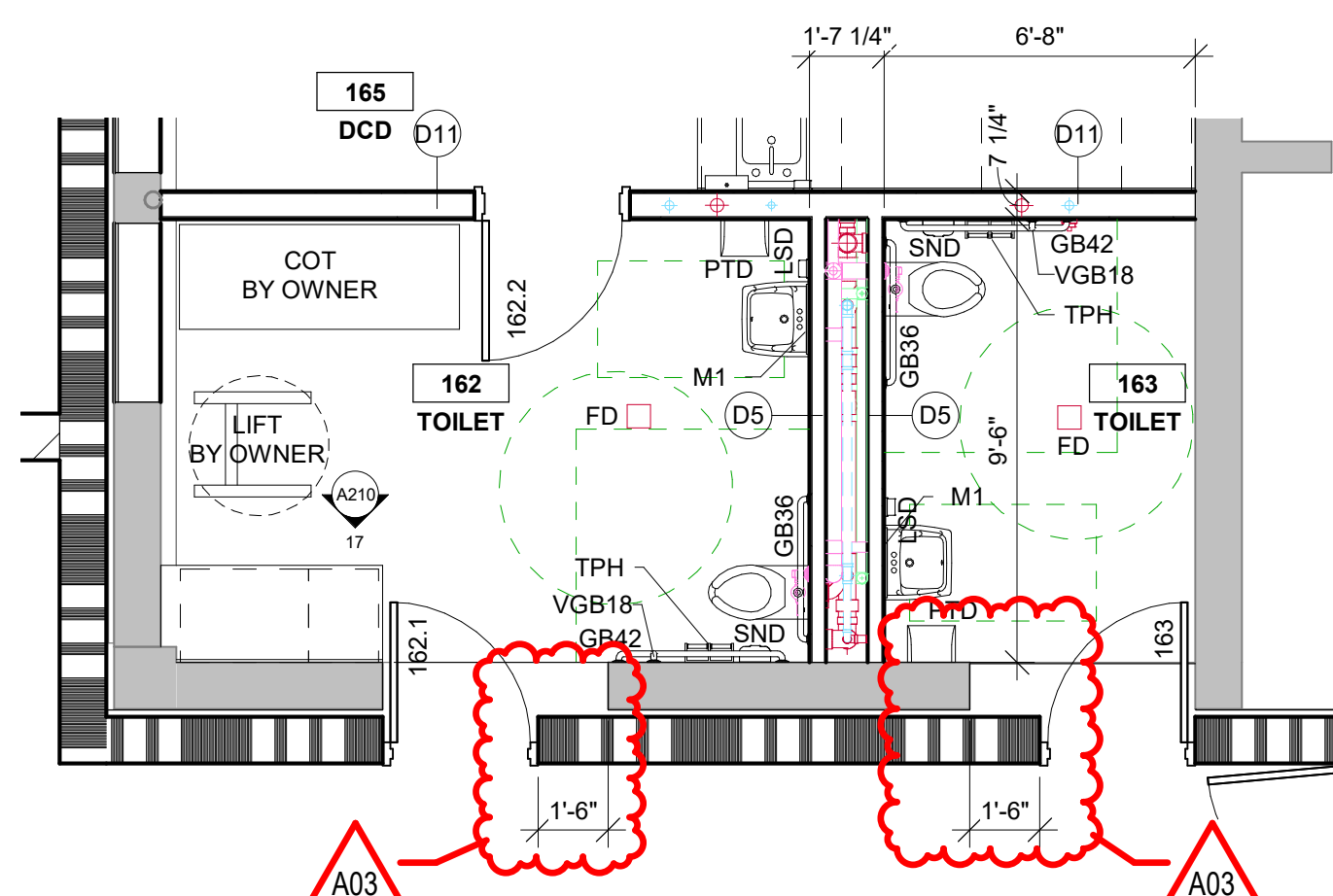
**2** ENLARGED TOILET ROOM PLAN  
1/4" = 1'-0"



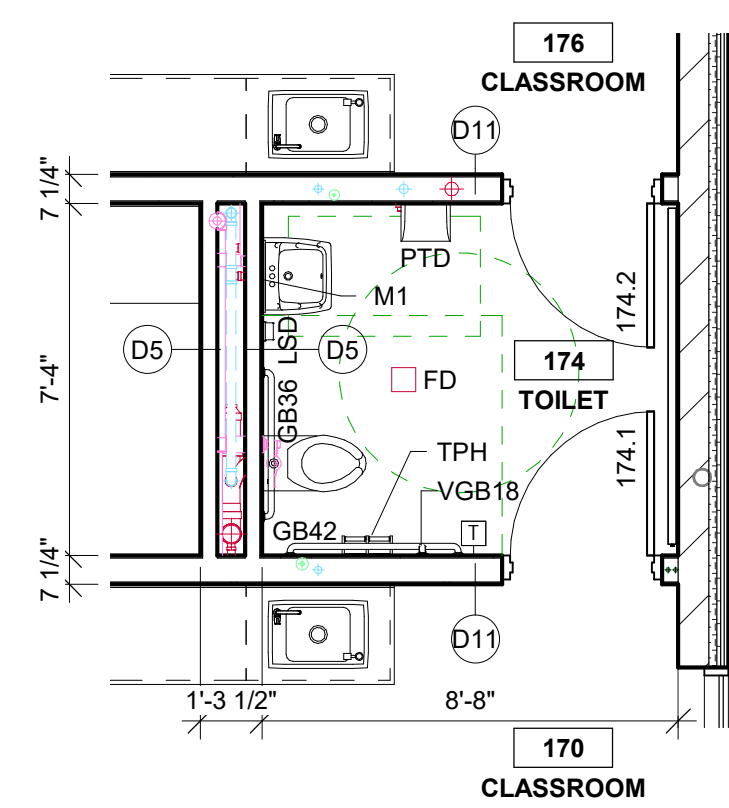
**3** ENLARGED TOILET ROOM PLAN  
1/4" = 1'-0"  
FIRST FLOOR SHOWN  
SECOND FLOOR SIMILAR



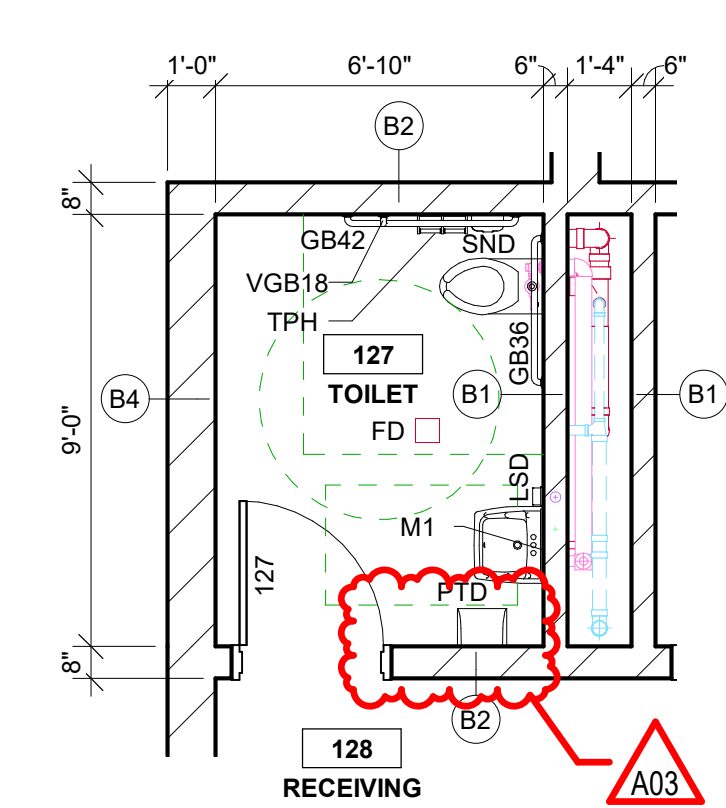
**4** ENLARGED TOILET RM PLAN  
1/4" = 1'-0"



**5** ENLARGED TOILET ROOM PLAN  
1/4" = 1'-0"



**6** ENLARGED TOILET RM PLAN  
1/4" = 1'-0"  
TYPICAL AT SEGMENT C CLASSROOMS



**7** ENLARGED TOILET RM PLAN  
1/4" = 1'-0"

LA CRESCENT - HOKAH PUBLIC SCHOOLS  
ELEMENTARY SCHOOL ADDITION AND  
RENOVATION  
504 SOUTH OAK STREET  
LA CRESCENT, MINNESOTA  
ENLARGED TOILET ROOM PLANS

Project Title:  
Project Location:  
Sheet Title:

HSR Project Number:  
**19014**

Project Date:  
**3.5.2020**

Drawn By:  
**DJH**

Key Plan:

Revisions:

No.	Description	Date
A03	ADDENDUM 3	3.24.20

**BID DOCUMENTS**

Graphic Scale:  
**VARIES**

Last Update:  
**3/23/2020 1:01:49 PM**

ABBREVIATION	ITEM	STD. MOUNTING HEIGHT	OWNER FURNISHED	CONTRACTOR FURNISHED	OWNER INSTALLED	CONTRACTOR INSTALLED
VGB18	1 1/2" DIA. VERTICAL GRAB BAR - 18" LOCATE 40" FROM BACK WALL	BOTTOM @ 40" A.F.F.		X		X
GB36	1 1/2" DIA. GRAB BAR, 36" LONG. SEE PLANS FOR CONFIG./DIMS.	CENTER @ 2'-10" A.F.F.		X		X
GB42	1 1/2" DIA. GRAB BARS, 42" LONG. SEE PLANS FOR CONFIG./DIMS.	CENTER @ 2'-10" A.F.F.		X		X
TPH	DBL TOILET PAPER HOLDER - CONFIRM LOCATION W/ OWNER LOCATE 3" FROM CORNER	CENTER @ 20" A.F.F.		X		X
TP	TOILET PARTITION (FLOOR MOUNTED OVERHEAD BRACED)			X		X
UP	23" X 48" URINAL PARTITION (WALL MOUNTED)	BOTTOM @ 1'-0" A.F.F.		X		X
CH	COAT HOOK (DOUBLE)	BOT. @ 4'-0" A.F.F.		X		X
PTD	PAPER TOWEL DISPENSER ROLL TYPE, (SURFACE MOUNT)	BOT. @ 42" A.F.F.	X			X
LSD	LIQUID SOAP DISP	CONTROL @ 42" A.F.F.		X		X
M1	1'-6" W X 3'-0" H MIRROR WITH FRAME	BOT @ 3'-4" A.F.F.		X		X
FD	FLOOR DRAIN - SEE PLUMBING			X		X
MBH	MOP/ BROOM HOLDER			X		X
SND	SANITARY NAPKIN DISPOSAL			X		X

ACCESSORY SCHEDULE GENERAL NOTES:  
1. CONFIRM EXACT LOCATION OF EACH ACCESSORY WITH OWNER PRIOR TO INSTALLATION.  
2. SURFACE MOUNTED ACCESSORIES SHALL BE INSTALLED OVER WALL TILE.

**A400**



Consultant:

Project Title:  
Project Number:  
Project Date:  
Drawn By:  
Key Plan:

19014  
3.5.2020  
DJH

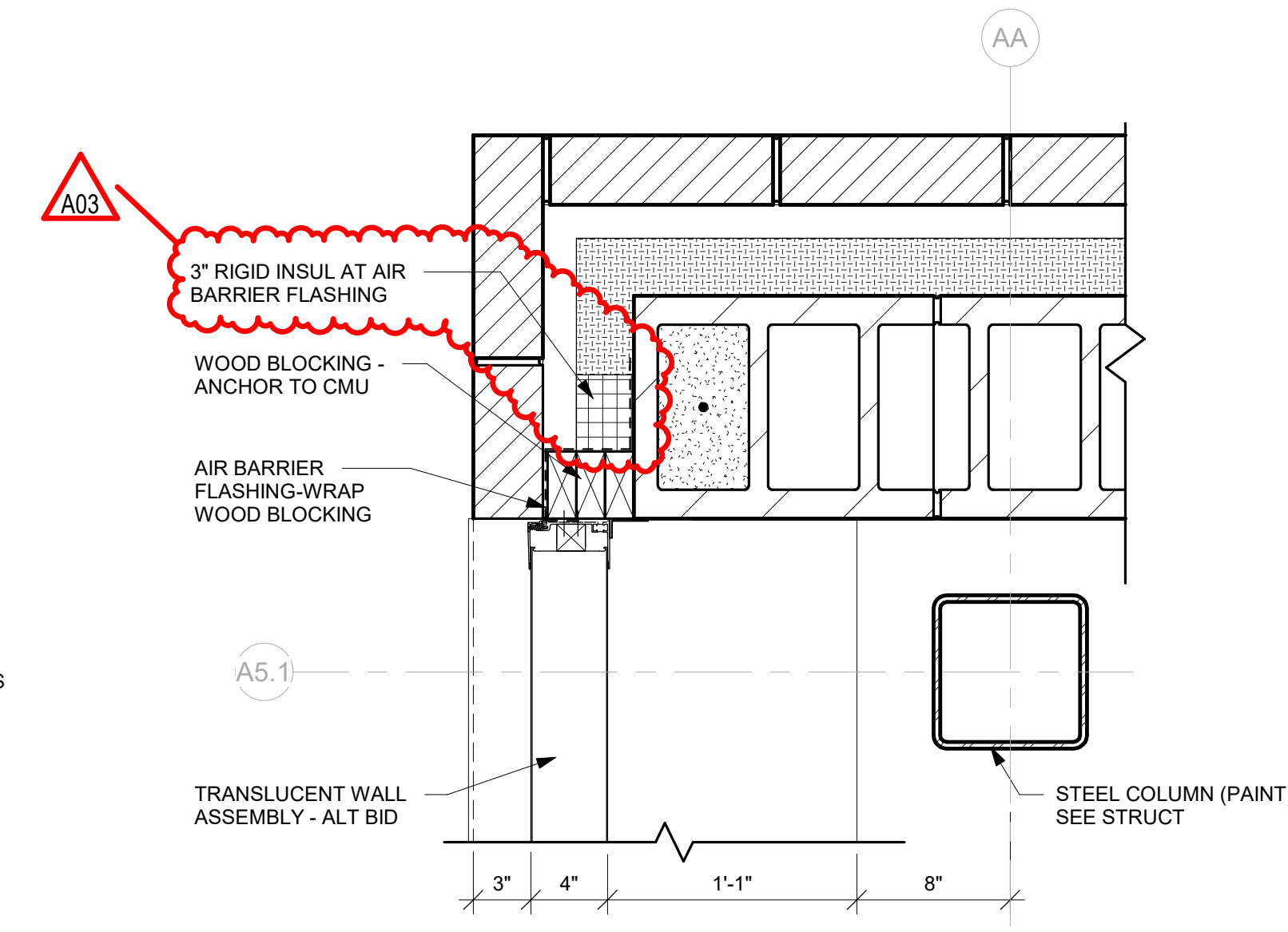
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DOCUMENTS

No.	Description	Date
A03	ADDENDUM 3	3.24.20

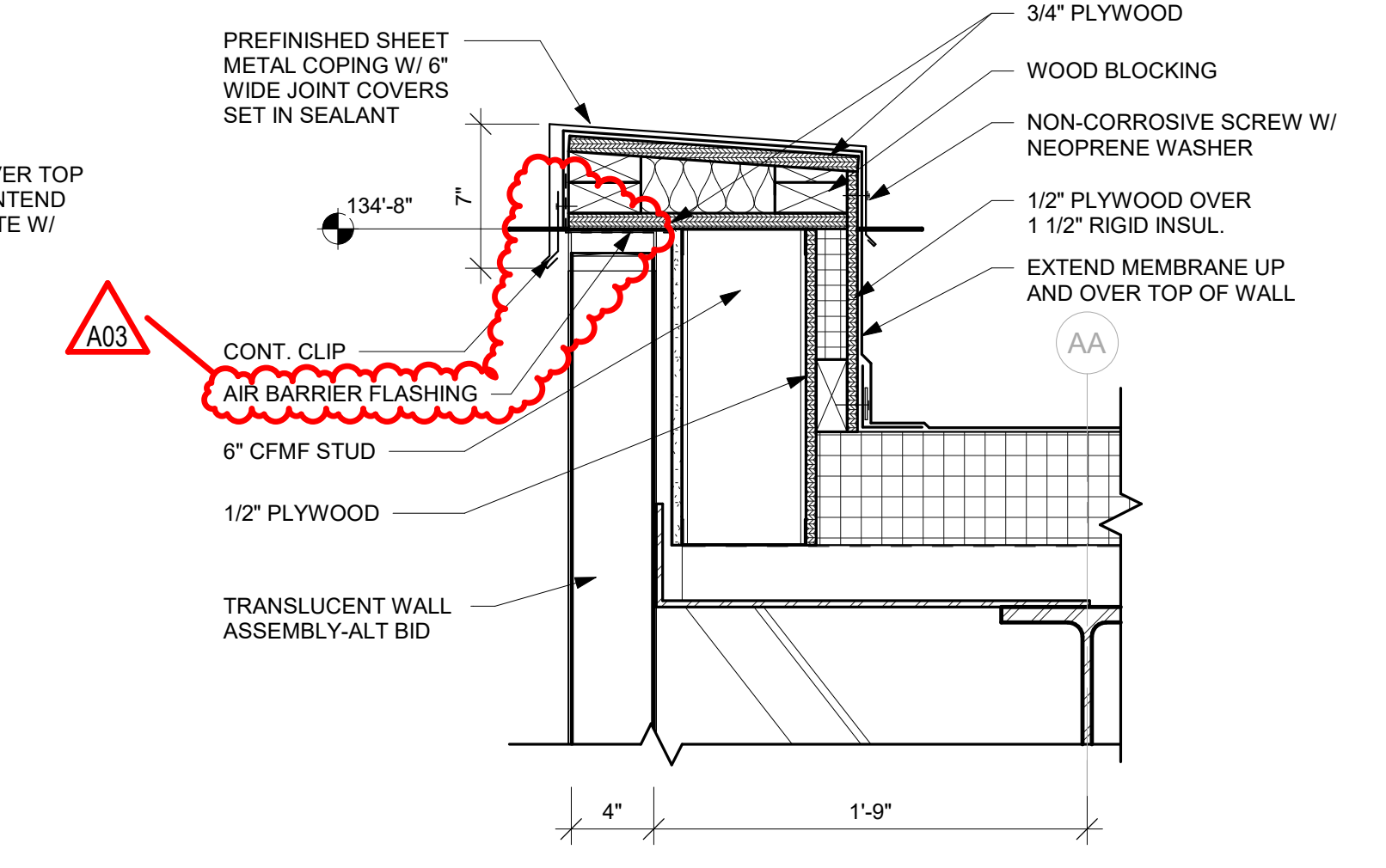
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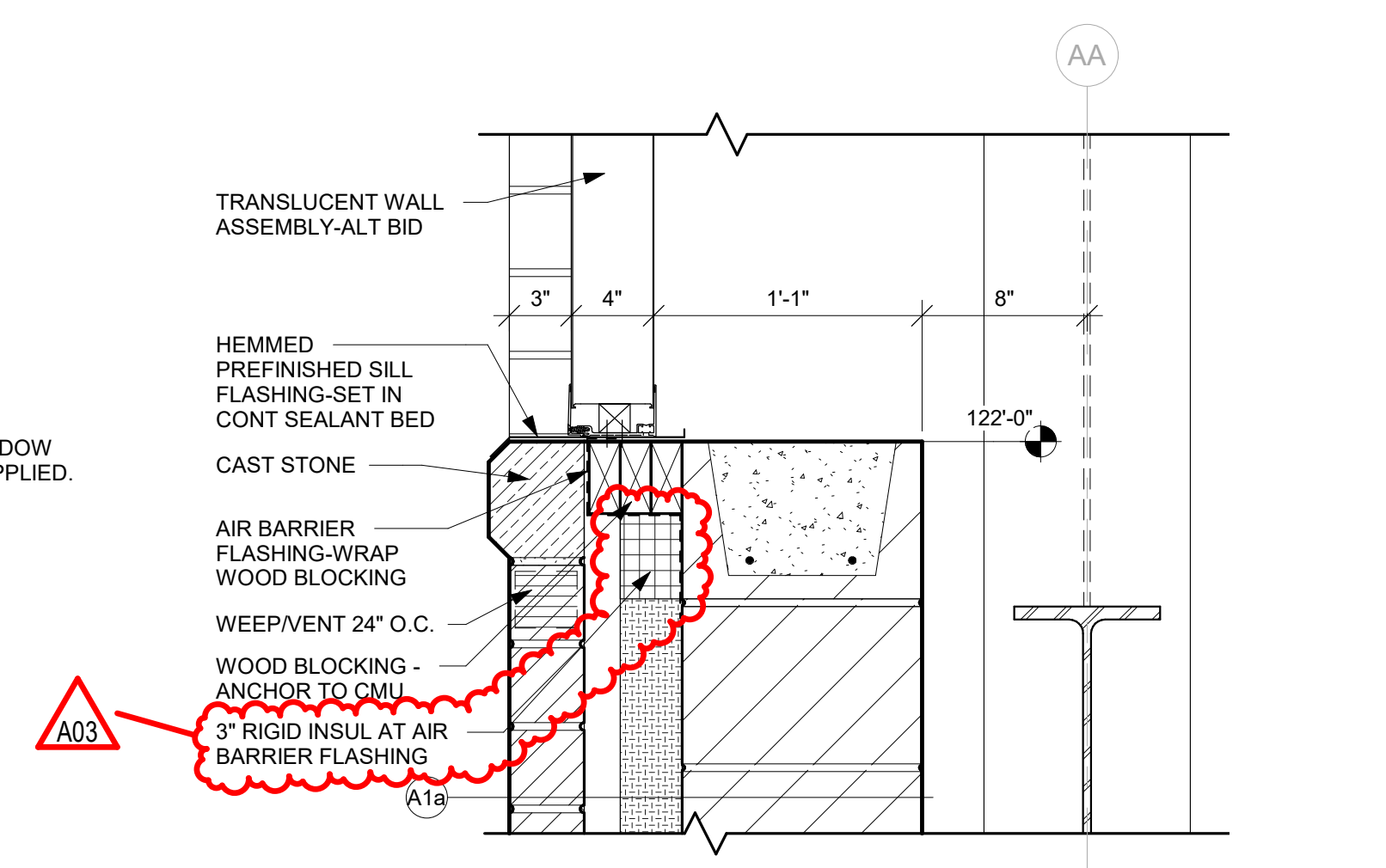
A500



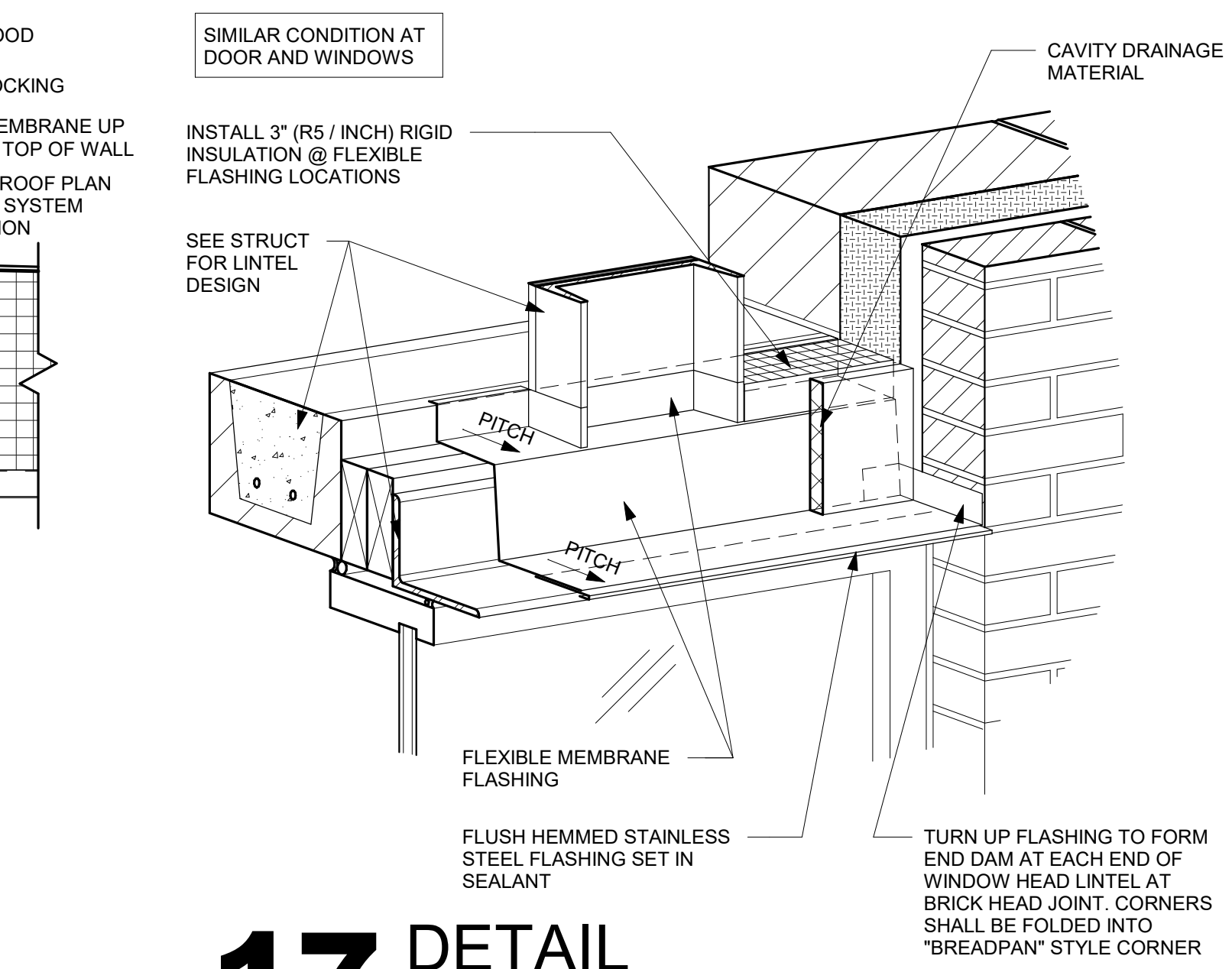
**20** WINDOW JAMB  
1 1/2" = 1'-0"



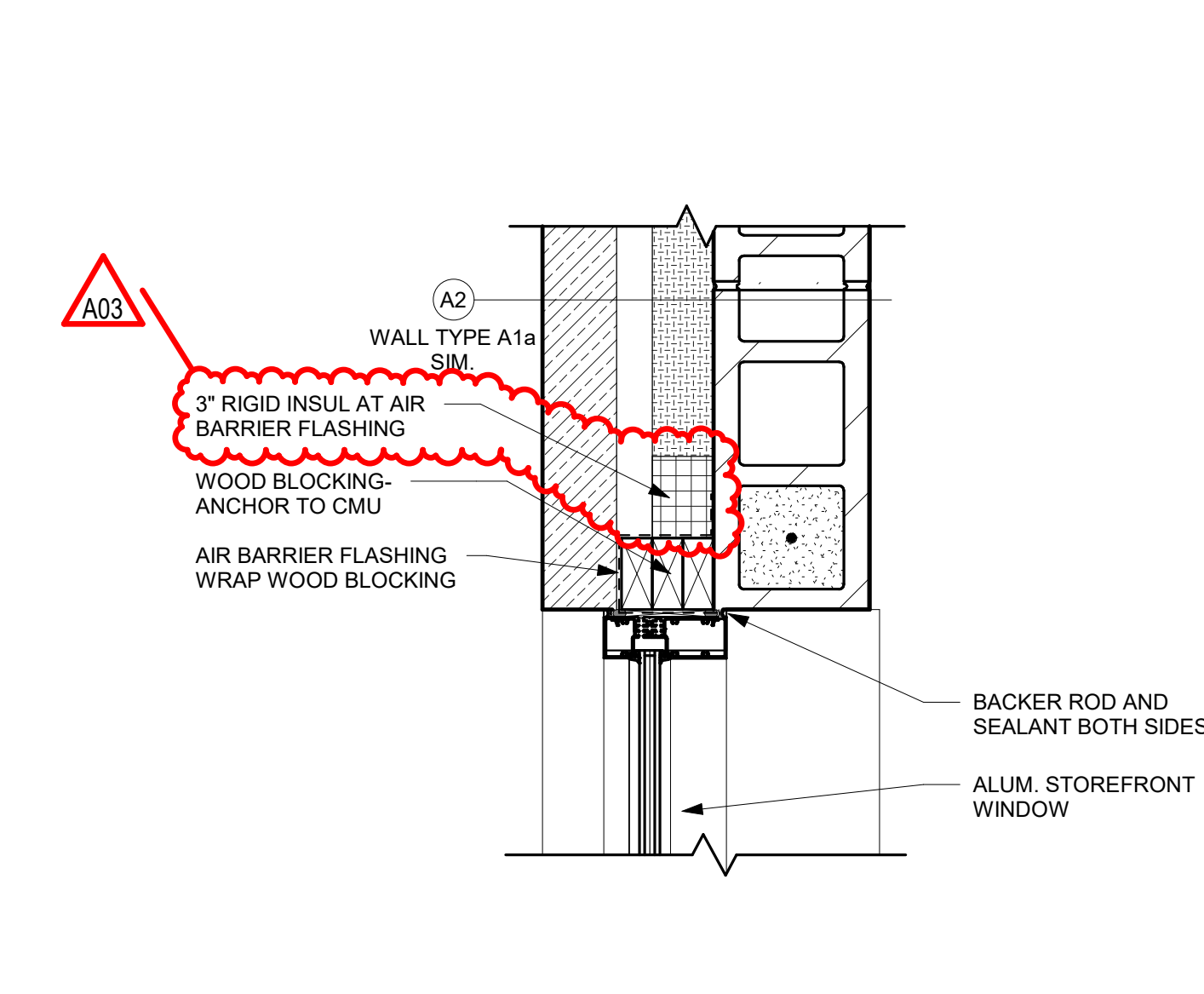
**19** WINDOW HEAD  
1 1/2" = 1'-0"



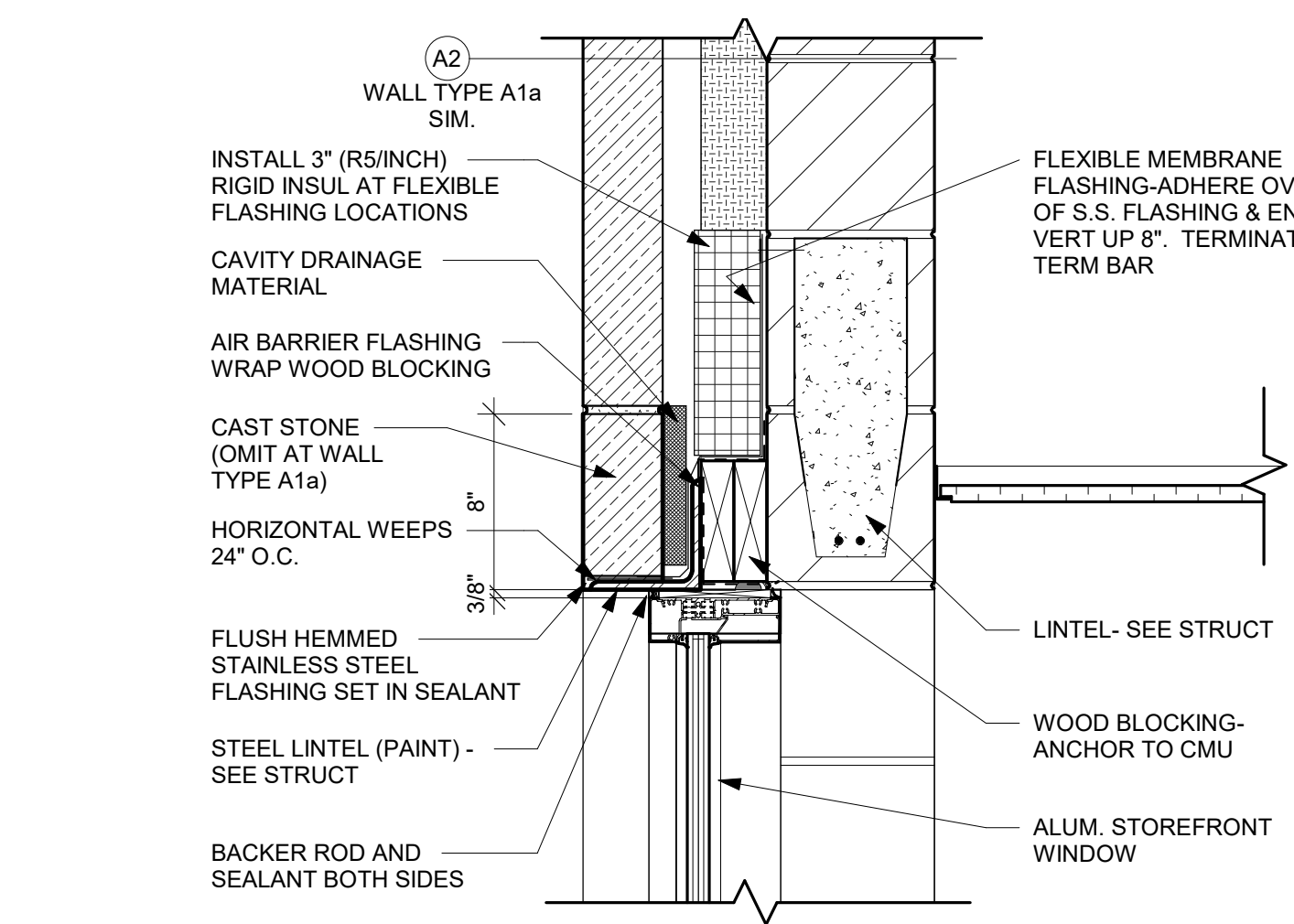
**18** WINDOW SILL  
1 1/2" = 1'-0"



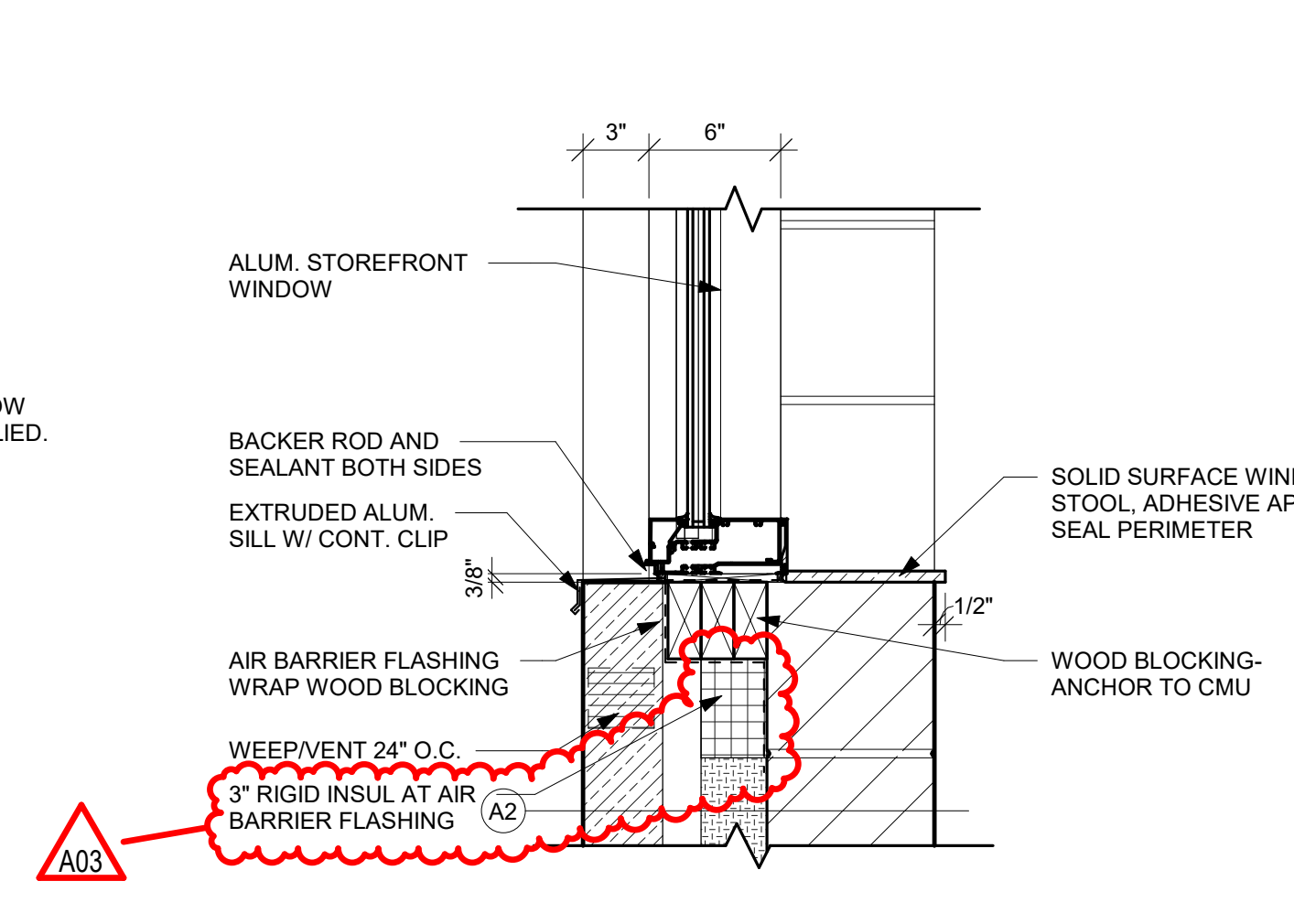
**17** DETAIL  
1 1/2" = 1'-0"



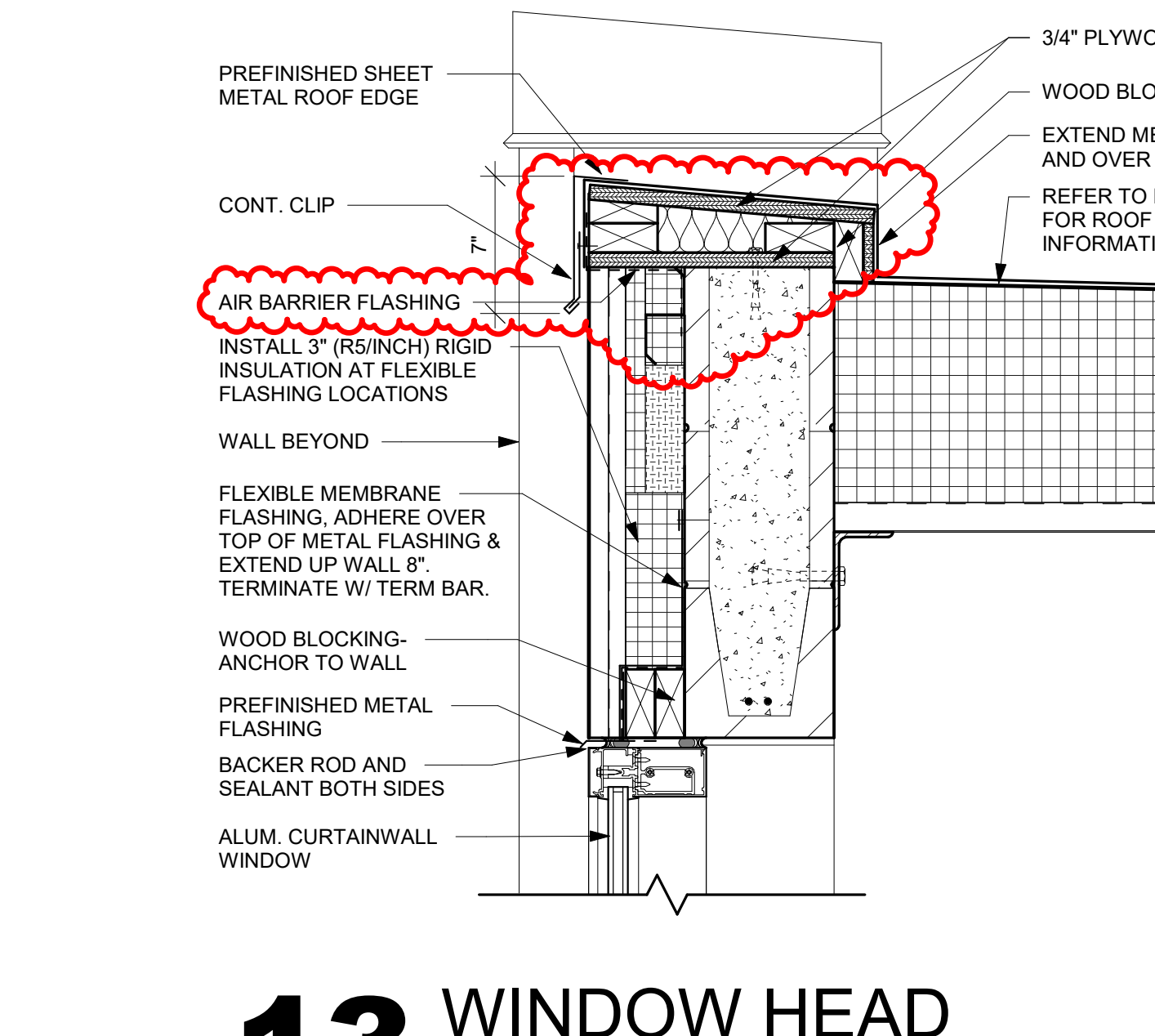
**16** WINDOW JAMB  
1 1/2" = 1'-0"



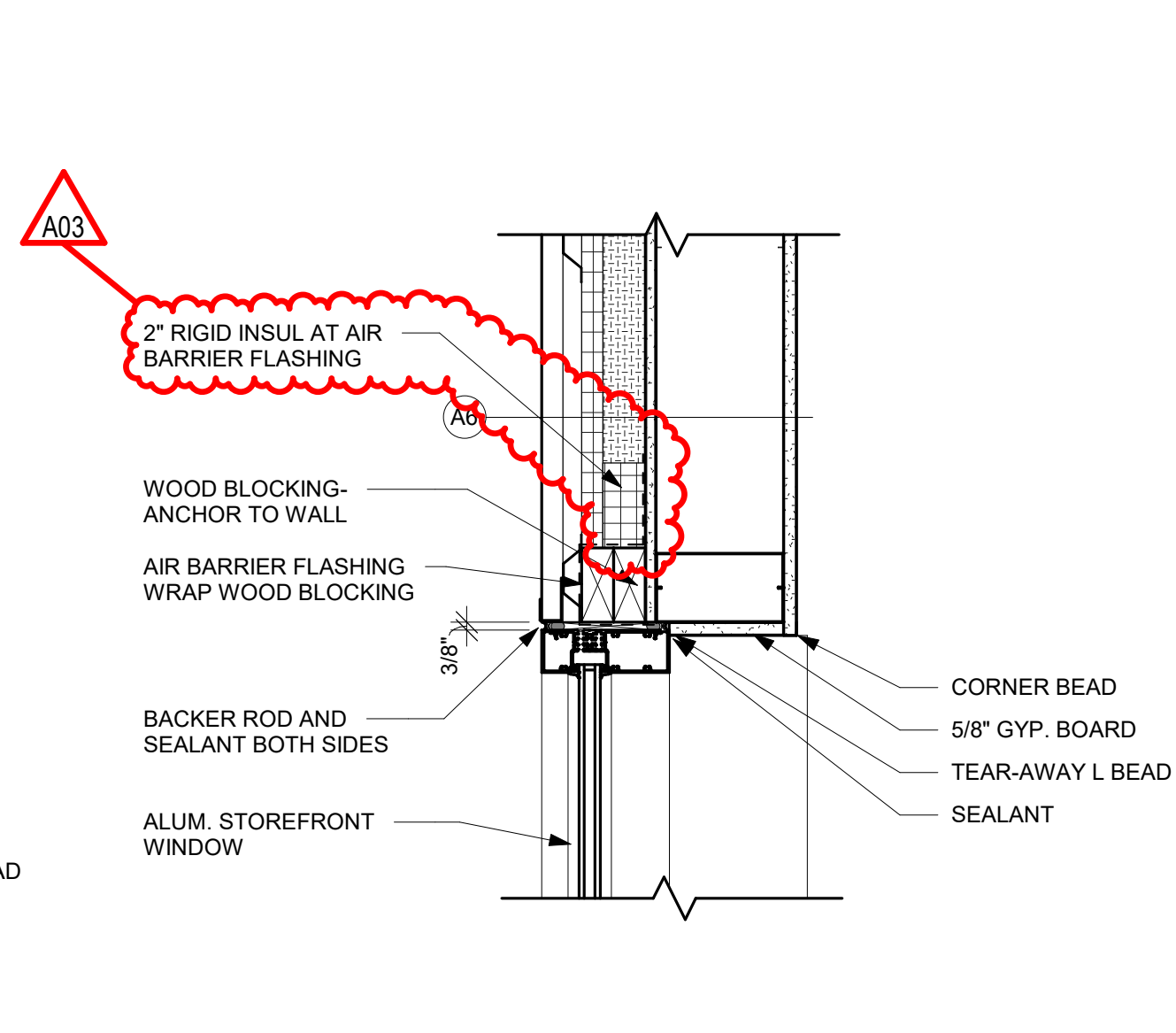
**15** WINDOW HEAD  
1 1/2" = 1'-0"



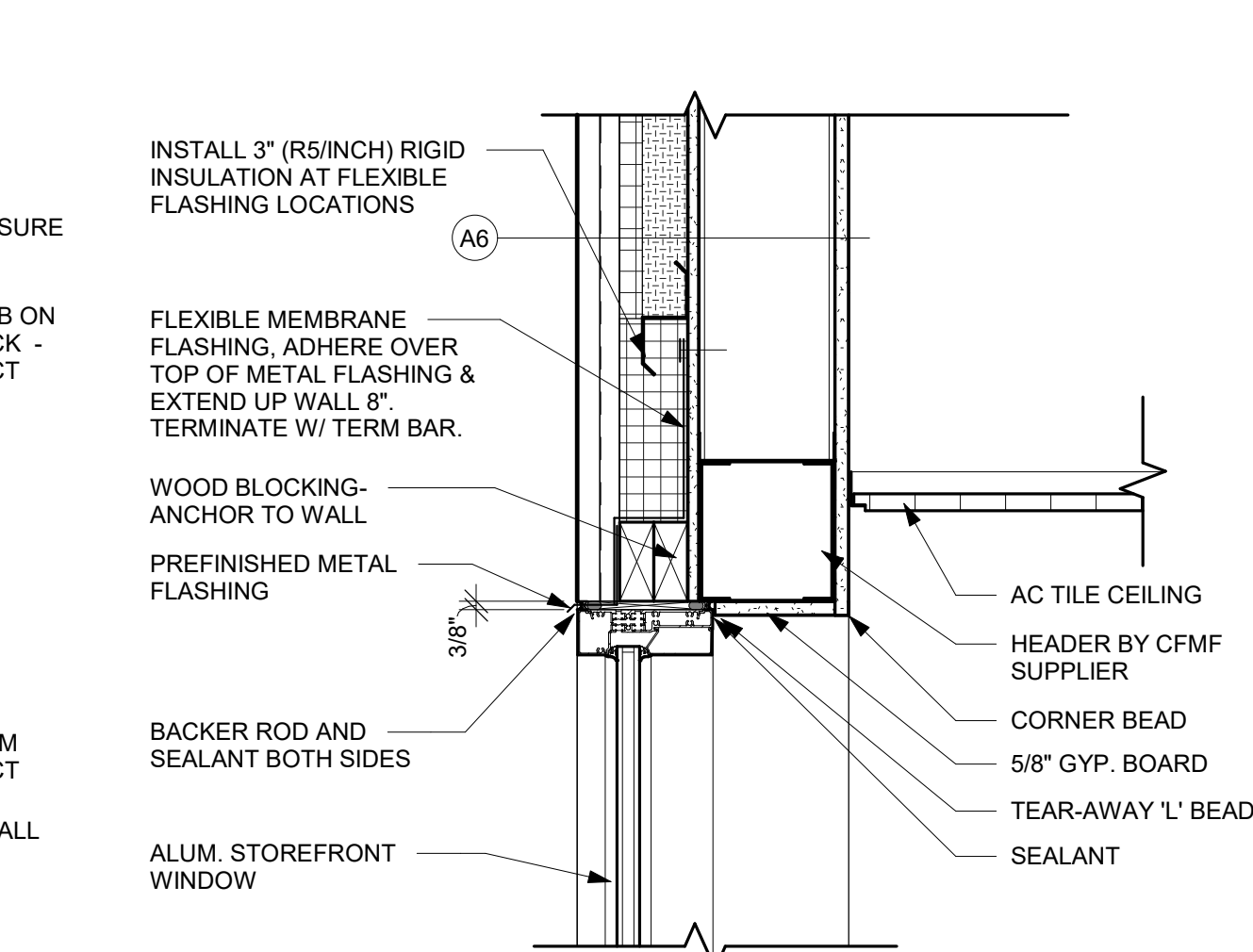
**14** WINDOW SILL  
1 1/2" = 1'-0"



