



DATE: June 25, 2019

FROM: Wight & Company
2500 N. Frontage Road
Darien, IL 60561

SUBJECT: ADDENDUM #1 TO THE BIDDING DOCUMENTS FOR:
BID GROUP #7
MASTER FACILITY PLAN IMPLEMENTATION
COMMUNITY HIGH SCHOOL DISTRICT 99
1436 NORFOLK STREET
DOWNERS GROVE, IL 60516

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This addendum forms a part of the Bidding Contract Documents, dated May 10, 2019. Bidders must acknowledge receipt of this Addendum in the space provided on the Bid Form. Drawing revisions clouded and tagged with delta 21.

SOUTH

I. Clarifications

II. Specifications

1. ADD attached specification 024116 – STRUCTURE DEMOLITION
2. ADD attached specification 040100 – MAINTENANCE OF MASONRY
3. ADD attached specification 044300 – STONE MASONRY
4. ADD attached specification 078100 – APPLIED FIREPROOFING
5. ADD attached specification 096626 – PRECAST EPOXY – RESIN TERRAZZO UNITS
6. ADD attached specification 102239 – FOLDING PANEL PARTITIONS

III. Modified Drawings

ARCHITECTURAL

1. Sheet A6.1 STAIR PLANS AND DETAILS (**Full size sheet reissued**):
 - a. Stainless steel cane detection rail added.

STRUCTURAL

2. Sheet S2.2B-C1 2ND FLOOR FRAMING PLAN – AREA C.1 (**Full size sheet reissued**):

- a. 6" thick hollow core precast plank revised to 8" thick hollow core precast plank in all locations.
 - b. Beam sizes modified on C.C between C.9 & C.11 and C.1 & C.2.
 - c. Location and size of tube supporting folding panel partition support steel revised.
3. Sheet S3.2B NON-TYPICAL SECTIONS AND DETAILS (**Full size sheet reissued**):
- a. Framing detail 9 modified to coordinate with precast hollow core plank revisions.
4. Sheet S3.3B NON-TYPICAL SECTIONS AND DETAILS (**Full size sheet reissued**):
- a. Framing detail 12 modified to allow tube location to be modified.

This addendum consists of: (2) Text Pages (6) Specification Sections and (4) Modified Drawing Sheets.

END OF ADDENDUM

SECTION 024116 - STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Demolition and removal of buildings and site improvements.
- 2. Disconnecting, capping or sealing, and abandoning site utilities in place.
- 3. Salvaging items for reuse by Owner.

- B. Related Requirements:

- 1. Division 01 Section "Summary" for use of the premises and phasing requirements.
- 2. Division 01 Section "Construction Progress Documentation" for preconstruction photographs taken before building demolition.
- 3. Division 01 Section "Construction Waste Management" for recycling and disposal of nonhazardous demolition wastes and for removal and storage of refrigerant.
- 4. Division 02 Section "Site Clearing" for site clearing and removing above- and below-grade improvements.
- 5. Division 23 Sections for demolishing or relocating site mechanical items.
- 6. Division 26 Sections for demolishing or relocating site electrical items.
- 7. Division 31 Section "Site Clearing" for site clearing and removal of above- and below-grade site improvements not part of building demolition.
- 8. Division 33 Section "Common Work Results for Utilities" for shutting off, disconnecting, removing, and sealing or capping utilities.

1.3 DEFINITIONS

- A. Demolish: Completely remove and legally dispose of off-site.
- B. Recycle: Recovery of demolition waste for subsequent processing in preparation for reuse.
- C. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged.

- D. Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse. Include fasteners or brackets needed for reattachment elsewhere.
- E. Existing to Remain: Protect construction indicated to remain against damage and soiling during demolition.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Proposed Protection Measures: Submit informational report, including drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
 - 1. Adjacent Buildings: Detail special measures proposed to protect adjacent buildings to remain including means of egress from those buildings.
- C. Proposed noise-control measures.
- D. Schedule of demolition activities indicating the following:
 - 1. Detailed sequence of demolition work, with starting and ending dates for each activity.
 - 2. Temporary interruption of utility services.
 - 3. Shutoff and capping or re-routing of utility services.
- E. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.
- F. Predemolition Photographs or Video: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by building demolition operations. Submit before the Work begins.
- G. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.6 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- B. Demolition Firm Qualifications: Engage an experienced, licensed firm and individuals that have successfully completed demolition. Work similar to that indicated for this Project.
- C. Regulatory Requirements: Comply with governing EPA notification regulations before starting demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- D. Standards: Comply with ANSI A10.6 and NFPA 241.
- E. Predemolition Conference: Conduct conference at Project site.
 - 1. Inspect and discuss condition of construction to be demolished.
 - 2. Review structural load limitations of existing structures.
 - 3. Review and finalize building demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review and finalize protection requirements.
 - 5. Review procedures for noise control and dust control.
 - 6. Review procedures for protection of adjacent buildings.
 - 7. Review items to be salvaged and returned to Owner.

1.7 PROJECT CONDITIONS

- A. Buildings to be demolished will be vacated and their use discontinued before start of Work.
- B. Buildings immediately adjacent to demolition area will be occupied. Conduct building demolition so operations of occupied buildings will not be disrupted.
 - 1. Provide not less than 72 hours' notice of activities that will affect operations of adjacent occupied buildings.
 - 2. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings.
 - a. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.
- C. Owner assumes no responsibility for buildings and structures to be demolished.
 - 1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. On-site storage or sale of removed items or materials is not permitted.

1.8 COORDINATION

- A. Arrange demolition schedule so as not to interfere with Owner's on-site operations or operations of adjacent occupied buildings.

PART 2 - PRODUCTS (Not Used)

2.1 SOIL MATERIALS

- A. Satisfactory Soils: Comply with requirements in Division 31 Section "Earth Moving."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting demolition operations.
- B. Review Project Record Documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
- D. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during building demolition operations.
- E. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

3.2 PREPARATION

- A. Refrigerant: Remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction before starting demolition.

- B. Existing Utilities: Locate, identify, disconnect, and seal or cap off indicated utilities serving buildings and structures to be demolished.
 - 1. Arrange to shut off indicated utilities with utility companies.
 - 2. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
 - 3. Cut off pipe or conduit a minimum of 24 inches below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.
- C. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of demolition.
- D. Salvaged Items: Comply with the following:
 - 1. Clean salvaged items of dirt and demolition debris.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to storage area designated by Owner.
 - 5. Protect items from damage during transport and storage.

3.3 PROTECTION

- A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations. Maintain exits from existing buildings.
- B. Existing Utilities: Maintain utility services to remain and protect from damage during demolition operations.
 - 1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.
 - 2. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and authorities having jurisdiction.
 - a. Provide at least 72 hours' notice to occupants of affected buildings if shutdown of service is required during changeover.
- C. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Division 1 Section "Temporary Facilities and Controls."
 - 1. Protect adjacent buildings and facilities from damage due to demolition activities.
 - 2. Protect existing site improvements, appurtenances, and landscaping to remain.

3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
 4. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 5. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
 6. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
 7. Erect and maintain dustproof partitions and temporary enclosures to limit dust, noise, and dirt migration to occupied portions of adjacent buildings.
- D. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

3.4 DEMOLITION, GENERAL

- A. General: Demolish indicated buildings and site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
 2. Maintain fire watch during, and for at least the number of hours after, flame cutting operations required by authorities having jurisdiction. >
 3. Maintain adequate ventilation when using cutting torches.
 4. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- B. Engineering Surveys: During demolition, perform surveys to detect hazards that may result from building demolition activities.
- C. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around demolition area.
- D. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
 2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- E. Explosives: Use of explosives will not be permitted.

3.5 DEMOLITION BY MECHANICAL MEANS

- A. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.
- B. Remove debris from elevated portions of the building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 - 1. Remove structural framing members and lower to ground by method suitable to minimize ground impact and dust generation.
- C. Salvage: Items to be removed and salvaged are indicated on Drawings.
- D. Below-Grade Construction:
 - 1. Below-Grade Construction: Demolish foundation walls and other below-grade construction.
 - a. Remove below-grade construction, including basements, foundation walls, and footings, completely.
 - 2. In areas of crawlspace and basement, completely remove below-grade foundation wall construction, including foundation walls and footings.
 - 3. Break up and remove below-grade concrete slabs.
- E. Existing Utilities:
 - 1. Demolish and remove existing utilities and below-grade utility structures.
 - a. Piping: Disconnect piping at unions, flanges, valves, or fittings.
 - b. Wiring Ducts: Disassemble into unit lengths and remove plug-in and disconnecting devices.
- F. Building Demolition: Demolish buildings completely and remove from the site. Use methods required to complete Work within limitations of governing regulations and as follows:
 - 1. Locate demolition equipment throughout the building and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 2. Demolish concrete and masonry in small sections.
 - 3. Break up and remove concrete slabs on grade, unless otherwise shown to remain.
 - 4. Remove air-conditioning equipment without releasing refrigerants.

3.6 SITE RESTORATION

A. Below-Grade Areas:

1. Completely fill below-grade areas and voids resulting from building demolition operations with satisfactory soil materials according to backfill requirements specified in Division 31 Section "Earth Moving."

B. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

3.7 REPAIRS

- #### A. Promptly repair damages to adjacent facilities caused by demolition operations.

3.8 DISPOSAL OF DEMOLISHED MATERIALS

- #### A. Promptly remove demolition waste materials from Project site and legally dispose of them in an EPA-approved landfill acceptable to authorities having jurisdiction. See Division 1 Section "Construction Waste Management" for recycling and disposal of demolition waste.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Do not burn demolished materials.

3.9 CLEANING

- #### A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.

1. Clean roadways of debris caused by debris transport.

END OF SECTION 024116

SECTION 040100 – MAINTENANCE OF MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Repairing unit masonry, including salvaging units.
 - 2. Repointing joints.
 - 3. Cleaning exposed masonry surfaces.

1.3 DEFINITIONS

- A. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.
- B. Remove, Salvage, and reinstall: Detach items from existing construction, in a manner to prevent damage, store until reinstalled, and reinstall where required.
- C. Stone Terminology: ASTM C 119.

1.4 COORDINATION

- A. Coordinate masonry maintenance with public circulation patterns at Project site. Some work is near public circulation patterns.
- B. Public circulation patterns cannot be closed off entirely, and in places can be only temporarily redirected around small areas of work. Plan and execute the Work accordingly.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to masonry restoration and cleaning including, but not limited to, the following:
 - a. Construction schedule. Verify availability of materials, Restoration Specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Materials, material application, sequencing, tolerances, and required clearances.

1.6 ACTION SUBMITTALS

- A. Product Data: For each product indicated. Include recommendations for application and use. Include test reports and certifications substantiating that products comply with requirements.
- B. Samples for Initial Selection: For each type and color of face brick, in the form of straps of five or more bricks.
- C. Samples for verification, before erecting the mockup, of the following:
 - 1. Face brick, in the form of straps of five or more bricks.
 - 2. Each type of mortar for pointing and masonry rebuilding and repair in the form of sample mortar strips, 6 inches long by 1/2 inch wide, set in aluminum or plastic channels.
 - 3. Each type of repair anchor.

1.7 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each type and size of the following:
 - 1. Masonry units.
 - a. Include material test reports substantiating compliance with requirements.
 - b. For bricks, include size-variation data verifying that actual range of sizes falls within specified tolerances.
 - c. For exposed brick, include material test report for efflorescence according to ASTM C 67.
 - d. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
- B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.8 QUALITY ASSURANCE

- A. Restoration Specialist Qualifications: Engage an experienced masonry restoration and cleaning firm that has completed work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
 - 1. Field Supervision: Require restoration specialist firms to maintain an experienced full-time supervisor on the Project site during times that masonry restoration and cleaning are in progress. Supervisors shall not be changed during Project except for causes beyond the control of the restoration specialist firm.
- B. Source Limitations: Obtain materials for masonry restoration from a single source for each type of material required (cement, sand, etc.) to ensure a match of quality, color, pattern, and texture. Coordinate quantities of salvaged brick required with demolition contractor. Masonry repair contractor shall clean and prepare salvaged brick for reuse.
- C. Quality-Control Program: Prepare a written quality-control program for this Project to systematically demonstrate the ability of personnel to properly follow methods and use materials and tools without damaging masonry. Include provisions for supervising performance and preventing damage due to worker fatigue.
- D. Restoration Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for each phase of restoration work including protection of surrounding materials and Project site.
 - 1. If materials and methods other than those indicated are proposed for any phase of restoration work, add to the Quality-Control Program a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project and worker's ability to use such materials and methods properly.
- E. Cleaning Program: Prepare a written cleaning program that describes cleaning process in detail, including materials, methods, and equipment to be used, protection of surrounding materials, and control of runoff during operations.
 - 1. If materials and methods other than those indicated are proposed for any phase of restoration work, add to the Quality-Control Program a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project and worker's ability to use such materials and methods properly.
- F. Cleaning and Repair Appearance Standard: Cleaned and repaired surfaces are to have a uniform appearance as viewed from 50 feet away by Architect. Perform additional stain removal, general cleaning, and spot cleaning of small areas that are noticeably different, so that surface blends smoothly into surrounding areas.

- G. Mockups: Prepare mockups of restoration and cleaning to demonstrate aesthetic effects and set quality standards for materials and execution and for fabrication and installation.
1. Masonry Repair: Prepare sample areas for each type of masonry material indicated to have repair work performed. If not otherwise indicated, size each mockup not smaller than 2 adjacent whole units or approximately 48 inches in least dimension. Erect sample areas in existing walls unless otherwise indicated, to demonstrate quality of materials, workmanship, and blending with existing work. Include the following as a minimum:
 - a. Replacement: Four brick units replaced.
 - b. Patching: Three small holes at least 1 inch in diameter for each type of masonry material indicated to be patched, so as to leave no evidence of repair.
 2. Repointing: Rake out joints in 2 separate areas, each approximately 36 inches high by 48 inches wide for each type of repointing required and repoint one of these areas.
 3. Cleaning: Clean an area approximately 25 sq. ft. for each type of masonry and surface condition.
 - a. Test cleaners and methods on samples of adjacent materials for possible adverse reactions. Do not use cleaners and methods known to have deleterious effect.
 - b. Allow a waiting period of not less than seven days after completion of sample cleaning to permit a study of sample panels for negative reactions.
 4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 5. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Deliver other materials to Project site in manufacturer's original and unopened containers, labeled with type and name of products and manufacturers.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- D. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.

- E. Store sand where grading and other required characteristics can be maintained and contamination avoided.

1.10 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit masonry restoration and cleaning work to be performed according to manufacturers' written instructions and specified requirements.
- B. Repair masonry units and repoint mortar joints only when air temperature is between 40 and 90 deg F and is predicted to remain so for at least 7 days after completion of the Work unless otherwise indicated.
- C. Cold-Weather Requirements: Comply with the following procedures for masonry repair and mortar-joint pointing:
 - 1. When air temperature is below 40 deg F, heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40 and 120 deg F.
 - 2. When mean daily air temperature is between 25 and 40 deg F, cover completed Work with weather-resistant, insulating blankets for 48 hours after repair and pointing.
 - 3. When mean daily air temperature is below 25 deg F, provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 48 hours after repair and pointing.
- D. Hot-Weather Requirements: Protect restoration work when temperature and humidity conditions produce excessive evaporation of water from mortar and patching materials. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 90 deg F and above.
- E. Clean masonry surfaces only when air temperature is 40 deg F and above and is predicted to remain so for at least 7 days after completion of cleaning.

1.11 SEQUENCING AND SCHEDULING

- A. Order replacement materials at the earliest possible date, to avoid delaying completion of the Work.
- B. Perform masonry restoration work in the following sequence:
 - 1. Remove plant growth.
 - 2. Rake out mortar from joints surrounding masonry to be replaced and from joints adjacent to masonry repairs along joints.
 - 3. Repair masonry, using existing salvaged masonry.
 - 4. Rake out mortar from joints to be repointed.
 - 5. Point mortar and sealant joints.
 - 6. After repairs and repointing have been completed and cured, perform a final cleaning to remove residues from this work.

7. Inspect for open mortar joints and repair before cleaning to prevent the intrusion of water and other cleaning materials into the wall.
8. Clean masonry surfaces.

PART 2 - PRODUCTS

2.1 MASONRY MATERIALS

- A. Face Brick: ASTM C 216, Grade SW, Type FBS.
 1. Unit Compressive Strength: Minimum average net area compressive strength of 5500 psi.
 2. Initial Rate of Absorption: More than 5 and less than 30 g/30sq. in. per minute when tested per ASTM C 67.
 3. Efflorescence, ASTM C 67: Rated "not effloresced."
 4. Matching Existing Masonry: Match size, color, texture, and blend of existing masonry.
 5. Application: Use where brick is exposed, unless otherwise indicated.

2.2 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150, Type I or Type II.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Aggregate for Mortar: ASTM C 144, unless otherwise indicated.
 1. Match size, texture, and gradation of existing mortar as closely as possible.
- D. Water: Potable.

2.3 CLEANING MATERIALS

- A. Water: Potable.
- B. Detergent Solution, Job Mixed: Solution prepared by mixing 2 cups of tetrasodium pyrophosphate (TSP), 1/2 cup of laundry detergent, and 20 quarts of hot water for every 5 gal. of solution required.

2.4 ACCESSORY MATERIALS

A. Sealant Materials:

1. Provide manufacturer's standard chemically curing, elastomeric sealant(s) of base polymer and characteristics indicated below that comply with applicable requirements in Division 07 Section "Joint Sealants."
 - a. Types: Single component, nonsag sealant.
2. Colors: Provide colors of exposed sealants to match colors of masonry adjoining installed sealant unless otherwise indicated.

B. Joint-Sealant Backing:

1. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
2. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where acceptable.

C. Miscellaneous Products: Select materials and methods of use based on the following, subject to approval of a mockup:

1. Previous effectiveness in performing the work involved.
2. Little possibility of damaging exposed surfaces.
3. Consistency of each application.
4. Uniformity of the resulting overall appearance.
5. Do not use products or tools that could do the following:
 - a. Remove, alter, or in any way harm the present condition or future preservation of existing surfaces, including surrounding surfaces not in contract.
 - b. Leave a residue on surfaces.

2.5 MORTAR MIXES

A. Measurement and Mixing: Measure cementitious and aggregate material in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.

1. Mixing Pointing Mortar: Thoroughly mix cementitious and aggregate materials together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 1 to 2 hours. Add remaining water in small portions until reaching mortar of the desired consistency. Use mortar within 30 minutes of final mixing; do not retemper or use partially hardened material.

- B. Do not use admixtures of any kind in mortar, unless otherwise indicated.
- C. Mortar Proportions: Mix mortar materials in the following proportions:
 - 1. Pointing Mortar for Brick: 1 part portland cement, 2 parts lime, and 6 parts colored- or natural-mortar aggregate.
 - 2. Rebuilding (Setting) Mortar: Comply with ASTM C 270, Proportion Specification, Type N, unless otherwise indicated; with cementitious material content limited to portland cement and lime.

PART 3 - EXECUTION

3.1 PROTECTION

- A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from masonry restoration work.
 - 1. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of restoration and cleaning work.
- B. Prevent mortar from staining face of surrounding masonry and other surfaces.
 - 1. Cover sills, ledges, and projections from mortar droppings.
 - 2. Keep wall area wet below rebuilding and pointing work to discourage mortar from adhering.
 - 3. Immediately remove grout and mortar in contact with exposed masonry and other surfaces.
 - 4. Clean mortar splatters from scaffolding at end of each day.

