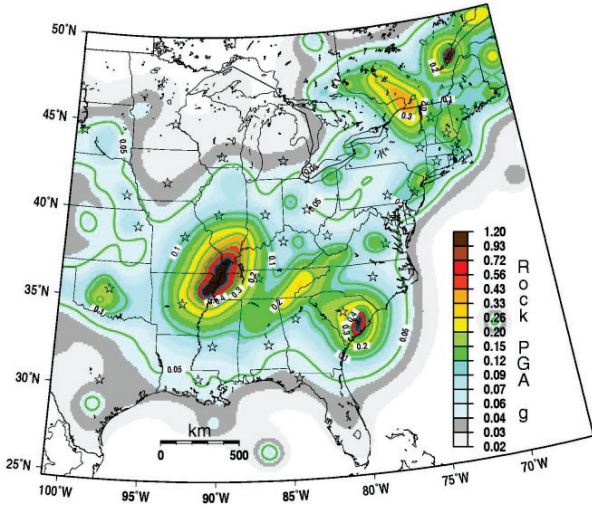


NIST GCR 14-917-26

Cost Analyses and Benefit Studies for Earthquake-Resistant Construction in Memphis, Tennessee

Design Drawings



NEHRP Consultants Joint Venture
*A partnership of the Applied Technology Council and the
Consortium of Universities for Research in Earthquake Engineering*



NIST
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U.S. Department of Commerce

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Cover image – U.S. Geological Survey 2008 National Seismic Hazard Map for 2% in 50 year Peak Ground Acceleration for the Central and Eastern U.S. Available from: <http://earthquake.usgs.gov/hazards/products/conterminous/2008/>.

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Prepared for
*U.S. Department of Commerce
National Institute of Standards and Technology
Engineering Laboratory
Gaithersburg, MD 20899*

By
NEHRP Consultants Joint Venture
*A partnership of the Applied Technology Council and
the Consortium of Universities for Research in Earthquake Engineering*

December 2013



U.S. Department of Commerce
Penny Pritzker, Secretary

National Institute of Standards and Technology
*Patrick Gallagher, Under Secretary of Commerce for Standards
and Technology and Director*

Participants

National Institute of Standards and Technology

John (Jack) R. Hayes, Jr., Director, National Earthquake Hazards Reduction Program
Steven L. McCabe, Deputy Director, National Earthquake Hazards Reduction Program
Matthew Speicher, NIST Project Manager

NEHRP Consultants Joint Venture

Applied Technology Council
201 Redwood Shores Parkway, Suite 240
Redwood City, California 94065
www.ATCouncil.org

Consortium of Universities for
Research in Earthquake Engineering
1301 S. 46th Street, Building 420
Richmond, California 94804
www.CUREE.org

Joint Venture Management Committee

James R. Harris
Robert Reitherman
Christopher Rojahn
Andrew Whittaker

Joint Venture Program Committee

Jon A. Heintz (Program Manager)
Michael Constantinou
C.B. Crouse
James R. Harris
William T. Holmes
Jack P. Moehle
Andrew Whittaker

Project Technical Committee

James R. Harris (Project Director)
David Bonneville
Ryan Kersting
John Lawson
Peter Morris

Project Review Panel

Michael E. Corrin
Ashraf Elsayed
Julie C. Furr
Richard W. Howe
Richard T. Meena
Luke Newman
Robert Norcross
Robert B. Paullus
John Walpole

Working Group Members

Kevin Cissna
Evan Hammel
Erica Hays
Guy Mazotta
Albert Misajon
Fred Rutz
Gene Stevens

Project Manager

Ayse Hortacsu

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Chapter 1

Apartment Building Design Drawings

This chapter provides the following design drawings prepared for the apartment building:

- S0.0 General Notes
- S1.0 Foundation
- S1.1 Foundation Details
- S2.0 2nd and 3rd Floor Framing
- S2.1 Roof Framing
- S2.2 Unit Structural Plans
- S2.3 Unit Architectural Plans
- S3.0 Elevations
- S3.1 Building Sections
- S4.0 Wall Sections and Details
- S4.1 Framing Details

DESIGN CRITERIA

THESE DRAWINGS SHOW ONE BUILDING DESIGNED TO THREE DIFFERENT CRITERIA FOR LATERAL LOADS

DESIGNS

DESIGN 1: WIND ONLY
 WIND PER ASCE 7-05
 NO SEISMIC LOAD
 REMAINDER PER IBC 2003

DESIGN 2: CURRENT CODE
 WIND PER ASCE 7-05
 SEISMIC PER SBC 1999
 REMAINDER PER IBC 2003

DESIGN 3: MODERN SEISMIC
 WIND PER ASCE 7-05
 SEISMIC PER ASCE 7-10
 REMAINDER PER IBC 2003

NOTE:

ALL DESIGNS ARE IN CONFORMANCE WITH THE NDS 2005

- NATIONAL DESIGN SPECIFICATION (NDS) FOR WOOD CONSTRUCTION, 2005 EDITION

DESIGN LOADING

- FLOOR LOADS: (FLOOR LIVE LOADS HAVE BEEN REDUCED ACCORDING TO SECTION 4.2.1 OF THE ASCE7)
 RESIDENTIAL FLOOR LIVE LOAD = 40 PSF
 DECKS = SAME AS OCCUPANCY SERVED
 MULTI FAMILY CORRIDOR SERVING PRIVATE ROOM = 40 PSF
 MULTI FAMILY PUBLIC ROOM = 100 PSF
 MULTI FAMILY CORRIDOR SERVING PUBLIC ROOM = 100 PSF

- WIND DESIGN (LAT 1)
 BASIC WIND SPEED (3 SECOND GUST) = 90 MPH
 EXPOSURE CATEGORY = B
 IMPORTANCE FACTOR, I = 1.0

- SEISMIC DESIGN CRITERIA (LAT 2)
 ACCELERATION (Av) = 0.204
 ACCELERATION (Aa) = 0.204
 GROUP = I
 SOIL PROFILE = S3
 SEISMIC PERFORMANCE CATEGORY = D
 SITE COEFFICIENT, S = 1.0

- SEISMIC DESIGN CRITERIA (LAT 3)
 SHORT PERIOD SPECTRAL RESPONSE ACCELERATION (Ss) = 0.742
 ONE SECOND SPECTRAL RESPONSE ACCELERATION(Sd) = 0.40
 SITE CLASS = D
 RESPONSE MODIFICATION COEFFICIENT (R) = 6.5 (OSB)
 SEISMIC RESPONSE COEFFICIENT (C) = 0.114
 IMPORTANCE FACTOR, I = 1.0

FOUNDATIONS

- THE FOLLOWING SOIL PROPERTIES HAVE BEEN USED IN THE DESIGN OF THE SPREAD FOOTING FOUNDATIONS:
 MAXIMUM ALLOWABLE BEARING PRESSURE:
 FOOTINGS = 2,000 PSF
- FIELD VERIFICATION OF ALLOWABLE BEARING PRESSURES SHALL BE MADE BY AN EXPERIENCED, QUALIFIED GEOTECHNICAL ENGINEER PRIOR TO PLACING FOUNDATIONS AND FLOOR SLABS. ALL FOOTING AND FLOOR SLABS SHALL BE PLACED ON NATURAL UNDISTURBED SOILS OR SOIL COMPACTED TO A LICENSED GEOTECHNICAL ENGINEERS SPECIFICATIONS. WHERE FILL IS USED BENEATH FOOTINGS OR SLABS, THE FILL OPERATION SHALL BE SUPERVISED BY A LICENSED GEOTECHNICAL ENGINEER.
- DO NOT PLACE BACKFILL AGAINST FOUNDATION WALLS WITHOUT ADEQUATE BRACING OR COMPLETING CONSTRUCTION OF SLABS ON GRADE AND HORIZONTAL FLOOR DIAPHRAGMS BENEATH THE ELEVATION OF THE FINISHED TOP OF GRADE.

MATERIAL GRADES

CAST-IN-PLACE CONCRETE

- CONCRETE SHALL BE NORMAL WEIGHT CONCRETE WITH TYPE I/II CEMENT CONFORMING TO ASTM C150 AND AGGREGATE CONFORMING TO ASTM C33 AND REACH A 28 DAY ULTIMATE COMPRESSIVE STRENGTH OF AT LEAST 3,000 PSI. CONCRETE SHALL BE MIXED, PROPORTIONED, CONVEYED AND PLACED IN ACCORDANCE WITH ACI-301 AND IBC SECTION 1905. MIX DESIGNS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:

MINIMUM PROPERTIES FOR CONCRETE MIXES						
CONCRETE FOR	28 DAY STRENGTH	MIN COURSE AGG SIZE	MIN CEMENT CONTENT	AIR CONTENT	MAX W/C RATIO	SLUMP
ALL U.N.O.	3,000	¾"	517 LBS	5% (±1½%)	0.45	3'-5"

- REINFORCING BARS SHALL BE ASTM A615-GRADE 60, UNLESS NOTED OTHERWISE.
- REINFORCING BARS THAT ARE TO BE FIELD BENT OR WELDED SHALL BE ASTM A706-GRADE 60.
- WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.
- ANCHOR BOLTS SHALL BE ASTM F1554-GRADE 36, "L" BOLTS WITH 3" HOOK AND 7" ENBEDMENT INTO CONCRETE.
- NON SHRINK GROUT SHALL CONFORM TO ASTM C1107

WOOD

- WOOD FRAMING LUMBER (SAWN LUMBER), PREFABRICATED WOOD I-JOISTS, STRUCTURAL GLUE-LAMINATED TIMBERS, WOOD STRUCTURAL PANELS, AND PRESERVATIVE-TREATED WOOD SHALL CONFORM TO SECTION 2303 OF THE IBC
- FRAMING LUMBER, DRY (19% MAXIMUM MOISTURE) SOUTHERN-PINE #3 (OR BETTER):
- LAMINATED VENEER LUMBER(LVL) SHALL BE MANUFACTURED UNDER A PROCESS APPROVED BY THE NATIONAL RESEARCH BOARD AND PROVIDE THE FOLLOWING MINIMUM DESIGN VALUES(AS SHOWN IN AN ICC-ESR REPORT):
 BENDING: Fb = 2600 PSI
 HORIZONTAL SHEAR: Fv = 285 PSI
 MODULUS OF ELASTICITY: E = 1,900,000 PSI
 ADJUSTED MODULUS OF ELASTICITY: Emin = 965,700 PSI
- PARALLEL STRAND LUMBER (PSL) SHALL BE MANUFACTURED UNDER A PROCESS APPROVED BY THE NATIONAL RESEARCH BOARD AND PROVIDE THE FOLLOWING MINIMUM DESIGN VALUES (AS SHOWN IN AN ICC-ESR REPORT):
 FOR BEAMS:
 BENDING: Fb = 2,900 PSI
 HORIZONTAL SHEAR: Fv = 290 PSI
 MODULUS OF ELASTICITY: E = 2,000,000 PSI
 ADJUSTED MODULUS OF ELASTICITY: Emin = 1,016,530 PSI

**DESIGN STUDY
 NOT FOR CONSTRUCTION**

FOR COLUMNS:
 COMPRESSION: Fc = 2,500 PSI
 BENDING: Fb = 2,400 PSI
 MODULUS OF ELASTICITY: E = 1,800,000 PSI
 ADJUSTED MODULUS OF ELASTICITY: Emin = 914,880 PSI

- OSB SHEATHING SHALL BE GRADE C-D, EXTERIOR GLUE, OR STRUCTURAL I, EXTERIOR GLUE (CONFORMING TO USDOC PS-1 OR PS-2 RESPECTIVELY) IN THE THICKNESSES SHOWN ON THE DRAWINGS. CDX PLYWOOD, EXPOSURE 1 MAY BE USED ON BUILDING EXTERIOR IF COVERED WITH WATERPROOFING MEMBRANE AND SIDING OR STUCCO. ORIENTED STRAND BOARD (OSB) MAY BE SUBSTITUTED IN EQUIVALENT THICKNESS, EXPOSURE, AND RATING TO THE SPECIFIED PLYWOOD SHEATHING.
- HOLD DOWN ANCHORS BY SIMPSON STRONG-TIE INC.

EXPANSION BOLTS

- EXPANSION BOLTS CALLED FOR ON THE DRAWINGS SHALL BE WEDGE TYPE EXPANSION ANCHORS ONLY. ACCEPTABLE WEDGE ANCHORS ARE:
 KWIK BOLT TZ BY HILTI CORPORATION
 TRUBOLT+ BY ITW REDHEAD
 POWERSTUD+ SD1 OR SD2 BY POWERS FASTENERS
 STRONG-BOLT BY SIMPSON STRONG-TIE

EPOXY

- EPOXY SHALL CONFORM TO ASTM C-881, TYPE IV, GRADE 2 WITH CLASS SUITABLE FOR ENVIRONMENTAL CONDITIONS. ACCEPTABLE EPOXIES FOR INSTALLING THREADED STEEL RODS INTO EXISTING CONCRETE ARE:
 PE1000+ BY POWERS FASTENERS
 HIT-RE 500-SD BY HILTI CORPORATION
 SET-XP BY SIMPSON STRONG-TIE

CONSTRUCTION PROVISIONS

GENERAL CONSTRUCTION PROVISIONS

- ALL DIMENSIONS ON STRUCTURAL DRAWINGS SHALL BE FIELD VERIFIED AND CHECKED AGAINST THE ARCHITECTURAL DRAWINGS. ANY DISCREPANCIES SHALL BE REPORTED TO THE ARCHITECT IMMEDIATELY.
- IN CASE OF CONFLICT BETWEEN NOTES, DETAILS, PLANS AND SPECIFICATIONS THE MOST RIGID REQUIREMENTS SHALL GOVERN UNTIL SUCH TIME AS A CLARIFICATION IS ISSUED BY THE ARCHITECT.
- CONTRACTOR SHALL REFER TO ARCHITECTURAL, MECHANICAL, PLUMBING, ELECTRICAL, AND ANY OTHER SPECIALTY DRAWINGS FOR SIZE AND LOCATION OF OPENINGS, CURBS, INSERTS, SLOPES, DEPRESSIONS, OR OTHER ITEMS THAT INTERFERE WITH THE STRUCTURE.
- THE REQUIREMENTS OF THE LATEST EDITION OF THE OSHA CONSTRUCTION STANDARDS SHALL BE FOLLOWED BY ALL CONTRACTORS, FABRICATORS, AND SUPPLIERS.
- CONTRACTOR SHALL PROVIDE ADEQUATE BRACING AND SHORING TO THE EXISTING STRUCTURE WHERE REQUIRED TO PERFORM MODIFICATIONS OR WORK ADJACENT TO SAME.
- DURING ERECTION OF THE FRAMING, THE CONTRACTOR SHALL BE RESPONSIBLE FOR TEMPORARY BRACING TO WITHSTAND ALL LOADS TO WHICH THE STRUCTURE MAY BE SUBJECTED, INCLUDING LATERAL LOADS, STOCKPILES OF MATERIALS, AND EQUIPMENT. SUCH BRACING SHALL BE LEFT IN PLACE AS LONG AS MAY BE REQUIRED FOR SAFETY AND UNTIL ALL STRUCTURAL FRAMING IS IN PLACE WITH CONNECTIONS COMPLETE AND ALL AT SUFFICIENT STRENGTH.
- ENGINEER'S APPROVAL MUST BE SECURED FOR ALL SUBSTITUTIONS.
- CONTRACTOR MAY REQUEST CHANGES FROM THE STRUCTURAL DRAWINGS. THESE CHANGES MUST BE APPROVED BY THE ARCHITECT AND DESIGNED BY J.R. HARRIS AND COMPANY PRIOR TO SUBMITTING SHOP DRAWINGS. CONTRACTOR SHALL COMPENSATE J.R. HARRIS AND COMPANY FOR MAKING THE CHANGES.
- REPRODUCTION OF STRUCTURAL CONTRACT DRAWINGS FOR RE-SUBMITTAL AS SHOP DRAWINGS IS PROHIBITED. SHOP DRAWINGS PRODUCED IN SUCH A MANNER WILL BE REJECTED.

QUALITY ASSURANCE

- SPECIAL INSPECTION SHALL BE PERFORMED FOR THE WORK INDICATED BELOW. SPECIAL INSPECTION SHALL BE PERFORMED IN ACCORDANCE WITH SECTIONS 109 AND 1704 OF THE IBC. WHERE DESIGNATED IN THESE NOTES, INSPECTIONS SHALL BE PERFORMED BY THE ENGINEER. A QUALIFIED TESTING AGENCY APPROVED BY THE BUILDING DEPARTMENT, & RETAINED BY THE OWNER SHALL PERFORM ALL OTHER SPECIAL INSPECTION. THE SPECIAL INSPECTOR SHALL FURNISH COPIES OF ALL INSPECTION RESULTS TO THE OWNER, ARCHITECT, ENGINEER, CONTRACTOR, AND BUILDING DEPARTMENT.

 THE CONTRACTOR SHALL NOTIFY THE SPECIAL INSPECTOR THAT THE WORK IS READY FOR INSPECTION AT LEAST 24 HOURS BEFORE SUCH INSPECTION IS TO OCCUR. ALL WORK REQUIRING SPECIAL INSPECTION SHALL REMAIN ACCESSIBLE AND EXPOSED UNTIL IT HAS BEEN OBSERVED AND INDICATED TO BE IN CONFORMANCE BY THE SPECIAL INSPECTOR. THE CONTRACTOR SHALL MAINTAIN JOBSITE COPIES OF ALL REPORTS SUBMITTED BY THE SPECIAL INSPECTOR.

SPECIAL INSPECTION OF THE FOLLOWING TYPES OF CONSTRUCTION IS REQUIRED:
 - CONCRETE CONSTRUCTION PER TABLE 1704.4
 - SOIL CONDITIONS, FILL PLACEMENT, AND DENSITY PER TABLE 1704.7
 - EXPANSION BOLT INSTALLATION PER MANUFACTURER
 - EPOXY ANCHOR INSTALLATION PER MANUFACTURER

- STRUCTURAL OBSERVATION SHALL BE PERFORMED BY THE ENGINEER OF RECORD IN ACCORDANCE WITH SECTIONS 1709 OF THE INTERNATIONAL BUILDING CODE FOR THE FOLLOWING BUILDING ELEMENTS:
 - CONCRETE CONSTRUCTION
- FOR DESIGN LAT 3 SPECIAL INSPECTION (PERIODIC) IS REQUIRED FOR SHEAR WALLS WITH MARK "02."

THE CONTRACTOR SHALL PROVIDE THE ENGINEER OF THE RECORD 48 HOUR NOTICE TO SCHEDULE APPROPRIATE SITE VISITS FOR STRUCTURAL OBSERVATION.

CAST-IN-PLACE CONCRETE CONSTRUCTION PROVISIONS

- CONCRETE SHALL BE PROPORTIONED, MIXED, CONVEYED, AND PLACED IN ACCORDANCE WITH ACI 301, AND IBC SECTION 1905.
- CONCRETE PROTECTION FOR REINFORCEMENT (COVER) SHALL BE AS FOLLOWS:
 CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH: 3"
 CONCRETE EXPOSED TO EARTH OR WEATHER (#5 AND SMALLER): 1.5"
 CONCRETE EXPOSED TO EARTH OR WEATHER (#6 AND LARGER): 2"
 CONCRETE NOT EXPOSED TO EARTH OR WEATHER:
 SLABS, WALLS, AND JOISTS (#11 AND SMALLER): 0.75"
 SLABS, WALLS, AND JOISTS (#14 AND LARGER): 1.5"
 BEAMS AND COLUMNS: 1.5"
- DETAIL BARS IN ACCORDANCE WITH THE LATEST EDITIONS OF ACI 315 AND ACI 318.
- NO SPLICES OF REINFORCEMENT SHALL BE MADE AND NO WELDING TO REINFORCING SHALL BE PERMITTED EXCEPT AS DETAILED OR AUTHORIZED BY THE STRUCTURAL ENGINEER. LAP SPLICES, WHERE PERMITTED, SHALL BE A MINIMUM OF THE LAP LENGTHS INDICATED IN THE "REBAR DEVELOPMENT LENGTH" SCHEDULE. WIRE FABRIC REINFORCEMENT MUST LAP ONE FULL MESH PLUS 2" AT SIDE AND END LAPS, BUT NOT LESS THAN 6", AND SHALL BE WIRED TOGETHER. MAKE ALL BARS CONTINUOUS AROUND CORNERS OR PROVIDE CORNER BARS OF EQUAL SIZE AND SPACING.
- CONTINUOUS BARS IN WALLS, BEAMS AND GRADE BEAMS SHALL BE SPLICED AT MID-SPAN FOR TOP BARS AND OVER SUPPORTS FOR BOTTOM BARS. SPLICE ONLY HALF OF BARS IN A LAYER AT ANY ONE LOCATION.
- PROVIDE ALL ACCESSORIES NECESSARY TO SUPPORT REINFORCING BARS AT POSITIONS SHOWN ON THE PLANS.

- PIPES AND CONDUITS MAY PASS THROUGH CONCRETE STRUCTURAL ELEMENTS, BUT SHALL NOT BE EMBEDDED WITHIN THE ELEMENT UNLESS SPECIFICALLY DETAILED TO CONFORM TO THE FOLLOWING REQUIREMENTS:
 - SHALL NOT DISPLACE OR BE IN CONTACT WITH REINFORCING BARS
 - THERE SHALL BE AT LEAST 1" CLEAR TO REINFORCING BARS
 - DIAMETER SHALL NOT EXCEED 1/3 OF MEMBER THICKNESS.
 - HORIZONTAL SPACING SHALL BE AT LEAST 3 DIAMETERS.
 - CONDUITS AND PIPES SHALL BE PLACED AT MID-DEPTH OF MEMBER.
 - CONDUIT AND PIPES SHALL NOT DISPLACE MORE THAN 4% OF CONCRETE TRIBUTARY AREA
 - PIPES AND CONDUIT SHALL NOT CONTAIN ALUMINUM
 - CONTRACTOR SHALL SUBMIT DETAILS OF CONDUIT/PIPING LOCATIONS TO THE ENGINEER FOR REVIEW AND APPROVAL.
- PLACE (2) #5 BARS (1 EA. FACE) WITH 2'-0 PROJECTION AROUND ALL OPENINGS IN CONCRETE.
- CAST-IN-PLACE CONCRETE SHALL NOT HAVE CONSTRUCTION JOINTS IN A HORIZONTAL PLANE. ANY STOP IN CONCRETE WORK MUST BE MADE AT CENTER OF SPAN WITH VERTICAL BULKHEADS AND HORIZONTAL KEYS, UNLESS OTHERWISE SHOWN. CONTRACTOR SHALL SUBMIT PROPOSED LOCATIONS OF CONSTRUCTION JOINTS IF ALTERNATIVE LOCATIONS ARE DESIRED. ALL CONSTRUCTION JOINTS SHALL BE AS DETAILED OR AS APPROVED BY THE ENGINEER.
- ALL CONCRETE SHALL BE CONSOLIDATED BY VIBRATION, SPADING, OR RODDING SO THAT CONCRETE COMPLETELY SURROUNDS REINFORCING AND EMBEDDED ITEMS WITHOUT SEGREGATION.
- FORM WORK SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH ACI 347.
- SAWN JOINTS IN SLABS ON GRADE SHALL BE MADE AS SOON AS POSSIBLE WITHOUT CAUSING DAMAGE TO THE SURFACE. JOINTS SHALL BE AS SHOWN ON THE DRAWINGS.

WOOD CONSTRUCTION REQUIREMENTS

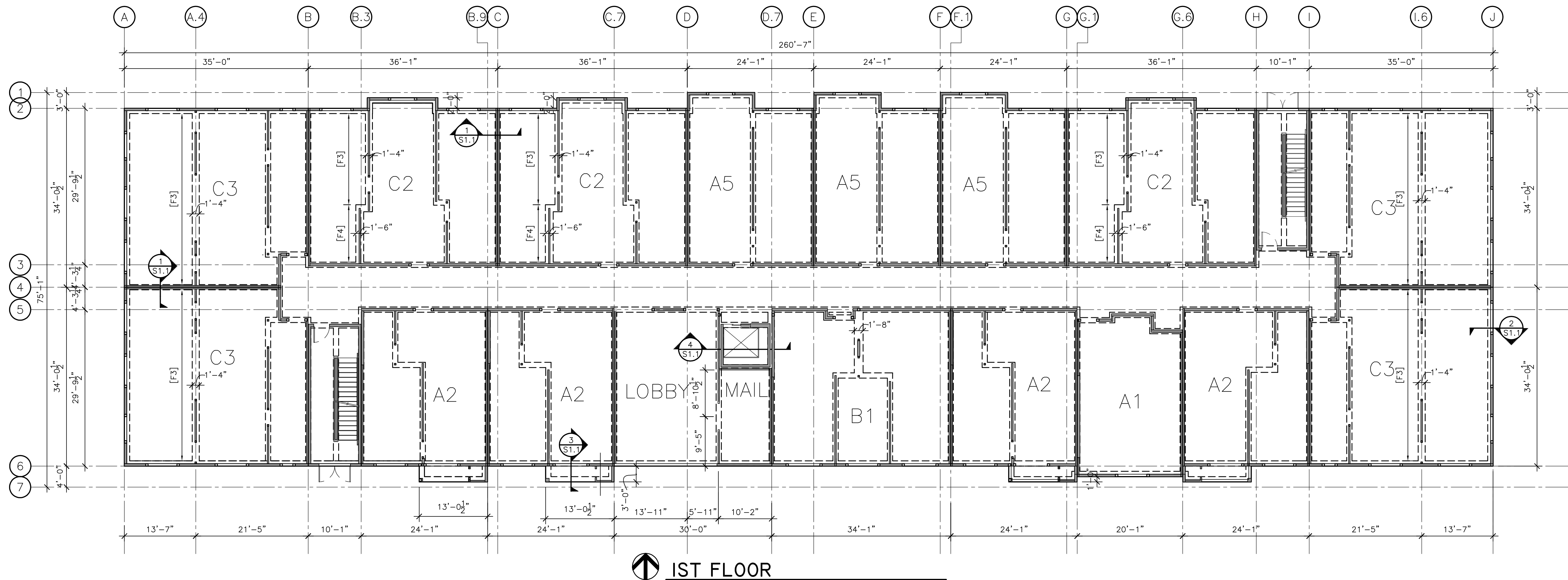
- FASTEN ALL WOOD MEMBERS WITH COMMON NAILS ACCORDING TO THE IBC SCHEDULE 2304.9.1 UNLESS NOTED OTHERWISE. NAIL SIZES SPECIFIED ON THE DRAWINGS ARE BASED ON THE FOLLOWING SPECIFICATIONS:

SIZE	DIAMETER	LENGTH	HEAD
6d COOLER	0.113"	2"	0.25"
8d	0.131"	2 1/2"	0.281"
10d	0.148"	3"	0.312
12d	0.148"	3 1/4"	0.312
16d	0.162"	3 1/2"	0.344

 GALVANIZED 8d & 10d BOX NAILS MAY BE SUBSTITUTED FOR 8d & 10d COMMON NAILS.
- ALL NAILS OR CONNECTORS IN CONTACT WITH PRESERVATIVE TREATED WOOD SHALL BE HOT DIPPED GALVANIZED OR STAINLESS STEEL. HOT DIPPED GALVANIZED AND STAINLESS STEEL ITEMS SHALL NOT BE IN CONTACT WITH EACH OTHER.
- NAIL SHEATHING TO FRAMING MEMBERS AS INDICATED ON THE PLANS. NAILS SHALL BE DRIVEN FLUSH WITH SURFACE OF SHEATHING, NO OVERDRIVEN NAILS WILL BE ALLOWED.
- ALL FRAMING HARDWARE AND CONNECTIONS SHALL BE "SIMPSON STRONG-TIE", SAN LEANDRO, CALIFORNIA, UNLESS NOTED OTHERWISE. ALL HARDWARE MUST BE INSTALLED USING NAIL SIZES AND TYPES SPECIFIED BY "SIMPSON STRONG-TIE".
- ALL WOOD IN DIRECT CONTACT WITH CONCRETE OR MASONRY SHALL BE PRESERVATIVE TREATED.
- DIMENSIONAL LUMBER SHALL BE INSTALLED WITH A MOISTURE CONTENT NOT TO EXCEED 19%. MANUFACTURED LUMBER (LVL, PSL, ETC) SHALL BE INSTALLED WITH A MOISTURE CONTENT NOT TO EXCEED 12%.
- WALL FRAMING SHALL CONSIST OF STUDS SPACED AT 16"O.C., UNLESS NOTED OTHERWISE. (2) STUDS MINIMUM SHALL BE PROVIDED AT THE END OF ALL WALLS AND AT EACH SIDE OF ALL OPENINGS UNLESS NOTED OTHERWISE. ALL WALLS SHALL HAVE A SINGLE BOTTOM PLATE AND A DOUBLE TOP PLATE. FASTEN THE BOTTOM PLATE TO WOOD FRAMING BELOW WITH (2) ROWS OF 12d NAILS AT 8" ON-CENTER UNLESS NOTED OTHERWISE.
- ALL BEARING WALL HEADERS & BEAMS TO REST ON DOUBLE TRIMMER WITH SINGLE FULL HEIGHT KING STUD UNLESS NOTED OTHERWISE. ALL NON-BEARING HEADERS IN EXTERIOR WALLS TO BE (2)2x8 MINIMUM, OR AS PER ARCH DRAWINGS, ON SINGLE TRIMMER WITH A SINGLE FULL HEIGHT KING STUD UNLESS NOTED OTHERWISE.
- SPLICE DOUBLE TOP PLATES WITH 4'-0" MINIMUM LENGTH AND 20-16d NAILS EACH SIDE OF SPLICE. WHERE FLUSH BEAM OR HEADER INTERRUPTS TOP PLATE PROVIDE SIMPSON ST6224 STRAP ACROSS END OF BEAM/HEADER TO TOP PLATE.
- PROVIDE FULL DEPTH BLOCKING BETWEEN JOISTS AT ALL SUPPORTS UNLESS NOTED OTHERWISE.
- STACK RAFTERS AND JOISTS OVER STUDS.
- ALL BOLTS AND LAG BOLTS SHALL HAVE WASHERS UNDER THEIR HEADS AND NUTS. INSTALLATION OF LAG BOLTS SHALL CONFORM TO THE NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION WITH A LEAD BORE HOLE OF 60% TO 70% OF THE SHANK DIAMETER.
- ALL ROOF TRUSSES SHALL BE CONNECTED TO THEIR SUPPORTING ELEMENTS WITH H2.5 HURRICANE TIES UNLESS NOTED OTHERWISE.
- METAL PLATE CONNECTED WOOD TRUSSES SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:
 A. TRUSSES SHALL BE DESIGNED AND FURNISHED BY THE TRUSS MANUFACTURER. TRUSSES SHALL BE DESIGNED FOR THE SPANS, LOADS, PROFILES, AND SUPPORT CONDITIONS SHOWN ON THE DRAWINGS.
 B. CONTRACTOR SHALL SUBMIT TO THE ARCHITECT AND ENGINEER FOR REVIEW AND APPROVAL (PRIOR TO CONSTRUCTION) STRUCTURAL CALCULATIONS AND DRAWINGS STAMPED BY A PROFESSIONAL ENGINEER REGISTERED TO PRACTICE IN THE STATE OF COLORADO. DESIGN OF THE TRUSSES SHALL CONFORM TO THE DESIGN SPECIFICATION ANSI-TP1 1-2007, LIGHT METAL PLATE CONNECTED WOOD TRUSS CONSTRUCTION BY THE TRUSS PLATE INSTITUTE, AND BY THE NATIONAL DESIGN STANDARD FOR METAL PLATE CONNECTED WOOD TRUSS CONSTRUCTION. PERMANENT LATERAL BRACING TO PREVENT BUCKLING OF TRUSS MEMBERS AND PERMANENT TRUSS BRACING TO RESIST WIND, SEISMIC AND OTHER FORCES ACTING PERPENDICULAR TO THE PLANE OF THE TRUSSES SHALL BE DESIGNED AND DETAILED BY THE TRUSS ENGINEER. THE SHOP DRAWINGS SHALL INCLUDE A DRAWING OF THE LATERAL BRACING SYSTEM WITH BRACING ALIGNMENT AND DETAILS SHOWING HOW THE LATERAL FORCES ARE TO BE RESOLVED.
 C. ALL TRUSSES SHALL BE ERECTED AND BRACED IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS. ALL BRIDGING, BLOCKING, AND BRACING SHALL BE INSTALLED PRIOR TO INSTALLING SHEATHING.
 D. METAL CONNECTING PLATES SHALL BE 20GA MINIMUM, AND ALL TRUSS MEMBERS SHALL BE AT LEAST 2X4 IN SIZE.
 E. TRUSS MANUFACTURER SHALL DESIGN AND SUPPLY ALL CONNECTORS, HANGERS, BEARING ENHANCERS, AND OTHER ITEMS REQUIRED TO SUPPORT AND ANCHOR THE TRUSSES TO THE BUILDING.
 F. TEMPORARY BRACING OF THE TRUSSES DURING INSTALLATION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

EXPANSION BOLT AND EPOXY ANCHOR INSTALLATION REQUIREMENTS

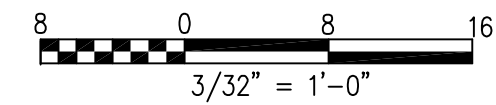
- HOLES SHALL BE DRILLED AT A DIAMETER AND DEPTH SPECIFIED BY THE MANUFACTURER USING A COARSE CUTTING ROCK CHISEL OR HAMMER DRILL. CORE DRILLS OR OTHER SMOOTH CUTTING DRILLS ARE NOT ALLOWED.
- HOLES SHALL BE THOROUGHLY CLEANED WITH A BRUSH, THEN VACUUMED OR BLOWN CLEAN WITH OIL FREE COMPRESSED AIR TO REMOVE ALL RESIDUE FROM THE DRILLING OPERATION.
- EXPANSION BOLTS AND EPOXY ANCHORS SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS.
- NOTIFY ENGINEER TO INSPECT HOLES FOR DEPTH, DIAMETER, AND CLEANLINESS PRIOR TO THE PLACEMENT OF EPOXY.
- INSTALLATION OF EPOXY ANCHORS SHALL BE PERFORMED BY PERSONNEL CERTIFIED BY THE ACI/CRSI ADHESIVE ANCHOR INSTALLER CERTIFICATION PROGRAM.



IST FLOOR

FOOTING SCHEDULE: ALL 3 DESIGNS				
MARK	WIDTH	DEPTH*	STEEL	COMMENT
[F1]	1'-0"	1'-0"	(2) #5'S CON'T TOP & BOTTOM	TYP INTERIOR FOOTING
[F2]	1'-0"	2'-0"	(2) #5'S CON'T TOP & BOTTOM	TYP EDGE FOOTING
[F3]	1'-4"	1'-0"	(2) #5'S CON'T TOP & BOTTOM	
[F4]	1'-6"	1'-0"	(2) #5'S CON'T TOP & BOTTOM	

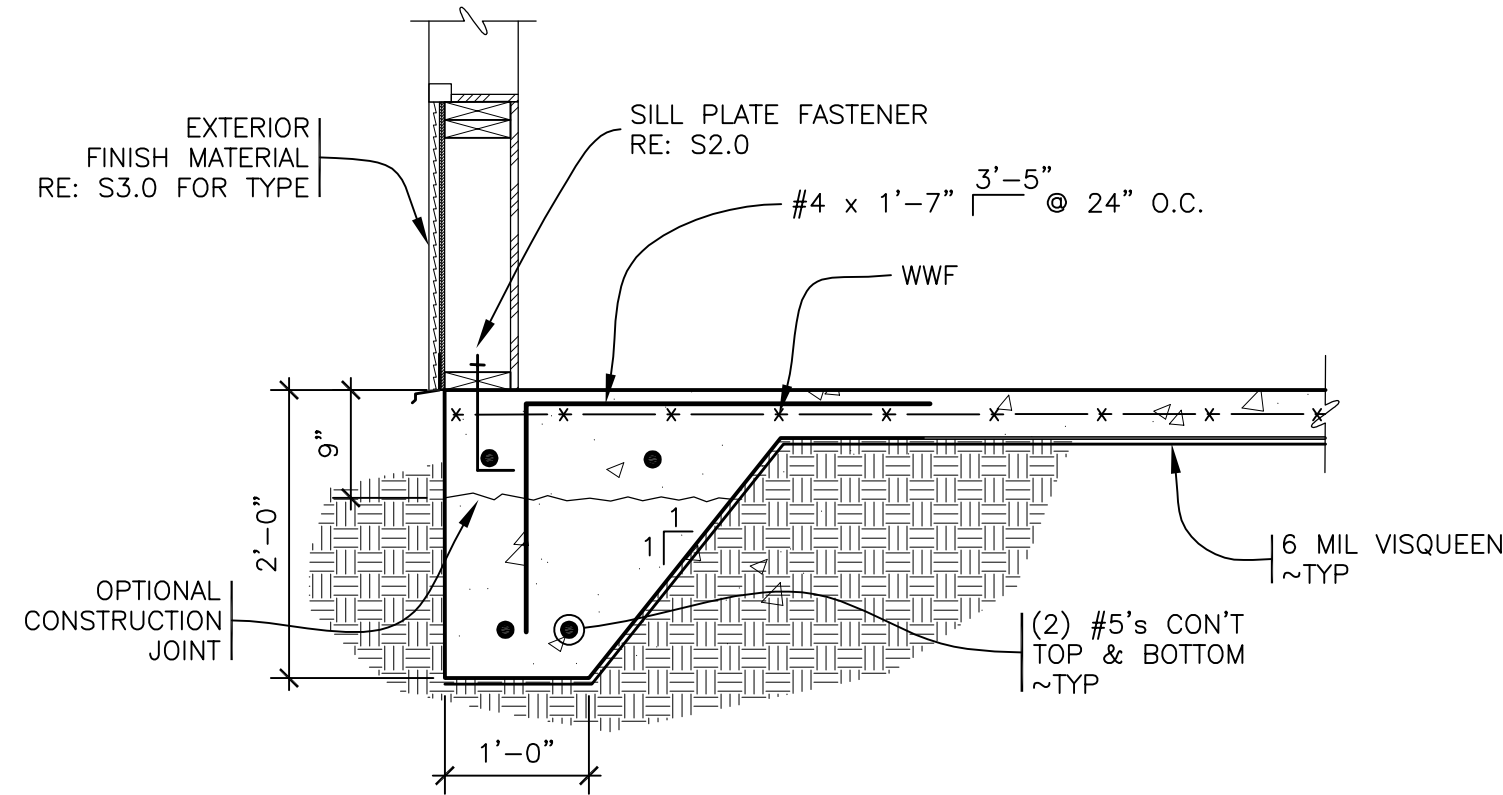
*FOOTING DEPTH FROM TOP OF SLAB TO BOTTOM OF FOOTING



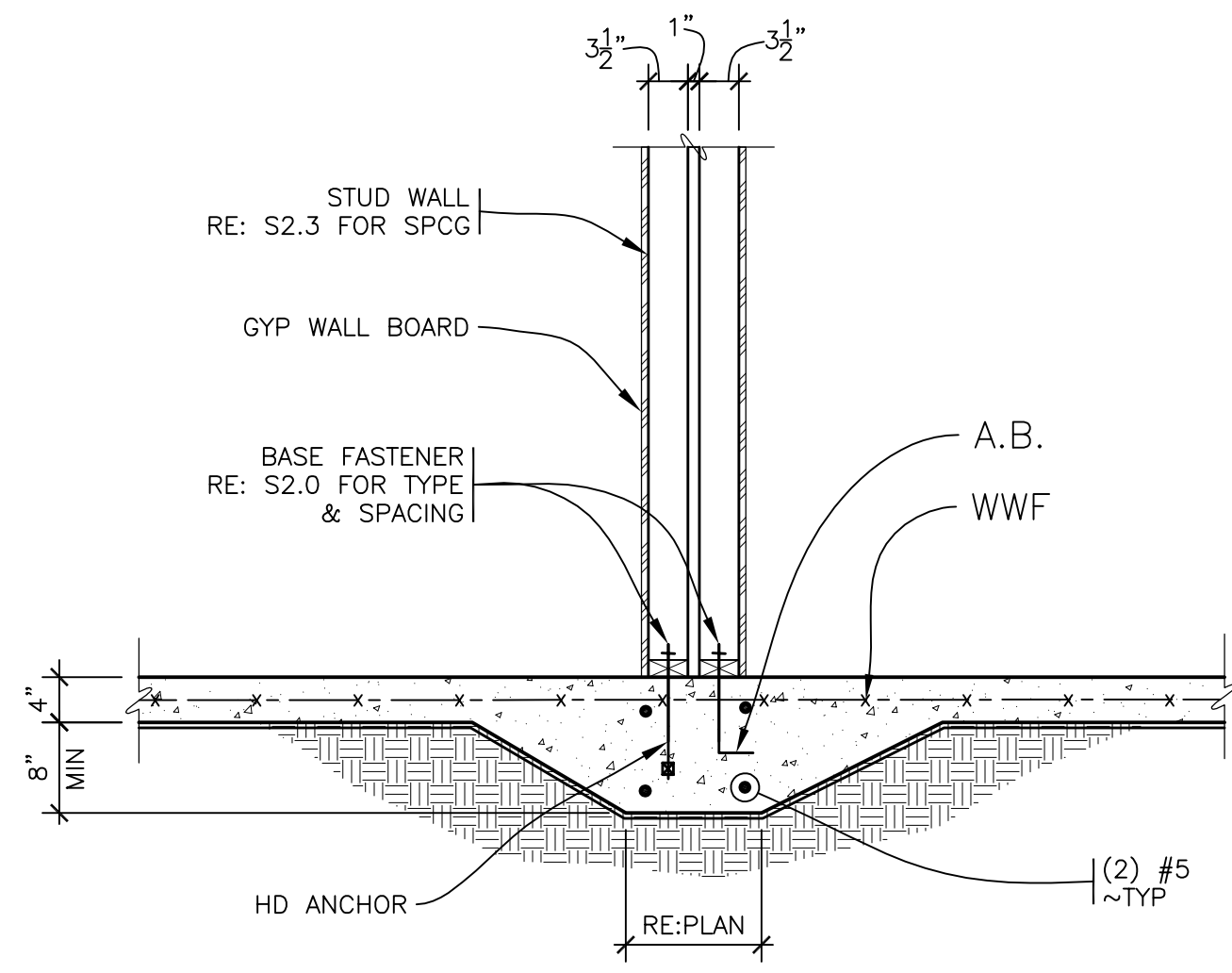
1. SLAB SHALL BE 4" THICK W/ WELDED WIRE REINFORCEMENT 6x6-W10.
2. ALL INTERIOR FOOTINGS 1'-0" WIDE AND 12" DEEP U.N.O.
3. ALL EXTERIOR FOOTINGS 1'-0" WIDE AND 2'-0" DEEP.
4. ALL STRUCTURAL WALLS SHALL HAVE 1/2" ANCHOR BOLTS AT 48" O.C. U.N.O. (ALL WALLS THIS PLAN)
5. THERE SHALL BE A MINIMUM OF TWO BOLTS PER SECTION OF WALL SILL PLATE W. ONE ANCHOR LOCATED NOT MORE THAN 8" OR LESS THAN 4" FROM EACH END OF EACH PIECE OF SILL PLATE.
6. REFER TO SHEET S2.3 FOR OVERALL UNIT LAYOUT AND DIMENSIONS FOR EACH UNIT.

DESIGN STUDY
NOT FOR CONSTRUCTION

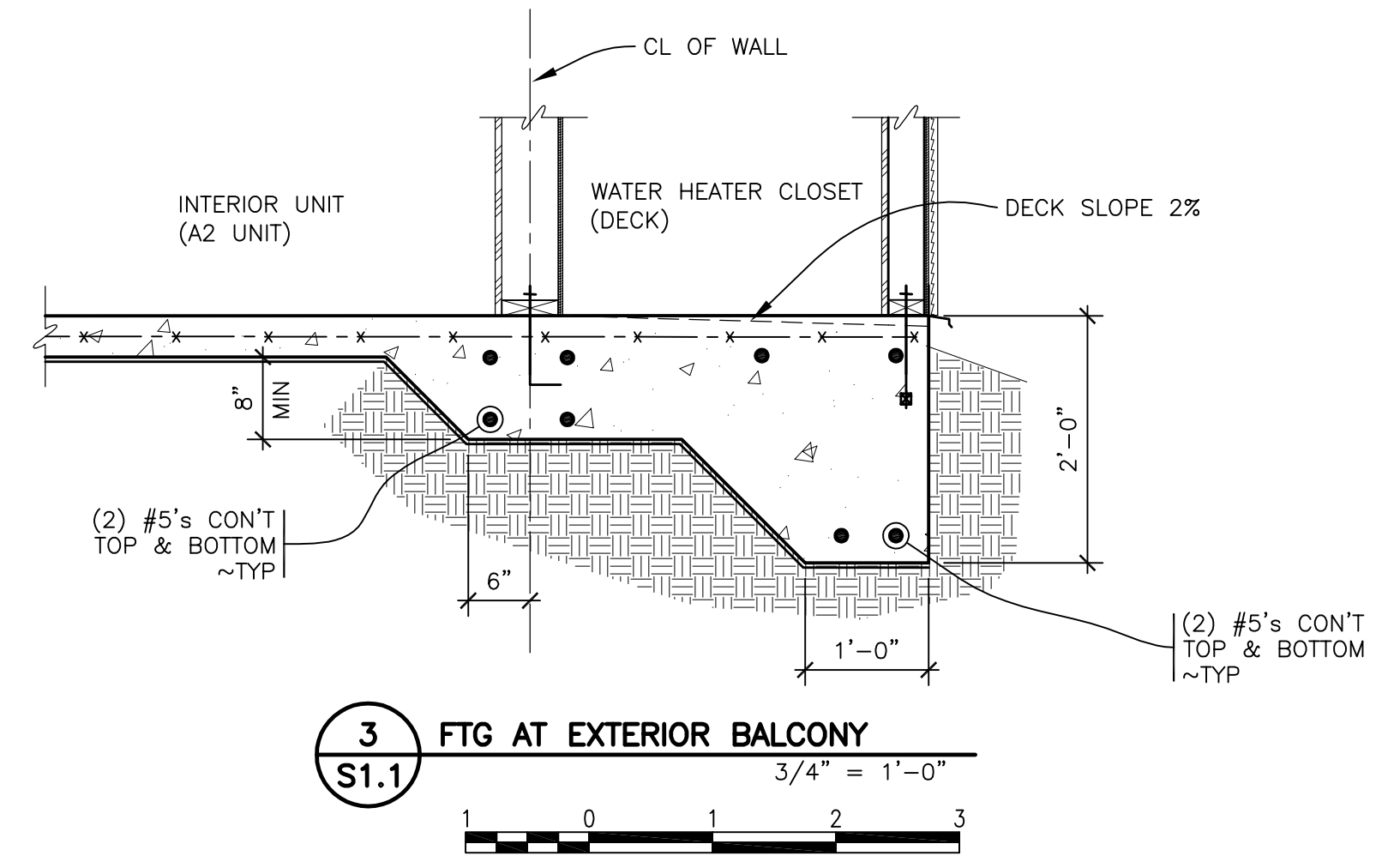
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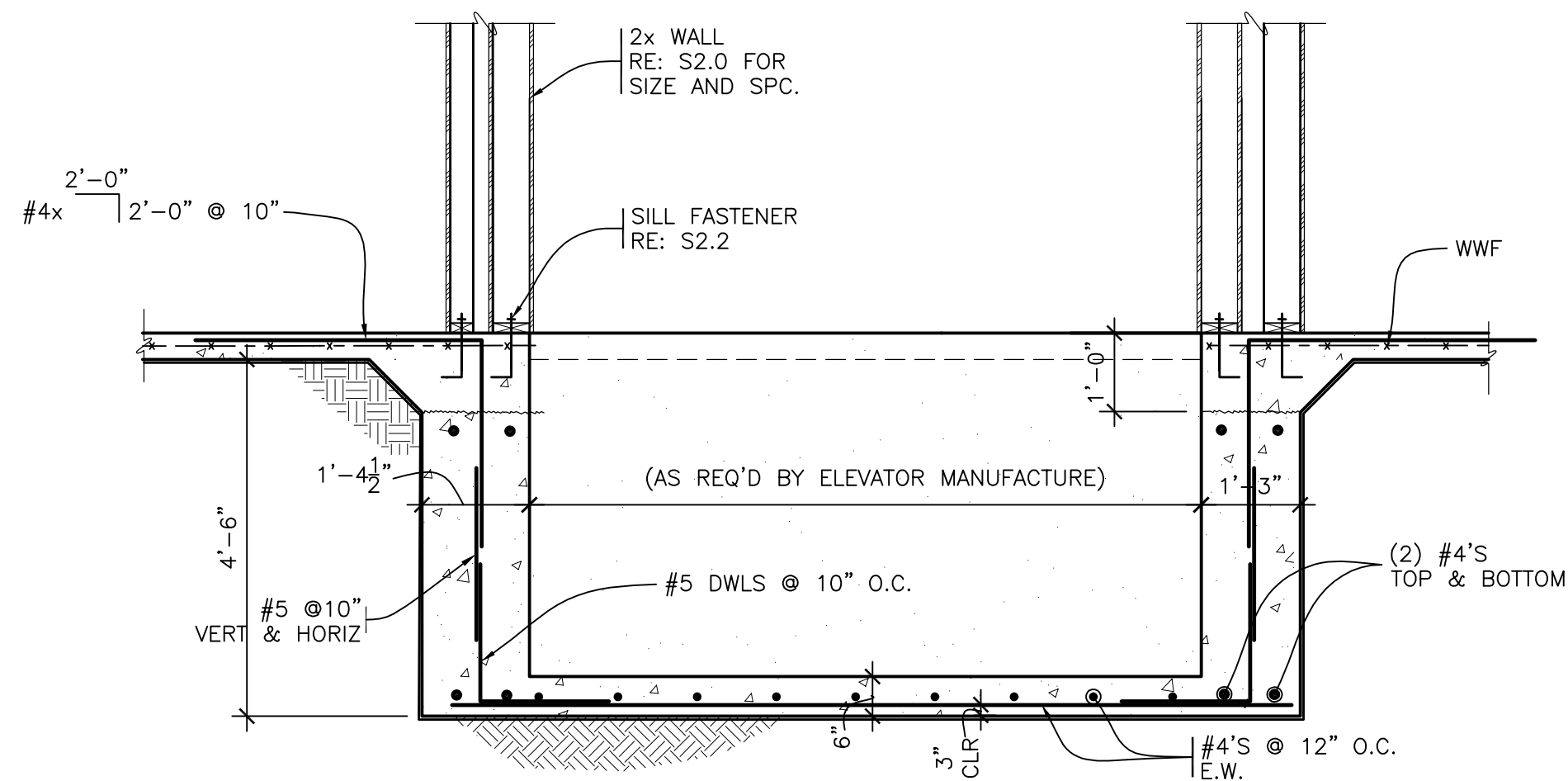
2
S1.1 TYP FTG AT EXTERIOR
3/4" = 1'-0"



1
S1.1 TYP FTG AT INTERIOR PARTY WALL
3/4" = 1'-0"

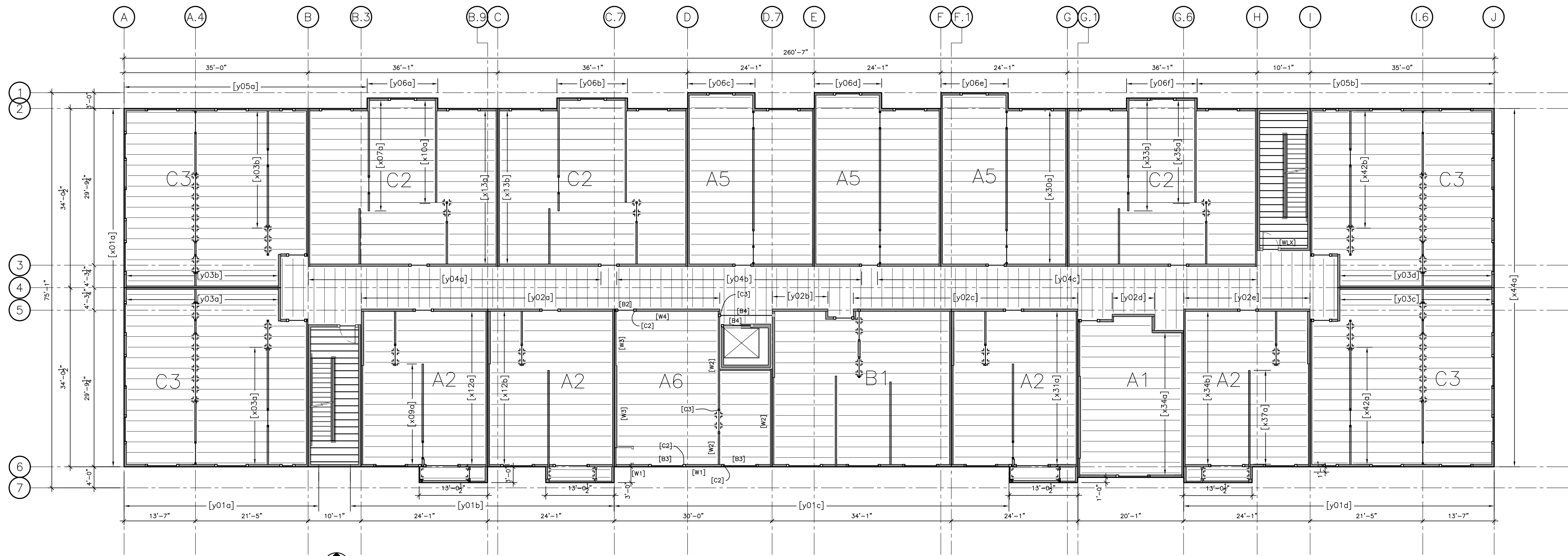


3
S1.1 FTG AT EXTERIOR BALCONY
3/4" = 1'-0"

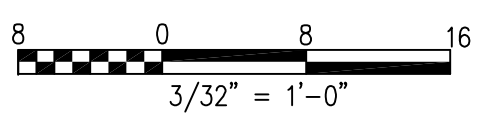


4
S1.1 ELEVATOR SHAFT
1/2" = 1'-0"

DESIGN STUDY
NOT FOR CONSTRUCTION



FLOOR FRAMING



- [Wx] DENOTES WALL TYPE RE: SECHULE ON S2.2
- [Bx] DENOTES BEAM TYPE RE: SCHEDULE ON S2.2
- [Cx] DENOTES COLUMN TYPE RE: SCHEDULE ON S2.2
- [xxx] DENOTES SHEAR WALL ID IN NORTH-SOUTH DIRECTION RE: SCHEDULE ON S2.0
- [yxx] DENOTES SHEAR WALL ID IN EAST-WEST DIRECTION RE: SCHEDULE ON S2.0
- FLOOR SHEATHING TO BE 3/4" T&G APA-RATED SHEATHING NAILED WITH 10d NAILS @ 6" O.C. ALONG PANEL EDGES AND BOUNDARIES, 12" IN THE FIELD U.N.O. 1 1/2" OF GYPCRETE TOPPING SHALL BE PLACED ON FLOOR SHEATHING.
- REFER TO ARCHITECTURAL SHEET S2.3 FOR OVERALL UNIT LAYOUT AND DIMENSIONS FOR EACH UNIT.
- SEE S4.0 AND S4.1 FOR TYPICAL DETAILS.

DESIGN STUDY
NOT FOR CONSTRUCTION

5 HOLD DOWN SCHEDULE

MARK	SIZE	COMMENTS	ANCHOR BOLT & THREADED ROD DIA.
0	NONE	SINGLE 2X STUD	-
2	HDU2-SD2.5	DOUBLE 2X STUDS	3/8"
4	HDU4-SDS2.5	DOUBLE 2X STUDS	3/8"
5	HDU5-SDS2.5	DOUBLE 2X STUDS	3/8"
8	HDU8-SDS2.5	(3) 2X STUDS	7/8"
11	HDU11-SDS2.5	(4) 2X STUDS	1"
12	HHDQ11-SD2.5	(4) 2X STUDS	1"
14	HDU14-SDS2.5	(4) 2X STUDS	1"

HOLD DOWN ANCHOR BOLTS SHALL BE EMBEDDED 9" IN CONCRETE AND SHALL HAVE A NUT AT ANCHOR END.

4 SHEAR WALL TYPES

MARK	SHEATHING AND NAILING
O1	3/8" OSB, BLOCKED W/ 8d AT 6" ON EDGES AND 12" IN FIELD
O2	3/8" OSB, BLOCKED W/ 8d AT 4" ON EDGES AND 12" IN FIELD
G1	1/2" GWB, UNBLOCKED W/ 6d COOLER AT 7" O.C.
G2	1/2" GWB BLOCKED W/ 6d COOLER AT 4" O.C.

2 LATERAL LOAD CASE, SBC 99', (LAT2) SHEAR WALLS

WALL MARK	STORY 1		STORY 2		STORY 3	
	SHTHG. MARK	HD MARK	SHTHG. MARK	HD MARK	SHTHG. MARK	HD MARK
x01a	O1	-	O1	-	O1	-
x44a	O1	-	O1	-	O1	-
y01a	O1	2	O1	-	O1	-
y01b	O1	2	O1	-	O1	-
y01c	O1	-	O1	-	O1	-
y01d	O1	-	O1	-	O1	-
y02a	G2	-	G1	-	G1	-
y02b	G2	2	G1	-	G1	-
y02c	G2	-	G1	-	G1	-
y02d	G2	2	G1	2	G1	-
y02e	G2	-	G1	-	G1	-
y03a	G2	2	G1	2	G1	-
y03b	G2	2	G1	2	G1	-
y03c	G2	2	G1	2	G1	-
y03d	G2	2	G1	2	G1	-
y04a	G2	-	G1	-	G1	-
y04b	G2	-	G1	-	G1	-
y04c	G2	-	G1	-	G1	-
y05a	O1	2	O1	-	O1	-
y05b	O1	-	O1	-	O1	-
y06a	O1	5	O1	2	O1	-
y06b	O1	5	O1	2	O1	-
y06c	O1	5	O1	2	O1	-
y06d	O1	5	O1	2	O1	-
y06e	O1	5	O1	2	O1	-
y06f	O1	5	O1	2	O1	-

3 LATERAL LOAD CASE, ASCE7-10, (LAT3) SHEAR WALLS

WALL MARK	STORY 1		STORY 2		STORY 3	
	SHTHG. MARK	HD MARK	SHTHG. MARK	HD MARK	SHTHG. MARK	HD MARK
x01a	O2	-	O2	-	O1	-
x03a	O2	2	O2	-	-	-
x03b	O2	2	O2	-	-	-
x07a	O2	-	O1	-	-	-
x09a	O2	2	O1	-	-	-
x10a	O2	2	O1	-	-	-
x12a	O2	5	O1	4	O1	4
x12b	O2	8	O1	4	O1	4
x13a	O2	8	O1	4	O1	4
x13b	O2	8	O1	4	O1	4
x30a	O2	8	O1	2	O1	2
x31a	O2	8	O1	2	O1	2
A33a	O2	-	O1	-	-	-
X34a	O2	2	O1	-	-	-
A34b	O2	4	O1	-	-	-
X35a	O2	2	O1	-	-	-
X37a	O2	5	O1	4	O1	4
X42a	O2	8	O2	4	O1	4
X42b	O2	8	O2	4	O1	4
X44a	O2	-	O2	-	O1	-
y01a	O2	12	O2	5	O2	2
y01b	O2	12	O1	2	O1	-
y01c	O2	4	O1	-	O1	-
y01d	O2	8	O2	2	O2	-
y02a	O1	-	O1	-	-	-
y02c	O1	-	O1	-	-	-
y02e	O1	2	O1	-	-	-
y04a	O1	-	O1	-	-	-
y04b	O1	-	O1	-	-	-
y04c	O1	-	O1	-	-	-
y05a	O2	8	O2	4	O2	2
y05b	O2	8	O2	2	O2	-
y06a	O2	12	O1	5	O1	2
y06b	O2	12	O1	5	O1	2
y06c	O2	12	O1	5	O1	2
y06d	O2	12	O1	5	O1	2
y06e	O2	12	O1	5	O1	2
y06f	O2	12	O1	5	O1	2

1 GENERAL SHEAR WALL SCHEDULE

FOR CASE LAT 1 (WIND ALONE) THE WALL ARE TO BE CONSTRUCTED AS FOLLOWS:
 -EXTERIOR WALLS 3/8" OSB (BLOCKED) W/ EDGE NAILING AT 6" O.C. AND FIELD NAILING @ 12" O.C.
 -INTERIOR BEARING WALLS 1/2" GWB (UNBLOCKED, 2 SIDES) W/ EDGE NAILING AT 7" O.C. AND FIELD NAILING @ 12" O.C.
 -PARTY WALLS 1/2" GWB (UNBLOCKED, 1 SIDE) W/ EDGE NAILING AT 7" O.C. AND FIELD NAILING @ 12" O.C.
 -STAIR & ELEVATOR WALLS 1/2" GWB (UNBLOCKED, 2 SIDES) W/ EDGE NAILING AT 7" O.C. AND FIELD NAILING @ 12" O.C.

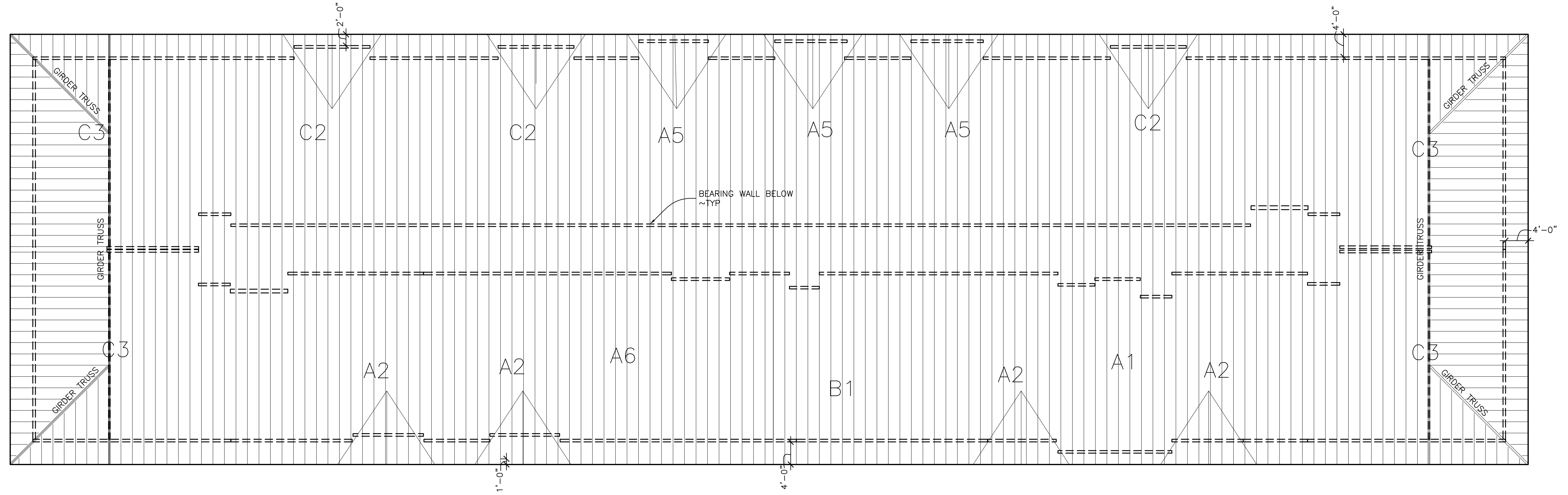
FOR CASE LAT 2 (SBC '99) AND LAT 3 (ASCE7-10), THE WALLS MARKED ON THE PLANS ARE UPGRADED ACCORDING TO THE SCHEDULE. FOR CASE LAT 2 ALL OTHER WALL ARE THE SAME AS FOR LAT 1.
 FOR CASE LAT 3 ALL THE SHEAR WALLS ARE IN THE SCHEDULE FOR LAT 3. ALL OTHER INTERIOR WALLS SHALL HAVE THE GYPSUM WALLBOARD ATTACHED ACCORDING TO THE IBC FOR NON-STRUCTURAL SHEATHING (ASTM C 840).
 OTHER EXTERIOR WALLS SHALL HAVE THE SAME 3/8" OSB AS CASE LAT 1

ALL EXTERIOR WALLS 2x6 @ 16" MIN, DOUGLAS FIR #2 W/ 3/8" OSB BLOCKED EXTERIOR SHEATHING FASTENED W/ 8d COMMON NAILS @ 6" O.C. @ EDGES & 12" O.C. IN FIELD, ANCHORED WITH 1/2" A.B. @ 48" O.C. EXCEPT NOTED WITH "O2, O3 AND O4" SHEATHING SHALL BE 32" O.C.

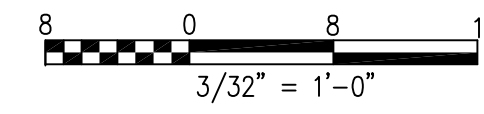
ALL INTERIOR BRG WALLS 2x4 @ 16" O.C. (MIN) SOUTHERN-PINE #3, SHEATHED W/ 1/2" GWB FASTENED TO STUDS W/ 6d COOLER @ 7" O.C. UNBLOCKED, ANCHORED WITH 1/2" A.B. @ 48" O.C. AT FIRST FLOOR, U.N.O. (ALTERNATIVE GWB FASTENERS - No. 6 TYPE S OR W DRYWALL SCREWS 1 1/4" LONG @ 4" O.C. EDGES, 12" O.C. FIELD BLOCKED AT SEAMS.) SEE S2.2 FOR CLOSER STUDS IN BEARING WALLS.

ALL STAIR AND ELEVATOR SHAFT WALLS 2x6 @ 16" O.C. SOUTHERN-PINE #3, SHEATHED W/ 1/2" GWB FASTENED TO STUDS W/ 6d COOLER @ 7" O.C. UNBLOCKED, ANCHORED WITH 1/2" A.B. @ 48" O.C. AT FIRST FLOOR, U.N.O. (ALTERNATIVE GWB FASTENERS - No. 6 TYPE S OR W DRYWALL SCREWS 1 1/4" LONG @ 4" O.C. EDGES, 12" O.C. FIELD BLOCKED AT SEAMS.)

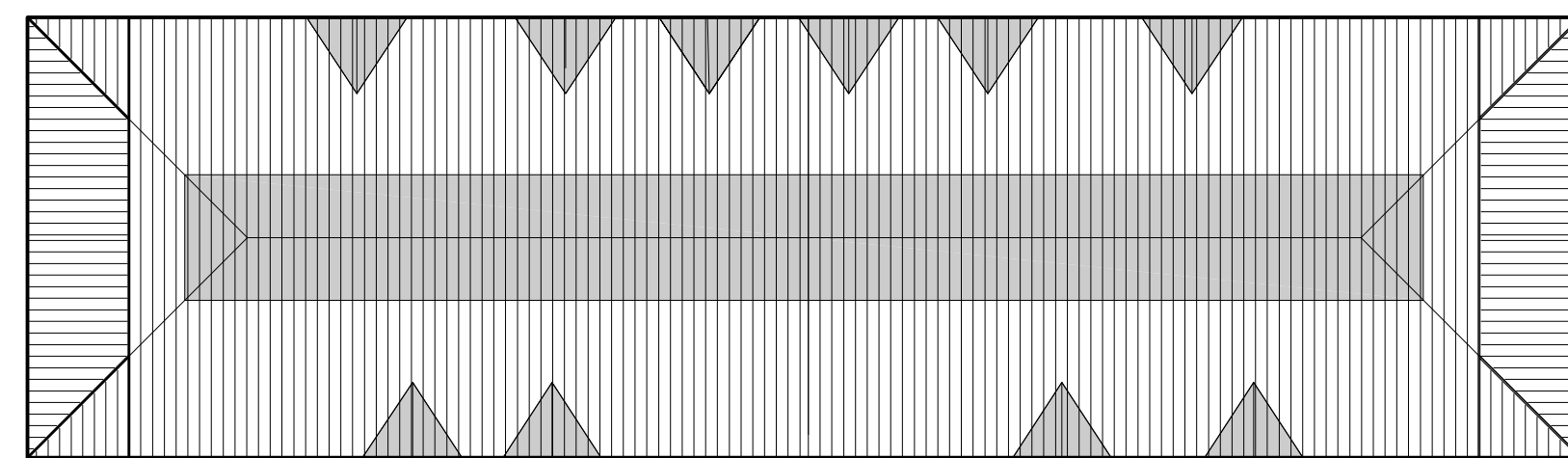
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 **ROOF FRAMING**



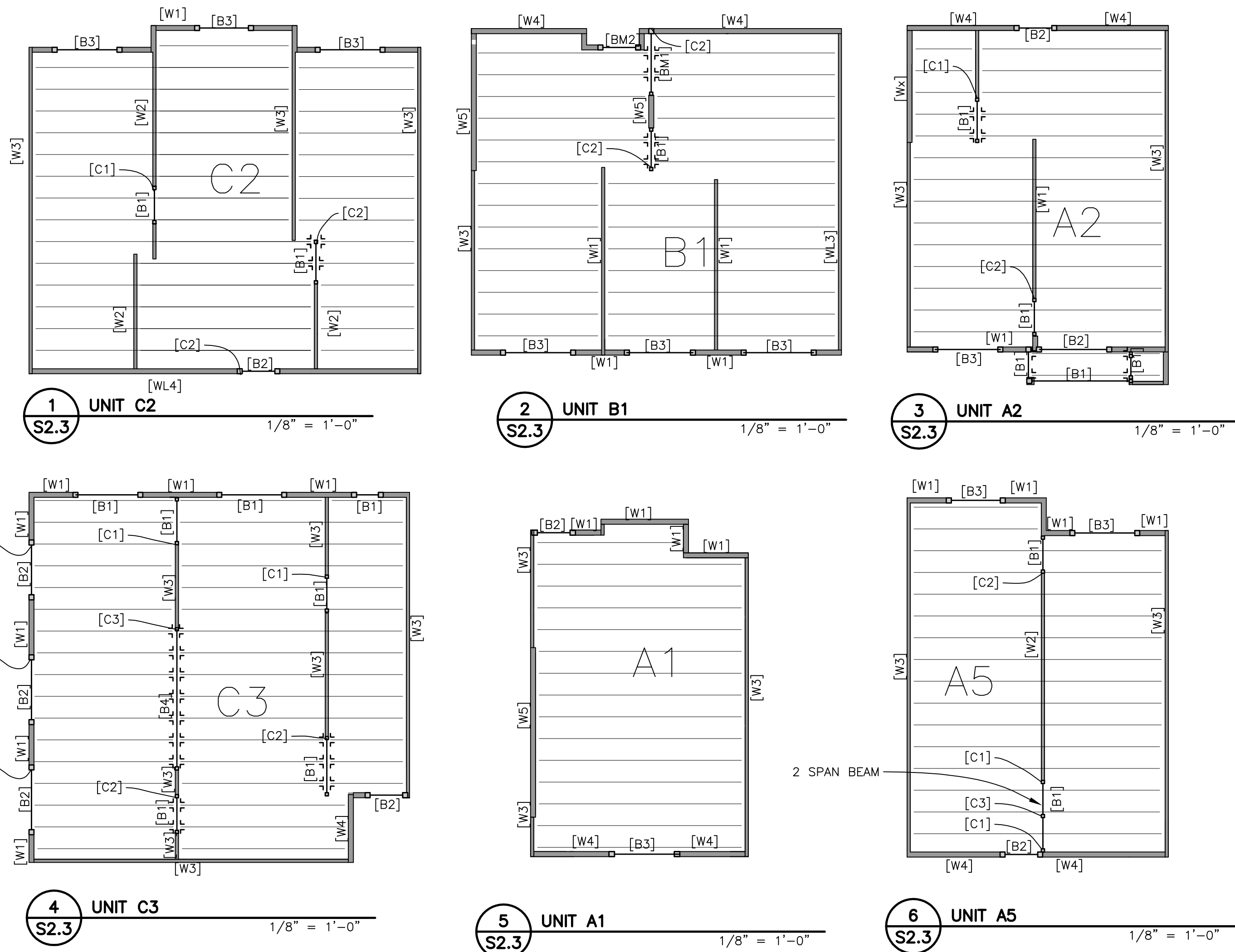
1. ROOF TRUSSES TO BE DESIGNED BY OTHERS. DESIGN ROOF TRUSSES FOR 20PSF LIVE LOAD AND 10 PSF BOTTOM CORD LIVE LOAD AND 10 PSF UPLIFT.
2. ROOF SHEATHING SHALL BE 1 5/8" OSB, GRADE CDX, APA RATED EXPOSURE 1 WITH EXTERIOR GLUE, SPAN RATING 32/16. FASTEN SHEATHING TO ROOF SUPPORTS W/ 8d @ 6" O.C. @ PANEL EDGES AND BOUNDARIES, 12" O.C. AT INTERMEDIATE SUPPORTS (UNBLOCKED) STAGGER PANEL EDGES.
3. RE S2.0 FOR SHEAR WALL LAYOUT
4. RE: S2.2 FOR BEARING WALL LAYOUT
5. RE: S2.3 FOR ARCH. UNIT LAYOUT



ROOF OVERFRAMING PLAN

1/32" = 1'-0"

DESIGN STUDY
NOT FOR CONSTRUCTION



TYPICAL UNIT PLANS
 1/8" = 1'-0"

ALL FLOORS FRAMED WITH 18" DEEP WOOD TRUSSES, DESIGN FOR 40PSF LIVE LOAD AND 25 PSF DEAD LOAD (INCLUDES ALLOWANCE FOR TRUSSES). REFER TO GENERAL NOTES FOR DESIGN STANDARDS.

NAIL FASTENING SCHEDULE			
CONNECTION	FASTENING (PER IBC 2006 TABLE 2304.9.1)	ALTERNATIVE	LOCATION
JOIST TO SILL OR GIRDER	(3) 8d COMMON	N/A	TOENAIL
BOTTOM PLATE TO JOIST OR BLOCKING	16d @ 16" O.C.	(2) 12d COMMON @ 16" O.C.	TYPICAL FACE NAIL
TOP PLATE TO STUD	(2) 16d COMMON	(3) 10d NAILS	END NAIL
STUD TO SOLE PLATE (TOENAIL)	(4) 8d COMMON	N/A	TOENAIL
STUD TO SOLE PLATE (END NAIL)	(2) 16d COMMON	(3) 10d NAILS	END NAIL
DOUBLE STUDS	16d @ 24" O.C.	10d @ 8" O.C.	FACE NAIL
DOUBLE TOP PLATES (TYPICAL FACE NAIL)	16d @ 16" O.C.	10d NAIL @ 12" O.C.	TYPICAL FACE NAIL
DOUBLE TOP PLATES (LAP SPLICE)	(8) 16d COMMON	(12) 10d NAILS	LAP SPLICE
BLOCKING BETWEEN JOISTS OR RAFTERS TO TOP PLATE	(3) 8d COMMON	N/A	TOENAIL
RIM JOIST TO TOP PLATE	8d @ 6" O.C.	N/A	TOENAIL
TOP PLATES, LAPS AND INTERSECTIONS	(2) 16d COMMON	N/A	FACE NAIL
CONTINUOUS HEADER, TWO PIECES	16d COMMON @ 16" O.C. ALONG EDGE	SEE TYP HDR 5/S3.5	16" O.C. ALONG EDGE
CEILING JOISTS TO PLATE	(3) 8d COMMON	N/A	TOENAIL
CONTINUOUS HEADER TO STUD	(4) 8d COMMON	N/A	TOENAIL
RAFTER TO PLATE	(3) 8d COMMON	N/A	TOENAIL
BUILT-UP CORNER STUDS	16d COMMON @ 24" O.C.	10d NAILS @ 16" O.C.	FACE NAIL
BUILT-UP GIRDERS AND BEAMS	20d COMMON @ 32" O.C.	SEE 5/S3.5	FACE NAIL AT TOP AND BOTTOM STAGGERED ON OPPOSITE SIDES
BUILT-UP GIRDERS AND BEAMS	(2) 20d COMMON	(4) 12d NAILS	FACE NAIL AT ENDS
JACK RAFTER TO HIP RAFTER	(2) 16d COMMON	(3) 10d NAILS	FACE NAIL
ROOF RAFTER TO 2x RIDGE BOARD	(2) 16d COMMON	(3) 10d NAILS	TOENAIL OR FACE NAIL
FLOOR TRUSS TO PLATE	(2) 16d COMMON	(3) 10d NAILS	TOENAIL OR FACE NAIL

NOTE: THIS SHEET THE SAME FOR ALL DESIGNS

COLUMN SCHEDULE				
MARK	SIZE 1ST	SIZE 2ND	SIZE 3RD	COMMENTS
[C1]	W/ (2) 2x4	N/A	N/A	
[C2]	W/ (2) 2x4	N/A	N/A	
[C3]	PSL 3 1/2"x7" W/ (3) KING STUDS	(3) 2x4	N/A	
[C4]	blank			
[C5]	(2) 2x6 W/ (2) 2X6 KING STUD	N/A	N/A	
[C6]	blank			

ALL COLUMNS WITHOUT MARKS TO BE (2) KING STUD MINIMUM U.N.O.

BEARING WALL SCHEDULE				
MARK	SIZE 1ST	SIZE 2ND	SIZE 3RD	COMMENTS
[W1]	2x6 @ 16" O.C.	2x6 @ 16" O.C.	2x6 @ 16" O.C.	TYPICAL EXTERIOR WALL
[W2]	(2) 2x4 @ 12" O.C.	2x4 @ 12" & 2x4 @ 24" O.C.	2x4 @ 16" O.C.	
[W3]	2X4 @ 12" O.C.	2x4 @ 16" O.C.	2x4 @ 16" O.C.	
[W4]	2x6 @ 12" O.C.	2x6 @ 16" O.C.	2x6 @ 16" O.C.	TYPICAL CORRIDOR WALL
[W5]	2x6 @ 16" O.C.	2x6 @ 16" O.C.	2x6 @ 16" O.C.	TYPICAL PLUMBING WALL

ALL EXTERIOR WALLS 2x6 @ 16" (MIN) SOUTHERN PINE #3 W/ 3/16" OSB EXTERIOR SHEATHING, FASTENED W/ 8d COMMON NAILS @ 6" O.C. @ EDGES AND 12" FIELD, U.N.O.

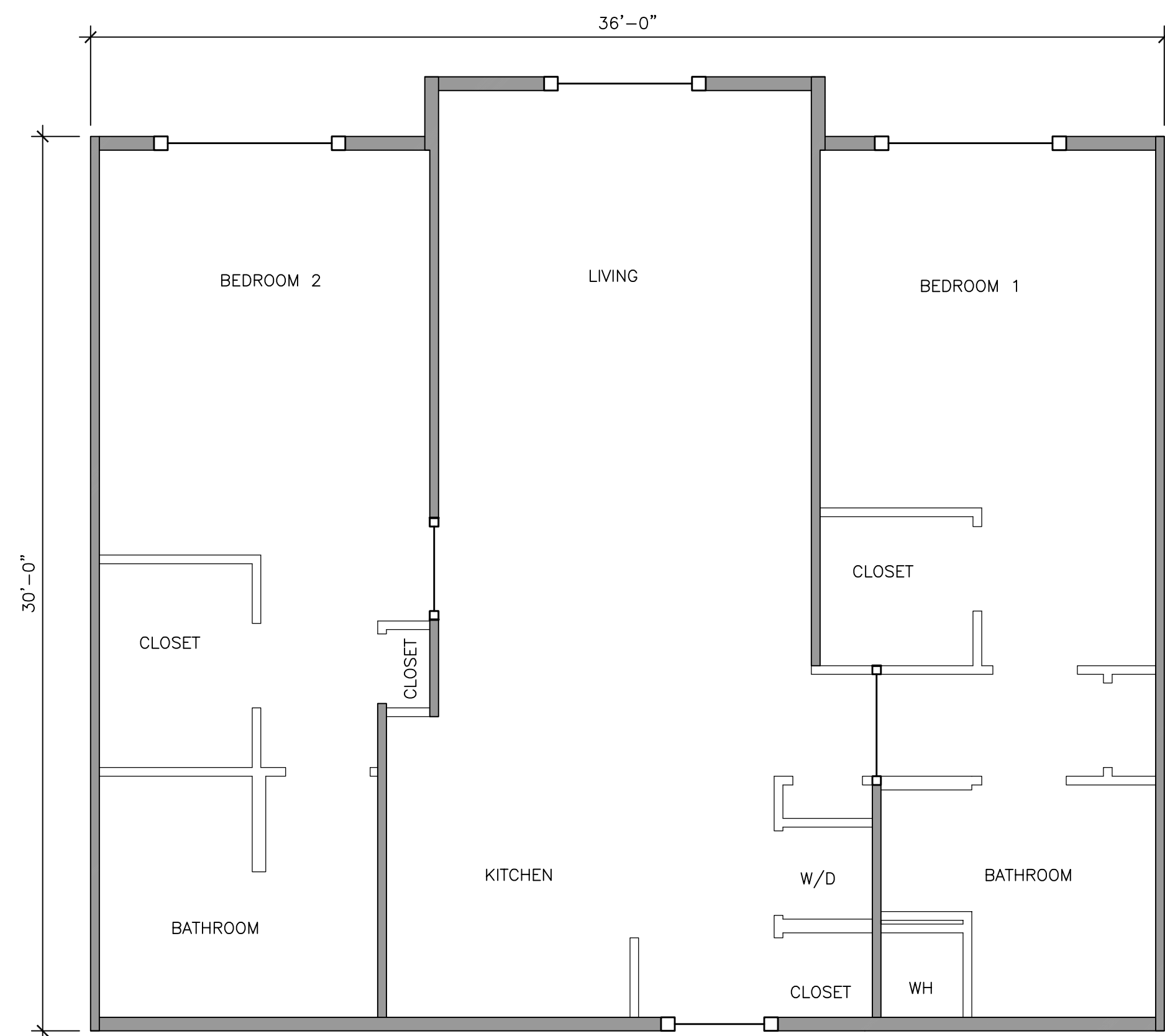
ALL INTERIOR BRG WALLS 2x4 @ 16" O.C. SOUTHERN PINE #3 U.N.O. ALL INTERIOR BRG WALLS SHEATHED W/ 1/2" GWB UNLOCKED FASTENED TO STUDS W/ 6d COOLER @ 7" O.C.