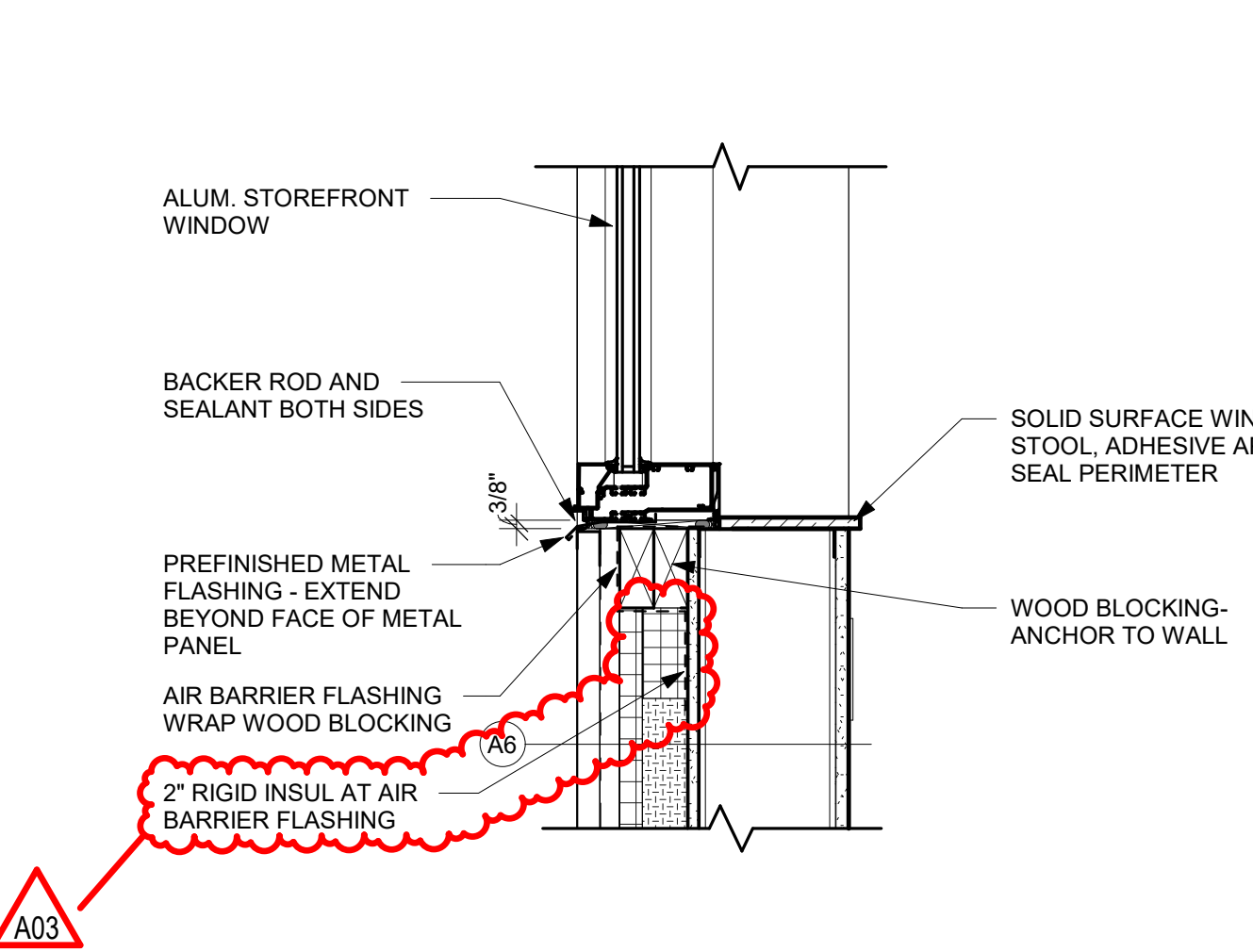
**13** WINDOW HEAD  
1 1/2" = 1'-0"



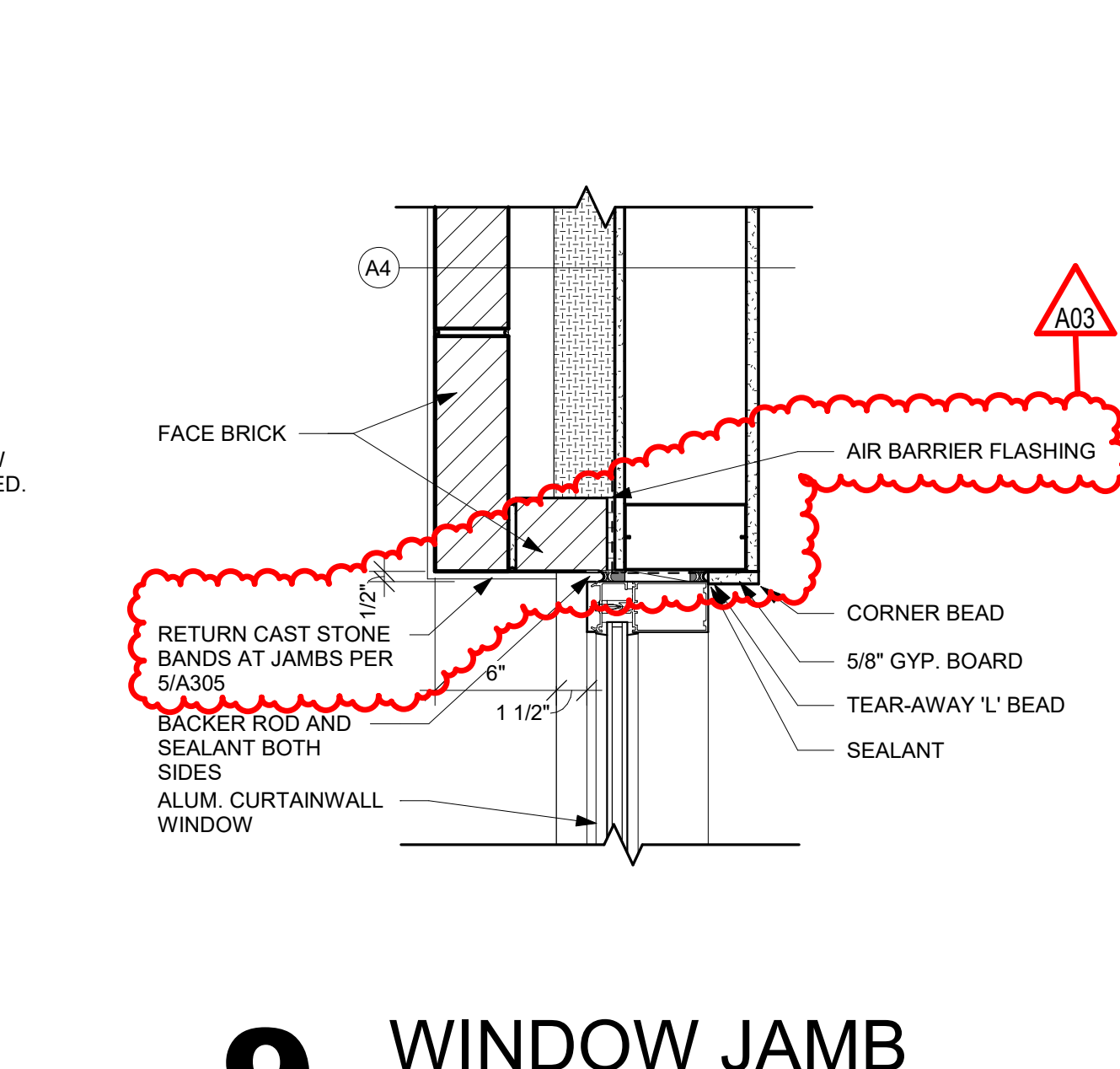
**12** WINDOW JAMB  
1 1/2" = 1'-0"



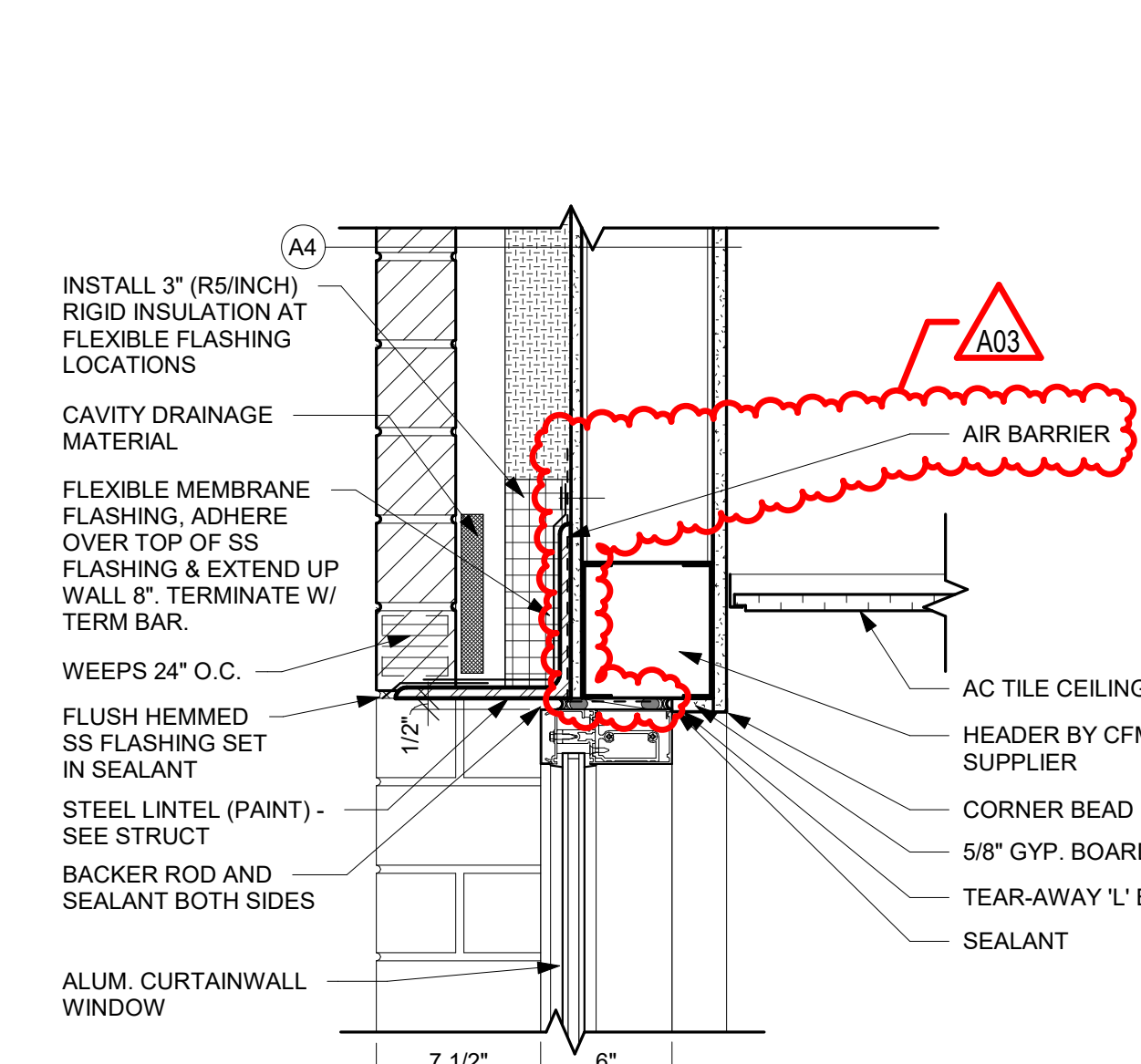
**11** WINDOW HEAD  
1 1/2" = 1'-0"



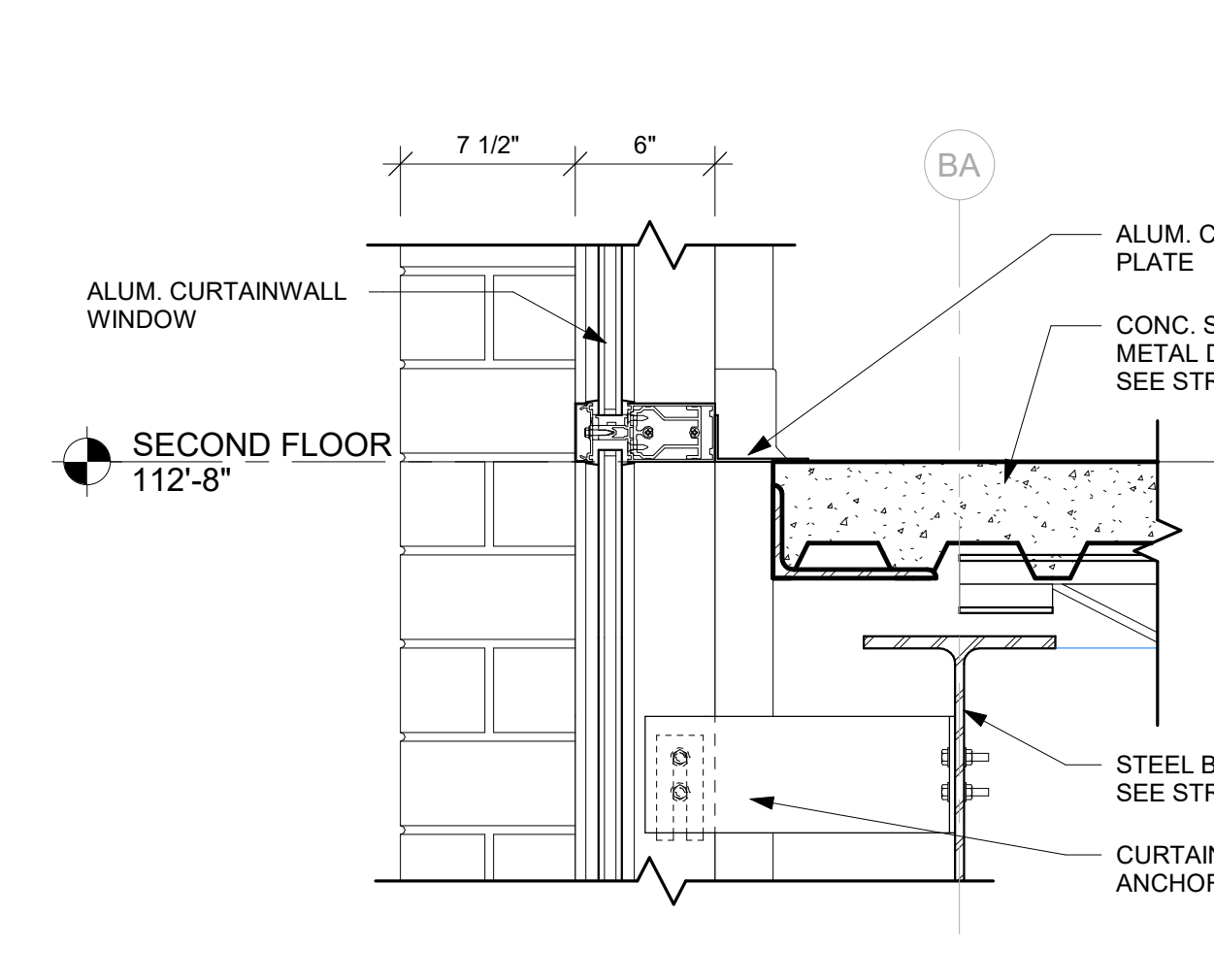
**10** WINDOW SILL  
1 1/2" = 1'-0"



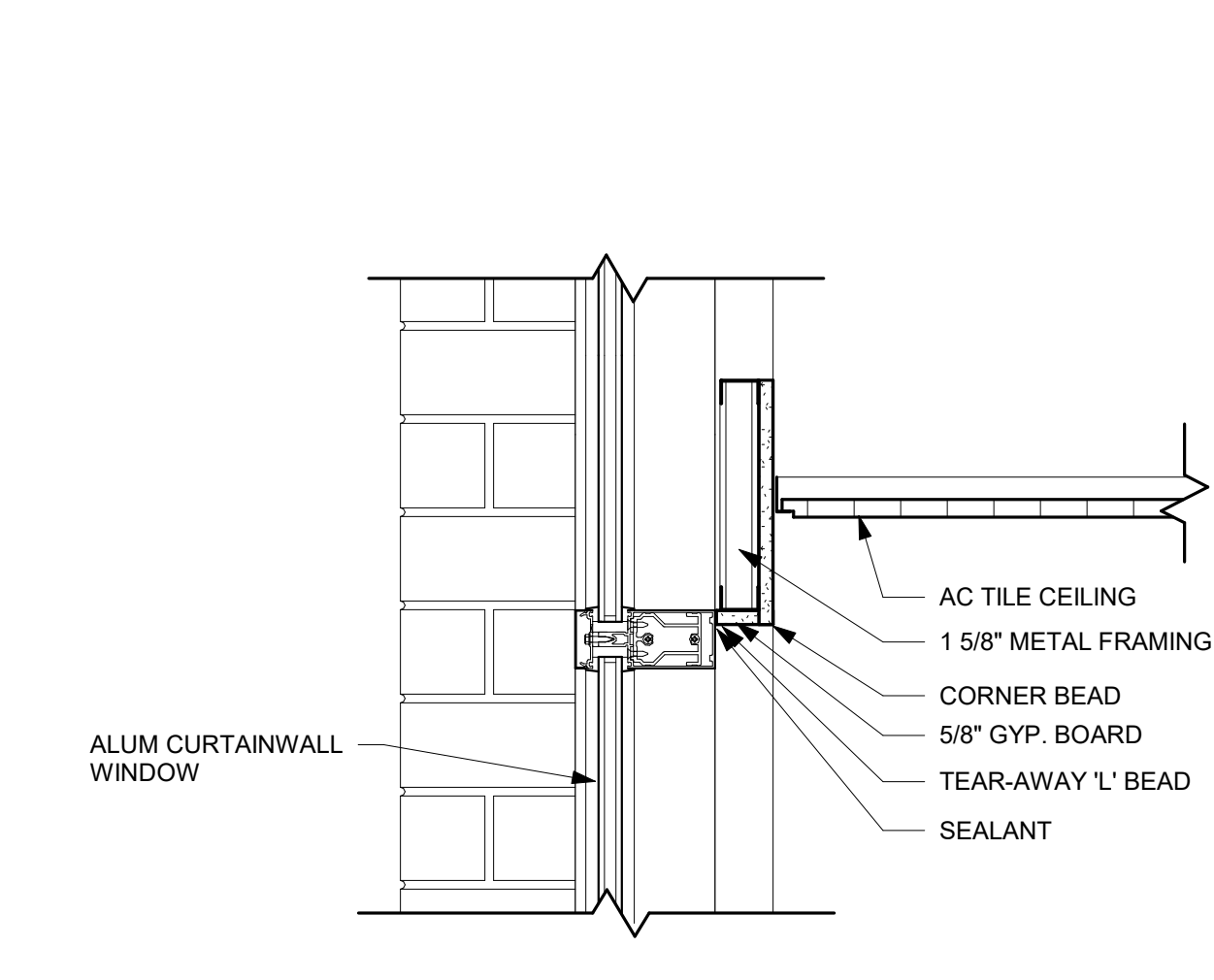
**9** WINDOW JAMB  
1 1/2" = 1'-0"



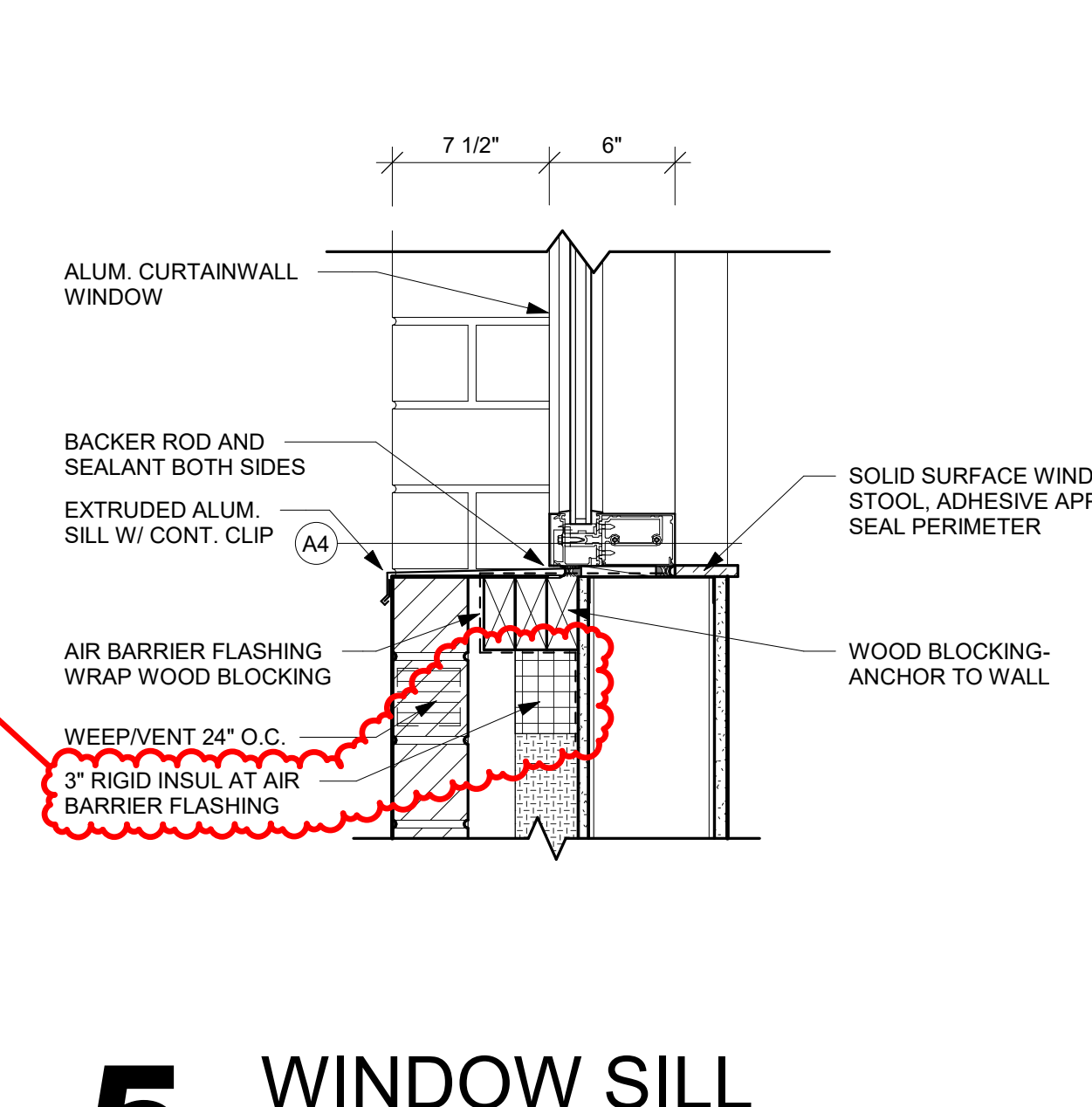
**8** WINDOW HEAD  
1 1/2" = 1'-0"



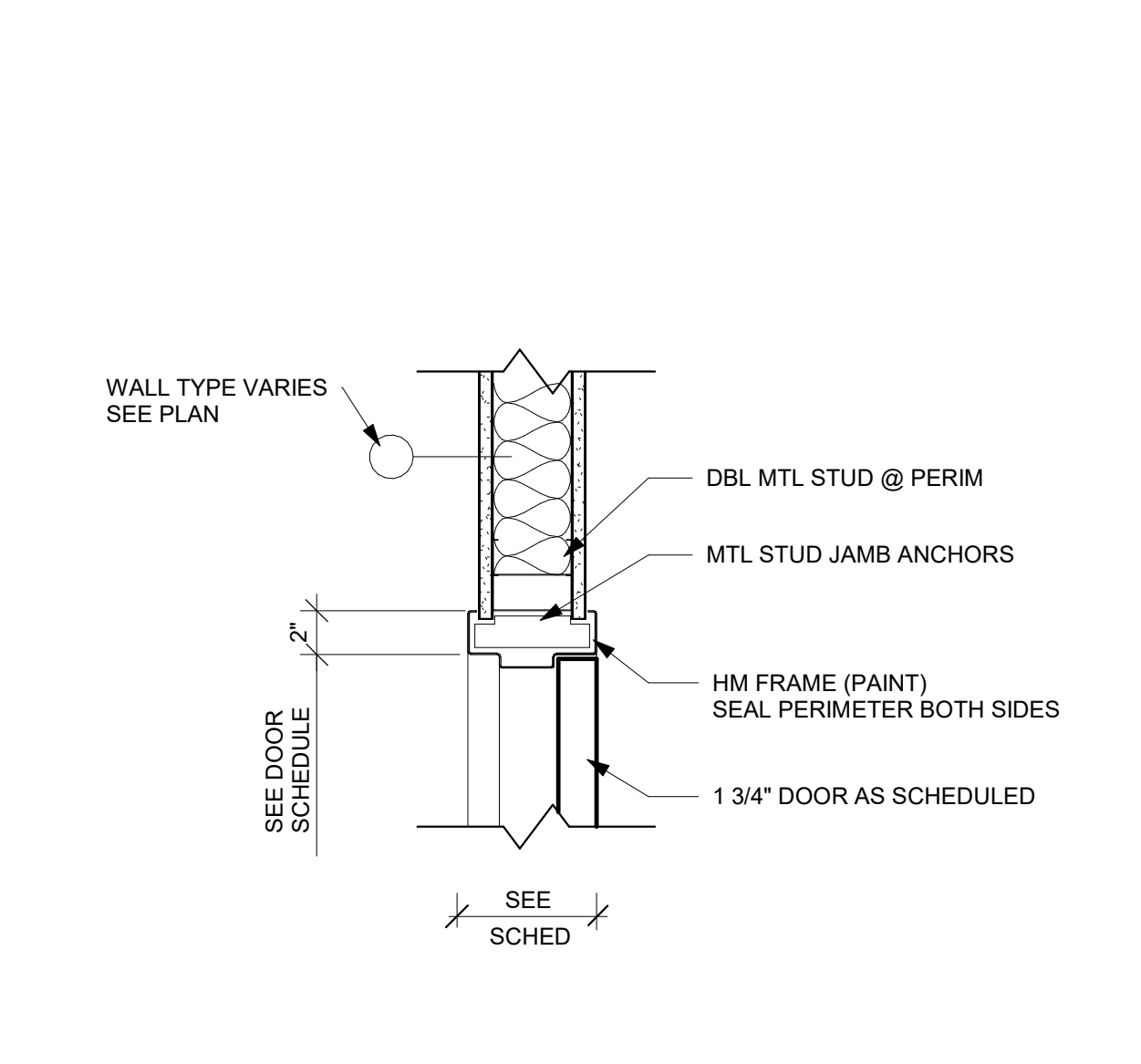
**7** WINDOW SILL  
1 1/2" = 1'-0"



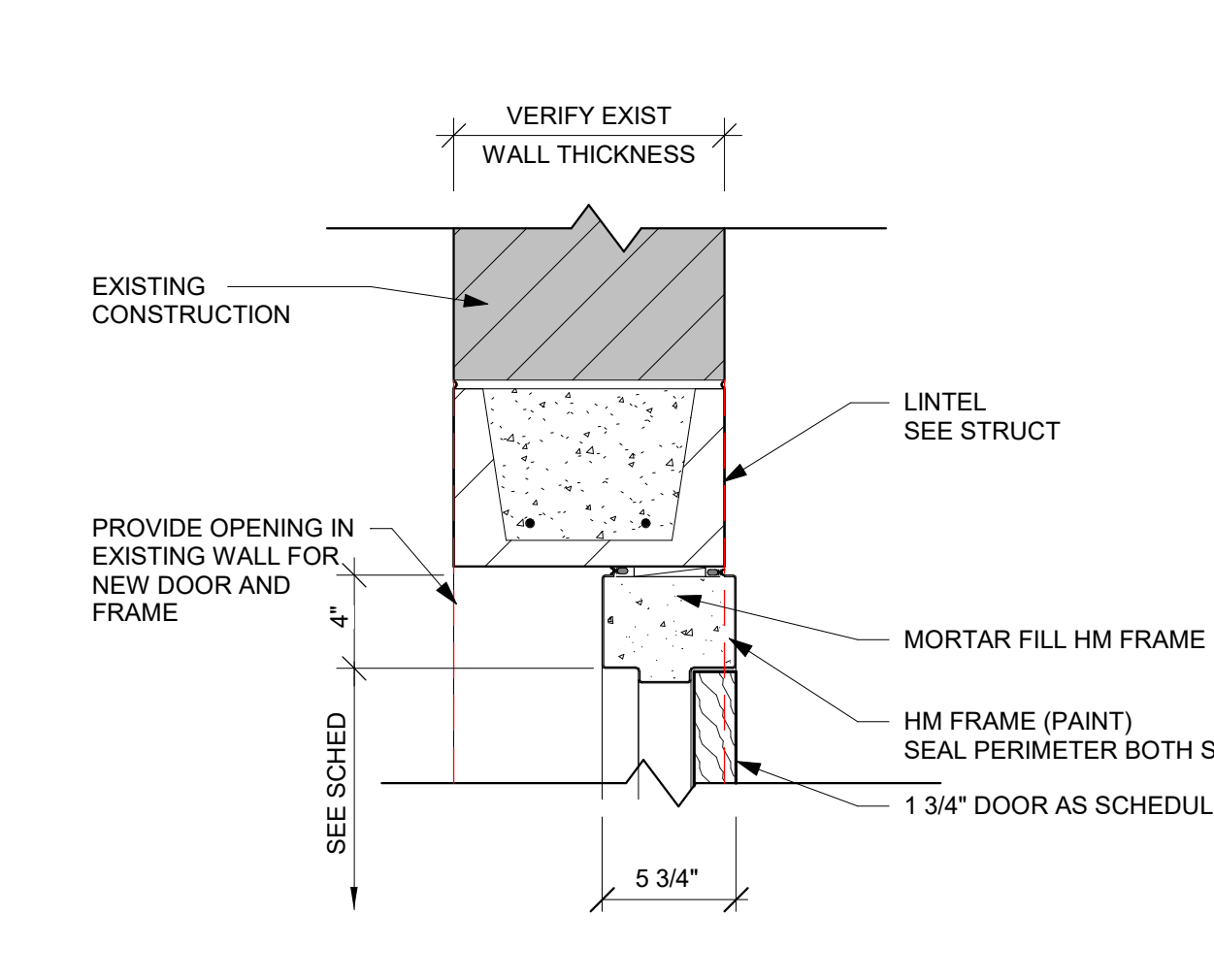
**6** WINDOW HEAD  
1 1/2" = 1'-0"



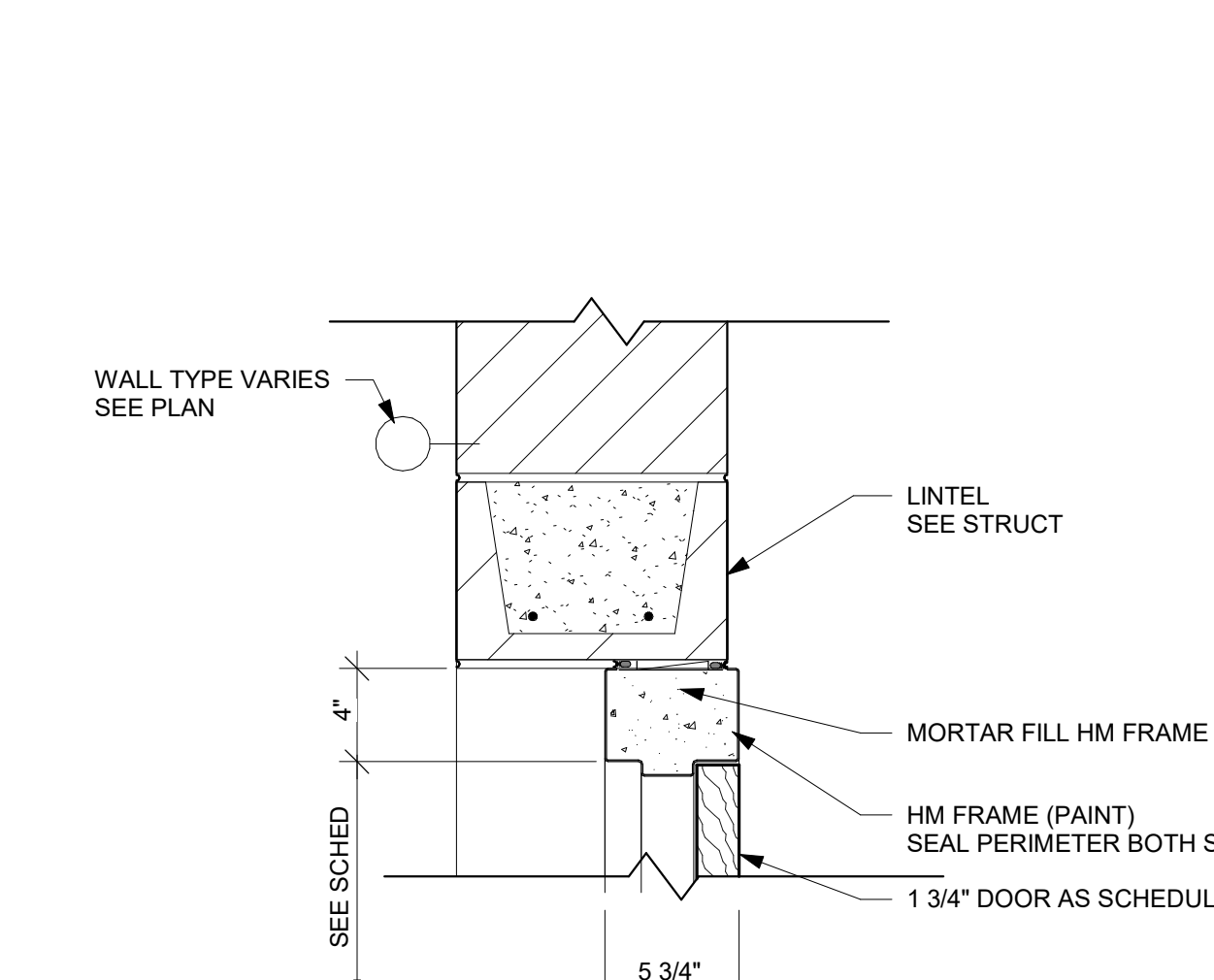
**5** WINDOW SILL  
1 1/2" = 1'-0"



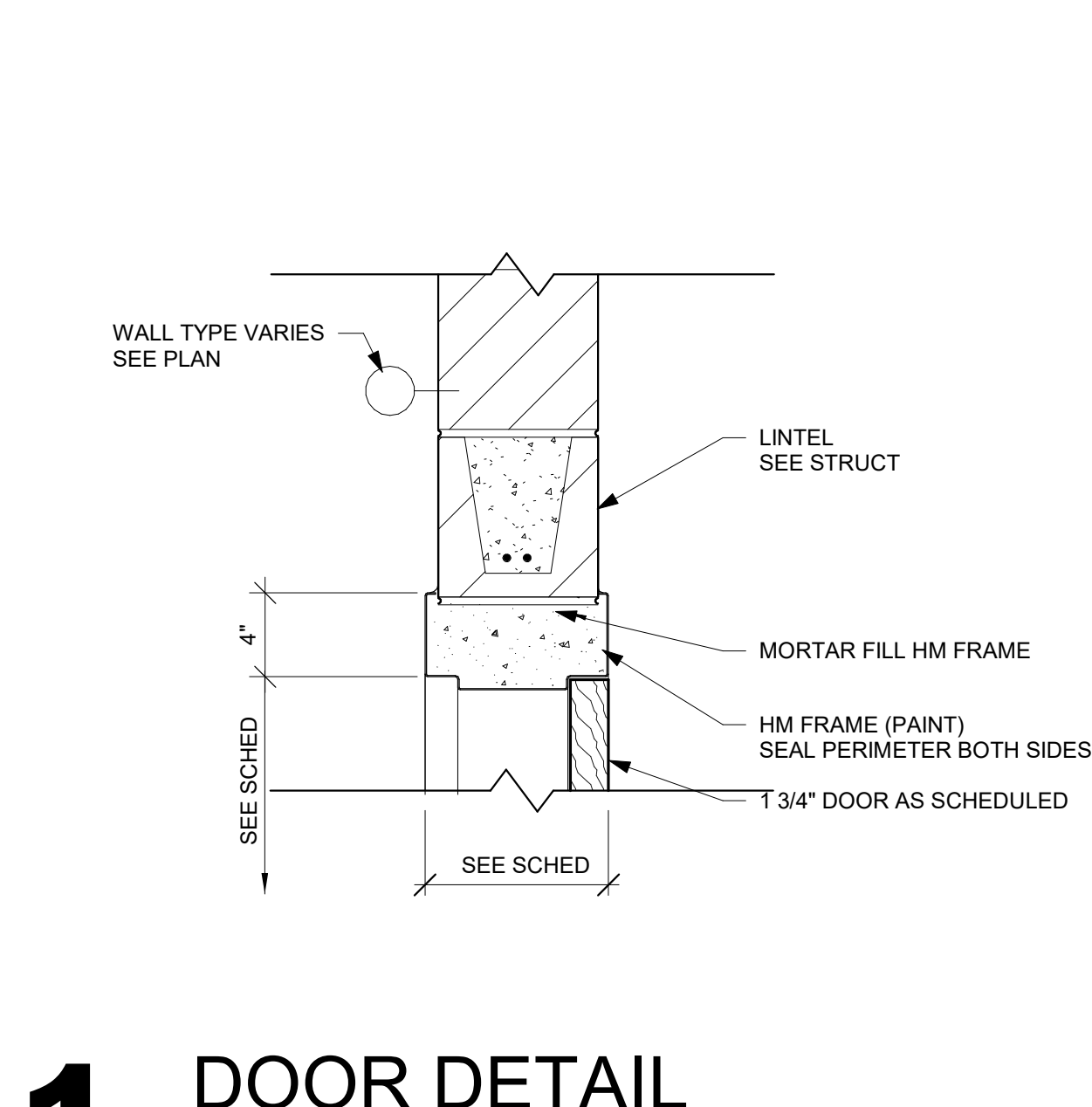
**4** DOOR DETAIL  
1 1/2" = 1'-0"



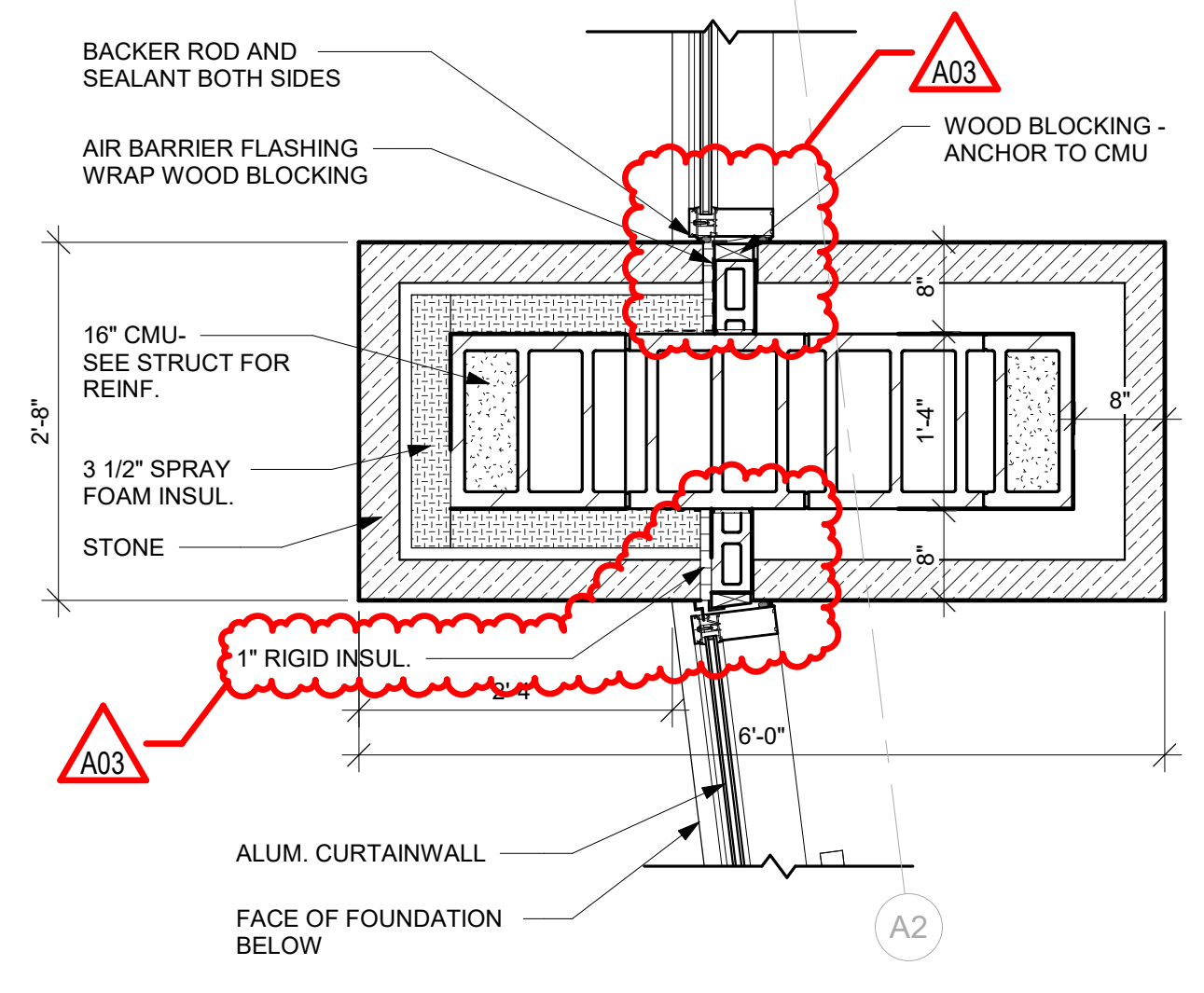
**3** DOOR DETAIL  
1 1/2" = 1'-0"



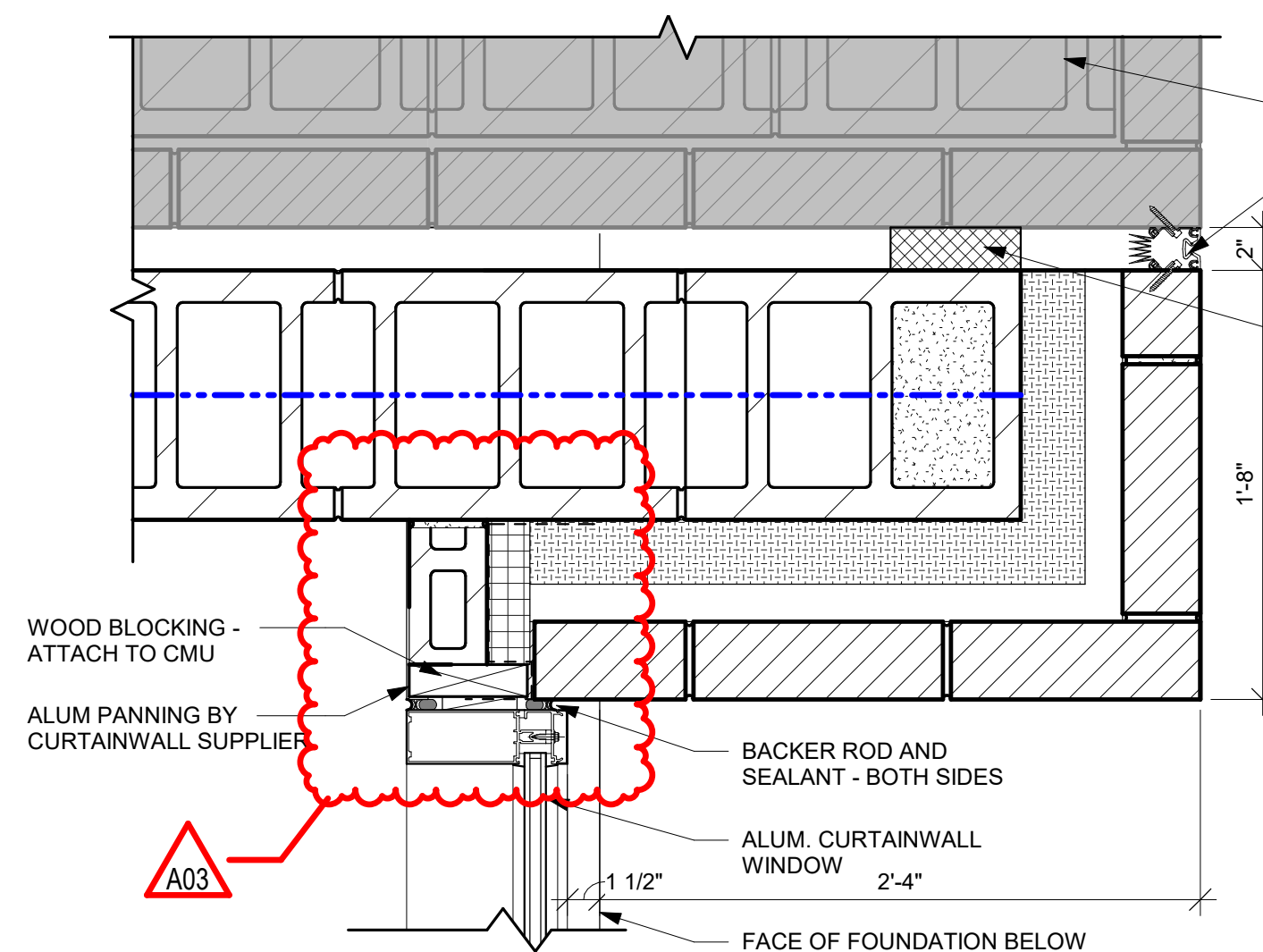
**2** DOOR DETAIL  
1 1/2" = 1'-0"



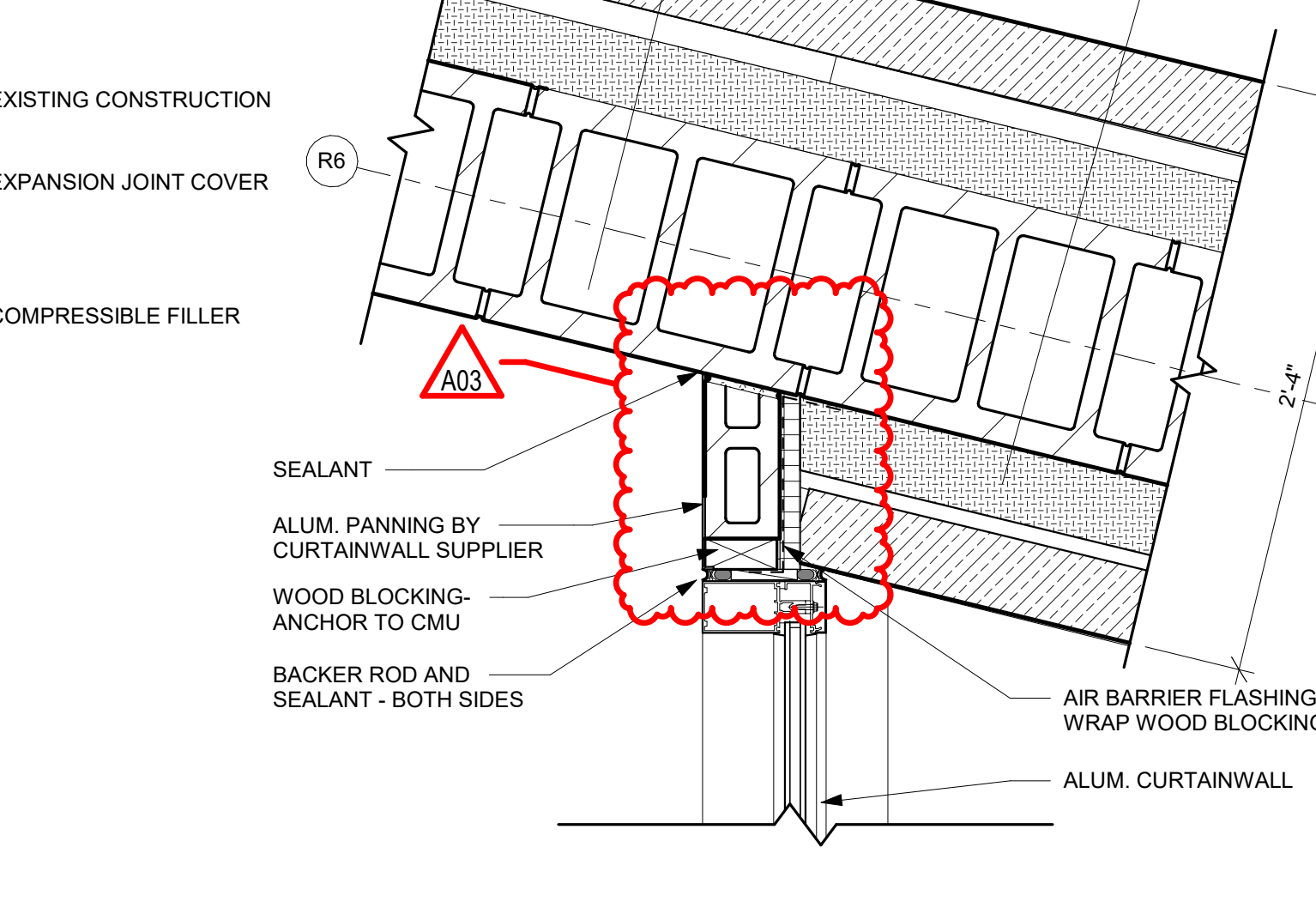
**1** DOOR DETAIL  
1 1/2" = 1'-0"



