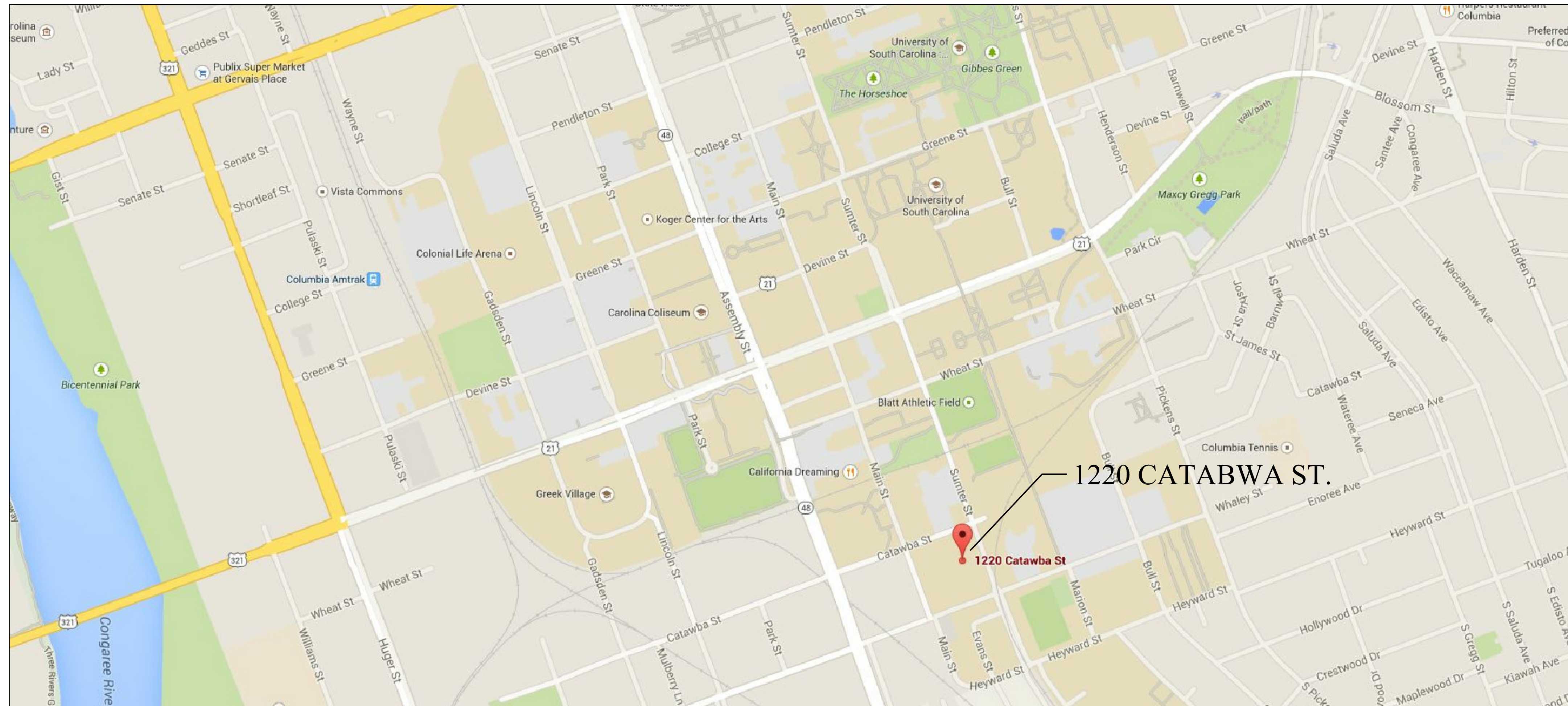


# SPENT FUEL RESEARCH LAB UPFIT - KNIGHT UNIVERSITY OF SOUTH CAROLINA COLUMBIA, SOUTH CAROLINA



## SYMBOLS

	DIMENSION TO FACE OF CONSTRUCTION (AS NOTED)		INTERIOR GLAZED FRAME
	DIMENSION TO COLUMN CENTERLINE		PARTITION TYPE
	STOREFRONT/WINDOW		INTERIOR ELEVATION
	DOOR NUMBER		DETAIL
	ROOM NUMBER		SECTION
	COLUMN GRIDLINE		

## A/E PROJECT TEAM

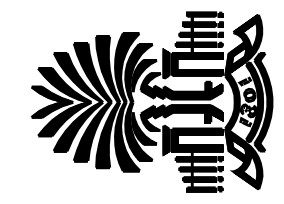
Architectural: WATSON TATE SAVORY, INC.  
Structural: CHAO & ASSOCIATES, INC.  
Mechanical: MECHANICAL DESIGN, INC.  
Electrical: LAND ENGINEERING, INC.

## ABBREVIATIONS

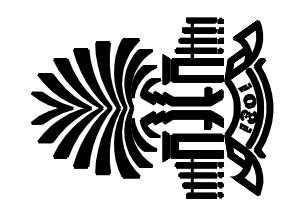
@-	ALTERNATE	MIN-	MINIMUM
&	AND	MO-	MASONRY OPENING
#	NUMBER	MTL-	METAL
CL	CENTER LINE	N.I.C.-	NOT IN CONTRACT
Ø	DIAMETER	NO.-	NUMBER
ACT-	ACOUSTICAL CEILING TILE	O.C.-	ON CENTER
A.F.F.	ABOVE FINISH FLOOR	OD-	OVERFLOW DRAIN
AWI	AMERICAN WOOD INSTITUTE	OH-	OPPOSITE HAND
CF-	COLD FORMED	PNT-	PAINT
CJ-	CONTROL JOINT	RCP-	REFLECTED CEILING PLAN
CONC-	CONCRETE	RD-	ROOF DRAIN
CPT-	CARPET	SIM-	SIMILAR
DS	DOWNSPOUT	SPNK-	SPRINKLERED
DHM-	DETENTION HOLLOW METAL	T-	TEMPERED (GLASS)
EJ-	EXPANSION JOINT (MASONRY)	TB+	TO BE ISSUED
EQ-	EQUAL	TBD-	TO BE DETERMINED
EWC-	ELECTRIC WATER COOLER	TEMP-	TEMPORARY
EXST-	EXISTING	TYP-	TYPICAL
FE-	FIRE EXTINGUISHER	U.N.O.-	UNLESS NOTED OTHERWISE
FEC-	FIRE EXTINGUISHER CABINET	V.I.F.-	VERIFY IN FIELD
GA-	GAUGE	VCT-	VINYL COMPOSITE TILE
GEJ-	GYPSPUM WALLBOARD EXPANSION JOINT	W-	WITH
GWB-	GYPSPUM WALLBOARD	WD-	WOOD
HGT-	HEIGHT		
HVAC-	HEATING, VENTILATION, AIR CONDITIONING		
MATL-	MATERIAL		
MAX-	MAXIMUM		
MFG-	MANUFACTURER		

## INDEX OF DRAWINGS:

T1.00	TITLE SHEET
A1.00	FLOOR PLANS, SECTIONS & DETAILS
S0.0	STRUCTURAL GENERAL NOTES & KEY PLAN
S1.0	STRUCTURAL FOUNDATION PLAN AND FRAMING PLAN
S1.1	STRUCTURAL SECTIONS AND DETAILS
S1.2	STRUCTURAL SECTIONS AND DETAILS
M1	HVAC FLOOR PLANS, NOTES, SCHEDULES AND DETAILS
P1	PLMG FLOOR PLAN, NOTES, SCHEDULES, DETAILS AND SPECS
E1.00	GENERAL NOTES, LEGEND, AND SCHEDULES
E2.00	ELECTRICAL SINGLE LINE DIAGRAM
E3.00	OVERALL BUILDING ELECTRICAL FLOOR PLAN
E3.10	MEZZANINE ELECTRICAL PLAN
E4.00	LAB SPACE ELECTRICAL PLANS
E5.00	LAB SPACE LIGHTING PLANS



Revisions:

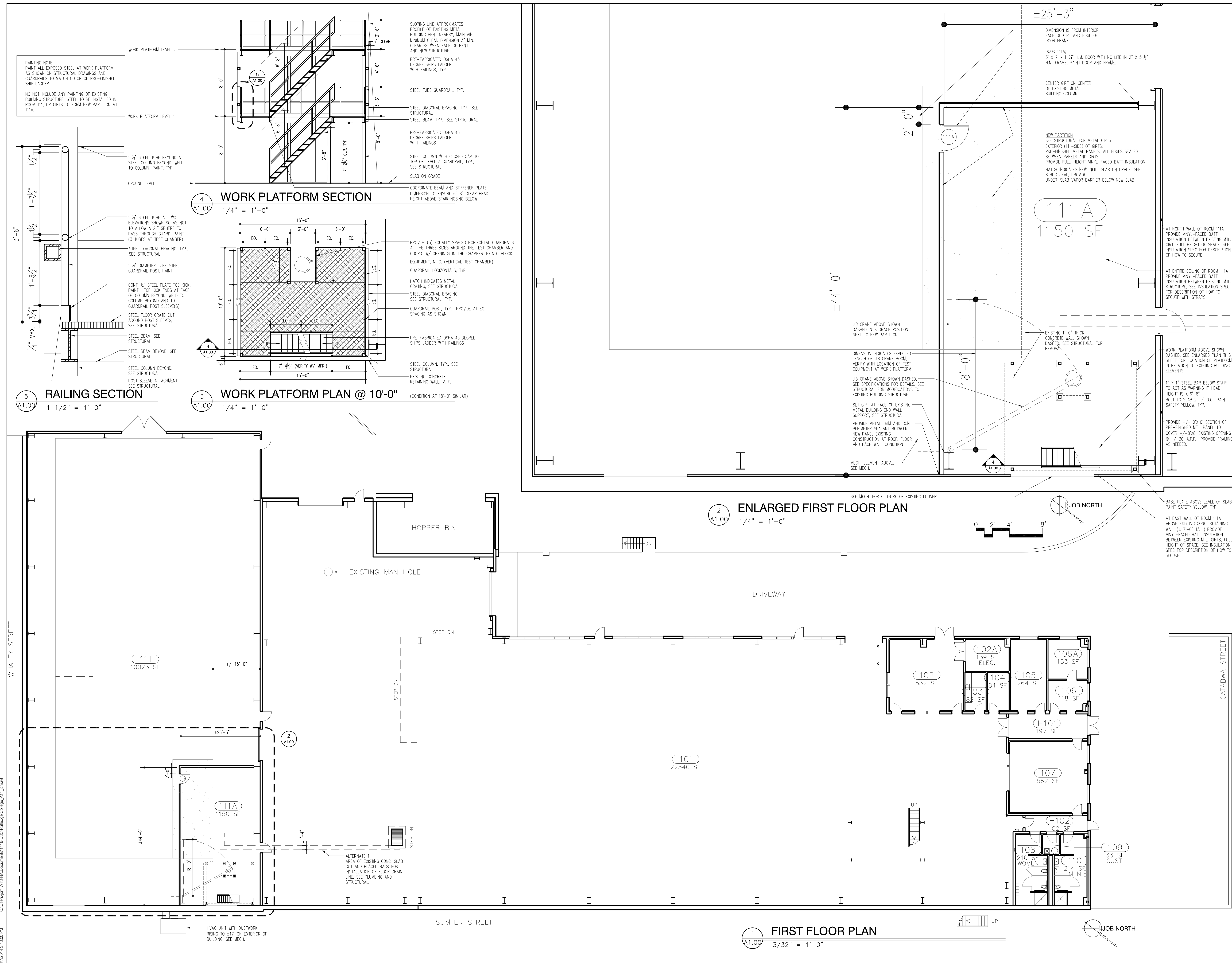
Project Number: 14.3.3.2

Date: 14 AUGUST 2015

Revisions:


FLOOR PLANS,  
SECTIONS &  
DETAILS

**A1.00**



**General Notes:**

- Design Specifications: International Building Code (2012 Edition).  
Design Loads:  
Floor live load: Slab on Grade 100 PSF  
Dead load: Actual
- In case of a discrepancy in dimensions or details, between Architectural and Structural drawings, not affecting strength, the Architect's plans shall govern. For dimensions and details not shown, see Architect's plans and/or field measurement shall be performed by G.C.
- The construction falsework design (if any) is the responsibility of the Contractor. The design shall be performed by a Registered Engineer and shall be submitted for approval before commencing of the work.
- Where a detail is shown on Structural drawings for one condition, it shall apply to all similar or like conditions, unless noted or shown otherwise on plans.
- All items shall be tightly anchored or attached square, plumb, and true, or in other planes and shapes as shown on the drawings. Joints shall be tight, even, and free of offsets. No field altering of any members will be allowed that will cause them not to be in accordance with the drawings and specifications, without written approval of the Project Engineer.
- The dimensions shown with a suffix "±" are approximate and shall be verified by the Contractor before fabrication.
- If the Contractor finds a difference between these drawings & existing conditions, or finds any other conditions which prohibit execution of the work as directed in these drawings, the Contractor shall notify the Engineer immediately.
- The owner shall employ a laboratory to perform the quality assurance, sampling, testing and/or inspection at his expense. Final selection of such laboratory shall be approved by the Engineer.
- The foundation is designed based on an allowable presumptive soil bearing pressure of 2 KSF per IBC 2012. The foundation excavation shall be verified by the Geotechnical Engineer before the placement of foundation. All fill soil shall be compacted at 8" lift in loose thickness. All subgrade of foundation shall be compacted to 95% standard proctor density as a minimum or as directed by soil report.
- Any revision/modification to the original design during the shop drawing process, the Contractor shall clearly cloud line all the changes and shall receive approval from the Engineer in writing before fabrication. Any costs associated with correcting the unapproved change shall be at the Contractor's expense.

**Concrete:**

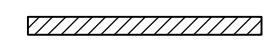


- Concrete: concrete minimum compressive strength at 28 days shall be 3,000 PSI.
- Reinforcement: all mild reinforcement bar shall be A615 grade 60 steel. All welded wire fabric shall conform to ASTM A185, grade 65. All welded wire fabric shall be in sheets and shall be supported on chairs.
- Bending dimensions & tolerances for reinforcing bar shall conform to current CRSI Manual of Standard Practice.
- Lap splices shall conform to the current CRSI Manual of Standard Practice unless otherwise noted.
- Horizontal construction joints to be scrubbed with a coarse wire brush at the approximate time of initial set to remove all laitance and to produce a roughened surface.
- Concrete work shall comply with ACI "Specifications for Structural Concrete" (ACI 301-10) and applicable provisions of ACI 318-11. Keep a copy of ACI Field Reference Manual (ACI SP-15-10) which includes ACI 301 and other ACI and ASTM references on the job.
- Detailing, fabricating, and placing of reinforcing steel and accessories shall be in accordance with ACI "Details and Detailing of Concrete Reinforcement" (ACI 315-99) and shall comply with (ACI 318-11) and with (ACI 301-10).
- The owner shall select the testing laboratory & employ the laboratory at the contractor's expense to perform concrete strength testing per ACI 318-11. Final selection of testing laboratory shall be approved by engineer.

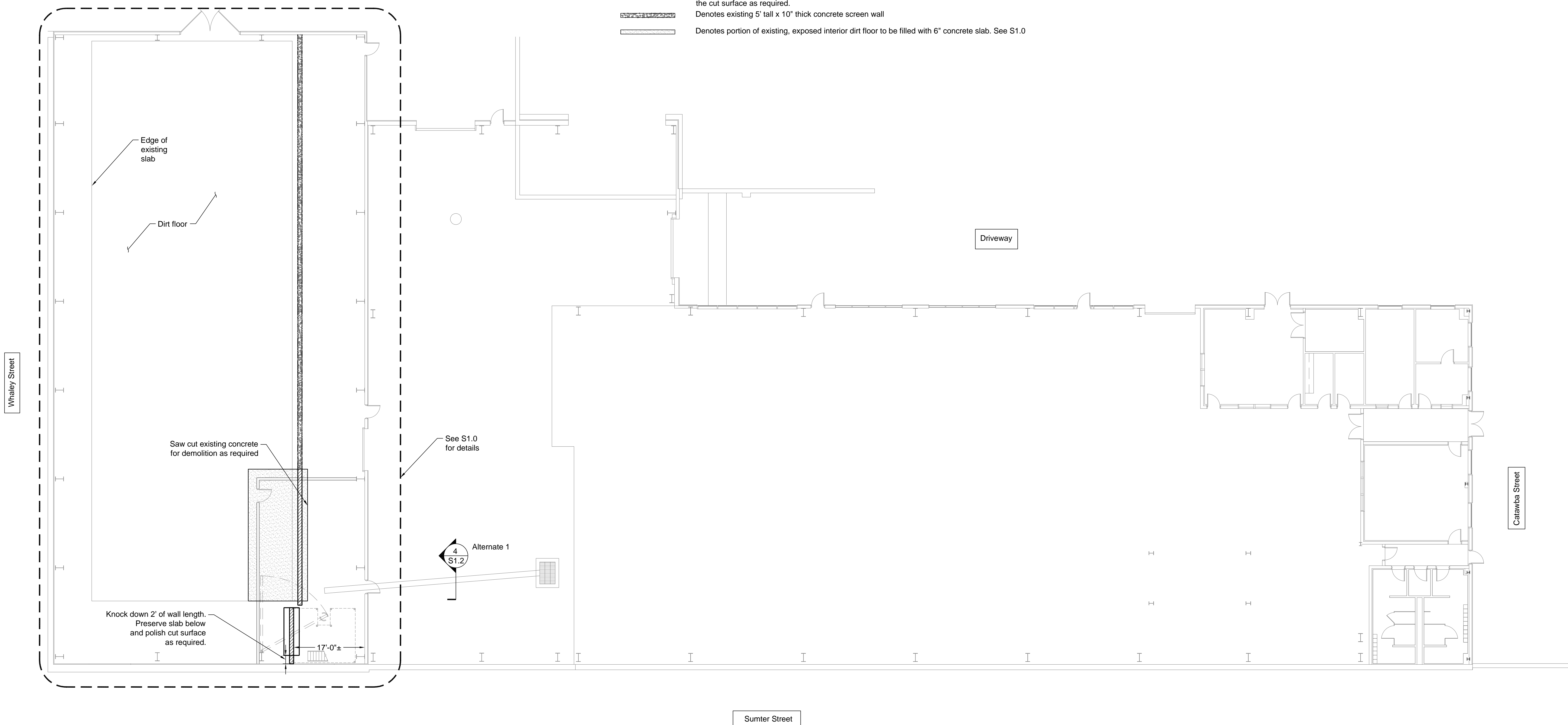
**Metal Framing (light gage):**

- All metal framing shall be designed, fabricated and erected in accordance with the American Iron and Steel Institute's "Specification for the Design of Cold Formed Steel Structural Members."
- Metal framing shall be of the size, gage and section properties indicated on the drawing or as required for the specific loading condition.
- All welding of metal framing shall be performed by certified welders experienced in the welding of light gage members.
- All metal framing shall be saw cut, square and true. Cutting of metal framing with a torch will not be permitted.
- Prior to proceeding w/ any metal framing work, the Contractor shall submit to the Architect/Engineer, for approval, shop drawings showing the size, location & connection details of all load bearing metal framing and all exterior framing. Shop drawings shall include a plan and elevation of all wall or soffit framing and connection details. The Contractor shall also submit calculations prepared and sealed by a Professional Engineer registered in the State of South Carolina which demonstrate that all applied loads will be resisted by the supplied framing system.
- All light gage walls shall be non-load bearing walls unless noted otherwise.

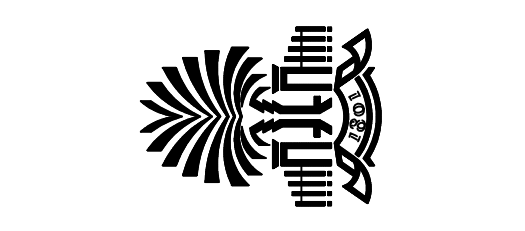
**Structural and Miscellaneous Steel**

- All structural and miscellaneous steel shall conform to the latest edition of the AISC "Specification for Structural Steel Buildings" and all its supplements, and to the AISC "Code of Standard Practice for Steel Buildings and Bridges".
- All structural steel shall conform to ASTM A-36, FY=36,000 PSI unless otherwise noted.
- Steel W-Shapes shall conform to ASTM A992.
- All rectangular or square steel HSS-Shapes shall conform to ASTM A500 grade B, FY=46,000 PSI.
- All welded connections shall be done with E70XX electrodes with 3/16" min. material. All welding shall comply with AWS D1-1 structural welding code the latest edition.
- All bolts shall be A325 snug tight bolts, unless otherwise noted.
- The structural steel shall have one coat of anti-rust paint and one coat of finish paint of color determined by the owner. Prior to painting, all steel surfaces shall be prepared in accordance with SSPC-SP3. All paints shall be approved by the Owner/Architect prior to their use.
- Fabrication and assembly of bolted connections shall comply with applicable sections of AISC "Specification for Structural Joints using ASTM A325 or A490 bolts."
- No openings in beams shall be permitted without the written permission of the engineer.
- The use of a gas-cutting torch in the field for cutting holes or for correcting fabrication errors will not be permitted on structural framing members except w/ the written approval of the Engineer for each specification.
- An independent inspection agency shall be employed by the owner and approved by the engineer to inspect the structural steel in the field and verify that it conforms to the requirements of the contract documents.
- All columns shall have 5/8" thick cap plates unless noted.
- All anchor bolts shall be ASTM F1554 Grade 36 type B, unless noted otherwise.
- Steel grating shall be made of 1 1/2" x 3/16" bearing bars with maximum 1 3/16" center-to-center spacing.

-  Denotes existing 5' tall x 10" thick concrete screen wall to be demolished. The demolition can be achieved by saw cutting existing concrete slab/footing, or knocking down the wall while preserving slab/footing below and polishing the cut surface as required.
-  Denotes existing 5' tall x 10" thick concrete screen wall
-  Denotes portion of existing, exposed interior dirt floor to be filled with 6" concrete slab. See S1.0



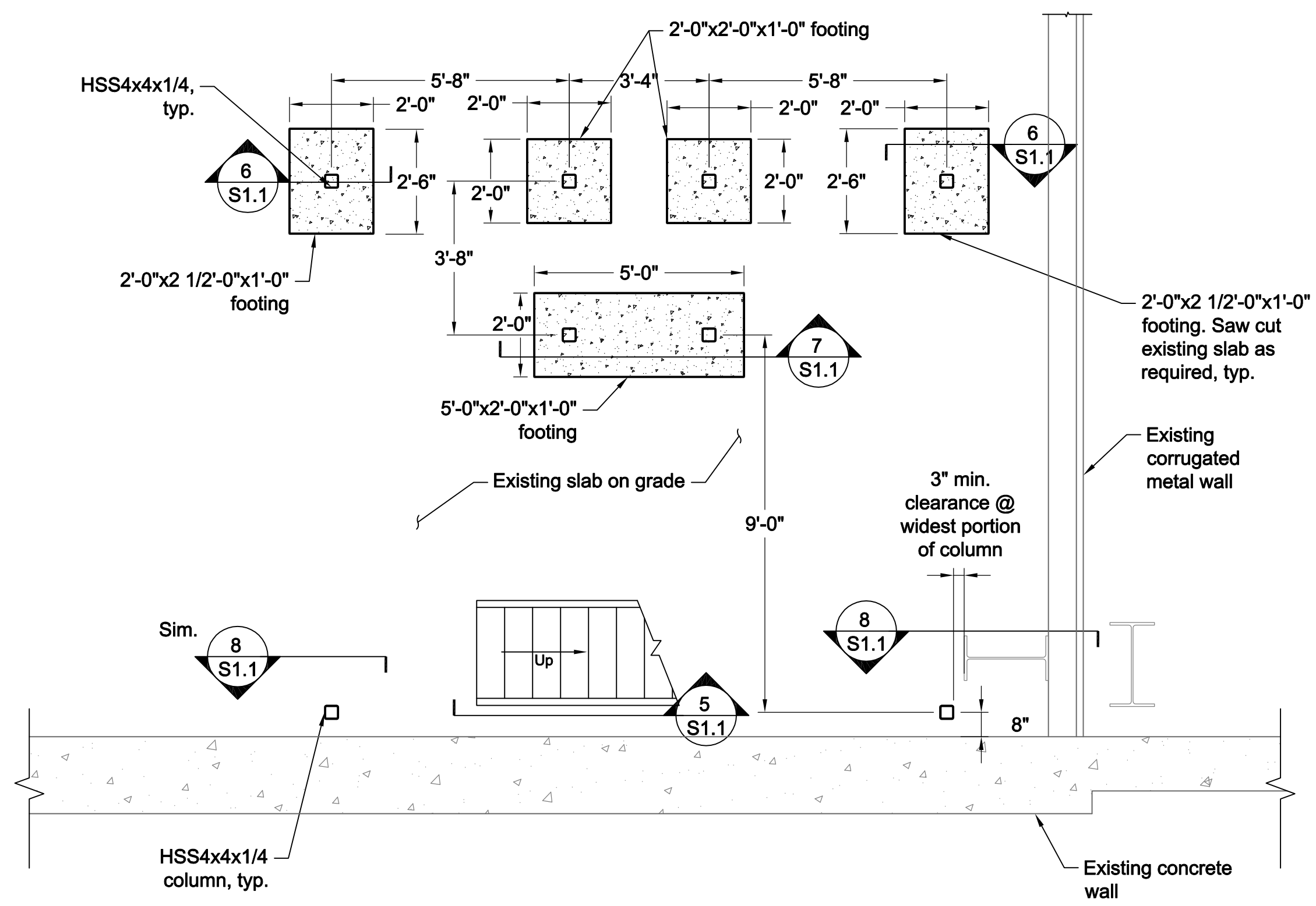
Plan view  
Scale: 3/32" = 1'-0"



Project Number: 1433.2  
Date: 17 AUGUST 2015  
Revisions:

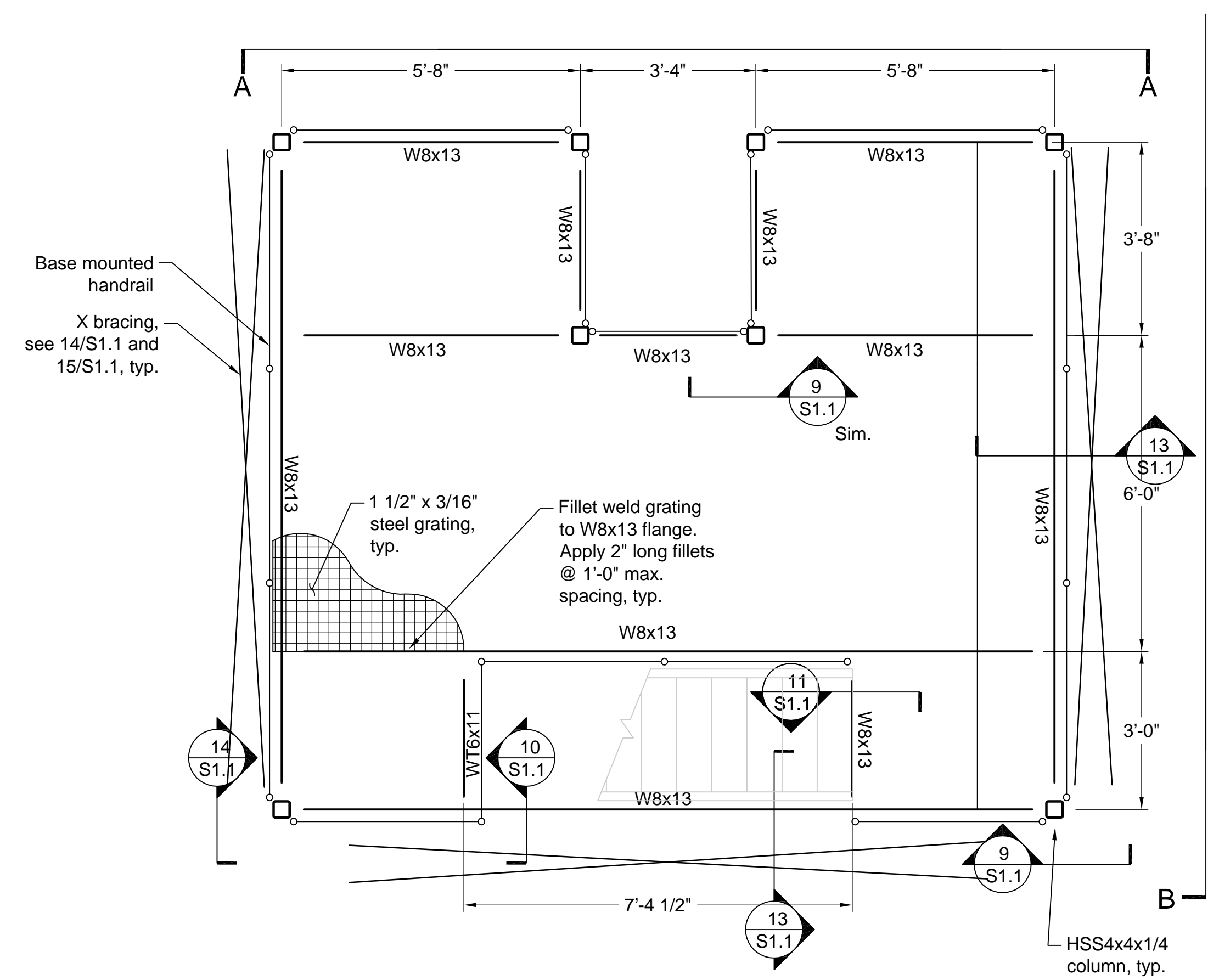
STRUCTURAL  
GENERAL  
NOTES &  
KEY PLAN