3.2 BRICK REMOVAL AND REPLACEMENT

- A. At locations indicated, carefully remove by hand, bricks that are damaged, spalled, or deteriorated. Cut out full units from joint to joint and in a manner to permit replacement with full-size units without damaging surrounding masonry.
 - 1. When removing single bricks, remove material from center of brick and work toward outside edges.
- B. Support and protect remaining masonry that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.
- C. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.

- D. Remove in an undamaged condition as many whole bricks as possible.
 - 1. Remove mortar, loose particles, and soil from brick by cleaning with hand chisels, brushes, and water.
 - 2. Remove sealants by cutting close to brick with utility knife and cleaning with solvents.
 - 3. Store brick for reuse. Store off ground, on skids, and protected from weather.
 - 4. Deliver cleaned brick not required for reuse to Owner unless otherwise indicated.
- E. Clean bricks surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.
- F. Install replacement brick into bonding and coursing pattern of existing brick. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges.
 - 1. Maintain joint width for replacement units to match existing joints.
- G. Lay replacement brick with completely filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet clay bricks that have ASTM C 67 initial rates of absorption (suction) of more than 30 g per 30 sq. in. per min. Use wetting methods that ensure units are nearly saturated but surface dry when laid. Maintain joint width for replacement units to match existing units.
 - 1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.

3.3 REPOINTING MASONRY

- A. Rake out and repoint joints to the following extent:
 - 1. All joints in areas indicated.
 - 2. Joints where mortar is missing or where they contain holes.
 - 3. Cracked joints where cracks can be penetrated at least 1/4 inch by a knife blade 0.027 inch thick.
 - 4. Cracked joints where cracks are 1/16 inch or more in width and of any depth.
 - 5. Joints where they sound hollow when tapped by metal object.
 - 6. Joints where they are worn back 1/4 inch or more from surface.
 - 7. Joints where they are deteriorated to point that mortar can be easily removed by hand, without tools.
 - 8. Joints where they have been filled with substances other than mortar.
 - 9. Joints indicated as sealant-filled joints.
- B. Do not rake out and repoint joints where not required.

- C. Rake out joints as follows, according to procedures demonstrated in approved mockup:
1. Remove mortar from joints to depths equal to 2-1/2 times their widths, but not less than 1/2 inch or not less than that required to expose sound, unweathered mortar.
 2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
 3. Do not spall edges of masonry units or widen joints. Replace damaged masonry units.
 - a. Cut out old mortar by hand with a chisel and mallet, unless otherwise indicated.
 - b. Do not use power-operated grinders without Architect's written approval based on submission by Contractor of a satisfactory quality-control program and demonstrated ability of operators to use tools without damaging masonry. Quality-control program shall include provisions for supervising performance and preventing damage due to worker fatigue.
- D. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.
- E. Point joints as follows:
1. Rinse masonry-joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at the time of pointing, excess water has evaporated or run off and joint surfaces are damp but free of standing water.
 2. Apply the first layer of pointing mortar to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Compact each layer thoroughly and allow it to become thumbprint hard before applying the next layer.
 3. After joints have been filled to a uniform depth, place remaining pointing mortar in 3 layers with first and second layers each filling about two-fifths of joint depth; third layer, the remaining one-fifth. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing bricks have rounded edges, slightly recess final layer from face. Take care not to spread mortar over edges onto exposed masonry surfaces or to featheredge mortar.
 4. When mortar is thumbprint hard, tool joints to match original appearance of joints, unless otherwise indicated. Remove excess mortar from edge of joint by brushing.
 5. Cure mortar by maintaining in a damp condition for at least 72 hours.

3.4 CLEANING MASONRY, GENERAL

- A. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other. Ensure that dirty residues and rinse water will not wash over cleaned, dry surfaces.

- B. Use only those cleaning methods indicated for each masonry material and location.
 - 1. Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that cleaning methods do not damage masonry.
 - a. Equip units with pressure gages.
- C. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging masonry surfaces.
- D. After cleaning is complete, remove protection no longer required. Remove tape and adhesive marks.

3.5 PRELIMINARY CLEANING

- A. Removing Plant Growth: Completely remove visible plant, moss, and shrub growth from masonry surfaces. Carefully remove plants, creepers, and vegetation by cutting at roots and allowing to dry as long as possible before removal. Remove loose soil and debris from open masonry joints to whatever depth they occur.
- B. Preliminary Cleaning: Before beginning general cleaning, remove extraneous substances that are resistant to cleaning methods being used. Extraneous substances include caulking, asphalt, and tar.
 - 1. Carefully remove heavy accumulations of material from surface of masonry with a sharp chisel. Do not scratch or chip masonry surface.

3.6 CLEANING BRICKWORK

- A. Detergent Cleaning:
 - 1. Wet surface with hot water applied by low-pressure spray.
 - 2. Scrub surface with detergent solution using medium-soft brushes until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil from mortar joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that surface remains wet.
 - 3. Rinse with hot water applied by low-pressure spray to remove detergent solution and soil.
 - 4. Repeat cleaning procedure above where required to produce cleaning effect established by mockup.

END OF SECTION 040100

SECTION 044300 – STONE MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes stone masonry anchored to cold-formed metal framing and sheathing.
- B. Products Installed but Not Furnished under This Section Include:
 - 1. Steel lintels in unit masonry.
- C. Related Requirements:
 - 1. Division 04 Section "Unit Masonry" for cavity-wall insulation, concealed flashing, and veneer anchors.
 - 2. Division 07 Section "Thermal Insulation" for insulation installed with cold-formed metal framing and sheathing.
 - 3. Division 07 Section "Sheet Metal Flashing and Trim" for exposed sheet metal flashing.
 - 4. Division 07 Section "Joint Sealers" for sealants for perimeter and control joints.

1.3 COORDINATION

- A. Advise installers of other work about specific requirements for placement of reinforcement, veneer anchors, flashing, and similar items to be built into stone masonry.

1.4 PREINSTALLATION MEETINGS

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

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification:
 - 1. For each stone type indicated. Include at least five samples in each set for each type of stone, exhibiting extremes of the full range of color and other visual characteristics expected in completed Work. Samples will establish the standard by which stone provided will be judged.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs experienced stonemasons and stone fitters.
- B. Mockups: Build mockups to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockup of typical wall area where directed by Architect.
 - 2. Build mockups for each type of stone masonry in sizes approximately 48 inches square by full thickness, including accessories.
 - a. Include stone coping at top of mockup.
 - b. Include a sealant-filled joint at least 16 inches long in mockup.
 - c. Include through-wall flashing installed for a 24-inch length in corner of mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit stone masonry above half of flashing).
 - 3. Protect accepted mockups from the elements with weather-resistant membrane.
 - 4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 5. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- B. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.9 FIELD CONDITIONS

- A. Protection of Stone Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed stone masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

- B. Stain Prevention: Immediately remove mortar and soil to prevent them from staining the face of stone masonry.
 - 1. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on the ground and over the wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at end of each day to prevent rain from splashing mortar and dirt on completed stone masonry.
- C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace stone masonry damaged by frost or freezing conditions. Comply with cold-weather construction requirements contained in TMS 402/602.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 402/602.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Stone: Obtain each variety of stone, regardless of finish, from one quarry with resources to provide materials of consistent quality in appearance and physical properties.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 LIMESTONE

- A. Material Standard: Comply with ASTM C568/C568M.
 - 1. Classification: III High Density.
- B. Description: Dolomitic limestone.
- C. Basis-of-Design Varieties and Sources: Subject to compliance with requirements, provide Arriscraft; Adair Limestone Marble, or equal.
 - 1. Finish: Fine dressed, veined.
 - 2. Color and Pattern: Sepia color, to match approved sample range.

2.3 MORTAR MATERIALS

- A. Comply with requirements of Division 04 Section "Unit Masonry."

2.4 VENEER ANCHORS

- A. Comply with requirements of Division 04 Section "Unit Masonry."

2.5 EMBEDDED FLASHING MATERIALS

- A. Comply with requirements of Division 04 Section "Unit Masonry."

2.6 MISCELLANEOUS MASONRY ACCESSORIES

- A. Comply with requirements of Division 04 Section "Unit Masonry."

2.7 CAVITY WALL INSULATION

- A. Comply with requirements of Division 04 Section "Unit Masonry."

2.8 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar and grout stains, efflorescence, and other new construction stains from stone masonry surfaces without discoloring or damaging masonry surfaces; expressly approved for intended use by cleaner manufacturer and stone producer.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Diedrich Technologies, Inc.
 - b. Dominion Restoration Products.
 - c. Prosoco, Inc.

2.9 FABRICATION

- A. Fabricate stone to comply with sizes, shapes, and tolerances recommended by applicable stone association or, if none, by stone source, for faces, edges, beds, and backs.

- 1. For limestone, comply with recommendations in ILI's "Indiana Limestone Handbook."

- B. Select or cut stone to produce pieces of thickness, size, and shape indicated, including details on Drawings.

- C. Dress joints (bed and vertical) straight and at right angle to face unless otherwise indicated.

- D. Carefully inspect stone at quarry or fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units before shipment.
 - 1. Clean sawed backs of stone to remove rust stains and iron particles.
- E. Thickness of Stone: Provide thickness indicated, but not less than the following:
 - 1. Thickness:
 - a. Anchored Veneer: 4 inches plus or minus 1/4 inch.
- F. Shape stone for type of masonry (pattern) as follows:
 - 1. As indicated by manufacturer's designation.
- G. Finish exposed faces and edges of stone to comply with requirements indicated for finish and to match approved samples and mockups.
 - 1. Finish: Smooth.

2.10 MORTAR MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
 - 1. Do not use calcium chloride.
 - 2. Use portland cement-lime mortar.
 - 3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in the form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Stone Masonry: Comply with ASTM C 270, Proportion Specification.
 - 1. Mortar for Setting Stone: Type N.
 - 2. Mortar for Pointing Stone: Type N.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces indicated to receive stone masonry, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

- B. Examine substrate to verify that inserts, reinforcement, veneer anchors, flashing, and other items installed in substrates and required for or extending into stone masonry are correctly installed.
- C. Examine wall framing, sheathing, and weather-resistant sheathing paper to verify that stud locations are suitable for spacing of veneer anchors and that installation will result in a weatherproof covering.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Accurately mark stud centerlines on face of weather-resistant sheathing paper before beginning stone installation.
- B. Clean dirty or stained stone surfaces by removing soil, stains, and foreign materials before setting. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.

3.3 INSTALLATION OF STONE MASONRY

- A. Perform necessary field cutting and trimming as stone is set.
 - 1. Use power saws to cut stone that is fabricated with saw-cut surfaces. Cut lines straight and true, with edges eased slightly to prevent snipping.
 - 2. Use hammer and chisel to split stone that is fabricated with split surfaces. Make edges straight and true, matching similar surfaces that were shop or quarry fabricated.
- B. Sort stone before it is placed in wall to remove stone that does not comply with requirements relating to aesthetic effects, physical properties, or fabrication, or that is otherwise unsuitable for intended use.
- C. Arrange stones in pattern indicated, with joint widths within tolerances indicated.
- D. Arrange stones with color and size variations uniformly dispersed for an evenly blended appearance.
- E. Install supports, fasteners, and other attachments indicated or necessary to secure stone masonry in place.
- F. Set stone accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.
- G. Install steel lintels where indicated. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

- H. Maintain uniform joint widths except for variations due to different stone sizes and where minor variations are required to maintain bond alignment if any. Lay walls with joints not less than 3/8 inch at narrowest points or more than 5/8 inch at widest points.
- I. Provide sealant joints of widths and at locations indicated.
 - 1. Keep sealant joints free of mortar and other rigid materials.
 - 2. Sealing joints is specified in Division 07 Section "Joint Sealants."
- J. Install embedded flashing, cavity drainage material, and weep holes at lintels, ledges, other obstructions to downward flow of water in wall, and where indicated, according to requirements of Division 04 Section "Unit Masonry."
- K. Coat limestone with cementitious dampproofing as follows:
 - 1. Stone at Grade: Beds, joints, and back surfaces to at least 12 inches above finish-grade elevations.
 - 2. Stone Extending below Grade: Beds, joints, back surfaces, and face surfaces below grade.
 - 3. Allow cementitious dampproofing formulations to cure before setting dampproofed stone. Do not damage or remove dampproofing in the course of handling and setting stone.

3.4 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch in 40 feet or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4 inch in 20 feet or 1/2 inch in 40 feet or more.
- B. Variation from Level: For lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4 inch in 20 feet or 1/2 inch in 40 feet or more.
- C. Variation of Linear Building Line: For position shown in plan, do not exceed 1/2 inch in 20 feet or 3/4 inch in 40 feet or more.
- D. Measure variation from level, plumb, and position shown in plan as variation of the average plane of the face of each stone from level, plumb, or dimensioned plane.
- E. Variation in Plane between Adjacent Stones: Do not exceed one-half of tolerance specified for thickness of stone.

3.5 INSTALLATION OF ANCHORED STONE MASONRY

- A. Anchor stone masonry to stud framing with adjustable, screw-attached veneer anchors unless otherwise indicated. Fasten anchors through sheathing to framing with two screws.
- B. Embed veneer anchors in mortar joints of stone masonry at least halfway, but not less than 1-1/2 inches, through stone masonry and with at least 5/8-inch cover on outside face.

- C. Space anchors to provide not less than one anchor per 2 sq ft of wall area. Install additional anchors within 12 inches of openings, sealant joints, and perimeter at intervals not exceeding 12 inches.
- D. Set stone in full bed of mortar with full head joints unless otherwise indicated. Build anchors into mortar joints as stone is set.
- E. Provide cavity of width indicated between stone masonry and backup construction. Keep cavity free of mortar droppings and debris.
 - 1. Slope beds toward cavity to minimize mortar protrusions into cavity.
 - 2. Do not attempt to trowel or remove mortar fins protruding into cavity.
- F. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

3.6 POINTING

- A. Point stone joints by placing and compacting pointing mortar in layers not more than 3/8 inch deep. Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.
 - 1. Joint Profile: Concave.

3.7 ADJUSTING AND CLEANING

- A. Remove and replace stone masonry of the following description:
 - 1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Architect.
 - 2. Defective joints.
 - 3. Stone masonry not matching approved samples and mockups.
 - 4. Stone masonry not complying with other requirements indicated.
- B. Replace in a manner that results in stone masonry matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean stone masonry as work progresses. Remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean stone masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Test cleaning methods on mockup; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before cleaning stone masonry.

3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
4. Wet wall surfaces with water before applying cleaner; remove cleaner promptly by rinsing thoroughly with clear water.
5. Clean stone masonry with proprietary acidic cleaner applied according to manufacturer's and stone fabricator's written instructions. Comply with recommendations in ILI's "Indiana Limestone Handbook."

3.8 EXCESS MATERIALS AND WASTE

- A. Disposal as Fill Material: Comply with requirements of Division 01 Section "Construction Waste Management."
- B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other waste, and legally dispose of off Owner's property.

END OF SECTION 044300

SECTION 078100 - APPLIED FIREPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes sprayed fire-resistive materials.

1.3 DEFINITIONS

- A. SFRM: Sprayed fire-resistive material.
- B. Exposed: Fire-resistive materials applied to surfaces that are exposed to view when the Work is completed, that are accessible through suspended ceilings, and that are in air-handling plenums.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review products, design ratings, restrained and unrestrained conditions, densities, thicknesses, bond strengths, and other performance requirements.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Sustainable Design Submittals:
 - 1. Laboratory Test Reports: For paints and coatings, indicating compliance with requirements for low-emitting materials.
- C. Samples: For each exposed product and for each color and texture specified, in manufacturer's standard dimensions in size.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and testing agency.

- B. Product Certificates: For each type of SFRM, signed by product manufacturer.
- C. Research/Evaluation Reports: For SFRM, from ICC-ES.

1.7 CLOSEOUT SUBMITTALS

- A. Warranties: Special warranties specified in this Section.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by fireproofing manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements.
- B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects to set quality standards for materials and execution.
 - 1. Build mockup of each type of fireproofing and different substrate and each required finish as shown on Drawings.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in original, unopened packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, shelf life if applicable, and fire-resistance ratings applicable to Project.
- B. Use materials with limited shelf life within period indicated. Remove from Project site and discard materials whose shelf life has expired.
- C. Store materials inside, under cover, and aboveground; keep dry until ready for use. Remove from Project site and discard wet or deteriorated materials.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not apply SFRM when ambient or substrate temperature is 40 deg F or lower unless temporary protection and heat are provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.
- B. Ventilation: Ventilate building spaces during and after application of fireproofing, providing complete air exchanges according to manufacturer's written instructions. Use natural means or, if they are inadequate, forced-air circulation until fireproofing dries thoroughly.

1.11 COORDINATION

- A. Sequence and coordinate application of SFRM with other related work specified in other Sections to comply with the following requirements:
1. Provide temporary enclosure as required to confine spraying operations and protect the environment.
 2. Provide temporary enclosures for applications to prevent deterioration of fire-resistive material due to exposure to weather and to unfavorable ambient conditions for humidity, temperature, and ventilation.
 3. Avoid unnecessary exposure of fire-resistive material to abrasion and other damage likely to occur during construction operations subsequent to its application.
 4. Do not apply fire-resistive material to metal roof deck substrates until concrete topping, if any, has been completed. For metal roof decks without concrete topping, do not apply fire-resistive material to metal roof deck substrates until roofing has been completed; prohibit roof traffic during application and drying of fire-resistive material.
 5. Do not apply fire-resistive material to metal floor deck substrates until concrete topping has been completed.
 6. Do not begin applying fire-resistive material until clips, hangers, supports, sleeves, and other items penetrating fire protection are in place.
 7. Defer installing ducts, piping, and other items that would interfere with applying fire-resistive material until application of fire protection is completed.
 8. Do not install enclosing or concealing construction until after fire-resistive material has been applied, inspected, and tested and corrections have been made to defective applications.

1.12 WARRANTY

- A. Special Warranty: Signed by Installer, in which Installer agrees to repair or replace SFRMs that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Cracking, flaking, spalling, or eroding in excess of specified requirements; peeling; or delaminating of SFRM from substrates.
 - b. Not covered under the warranty are failures due to damage by occupants and Owner's maintenance personnel, exposure to environmental conditions other than those investigated and approved during fire-response testing, and other causes not reasonably foreseeable under conditions of normal use.
 2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Assemblies: Provide fireproofing, including auxiliary materials, according to requirements of each fire-resistance design and manufacturer's written instructions.
- B. Source Limitations: Obtain fireproofing for each fire-resistance design from single source.
- C. Fire-Resistance Design: Indicated on Drawings, tested according to ASTM E 119 or UL 263; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Steel members are to be considered unrestrained unless specifically noted otherwise.
- D. Low-Emitting Materials: Coatings shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- E. Asbestos: Provide products containing no detectable asbestos.

2.2 EXPOSED SFRM

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Exposed Wet-Mix Portland-Cement-Based SFRM:
 - a. Carbolite Company, subsidiary of RPM International; Pyrolite 22.
 - b. GCP Applied Technologies Inc. (formerly Grace Construction Products); Monokote Type Z106.
 - c. Isolatek International; Cafco 400.
 - d. Southwest Fireproofing Products Co.; 7GP.
- B. Material Composition: Manufacturer's standard product, as follows:
 - 1. Exposed Wet-Mix Portland-Cement-Based SFRM: Factory-mixed, dry, cement aggregate formulation; or chloride-free formulation of portland cement binders, additives, and inorganic aggregates mixed with water at Project site to form a slurry or mortar for conveyance and application.
- C. Physical Properties: Minimum values, unless otherwise indicated, or higher values required to attain designated fire-resistance ratings, measured per standard test methods referenced with each property as follows:
 - 1. Dry Density: Values for average and individual densities as required for fire-resistance ratings indicated, per ASTM E 605 or AWCI Technical Manual 12-A,

Section 5.4.5, "Displacement Method," but with an average density of not less than 22 lb/cu. ft.