BEAM SCHEDULE		
MARK	SIZE	COMMENTS
[B1]	(2) 2x12 SOUTHERN PINE #3	W/ 1/2" OSB SPACERS
[B2]	(3) 2x12 SOUTHERN PINE #3	W/ 1/2" OSB SPACERS (SEE TYP DOOR HEADER)
[B3]	(3) 2x12 SOUTHERN PINE #3	W/ 1/2" OSB SPACERS (SEE TYP WINDOW HEADER)
[B4]	(2) LVL 1 3/4"x7 1/4"	

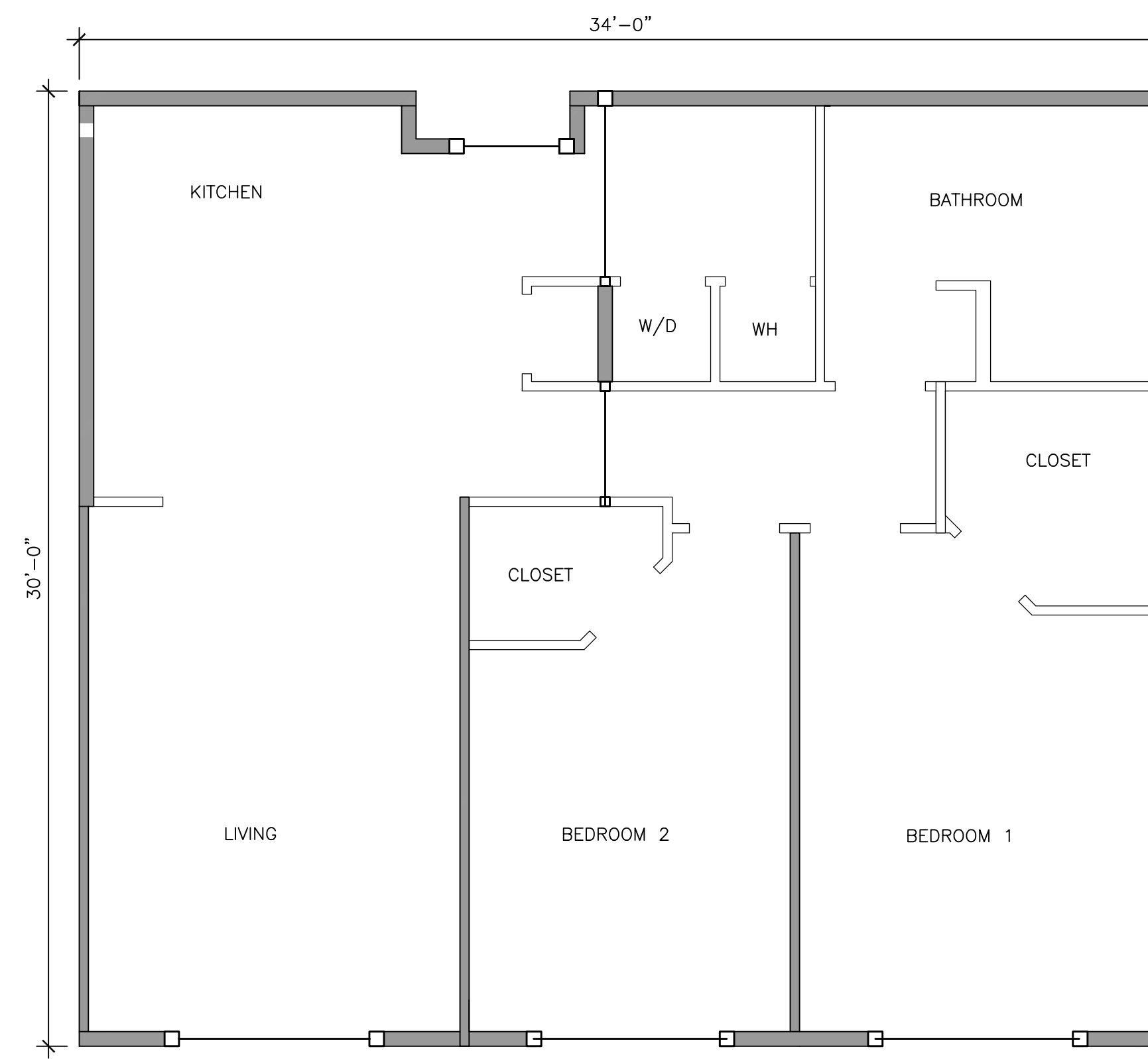
U.N.O. TYP. HEADER TO BE (2) 2X8 SOUTHERN PINE #3 W/ 1/2" OSB SPACERS

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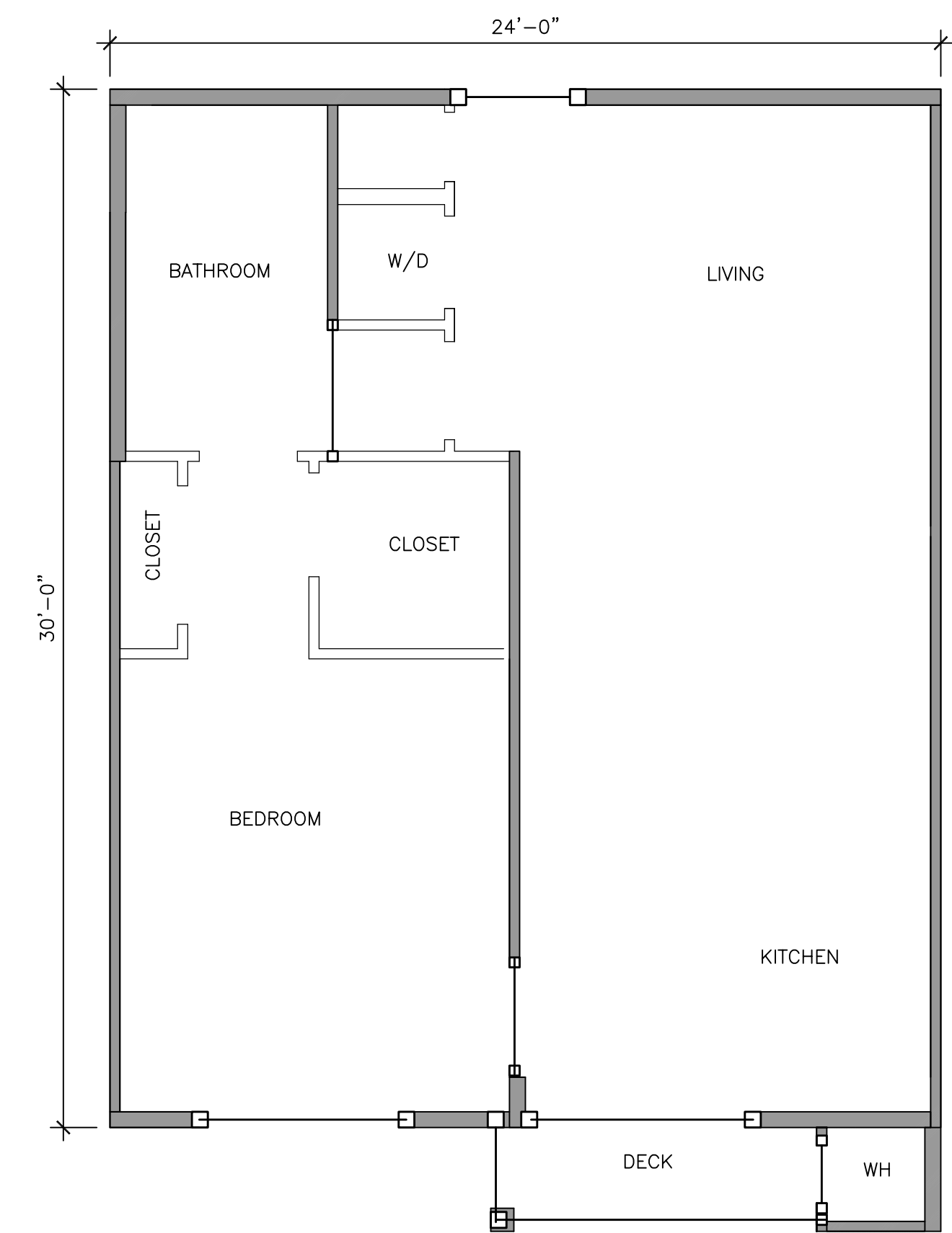
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1 UNIT C2 ARCH
S2.4
1/4" = 1'-0"
4 2 0 4 8



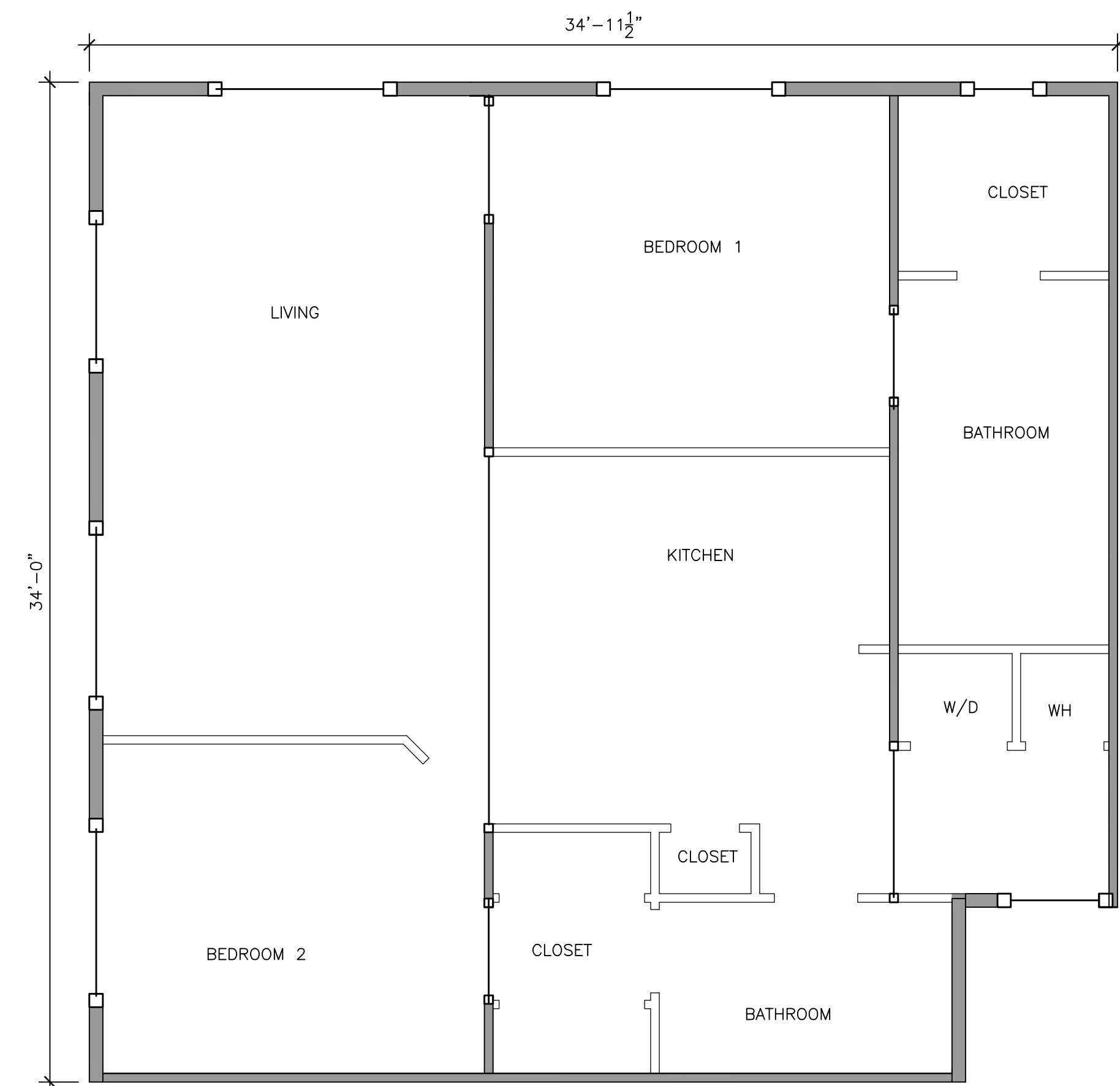
2 UNIT B1 ARCH
S2.4
1/4" = 1'-0"
4 2 0 4 8



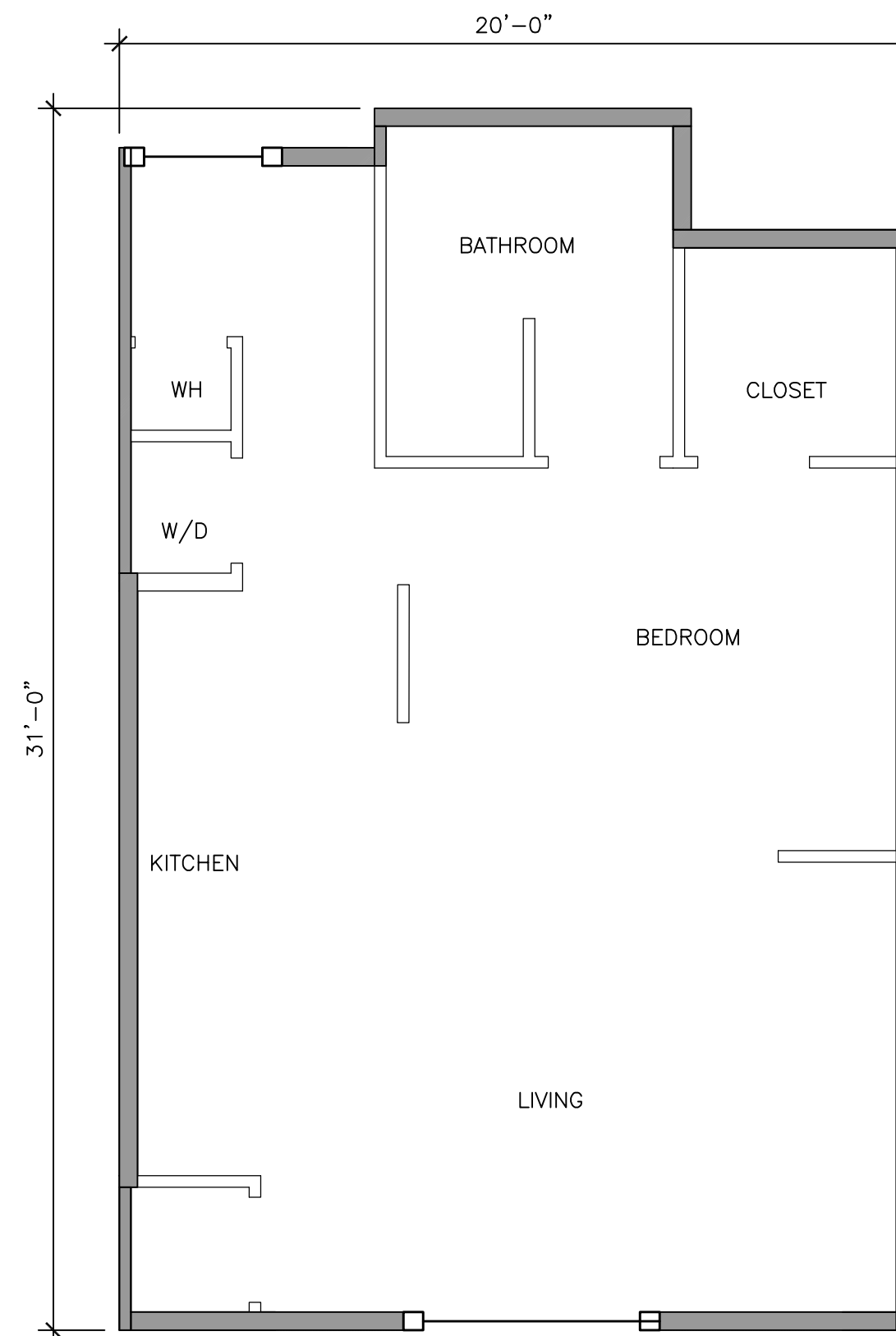
3 UNIT A2 ARCH
S2.4
1/4" = 1'-0"
4 2 0 4 8

NOTE: THIS SHEET THE SAME FOR ALL DESIGNS

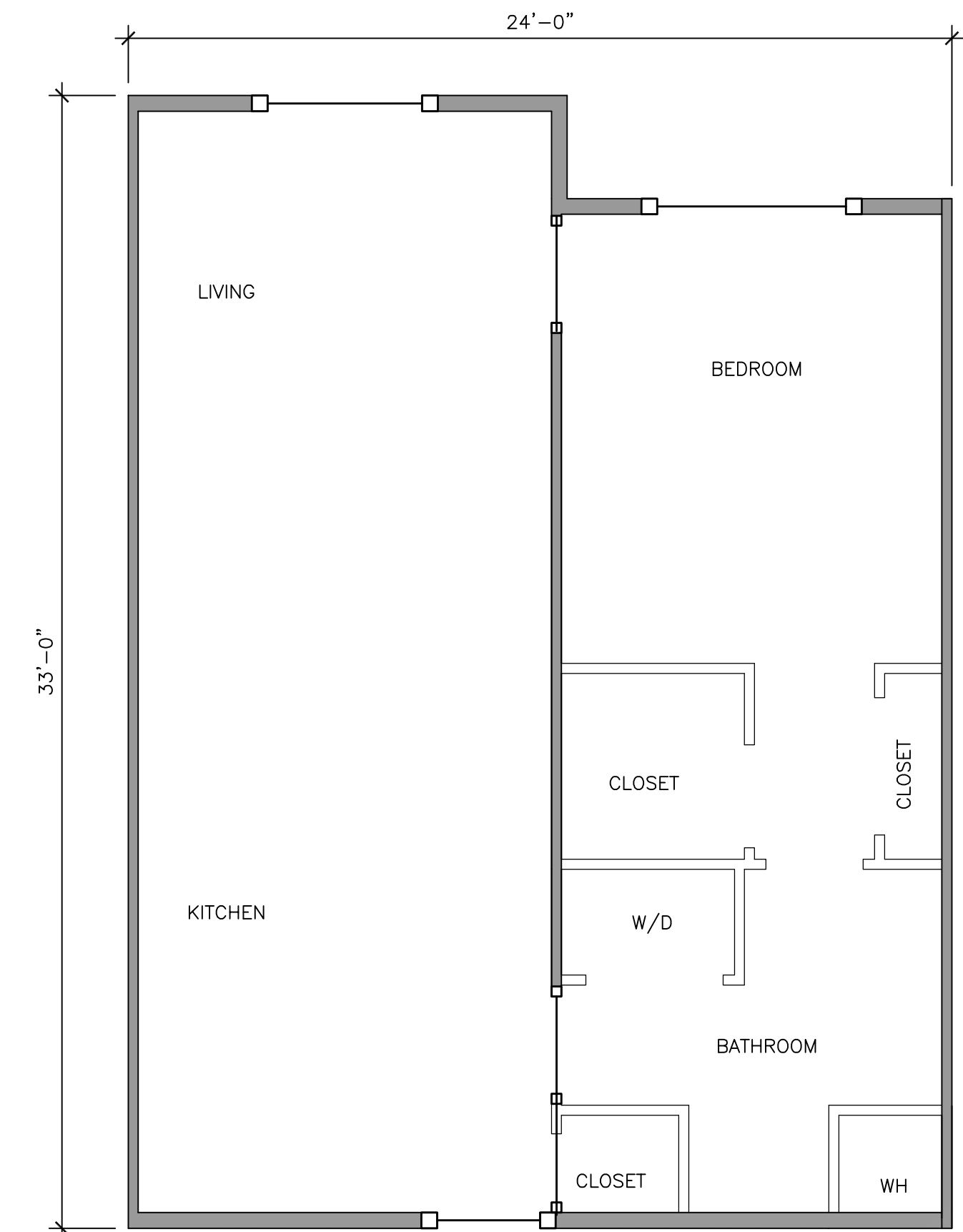
DESIGN STUDY
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4 UNIT C3 ARCH
S2.4
1/4" = 1'-0"
4 2 0 4 8

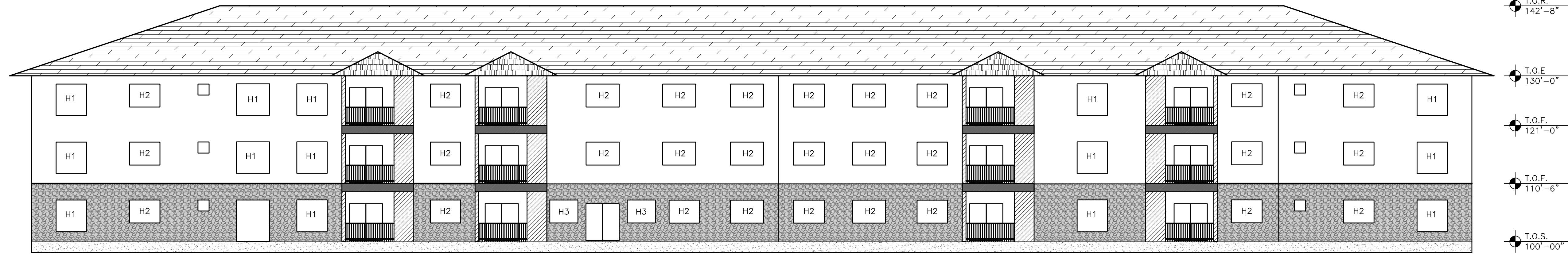


5 UNIT A1 ARCH
S2.4
1/4" = 1'-0"
4 2 0 4 8

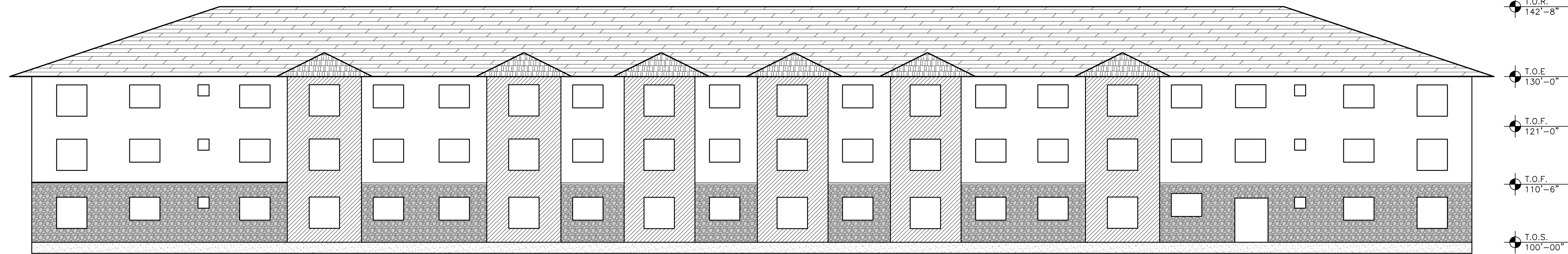


6 UNIT A5 ARCH
S2.4
1/4" = 1'-0"
4 2 0 4 8

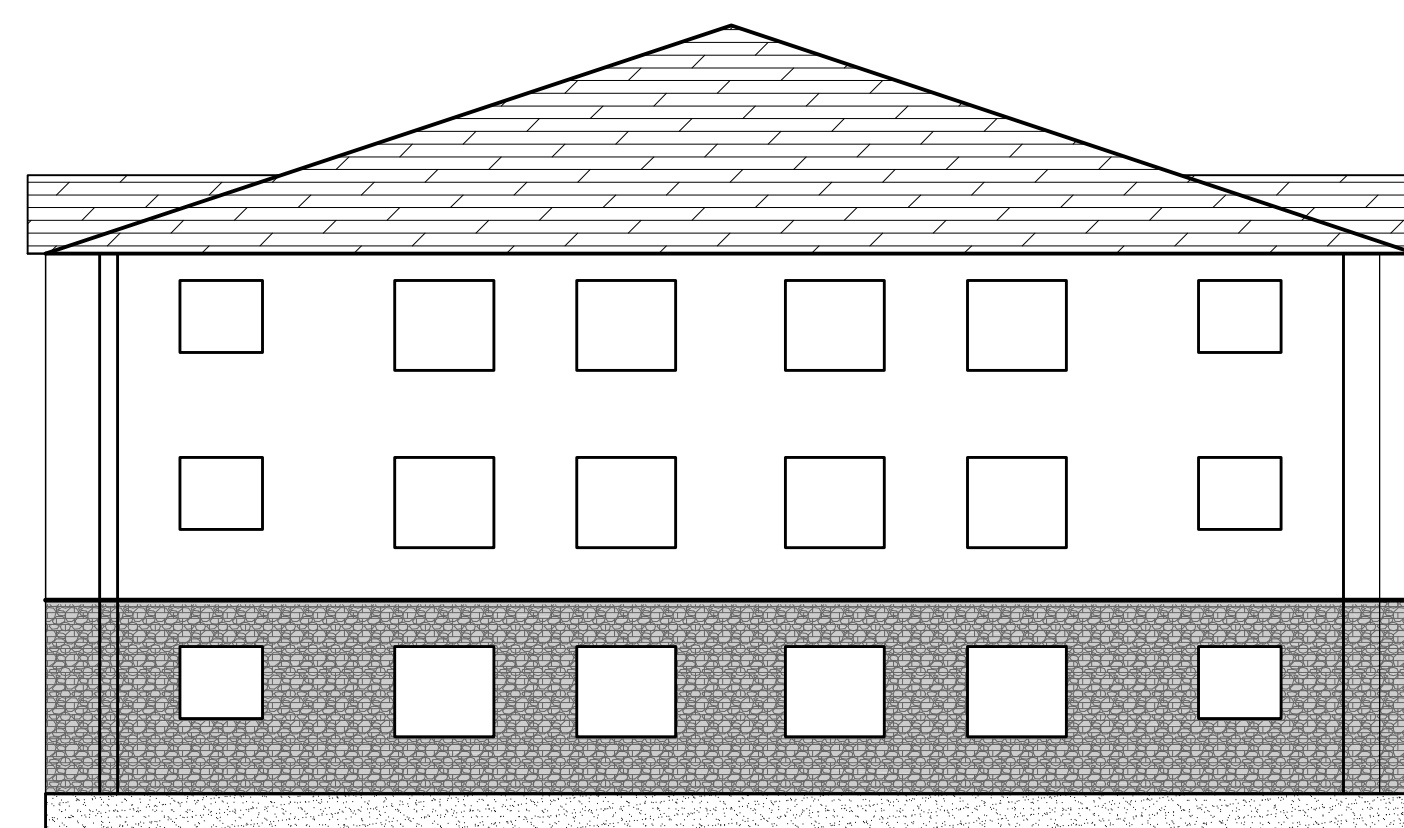
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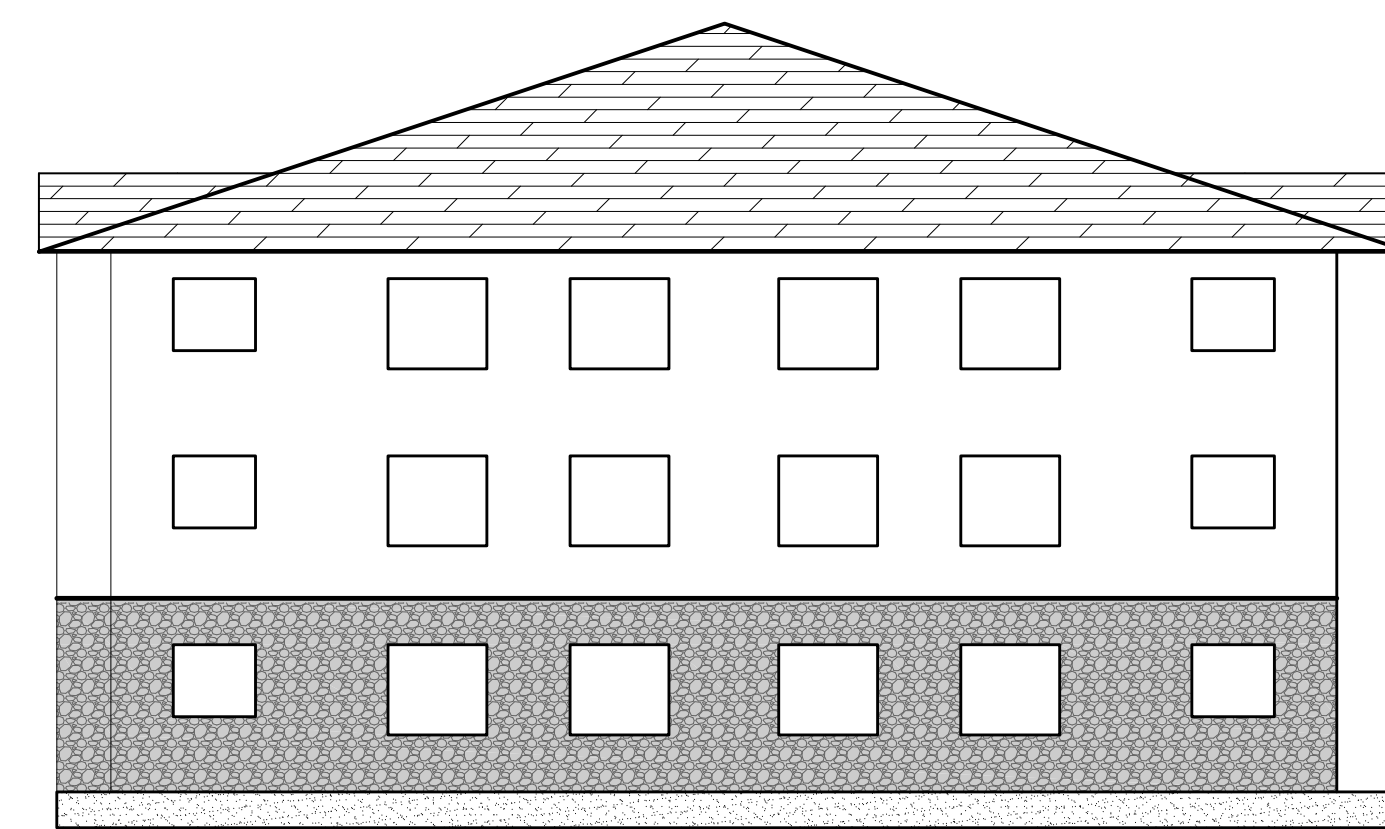
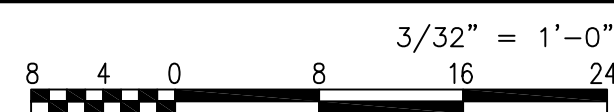
SOUTH ELEVATION



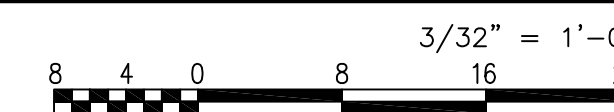
NORTH ELEVATION



EAST ELEVATION

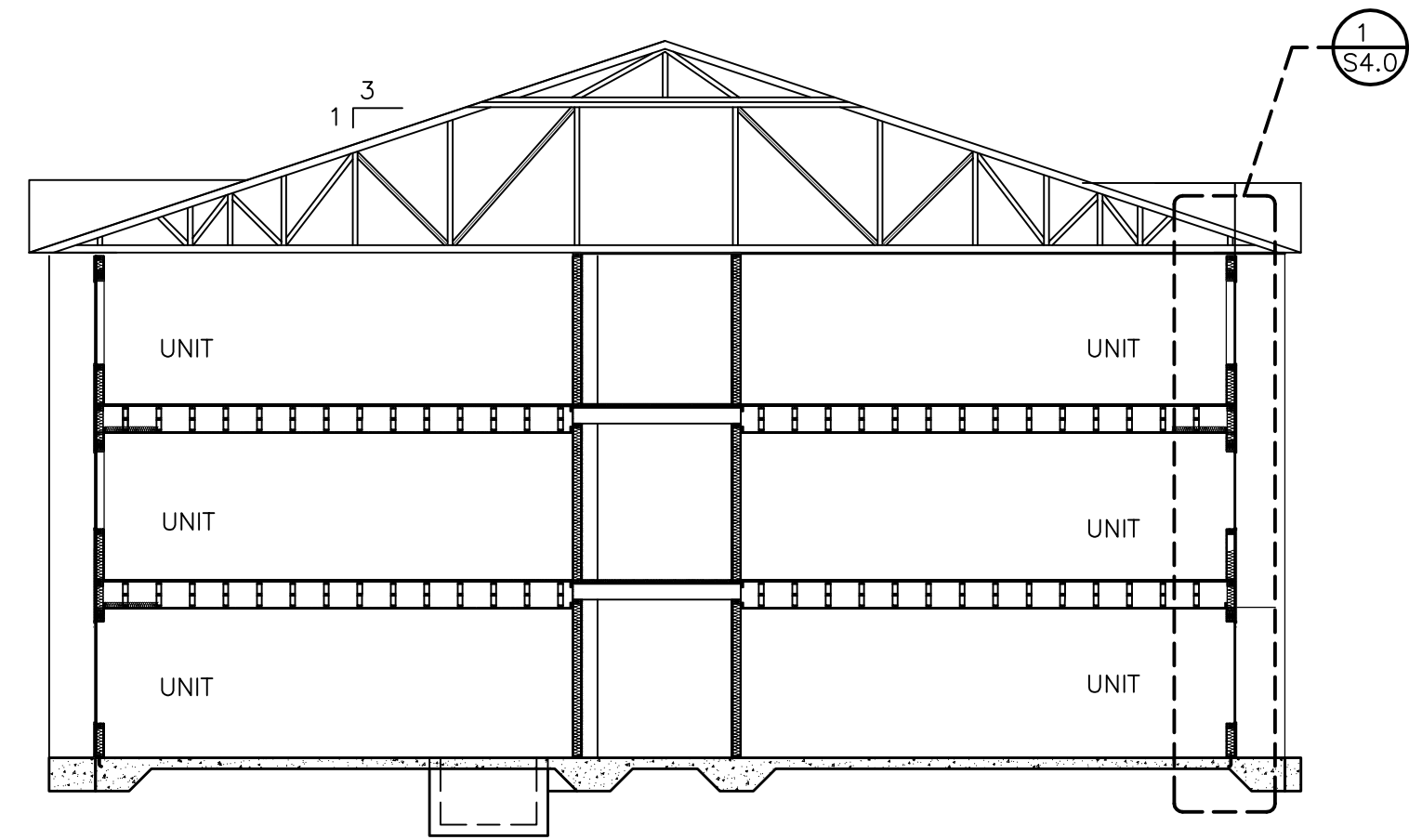


WEST ELEVATION

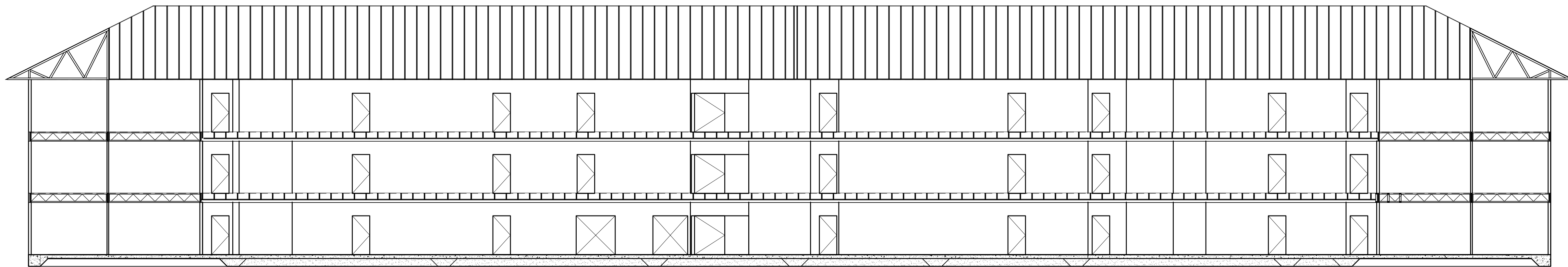


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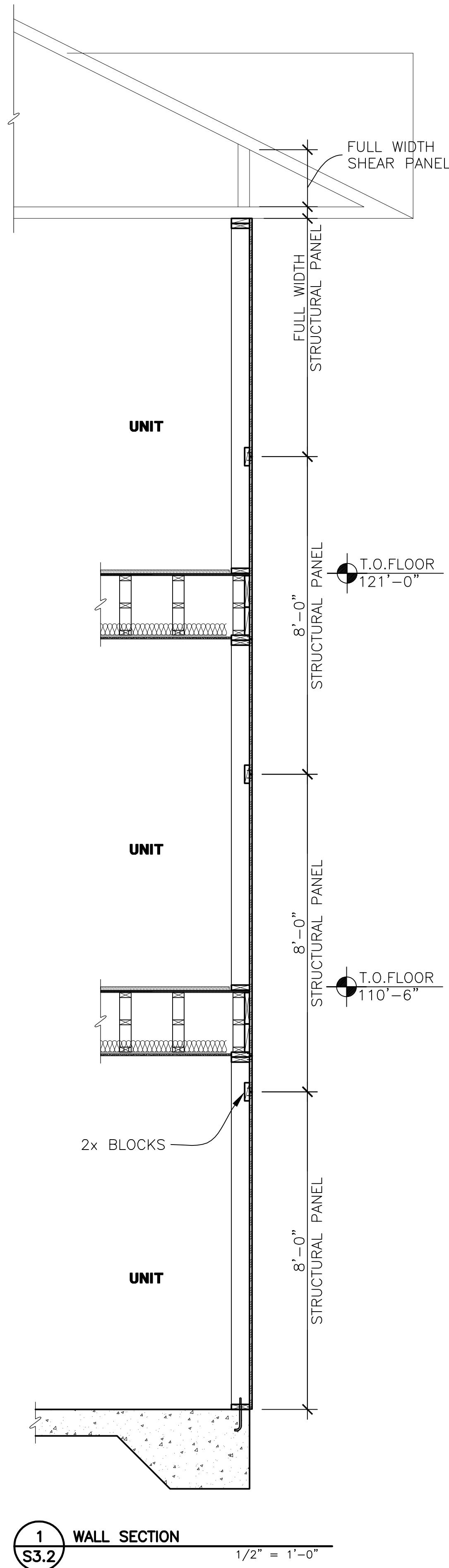
1 WALL SECTION
 S3.1 $\frac{3}{32}'' = 1'-0''$
 8 4 0 8 16 24



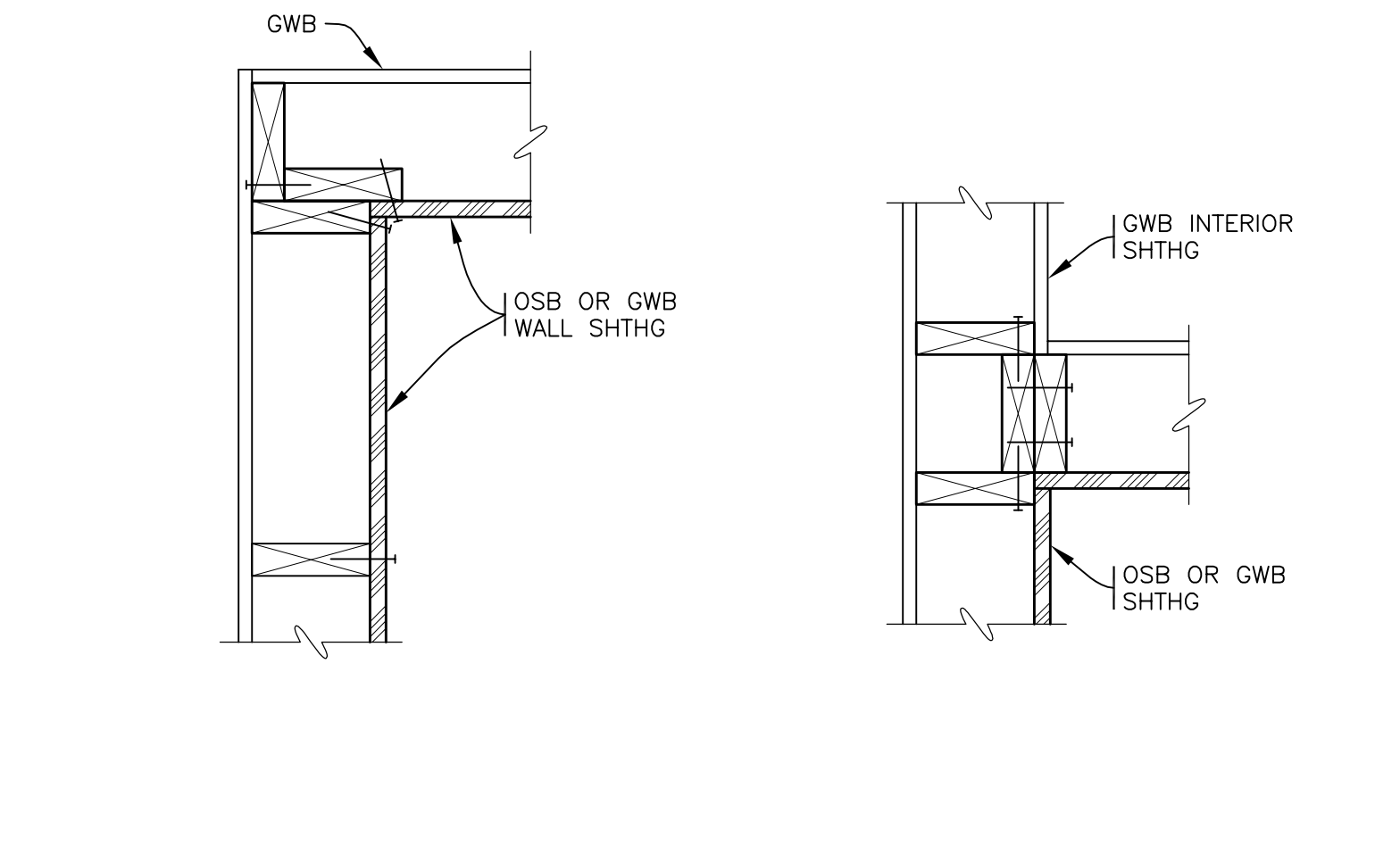
1 WALL SECTION
 S3.1 $\frac{3}{32}'' = 1'-0''$
 8 4 0 8 16 24

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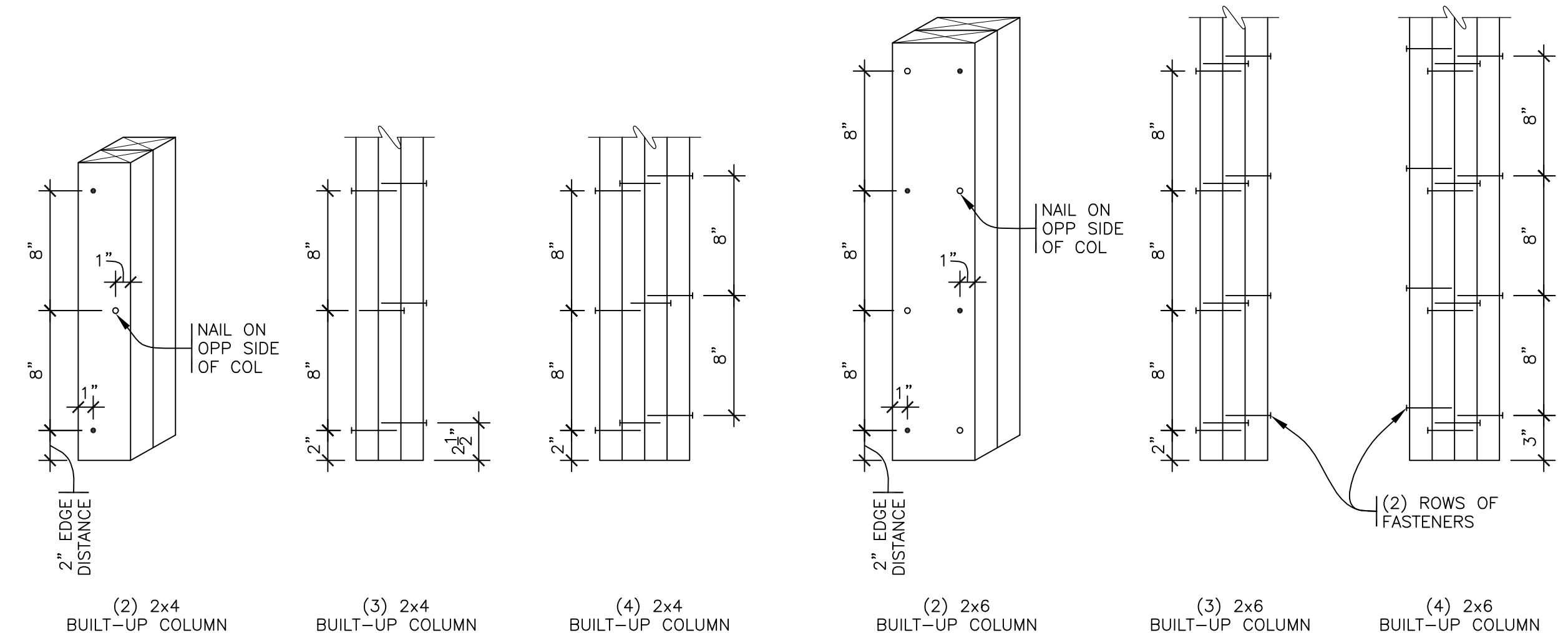


1 WALL SECTION
S3.2
1/2" = 1'-0"



2 TYPICAL INSIDE CORNER S4.0
3/4" = 1'-0"

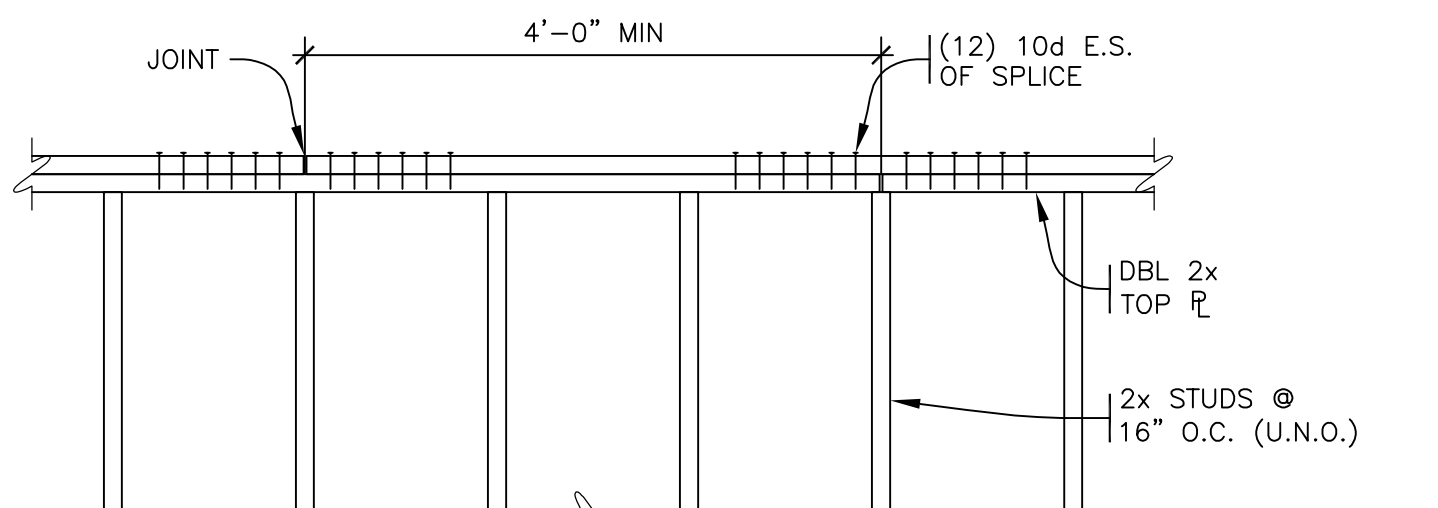
3 TYPICAL WALL INTERSECTION S4.0
3/4" = 1'-0"



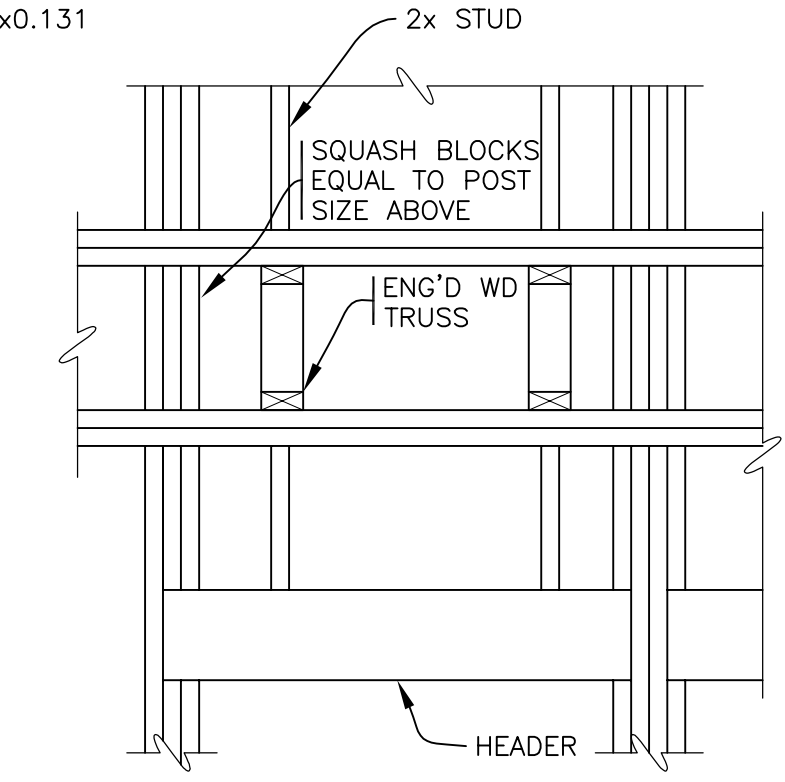
4 TYPICAL 2x4 BUILT-UP COLUMN NAILING S4.0
1 1/2" = 1'-0"

5 TYPICAL 2x6 BUILT-UP COLUMN NAILING S4.0
1 1/2" = 1'-0"

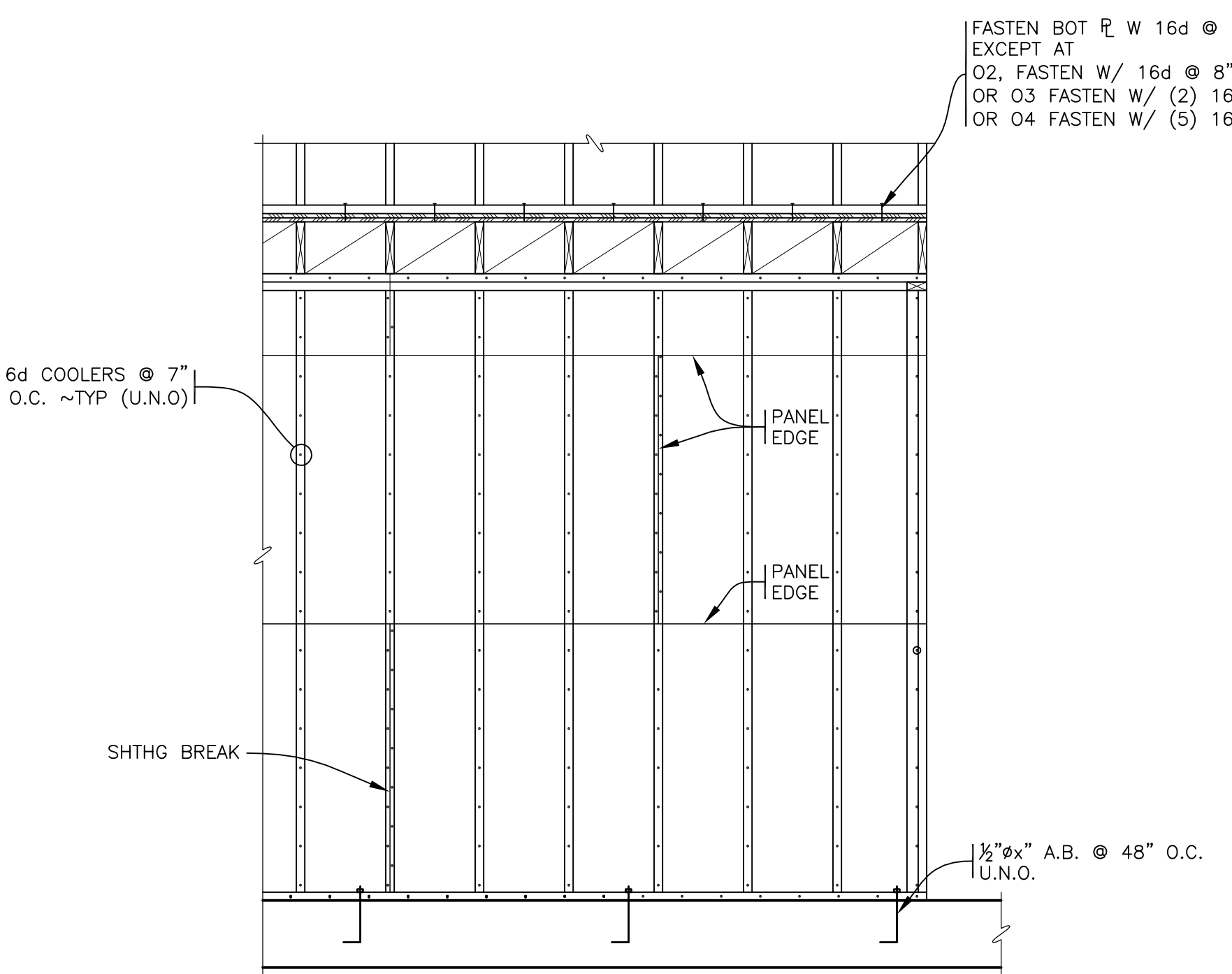
NOTE: ALL NAILS 3"x0.131



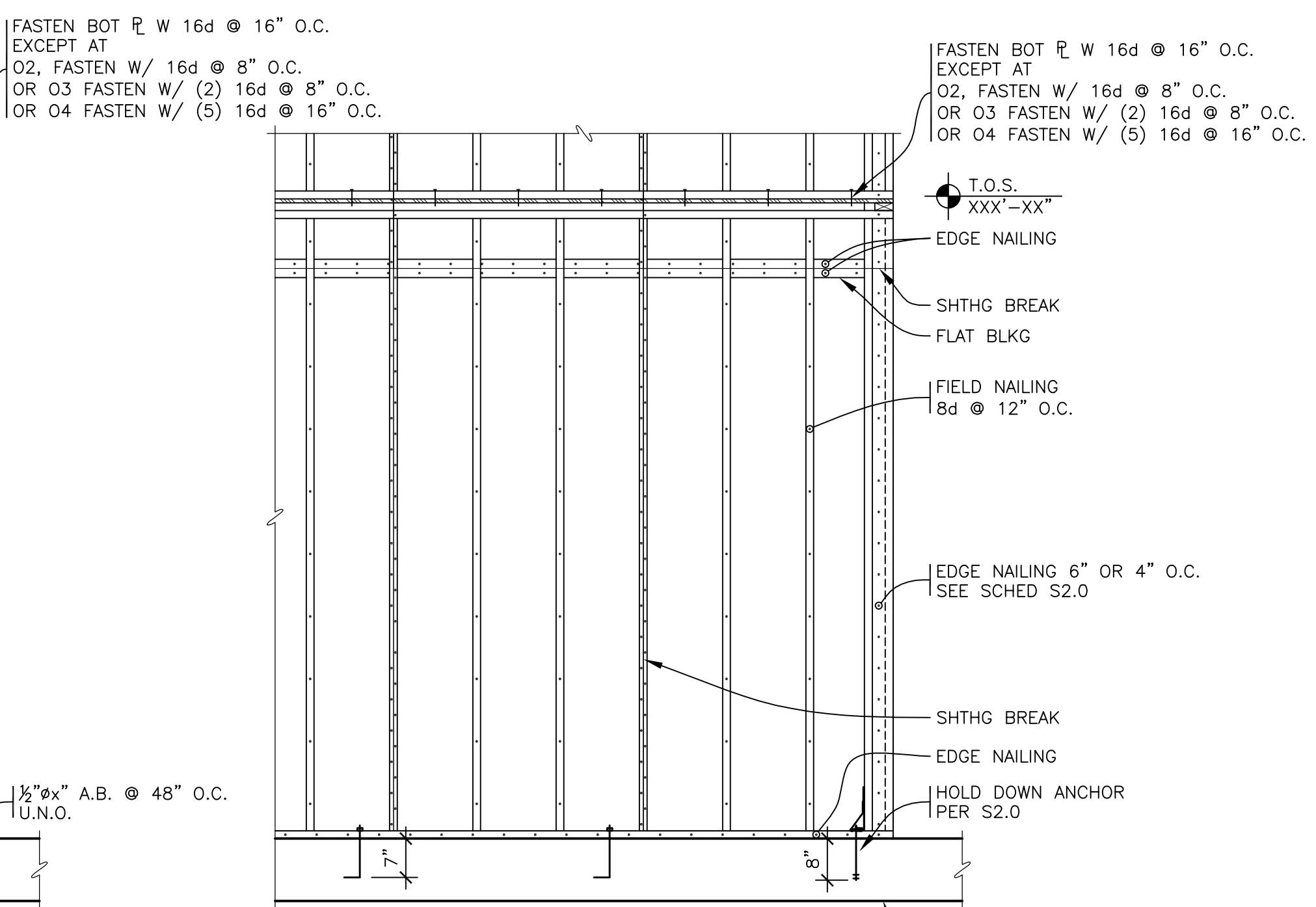
6 TYP DBL PLATE SPLICE DETAIL S4.0
3/4" = 1'-0"



7 TYPICAL HEADER S4.0
3/4" = 1'-0"



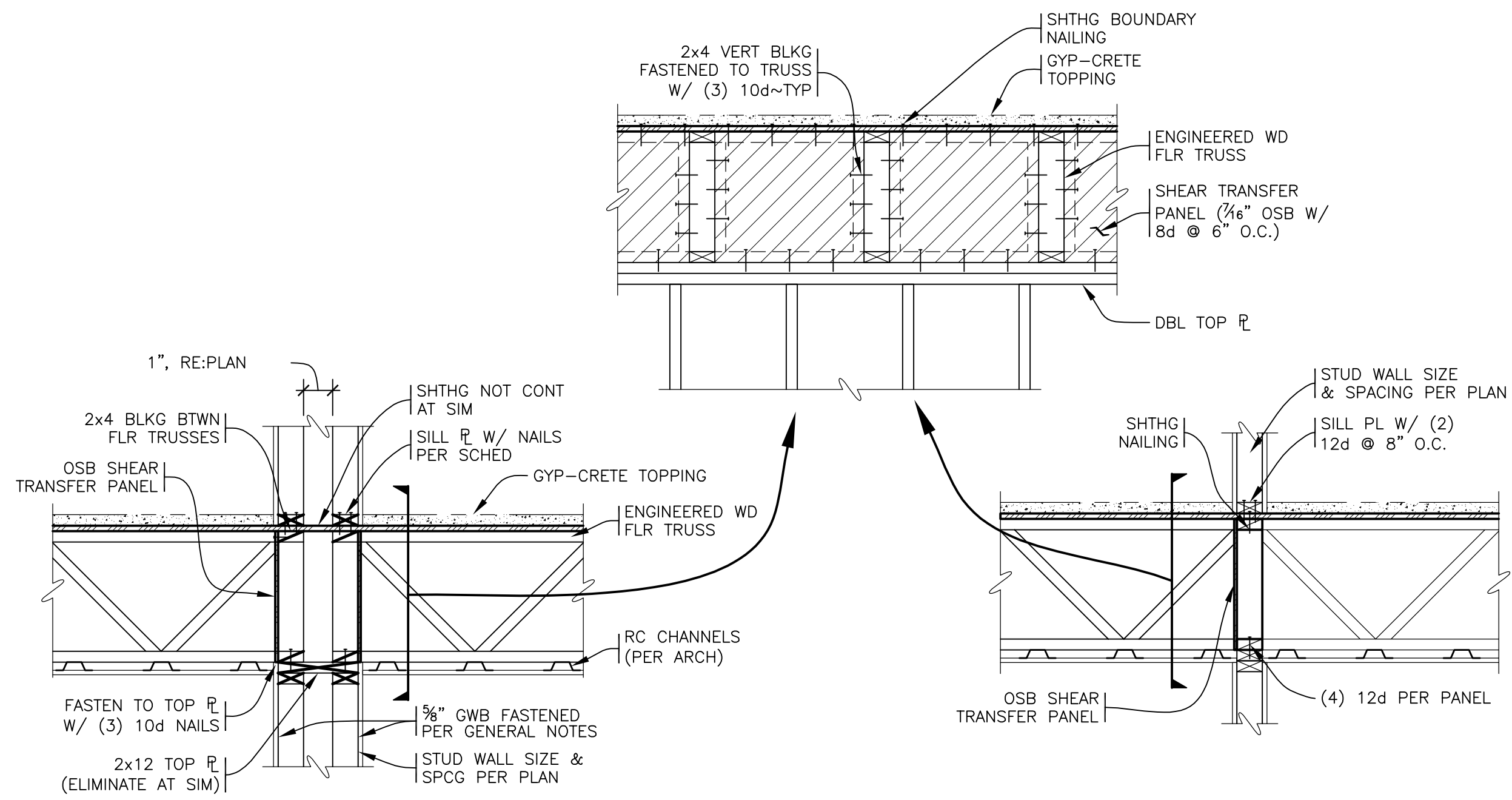
8 TYPICAL INTERIOR GWB SHEARWALL S4.0
1/2" = 1'-0"



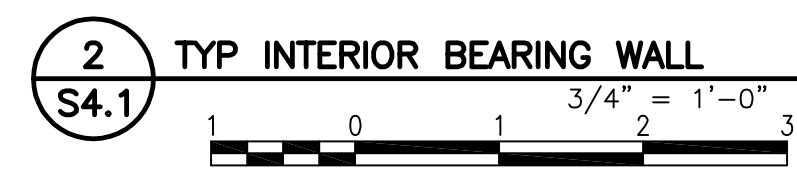
9 TYPICAL EXTERIOR SHEARWALL S4.0
1/2" = 1'-0"

DESIGN STUDY
NOT FOR CONSTRUCTION

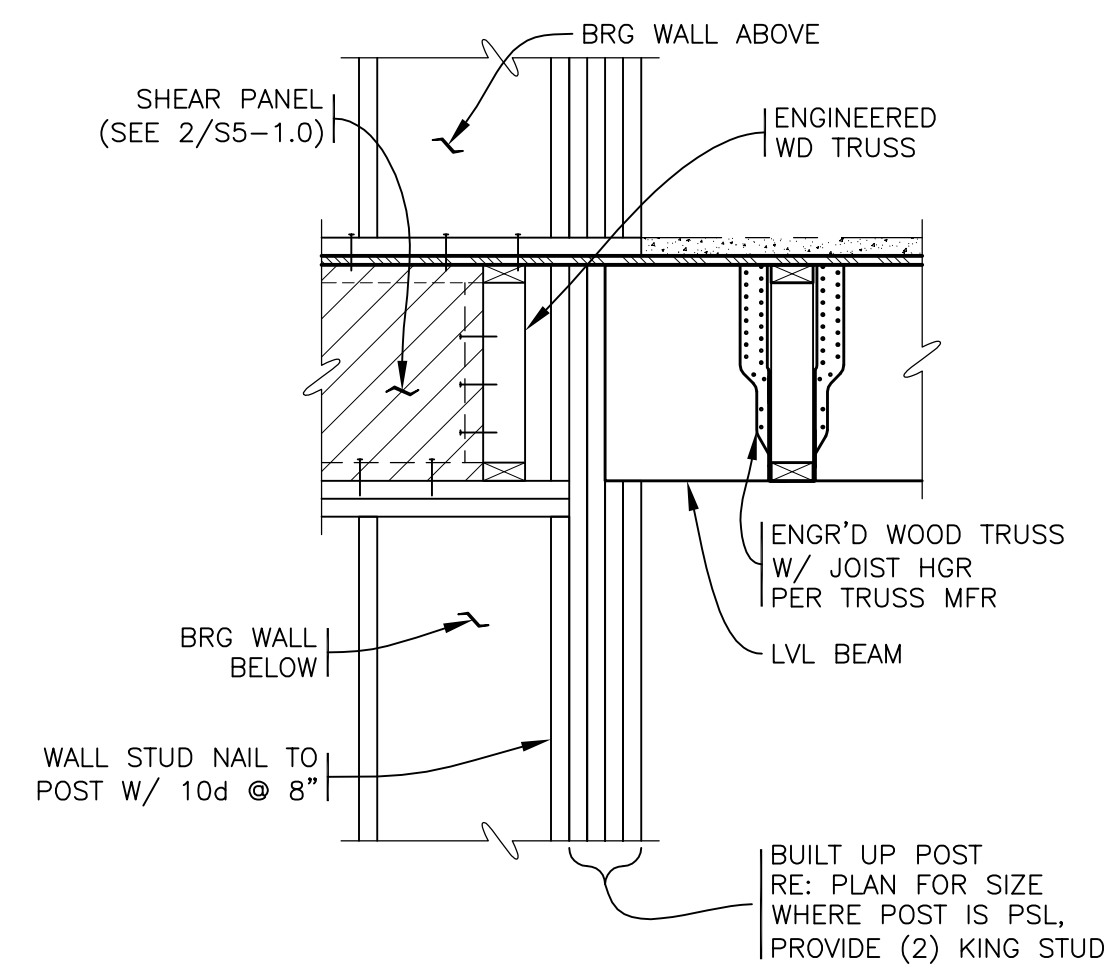
Last Edit: 1/13/2014



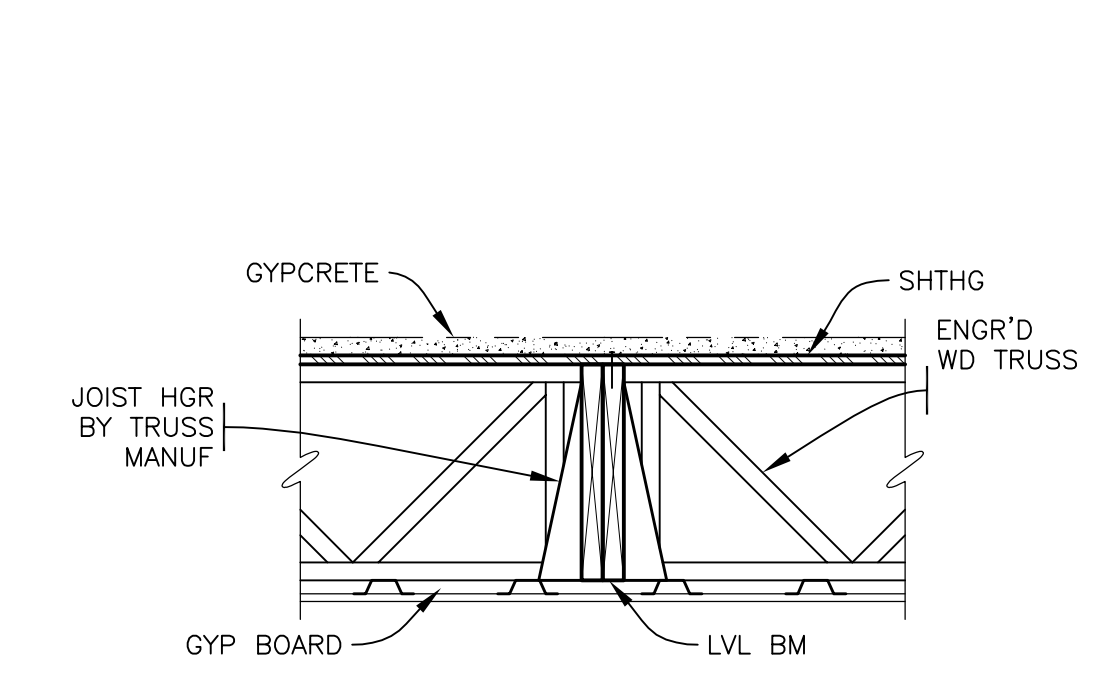
1 TYP BEARING PARTY WALL
S4.1 3/4" = 1'-0"



2 TYP INTERIOR BEARING WALL
S4.1 3/4" = 1'-0"

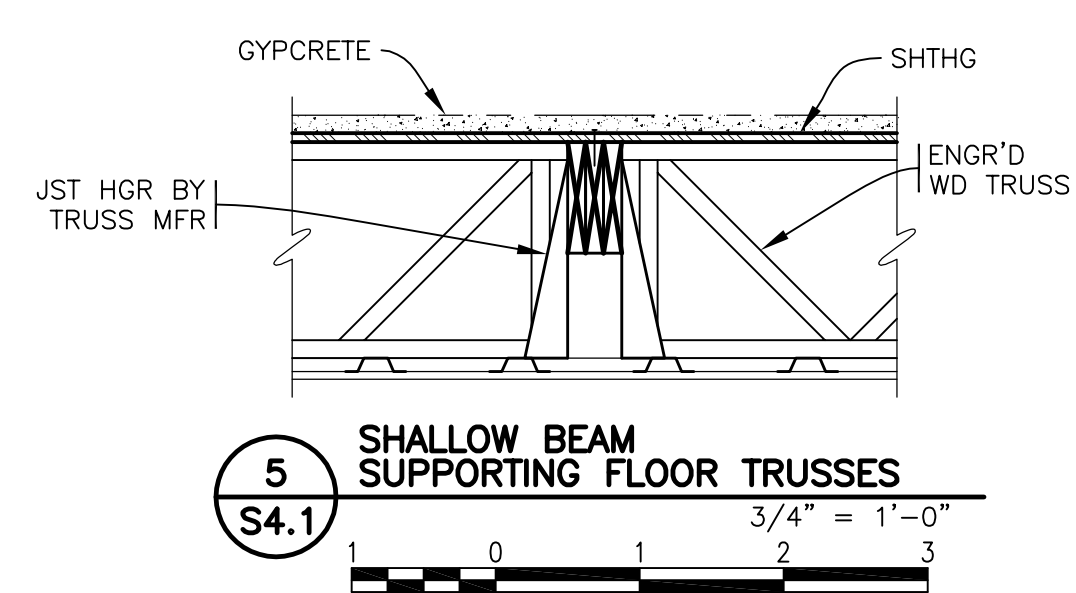


3 BEAM AT INTERIOR WALL
S4.1 3/4" = 1'-0"

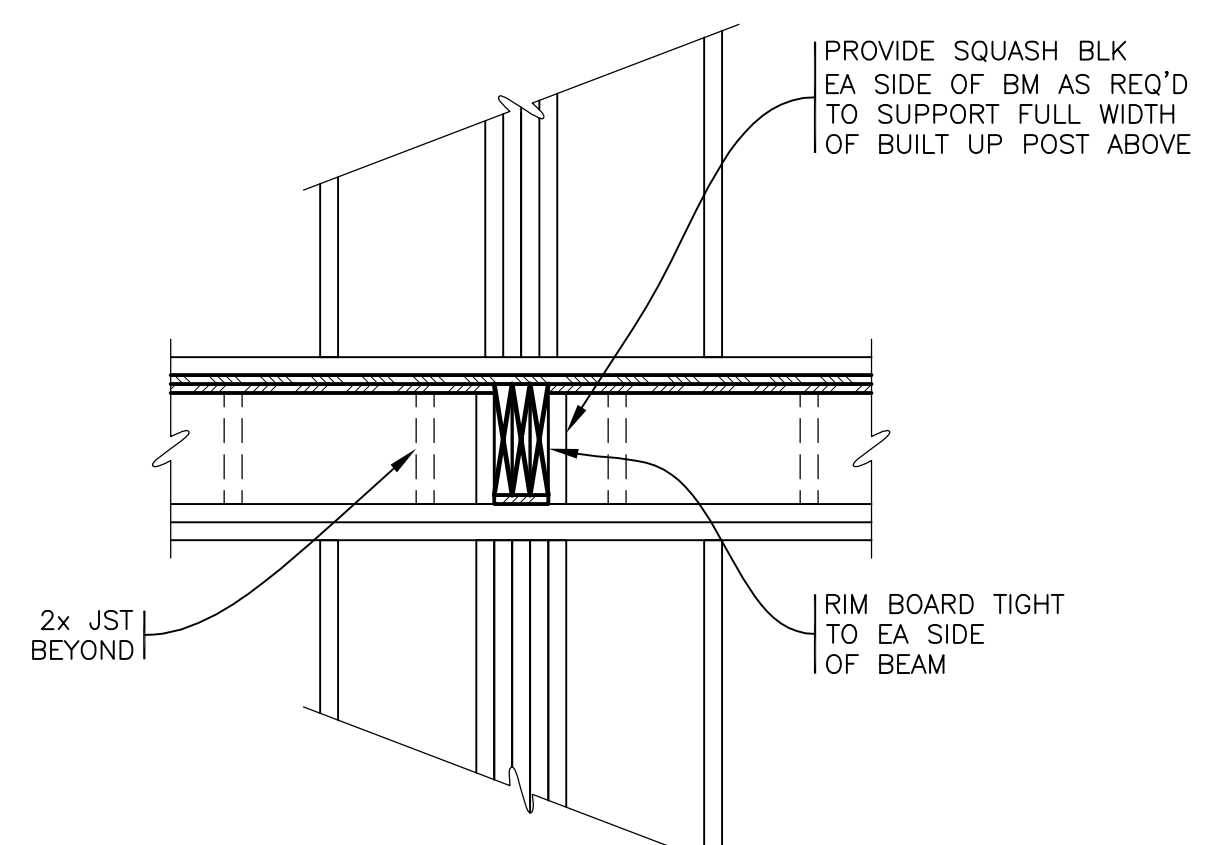


4 DEEP BEAM SUPPORTING FLOOR TRUSSES
S4.1 3/4" = 1'-0"

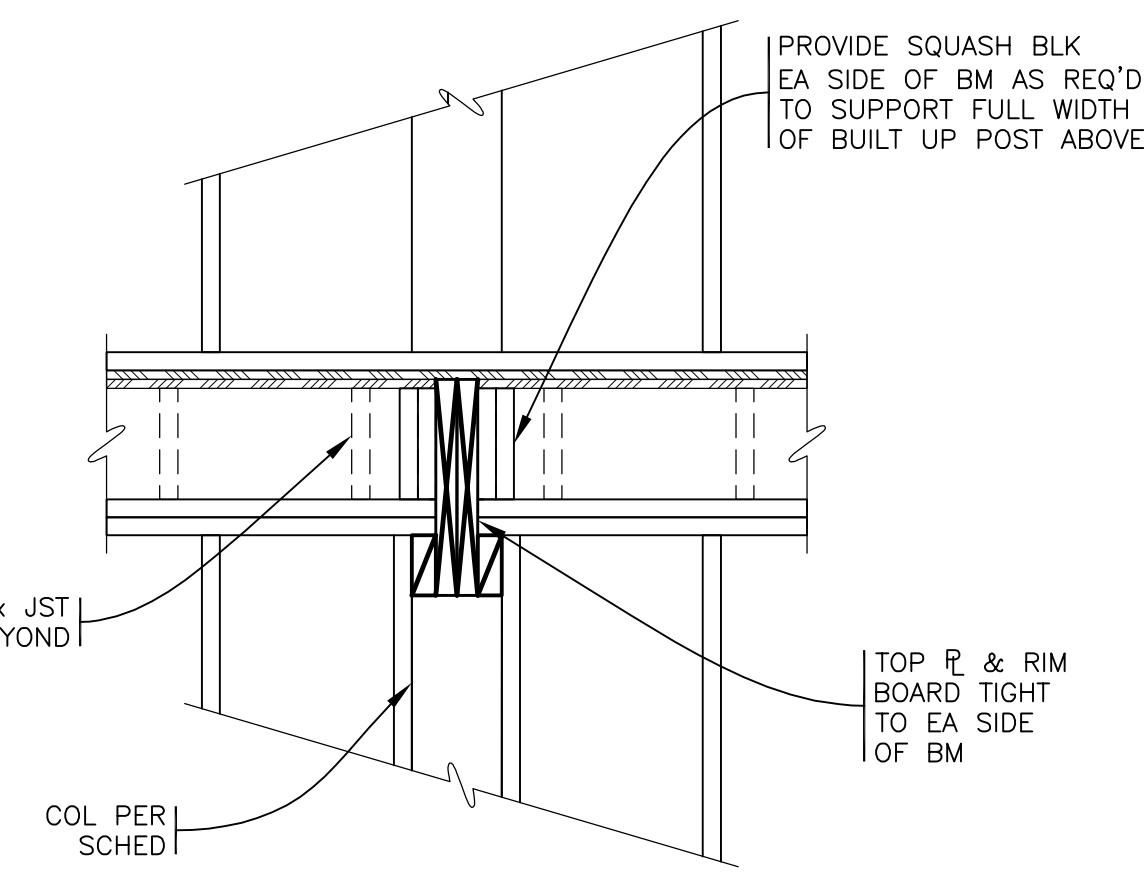
DESIGN STUDY
NOT FOR CONSTRUCTION



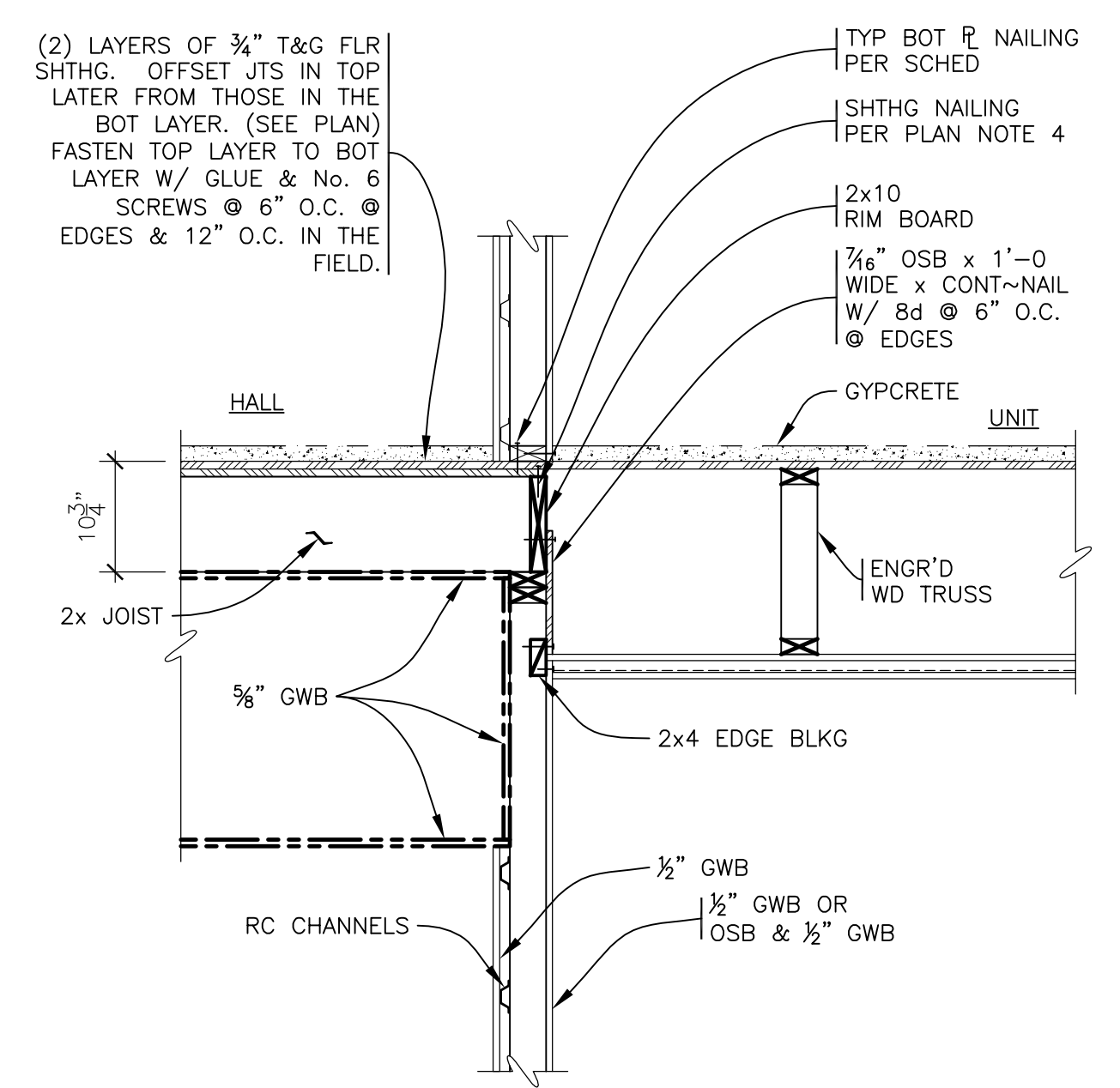
5 SHALLOW BEAM SUPPORTING FLOOR TRUSSES
S4.1 3/4" = 1'-0"



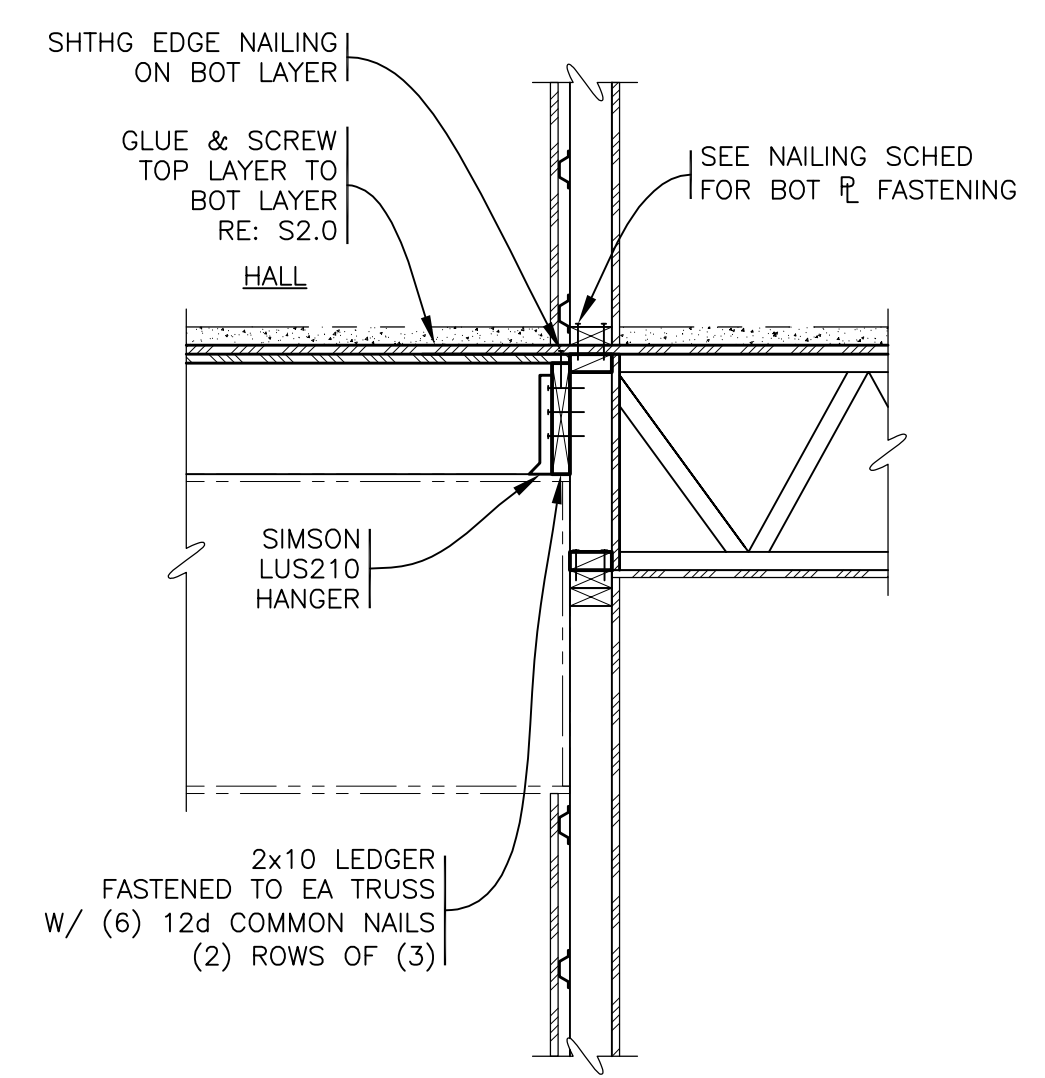
6 SHALLOW BEAM SUPPORTED ON PERPENDICULAR WALL
S4.1 3/4" = 1'-0"



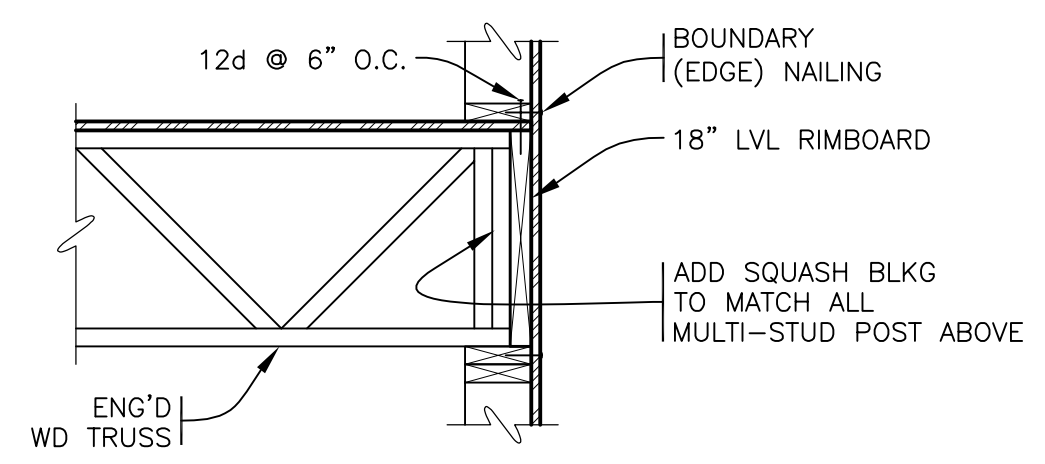
7 DEEP BEAM SUPPORTED ON PERPENDICULAR WALL
S4.1 3/4" = 1'-0"



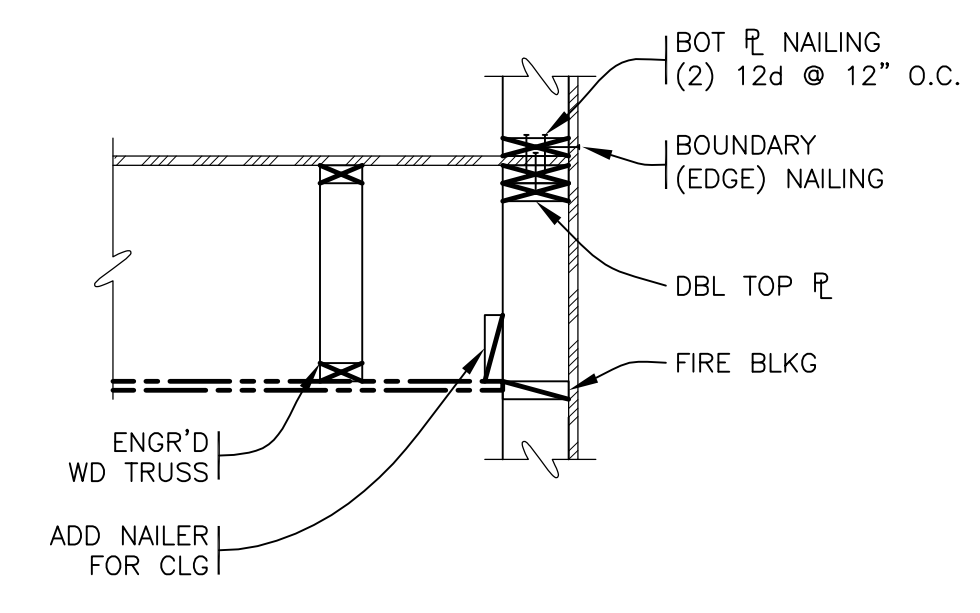
8 TYP CORRIDOR WALL
S4.1 3/4" = 1'-0"



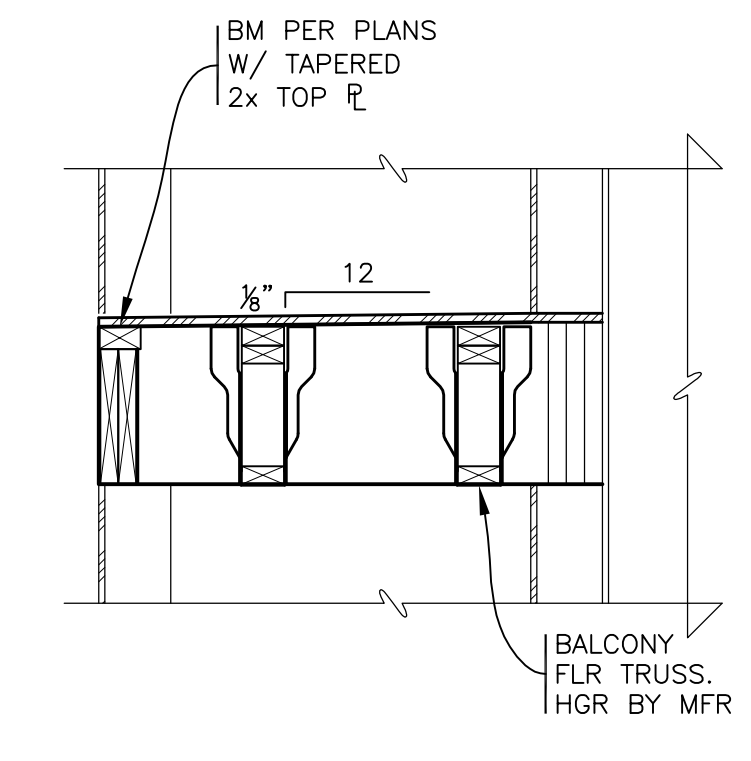
9 CORRIDOR WALL WITH FLOOR TRUSS BEARING
S4.1 3/4" = 1'-0"



10 TYP EXTERIOR WALL BEARING FLOOR TRUSSES
S4.1 3/4" = 1'-0"



11 TYP INTERIOR BEARING WALL PARALLEL TO FLOOR TRUSSES
S4.1 3/4" = 1'-0"



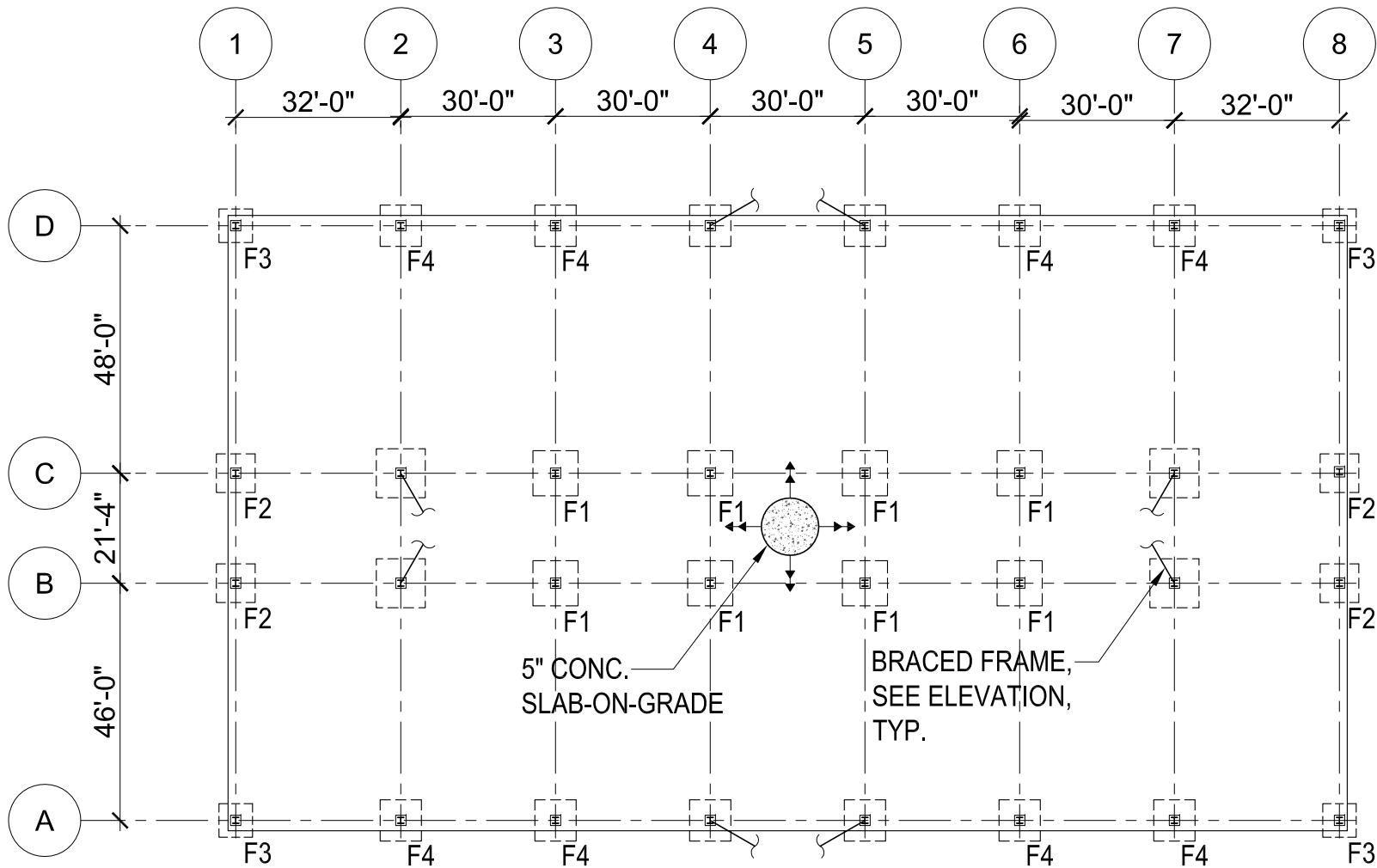
12 BALCONY SECTION
S4.1 3/4" = 1'-0"

Chapter 2

Office Building Design Drawings

This chapter provides the following design drawings prepared for the office building:

- Figure 1: Foundation Plan [Office: ASCE 7-05 Wind Design]
- Figure 2: Typical Floor Plan [Office: ASCE 7-05 Wind Design]
- Figure 3: Column Schedule [Office: ASCE 7-05 Wind Design]
- Figure 4: Braced Frame Elevation (N-S Direction) [Office: ASCE 7-05 Wind Design]
- Figure 5: Braced Frame Elevation (E-W Direction) [Office: ASCE 7-05 Wind Design]
- Figure 6: Foundation Plan [Office: 1999 SBC Seismic Design]
- Figure 7: Typical Floor Plan [Office: 1999 SBC Seismic Design]
- Figure 8: Column Schedule [Office: 1999 SBC Seismic Design]
- Figure 9: Braced Frame Elevation (N-S Direction) [Office: 1999 SBC Seismic Design]
- Figure 10: Braced Frame Elevation (E-W Direction) [Office: 1999 SBC Seismic Design]
- Figure 11: Foundation Plan [Office: ASCE 7-10 Seismic Design]
- Figure 12: Typical Floor Plan [Office: ASCE 7-10 Seismic Design]
- Figure 13: Column Schedule [Office: ASCE 7-10 Seismic Design]
- Figure 14: Braced Frame Elevation (N-S Direction) [Office: ASCE 7-10 Seismic Design]
- Figure 15: Braced Frame Elevation (E-W Direction) [Office: ASCE 7-10 Seismic Design]
- Figure 16: Brace Connection Detail [Office: 1999 SBC Seismic Design]
- Figure 17: Brace Connection Detail [Office: ASCE 7-10 Seismic Design]
- Figure 18: Typical Beam Connections all Designs
- Figure 19: Typical Collector Beam Moment Connection Detail



LEGEND:

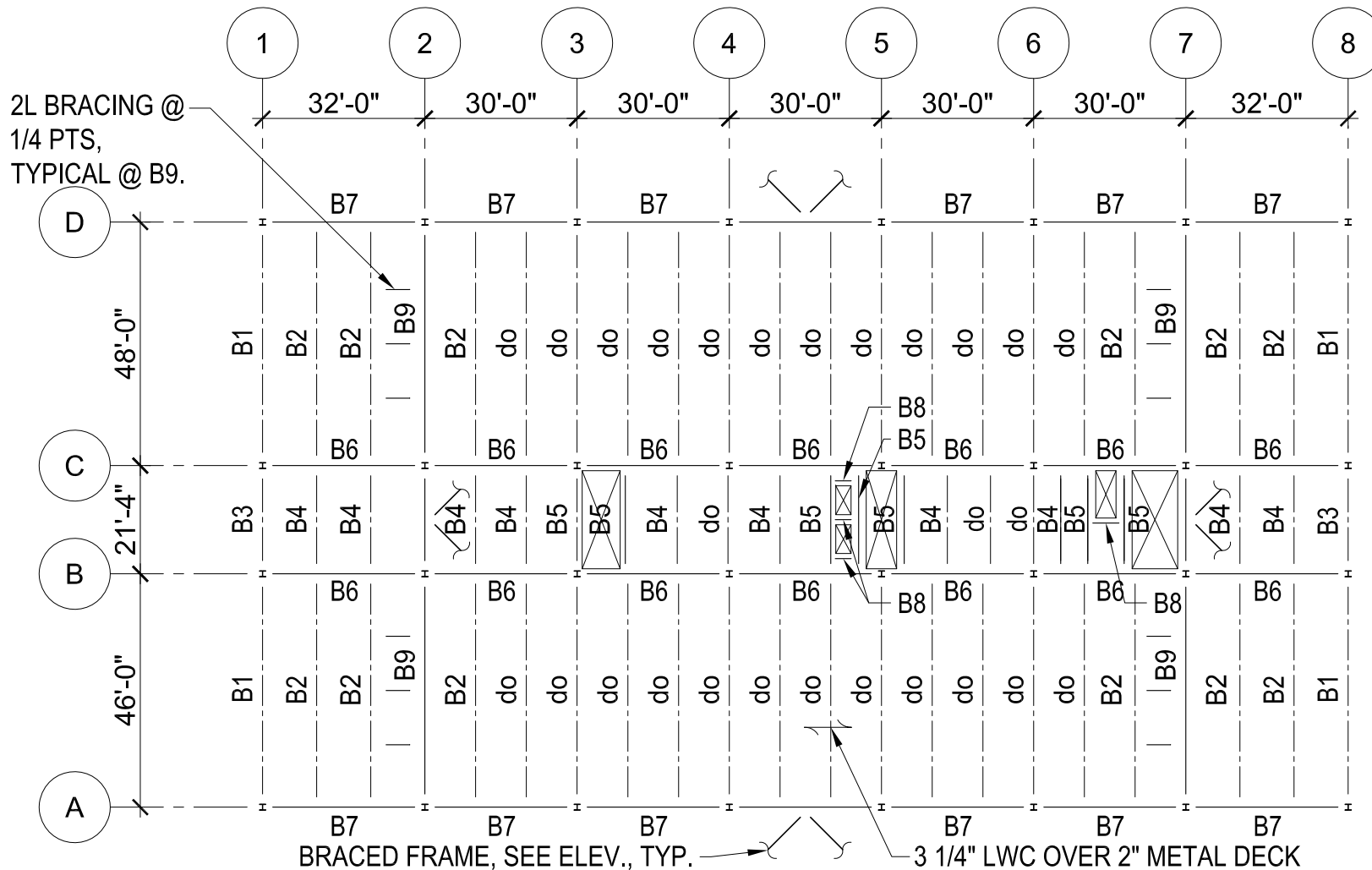
- F1 - 8'-9" SQUARE x 2'-6" THICK FTG. W/ (9) #8 E.W., BOT.
- F2 - 7'-6" SQUARE x 2'-6" THICK FTG. W/ (8) #7 E.W., BOT.
- F3 - 6'-6" SQUARE x 2'-6" THICK FTG. W/ (7) #6 E.W., BOT.
- F4 - 8'-0" SQUARE x 2'-6" THICK FTG. W/ (8) #7 E.W., BOT.