**S0.0**

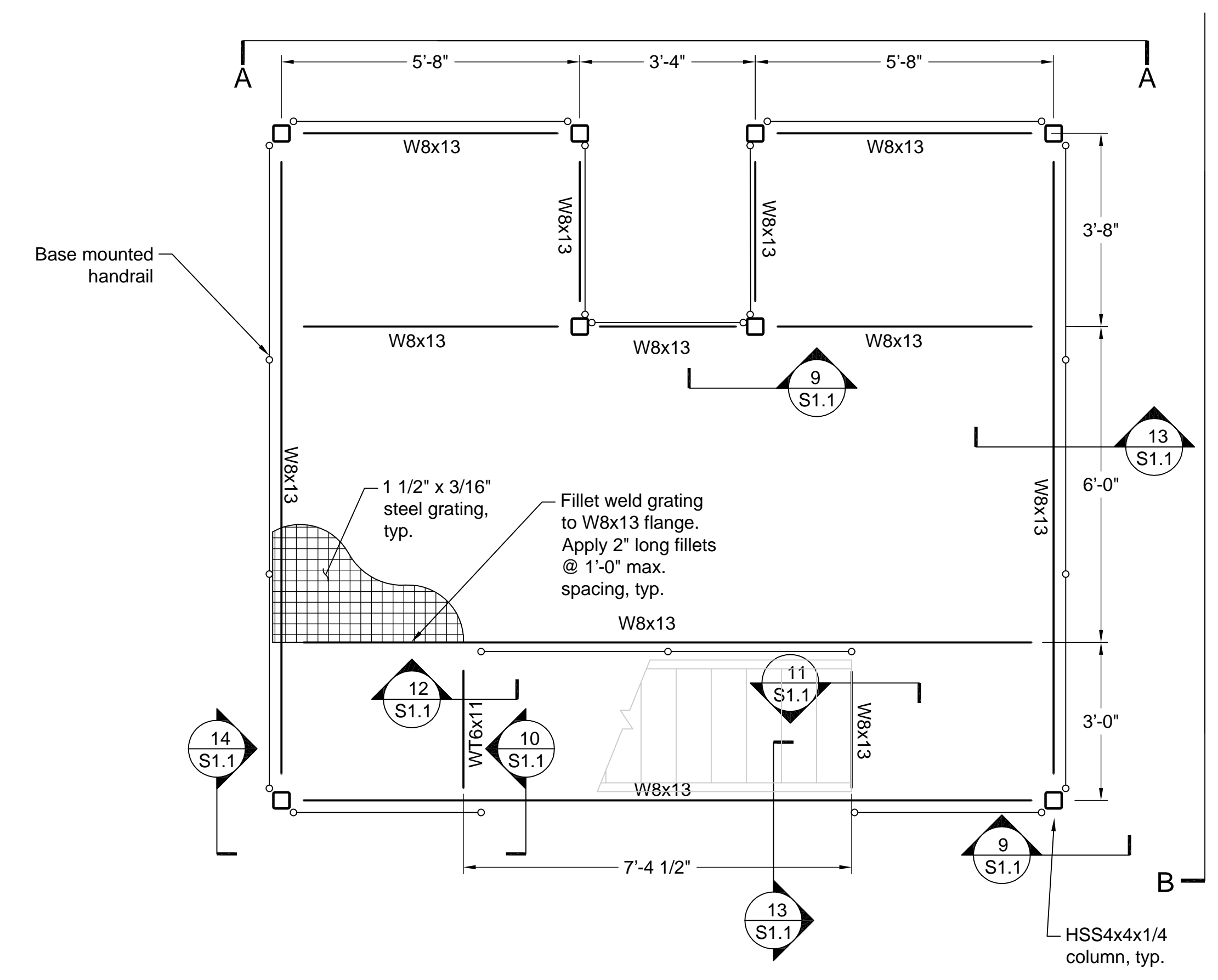


2 - Steel Frame Foundation Plan

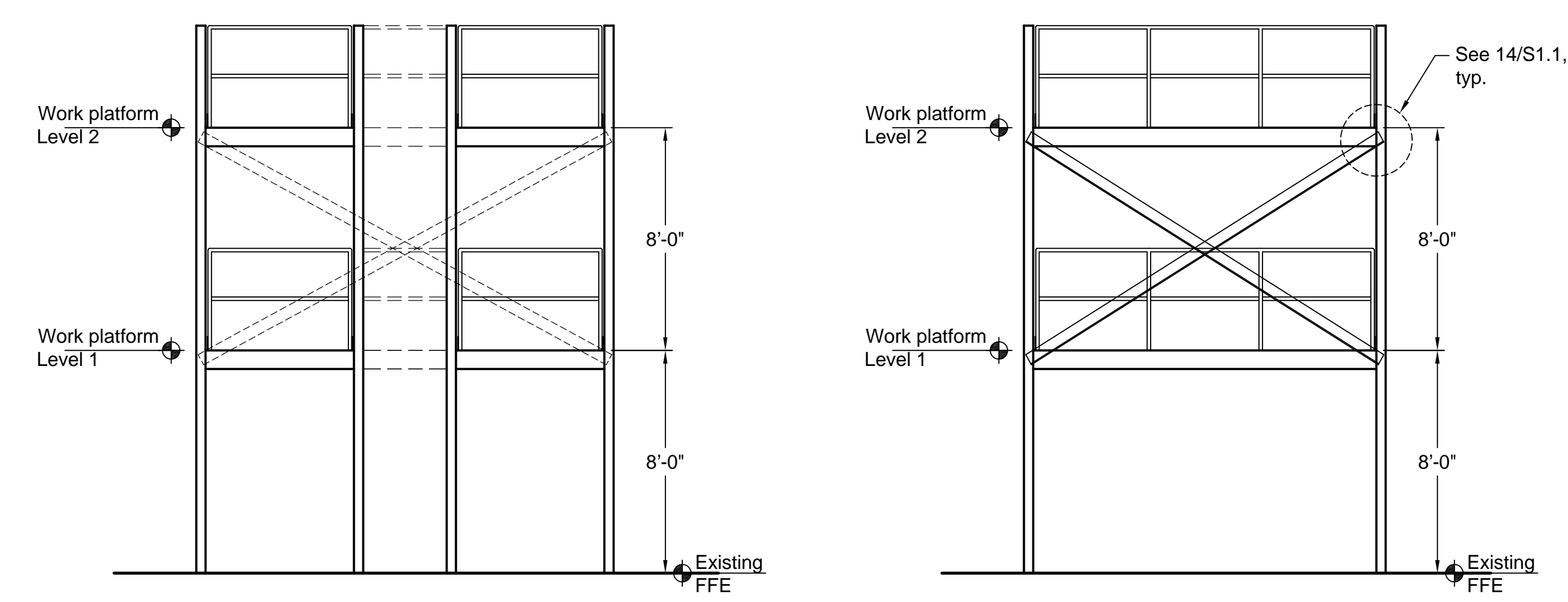
Scale: 3/8" = 1'-0"



Level 2 Framing Plan

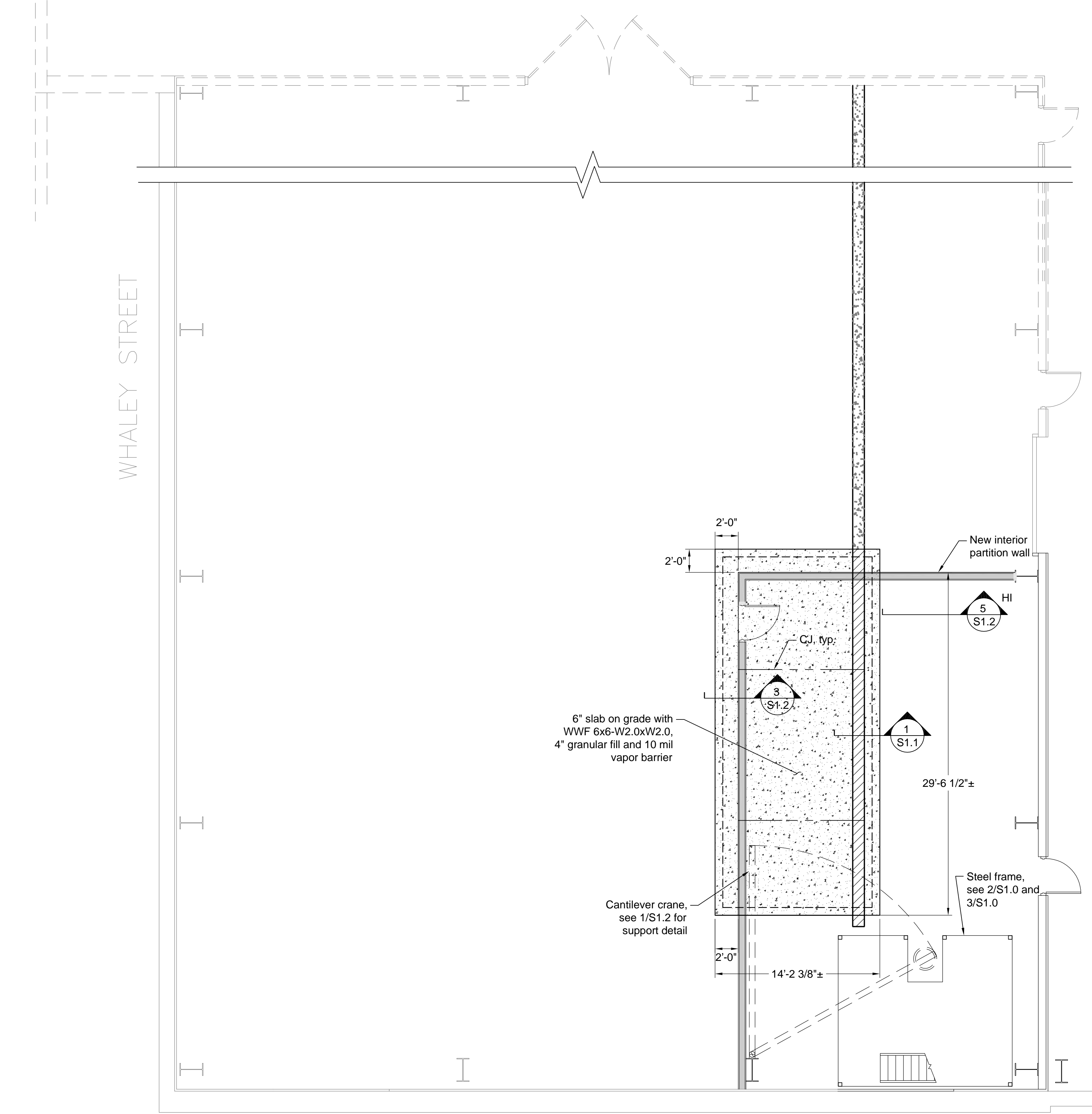


Level 1 Framing Plan



Elevation A-A  
Scale: 1/4" = 1'-0"

Elevation B-B  
Scale: 1/4" = 1'-0"

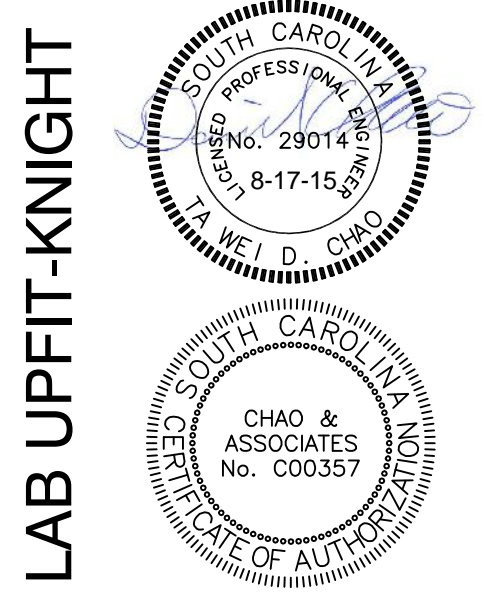


1 - Rotor Drive Train Area Foundation Plan

Scale: 3/16" = 1'-0"

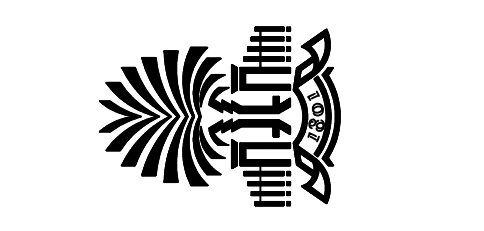
3 - Typical Steel Floor Framing Plan and Frame Elevation

Scale: 1/2" = 1'-0"



SPENT FUEL RESEARCH LAB UPFIT-KNIGHT

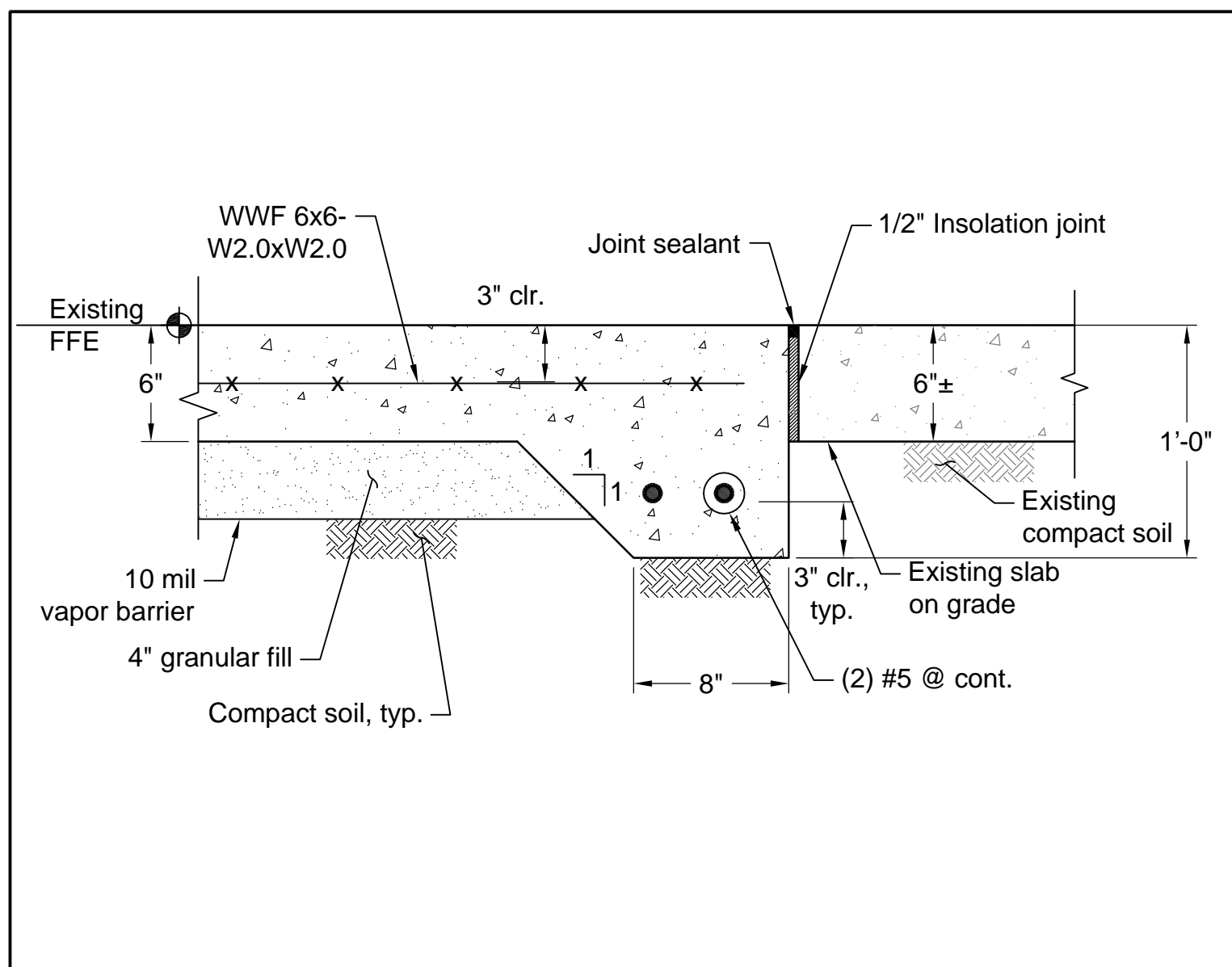
University of South Carolina  
1220 Catabaux Street  
Columbia, SC 29201  
State Project Number: H27-Z209-B



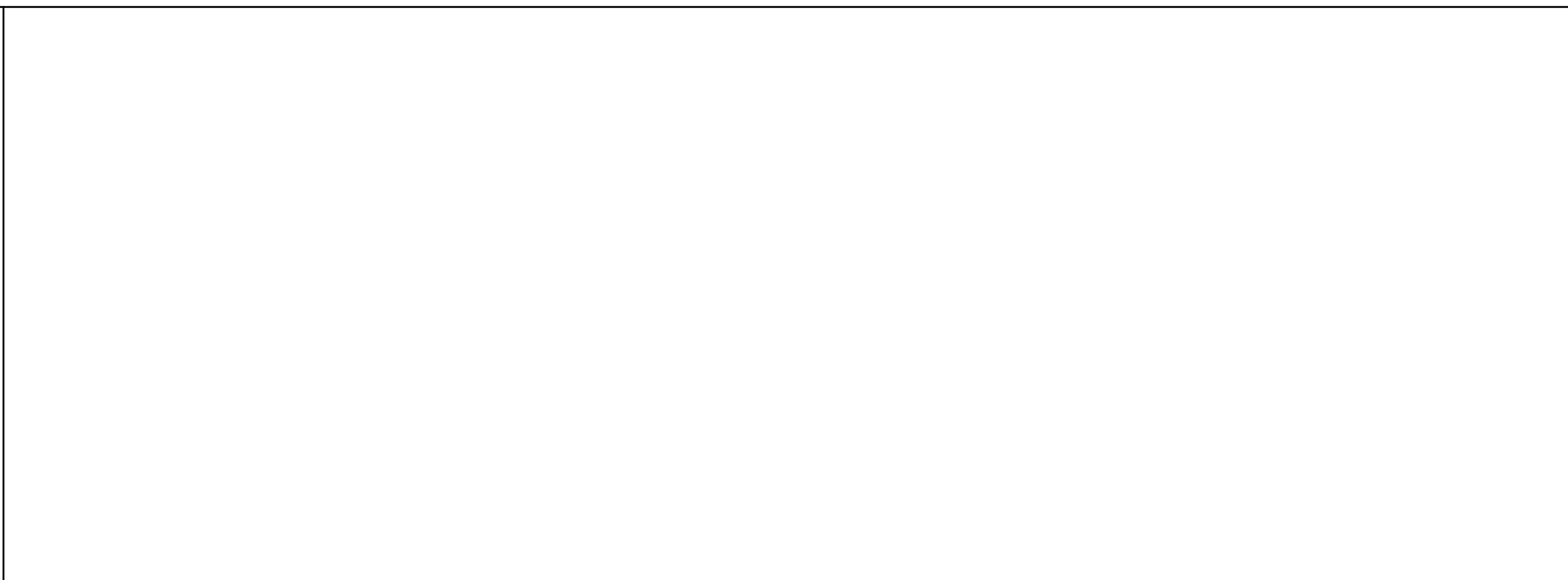
Project Number: 1433.2  
Date: 17 AUGUST 2015  
Revisions:

STRUCTURAL  
FOUNDATION  
PLAN &  
FRAMING  
PLAN

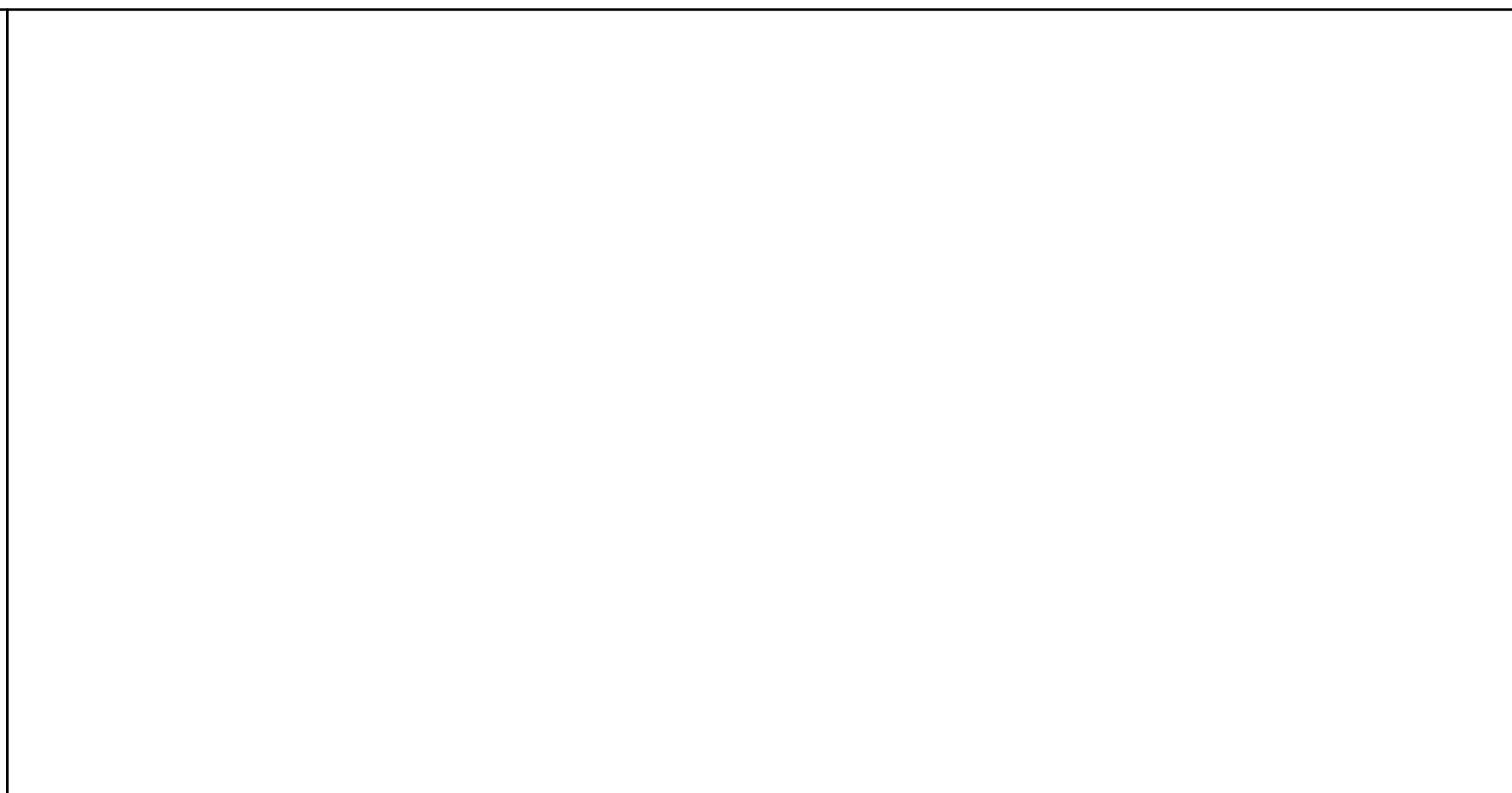
**S1.0**



1 - Section Scale: 1 1/2" = 1'-0"