2. Bond Strength: 434 lbf/sq. ft. minimum per ASTM E 736.
3. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 10 or less.
 - b. Smoke-Developed Index: 10 or less.
4. Density: Not less than density specified in the approved fire-resistance design, according to ASTM E 605.
5. Bond Strength: 1000 lbf/sq. ft. minimum per ASTM E 736.
6. Compressive Strength: 300 lbf/sq. in. minimum per ASTM E 761.
7. Corrosion Resistance: No evidence of corrosion per ASTM E 937.
8. Deflection: No cracking, spalling, or delamination per ASTM E 759.
9. Effect of Impact on Bonding: No cracking, spalling, or delamination per ASTM E 760.
10. Air Erosion: Maximum weight loss of 0.025 g/sq. ft. per ASTM E 859.
11. Combustion Characteristics: Passes ASTM E 136.
12. Fungal Resistance: No observed growth on specimens per ASTM G 21.

2.3 AUXILIARY FIRE-RESISTIVE MATERIALS

- A. General: Provide auxiliary materials that are compatible with fireproofing and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.
- B. Substrate Primers: Primers approved by fireproofing manufacturer and complying with one or both of the following requirements:
 1. Primer and substrate are identical to those tested in required fire-resistance design by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 2. Primer's bond strength in required fire-resistance design complies with specified bond strength for fireproofing and with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction, based on a series of bond tests according to ASTM E 736.
- C. Bonding Agent: Product approved by fireproofing manufacturer and complying with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction.
- D. Metal Lath: Expanded metal lath fabricated from material of weight, configuration, and finish required to comply with fire-resistance designs indicated and fire-resistive material manufacturer's written recommendations. Include clips, lathing accessories, corner beads, and other anchorage devices required to attach lath to substrates and to receive SFRM.

- E. Topcoat: Suitable for application over applied fireproofing; of type recommended in writing by fireproofing manufacturer for each fire-resistance design.
 - 1. Water-Based Permeable Topcoat: Factory-mixed formulation for brush, roller, or spray application over applied SFRM. Provide application at a rate of 60 sq ft/gal.
 - a. Basis-of-Design Product: Subject to compliance with requirements, provide Isolatak International; Cafco TOP-COTE, or equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of the Work and according to each fire-resistance design.
 - 1. Verify that substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, paints, and encapsulants, or other foreign substances capable of impairing bond of fireproofing with substrates under conditions of normal use or fire exposure.
 - 2. Verify that objects penetrating fireproofing, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
 - 3. Verify that substrates receiving fireproofing are not obstructed by ducts, piping, equipment, or other suspended construction that will interfere with fireproofing application.
- B. Verify that concrete work on steel deck is complete before beginning fireproofing work.
- C. Verify that roof construction, installation of rooftop HVAC equipment, and other related work are complete before beginning fireproofing work.
- D. Conduct tests according to fireproofing manufacturer's written instructions to verify that substrates are free of substances capable of interfering with bond.
- E. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Cover other work subject to damage from fallout or overspray of fire-resistive materials during application.
- B. Clean substrates of substances that could impair bond of fireproofing.

- C. Prime substrates where included in fire-resistance design and where recommended in writing by fireproofing manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive fireproofing.
- D. For applications visible on completion of Project, repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of SFRM. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.

3.3 APPLICATION, GENERAL

- A. Construct fireproofing assemblies that are identical to fire-resistance design indicated and products as specified, tested, and substantiated by test reports; for thickness, primers, sealers, topcoats, finishing, and other materials and procedures affecting fireproofing work.
- B. Comply with fire-resistive material manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and spray on fire-resistive material, as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.
- C. Apply SFRM that is identical to products tested as specified in Part 1 "Quality Assurance" Article and substantiated by test reports, with respect to rate of application, accelerator use, sealers, topcoats, tamping, troweling, water overspray, or other materials and procedures affecting test results.
- D. Coordinate application of fireproofing with other construction to minimize need to cut or remove fireproofing.
 - 1. Do not begin applying fireproofing until clips, hangers, supports, sleeves, and other items penetrating fireproofing are in place.
 - 2. Defer installing ducts, piping, and other items that would interfere with applying fireproofing until application of fireproofing is completed.
- E. Metal Decks:
 - 1. Do not apply fireproofing to underside of metal deck substrates until concrete topping, if any, is completed.
 - 2. Do not apply fireproofing to underside of metal roof deck until roofing is completed; prohibit roof traffic during application and drying of fireproofing.
- F. Install auxiliary materials as required, as detailed, and according to fire-resistance design and fireproofing manufacturer's written instructions for conditions of exposure and intended use. For auxiliary materials, use attachment and anchorage devices of type recommended in writing by fireproofing manufacturer.
- G. Spray apply fire-resistive materials to maximum extent possible. Following the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by SFRM manufacturer.

- H. Extend fireproofing in full thickness over entire area of each substrate to be protected.
- I. Install body of fireproofing in a single course unless otherwise recommended in writing by fireproofing manufacturer.

3.4 APPLICATION, EXPOSED SFRM

- A. Apply exposed SFRM in thicknesses and densities not less than those required to achieve fire-resistance ratings designated for each condition, but apply in greater thicknesses and densities if indicated.
 - 1. For steel beams and bracing, provide a thickness of not less than 1 inch.
 - 2. For metal floor or roof decks, provide a thickness of not less than 1/2 inch.
- B. Provide a uniform finish complying with description indicated for each type of material and matching Architect's sample or, if none, finish approved for field-erected mockup.
- C. Apply exposed portland-cement-based SFRM to produce the following finish:
 - 1. Spray-textured finish with no further treatment.
- D. Cure exposed SFRM according to product manufacturer's written recommendations.
- E. Apply topcoat to SFRM according to manufacturer's written instructions.

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
 - 1. Test and inspect as required by the IBC, Subsection 1705.13, "Sprayed Fire-Resistant Materials."
- B. Perform the tests and inspections of completed Work in successive stages. Do not proceed with application of fireproofing for the next area until test results for previously completed applications of fireproofing show compliance with requirements. Tested values must equal or exceed values as specified and as indicated and required for approved fire-resistance design.
- C. Fireproofing will be considered defective if it does not pass tests and inspections.
 - 1. Remove and replace fireproofing that does not pass tests and inspections, and retest.
 - 2. Apply additional fireproofing, per manufacturer's written instructions, where test results indicate insufficient thickness, and retest.
- D. Prepare test and inspection reports.

3.6 CLEANING, PROTECTING, AND REPAIR

- A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.
- B. Protect fireproofing, according to advice of manufacturer and Installer, from damage resulting from construction operations or other causes, so fireproofing will be without damage or deterioration at time of Substantial Completion.
- C. As installation of other construction proceeds, inspect fireproofing and repair damaged areas and fireproofing removed due to work of other trades.
- D. Repair fireproofing damaged by other work before concealing it with other construction.
- E. Repair fireproofing by reapplying it using same method as original installation or using manufacturer's recommended trowel-applied product.

END OF SECTION 078100

SECTION 096623 – PRECAST EPOXY-RESIN TERRAZZO UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes precast epoxy-resin terrazzo units.
- B. Related Requirements:
 - 1. Division 07 Section "Joint Sealers" for furnishing and installing joint sealants.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to precast epoxy-resin terrazzo units including, but not limited to, the following:
 - a. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
 - b. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:
 - 1. Product Data: For adhesives, indicating VOC content.
 - 2. Laboratory Test Reports: For adhesives and sealers, indicating compliance with requirements for low-emitting materials.
- C. Shop Drawings: Include precast epoxy-resin terrazzo units installation requirements. Include plans, elevations, sections, component details, and attachment to other work. Show layout of the following:
 - 1. Stair treads, risers, and landings.
 - 2. Precast terrazzo jointing and edge configurations.

- D. Samples for Initial Selection: NTMA color plates showing the full range of colors and patterns available for each terrazzo type.
- E. Samples for Verification: For each type, material, color, and pattern, of terrazzo and accessory required showing the full range of color, texture, and pattern variations expected. Label each terrazzo sample to identify manufacturer's matrix color and aggregate types, sizes, and proportions. Prepare samples of same thickness and from same material to be used for the Work in size indicated below:
 - 1. Precast Terrazzo: 6-inch-square Samples.
 - 2. Accessories: 6-inch-long samples of each exposed strip item required.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.
- C. Material Certificates: For each type of precast epoxy-resin terrazzo units, from manufacturer.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For precast epoxy-resin terrazzo units to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who is acceptable to precast epoxy-resin terrazzo unit manufacturer to install manufacturer's products.
- B. Source Limitations: Obtain precast epoxy-resin terrazzo units from one source from a single manufacturer. Provide secondary materials including patching and fill material, joint sealant, and repair materials of type and from source recommended by manufacturer of primary materials.
- C. Source Limitations for Marble Chips: Obtain each color, grade, type, and variety of granular materials from one source with resources to provide materials of consistent quality in appearance and physical properties.
- D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockups for precast epoxy-resin terrazzo units, including accessories.
 - a. Size: First three stair treads.

2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in supplier's original wrappings and containers, labeled with source's or manufacturer's name, material or product brand name, and lot number if any.
- B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting terrazzo installation.
- B. Field Measurements: Verify actual dimensions of construction contiguous with precast terrazzo by field measurements before fabrication.
- C. Close spaces to traffic during precast epoxy-resin terrazzo units application and for not less than 24 hours after application unless manufacturer recommends a longer period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. NTMA Standards: Comply with NTMA's "Terrazzo Specifications and Design Guide" and with written recommendations for terrazzo type indicated unless more stringent requirements are specified.
- B. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 PRECAST EPOXY-RESIN TERRAZZO UNITS

- A. Precast Terrazzo Treads and Landings: Comply with NTMA's written recommendations for fabricating precast terrazzo units in sizes and profiles indicated. Reinforce units as required by unit sizes, profiles, and thicknesses and as recommended by manufacturer. Finish exposed-to-view edges and reveals to match face finish. Ease exposed edges to 1/8-inch radius.
- B. Color, Pattern, and Finish: As selected by Architect from NTMA standard-terrazzo plates.

2.3 STRIP MATERIALS

- A. Accessory Strips: Match divider strip width, material, and color unless otherwise indicated. Use the following types of accessory strips as required to provide a complete installation:
 - 1. Nosings for terrazzo stair treads and landings.
- B. Abrasive Strips: Three-line abrasive inserts at nosings. Silicon carbide or aluminum oxide, or combination of both, in epoxy-resin binder and set in channel.
 - 1. Width: 1/2 inch.
 - 2. Depth: As required by terrazzo thickness.
 - 3. Length: 4 inches less than stair width.
 - 4. Color: As selected by Architect from full range of industry colors.

2.4 MISCELLANEOUS ACCESSORIES

- A. Anchoring Devices: Provide mechanical anchoring devices as recommended by fabricator for proper anchorage and support of units for conditions of installation and support.
- B. Patching and Fill Material: Terrazzo manufacturer's resinous product approved and recommended by manufacturer for application indicated.
- C. Joint Compound: Terrazzo manufacturer's resinous product approved and recommended by manufacturer for application indicated.
- D. Cleaner: Chemically neutral cleaner with pH factor between 7 and 10 that is biodegradable, phosphate free, and recommended by sealer manufacturer for use on terrazzo type indicated.
- E. Sealer: Slip- and stain-resistant penetrating-type sealer that is chemically neutral with pH factor between 7 and 10; does not affect color or physical properties of terrazzo; is recommended by sealer manufacturer; and complies with NTMA's "Terrazzo Specifications and Design Guide" for terrazzo type indicated.
 - 1. Surface Friction: Not less than 0.6 according to ASTM D 2047.
 - 2. Acid-Base Properties: With pH factor between 7 and 10.
 - 3. Products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

- A. Clean substrates of deleterious substances, including oil and grease.

3.3 PRECAST EPOXY-RESIN TERRAZZO UNITS INSTALLATION

- A. Install precast epoxy-resin terrazzo units using method recommended by NTMA and manufacturer unless otherwise indicated.
- B. Do not install units that are chipped, cracked, discolored, or not properly finished.
- C. Install precast epoxy-resin terrazzo units level, plumb, and firmly anchored in locations and at heights indicated.
- D. Seal joints between precast epoxy-resin terrazzo units with joint compound matching precast terrazzo matrix.

3.4 CLEANING, SEALING, AND PROTECTING

- A. Cleaning: Wash surfaces with cleaner according to NTMA's written recommendations and manufacturer's written instructions; rinse surfaces with water and allow to dry thoroughly.
- B. Sealing:
 - 1. Seal surfaces according to NTMA's written recommendations.
 - 2. Apply sealer according to sealer manufacturer's written instructions.
- C. Protection: Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure that precast epoxy-resin terrazzo units are without damage or deterioration at time of Substantial Completion.

END OF SECTION 096626

SECTION 102239 – FOLDING PANEL PARTITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes manually operated, acoustical panel partitions.
- B. Related Requirements:
 - 1. Division 05 Section "Metal Fabrications" for supports that attach supporting tracks to overhead structural system.
 - 2. Division 08 Section "Door Hardware" for hardware to the extent not specified in this Section.
 - 3. Division 09 Section "Gypsum Board Assemblies" for sound barrier construction above the ceiling at track.

1.3 DEFINITIONS

- A. STC: Sound transmission class.

1.4 PREINSTALLATION MEETINGS

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

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Sustainable Design Submittals:
 - 1. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
- C. Shop Drawings: For operable panel partitions.
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Indicate stacking and operating clearances. Indicate location and installation requirements for hardware and track, blocking, and direction of travel.

- D. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for units with factory-applied color finishes.
 - 1. Include similar Samples of accessories involving color selection.
- E. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below and of same thickness and material indicated for the Work. If finishes involve normal color pattern or texture variations, include sample sets showing the full range of variations expected.
 - 1. Panel Face Material: Manufacturer's standard-size unit, not less than 3 inches square.
 - 2. Panel Edge Material: Not less than full width by 3 inches long.

1.6 INFORMATIONAL SUBMITTALS

- A. Setting Drawings: For embedded items and cutouts required in other work, including support beam punching template.
- B. Qualification Data: For qualified Installer.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each folding panel partition.
- D. Sample Warranty: For manufacturer's special warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For operable panel partitions to include in maintenance manuals.
 - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. Panel finish facings and finishes for exposed trim and accessories. Include precautions for cleaning materials and methods that could be detrimental to finishes and performance.
 - b. Seals, hardware, track, track switches, carriers, and other operating components.

1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials from the same production run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Panel Finish-Facing Material: Furnish full width in quantity to cover both sides of two panels when installed.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.10 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of folding panel partition openings by field measurements before fabrication.

1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of folding panel partitions that fail in materials or workmanship within specified warranty period.

- 1. Failures include, but are not limited to, the following:
 - a. Faulty operation of folding panel partitions.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal wear.
- 2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Acoustical Performance: Provide folding panel partitions tested by a qualified testing agency for the following acoustical properties according to test methods indicated:
 - 1. Sound-Transmission Requirements: Folding panel partition assembly tested for laboratory sound-transmission loss performance according to ASTM E 90, determined by ASTM E 413, and rated for not less than the STC indicated.
- B. Fire-Test-Response Characteristics: Provide panels with finishes meeting one of the following as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. Surface-Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame Spread: 25 or less.
 - b. Smoke Developed: 450 or less.

2.2 OPERABLE ACOUSTICAL PANELS

- A. Operable Acoustical Panels: Partition system, including panels, seals, finish facing, suspension system, operators, and accessories.
 - 1. Basis-of-Design Product: The design for folding panel partitions is based on Hufcor, Inc.; 632. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
 - a. Modernfold, Inc.; a DORMA Group company.
 - b. Panelfold, Inc.
- B. Partition Operation: Manually operated, paired panels.
- C. Panel Construction: As required to support panel from suspension components and with reinforcement for hardware attachment. Fabricate panels with tight hairline joints and concealed fasteners. Fabricate panels so finished in-place partition is rigid; level; plumb; aligned, with tight joints and uniform appearance; and free of bow, warp, twist, deformation, and surface and finish irregularities.
- D. Dimensions: Fabricate operable acoustical panel partitions to form an assembled system of dimensions indicated and verified by field measurements.
 - 1. Panel Width: Standard widths.
- E. STC: Not less than 45.
- F. Panel Weight: 8 to 12 lb/sq. ft. maximum.
- G. Panel Thickness: Not less than 3 inches.
- H. Panel Materials:
 - 1. Steel Frame: Steel sheet, manufacturer's standard nominal minimum thickness for uncoated steel.
 - 2. Steel Face/Liner Sheets: Tension-leveled steel sheet, manufacturer's standard minimum nominal thickness for uncoated steel.
 - 3. Gypsum Board: ASTM C 1396.
- I. Panel Closure: Manufacturer's standard unless otherwise indicated.
 - 1. Initial Closure: Fixed jamb.
 - 2. Final Closure: Constant-force, lever-operated, mechanical closure expanding from panel edge to create a constant-pressure acoustical seal.
- J. Hardware: Manufacturer's standard as required to operate operable panel partition and accessories; with decorative, protective finish.
 - 1. Hinges: Manufacturer's standard.

K. Finish Facing: One of the followings, as indicated on Drawings:

1. Marker board.
2. High-pressure decorative laminate.

2.3 SEALS

A. General: Provide seals that produce operable panel partitions complying with performance requirements and the following:

1. Manufacturer's standard seals unless otherwise indicated.
2. Seals made from materials and in profiles that minimize sound leakage.
3. Seals fitting tight at contact surfaces and sealing continuously between adjacent panels and between operable panel partition perimeter and adjacent surfaces, when operable panel partition is extended and closed.

B. Vertical Seals: Deep-nesting, interlocking astragals mounted on each edge of panel, with continuous PVC acoustical seal.

C. Horizontal Top Seals: Continuous-contact, resilient seal exerting uniform constant pressure on track or resilient, mechanical, retractable, constant-force-contact seal exerting uniform constant pressure on track when extended.

D. Horizontal Bottom Seals: PVC-faced, mechanical, retractable, constant-force-contact seal exerting uniform constant pressure on floor when extended, ensuring horizontal and vertical sealing and resisting panel movement.

1. Automatically Operated for Acoustical Panels: Extension and retraction of bottom seal automatically operated by movement of partition, with operating range not less than 1-1/2 inches (38 mm) between retracted seal and floor finish.

2.4 PANEL FINISH FACINGS

A. General: Provide finish facings for panels that comply with indicated fire-test-response characteristics and that are factory applied to operable panel partitions with appropriate backing, using mildew-resistant nonstaining adhesive as recommended by facing manufacturer's written instructions.

1. Apply one-piece, seamless facings that are free of air bubbles, wrinkles, blisters, and other defects, with edges tightly butted, and with no gaps or overlaps. Horizontal seams are not permitted. Tightly secure and conceal raw and selvage edges of facing for finished appearance.

B. High-Pressure Decorative Laminate: NEMA LD 3, Horizontal grade.

1. Color/Pattern: As selected by Architect from manufacturer's full range.

- C. Marker Board Surface: Manufacturer's standard marker board surface, full width and height of panel, with recessed eraser pocket.
 - 1. Surface Color: As selected by Architect from manufacturer's full range.
 - 2. Size: Full width and height of panel.
 - 3. Trim: Aluminum slip-on or snap-on trim with no visible screws or exposed joints and with corners mitered to a neat, hairline joint.
 - 4. Chalk Tray and Eraser Pocket: Manufacturer's standard aluminum tray, pocket, and finish.
- D. Paint: Manufacturer's standard factory-painted finish.
 - 1. Color: As selected by Architect from manufacturer's full range.
- E. Edges: Manufacturer's standard edge.