NOTE:

PROVIDE RAMMED AGGREGATE PIERS BENEATH ALL FOOTINGS

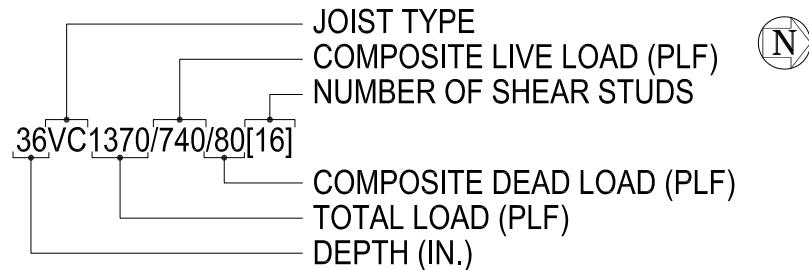


**FIGURE 1: FOUNDATION PLAN
OFFICE: ASCE 7-05 WIND DESIGN**



LEGEND:

- B1 - 36VC900/500/50[24]
- B2 - 36VC1270/640/80[24]
- B3 - 36VC900/500/50[16]
- B4 - 36VC1370/740/80[16]
- B5 - W16x26
- B6 - W24x62 [22]
- B7 - W21x50 [20]
- B8 - W12x14
- B9 - W21x48 [24]



**FIGURE 2: TYPICAL FLOOR PLAN
OFFICE: ASCE 7-05 WIND DESIGN**

COLUMN SCHEDULE		
		▼ ROOF ELEV. 54'-4"
W10x39	W10x33	▼ FOURTH FLOOR ELEV. 39'-8"
		▼ THIRD FLOOR ELEV. 26'-10"
W10x49	W10x39	▼ SECOND FLOOR ELEV. 14'-0"
		▼ GROUND FLOOR ELEV. 0'-0"
A2,3 D2,3 A6,7 D6,7 B3-6 C3-6	A1,8 D1,8 B1,8 C1,8	

FIGURE 3: COLUMN SCHEDULE
OFFICE: ASCE 7-05 WIND DESIGN

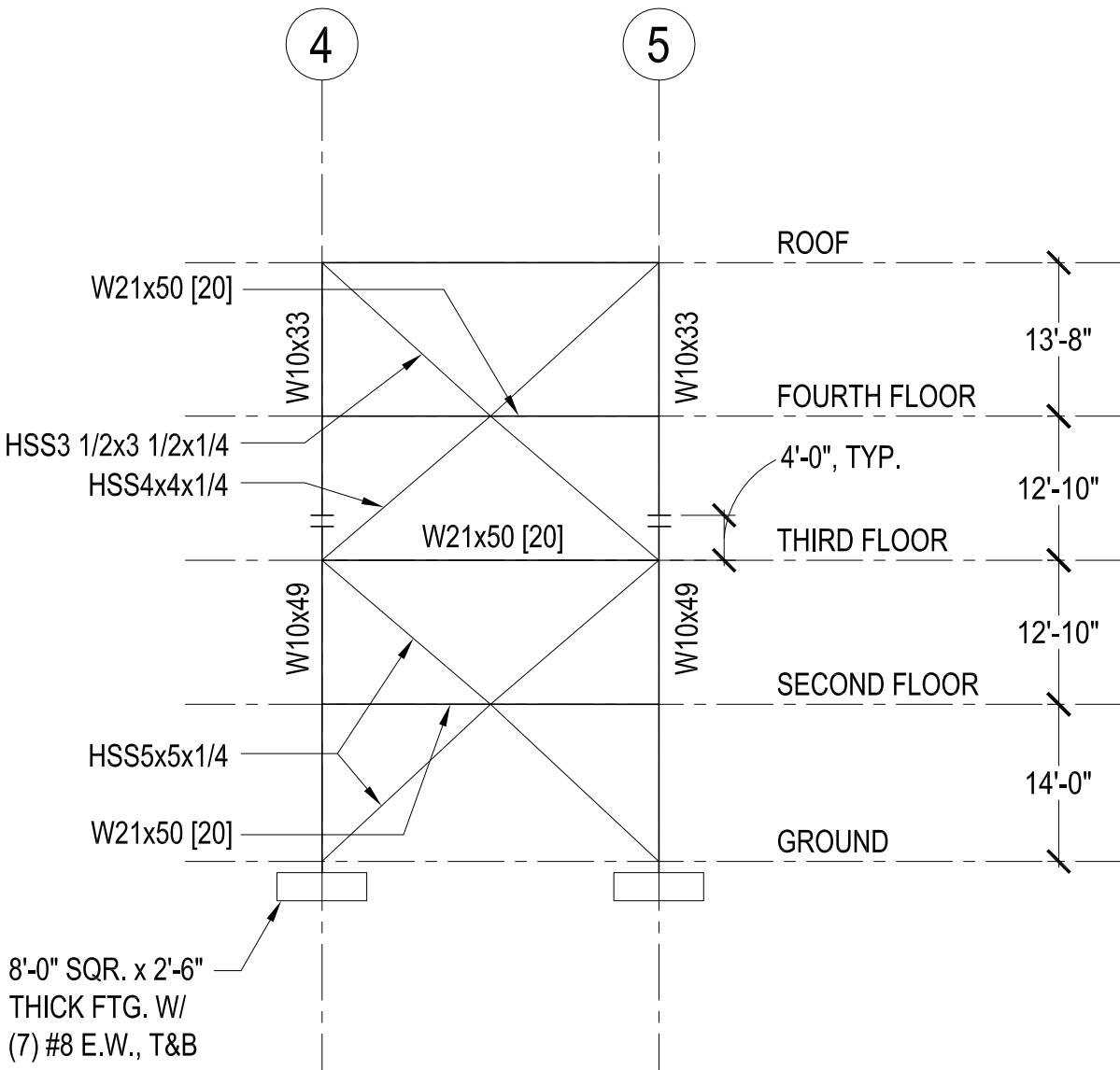


FIGURE 4: BRACED FRAME ELEVATION (N-S DIRECTION)
OFFICE: ASCE 7-05 WIND DESIGN

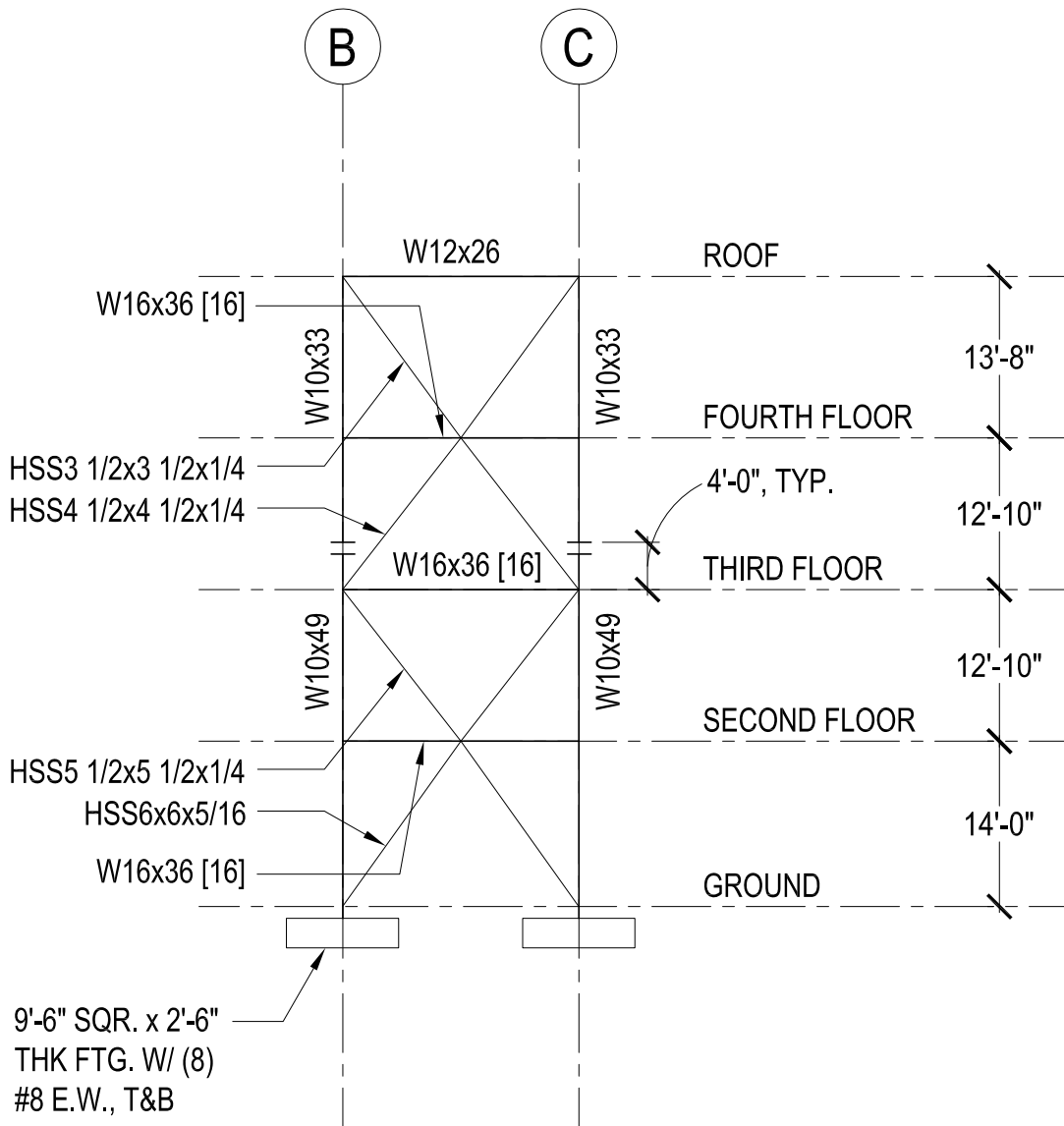
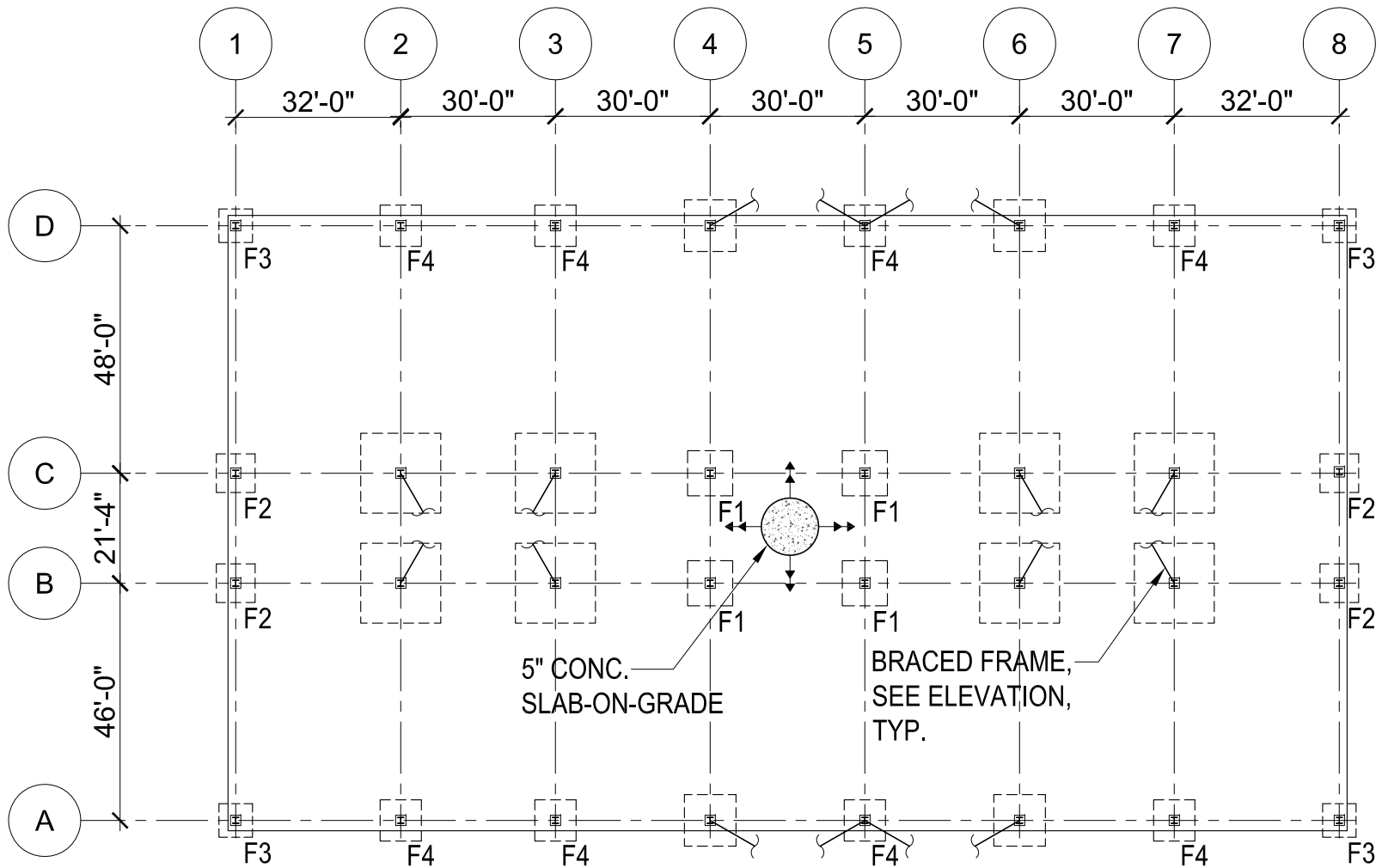


FIGURE 5: BRACED FRAME ELEVATION (E-W DIRECTION)
OFFICE: ASCE 7-05 WIND DESIGN



LEGEND:

- F1 - 8'-9" SQUARE x 2'-6" THICK FTG. W/ (9) #8 E.W., BOT.
- F2 - 7'-6" SQUARE x 2'-6" THICK FTG. W/ (8) #7 E.W., BOT.
- F3 - 6'-6" SQUARE x 2'-6" THICK FTG. W/ (7) #6 E.W., BOT.
- F4 - 8'-0" SQUARE x 2'-6" THICK FTG. W/ (8) #7 E.W., BOT.

NOTE:

PROVIDE RAMMED AGGREGATE PIERS BENEATH ALL FOOTINGS



FIGURE 06: FOUNDATION PLAN
OFFICE: 1999 SBC SEISMIC DESIGN

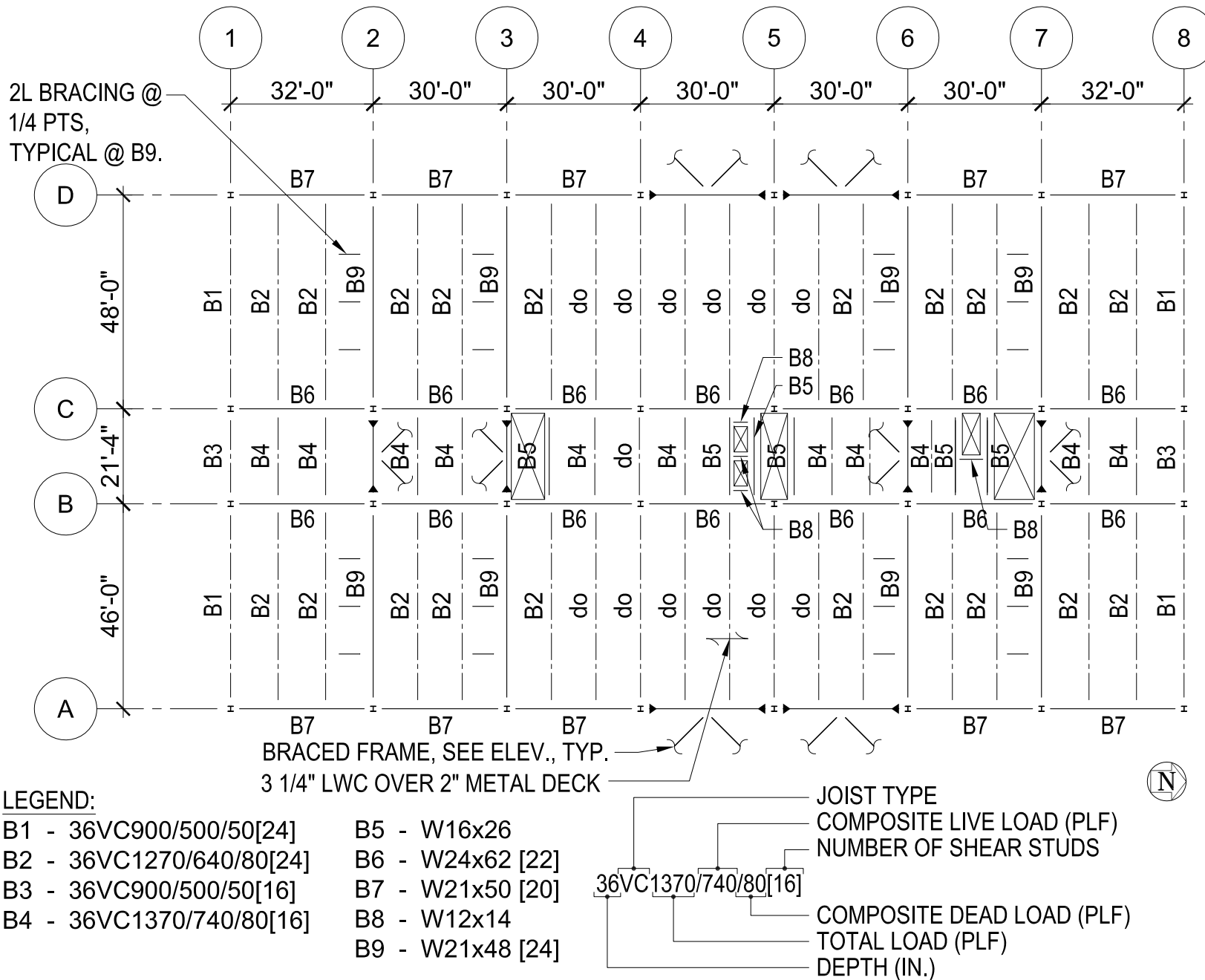


FIGURE 7: TYPICAL FLOOR PLAN
OFFICE: 1999 SBC SEISMIC DESIGN

COLUMN SCHEDULE		
		▼ ROOF ELEV. 54'-4"
W10x39	W10x33	▼ FOURTH FLOOR ELEV. 39'-8"
		▼ THIRD FLOOR ELEV. 26'-10"
W10x49	W10x39	▼ SECOND FLOOR ELEV. 14'-0"
		▼ GROUND FLOOR ELEV. 0'-0"
A2,3,7 D2,3,7 B4,5 C4,5	A1,8 D1,8 B1,8 C1,8	

FIGURE 8: COLUMN SCHEDULE
OFFICE: 1999 SBC SEISMIC DESIGN

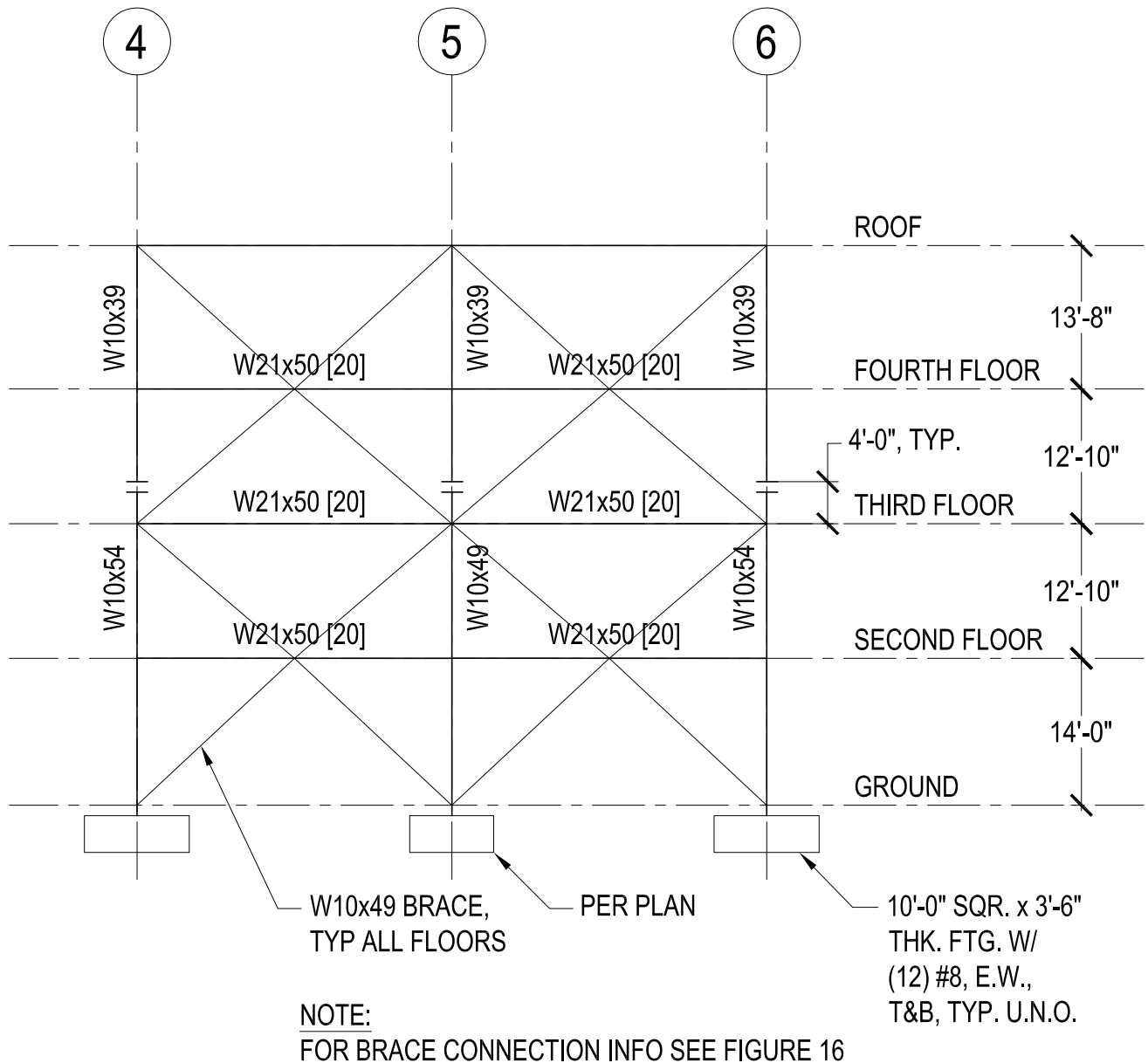


FIGURE 9: BRACED FRAME ELEVATION (N-S DIRECTION)
OFFICE: 1999 SBC SEISMIC DESIGN

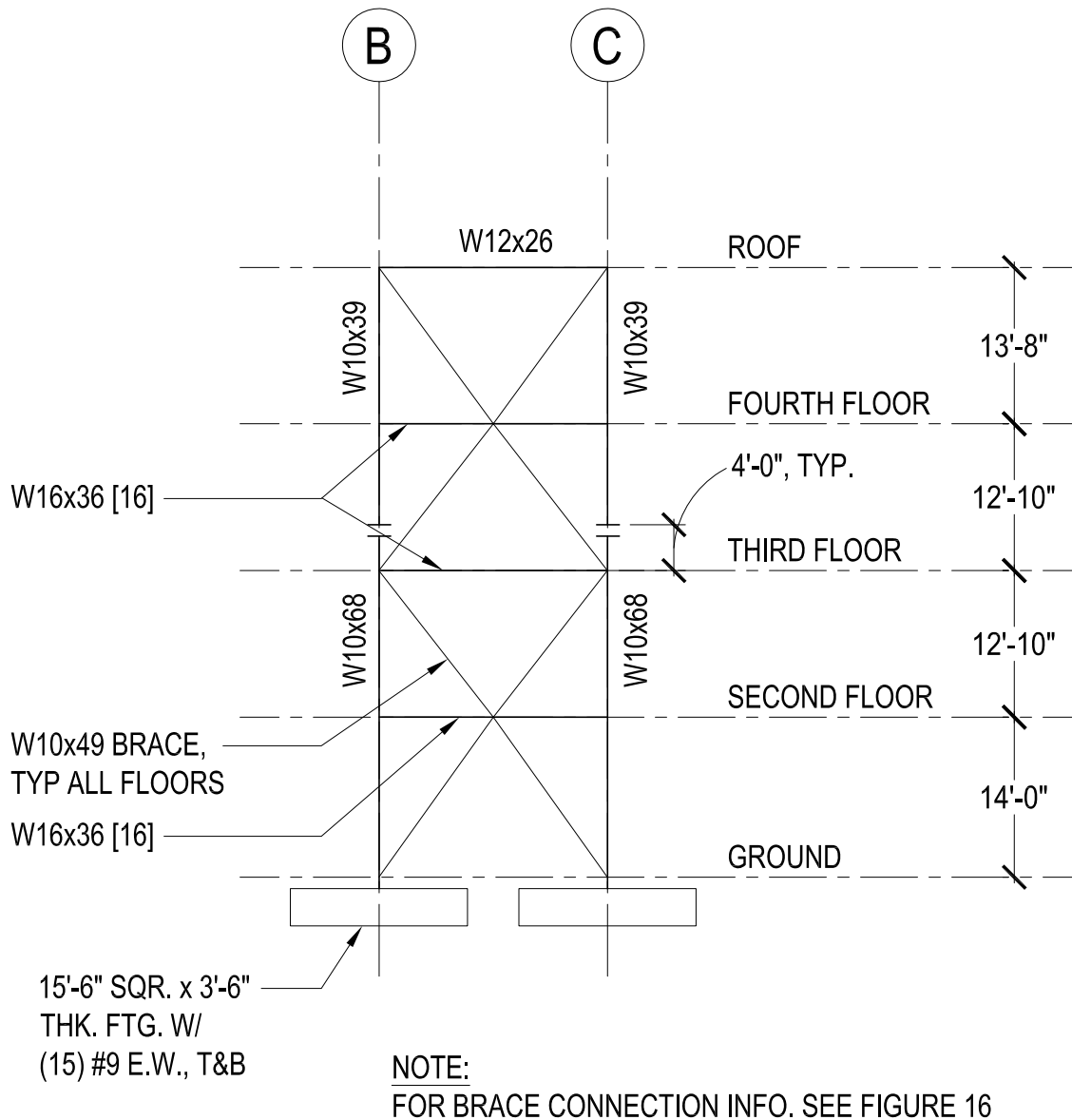
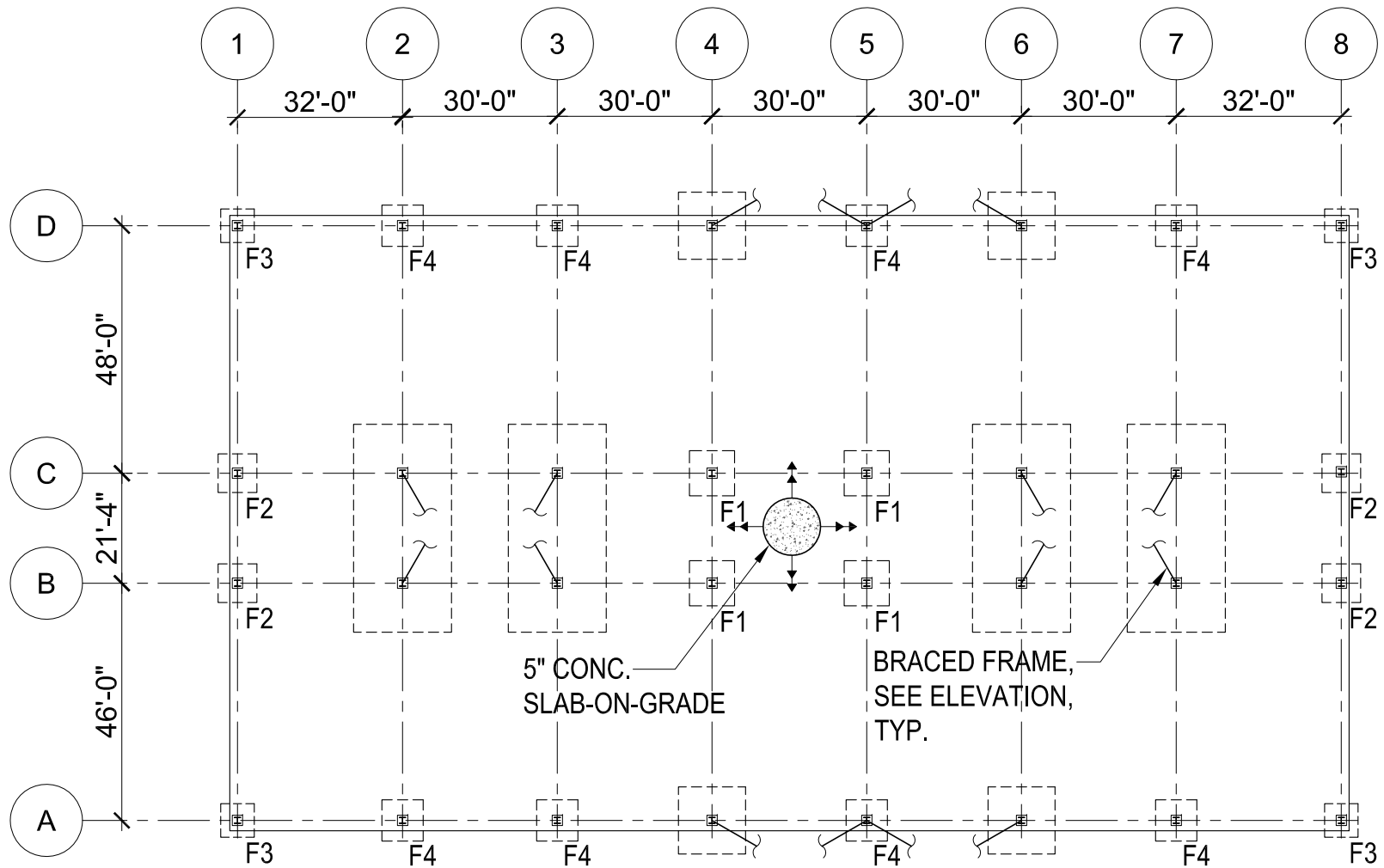


FIGURE 10: BRACED FRAME ELEVATION (E-W DIRECTION)
OFFICE: 1999 SBC SEISMIC DESIGN



LEGEND:

- F1 - 8'-9" SQUARE x 2'-6" THICK FTG. W/ (9) #8 E.W., BOT.
- F2 - 7'-6" SQUARE x 2'-6" THICK FTG. W/ (8) #7 E.W., BOT.
- F3 - 6'-6" SQUARE x 2'-6" THICK FTG. W/ (7) #6 E.W., BOT.
- F4 - 8'-0" SQUARE x 2'-6" THICK FTG. W/ (8) #7 E.W., BOT.

NOTE:

PROVIDE RAMMED AGGREGATE PIERS BENEATH ALL FOOTINGS



**FIGURE 11: FOUNDATION PLAN
OFFICE: ASCE 7-10 SEISMIC DESIGN**

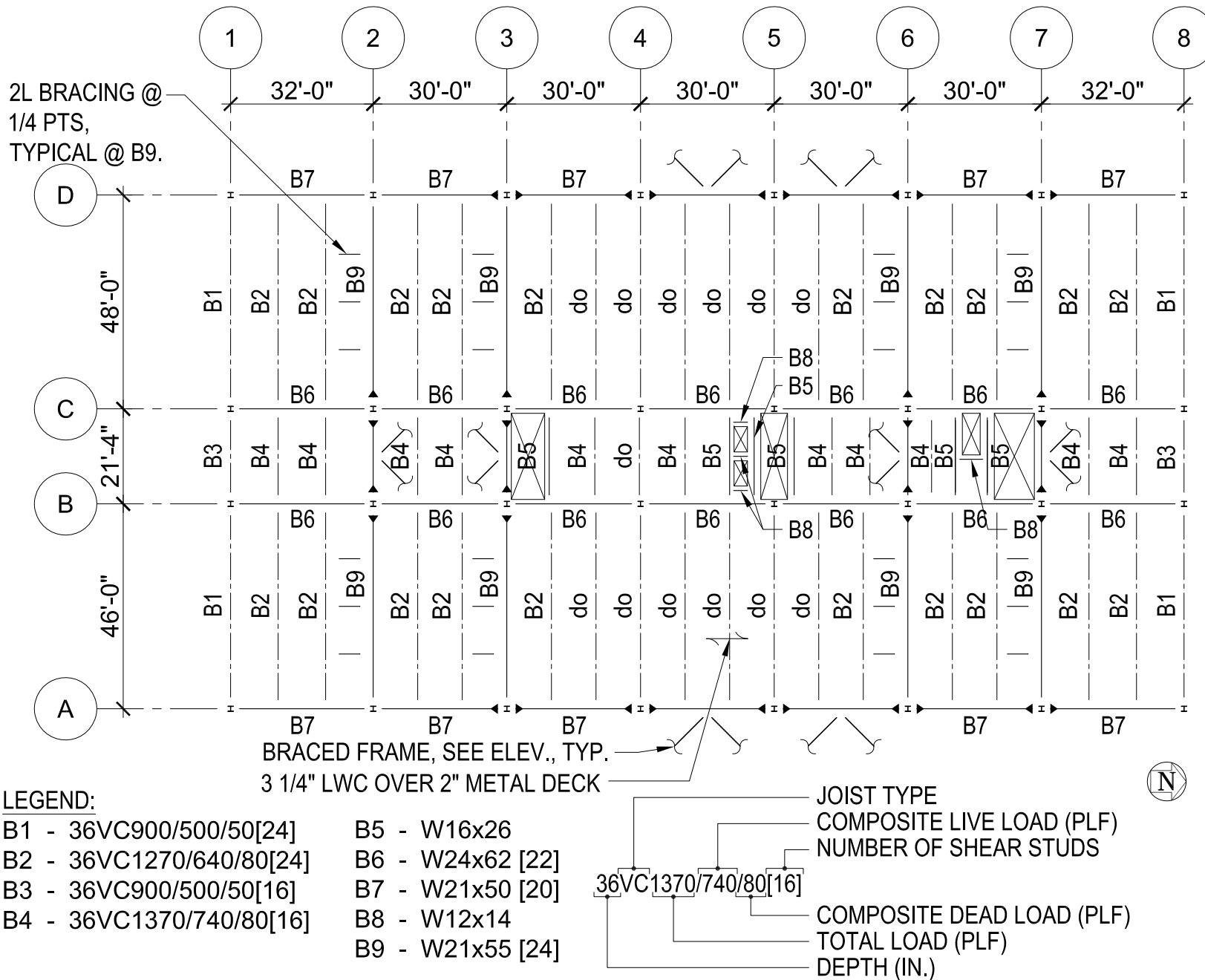



FIGURE 12: TYPICAL FLOOR PLAN
OFFICE: ASCE 7-10 SEISMIC DESIGN

COLUMN SCHEDULE		
		▼ ROOF ELEV. 54'-4"
W10x39	W10x33	▼ FOURTH FLOOR ELEV. 39'-8"
		▼ THIRD FLOOR ELEV. 26'-10"
W10x49	W10x39	▼ SECOND FLOOR ELEV. 14'-0"
		▼ GROUND FLOOR ELEV. 0'-0"
A2,3,7 D2,3,7 B4,5 C4,5	A1,8 D1,8 B1,8 C1,8	

4'-0" 


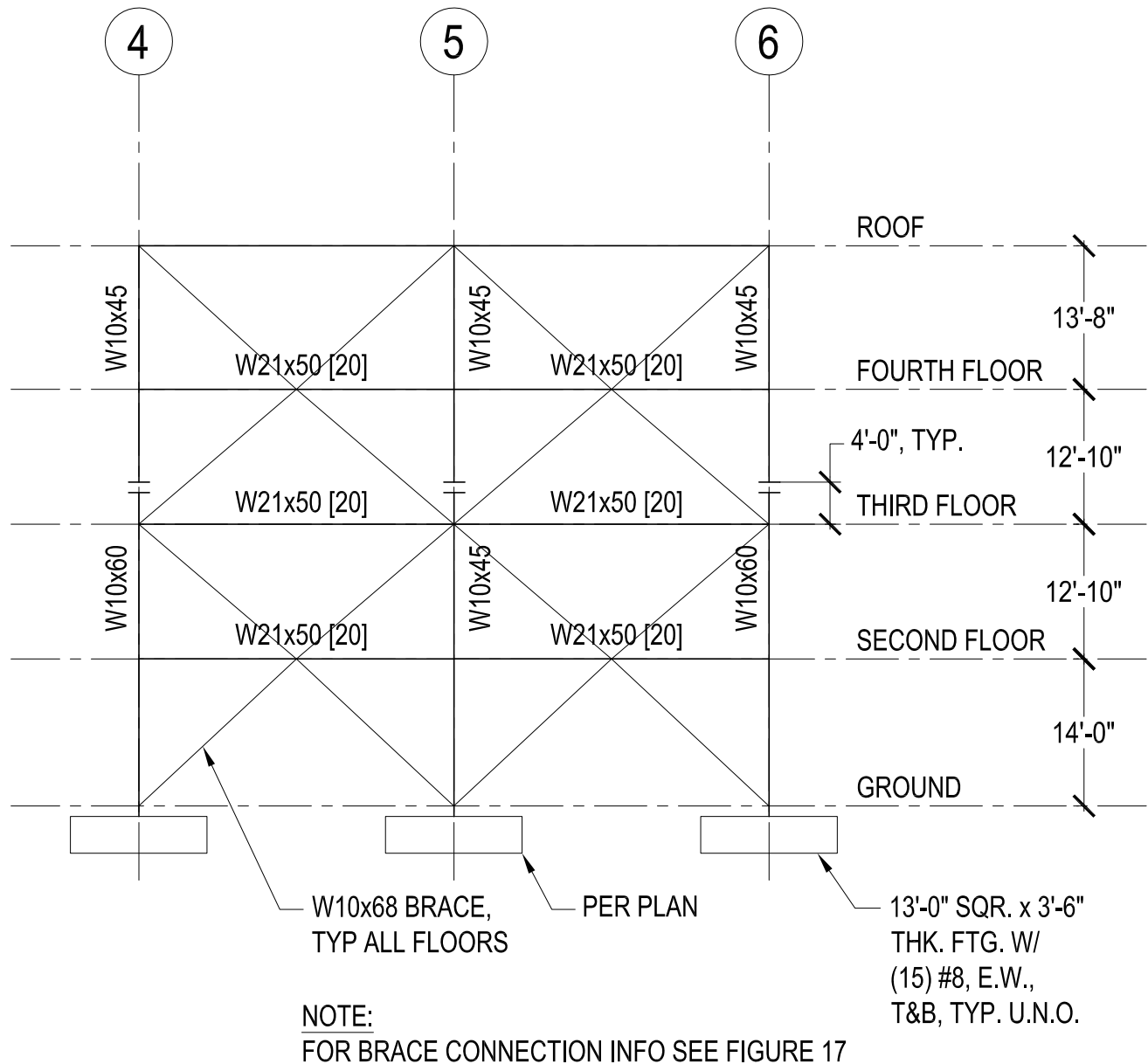
1'-0" 

FIGURE 13: COLUMN SCHEDULE
OFFICE: ASCE 7-10 SEISMIC DESIGN



**FIGURE 14: BRACED FRAME ELEVATION (N-S DIRECTION)
OFFICE: ASCE 7-10 SEISMIC DESIGN**

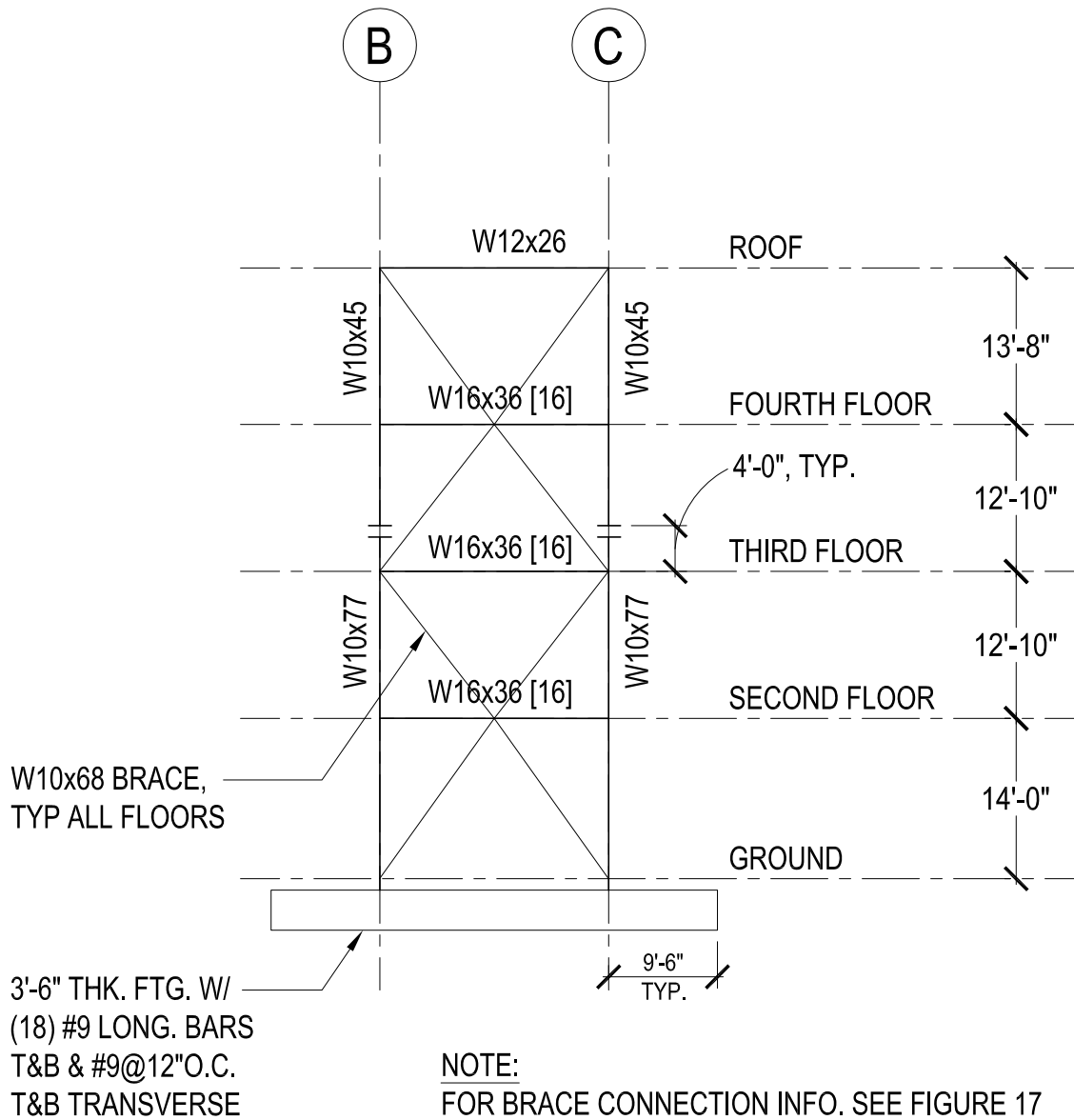
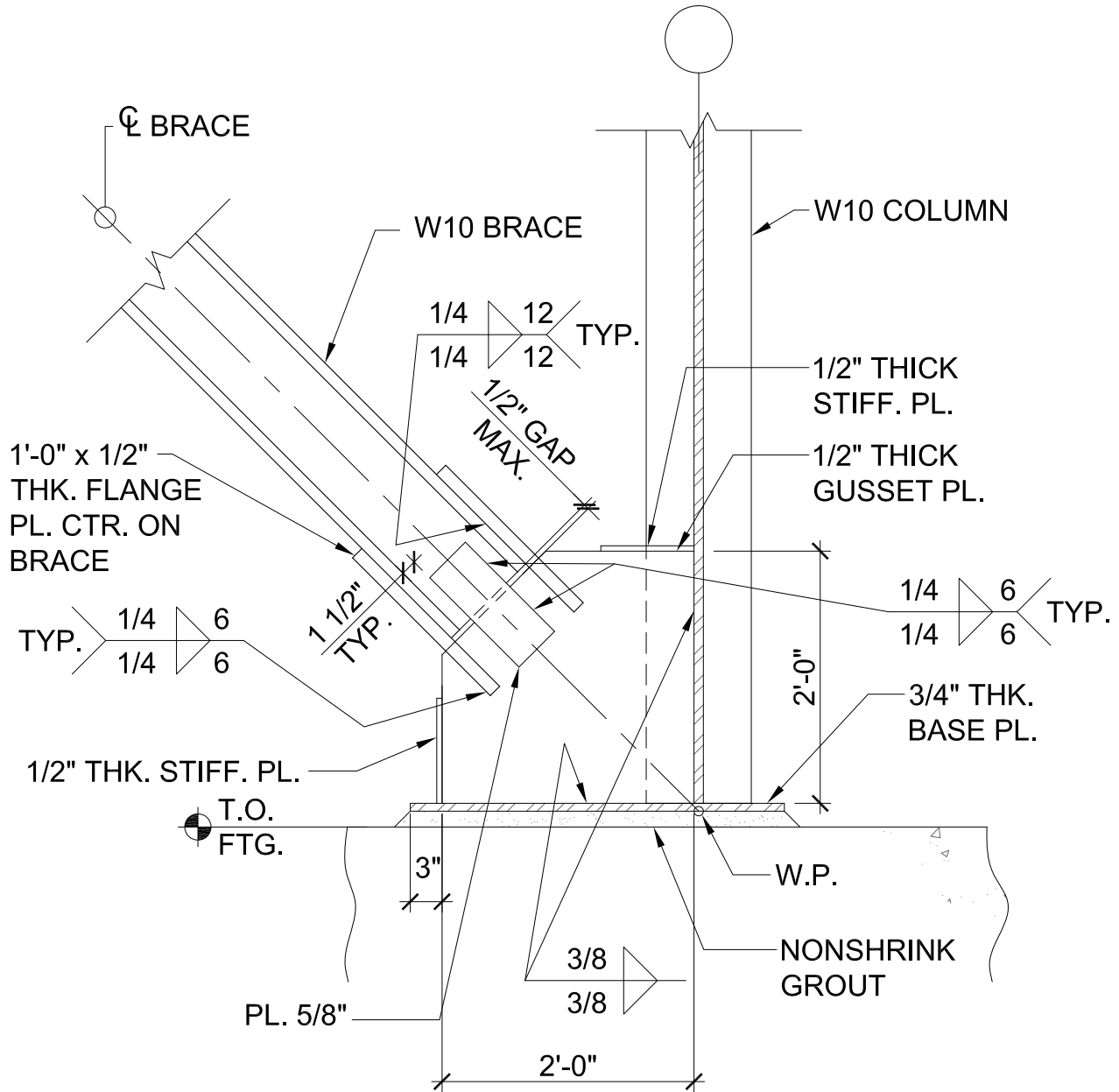
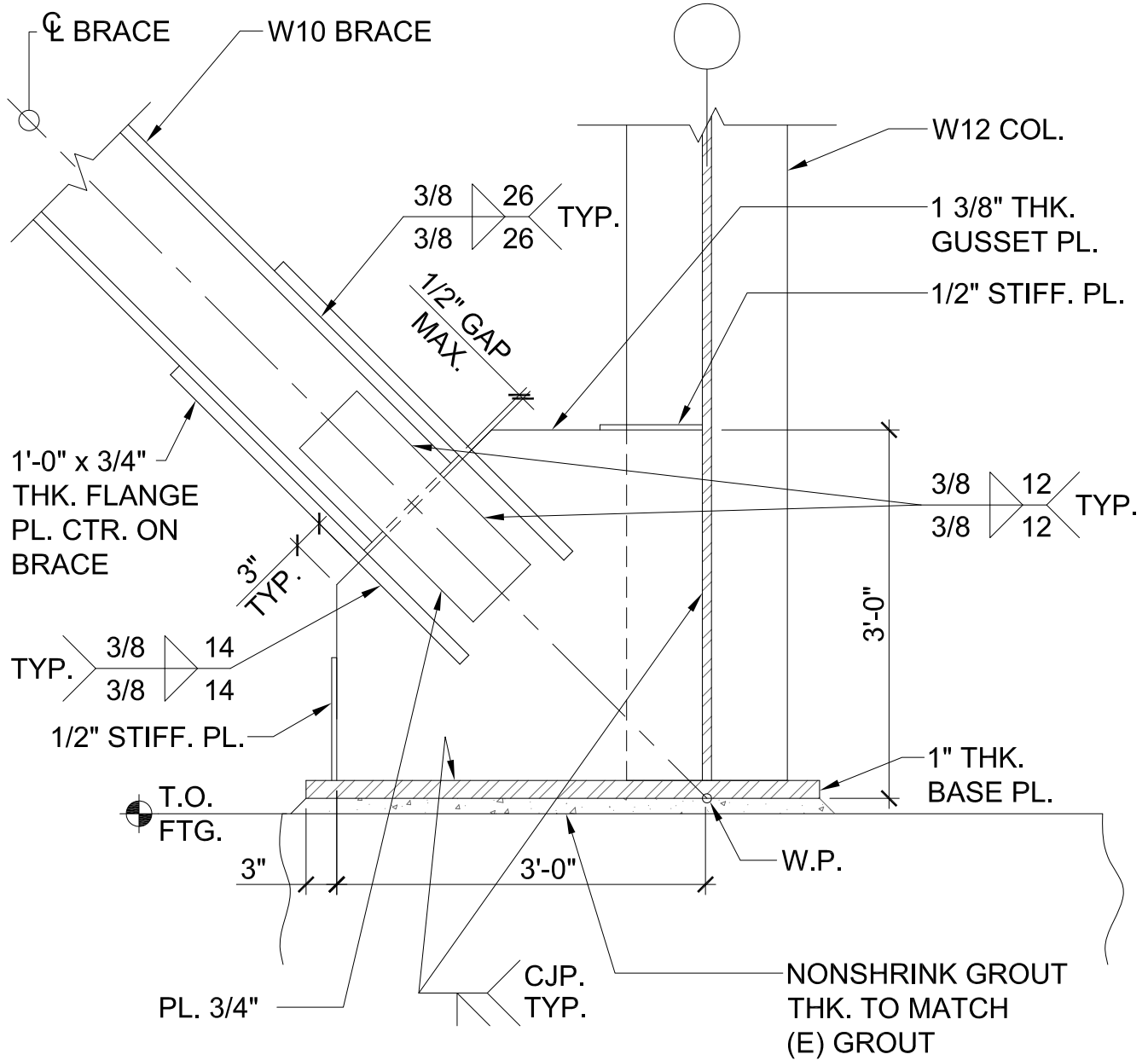


FIGURE 15: BRACED FRAME ELEVATION (E-W DIRECTION)
OFFICE: ASCE 7-10 SEISMIC DESIGN



NOTE
 ALL PLATES ASTM A572 GR. 50 STEEL

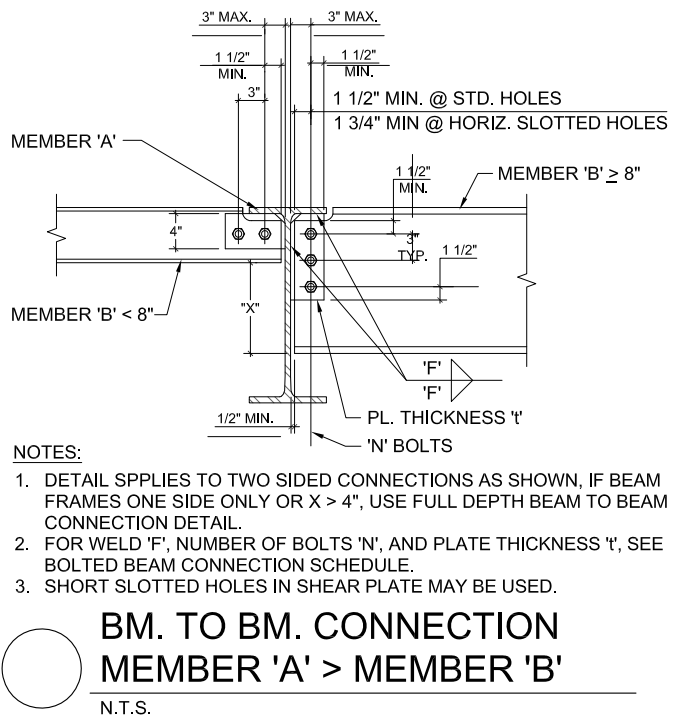
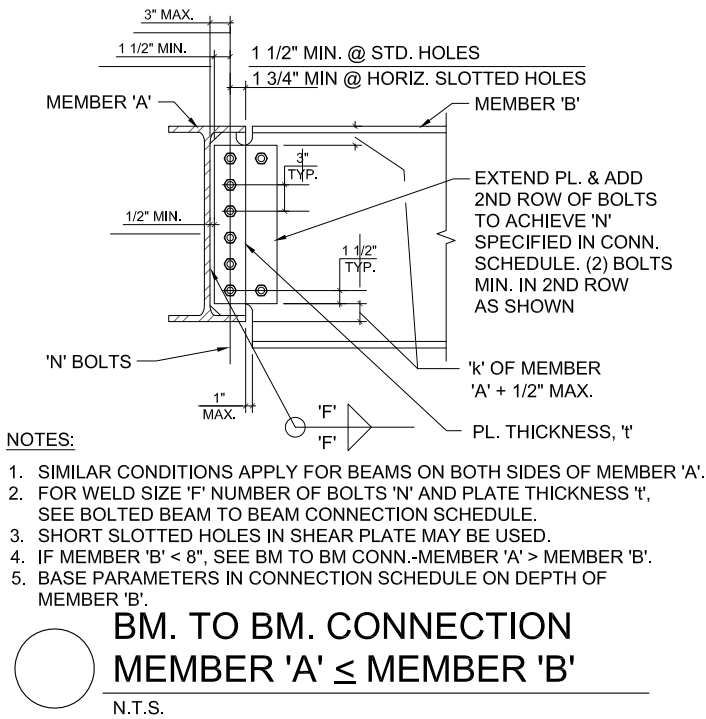
FIGURE 16: BRACE CONNECTION
 OFFICE: 1999 SBC SEISMIC DESIGN



NOTE:

1. ALL PLATES ASTM A572 GR. 50 STEEL.

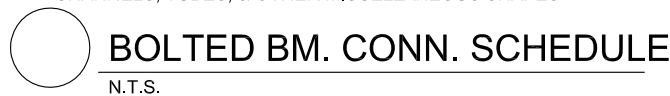
**FIGURE 17: BRACE CONNECTION
OFFICE: ASCE 7-10 SEISMIC DESIGN**



BEAM CONNECTION SCHEDULE				
NOMINAL MEMBER DEPTH	SHEAR PL. THICKNESS ('t')	FASTENERS A325-X U.O.N. ('N')	WELD SIZE ('F')	REMARKS
LESS THAN 12"	3/8"	(2) 7/8"Ø	5/16"	
12" THRU 14"	3/8"	(3) 7/8"Ø	5/16"	
16" THRU 18"	1/2"	(4) 7/8"Ø	3/8"	
21"	1/2"	(5) 7/8"Ø	3/8"	
24"	1/2"	(6) 7/8"Ø	3/8"	
27"	1/2"	(7) 7/8"Ø	3/8"	
30"	1/2"	(8) 7/8"Ø	3/8"	
33"	1/2"	(9) 7/8"Ø	3/8"	
36"	1/2"	(10) 7/8"Ø	3/8"	
40"	1/2"	(11) 7/8"Ø	3/8"	

NOTES:

- BOLT HOLES TO BE STD. HOLES 1/16" GREATER THAN BOLT DIAMETER. SHORT SLOTTED HOLES IN SHEAR PLATE MAY BE USED ONLY WHERE NOTED.
- BOLTS TO BE FULLY PRETENSIONED W/ HARDENED WASHERS, U.O.N.
- SCHEDULE BASED ON NOMINAL DEPTH OF WIDE FLANGE BEAMS, CHANNELS, TUBES, & OTHER MISCELLANEOUS SHAPES.



**FIGURE 18: TYPICAL BEAM CONNECTIONS
ALL DESIGNS**

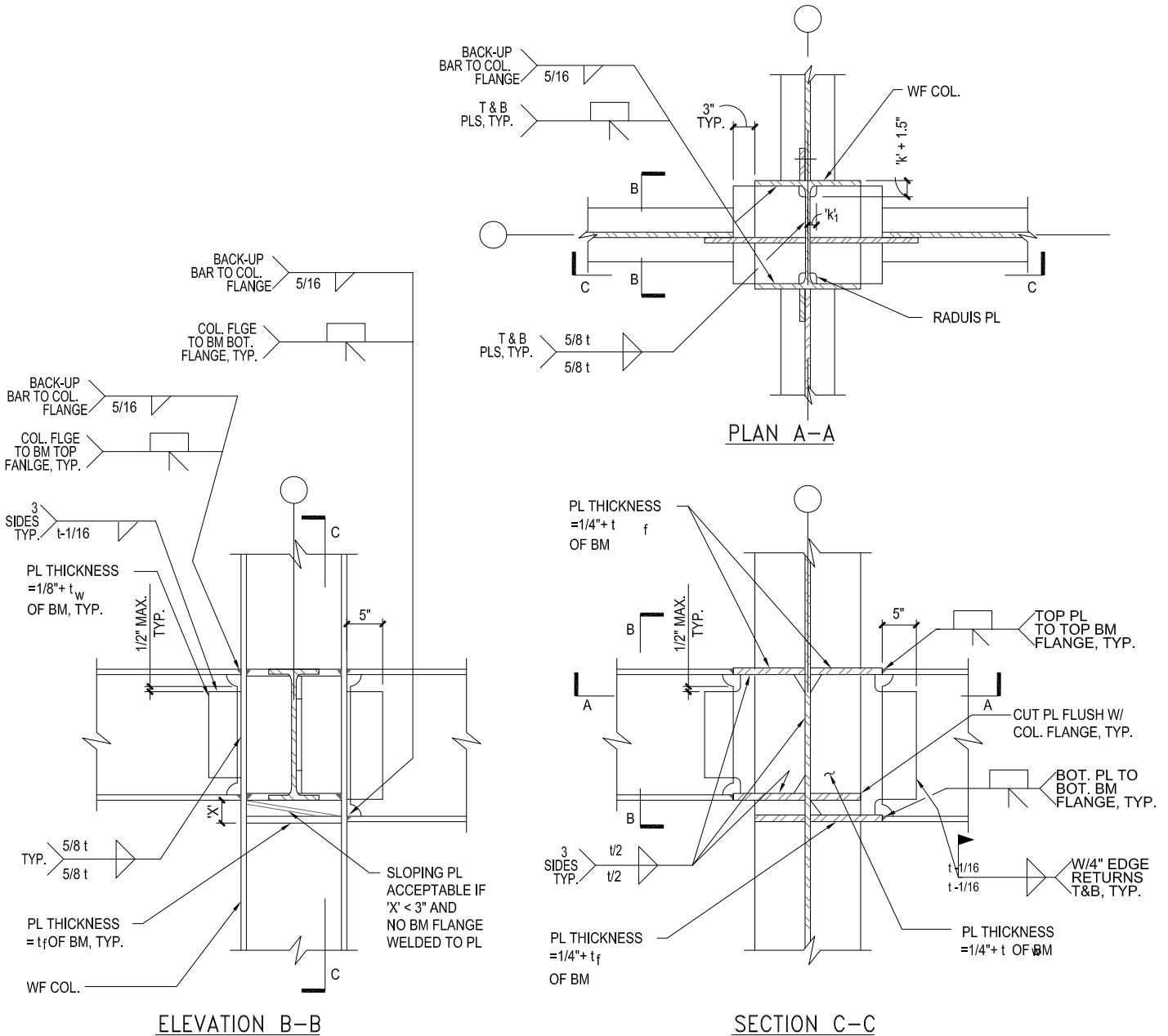


FIGURE 19:
TYPICAL COLLECTOR BEAM MOMENT CONNECTION DETAIL

Retail Building Design Drawings

This chapter provides the following design drawings prepared for the retail building:

- S1.1 General Notes
- S.1.2 General Notes
- S.1.3 Typical Details
- S.1.4 Typical Details
- S.2.1 Foundation Plan
- S.2.2 Roof Framing Plan
- S.4.1 Panel Elevations
- S.4.2 Panel Elevations & Sections
- S.4.3 Panel Reinforcing Elevations
- S.4.4 Panel Details
- S.5.1 Details
- S.5.2 Details

GENERAL NOTES

APPLICABLE TO ALL DRAWINGS UNLESS NOTED OR SHOWN OTHERWISE

STRUCTURAL STEEL

- Fabrication, erection and materials shall conform with the AISC Specification for Structural Steel Buildings, the AISC Seismic Provisions for Structural Steel Buildings, and the International Building Code, latest editions.
- Structural Steel wide flange shapes shall conform with ASTM A992. All other Structural Steel rolled shapes (channels, angles, etc) and plates shall conform with ASTM A36, uno.
- Steel Pipe shall conform to ASTM A53, Types E or S, Grade B.
- All Hollow Structural Sections (HSS) shall conform to ASTM A500, Grade B.
- All structural steel shall receive a minimum of one shop coat of red primer paint. Do not paint areas to be field welded, fireprotected, galvanized, to receive slip-critical high strength bolts, or to be embedded in concrete. Provide additional painting as noted in the specifications.
- All structural steel shall be erected plumb and true to line. Temporary bracing shall be installed and shall be left in place until other means are provided to adequately brace the structure. Contractor responsible for reviewing all base plate and support conditions during erection and bracing as required. See AISC and OSHA requirements.
- Place non-shrink grout under all base plates before adding vertical load.
- Structural steel below grade shall have 3 inches minimum of concrete cover.
- Bolted connections shall consist of unfinished bolts conforming to ASTM A307 unless noted otherwise. Where high strength bolts are indicated, bolts conforming to ASTM A325 or ASTM A490 as needed shall be provided. Anchor rods cast in concrete or masonry shall be headed bolts with cut threads, full diameter conforming to ASTM F1554 gr. 36, 35 (weldable per SI Supplementary Requirements), or 105 as indicated on drawings. All bolted connections and base plates shall have standard cut washers unless noted otherwise. Washers for base plates shall conform to ASTM F444 unless noted otherwise, and shall be placed at top and bottom of plate.
- "Slip-critical" bolted connections:
 - "Slip-critical" connections (A325SC design values with special inspection) are required at all braced frame connections, at all connections along chord lines and drag lines (as noted on plans), and uno, at all bolts in oversized or slotted holes.
 - The special inspector must be present during installation and tightening operation of "slip-critical" connections.
- Provide 1/2" diameter stitch bolts and ring fills, spaced at not more than 2'-0" on center for all double angle members.
- At wood to steel parallel contact, bolt with 1/2" diameter bolts at maximum 24" oc.
- Holes for unfinished bolts shall be of the same nominal diameter of the bolt plus 1/16". Use standard AISC gage and pitch for bolts except as noted otherwise.
- Welding shall be done by the electric arc process in accordance with American Welding Society Standards, using only certified welders. All groove welds shall have complete penetration unless noted otherwise. All exposed welds shall be ground smooth. All electrodes for welding shall comply with AWS code, ETO series minimum.
- Weld lengths called for on plans are the net effective lengths required.
- Minimum fillet welds:
 - 3/16" @ 1' < 1/2'
 - 1/4" @ 1' < 3/4'
 - 5/16" @ 1' > 3/4'
- Welding Procedure Specifications (WPS) for shop and field prequalified weld joints and weld joints qualified by test shall be prepared for review prior to fabrication. All welding procedures such as base metals, welding processes, filler metals and joint details that meet the requirements of AWS D1.1 Section 5.1 shall be considered as prequalified. Any change or substitution that is beyond the range or tolerance or requirements for prequalification shall be qualified by test per AWS D1.1 Section 5 part B. Qualification testing is required when the depth of a partial penetration or complete penetration weld is 2" or greater.
- For nondestructive testing of welded connections excluding primary members of moment resisting frames:
 - Welded connections shall be tested by nondestructive methods for compliance with AISC J1, and job specifications. Ultrasonic Testing shall be in accordance with AWS D1.1, ASTM E164 and ASME Section V. Radiography shall be in accordance with AWS D1.1, ASTM E94 and E99, and ASME Section V. This testing shall be part of the special inspection requirements of Section 104.3 performed by an approved independent testing laboratory as follows:
 - Base metal thicker than 1 inch when subject to through thickness weld shrinkage strains.
 - All complete joint penetration groove or butt welds.
 - All partial joint penetration groove welds when used in column splices.
 - Any material discontinuities shall be accepted or rejected on the basis of defect rating in accordance with the (larger reflector) criteria of AISC J2.

COLD FORMED METAL FRAMING

- Galvanized sheet steel shall conform to ASTM A653, structural quality, with a minimum yield strength of 33 ksi for 43 mils (B ga) and thinner and ASTM A653, structural quality, with a minimum yield strength of 50 ksi for 54 mils (6 ga) and thicker. Hot-rolled carbon sheet and strip steel used in the fabrication of cold-formed members shall conform to ASTM A101 with rust inhibitive coating.
- Metal studs and joists shall be of size and thickness shown on drawings with the minimum effective section properties shown in the table(s).
- Minimum thickness shown in table for the thickness specified represents 95% of design thickness per 2007 AISI-NAS W1204 supplement.
- Metal framing shall be per ICC-ES No. 4435. Contractor shall be responsible for obtaining agency approval for any substitutions.
- Welding shall be in accordance with AWS D1.3 "Structural Welding Code-Sheet Steel". Welders shall be AWS certified. Welding Rods: E60XX series. All field welding shall have special inspection.
- Typical metal track shall be same gauge as studs which it supports, unpunched, with a flange width of 1 1/4 inches and a depth equal to the nominal stud plus 2 times the track thickness plus the radius. Nested tracks shall be fabricated to fill the outside of a typical metal track. Deep leg tracks shall have a minimum flange width of 2 inches. Use slotted slip tracks where specified. See sections and typical metal stud details.
- Metal studs shall not have punch-outs closer than 10" from the end of the stud or at intermediate lateral bearing points of studs.

COLD FORMED METAL FRAMING PROPERTIES - S9MA C STUDS & JOISTS - S162 SECTIONS 2,3

Gauge/Mil	20/33		18/43		16/54		14/68		S studs & Joists
Designation	S162-33	S162-43	S162-54	S162-68	S162-33	S162-43	S162-54	S162-68	
Min Thickness	0.0329	0.0428	0.0538	0.0677					
Depth "D"	Ix	Sx	Ix	Sx	Ix	Sx	Ix	Sx	
	2 1/2"	0.235	0.180	0.302	0.240	0.370	0.288	0.450	0.357
3 5/8"	0.551	0.292	0.710	0.389	0.873	0.468	1.069	0.584	
4"	0.692	0.332	0.892	0.443	1.098	0.533	1.346	0.666	
6"	1.793	0.577	2.316	0.767	2.860	0.927	3.525	1.164	
8"	3.582	0.757	4.633	1.158	5.736	1.397	7.089	1.757	
10"	-	-	8.025	1.414	9.950	1.712	12.325	2.465	
12"	-	-	-	-	15.730	2.024	19.518	2.953	

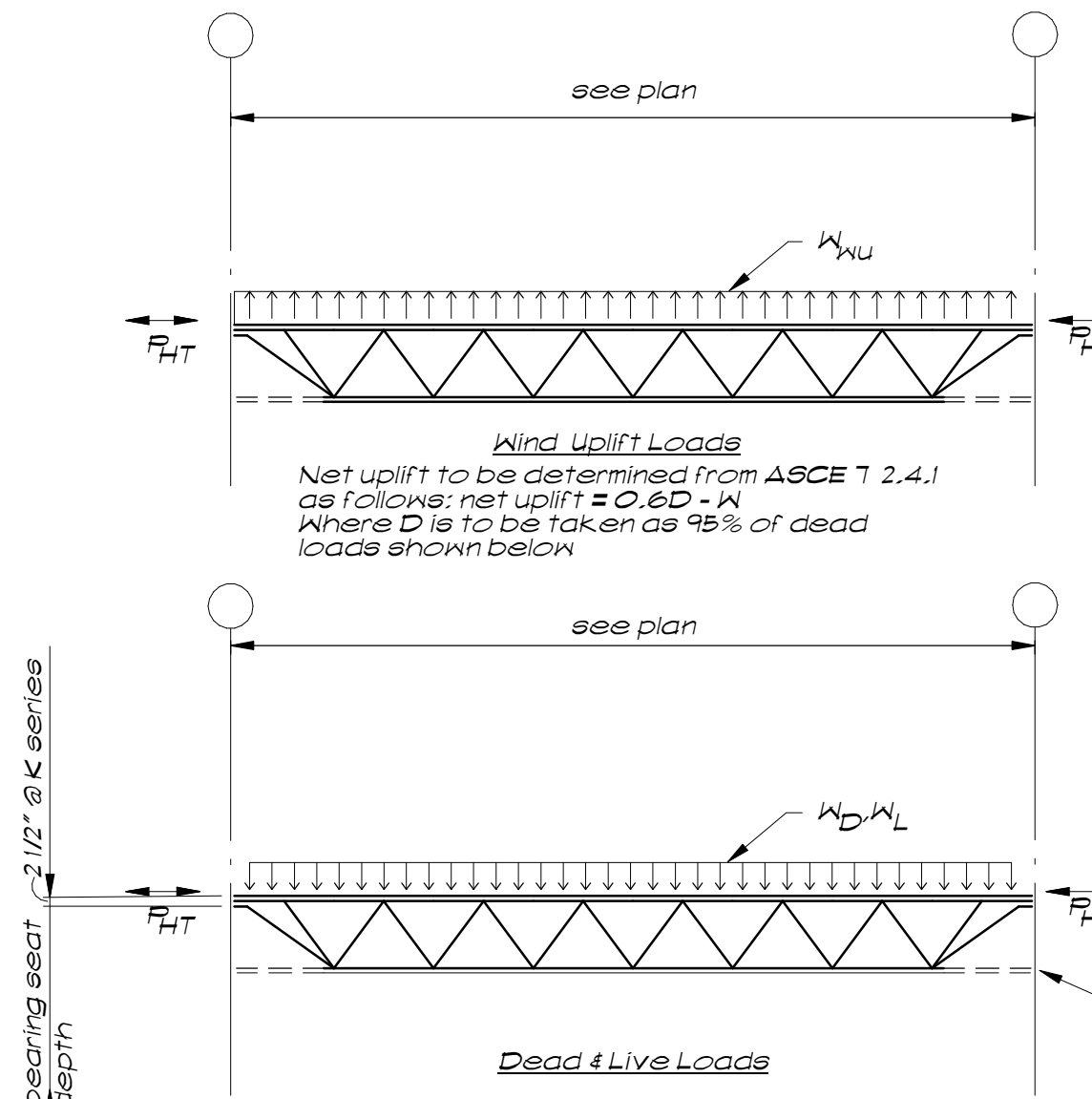
- For complete section designations in accordance with S9MA standards, add member depth to front of indicated designation. Example: For 3 5/8" member with gauge/mil of 18/43, the full designation is 362562-43.
- Section properties shown are effective properties conforming to AISI A.7.2 per S9MA standards for material strength noted below.
- Provide 33 ksi min material for 18/43 & listed sections, provide 50 ksi material for 16/54 & heavier sections.

STEEL JOIST AND JOIST GIRDER DESIGN CRITERIA

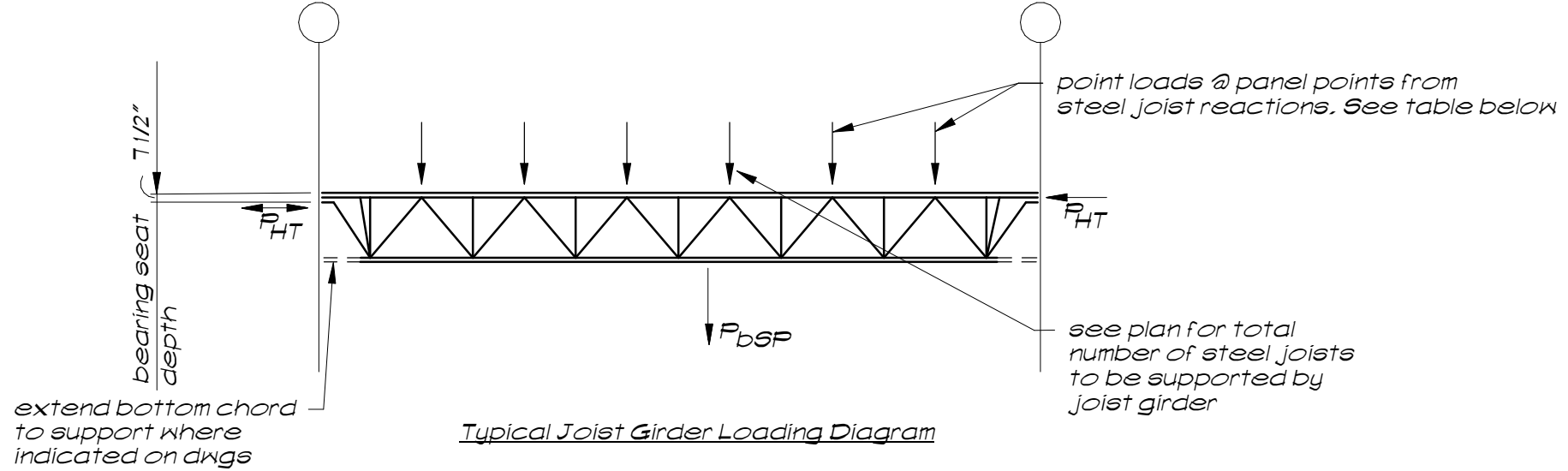
- All steel joists, joist girders, accessories and connections shall comply with latest edition of IBC & ASCE 7 & Steel Joist Institute standards except that the field welding shall comply with American Welding Society standards. All welding shall be performed by qualified certified welders.
- In accordance with IBC 2206.3, the steel joist manufacturer shall submit design calculations bearing the seal and signature of a registered California Civil Engineer. The maximum demand/capacity ratio for all design calculations shall be 1.00. Design calculations shall include a statement noting that the joist design complies with all criteria provided in the approved construction documents and has been based on configurations details, spacing, etc., as shown in the steel joist manufacturer's steel joist placement plans.
- In accordance with IBC 2206.5 & 1104.2.2, at the completion of fabrication, the steel joist manufacturer shall submit a certificate of compliance stating that the work was performed in accordance with the approved construction documents and with SJI standard specifications.
- Maximum un-factored live load deflections shall not exceed L/360 for floors and roof members supporting plaster or L/240 for other roof members. Maximum un-factored total load deflection shall not exceed L/180. Calculated member deflections shall not be reduced by camber.
- Camber all roof joists as indicated in SJI code of standard practice. Camber all floor joists as required to achieve a flat floor. Minimum floor joist camber should equal 100% of the un-factored non-composite dead load.
- See Roof Framing Plans, Mechanical Plans, etc for locations and weights of supported equipment. General Contractor shall coordinate the weight and location of all supported equipment and supply this information to the steel joist manufacturer for the design of the trusses. Provide web members as required to support point loads, design truss chords for bending between panel points or provide supplemental struts as in Coordinate equipment loads with the mechanical contractor prior to fabrication.
- Bridging, welding and all accessories req'd to connect steel joists and girders shall be furnished by the Steel Joist Mfr. Add'l bridging req'd @ uplift condition shall be designed & provided by Steel Joist Mfr. Bridging shall not attach to wood panelized roof framing.
- Provide truss panel point to align with columns and blocking beams as shown on plans and sections.
- Location of all erection aids req'd by Steel Joist Mfr shall be coordinated to avoid conflicts with Structural, Architectural & MEP elements.
- Fire sprinkler shop drawings shall be submitted & reviewed prior to commencing steel joist design.
- For steel joist and joist girder loading information see Steel Joist & Joist Girder Loading Diagram Notes.

STEEL JOIST AND JOIST GIRDER LOADING DIAGRAM NOTES:

- Steel joist design shall be based on Allowable Stress Design (ASD) & shall utilize the appropriate load combinations provided in ASCE 7 chapter 2. Increases in allowable stress based on duration of loading shall not be used. Where steel joists are required to resist seismic forces, the additional load combinations of ASCE 7 12.4.2.3 and 12.4.3.2 shall also apply.
- All loads are un-factored u.n.o. All seismic loads are E (not E/1.4) level. All seismic drag loads are Emh (i.e. 0.5E).
- The joists specified on plan are based on option #1 approach as noted in the SJI code of standard practice, section 6. Per section 6 "Joist manufacturer shall design joists for additional loads as shown". See plan and loading diagrams for additional loading conditions. The additional loads may require the use of joists that have greater capacity than the typical joist shown on the plans and/or additional joists may be required to accommodate the additional loads.
- Uniform Loads:
 - All top chord uniform loads shall be assumed to occur along the full length of the truss u.n.o. Snow drift loads shall be considered where shown.
 - Bottom chord uniform loads shall be considered to occur along the full length of the truss. Bottom chords shall extend to support where necessary to attach suspended elements.
- Point Loads:
 - Point load locations shown are approximate. Coordinate final locations with Architectural, Mechanical Plumbing and Electrical. In lieu of determining precise locations of point loads at steel joists, the manufacturer may consider point loads as "addload" with the joist design based on worst case possible locations of point loads. Joist manufacturer shall design top and bottom chords to support point loads not occurring at panel points or shall provide supplemental struts as in
 - Where non-structural component bracing attaches to steel joists, manufacturer shall include bracing loads in the load combinations. Where the design of non-structural component support & bracing has been deferred, General Contractor shall provide hanger & bracing loads, locations & attachment details to steel joist manufacturer for inclusion in steel joist design.
 - For design requirements see Steel Joist and Joist Girder Design Criteria
- Joist designations shown on framing plans correspond to the following:
 - Steel Joist Example**
26K (RJ-1) indicates 26" deep 'K' series roof joist with loading type RJ-1 as shown in loading schedule. Final steel joist section number (e.g. 26K10) to be determined by steel joist mfr.
 - Steel Joist Girder Example**
40G (RJG-1) indicates 36" deep roof joist girder with loading type RJG-1 as shown in loading schedule. Load at each panel point is determined from steel joist reactions. Steel joist spacing and number of joists supported by joist girder shall be as shown on plans.



Typical Steel Joist Loading Diagrams



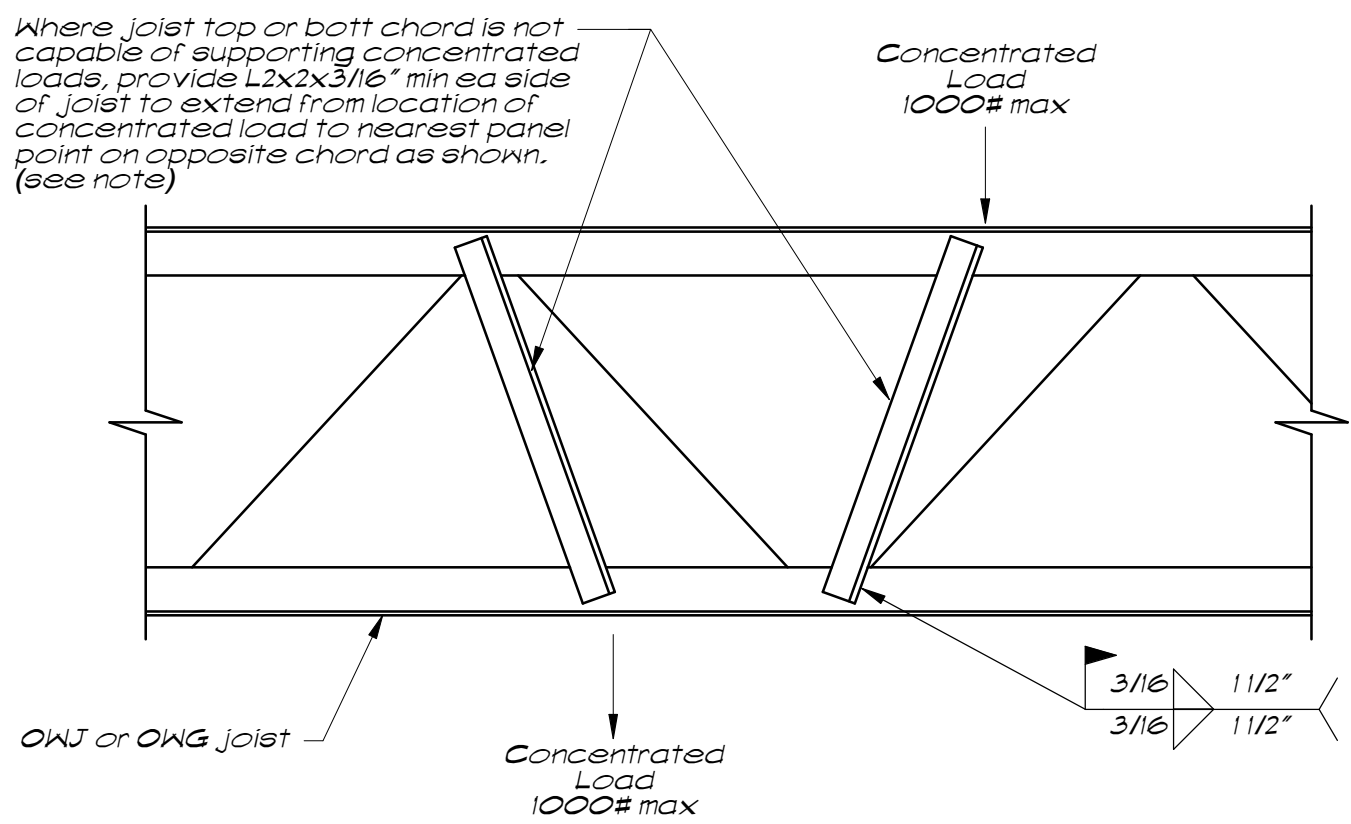
Typical Steel Joist Girder Loading Diagrams

LOADING SCHEDULE

STEEL JOIST LOADING TYPE	Point Loads							
	P_D	P_L	P_{NU}	P_{bSP}	W_{NU}	W_D	W_L	F_{HT}
RJ-1	-	-	-	see notes	118 (89)	107	124	see plans
RJG-1	4.5	3.3	4.8 (3.6)	-	-	-	-	-

Notes:

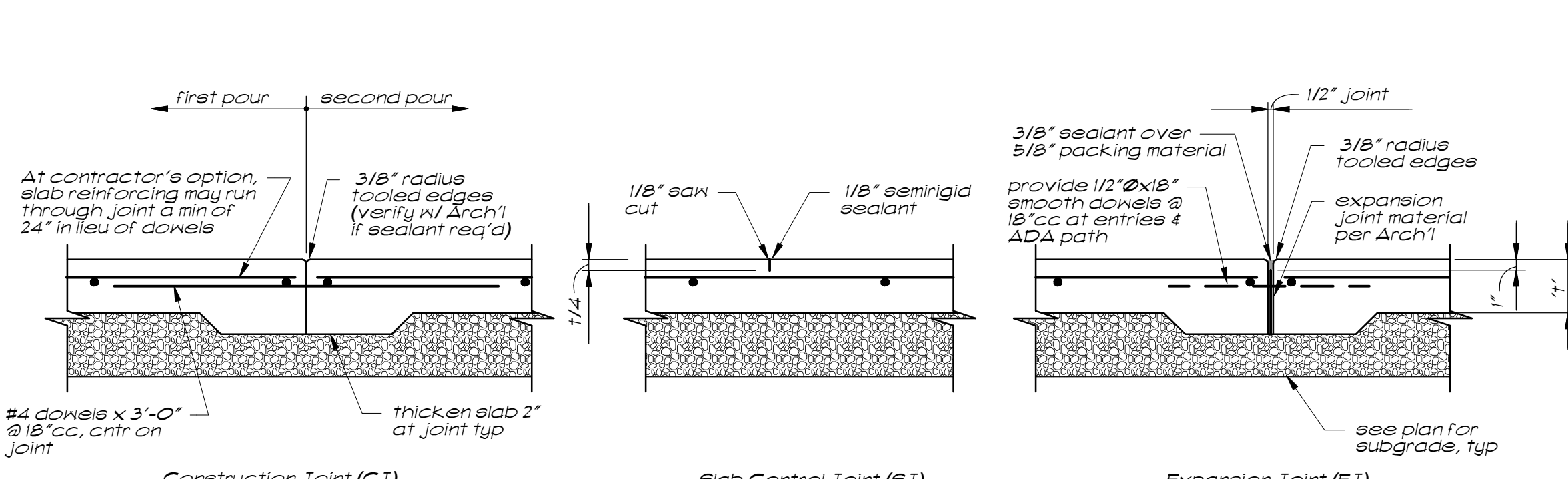
- The loads shown do not include self weight of the girders
- Point Load Symbols:
 - P_D = top chord point dead load (k)
 - P_L = top chord point live load (k)
 - P_{bSP} = bottom chord point load at sprinklers. Vertical load at fire sprinklers supports shall include weight of water filled pipe plus 250#. P_{bSP} may occur at any location along bottom chord & may not occur at a panel point. General Contractor shall coordinate the weight & location of all sprinkler loads and supply this information to steel joist mfr prior to commencing steel joist design. Sprinkler live load need not be concurrent with any other live loads.
 - P_{NU} = top chord point wind load, upwards (k) - Design #1 and #3 shown, Design #2 in parenthesis
 - W_{NU} = top chord distributed wind load (plf)
 - W_D = top chord distributed dead load (plf)
 - W_L = top chord distributed live load (plf)
 - F_{HT} = horizontal top chord axial force (consider both tension & compression) from wind or seismic forces. Where noted as seismic drag load, consider add'l load combinations of ASCE 7 12.4.3.2
 - F_{WU} = top chord wind uplift where occurs, see Steel Joist Loading Diagram for required load combinations.