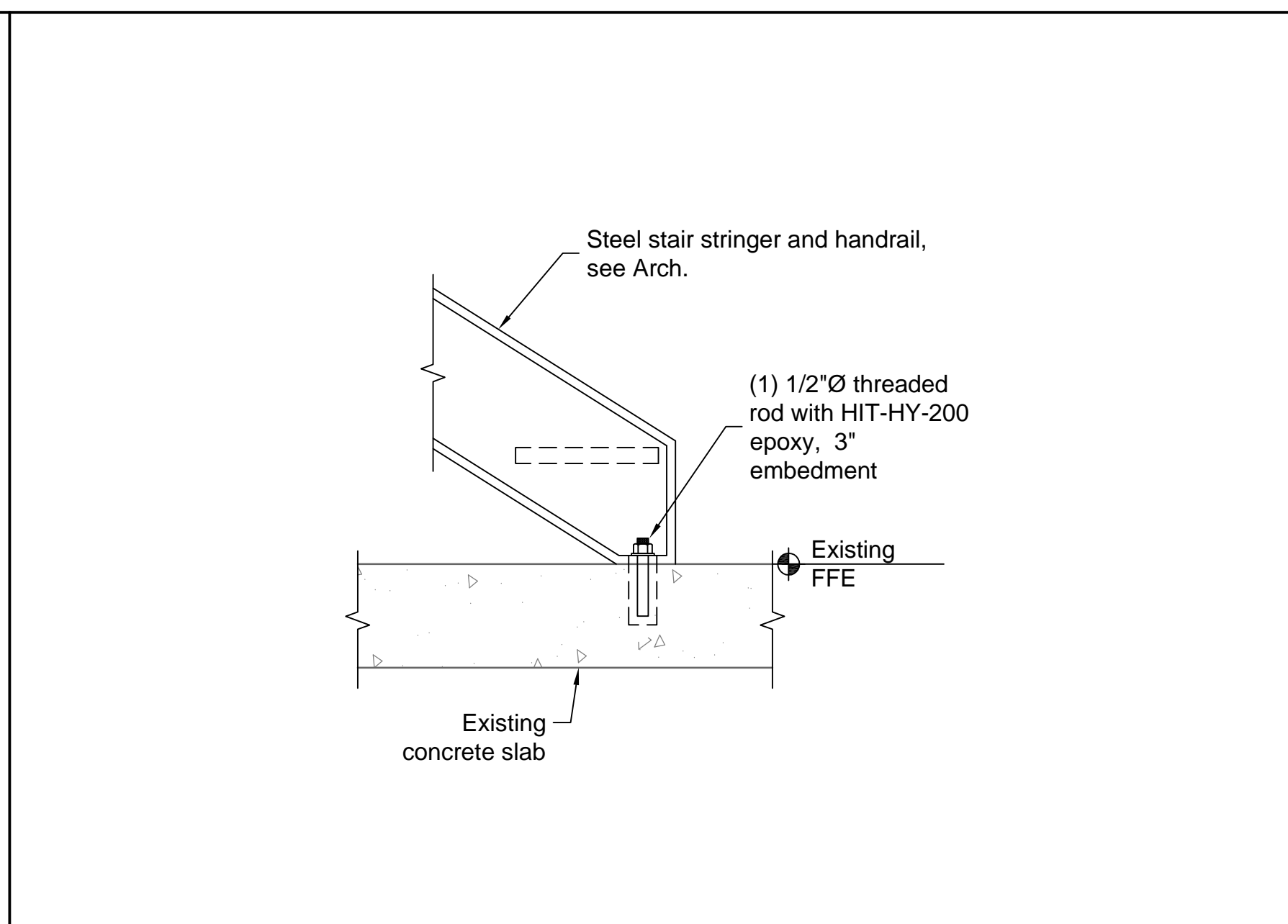
2 - Not used



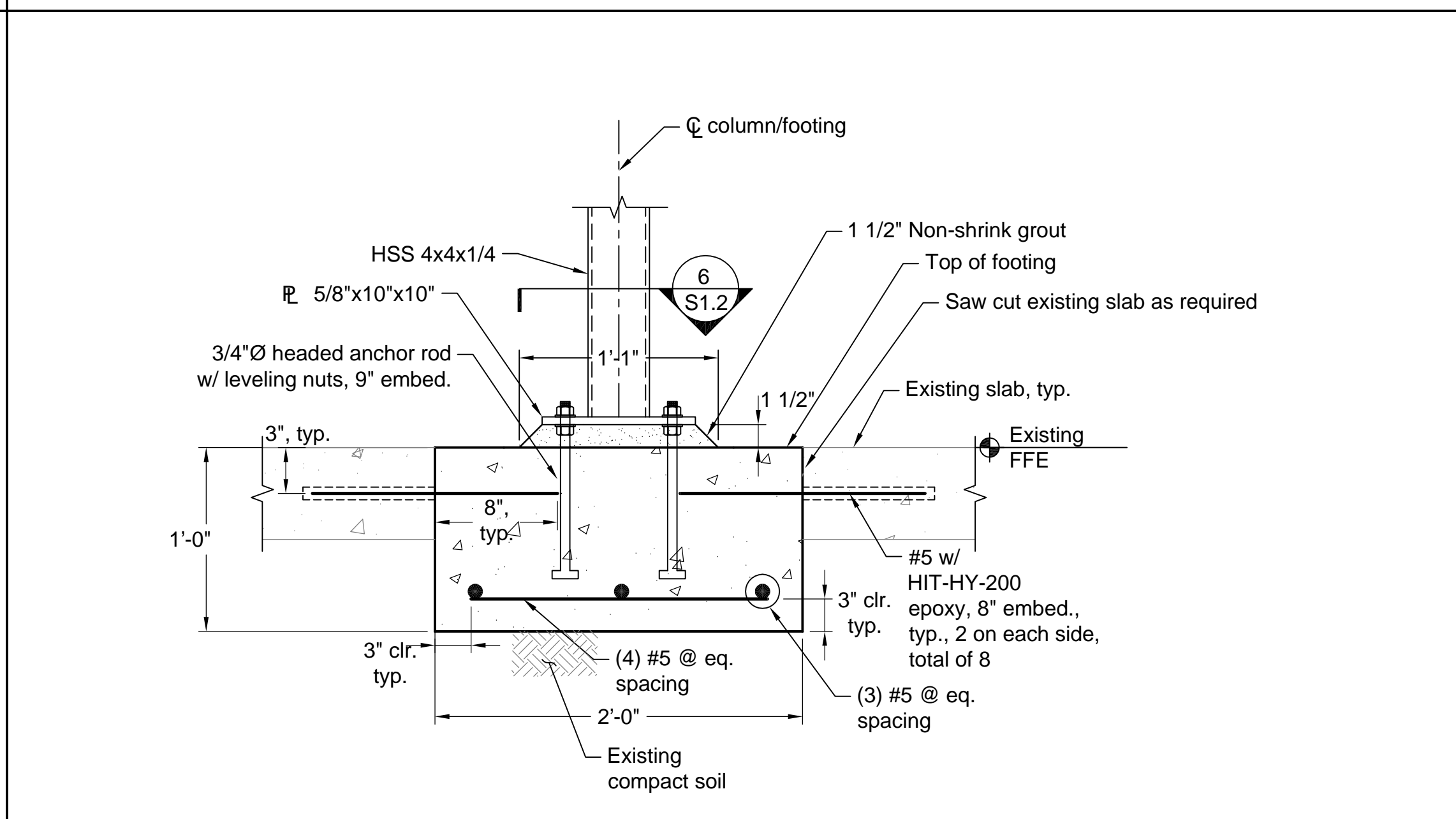
3 - Not used



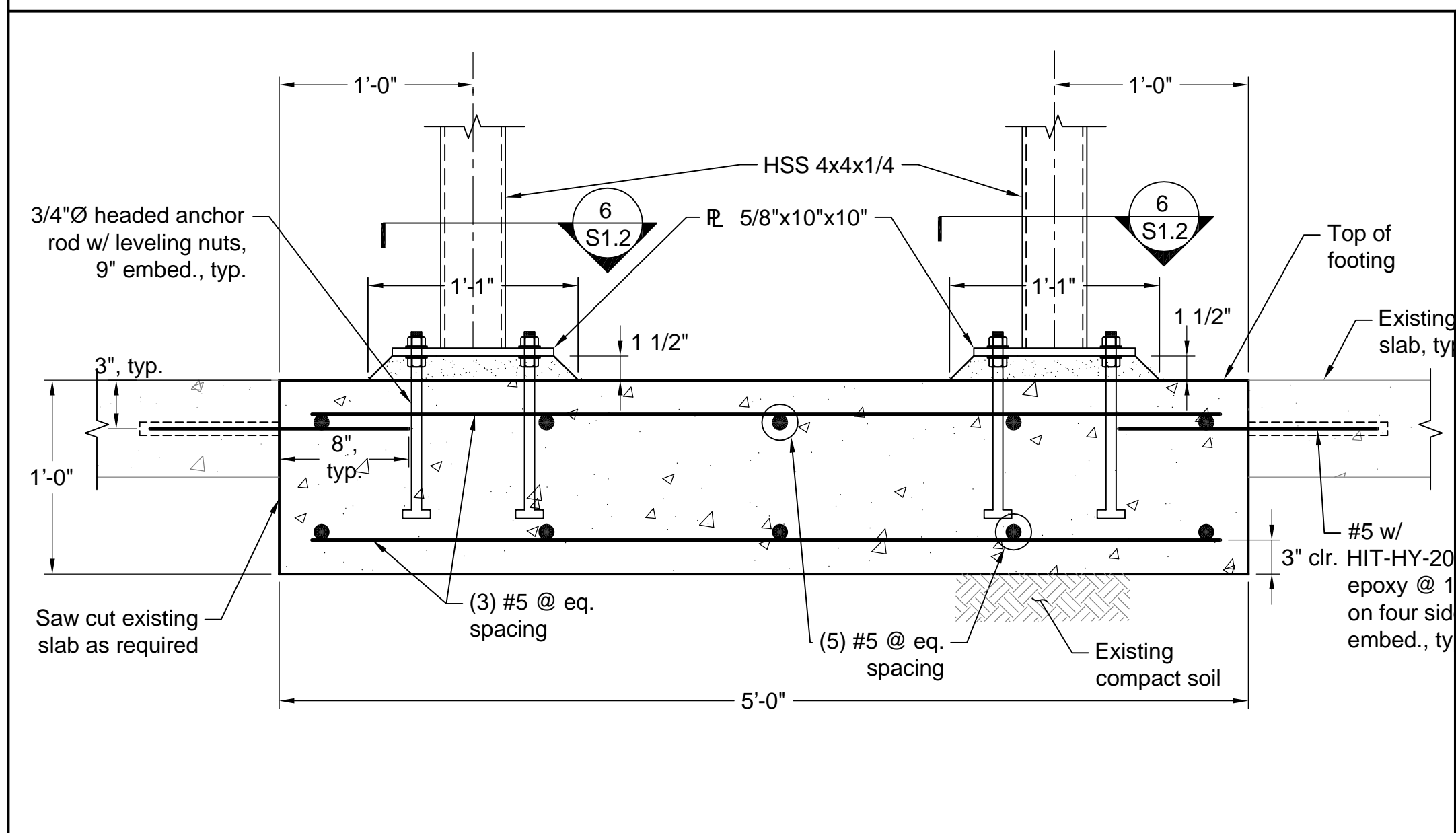
4 - Not used



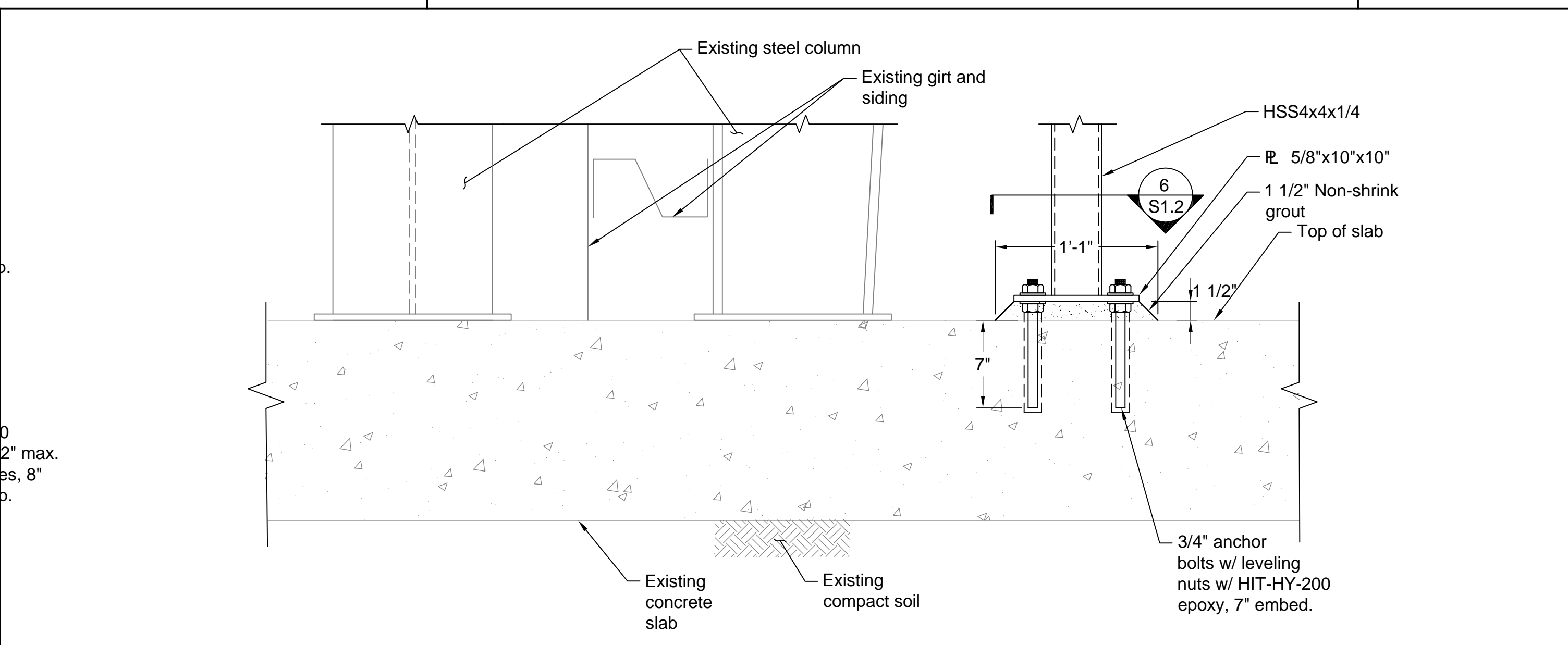
5 - Section Scale: 1 1/2" = 1'-0"



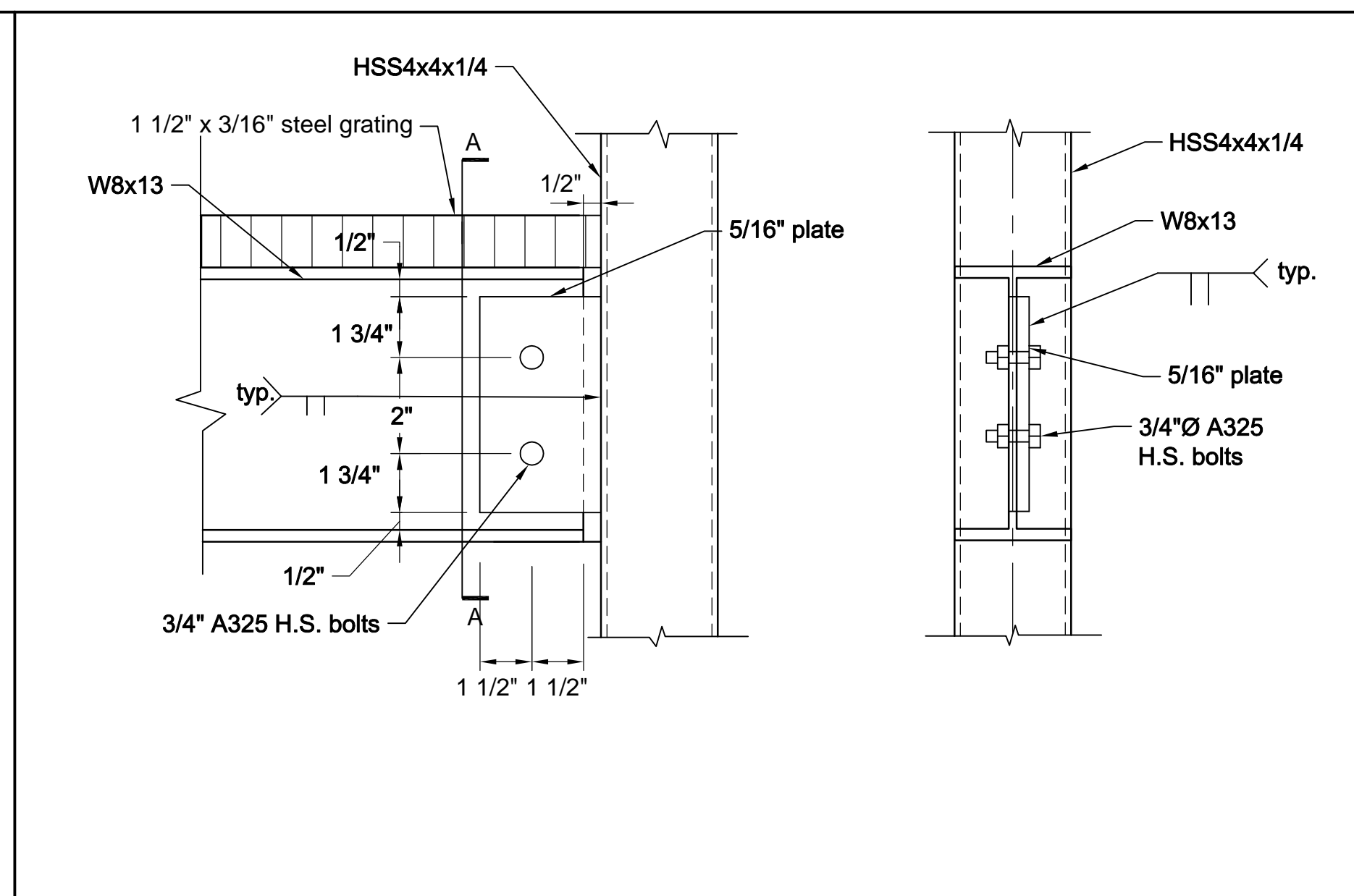
6 - Section Scale: 1 1/2" = 1'-0"



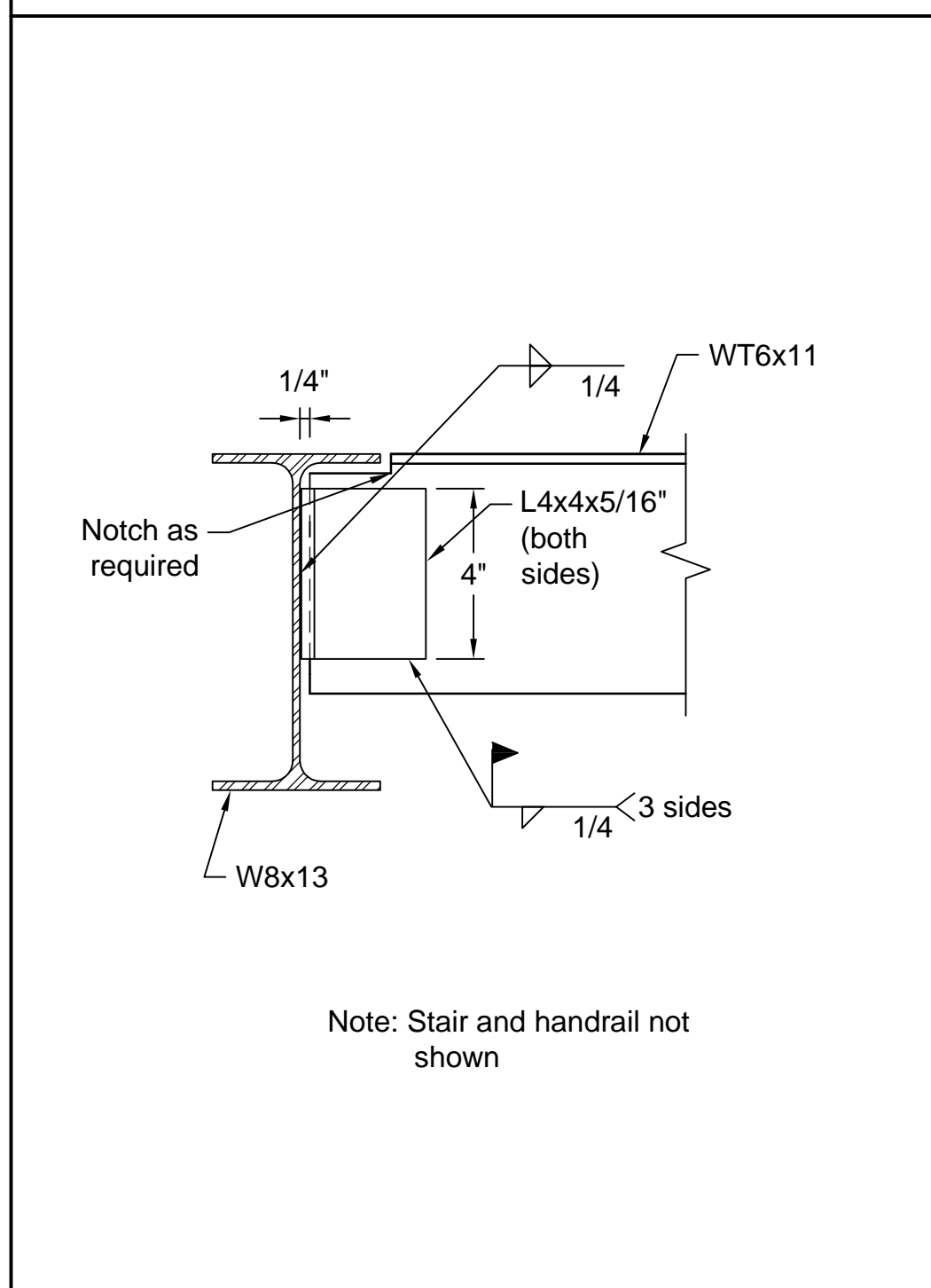
7 - Section Scale: 1 1/2" = 1'-0"



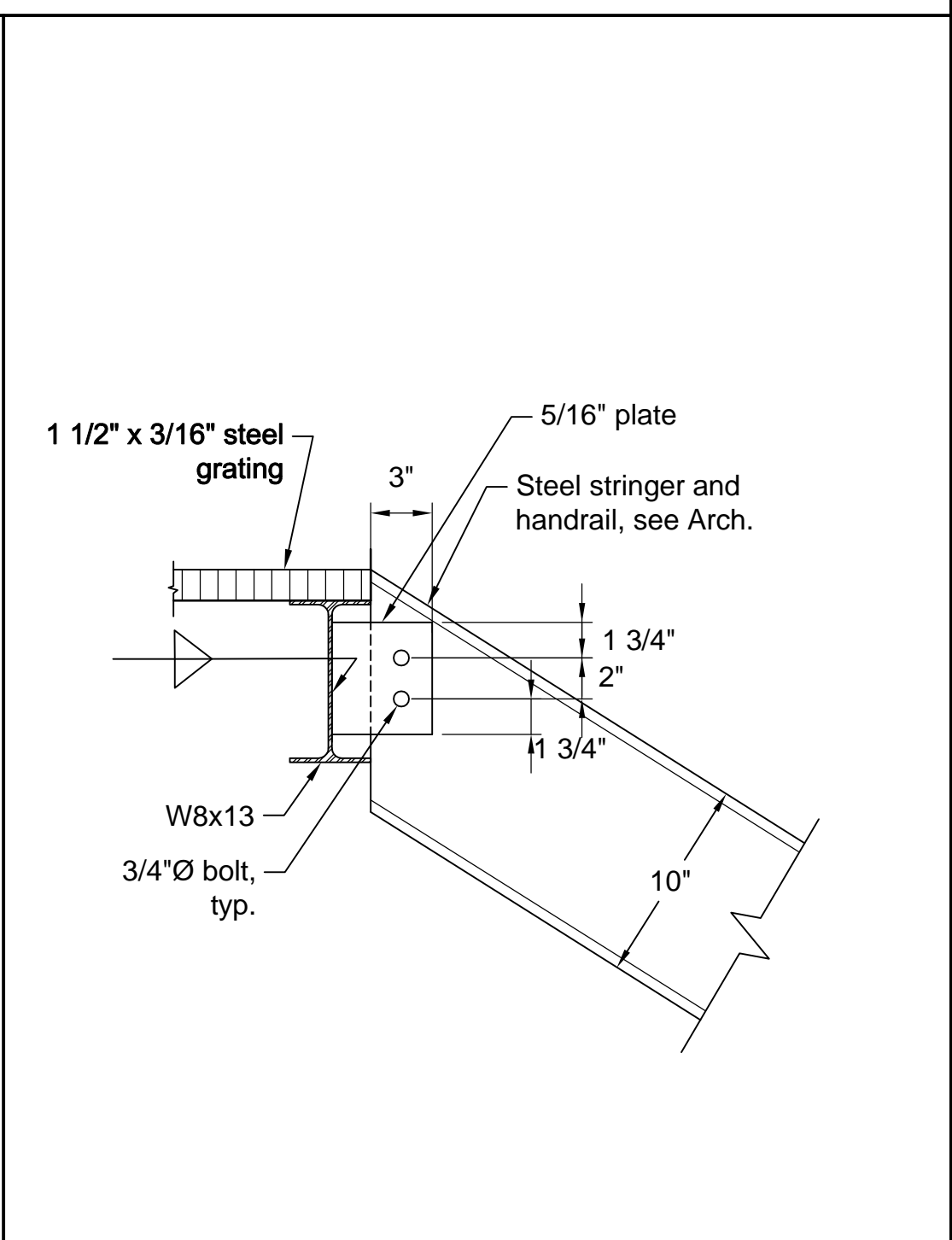
8 - Section Scale: 1 1/2" = 1'-0"



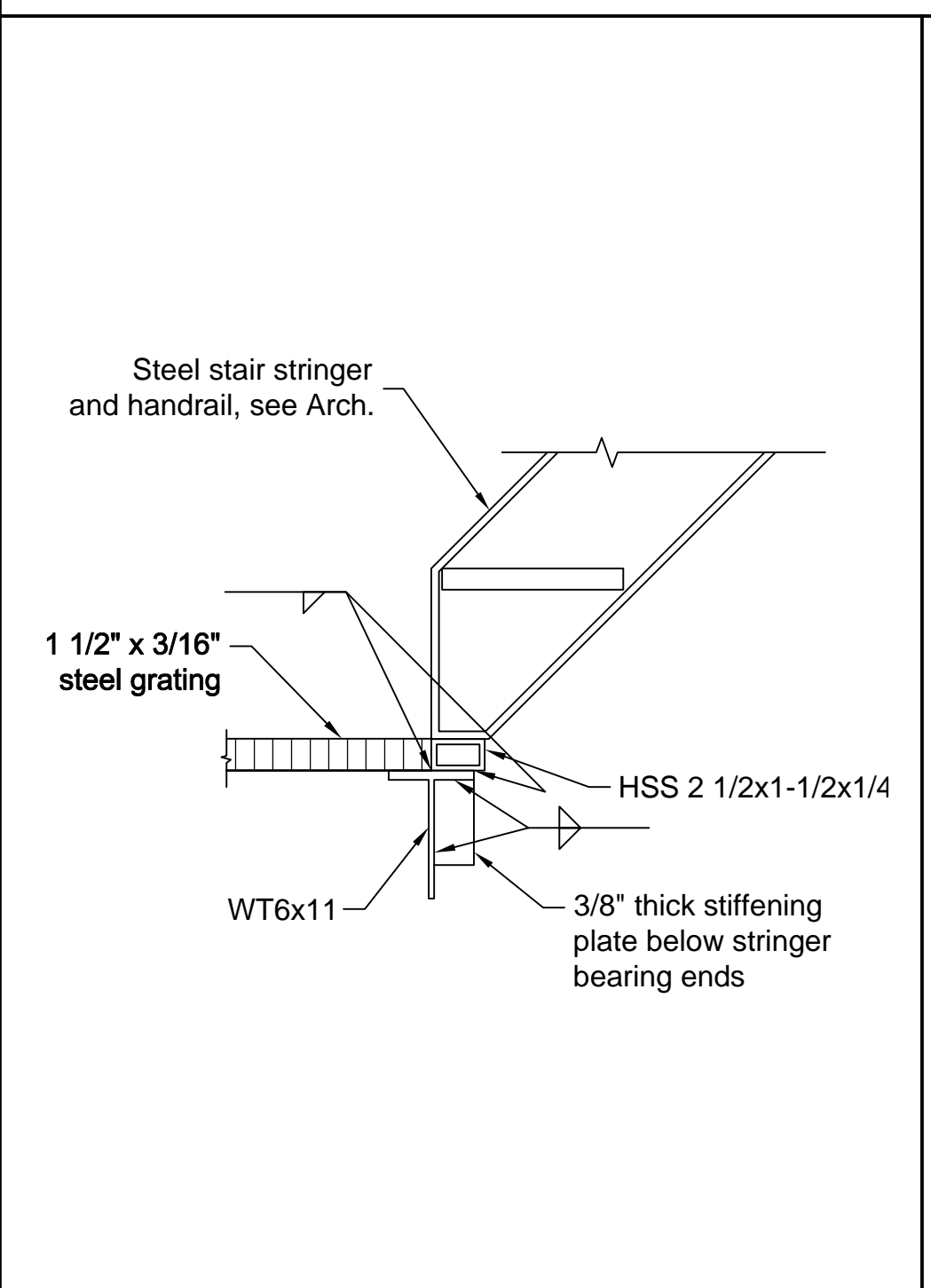
9 - Typical Beam - Column Connection Scale: 1 1/2" = 1'-0"



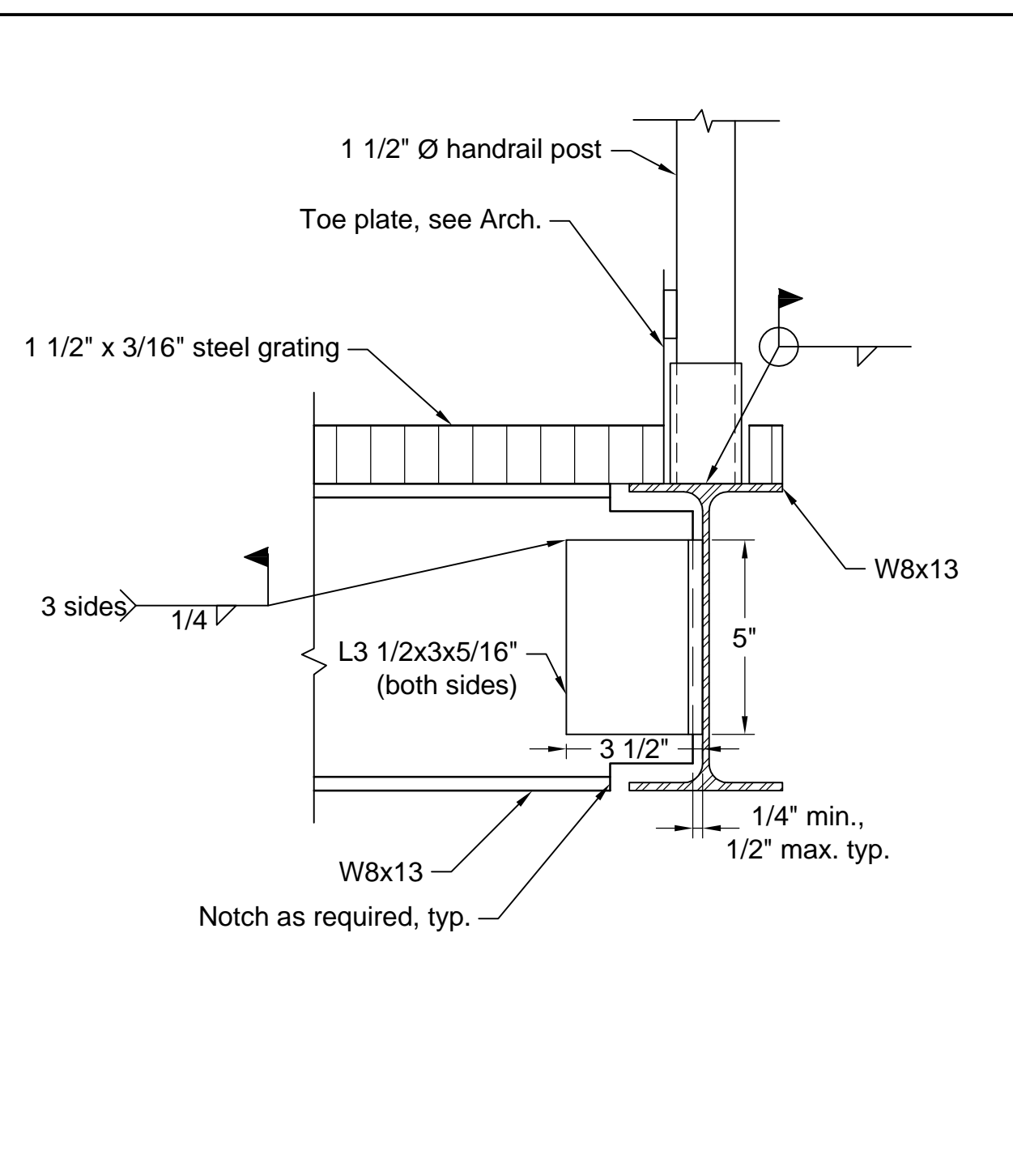
10 - Section Scale: 3" = 1'-0"



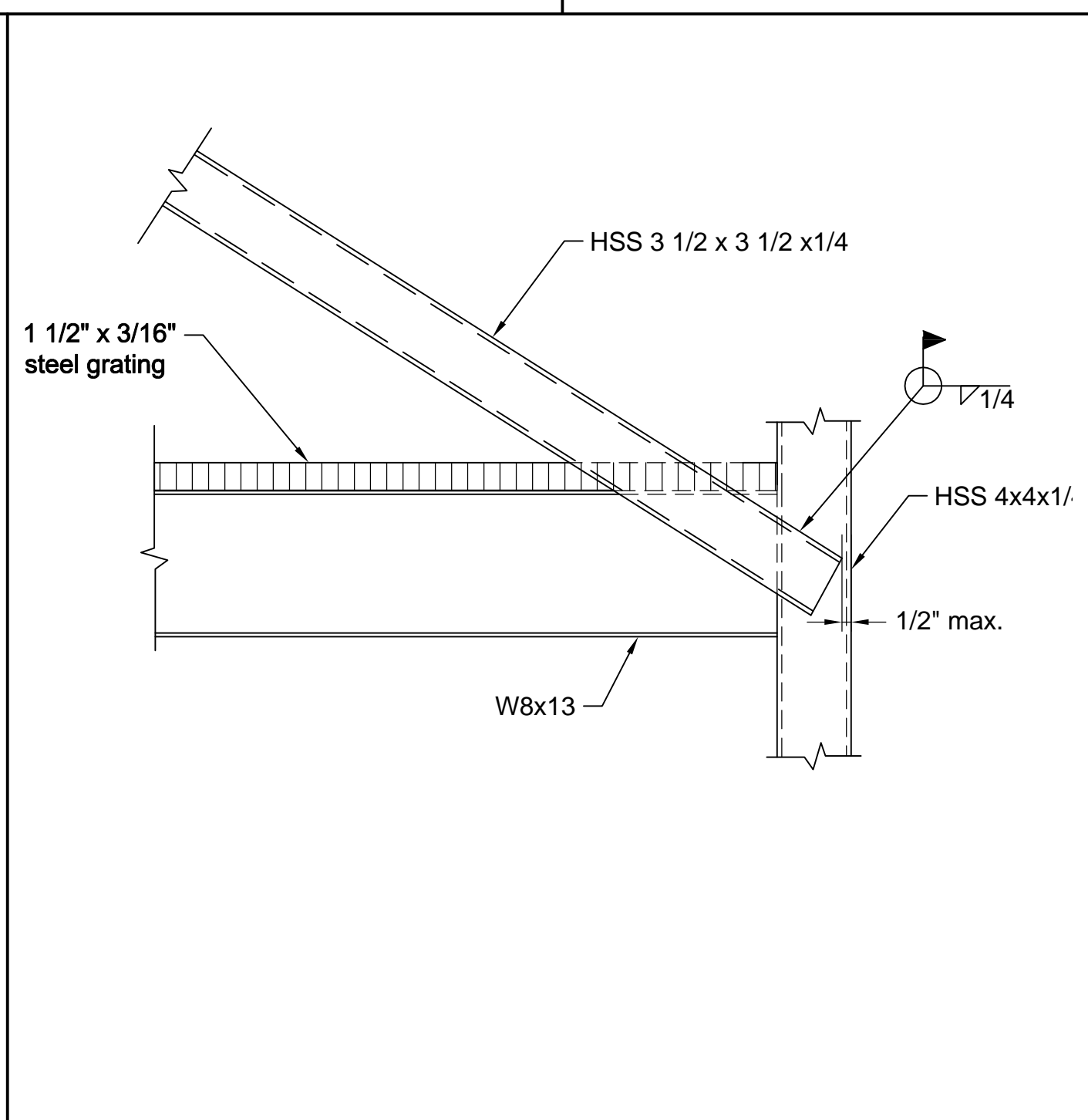
11 - Section Scale: 1 1/2" = 1'-0"