2.5 SUSPENSION SYSTEMS

- A. Tracks: Steel or aluminum with adjustable steel hanger rods for overhead support, designed for type of operation, size, and weight of folding panel partition indicated. Size track to support partition operation and storage without damage to suspension system, folding panel partitions, or adjacent construction. Limit track deflection to no more than 0.10 inch between bracket supports. Provide a continuous system of track sections and accessories to accommodate configuration and layout indicated for partition operation and storage.
- B. Carriers: Trolley system as required for configuration type, size, and weight of partition and for easy operation; with ball-bearing wheels.
- C. Track Intersections, Switches, and Accessories: As required for type of operation, storage, track configuration, and layout indicated for folding panel partition, and compatible with partition assembly specified. Fabricate track intersections and switches from steel or aluminum.
 - 1. L Intersections: Allow panels to change 90 degrees in direction of travel.
 - 2. T Intersections: Allow panels to pass through or change 90 degrees to another direction of travel.
- D. Aluminum Finish: Mill finish or manufacturer's standard, factory-applied, decorative finish, unless otherwise indicated.
- E. Steel Finish: Factory-applied, corrosion-resistant, protective coating, unless otherwise indicated.

2.6 ACCESSORIES

- A. Work Surfaces: Quantities, placement, and size indicated.
 - 1. Surface: Porcelain steel marker/projection surface.
 - 2. Surface Color: As selected by Architect from manufacturer's full range.

3. Size: Full width of panel by 48 inches.
 4. Trim: Aluminum slip-on or snap-on trim with no visible screws or exposed joints and with corners mitered to a neat, hairline joint.
- B. Chalk Tray and Eraser Pocket: Aluminum with clear anodic finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine flooring, structural support, and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of folding panel partitions.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install operable panel partitions and accessories after other finishing operations, including painting, have been completed in area of partition installation.
- B. Install panels in numbered sequence indicated on Shop Drawings.
- C. Broken, cracked, chipped, deformed, or unmatched panels are not acceptable.
- D. Broken, cracked, deformed, or unmatched gasketing or gasketing with gaps at butted ends is not acceptable.
- E. Light-Leakage Test: Illuminate one side of partition installation and observe vertical joints and top and bottom seals for voids. Adjust partitions for alignment and full closure of vertical joints and full closure along top and bottom seals.

3.3 ADJUSTING

- A. Adjust operable panel partitions, hardware, and other moving parts to function smoothly, and lubricate as recommended by manufacturer.
- B. Verify that safety devices are properly functioning.

3.4 CLEANING AND PROTECTION

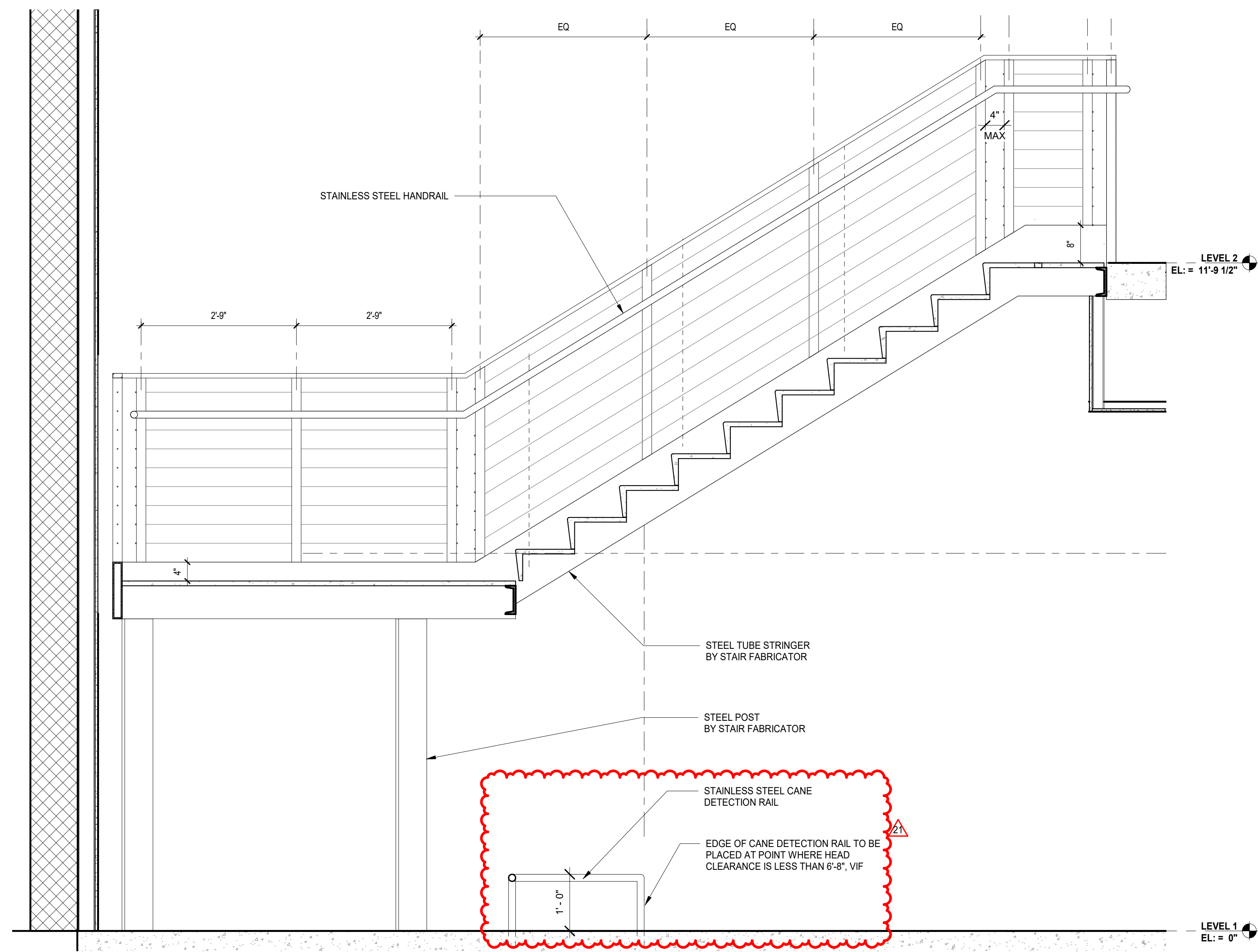
- A. Clean soiled surfaces on completing installation of folding panel partitions, to remove dust, fingerprints, adhesives, and other foreign materials according to manufacturer's written instructions.

- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure folding panel partitions are without damage or deterioration at time of Substantial Completion.
- C. Replace panels that cannot be cleaned and repaired, in a manner approved by Architect, before time of Substantial Completion.

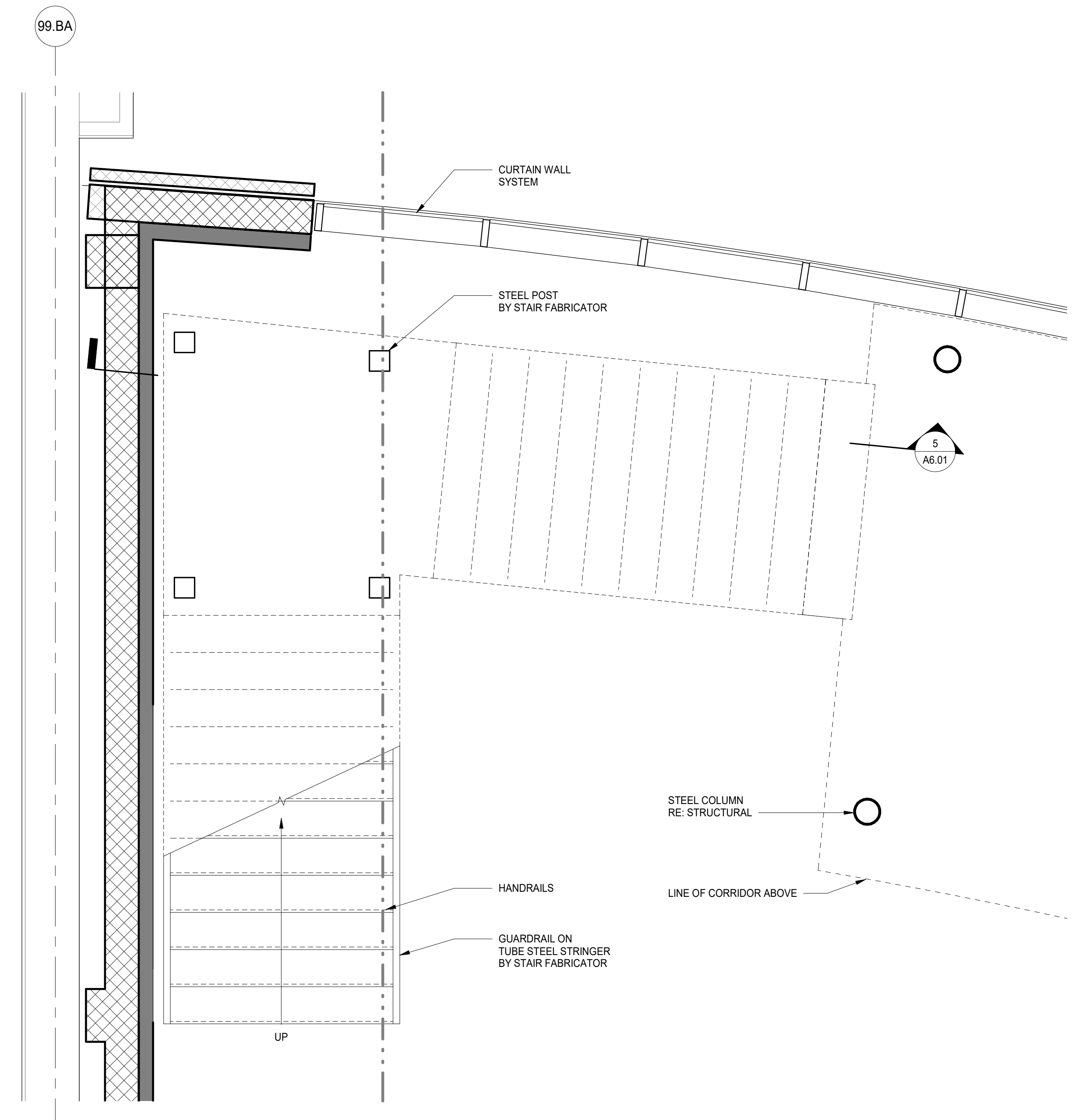
3.5 DEMONSTRATION

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

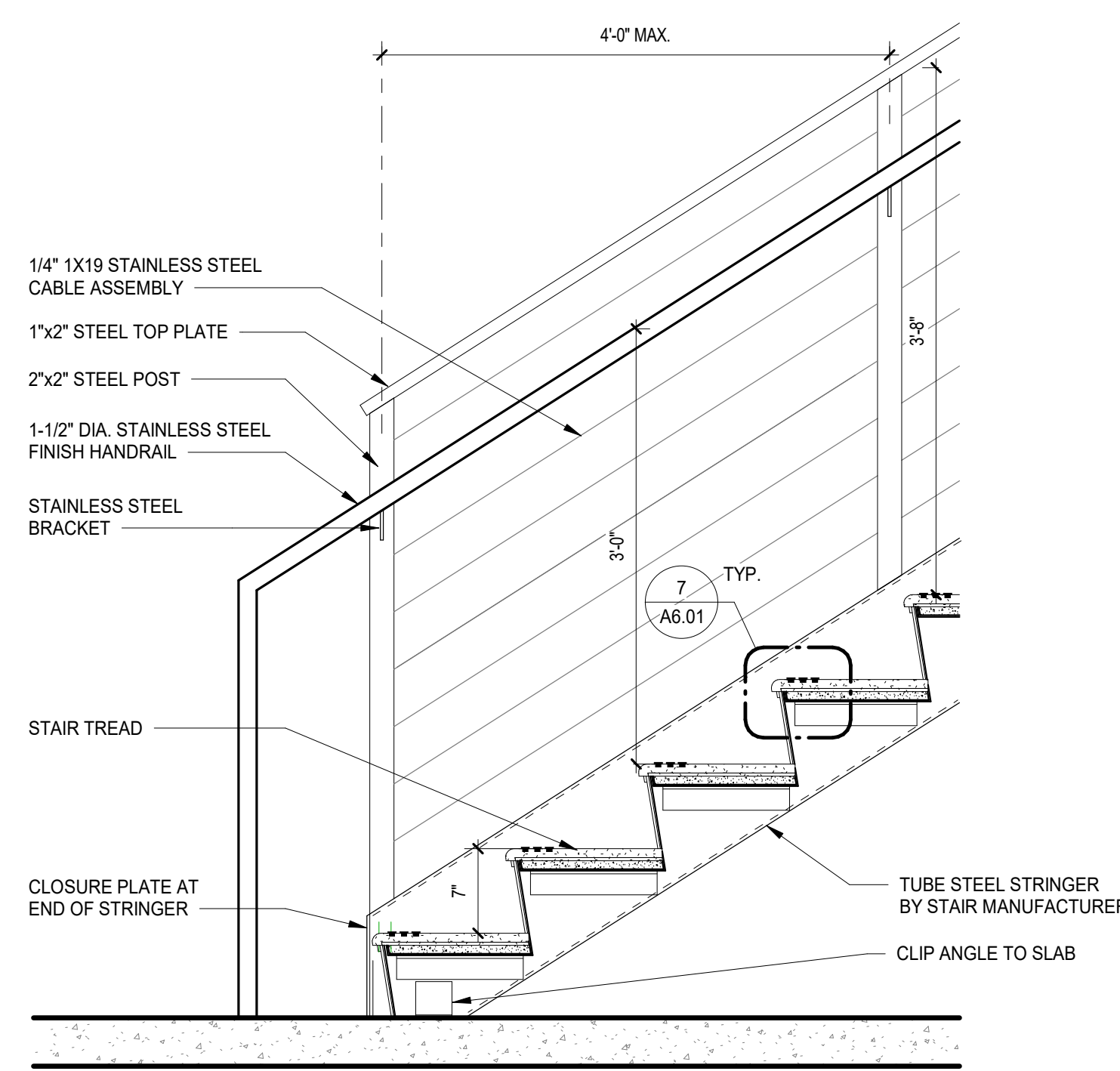
END OF SECTION 102239



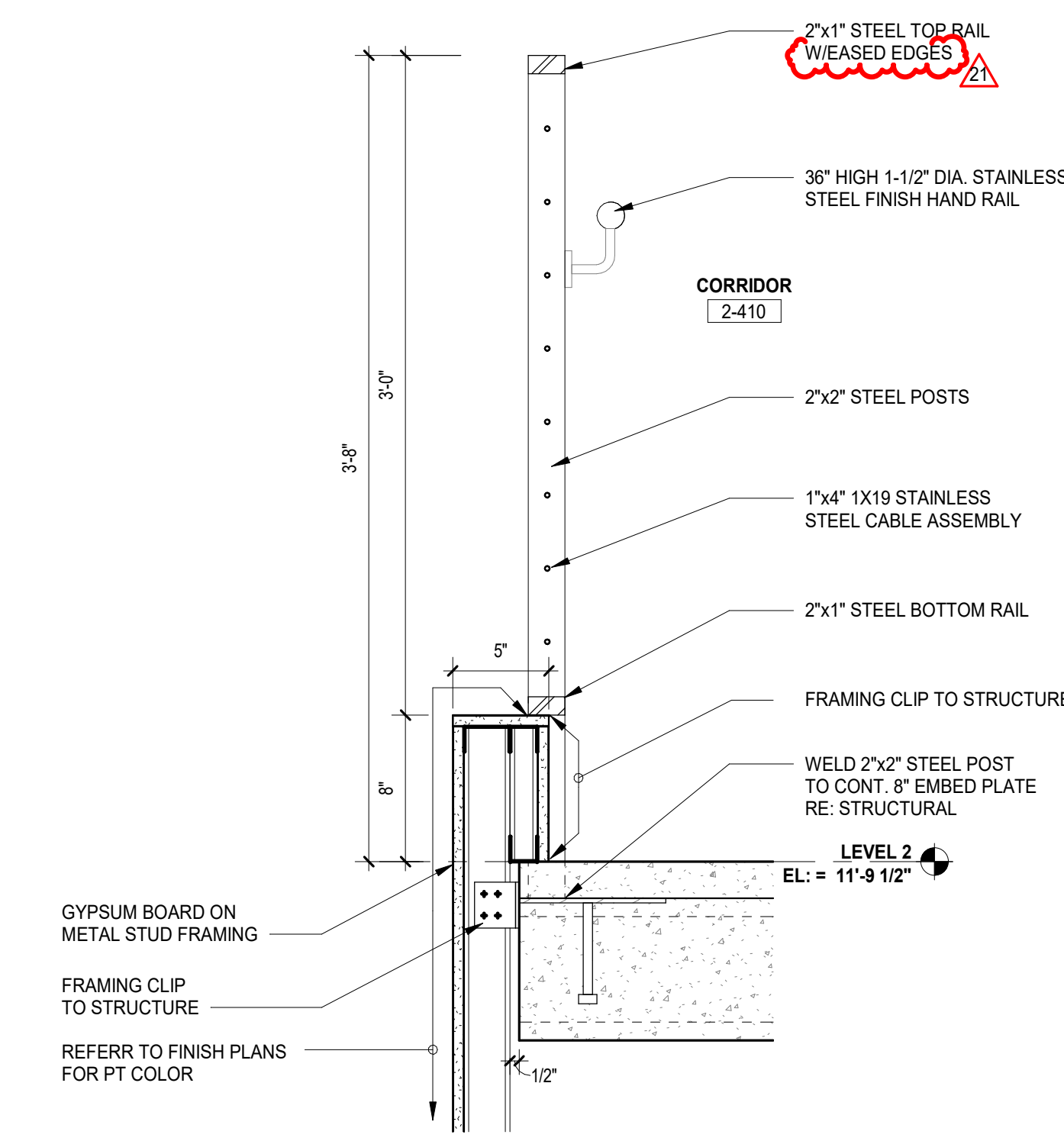
5 STAIR SECTION
SCALE: 3/4" = 1'-0"