Note: O/WJ mfr to verify size and connection of L support as shown above can be accommodated without compromising the structural integrity of the joist as designed by the mfr. If detail shown is not acceptable, O/WJ mfr is to provide alternate detail.

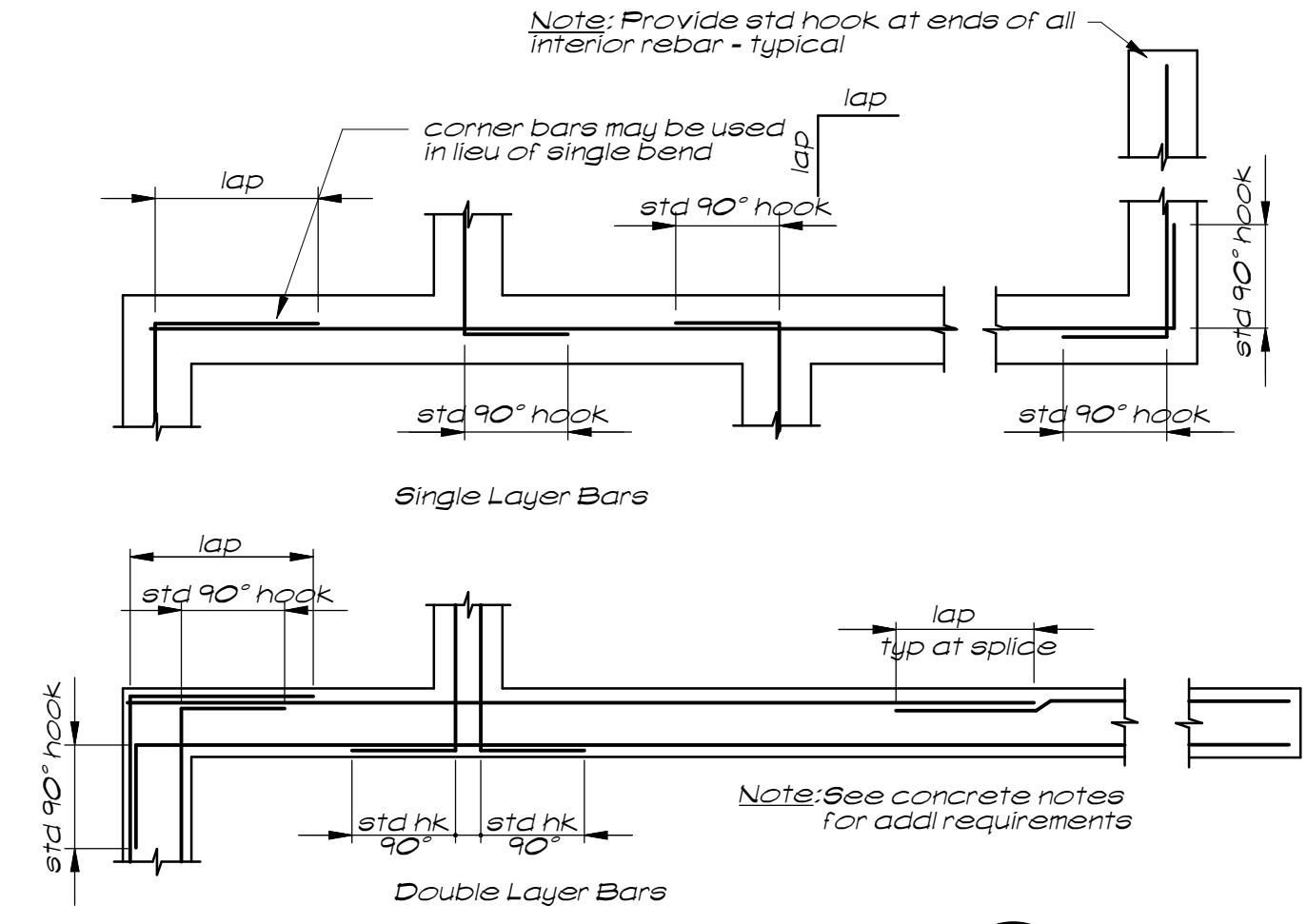
TYPICAL DETAILS

APPLICABLE TO ALL DRAWINGS UNLESS NOTED OR SHOWN OTHERWISE

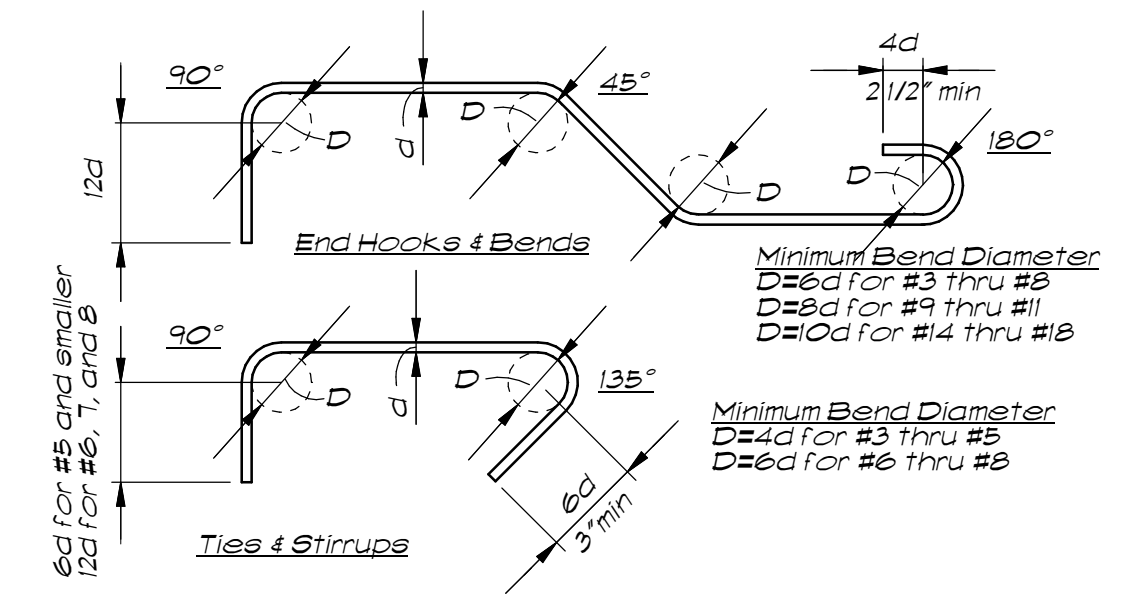


Note:
 1. Construction joints and control joints shall divide slab into areas not exceeding 225 sq ft without reentrant corners and with length to width ratios not exceeding 1 1/2 to 1. Joint spacing shall not exceed 15 feet in either direction.
 2. Contractor shall submit layout plan showing proposed control and construction joint locations to Architect & Structural Engineer for review & approval.
 3. Semirigid sealant to be Euclid Eucro #100 or equal.

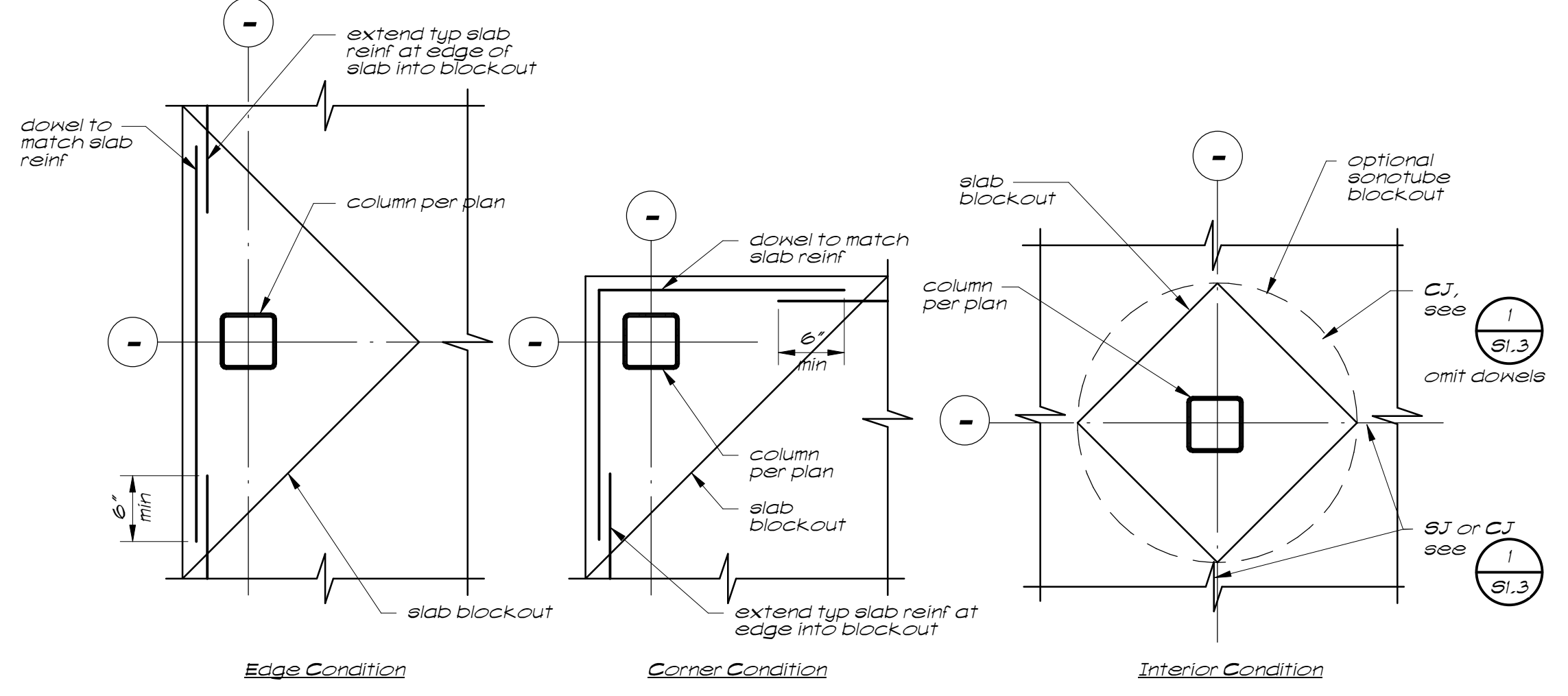
Slab On Grade Joints 1
3105D001-12 SI.3



Corner Reinforcing at Concrete Ftgs 2
2005D011-32 SI.3

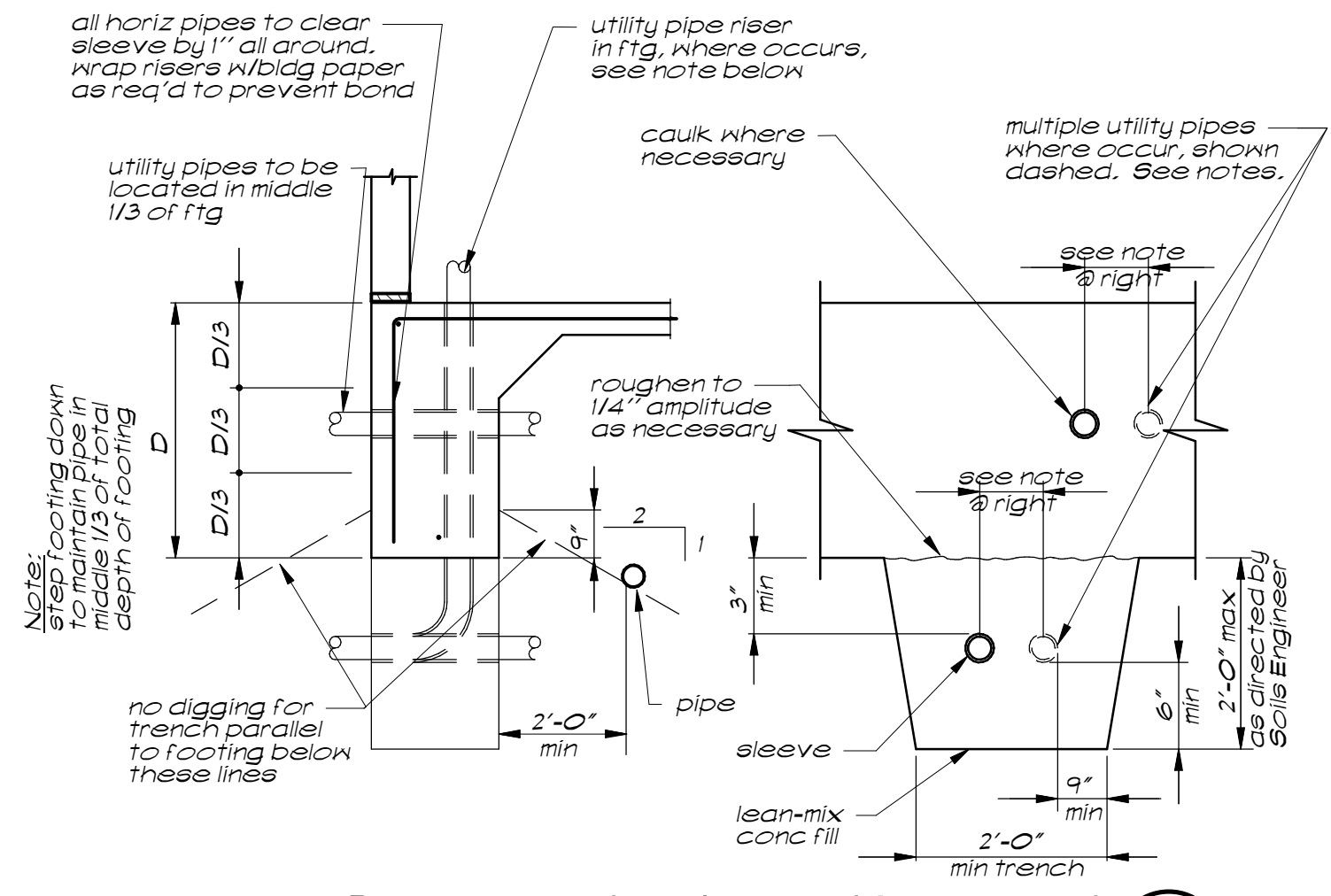


Standard Rebar Hooks and Bends 3
3005D011-12 SI.3



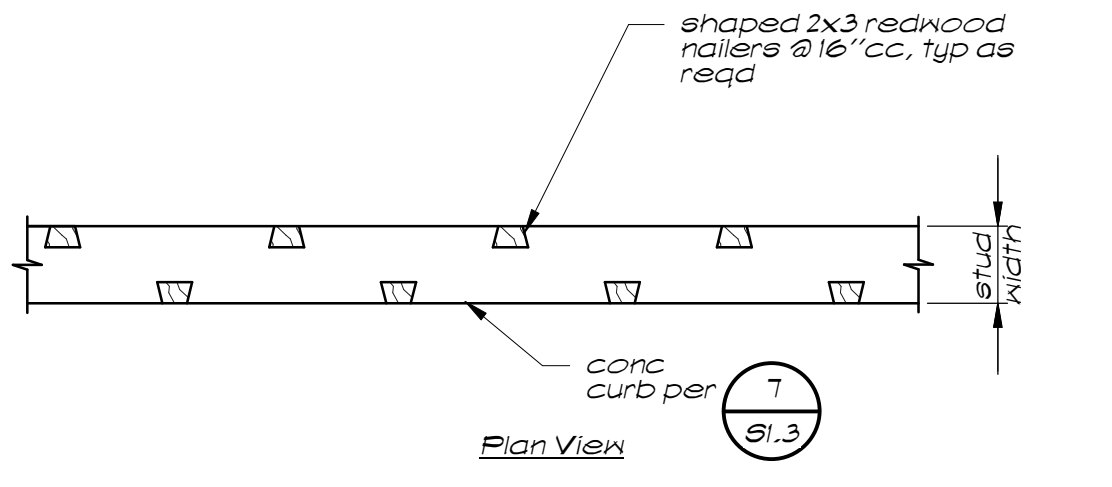
Note:
 1. Slab blockout shall not extend beyond footing.
 2. At exposed concrete conditions, coordinate blockout shape and size w/ Arch' dwgs.

Slab Blockout 4
3105D002-12 SI.3

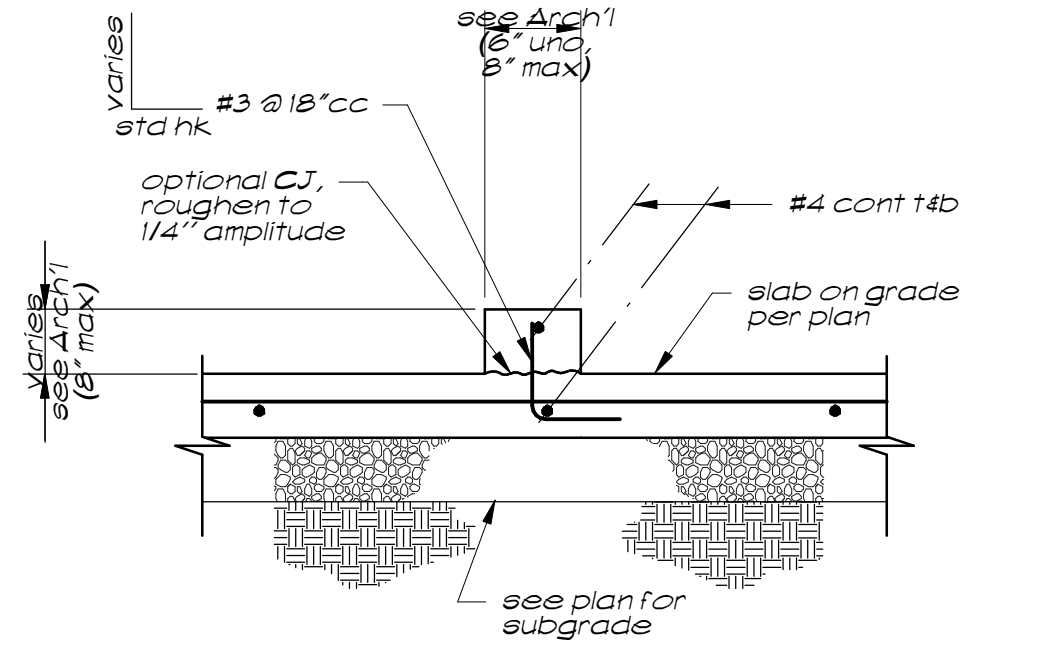


Concrete Footings at Utility Pipes 5
2005D003-32 SI.3

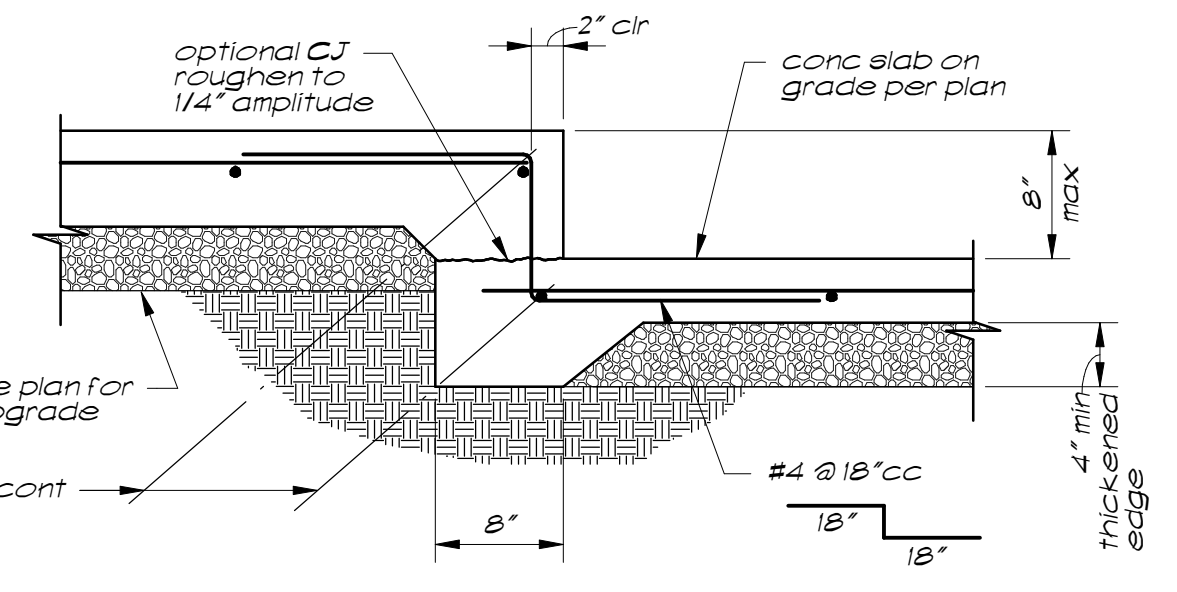
- Notes:**
1. Reinforcing shall not be interrupted, cut or displaced by placement of utility pipe.
 2. Lean mix concrete fill to be placed before ftg is cast (mono-pour ftg conc optional). Make same width as ftg and full width of pipe trench.
 3. Step ftg if pipe occurs in lower third of original footing depth.
 4. No pipes shall be placed below spread ftgs or within 2 to 1 bearing zone around spread footing.
 5. If pipe is in place prior to casting concrete, wrap pipe w/ 1" Styrofoam insulation in lieu of sleeve.
 6. Utility pipes are not allowed parallel in footing.
 7. Multiple utility pipes (two or more) may be installed as shown above, provided they are spaced a minimum of 4 pipe/conduit diameters on center with a minimum of 3" of concrete between.
 8. Utility pipes risers may occur in continuous wall footings provided they are no larger than footing width(s) and occur within the middle 1/3 of the footing width. Multiple risers may occur if spaced as noted above.
 9. Utility pipes perpendicular to footings and more than 2'-0" below bottom of footings do not require lean-mix concrete encasement subject to acceptance of The Soils Engineer.
 10. Conditions not conforming to the parameters noted above shall be reviewed on a case-by-case basis.



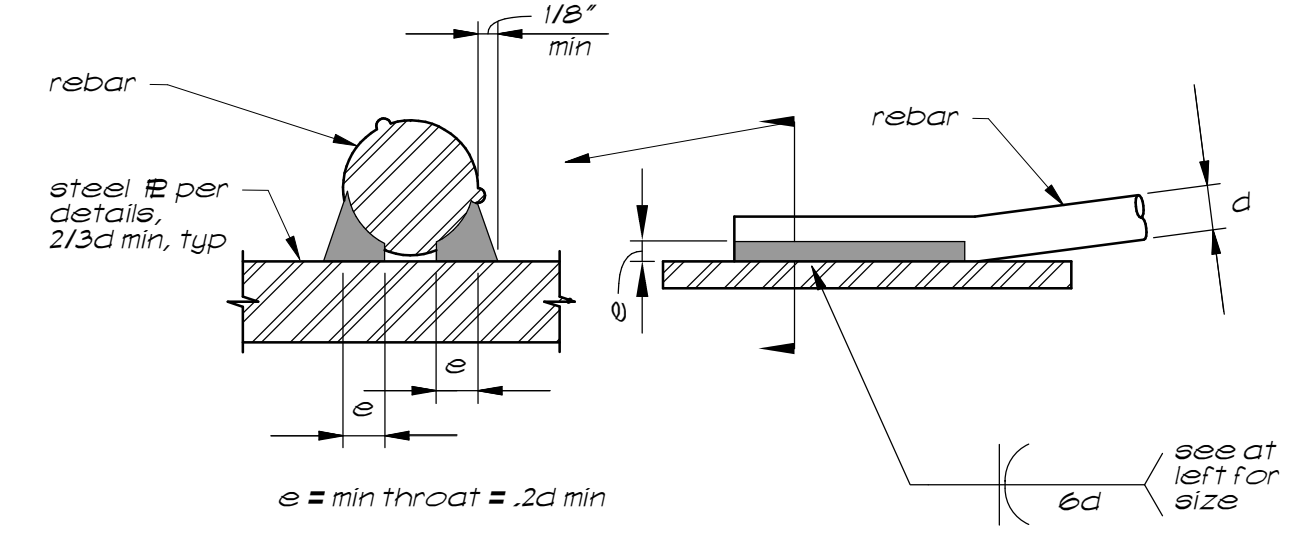
Nailers In Concrete Curb 6
3105D006-12 SI.3



Curb at Slab on Grade 7
3105D006-12 SI.3



Step In Slab 8
3105D003-12 SI.3

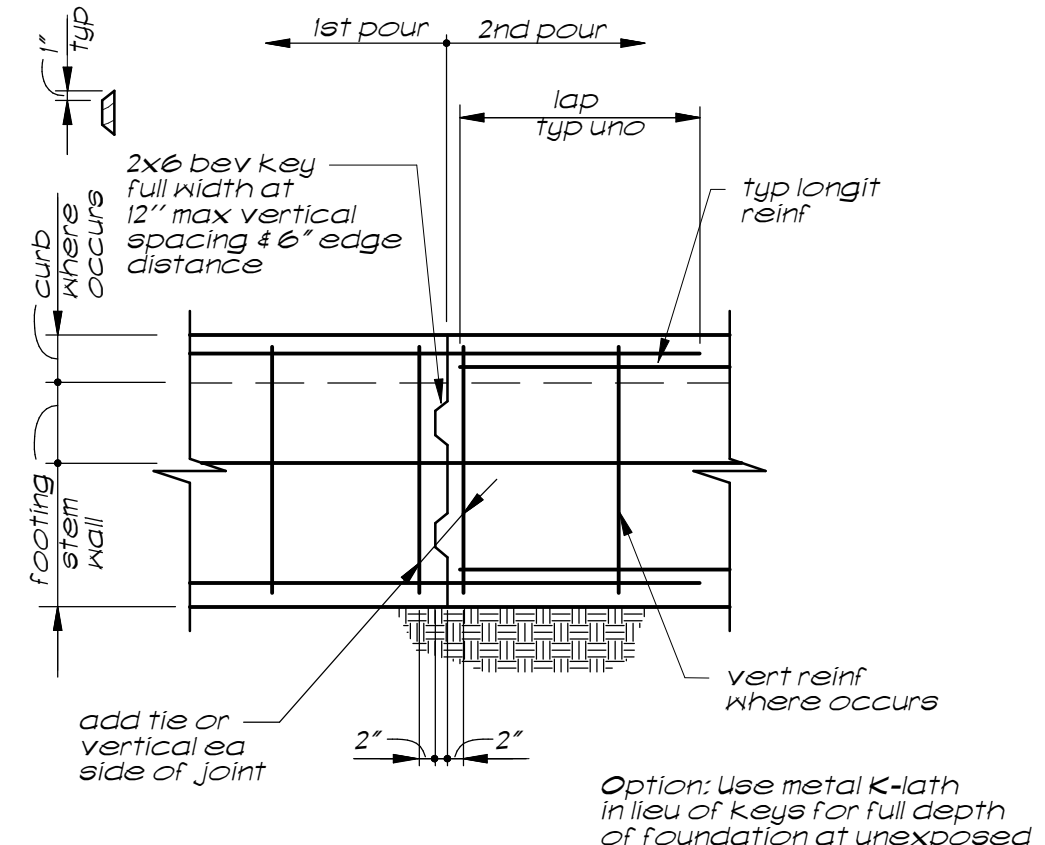


- Notes:**
1. Reinforcing to be welded, except ASTM A706, shall conform to the material property requirements of ANSI/AWS D1.4, newest edition.
 2. All preheating and welding shall be done in accordance with ANSI/AWS D1.4, newest edition.
 3. All welding shall be continuously inspected by a qualified laboratory.

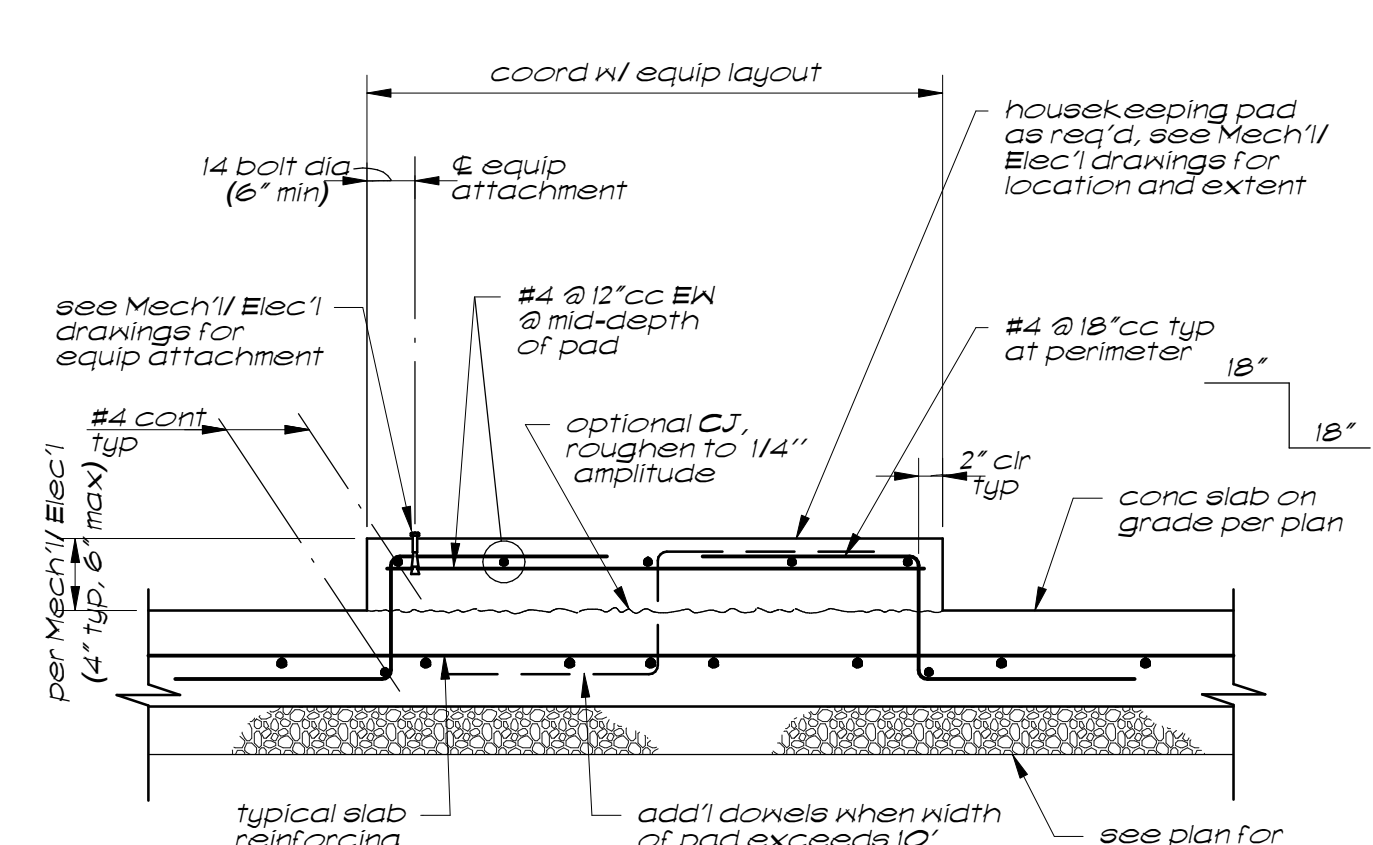
Rebar Welding 9
3005D002-32 SI.3

TYPICAL DETAILS

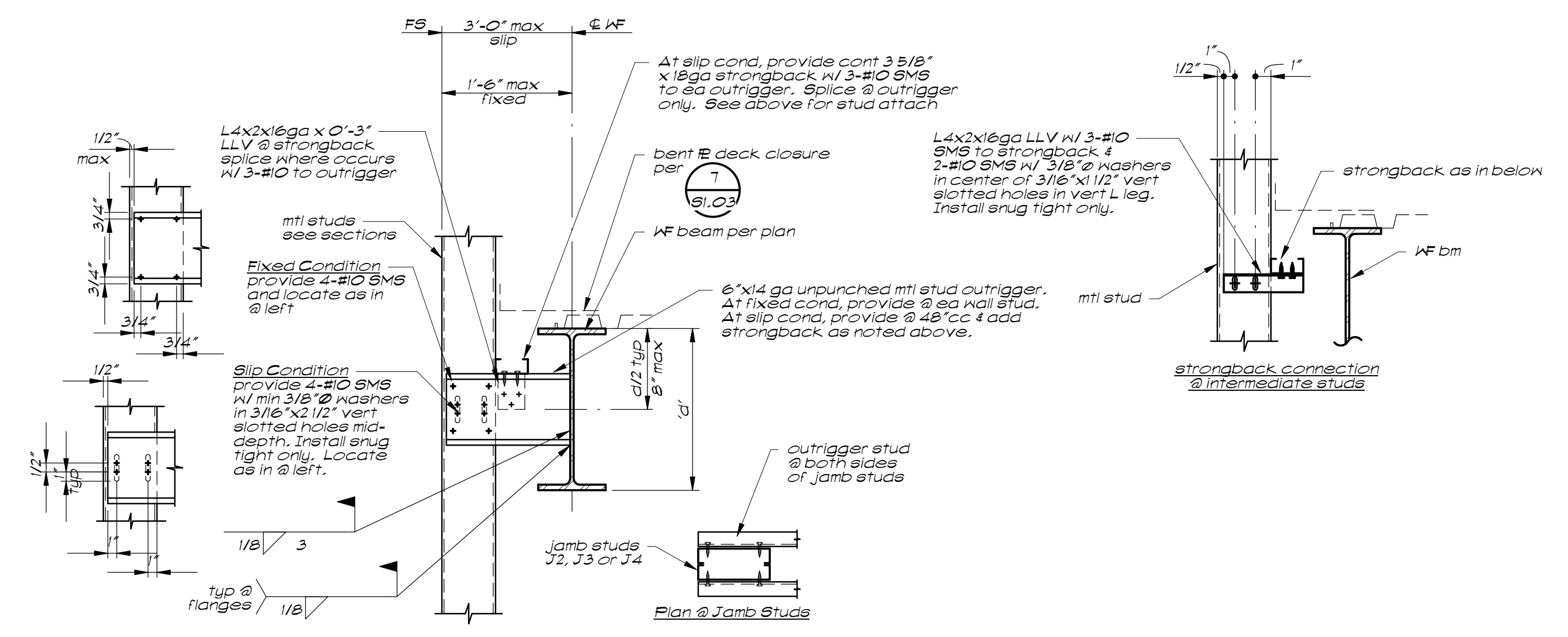
APPLICABLE TO ALL DRAWINGS UNLESS NOTED OR SHOWN OTHERWISE



Typical Foundation Construction Joint (1) S1.4
2085D012-34



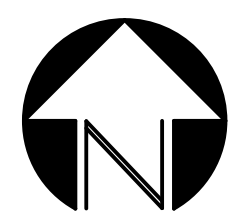
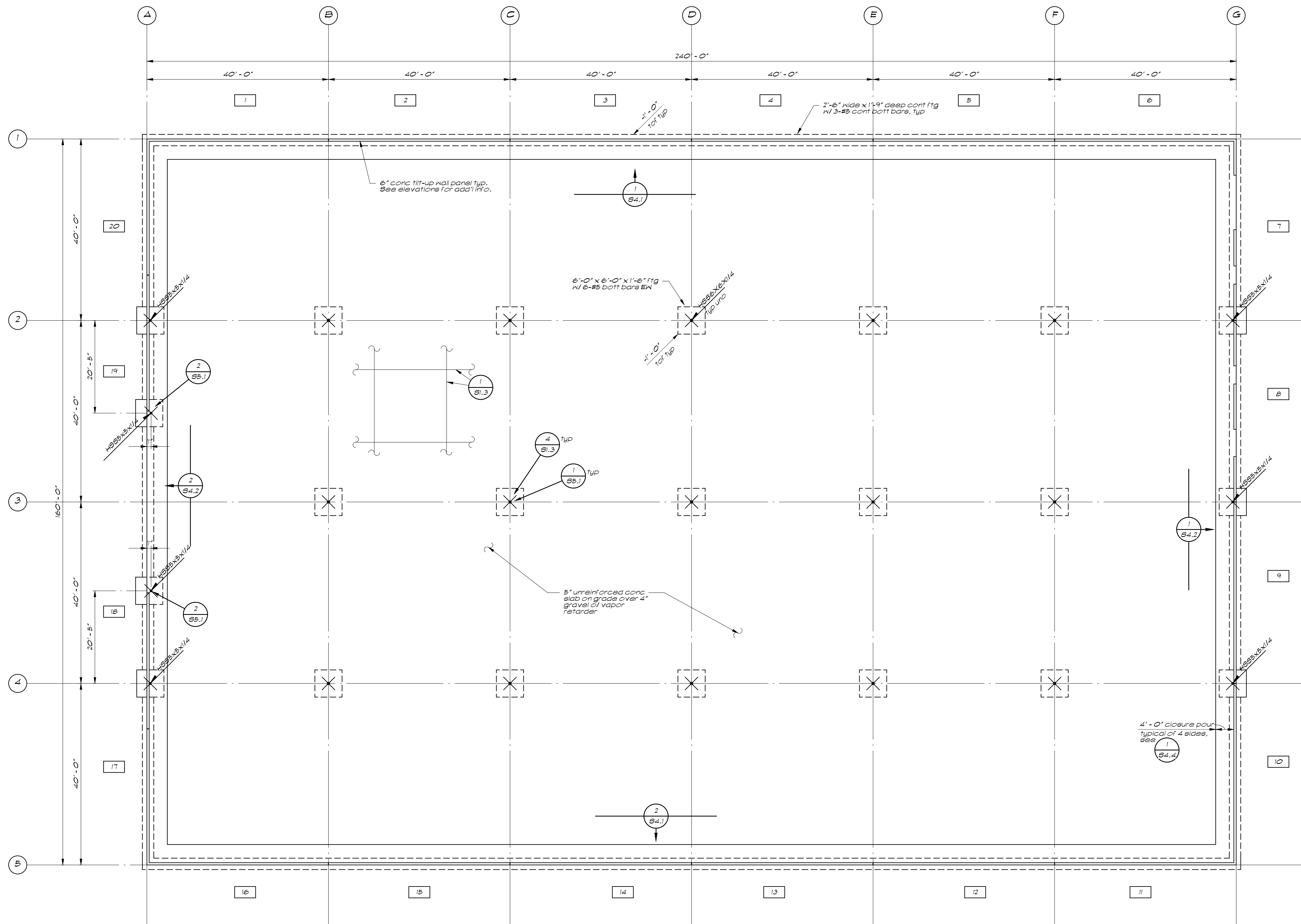
Housekeeping Pad at Slab on Grade (2) S1.4
3108D006-16



Detail (3) S1.4
5418D003-12

NEHRP CONSULTANTS JOINT VENTURE FOR THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY NATIONAL EARTHQUAKE HAZARDS REDUCTION PROGRAM
COST ANALYSES AND BENEFIT STUDIES FOR EARTHQUAKE-RESISTANT CONSTRUCTION IN MEMPHIS, TENNESSEE
DESIGN STUDY NOT FOR CONSTRUCTION
RETAIL BUILDING
TYPICAL DETAILS
DECEMBER 2013
S1.4

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Foundation Plan — 3/32" = 1'-0"

NEHRP CONSULTANTS JOINT VENTURE
FOR THE
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
NATIONAL EARTHQUAKE HAZARDS REDUCTION PROGRAM

COST ANALYSES AND BENEFIT STUDIES FOR
EARTHQUAKE-RESISTANT CONSTRUCTION IN
MEMPHIS, TENNESSEE

DESIGN STUDY
NOT FOR
CONSTRUCTION

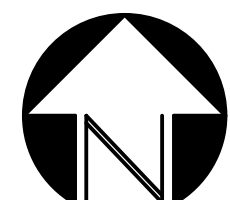
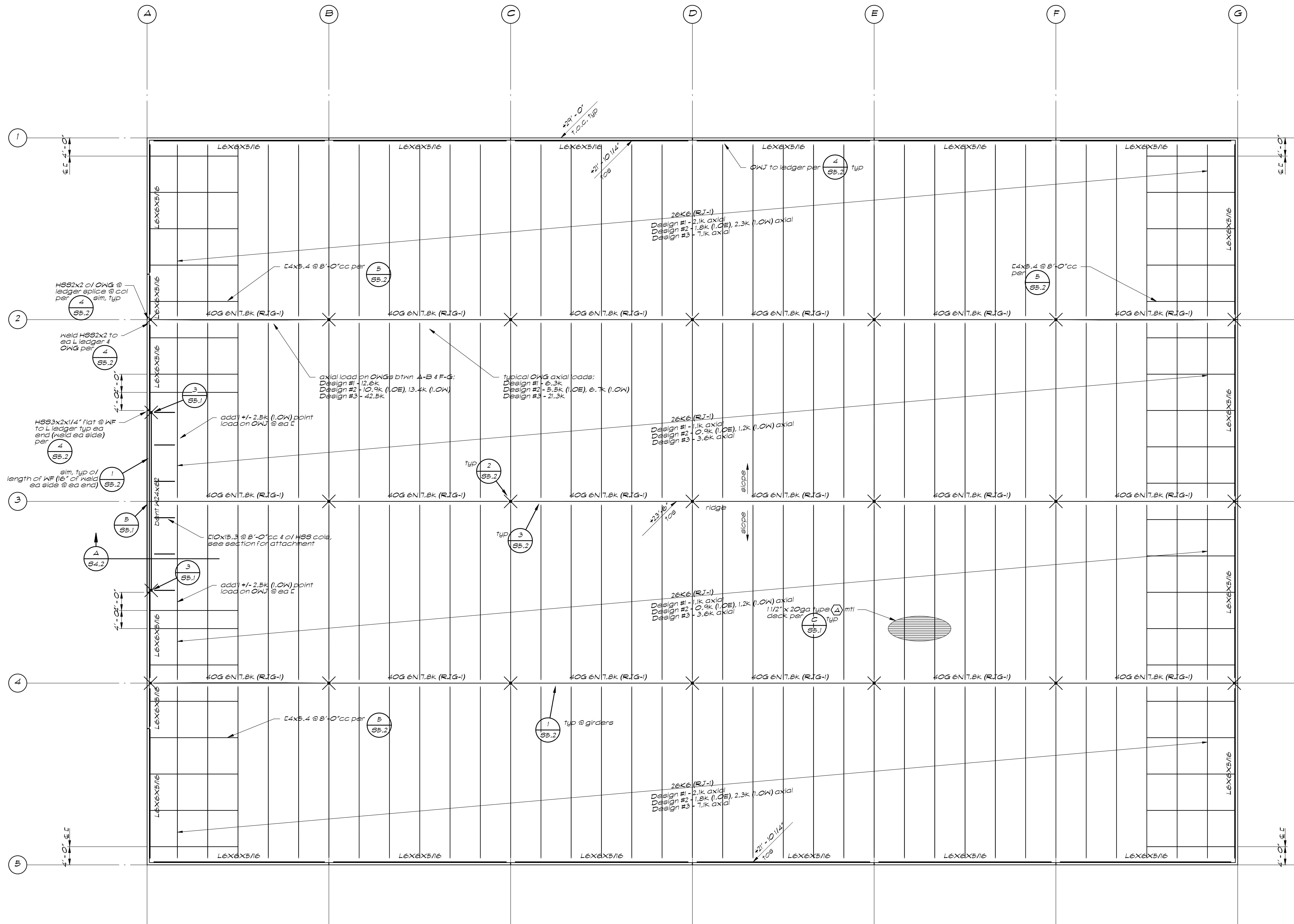
RETAIL
BUILDING

FOUNDATION
PLAN

DECEMBER 2013

S2.1

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Roof Framing Plan — 3/32" = 1'-0"

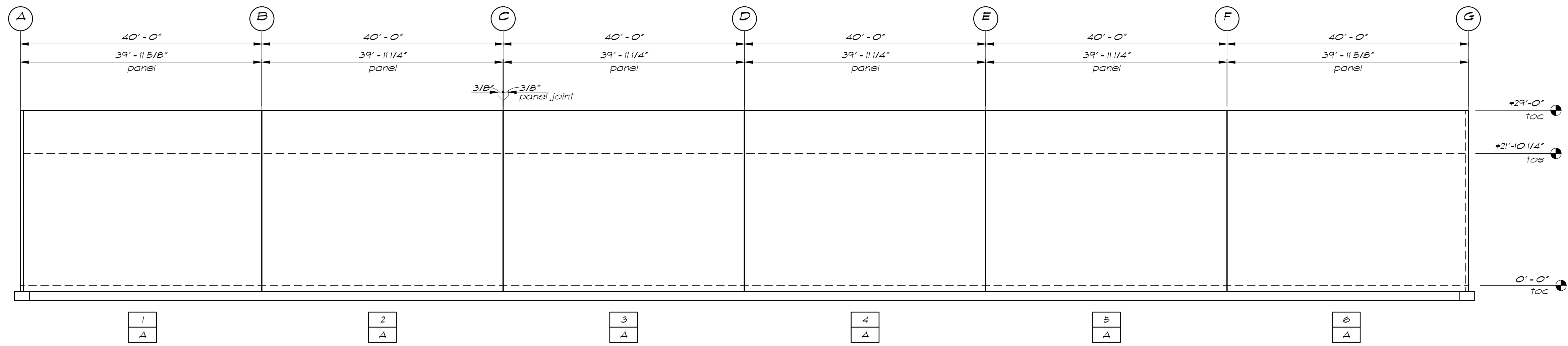
DESIGN STUDY
NOT FOR
CONSTRUCTION

RETAIL
BUILDING

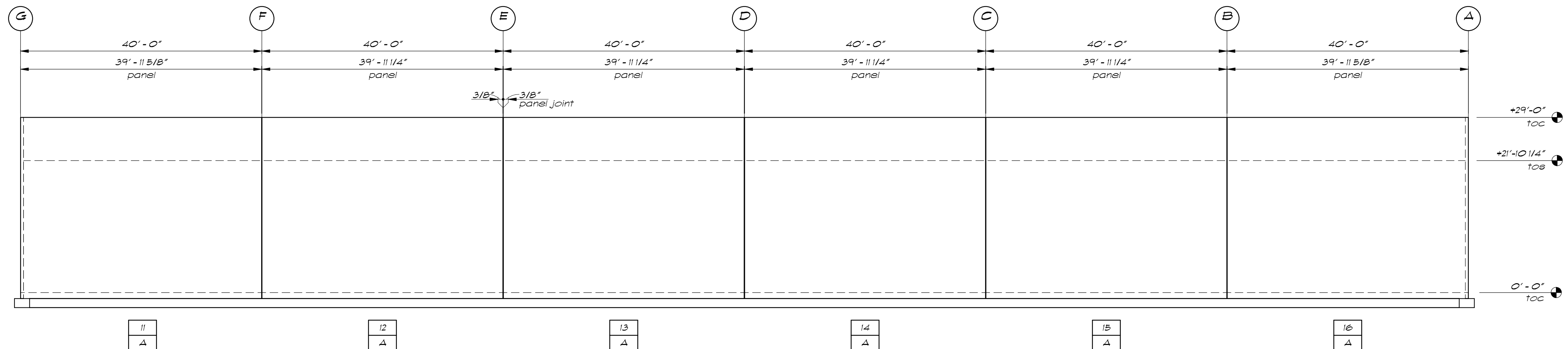
ROOF
FRAMING
PLAN

DECEMBER 2013

S2.2



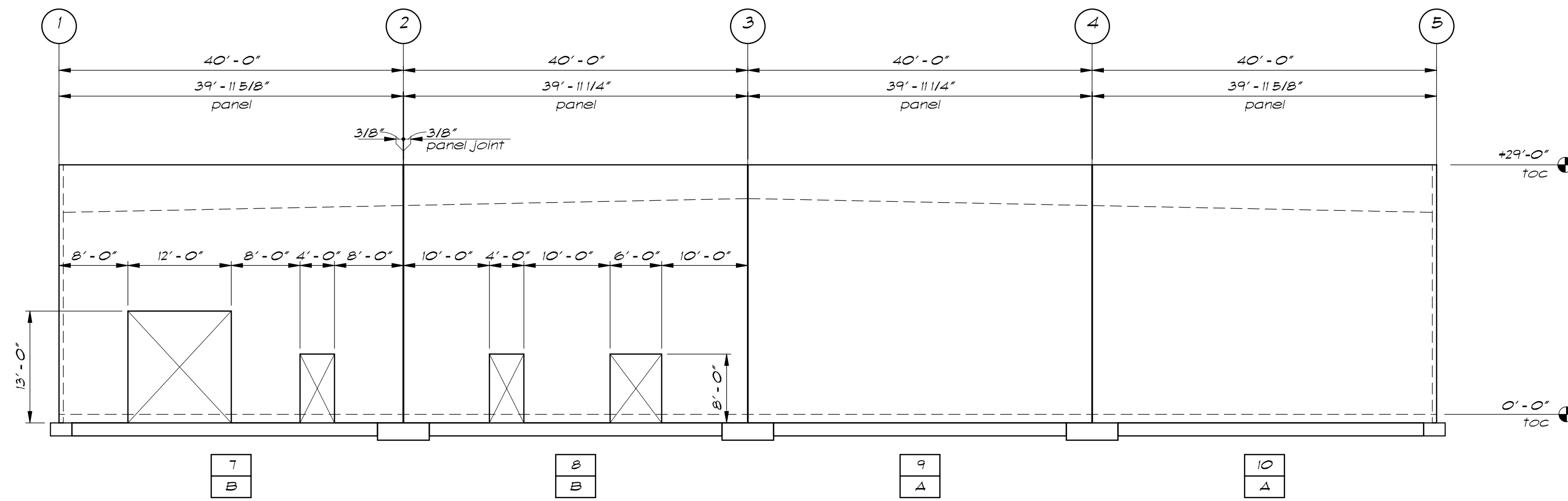
Elevation $\frac{1}{S4.1} - 3/32" = 1'-0"$



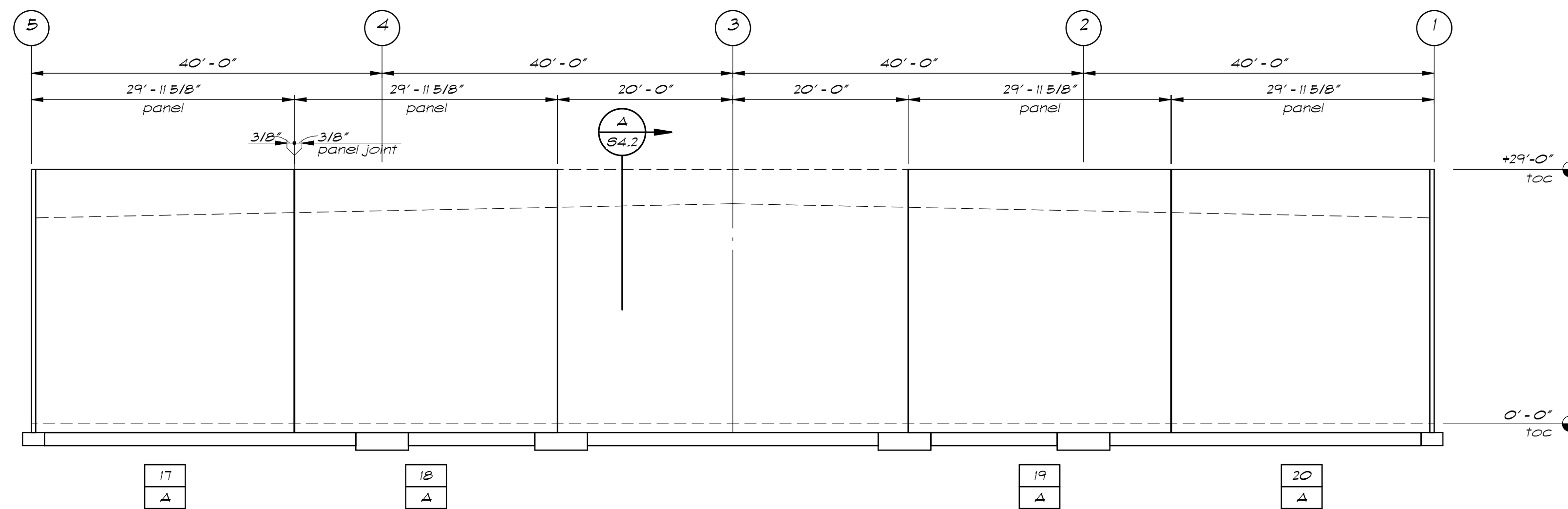
Elevation $\frac{2}{S4.1} - 3/32" = 1'-0"$

TILT-UP CONCRETE PANELS

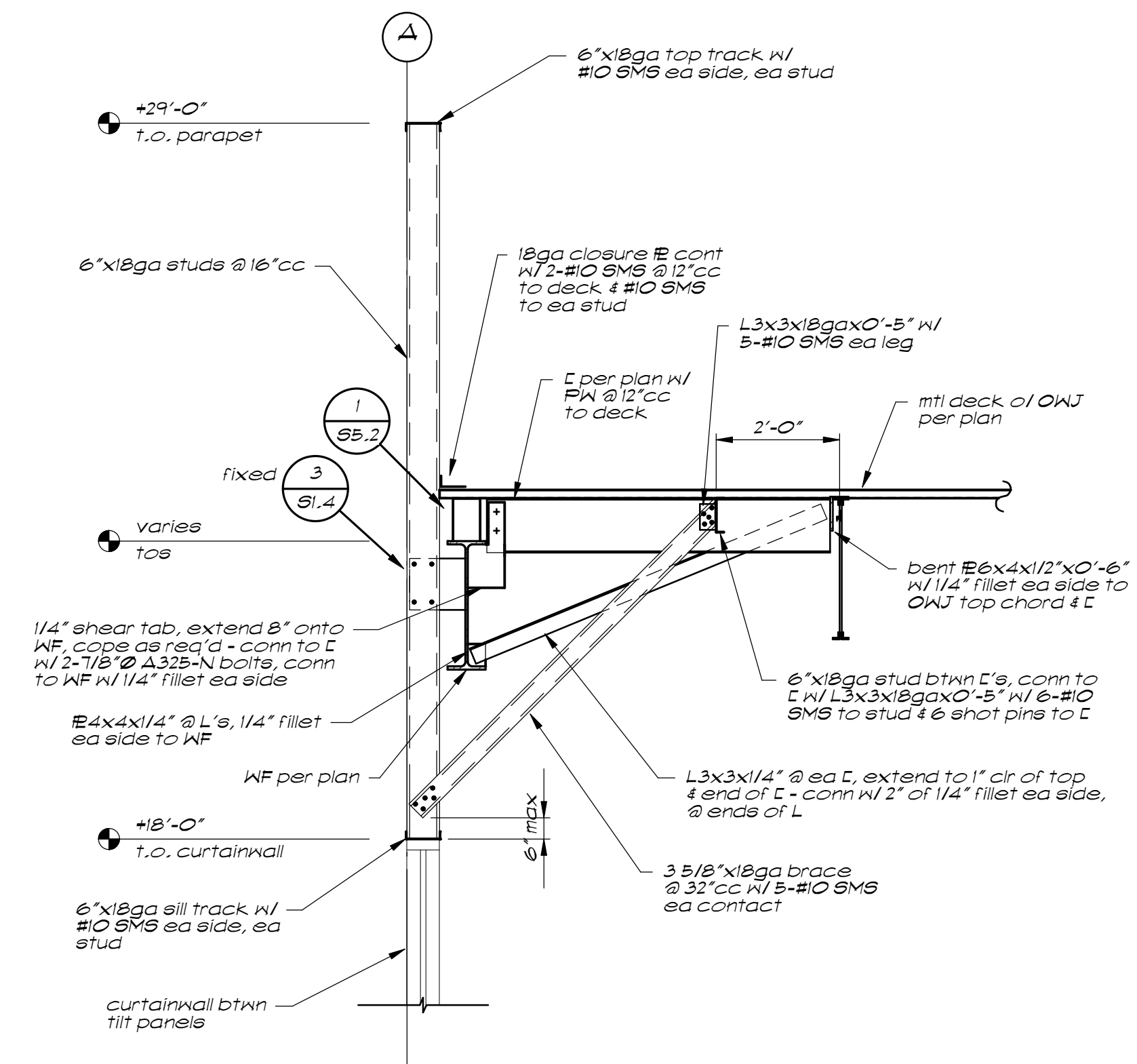
1. See Architectural drawings for all panel finishes, chamfers, joint sealants and surface treatments.
2. All panels are 6" total thickness. No reveals permitted in panels.
3. General Contractor shall provide adequate temporary shoring and bracing of tilt-up concrete wall panels until all diaphragms (roofs & floors) are permanently connected.
4. Contractor shall submit shop drawings to show panel size, openings and reveals. Contractor shall be responsible for adequacy of panel for lifting stresses. Additional reinforcing or strong backs shall be designed and provided by Contractor.
5. All panel elevations are viewed from the inside of the building typical, unless otherwise noted.
6. Structural concrete for all tilt-up panels shall test 4000 psi minimum at 28 days.
7. $\frac{1}{A}$ Indicates panel identification mark with panel # and panel type. For reinforcing info at each panel type, see sheet S4.3
8. See $\frac{2}{S4.4}$ for slab condition at openings.



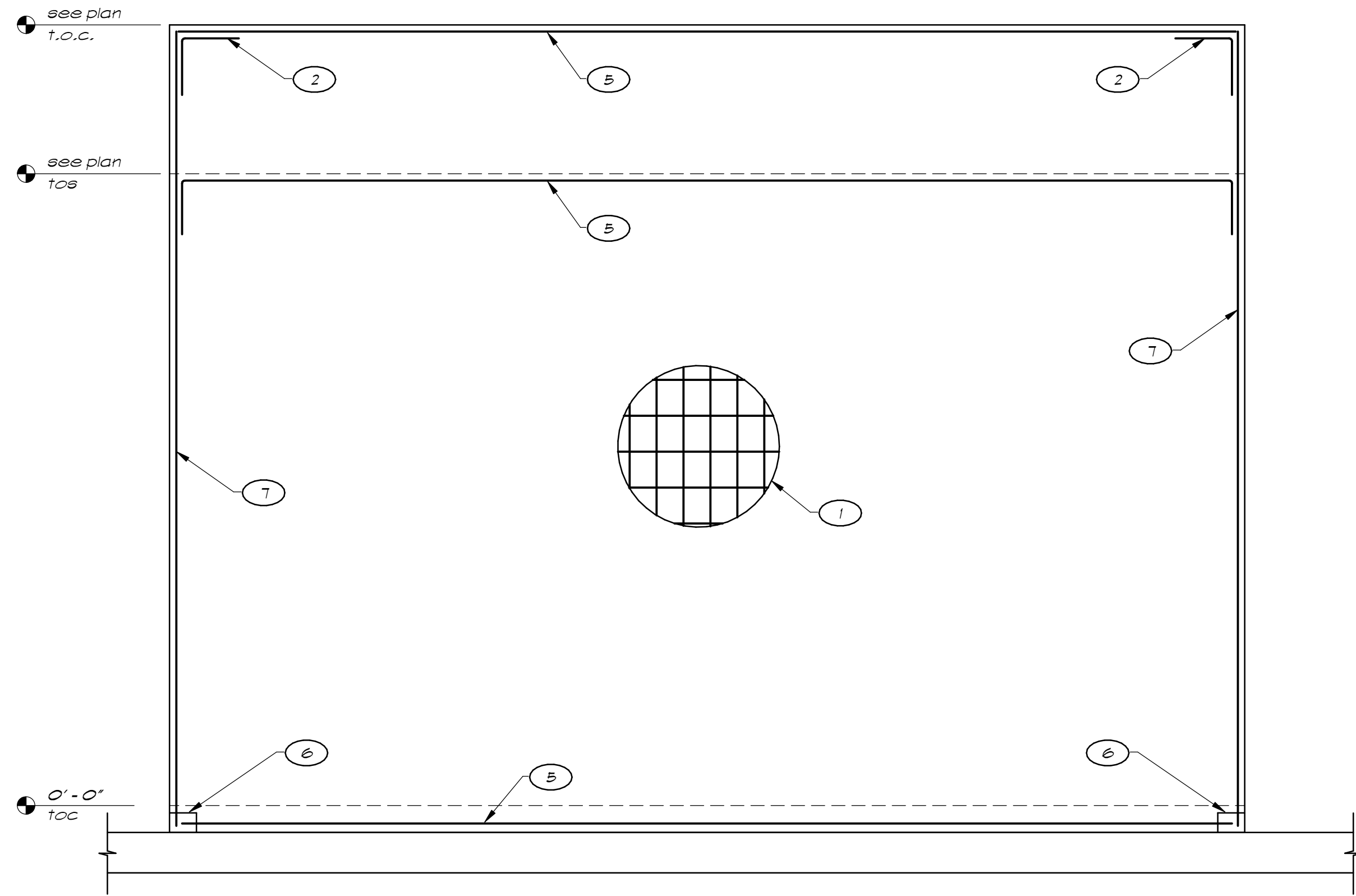
Elevation $\frac{1}{S4.2} - 3/32" = 1'-0"$



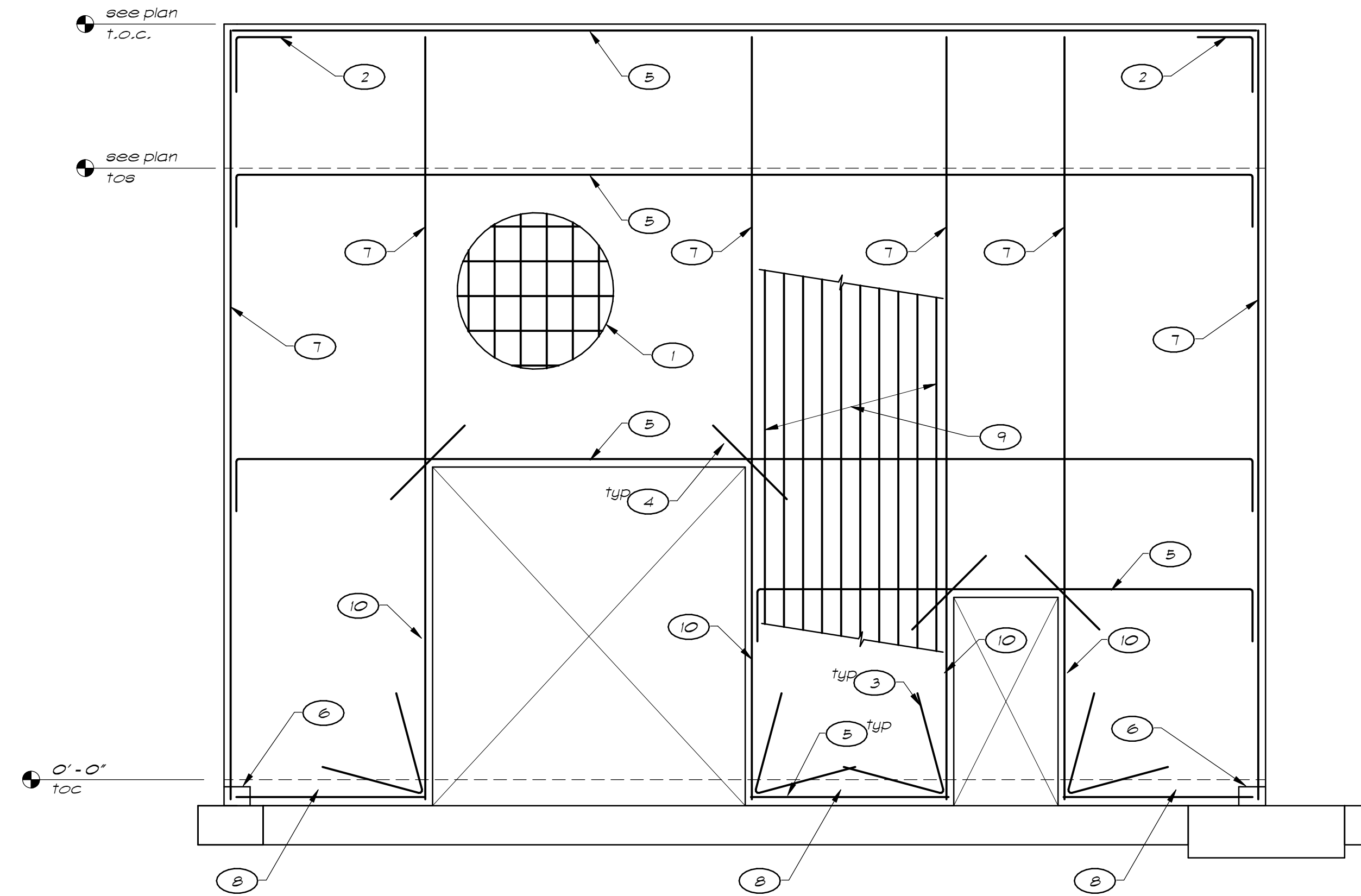
Elevation $\frac{2}{S4.2} - 3/32" = 1'-0"$



Section $\frac{A}{S4.2} - 1/2" = 1'-0"$



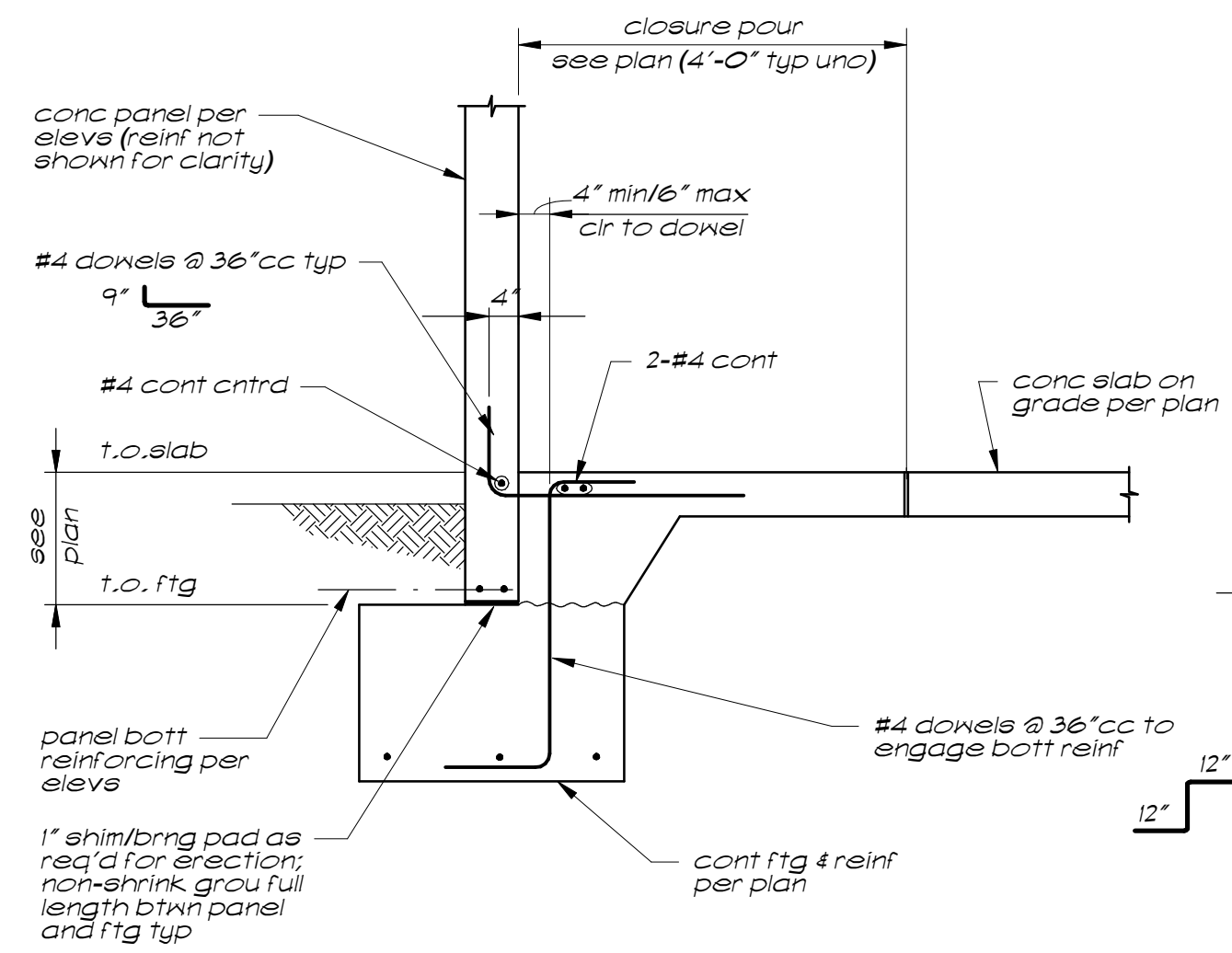
Panel Elevation Type A $\frac{1}{54.3} - 1/4" = 1'-0"$



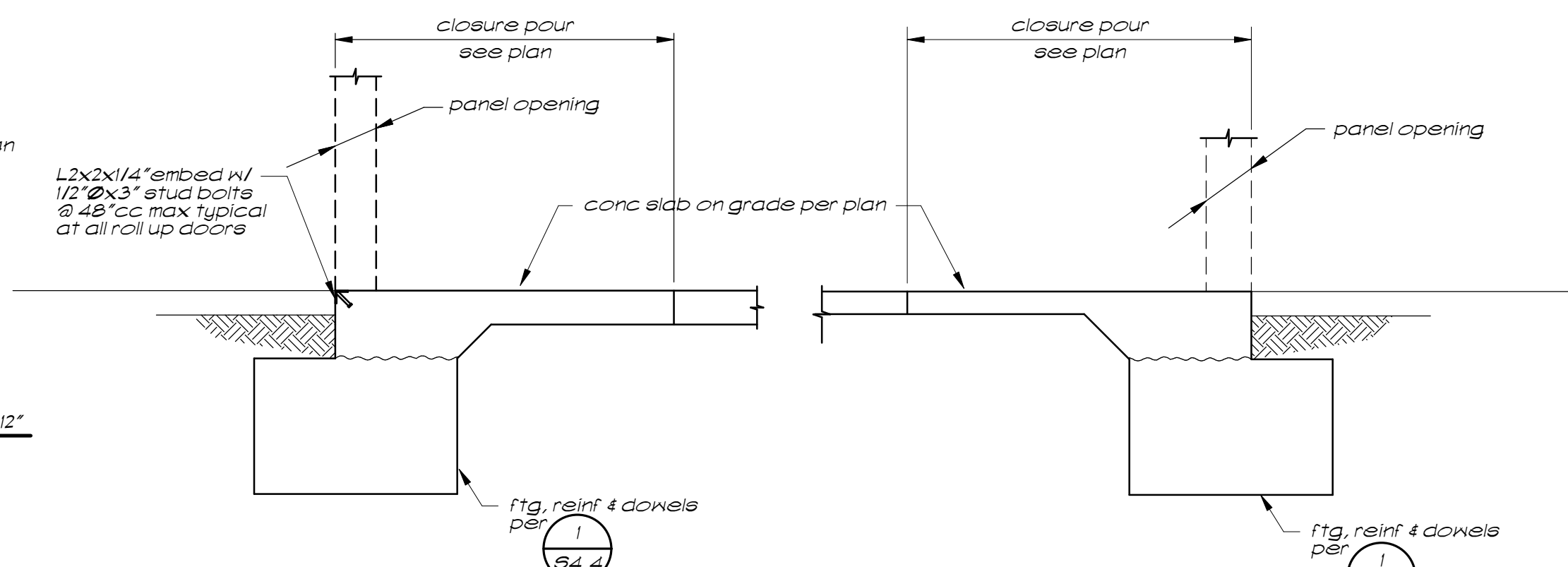
Panel Elevation Type B $\frac{2}{54.3} - 1/4" = 1'-0"$

Panel Reinforcing Elevation Key Notes

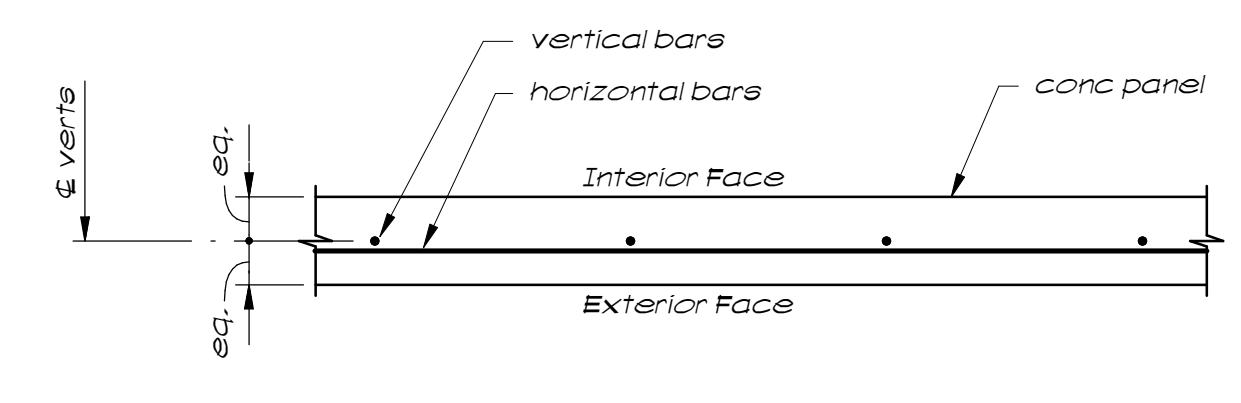
- ① Design #1 & #3 - #5 cont @ 16"cc vert (centered)
Design #2 - #5 @ 18"cc vert (centered)
- All designs - #4 cont @ 16"cc horiz
- ② #4 corner bar centered $\begin{matrix} 24" \\ \text{---} \\ 24" \end{matrix}$
- ③ #5 hairpin centered $\begin{matrix} 48" \\ \text{---} \\ 48" \end{matrix}$
- ④ #4 x 4'-0" diagonal centered
- ⑤ 2 - #5 cont horiz w/ std hooks @ ends, no hooks req'd @ 14b of panels
- ⑥ panel base conn per $\frac{4}{54.4}$
- ⑦ 2 - #5 jamb bars full height
- ⑧ 4 - #4 dowels into closure pour per eq spaced @ width of panel leg $\frac{1}{54.4}$
- ⑨ 10 - #5 verts eq spaced between jamb bars @ panel #7
8 - #5 verts eq spaced between jamb bars @ panel #8
- ⑩ Design #2 - add one #5 full height vert bar in addition to typical reinforcing, located 9" from edge of opening



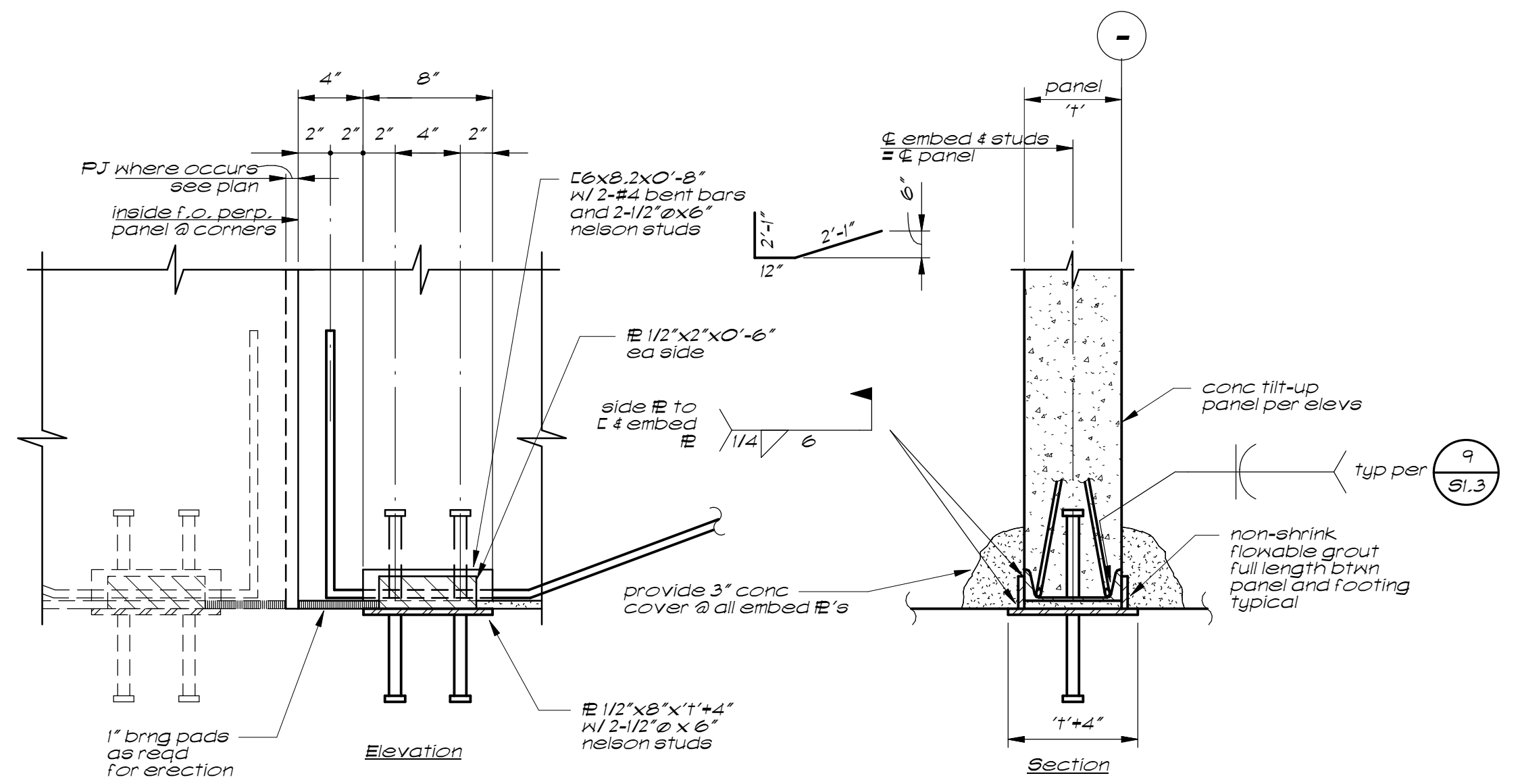
Detail 1
322SD003-24
S4.4



Detail 2
322SD005-24
S4.4



Detail 3
322SD010-12
S4.4

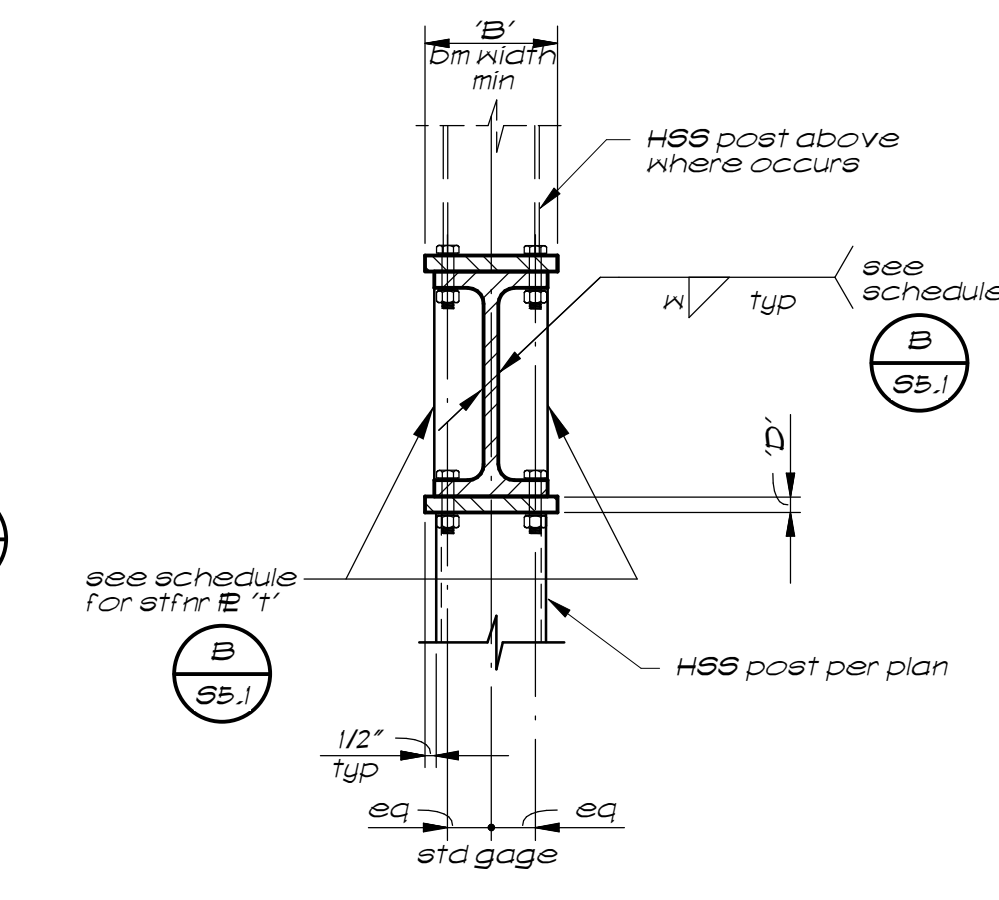
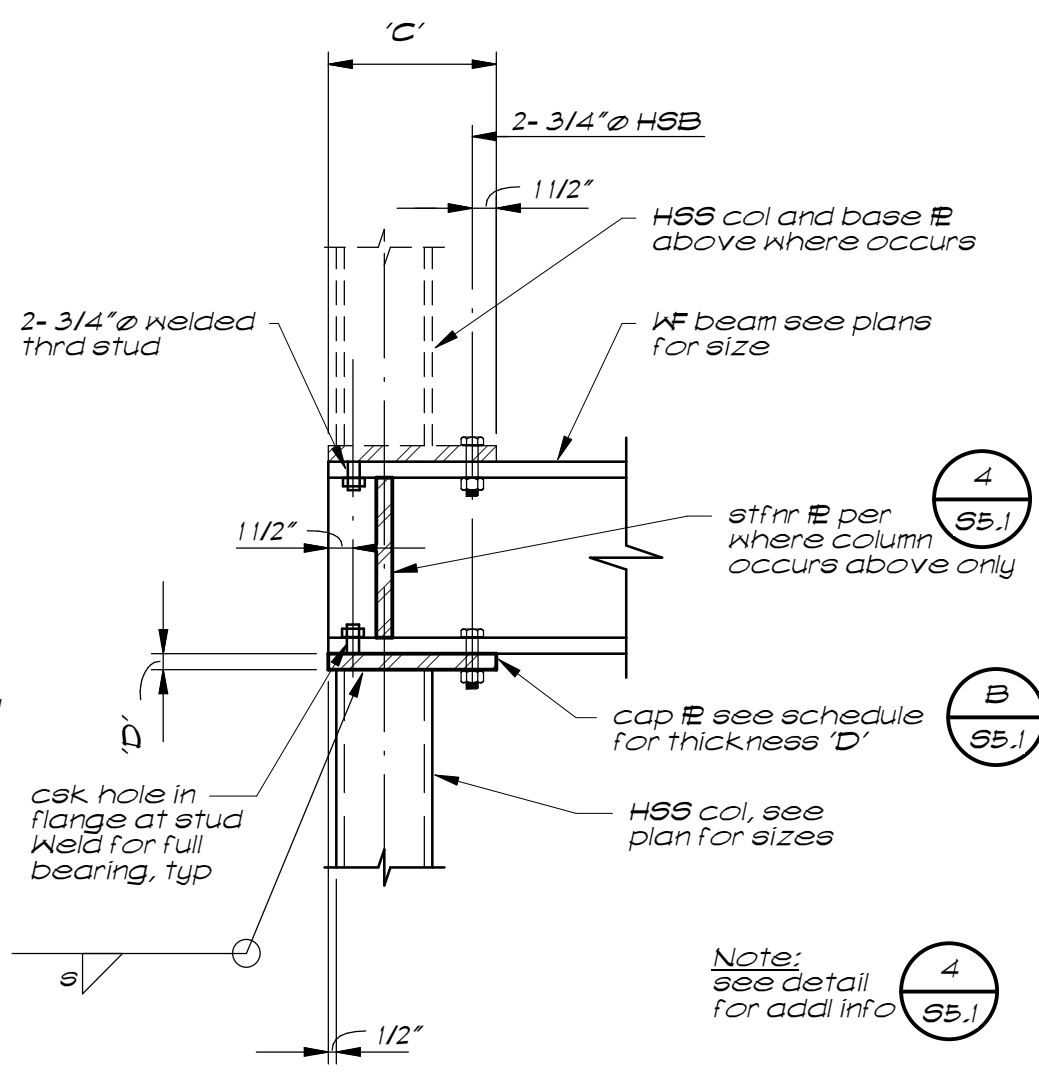
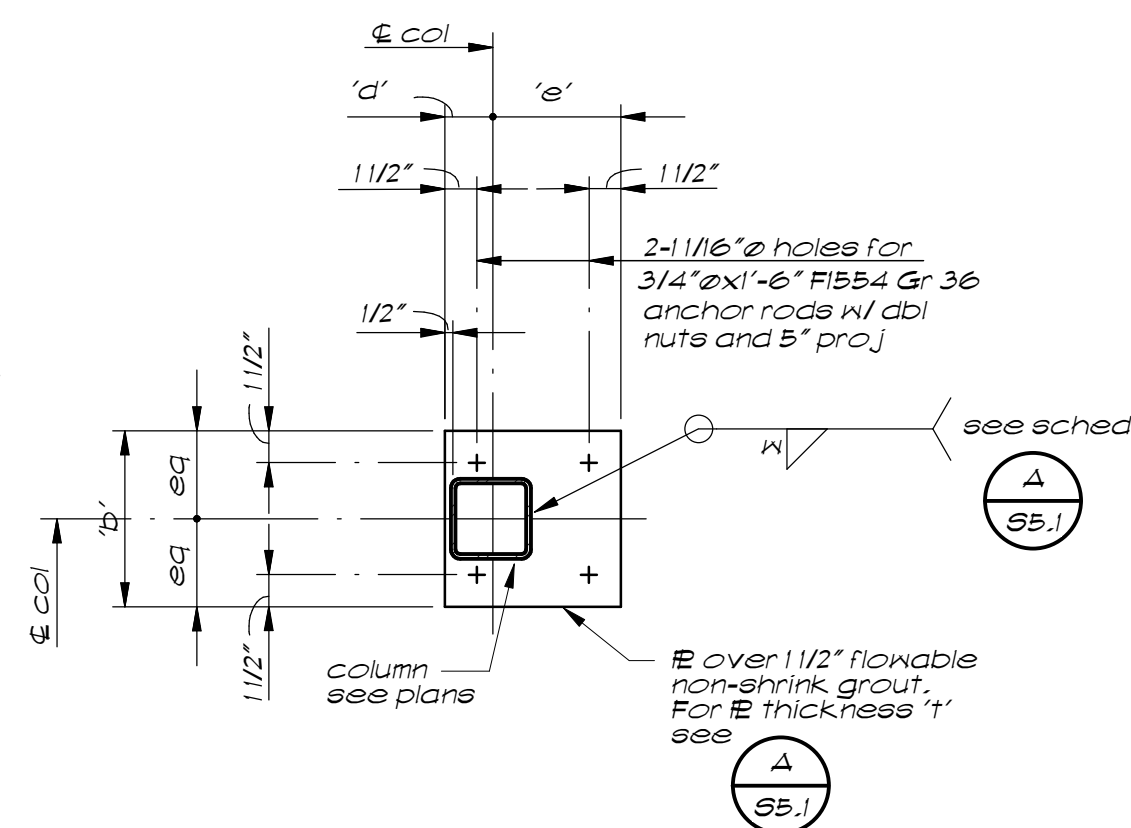
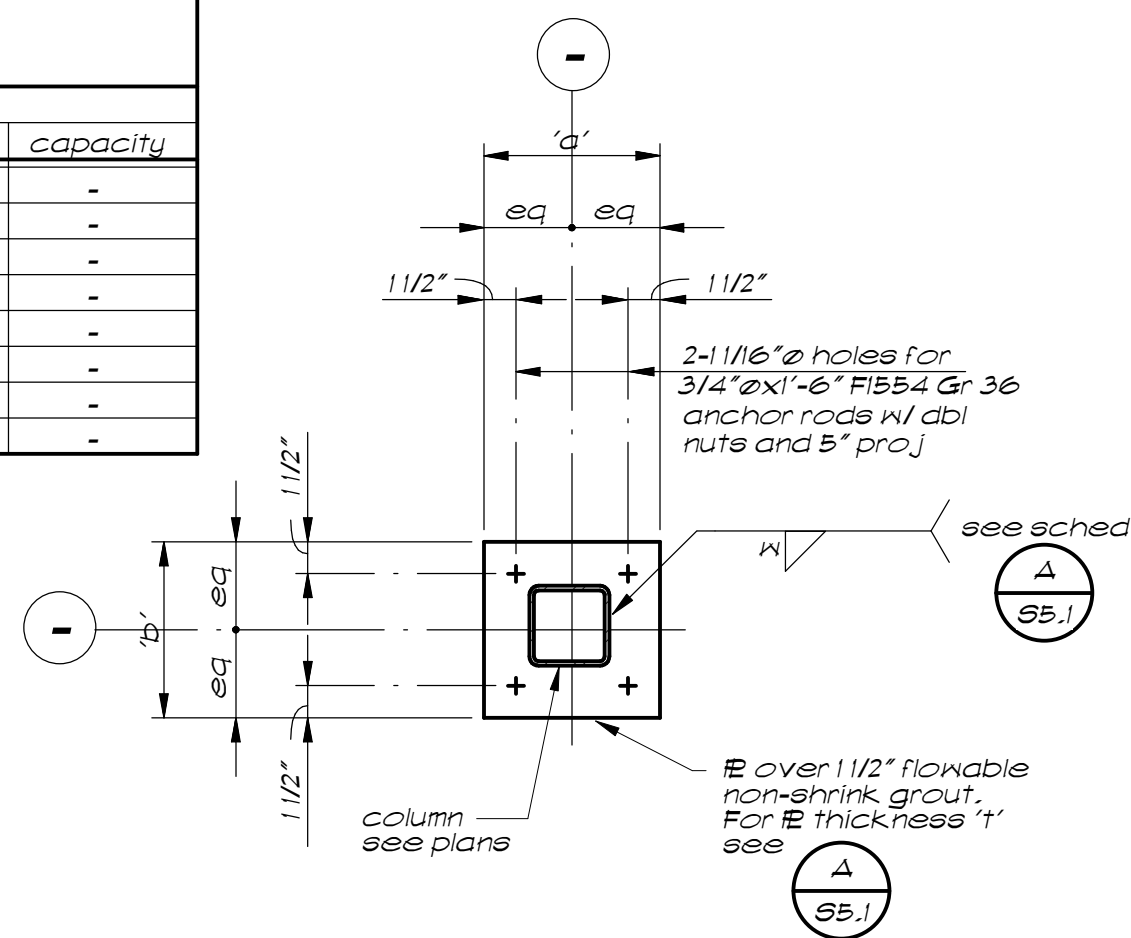


Detail 4
322SD100-8
S4.4

Base Plate Schedule

Column Size	Base Plate Size						Capacity
	'f'	'g'	'b'	'c'	'd'	'e'	
3x3	5/8"	9"	9"	3 1/2"	2"	7"	-
4x4	5/8"	10"	10"	5"	2 1/2"	7 1/2"	-
5x5	1"	11"	11"	5 1/2"	3"	8"	-
6x6	1"	12"	12"	7"	3 1/2"	8 1/2"	-
7x7	1 1/4"	13"	13"	8"	4"	9"	-
8x8	1 1/4"	14"	14"	9"	4 1/2"	9 1/2"	-
10x10	1 1/2"	16"	16"	11"	5 1/2"	10 1/2"	-
12x12	1 1/2"	18"	18"	13"	6 1/2"	11 1/2"	-

Notes:
1. Weld 'w' shall be 1/4" at base plates 3/4" and less, 5/16" at base plates greater than 3/4".