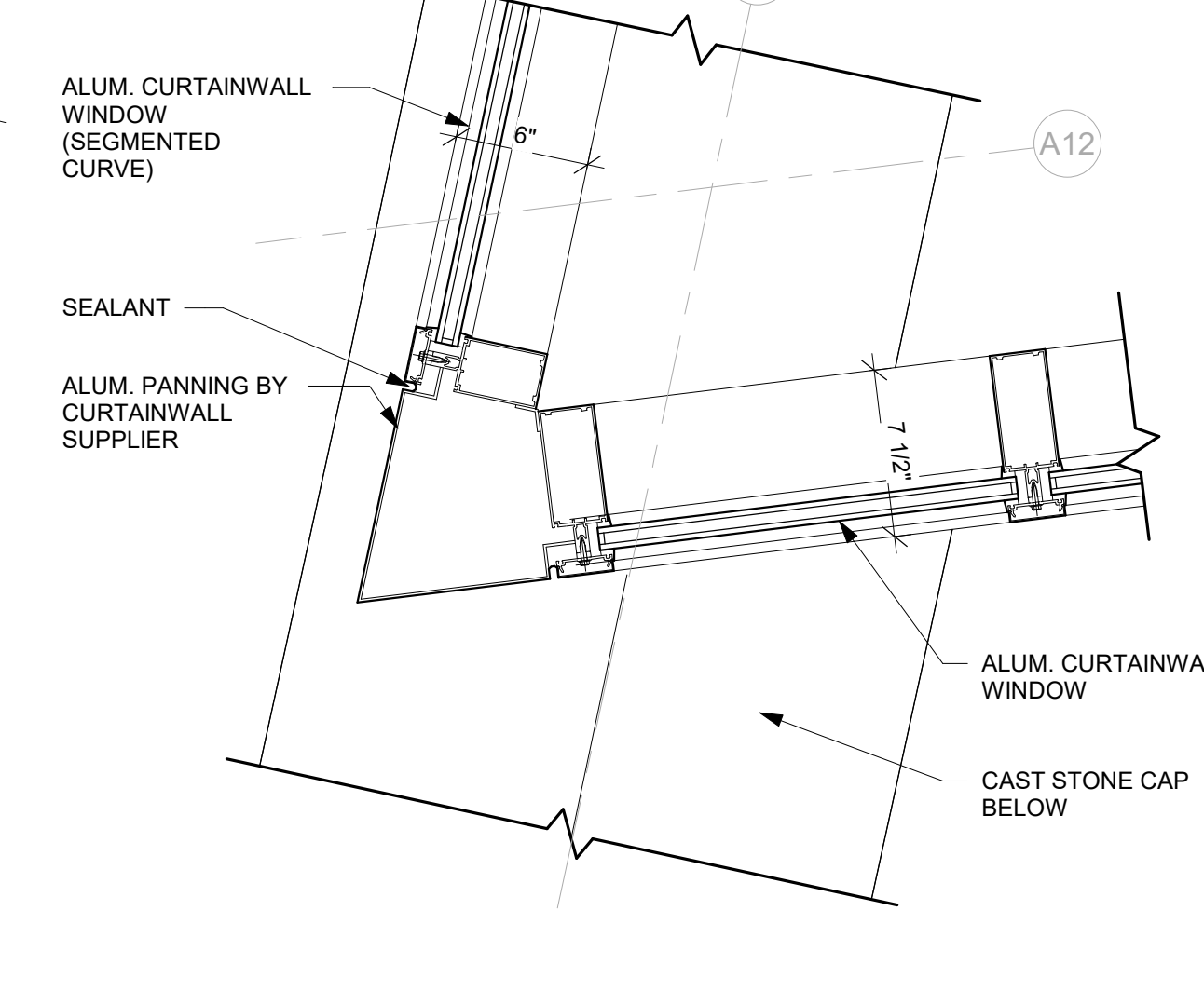
**4** PLAN DETAIL  
3/4" = 1'-0"



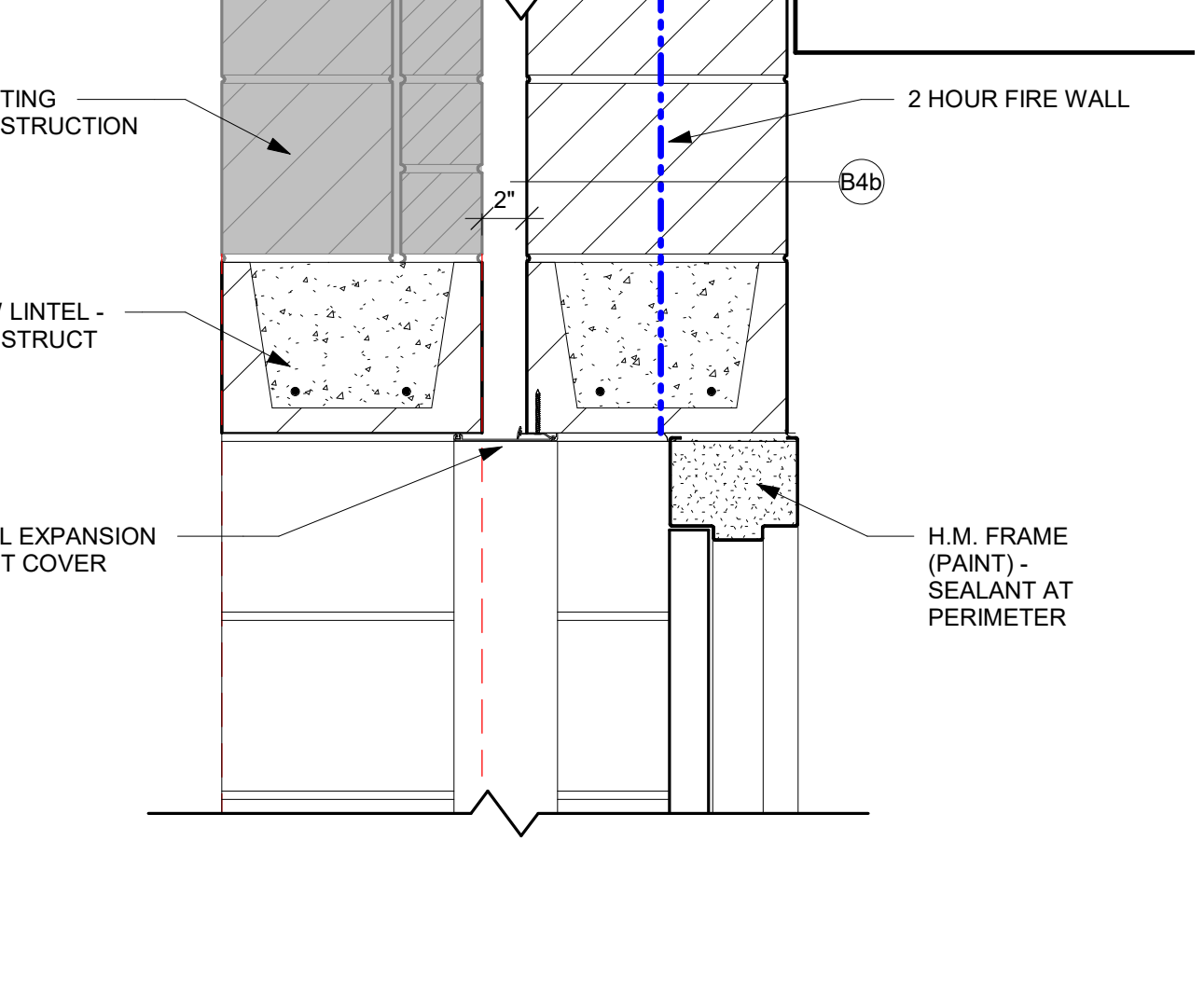
**8** PLAN DETAIL  
1 1/2" = 1'-0"



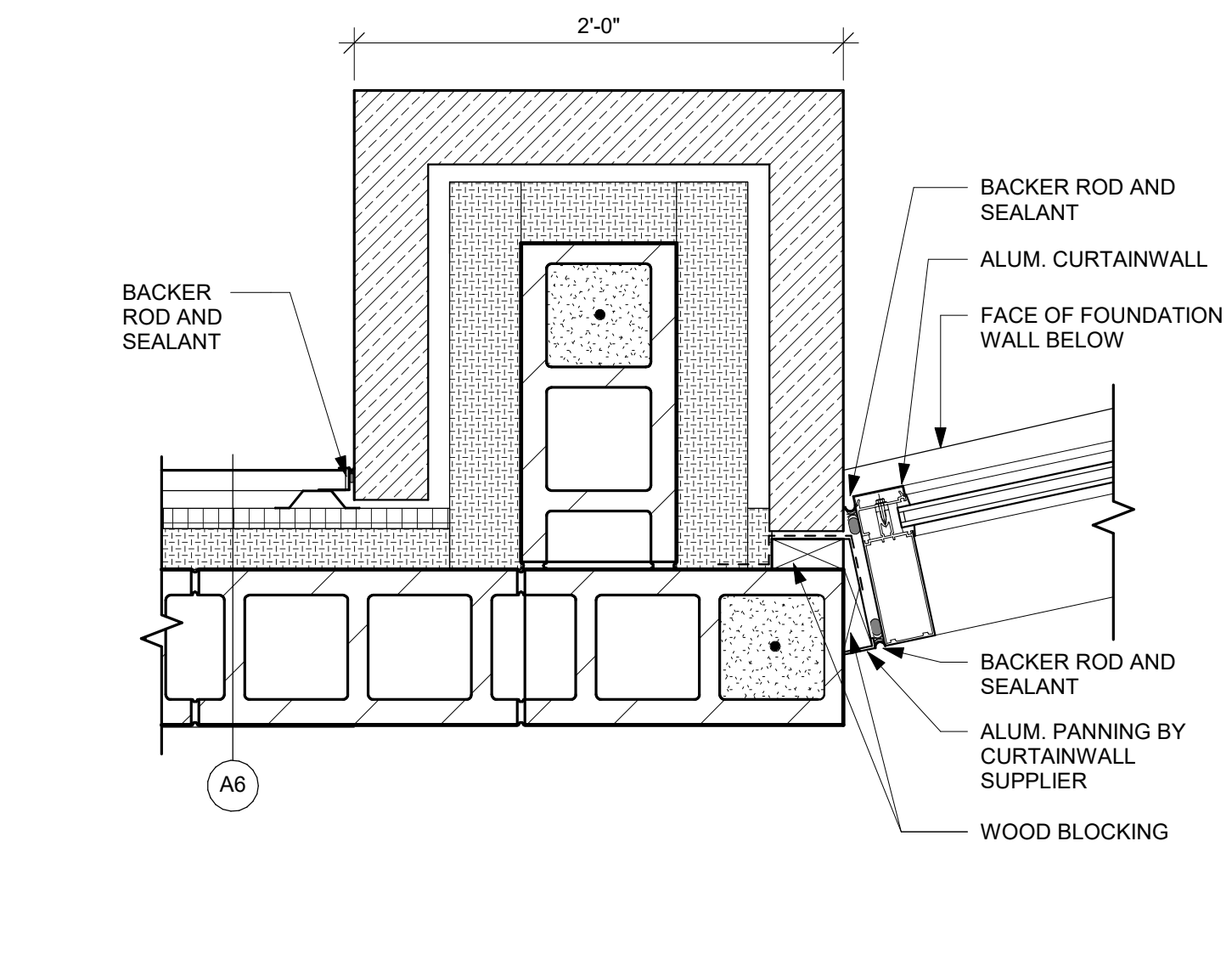
**12** PLAN DETAIL  
1 1/2" = 1'-0"



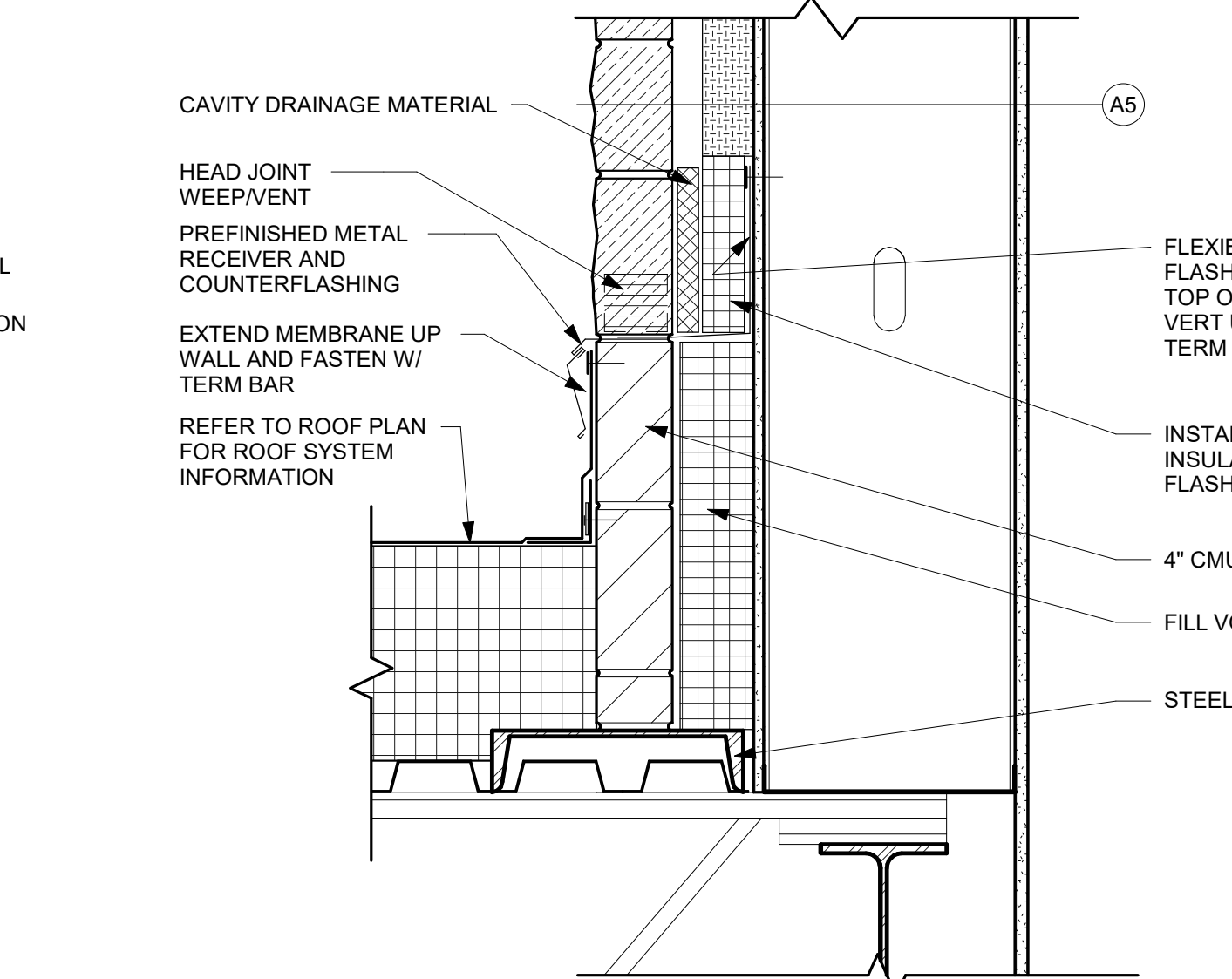
**16** WINDOW JAMB  
1 1/2" = 1'-0"



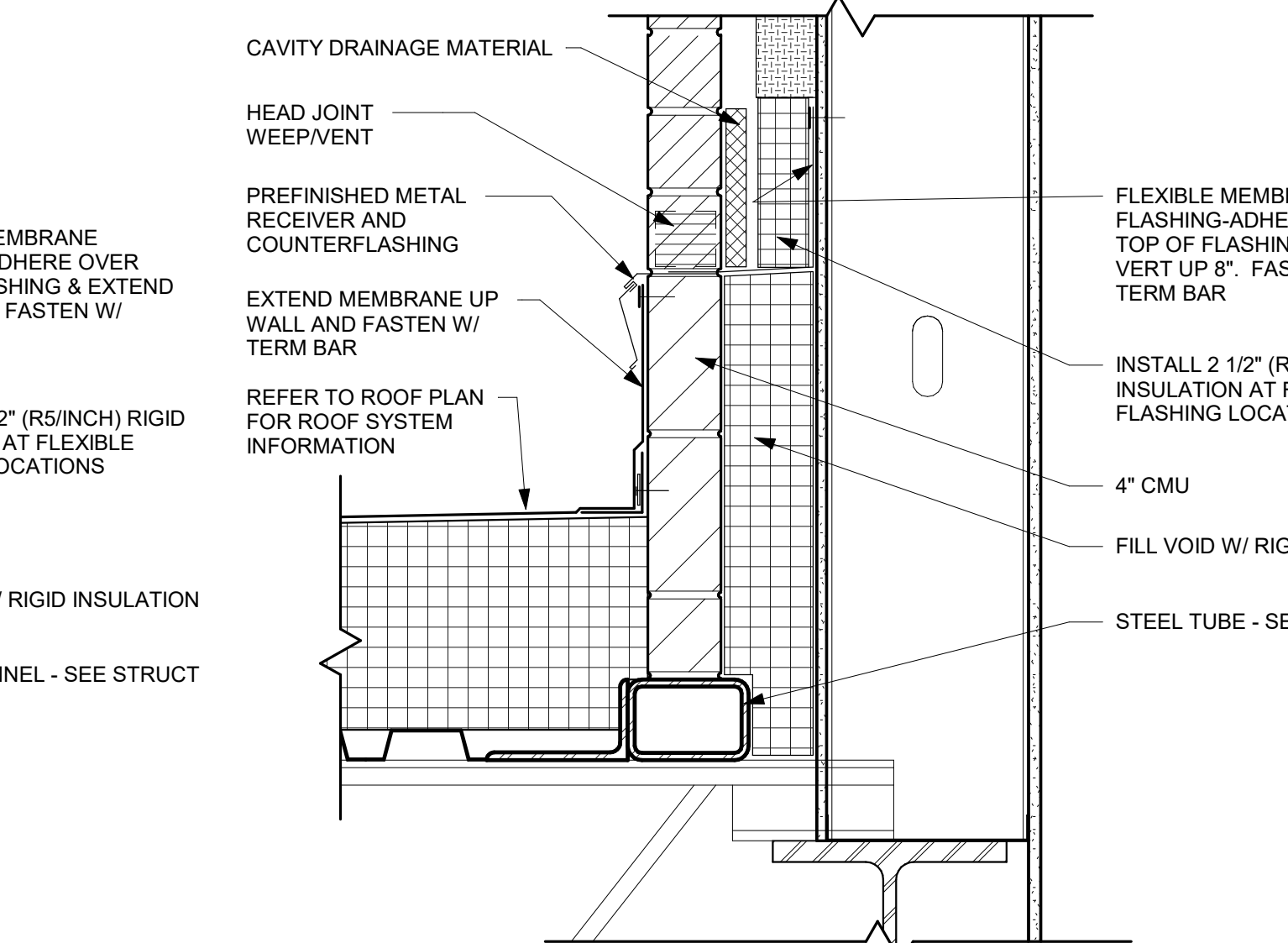
**20** DOOR DETAIL  
1 1/2" = 1'-0"



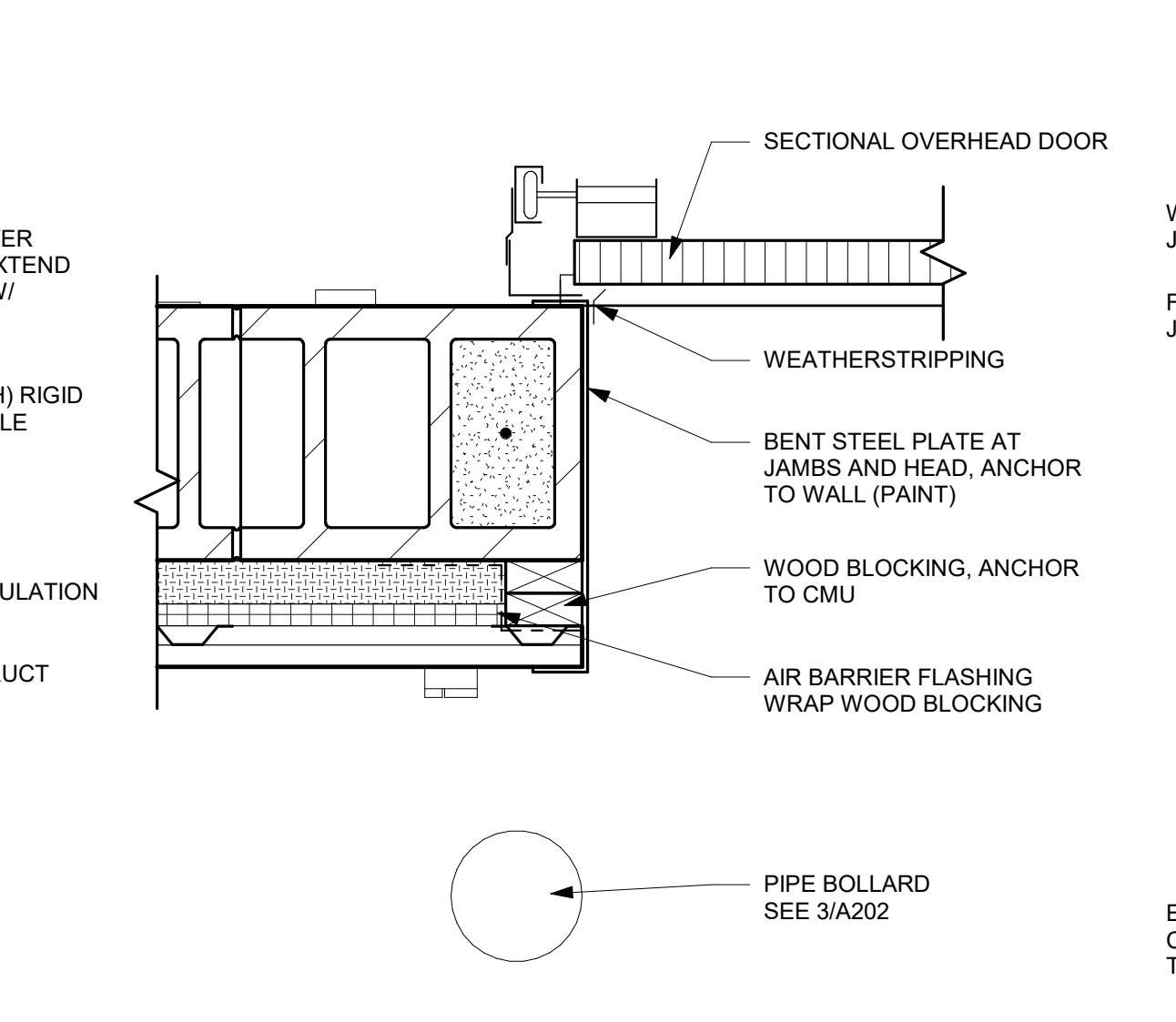
**3** PLAN DETAIL  
1 1/2" = 1'-0"



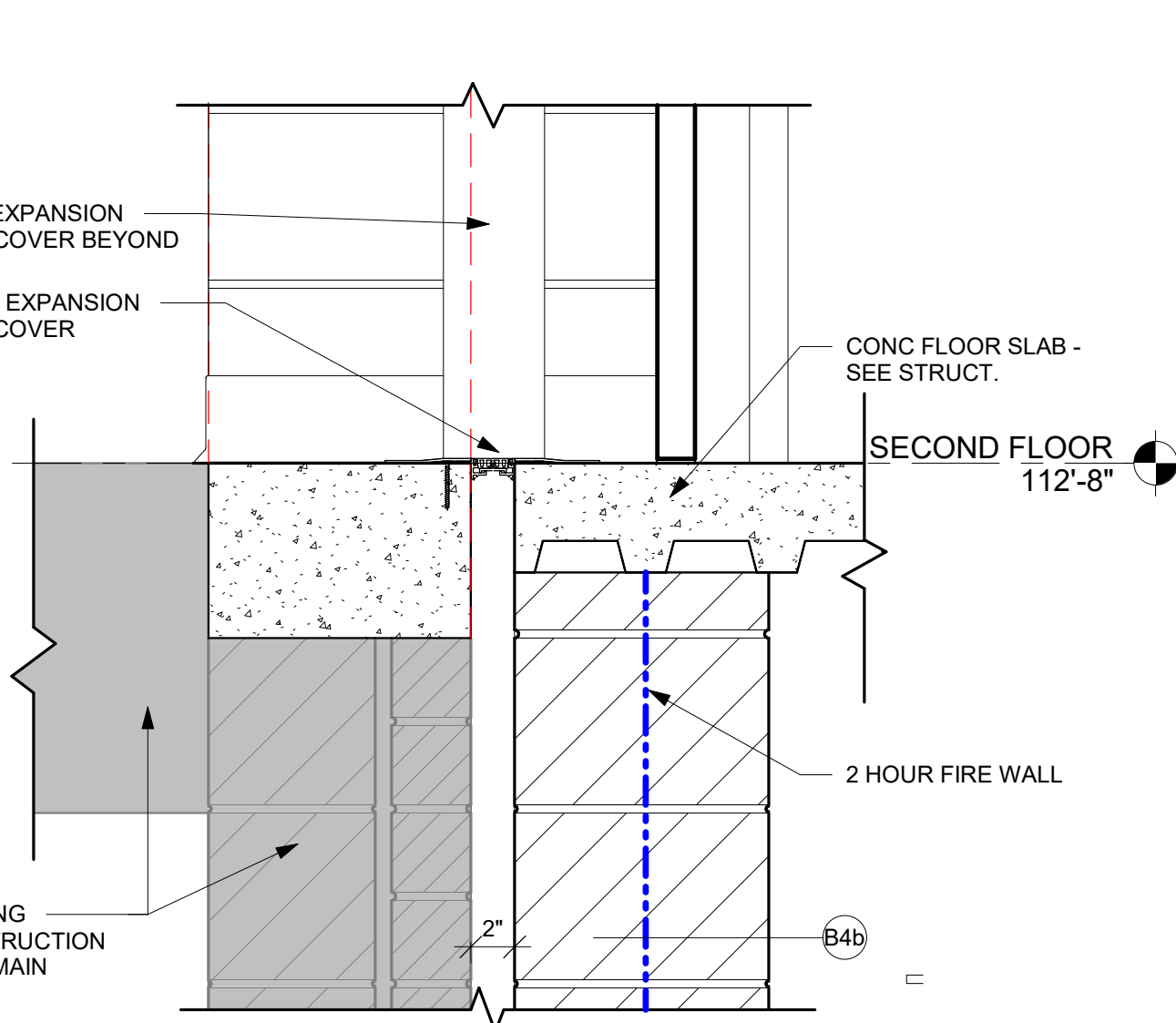
**7** ROOF DETAIL  
1 1/2" = 1'-0"



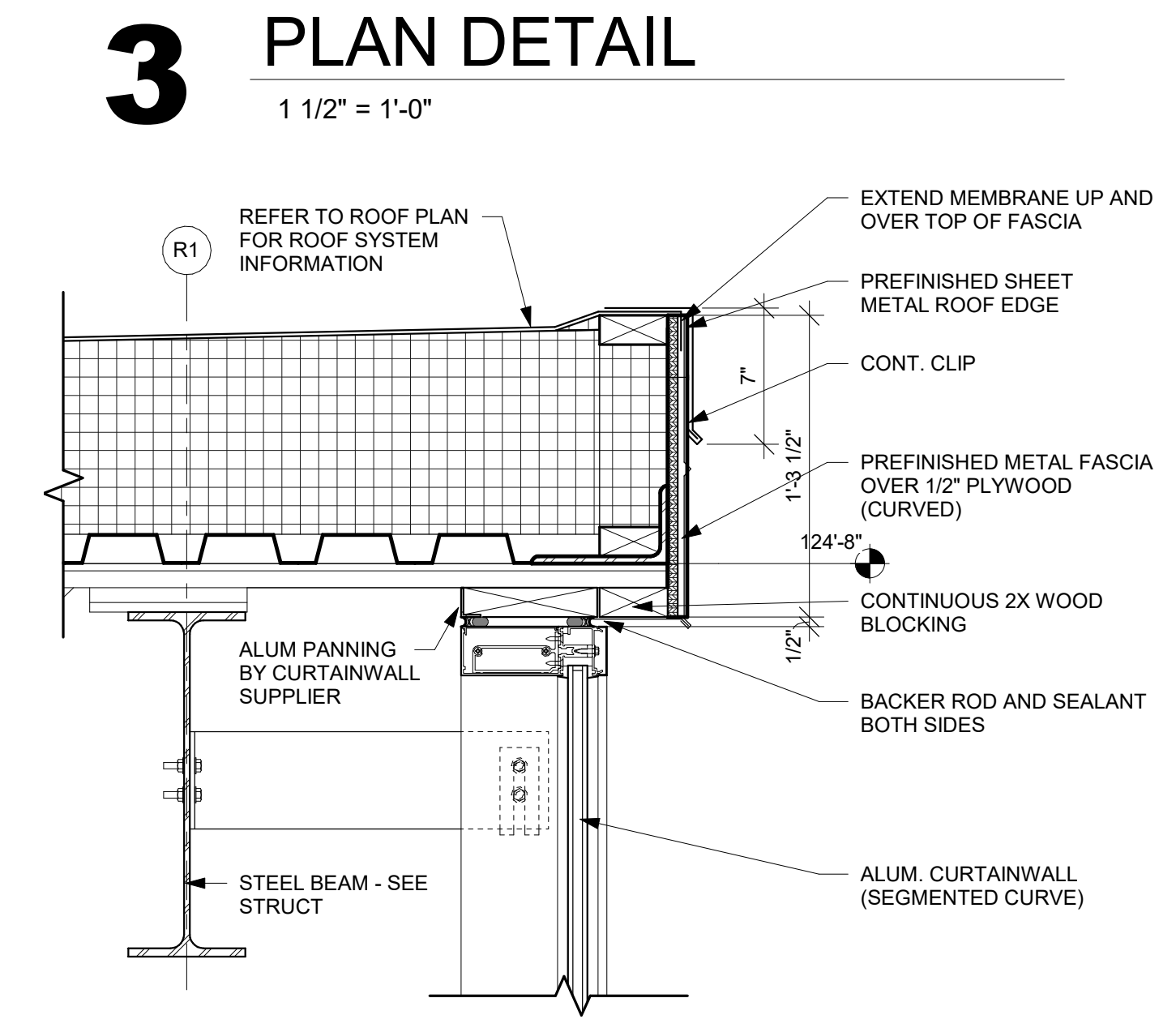
**11** ROOF DETAIL  
1 1/2" = 1'-0"



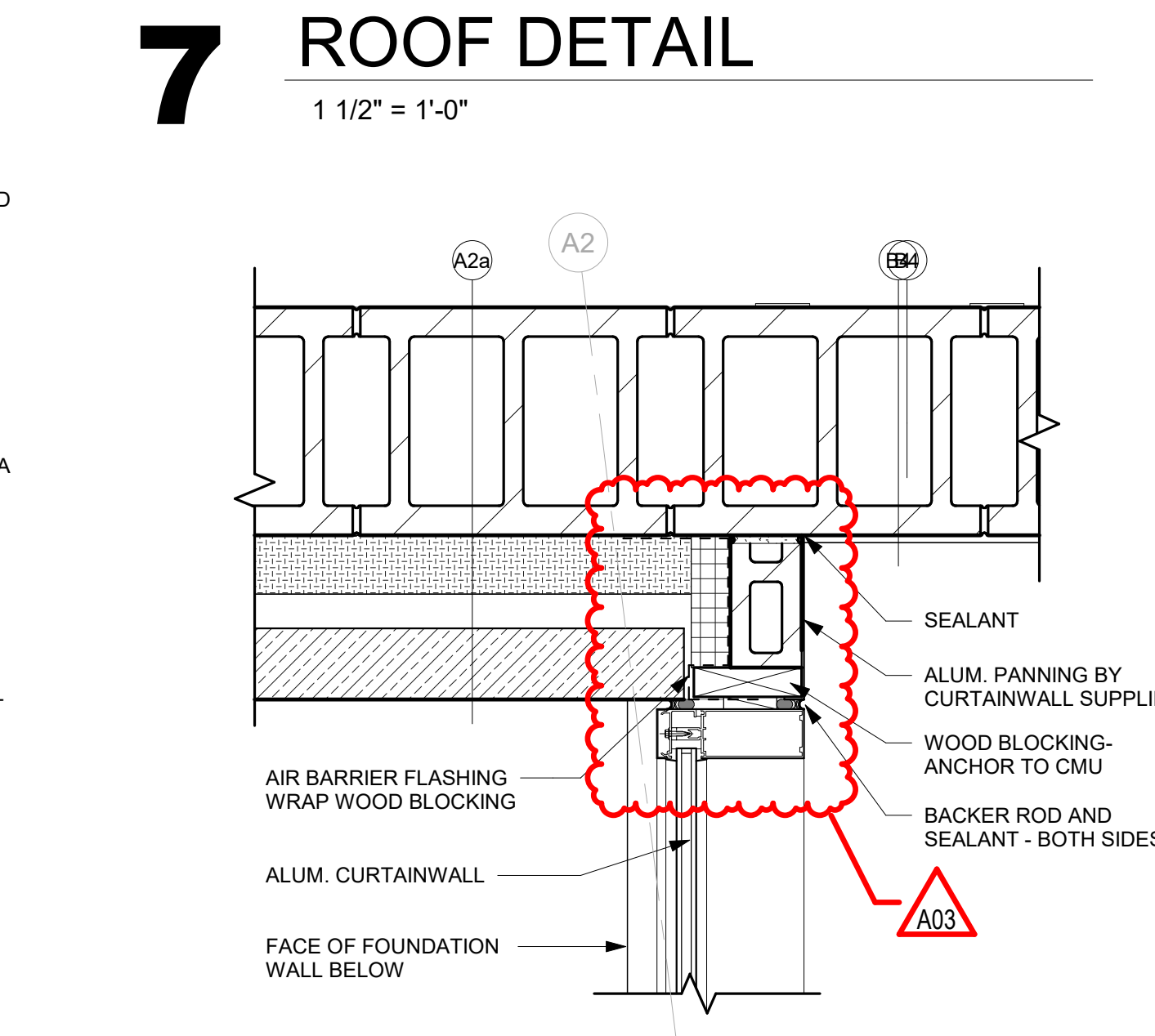
**15** PLAN DETAIL  
1 1/2" = 1'-0"



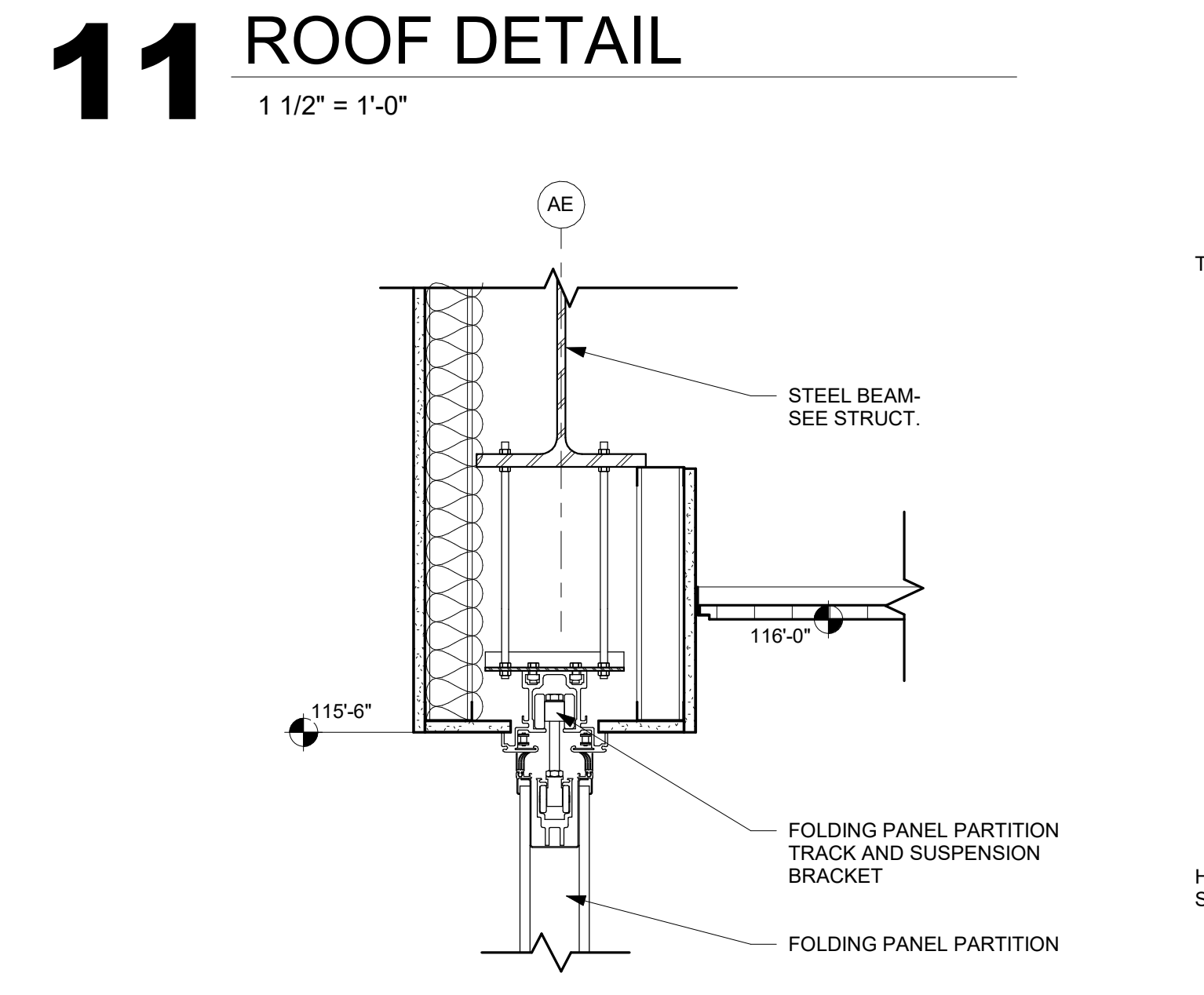
**19** FLOOR DETAIL  
1 1/2" = 1'-0"



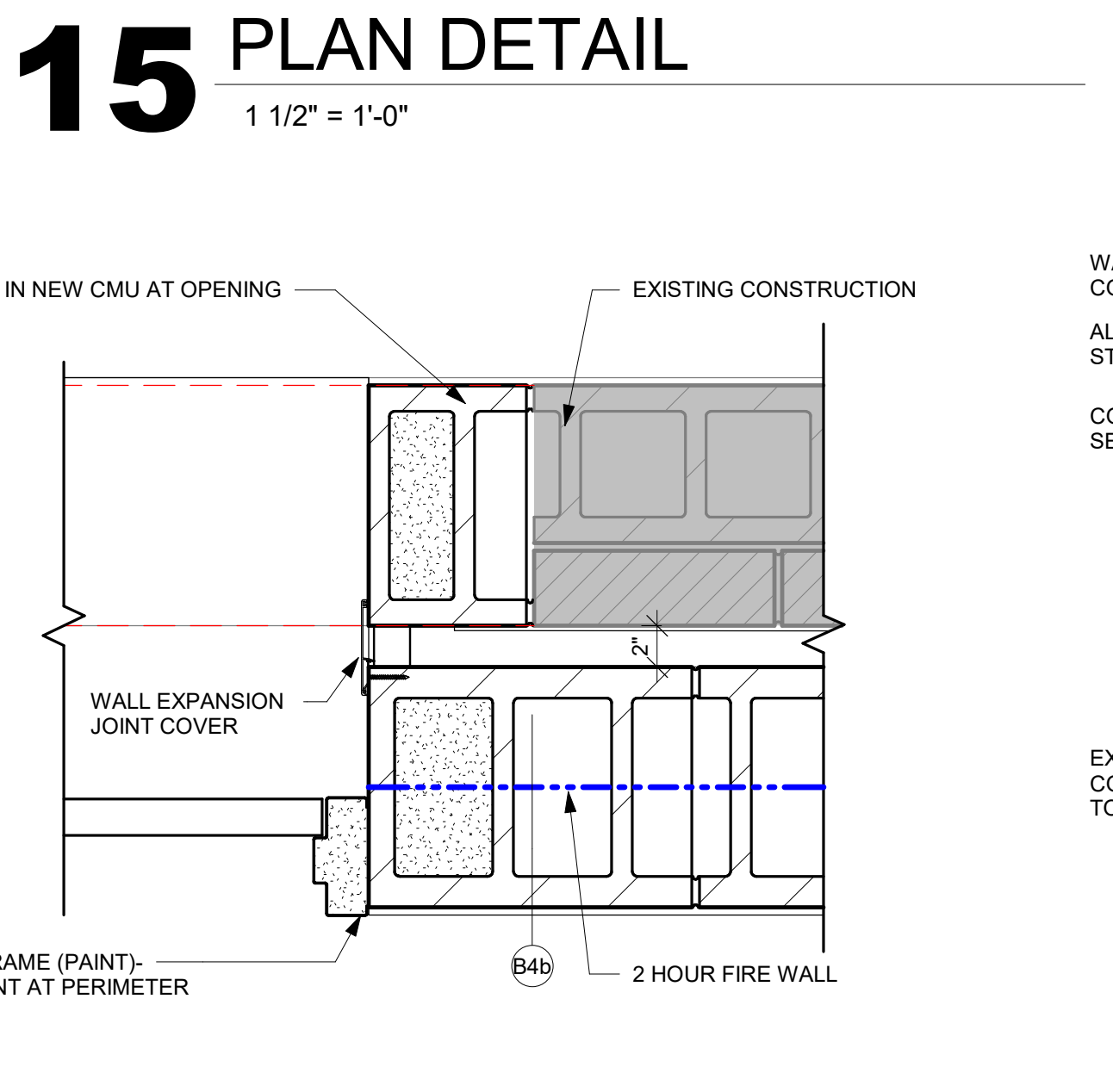
**2** ROOF DETAIL  
1 1/2" = 1'-0"



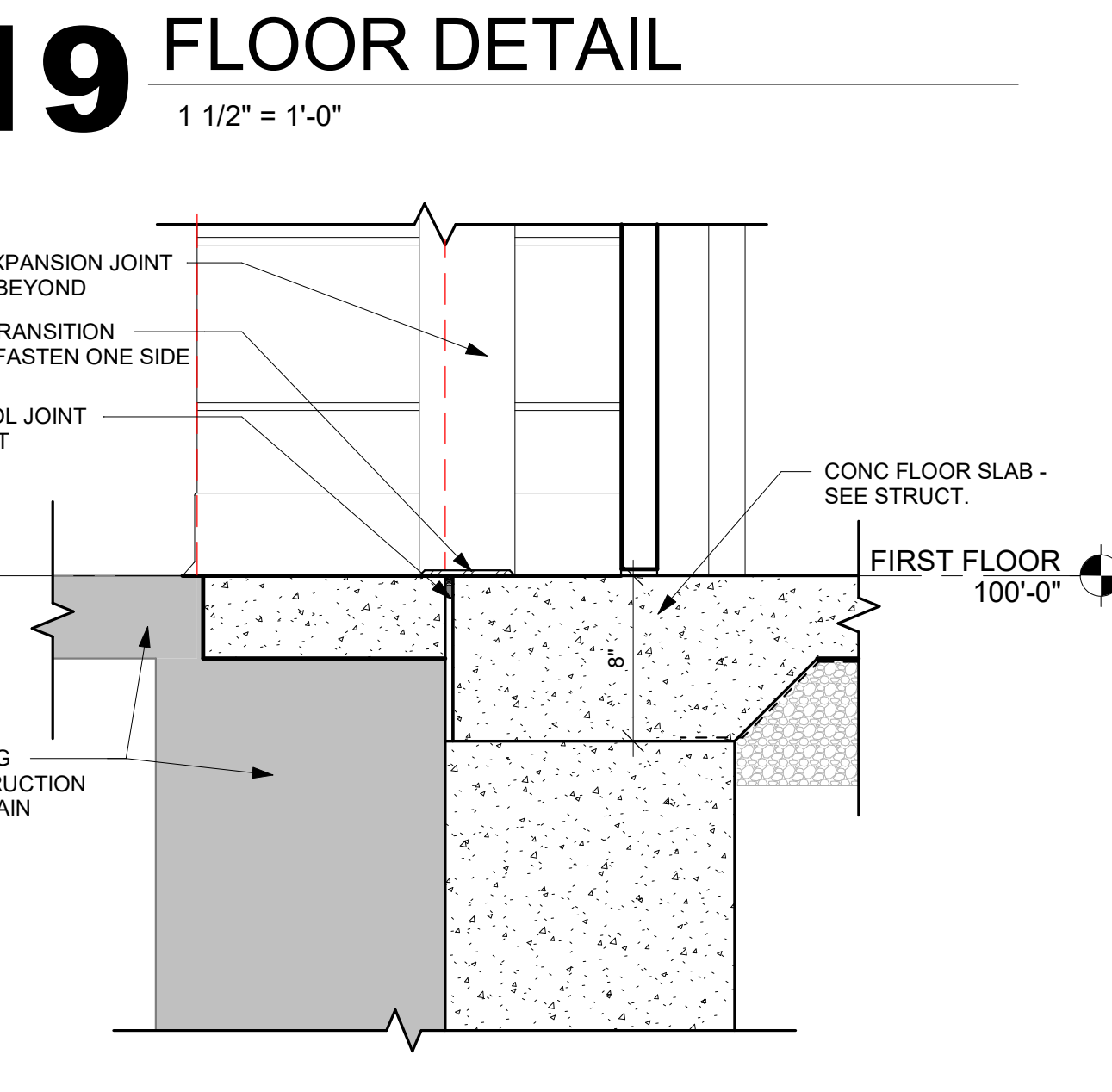
**6** PLAN DETAIL  
1 1/2" = 1'-0"



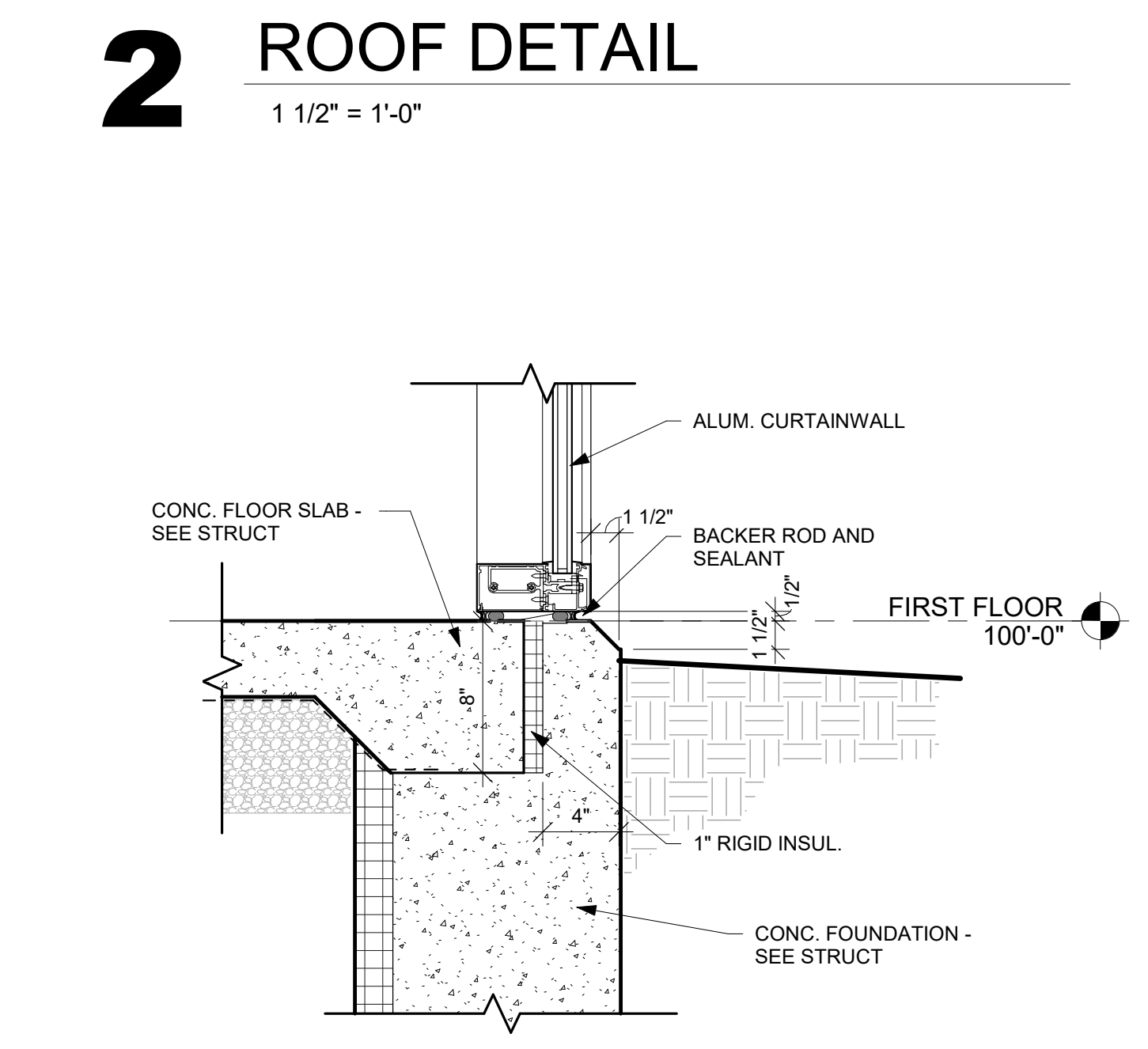
**10** DETAIL  
1 1/2" = 1'-0"