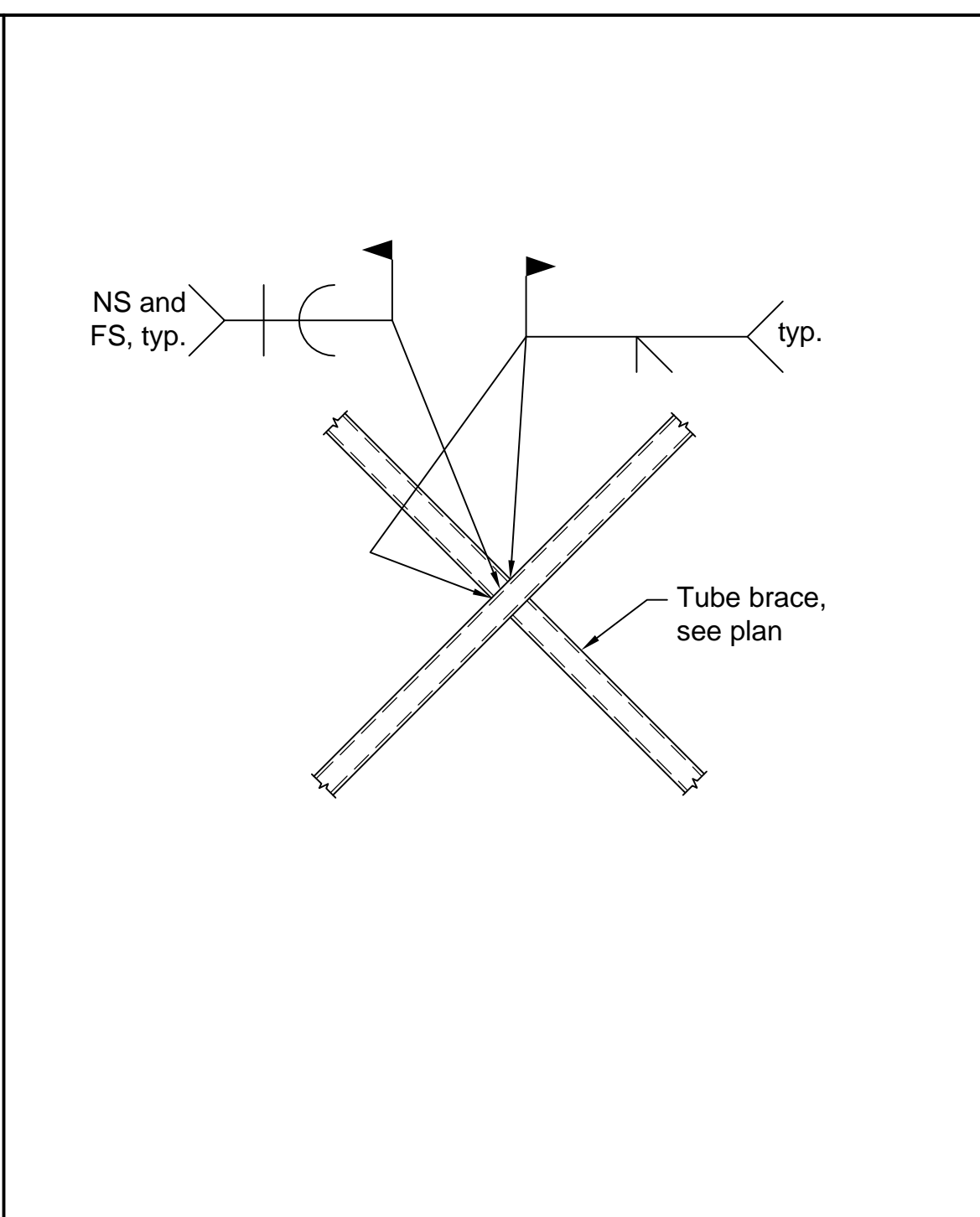
12 - Section Scale: 1 1/2" = 1'-0"



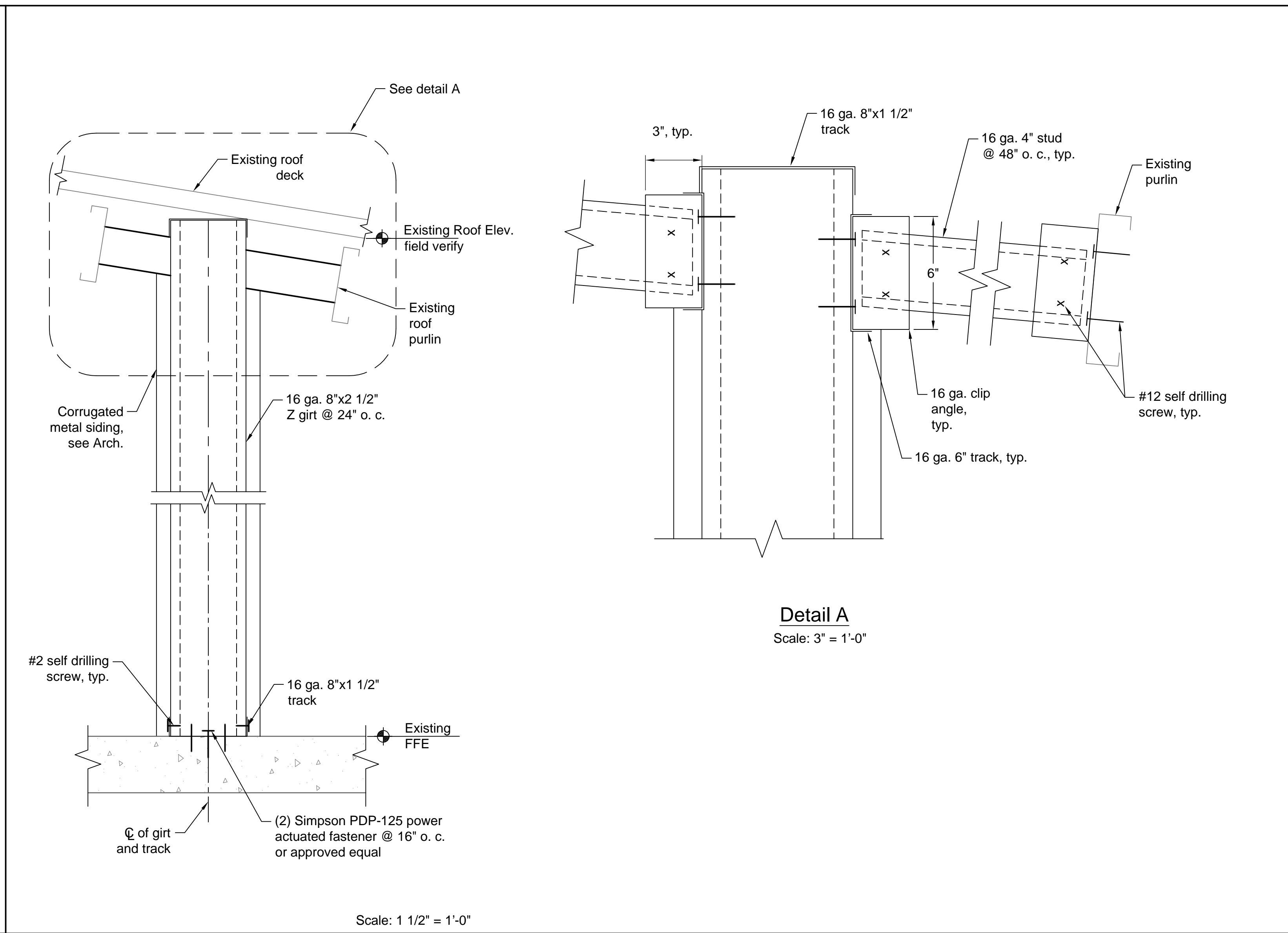
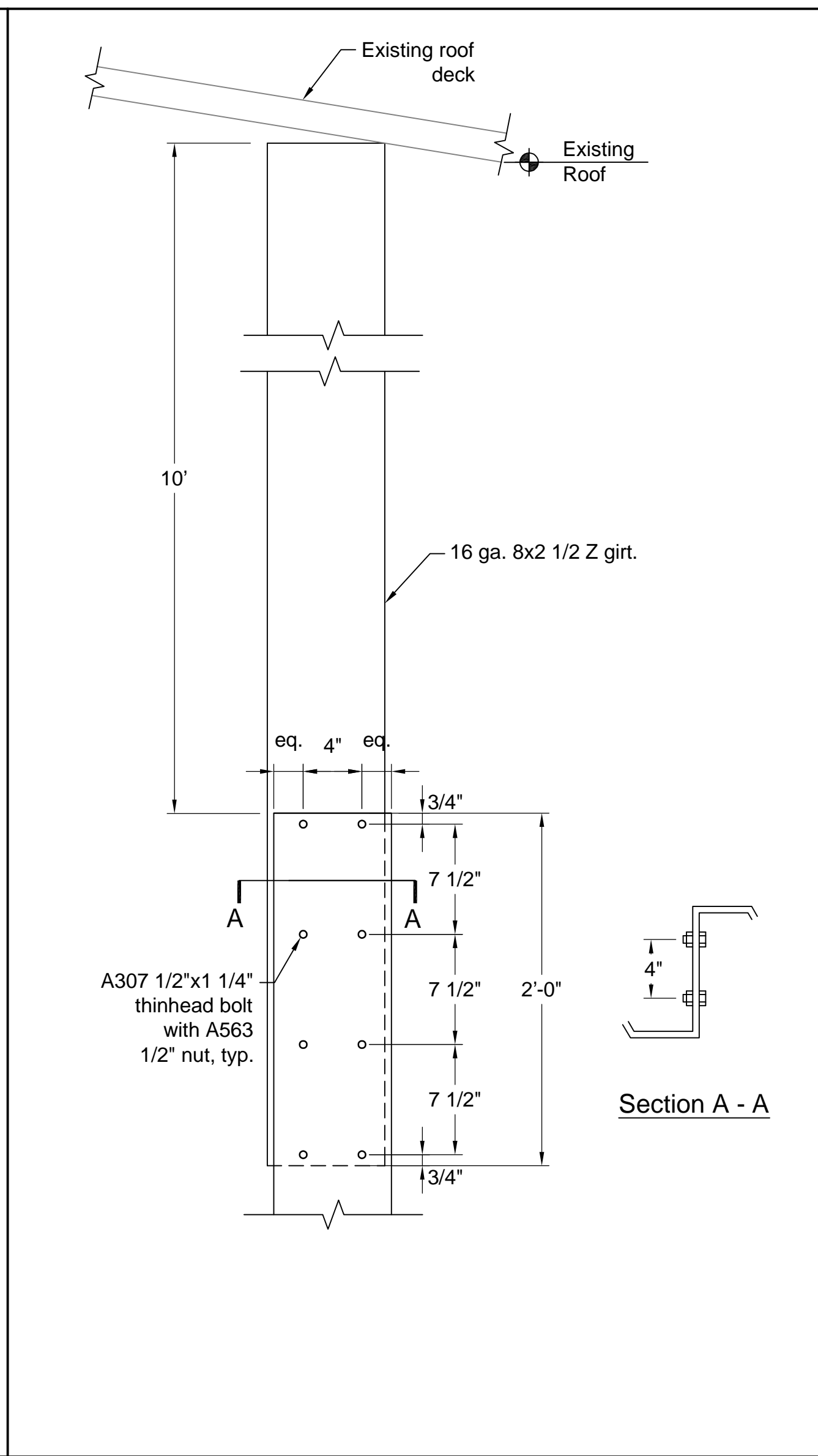
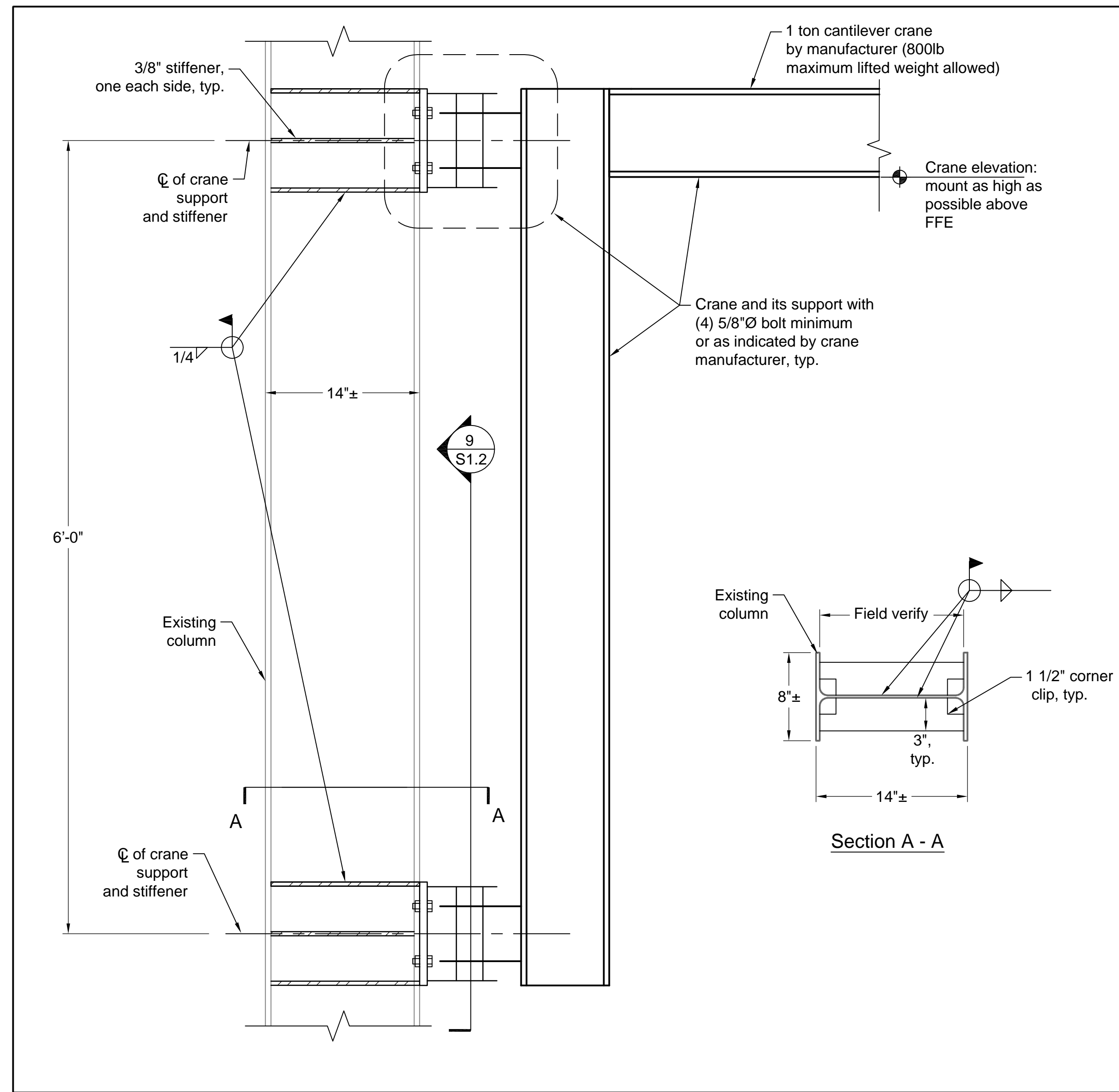
13 - Section Scale: 3" = 1'-0"



14 - Section Scale: 1 1/2" = 1'-0"



15 - Typical X-Brace Intersection Scale: 1" = 1'-0"

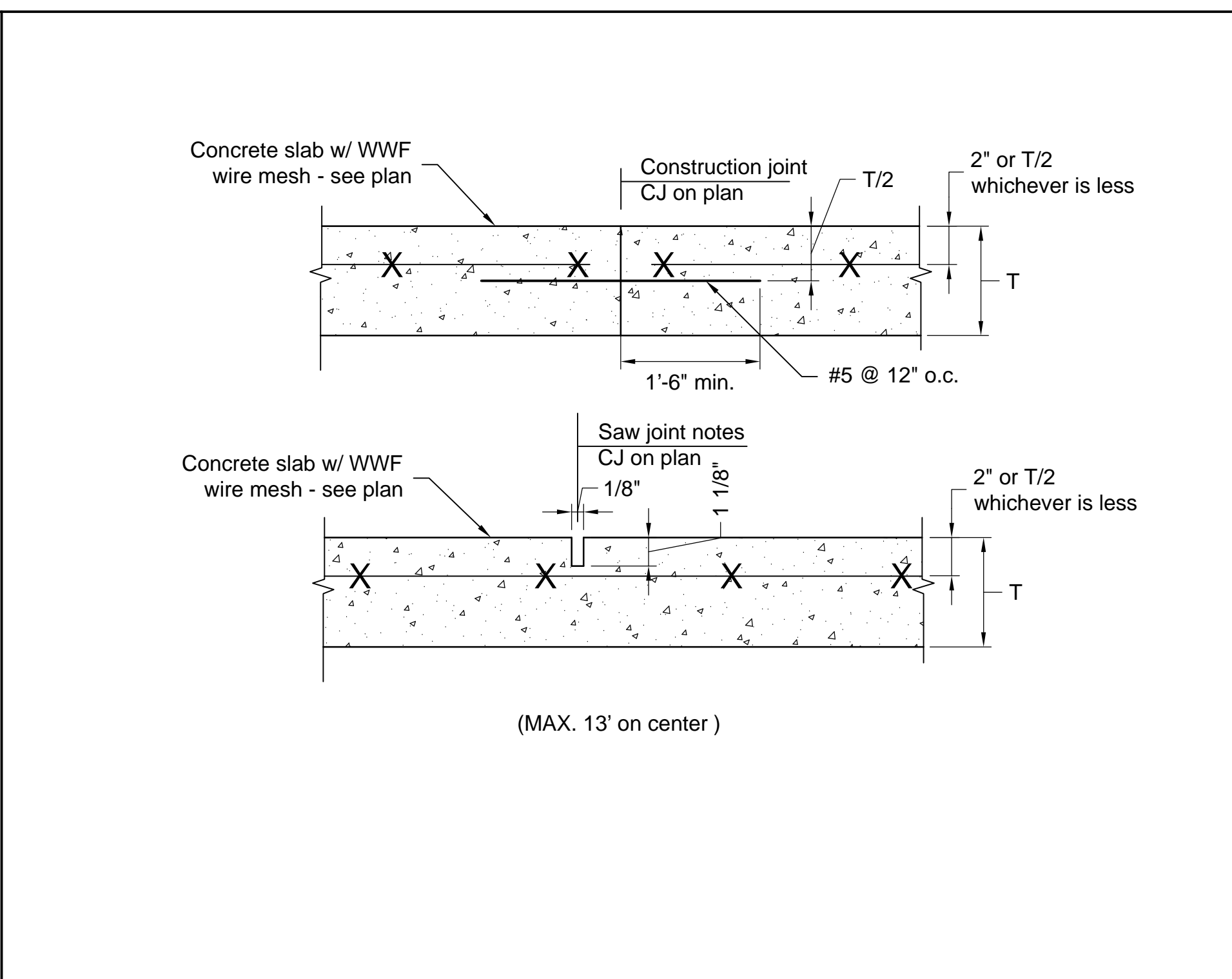
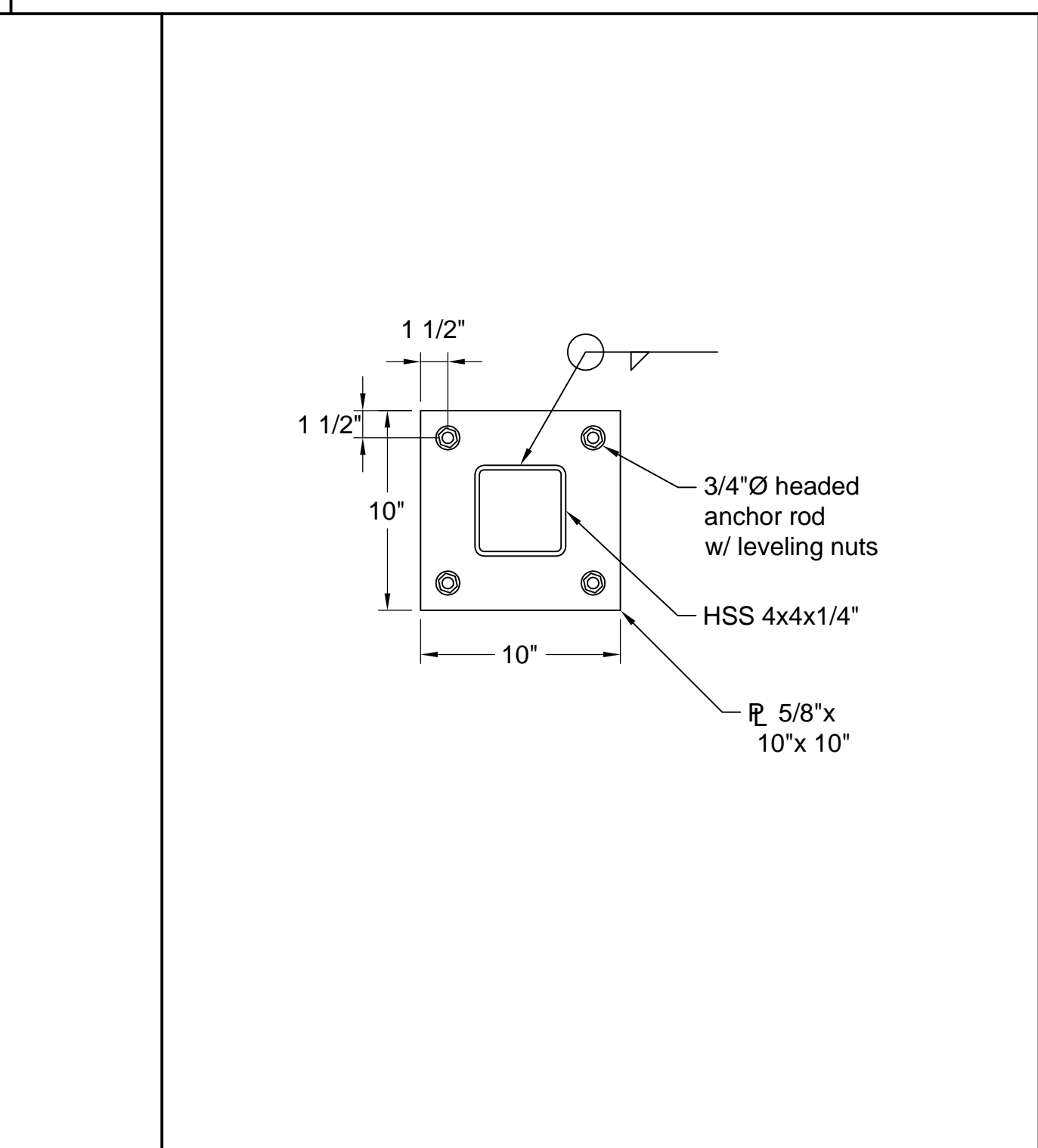
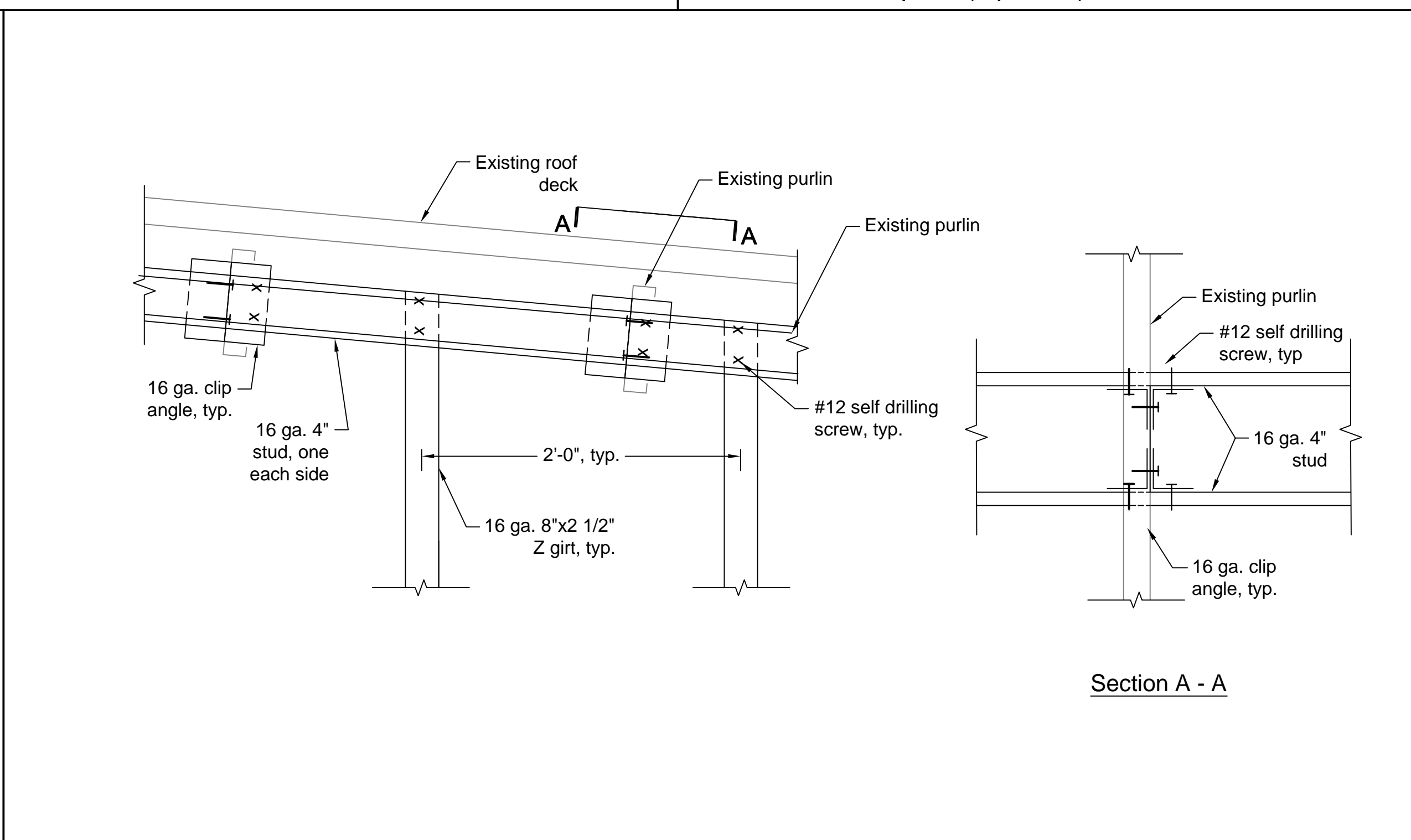
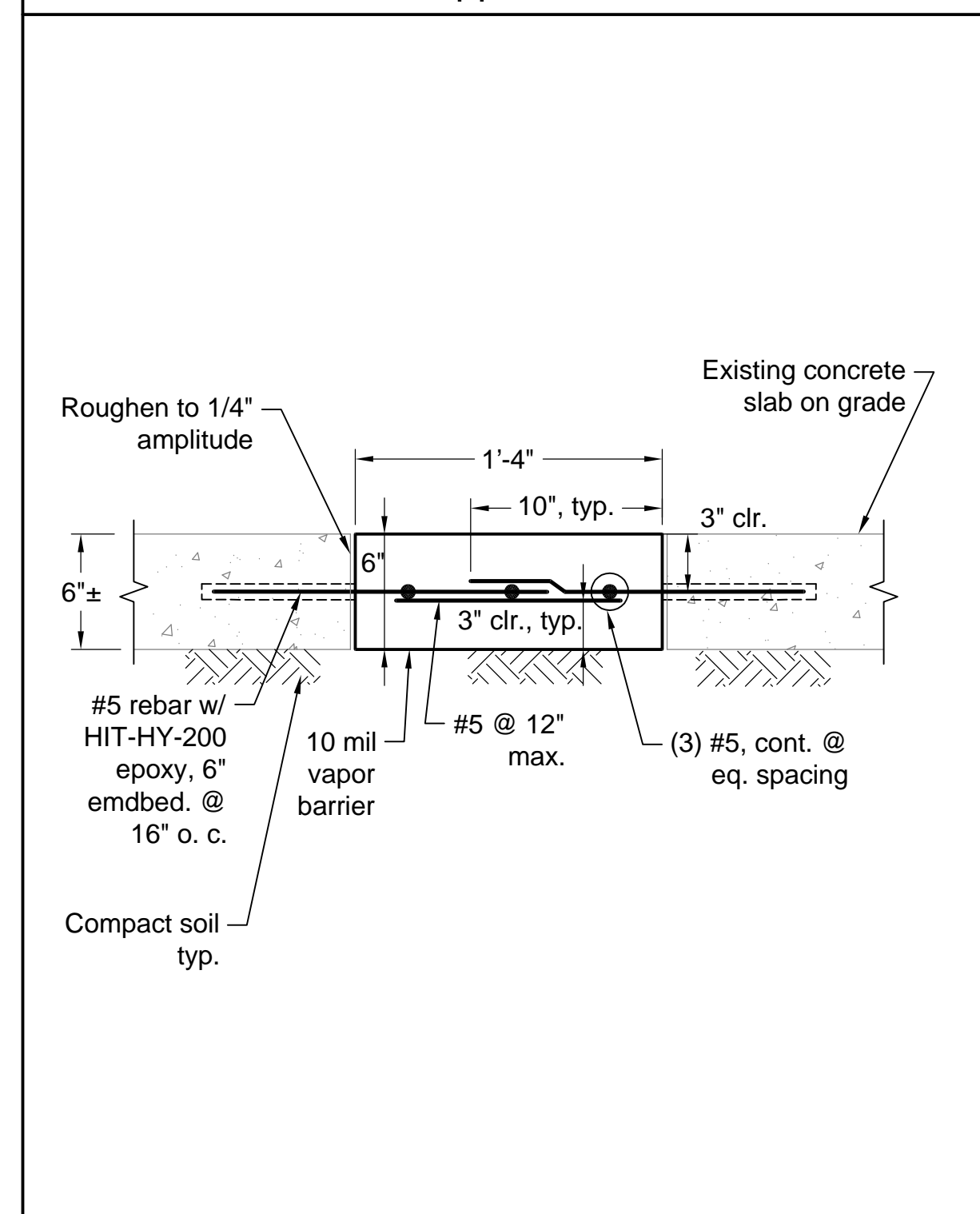