Detail 1 (518SD002-12)

Detail 2 (518SD003-12)

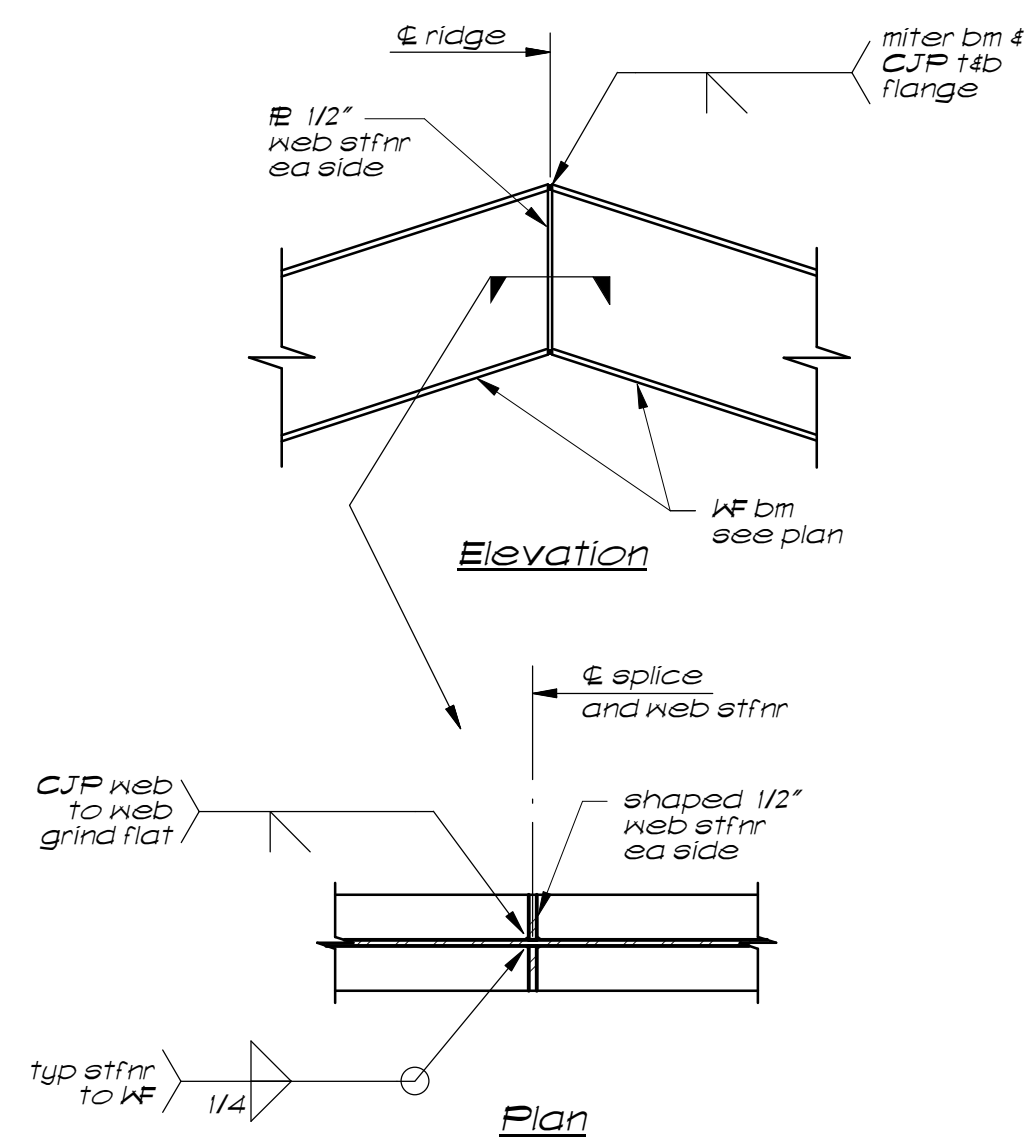
Detail 3 (518SD004-12)

Detail 4 (518SD002-12)

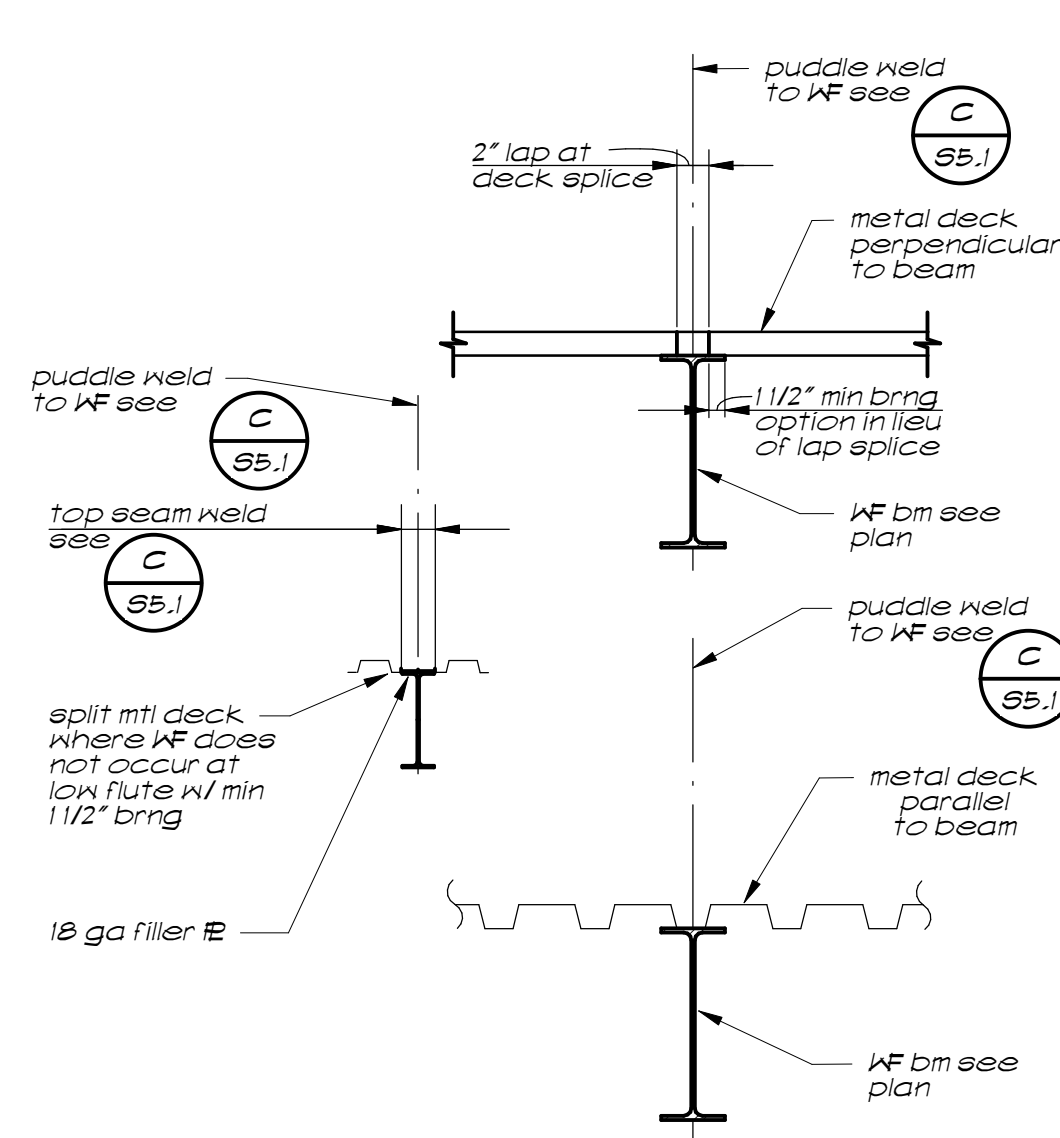
Connection Schedule

HSS Column Size	Stirr E 't'	W	Base E			
			'A'	'B' (2)	'C'	'D'
3"x3"	1/4"	3/16"	11"	4"	7 1/2"	1/2"
4"x4"	1/4"	1/4"	12"	5"	8 1/2"	5/8"
5"x5"	3/8"	1/4"	13"	6"	9 1/2"	3/4"
6"x6"	3/8"	1/4"	14"	7"	10 1/2"	3/4"
7"x7"	1/2"	1/4"	15"	8"	11 1/2"	3/4"
8"x8"	3/4"	5/16"	15"	9"	12 1/2"	7/8"
10"x10"	3/4"	5/16"	16"	11"	14 1/2"	1"

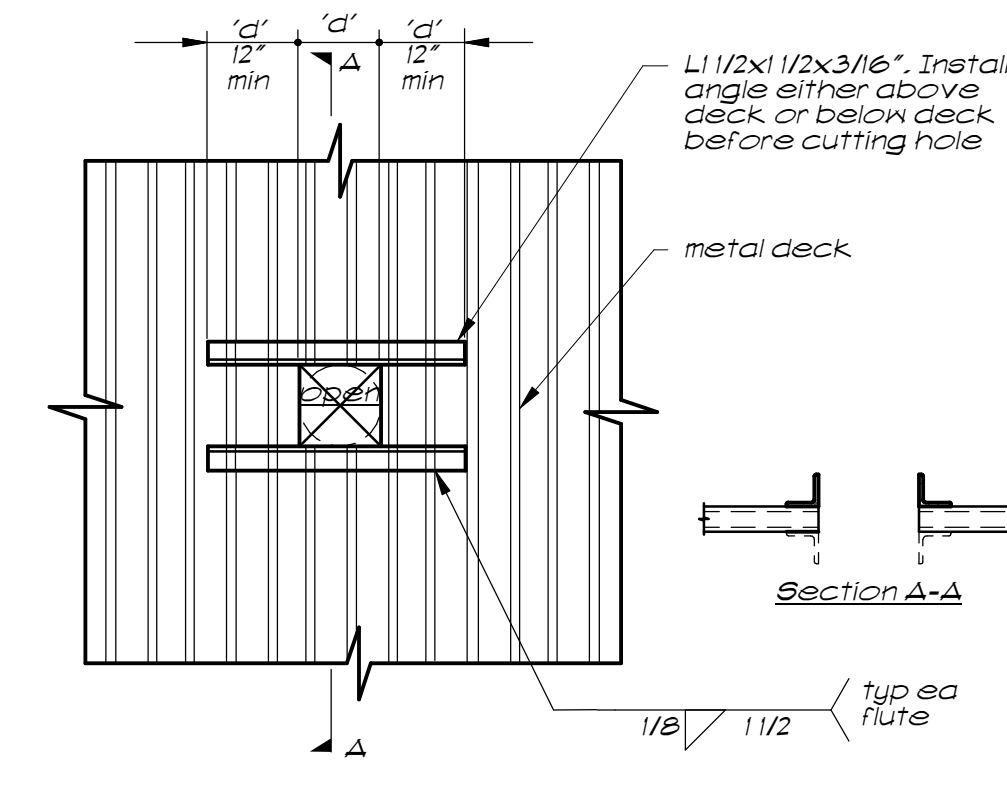
Notes:
1. Use E 't' for largest HSS column at connection.
2. 'B' indicates the minimum width. Use the greater width of the beam flange or the minimum indicated.
3. Weld 's' shall be 1/4" at base plates 3/4" thick and less, 5/16" at base plates greater than 3/4" thick.



Detail 5 (518SD001-12)



Detail 6 (518SD003-12)

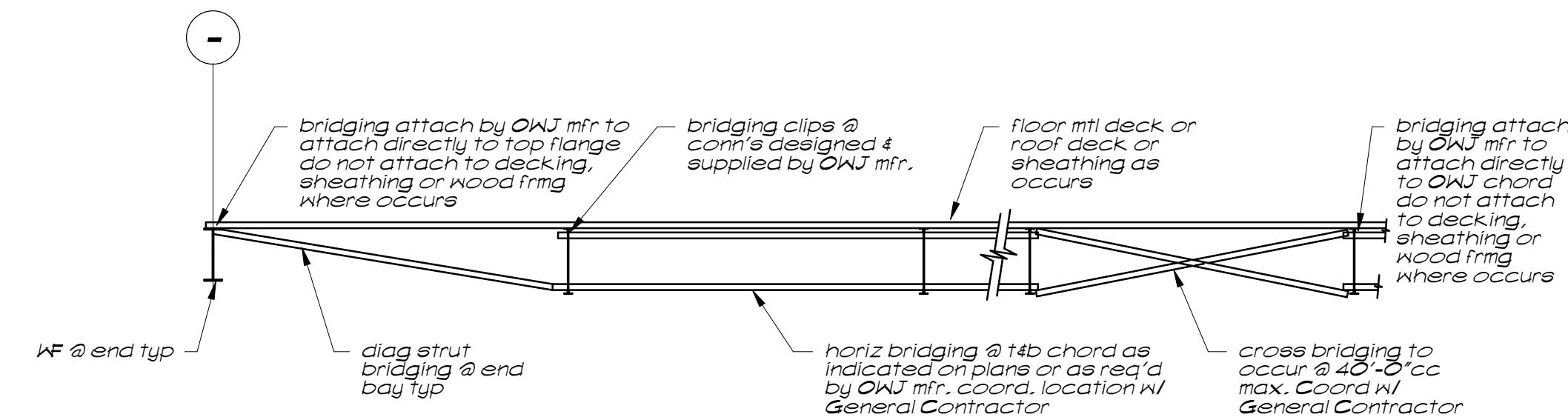


Detail 7 (518SD003-12)

Deck Welding Schedule

Deck Type	Depth & Gauge	Perpendicular Supports	Parallel Supports	Side Laps	Diaphragm Shear Capacity
DGB-36 Roof Deck	1 1/2" x 20 ga	4 PW per sheet	PW @ 12" cc	DG @ 36" cc	667#1

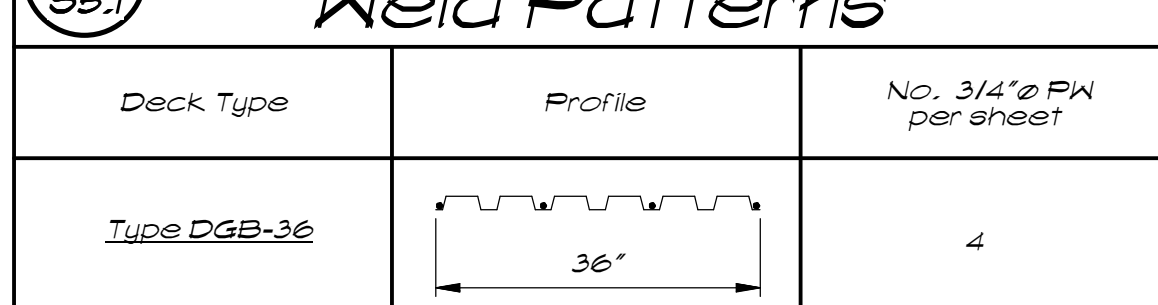
Notes:
1. PW = 3/4" diameter (1/2" effective diameter) puddle weld; TSN = 1 1/2" min top seam weld; DG = Delta Grip.
2. Metal deck shall be AISC or approved equal, of type and gauge shown on plans and welded as shown above.
3. See D (55.1) for typical weld patterns.
4. See E (55.1) for metal deck welding at struct steel supports.
5. All metal deck shall have two spans minimum.
6. Provide shoring as required at all decks per mfr recommendations.

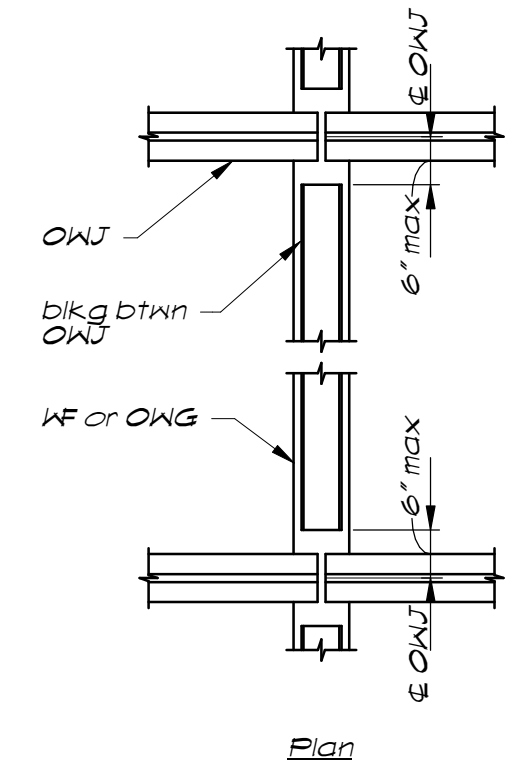


Detail 8 (565SD002-48)

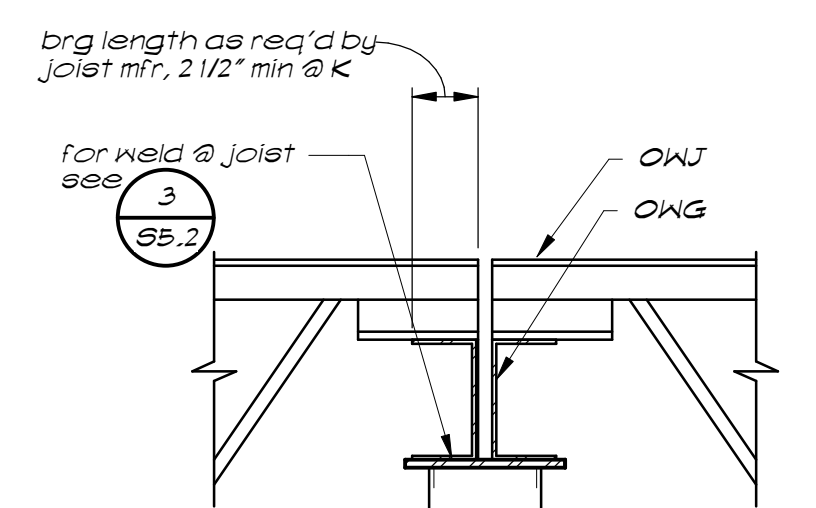
Metal Deck Weld Patterns

Deck Type	Profile	No. 3/4" x PW per sheet
Type DGB-36	36"	4

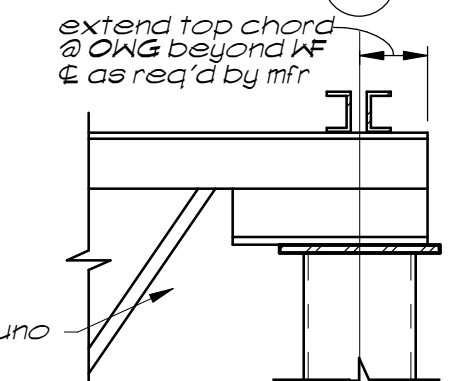




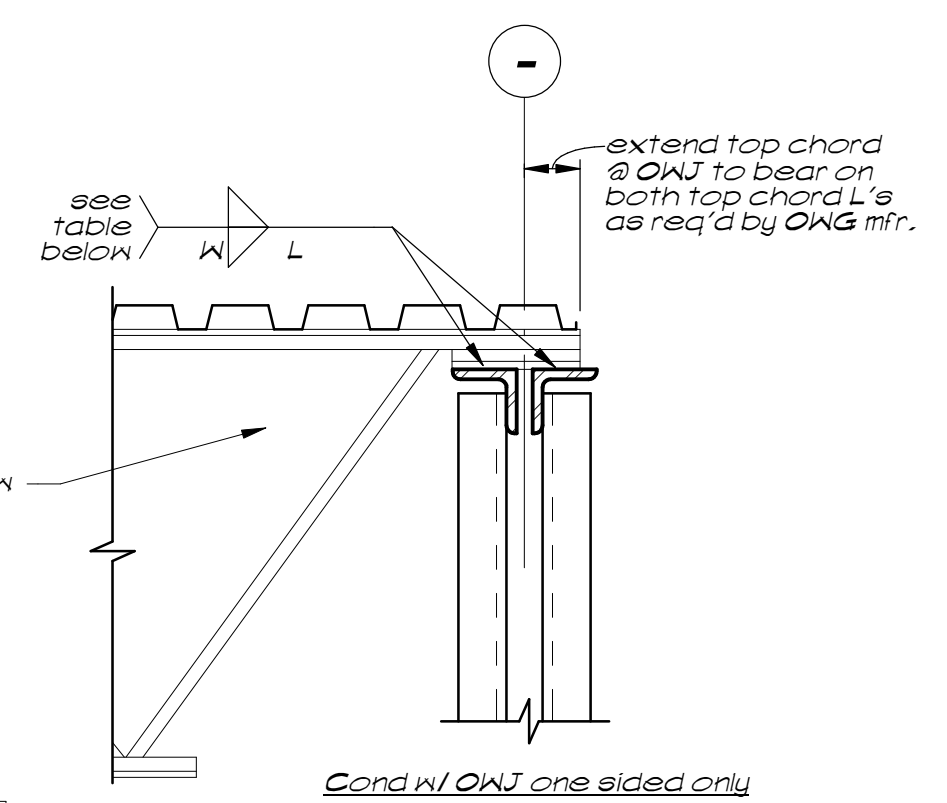
Plan



3
S5.2

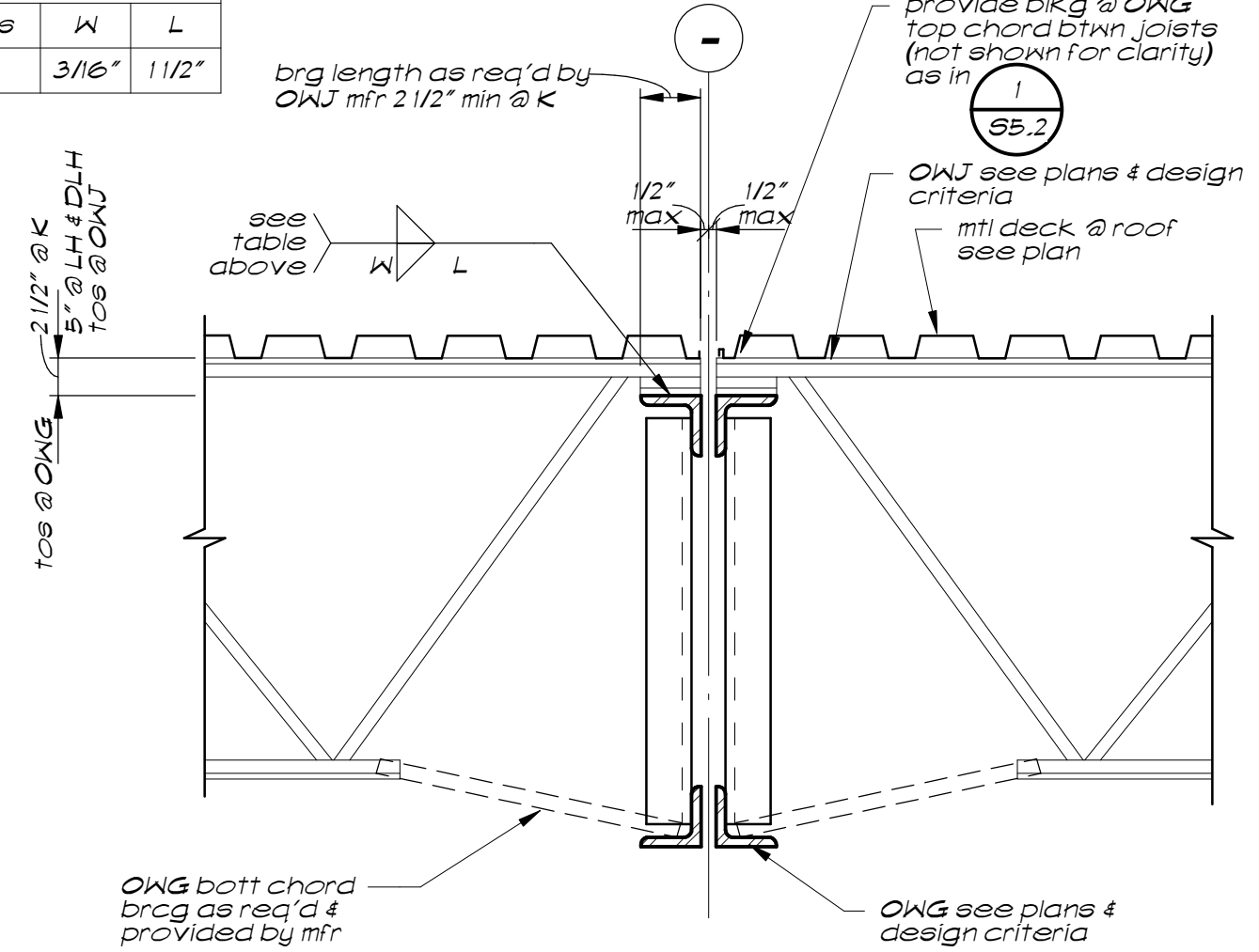


Cond w/ OWG one side only

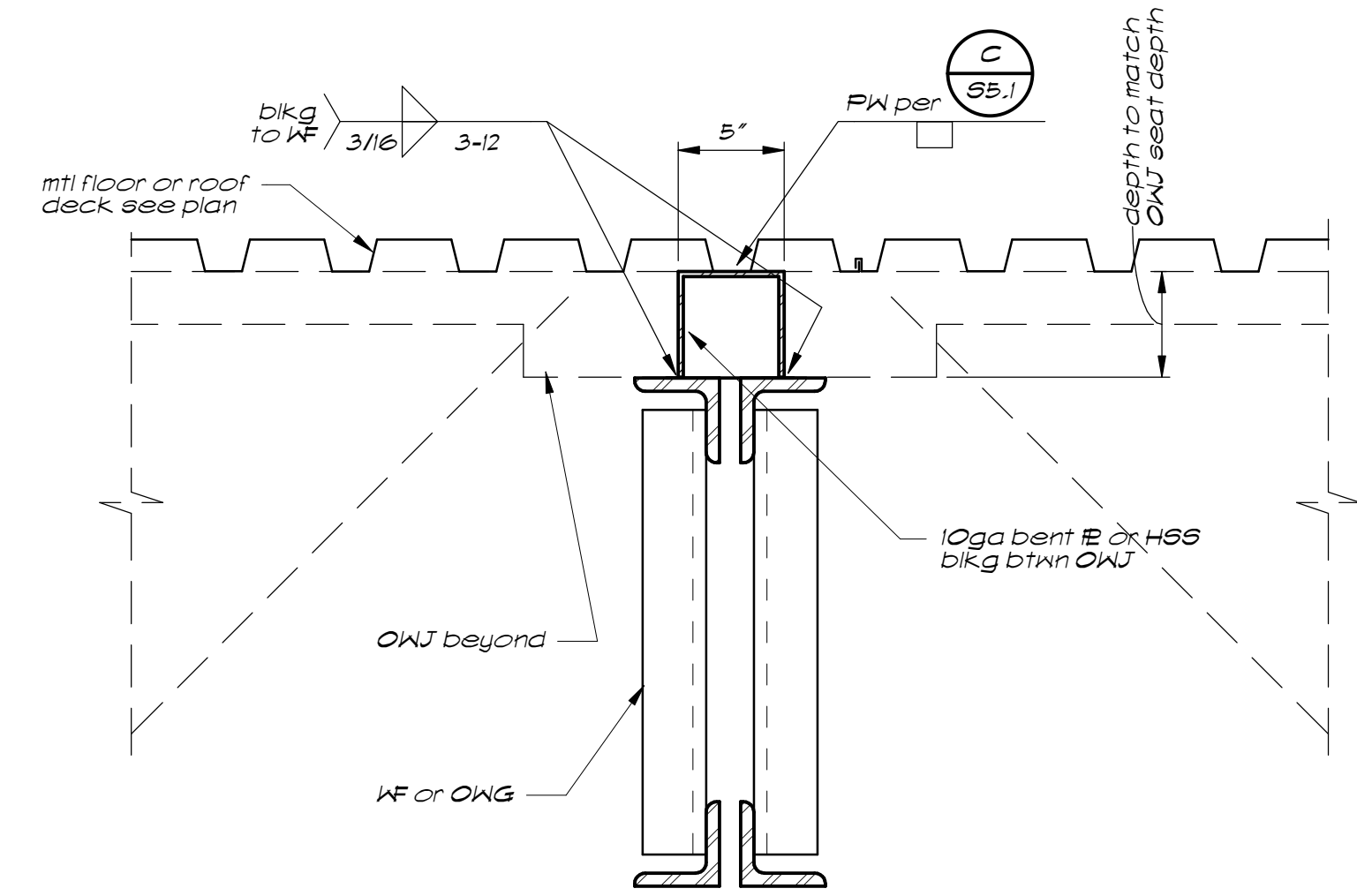


Cond w/ OWJ one sided only

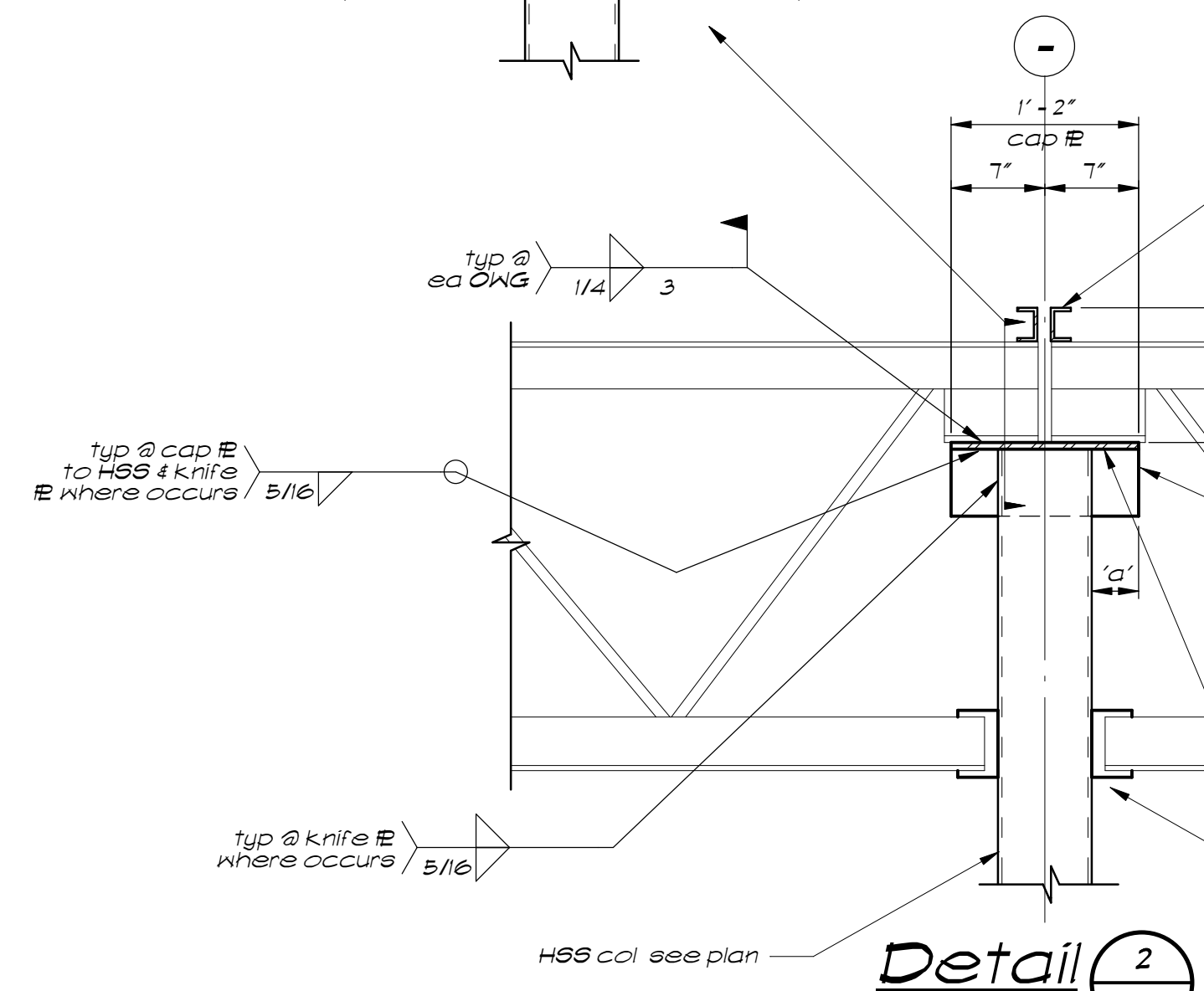
Joist brg weld		
Series	W	L
K	3/16"	1 1/2"



Detail 3
OWJ to OWG - Roof
S5.2

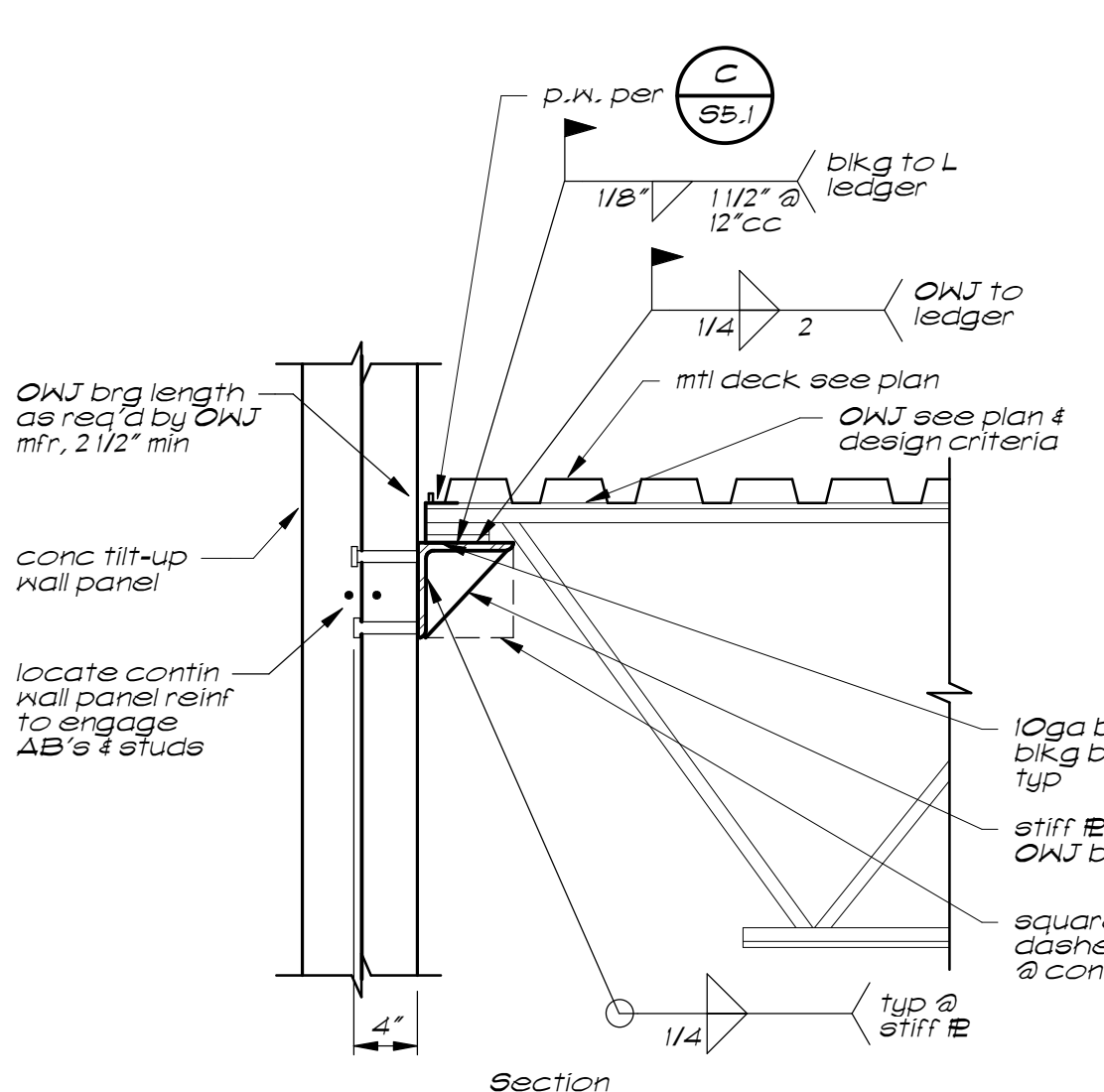


Detail 1
Bent @ blk g btwn joists
S5.2

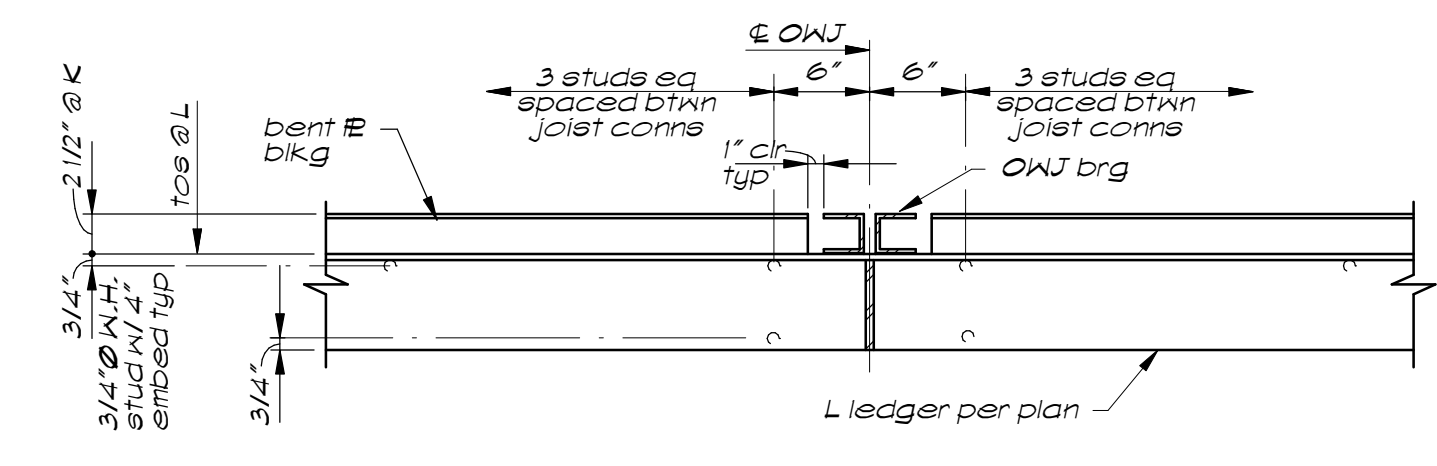


Detail 2
OWJ to Column - Roof
S5.2

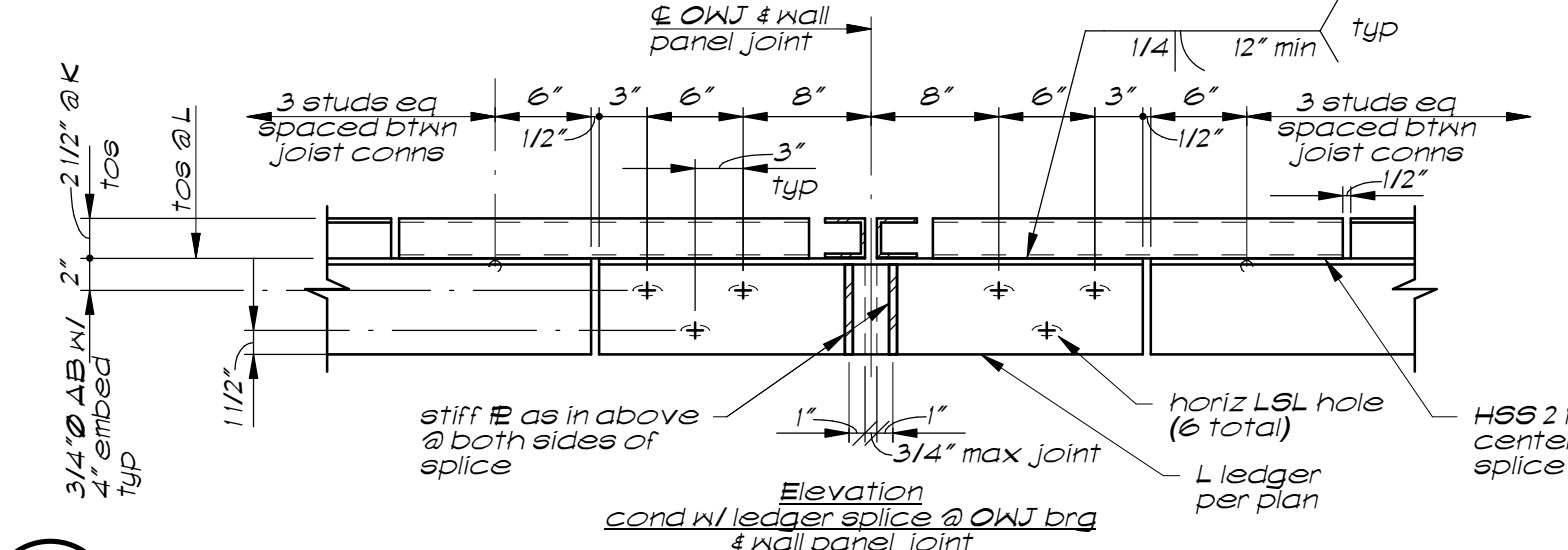
Note: cond @ bldg edge w/ OWJ one side only sim



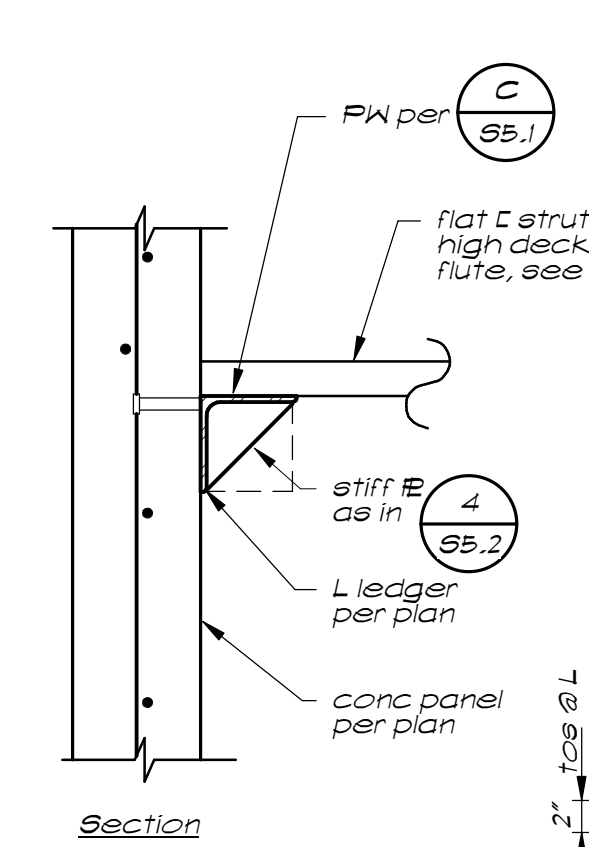
Section



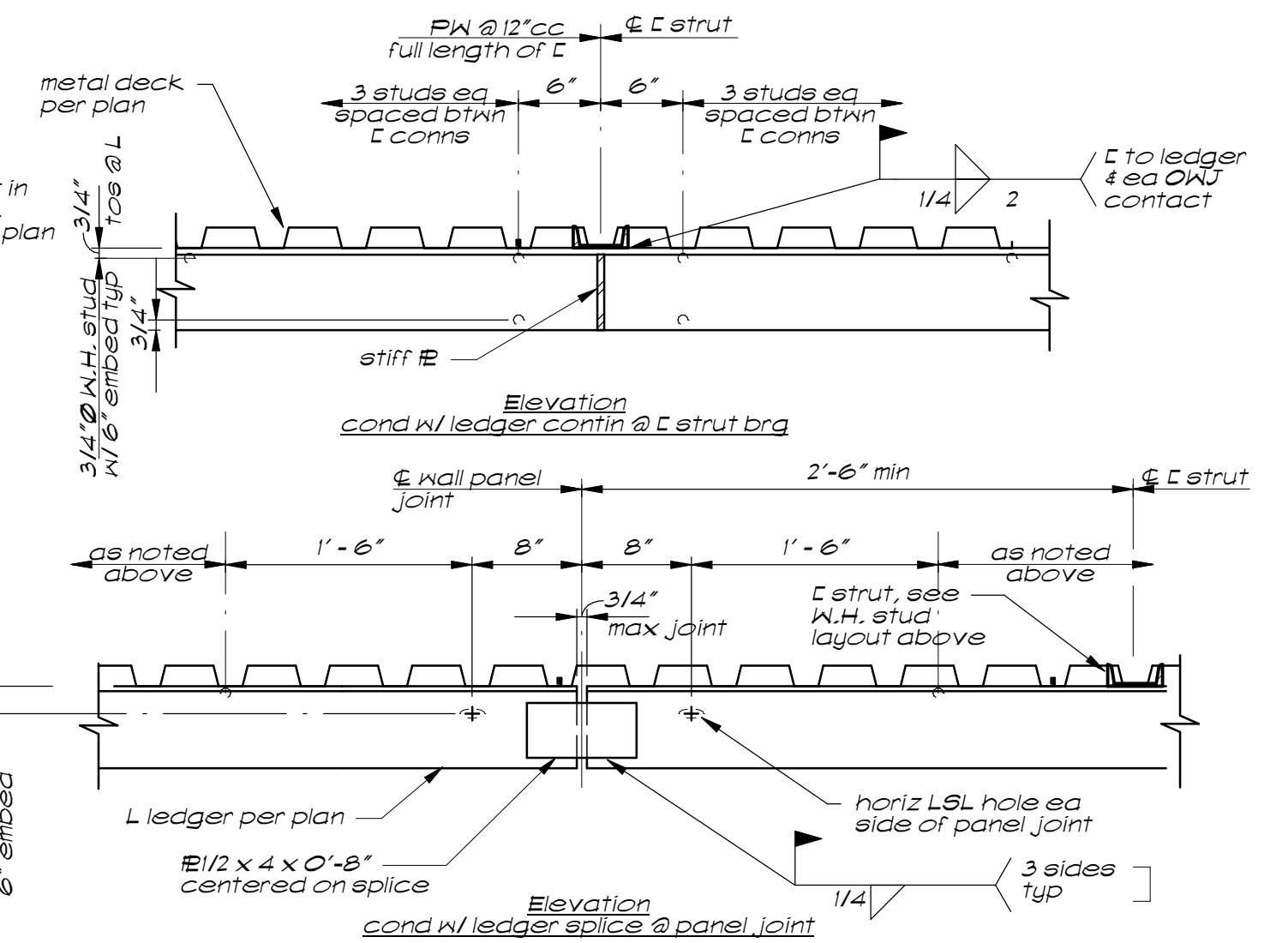
Elevation
Typ condition @ OWJ brg



Elevation
cond w/ ledger splice @ OWJ brg & wall panel joint



Section



Detail 5
S5.2

Chapter 4

Warehouse Building Design Drawings

This chapter provides the following design drawings prepared for the warehouse building:

- S1.1 General Notes
- S.1.2 General Notes
- S.1.3 Typical Details
- S.2.1 Foundation Plan
- S.2.2 Roof Framing Plan
- S.4.1 Panel Elevations
- S.4.2 Panel Elevations
- S.4.3 Panel Reinforcing Elevations
- S.4.4 Panel Reinforcing Elevations
- S.4.5 Panel Details
- S.4.6 Braced Frame Elevations & Details
- S.4.7 Braced Frame Details
- S.5.1 Details
- S.5.2 Details
- S.5.3 Details

GENERAL NOTES

APPLICABLE TO ALL DRAWINGS UNLESS NOTED OR SHOWN OTHERWISE

STRUCTURAL STEEL

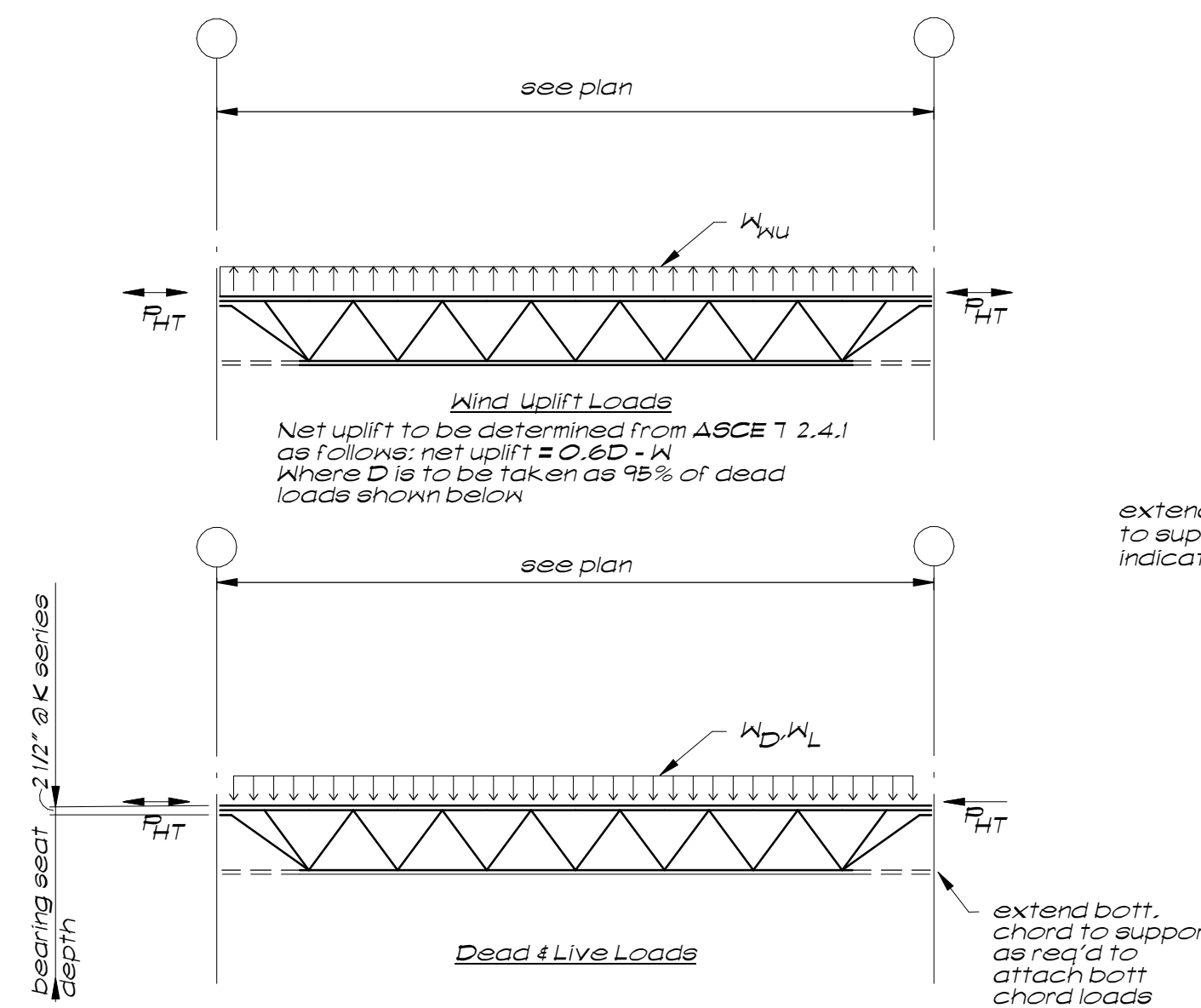
- Fabrication, erection and materials shall conform with the AISC Specification for Structural Steel Buildings, the AISC Seismic Provisions for Structural Steel Buildings, and the International Building Code, latest editions.
- Structural Steel wide flange shapes shall conform with ASTM A992. All other Structural Steel rolled shapes (channels, angles, etc) and plates shall conform with ASTM A36, uno.
- Steel Pipe shall conform to ASTM A53, Types E or S, Grade B.
- All Hollow Structural Sections (HSS) shall conform to ASTM A500, Grade B.
- All structural steel shall receive a minimum of one shop coat of red primer paint. Do not paint areas to be field welded, fireproofed, galvanized, to receive slip-critical high strength bolts, or to be embedded in concrete. Provide additional painting as noted in the specifications.
- All structural steel shall be erected plumb and true to line. Temporary bracing shall be installed and shall be left in place until other means are provided to adequately brace the structure. Contractor responsible for reviewing all base plate and support conditions during erection and bracing as required. See AISC and OSHA requirements.
- Place non-shrink grout under all base plates before adding vertical load.
- Structural steel below grade shall have 3 inches minimum of concrete cover.
- Bolted connections shall consist of unfinished bolts conforming to ASTM A307 unless noted otherwise. Where high strength bolts are indicated, bolts conforming to ASTM A325 or ASTM A490 as needed shall be provided. Anchor rods cast in concrete or masonry shall be headed bolts with cut threads, full diameter body style conforming to ASTM F1554 Gr. 36, 55 (weldable per SI Supplementary Requirements), or 105 as indicated on drawings. All bolted connections and base plates shall have standard cut washers unless noted otherwise. Washers for base plates shall conform to ASTM F444 unless noted otherwise, and shall be placed at top and bottom of plate.
- "Slip-critical" bolted connections:
 - "Slip-critical" connections (A325SC design values with special inspection) are required at all braced frame connections, at all connections along chord lines and drag lines (as noted on plans), and uno, at all bolts in oversized or slotted holes.
 - The special inspector must be present during installation and tightening operation of "slip-critical" connections.
- Provide 1/2" diameter stitch bolts and ring fills, spaced at not more than 2'-0" on center for all double angle members.
- At wood to steel parallel contact, bolt with 1/2" diameter bolts at maximum 24"oc.
- Holes for unfinished bolts shall be of the same nominal diameter of the bolt plus 1/16". Use standard AISC gage and pitch for bolts except as noted otherwise.
- Welding shall be done by the electric arc process in accordance with American Welding Society Standards, using only certified welders. All groove welds shall have complete penetration unless noted otherwise. All exposed welds shall be ground smooth. All electrodes for welding shall comply with AWS code, E70 series minimum.
- Weld lengths called for on plans are the net effective lengths required.
- Minimum fillet welds:
 - 3/16" @ 1' < 1/2'
 - 1/4" @ 1' < 3/4'
 - 5/16" @ 1' > 3/4'
- Welding Procedure Specifications (WPS) for shop and field prequalified weld joints and weld joints qualified by test shall be prepared for review prior to fabrication. All welding procedure items such as base metals, welding processes, filler metals and joint details that meet the requirements of AWS D1.1 Section 5.1 shall be considered as prequalified. Any change or substitution that is beyond the range or tolerance or requirements for prequalification shall be qualified by test per AWS D1.1 Section 5 part B. Qualification testing is required when the depth of a partial penetration or complete penetration weld is 2" or greater.
- For nondestructive testing of welded connections excluding primary members of moment resisting frames:
 - Welded connections shall be tested by nondestructive methods for compliance with AISC J1, and job specifications. Ultrasonic Testing shall be in accordance with AWS D1.1, ASTM E164 and ASME Section V, Radiography shall be in accordance with AWS D1.1, ASTM E94 and E99, and ASME Section V. This testing shall be part of the special inspection requirements of IBC Section 1704.3 performed by an approved independent testing laboratory as follows:
 - Base metal thicker than 1 inch when subject to through thickness weld shrinkage strains.
 - All complete joint penetration groove or butt welds.
 - All partial joint penetration groove welds when used in column splices.
 - Any material discontinuities shall be accepted or rejected on the basis of defecting in accordance with the (larger reflector) criteria of AISC J2.

STEEL JOIST AND JOIST GIRDER DESIGN CRITERIA

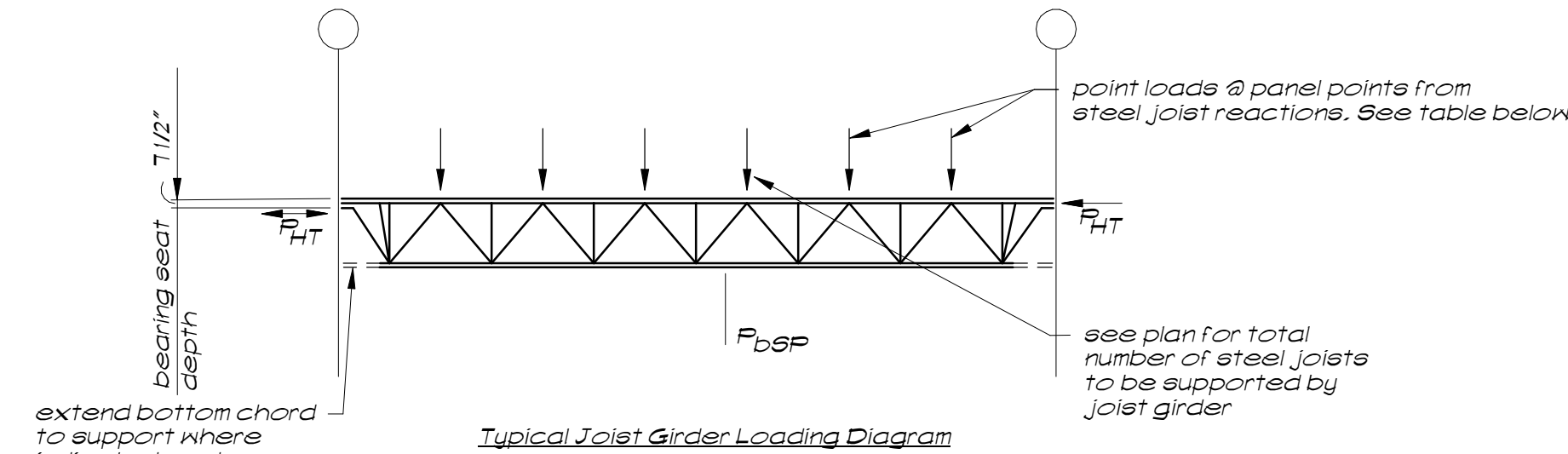
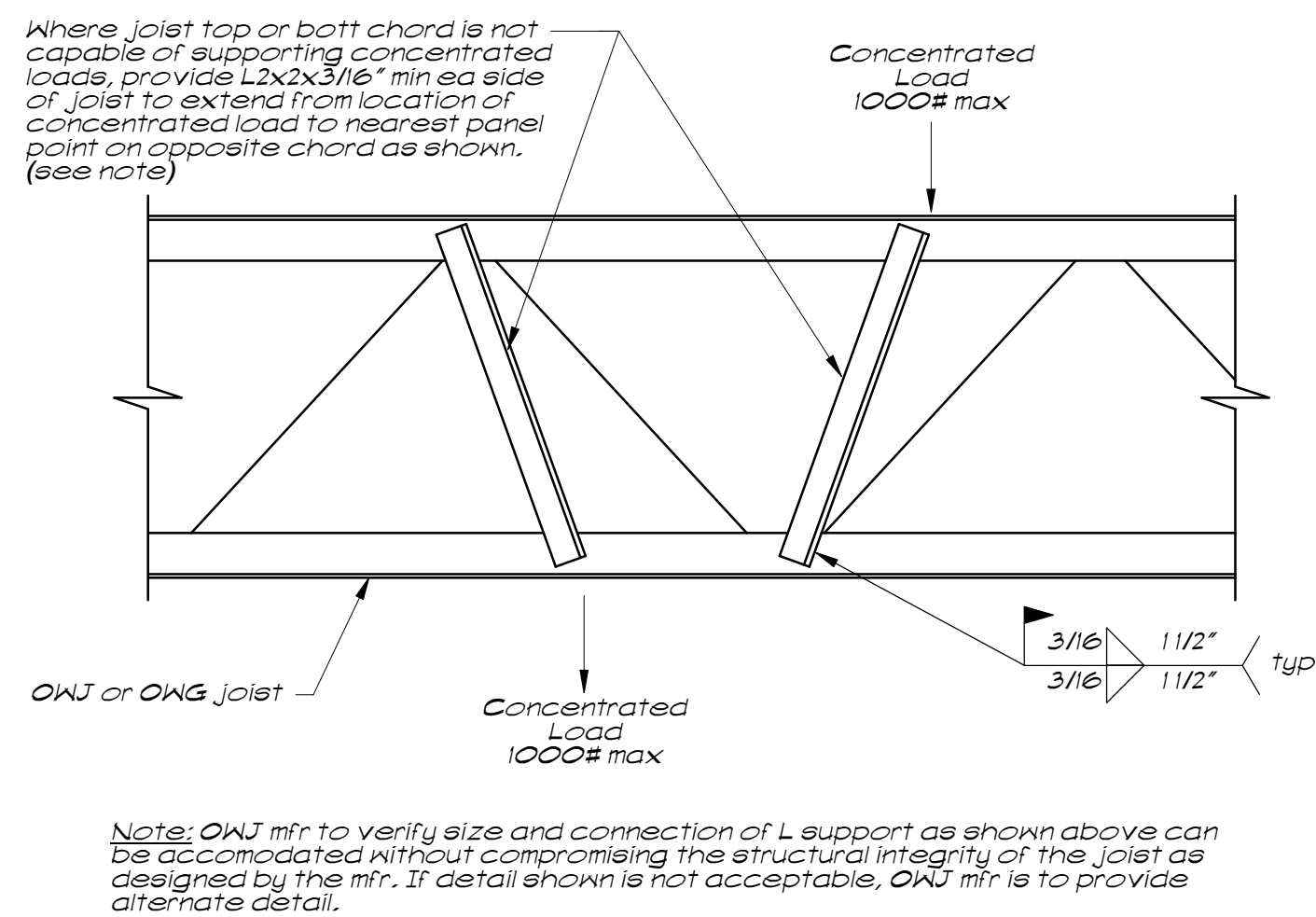
- All steel joists, joist girders, accessories and connections shall comply with latest edition of IBC & ASCE 7 & Steel Joist Institute standards except that the field welding shall comply with American Welding Society standards. All welding shall be performed by qualified certified welders.
- In accordance with IBC 2206.3, the steel joist manufacturer shall submit design calculations bearing the seal and signature of a registered California Civil Engineer. The maximum demand/capacity ratio for all design calculations shall be 1.00. Design calculations shall include a statement noting that the joist design complies with all criteria provided in the approved construction documents and has been based on configurations details, spacing, etc., as shown in the steel joist manufacturer's steel joist placement plans.
- In accordance with IBC 2206.5 & 1704.2.2, at the completion of fabrication, the steel joist manufacturer shall submit a certificate of compliance stating that the work was performed in accordance with the approved construction documents and with SJI standard specifications.
- Maximum un-factored live load deflections shall not exceed L/360 for floors and roof members supporting plaster or L/240 for other roof members. Maximum un-factored total load deflection shall not exceed L/180. Calculated member deflections shall not be reduced by camber.
- Camber all roof joists as indicated in SJI code of standard practice. Camber all floor joists as required to achieve a flat floor. Minimum floor joist camber should equal 100% of the un-factored non-composite dead load.
- See Roof Framing Plans, Mechanical Plans, etc for locations and weights of supported equipment. General Contractor shall coordinate the weight and location of all supported equipment and supply this information to the steel joist manufacturer for the design of the trusses. Provide web members as required to support point loads, design truss chords for bending between panel points or provide supplemental struts as in Coordinate equipment loads with the mechanical contractor prior to fabrication.
- Bridging, welding and all accessories req'd to connect steel joists and girders shall be furnished by the Steel Joist Mfr. Add'l bridging req'd @ uplift condition shall be designed & provided by Steel Joist Mfr. Bridging shall not attach to wood panelized roof framing.
- Provide truss panel point to align with columns and blocking beams as shown on plans and sections.
- Location of all erection aids req'd by Steel Joist Mfr shall be coordinated to avoid conflicts with Structural, Architectural & MEP elements.
- Fire sprinkler shop drawings shall be submitted & reviewed prior to commencing steel joist design.
- For steel joist and joist girder loading information see Steel Joist & Joist Girder Loading Diagram Notes.

STEEL JOIST AND JOIST GIRDER LOADING DIAGRAM NOTES:

- Steel joist design shall be based on Allowable Stress Design (ASD) & shall utilize the appropriate load combinations provided in ASCE 7 chapter 2. Increases in allowable stress based on duration of loading shall not be used. Where steel joists are required to resist seismic forces, the additional load combinations of ASCE 7 12.4.2.3 and 12.4.3.2 shall also apply.
- All loads are un-factored u.n.o. All seismic loads are E (not E/1.4) level. All seismic drag loads are Emh (i.e. Ω_E).
- The joists specified on plan are based on option #1 approach as noted in the SJI code of standard practice, section 6. Per section 6 "Joist manufacturer shall design joists for additional loads as shown". See plan and loading diagrams for additional loading conditions. The additional loads may require the use of joists that have greater capacity than the typical joist shown on the plans and/or additional joists may be required to accommodate the additional loads.
- Uniform Loads:
 - All top chord uniform loads shall be assumed to occur along the full length of the truss u.n.o. Snow drift loads shall be considered where shown.
 - Bottom chord uniform loads shall be considered to occur along the full length of the truss. Bottom chord loads shall extend to support where necessary to attach suspended elements.
- Point Loads:
 - Point load locations shown are approximate. Coordinate final locations with Architectural, Mechanical Plumbing and Electrical. In lieu of determining precise locations of point loads at steel joists, the manufacturer may consider point loads as "addload" with the joist design based on worst case possible locations of point loads. Joist manufacturer shall design top and bottom chords to support point loads not occurring at panel points or shall provide supplemental struts as in
 - Where non-structural component bracing attaches to steel joists, manufacturer shall include bracing loads in the load combinations. Where the design of non-structural component support & bracing has been deferred, General Contractor shall provide hanger & bracing loads, locations & attachment details to steel joist manufacturer for inclusion in steel joist design.
- For design requirements see Steel Joist and Joist Girder Design Criteria
- Joist designations shown on framing plans correspond to the following:
 - Steel Joist Example**
26K (RJ-1) Indicates 26" deep 'K' series roof joist with loading type RJ-1 as shown in loading schedule. Final steel joist section number (e.g. 26K10) to be determined by steel joist mfr.
 - Steel Joist Girder Example**
40G (RJG-1) Indicates 36" deep roof joist girder with loading type RJG-1 as shown in loading schedule. Load at each panel point is determined from steel joist reactions. Steel joist spacing and number of joists supported by joist girder shall be as shown on plans.



Typical Steel Joist Loading Diagrams



Typical Steel Joist Girder Loading Diagrams

LOADING SCHEDULE

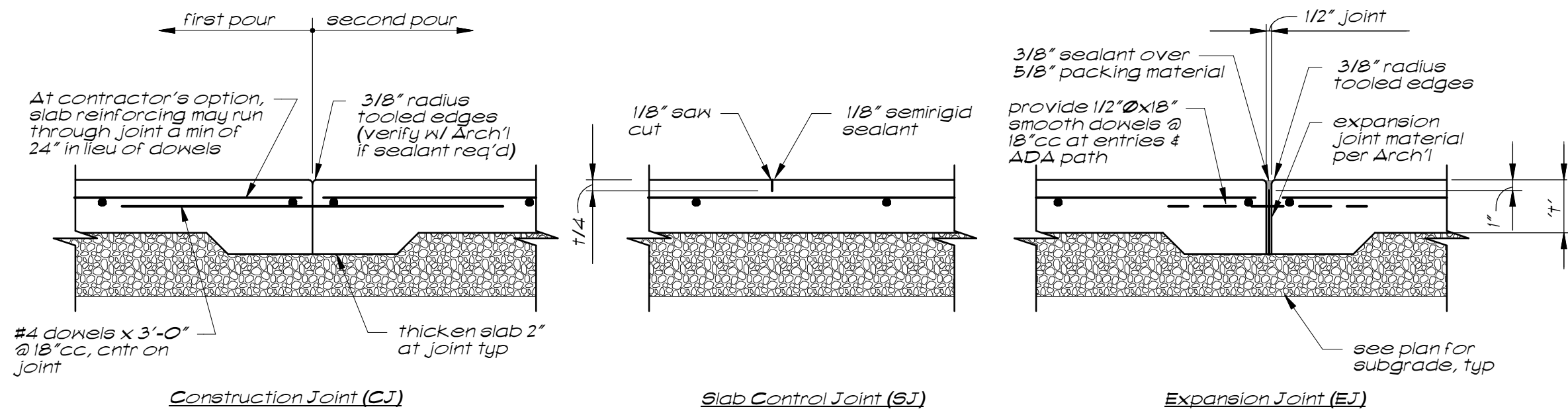
STEEL JOIST LOADING TYPE	Joist Loads							F _{HT}		
	P _D	P _L	P _{WU}	P _{bSP}	W _{WU}	W _D	W _L	Design 1	Design 2	Design 3
J1	-	-	-	see notes	123 (95)	88	III	(2.2)	2.6 (1.9)	6.9 (3.3)
J2	-	-	-	-	123 (95)	88	III	(1.1)	1.3 (1.0)	3.5 (1.8)
J3	-	-	-	-	123 (95)	88	III	(2.2)	2.6 (1.9)	6.9 (3.3)
J4	-	-	-	-	123 (95)	88	III	(7.5)	20.3 (4.8)	55.3 (7.5)
G1	4.7	3.8	6.2 (4.8)	-	-	-	-	(8.9)	10.7 (7.4)	21.1 (8.9)
G2	2.4	1.9	3.1 (2.4)	-	-	47	38	(9.9)	11.4 (8.3)	27.7 (9.9)
G1a	4.7	3.8	6.2 (4.8)	-	-	-	-	(8.9)	10.7 (7.4)	10.6 (8.9)
G2a	2.4	1.9	3.1 (2.4)	-	-	47	38	(9.9)	11.4 (8.3)	10.6 (9.9)

Notes:

- The loads shown do not include self weight of the girders
- Point Load Symbols:
 - P_D = top chord point dead load (k)
 - P_L = top chord point live load (k)
 - P_{bSP} = bottom chord point load at sprinklers. Vertical load at fire sprinklers supports shall include weight of water filled pipe plus 250#. P_{bSP} may occur at any location along bott chord & may not occur at a panel point. General Contractor shall coordinate the weight & location of all sprinkler loads and supply this information to steel joist mfr prior to commencing steel joist design. Sprinkler live load need not be concurrent with any other live loads.
 - P_{WU} = top chord point wind load, upwards (k) - Design #1 and #3 shown, Design #2 in parenthesis
 - W_{WU} = top chord distributed wind load (plf)
 - W_D = top chord distributed dead load (plf)
 - W_L = top chord distributed live load (plf)
 - F_{HT} = horizontal top chord axial force (consider both tension & compression) from seismic force (wind shown in parenthesis). Where noted as seismic drag load, consider add'l load combinations of ASCE 7 12.4.3.2. Loads shown are 1.0E and 1.0N (k)
 - P_{WU} = top chord wind uplift where occurs, see Steel Joist Loading Diagram for required load combinations.
- Unless specific design is used, baseline joists are 30K7. G1 girders are 50G2N5.5K and G2 girders are 50G2N4.3K.

TYPICAL DETAILS

APPLICABLE TO ALL DRAWINGS UNLESS NOTED OR SHOWN OTHERWISE



Construction Joint (CJ)

Slab Control Joint (SJ)

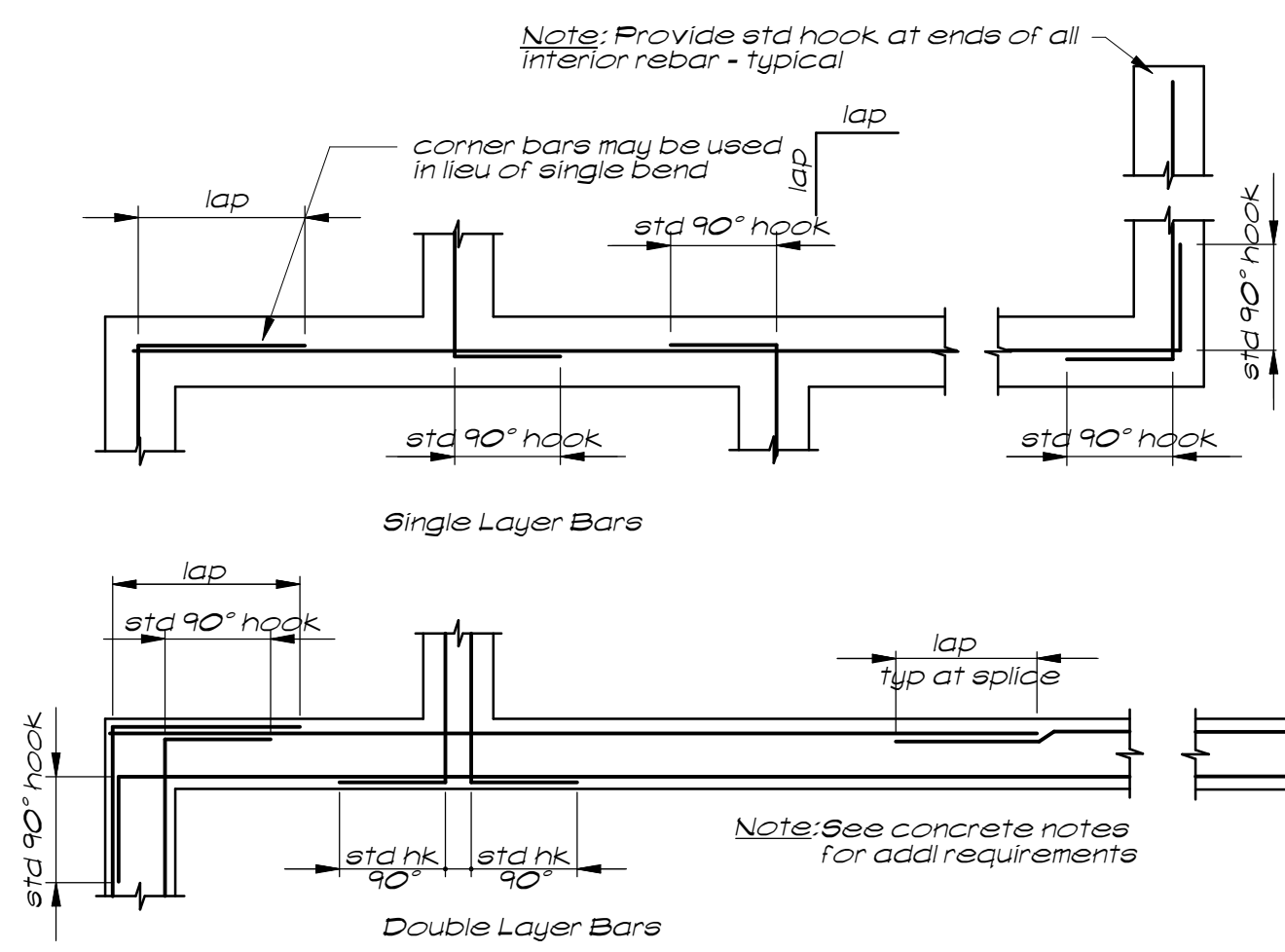
Expansion Joint (EJ)

Note:

- Construction joints and control joints shall divide slab into areas not exceeding 225 sq ft without reentrant corners and with length to width ratios not exceeding 1 1/2 to 1. Joint spacing shall not exceed 15 feet in either direction.
- Contractor shall submit layout plan showing proposed control and construction joint locations to Architect & Structural Engineer for review & approval.
- Semirigid sealant to be Euclid Euclo #100 or equal.

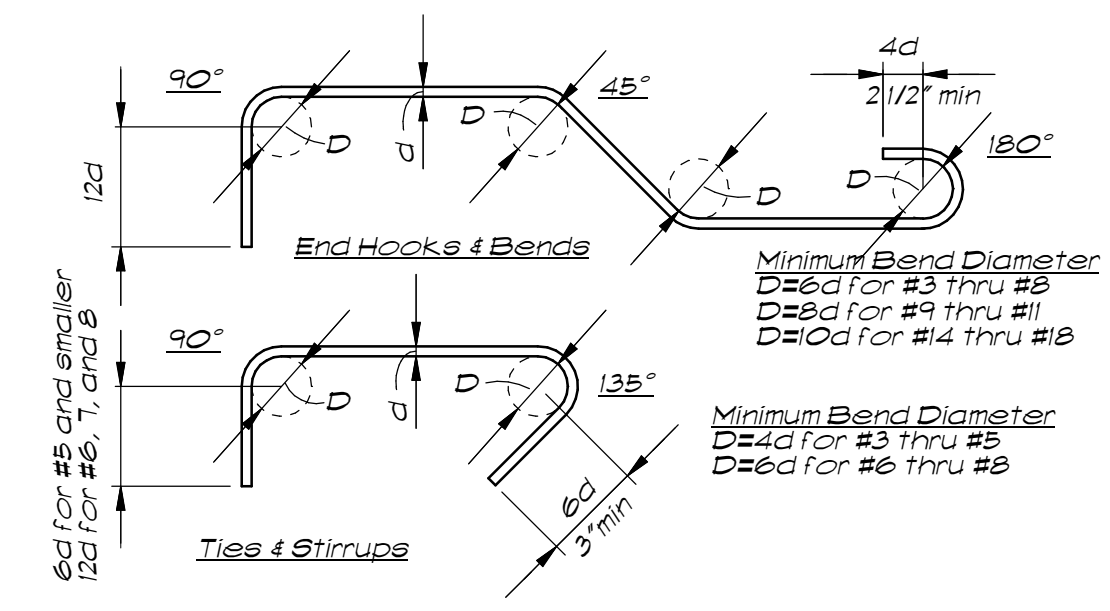
Slab On Grade Joints

3105D001-12
S1.3



Corner Reinforcing at Concrete Ftgs

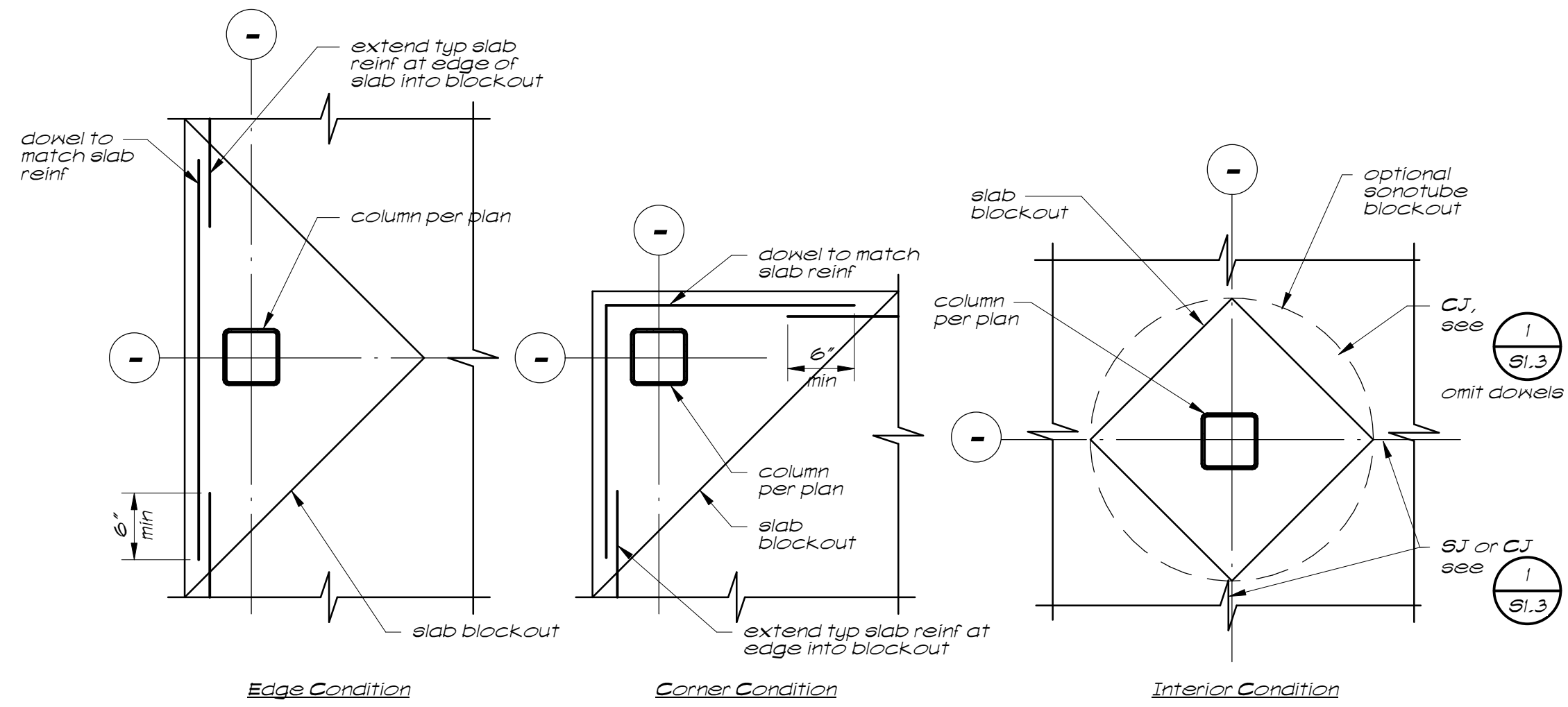
2005D011-32
S1.3



Standard Rebar Hooks and Bends

3005D011-12
S1.3

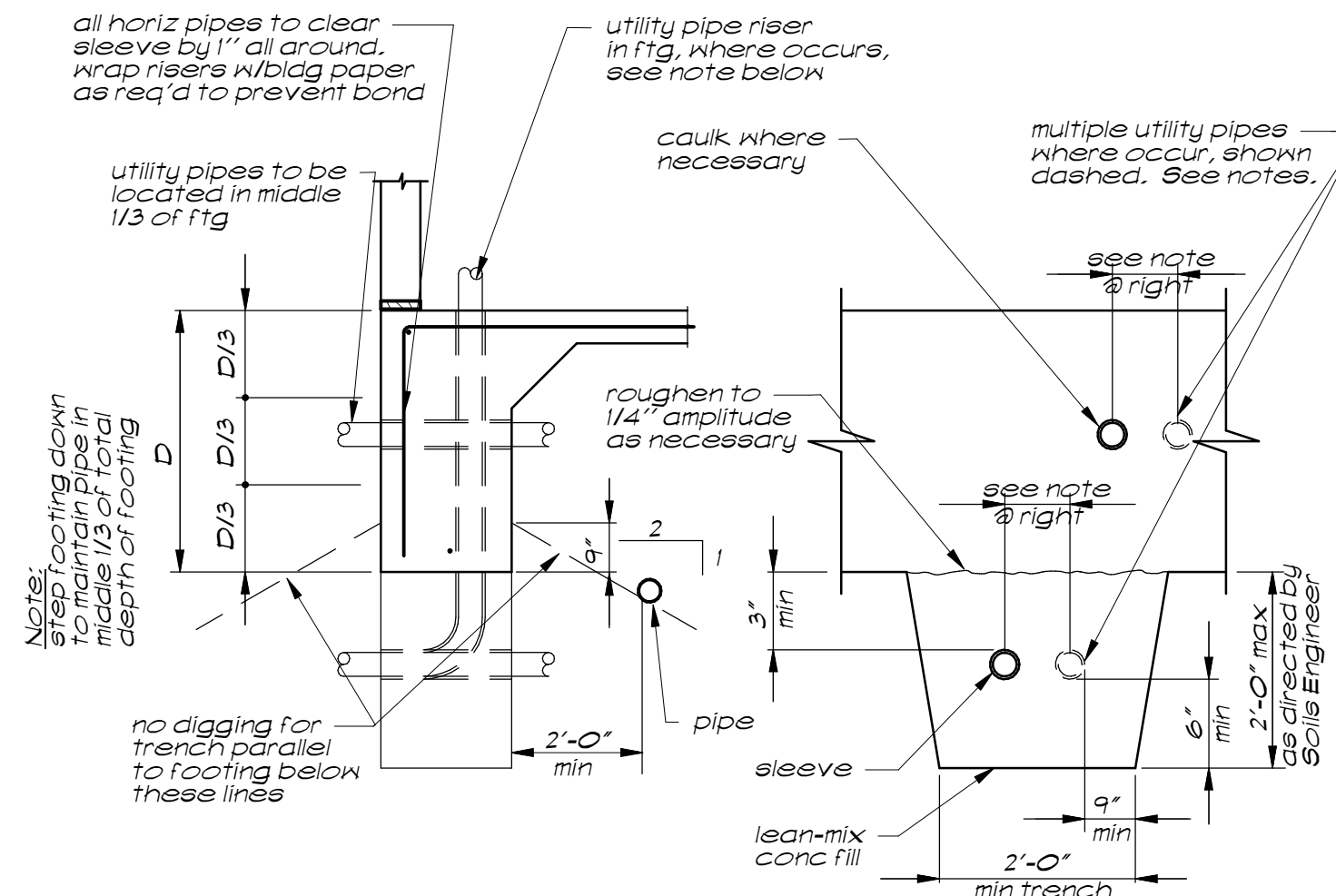
Note: All hooks shall be 90° or 180° standard hooks unless otherwise shown or noted.



- Note:
- Slab blockout shall not extend beyond footing.
 - At exposed concrete conditions, coordinate blockout shape and size w/ Arch'd dwgs.