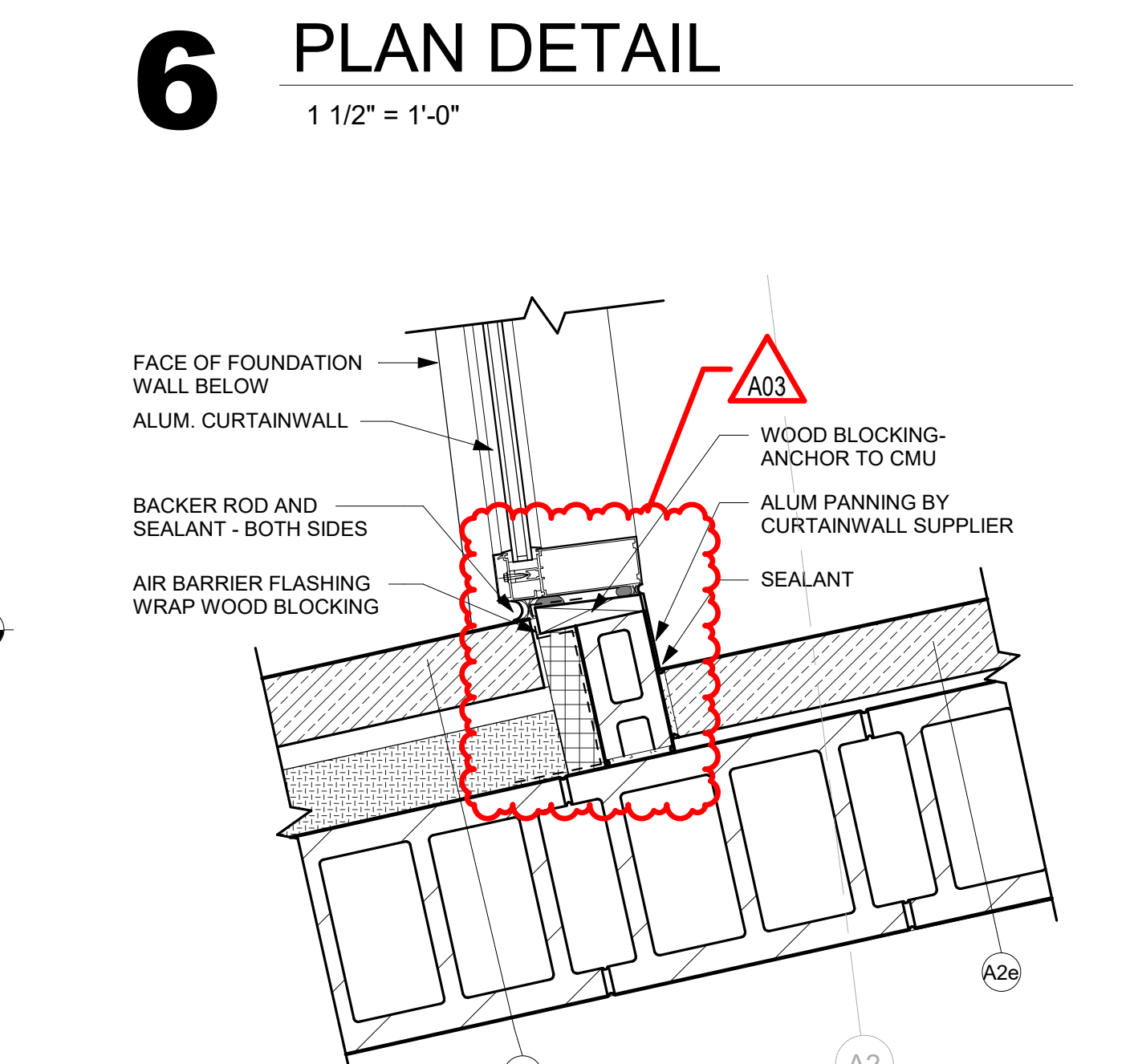
**14** PLAN DETAIL  
1 1/2" = 1'-0"



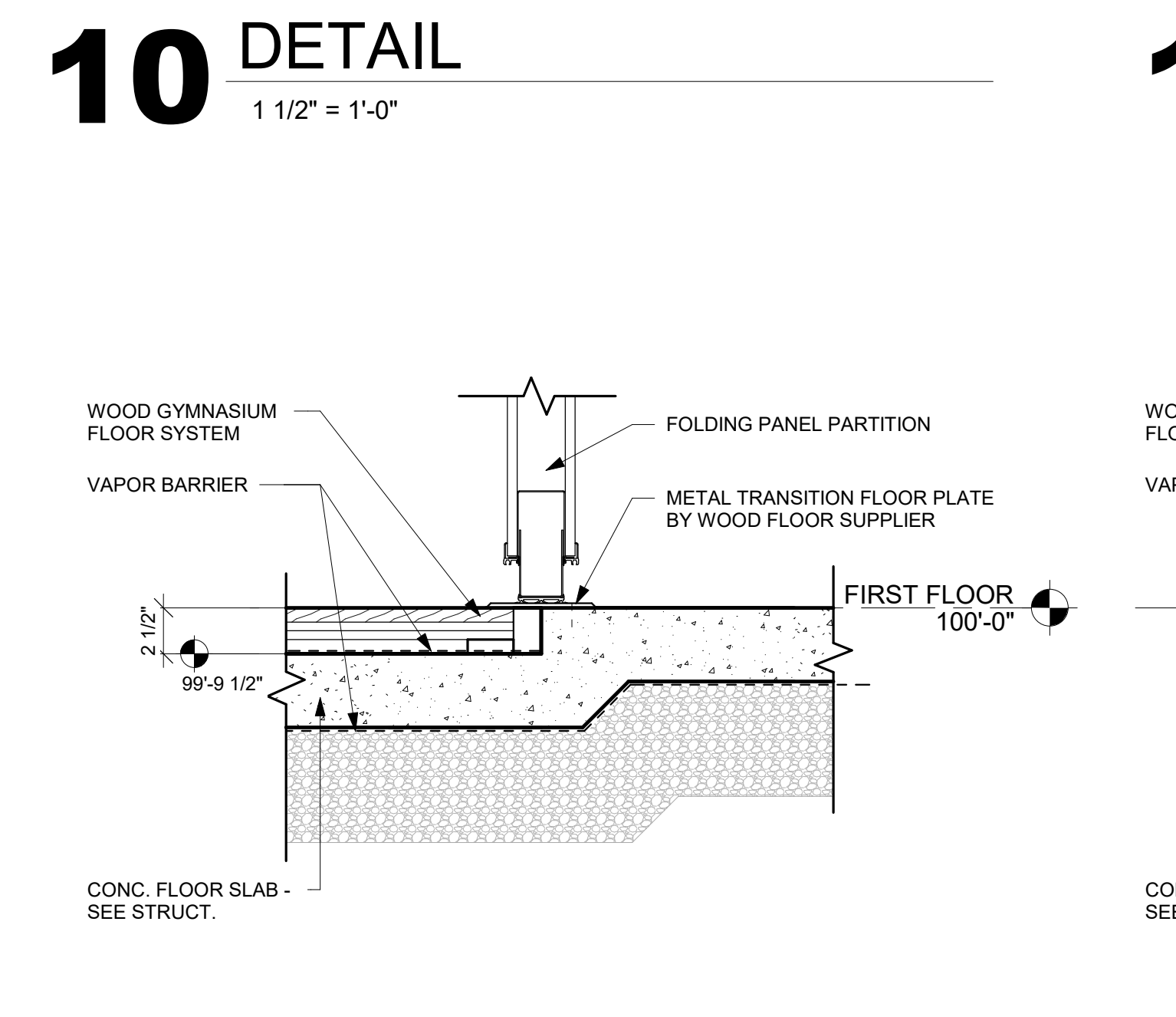
**18** FLOOR DETAIL  
1 1/2" = 1'-0"



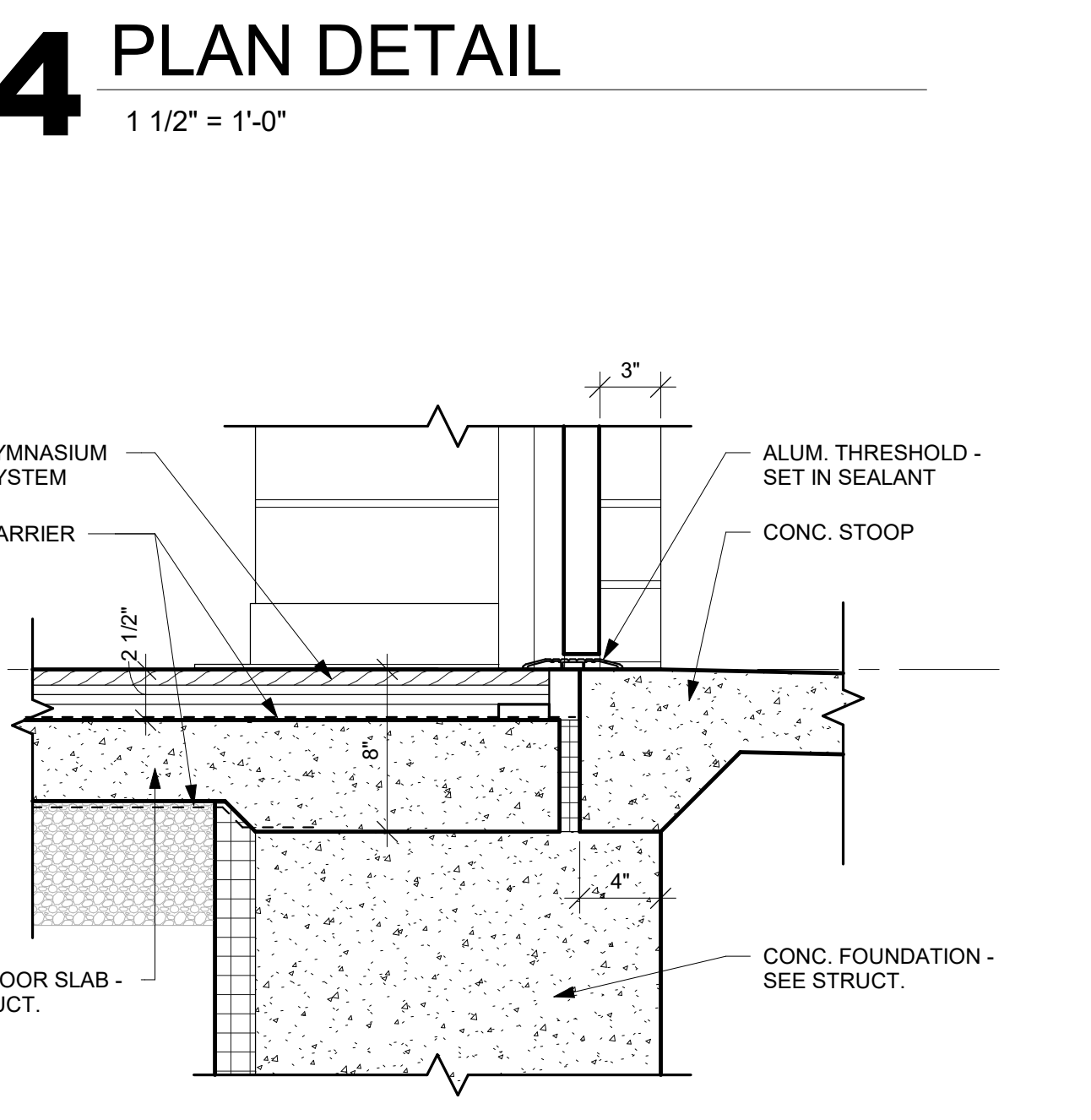
**1** WALL DETAIL  
1 1/2" = 1'-0"



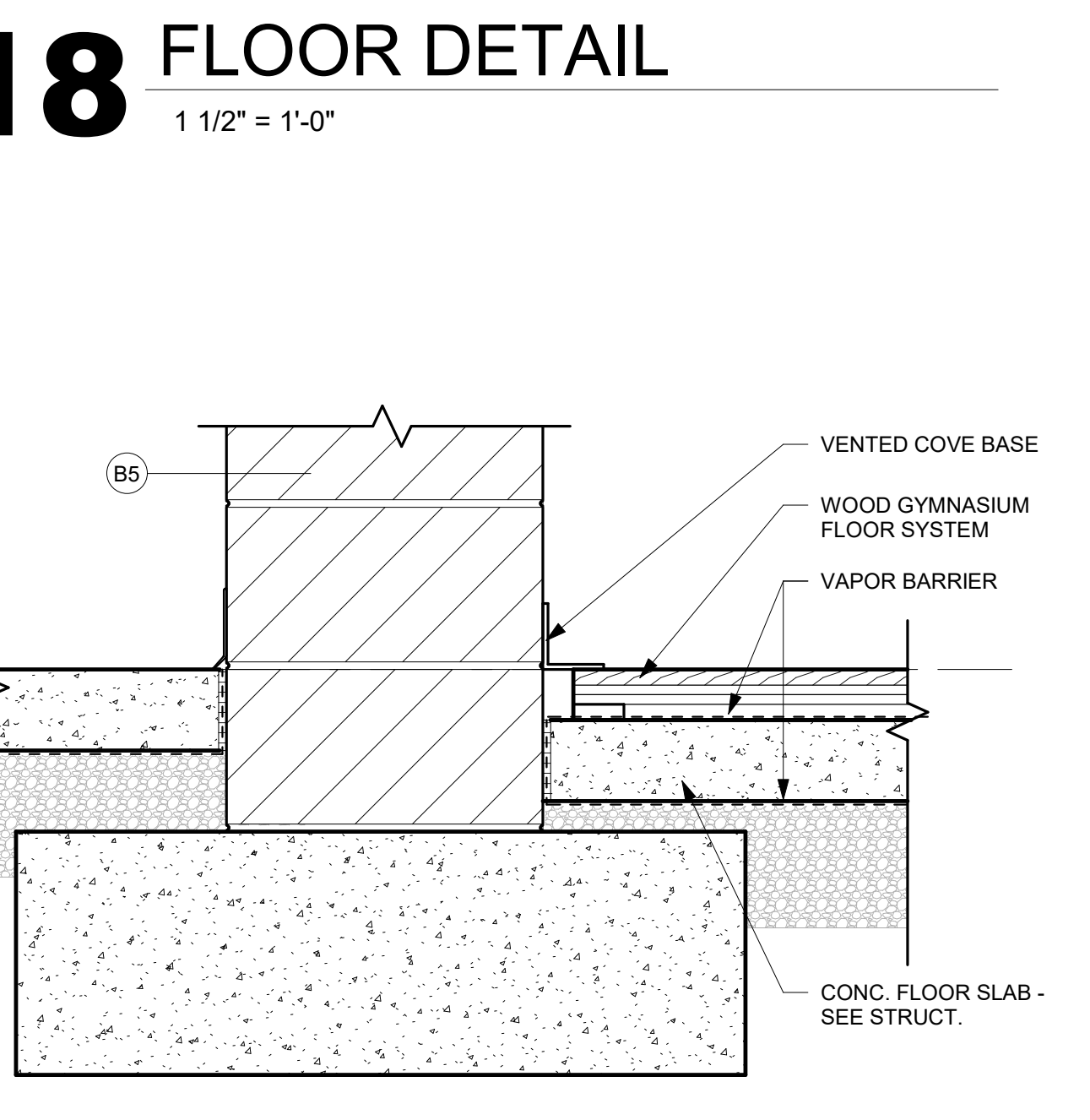
**5** PLAN DETAIL  
1 1/2" = 1'-0"



**9** FLOOR DETAIL  
1 1/2" = 1'-0"



**13** FLOOR DETAIL  
1 1/2" = 1'-0"



**17** FLOOR DETAIL  
1 1/2" = 1'-0"



Consultant:

Project Title:  
Project Location:  
Project Number:  
19014

Date:  
3.5.2020

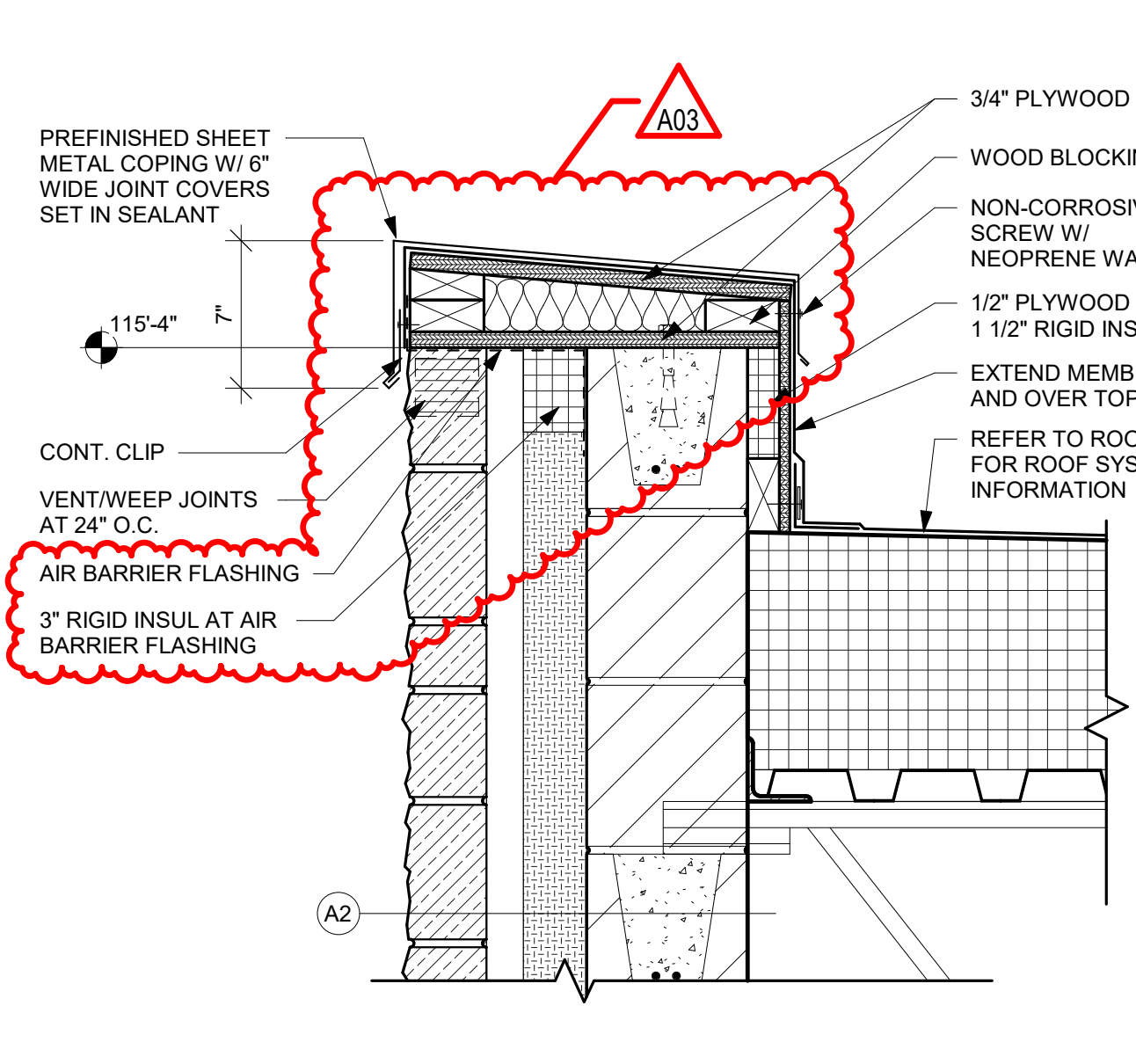
Drawn By:  
DJH

Key Plan:

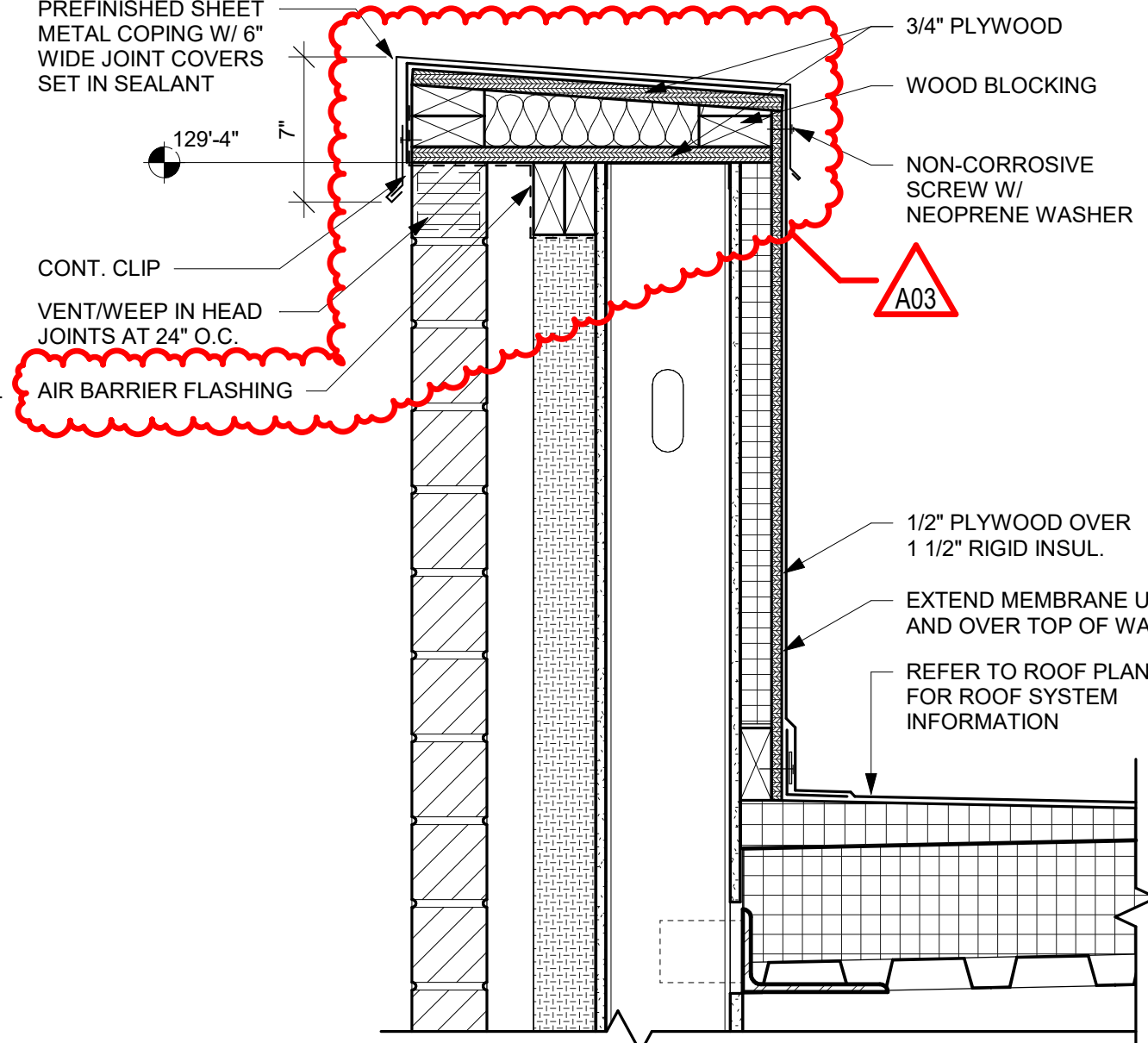
BID DOCUMENTS

No.	Description	Date
A03	ADDENDUM 3	3.24.20

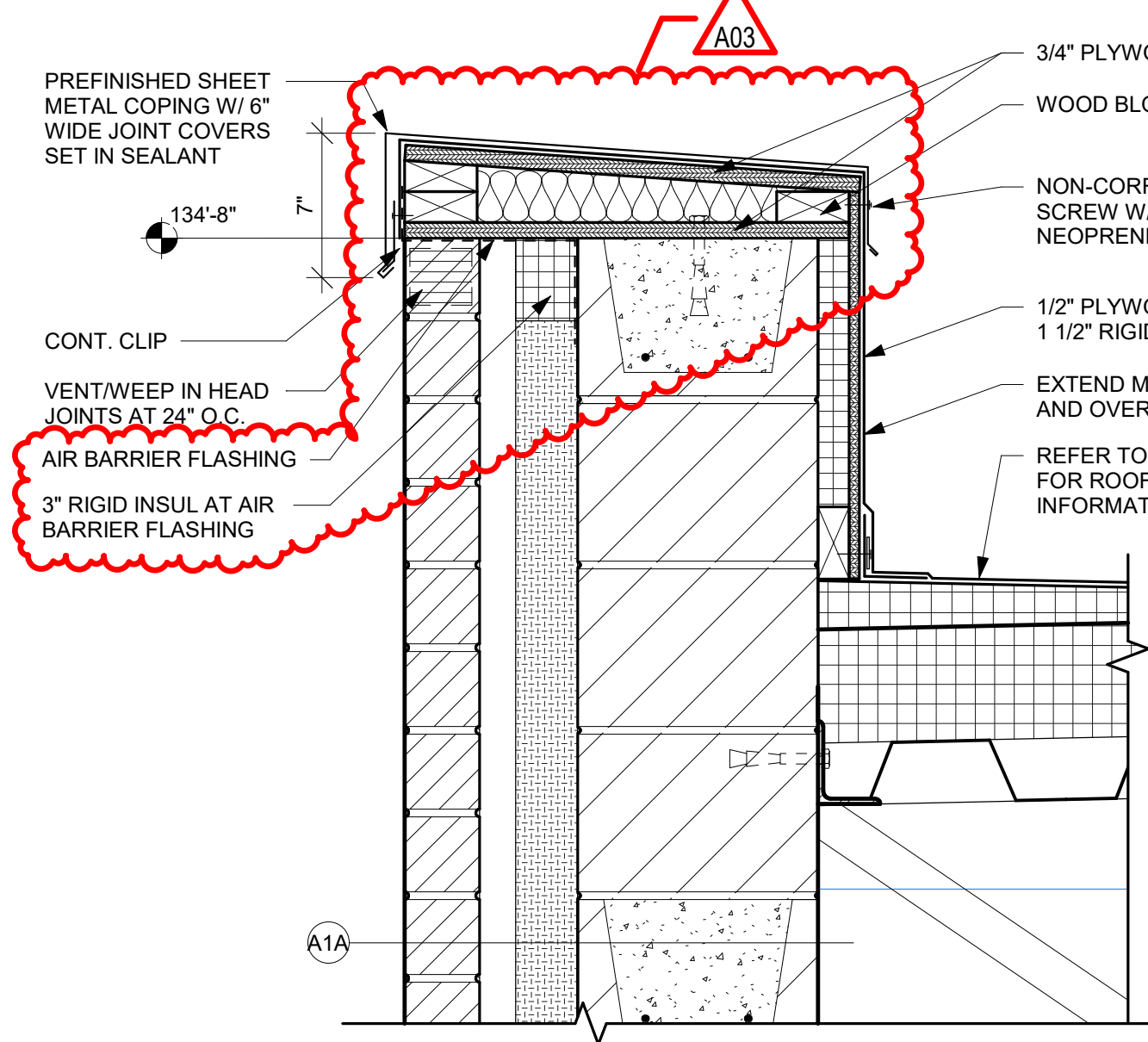
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3/24/2020 1:33:03 PM



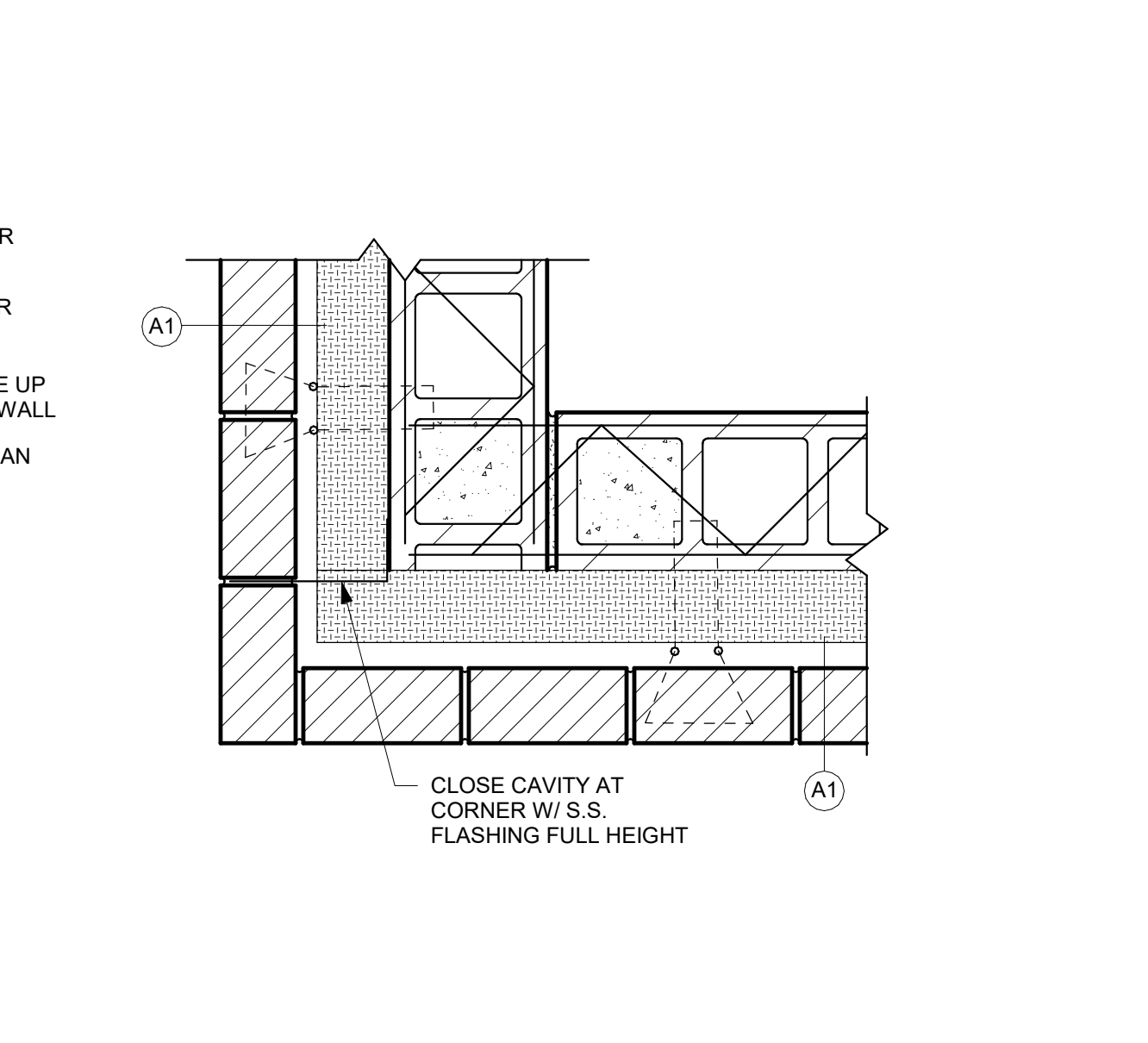
**4** ROOF DETAIL  
1 1/2" = 1'-0"



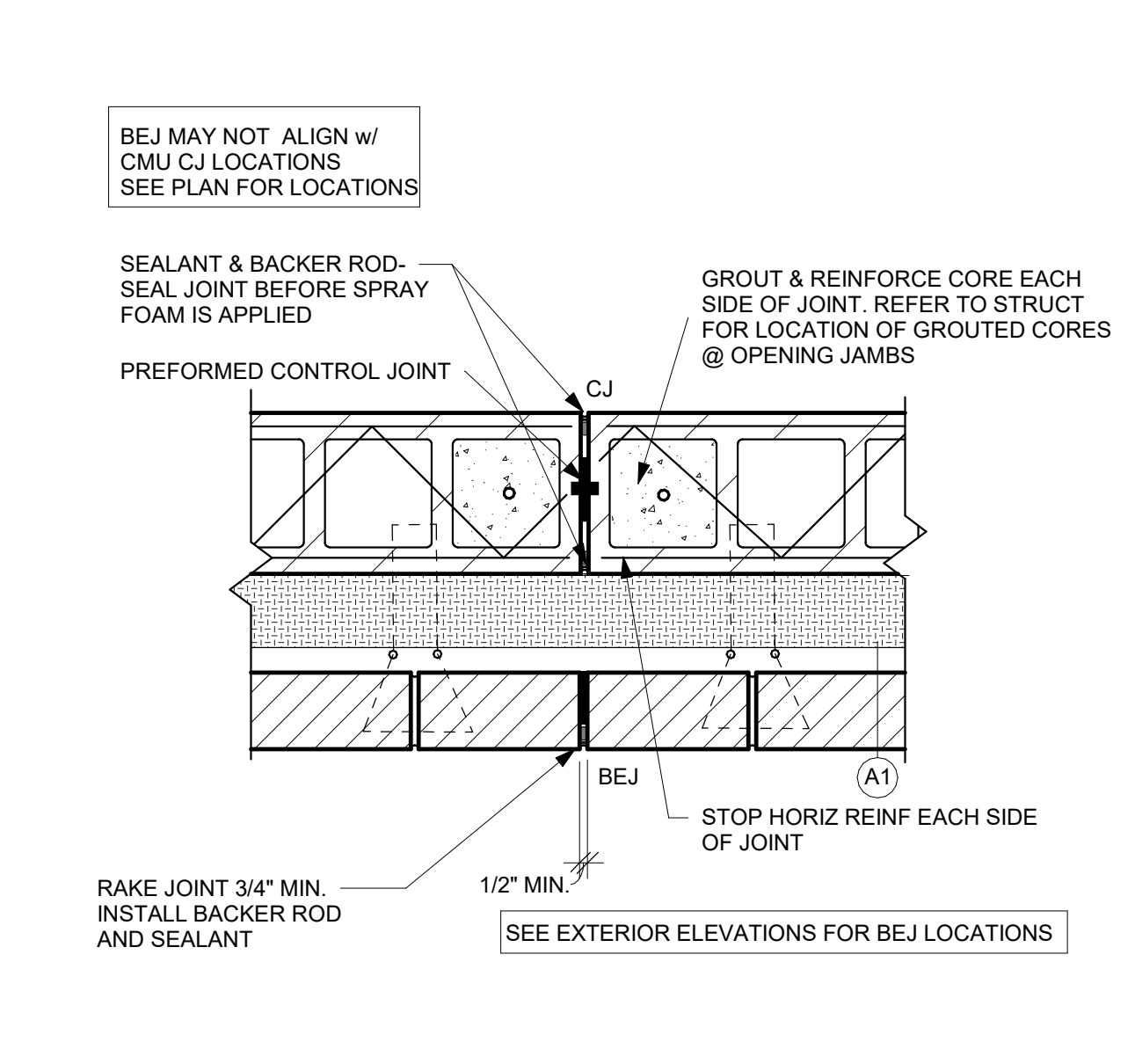
**8** ROOF DETAIL  
1 1/2" = 1'-0"



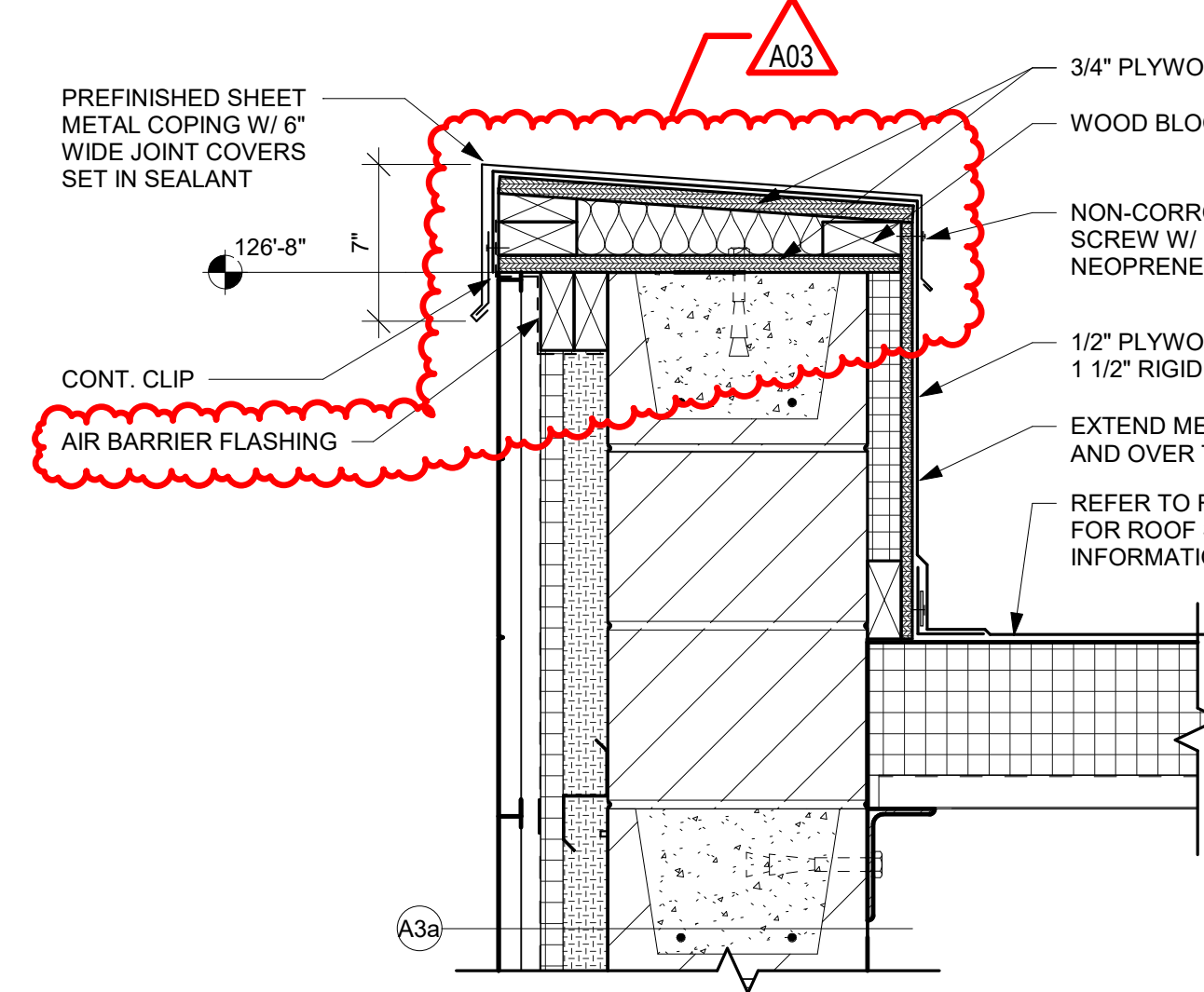
**12** ROOF DETAIL  
1 1/2" = 1'-0"



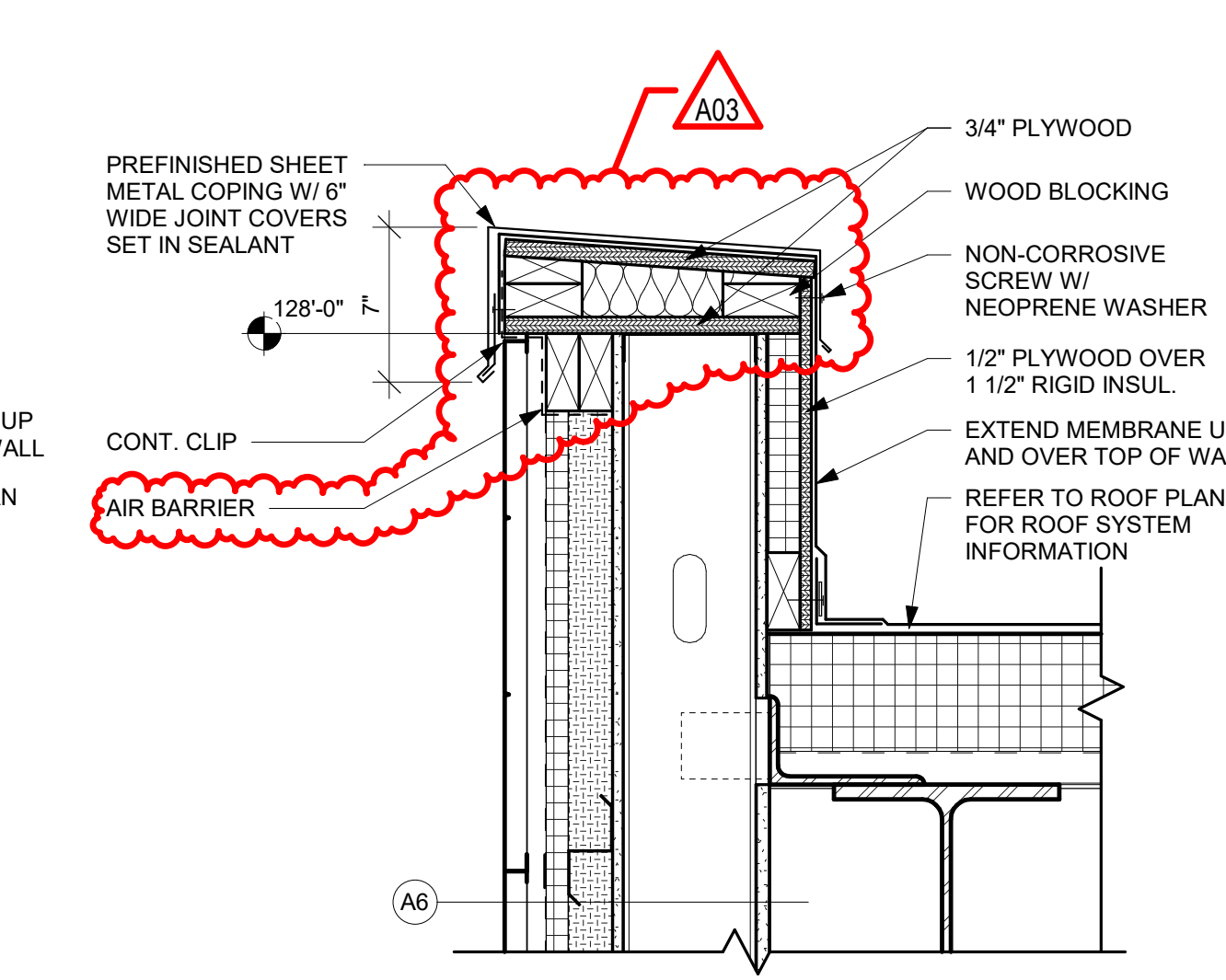
**16** PLAN DETAIL  
1 1/2" = 1'-0"



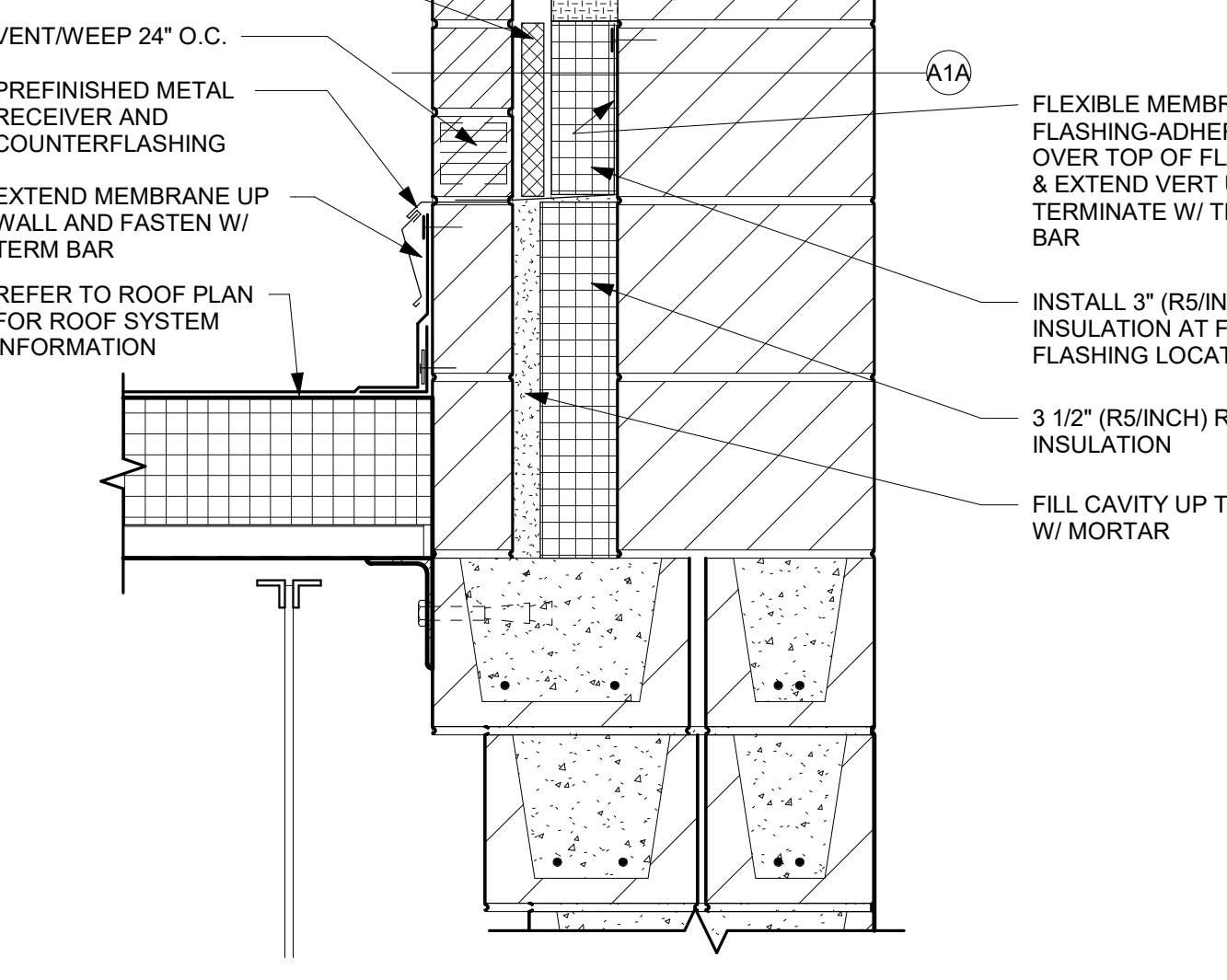
**20** PLAN DETAIL  
1 1/2" = 1'-0"