1 - Cantilever Crane Support Detail

Scale: 1 1/2" = 1'-0"

2 - Vertical Girt Splice (Optional)

3 - Partition Wall Detail (wall parallel to purlins)



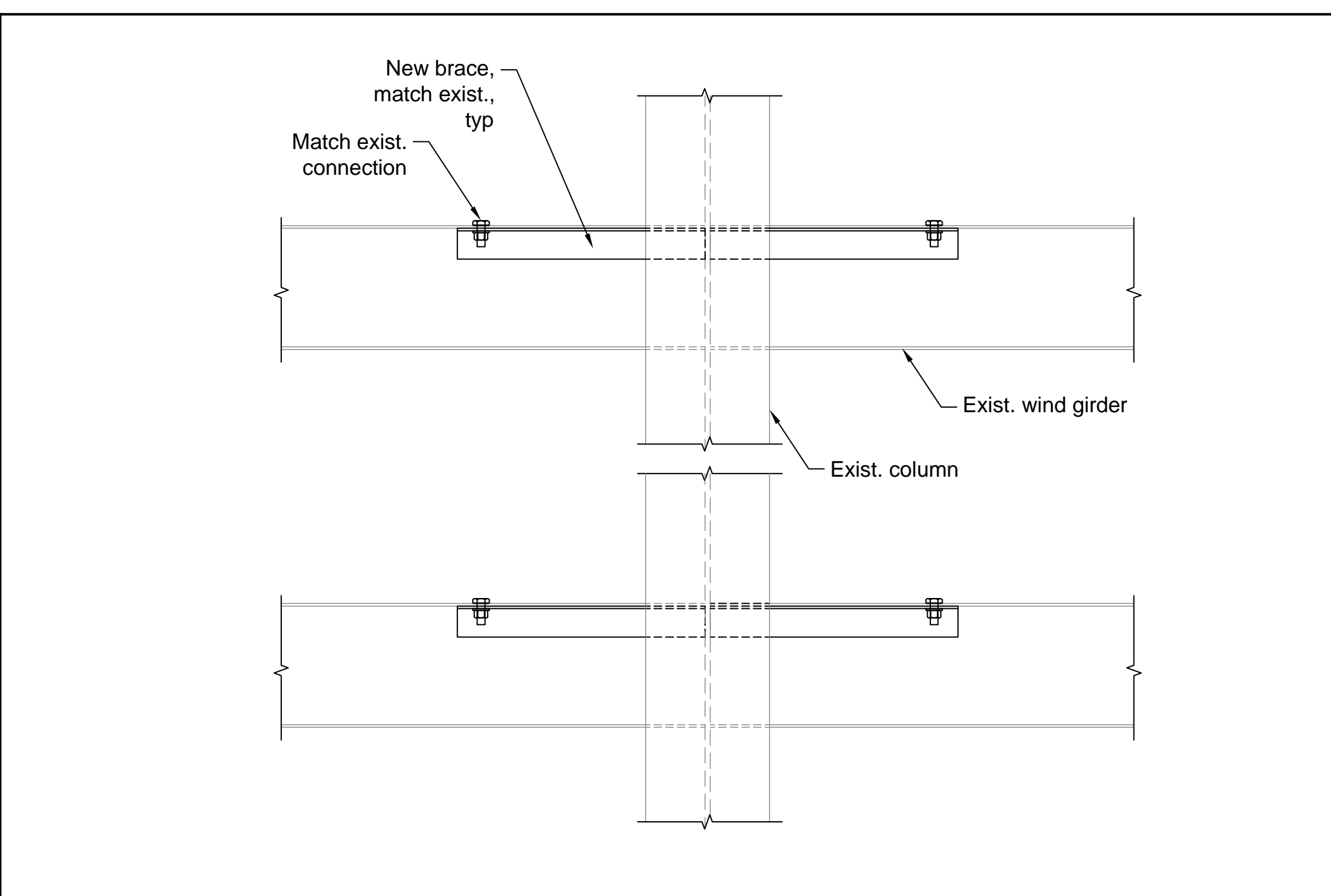
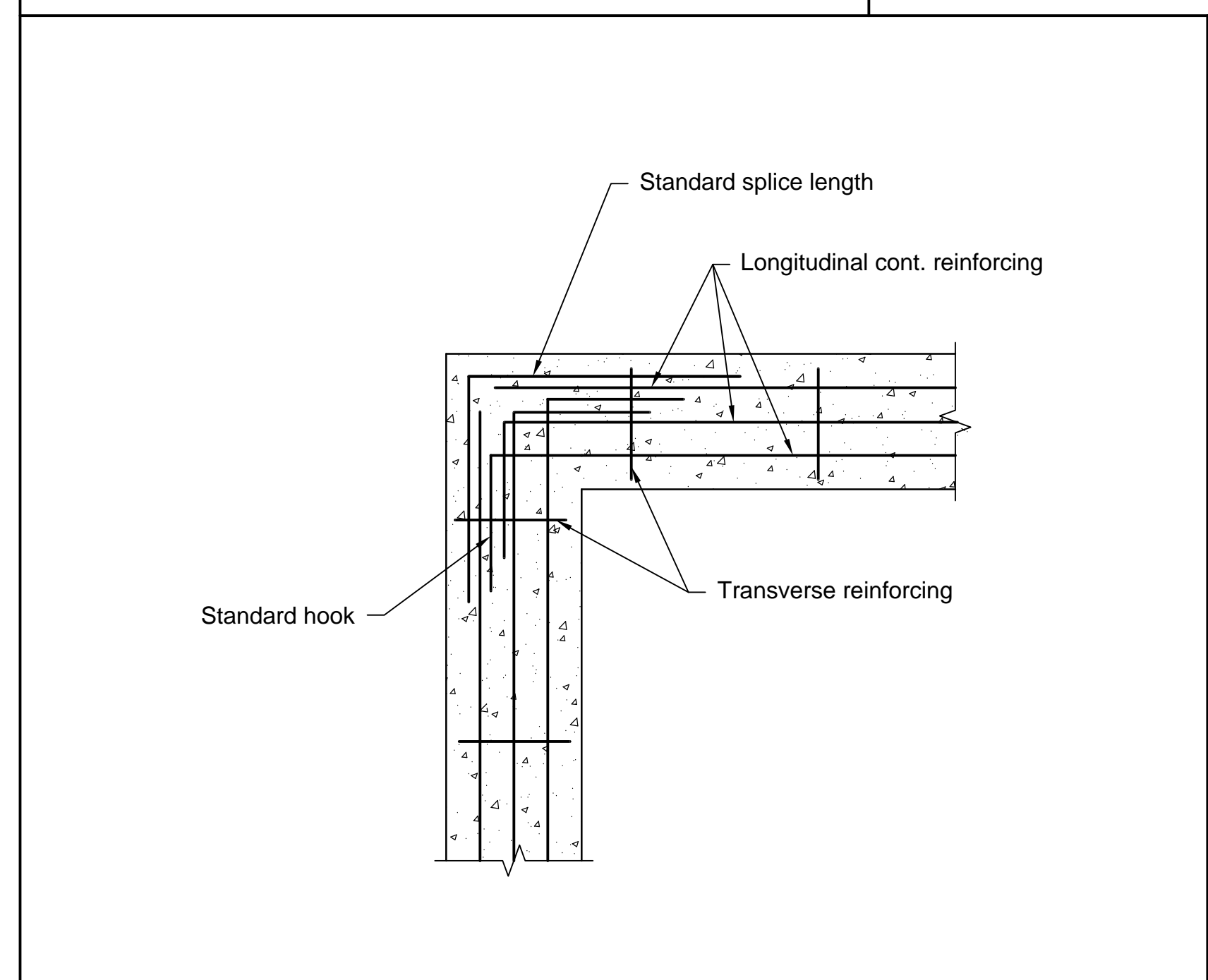
4 - Section

Scale: 1 1/2" = 1'-0"

5 - Partition Wall Detail (wall perpendicular to purlins)

6 - Section

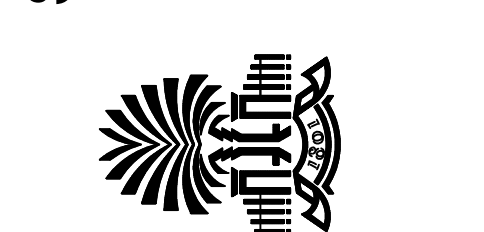
7 - Contraction Joint Standard Detail

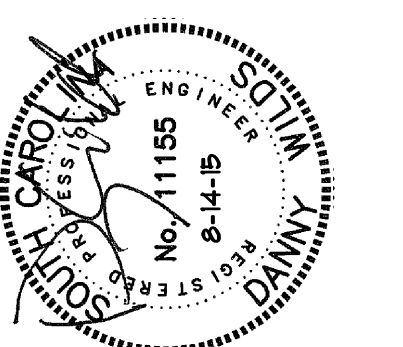


8 - Typical Footing Corner Detail

Scale: NTS

9 - Column Bracing Detail





Project Number: 1433.2  
Date: 14 AUGUST 2015  
Revisions:

HVAC FLOOR PLANS, NOTES, SCHEDULES, AND DETAILS

M1

PACKAGED HEAT PUMP SCHEDULE ①②③④													
MARK	TRANE MODEL ②	O.A. CFM	AUX. HEAT KW (NET)	INDOOR FAN			COOLING ③				HEATING ④ (1°F)		
				CFM	E.S.P.	H.P.	TOTAL	SENS.	ENT.AIR	SEER	EER	TOTAL	HSPF
FAC-1	4UCZ-6048	160	121	1600	0.45"	3/4	48.0	36.0	80/61	16.0	12.0	21.0	9.0

- ① UNIT TO MATCH AVAILABLE ELECTRICAL SERVICE, SEE ELECTRICAL. UNIT SHALL BE SINGLE POINT POWER CONNECTION.
- ② OR EQUAL BY CARRIER, DAIKIN, JCI, YORK, OR APPROVED EQUAL.
- ③ BASED ON 95°F CONDENSER AIR TEMPERATURE.
- ④ BASED ON 10°F ENTERING AIR TEMPERATURE.
- ⑤ PROVIDE UNIT WITH O.A. HOOD, DAMPER, AND WASHABLE FILTER.
- ⑥ PROVIDE UNIT WITH HORIZONTAL AIRFLOW, VARIABLE SPEED ECM FAN MOTOR, 2 SPEED COMPRESSOR.
- ⑦ PROVIDE ENTHALPY ECONOMIZER WITH BAROMETRIC RELIEF.

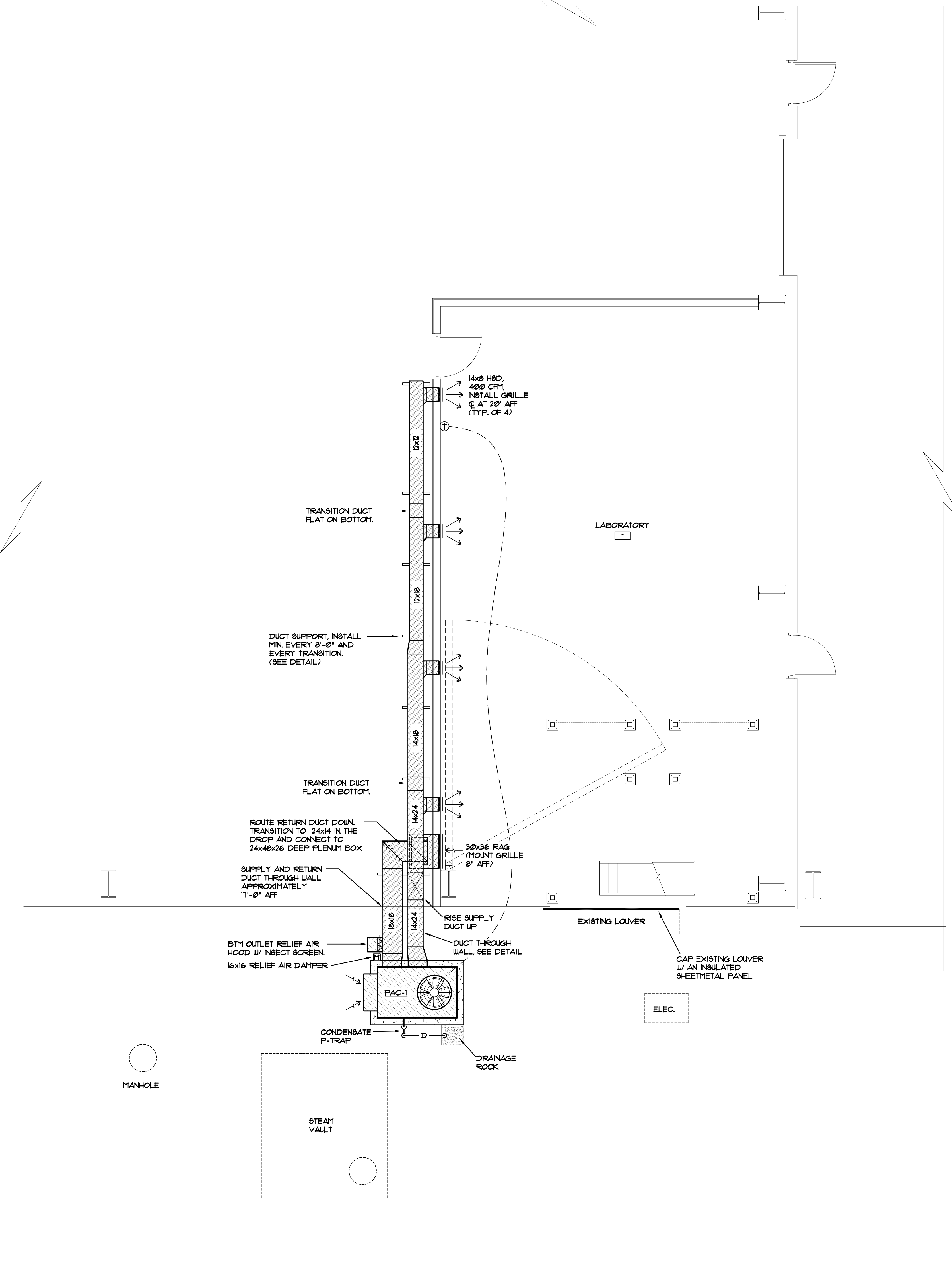
SYMBOLS	
	NEW MATERIAL
	ACOUSTICALLY LINED DUCT
	AIR FLOWRATE, CUBIC FEET PER MINUTE
	GRILLE OR DIFFUSER MARK, BALANCING CFM
	TURNING VANE
	THERMOSTAT
	CONDENSATE DRAIN LINE (INSULATED)

GRILLE AND DIFFUSER SCHEDULE			
GRILLE/DIFFUSER	CEILING TYPE	PRICE # MODEL NO.	MATERIAL
H&D	GYP. BD.	MODEL - 520 W/ OBD	ALUMINUM
RAG	GYP. BD.	MODEL - 91	STEEL

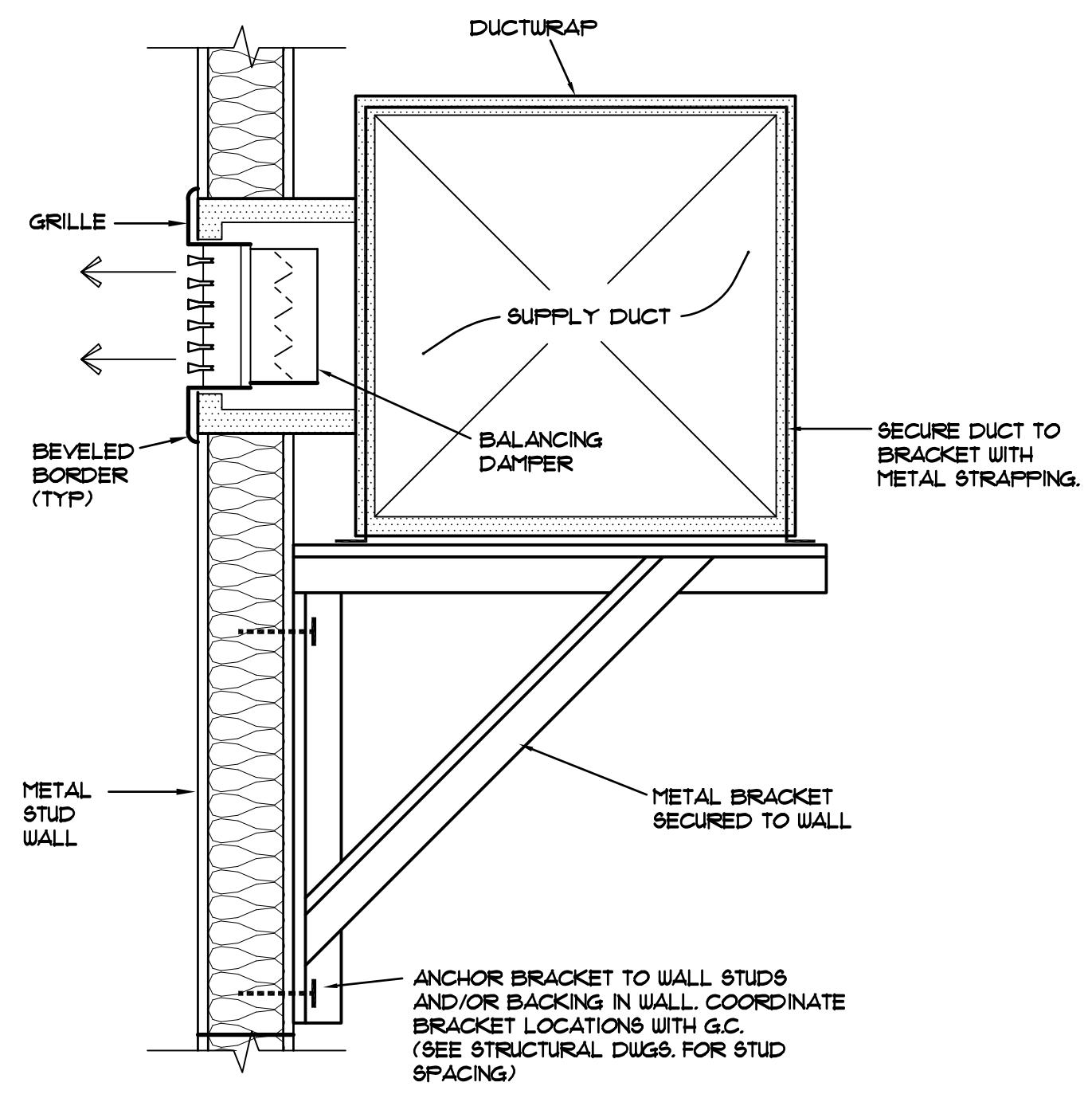
\* OR EQUAL BY TITUS, METALAIR, CARNES, NAILOR, KREUGER OR APPROVED EQUAL.

NOTES: 1. GRILLE AND DIFFUSER COLORS SHALL BE SELECTED BY ARCHITECT. SUBMIT COLOR SAMPLES TO ARCHITECT.

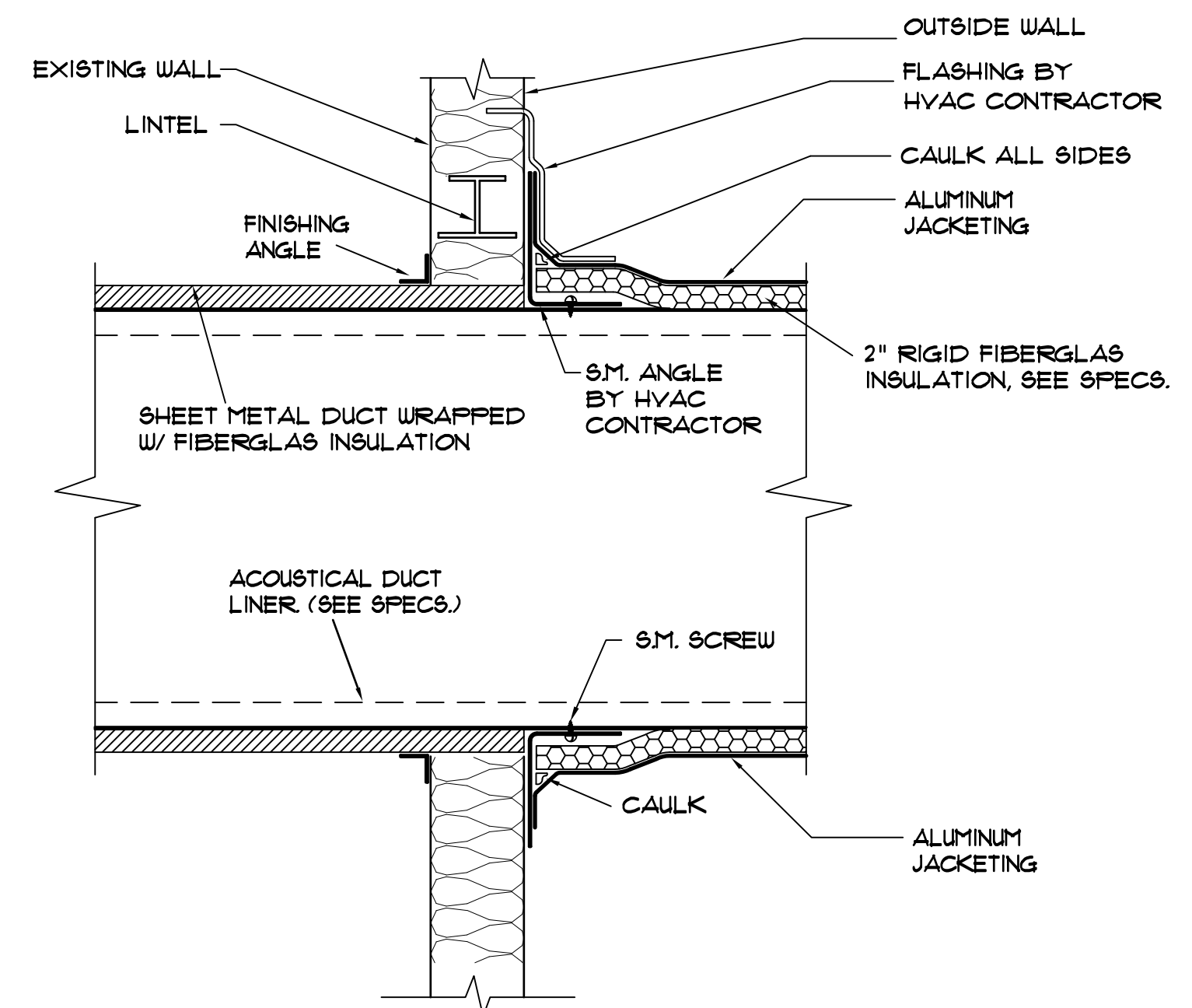
- | NOTES |   |
|-------|---|
| 1.    | DO NOT SCALE DRAWINGS, ROUGH FROM EQUIPMENT MANUFACTURER'S DRAWINGS AND EXISTING CONDITIONS.  |
| 2.    | DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED. DUCT SIZES SHOWN ON DRAWINGS ARE INTERIOR DIMENSIONS.  |
| 3.    | WHENEVER THE WORD "PROVIDE" IS USED IT SHALL MEAN FURNISH AND INSTALL COMPLETE AND READY FOR USE.   |
| 4.    | INSTALLATION OF EQUIPMENT, DUCTWORK, AND PIPING, INCLUDING VIBRATION ISOLATION SHALL COMPLY WITH 2012 INTERNATIONAL BUILDING CODE FOR SEISMIC PROTECTION. |
| 5.    | PROVIDE ALL ITEMS OF MISCELLANEOUS STEEL AS REQUIRED FOR INSTALLATION OF WORK.  |
| 6.    | PROVIDE FOR ACCESS TO ALL MECHANICAL ITEMS REQUIRING CLEANING OR ADJUSTMENT.  |



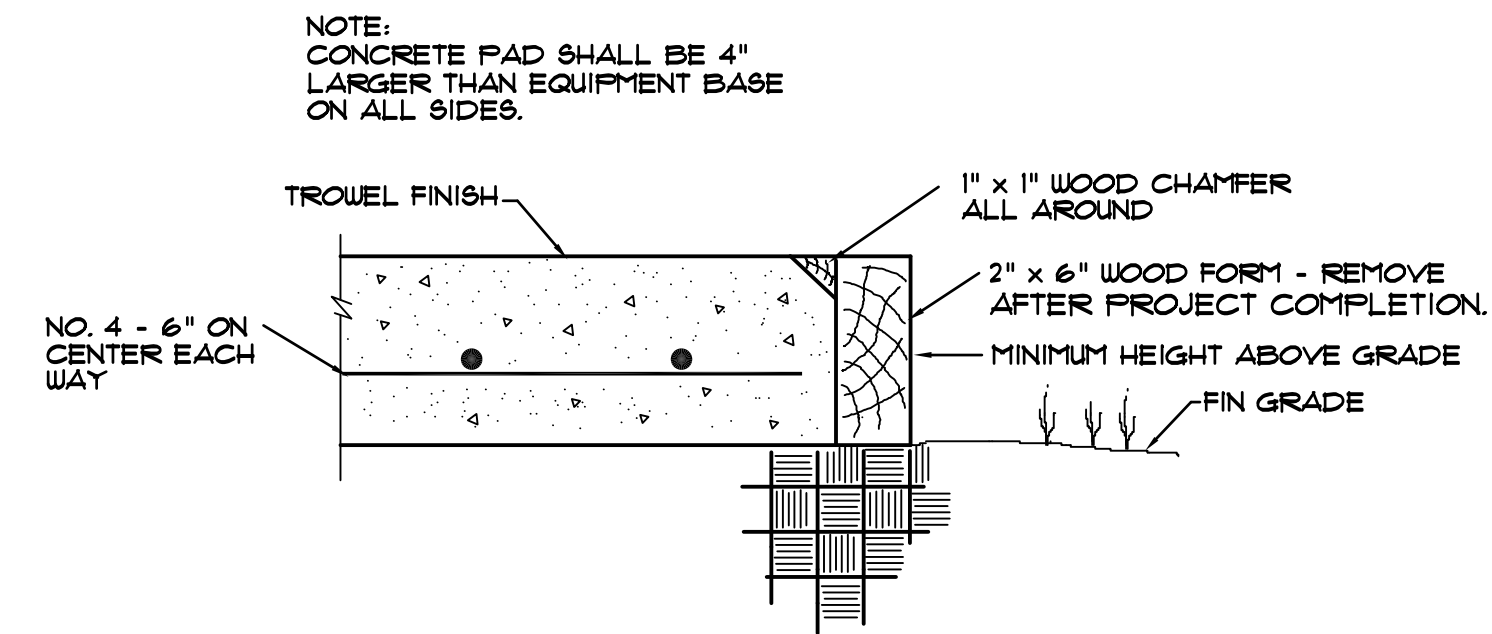
**HVAC FLOOR PLAN**  
SCALE: 1/4" = 1'-0"



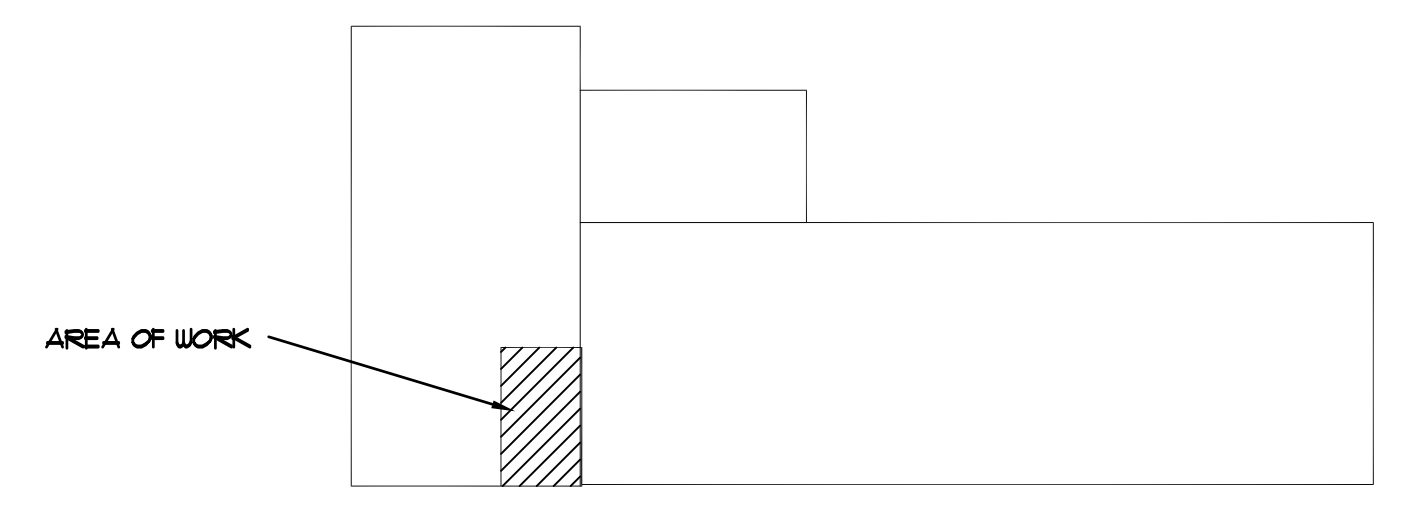
**DUCT SUPPORT DETAIL**  
NOT TO SCALE



**DUCT THRU OUTSIDE WALL**  
NOT TO SCALE



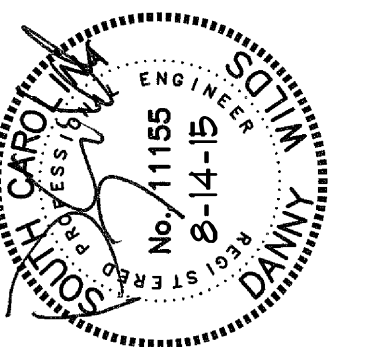
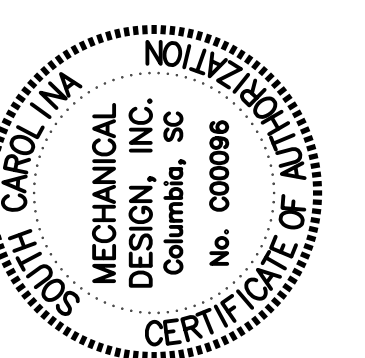
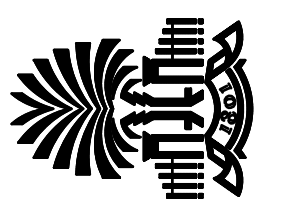
**OUTDOOR EQUIPMENT FOUNDATION**  
NOT TO SCALE