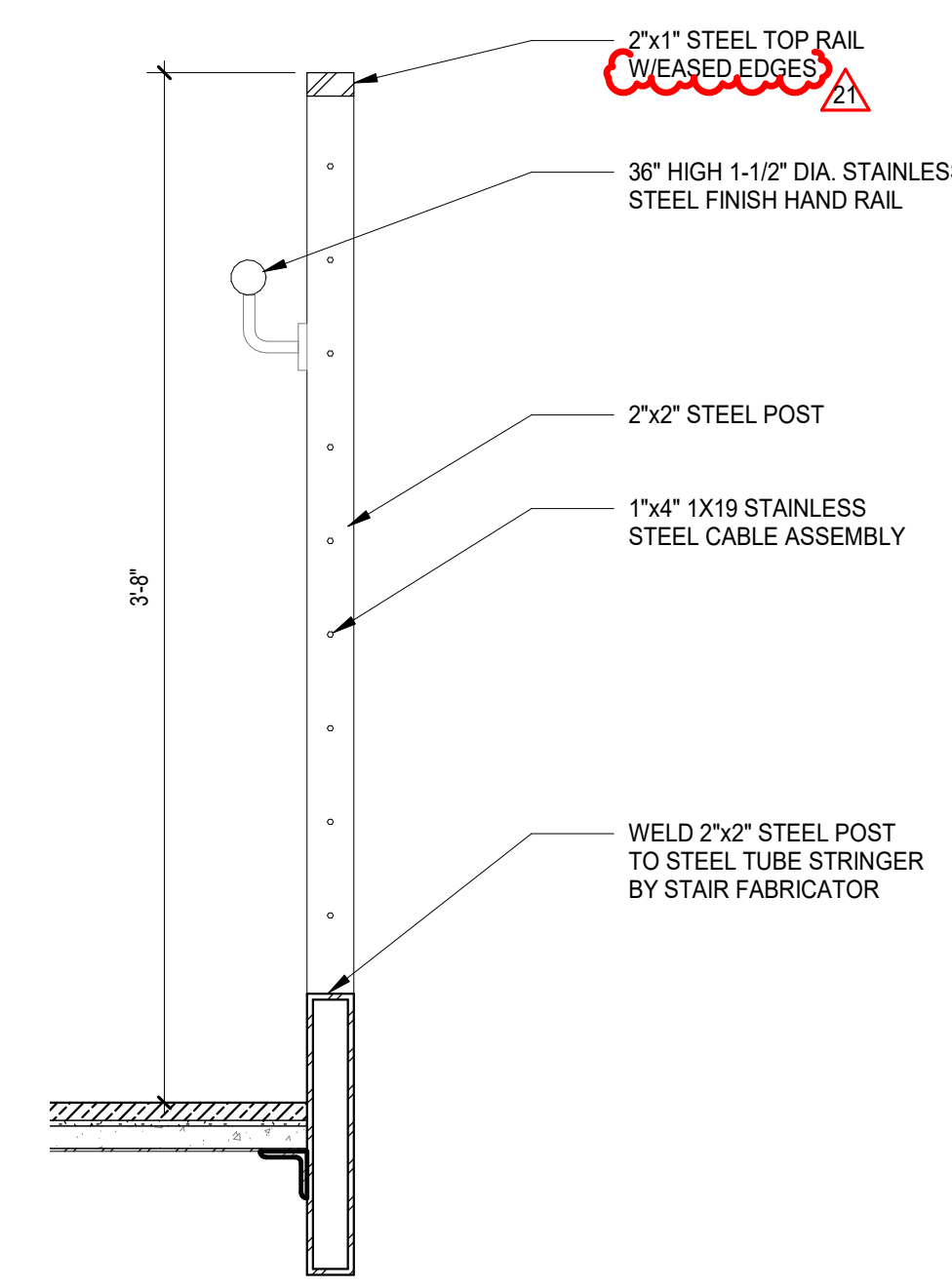
1 ENLARGED STAIR PLAN - LEVEL 1 - AREA C.2
SCALE: 1/2" = 1'-0"



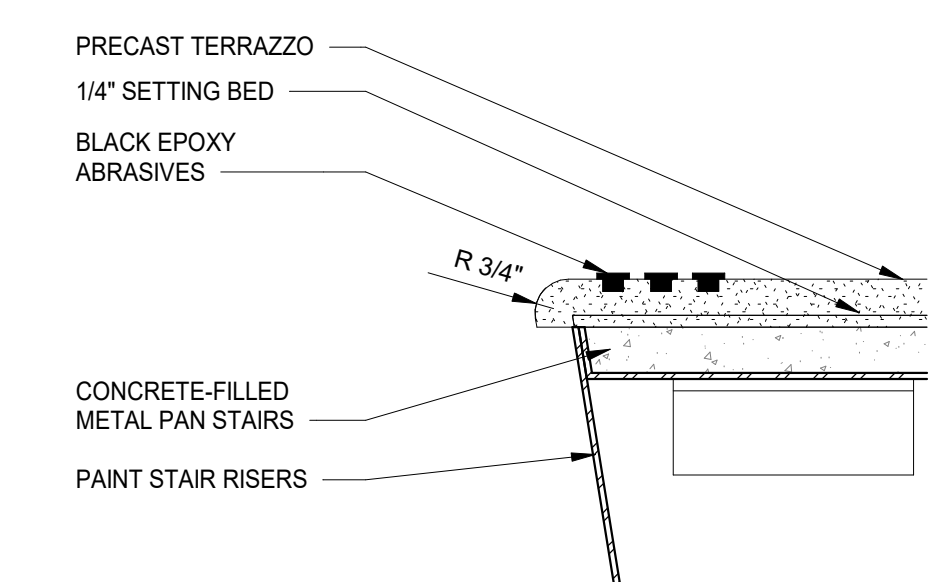
6 STAIR & RAILING DETAIL AT BOTTOM OF RUN
SCALE: 1" = 1'-0"



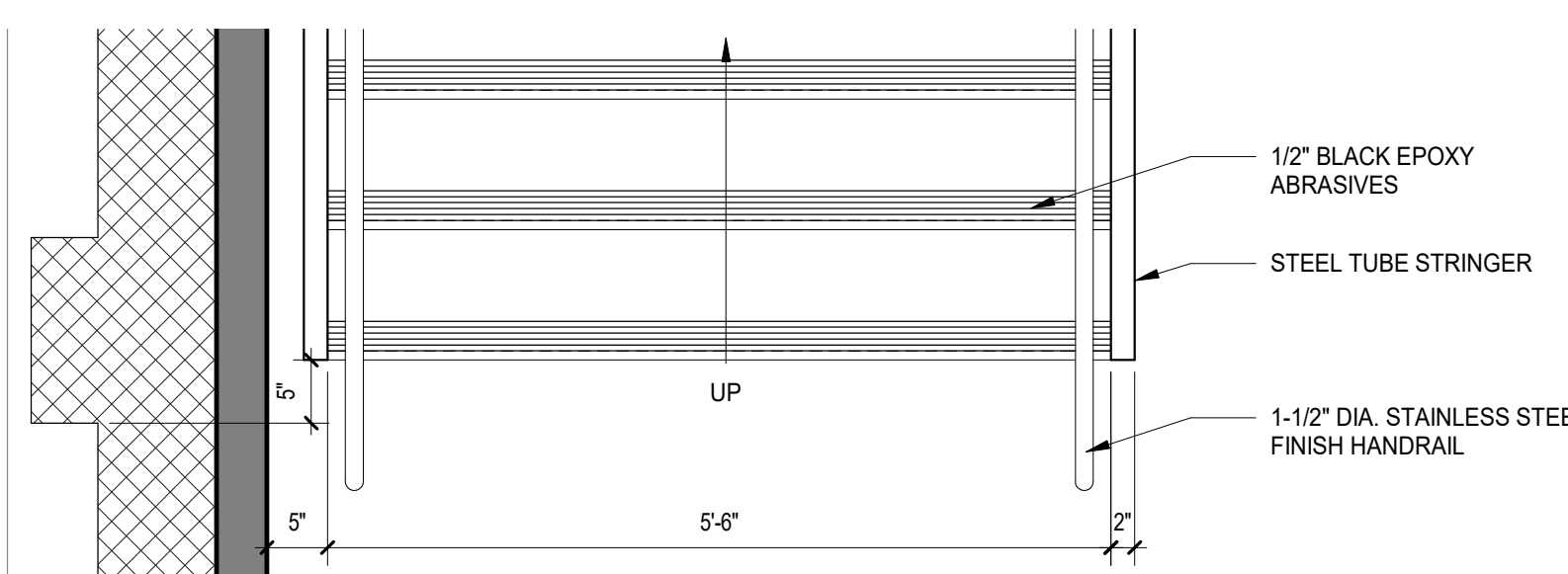
8 GUARDRAIL SECTION @ CORRIDOR
SCALE: 1 1/2" = 1'-0"



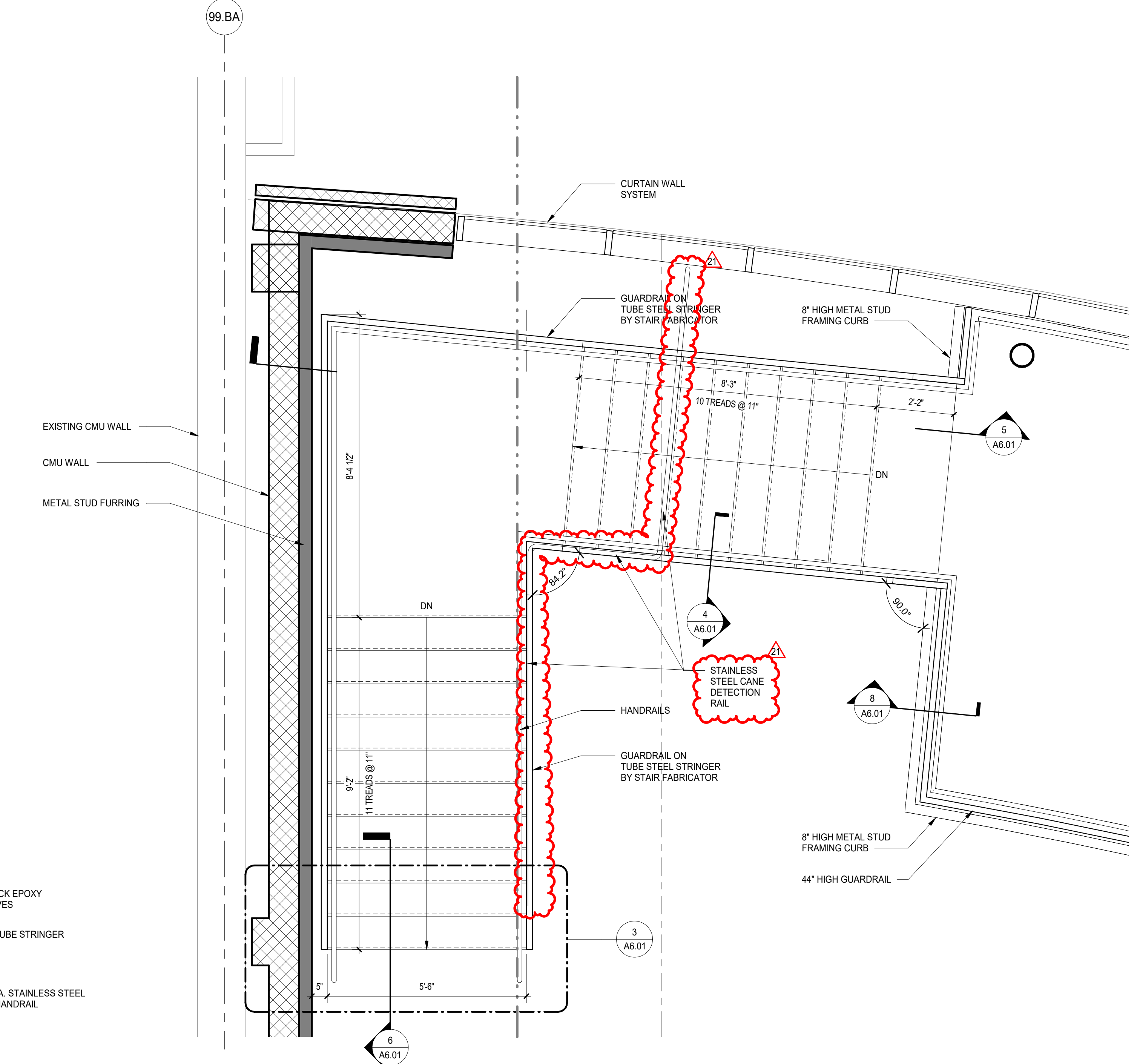
4 GUARDRAIL SECTION @ STAIRS
SCALE: 1 1/2" = 1'-0"



7 STAIR DETAIL - NOSING
SCALE: 3" = 1'-0"



3 STAIR DETAIL - ENLARGED PLAN @ LANDING
SCALE: 3/4" = 1'-0"



2 ENLARGED STAIR PLAN - LEVEL 2 - AREA C.2
SCALE: 1/2" = 1'-0"

**NOT FOR
CONSTRUCTION**

21	ISSUED FOR ADDENDUM 1 - B07	06.25.2019
20	ISSUED FOR BID GROUP 7 - PHASE B	06.07.2019
19	ISSUED FOR 75% CONSTRUCTION DOCUMENTS	05.10.2019
18	ISSUED FOR DESIGN DEVELOPMENT - PHASE B	03.11.2019
REV	ISSUE	DATE

**MFP
IMPLEMENTATION -
SOUTH**

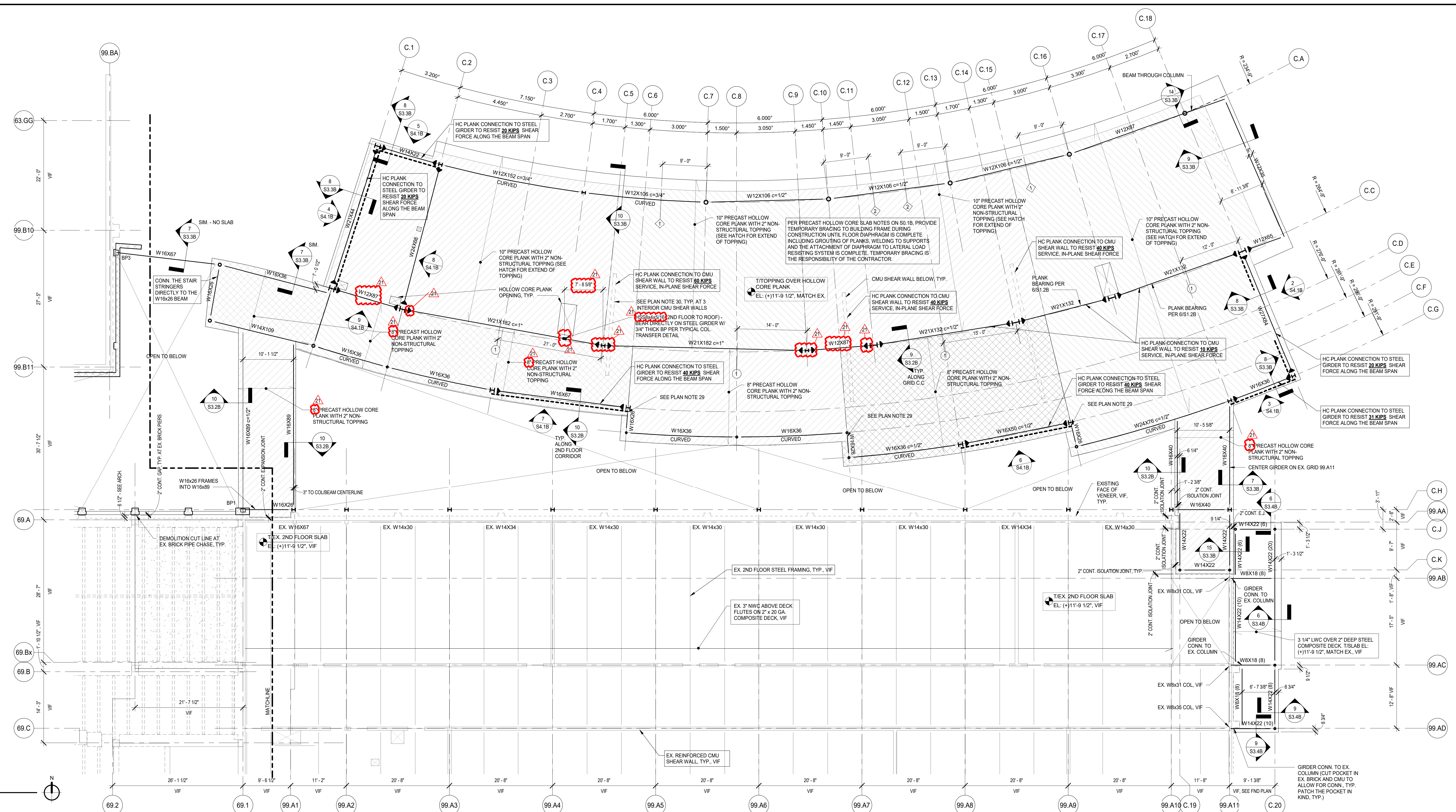
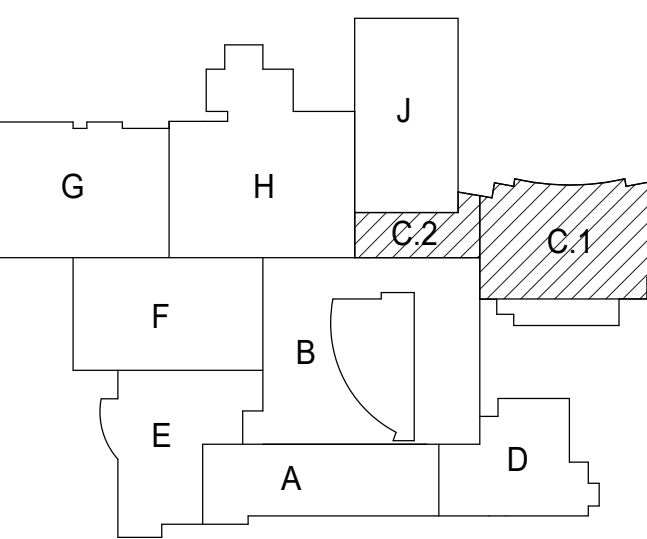
1436 NORFOLK STREET
DOWNERS GROVE, IL 60516

STAIR PLANS & DETAILS

Project Number:
5274-42
Drawn By:
A.SASSILA

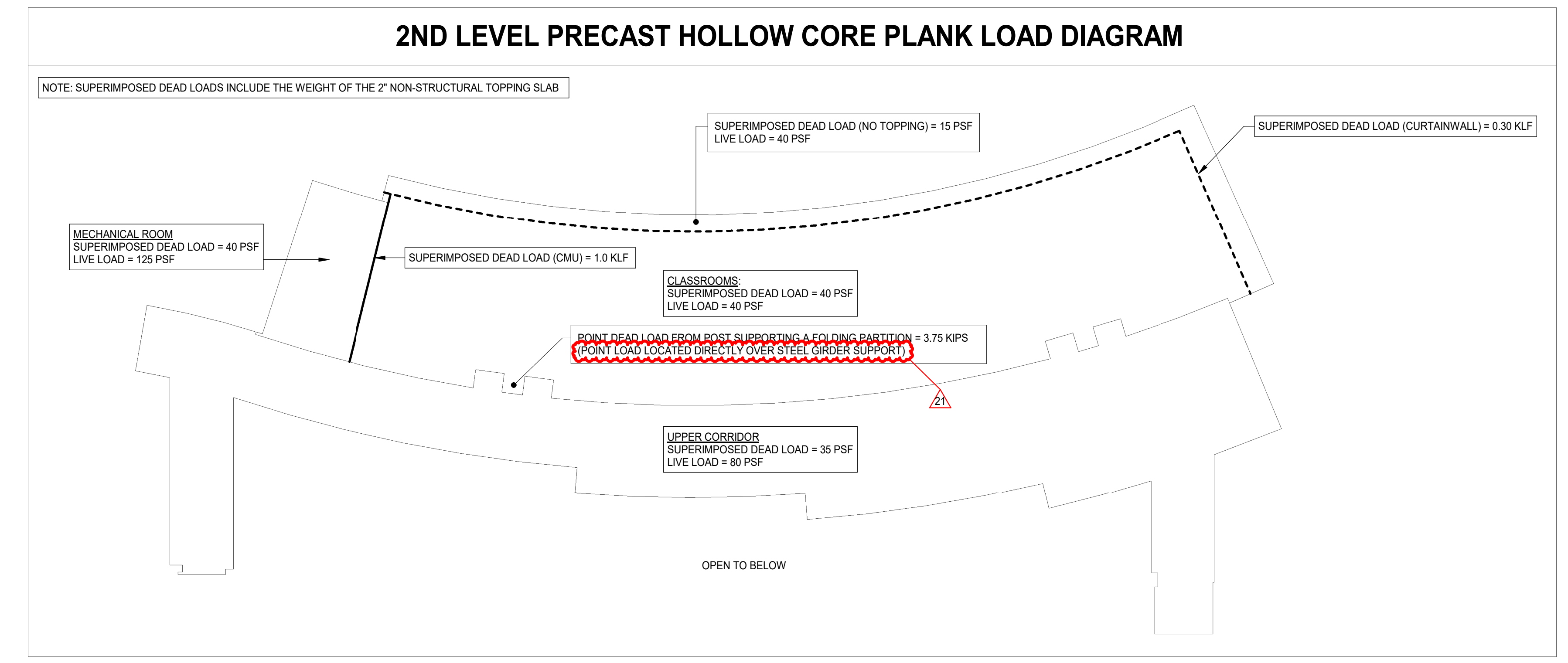
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A6.01