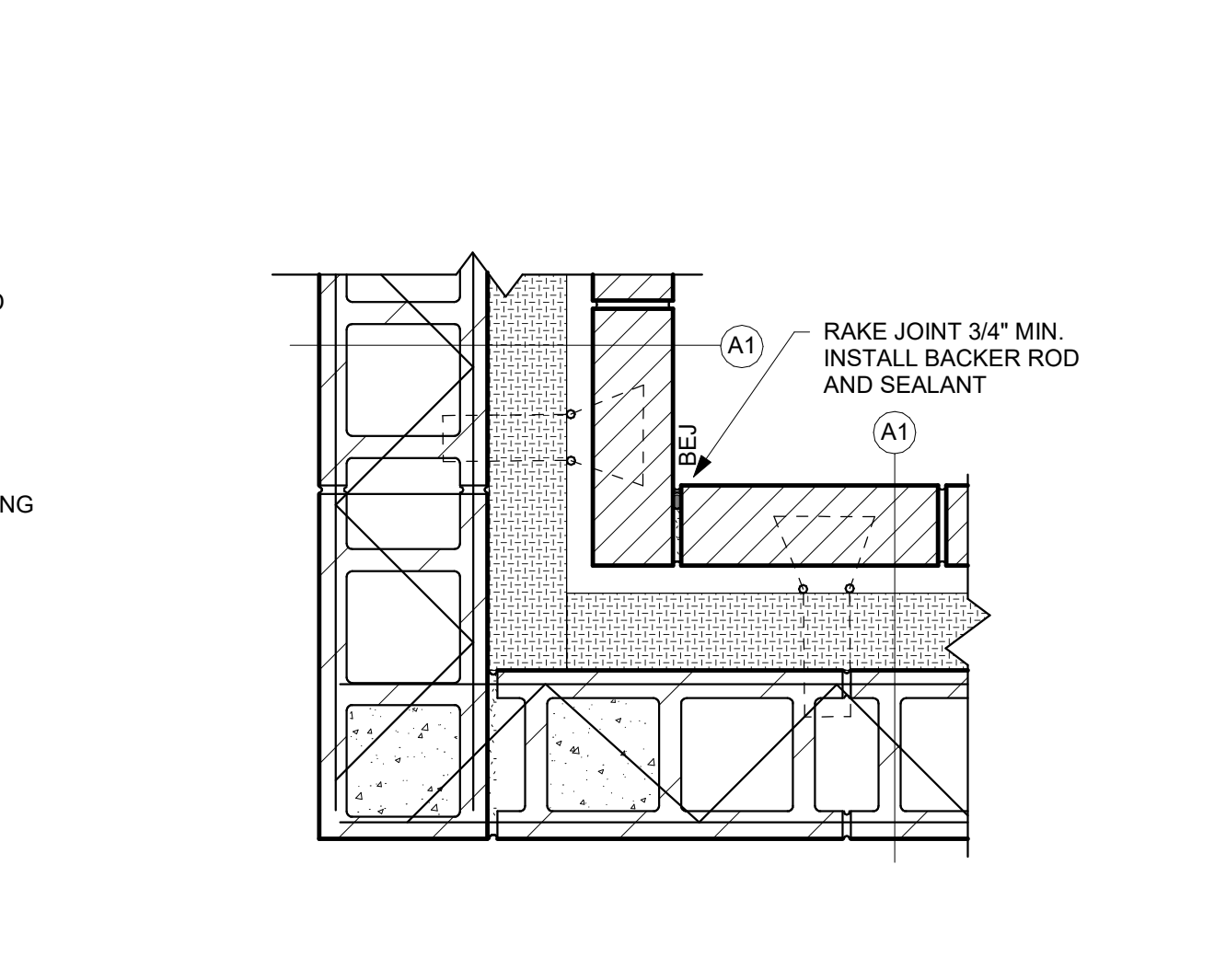
**3** ROOF DETAIL  
1 1/2" = 1'-0"



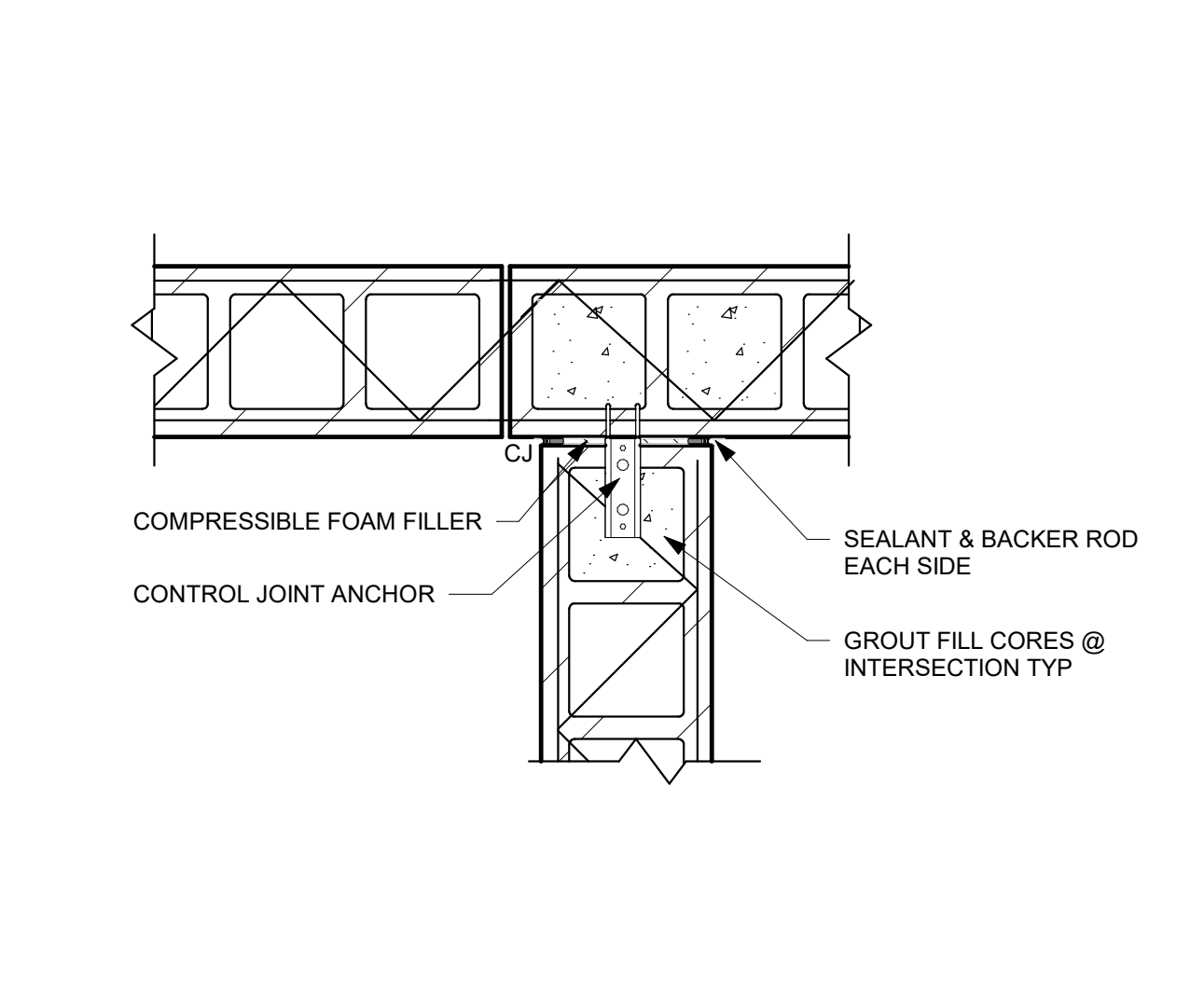
**7** ROOF DETAIL  
1 1/2" = 1'-0"



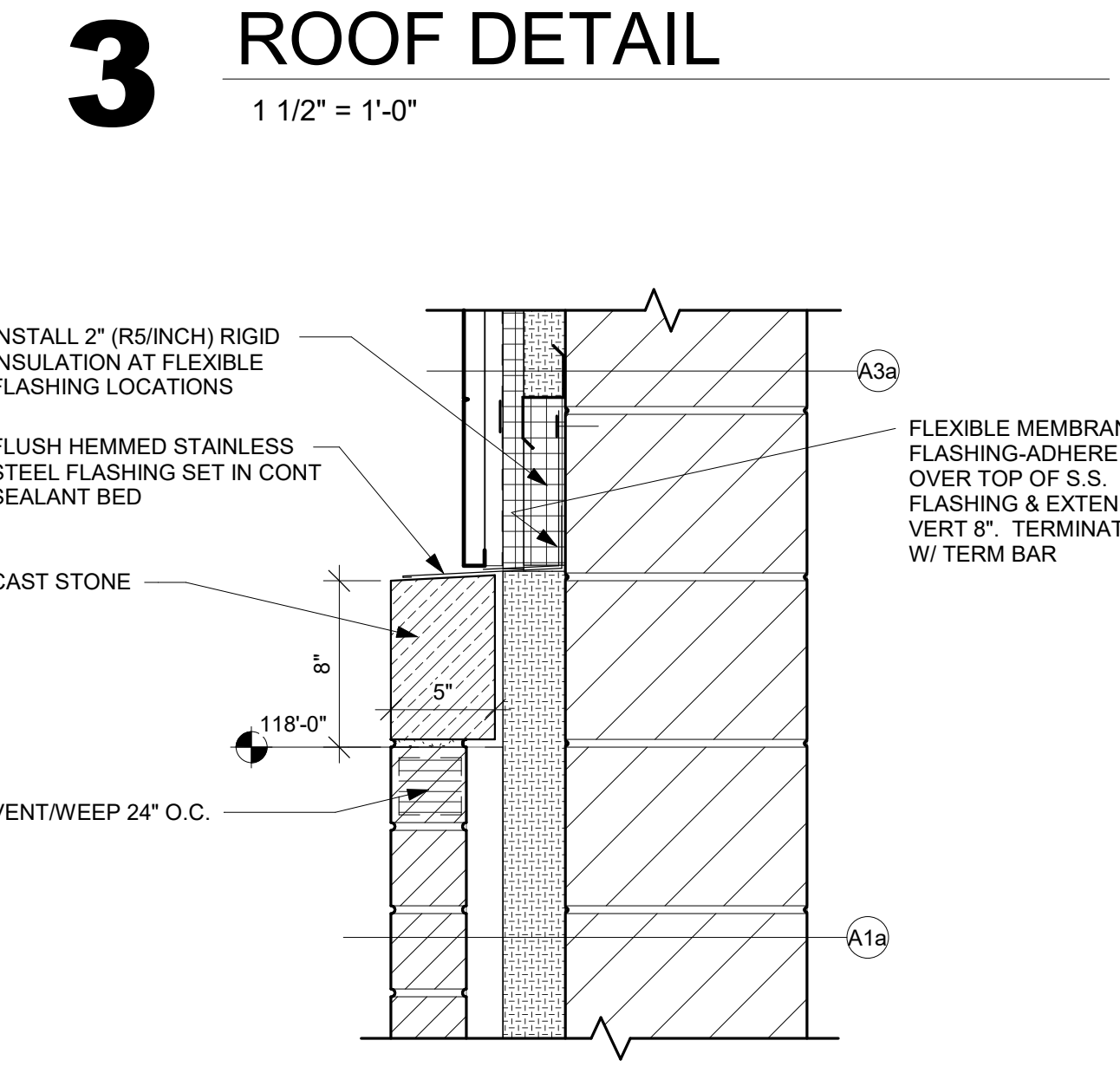
**11** ROOF DETAIL  
1 1/2" = 1'-0"



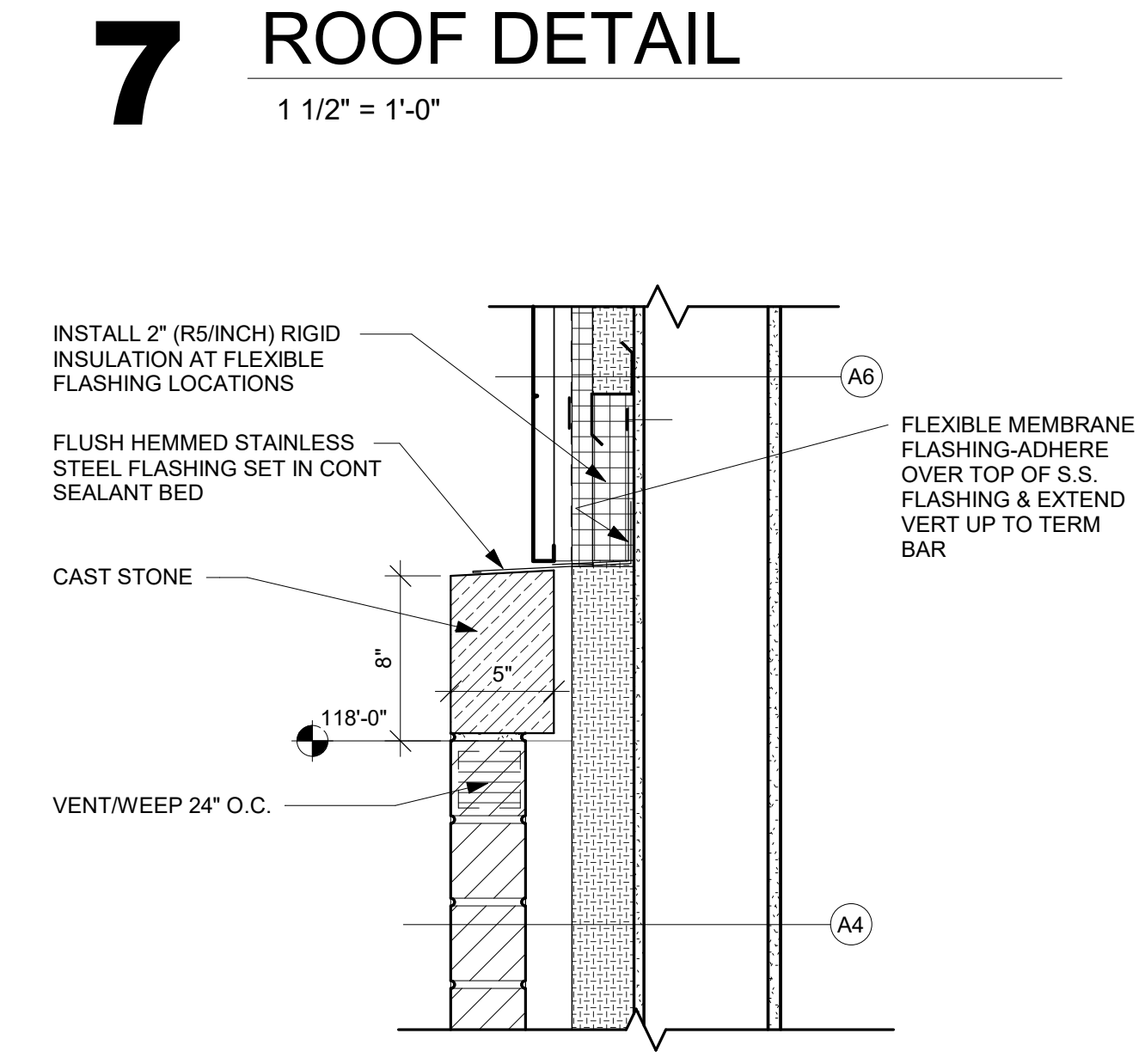
**15** PLAN DETAIL  
1 1/2" = 1'-0"



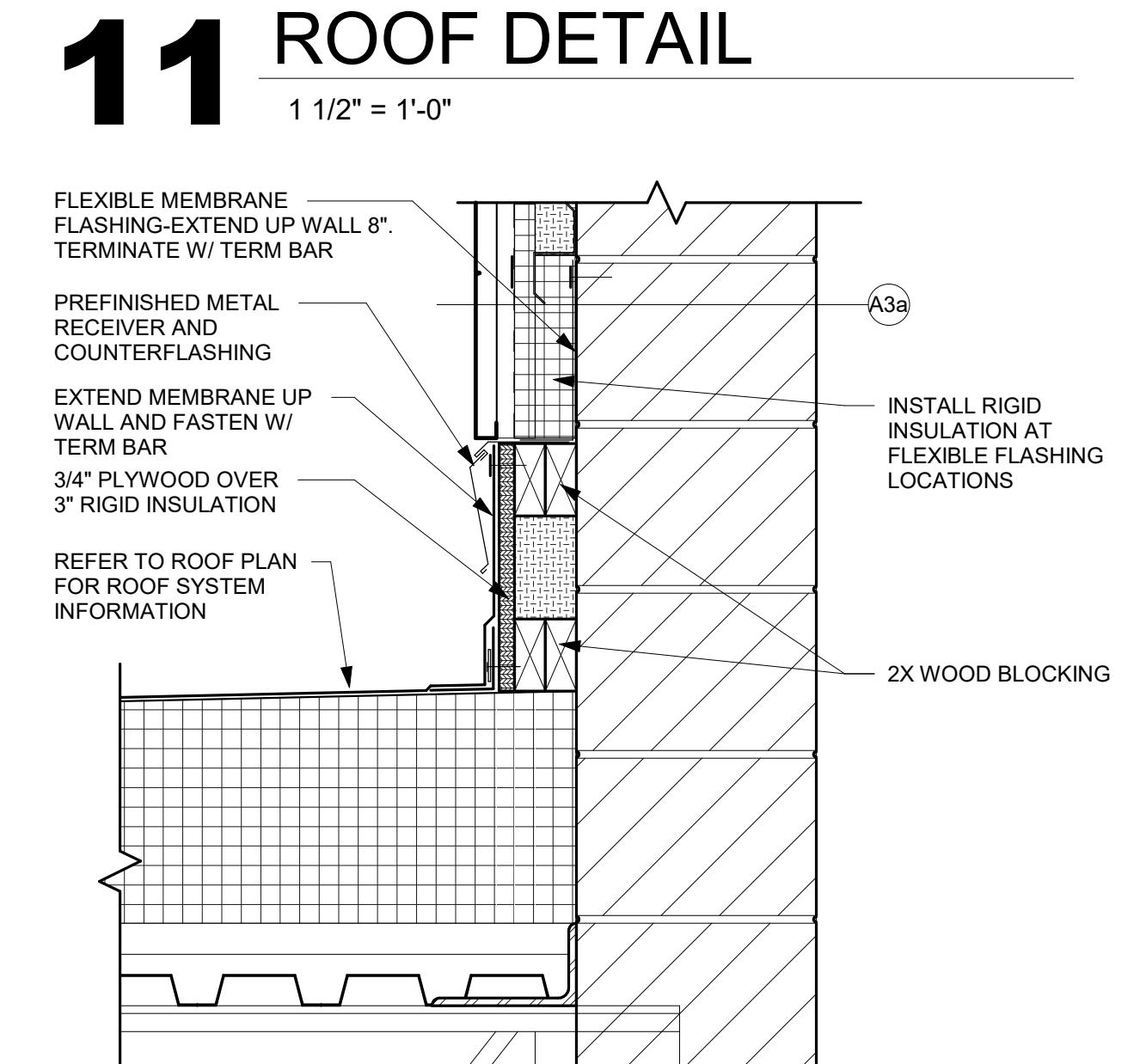
**19** PLAN DETAIL  
1 1/2" = 1'-0"



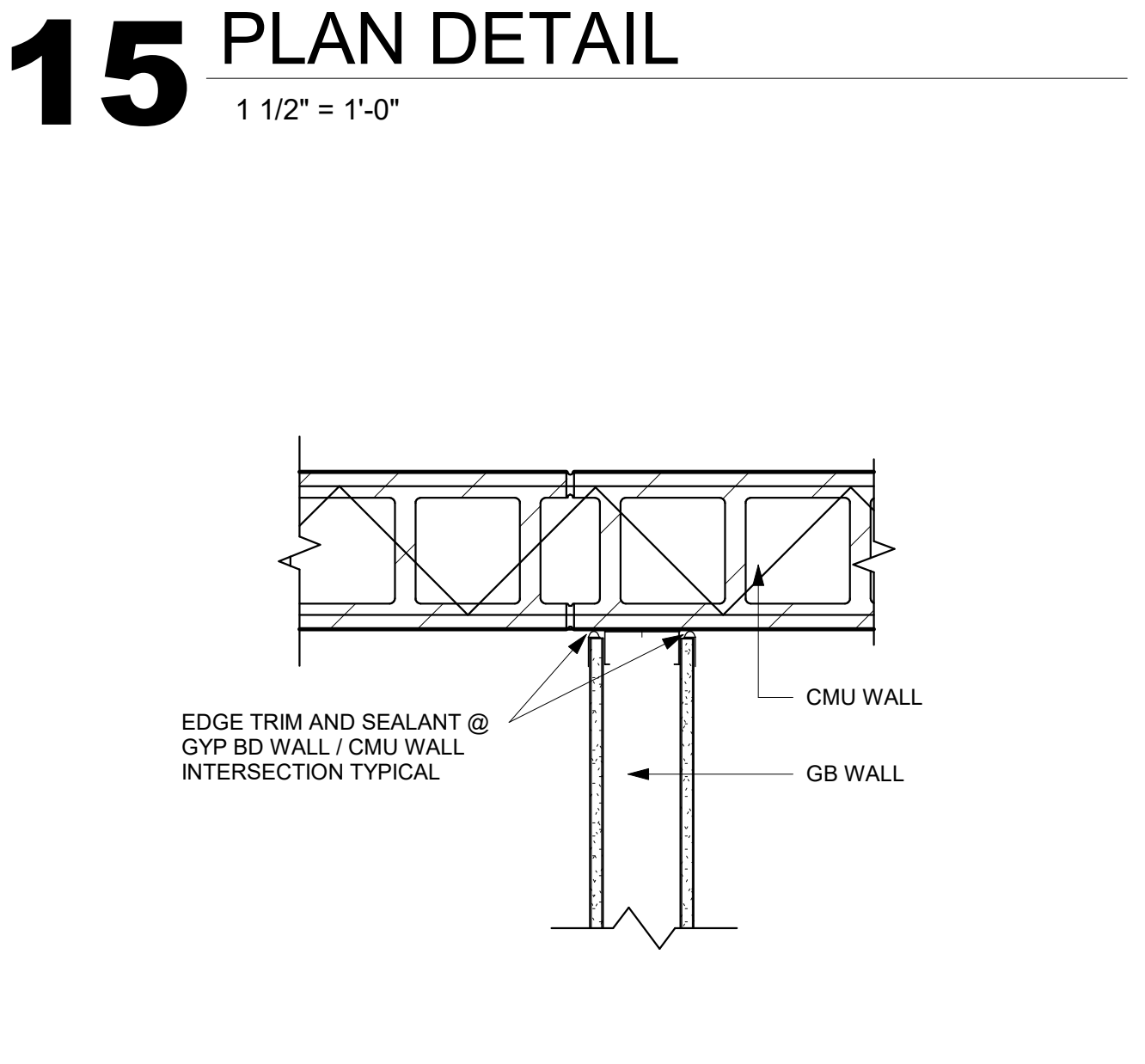
**2** WALL DETAIL  
1 1/2" = 1'-0"



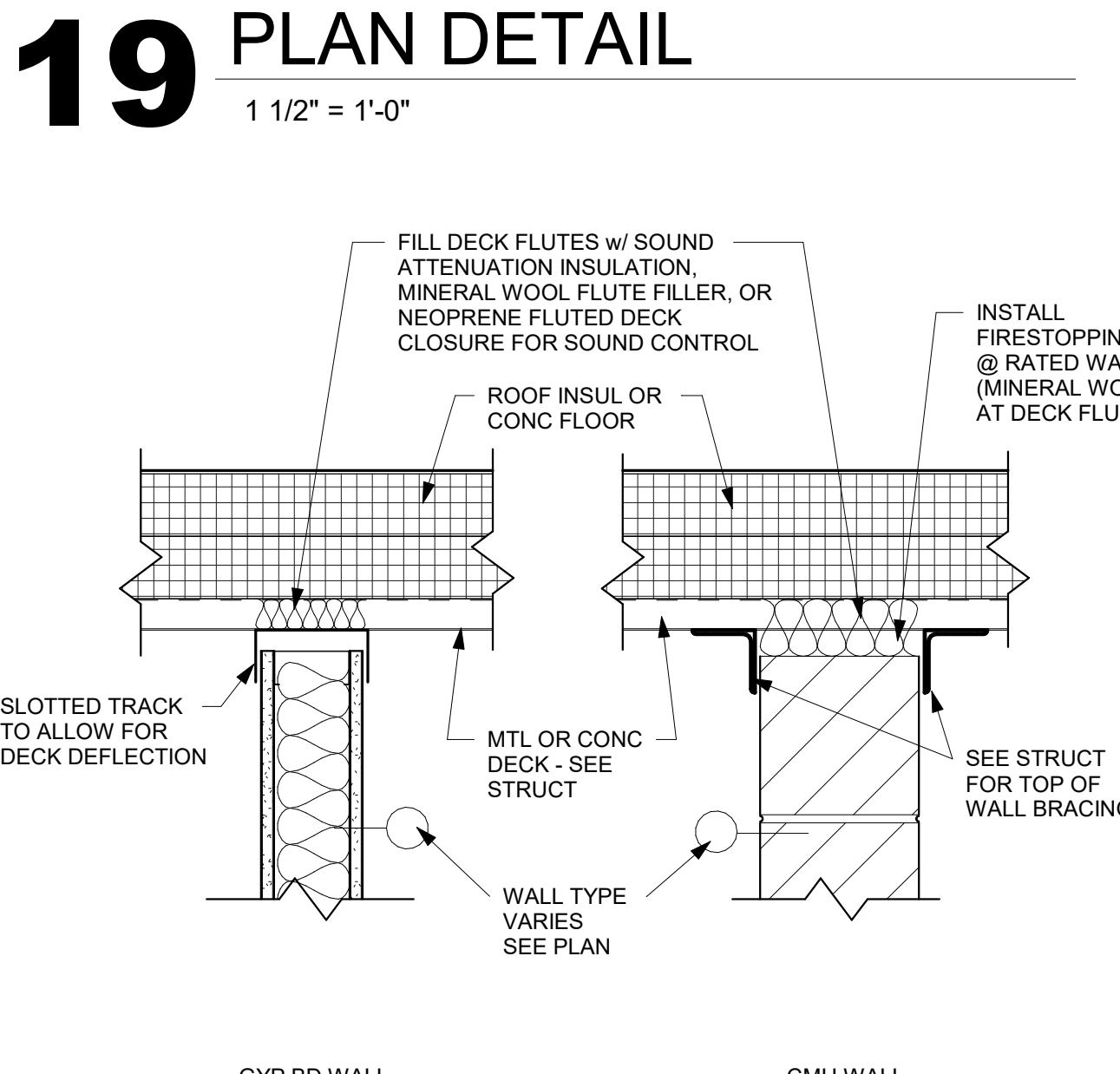
**6** WALL DETAIL  
1 1/2" = 1'-0"



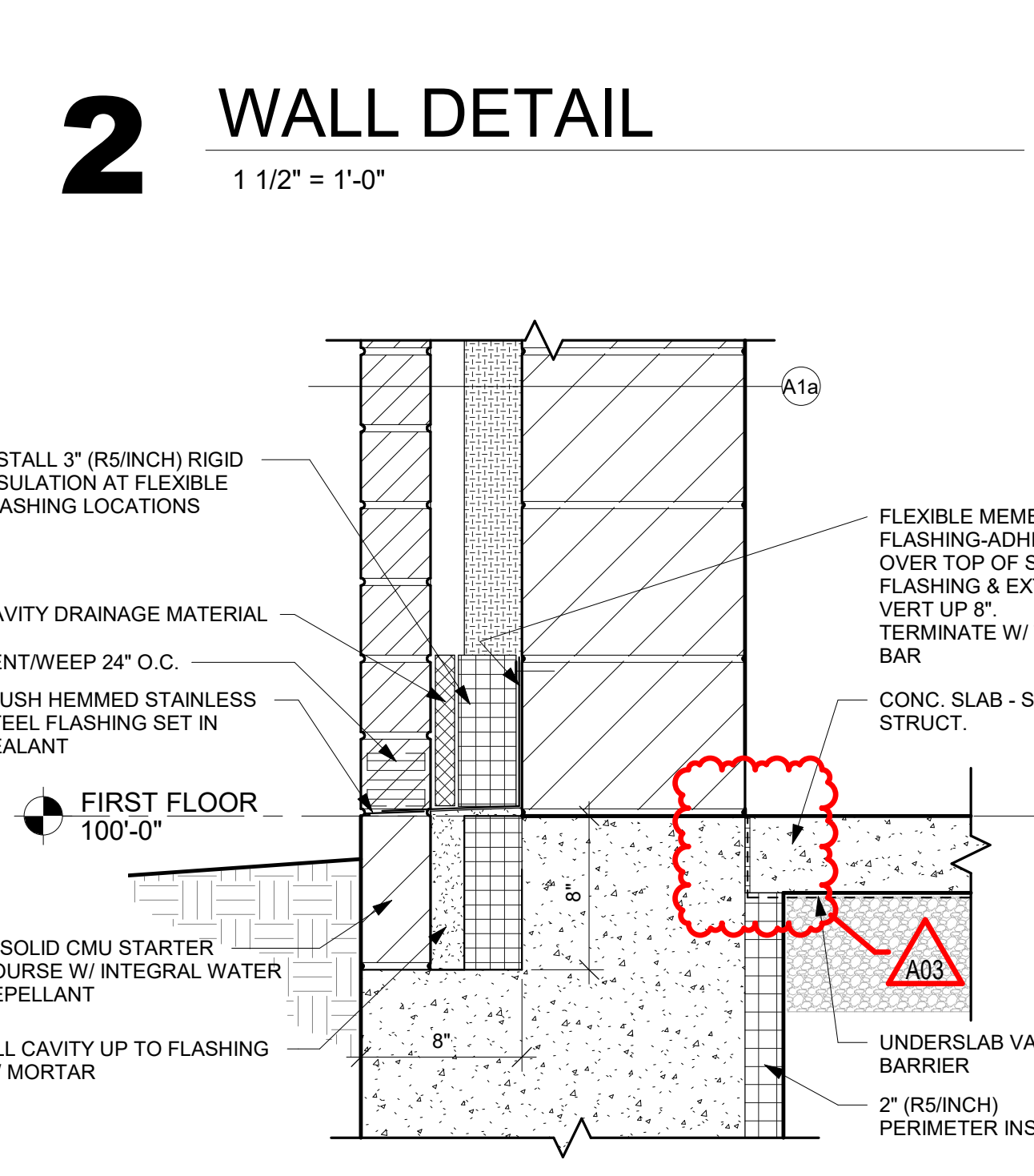
**10** ROOF DETAIL  
1 1/2" = 1'-0"



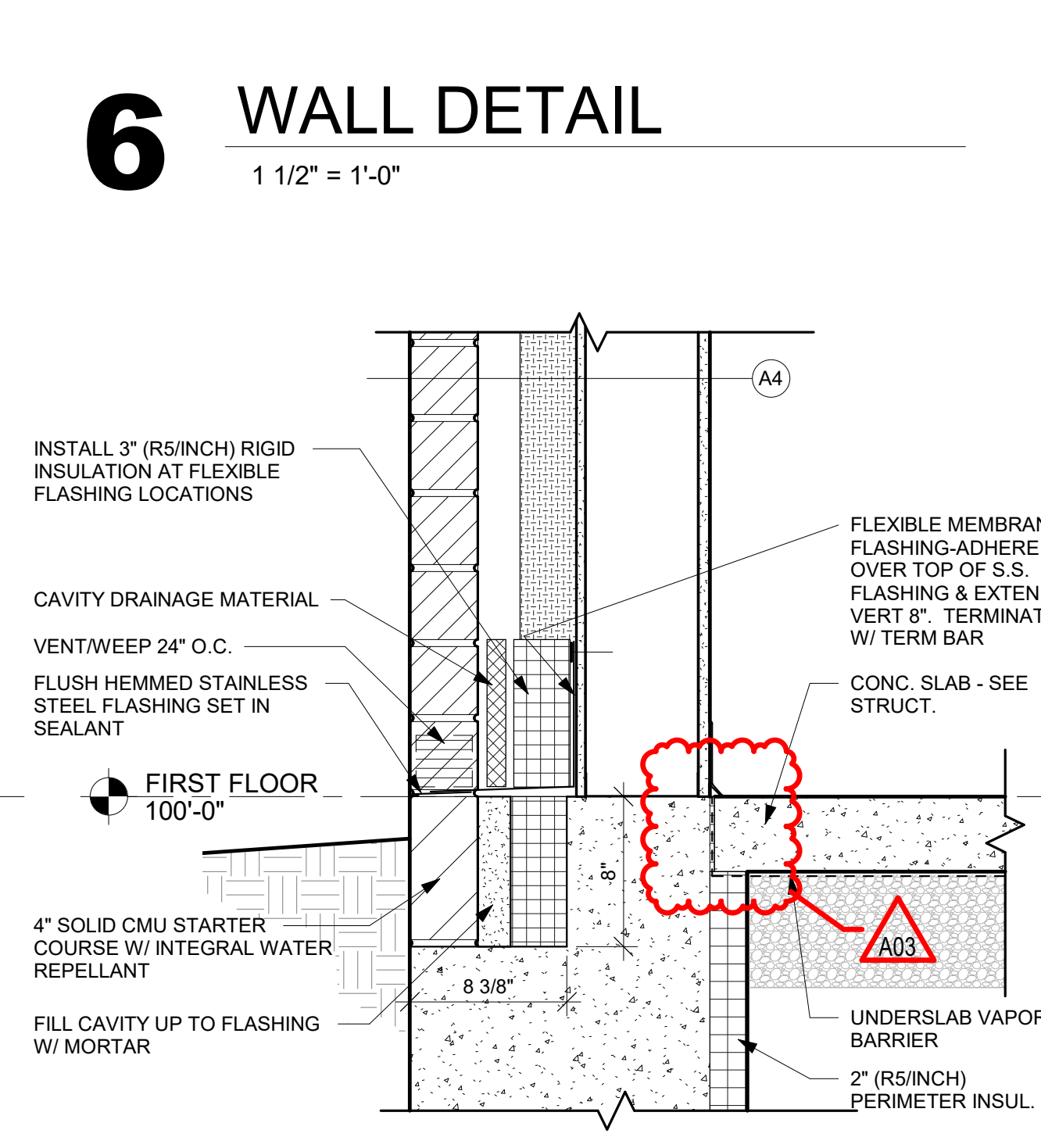
**14** PLAN DETAIL  
1 1/2" = 1'-0"



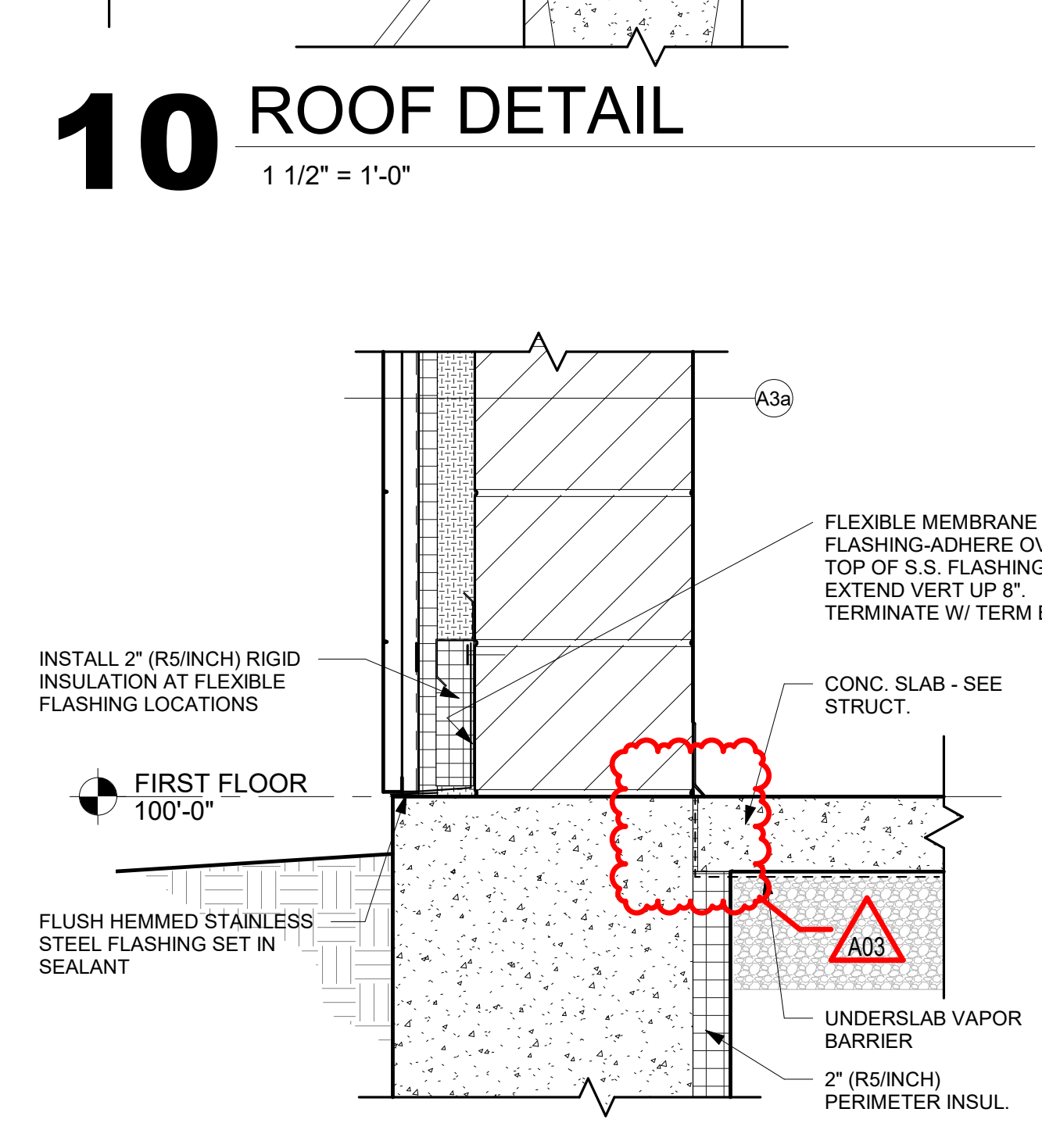
**18** DETAIL  
1 1/2" = 1'-0"



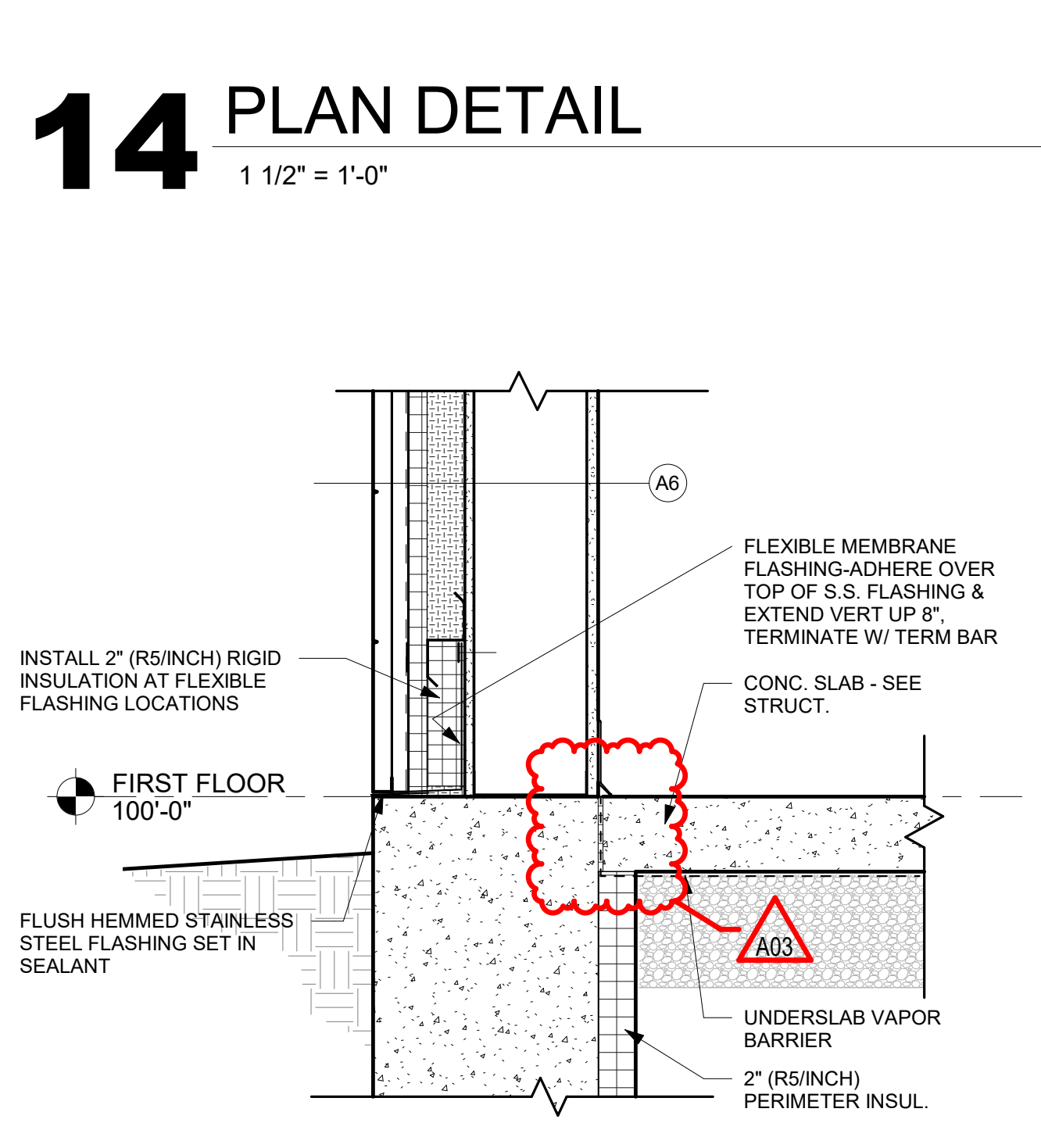
**1** WALL DETAIL  
1 1/2" = 1'-0"



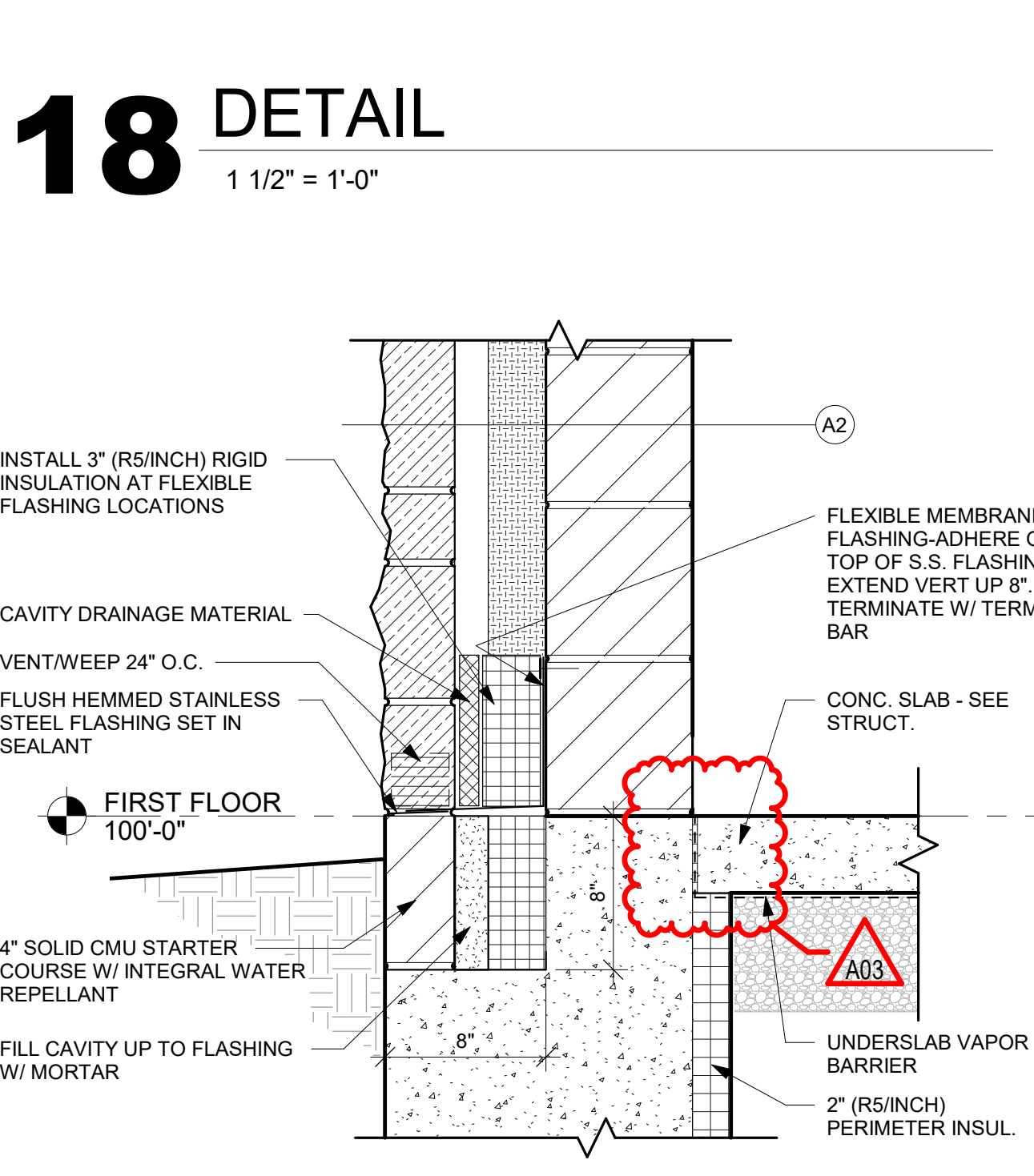
**5** WALL DETAIL  
1 1/2" = 1'-0"



**9** WALL DETAIL  
1 1/2" = 1'-0"



**13** WALL DETAIL  
1 1/2" = 1'-0"



**17** WALL DETAIL  
1 1/2" = 1'-0"



Consultant:

Project Title:  
Project Location:  
Project Number:  
19014

Project Date:  
3.5.2020

Drawn By:  
DJH

Key Plan:

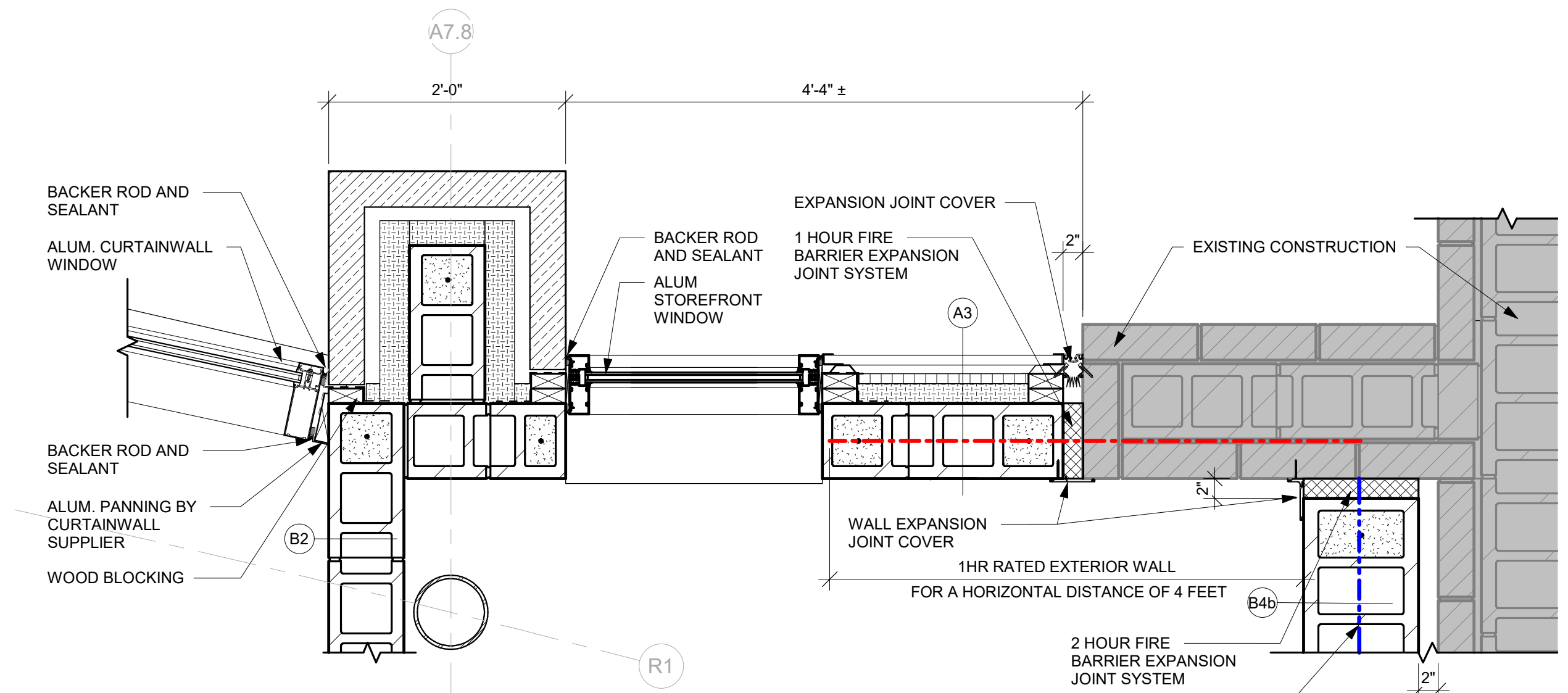
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DOCUMENTS