**KEY PLAN**  
NO SCALE

**MECHANICAL DESIGN INC.**  
4403 Broad River Road  
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CONTACT: Justin Varco  
DATE: 08/14/15  
COMM. NO. 153197

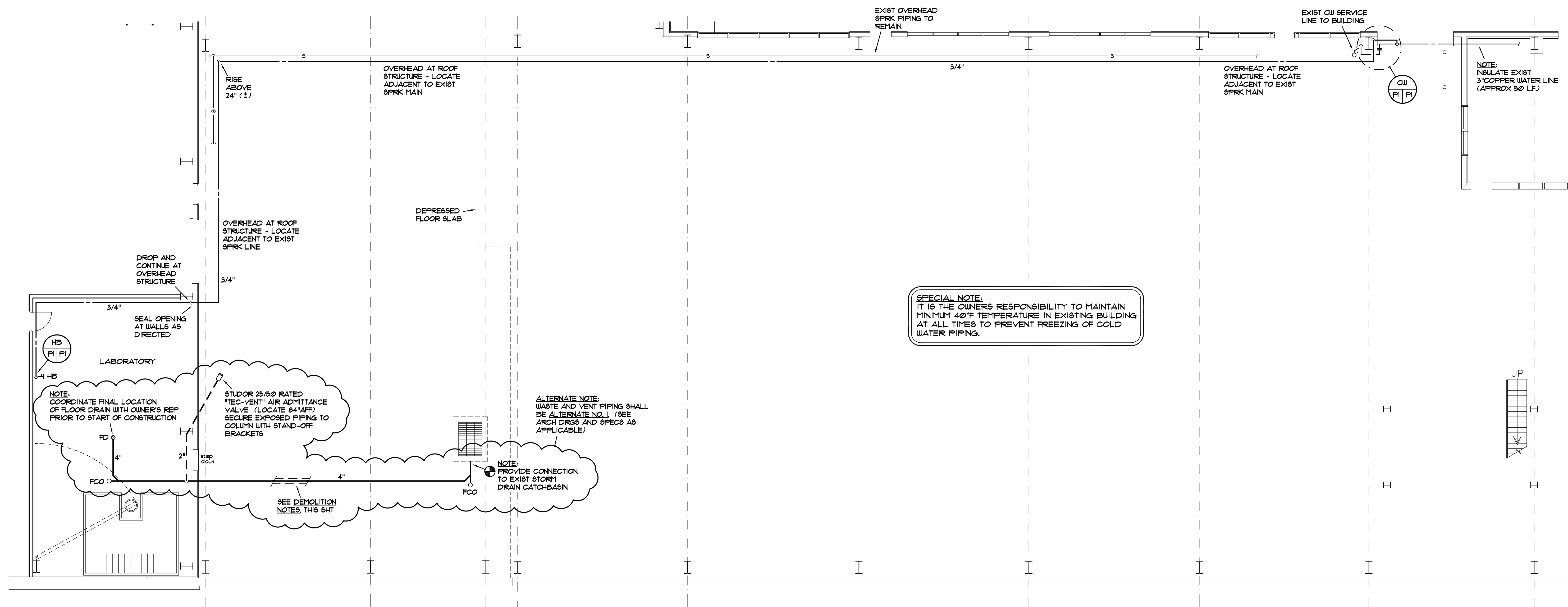


Project Number: 14332  
Date: 14 AUGUST 2015

Revisions:  
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\_\_\_\_\_  
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PLBG FLOOR PLAN, NOTES, SCHEDULES, DETAILS AND SPECS

**P1**



**PLUMBING FLOOR PLAN**

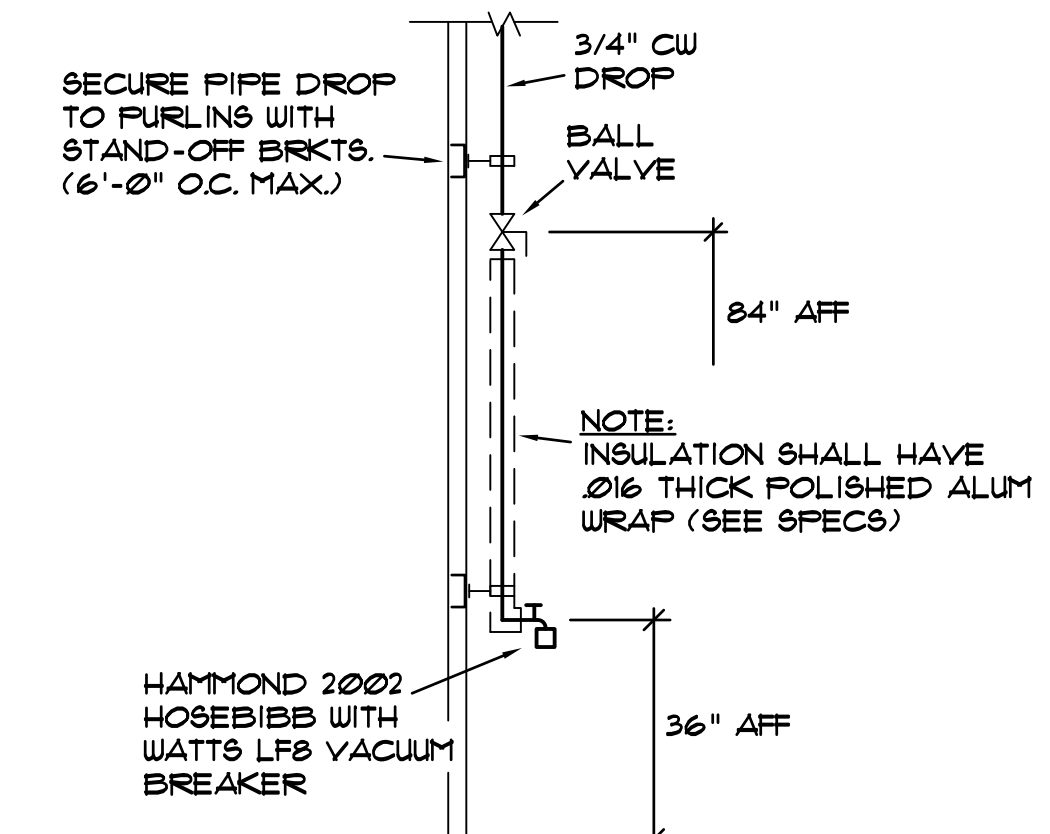
SCALE: 1/8" = 1'-0"

PLUMBING SYMBOLS	
SYMBOL	DESCRIPTION
---	DRAIN PIPING
---	COLD WATER PIPING
○	BALL VALVE
○	FLOOR CLEANOUT
○	4" FLOOR DRAIN - CONDENSATE
○	CONNECT TO EXIST
○	COLD WATER, HOT WATER

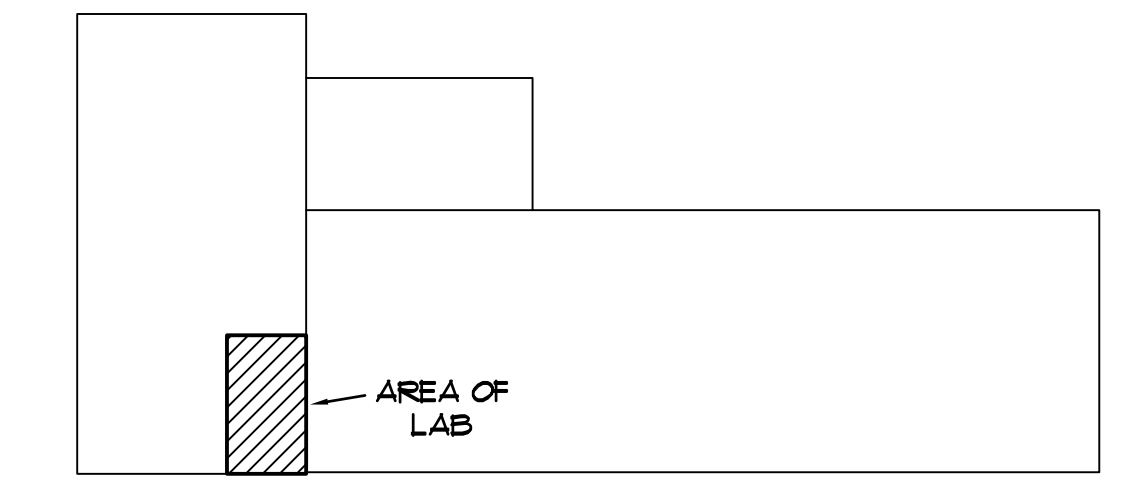
- DEMOLITION NOTES**
- CONTRACTOR SHALL SAWCUT AND REMOVE EXIST FLOOR SLABS AS REQUIRED FOR THE INSTALLATION OF DRAIN PIPING.
  - COORDINATE ALL DEMOLITION OF EXISTING SURFACES WITH THE GENERAL CONTRACTOR TO PROVIDE MINIMAL AMOUNT OF DEMOLITION AS REQUIRED.
  - PATCHING OF EXISTING FINISHED SURFACES SHALL BE BY THE GENERAL CONTRACTOR.

- PLUMBING NOTES**
- DO NOT SCALE DRAWINGS. ROUGH FROM EXISTING CONDITIONS.
  - COORDINATE PLUMBING SYSTEMS WITH ALL TRADES TO AVOID INTERFERENCE AND CONFLICTS PRIOR TO INSTALLATION OF PIPING, FIXTURES, AND EQUIPMENT.
  - ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THE (IBC) BUILDING AND (IPC) PLUMBING CODES, 2012 EDITIONS OF THE (ICC) INTERNATIONAL CODE COUNCIL AND ALL LOCAL CODES AND ORDINANCES.
  - WHENEVER THE WORD "PROVIDE" IS USED, IT SHALL MEAN FURNISH AND INSTALL COMPLETE AND READY FOR USE.
  - PROVIDE DEEP SEAL P-TRAP FOR FLOOR DRAIN TO PREVENT LOSS OF TRAP SEAL IN ACCORDANCE WITH 2012 (IPC) PLUMBING CODE 1002.4. PROVIDE PROSET TRAP GUARD TRAP PRIMER ALTERNATIVE AND INSTALL BELOW STRAINER AT FLOOR DRAIN.

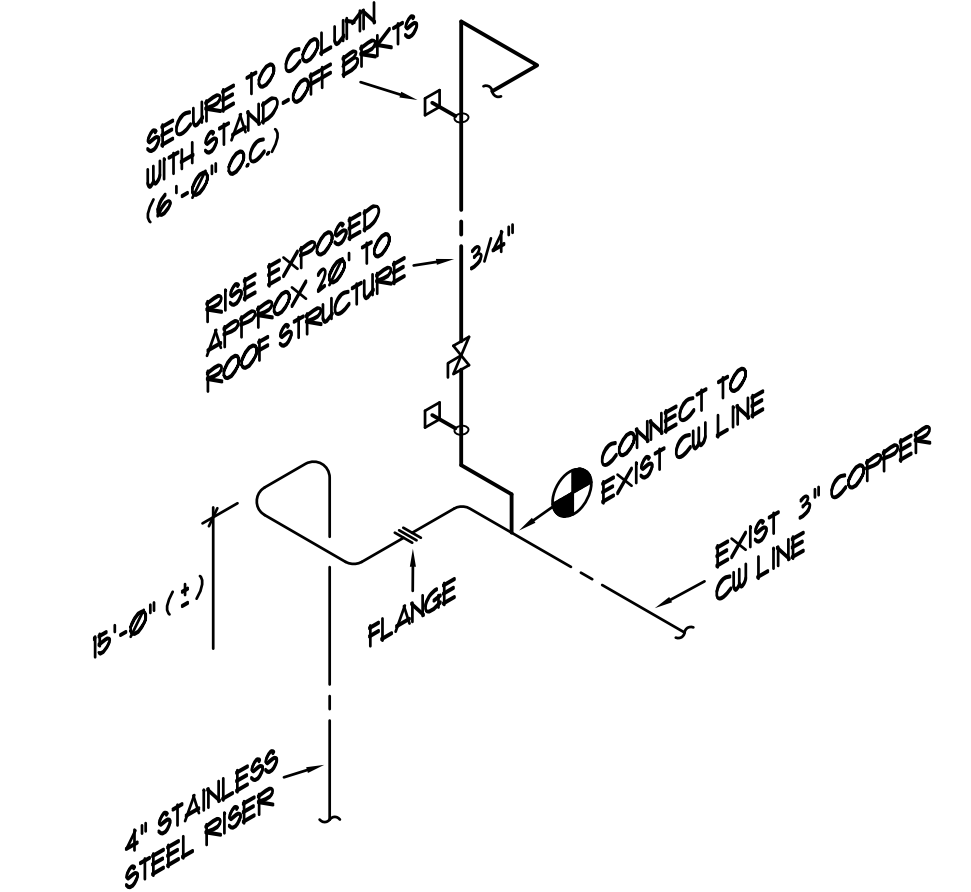
- PLUMBING SPECIFICATIONS**
- DRAIN AND VENT PIPING:** BELOW SLAB SHALL BE CAST IRON PIPE WITH BELL AND SPIGOT FITTINGS. ABOVE SLAB SHALL BE NO-HUB CAST IRON PIPE AND FITTINGS WITH MEDIUM DUTY 4-BAND COUPLINGS. PIPE AND FITTINGS SHALL BE IN ACCORDANCE WITH ASTM A-14 AND WU-P-401d. 4-BAND COUPLINGS SHALL BE AS MFR'D BY HUSKY (8D-2000) OR MISSION HEAVYWEIGHT (BLUE).
  - FLOOR CLEANOUT:** ZURN ZN-1400-BP-NL, WITH ROUND SCORIATED NICKLE-BRONZE ADJUSTABLE FLOOR COVER AND NEOPRENE GASKET SEAL CONNECTION OR EQUAL BY JR SMITH OR JOSAM WILL BE ACCEPTED. INSTALL TOP OF COVER FLUSH WITH FINISHED FLOOR.
  - FLOOR DRAIN:** ZURN ZN-415-2B WITH 8" ROUND NICKLE-BRONZE STRAINER, 4" OUTLET.
  - COLD WATER PIPING:** PIPING SHALL BE HARD DRAIN TYPE L COPPER PIPE AND FITTINGS. USE LEAD-FREE SOLDER (95/5) FOR ALL JOINTS.
  - INSULATION:** PROVIDE 1-1/2" THICK 25/50 RATED FIBERGLASS INSULATION WITH ASJ JACKET FOR ALL WATER PIPING. INSULATION SHALL BE COVERED IN 8 OZ COTTON CANVAS JACKET. REFER TO DETAIL ON DRS AND PROVIDE 2/16" THICK ALUMINUM JACKET TO PROTECT DROP TO HOSEBIBB.
    - MITER ALL JOINTS. DO NOT FILL WITH LOOSE INSULATION.
    - INSTALL 25/50 RATED PVC FITTING COVERS AT ALL JOINTS.
  - HANGERS:** PROVIDE COPPER COATED TEARDROP HANGERS, SPACED NOT OVER 6 FEET APART FOR SUPPORT OF COLD WATER PIPING.



**HOSEBIBB DETAIL**  
NOT TO SCALE



**KEY PLAN**  
NO SCALE



**CW CONNECTION DETAIL**  
SCHEMATIC

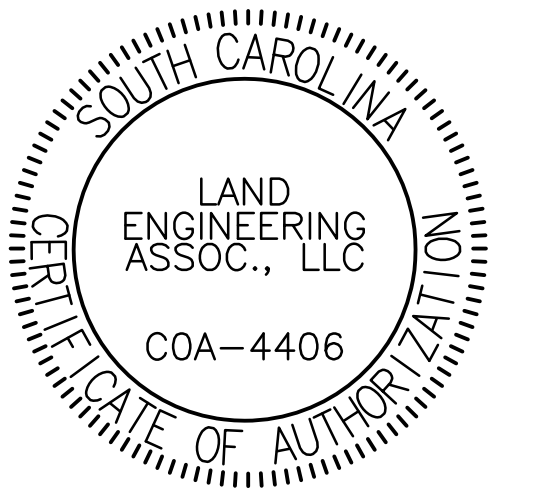
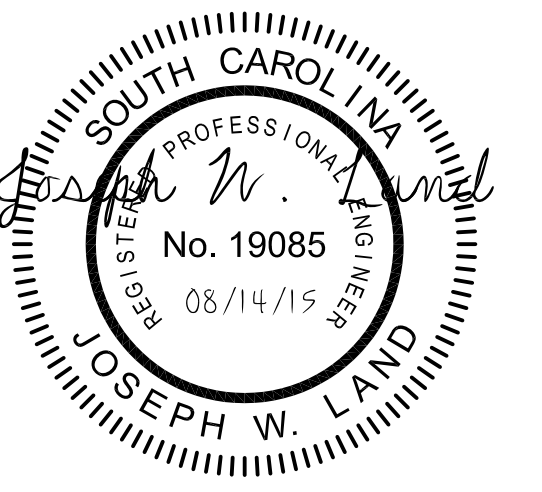
- EXISTING CONDITIONS NOTES:**
- EXISTING DRAWINGS ARE NOT AVAILABLE FOR THIS BUILDING. CONTRACTOR SHALL PROCEED WITH CAUTION DURING LAYOUT AND DEMOLITION OF EXISTING FLOOR SLAB.
  - CONTRACTOR IS REQ'D TO VISIT PROJECT SITE PRIOR TO SUBMITTING BID AND THOROUGHLY FAMILIARIZE HIMSELF WITH ALL EXIST CONDITIONS RELATING TO THIS PROJECT. SUBMISSION OF A BID WILL BE CONSIDERED AS EVIDENCE THAT THE CONTRACTOR HAS VISITED THE SITE OF WORK.

**MECHANICAL DESIGN INC.**

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DATE: 08/14/15  
COMM. NO. 153197





Project Number: 14.3.3.2

Date: 14 August 2015

Revisions:

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\_\_\_\_\_  
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GENERAL  
NOTES, LEGEND,  
AND SCHEDULES

E1.00

LIGHTING FIXTURE SCHEDULE

SYMBOL	TYPE	DESCRIPTION	MANUFACTURER	MODEL NUMBER	OPTICAL ELEMENT	MOUNTING	VOLTS	LAMPS
	A	4' FLUORESCENT SURFACE-MOUNT FIXTURE WITH 1 BALLAST, 3 LAMPS AND A WET LOCATION LISTING.	WILLIAMS	93-4-3-32-A-WET/2-SS LATCH-EB3	0.125" ACRYLIC LENS	CEILING GRID	277V	3 - SYLVANIA: FO32/25W/841/XP/SS/ECO3
	B	HIGH-BAY L.E.D. PENDANT-HUNG LIGHTING FIXTURE.	GE LIGHTING	ABH2-4-4H-47-F-N-N-23-B-D-W	30 DEGREE DIFFUSED LENS	PENDANT HUNG AT 42' AFF	277V	L.E.D. - 34,000 lumens/4000k
	U1	EMERGENCY LIGHTING UNIT, WALL MOUNTED WITH TWO HEADS, SELF DIAGNOSTICS, 90 MINUTE BATTERY BACKUP SYSTEM, NEMA-4X RATING.	EMERGI-LITE	W-12SV24N-2-LG-DA	MR16 HEADLAMPS (FLOOD)	SURFACE MOUNT ON WALL AT 7' AFF U.N.O.	277V	2 - 12-VOLT, 4-WATT MR16 L.E.D.
	U2	EMERGENCY LIGHTING UNIT, WALL MOUNTED WITH TWO HEADS, SELF DIAGNOSTICS, 90 MINUTE BATTERY BACKUP SYSTEM, NEMA-4X RATING.	EMERGI-LITE	W-12SV24N-2-LG-DA	MR16 HEADLAMPS (FLOOD)	SURFACE MOUNT ON CEILING	277V	2 - 12-VOLT, 4-WATT MR16 L.E.D.
		POLY-VNYL CHLORIDE, L.E.D. SELF-POWERED EXIT SIGN WITH A 90 MINUTE BATTERY BACKUP SYSTEM AND A NEMA 4X RATING.	EMERGI-LITE	WW-SVXN-1-R-D-4X	L.E.D. DIFFUSER	SURFACE MOUNT ON WALL AT 8' AFF U.N.O.	277V	L.E.D.

ELECTRICAL DRAWING INDEX

E1.00	GENERAL NOTES, LEGEND, AND SCHEDULES
E2.00	ELECTRICAL SINGLE-LINE DIAGRAMS AND SCHEDULES
E3.00	OVERALL BUILDING ELECTRICAL FLOOR PLAN
E3.10	MEZZANINE ELECTRICAL PLAN
E4.00	LAB SPACE ELECTRICAL PLANS
E5.00	LAB SPACE LIGHTING PLANS

GENERAL CONSTRUCTION NOTES

- PROVIDE ALL WORK IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS:  
INTERNATIONAL BUILDING CODE 2012 EDITION  
NFPA 70 - NATIONAL ELECTRICAL CODE 2011 EDITION  
ANSI A117.1 - ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES 2009 EDITION
  - PROVIDE RACEWAY AND WIRING TO ALL DEVICES, FIXTURES, AND EQUIPMENT INDICATED ON THE CONTRACT DRAWINGS. THE DRAWINGS INDICATE PARTIAL RACEWAY AND WIRING REQUIREMENTS TO HELP CLARIFY DESIGN INTENT. WHERE RACEWAY AND/OR WIRING IS NOT INDICATED FOR DEVICES, FIXTURES, OR EQUIPMENT THE ARRANGEMENT, GROUPING, AND ROUTING SHALL BE PROVIDED IN ACCORDANCE WITH THE 2011 EDITION OF THE NATIONAL ELECTRICAL CODE.
  - THERE ARE NO RATED WALLS IN THE BUILDING. CONTRACTOR SHALL NEATLY CUT WALLS TO MINIMIZE ANY GAPS BETWEEN RACEWAY AND BUS DUCT PENETRATIONS.
  - RACEWAYS SHALL BE 3/4" GALVANIZED RMC WITH THREADED TYPE FITTINGS UNLESS NOTED OR DETAILED OTHERWISE.
  - JUNCTION BOXES SHALL BE CAST-METAL TYPE WITH GASKETED SCREW COVER, SIZED AND SUPPORTED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE. PROVIDE JUNCTION BOXES AS REQUIRED FOR POWER AND CONTROL WIRING RENOVATIONS.
  - INSTALL ELECTRICAL SYSTEMS WITHOUT INTERFERING WITH DUCTS, PIPES, STRUCTURAL MEMBERS, OR OTHER SYSTEMS.
  - THOROUGHLY CLEAN ALL EQUIPMENT AND SYSTEMS BEFORE PLACING IN OPERATION. RESTORE FINISHED SURFACES IF DAMAGED AND DELIVER THE ENTIRE INSTALLATION IN AN APPROVED CONDITION. THE CONTRACTOR SHALL INSTRUCT THE OWNER'S PERSONNEL IN THE PROPER OPERATION AND MAINTENANCE OF ALL SYSTEMS.
  - THE CONTRACTOR SHALL GUARANTEE THE WORK INSTALLED UNDER THIS CONTRACT FOR A PERIOD OF ONE YEAR AFTER DATE OF FINAL ACCEPTANCE. DEFECTS WHICH APPEAR AS A RESULT OF NORMAL USAGE SHALL BE REMEDIED BY THE CONTRACTOR TO THE COMPLETE SATISFACTION OF THE OWNER WITHOUT COST TO THE OWNER.
  - THE CONTRACTOR SHALL VISIT THE EXISTING BIOMASS FACILITY TO FIELD VERIFY EXISTING CONDITIONS PRIOR TO BID.
  - CUTTING, DRILLING, AND PATCHING: PROVIDE CHASES, SLOTS, AND OPENINGS IN EXISTING BUILDING COMPONENTS TO ALLOW FOR ELECTRICAL INSTALLATIONS. PERFORM CUTTING, DRILLING, FITTING, AND PATCHING REQUIRED TO:
    - INSTALL EQUIPMENT, MATERIALS, AND RACEWAYS IN EXISTING STRUCTURES.
    - REMOVE AND REPLACE DEFECTIVE WORK THAT DOES NOT CONFORM TO REQUIREMENTS OF THE CONTRACT DOCUMENTS.
    - UPON WRITTEN INSTRUCTIONS FROM THE ARCHITECT/ENGINEER, UNCOVER AND RESTORE WORK TO PROVIDE FOR ARCHITECT/ENGINEER OBSERVATION OF CONCEALED WORK.
- PROTECT EXISTING STRUCTURES, FURNISHINGS, FINISHES, MECHANICAL SYSTEMS, AND ELECTRICAL SYSTEMS WHILE PERFORMING CUTTING, DRILLING, FITTING, AND PATCHING.
- PATCH EXISTING SURFACES AND BUILDING COMPONENTS USING NEW MATERIALS THAT MATCH EXISTING MATERIALS. PATCHING SHALL BE PERFORMED BY EXPERIENCED INSTALLERS.

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
	LIGHTING FIXTURE; TYPE, CIRCUIT NUMBER, AND SWITCHLEG AS INDICATED. SEE THE LIGHTING FIXTURE SCHEDULE FOR ADDITIONAL SYMBOLS AND TYPES.
	SINGLE OR DOUBLE FACE EXIT SIGN, CEILING MOUNTED. PROVIDE DIRECTIONAL ARROWS/CHEVRONS AS INDICATED ON PLAN.
	SINGLE OR DOUBLE FACE EXIT SIGN, WALL OR BACK MOUNTED. PROVIDE DIRECTIONAL CHEVRONS (ARROWS) AS INDICATED ON PLAN.
	SINGLE-POLE TOGGLE SWITCH RATED 277 VOLTS, 20 AMPS. SURFACE MOUNT SWITCH ON WALL AT 42 INCHES AFF UNLESS NOTED OTHERWISE. PROVIDE A CAST-METAL BACKBOX FOR SWITCH.
	ONE-SECTION PANELBOARD, SURFACE MOUNTED WITH TOP AT 66" AFF. TWO-SECTION PANELBOARD, SURFACE MOUNTED WITH TOP AT 66" AFF.
	POWER TRANSFORMER - TYPE AS INDICATED.
	ELECTRICAL CONNECTIONS TO A MOTOR OR TO MOTOR DRIVEN EQUIPMENT.
	SAFETY DISCONNECT SWITCH - TYPE AND RATINGS AS INDICATED ON PLAN. COORDINATE MOUNTING LOCATION WITH MECHANICAL CONTRACTOR TO ENSURE PROPER WORKING CLEARANCES PER THE NEC.
	CAST-METAL JUNCTION BOX, WALL MOUNTED.
	CAST-METAL JUNCTION BOX, UNIT OR CEILING MOUNTED UNLESS NOTED OTHERWISE.
	QUADPLEX RECEPTACLE (TWO DUPLEX RECEPTACLES, AS DESCRIBED ABOVE, MOUNTED IN A COMMON BOX). FLUSH MOUNT DEVICES IN WALL AT 18" AFF UNLESS NOTED OTHERWISE. PROVIDE A CAST-METAL BACKBOX FOR RECEPTACLES.
	DUPLEX, GROUND-FAULT-INTERRUPT TYPE RECEPTACLE, NEMA 5-20R. SURFACE MOUNT DEVICE ON WALL AT 18" AFF OR TO PLATFORM RAILING, AS APPLICABLE UNLESS NOTED OTHERWISE. PROVIDE A GASKETED CAST-METAL BACKBOX FOR RECEPTACLE.
	DUPLEX, GROUND-FAULT-INTERRUPT TYPE RECEPTACLE, NEMA 5-20R, WITH A WEATHERPROOF IN-USE TYPE BOX/COVER. SURFACE MOUNT DEVICE ON WALL AT APPROXIMATELY 18" AFF OR AFG, AS APPLICABLE.
	TOMBSTONE FLOOR RECEPTACLE - WIREMOLD #525J SERVICE FITTING WITH GFI RECEPTACLE OPENING AND 20 AMP GFI DUPLEX RECEPTACLE.
	COMMUNICATIONS EQUIPMENT BACKBOARD - 4" w X 8" h X 3/4" d CLASS "A" TYPE PLYWOOD. PAINT BACKBOARD ON ALL SIDES WITH LIGHT GRAY, FIRE-RETARDANT PAINT. BACKBOARD SHALL BE SECURELY FASTENED TO WALL.
	VOICE/DATA COMMUNICATIONS OUTLET. PROVIDE A 4" SQUARE CAST METAL BOX WITH SINGLE-GANG ADAPTER PLATE MOUNTED ON WALL AT 18" AFF OR TO PLATFORM RAILING, AS APPLICABLE UNLESS NOTED OTHERWISE. PROVIDE A ONE INCH RACEWAY WITH PULL STRING FROM OUTLET TO COMMUNICATIONS BACKBOARD "CB1". PROVIDE A FIBER BUSHING ON BOTH ENDS OF RACEWAY.
	EXISTING HIGH-BAY METAL HALIDE LIGHTING FIXTURE - REMOVE. MAINTAIN INTEGRITY OF EXISTING CIRCUIT THAT SERVES OTHER LIGHTING FIXTURES.