Slab Blockout

3105D002-12
S1.3

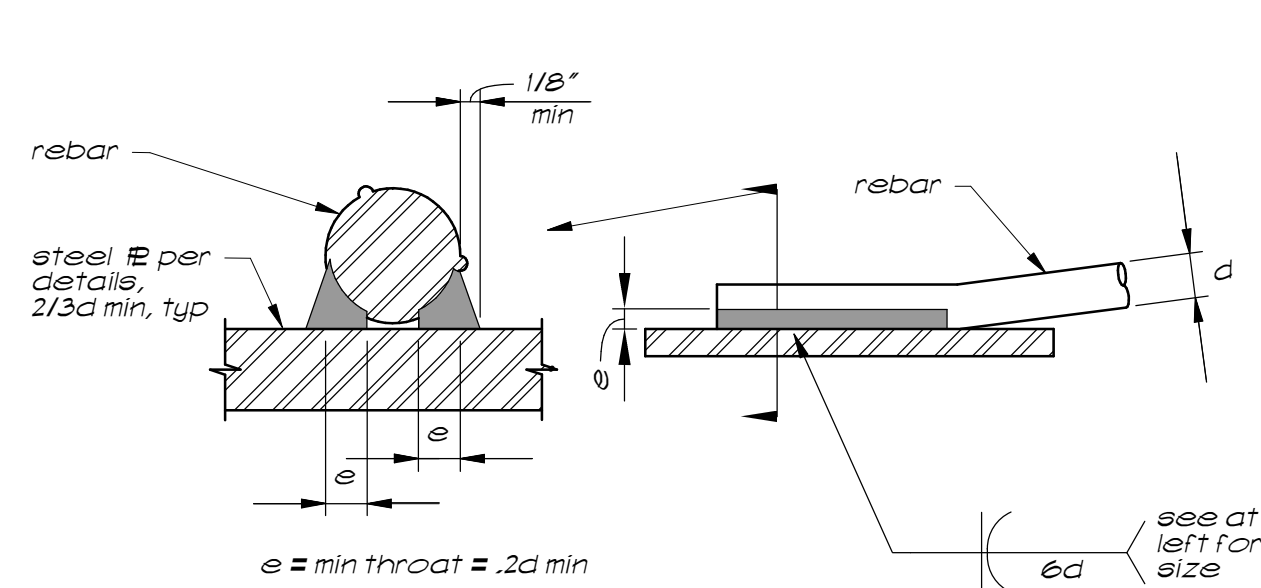


Concrete Footings at Utility Pipes

2005D003-32
S1.3

Notes:

- Reinforcing shall not be interrupted, cut or displaced by placement of utility pipe.
- Lean mix concrete fill to be placed before ftg is cast (mono-pour ftg conc optional). Make same width as ftg and full width of pipe trench.
- Step ftg if pipe occurs in lower third of original footing depth.
- No pipes shall be placed below spread ftgs or within 2 to 1 bearing zone around spread footing.
- If pipe is in place prior to casting concrete, wrap pipe w/ 1" Styrofoam insulation in lieu of sleeve.
- Utility pipes are not allowed parallel in footing.
- Multiple utility pipes (two or more) may be installed as shown above, provided they are spaced a minimum of 4 pipe/conduit diameters on center with a minimum of 3" of concrete between.
- Utility pipes risers may occur in continuous wall footings provided they are no larger than footing width(s) and occur within the middle 1/2 of the footing width. Multiple risers may occur if spaced as noted above.
- Utility pipes perpendicular to footings and more than 2'-0" below bottom of footings do not require lean-mix concrete encasement subject to acceptance of The Soils Engineer.
- Conditions not conforming to the parameters noted above shall be reviewed on a case-by-case basis.

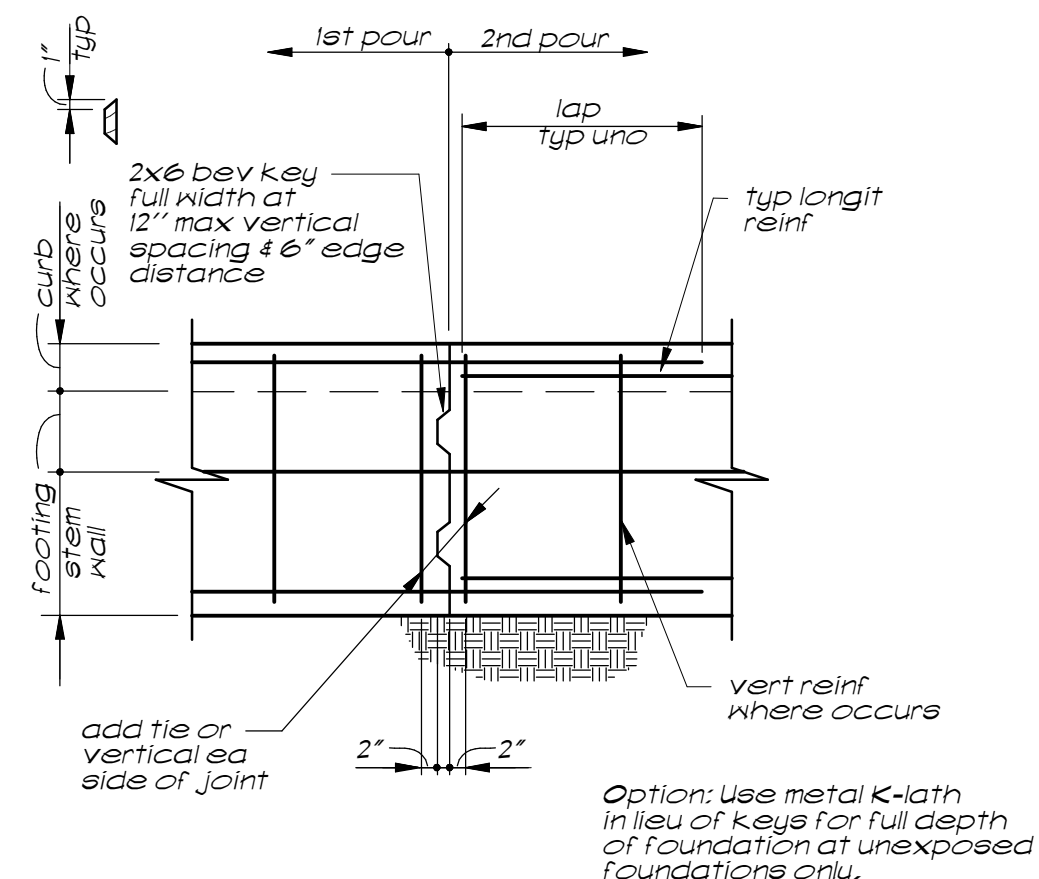


Notes:

- Reinforcing to be welded, except ASTM A706, shall conform to the material property requirements of ANSI/AWS D1.4, newest edition.
- All preheating and welding shall be done in accordance with ANSI/AWS D1.4, newest edition.
- All welding shall be continuously inspected by a qualified laboratory.

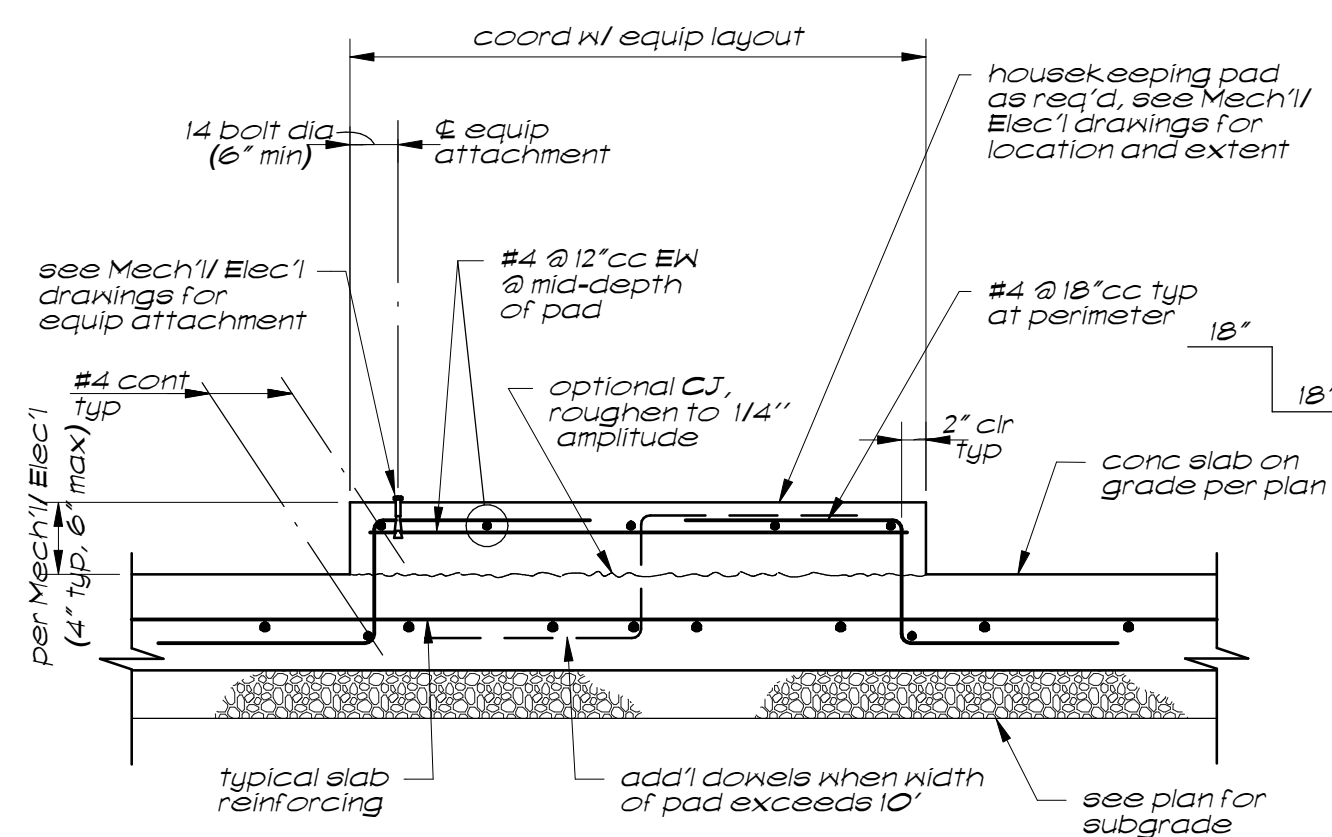
Rebar Welding

3005D002-32
S1.3



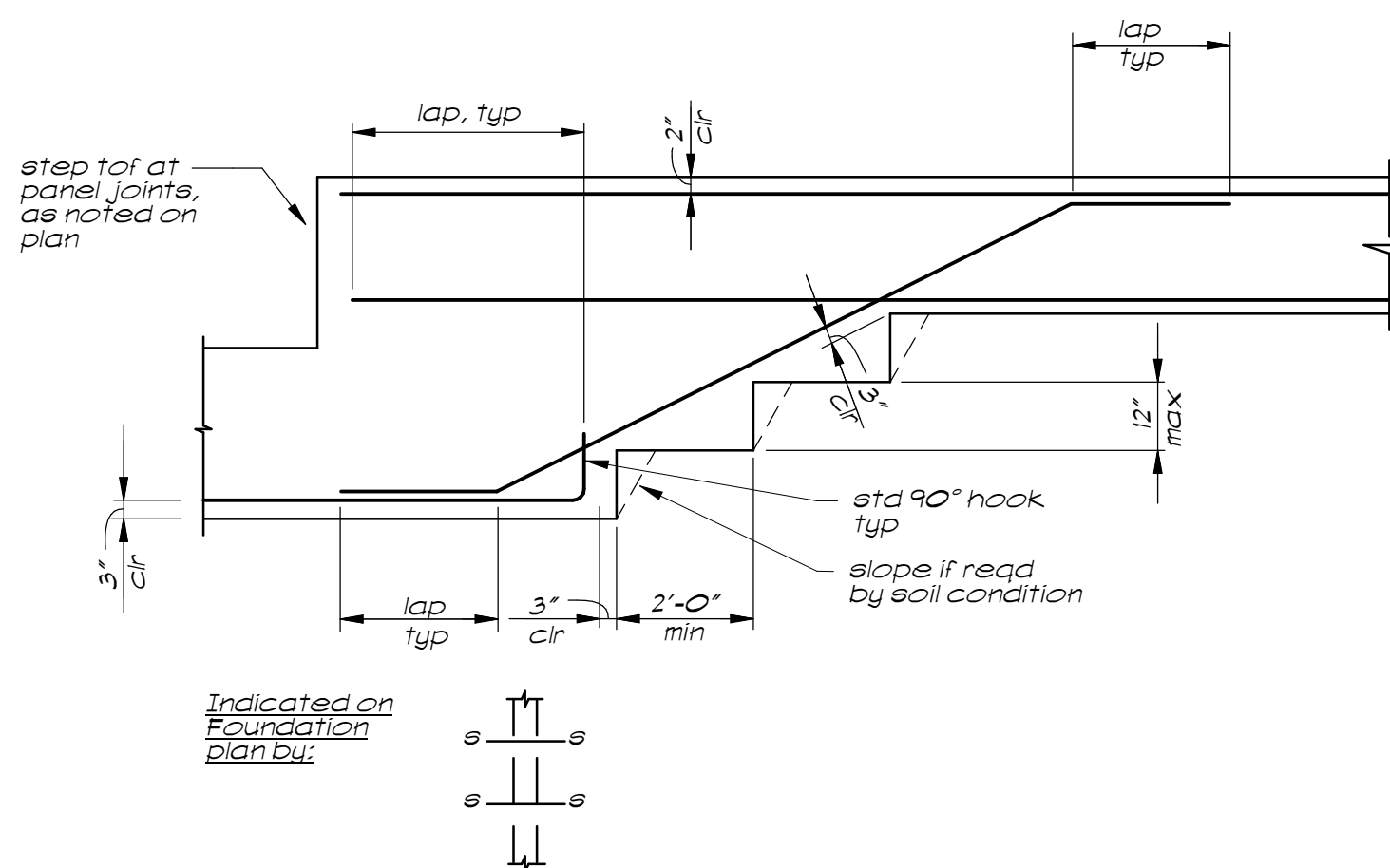
Typical Foundation Construction Joint

2005D012-24
S1.3

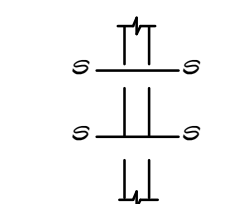


Housekeeping Pad at Slab on Grade

3105D005-16
S1.3

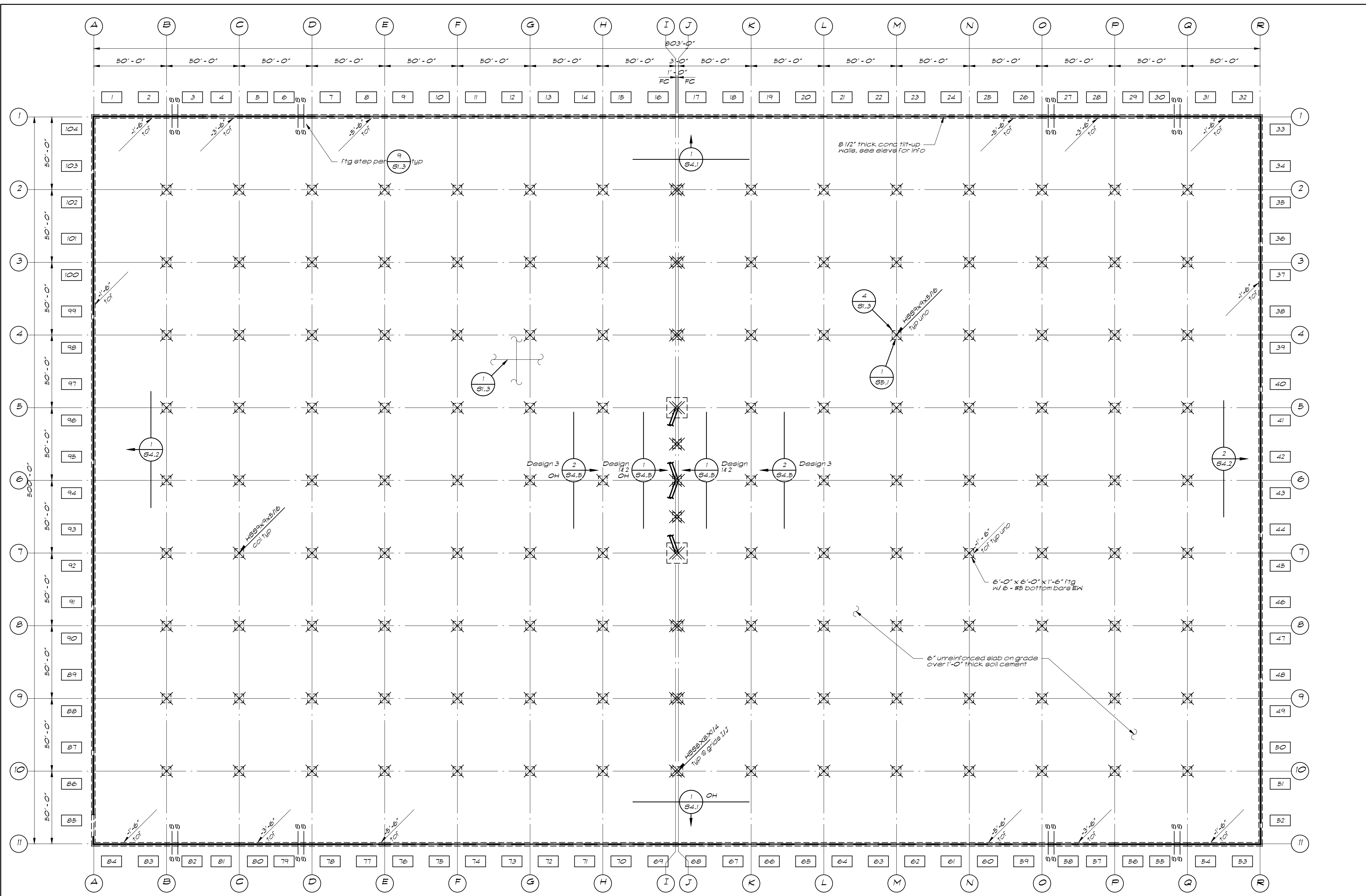


Indicated on Foundation plan by:



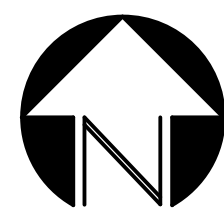
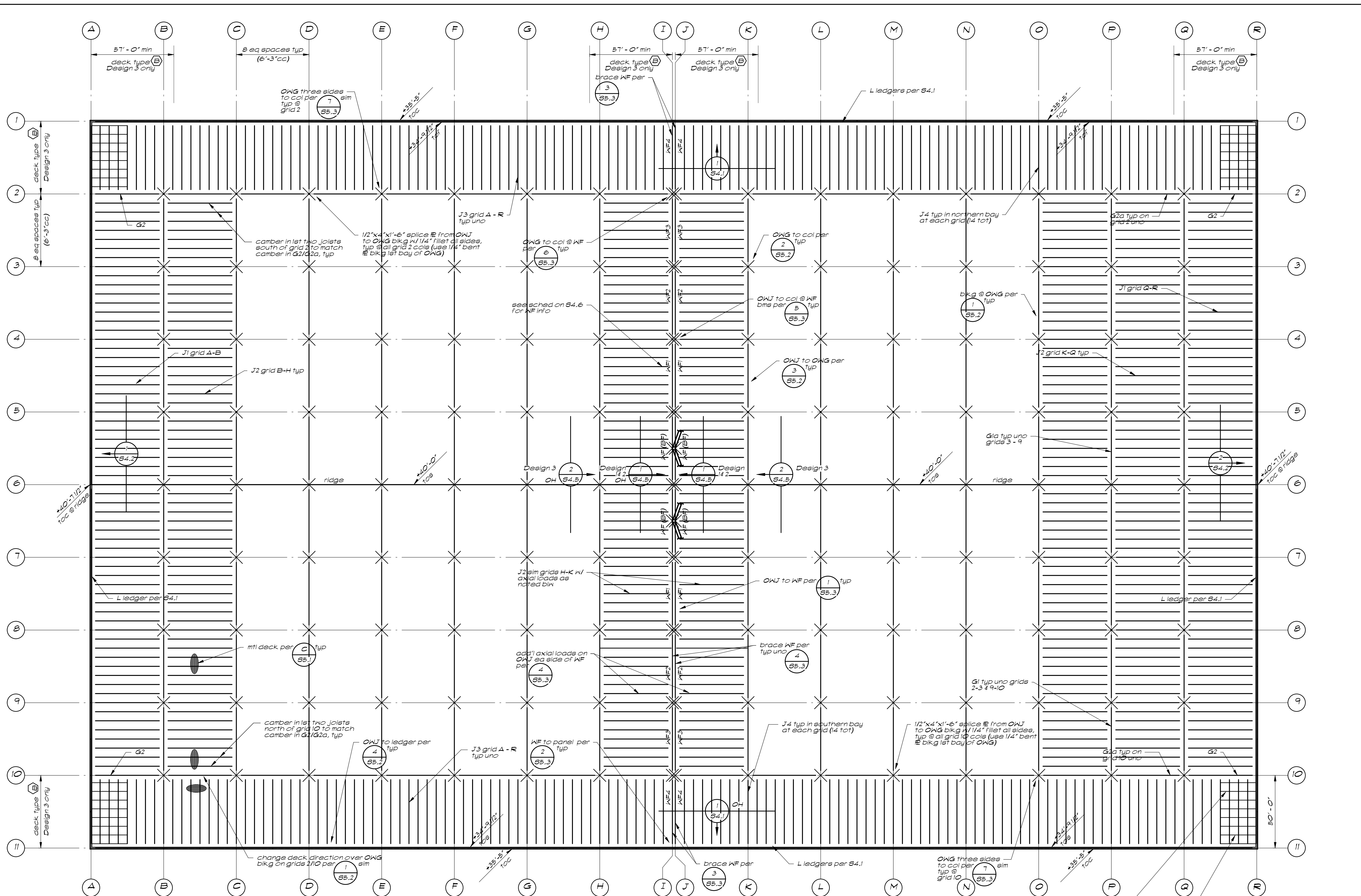
Footing Step

2005D019-12
S1.3



 **Foundation Plan** — 1/32" = 1'-0"

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Roof Framing Plan — 1/32" = 1'-0"
 108 = b.o. deck

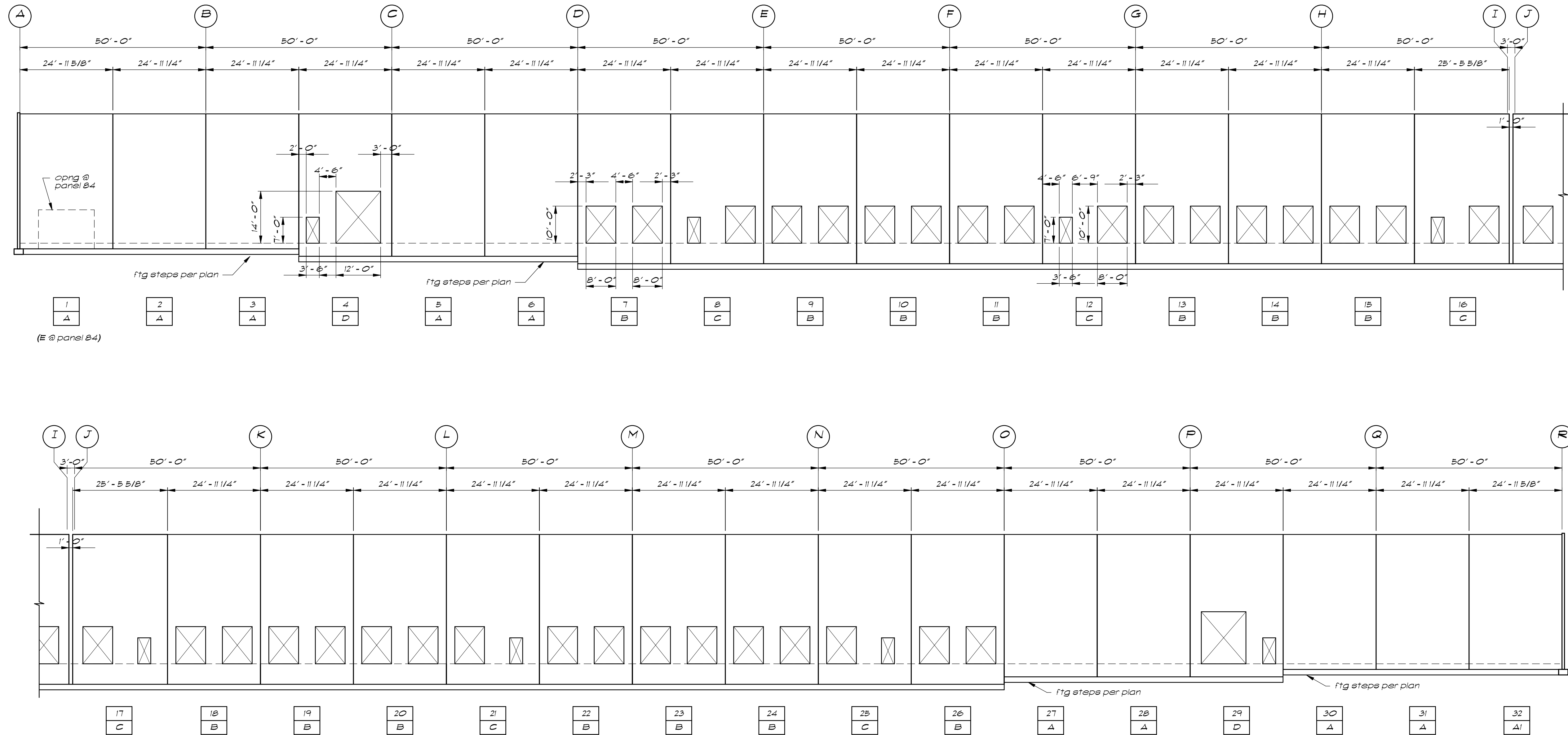
DESIGN STUDY
 NOT FOR
 CONSTRUCTION

**WAREHOUSE
 BUILDING**

**ROOF
 FRAMING
 PLAN**

DECEMBER 2013

S2.2

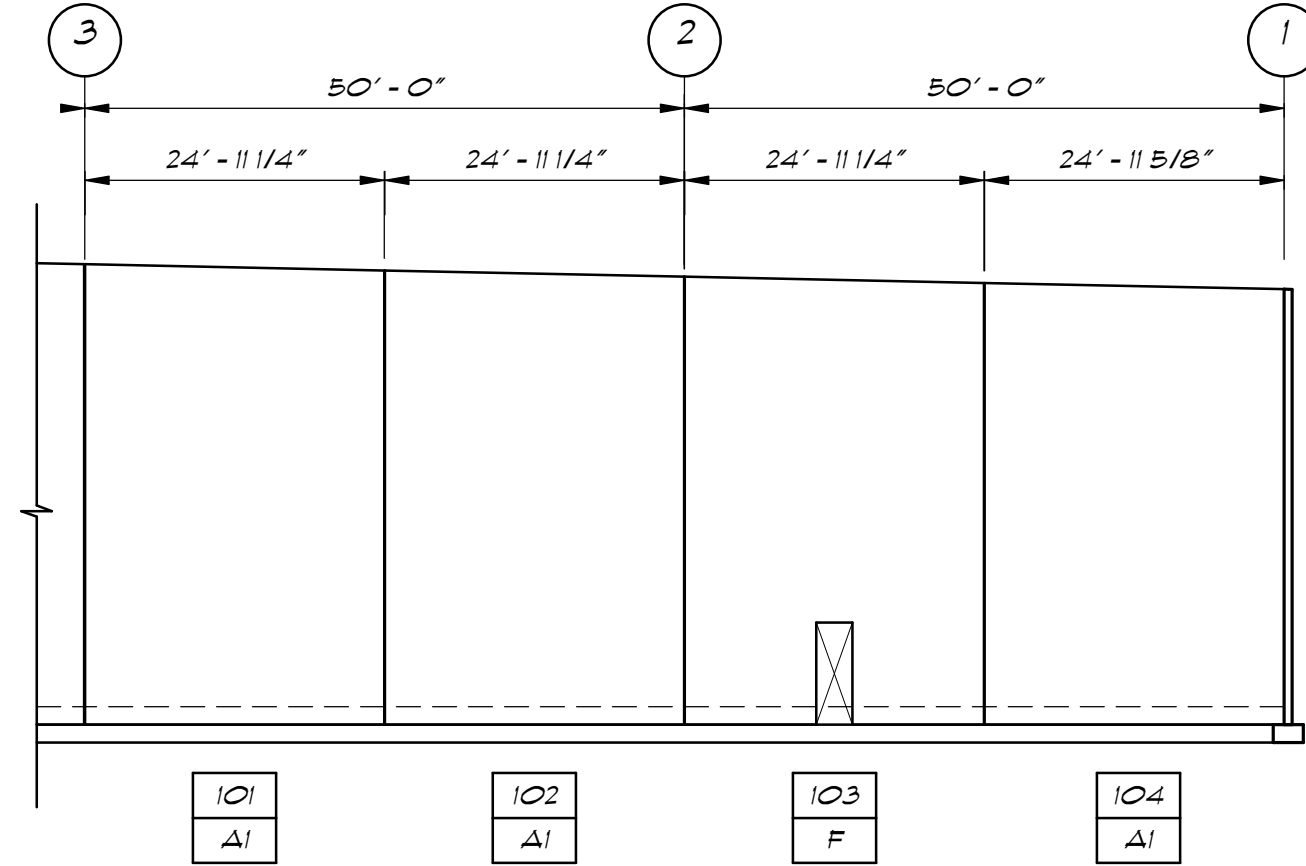
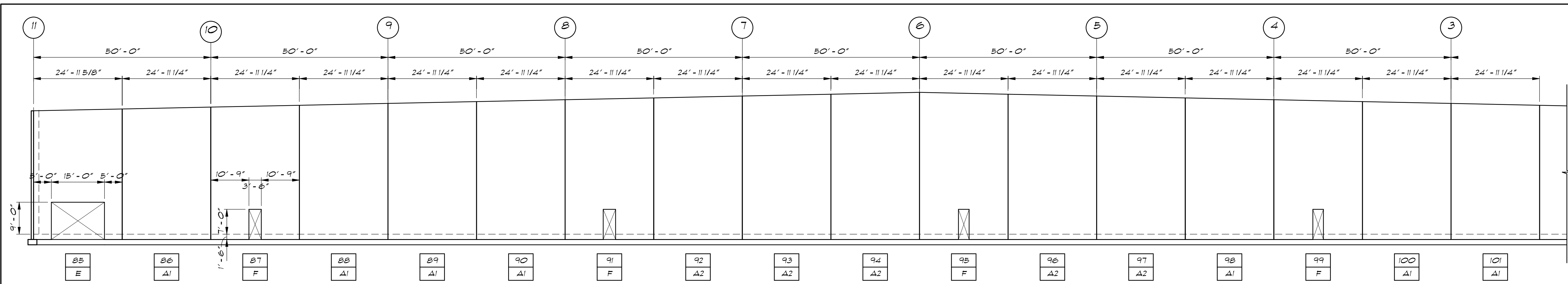


North Elevation (South Elevation OH) $\frac{1}{54.1} = 1'-0"$

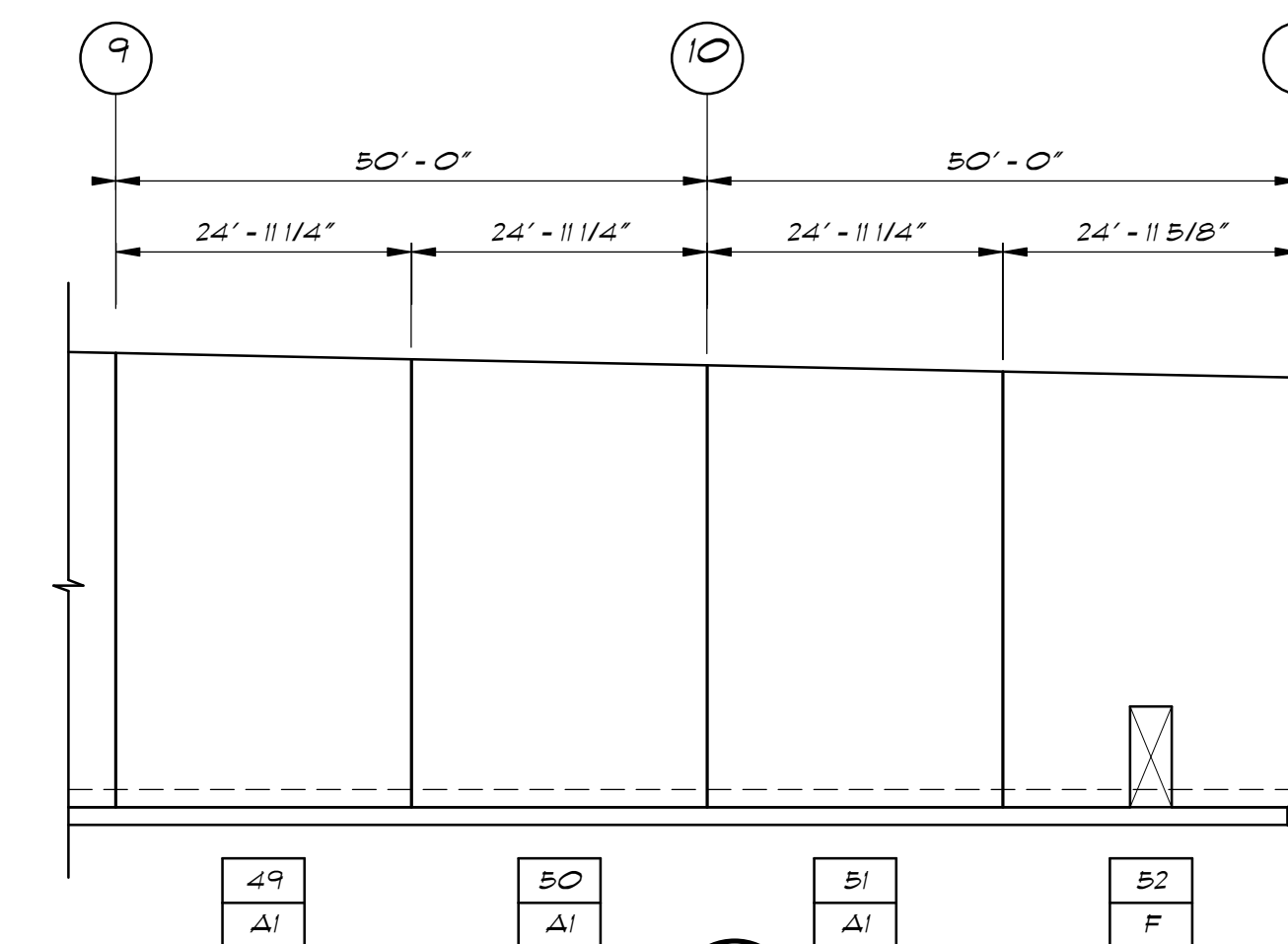
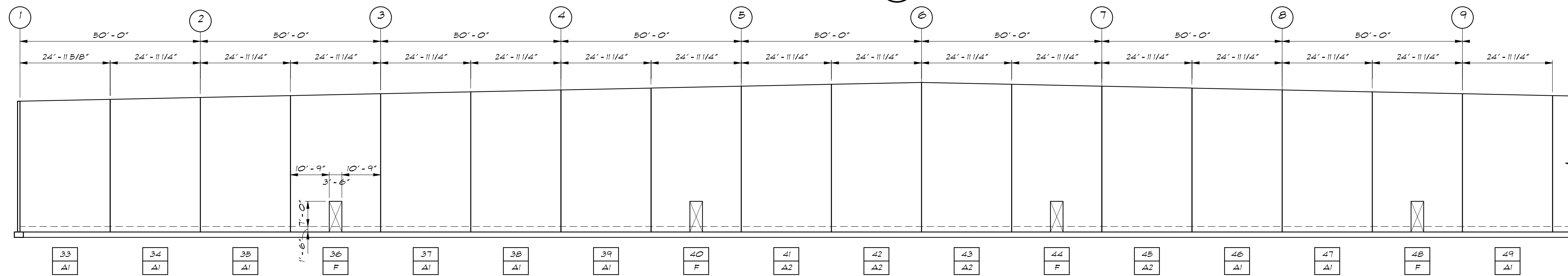
Grid 1/11 L Ledger Schedule			
	L6x6x5/16	L6x6x1/2	L8x8x5/8
Design 1	typ uno	-	-
Design 2	typ uno	-	-
Design 3	typ uno	2, 11-3, 20-22, 31, 57-58, 65-66, 71-72, 79-80	3-10, 23-30, 59-64, 73-78

TILT-UP CONCRETE PANELS

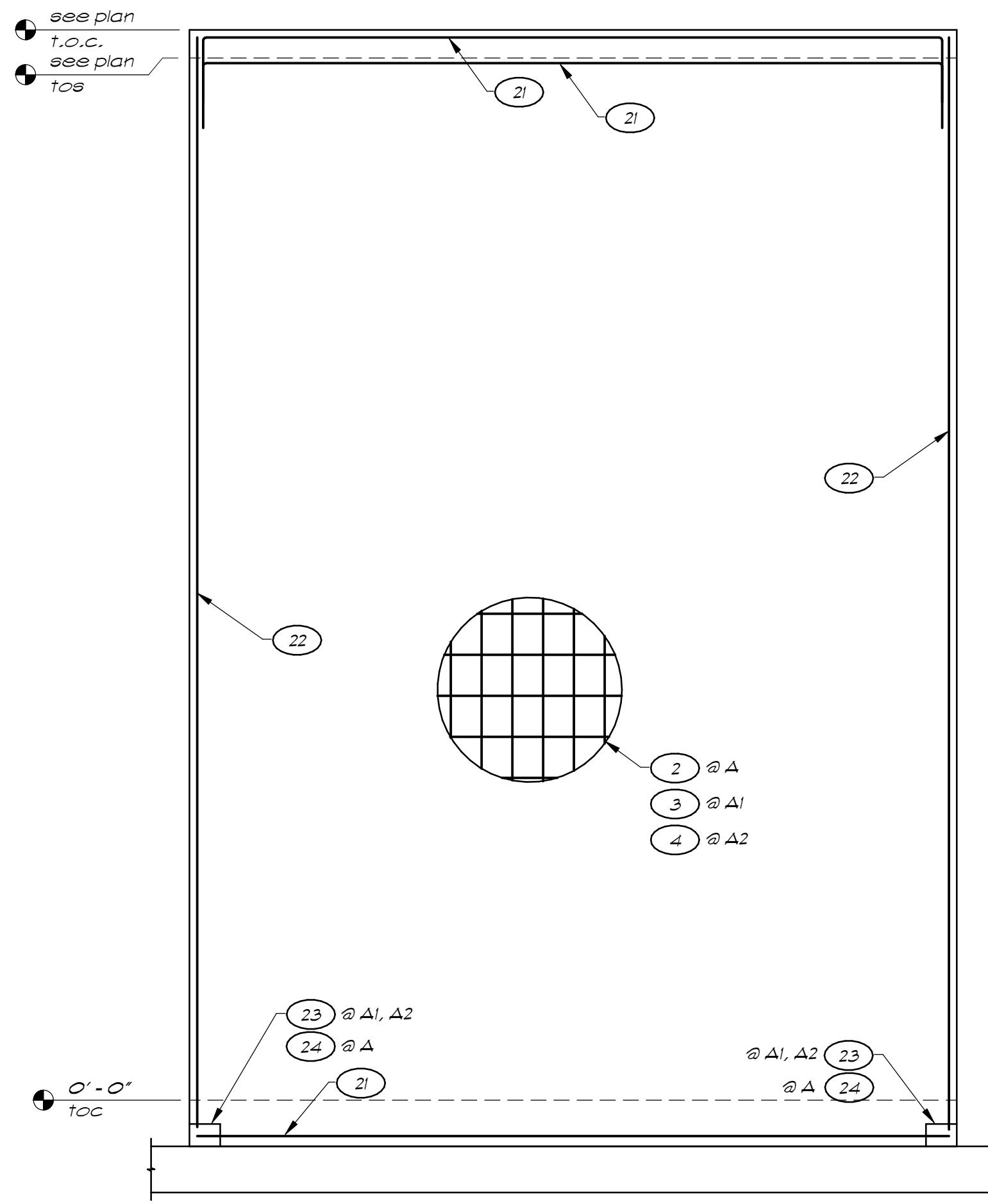
- See Architectural drawings for all panel finishes, chamfers, joint sealants and surface treatments.
- All panels are 8 1/2" total thickness with 3/4" deep max reveal.
- General Contractor shall provide adequate temporary shoring and bracing of tilt-up concrete wall panels until all diaphragms (roofs & floors) are permanently connected.
- Contractor shall submit shop drawings to show panel size, openings and reveals. Contractor shall be responsible for adequacy of panel for lifting stresses. Additional reinforcing or strong backs shall be designed and provided by Contractor.
- All panel elevations are viewed from the inside of the building typical, uno
- Structural concrete for all tilt-up panels shall test 4000 psi minimum at 28 days.
- Indicates panel identification mark, with panel # and panel type. For reinforcing info at each panel type, see sheet S4.3/S4.4.
 - See $\frac{1}{54.5}$ $\frac{2}{54.5}$ for panel conn to slab/dn.
 - See schedule this sheet for L ledgers on grids 1 and 11.



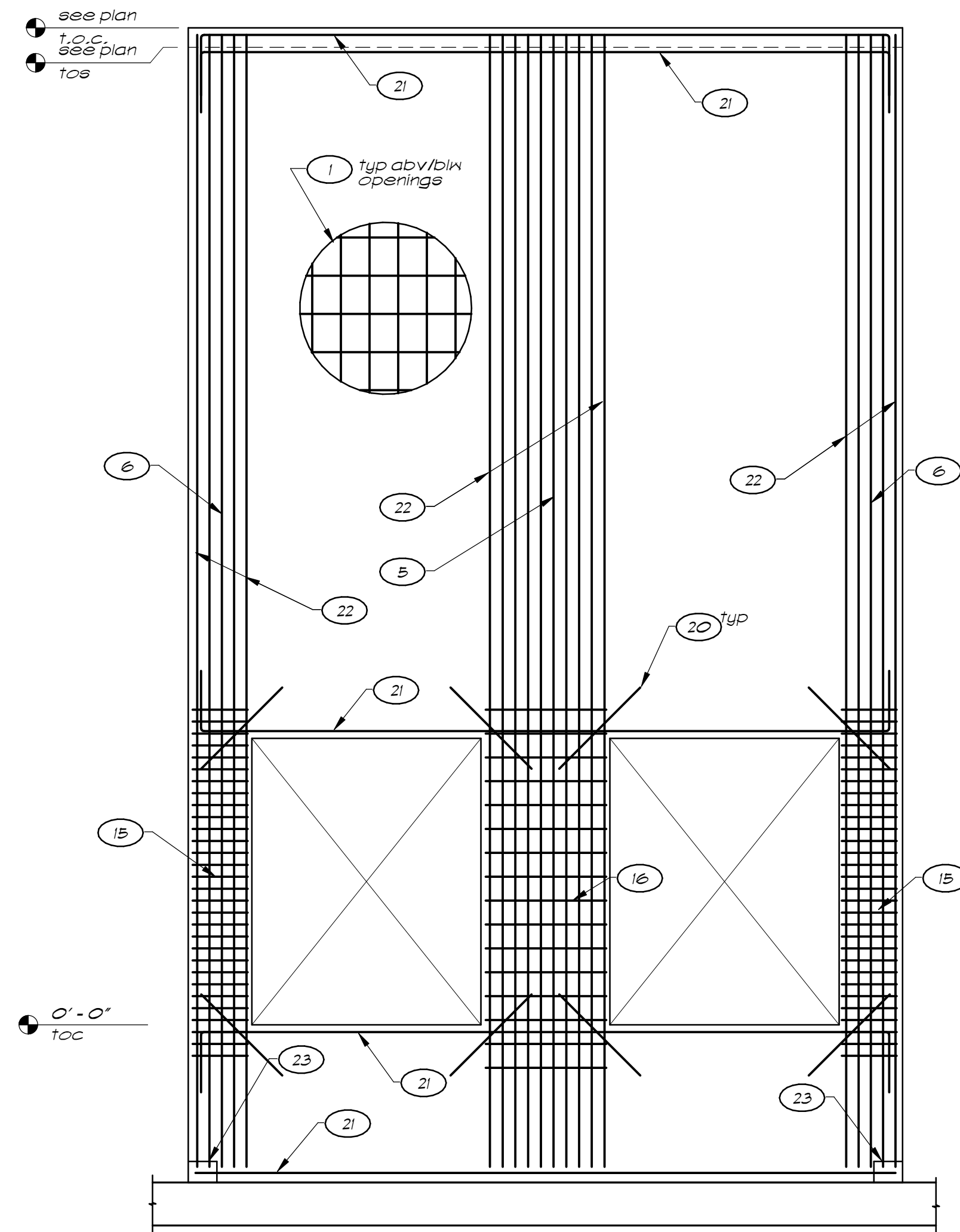
West Elevation $\frac{1}{54.2} - 1/16" = 1'-0"$



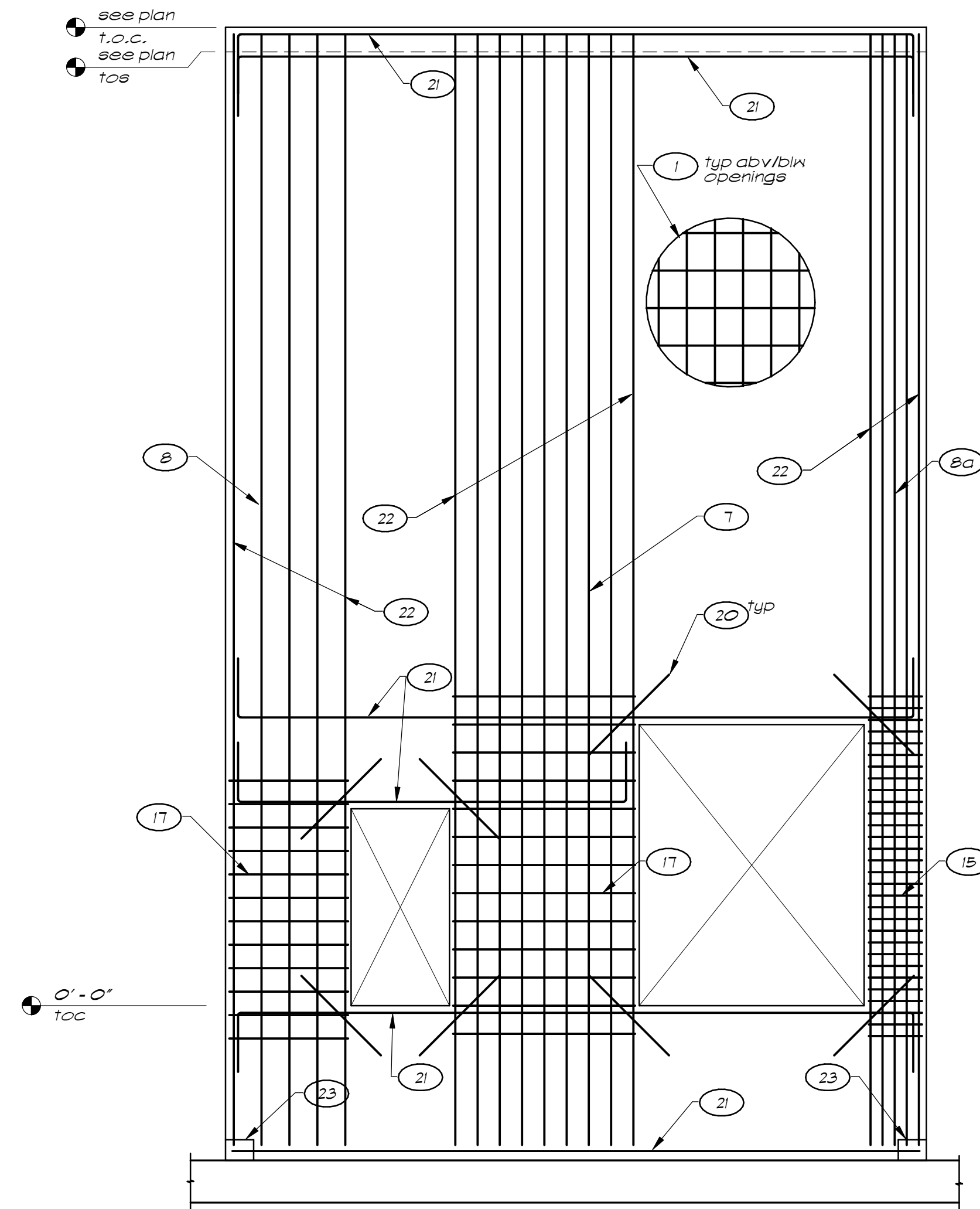
East Elevation $\frac{2}{54.2} - 1/16" = 1'-0"$



Panel Elevation Type A, A1, A2 $\frac{1}{S4.3} - 1/4" = 1'-0"$



Panel Elevation Type B $\frac{2}{S4.3} - 1/4" = 1'-0"$



Panel Elevation Type C $\frac{3}{S4.3} - 1/4" = 1'-0"$

Design #1 - Panel Reinforcing Elevation Key Notes

- | | |
|---|--|
| 1 #4 @ 12"cc vert (centered)
#4 @ 12"cc horiz (extend into wall piers) | 13 add one full height typ vert bar EF in addition to typical reinforcing, 9" from edge of opening |
| 2 #6 @ 9"cc vert (centered)
#4 @ 12"cc horiz | 14 #3 horiz @ 12"cc EF (extend 1'-0" abv 4 blk opng) |
| 3 #6 @ 7"cc vert (centered)
#4 @ 12"cc horiz | 15 see 14 |
| 4 #5 @ 12"cc vert each face
#3 @ 12"cc each face | 16 see 14 |
| 5 8-#5 vert EF btwn jamb bars | 17 see 14 |
| 6 4-#5 vert EF btwn jamb bars | 18 see 14 |
| 7 7-#5 vert EF btwn jamb bars | 19 #5 hairpin centered 48° |
| 8 3-#5 vert EF btwn jamb bars | 20 #4 x 4'-0" diagonal centered |
| 8a 4-#5 vert EF btwn jamb bars | 21 2 - #5 cont horiz w/ std hooks @ ends |
| 9 7-#5 vert EF btwn jamb bars | 22 2 - #5 jamb bars full height |
| 10 1-#5 vert EF btwn jamb bars | 23 panel base conn per $\frac{6}{S4.5}$ |
| 11 7-#5 vert EF btwn jamb bars | 24 see 23 |
| 12 8-#5 vert EF btwn jamb bars | |

Note: Reinf placement w/ bars EF per $\frac{4}{S4.5}$ typ uno
Reinf placement w/ bars centered per $\frac{3}{S4.5}$ typ uno

Design #2 - Panel Reinforcing Elevation Key Notes

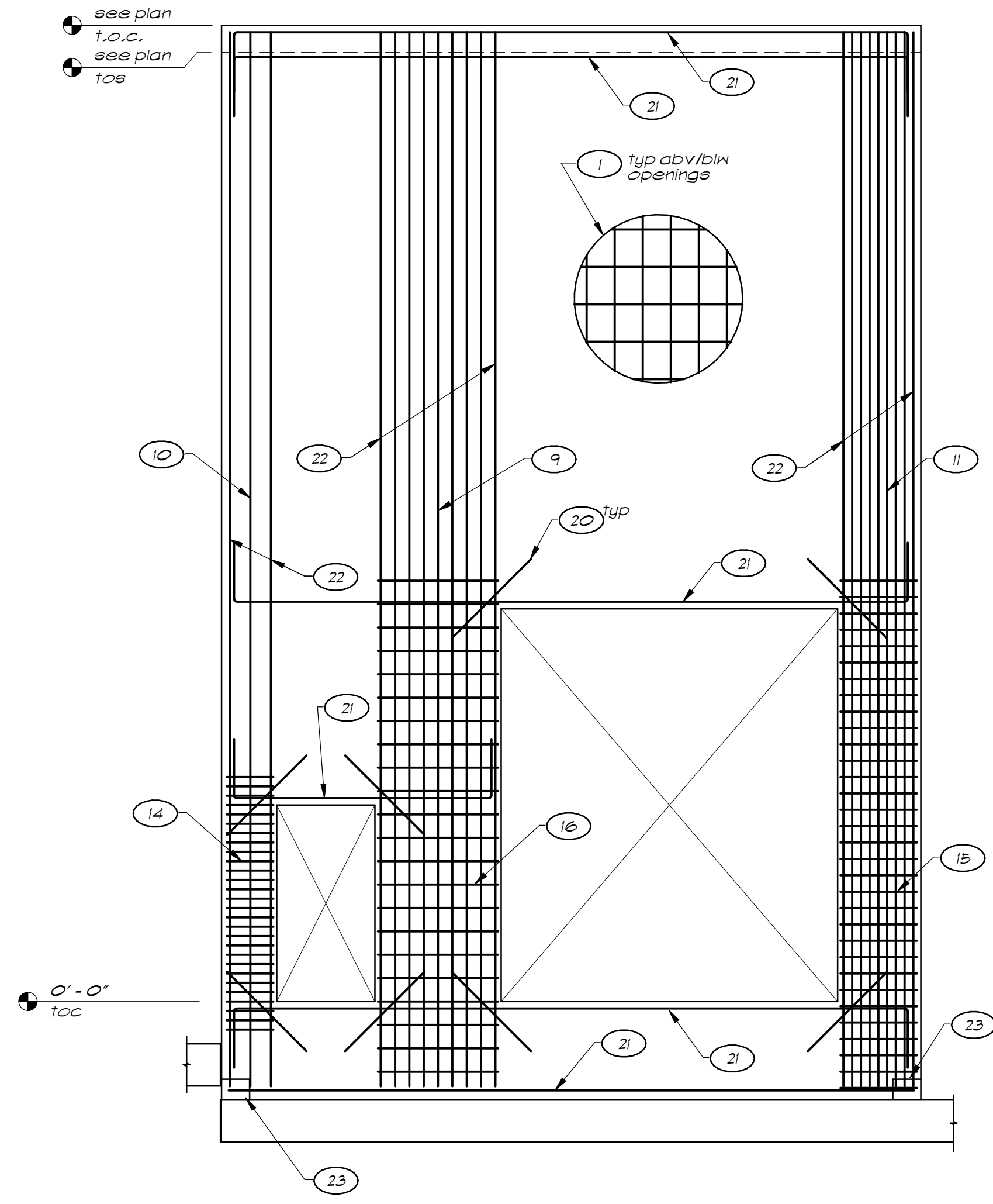
- | | |
|---|--|
| 1 #4 @ 12"cc vert (centered)
#4 @ 12"cc horiz (extend into wall piers) | 13 not used |
| 2 #5 @ 8"cc vert (centered)
#4 @ 12"cc horiz | 14 #3 horiz @ 12"cc EF (extend 1'-0" abv 4 blk opng) |
| 3 #6 @ 10"cc vert (centered)
#4 @ 12"cc horiz | 15 see 14 |
| 4 #6 @ 7"cc vert (centered)
#4 @ 12"cc horiz | 16 see 14 |
| 5 8-#5 vert EF btwn jamb bars | 17 see 14 |
| 6 4-#5 vert EF btwn jamb bars | 18 #4 horiz @ 12"cc |
| 7 7-#5 vert EF btwn jamb bars | 19 #5 hairpin centered 48° |
| 8 3-#5 vert EF btwn jamb bars | 20 #4 x 4'-0" diagonal centered |
| 8a 4-#5 vert EF btwn jamb bars | 21 2 - #5 cont horiz w/ std hooks @ ends |
| 9 7-#5 vert EF btwn jamb bars | 22 2 - #5 jamb bars full height |
| 10 1-#5 vert EF btwn jamb bars | 23 panel base conn per $\frac{6}{S4.5}$ |
| 11 7-#5 vert EF btwn jamb bars | 24 see 23 |
| 12 7-#5 vert EF btwn jamb bars | |

Note: Reinf placement w/ bars EF per $\frac{4}{S4.5}$ typ uno
Reinf placement w/ bars centered per $\frac{3}{S4.5}$ typ uno

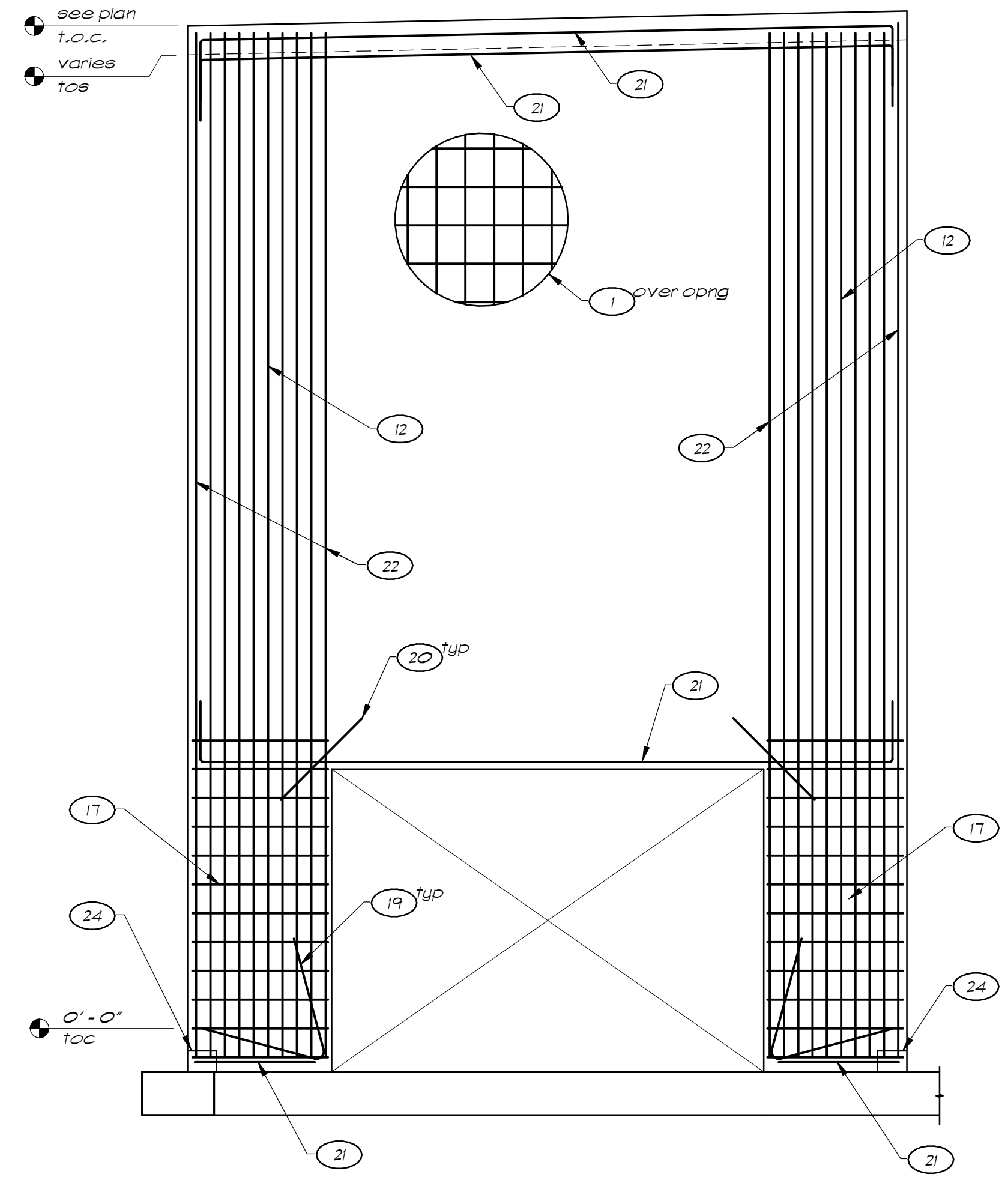
Design #3 - Panel Reinforcing Elevation Key Notes

- | | |
|---|--|
| 1 #4 @ 12"cc vert (centered)
#4 @ 12"cc horiz (extend into wall piers) | 13 add one full height typ vert bar EF in addition to typical reinforcing, 9" from edge of opening |
| 2 #6 @ 9"cc vert (centered)
#4 @ 12"cc horiz | 14 #3 horiz @ 4"cc EF (extend 1'-0" abv 4 blk opng) w/ hook ea end per $\frac{5}{S4.5}$ |
| 3 #6 @ 7"cc vert (centered)
#4 @ 12"cc horiz | 15 #3 horiz @ 8"cc EF (extend 1'-0" abv 4 blk opng) w/ hook ea end per $\frac{5}{S4.5}$ |
| 4 #5 @ 12"cc vert each face
#3 @ 12"cc each face | 16 #3 horiz @ 10"cc EF (extend 1'-0" abv 4 blk opng) |
| 5 9-#5 vert EF btwn jamb bars | 17 #3 horiz @ 12"cc EF (extend 1'-0" abv 4 blk opng) |
| 6 5-#5 vert EF btwn jamb bars | 18 see 17 |
| 7 7-#5 vert EF btwn jamb bars | 19 #5 hairpin centered 48° |
| 8 3-#5 vert EF btwn jamb bars | 20 #4 x 4'-0" diagonal centered |
| 8a 5-#5 vert EF btwn jamb bars | 21 2 - #5 cont horiz w/ std hooks @ ends |
| 9 10-#5 vert EF btwn jamb bars | 22 2 - #5 jamb bars full height (2-#7 @ panel type A) |
| 10 1-#5 vert EF btwn jamb bars | 23 panel base conn per $\frac{6}{S4.5}$ |
| 11 7-#5 vert EF btwn jamb bars | 24 panel base conn per $\frac{8}{S4.5}$ $\frac{9}{S4.5}$ |
| 12 9-#5 vert EF btwn jamb bars | |

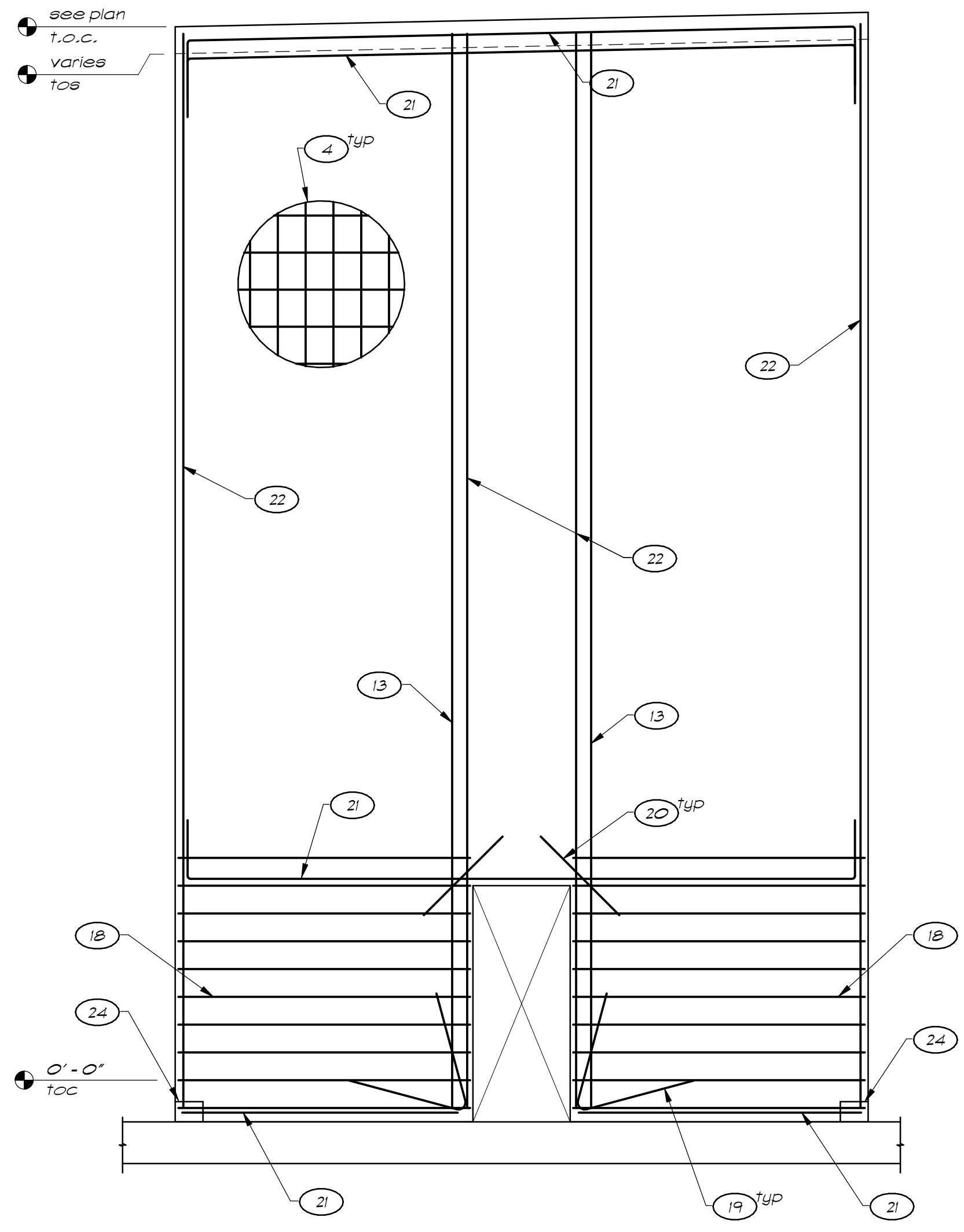
Note: Reinf placement w/ bars EF per $\frac{4}{S4.5}$ typ uno
Reinf placement w/ bars centered per $\frac{3}{S4.5}$ typ uno



Panel Elevation Type D $\frac{1}{54.4} - 1/4" = 1'-0"$



Panel Elevation E $\frac{2}{54.4} - 1/4" = 1'-0"$



Panel Elevation F $\frac{3}{54.4} - 1/4" = 1'-0"$

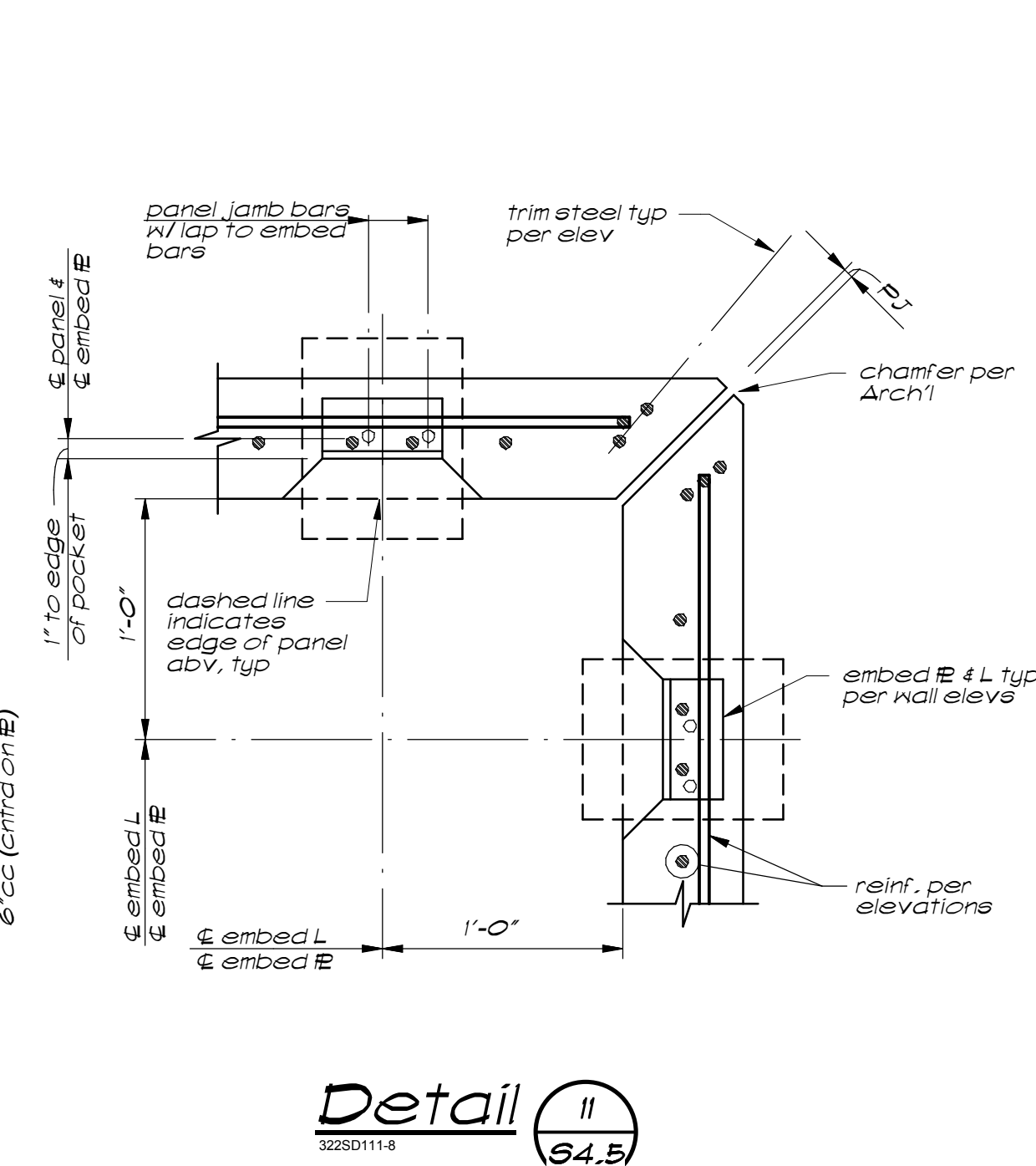
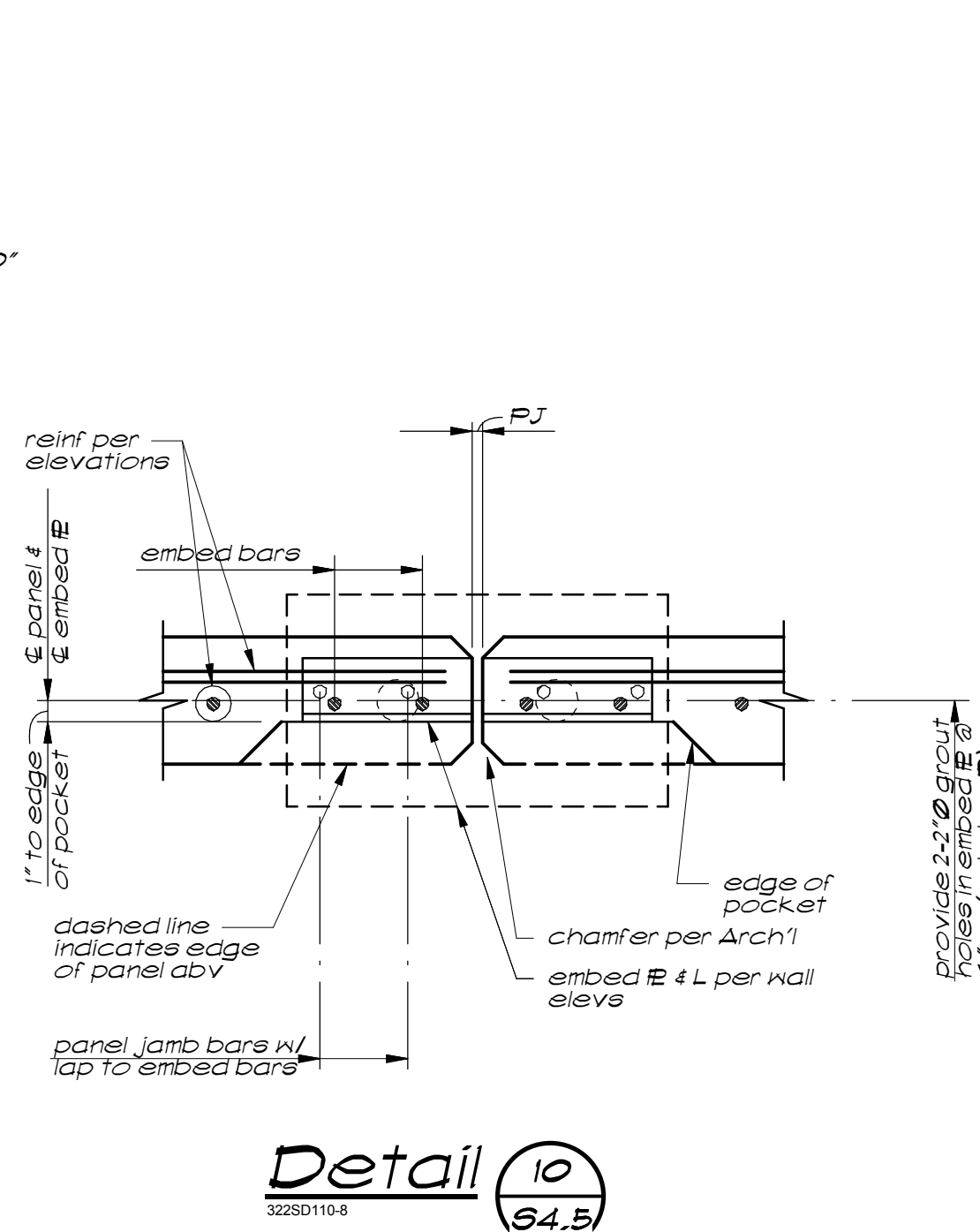
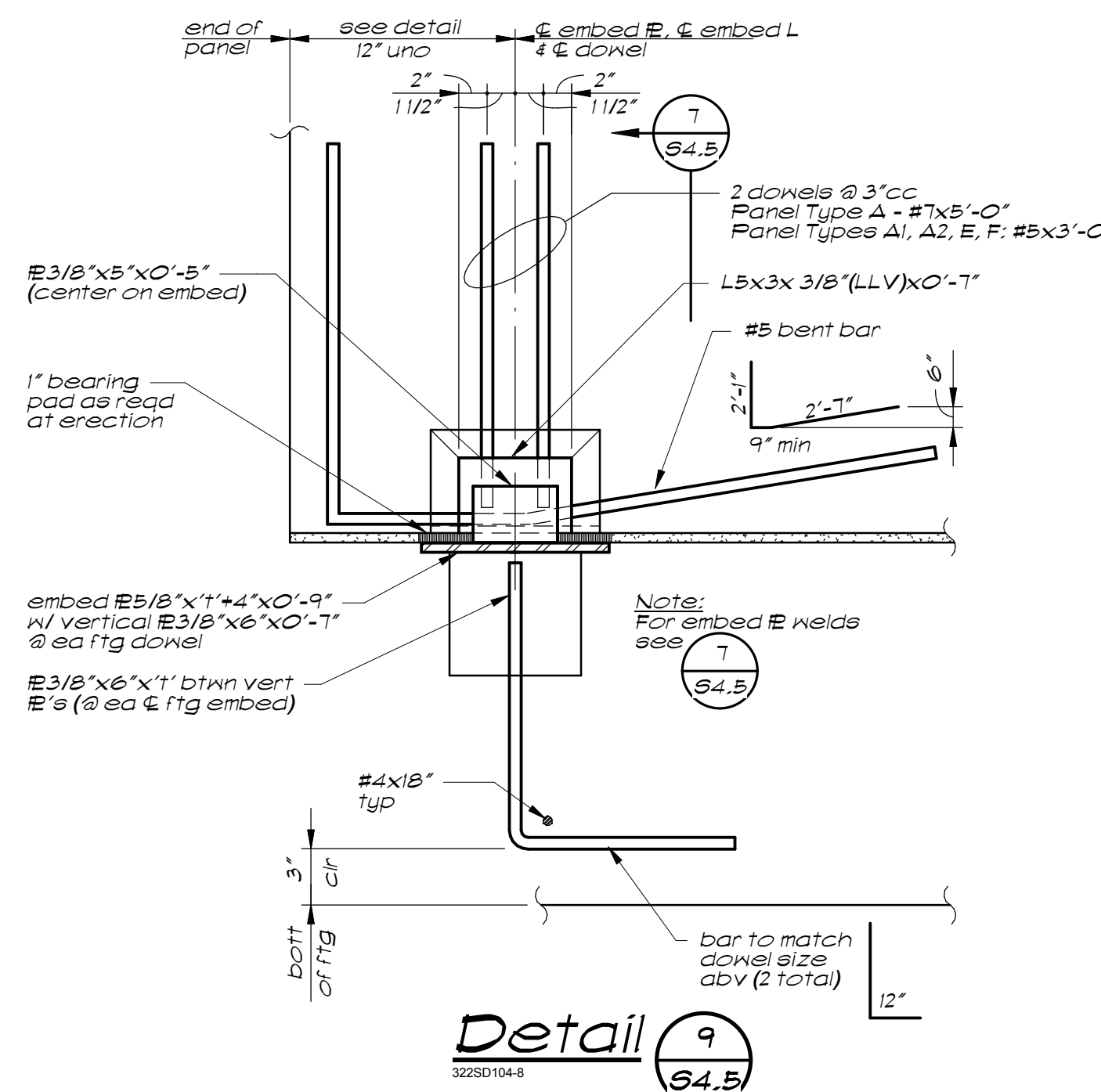
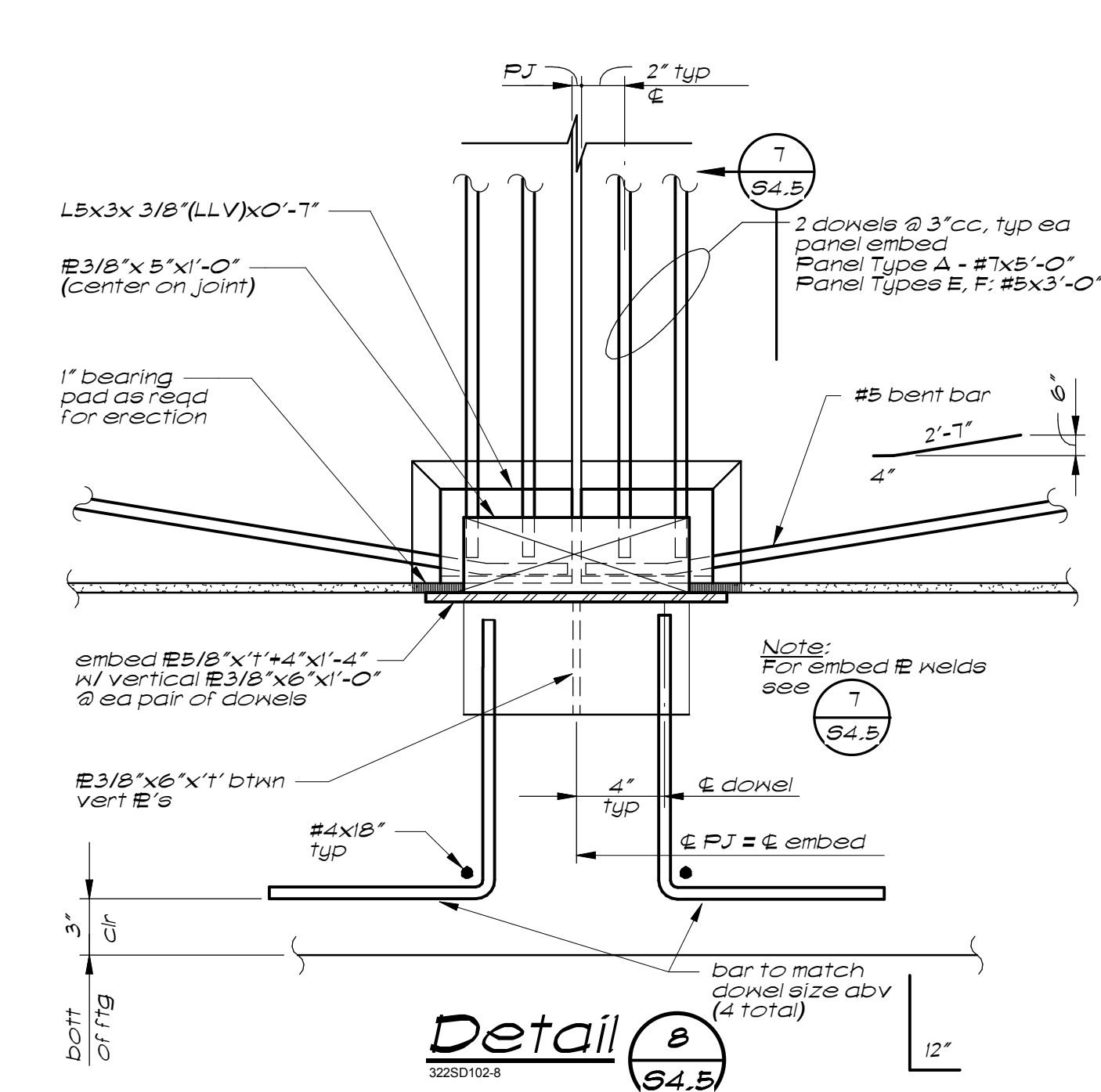
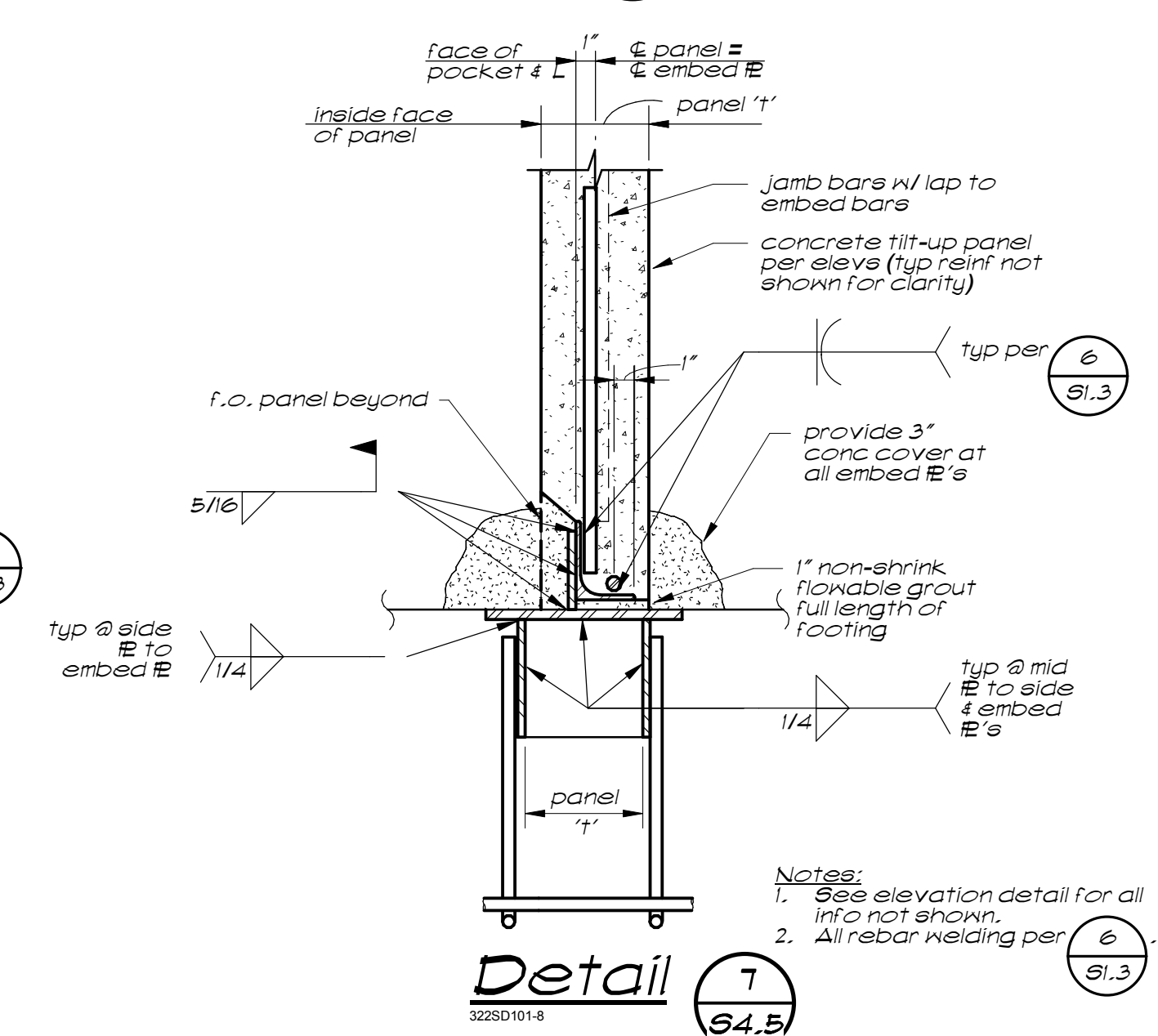
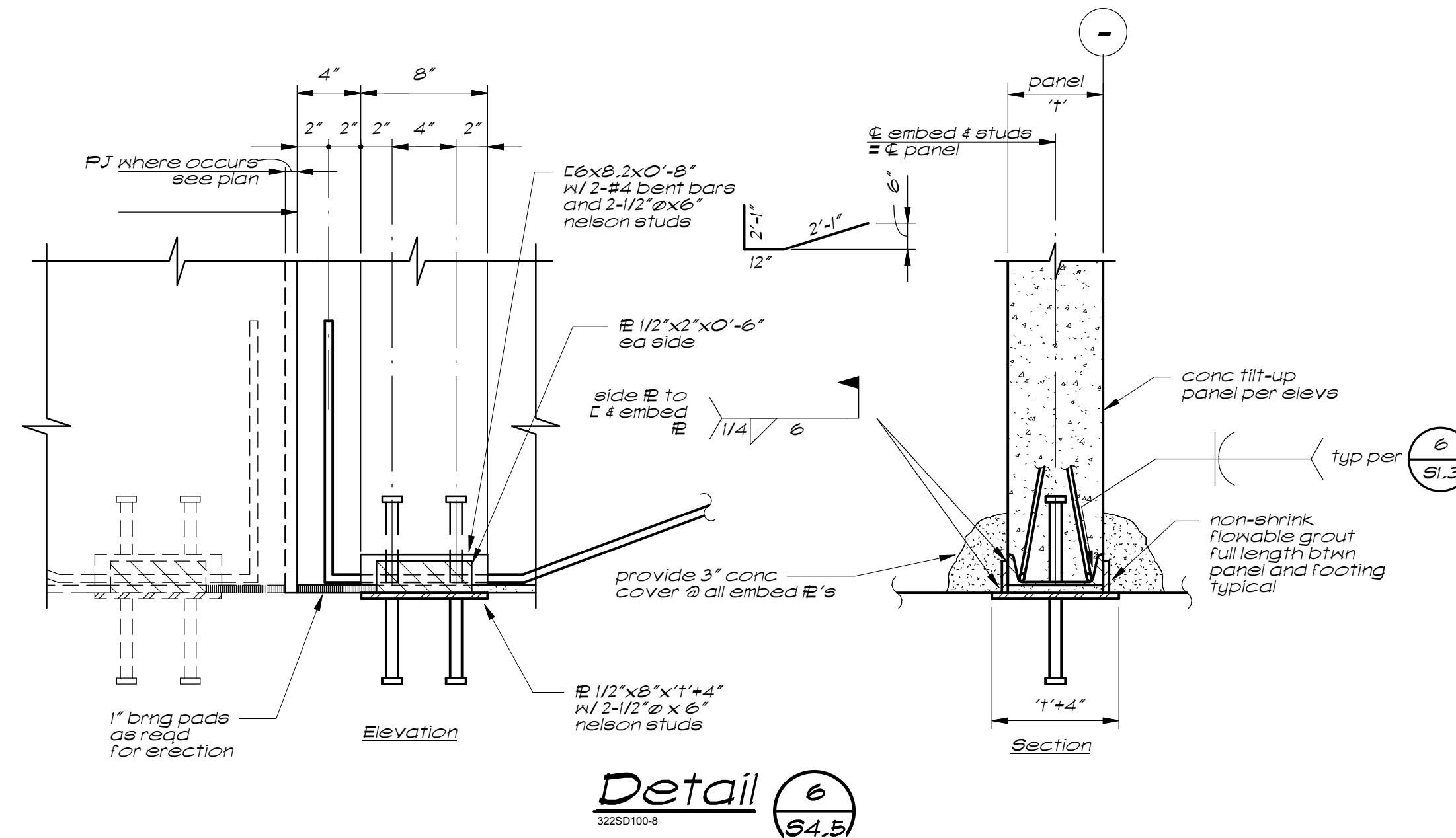
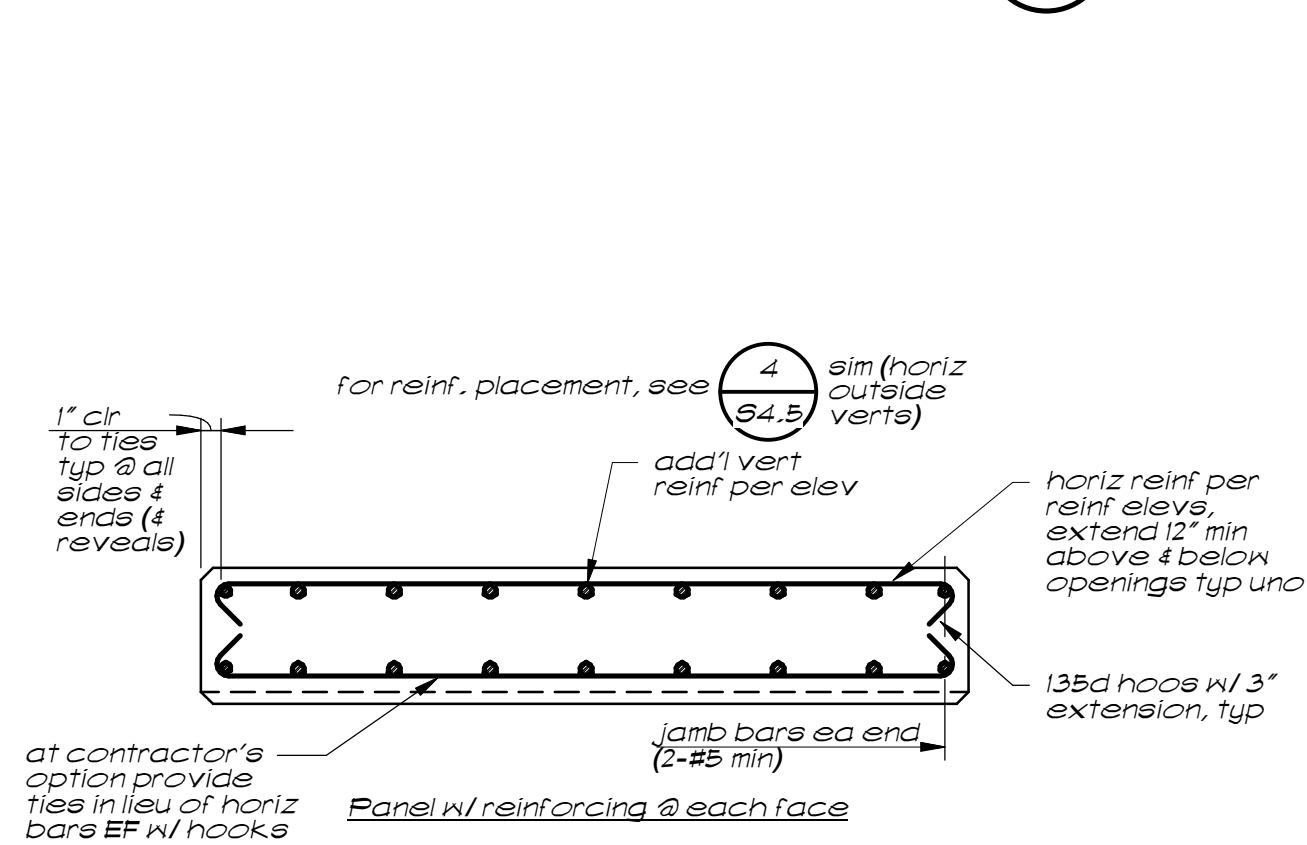
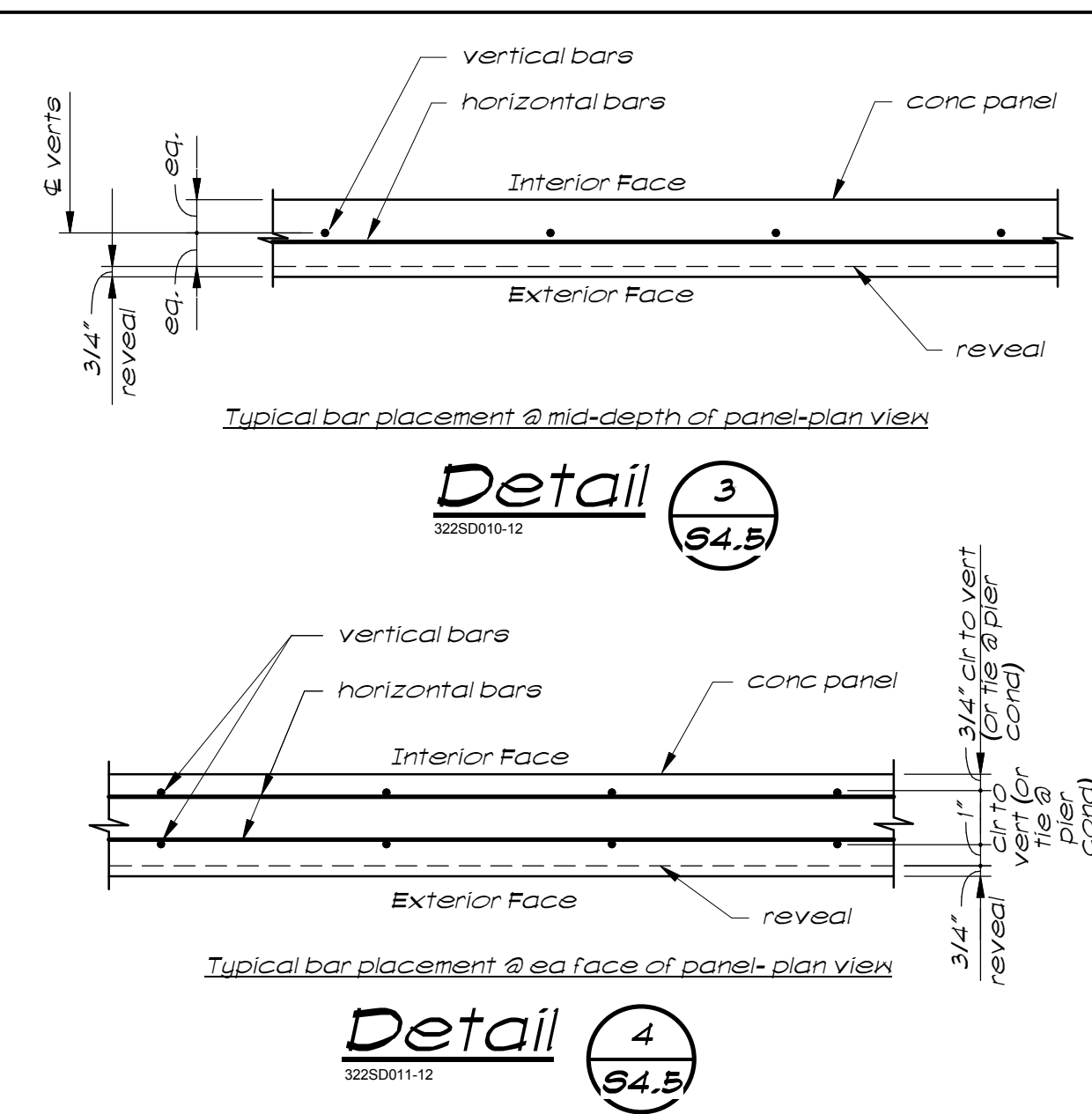
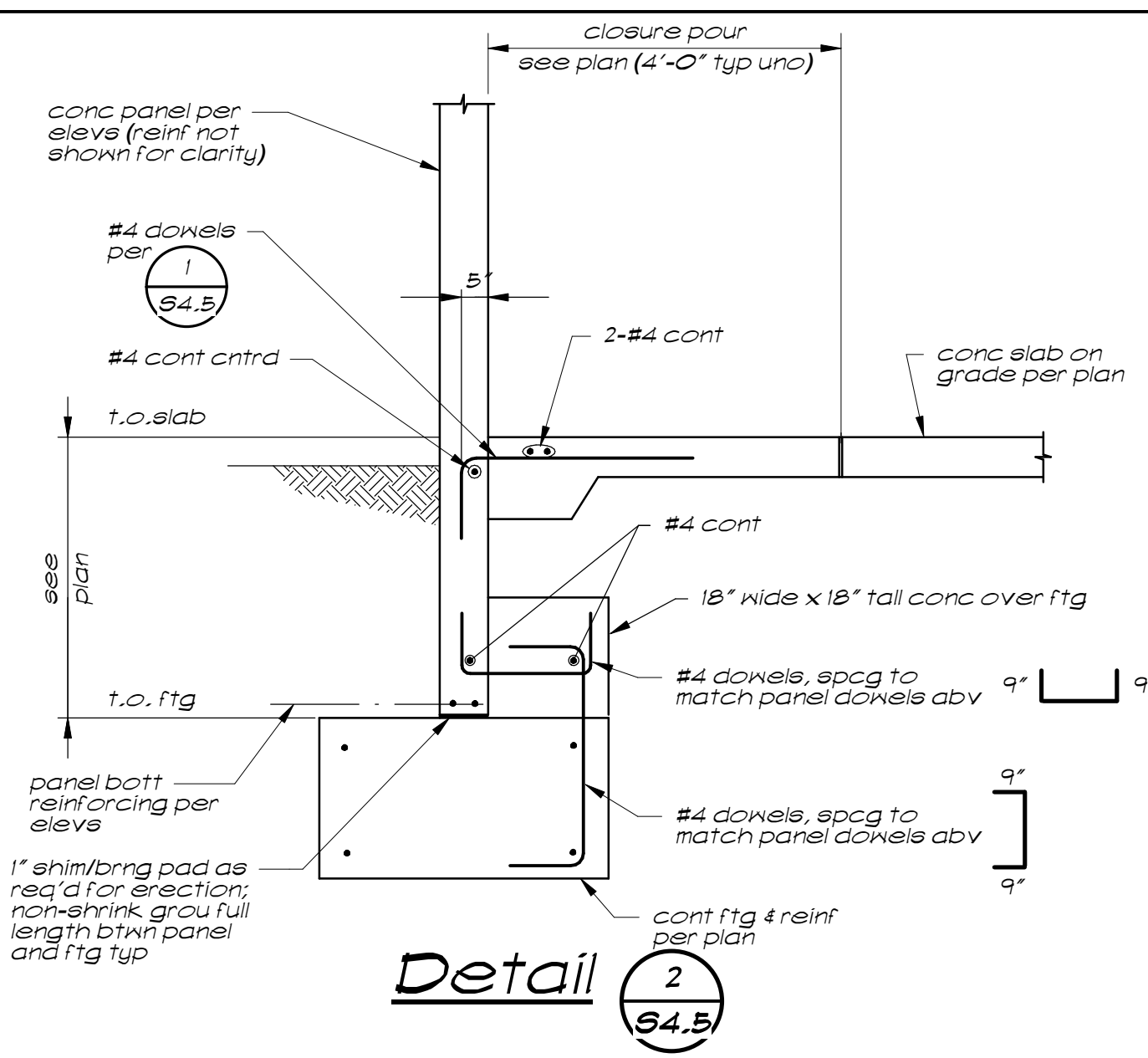
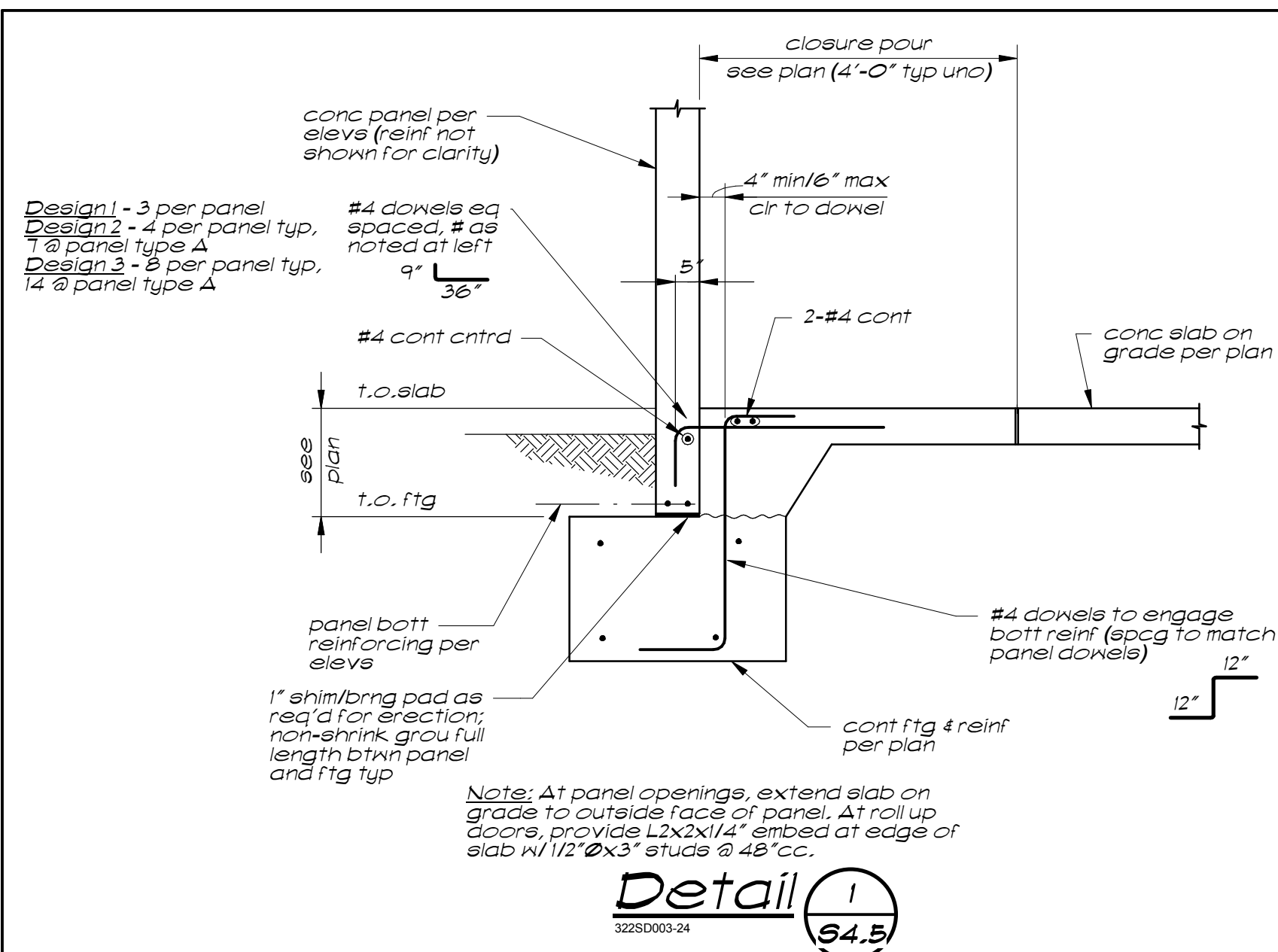
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DESIGN STUDY
NOT FOR
CONSTRUCTION