No.	Description	Date
A03	ADDENDUM 3	3.24.20

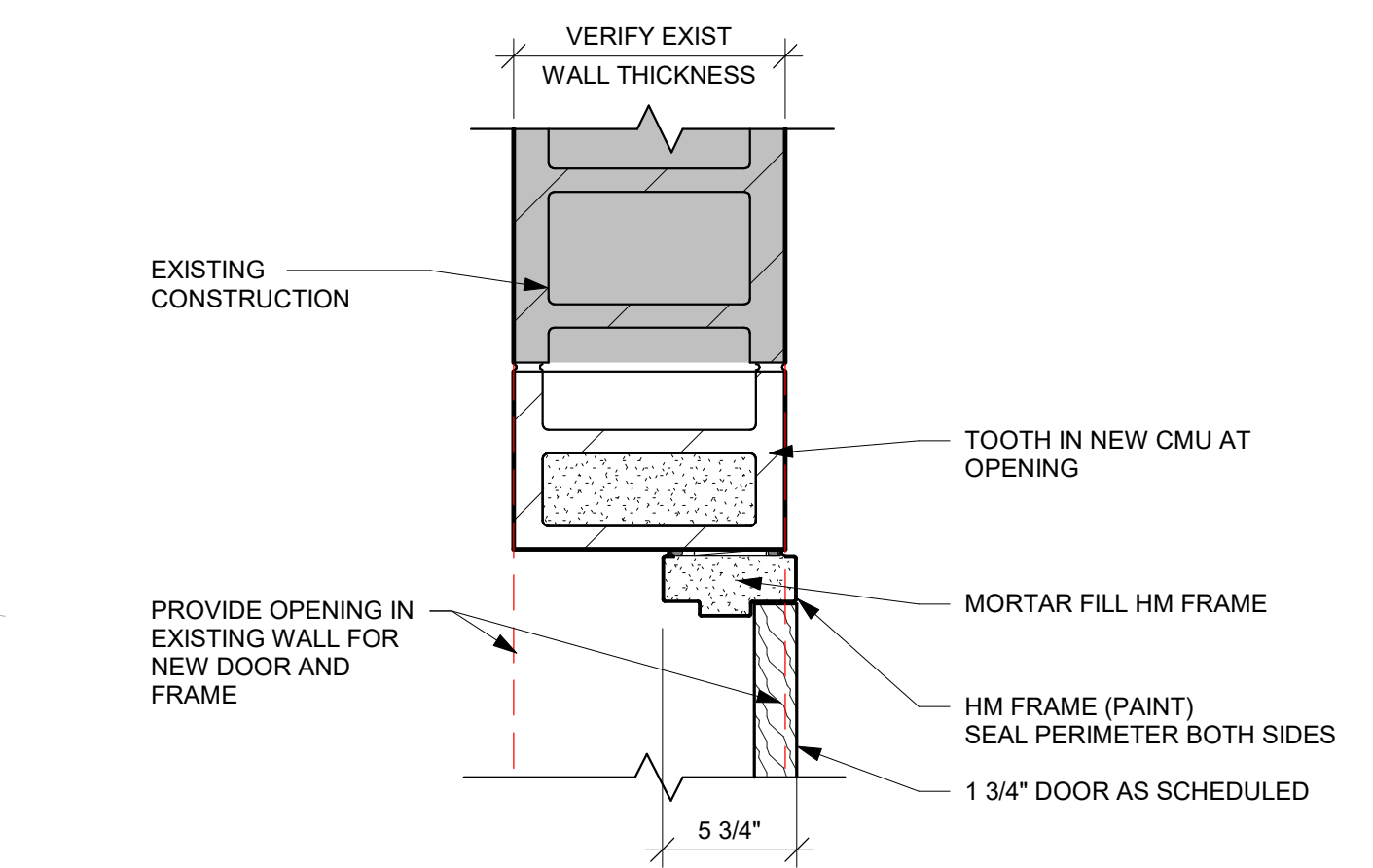
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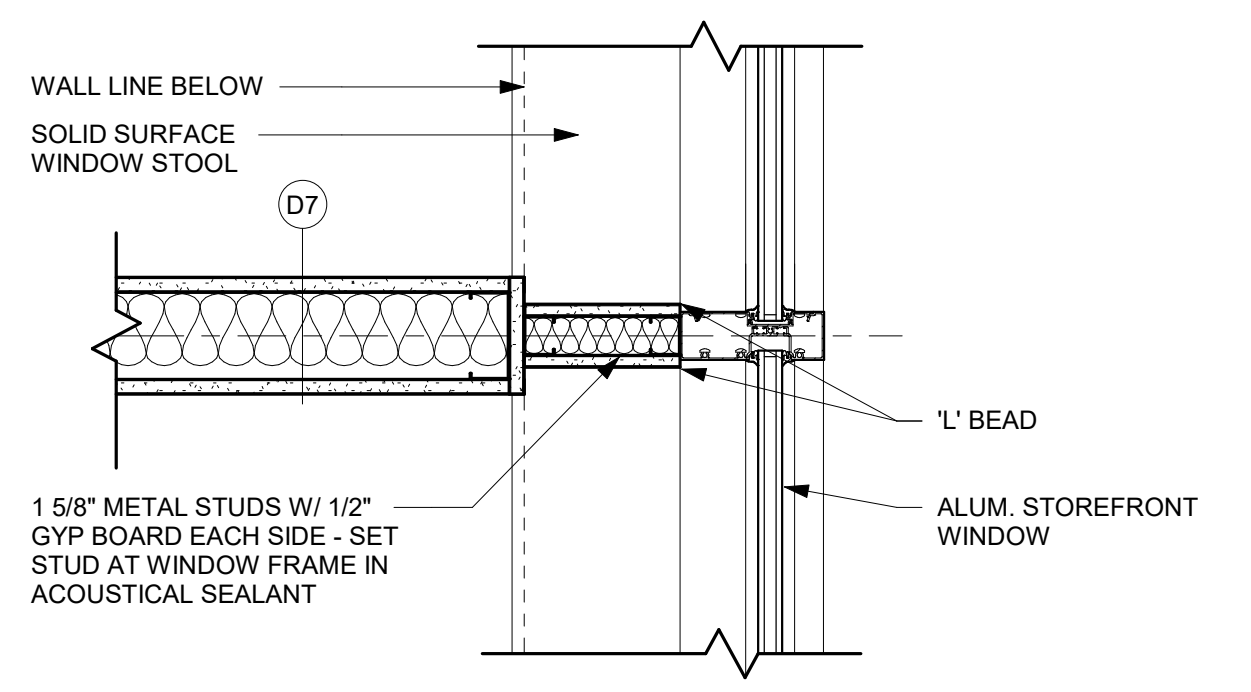
A503



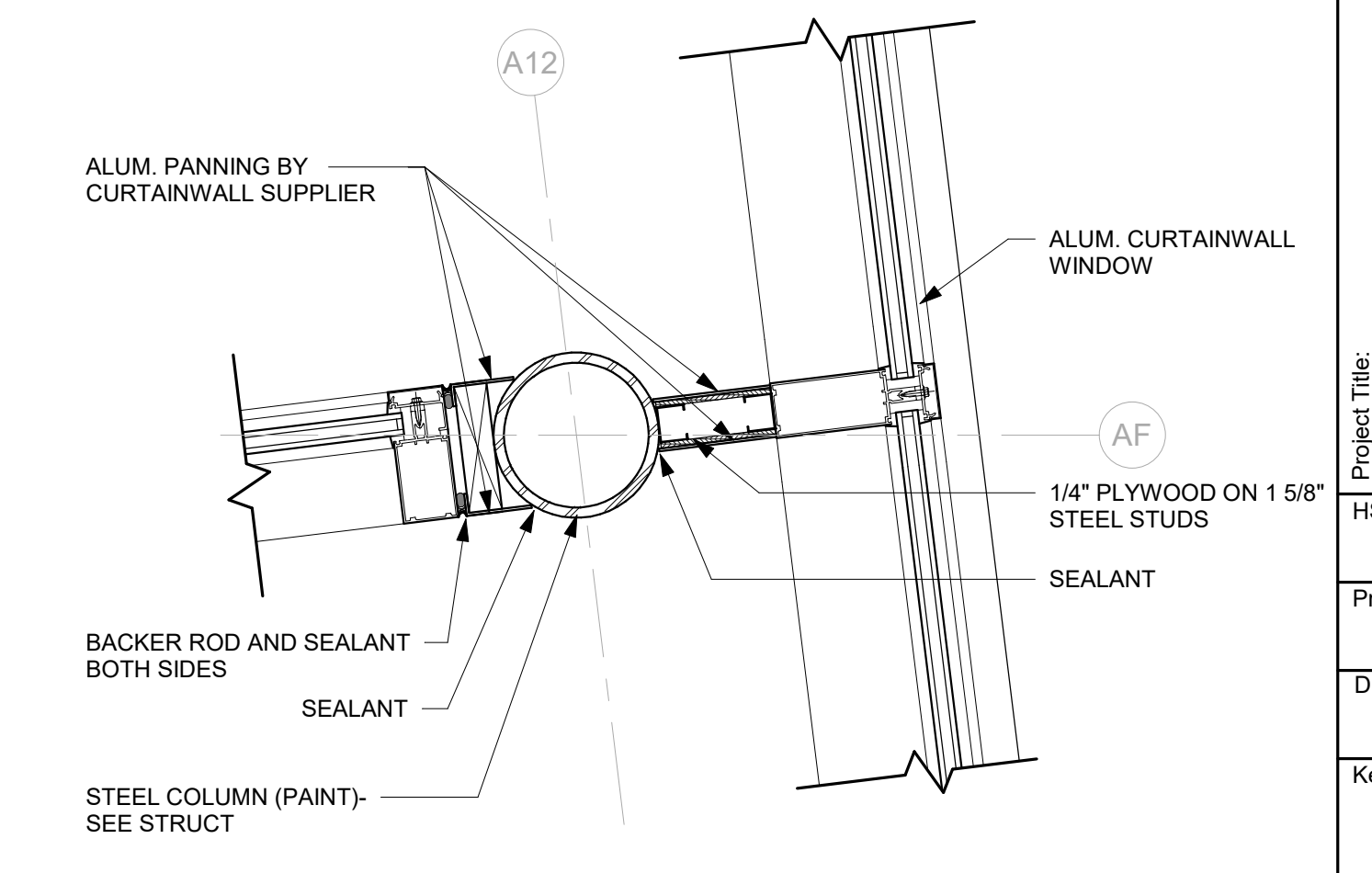
16 PLAN DETAIL  
1" = 1'-0"



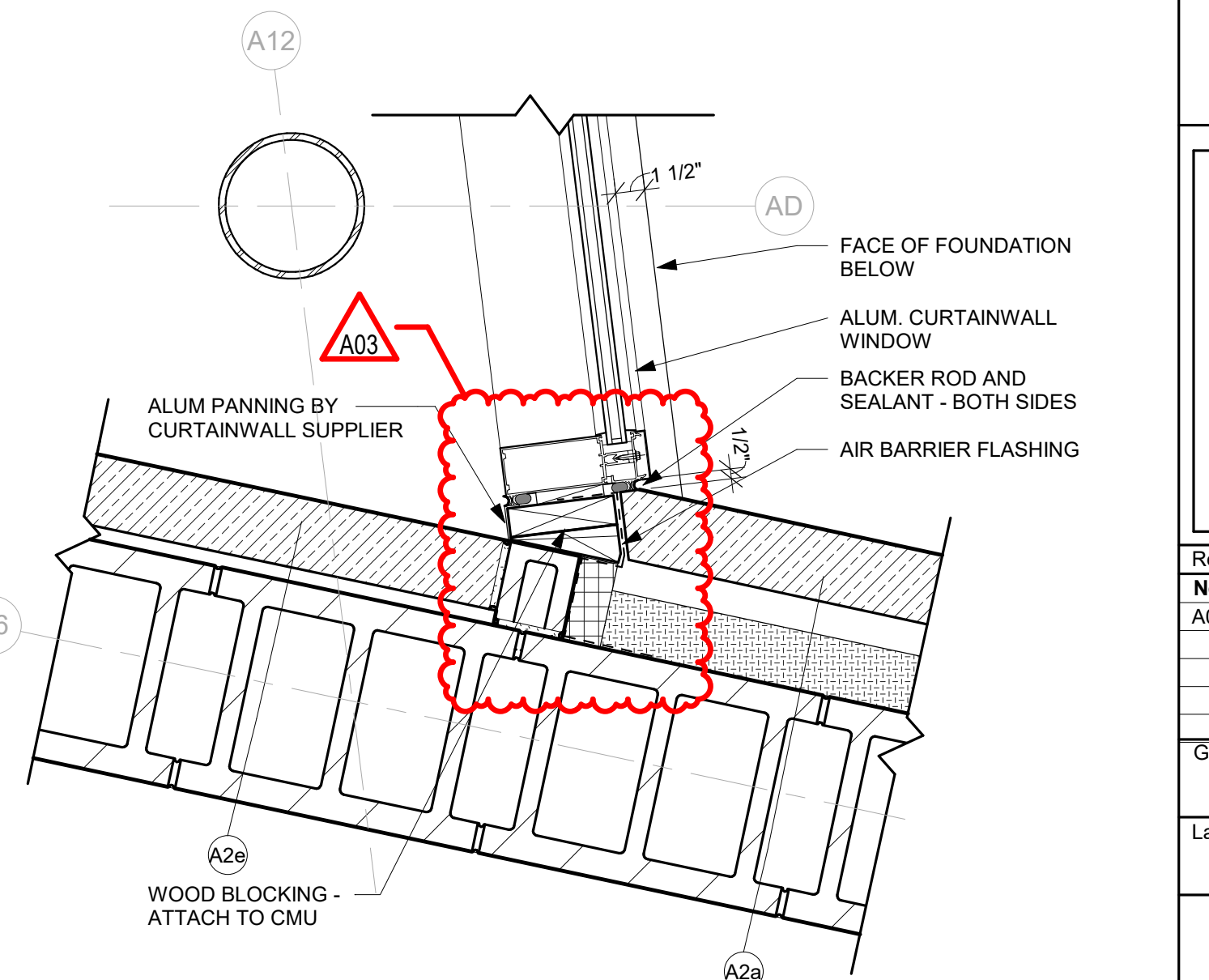
15 DOOR DETAIL  
1 1/2" = 1'-0"



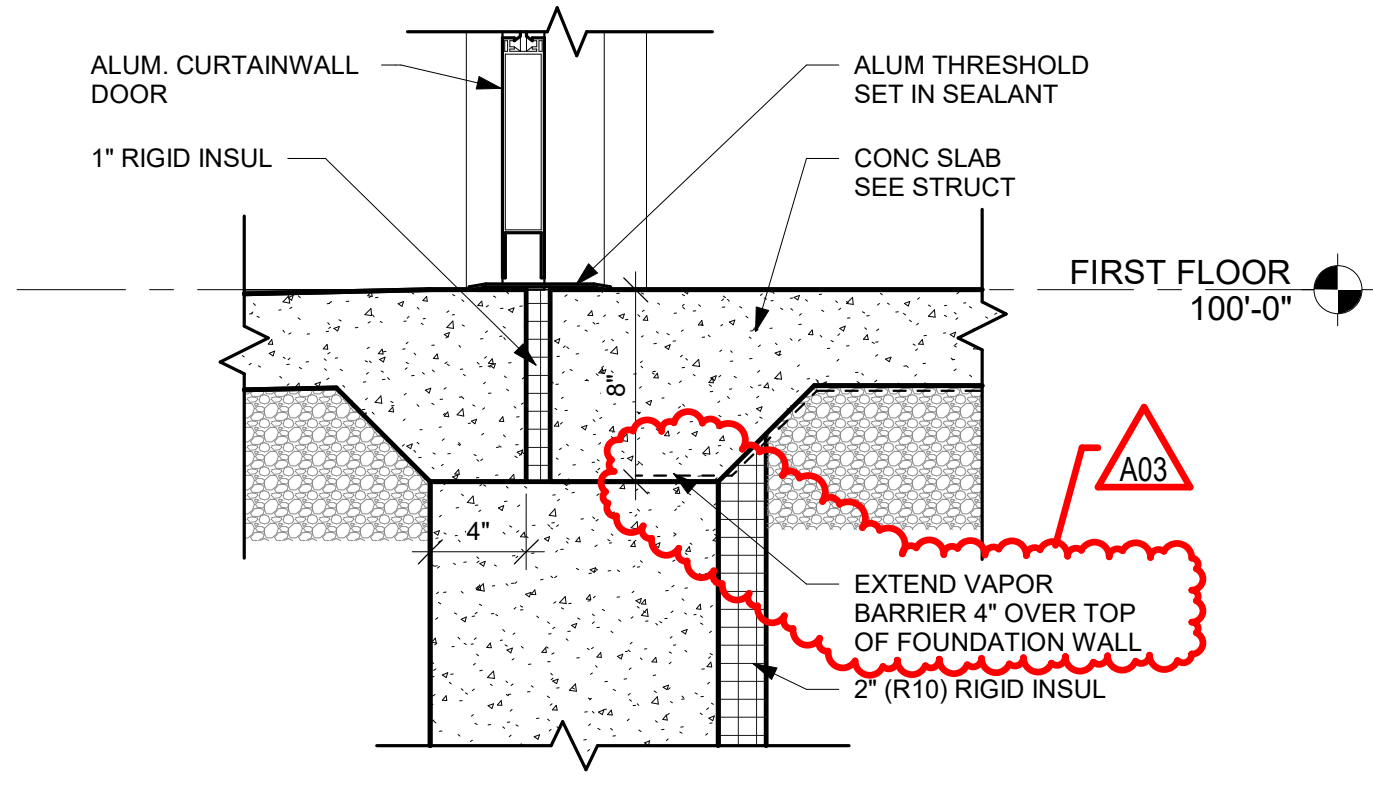
19 PLAN DETAIL  
1 1/2" = 1'-0"



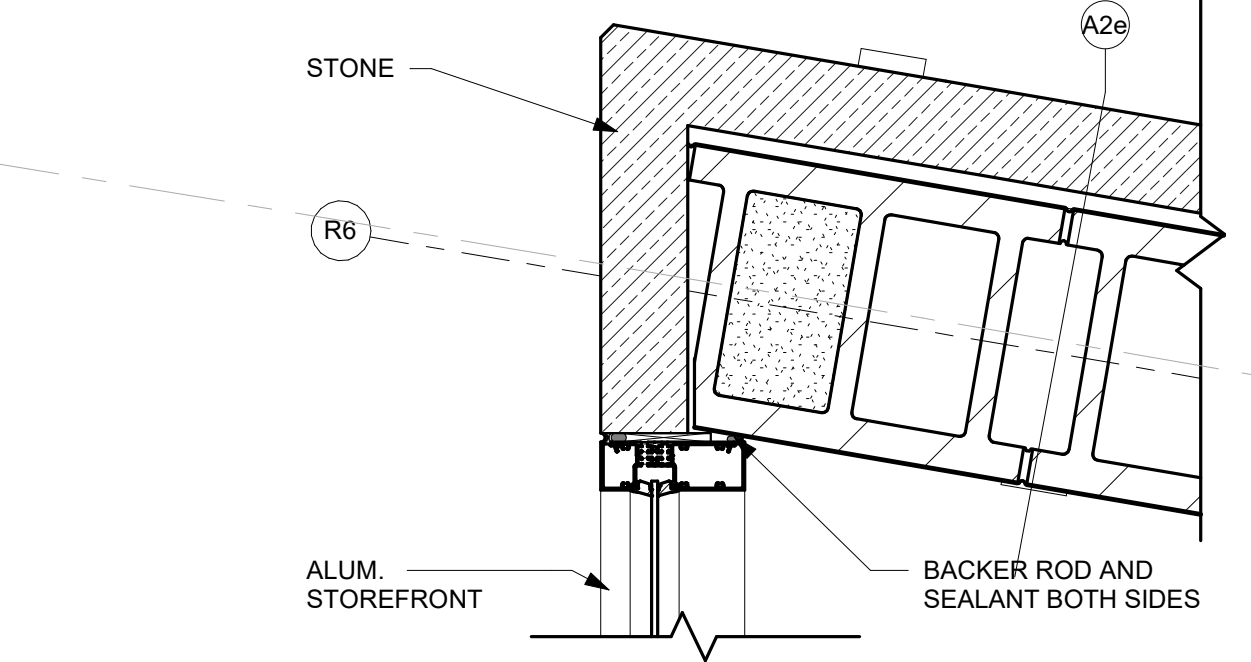
18 PLAN DETAIL  
1 1/2" = 1'-0"



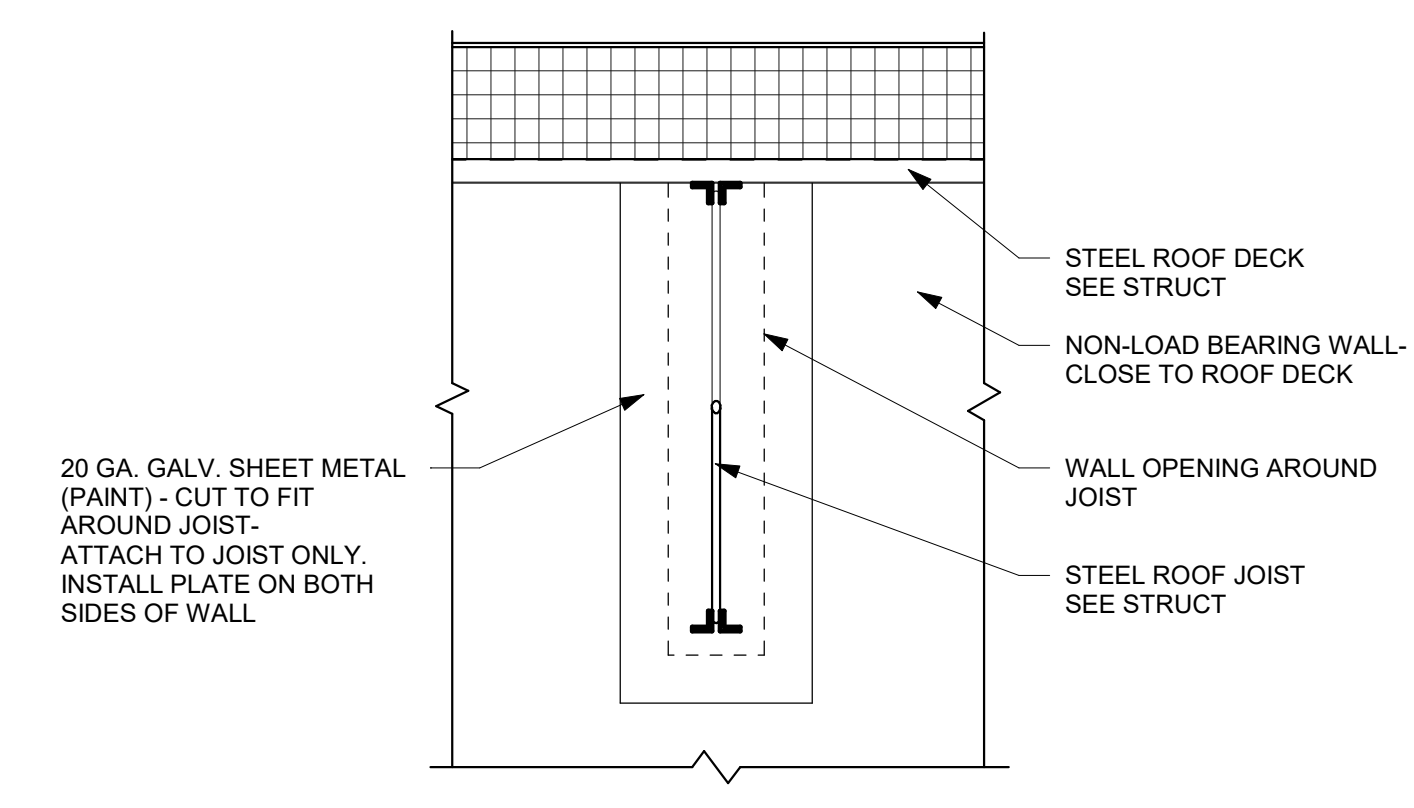
17 PLAN DETAIL  
1 1/2" = 1'-0"



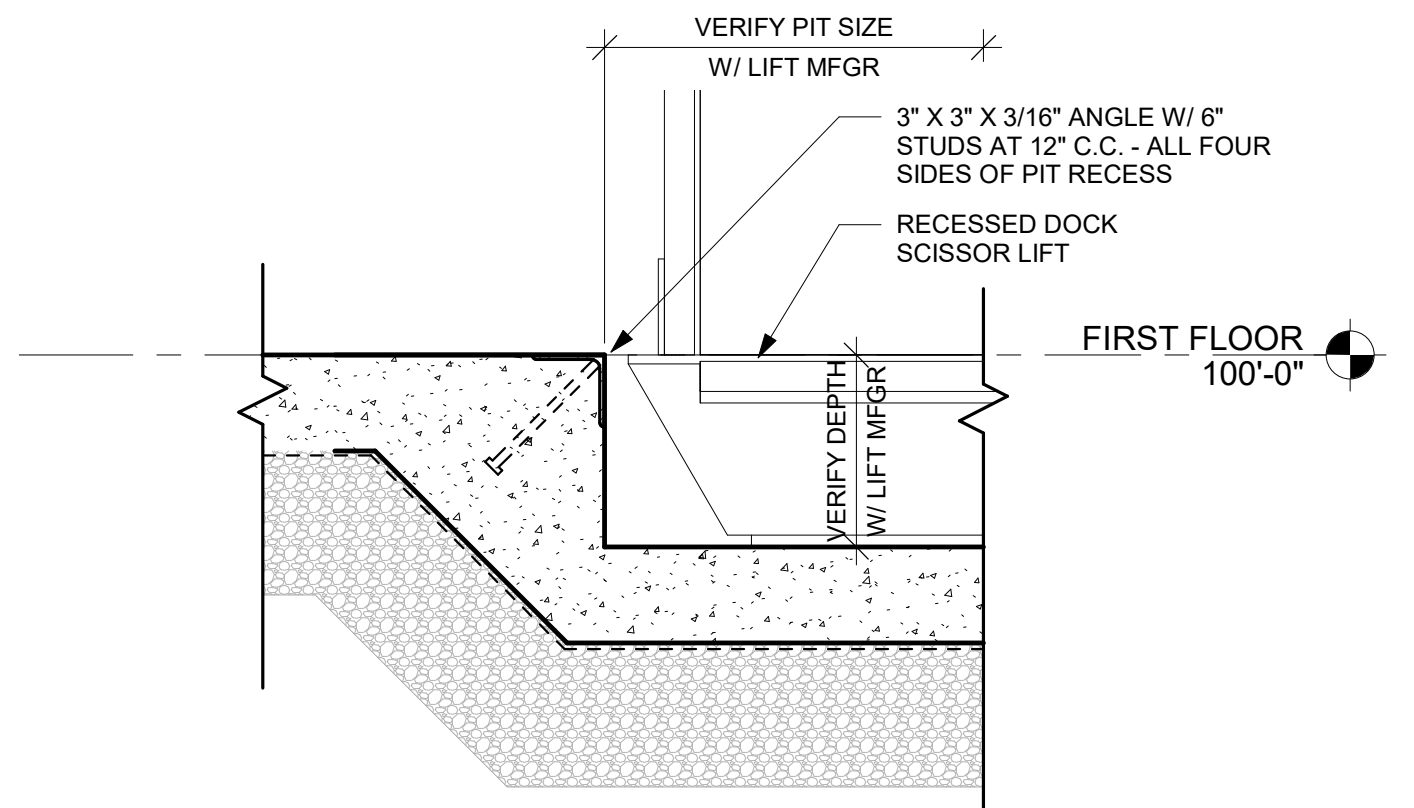
12 DOOR DETAIL  
1 1/2" = 1'-0"



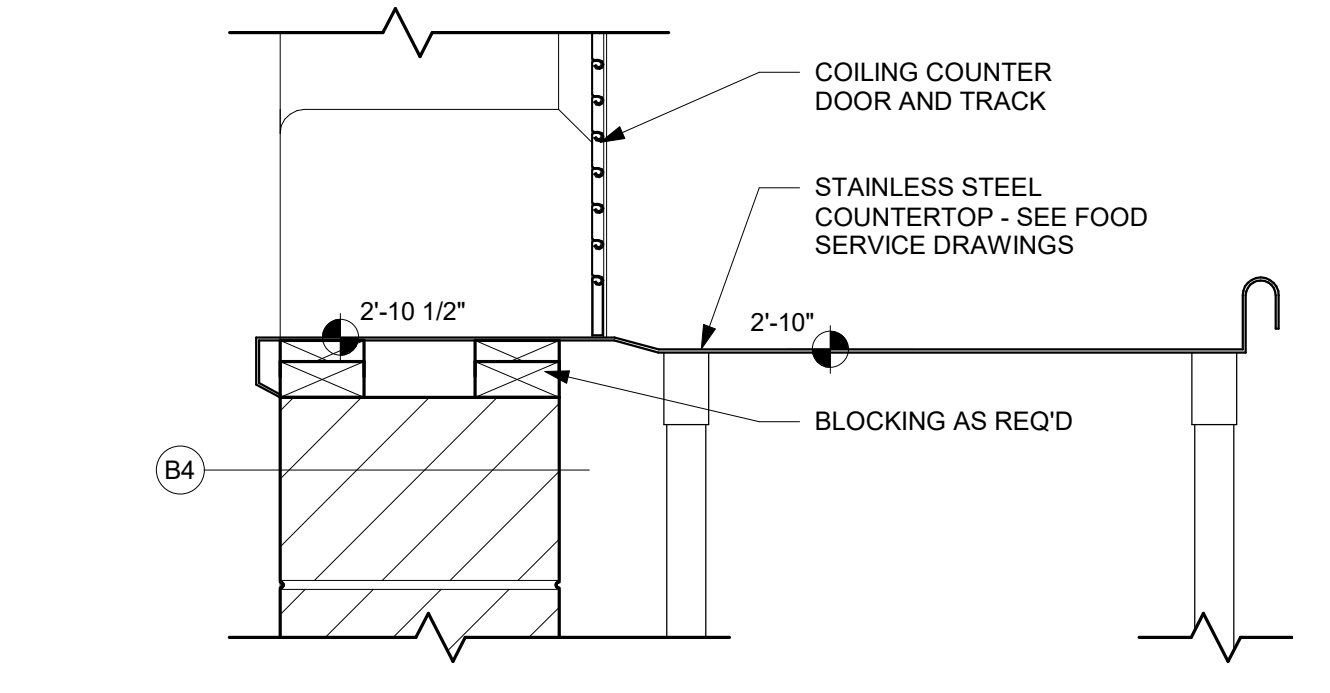
11 PLAN DETAIL  
1 1/2" = 1'-0"



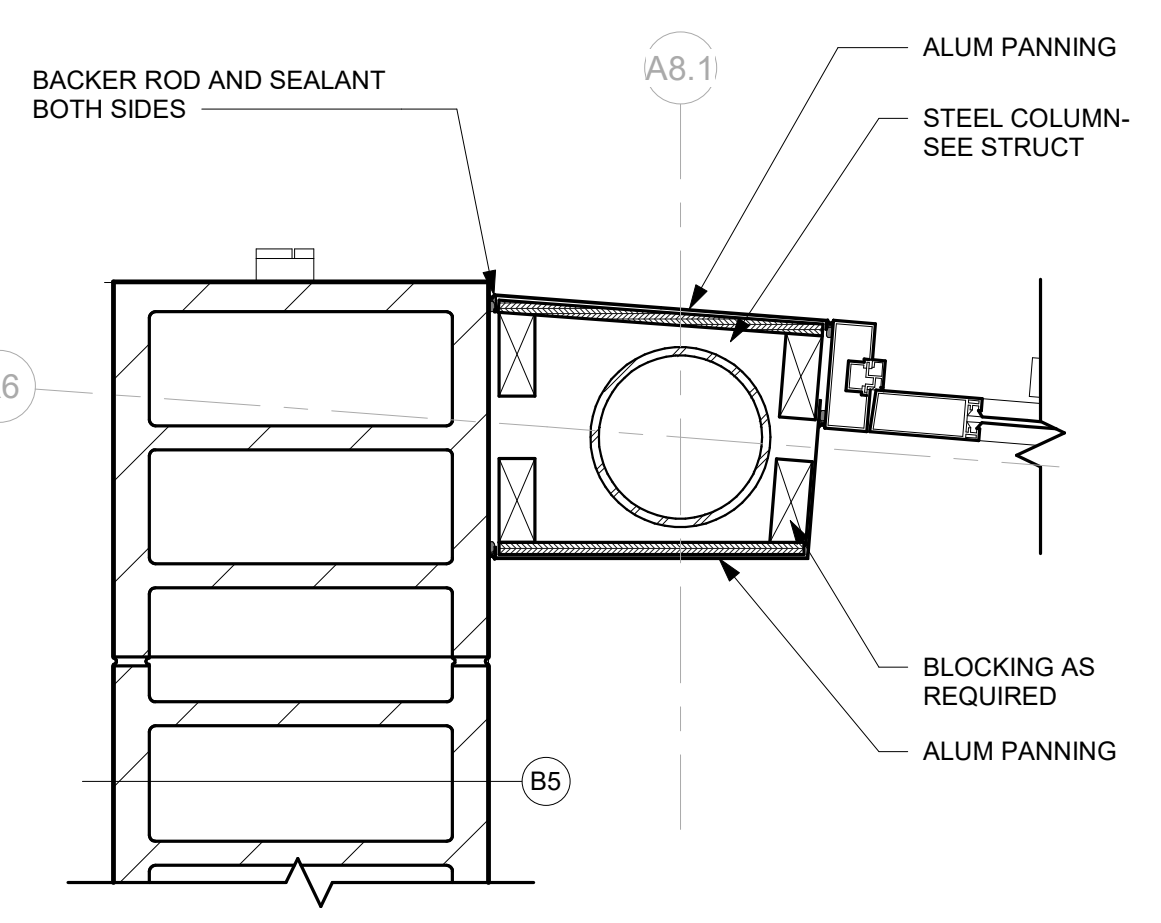
10 WALL DETAIL  
1" = 1'-0"



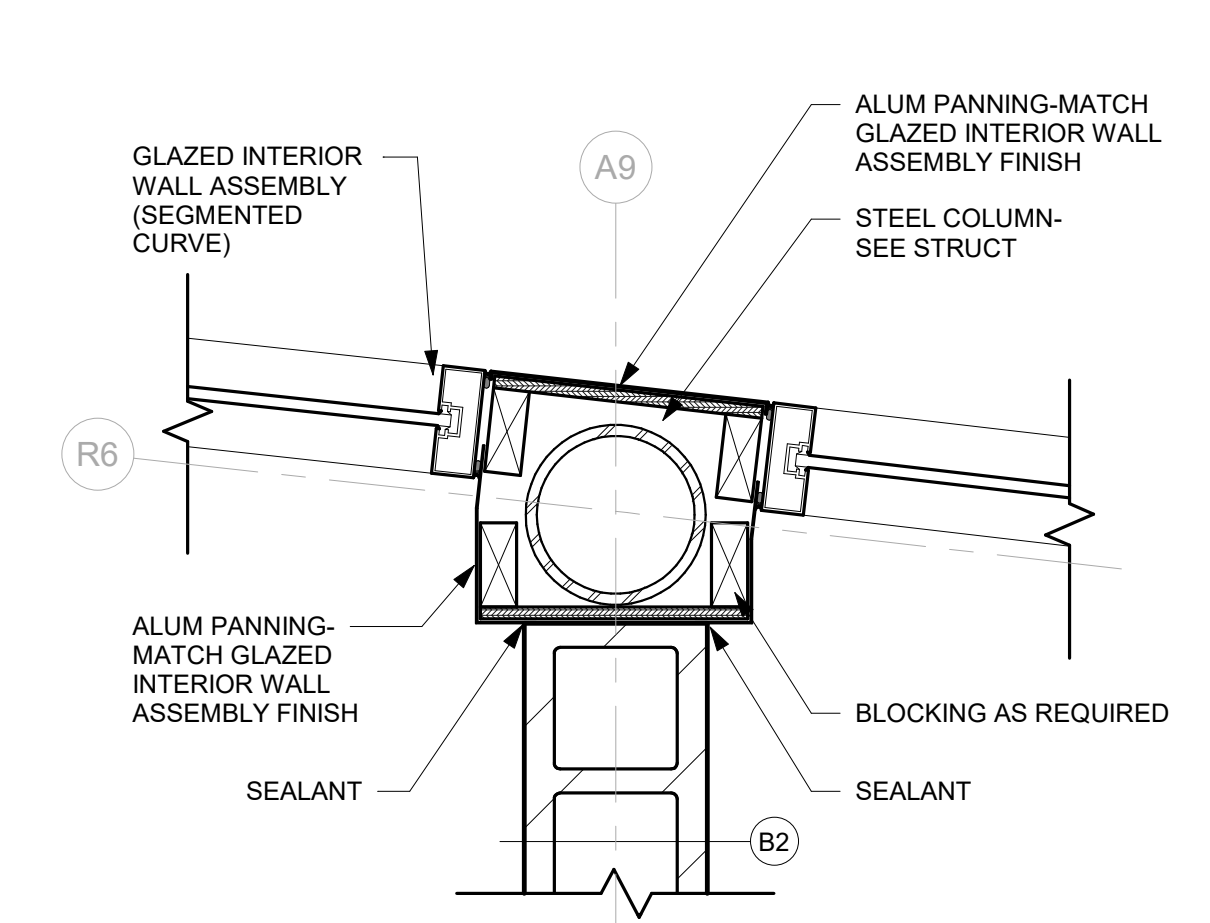
9 DETAIL  
1 1/2" = 1'-0"



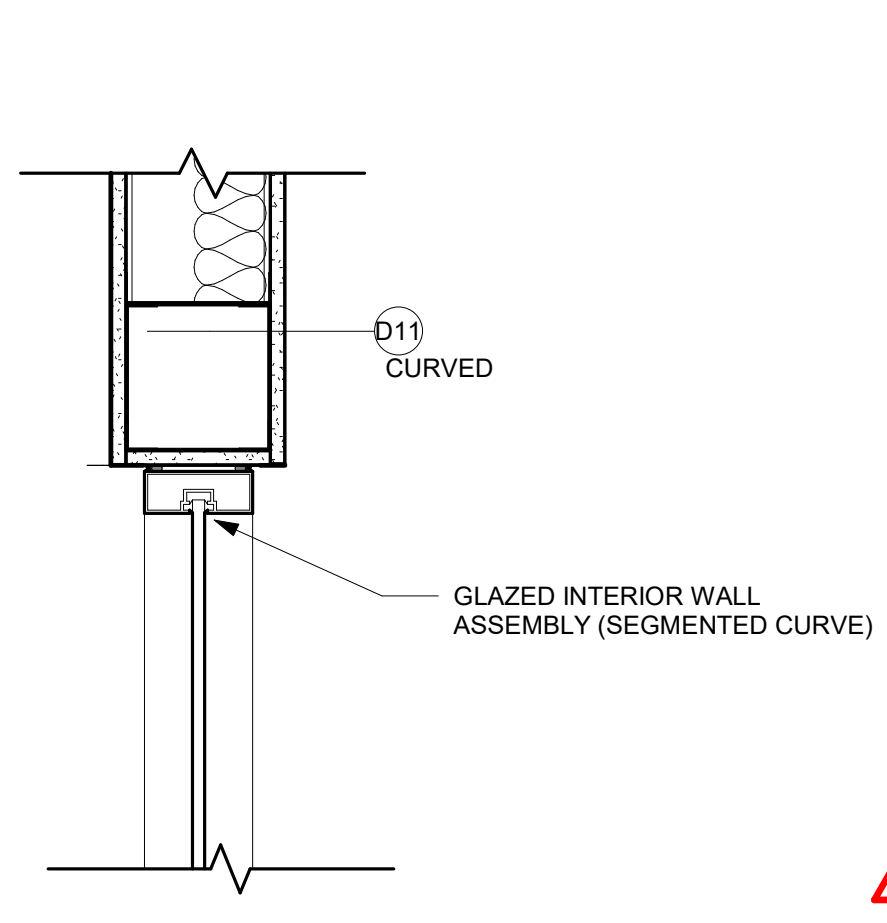
13 DOOR DETAIL  
1 1/2" = 1'-0"



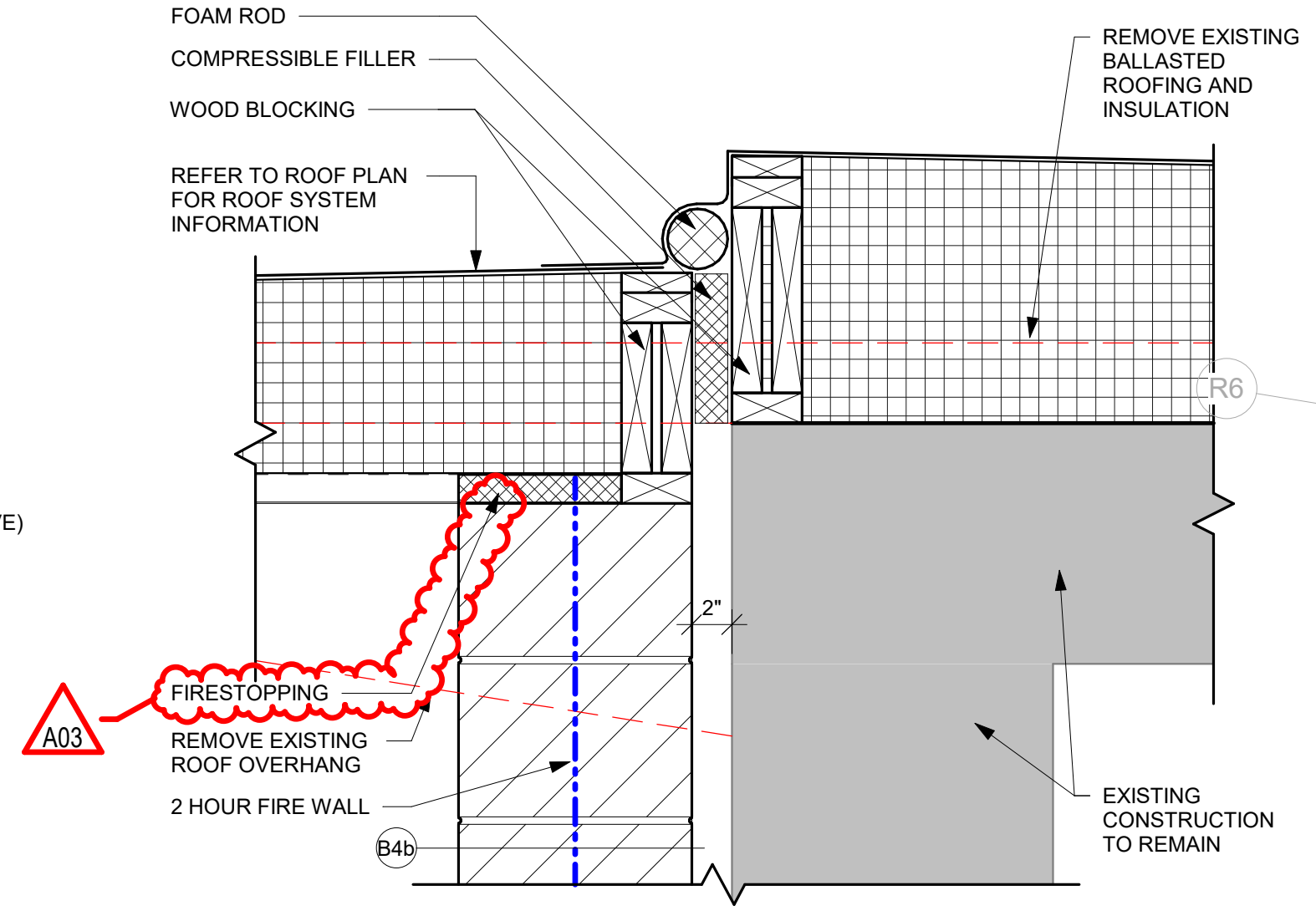
4 PLAN DETAIL  
1 1/2" = 1'-0"



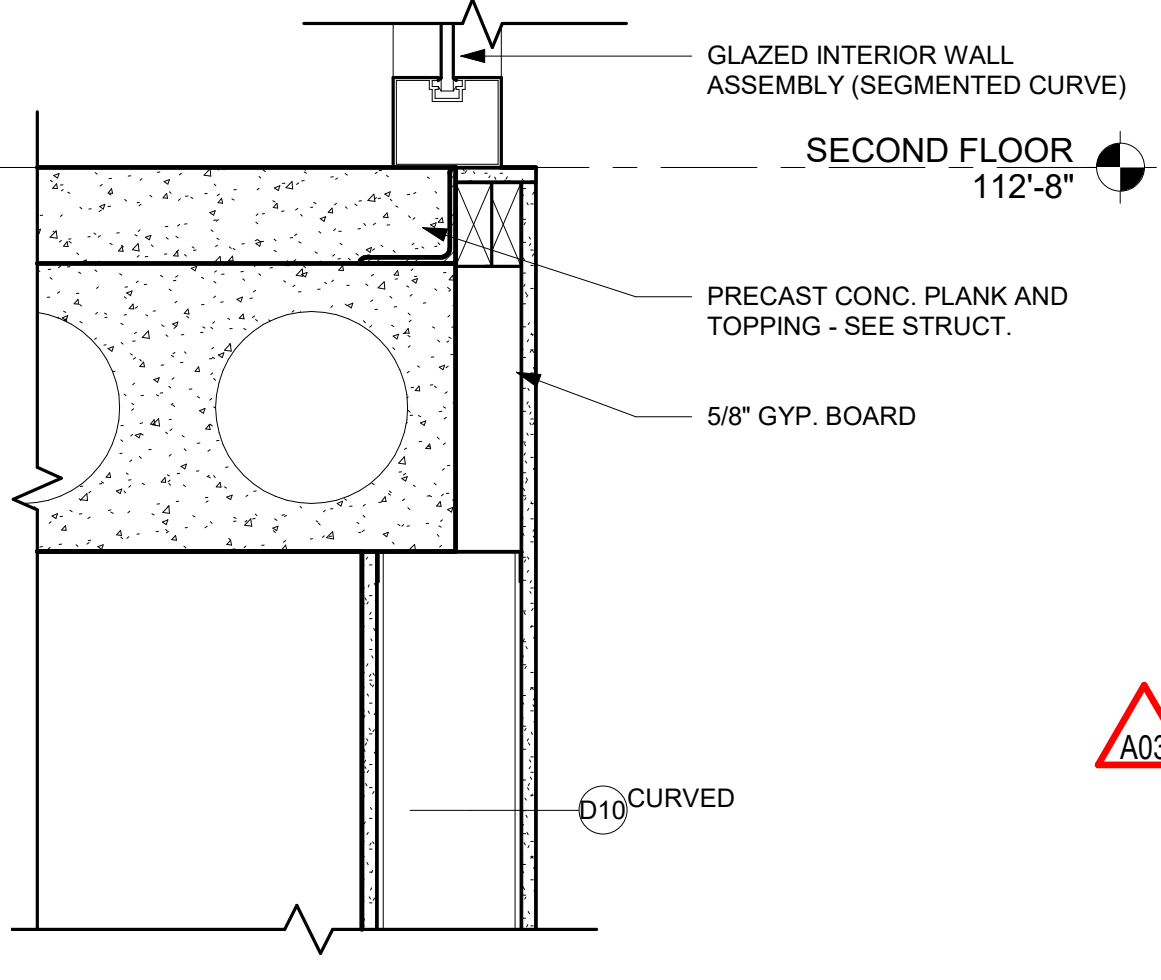
8 PLAN DETAIL  
1 1/2" = 1'-0"