277/480V, 3 PH., 4W, 60 HZ  
225 AMP MAIN BREAKER  
ONE SECTION PANEL - SURFACE MOUNTED  
NEMA 3R ENCLOSURE  
65,000 A.I.C. SYM. (MINIMUM)

PANEL "H2"

LOADS SERVED	BKR. AMP	LOAD KVA	CKT. NO.	(S / N)	CKT. NO.	LOAD KVA	BKR. AMP	LOADS SERVED
EXIT LIGHTS - KNIGHT LAB	20	0.5	1	—	2	0.0	20	SPARE
OVERHEAD LIGHTS - KNIGHT LAB	20	1.9	3	—	4	0.0	20	SPARE
PLATFORM LIGHTS - KNIGHT LAB	20	0.7	5	—	6	0.0	20	SPARE
SPARE	20	0.0	7	—	8	0.0	20	SPARE
SPARE	20	0.0	9	—	10	0.0	20	SPARE
SPARE	20	0.0	11	—	12	0.0	20	SPARE
SPARE	20	0.0	13	—	14	0.0	20	SPARE
SPARE	20	0.0	15	—	16	0.0	20	SPARE
SPARE	20	0.0	17	—	18	0.0	20	SPARE
SPARE	20	0.0	19	—	20	0.0	20	SPARE
SPARE	20	0.0	21	—	22	0.0	20	SPARE
SPARE	20	0.0	23	—	24	0.0	20	SPARE
SPARE	20	0.0	25	—	26	9.1	125	75 kVA TRANSFORMER "T2"
SPARE	20	0.0	27	—	28	9.1	125	75 kVA TRANSFORMER "T2"
SPARE	20	0.0	29	—	30	9.1	125	75 kVA TRANSFORMER "T2"

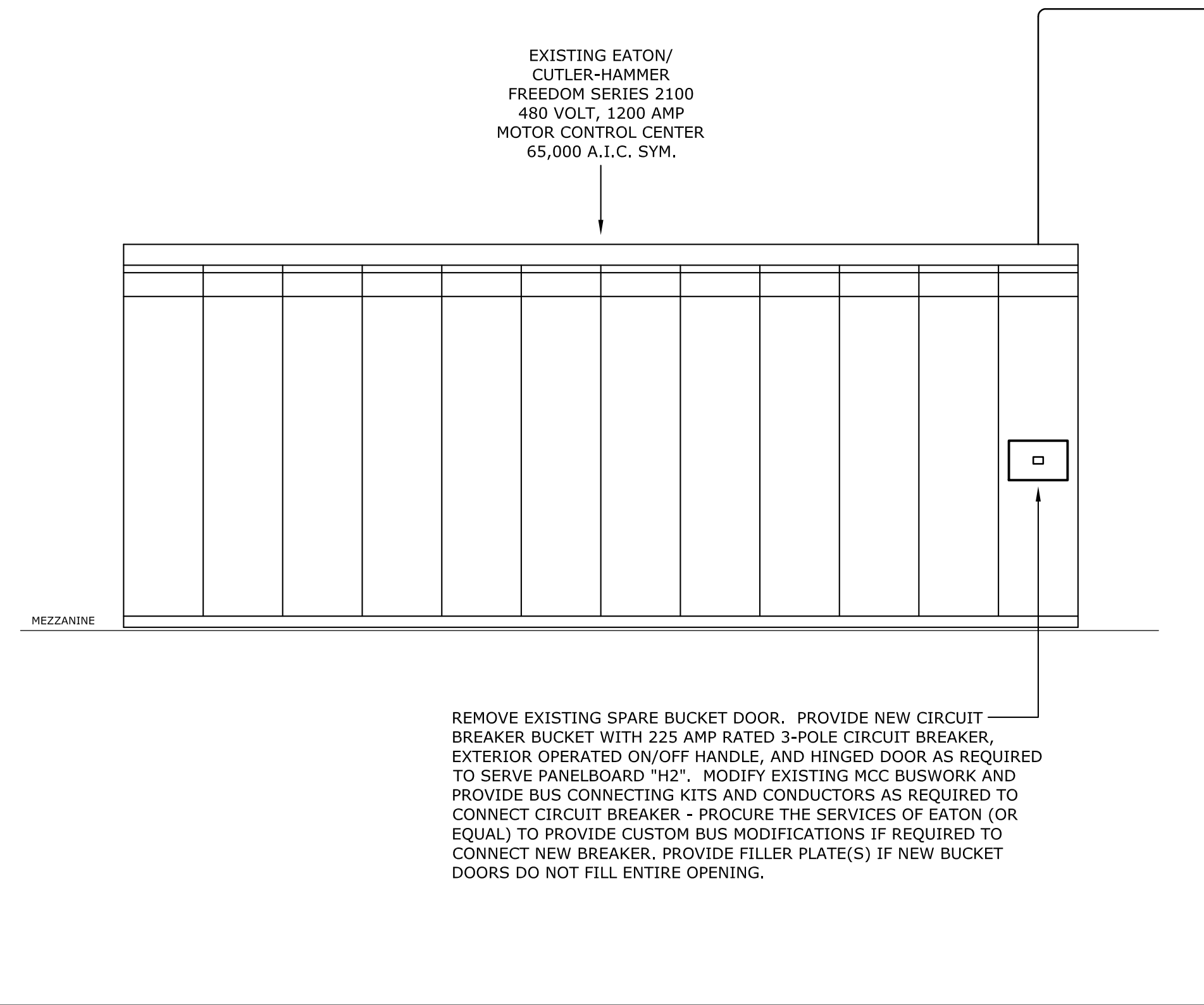
TOTAL LOAD (KVA): 30.5

120/208V, 3 PH., 4W, 60 HZ  
225 AMP MAIN BREAKER  
ONE SECTION PANEL - SURFACE MOUNTED  
NEMA 3R ENCLOSURE  
10,000 A.I.C. SYM. (MINIMUM)

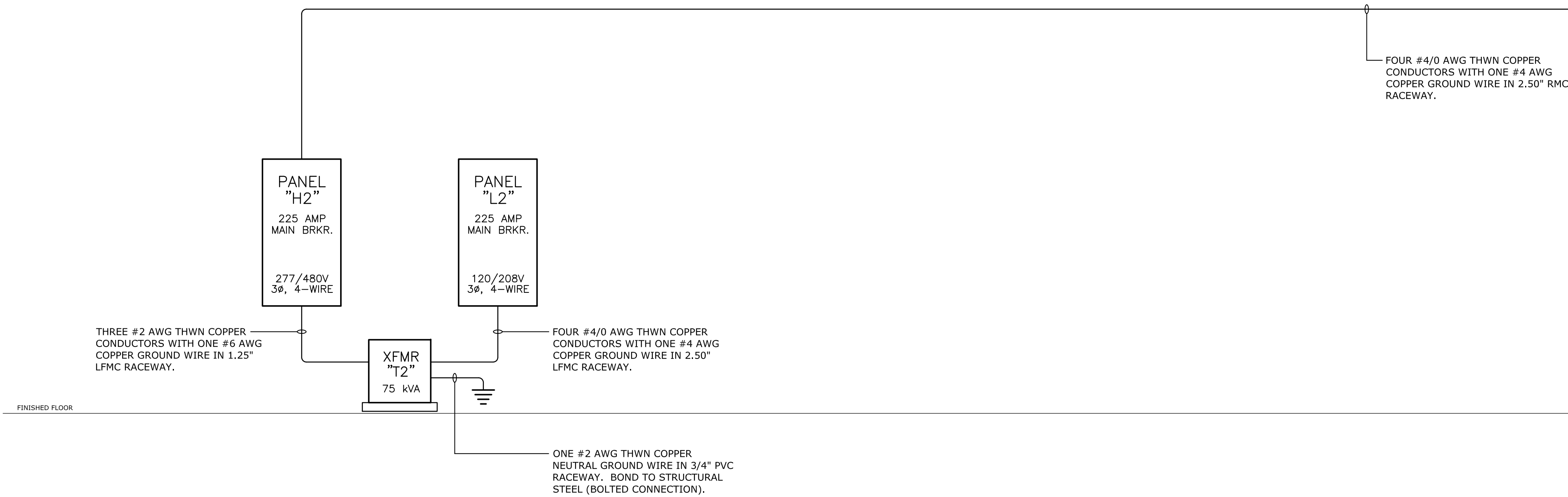
PANEL "L2"

LOADS SERVED	BKR. AMP	LOAD KVA	CKT. NO.	(S / N)	CKT. NO.	LOAD KVA	BKR. AMP	LOADS SERVED
ROOM 111A - RECEPTACLE	20	0.2	1	—	2	1.5	20	3kW SUBMERSIBLE HEATER
ROOM 111A - RECEPTACLE	20	0.4	3	—	4	1.5	20	3kW SUBMERSIBLE HEATER
ROOM 111A - RECEPTACLE	20	0.2	5	—	6	0.0	20	SPARE
ROOM 111A - RECEPTACLE	20	0.2	7	—	8	0.0	20	SPARE
ROOM 111A - RECEPTACLE	20	0.6	9	—	10	0.0	20	SPARE
PLATFORM, LEVEL 1 - RECEPTACLE	20	0.2	11	—	12	0.0	20	SPARE
PLATFORM, LEVEL 1 - RECEPTACLE	20	0.2	13	—	14	0.0	20	SPARE
PLATFORM, LEVEL 1 - RECEPTACLE	20	0.4	15	—	16	0.0	20	SPARE
PLATFORM, LEVEL 1 - RECEPTACLE	20	0.4	17	—	18	0.0	20	SPARE
PLATFORM, LEVEL 2 - RECEPTACLE	20	0.2	19	—	20	0.0	20	SPARE
PLATFORM, LEVEL 2 - RECEPTACLE	20	0.2	21	—	22	0.0	20	SPARE
PLATFORM, LEVEL 2 - RECEPTACLE	20	0.4	23	—	24	0.0	20	SPARE
PLATFORM, LEVEL 2 - RECEPTACLE	20	0.6	25	—	26	0.0	20	SPARE
PLATFORM, LEVEL 3 - RECEPTACLE	20	0.2	27	—	28	0.0	20	SPARE
PLATFORM, LEVEL 3 - RECEPTACLE	20	0.2	29	—	30	0.0	20	SPARE
PLATFORM, LEVEL 3 - RECEPTACLE	20	0.4	31	—	32	0.0	20	SPARE
PLATFORM, LEVEL 3 - RECEPTACLE	20	0.6	33	—	34	0.0	20	SPARE
COMM. BACKBOARD - RECEPTACLE	20	0.4	35	—	36	0.0	20	SPARE
SPARE	20	0.0	37	—	38	0.0	20	SPARE
SPARE	20	0.0	39	—	40	9.2	110	OUTDOOR PAC1 HVAC UNIT
SPARE	20	0.0	41	—	42	9.2	110	OUTDOOR PAC1 HVAC UNIT

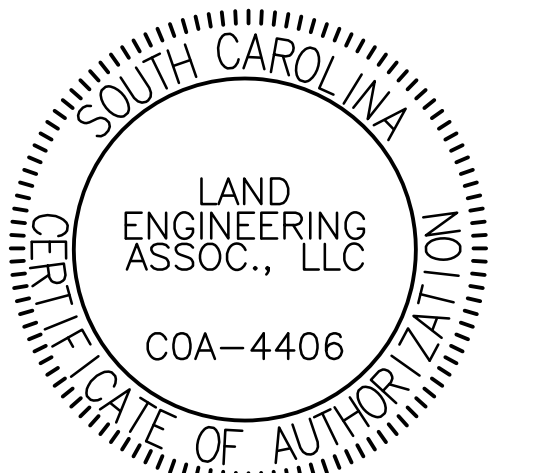
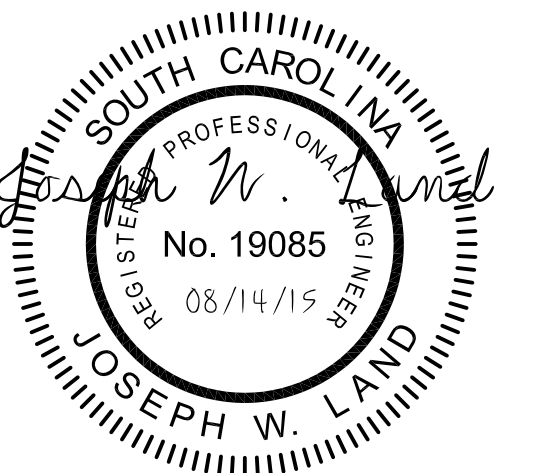
TOTAL LOAD (KVA): 27.4



REMOVE EXISTING SPARE BUCKET DOOR. PROVIDE NEW CIRCUIT BREAKER BUCKET WITH 225 AMP RATED 3-POLE CIRCUIT BREAKER, EXTERIOR OPERATED ON/OFF HANDLE, AND HINGED DOOR AS REQUIRED TO SERVE PANELBOARD "H2". MODIFY EXISTING MCC BUSWORK AND PROVIDE BUS CONNECTING KITS AND CONDUCTORS AS REQUIRED TO CONNECT CIRCUIT BREAKER. PROVIDE THE SERVICES OF EATON (OR EQUAL) TO PROVIDE CUSTOM BUS MODIFICATIONS IF REQUIRED TO CONNECT NEW BREAKER. PROVIDE FILLER PLATE(S) IF NEW BUCKET DOORS DO NOT FILL ENTIRE OPENING.



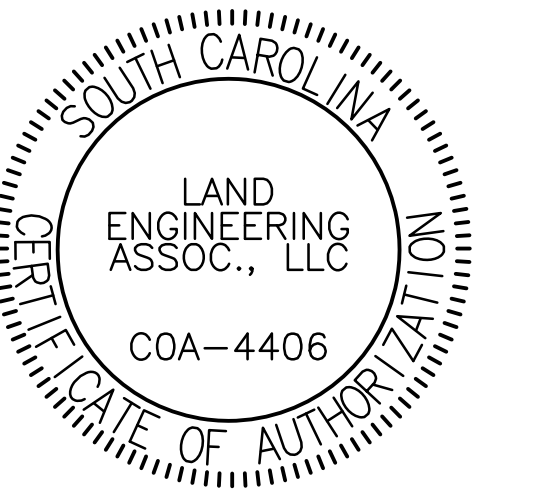
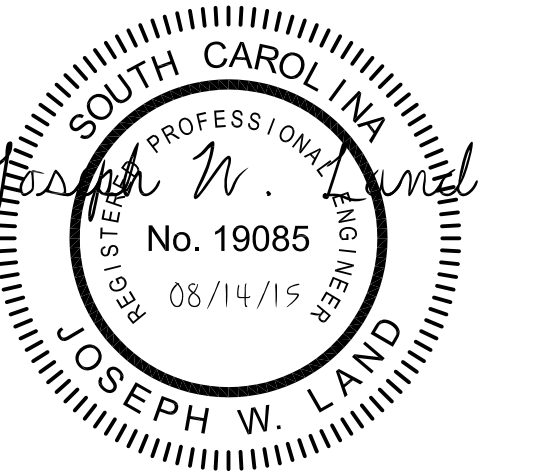
1 ELECTRICAL SINGLE-LINE DIAGRAM  
E2.00 NOT TO SCALE



Project Number: 14.3.3.2  
Date: 14 August 2015  
Revisions:

ELECTRICAL  
SINGLE-LINE  
DIAGRAM





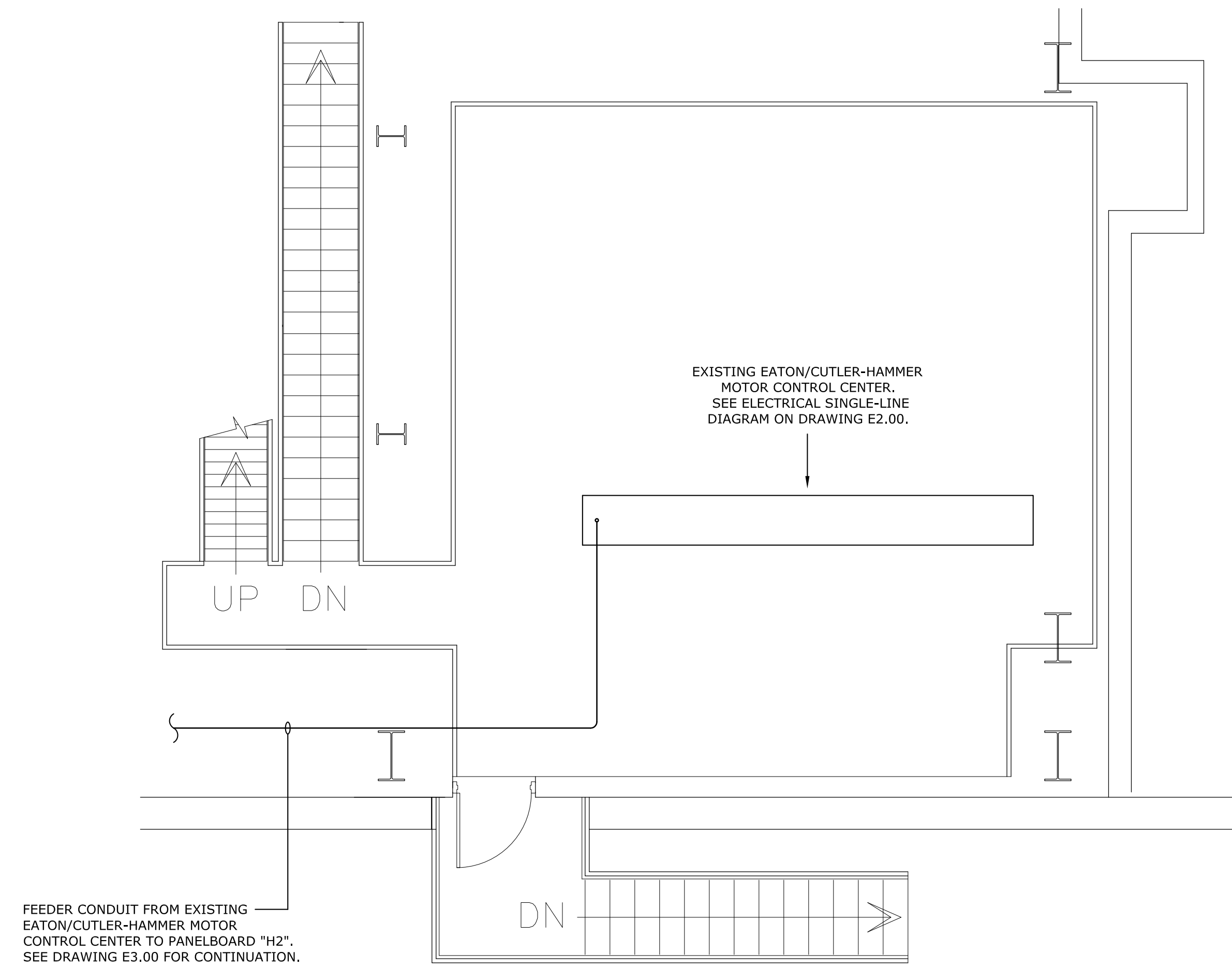
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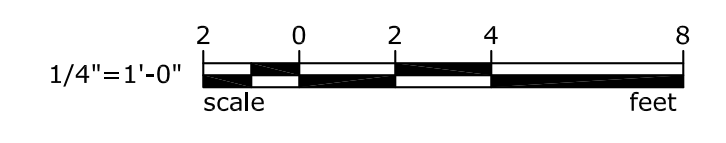
Revisions:


MEZZANINE  
ELECTRICAL  
PLAN

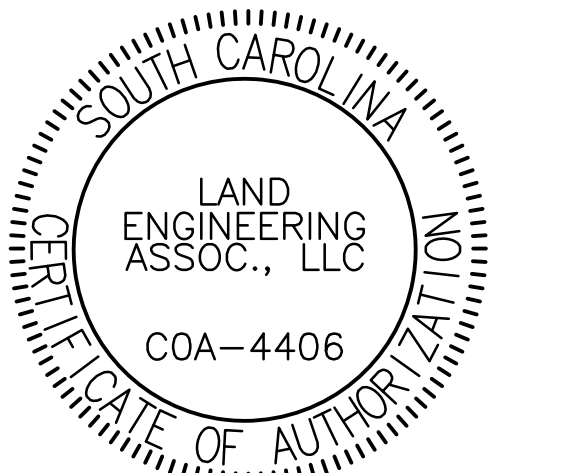
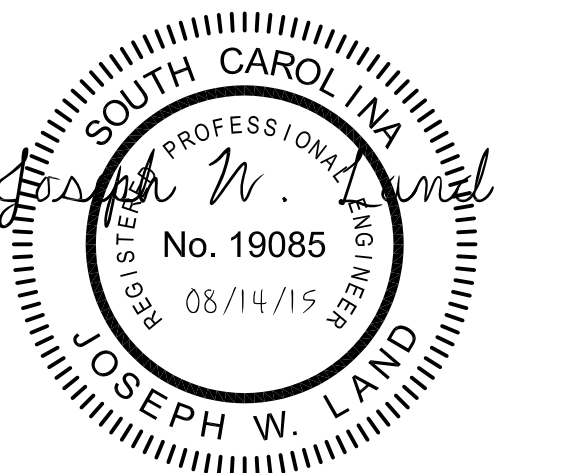
E3.10



**1** MEZZANINE ELECTRICAL PLAN  
SCALE: 1/4" = 1'-0"



**LEA** LAND ENGINEERING ASSOCIATES, LLC  
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Joe.Land.LEA@sc.rr.com



Project Number: 14.3.3.2

Date: 14 August 2015

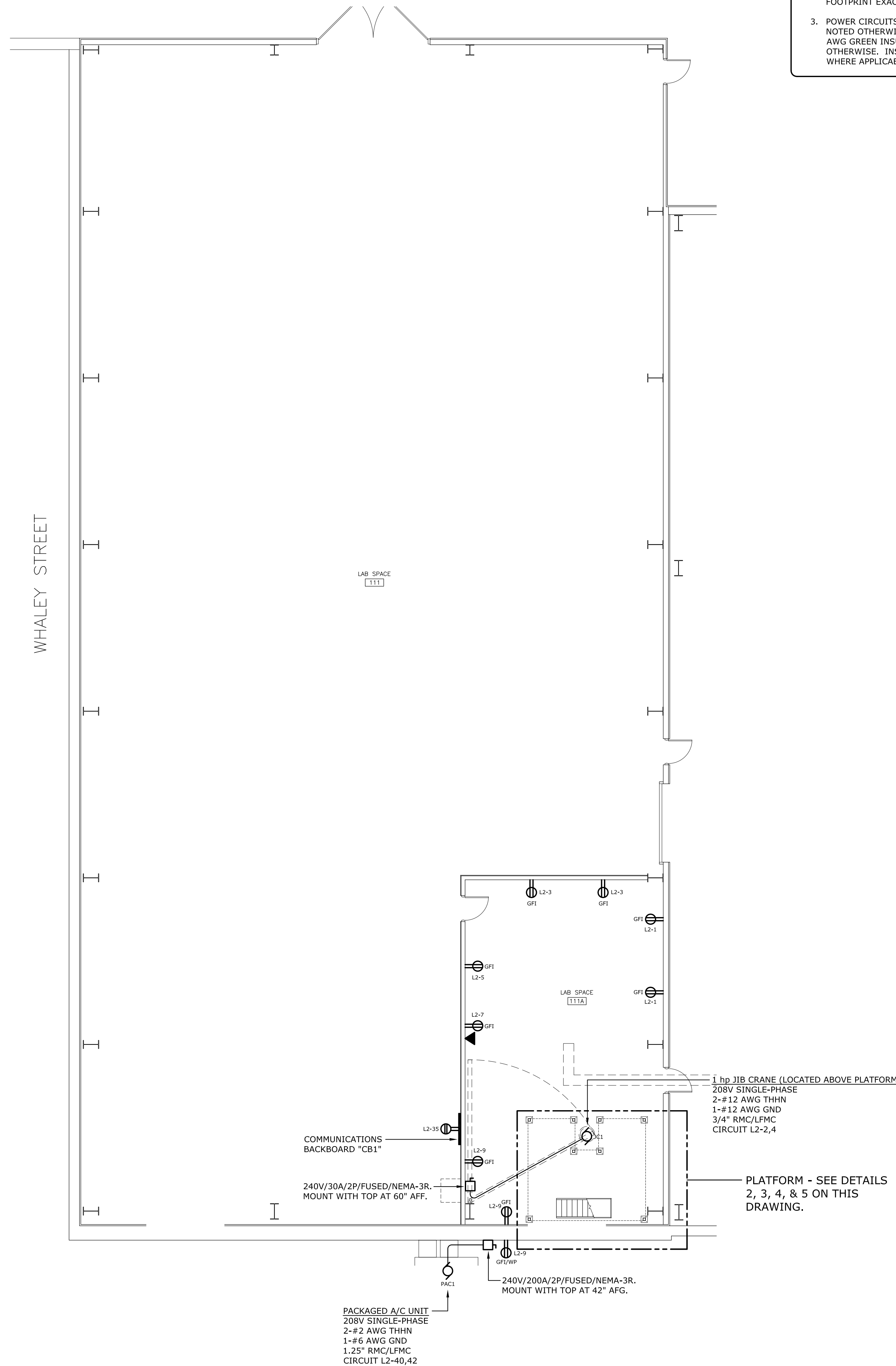
Revisions:


LAB SPACE  
ELECTRICAL  
PLANS

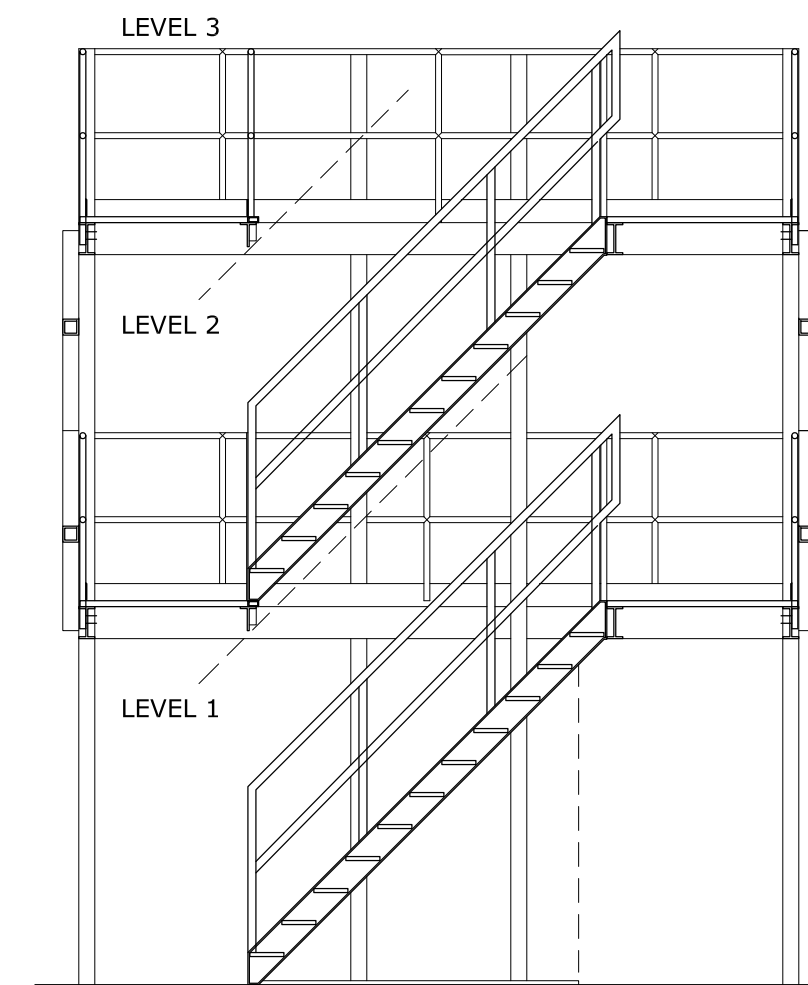
**E4.00**

**ELECTRICAL NOTES**

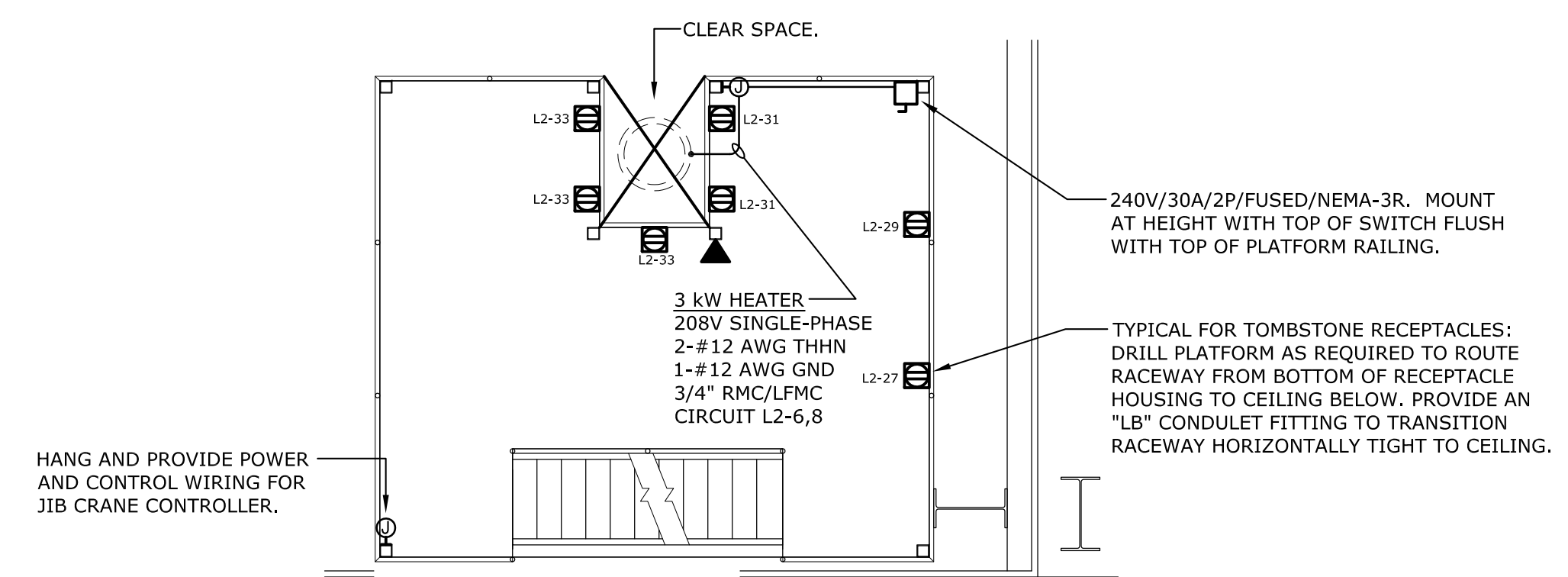
- ALL EQUIPMENT AND BOXES SHALL BE NEMA-3R RATED. ALL RACEWAYS SHALL BE GALVANIZED RMC WITH THREADED TYPE FITTINGS. MYER'S HUBS SHALL BE PROVIDED FOR ALL RACEWAY CONNECTIONS TO EQUIPMENT. ALL FLEXIBLE RACEWAYS SHALL BE LIQUID-TIGHT FLEXIBLE METAL CONDUIT. ALL CONDUCTORS SHALL BE COPPER WITH TYPE THHN INSULATION. ALL CIRCUITS SHALL INCLUDE A GREEN INSULATED COPPER GROUND WIRE.
- FOR EQUIPMENT REFERENCED TO THIS NOTE, PROVIDE A 4-INCH HIGH CONCRETE EQUIPMENT PAD. PROVIDE WIRE MESH IN CONCRETE. DRILL CONCRETE FLOOR AND PROVIDE REBAR DOWELS FOR SEISMIC RESTRAINT OF PAD - GROUT OR EPOXY-GLUE DOWELS INTO DRILLED HOLES. CONCRETE SHALL BE 2500 PSI WITH BROOM FINISH. MOUNTING ARRANGEMENT SHALL BE SUCH THAT THE BACK OF THE EQUIPMENT IS A MINIMUM OF 12 INCHES FROM WALL. CONCRETE PAD SHALL OVERLAP EQUIPMENT FOOTPRINT EXACTLY 4 INCHES ON ALL SIDES.
- POWER CIRCUITS INDICATED ON PLAN SHALL BE SERVED FROM PANEL "L2" UNLESS NOTED OTHERWISE. ALL CIRCUITS SHALL BE TWO #12 AWG THHN WITH ONE #12 AWG GREEN INSULATED GROUND WIRE IN 3/4" RMC RACEWAY UNLESS NOTED OTHERWISE. INSTALL HORIZONTAL RACEWAYS TIGHT TO CEILINGS OF PLATFORM WHERE APPLICABLE.