WAREHOUSE
BUILDING

PANEL
REINFORCING
ELEVATIONS

DECEMBER 2013



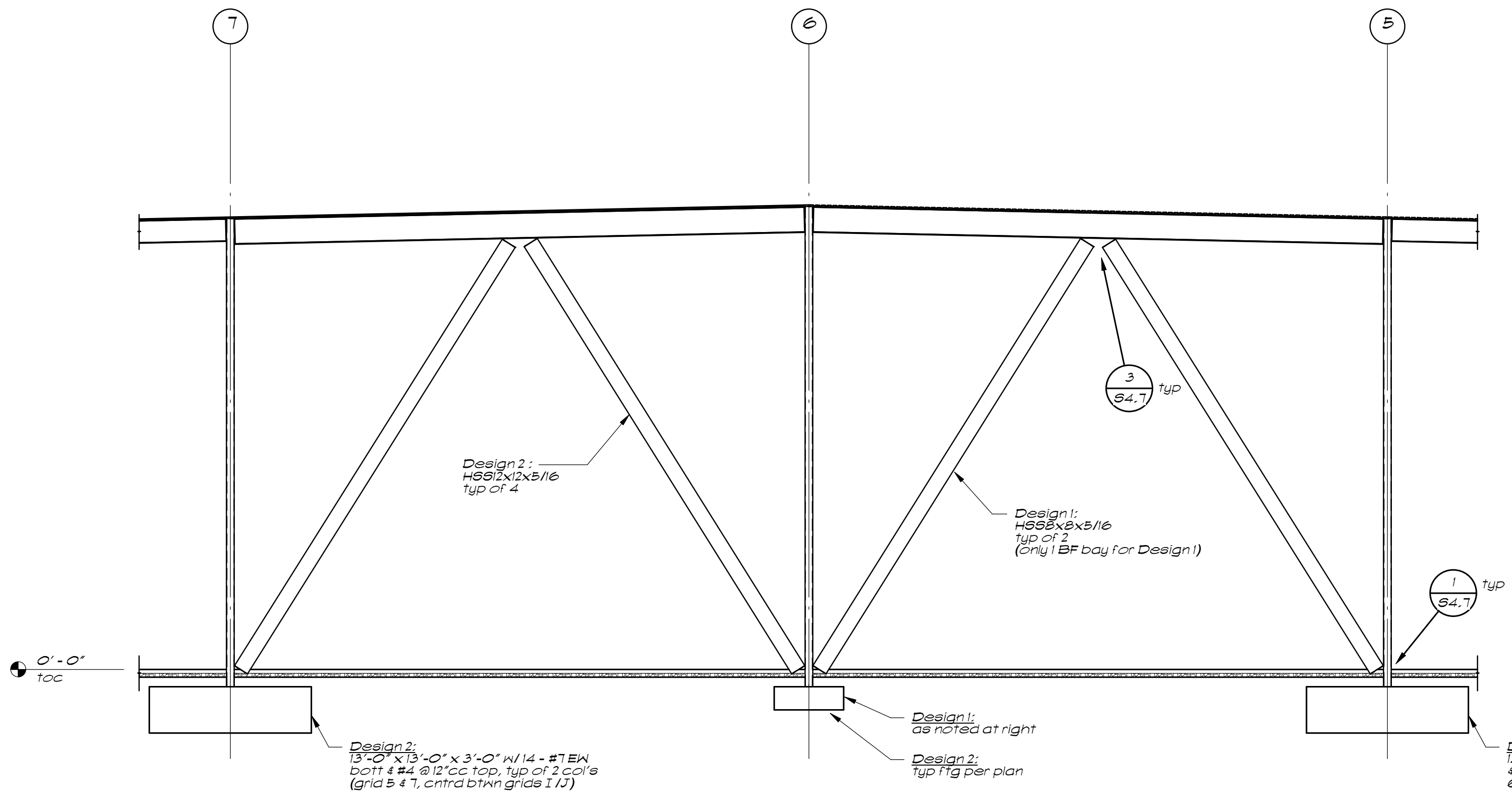
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3
S4.6 **Brace Welding Schedule**

Tube Bracing	E 't' (note 2)	Weld size	Weld lengths (min per note #3)					
			L1'	L2'	L3'	L4'	L5'	L6'
HSS8x8x5/16	3/4"	1/4"	4"	N/A	N/A	8"	6"	N/A
HSS12x12x5/16	3/4"	5/16"	8"	N/A	N/A	18"	6"	N/A
HSS16x10.625	1"	3/8"	14"	15"	12"	30"	12"	N/A
db1L5x5	note 6	3/8"	N/A	N/A	N/A	N/A	N/A	15"

Notes:

- For typical HSS slot detail see **3** S4.7. For Brace Frame Gusset Plate Geometry Detail see **1** S4.7. Fabricator shall submit shop drawings for each joint that are drawn to the same horizontal and vertical scales so that proper joint detailing may be verified.
- All gusset E's are to be ASTM A572 Gr 50 uno.
- Length of weld from gusset E to beam or column shall be full length of E. Weld lengths shown above are minimum and may need to be exceeded to accommodate connection geometry, see details.
- Plate lengths may be adjusted $\pm 1/2"$ to facilitate fabrication.
- Weld HSS diagonal bracing to gusset E's **ONLY AFTER** framing, metal deck and concrete (where occurs) have been placed.
- Where diagonal bracing & horizontal strut attach to a common connection E, the diagonal bracing size shall determine the conn E 't'.
- The Fabricator shall submit one representative sample connection detail for each joint configuration type for review to verify the parameters given have been properly interpreted **BEFORE** detailing all of the building brace frame joints. The Fabricator is to detail the remaining joints **only after** this submittal has been reviewed and returned to the General Contractor.



Braced Frame Elevation **1** S4.6 - 1/8" = 1'-0"
Design 1 & 2

4
S4.6 **WF Beams Grid I/J**

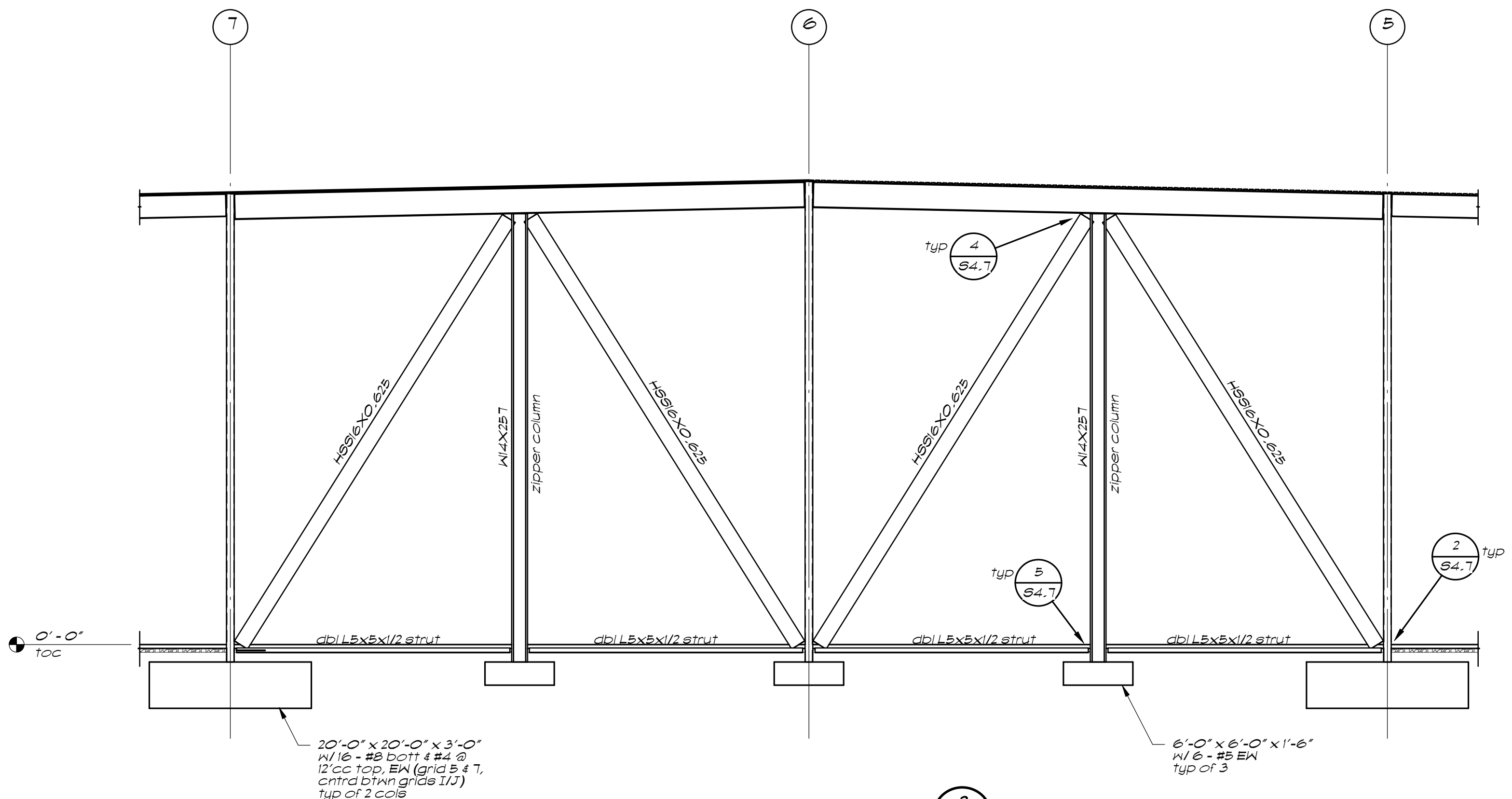
	WF 1	WF 2	WF 3	WF 4	WF (BF)
Design 1	W24x55 c = 1"	W24x55 c = 1"	W24x55 c = 1"	W24x55 c = 1"	W24x55 c = 1"
Design 2	W24x68 c = 3/4"	W24x55 c = 1"	W24x55 c = 1"	W24x55 c = 1"	W24x68 c = 3/4"
Design 3	W24x76 c = 3/4"	W24x68 c = 3/4"	W24x68 c = 3/4"	W24x55 c = 1"	W27x94

Note: "c" is amount of camber

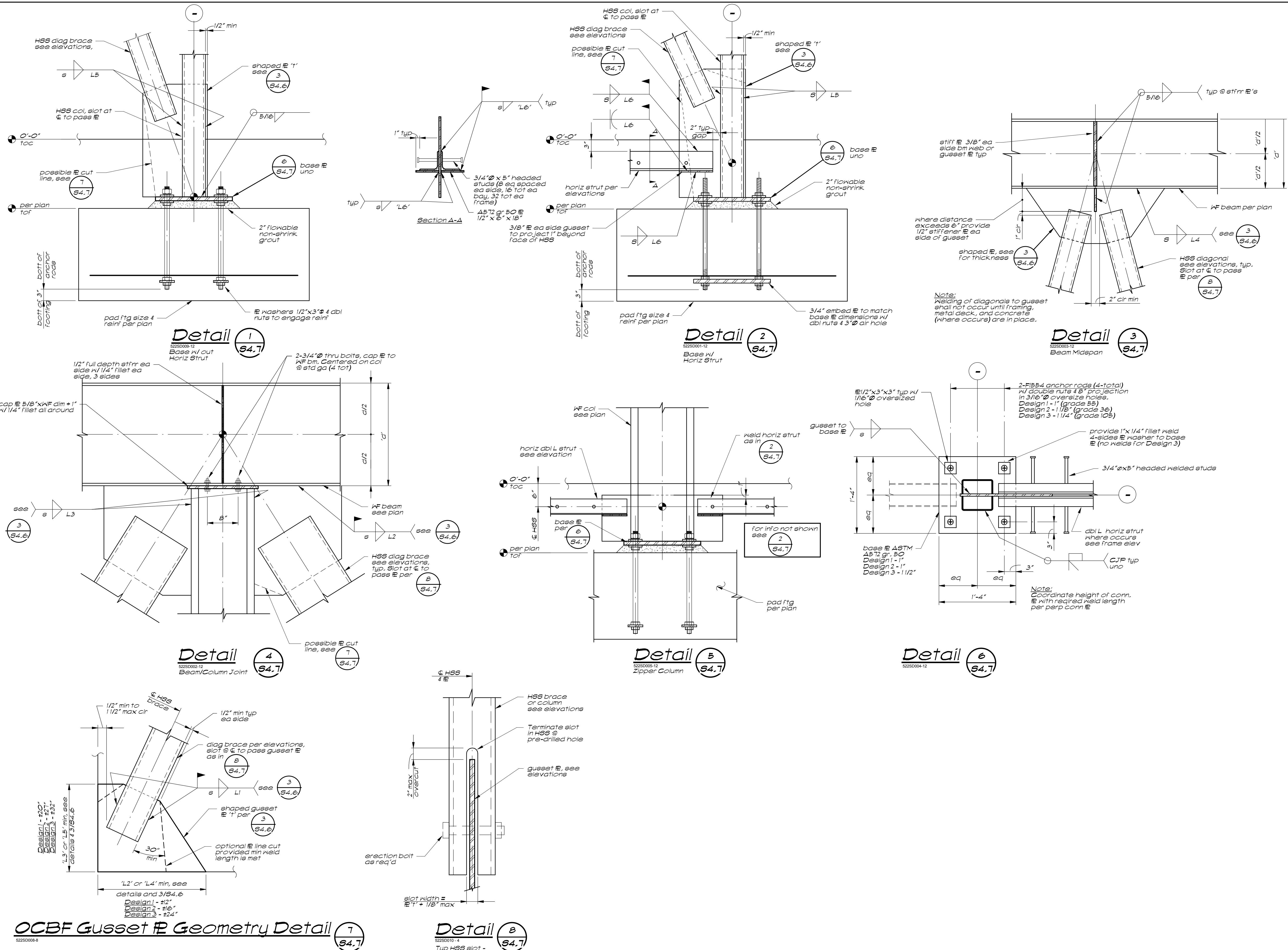
5
S4.6 **WF Beam Connections Grid I/J**

	Grid 2	Grid 3	Grid 4	Grid 5	Grid 6
Design 1	6/55.1 (1)	6/55.1 (1)	6/55.1 (1)	6/55.1 (1)	6/55.1 (1)
Design 2	6/55.1 (1)	6/55.1 (1)	6/55.1 (2)	6/55.1 (2)	6/55.1 (2)
Design 3	6/55.1 (1)	6/55.1 (2)	7/55.1	7/55.1	7/55.1

Note: 1. Connections are mirrored about grid 6
2. "(#)" indicates # of rows of slip critical bolts
3. Connection to occur @ beam on each side of column @ noted grid



Braced Frame Elevation **2** S4.6 - 1/8" = 1'-0"
Design 3



A Base Plate Schedule

Column Size	Base Plate Size						Capacity
	'a'	'b'	'c'	'd'	'e'	'f'	
3x3	5/8"	9"	9"	3 1/2"	2"	7"	-
4x4	5/8"	10"	10"	5"	2 1/2"	7 1/2"	-
5x5	1"	11"	11"	5 1/2"	3"	8"	-
6x6	1"	12"	12"	7"	3 1/2"	8 1/2"	-
7x7	1 1/4"	13"	13"	8"	4"	9"	-
8x8	1 1/4"	14"	14"	9"	4 1/2"	9 1/2"	-
10x10	1 1/2"	16"	16"	11"	5 1/2"	10 1/2"	-
12x12	1 1/2"	18"	18"	13"	6 1/2"	11 1/2"	-

Notes:
 1. Weld 'w' shall be 1/4" at base plates 3/4" and less, 5/16" at base plates greater than 3/4".

B Connection Schedule

HSS Column Size	Stirr IR 't'	Base IR				
		'A'	'B'	'C'	'D'	
3"x3"	1/4"	3/16"	11"	4"	7 1/2"	1/2"
4"x4"	1/4"	1/4"	12"	5"	8 1/2"	5/8"
5"x5"	3/8"	1/4"	13"	6"	9 1/2"	3/4"
6"x6"	3/8"	1/4"	14"	7"	10 1/2"	3/4"
7"x7"	1/2"	1/4"	15"	8"	11 1/2"	3/4"
8"x8"	3/4"	5/16"	15"	9"	12 1/2"	7/8"
10"x10"	3/4"	5/16"	16"	11"	14 1/2"	1"

Notes:
 1. Use IR 't' for largest HSS column at connection
 2. 'B' indicates the minimum width. Use the greater width of the beam flange or the minimum indicated.
 3. Weld 's' shall be 1/4" at base plates 3/4" thick and less, 5/16" at base plates greater than 3/4" thick.

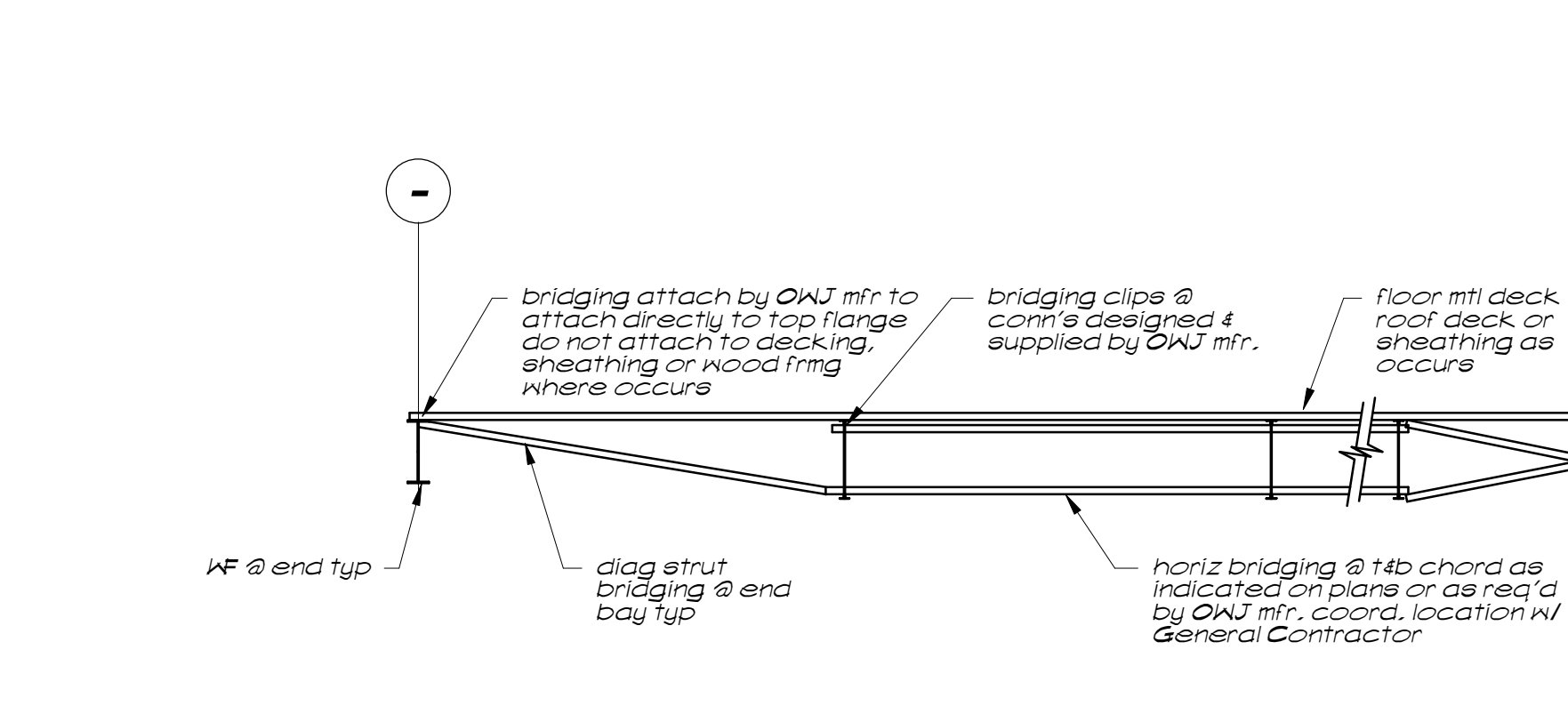
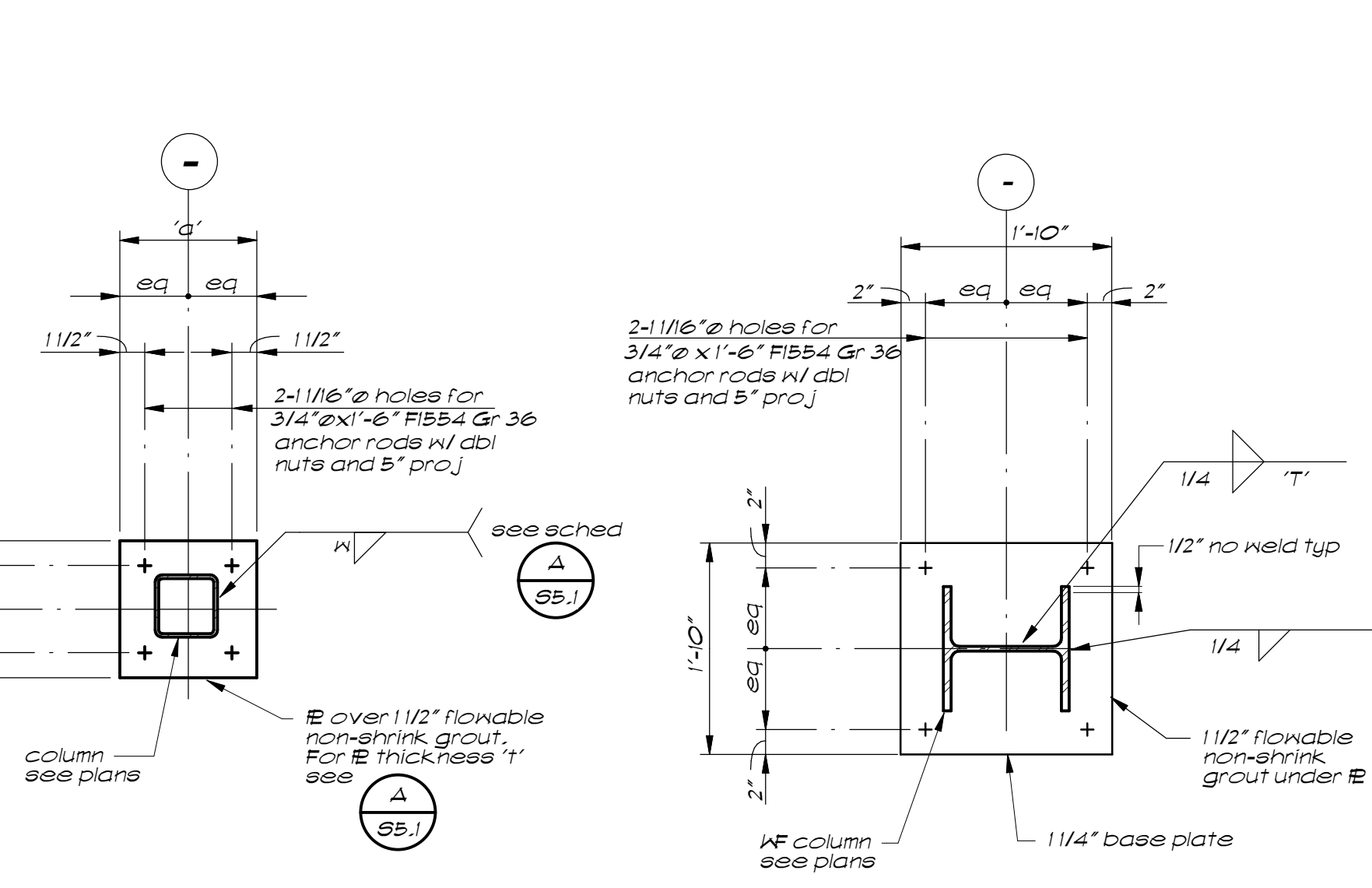
C Deck Welding Schedule

Deck Type	Depth & Gauge	Perpendicular Supports	Parallel Supports	Side Laps	Diaphragm Shear Capacity
DGB-36 Roof Deck	1 1/2"x22 ga	4 PW per sheet	PW @ 12" cc	DG @ 60" cc	489#/,
DGB-36 Roof Deck	1 1/2"x22 ga	4 PW per sheet	PW @ 12" cc	DG @ 18" cc	684#/,

Notes:
 1. PW = 3/4" diameter (1/2" effective diameter) puddle weld; TSN = 1 1/2" min top seam weld; DG = Delta Grip
 2. Metal deck shall be ASC or approved equal, of type and gauge shown on plans and welded as shown above.
 3. See D for typical weld patterns.
 4. See 3 for metal deck welding at struct steel supports.
 5. All metal deck shall have two spans minimum.
 6. Provide shoring as required at all decks per mfr recommendations.

D Metal Deck Weld Patterns

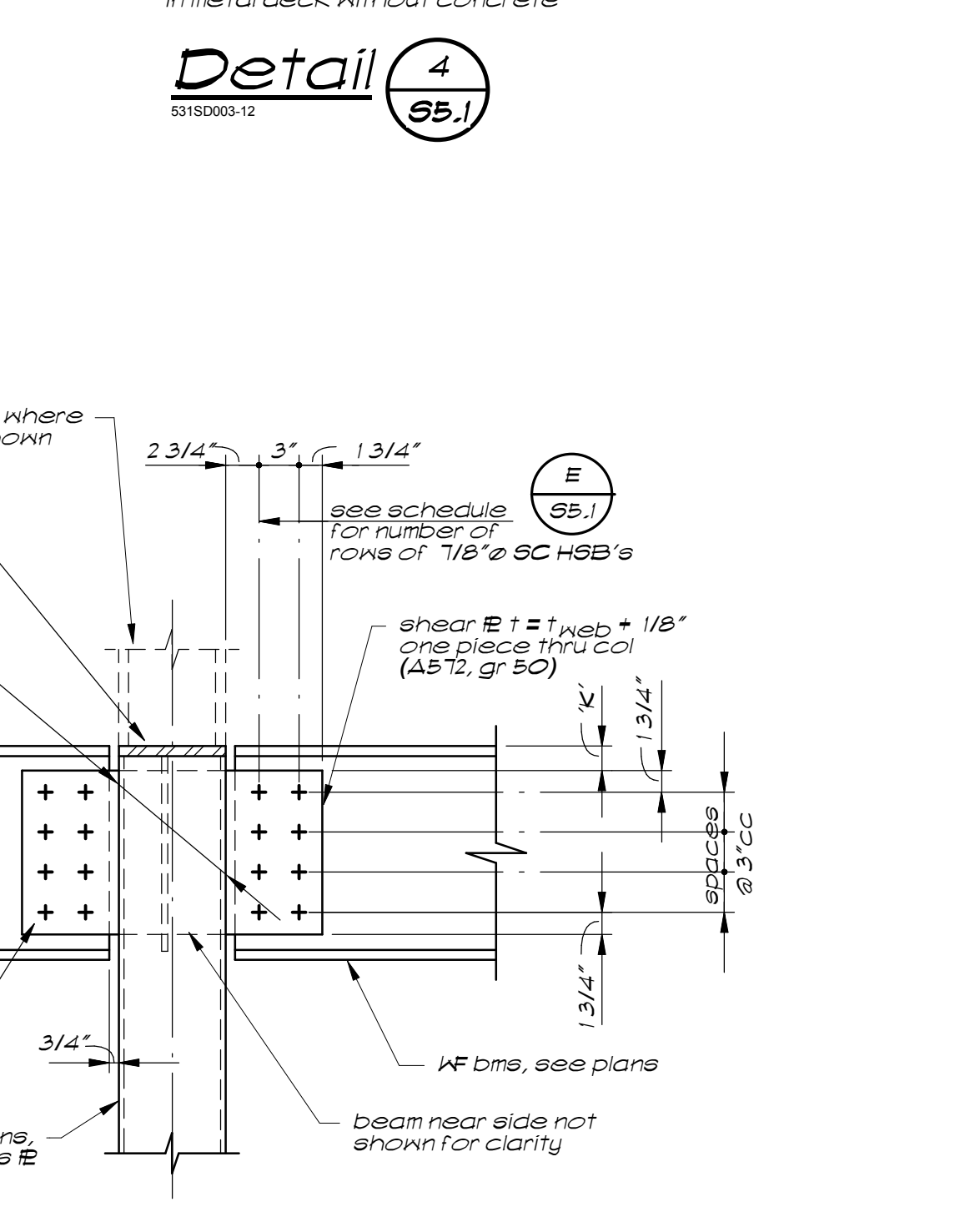
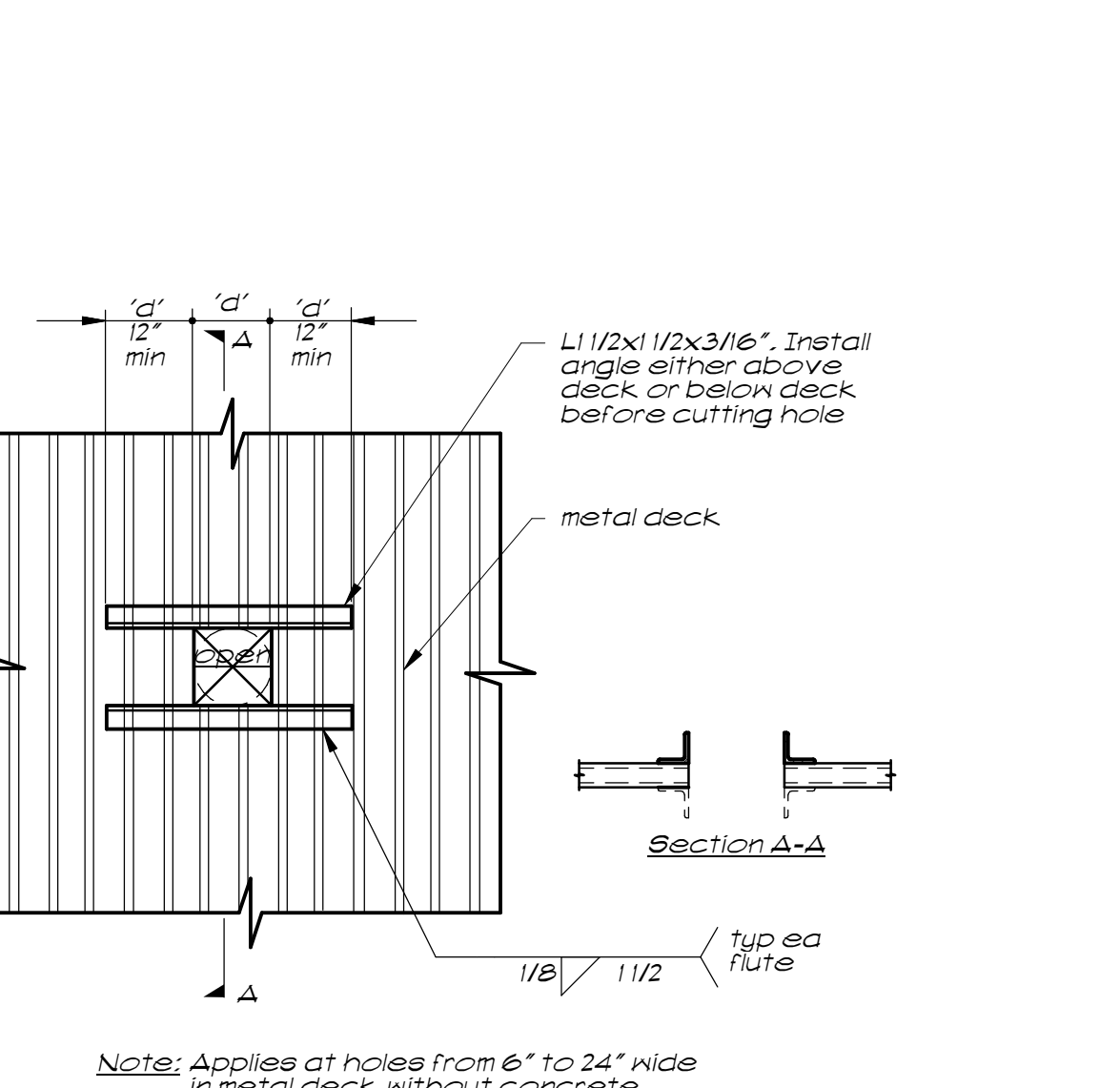
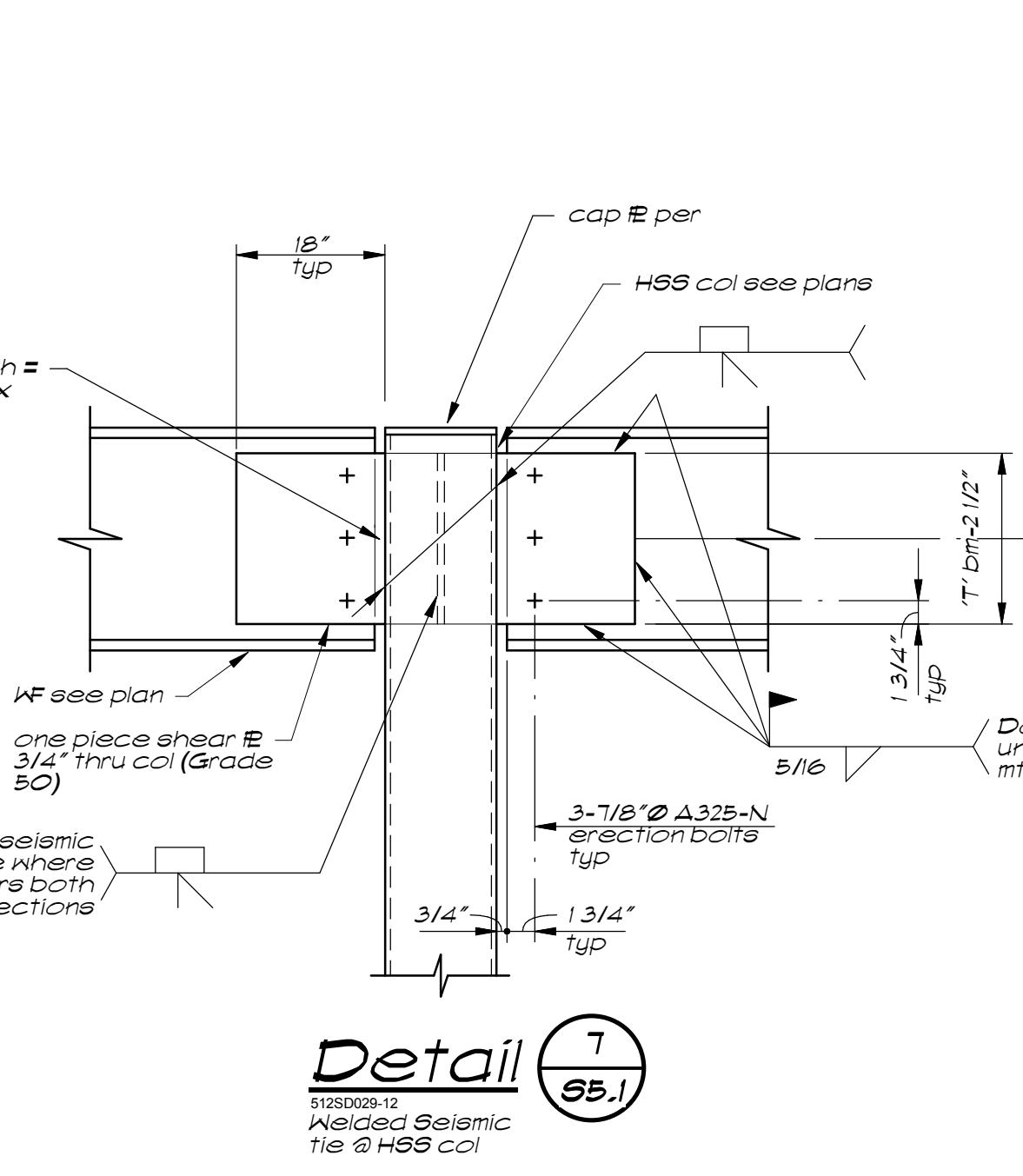
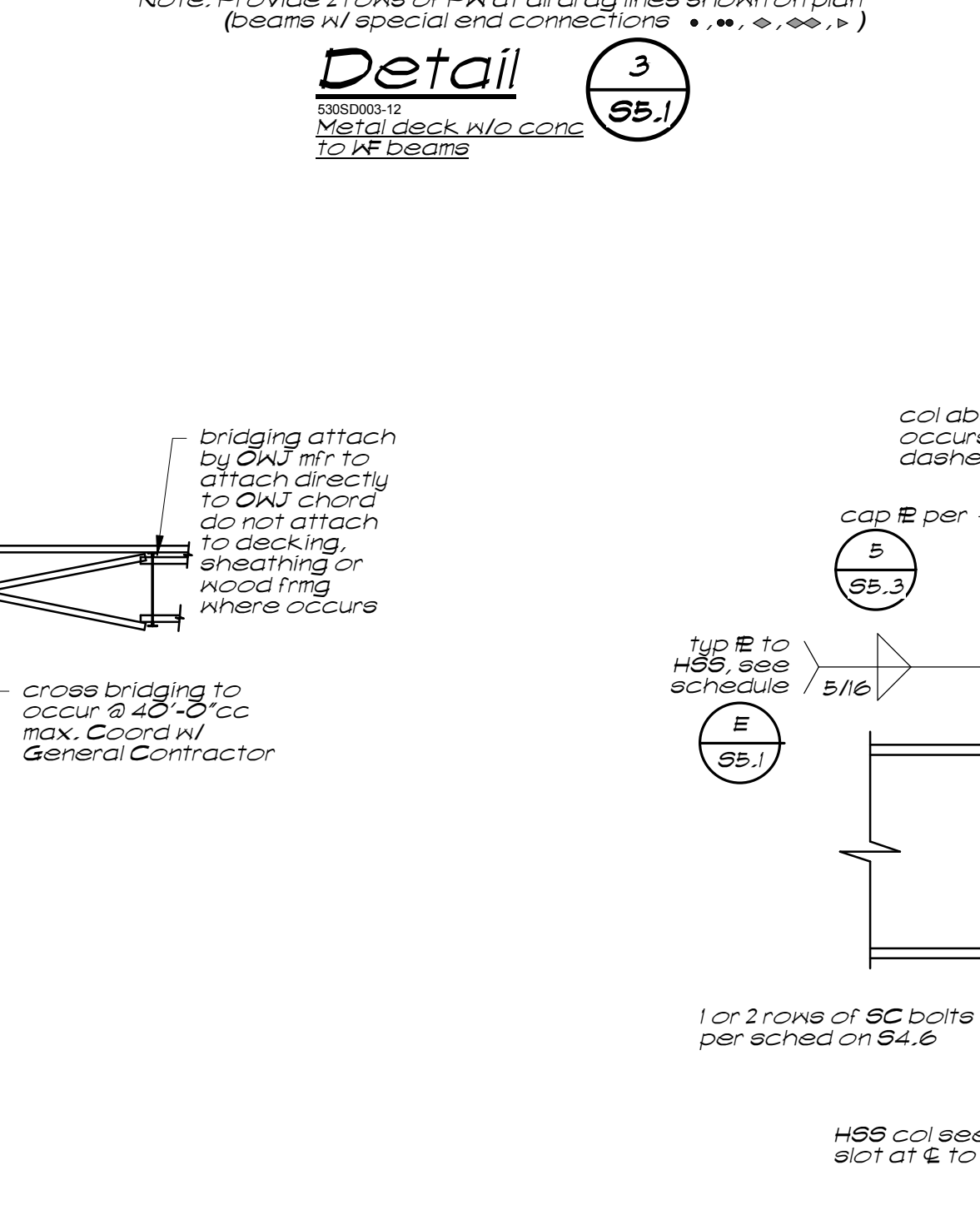
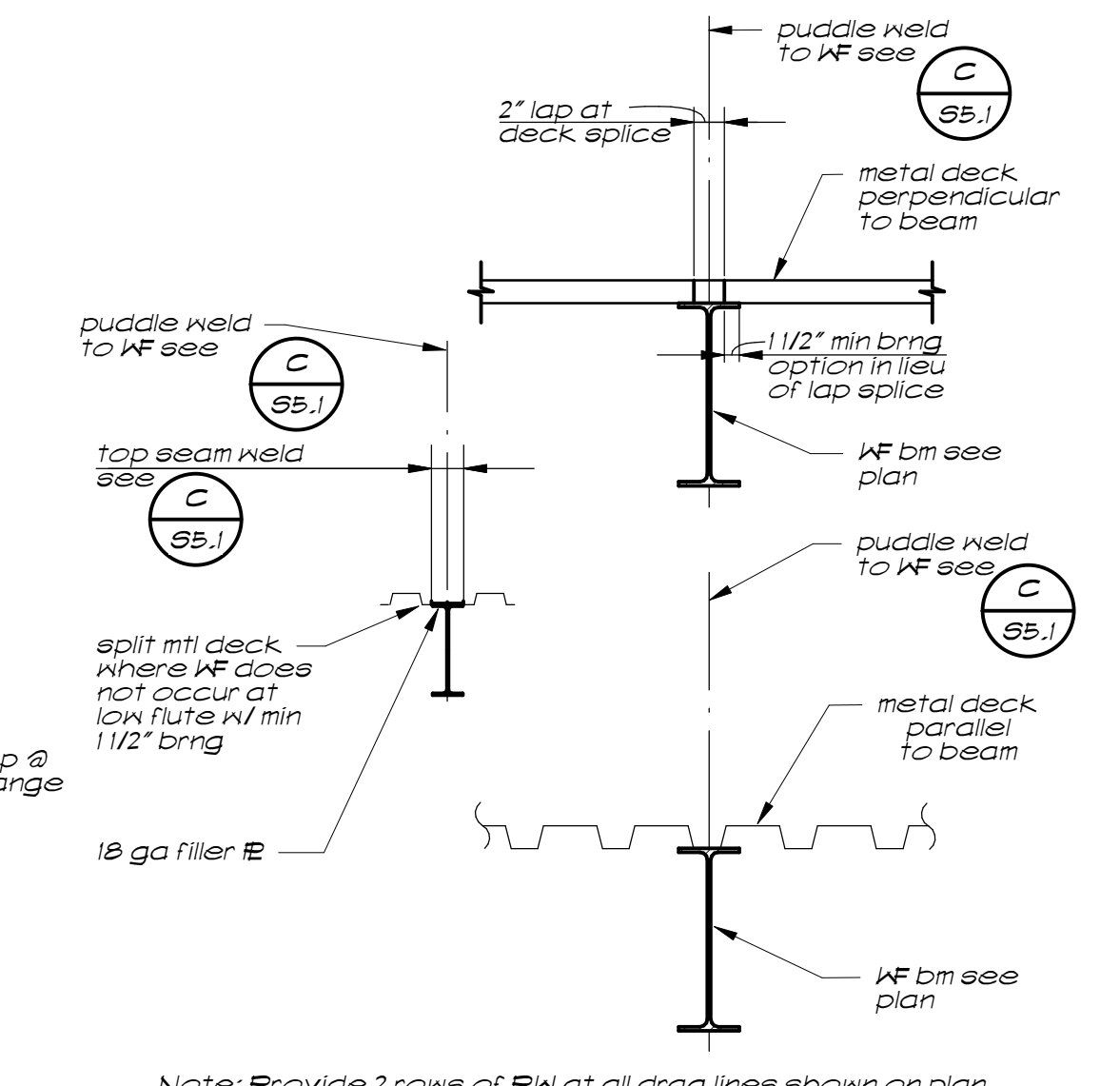
Deck Type	Profile	No. 3/4" PW per sheet
Type DGB-36		4

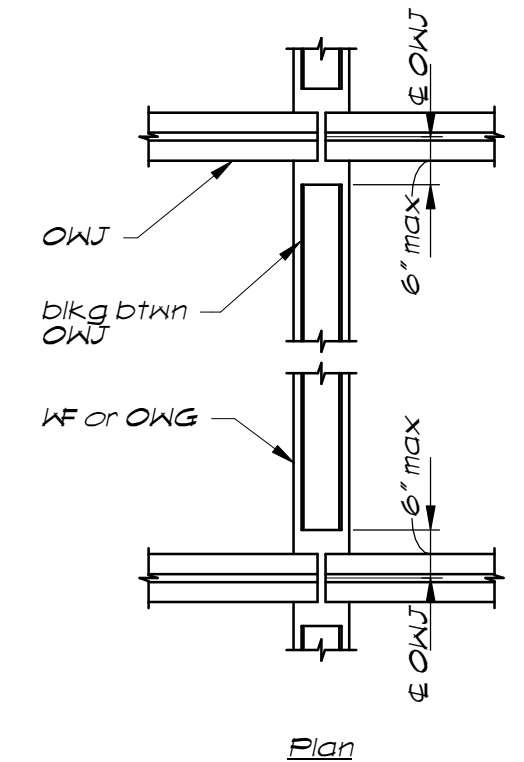


E Connection Schedule

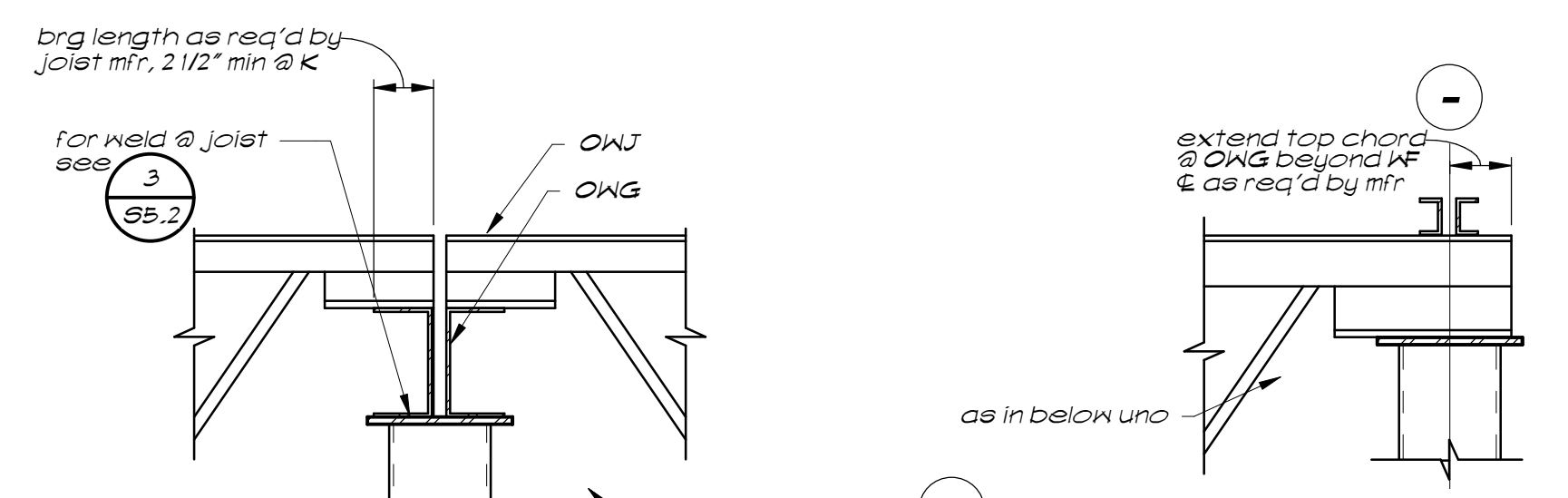
Beam Size	No. & Dia. A325-N Bolts	Stirr IR 't'	Weld	Max. load ² capacity
EB & IO	2 - 7/8"	1/4"	3/16"	26.1K
WB & WIO	2 - 7/8"	1/4"	3/16"	26.1K
W12 & W14	3 - 7/8"	1/4"	3/16"	39.1K
W16	4 - 7/8"	3/8"	1/4"	78.3K
W18	5 - 7/8"	3/8"	1/4"	97.9K
W21	5 - 7/8"	3/8"	1/4"	97.9K
W24	6 - 7/8"	3/8"	1/4"	117K
W27	7 - 7/8"	3/8"	1/4"	137K
W30	8-1"	3/8"	5/16"	152K
W33	9-1"	1/2"	3/8"	227K
W36	10-1"	5/8"	3/8"	275K

Notes:
 1. This schedule applies to non-frame connections, typical.
 2. LRFD load capacity per AISC Manual 13th ed., table 10-9a.

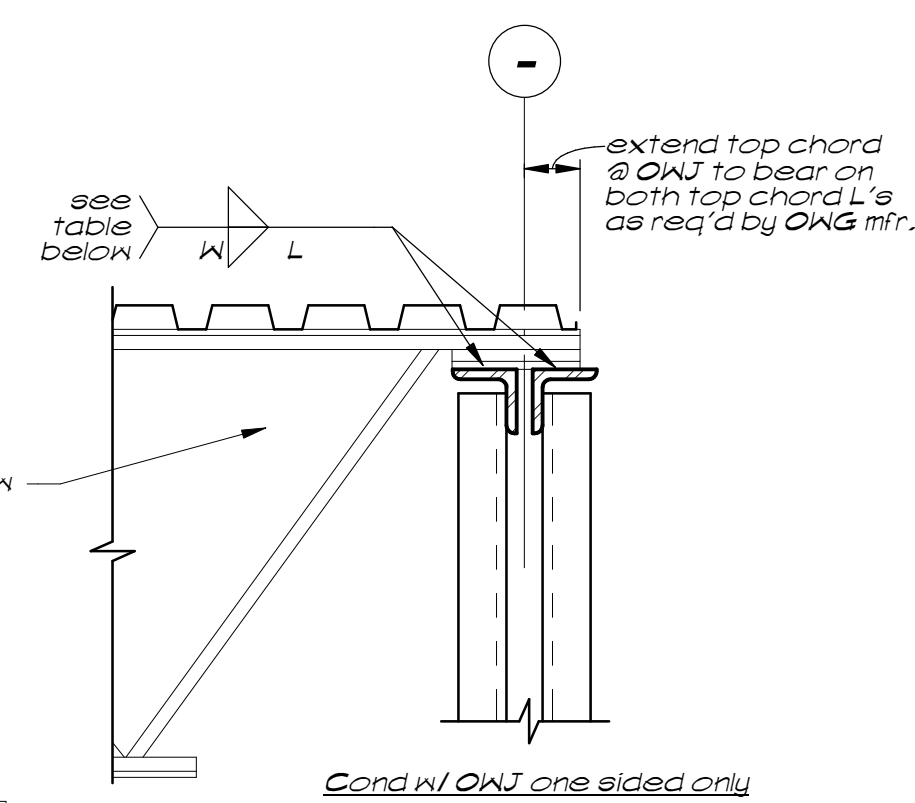




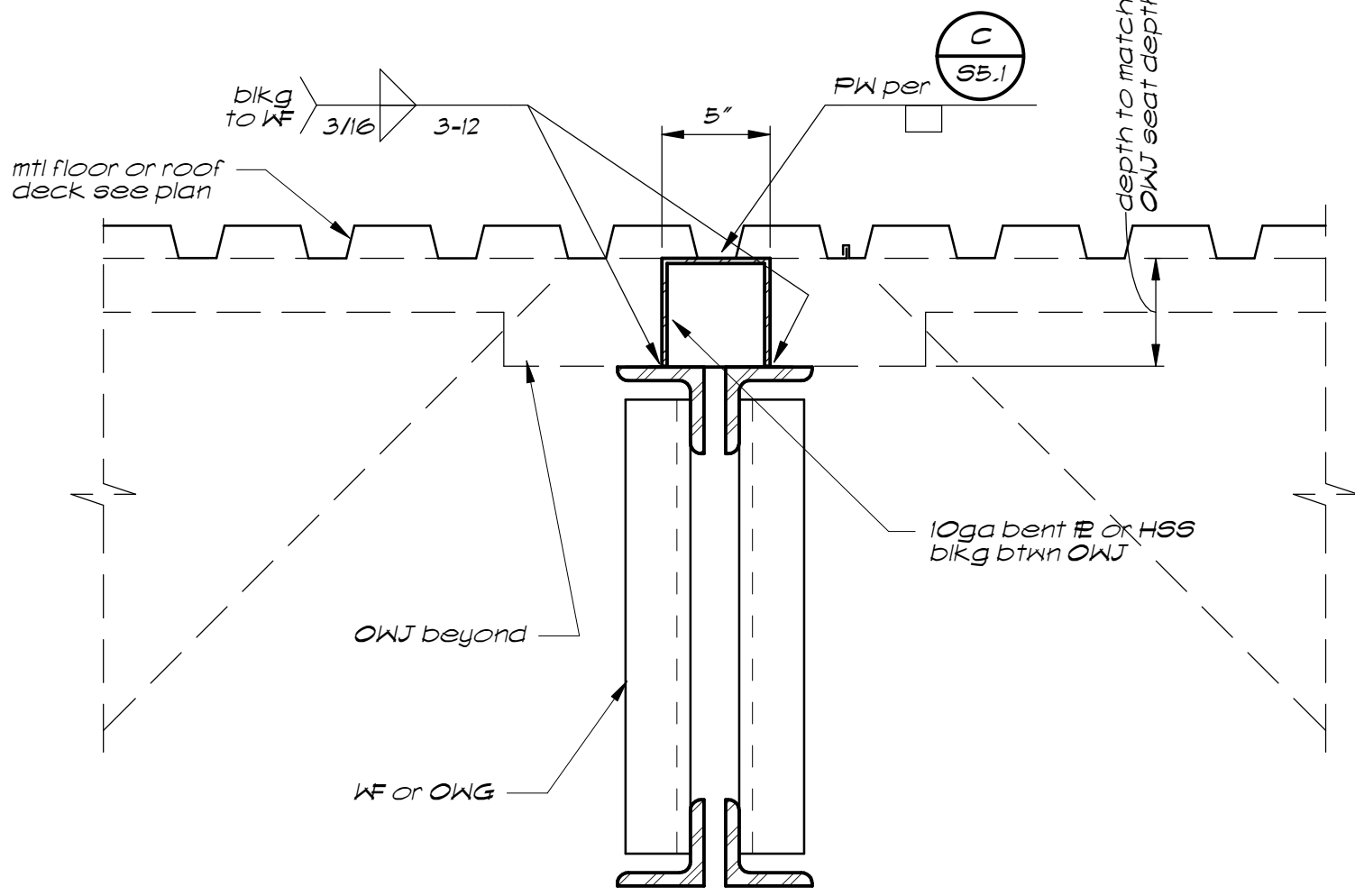
Plan



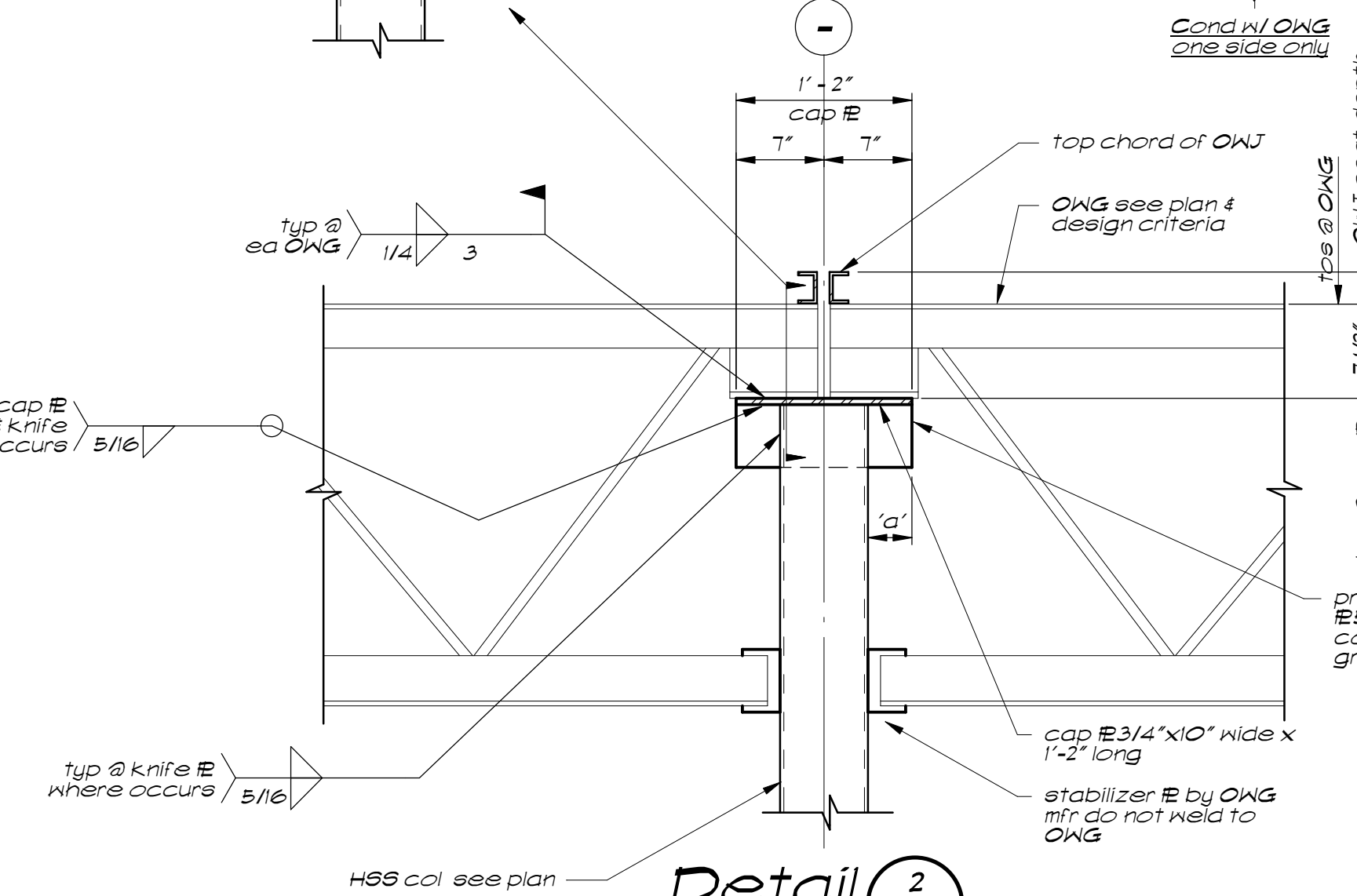
Elevation



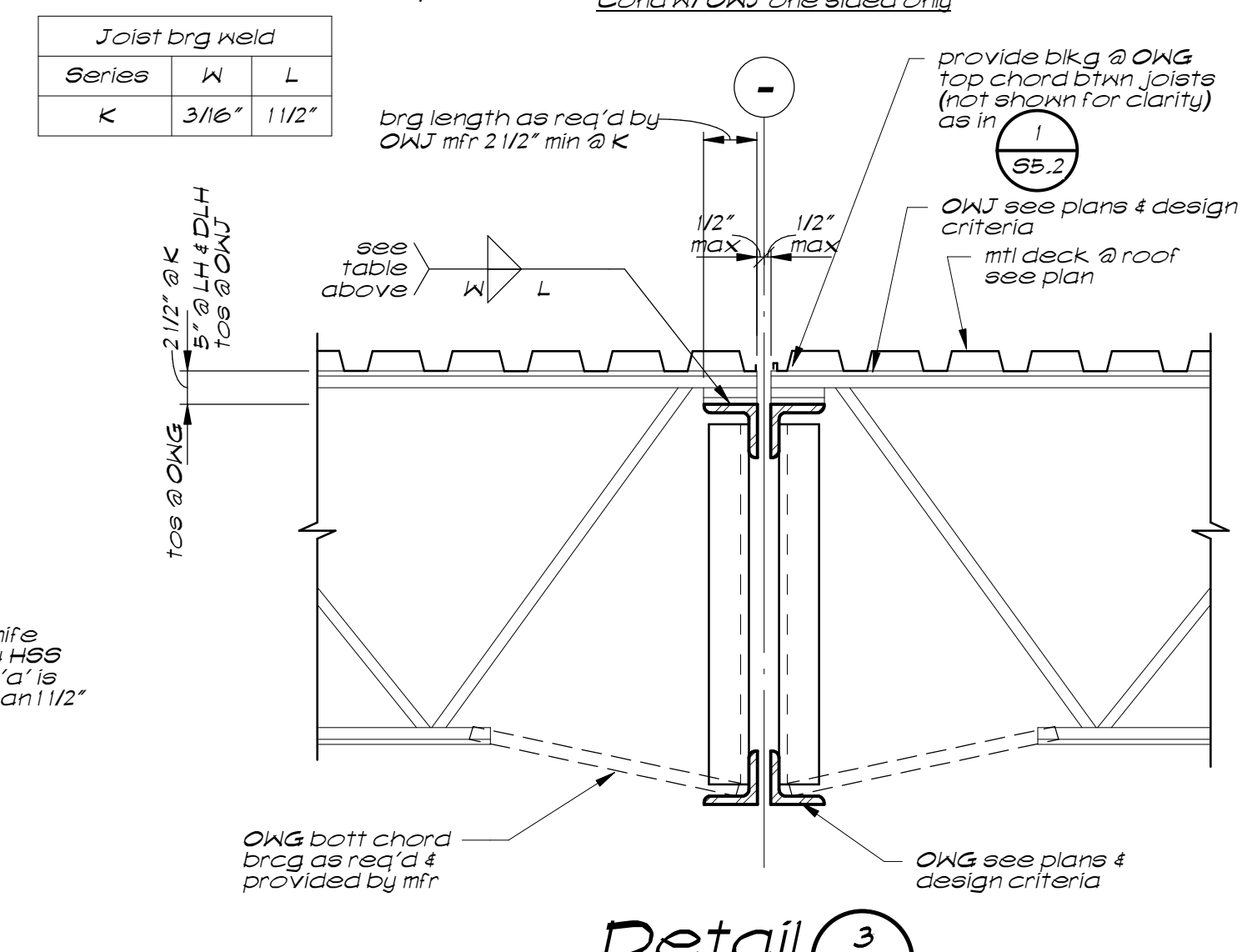
Elevation



Detail 1
S5.2
Bent @ bkg btrwn joists



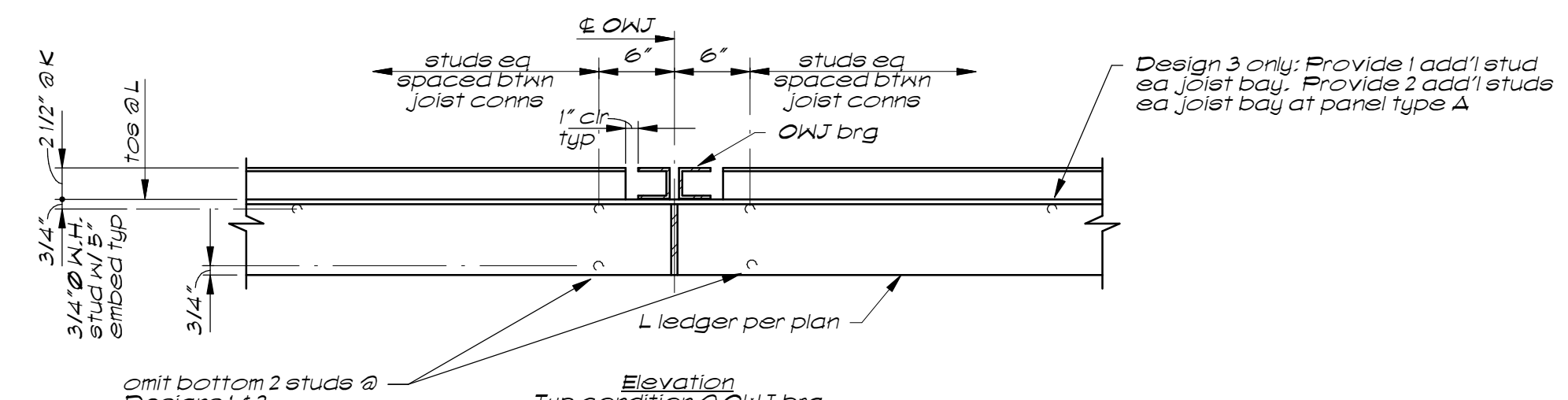
Detail 2
S5.2
OWJ to Column - Roof



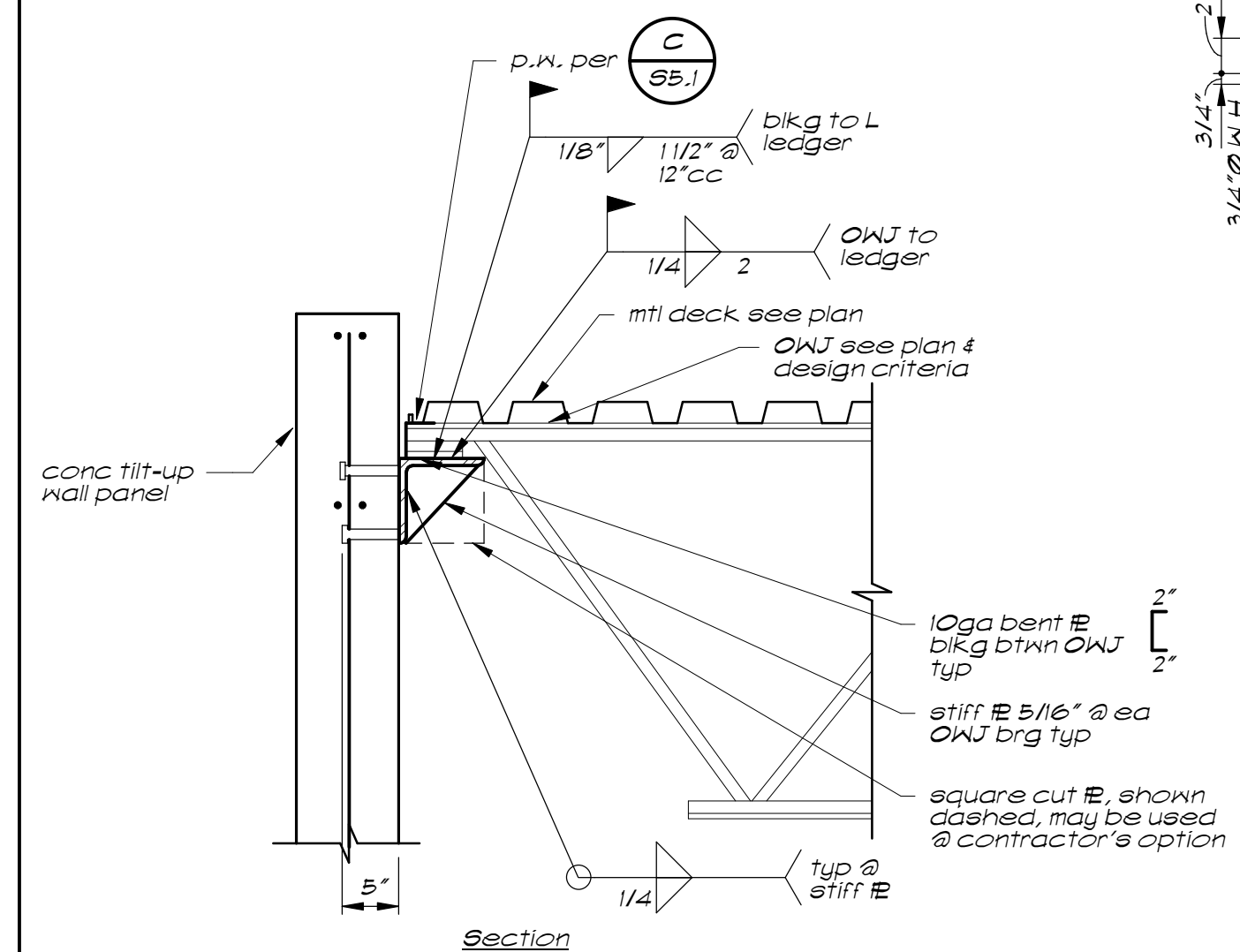
Detail 3
S5.2
OWJ to OWG - Roof

Joist brg weld		
Series	W	L
K	3/16"	1/12"

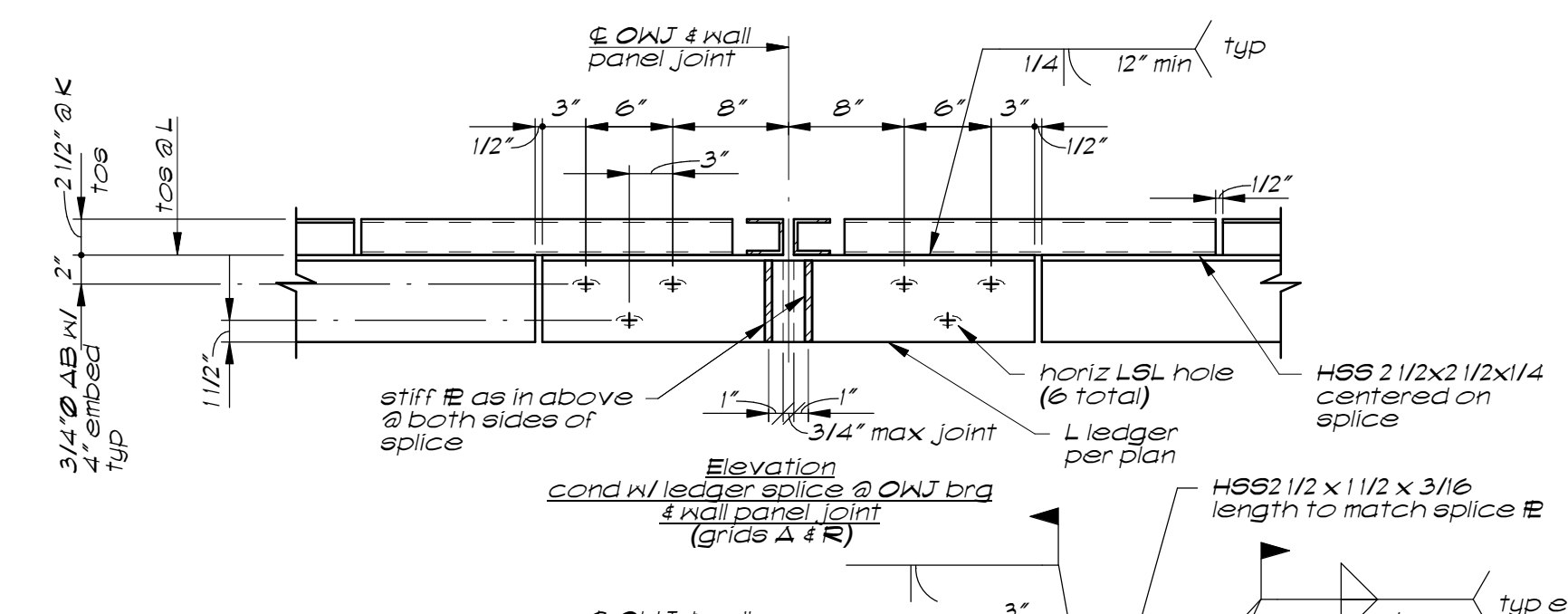
Note: cond @ bldg edge w/ OWJ one side only sim



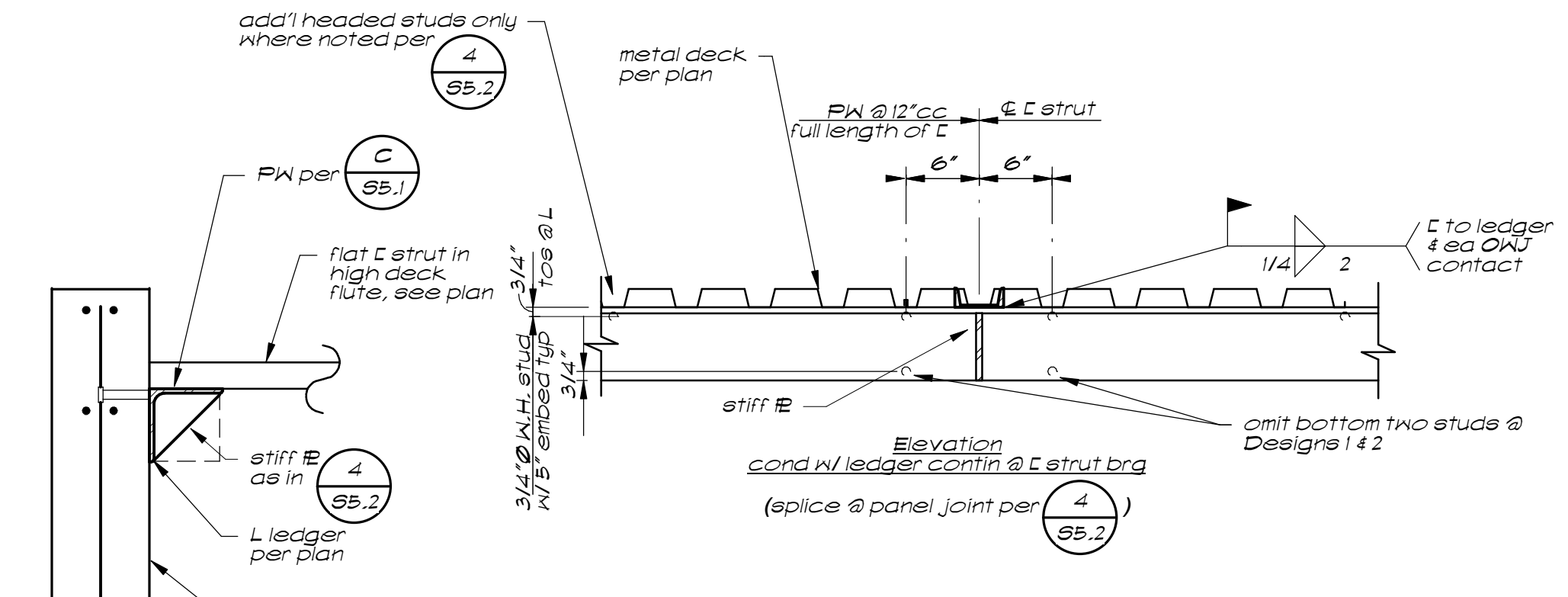
Elevation
Typ condition @ OWJ brg



Section



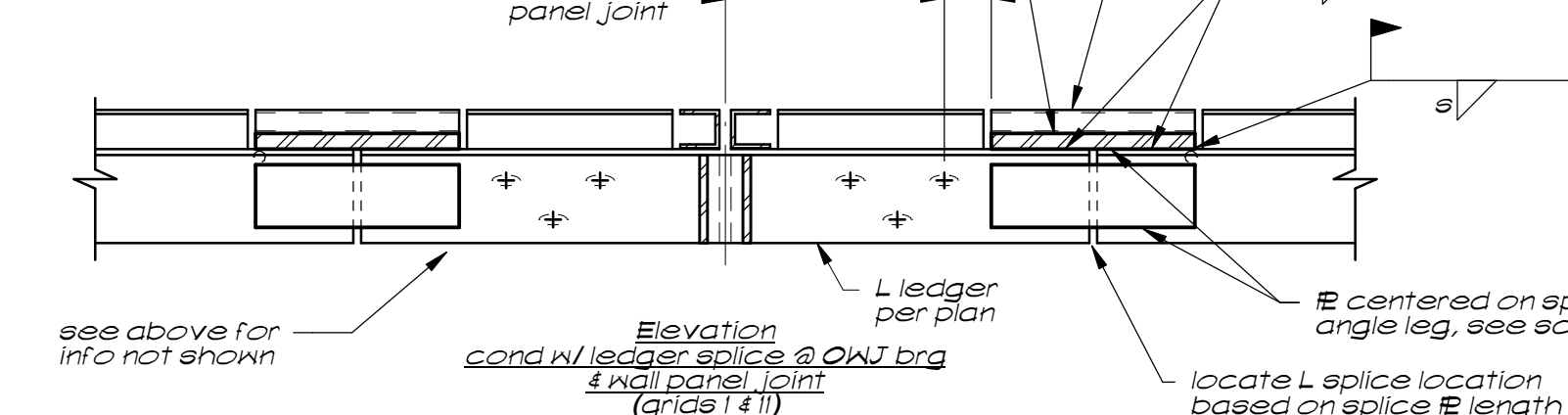
Elevation
cond w/ ledger splice @ OWJ brg & wall panel joint (Grids A & R)