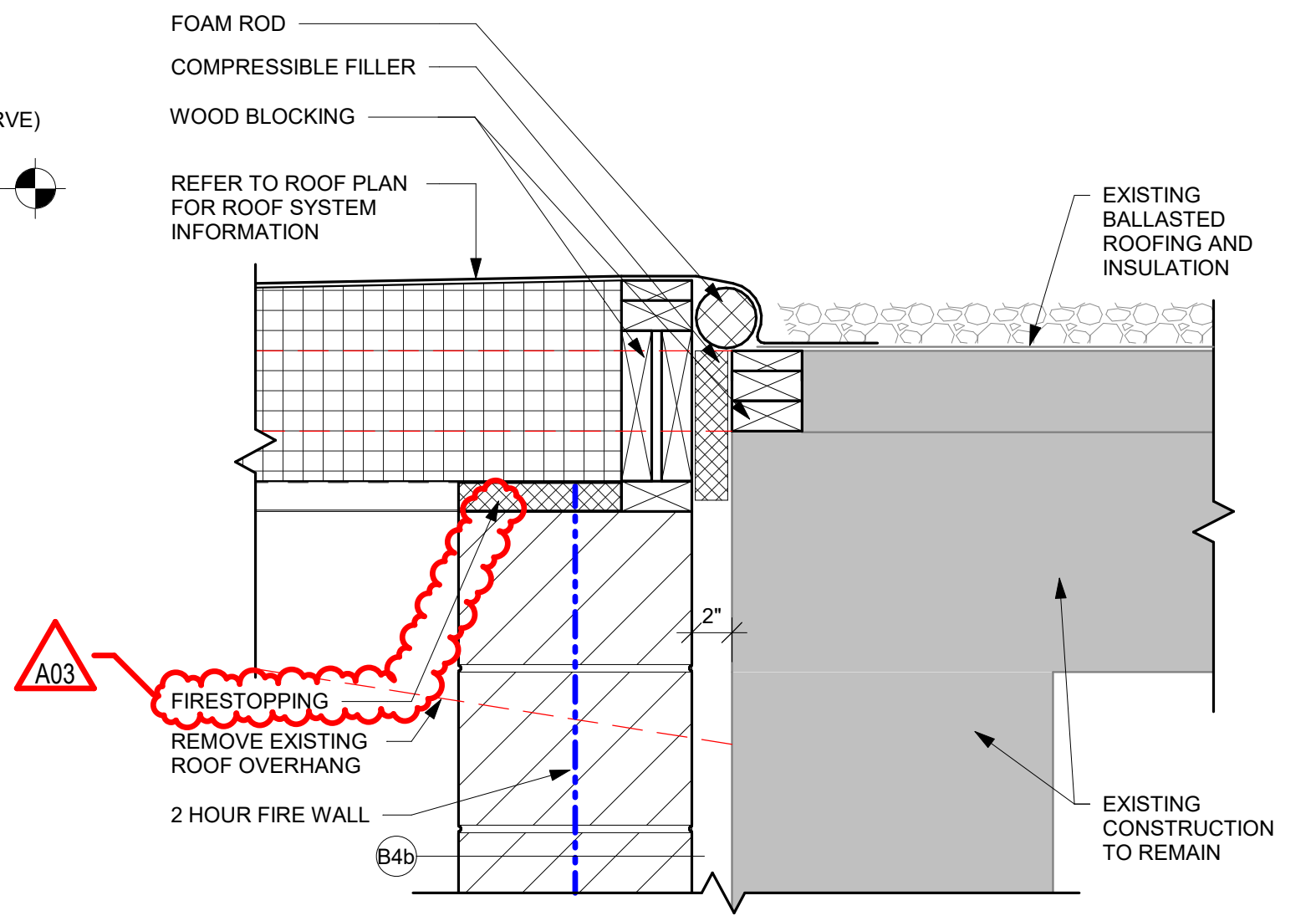
3 DETAIL  
1 1/2" = 1'-0"



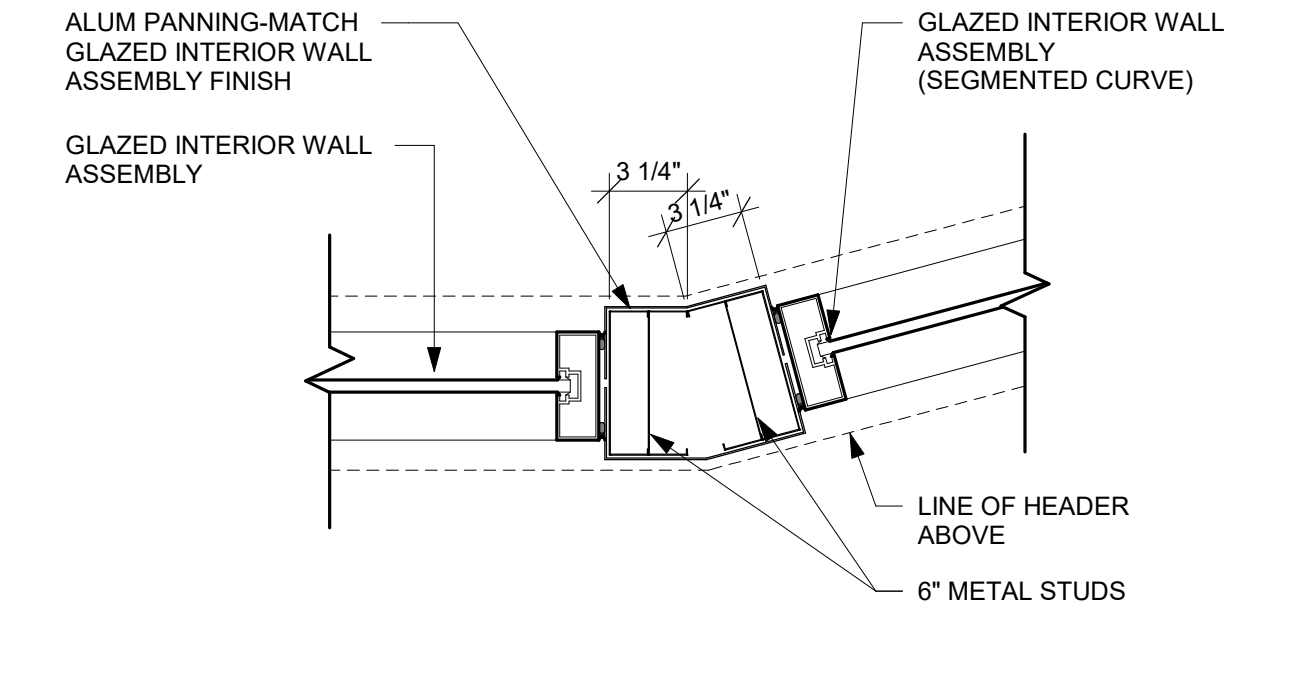
7 ROOF DETAIL  
1 1/2" = 1'-0" ALT BID



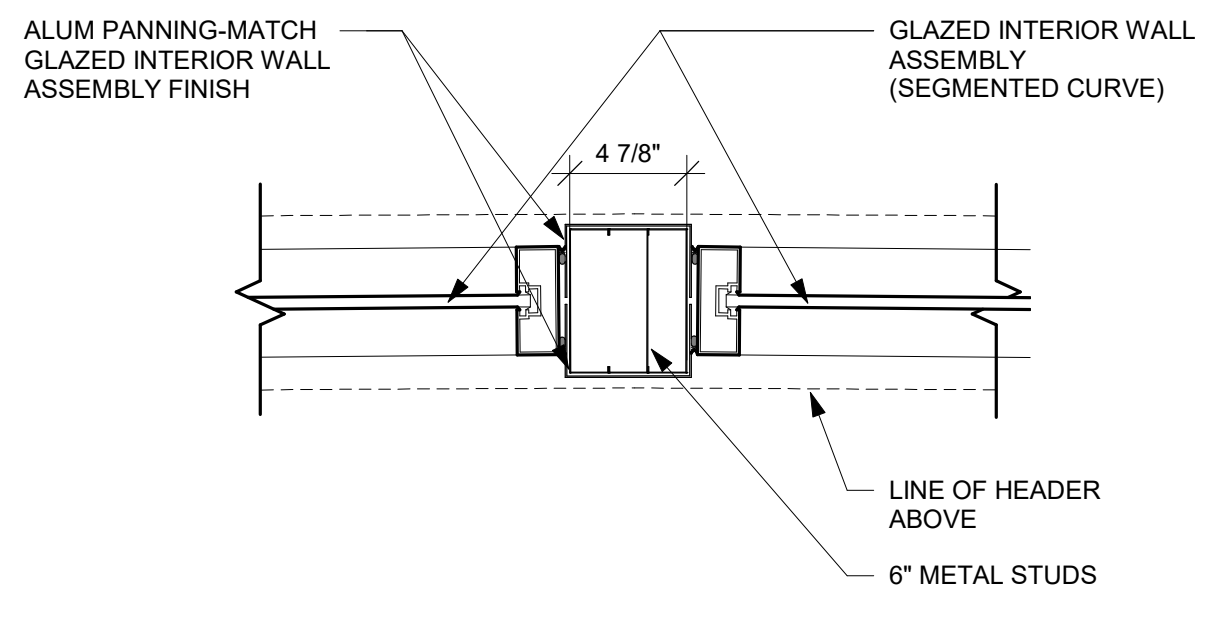
2 DETAIL  
1 1/2" = 1'-0"



6 ROOF DETAIL  
1 1/2" = 1'-0" BASE BID



1 PLAN DETAIL  
1 1/2" = 1'-0"



5 PLAN DETAIL  
1 1/2" = 1'-0"



DOOR SCHEDULE

Table with columns: BUILDING SEGMENT, DOOR NO., SIZE (W, H, T), DOOR MAT'L, GLASS TYPE, U-CUT OR LOUVER, FRAME MAT'L, FRAME ELEV, DEPTH, HEAD, JAMB, SILL, FIRE LABEL, HDWR GROUP, REMARKS. Contains multiple rows of door specifications.

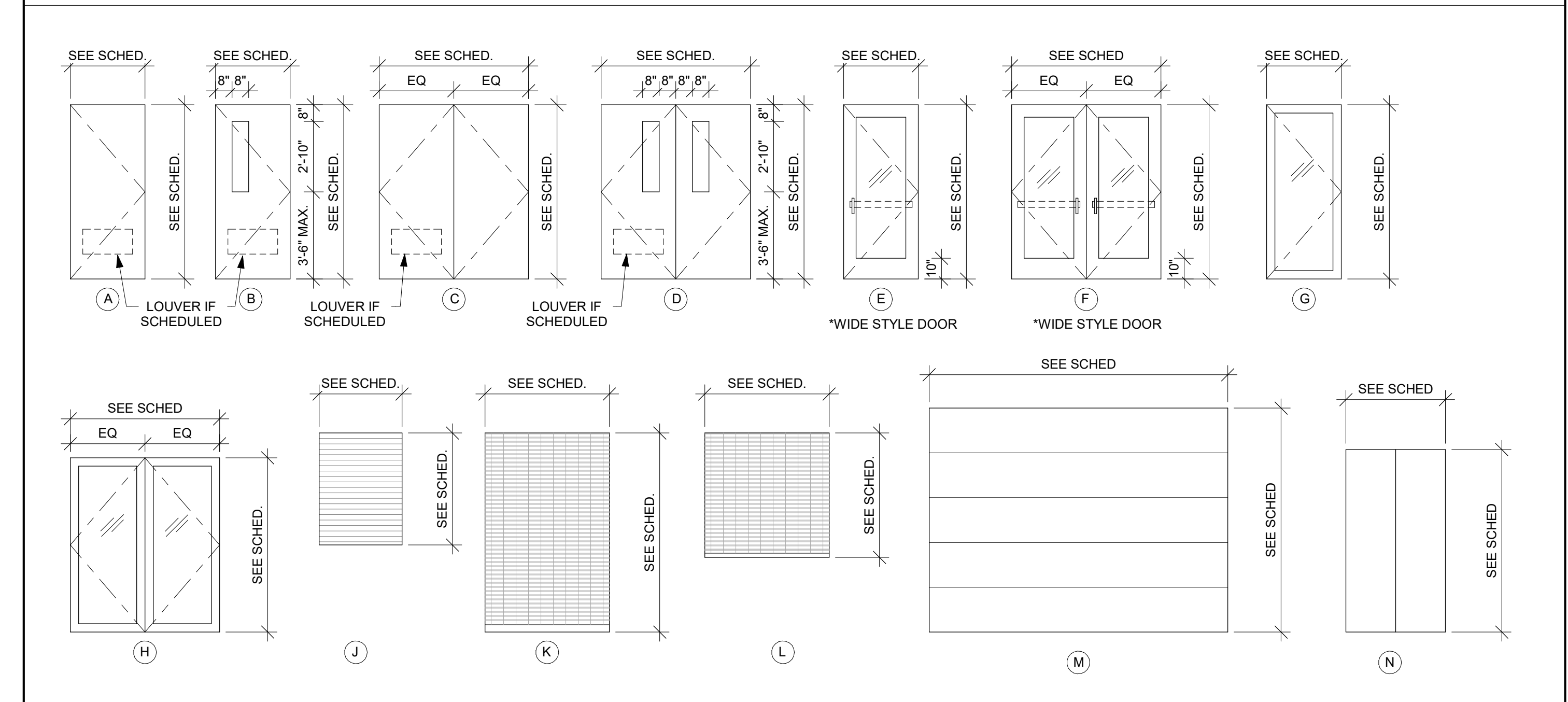
DOOR SCHEDULE

Table with columns: BUILDING SEGMENT, DOOR NO., SIZE (W, H, T), DOOR MAT'L, GLASS TYPE, U-CUT OR LOUVER, FRAME MAT'L, FRAME ELEV, DEPTH, HEAD, JAMB, SILL, FIRE LABEL, HDWR GROUP, REMARKS. Contains multiple rows of door specifications.

DOOR SCHEDULE GENERAL NOTES

- HM = HOLLOW METAL ALUM = ALUMINUM SCWD = SOLID CORE WOOD DOOR FRP = FIBERGLASS REINFORCED POLYESTER
A. SEE SPECIFICATIONS FOR DOOR HARDWARE GROUPS
B. ALL HM (HOLLOW METAL) DOORS SHALL BE PAINTED
C. ALL DOUBLE DOORS TO HAVE TWO EQUAL LEAFS UNLESS NOTED OTHERWISE

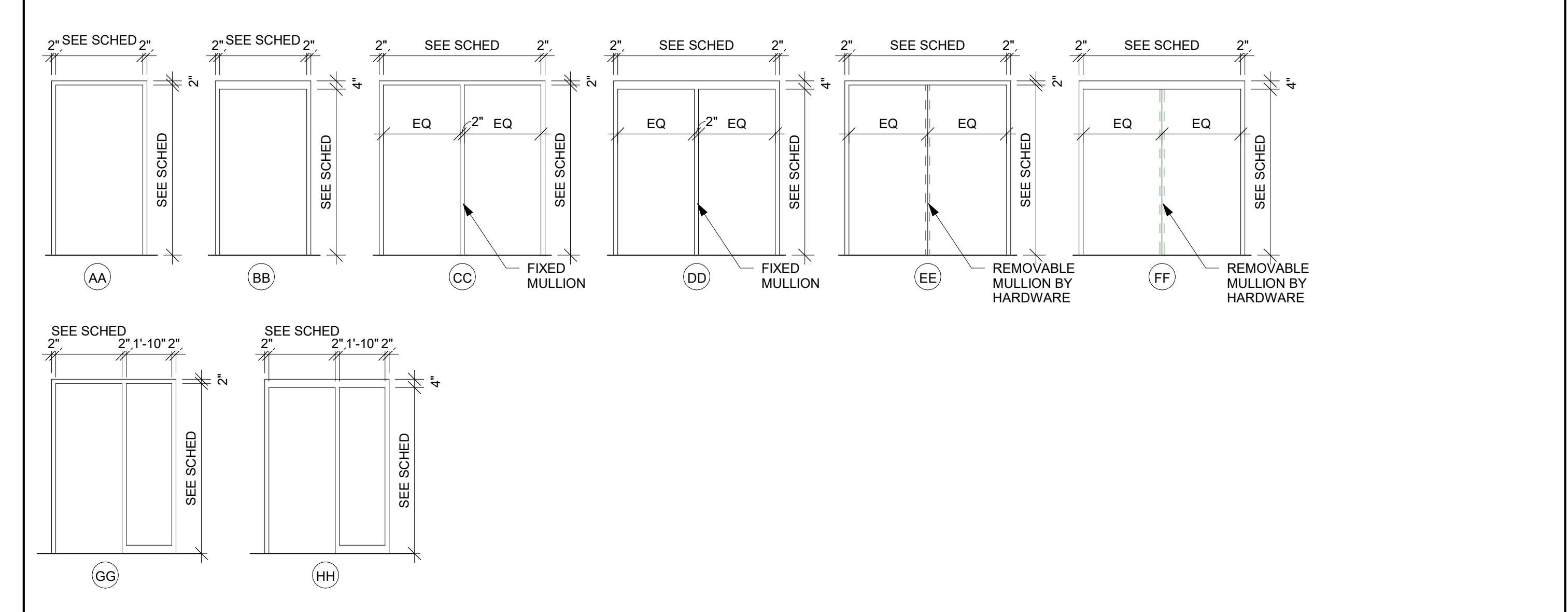
DOOR TYPES



DOOR FRAME GENERAL NOTES

- HM = HOLLOW METAL ALUM = ALUMINUM
A. SEE SHEET A800 FOR ADDITIONAL FRAME TYPES
B. ALL HM (HOLLOW METAL) FRAMES SHALL BE PAINTED.

DOOR FRAME TYPES



DOOR SCHEDULE REMARKS

- 1. KEY FOB ACCESS AND ELECTRIC STRIKE REQUIRED.
2. AUTO OPERATOR - SEE PLAN FOR PUSH BUTTON LOCATIONS
3. MANUALLY OPERATED FACE OF WALL MOUNTED OPEN SLAT ALUMINUM COILING GRILLE
4. MANUALLY OPERATED FACE OF WALL MOUNTED COILING COUNTER DOOR
5. HIGH LIFT INSULATED SECTIONAL OVERHEAD DOOR
6. NEW DOOR AND FRAME IN EXISTING OPENING - VERIFY SIZE
7. GLASS DOOR IN GLAZED WALL ASSEMBLY, TEMPERED GLASS AS REQ'D BY DESIGN
8. 2 PANEL BIFOLD DOOR
9. MAGNETIC HOLD OPEN REQUIRED

ARCHITECTURE ENGINEERING INTERIOR DESIGN



HSR ASSOCIATES INC.
100 MILWAUKEE STREET
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FAX: 608.782.5844
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Consultant:

Project Title: LA CRESCENT - HOKAH PUBLIC SCHOOLS ELEMENTARY SCHOOL ADDITION AND RENOVATION
Project Location: 504 SOUTH OAK STREET LA CRESCENT, MINNESOTA
Sheet Title: DOOR SCHEDULE

HSR Project Number: 19014
Project Date: 3.5.2020
Drawn By: DJH

Key Plan:

BID DOCUMENTS

Table with columns: No., Description, Date. Row 1: A03 ADDENDUM 3 3.24.20

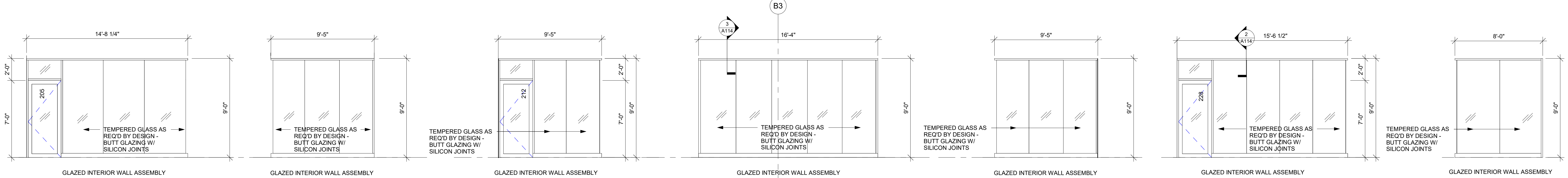
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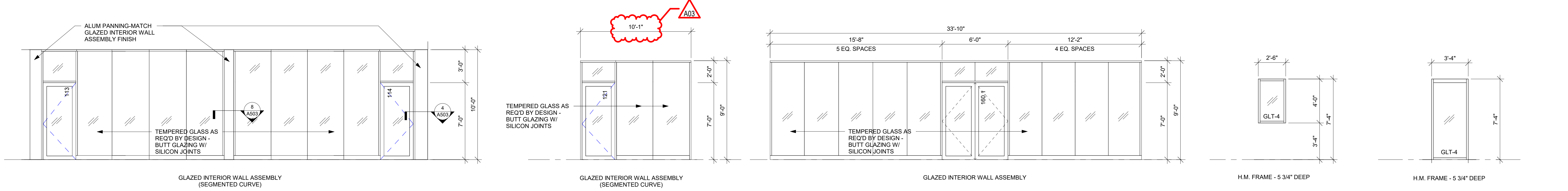
A601



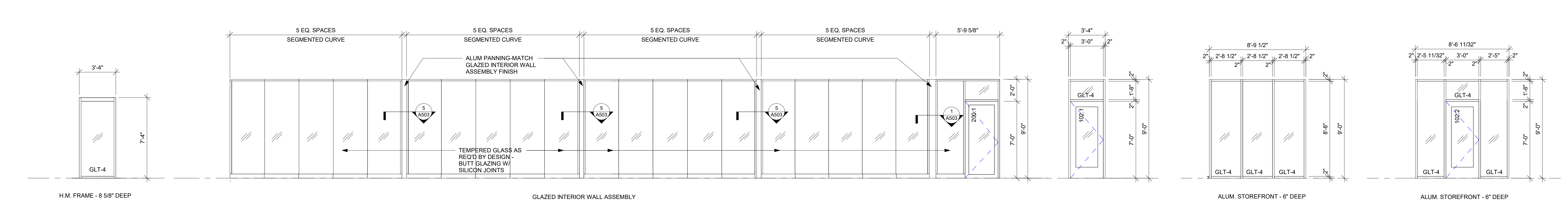
Consultant:



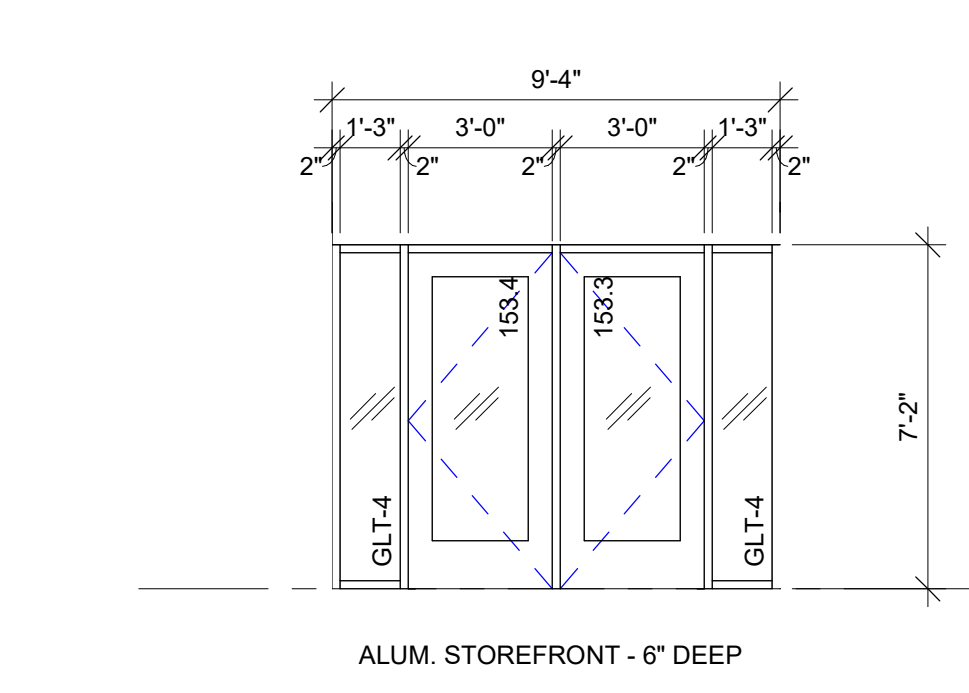
**1** FRAME ELEV. 1/4" = 1'-0"  
**2** FRAME ELEV. 1/4" = 1'-0"  
**3** FRAME ELEV. 1/4" = 1'-0"  
**4** FRAME ELEV. 1/4" = 1'-0"  
**5** FRAME ELEV. 1/4" = 1'-0"  
**6** FRAME ELEV. 1/4" = 1'-0"  
**7** FRAME ELEV. 1/4" = 1'-0"



**8** FRAME ELEV. 1/4" = 1'-0"  
**9** FRAME ELEV. 1/4" = 1'-0"  
**10** FRAME ELEV. 1/4" = 1'-0"  
**11** FRAME ELEV. 1/4" = 1'-0"  
**12** FRAME ELEV. 1/4" = 1'-0"



**13** FRAME ELEV. 1/4" = 1'-0"  
**14** FRAME ELEV. 1/4" = 1'-0"  
**15** FRAME ELEV. 1/4" = 1'-0"  
**16** FRAME ELEV. 1/4" = 1'-0"  
**17** FRAME ELEV. 1/4" = 1'-0"



**18** FRAME ELEV. 1/4" = 1'-0"

LA CRESCENT - HOKAH PUBLIC SCHOOLS  
ELEMENTARY SCHOOL ADDITION AND  
RENOVATION  
504 SOUTH OAK STREET  
LA CRESCENT, MINNESOTA  
INTERIOR FRAME TYPES

Project Title:  
Project Location:  
Sheet Title:

HSR Project Number: 19014  
Project Date: 3.5.2020  
Drawn By: DJH

Key Plan:

BID DOCUMENTS

No.	Description	Date
A03	ADDENDUM 3	3.24.20

Graphic Scale:  
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Last Update: 3/23/2020 1:05:51 PM

**A604**

**HOLLOW METAL FRAMES**  
1. HOLLOW METAL FRAMES FOR BORROWED LITES SHALL BE 8 3/4" DEEP @ 8" CMU WALLS & 5 3/4" DEEP @ 12" CMU WALLS - SEE FLOOR PLANS. SEE DOOR SCHEDULE FOR DOOR FRAME DEPTHS.  
2. SEE SHEET A601 FOR STANDARD HOLLOW METAL DOOR FRAME ELEVATIONS.

MASTER COLOR SCHEDULE

Main table with columns for Manufacturer/Color, General Location, Remarks, and specific material details across various categories like Cabinets, Flooring, Carpeting, Painting, and Tile.



HSR ASSOCIATES INC. 100 MILWAUKEE STREET LA CROSSE, WISCONSIN PHONE: 608.784.1830 FAX: 608.782.5844 www.hsrassociates.com

Consultant:

LA CRESCENT - HOKAH PUBLIC SCHOOLS ELEMENTARY SCHOOL ADDITION AND RENOVATION

504 SOUTH OAK STREET LA CRESCENT, MINNESOTA

Project Title: HSR Project Number: 19014 Project Date: 3.5.2020 Drawn By: K.VEERKAMP

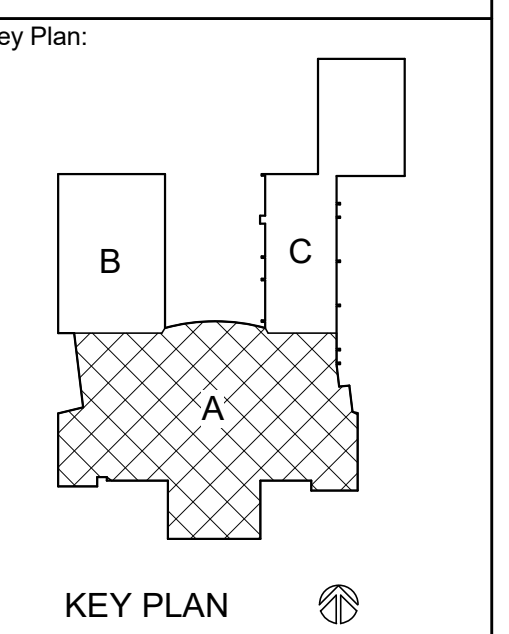
Key Plan:

BID DOCUMENTS

Revisions table with columns for No., Description, and Date.

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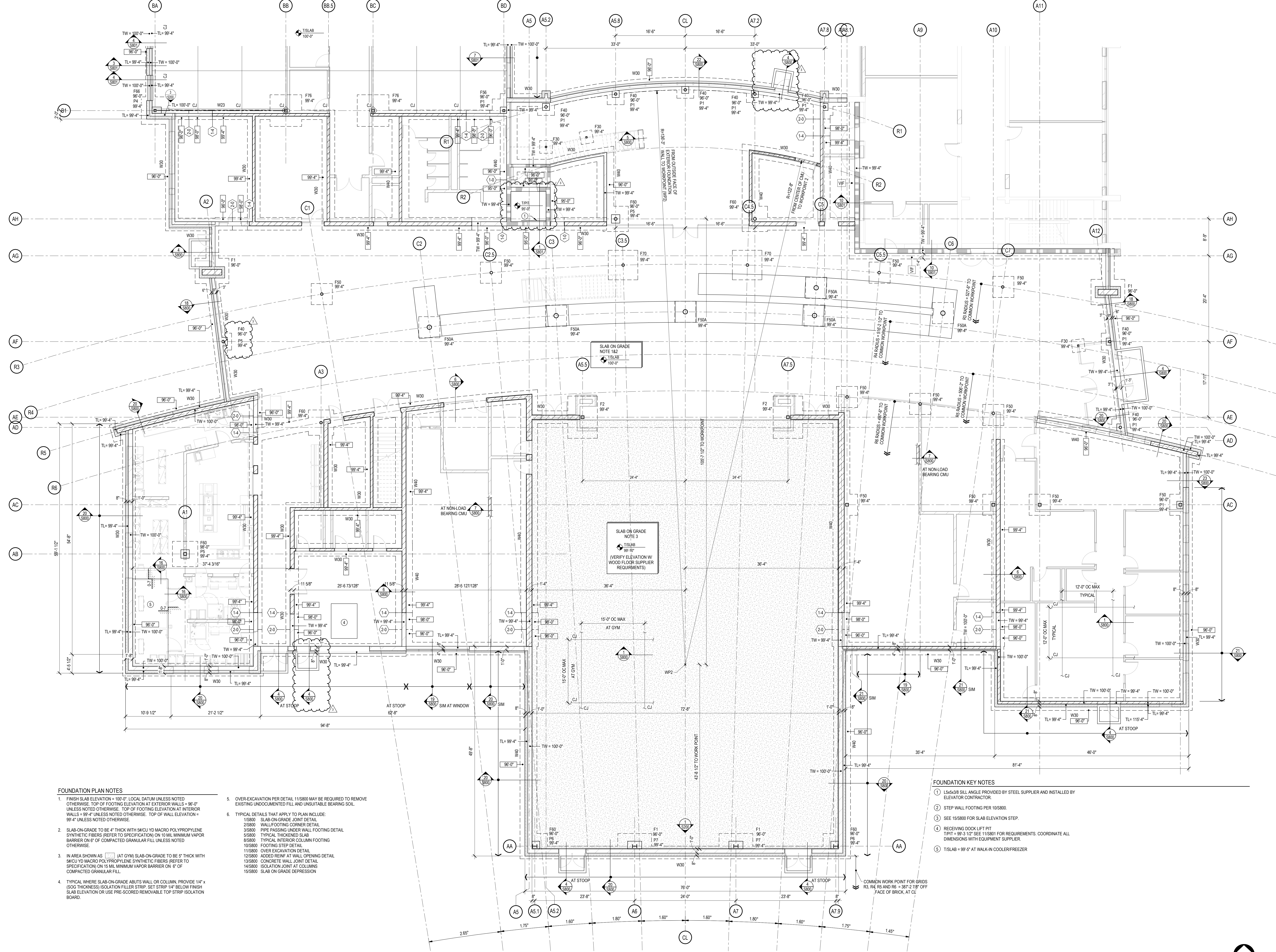


**BID DOCUMENTS**

No.	Description	Date
3	ADDENDUMS	3/24/20

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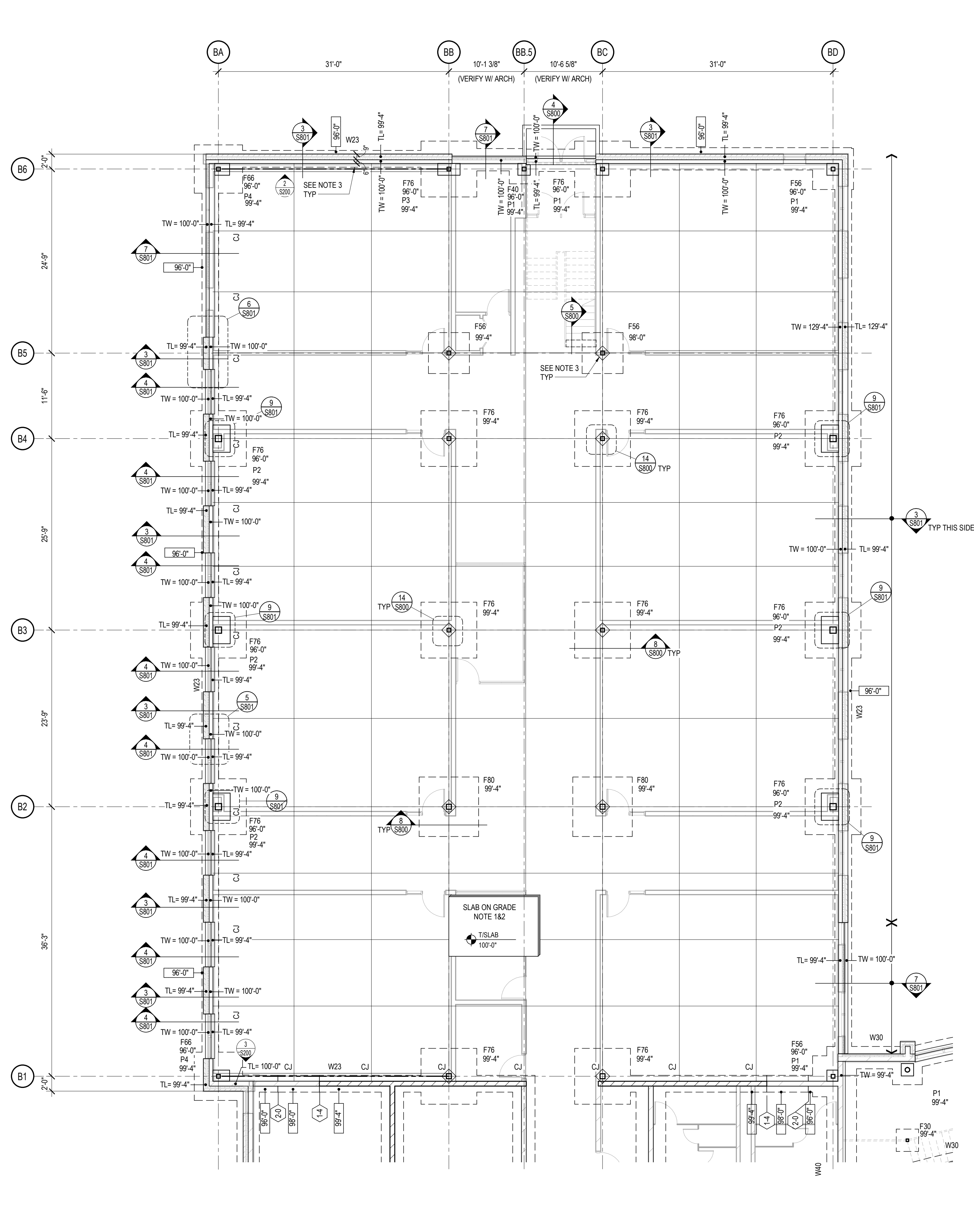
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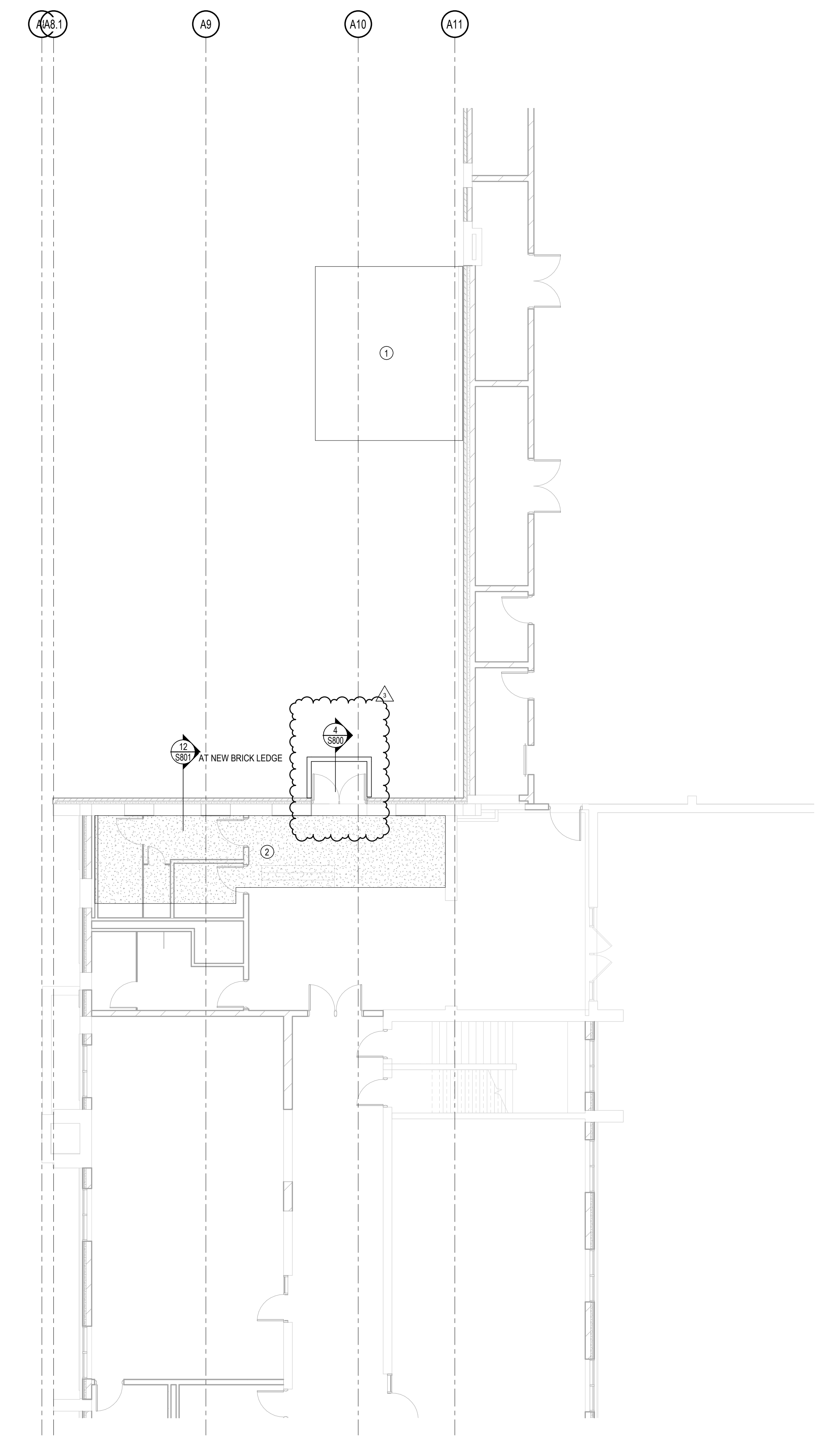
- FOUNDATION PLAN NOTES**
- FINISH SLAB ELEVATION = 100'-0" LOCAL DATUM UNLESS NOTED OTHERWISE. TOP OF FOOTING ELEVATION AT EXTERIOR WALLS = 96'-0" UNLESS NOTED OTHERWISE. TOP OF FOOTING ELEVATION AT INTERIOR WALLS = 99'-4" UNLESS NOTED OTHERWISE. TOP OF WALL ELEVATION = 99'-4" UNLESS NOTED OTHERWISE.
  - SLAB-ON-GRADE TO BE 4" THICK WITH 5#/CU YD MACRO POLYPROPYLENE SYNTHETIC FIBERS (REFER TO SPECIFICATION) ON 10 MIL MINIMUM VAPOR BARRIER ON P/ OF COMPACTED GRANULAR FILL UNLESS NOTED OTHERWISE.
  - IN AREA SHOWN AS [ ] AT GYM SLAB-ON-GRADE TO BE 6" THICK WITH 5#/CU YD MACRO POLYPROPYLENE SYNTHETIC FIBERS (REFER TO SPECIFICATION) ON 15 MIL MINIMUM VAPOR BARRIER ON 6" OF COMPACTED GRANULAR FILL.
  - TYPICAL WHERE SLAB-ON-GRADE ABUTS WALL OR COLUMN, PROVIDE 14" x (SOO THICKNESS) ISOLATION FILLER STRIP. SET STROP 1/4" BELOW FINISH SLAB ELEVATION OR USE PRE-SCORED REMOVABLE TOP STROP ISOLATION BOARD.
  - OVER-EXCAVATION PER DETAIL 11/S800 MAY BE REQUIRED TO REMOVE EXISTING UNDOCUMENTED FILL AND UNSUITABLE BEARING SOIL.
  - TYPICAL DETAILS THAT APPLY TO PLAN INCLUDE:  
11/S800 SLAB-ON-GRADE JOINT DETAIL  
23/S800 WALL/FOOTING CORNER DETAIL  
3/S800 PIPE PASSING UNDER WALL FOOTING DETAIL  
5/S800 TYPICAL THICKENED SLAB  
6/S800 TYPICAL INTERIOR COLUMN FOOTING  
10/S800 FOOTING STEP DETAIL  
11/S800 OVER EXCAVATION DETAIL  
12/S800 ADDED REIN AT WALL OPENING DETAIL  
13/S800 CONCRETE WALL JOINT DETAIL  
14/S800 ISOLATION JOINT AT COLUMNS  
15/S800 SLAB ON GRADE DEPRESSION

- FOUNDATION KEY NOTES**
- 15x5x3/8 SILL ANGLE PROVIDED BY STEEL SUPPLIER AND INSTALLED BY ELEVATOR CONTRACTOR.
  - STEP WALL FOOTING PER 10/S800.
  - SEE 15/S800 FOR SLAB ELEVATION STEP.
  - RECEIVING DOCK LIFT PIT TYPICAL = 99'-3 1/2" SEE 11/S801 FOR REQUIREMENTS. COORDINATE ALL DIMENSIONS WITH EQUIPMENT SUPPLIER.
  - TS/LAB = 99'-5" AT WALK-IN COOLER/FREEZER

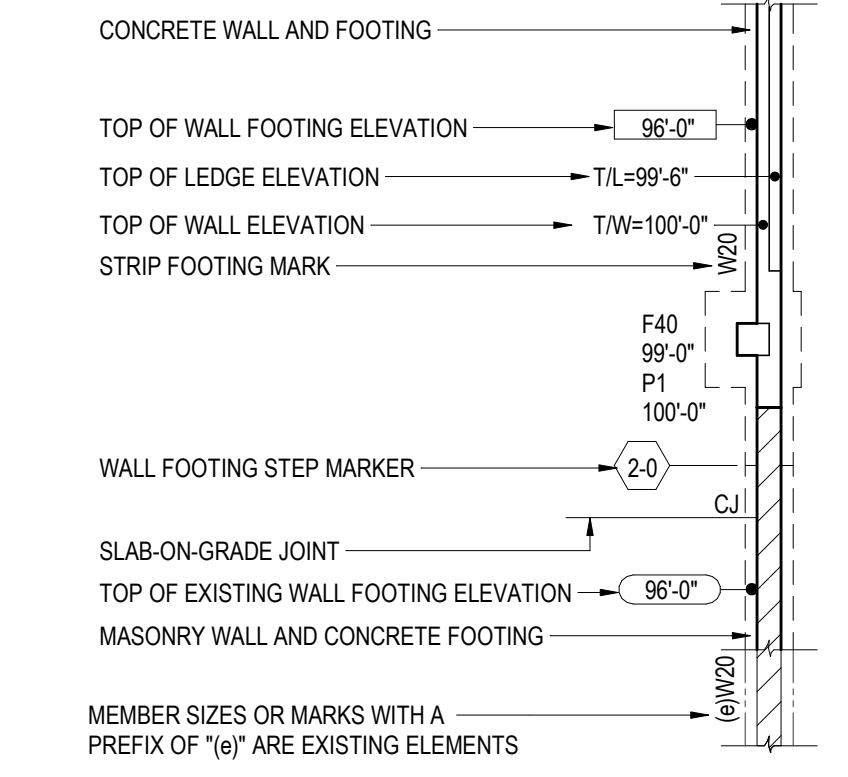
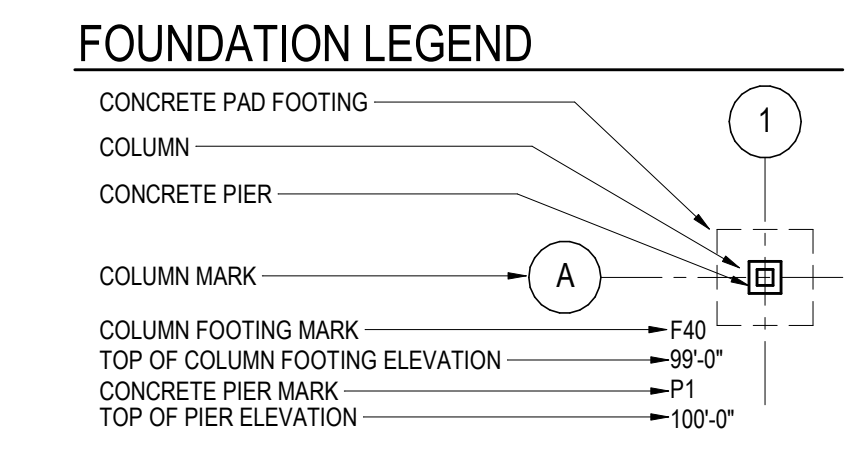




1 FOUNDATION PLAN - SEGMENT B  
SCALE: 1/8" = 1'-0"



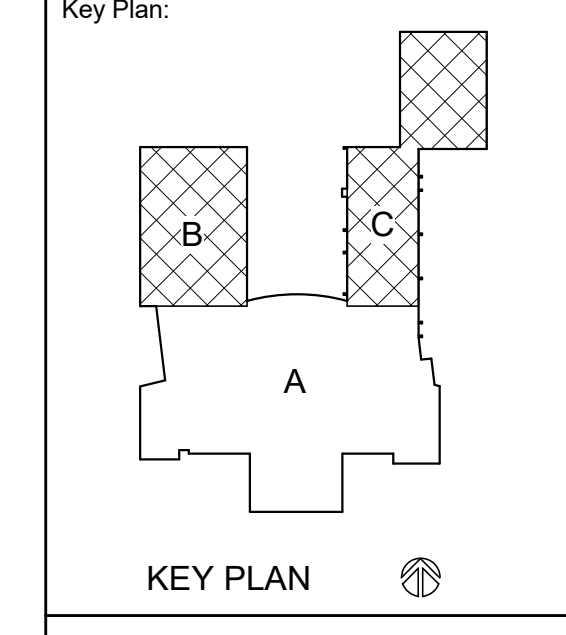
2 FOUNDATION PLAN - SEGMENT C  
SCALE: 1/8" = 1'-0"



- FOUNDATION KEY NOTES**
- 12" SLAB WITH (2) LAYERS OF #4 AT 12" OC BOTH WAYS FOR FLORPOT OF RTU
  - EXISTING T/SLAB = 99'-6"  
USE EPS-15 OR BETTER STRUCTURAL FOAM FILL BELOW NEW 4" SLAB TO BE CAST AT T/SLAB = 100'-0"

**FOUNDATION PLAN NOTES**

- FINISH SLAB ELEVATION = 100'-0". LOCAL DATUM UNLESS NOTED OTHERWISE. TOP OF FOOTING ELEVATION AT EXTERIOR WALLS = 96'-0" UNLESS NOTED OTHERWISE. TOP OF FOOTING ELEVATION AT INTERIOR WALLS = 99'-4" UNLESS NOTED OTHERWISE. TOP OF WALL ELEVATION = 99'-4" UNLESS NOTED OTHERWISE.
- SLAB-ON-GRADE TO BE 4" THICK WITH 5#/CU YD MACRO POLYPROPYLENE SYNTHETIC FIBERS (REFER TO SPECIFICATION) ON 10 MIL MINIMUM VAPOR BARRIER ON 6" OF COMPACTED GRANULAR FILL UNLESS NOTED OTHERWISE.
- TYPICAL WHERE SLAB-ON-GRADE ADJUTS WALL OR COLUMN, PROVIDE 1/4" x (SOG THICKNESS) ISOLATION FILLER STRIP. SET STRIP 1/4" BELOW FINISH SLAB ELEVATION OR USE PRE-SCORED REMOVABLE TOP STRIP ISOLATION BOARD.
- OVER-EXCAVATION PER DETAIL 11/S800 MAY BE REQUIRED TO REMOVE EXISTING UNDOCUMENTED FILL AND UNSUITABLE BEARING SOIL.
- TYPICAL DETAILS THAT APPLY TO PLAN INCLUDE:  
1/S800 SLAB-ON-GRADE JOINT DETAIL  
2/S800 WALL FOOTING CORNER DETAIL  
3/S800 PIPE PASSING UNDER WALL FOOTING DETAIL  
10/S800 FOOTING STEP DETAIL  
12/S800 ADDED REINF AT WALL OPENING DETAIL  
13/S800 CONCRETE WALL JOINT DETAIL  
14/S800 ISOLATION JOINT AT COLUMNS



Revisions:

No.	Description	Date
3	ADDENDUMS	3/24/20



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Consultant:  
**raSmith**  
CREATIVITY BEYOND ENGINEERING  
project number: 1190387

**ENGINEER CERTIFICATION**  
I hereby certify that this Plan, Specification or Report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the state of Minnesota.  
Wayne W. Vandenberg  
Date: 03/04/2020 Lic. No.: 43495