1 BRACED FRAME ELEVATION
SCALE: 1/8" = 1'-0"

- ELEVATED FLOOR AND ROOF PLAN NOTES**
- SEE S0 SERIES DRAWINGS FOR GENERAL NOTES, ABBREVIATIONS, SYMBOLS AND LINTEL SCHEDULES.
 - SEE S1 SERIES DRAWINGS FOR TYPICAL SECTIONS AND DETAILS.
 - SEE S3 SERIES DRAWINGS FOR NON-TYPICAL SECTIONS AND DETAILS.
 - SEE S4 SERIES DRAWINGS FOR SCHEDULES AND DETAILS.
 - SEE S5 SERIES DRAWINGS FOR ELEVATIONS.
 - SEE PLANS FOR TOP OF HOLLOW CORE PLANK ELEVATION.
 - CONCRETE TOPPING OVER HOLLOW CORE PLANK SHALL BE 2" THICK. REINFORCE NON-STRUCTURAL TOPPING SLAB WITH 4 LBS/CY YD. OF STIRRA 9040 MACROSYNTHETIC FIBERS OR EQUIVALENT.
 - (H) AS INDICATED ON PLAN INDICATES HIGHER BEAM OF FRAMING MEMBERS IN SAME VERTICAL PLANE.
 - (L) AS INDICATED ON PLAN INDICATES LOWER BEAM OF FRAMING MEMBERS IN SAME VERTICAL PLANE.
 - SEE ARCHITECTURAL DRAWINGS FOR CURBS NOT INDICATED (SIZE AND LOCATION). SEE TYPICAL SECTIONS AND DETAILS FOR CURB REINFORCEMENT.
 - FLOOR DECK SHALL BE 3/4" THICK LIGHTWEIGHT CONCRETE OVER 2" DEEP COMPOSITE STEEL FLOOR DECK. REINFORCE SLAB WITH 4 LBS/CY YD. OF STIRRA 9040 MACROSYNTHETIC FIBERS OR EQUIVALENT.
 - SEE PLAN FOR BOTTOM OF STEEL DECK ELEVATIONS. TYPICAL UNLESS NOTED OTHERWISE.
 - ROOF DECK SHALL BE 1 1/2" DEEP STEEL ROOF DECK AND ON PLAN.
 - SEE PLAN FOR BOTTOM OF STEEL ROOF DECK ELEVATIONS. TYPICAL UNLESS NOTED OTHERWISE.
 - PROVIDE 1/2"x6"x6" STEEL ANGLE OR BENT PLATE AT ROOF PERIMETER AND STEEL ANGLE OR BENT PLATE AT INTERIOR OPENINGS IN ACCORDANCE WITH TYPICAL DETAILS.
 - SEE SHEET S5.28 FOR SPECIAL DESIGN JOIST SCHEMATIC LOADINGS.
 - SUSPEND PIPE HANGERS AND OTHER MECHANICAL EQUIPMENT FROM DESIGNATED OR APPROVED STEEL JOISTS. LOCATE CONCENTRATED LOADS AT JOIST PANEL POINTS ONLY OR REINFORCE STEEL JOISTS IN ACCORDANCE WITH TYPICAL SECTIONS AND DETAILS.
 - PLACE SUPPORTS FOR ROOF TOP EQUIPMENT LOADS ON DESIGNATED OR APPROVED STEEL JOISTS. LOCATE CONCENTRATED LOADS AT JOIST PANEL POINTS ONLY OR REINFORCE STEEL JOISTS IN ACCORDANCE WITH TYPICAL SECTIONS AND DETAILS.
 - SUPPORT ALL MEPPF EQUIPMENT AND PIPING LARGER THAN 2" IN DIAMETER DIRECTLY FROM THE DESIGNATED STEEL ROOF JOIST AND STEEL WIDE-FLANGED BEAM AND GIRDER FRAMING. DO NOT SUPPORT THE FOREMENTIONED FROM THE STEEL ROOF DECK DIRECTLY. ITEMS SUCH AS LIGHTWEIGHT CEILING GRD. LIGHTING MAY BE SUPPORTED FROM THE ROOF DECK DIRECTLY.
 - AT THE NEW ADDITION, ALL ROOFS ARE DESIGNED TO SUPPORT A MAXIMUM ALLOWED SUPERIMPOSED DEAD LOAD FROM THE PHOTOVOLTAIC BALLASTED SYSTEM OF 8 PSF PLUS THE ADDITIONAL DOWNWARD WIND PRESSURE FROM THE PHOTOVOLTAIC BALLASTED SYSTEM OF 13 PSF. SYSTEMS OTHER THAN THE PHOTOVOLTAIC BALLASTED SYSTEM ARE NOT PERMITTED.
 - AT 2ND FLOOR ONLY - SAW CUT 1/4" WIDE x 1/2" DEEP CONTROL JOINTS IN THE NON-STRUCTURAL TOPPING SLAB AT AREAS OF EXPOSED 'SALTED CONCRETE' FINISH. LOCATE JOINTS AT COLUMN CENTERLINES AND AT 12 FEET CTS MAX AT REMAINDER.
 - MAXIMUM LIVE LOAD DEFLECTION AT HOLLOW CORE PLANK = 3/16" TYP.
 - 2ND FLOOR NON-STRUCTURAL TOPPING SLAB SHALL RECEIVE TROWEL FINISH, PER SPECIFICATION SECTION 03300, SECTION 3.0. COORDINATE TROWELING AND FLOATING PROCEDURE WITH THE MACRO SYNTHTIC FIBER SUPPLIER/MANUFACTURER.
 - SEE STEEL DECK NOTES ON S0.18 FOR STEEL DECK DIAPHRAGM INFORMATION.
 - MAXIMUM LIVE LOAD DEFLECTION AT THE ROOF STRUCTURE = 1" TYP.
 - ALL MEPP EQUIPMENT STEEL SUPPORTS SHALL BE COORDINATED WITH THE INSTALLING CONTRACTORS. SEE PLANS AND TYPICAL DETAILS FOR STEEL SUPPORT REQUIREMENTS.
 - COORDINATE SIZE AND QUANTITY OF ROOF DECK PENETRATIONS WITH MEPPF DRAWINGS. TYP. REINFORCE NEW PENETRATIONS IN EXISTING NEW ROOF DECKS PER TYPICAL STRUCTURAL DETAILS.
 - SEE PLAN FOR PLAN NOTE 28 CALL OUT LOCATIONS - DESIGN AND DETAIL THE ANGLE CONNECTION TO THE TOP OF STEEL COLUMN AND TO THE ROOF JOIST TOP CHORD FOR AN AXIAL FORCE OF 3 KIPS. JOIST SUPPLIER/MANUFACTURER SHALL DESIGN THE STEEL JOIST TOP CHORD FOR THE FOREMENTIONED AXIAL FORCE.
 - SEE TYPICAL DETAIL 201.28 FOR CMU WALL-TO-HOLLOW CORE PRECAST PLANK CONNECTION. TYP. AT 3 INTERIOR CMU SHEAR WALLS.
 - FOR BEAM BEARING PLATE SCHEDULE. SEE SHEET S2.2B-C2.
 - SEE 1051.28 FOR THE STEEL JOIST BEARING PLATE INFORMATION.



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REV	ISSUE	DATE
21	ISSUED FOR ADDENDUM 1 - BID GROUP 7 - PHASE B	06.25.2019
16	ISSUED FOR ADDENDUM 3 - BID GROUP 6	06.07.2019
14	ISSUED FOR ADDENDUM 2 - BID GROUP 6	05.31.2019
	ISSUED FOR BID - BID GROUP 6	05.10.2019
	ISSUED FOR 75% CD - PHASE B	05.10.2019
	ISSUED FOR 50% CONSTRUCTION DOCUMENTS - PHASE B	04.12.2019
	ISSUED FOR DESIGN DEVELOPMENT - PHASE B	03.11.2019

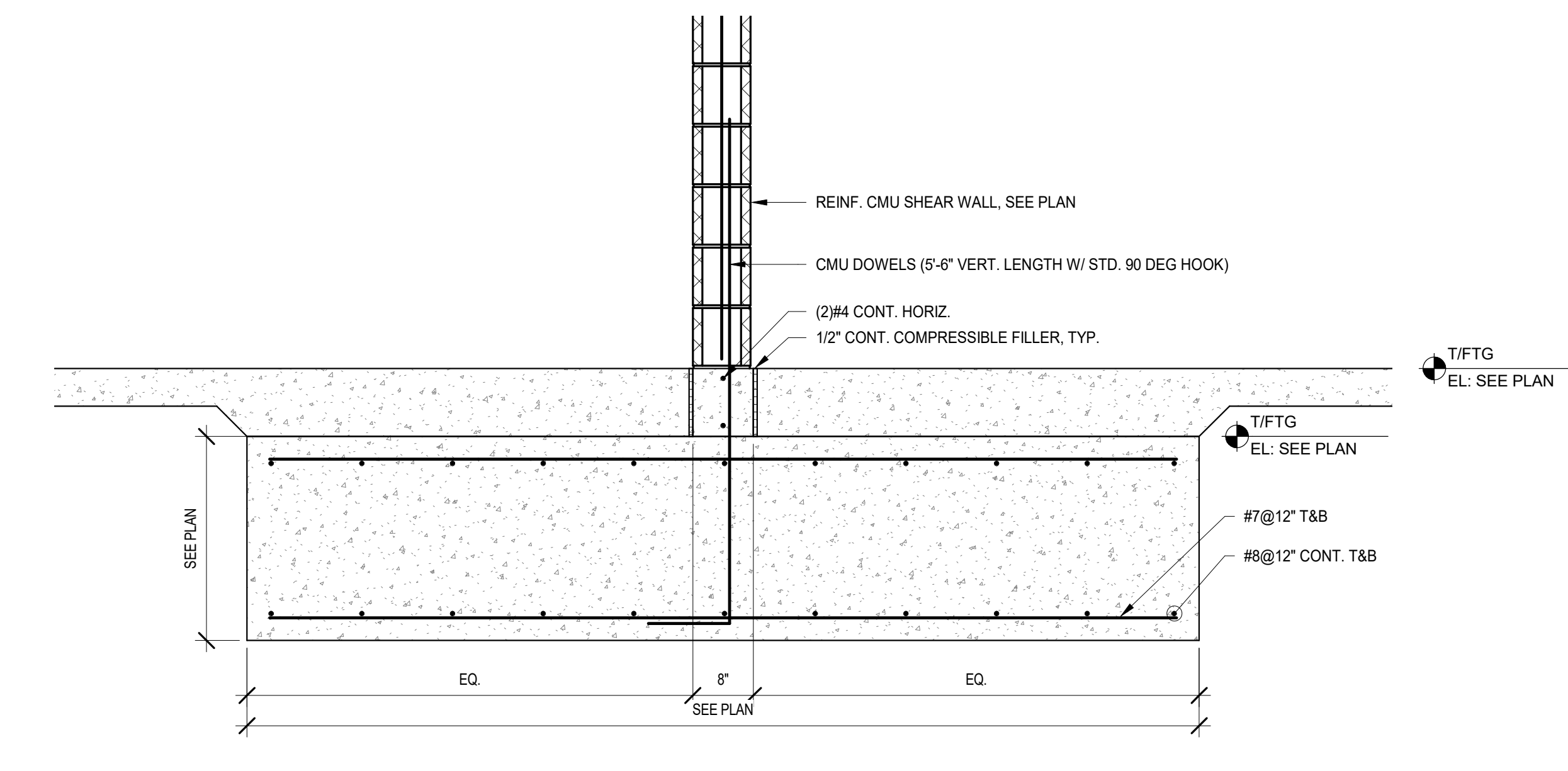
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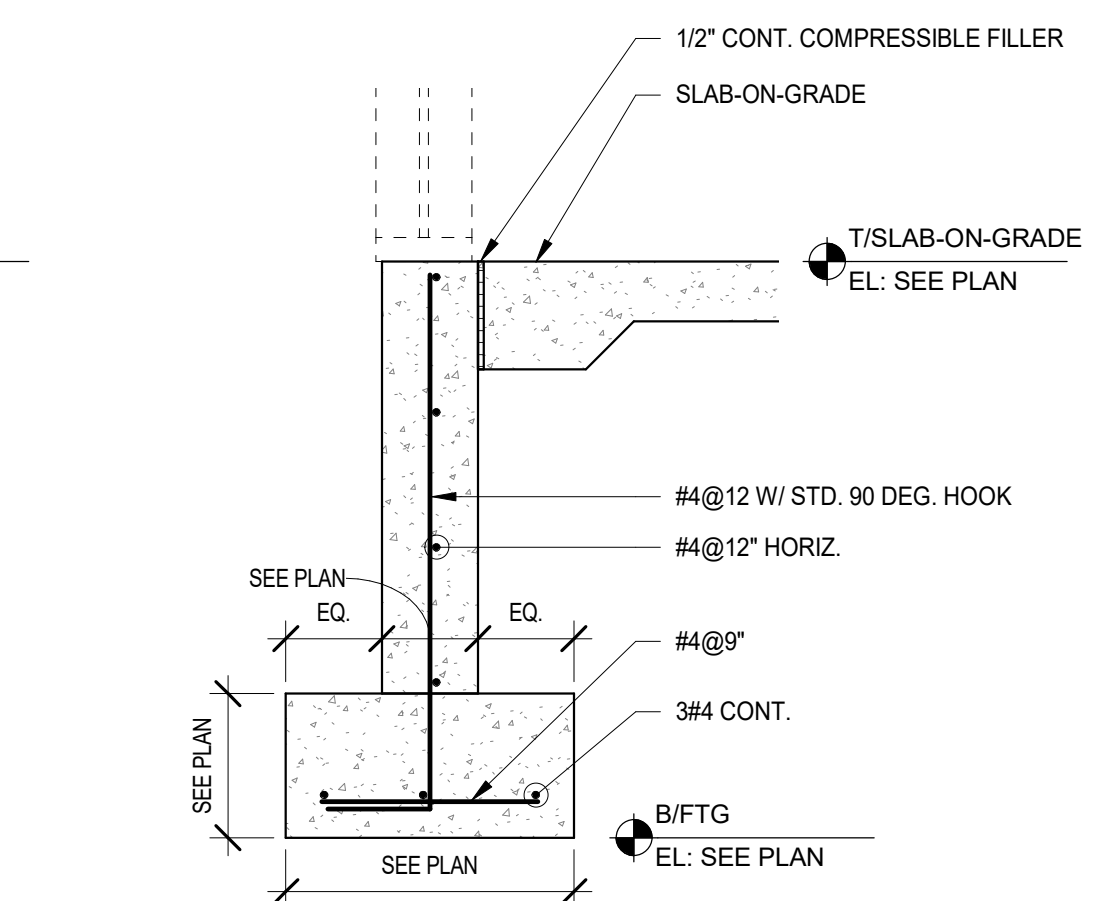
2ND FLOOR FRAMING PLAN - AREA C.1

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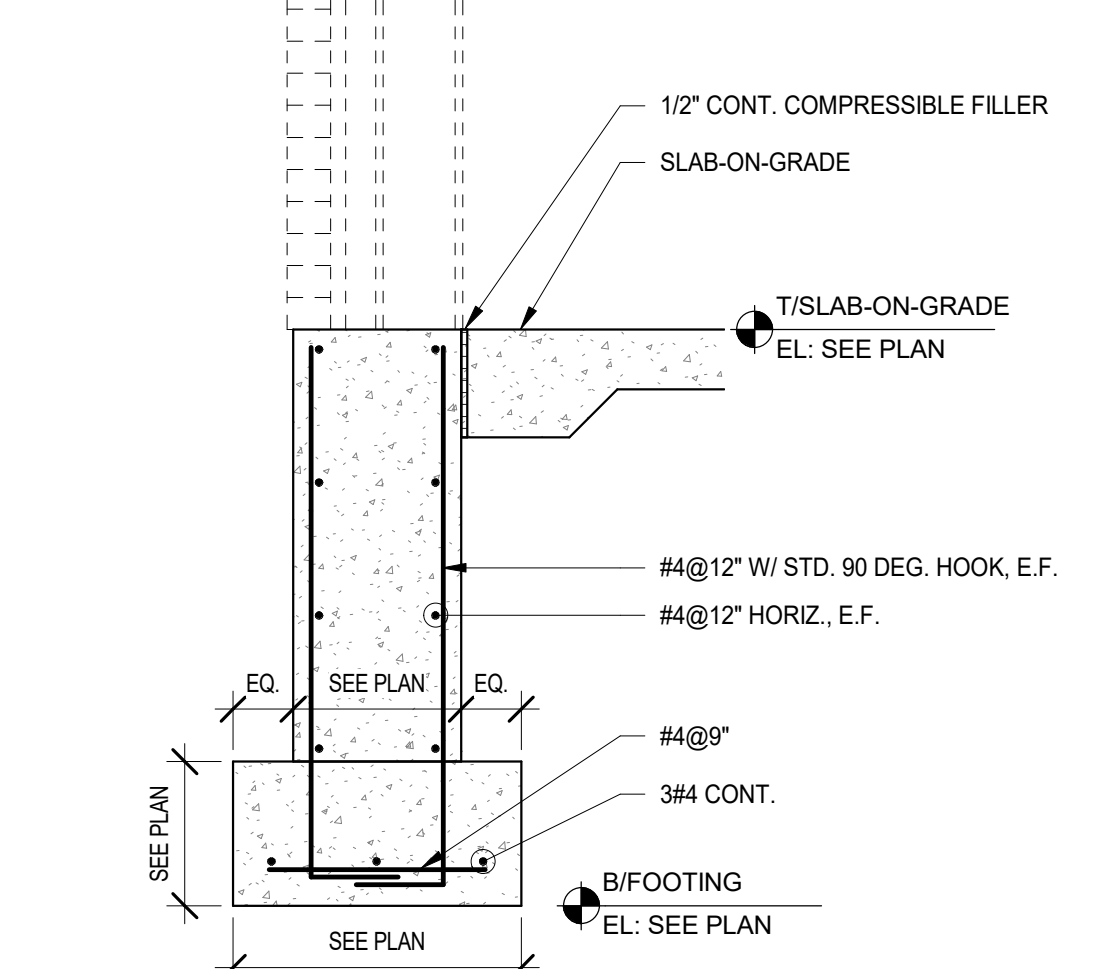
S2.2B-C1