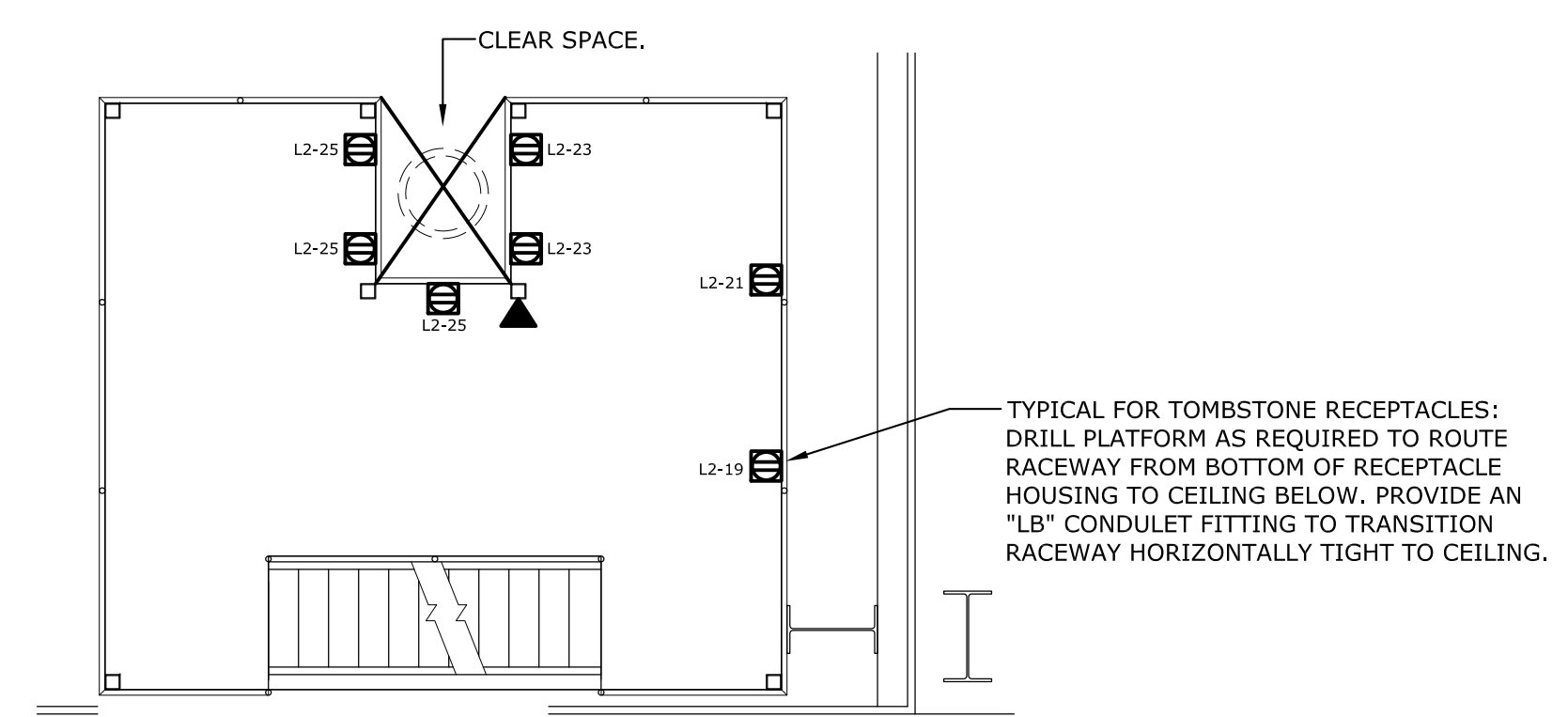
**1 LAB SPACE ELECTRICAL PLAN**  
SCALE: 1/8" = 1'-0"



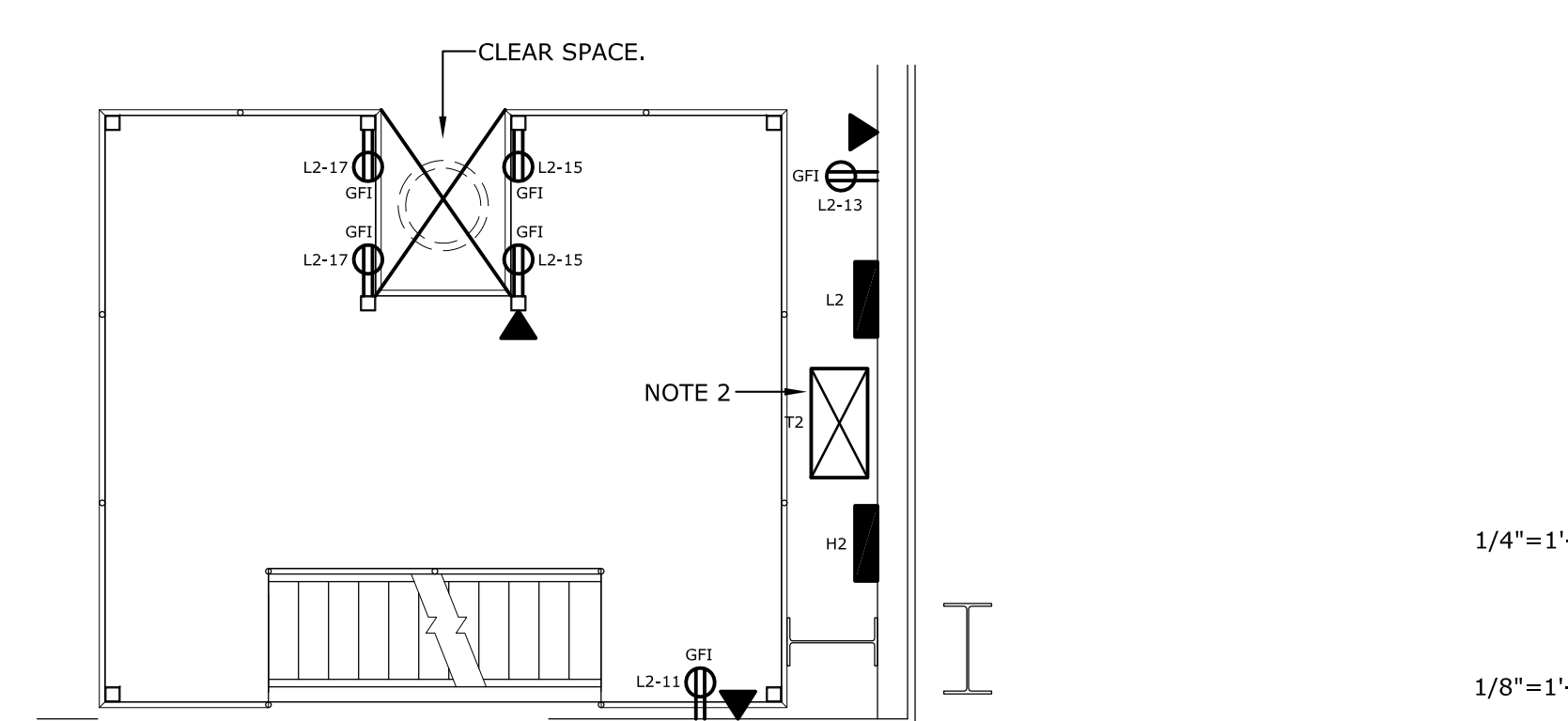
**5 ELEVATION AT PLATFORM**  
NOT TO SCALE



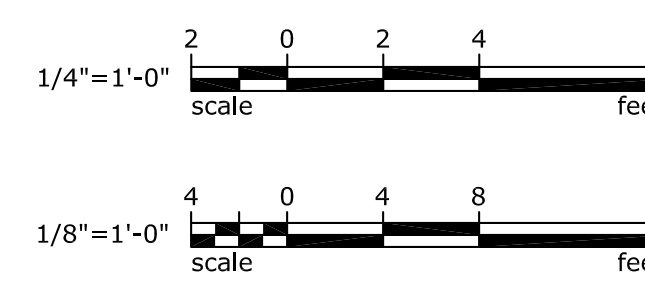
**4 LEVEL 3 ELECTRICAL PLAN**  
SCALE: 1/4" = 1'-0"



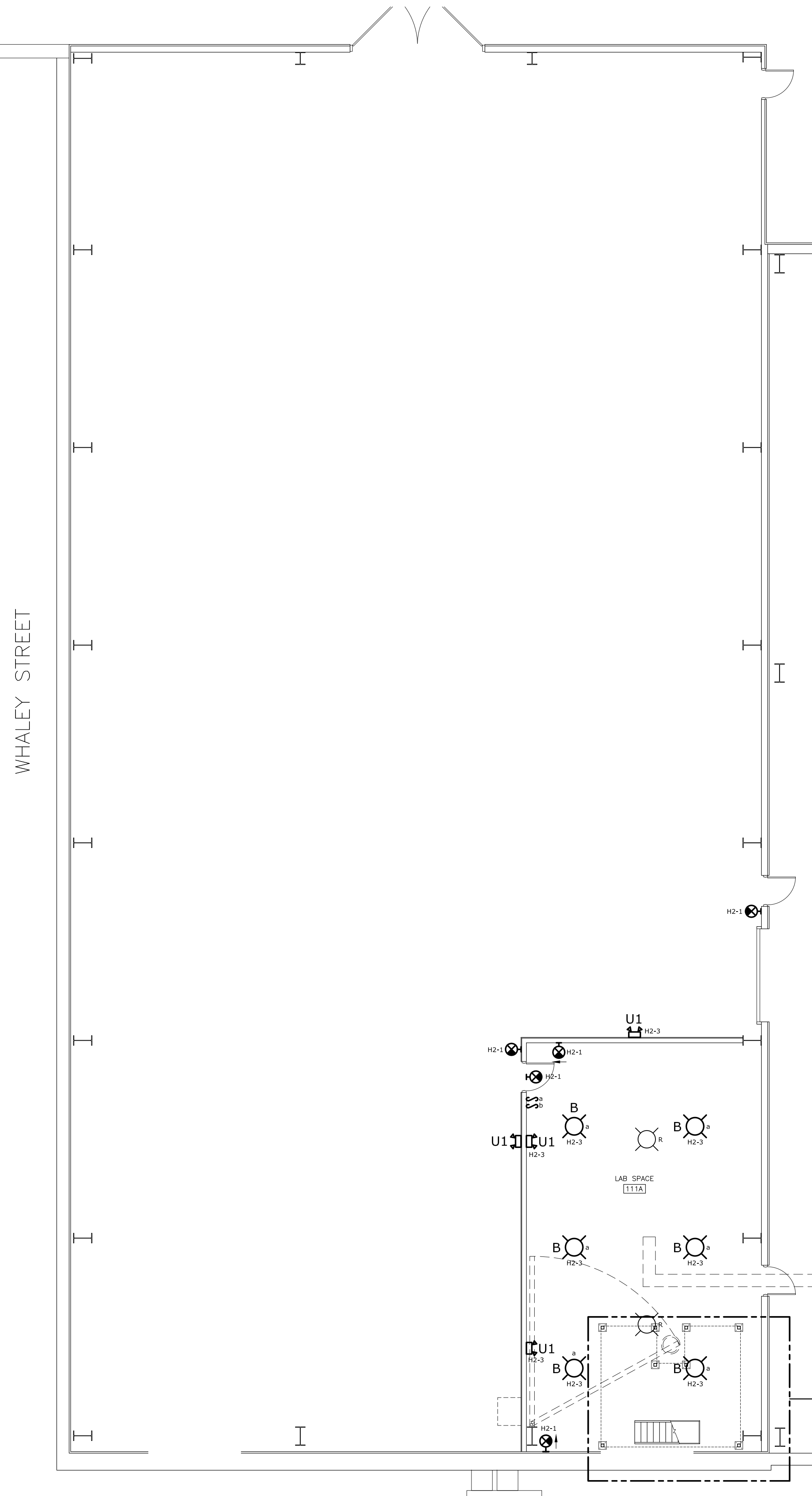
**3 LEVEL 2 ELECTRICAL PLAN**  
SCALE: 1/4" = 1'-0"



**2 LEVEL 1 ELECTRICAL PLAN**  
SCALE: 1/4" = 1'-0"



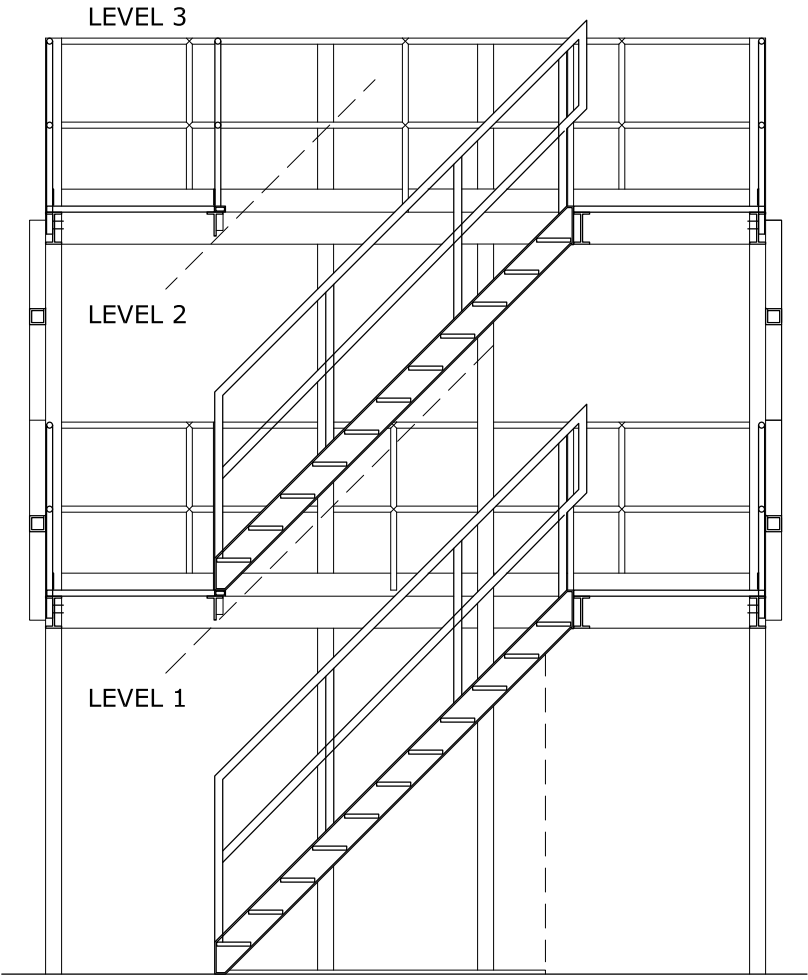
**LEA** LAND ENGINEERING ASSOCIATES, LLC  
USC-2014-11  
262 SANDHURST ROAD, SUITE 101  
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(803) 528-1437  
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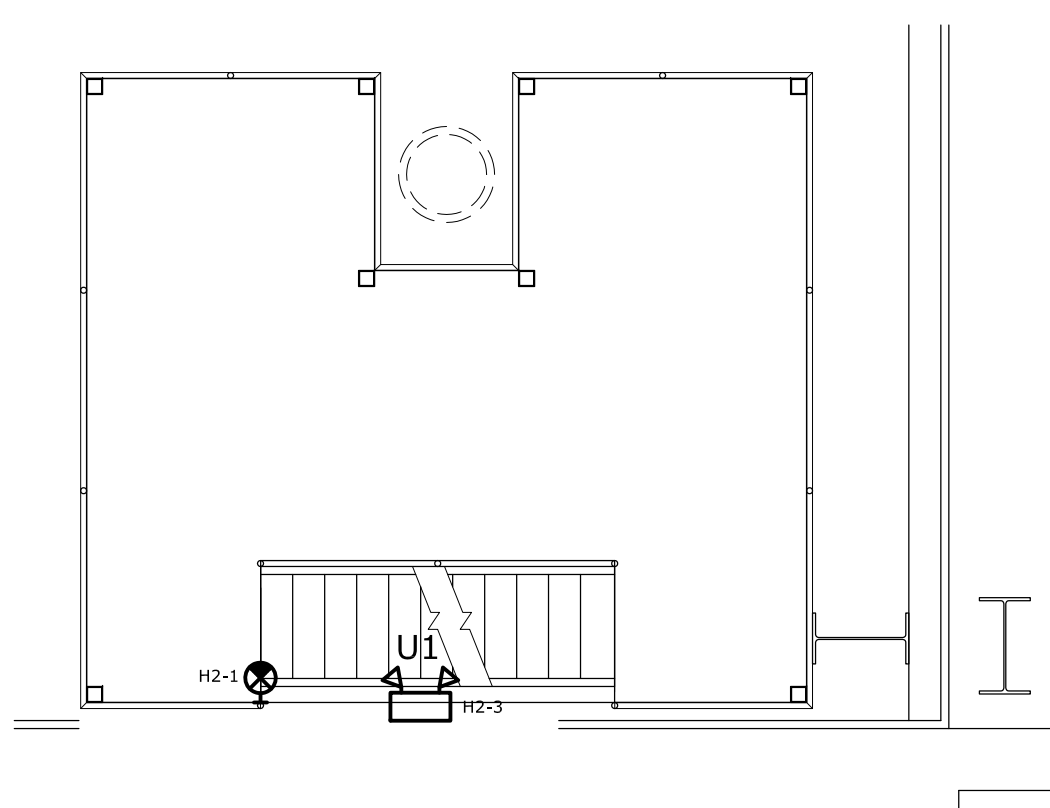
**1** LAB SPACE LIGHTING PLAN  
E5.00 SCALE: 1/8" = 1'-0"

**LIGHTING NOTES**

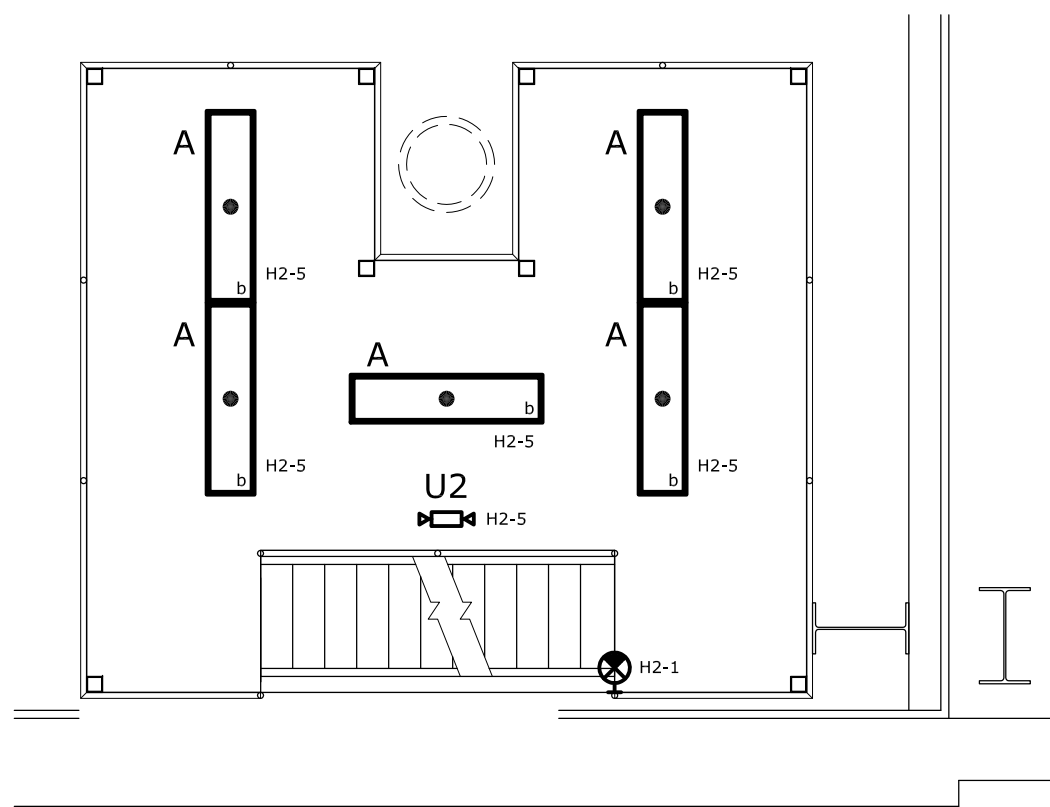
1. ALL EQUIPMENT AND BOXES SHALL BE NEMA-3R RATED. ALL RACEWAYS SHALL BE GALVANIZED RMC WITH THREADED TYPE FITTINGS. ALL FLEXIBLE RACEWAYS SHALL BE LIQUID-TIGHT FLEXIBLE METAL CONDUIT. ALL CONDUCTORS SHALL BE COPPER WITH TYPE THHN INSULATION. ALL CIRCUITS SHALL INCLUDE A GREEN INSULATED COPPER GROUND WIRE.
  2. LIGHTING CIRCUITS INDICATED ON PLAN SHALL BE SERVED FROM PANEL "H2" UNLESS NOTED OTHERWISE. ALL CIRCUITS SHALL BE TWO #12 AWG THHN WITH ONE #12 AWG GREEN INSULATED GROUND WIRE IN 3/4" RMC RACEWAY UNLESS NOTED OTHERWISE. PROVIDE #12 AWG THHN TRAVELERS AS REQUIRED FOR SWITCHING CIRCUITS.
- NOTE: A NON-SWITCHED PHASE CONDUCTOR SHALL BE ROUTED TO ALL EXIT SIGNS AND EMERGENCY LIGHTING UNITS (FOR CHARGING AND FOR CIRCUIT LOSS DETECTION).



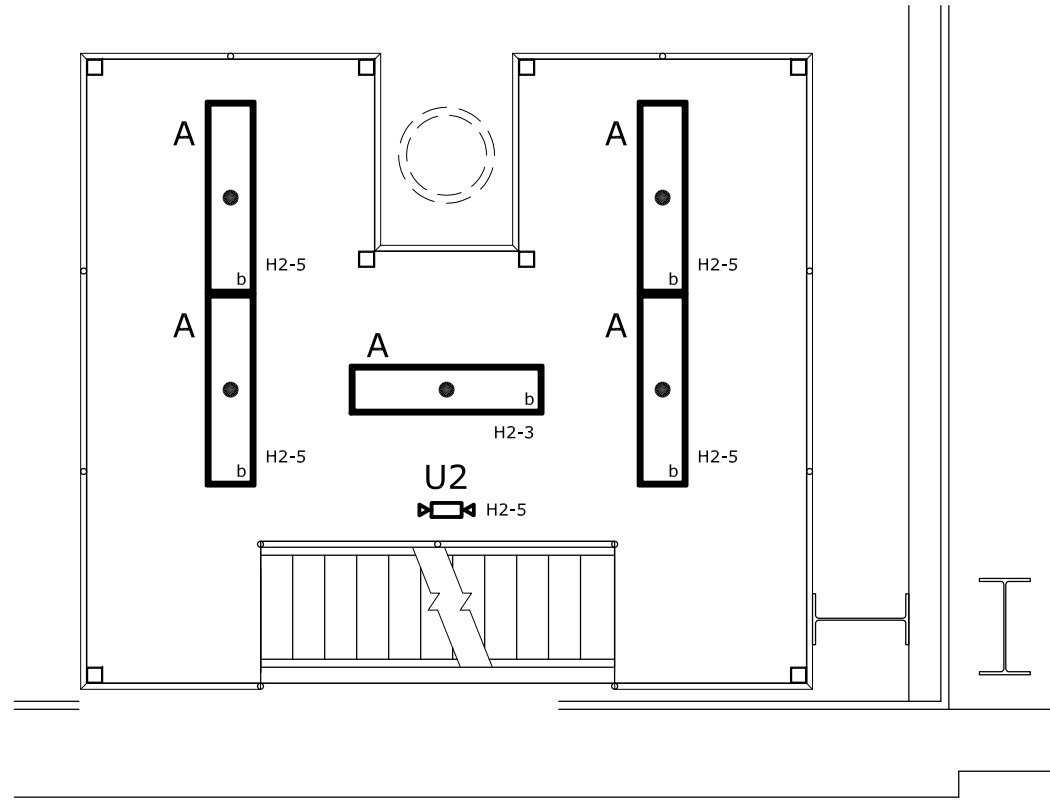
**5** ELEVATION AT PLATFORM  
E5.00 NOT TO SCALE



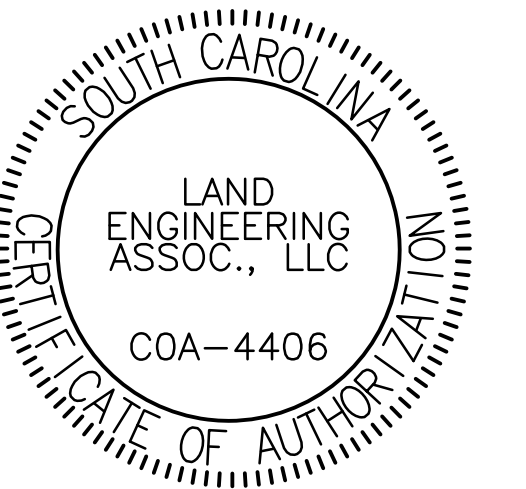
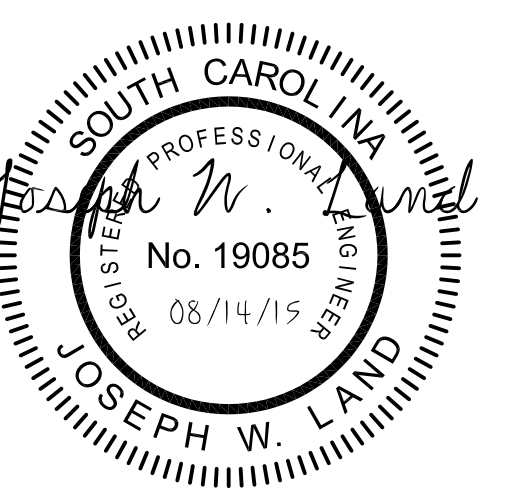
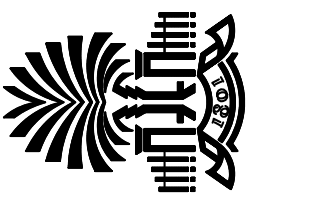
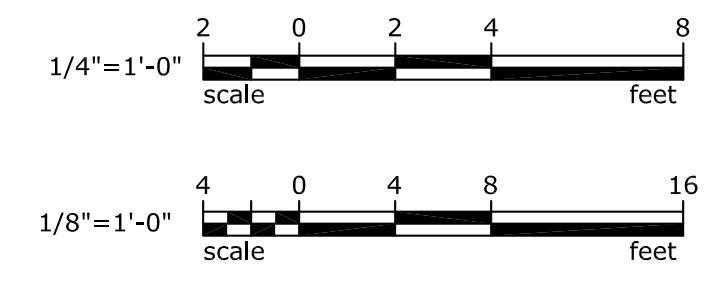
**4** LEVEL 3 LIGHTING PLAN  
E5.00 SCALE: 1/4" = 1'-0"



**3** LEVEL 2 LIGHTING PLAN  
E5.00 SCALE: 1/4" = 1'-0"



**2** LEVEL 1 LIGHTING PLAN  
E5.00 SCALE: 1/4" = 1'-0"



Project Number: 14.3.3.2  
 Date: 14 August 2015  
 Revisions:

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 \_\_\_\_\_  
 \_\_\_\_\_  
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LAB SPACE  
 LIGHTING  
 PLANS