**LA CRESCENT - HOKAH PUBLIC SCHOOLS  
ELEMENTARY SCHOOL**  
504 SOUTH OAK STREET  
LA CRESCENT, MINNESOTA  
SECOND FLOOR & LOW ROOF FRAMING PLAN - SEGMENT A

Project Title:  
**LA CRESCENT - HOKAH PUBLIC SCHOOLS  
ELEMENTARY SCHOOL**

Project Location:  
504 SOUTH OAK STREET  
LA CRESCENT, MINNESOTA

Project Number:  
**19014**

Project Date:  
**3.5.2020**

Drawn By:  
**raSmith**

Key Plan:

**BID DOCUMENTS**

Revisions:

No.	Description	Date
3	ADDENDUMS	3/24/20

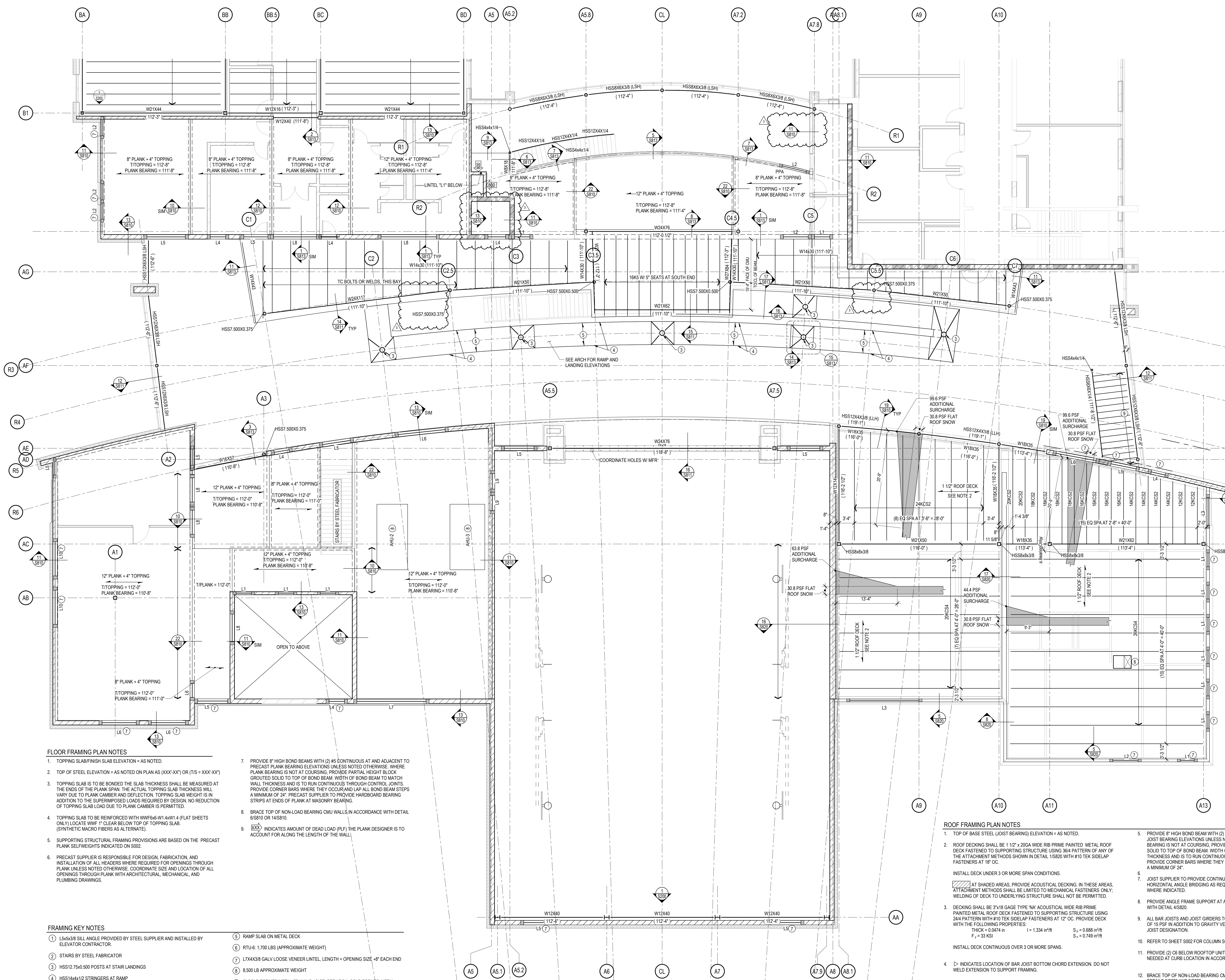
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**S105**

**STRUCTURAL STEEL LEGEND**

- INDICATES BEAM FRAMING OVER OR THRU HSS OR WF COLUMN
- INDICATES BEAM FRAMING INTO SIDE OF HSS OR WF COLUMN
- COLUMN MARK / COLUMN SIZE
- INDICATES BEAM-TO-COLUMN MOMENT FRAME CONNECTION
- TOP OF STEEL ELEVATION
- SHOP CAMBER
- FIELD APPLIED SHEAR STUDS BETWEEN BEAM ENDS AND/OR CONCENTRATED LOADS
- BEAM DESIGNATION
- JOIST GIRDER DESIGNATION
- INDICATED LOCATION OF BEAM SPLICE
- INDICATES EXISTING BEAM / JOIST FRAMING INTO SIDE OF NEW GIRDER
- INDICATES BEAM / JOIST FRAMING INTO SIDE OF GIRDER
- INDICATES BEAM / JOIST FRAMING OVER GIRDER
- INDICATES MOMENT CONNECTION BETWEEN BEAMS ACROSS GIRDER IN SAME HORIZONTAL PLANE
- MEMBER SIZES OR MARKS WITH A PREFIX OF "6" ARE EXISTING ELEMENTS



- FLOOR FRAMING PLAN NOTES**
- TOPPING SLAB FINISH SLAB ELEVATION = AS NOTED.
  - TOP OF STEEL ELEVATION = AS NOTED ON PLAN AS (XXX.XX) OR (T/S = XXX.XX)
  - TOPPING SLAB IS TO BE BONDED TO THE SLAB THICKNESS SHALL BE MEASURED AT THE ENDS OF THE PLANK SPAN. THE ACTUAL TOPPING SLAB THICKNESS WILL VARY DUE TO PLANK CAMBER AND DEFLECTION. TOPPING SLAB WEIGHT IS IN ADDITION TO THE SUPERIMPOSED LOADS REQUIRED BY DESIGN. NO REDUCTION OF TOPPING SLAB LOAD DUE TO PLANK CAMBER IS PERMITTED.
  - TOPPING SLAB TO BE REINFORCED WITH WWF6x6-W14W14 (FLAT SHEETS ONLY) LOCATE WWF 1" CLEAR BELOW TOP OF TOPPING SLAB. (SYNTHETIC MACRO FIBERS AS ALTERNATE)
  - SUPPORTING STRUCTURAL FRAMING PROVISIONS ARE BASED ON THE PRECAST PLANK SELFWEIGHTS INDICATED ON S02.
  - PRECAST SUPPLIER IS RESPONSIBLE FOR DESIGN, FABRICATION, AND INSTALLATION OF ALL HEADERS WHERE REQUIRED FOR OPENINGS THROUGH PLANK UNLESS NOTED OTHERWISE. COORDINATE SIZE AND LOCATION OF ALL OPENINGS THROUGH PLANK WITH ARCHITECTURAL, MECHANICAL, AND PLUMBING DRAWINGS.
  - PROVIDE 8" HIGH BOND BEAMS WITH (2) #5 CONTINUOUS AT AND ADJACENT TO PRECAST PLANK BEARING ELEVATIONS UNLESS NOTED OTHERWISE. WHERE PLANK BEARING IS NOT AT COURSING, PROVIDE PARTIAL HEIGHT BLOCK GROUDED SOLID TO TOP OF BOND BEAM. WIDTH OF BOND BEAM TO MATCH WALL THICKNESS AND IS TO RUN CONTINUOUS THROUGH CONTROL JOINTS. PROVIDE CORNER BARS WHERE THEY OCCUR AND LAP ALL BOND BEAM STEPS A MINIMUM OF 24". PRECAST SUPPLIER TO PROVIDE HARDBOARD BEARING STRIPS AT ENDS OF PLANK AT MASONRY BEARING.
  - BRACE TOP OF NON-LOAD BEARING CMU WALLS IN ACCORDANCE WITH DETAIL 6/S810 OR 14/S810.
  - (XXX) INDICATES AMOUNT OF DEAD LOAD (PLF) THE PLANK DESIGNER IS TO ACCOUNT FOR ALONG THE LENGTH OF THE WALL.

- FRAMING KEY NOTES**
- L5x3x3 SILL ANGLE PROVIDED BY STEEL SUPPLIER AND INSTALLED BY ELEVATOR CONTRACTOR.
  - STAIRS BY STEEL FABRICATOR
  - HSS12.75x0.500 POSTS AT STAIR LANDINGS
  - HSS14x4x1/2 STRINGERS AT RAMP
  - RAMP SLAB ON METAL DECK
  - RTU-6: 1.700 LBS (APPROXIMATE WEIGHT)
  - L7X4X3/8 GALV LOOSE VENEER LINTEL, LENGTH = OPENING SIZE + 8" EACH END
  - 8.500 LB APPROXIMATE WEIGHT
  - COLD FORMED METAL FRAMING JOIST. SEE ARCH. COLD FORMED METAL FRAMING DESIGNER TO DESIGN AS WALKABLE CEILING. (40 PSF. MIN)

- ROOF FRAMING PLAN NOTES**
- TOP OF BASE STEEL (JOIST BEARING) ELEVATION = AS NOTED.
  - ROOF DECKING SHALL BE 1 1/2" x 20GA WIDE RIB PRIME PAINTED METAL ROOF DECK FASTENED TO SUPPORTING STRUCTURE USING 36# PATTERN OF ANY OF THE ATTACHMENT METHODS SHOWN IN DETAIL 1/S820 WITH #10 TEK SIDELAP FASTENERS AT 18" OC.
  - INSTALL DECK UNDER 3 OR MORE SPAN CONDITIONS. AT SHADDED AREAS, PROVIDE ACOUSTICAL DECKING. IN THESE AREAS, ATTACHMENT METHODS SHALL BE LIMITED TO MECHANICAL FASTENERS ONLY; WELDING OF DECK TO UNDERLYING STRUCTURE SHALL NOT BE PERMITTED.
  - DECKING SHALL BE 3"x18" GAGE TYPE 'NA' ACOUSTICAL WIDE RIB PRIME PAINTED METAL ROOF DECK FASTENED TO SUPPORTING STRUCTURE USING 24# PATTERN WITH #10 TEK SIDELAP FASTENERS AT 12" OC. PROVIDE DECK WITH THE FOLLOWING PROPERTIES:  
THICK = 0.0474 in      I = 1.334 in<sup>4</sup>      S<sub>x</sub> = 0.688 in<sup>3</sup>      F<sub>y</sub> = 33 KSI  
S<sub>x</sub> = 0.749 in<sup>3</sup>
  - INSTALL DECK CONTINUOUS OVER 3 OR MORE SPANS.
  - INDICATES LOCATION OF BAR JOIST BOTTOM CHORD EXTENSION. DO NOT WELD EXTENSION TO SUPPORT FRAMING.
  - PROVIDE 8" HIGH BOND BEAM WITH (2) #5 CONTINUOUS AT AND ADJACENT TO JOIST BEARING ELEVATIONS UNLESS NOTED OTHERWISE. WHERE JOIST BEARING IS NOT AT COURSING, PROVIDE PARTIAL HEIGHT BLOCK GROUDED SOLID TO TOP OF BOND BEAM. WIDTH OF BOND BEAM TO MATCH WALL THICKNESS AND IS TO RUN CONTINUOUS THROUGH CONTROL JOINTS. PROVIDE CORNER BARS WHERE THEY OCCUR AND LAP ALL BOND BEAM STEPS A MINIMUM OF 24".
  - JOIST SUPPLIER TO PROVIDE CONTINUOUS TOP AND BOTTOM DIAGONAL HORIZONTAL ANGLE BRIDGING AS REQUIRED. PROVIDE DIAGONAL X-BRIDGING WHERE INDICATED.
  - PROVIDE ANGLE FRAME SUPPORT AT ALL ROOF OPENINGS IN ACCORDANCE WITH DETAIL 4/S820.
  - ALL BAR JOISTS AND JOIST GIRDERS TO BE DESIGNED FOR A NET UPLIFT LOAD OF 15 PSF IN ADDITION TO GRAVITY VERTICAL LOADS REQUIRED BY THE BAR JOIST DESIGNATION.
  - REFER TO SHEET S002 FOR COLUMN SCHEDULE.
  - PROVIDE (2) C8 BELOW ROOFTOP UNIT CURB AND REINFORCE JOIST AS NEEDED AT CURB LOCATION IN ACCORDANCE WITH DETAIL 3/S820 (TYPICAL).
  - BRACE TOP OF NON-LOAD BEARING CMU WALLS IN ACCORDANCE WITH DETAILS 6/S820 AND 7/S820

**1 SECOND FLOOR & LOW ROOF FRAMING PLAN - SEGMENT A**  
SCALE: 1/8" = 1'-0"



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project number: 1190367

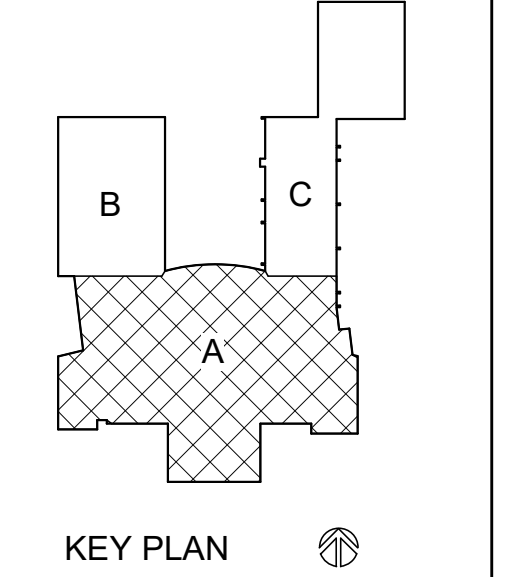
**ENGINEER CERTIFICATION**  
I hereby certify that this Plan, Specification or Report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the state of Wisconsin.  
Wayne W. Vandenberg  
Date: FEBRUARY 4, 2020, Lic. No. 42493

**LA CRESCENT - HOKAH PUBLIC SCHOOLS  
ELEMENTARY SCHOOL**  
504 SOUTH OAK STREET  
LA CRESCENT, MINNESOTA  
**ROOF FRAMING PLAN - SEGMENT A**

Project Title:  
Project Number:  
Project Date:  
Drawn By:  
Key Plan:

19014  
3.5.2020  
raSmith

KEY PLAN

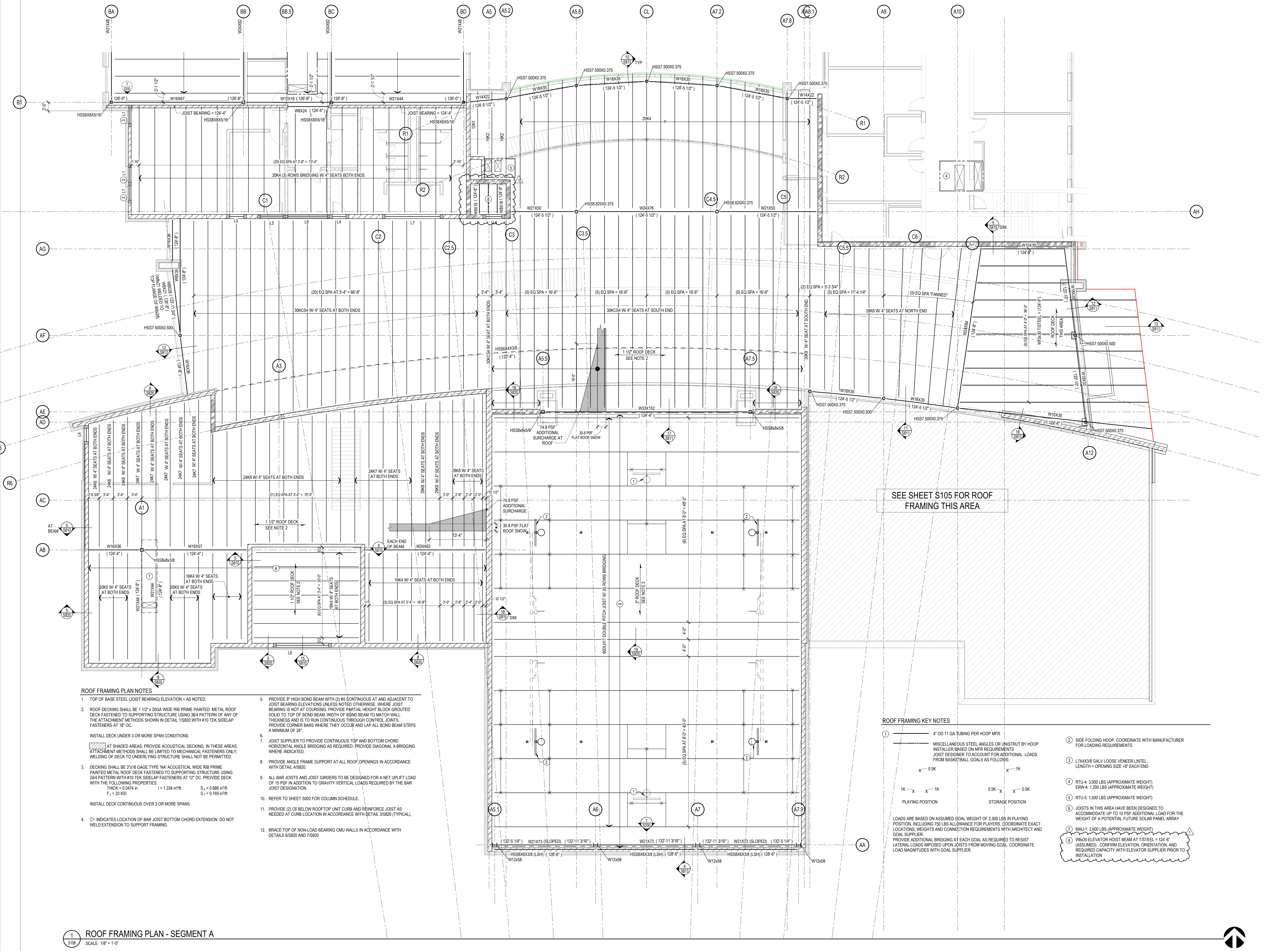


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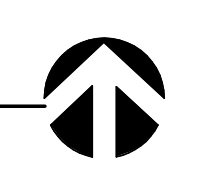
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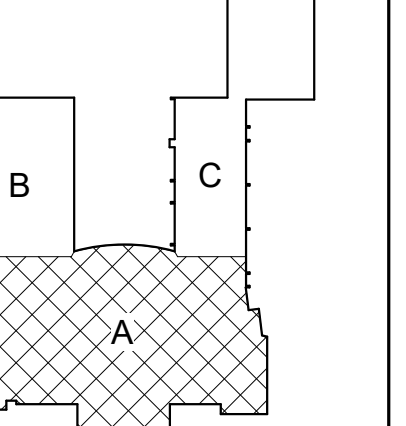
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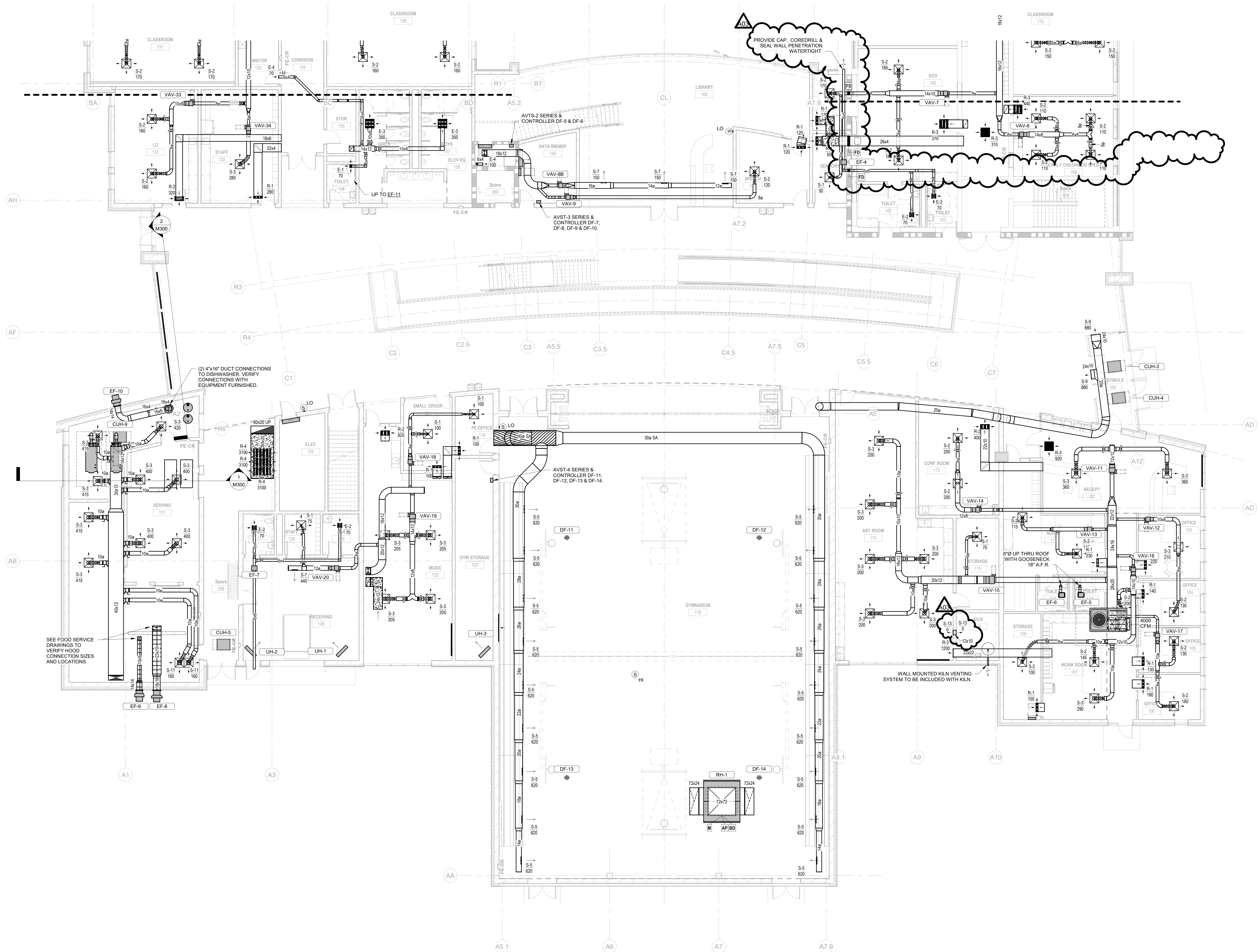
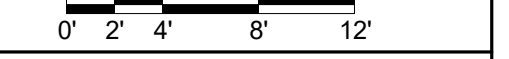
- ROOF FRAMING PLAN NOTES**
- TOP OF BASE STEEL (JOIST BEARING) ELEVATION = AS NOTED.
  - ROOF DECKING SHALL BE 1 1/2" x 20GA WIDE RIB PRIME PAINTED METAL ROOF DECK FASTENED TO SUPPORTING STRUCTURE USING 364 PATTERN OF ANY OF THE ATTACHMENT METHODS SHOWN IN DETAIL 3/5820 WITH #10 TEK SIDELAP FASTENERS AT 18" OC.  
INSTALL DECK UNDER 3 OR MORE SPAN CONDITIONS.  
AT SHADED AREAS, PROVIDE ACOUSTICAL DECKING. IN THESE AREAS, ATTACHMENT METHODS SHALL BE LIMITED TO MECHANICAL FASTENERS ONLY. WELDING OF DECK TO UNDERLYING STRUCTURE SHALL NOT BE PERMITTED.
  - DECKING SHALL BE 3"x18" GAGE TYPE 'NA' ACOUSTICAL WIDE RIB PRIME PAINTED METAL ROOF DECK FASTENED TO SUPPORTING STRUCTURE USING 244 PATTERN WITH #10 TEK SIDELAP FASTENERS AT 12" OC. PROVIDE DECK WITH THE FOLLOWING PROPERTIES:  
THICK = 0.0474 in    I = 1.334 in<sup>4</sup>/ft    S<sub>x</sub> = 0.688 in<sup>3</sup>/ft  
F<sub>y</sub> = 33 KSI    S<sub>y</sub> = 0.749 in<sup>3</sup>/ft
  - INDICATES LOCATION OF BAR JOIST BOTTOM CHORD EXTENSION. DO NOT WELD EXTENSION TO SUPPORT FRAMING.
  - PROVIDE 8" HIGH BOND BEAM WITH (2) #5 CONTINUOUS AT AND ADJACENT TO JOIST BEARING ELEVATIONS UNLESS NOTED OTHERWISE. WHERE JOIST BEARING IS NOT AT COURSING, PROVIDE PARTIAL HEIGHT BLOCK GROUDED SOLID TO TOP OF BOND BEAM. WIDTH OF BOND BEAM TO MATCH WALL THICKNESS AND IS TO RUN CONTINUOUS THROUGH CONTROL JOINTS. PROVIDE CORNER BARS WHERE THEY OCCUR AND LAP ALL BOND BEAM STEPS A MINIMUM OF 24".
  - JOIST SUPPLIER TO PROVIDE CONTINUOUS TOP AND BOTTOM CHORD HORIZONTAL ANGLE BRIDGING AS REQUIRED. PROVIDE DIAGONAL X BRIDGING WHERE INDICATED.
  - PROVIDE ANGLE FRAME SUPPORT AT ALL ROOF OPENINGS IN ACCORDANCE WITH DETAIL 4/5820.
  - ALL BAR JOISTS AND JOIST GIRDERS TO BE DESIGNED FOR A NET UPLIFT LOAD OF 15 PSF IN ADDITION TO GRAVITY VERTICAL LOADS REQUIRED BY THE BAR JOIST DESIGNATION.
  - REFER TO SHEET S002 FOR COLUMN SCHEDULE.
  - PROVIDE (2) C6 BELOW ROOFTOP UNIT CURB AND REINFORCE JOIST AS NEEDED AT CURB LOCATION IN ACCORDANCE WITH DETAIL 3/5820 (TYPICAL).
  - BRACE TOP OF NON-LOAD BEARING CMU WALLS IN ACCORDANCE WITH DETAILS 6/5820 AND 7/5820.

- ROOF FRAMING KEY NOTES**
- 4" OD 11 GA TUBING PER HOOP MFR
  - MISCELLANEOUS STEEL ANGLES OR UNSTRUT BY HOOP INSTALLER BASED ON MFR REQUIREMENTS  
JOIST DESIGNER TO ACCOUNT FOR ADDITIONAL LOADS FROM BASKETBALL GOALS AS FOLLOWS:  
X = 0.5K    X = 1K  
PLAYING POSITION    STORAGE POSITION
  - LOADS ARE BASED ON ASSUMED GOAL WEIGHT OF 2,500 LBS IN PLAYING POSITION, INCLUDING 750 LBS ALLOWANCE FOR PLAYERS. COORDINATE EXACT LOCATIONS, WEIGHTS AND CONNECTION REQUIREMENTS WITH ARCHITECT AND GOAL SUPPLIER.  
PROVIDE ADDITIONAL BRIDGING AT EACH GOAL AS REQUIRED TO RESIST LATERAL LOADS IMPOSED UPON JOISTS FROM MOVING GOAL. COORDINATE LOAD MAGNITUDES WITH GOAL SUPPLIER.
  - SIDE FOLDING HOOP. COORDINATE WITH MANUFACTURER FOR LOADING REQUIREMENTS
  - RTU-4: 3,000 LBS (APPROXIMATE WEIGHT)  
ERW-4: 1,200 LBS (APPROXIMATE WEIGHT)
  - RTU-5: 1,500 LBS (APPROXIMATE WEIGHT)
  - JOISTS IN THIS AREA HAVE BEEN DESIGNED TO ACCOMMODATE UP TO 10 PSF ADDITIONAL LOAD FOR THE WEIGHT OF A POTENTIAL FUTURE SOLAR PANEL ARRAY
  - MAU-1: 2,800 LBS (APPROXIMATE WEIGHT)
  - W18X35 ELEVATOR HOIST BEAM AT 13'0" - 12'4" (ASSUMED). CONFIRM ELEVATION, ORIENTATION, AND REQUIRED CAPACITY WITH ELEVATOR SUPPLIER PRIOR TO INSTALLATION





No.	Description	Date
A03	Addendum 3	3/24/2020



NORTH  
**1** DUCTWORK LEVEL 1 REMODEL PLAN - AREA A  
1/8" = 1'-0"





Consultant:

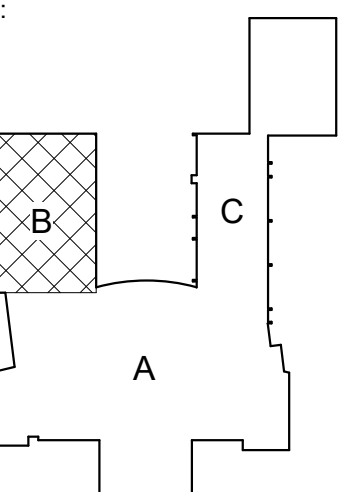
Project Title: **LA CRESCENT - HOKAH PUBLIC SCHOOLS  
ELEMENTARY SCHOOL**  
Project Location: **504 SOUTH OAK STREET  
LA CRESCENT, MINNESOTA**  
Sheet Title: **LEVEL 2 DUCTWORK REMODEL PLAN - AREA B**

HSR Project Number: **19014**

Project Date: **2/4/2020**

Drawn By: **LESCHER**

Key Plan:



KEY PLAN

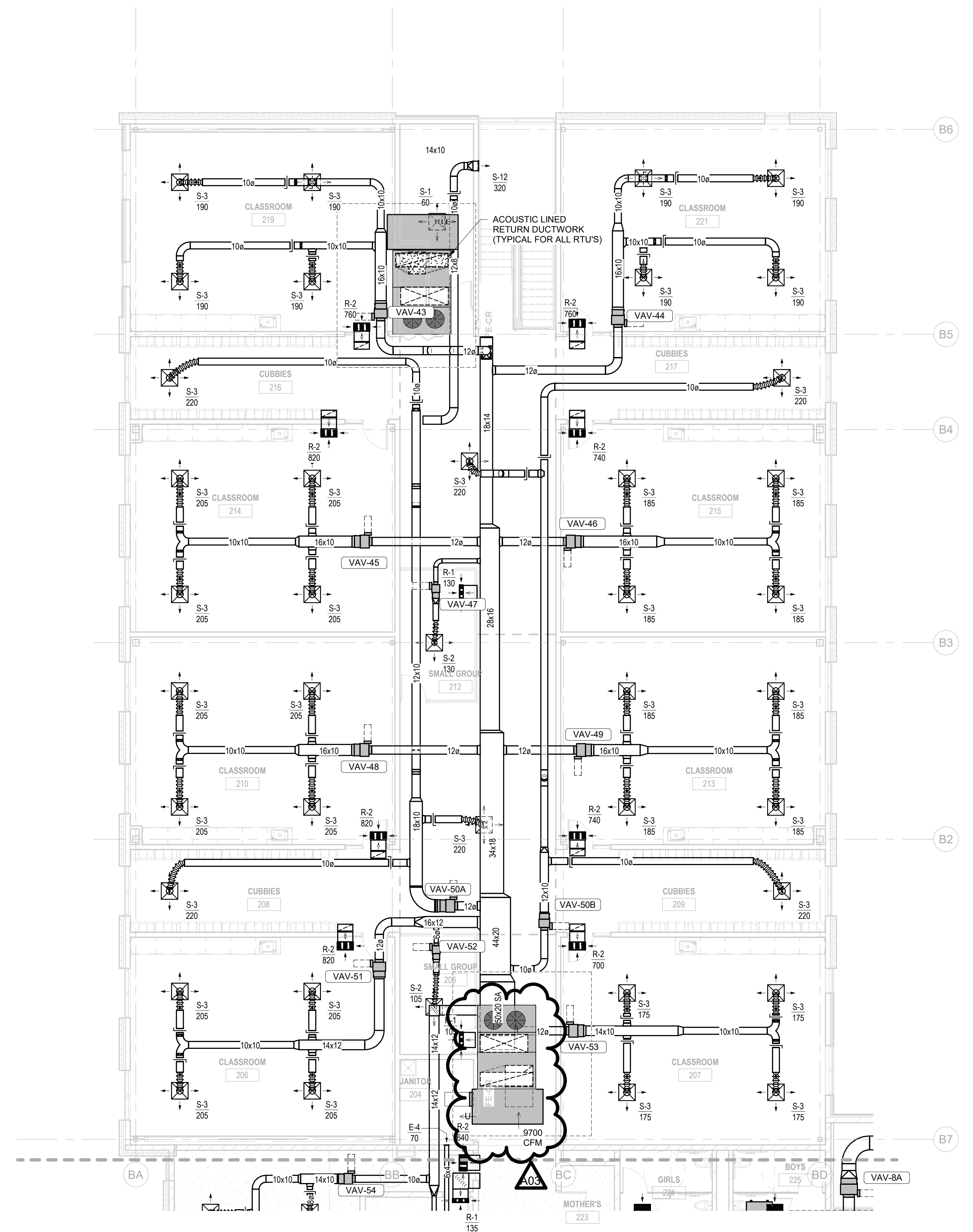
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DOCUMENTS**

No.	Description	Date
A03	Addendum 3	3/24/2020

Graphic Scale:  
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Last Update:  
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**1 DUCTWORK LEVEL 2 REMODEL PLAN - AREA B**  
1/8" = 1'-0"



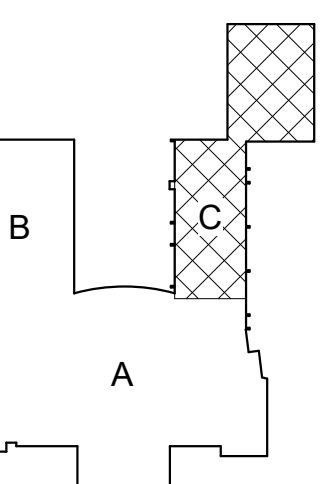
Consultant:

LA CRESCENT - HOKAH PUBLIC SCHOOLS  
ELEMENTARY SCHOOL  
504 SOUTH OAK STREET  
LA CROSSE, MINNESOTA  
LEVEL 2 DUCTWORK REMODEL PLAN - AREA C

Project Title:  
HSR Project Number:  
Project Date:  
Drawn By:

19014  
2/4/2020  
LESCHER

Key Plan:



KEY PLAN

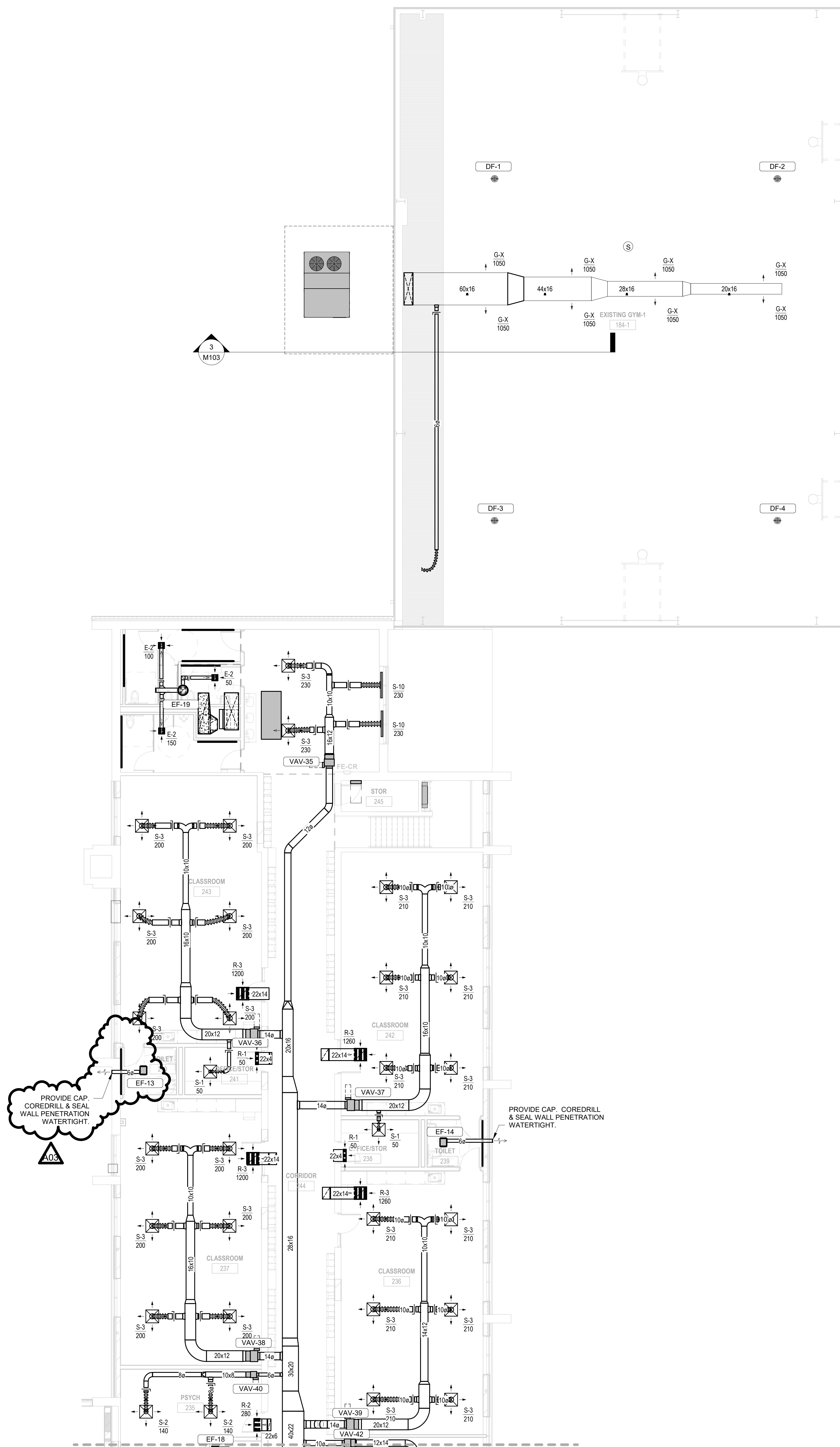
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No.	Description	Date
A03	Addendum 3	3/24/2020

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Last Update:  
3/24/2020 10:42:15 AM

M107



1

DUCTWORK LEVEL 2 REMODEL PLAN - AREA C

1/8" = 1'-0"



Consultant:

Project Title:  
**LA CRESCENT - HOKAH PUBLIC SCHOOLS  
ELEMENTARY SCHOOL**  
Project Location:  
504 SOUTH OAK STREET  
LA CRESCENT, MINNESOTA  
Sheet Title:  
**MECHANICAL ROOF PLAN**

HSR Project Number:  
**19014**

Project Date:  
**2/4/2020**

Drawn By:  
**LESCHER**

Key Plan:

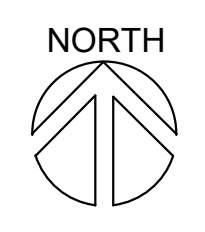
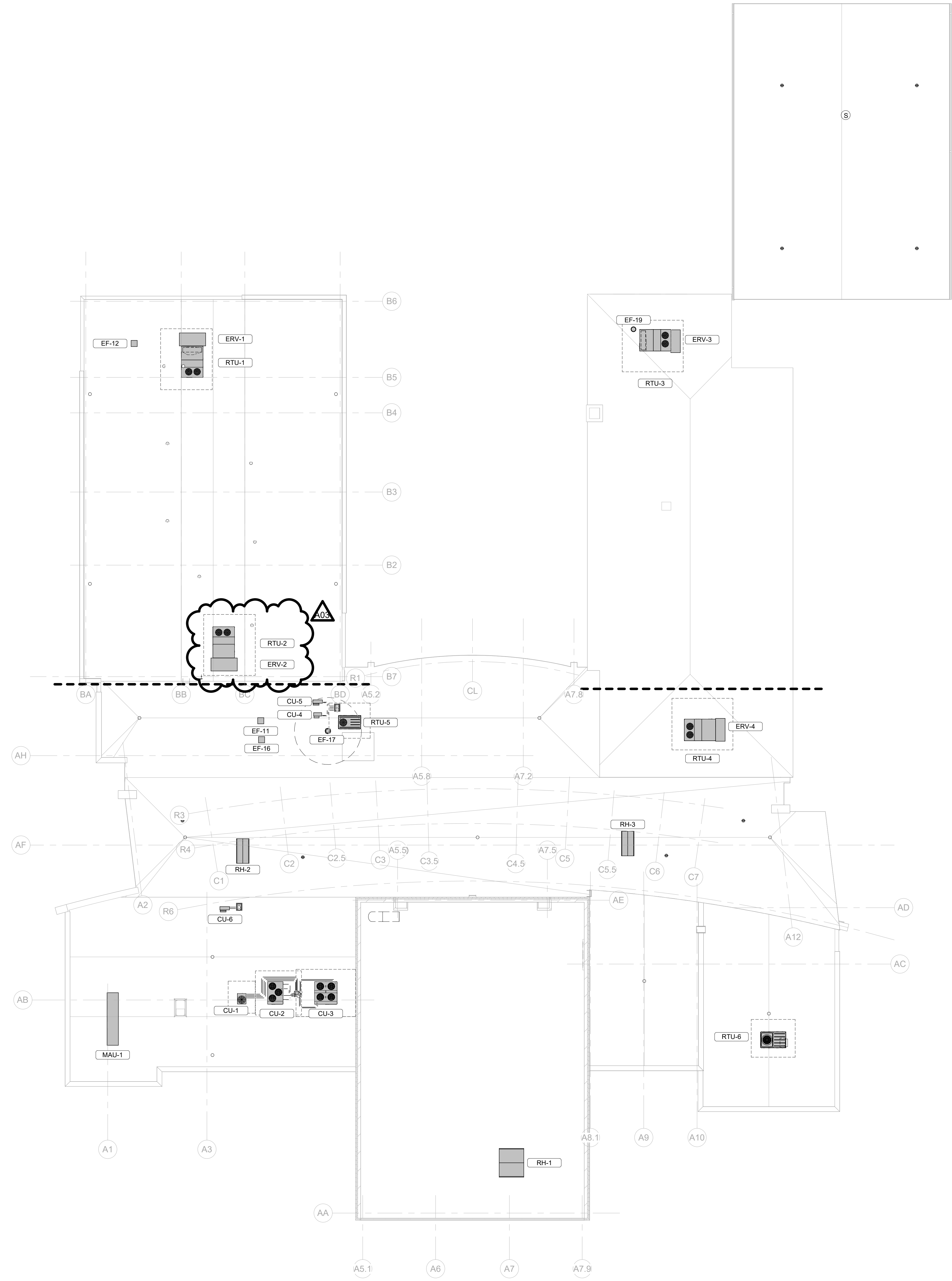
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DOCUMENTS**

No.	Description	Date
A03	Addendum 3	3/24/2020

Graphic Scale:  
0' 4' 8' 16' 24'

Last Update:  
**3/24/2020 10:42:16 AM**

**M116**



**1 MECHANICAL ROOF PLAN**  
1/16" = 1'-0"



Consultant:

LA CRESCENT - HOKAH PUBLIC SCHOOLS  
ELEMENTARY SCHOOL

504 SOUTH OAK STREET  
LA CRESCENT, MINNESOTA

LEVEL 1 OVERALL PLENUM PLAN

Project Title:

HSR Project Number: 19014

Project Date: 2/4/2020

Drawn By: LESCHER

Key Plan:

BID  
DOCUMENTS

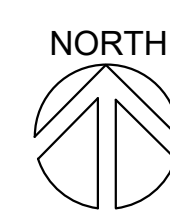
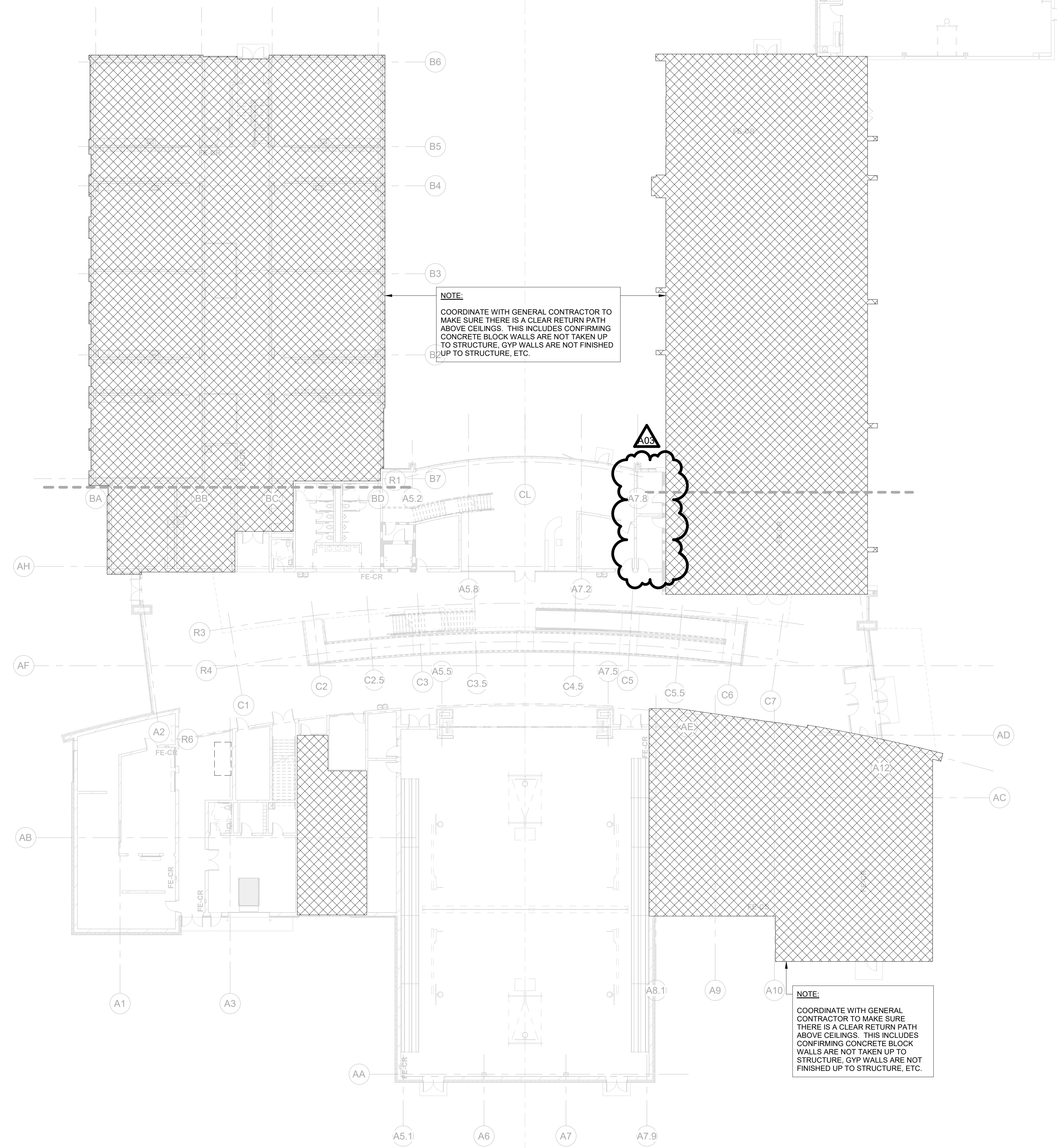
No.	Description	Date
A03	Addendum 3	3/24/2020

Graphic Scale:  
0' 4' 8' 16' 24'

Last Update:  
3/24/2020 10:42:17 AM

M117

**PLENUM NOTE:**  
SPACE ABOVE LAY-IN CEILING IS BEING USED AS A RETURN AIR PLENUM. ALL MATERIALS CONTAINED THEREIN SHALL BE PLENUM RATED AND COMPLY WITH INTERNATIONAL MECHANICAL CODE, IMC SECTION 602.2.1 PLENUMS. MATERIALS SHALL BE NONCOMBUSTIBLE OR SHALL HAVE A FLAME AND SMOKE SPREAD INDEX OF NOT MORE THAN 25/50 WHEN TESTED IN ACCORDANCE WITH ASTM E84. PIPING AND DUCTWORK SHALL BE INSTALLED SO THAT THE RETURN AIR PASTH IS NOT BLOCKED OR OBSTRUCTED.



1

LEVEL 1 OVERALL PLENUM PLAN

1/16" = 1'-0"