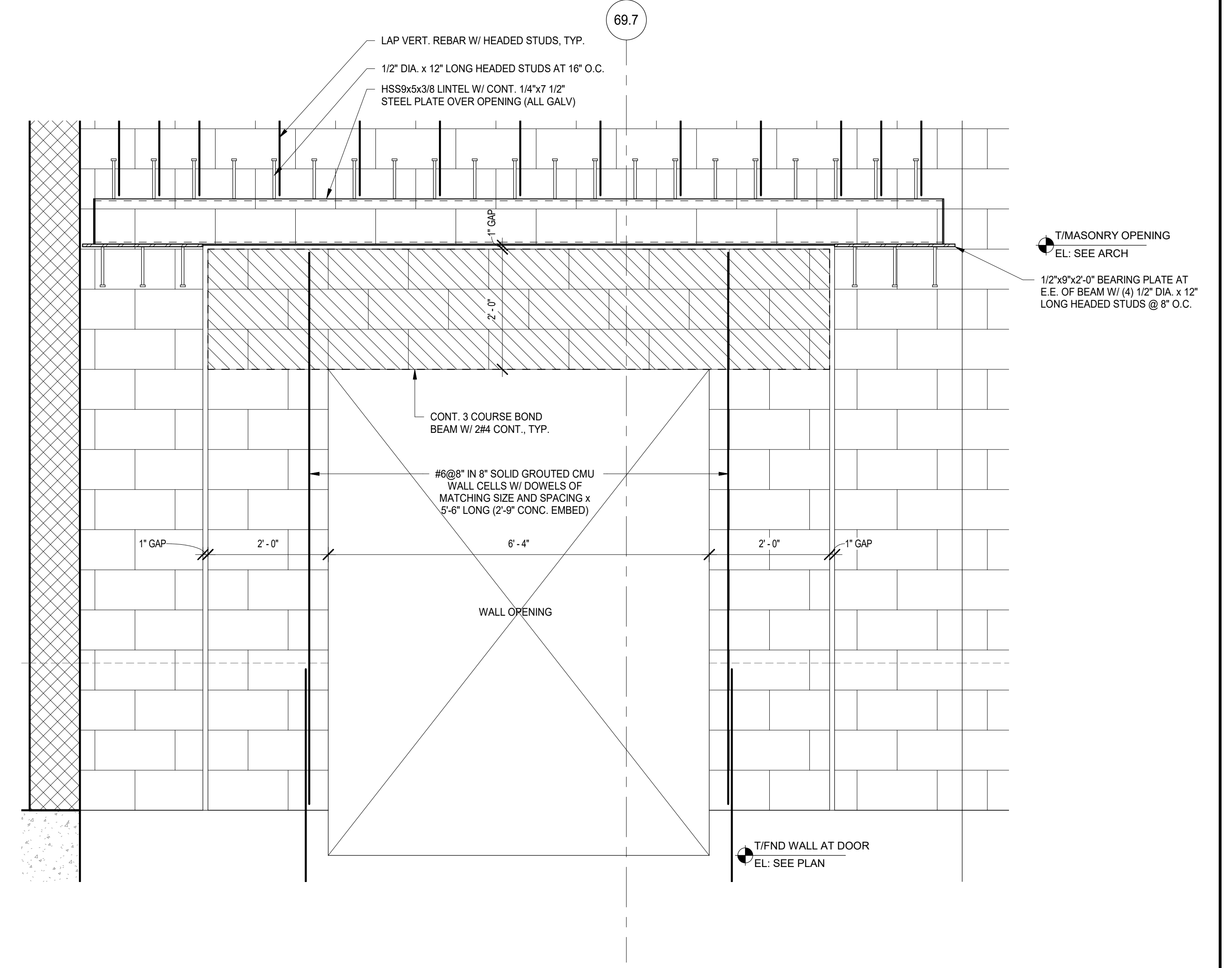
6 FOUNDATION DETAIL
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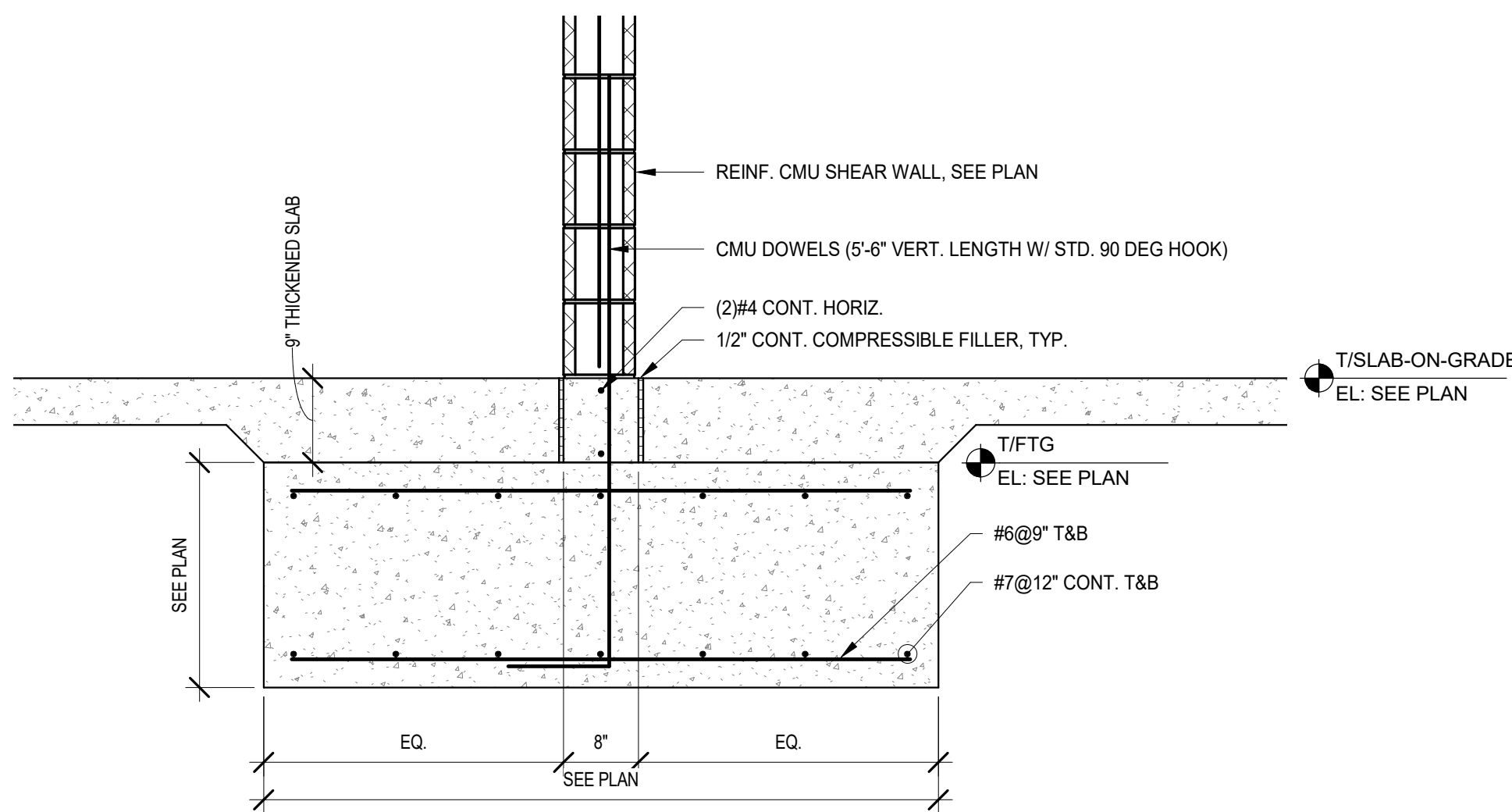
4 FOUNDATION DETAIL
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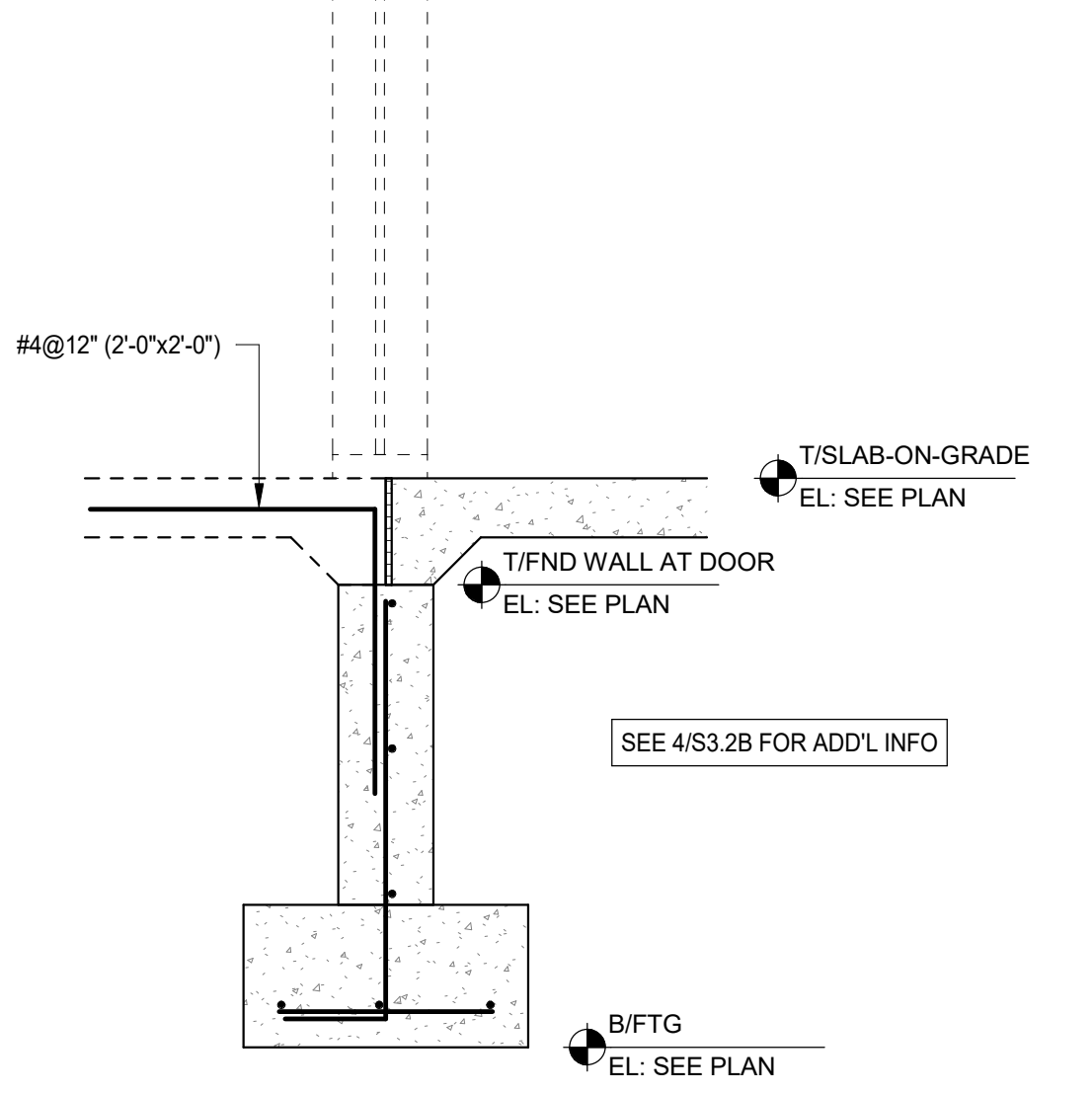
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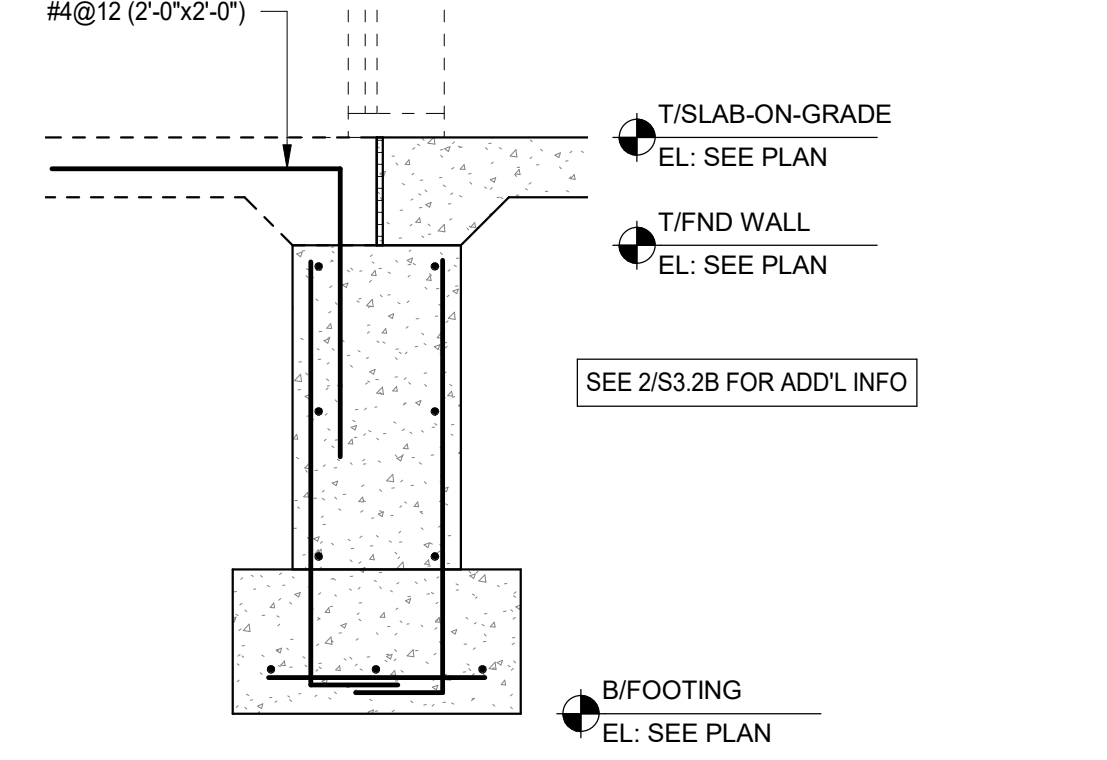
1 CMU FIREWALL ELEVATION
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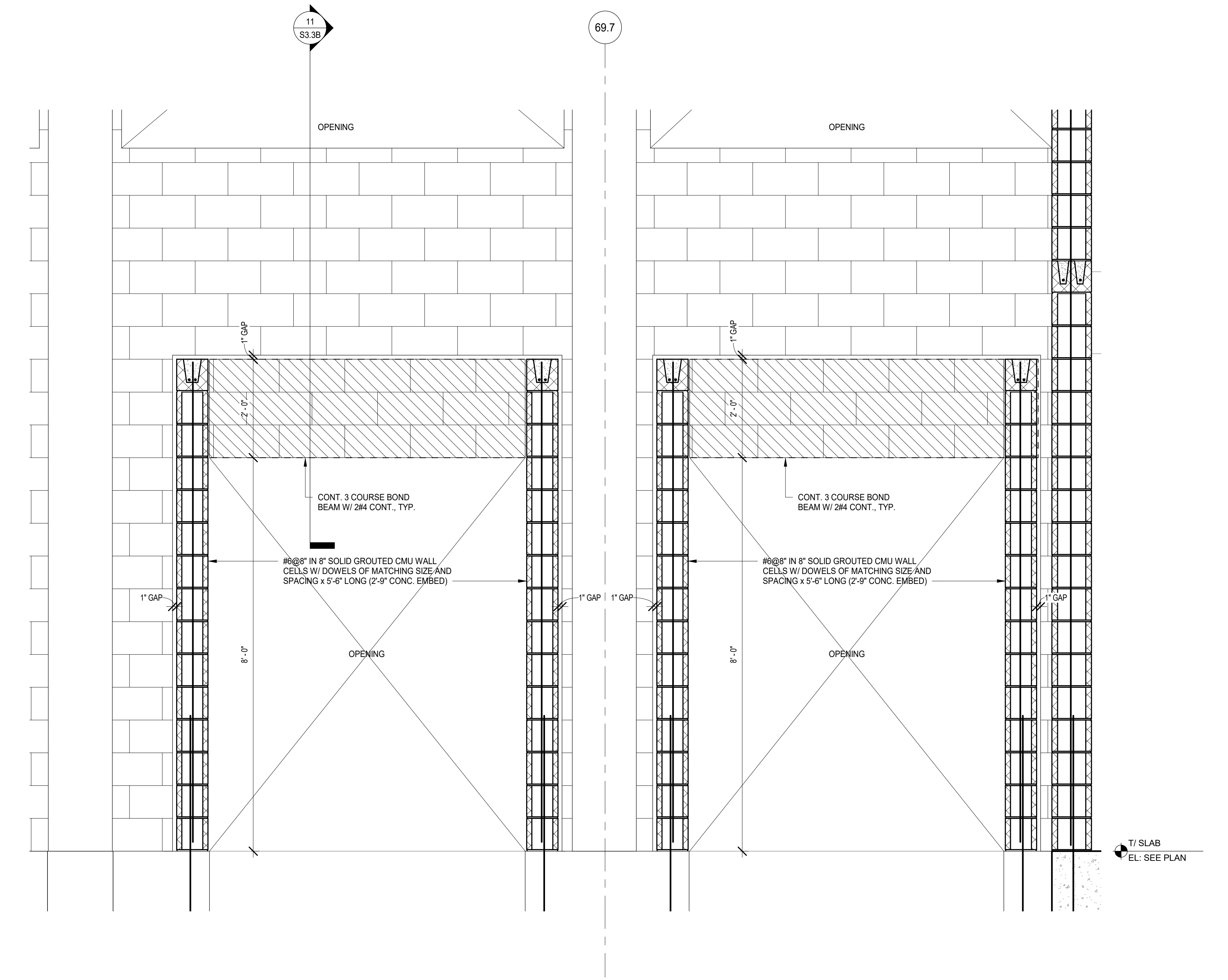
7 FOUNDATION DETAIL
SCALE: 3/4" = 1'-0"



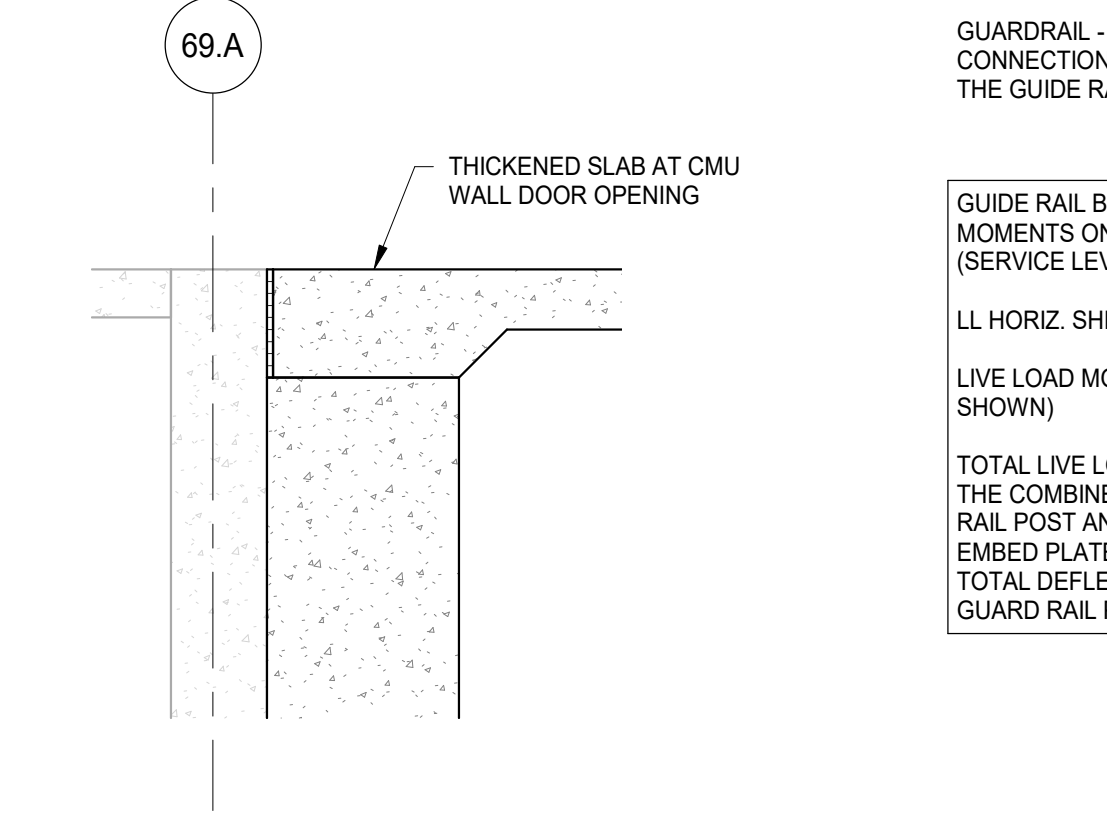
5 FOUNDATION DETAIL
SCALE: 3/4" = 1'-0"



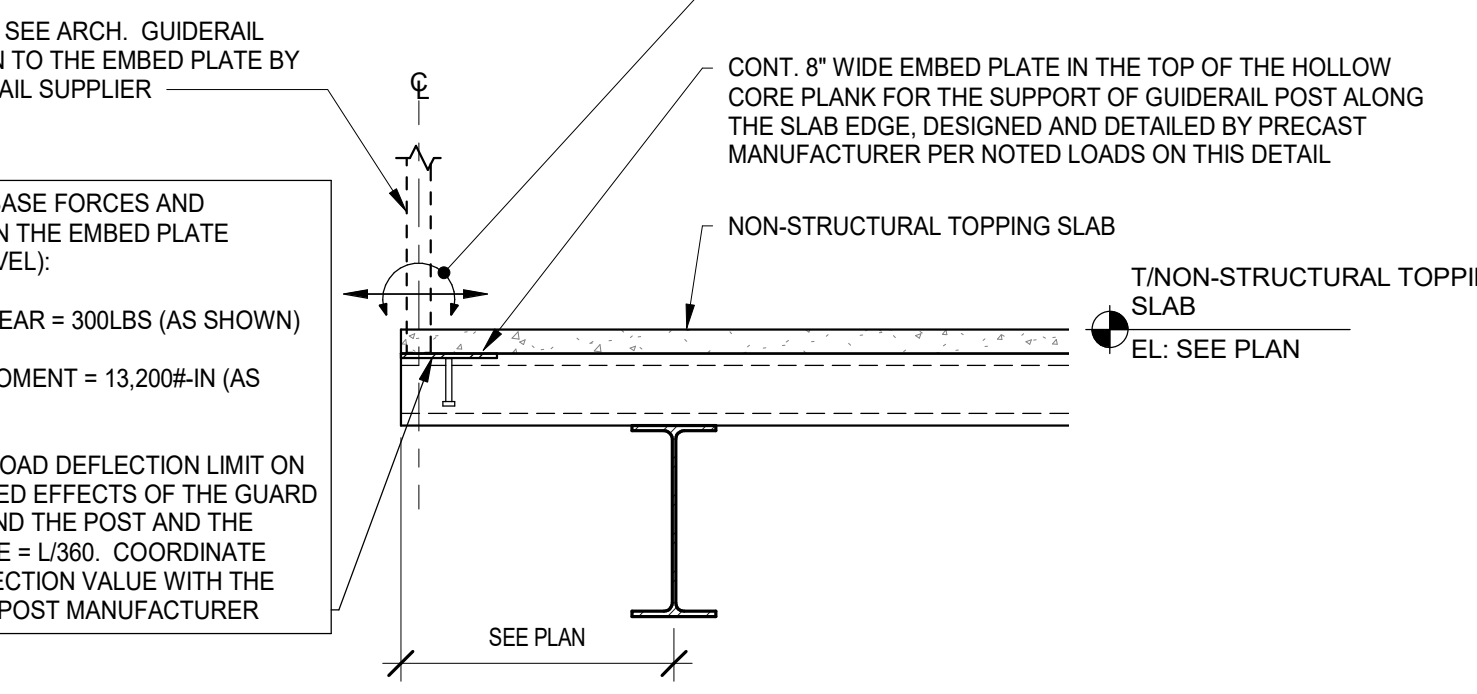
3 FOUNDATION DETAIL
SCALE: 3/4" = 1'-0"



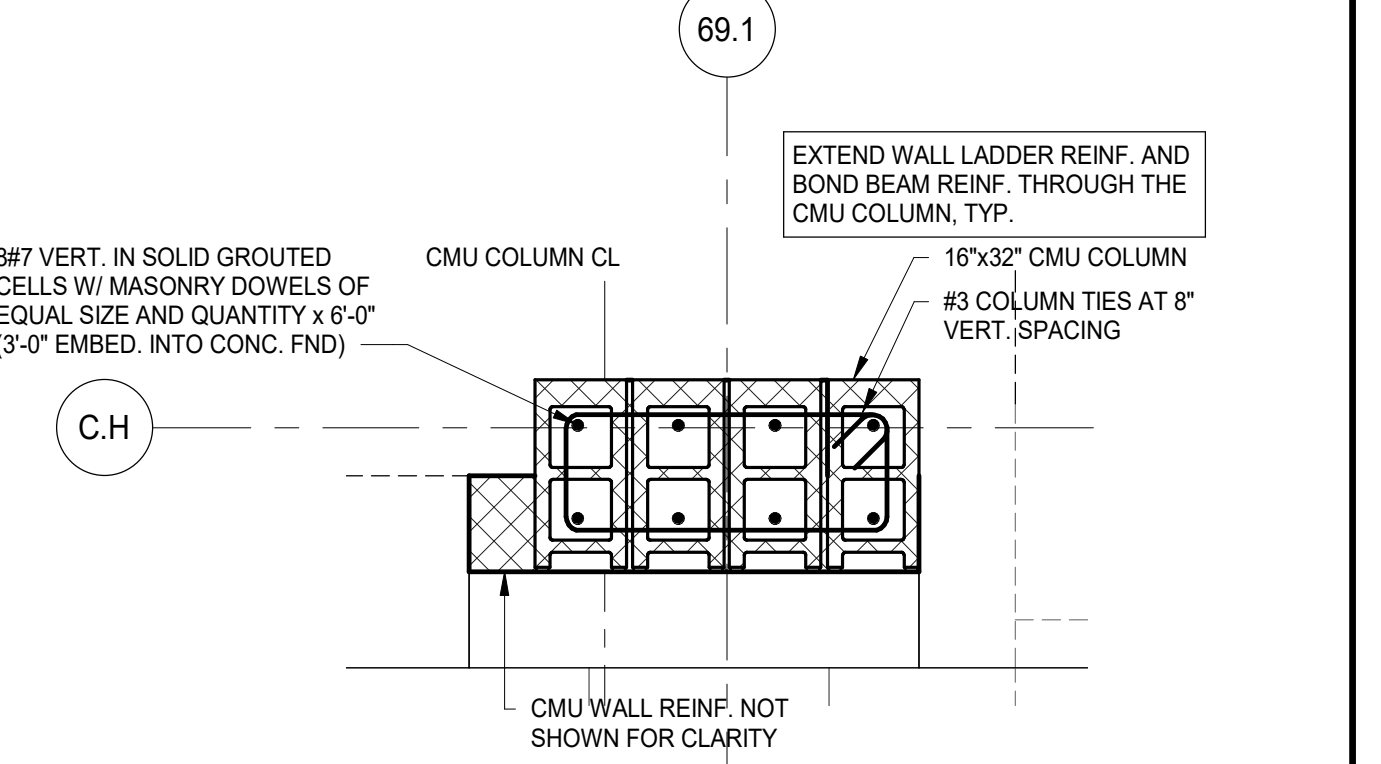
13 CMU FIREWALL ELEVATION
SCALE: 3/4" = 1'-0"



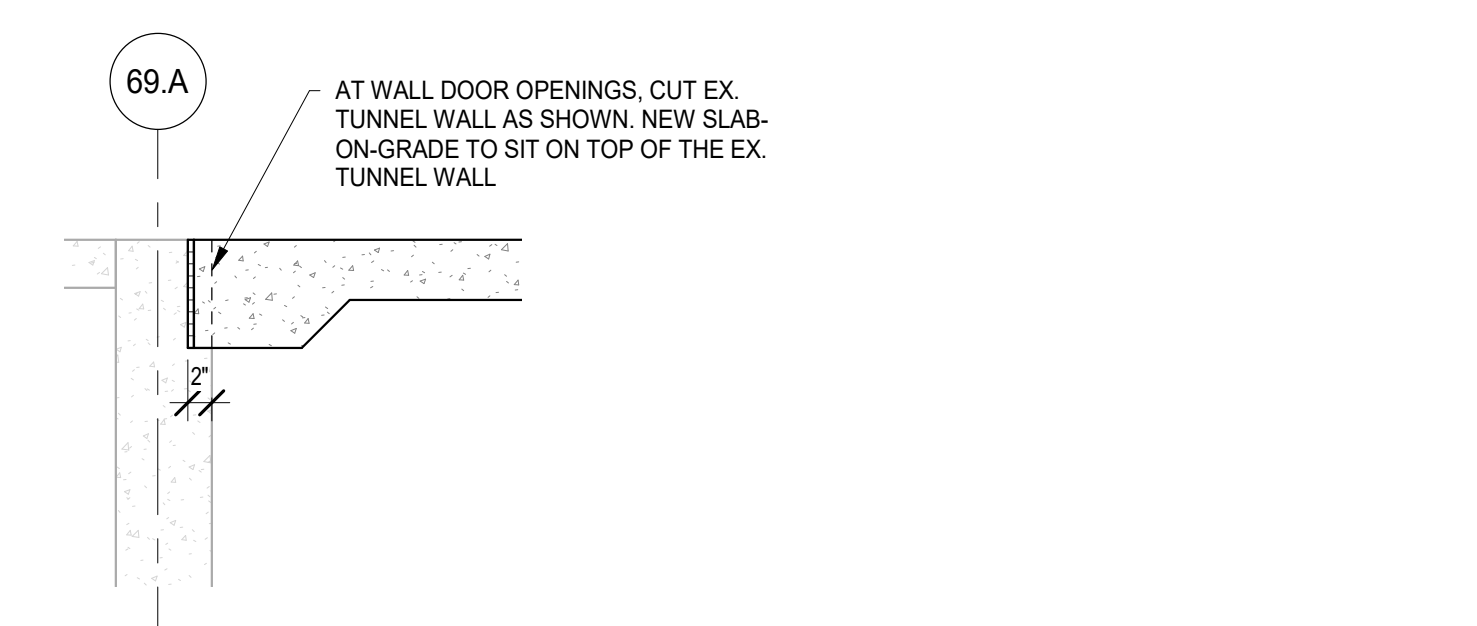
12 FOUNDATION DETAIL
SCALE: 3/4" = 1'-0"



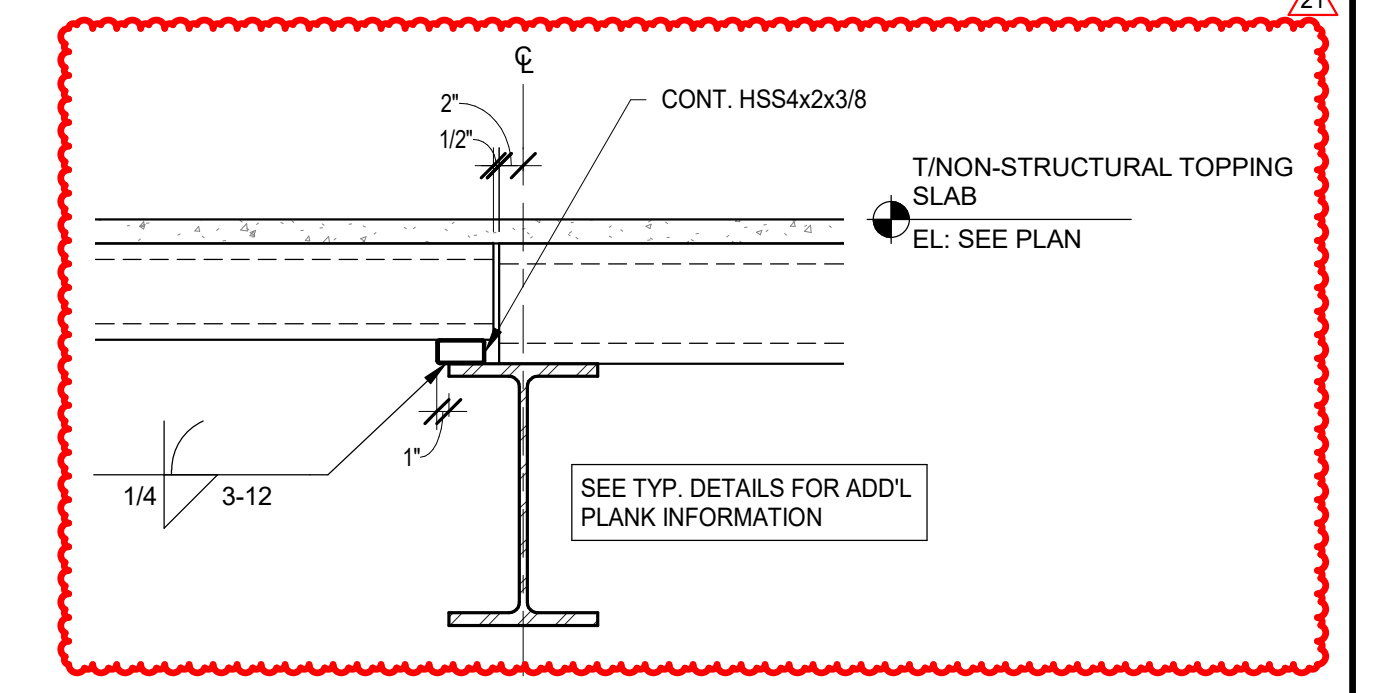
10 FRAMING DETAIL
SCALE: 3/4" = 1'-0"



8 CMU COLUMN ENLARGED PLAN VIEW
SCALE: 3/4" = 1'-0"



11 FOUNDATION DETAIL
SCALE: 3/4" = 1'-0"



9 FRAMING DETAIL
SCALE: 3/4" = 1'-0"

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21	ISSUED FOR ADDENDUM 1 - R/F	06.25.2019
	ISSUED FOR BID GROUP 7 - PHASE B	06.07.2019
18	ISSUED FOR ADDENDUM 3 - BID GROUP 6	06.07.2019
14	ISSUED FOR ADDENDUM 2 - BID GROUP 6	05.31.2019
	ISSUED FOR BID - BID GROUP 6	05.10.2019
	ISSUED FOR 75% CD - PHASE B	05.10.2019
REV	DATE	DATE

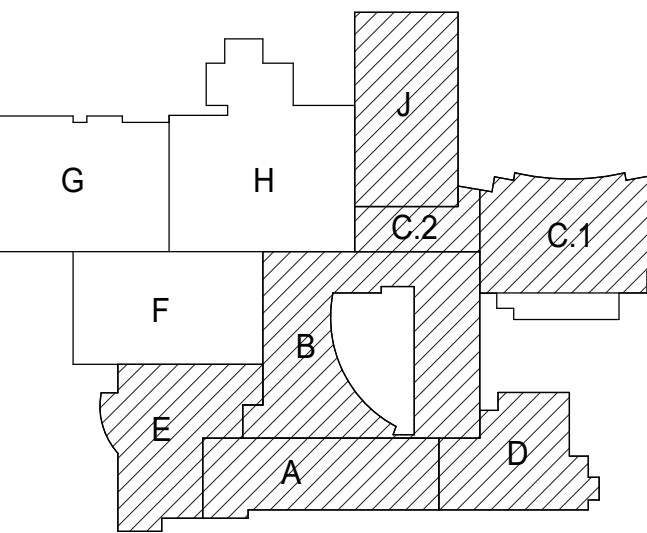
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NON-TYPICAL SECTIONS AND DETAILS

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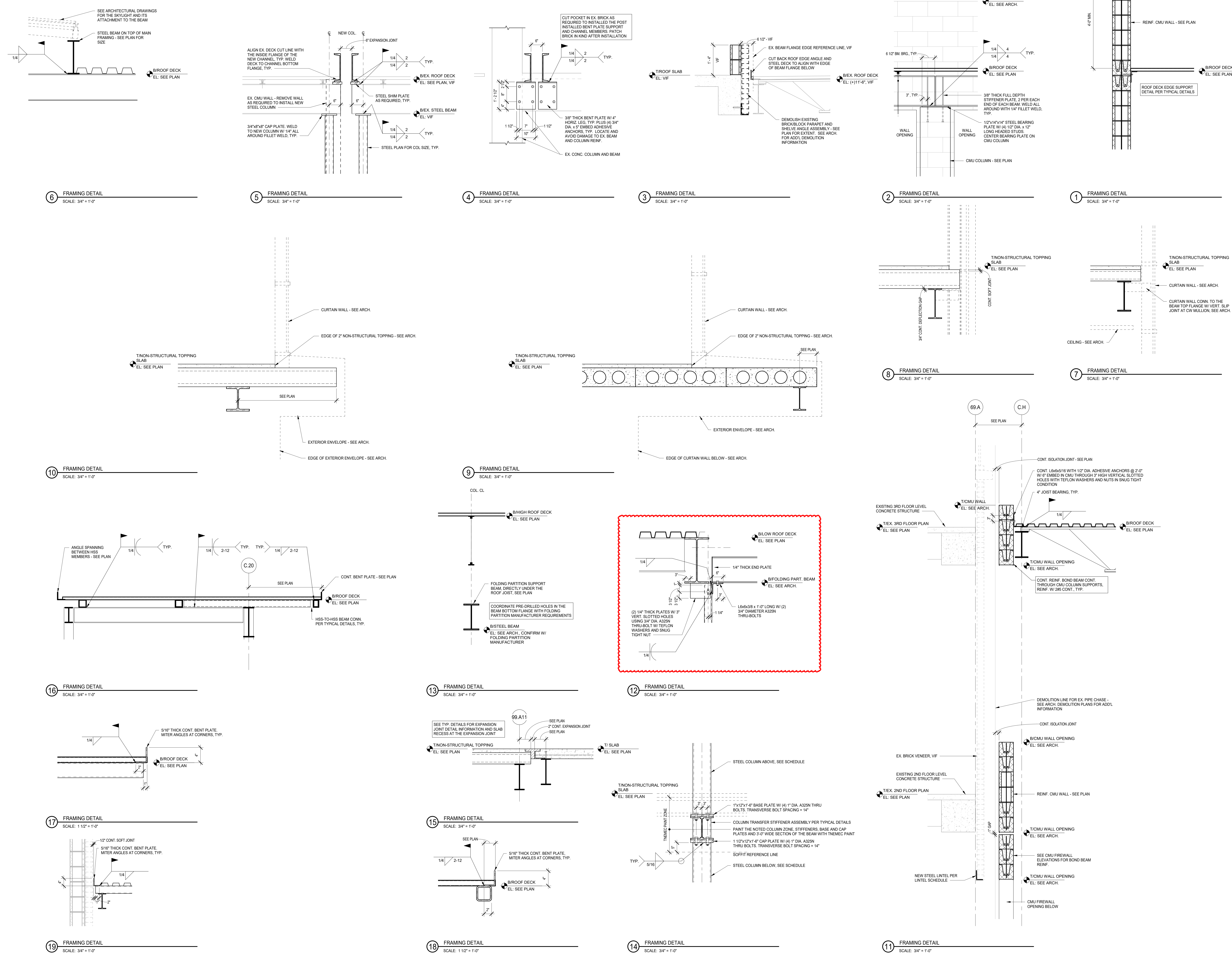
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	ISSUED FOR 75% CD - PHASE B	05.10.2019
REV	ISSUE	DATE

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NON-TYPICAL SECTIONS AND DETAILS

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