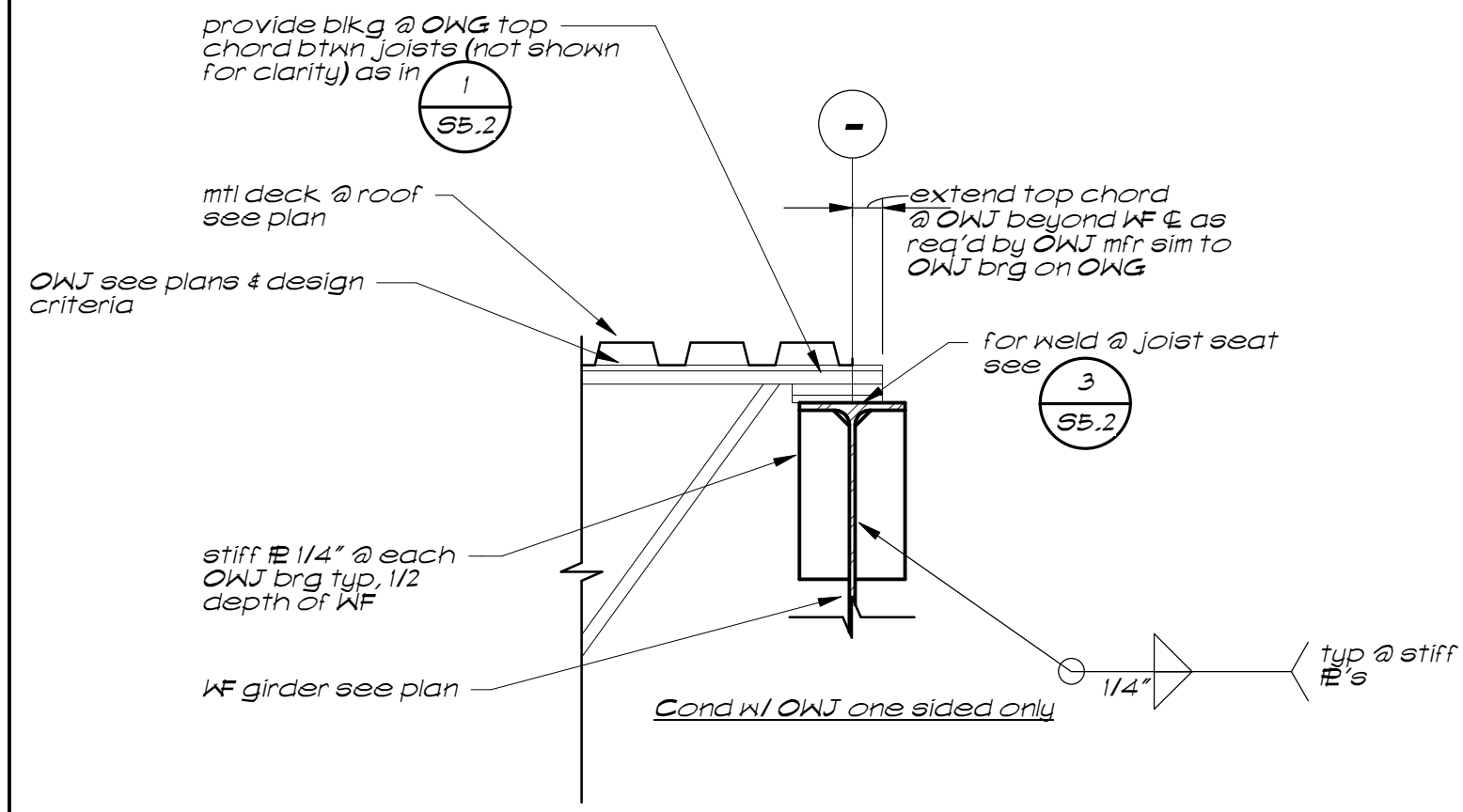
Detail 5
S5.2

Schedule				
Ledger	@	s	l	
L6x6x5/16	1"x4"x9"	1/4	4'	
L6x6x1/2	1"x4"x13"	1/4	6'	
L8x8x5/8	1"x5"x21"	5/16	10'	

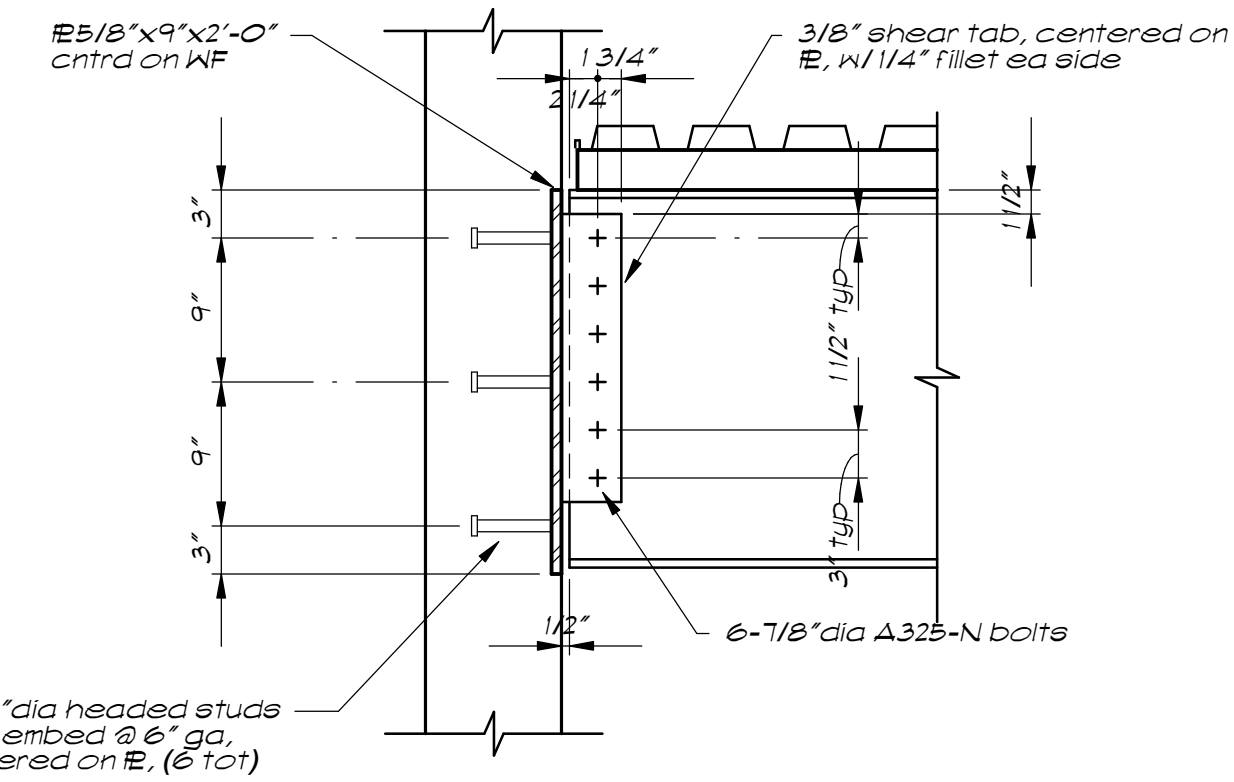
Detail 4
S5.2
Typical OWJ Ledger - Roof



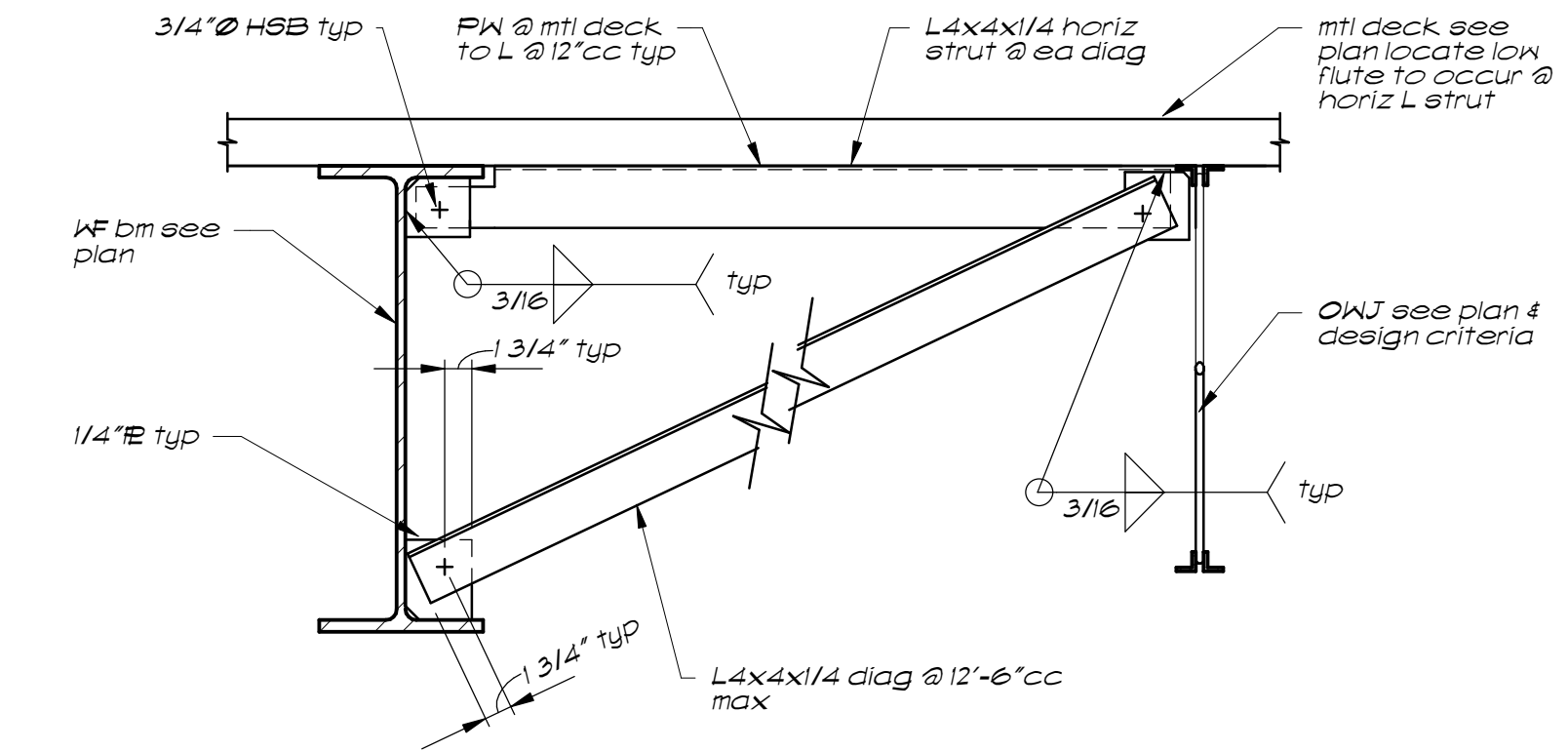
Elevation
cond w/ ledger splice @ OWJ brg & wall panel joint (Grids I & J)



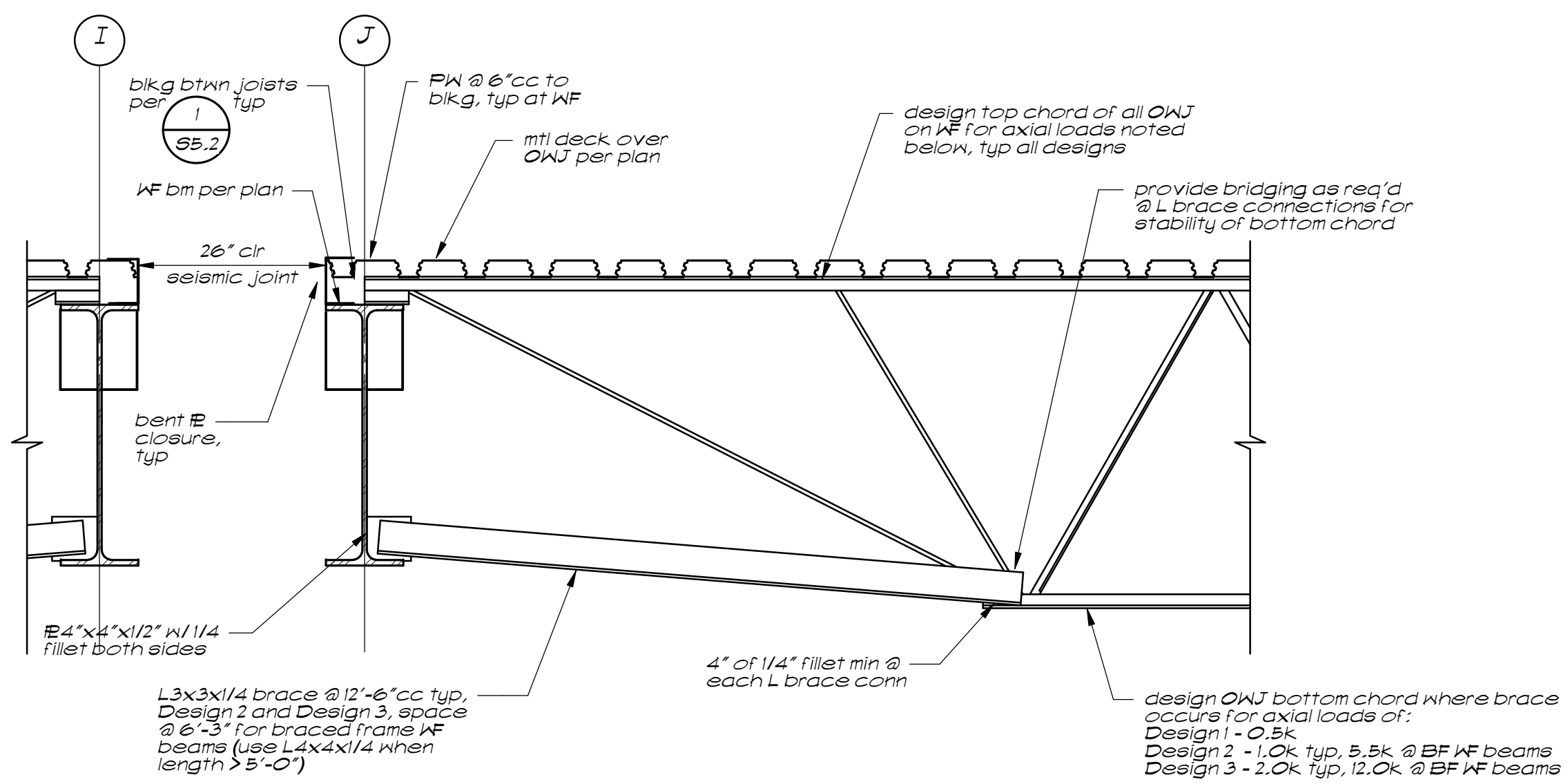
Detail 1
OWS to WF Girder - Roof
S5.3
560SD012-12



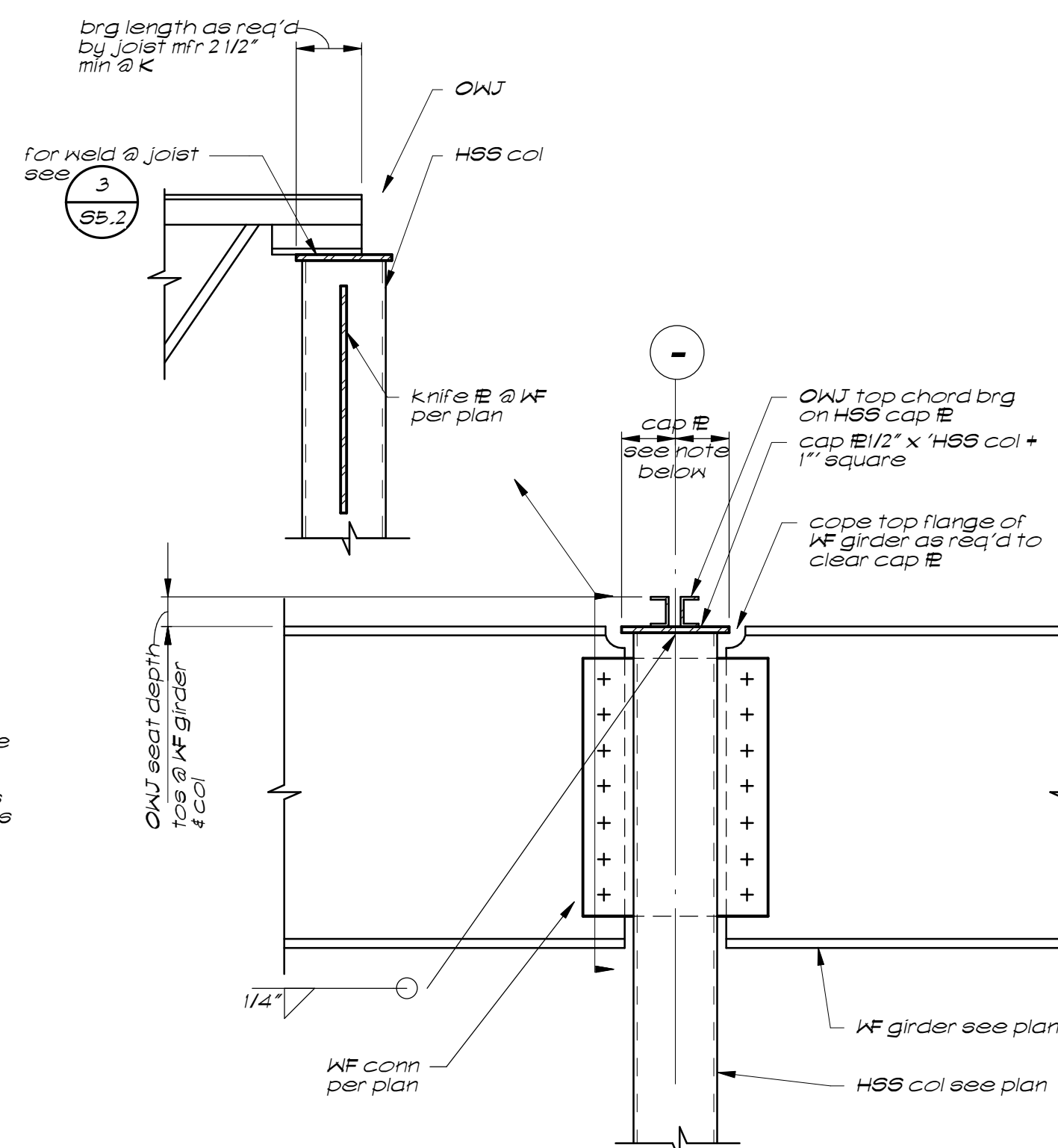
Detail 2
S5.3 - 1" = 1'-0"



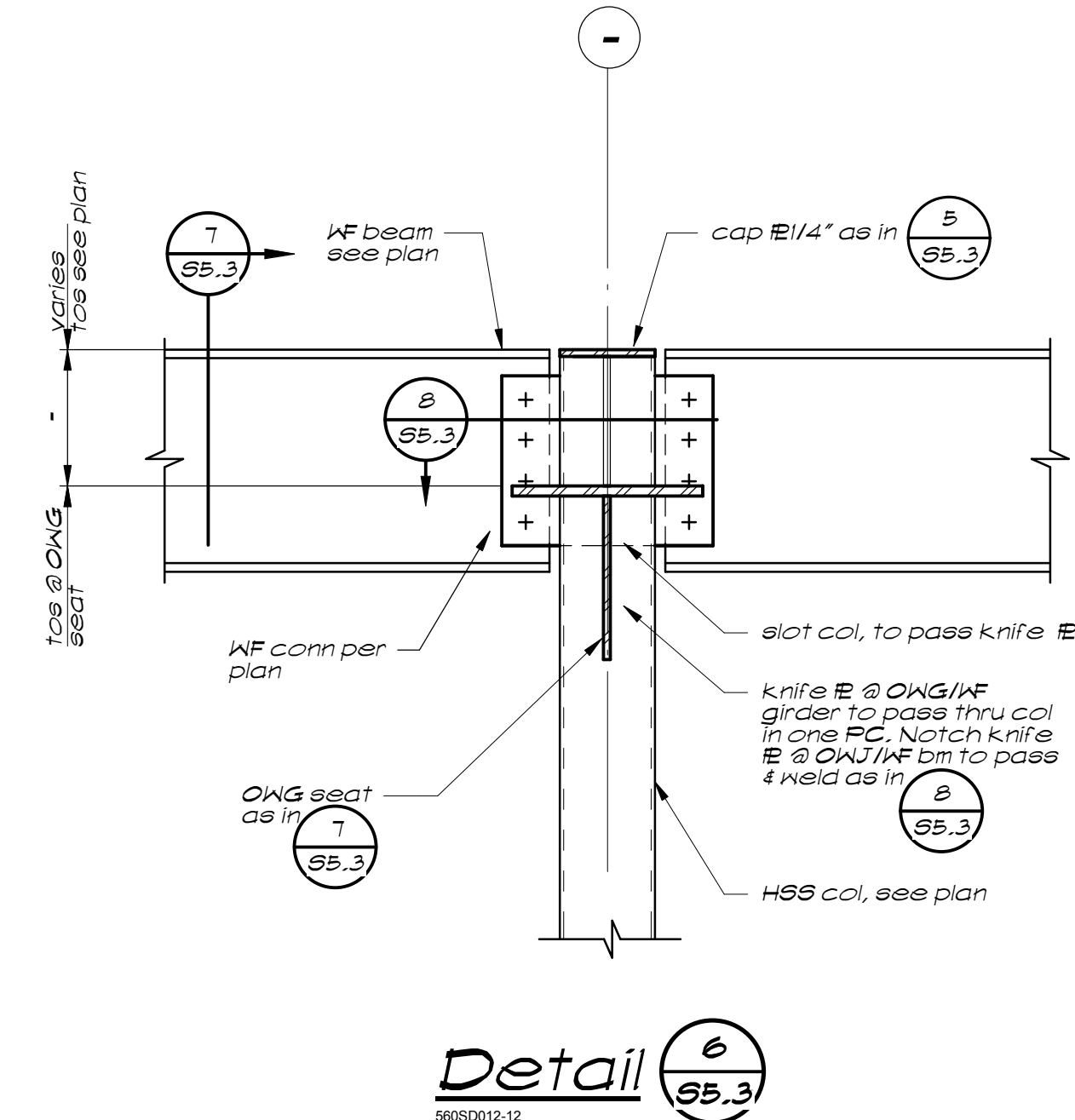
Detail 3
Typical WF Beam Bracing
S5.3
560SD029-12



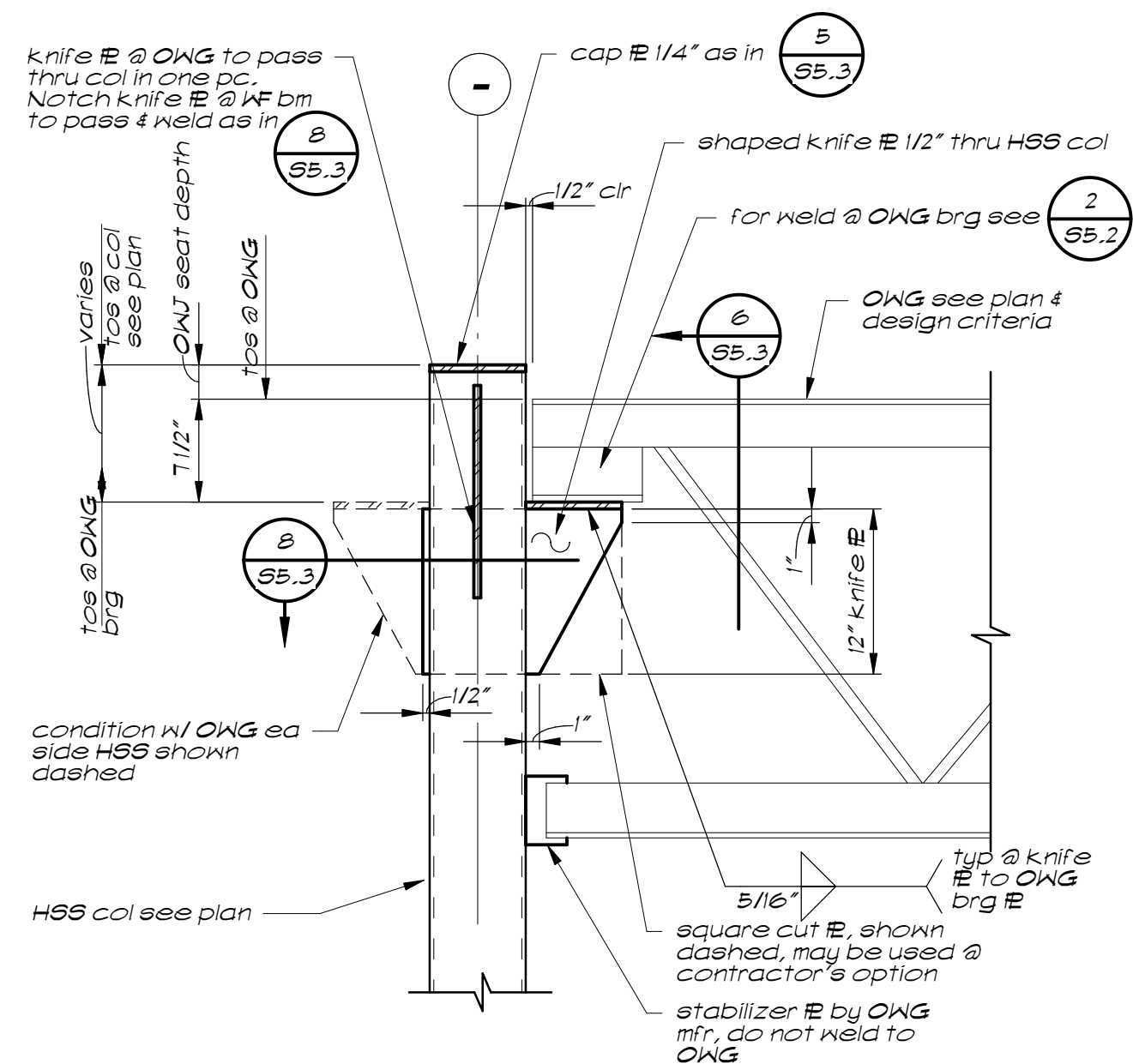
Detail 4
S5.3 - 1" = 1'-0"



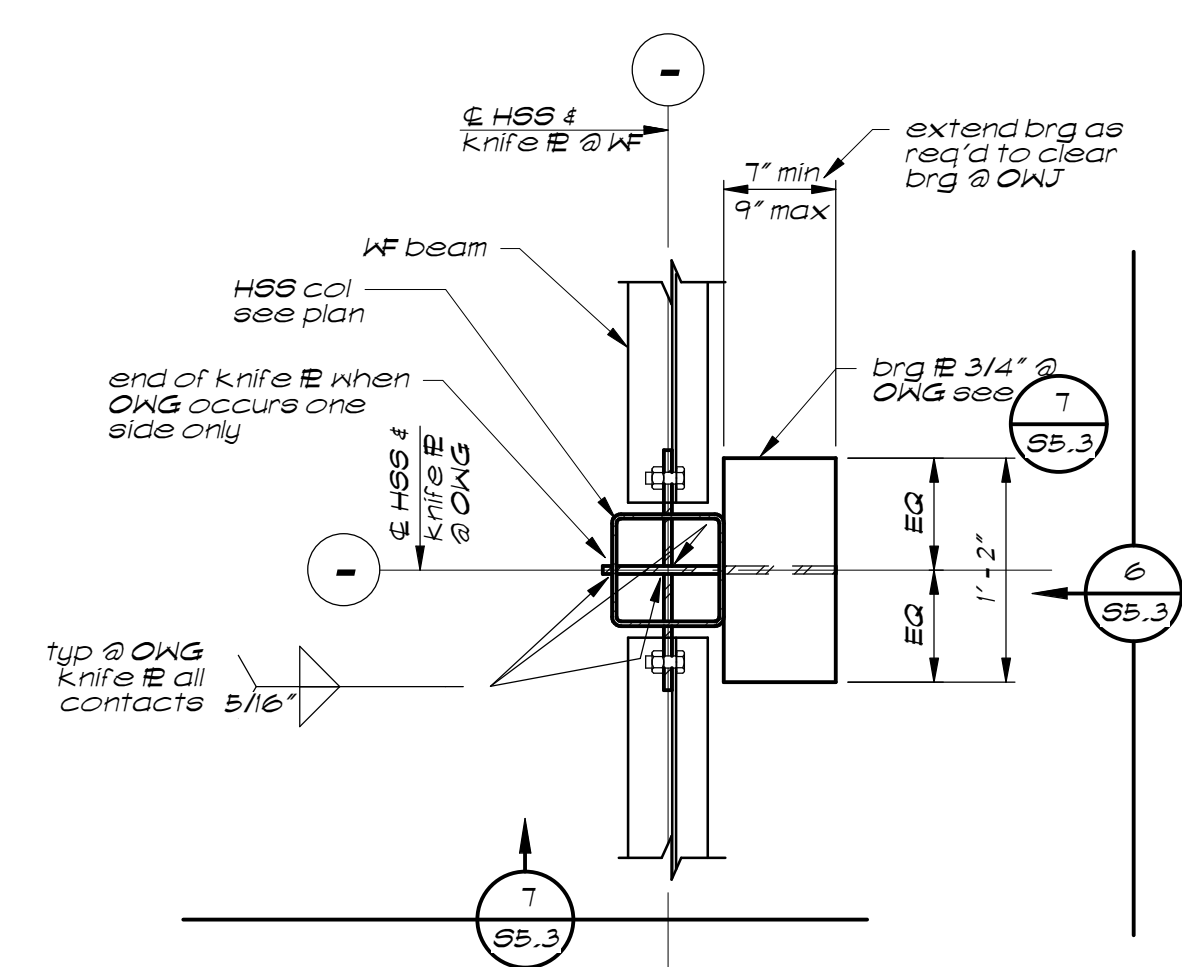
Detail 5
WF Girder to Column - Roof
S5.3
560SD011-12



Detail 6
S5.3
560SD012-12



Detail 7
S5.3
560SD013-12

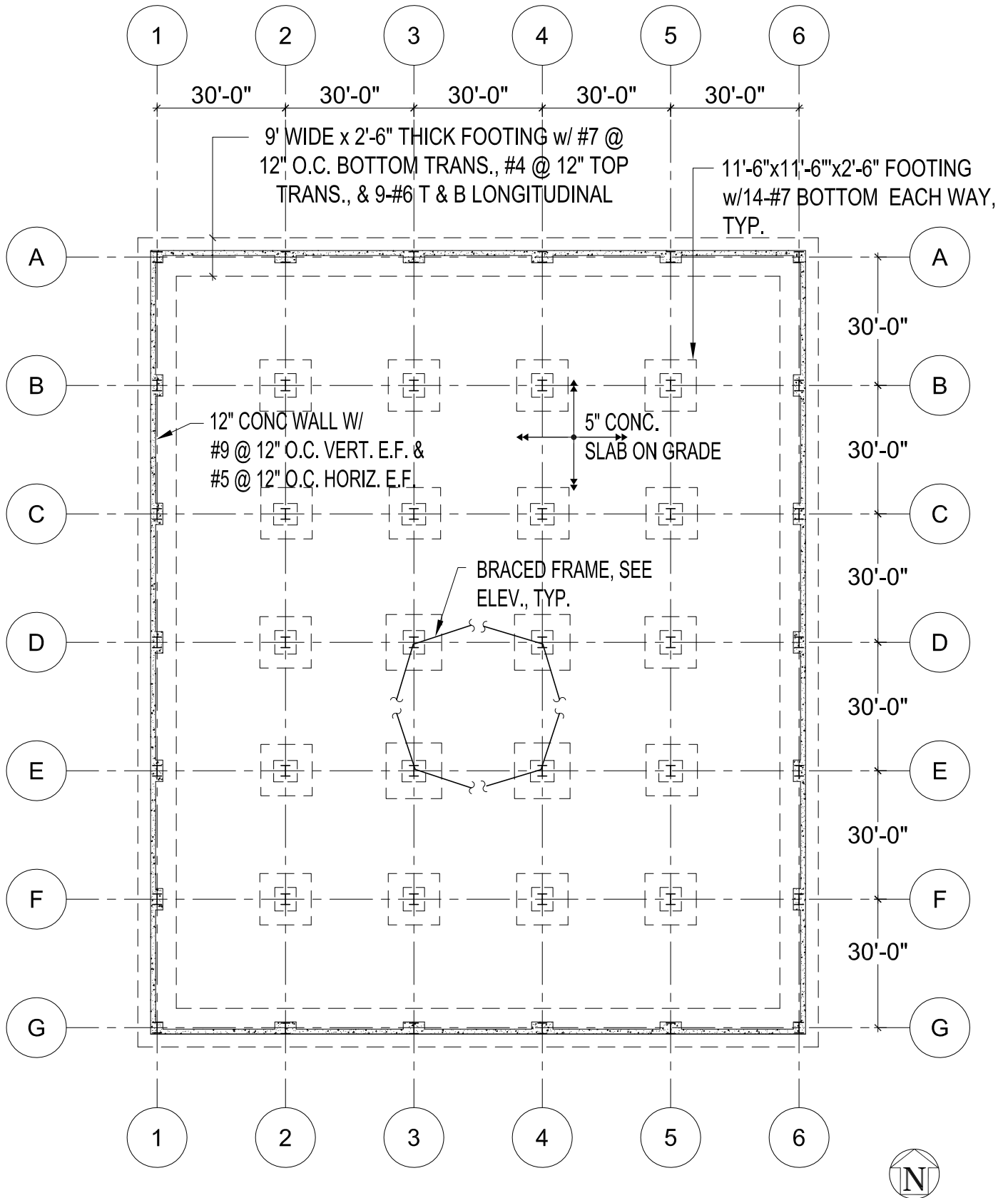


Plan Detail 8
S5.3
560SD016-12

Hospital Building Design Drawings

This chapter provides the following design drawings prepared for the hospital building:

- Figure 1: Foundation Plan [Hospital: ASCE 7-05 Wind Design]
- Figure 2: Typical Floor Plan [Hospital: ASCE 7-05 Wind Design]
- Figure 3: Column Schedule [Hospital: ASCE 7-05 Wind Design]
- Figure 4: Braced Frame Elevation Lines 3, 4, E & D [Hospital: ASCE 7-05 Wind Design]
- Figure 5: Foundation Plan [Hospital: IBC 2003 (ASCE 7-02) Seismic Design]
- Figure 6: Typical Floor Plan [Hospital: IBC 2003 (ASCE 7-02) Seismic Design]
- Figure 7: Column Schedule [Hospital: IBC 2003 (ASCE 7-02) Seismic Design]
- Figure 8: Braced Frame Elevation [Hospital: IBC 2003 (ASCE 7-02) Seismic Design]
- Figure 9: Foundation Plan [Hospital: ASCE 7-10 Seismic Design]
- Figure 10: Typical Floor Plan [Hospital: ASCE 7-10 Seismic Design]
- Figure 11: Column Schedule [Hospital: ASCE 7-10 Seismic Design]
- Figure 12: Braced Frame Elevation [Hospital: ASCE 7-10 Seismic Design]
- Figure 13: BRBF Connection Detail
- Figure 14: Collector Beam Connection Detail
- Figure 15: Typical Beam Connections all Designs
- Figure 16: BRB Connection at Foundation



**FIGURE 1: FOUNDATION PLAN
HOSPITAL: ASCE 7-05 WIND DESIGN**

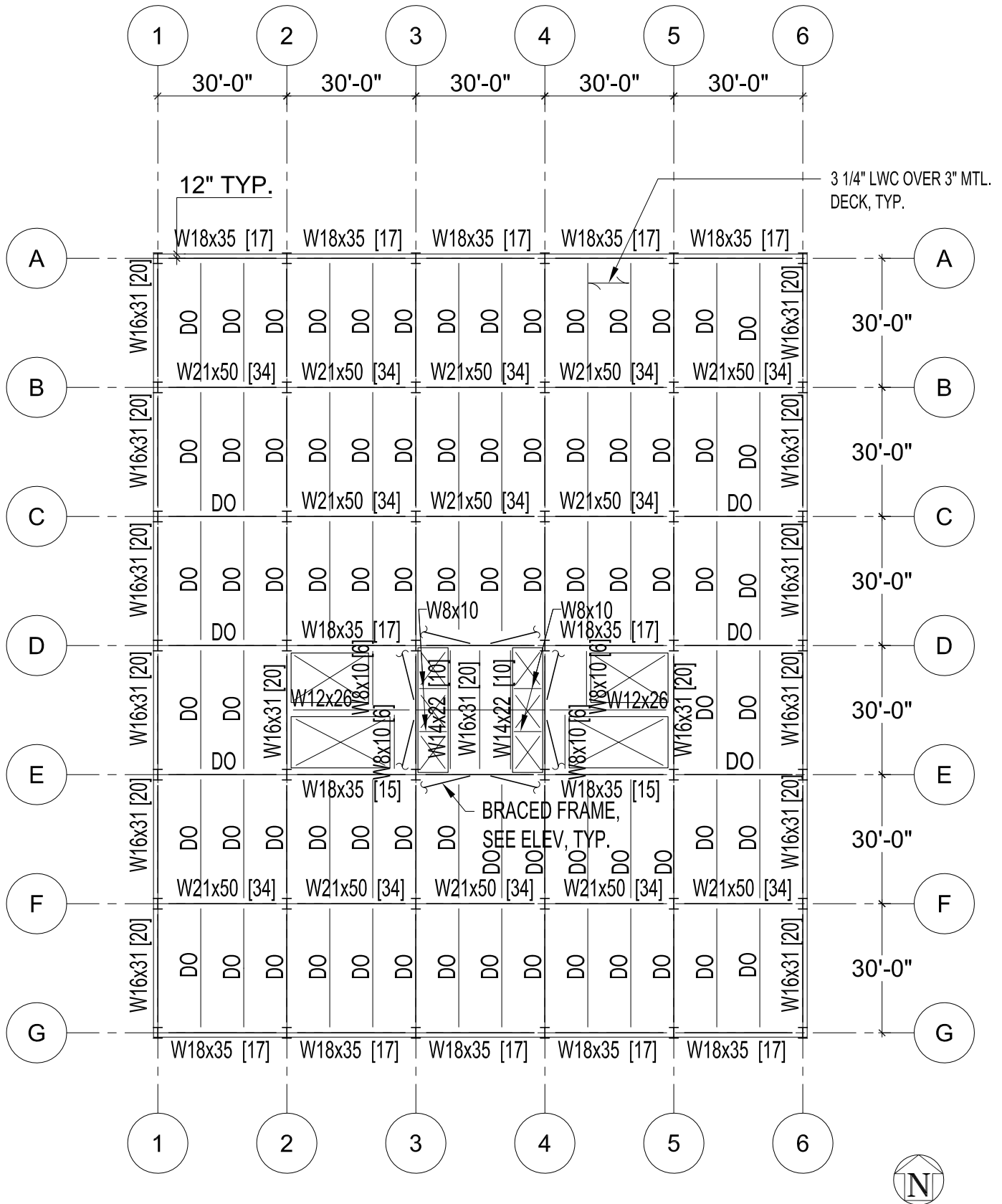
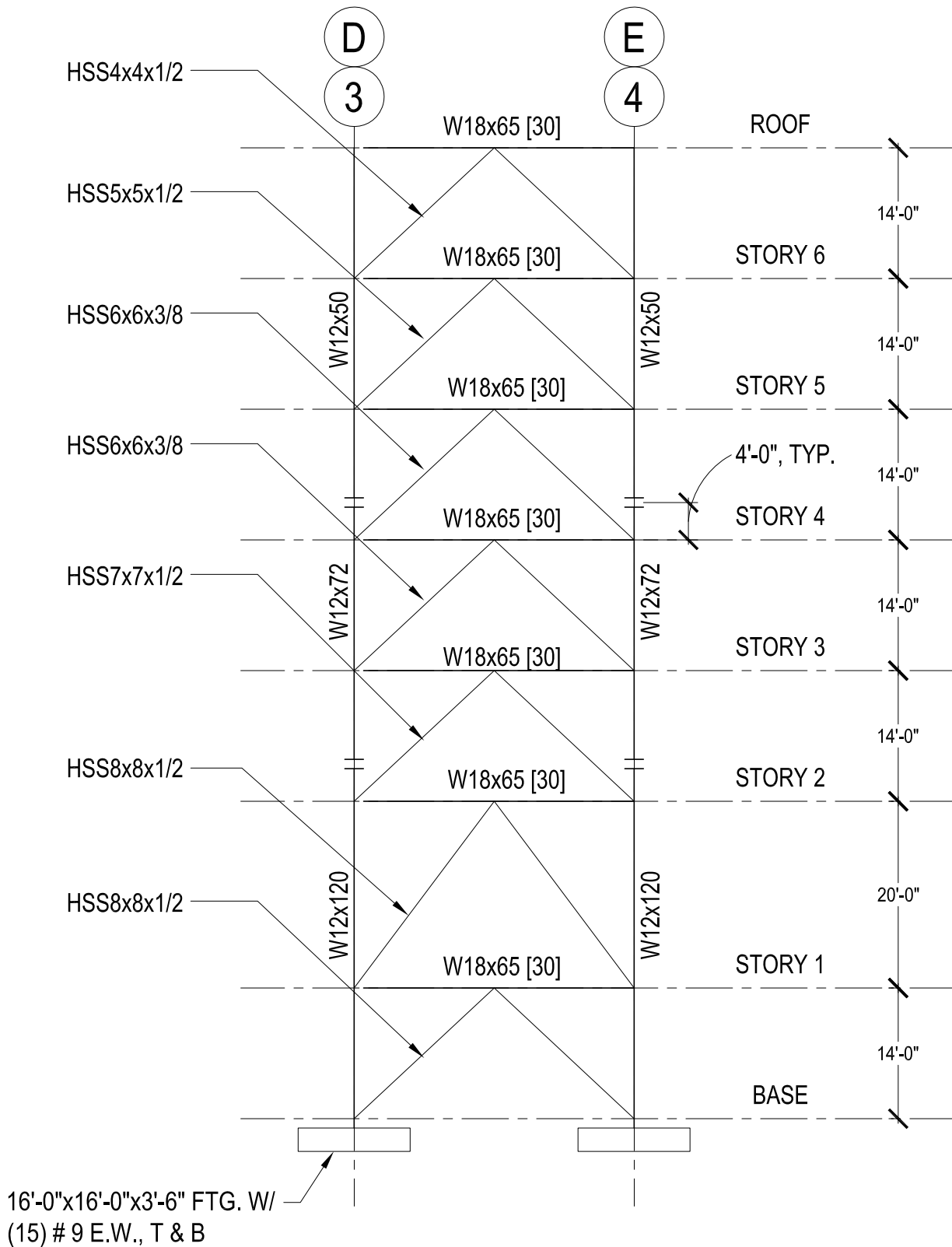


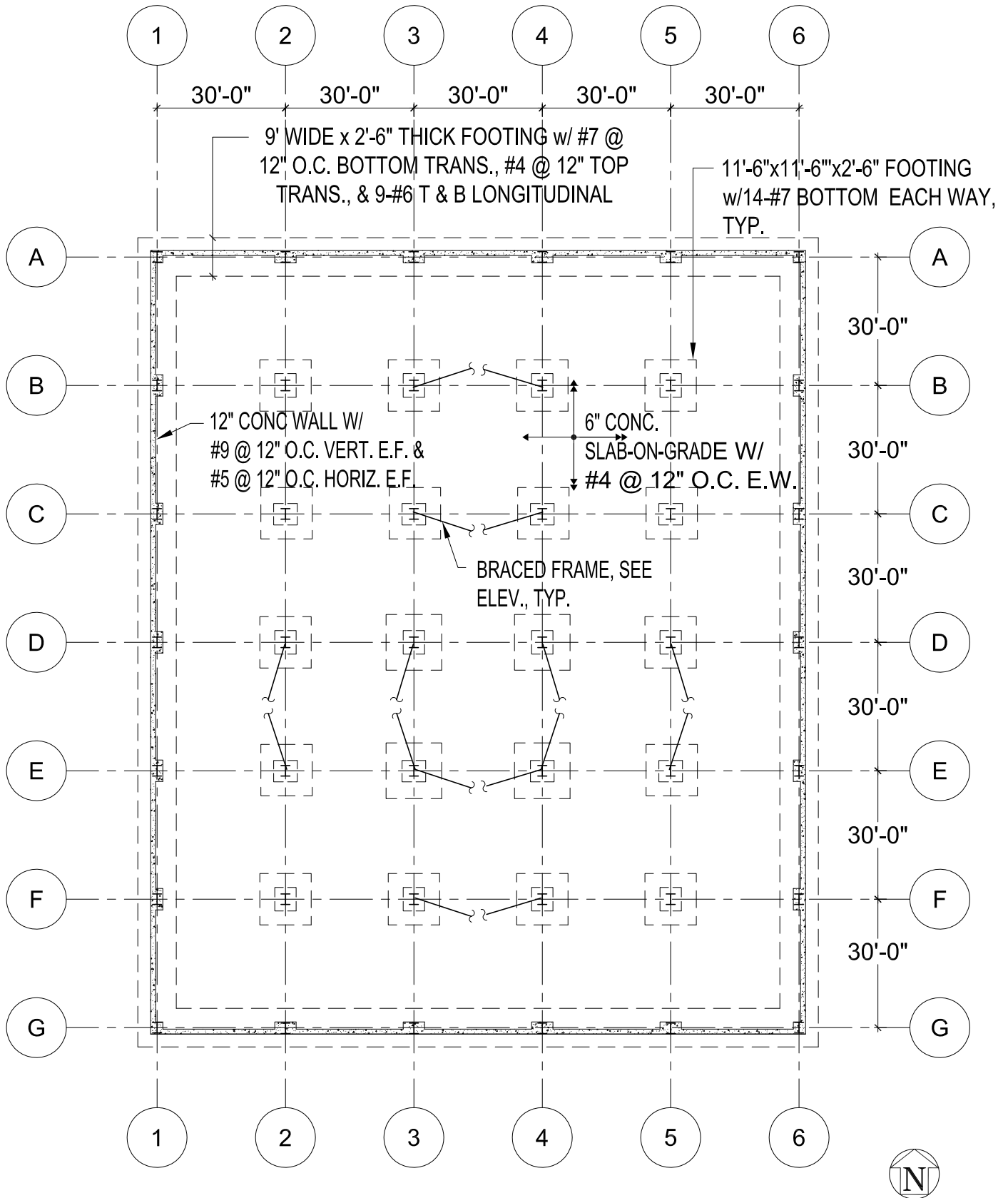
FIGURE 2: TYPICAL FLOOR PLAN
HOSPITAL: ASCE 7-05 WIND DESIGN

COLUMN SCHEDULE					
	C1	C2	C3	C4	
					▼ ROOF ELEV. 90'-0"
	W12x40	W12x40	W12x53	W12x53	▼ SIXTH FLOOR ELEV. 76'-0"
					▼ FIFTH FLOOR ELEV. 62'-0"
4'-0"					▼ FOURTH FLOOR ELEV. 48'-0"
	W12x40	W12x53	W12x65	W12x65	▼ THIRD FLOOR ELEV. 34'-0"
4'-0"					▼ SECOND FLOOR ELEV. 20'-0"
	W12x53	W12x65	W12x96	W12x96	▼ GROUND FLOOR ELEV. 0'-0"
					▼ BASEMENT FLOOR ELEV. -14'-0"
					▼ T.O. FOOTING ELEV. -15'-0"
	A1,6 G1,6	A2-5 G2-5 B1,6 C1,6 D1,6 E1,6 F1,6	D2,5 E2,5	B2-5 C2-5 F2-5	

FIGURE 3: COLUMN SCHEDULE
HOSPITAL: ASCE 7-05 WIND DESIGN



**FIGURE 4: BRACED FRAME ELEVATION
LINES ③, ④, E, & D
HOSPITAL: ASCE 7-05 WIND DESIGN**



**FIGURE 5: FOUNDATION PLAN
HOSPITAL: IBC 2003 (ASCE 7-02) SEISMIC DESIGN**

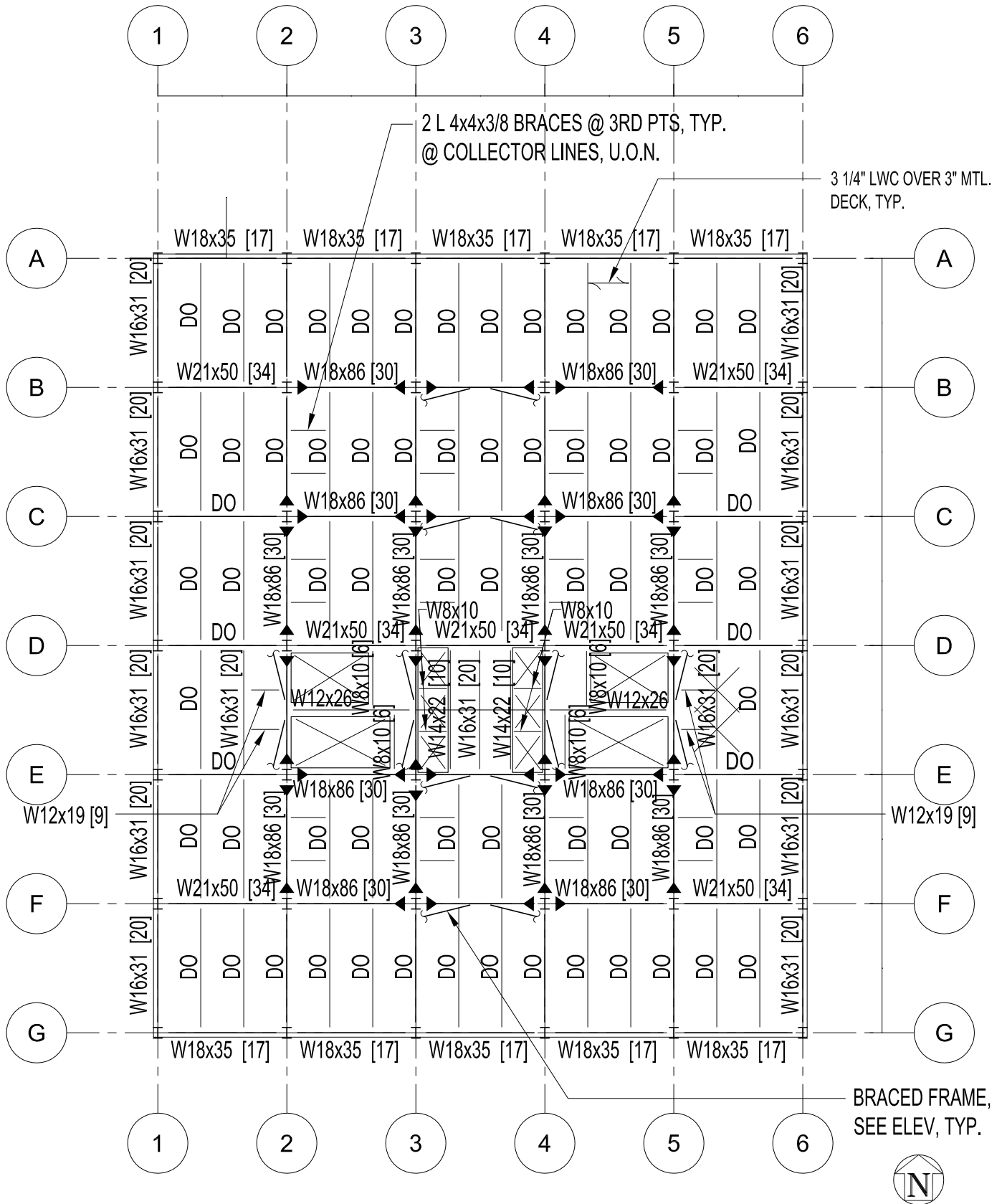


FIGURE 6: TYPICAL FLOOR PLAN
HOSPITAL: IBC2003 [ASCE 7-02] SEISMIC DESIGN

COLUMN SCHEDULE			
			▼ ROOF ELEV. 90'-0"
W12x40	W12x40	W12x53	▼ SIXTH FLOOR ELEV. 76'-0"
			▼ FIFTH FLOOR ELEV. 62'-0"
			▼ FOURTH FLOOR ELEV. 48'-0"
W12x40	W12x53	W12x65	▼ THIRD FLOOR ELEV. 34'-0"
			▼ SECOND FLOOR ELEV. 20'-0"
W12x53	W12x65	W12x96	▼ GROUND FLOOR ELEV. 0'-0"
			▼ BASEMENT FLOOR ELEV. -14'-0"
			▼ T.O. FOOTING ELEV. -15'-0"
A1,6 G1,6	A2-5 G2-5 B1,6 C1,6 D1,6 E1,6 F1,6	B2,5 C2,5 F2,5	

FIGURE 7: COLUMN SCHEDULE
HOSPITAL: IBC 2003 (ASCE 7-02) SEISMIC DESIGN

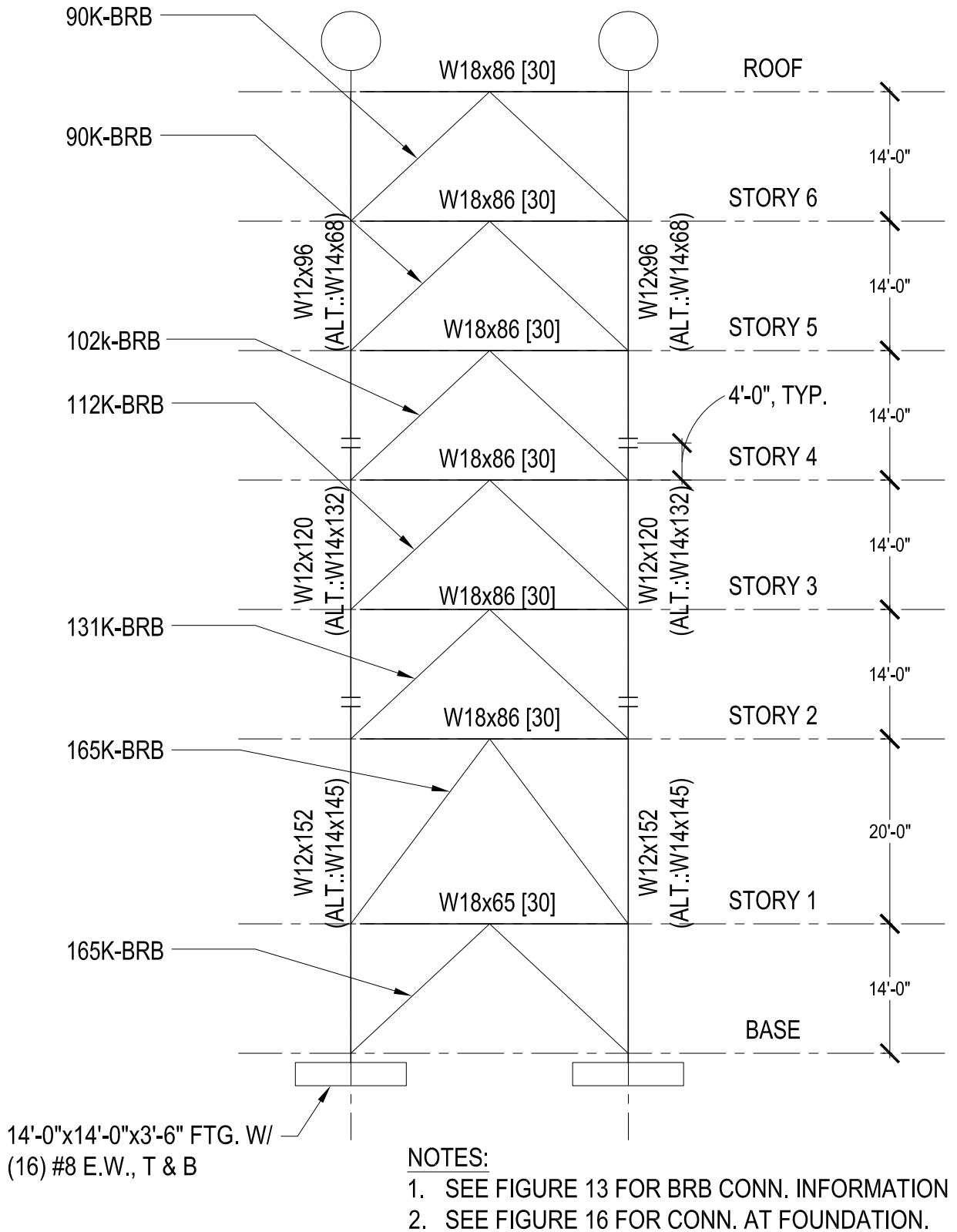


FIGURE 8: BRACED FRAME ELEVATION
 HOSPITAL: IBC 2003 (ASCE 7-02) SEISMIC DESIGN

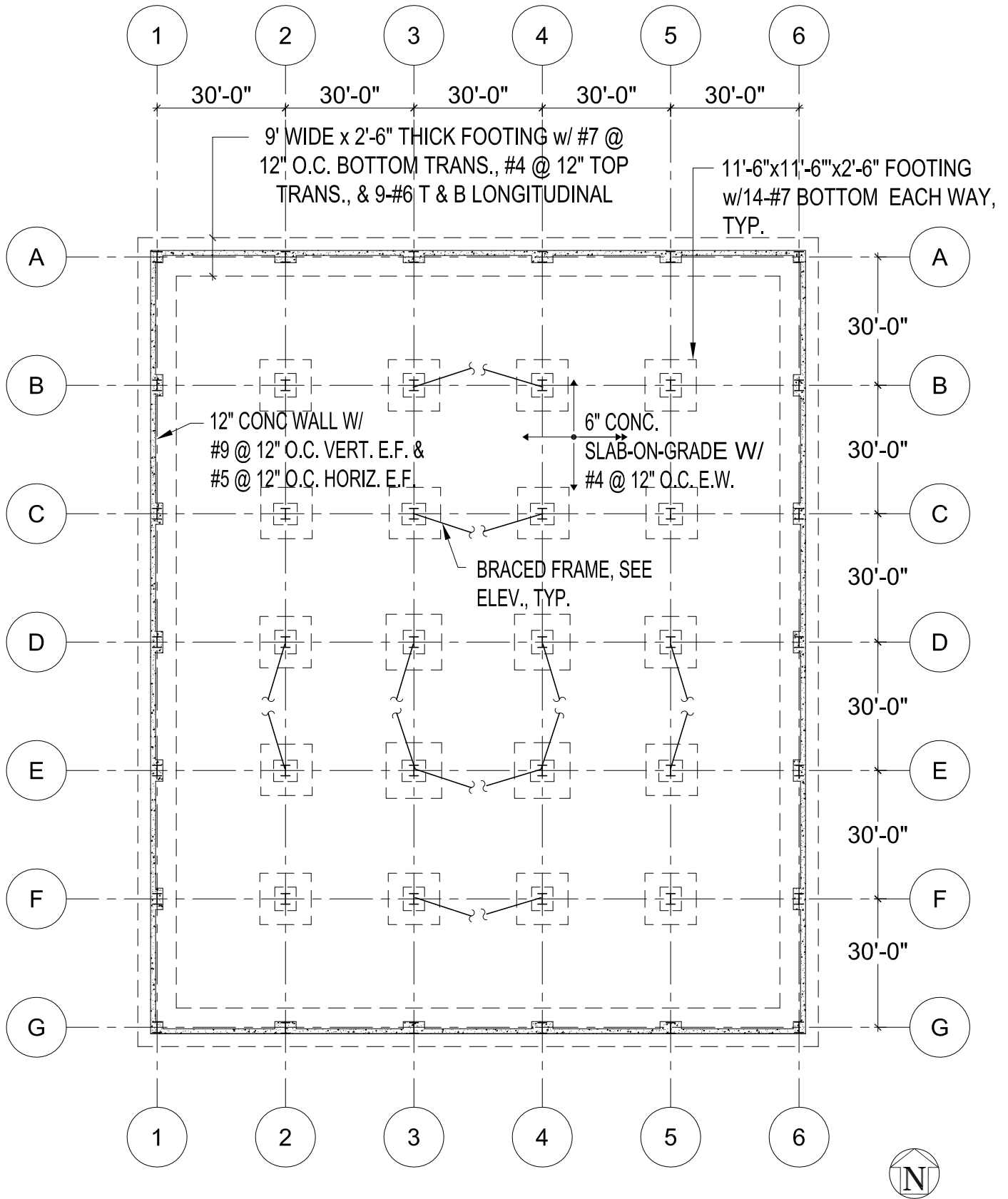


FIGURE 9: FOUNDATION PLAN
HOSPITAL: ASCE 7-10 SEISMIC DESIGN

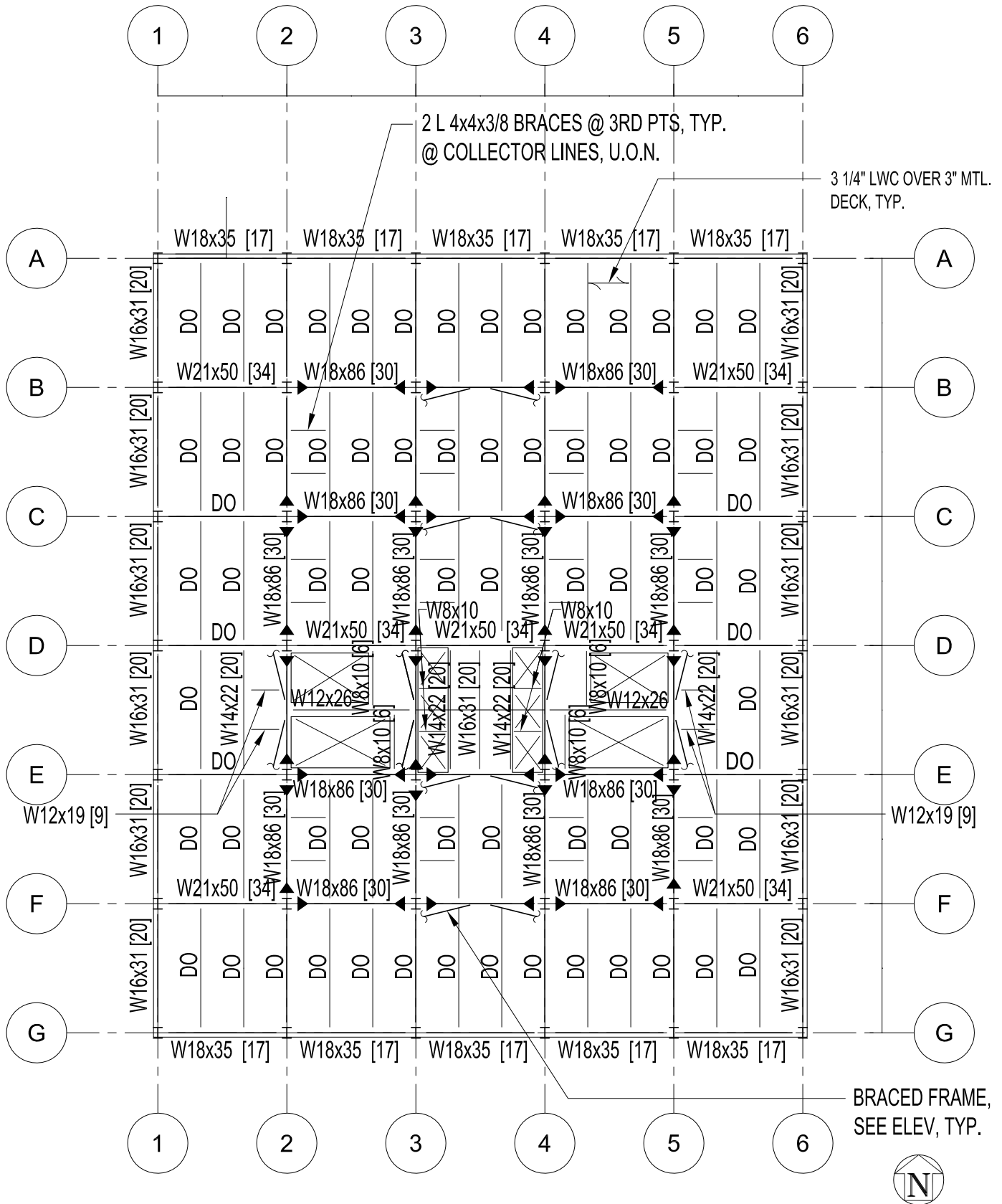
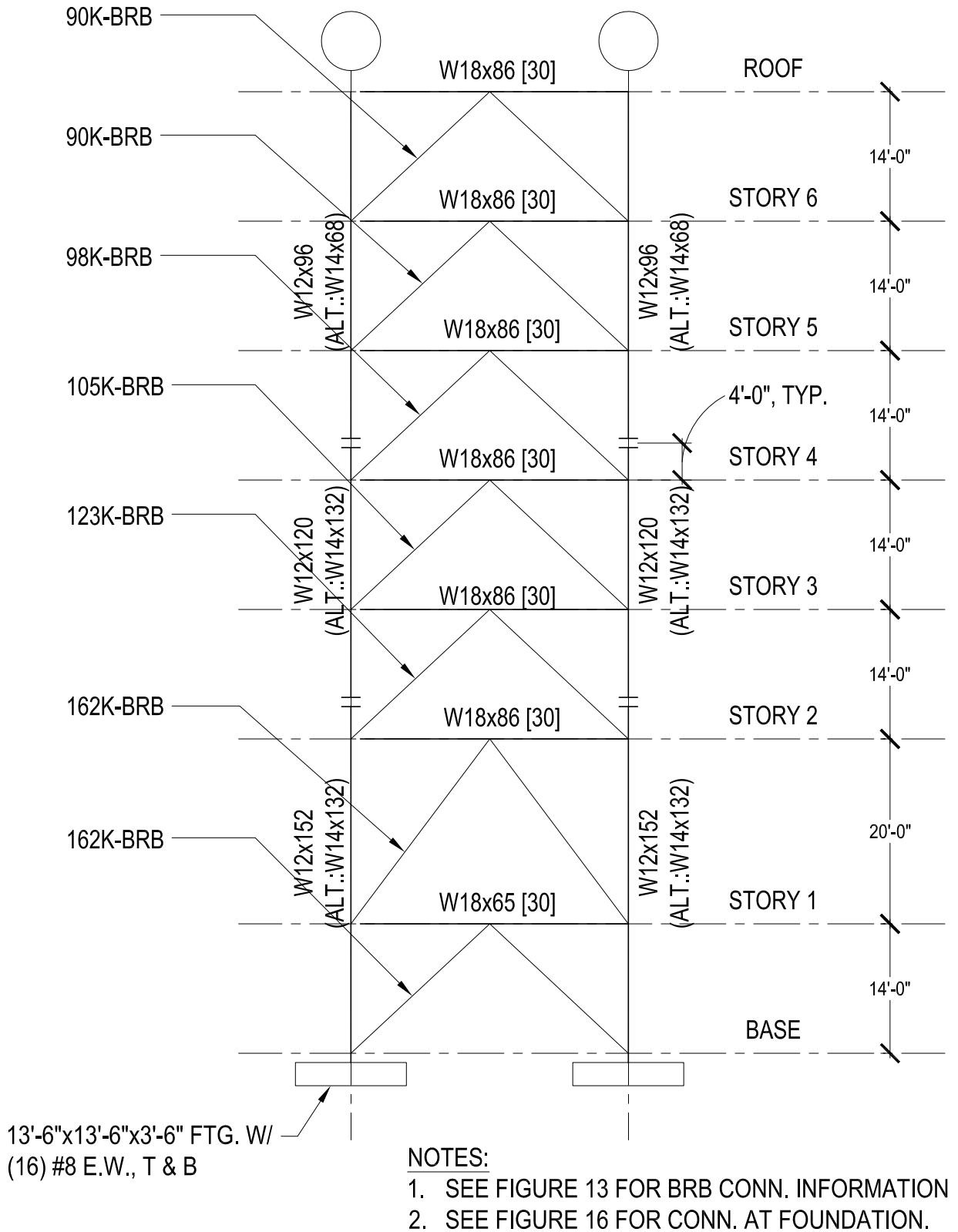


FIGURE 10: TYPICAL FLOOR PLAN
HOSPITAL: ASCE 7-10 SEISMIC DESIGN

COLUMN SCHEDULE			
			▼ ROOF ELEV. 90'-0"
W12x40	W12x40	W12x53	▼ SIXTH FLOOR ELEV. 76'-0"
			▼ FIFTH FLOOR ELEV. 62'-0"
			▼ FOURTH FLOOR ELEV. 48'-0"
W12x40	W12x53	W12x65	▼ THIRD FLOOR ELEV. 34'-0"
			▼ SECOND FLOOR ELEV. 20'-0"
W12x53	W12x65	W12x96	▼ GROUND FLOOR ELEV. 0'-0"
			▼ BASEMENT FLOOR ELEV. -14'-0"
			▼ T.O. FOOTING ELEV. -15'-0"
A1,6 G1,6	A2-5 G2-5 B1,6 C1,6 D1,6 E1,6 F1,6	B2,5 C2,5 F2,5	

FIGURE 11: COLUMN SCHEDULE
HOSPITAL: ASCE 7-10 SEISMIC DESIGN



**FIGURE 12: BRACED FRAME ELEVATION
HOSPITAL: ASCE 7-10 SEISMIC DESIGN**

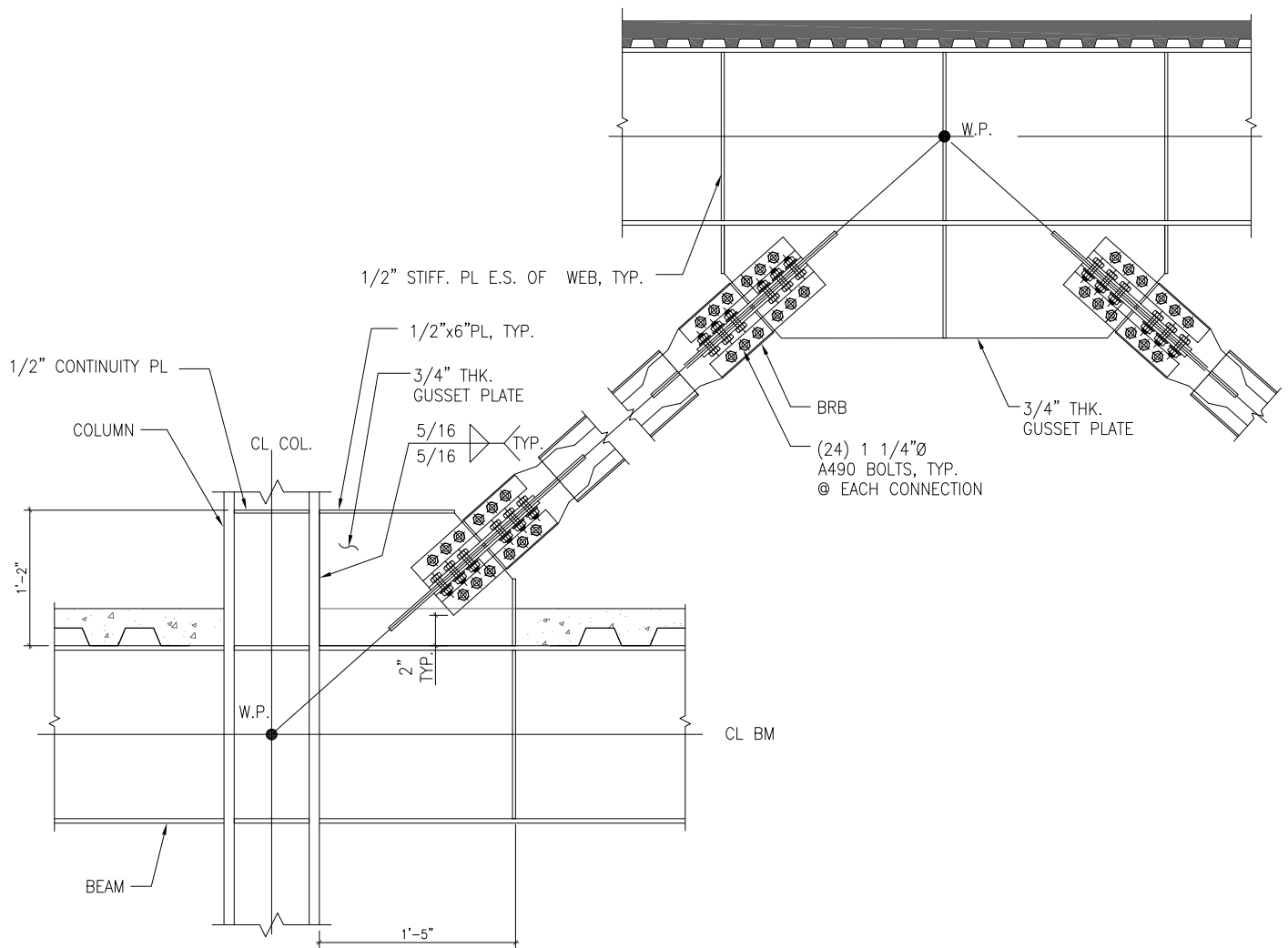


FIGURE 13: BRBF CONNECTION DETAIL

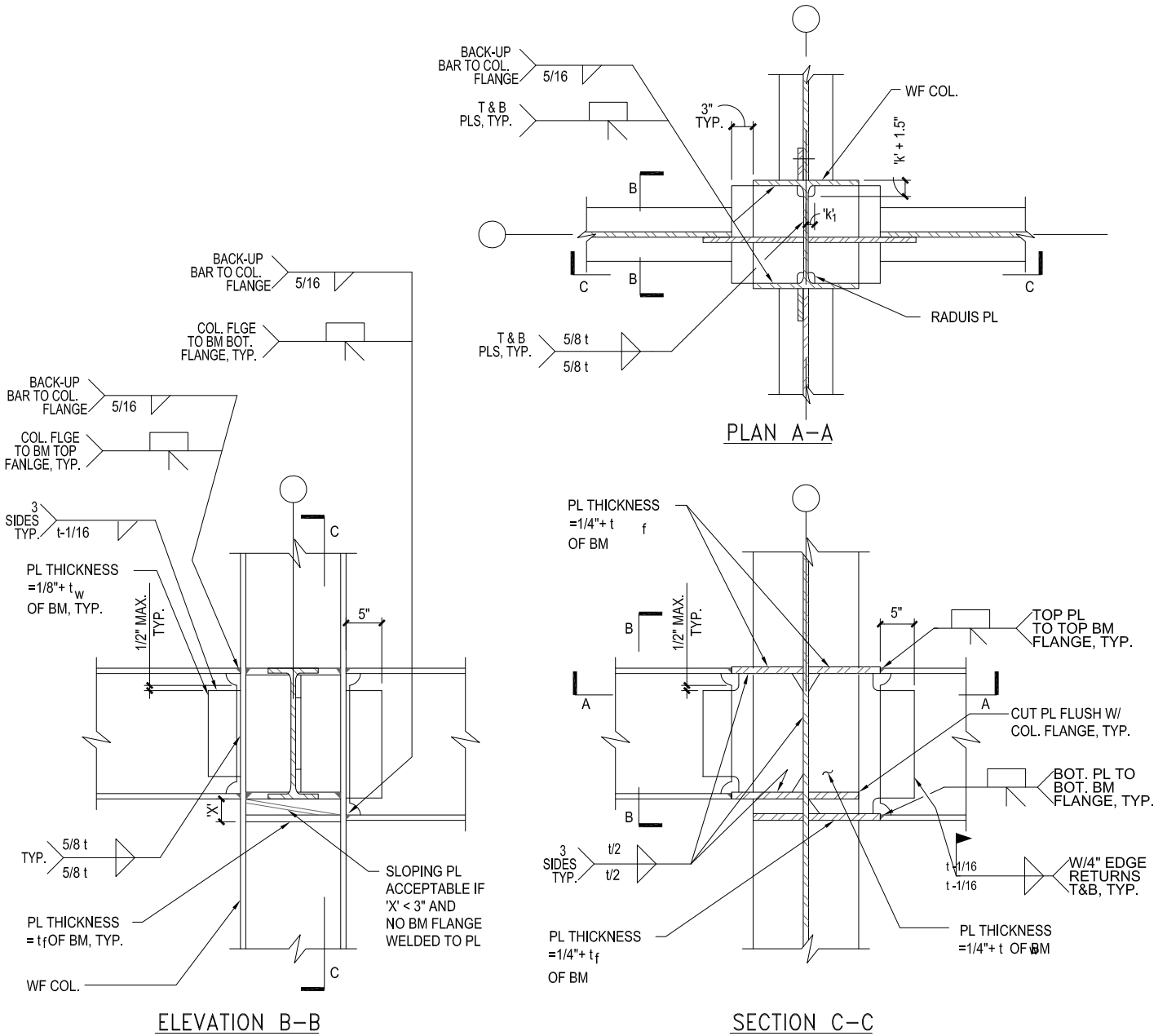
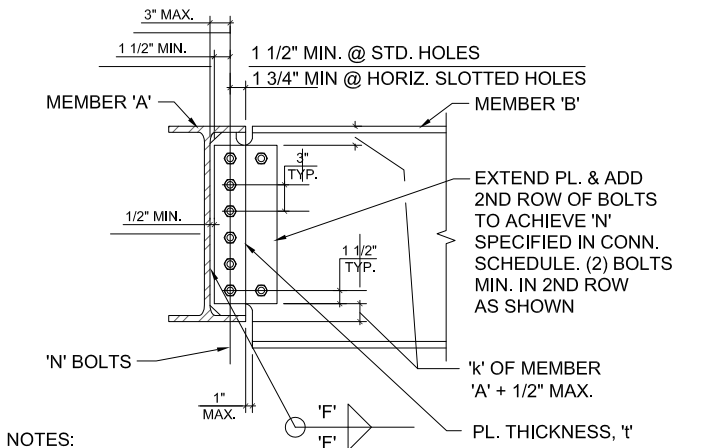


FIGURE 14:
COLLECTOR BEAM MOMENT CONNECTION DETAIL

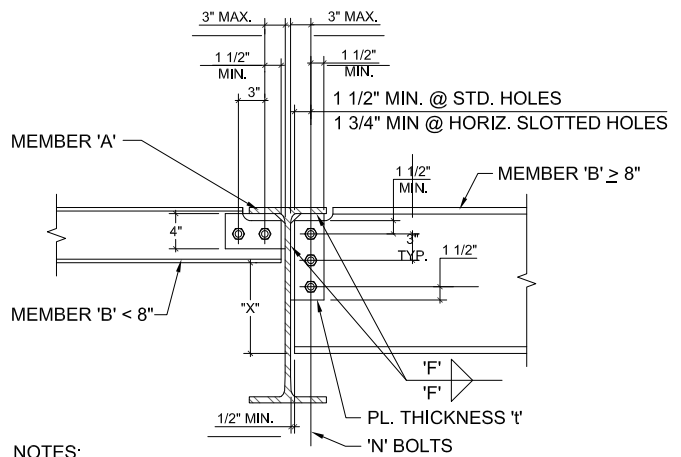


NOTES:

1. SIMILAR CONDITIONS APPLY FOR BEAMS ON BOTH SIDES OF MEMBER 'A'.
2. FOR WELD SIZE 'F' NUMBER OF BOLTS 'N' AND PLATE THICKNESS 't', SEE BOLTED BEAM TO BEAM CONNECTION SCHEDULE.
3. SHORT SLOTTED HOLES IN SHEAR PLATE MAY BE USED.
4. IF MEMBER 'B' < 8", SEE BM TO BM CONN.-MEMBER 'A' > MEMBER 'B'.
5. BASE PARAMETERS IN CONNECTION SCHEDULE ON DEPTH OF MEMBER 'B'.

**BM. TO BM. CONNECTION
MEMBER 'A' ≤ MEMBER 'B'**

N.T.S.



NOTES:

1. DETAIL APPLIES TO TWO SIDED CONNECTIONS AS SHOWN, IF BEAM FRAMES ONE SIDE ONLY OR X > 4", USE FULL DEPTH BEAM TO BEAM CONNECTION DETAIL.
2. FOR WELD 'F', NUMBER OF BOLTS 'N', AND PLATE THICKNESS 't', SEE BOLTED BEAM CONNECTION SCHEDULE.
3. SHORT SLOTTED HOLES IN SHEAR PLATE MAY BE USED.

**BM. TO BM. CONNECTION
MEMBER 'A' > MEMBER 'B'**

N.T.S.

BEAM CONNECTION SCHEDULE				
NOMINAL MEMBER DEPTH	SHEAR PL. THICKNESS ('t')	FASTENERS A325-X U.O.N. ('N')	WELD SIZE ('F')	REMARKS
LESS THAN 12"	3/8"	(2) 7/8"Ø	5/16"	
12" THRU 14"	3/8"	(3) 7/8"Ø	5/16"	
16" THRU 18"	1/2"	(4) 7/8"Ø	3/8"	
21"	1/2"	(5) 7/8"Ø	3/8"	
24"	1/2"	(6) 7/8"Ø	3/8"	
27"	1/2"	(7) 7/8"Ø	3/8"	
30"	1/2"	(8) 7/8"Ø	3/8"	
33"	1/2"	(9) 7/8"Ø	3/8"	
36"	1/2"	(10) 7/8"Ø	3/8"	
40"	1/2"	(11) 7/8"Ø	3/8"	

NOTES:

1. BOLT HOLES TO BE STD. HOLES 1/16" GREATER THAN BOLT DIAMETER. SHORT SLOTTED HOLES IN SHEAR PLATE MAY BE USED ONLY WHERE NOTED.
2. BOLTS TO BE FULLY PRETENSIONED W/ HARDENED WASHERS, U.O.N.
3. SCHEDULE BASED ON NOMINAL DEPTH OF WIDE FLANGE BEAMS, CHANNELS, TUBES, & OTHER MISCELLANEOUS SHAPES.

BOLTED BM. CONN. SCHEDULE

N.T.S.

**FIGURE 15: TYPICAL BEAM CONNECTIONS
ALL DESIGNS**

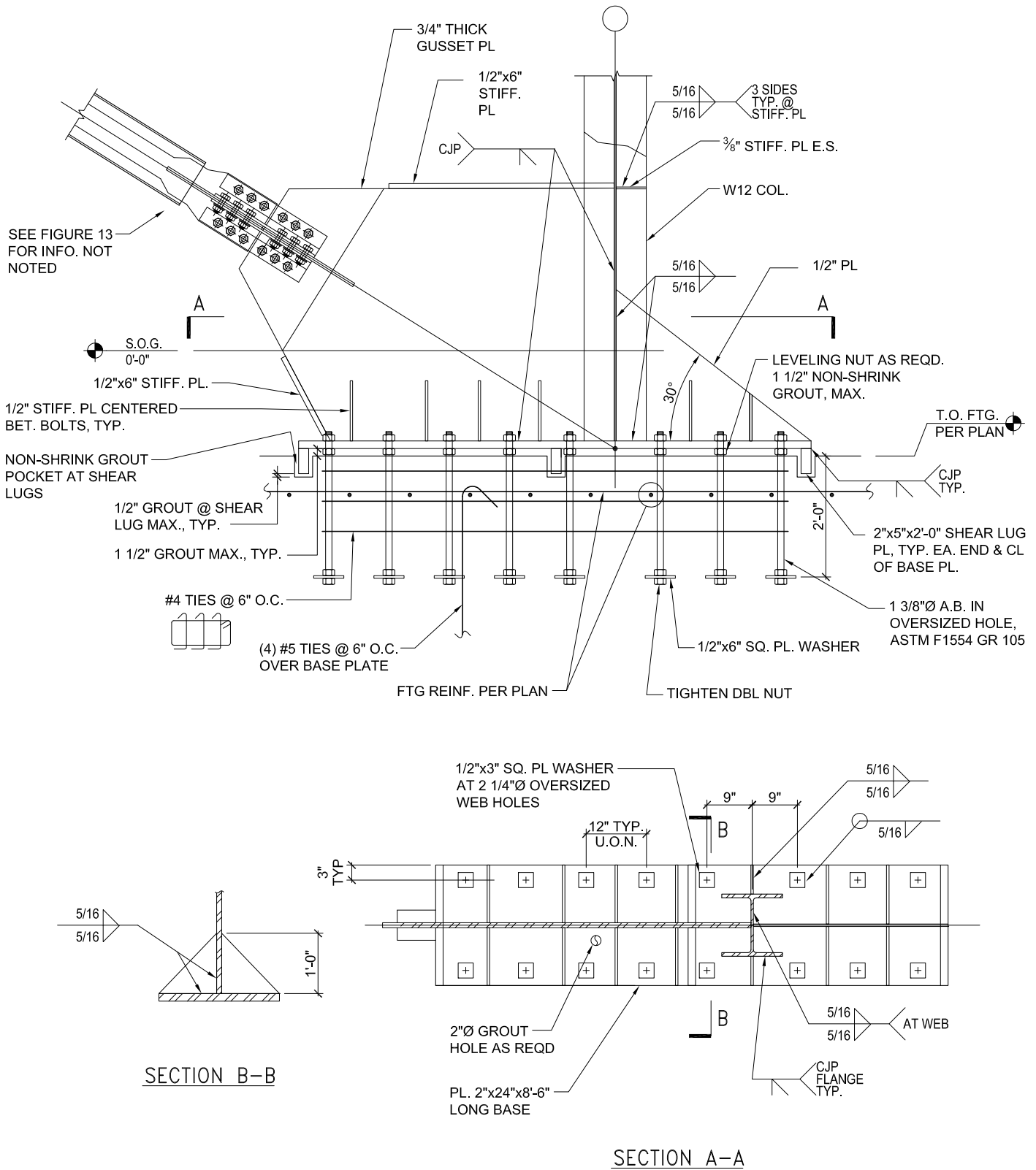


FIGURE 16: BRB CONNECTION AT FOUNDATION

Chapter 6

School Building Design Drawings

This chapter provides the following design drawings prepared for the school building:

- S0.1 General Notes
- S0.2 General Notes
- S1 Foundation Plan
- S2 Foundation Plan
- S3 Foundation Plan
- S4 Low Roof Plan
- S5 2nd Floor Plan
- S6 2nd Floor Plan
- S7 Roof Plan
- S8 Roof Plan
- S9 Roof Plan
- S10 Elevations
- S11 Elevations
- S12 Elevations
- S13 Wall Reinforcement and Details
- S14 Wall Connection Details

STRUCTURAL GENERAL NOTES

DESIGN CRITERIA

DESIGN STANDARDS

THREE DESIGNS, BY THE STANDARDS LISTED BELOW, ARE PRESENTED:

1. WIND per ASCE7-05:
 - a. IBC 2003
 - b. ACI-318-02
 - c. AISC MANUAL OF STEEL CONSTRUCTION, LRFD, 3rd ed., 2002
 - d. TMS-402-02
2. SEISMIC per SBC-99:
 - a. ACI-318-02
 - b. AISC MANUAL OF STEEL CONSTRUCTION, LRFD, 3RD ED., 2002
 - c. TMS-402-02
3. SEISMIC per ASCE7-10:
 - a. IBC 2009
 - b. ACI-318-08
 - c. AISC MANUAL OF STEEL CONSTRUCTION, 13th ed., 2005
 - d. TMS-402, 2008

DESIGNS 2 AND 3 DO NOT REDUCE ANY CAPACITY BELOW DESIGN 1.

DESIGN LOADING

1. FLOOR LOADS:

OFFICE LIVE LOAD =	50 PSF
OFFICE PARTITION LOAD =	20 PSF
SCHOOL CLASSROOM =	40 PSF
	1,000 LB PT LOAD
SCHOOL CORRIDOR ABOVE 1ST FLOOR =	80 PSF
	1,000 LB PT LOAD
SCHOOL CORRIDOR 1ST FLOOR =	100 PSF
	1,000 LB PT LOAD
MECHANICAL ROOMS =	125 PSF
2. ROOF SNOW LOAD = 10 PSF UNIFORMLY DISTRIBUTED ON ROOFS, NOT REDUCIBLE
3. WIND DESIGN

WIND per ASCE7-05:
 BASIC WIND SPEED = 90 MPH 3-SECOND GUST
 EXPOSURE CATEGORY = C
4. SEISMIC DESIGN CRITERIA:

SEISMIC DESIGN PER SBC-99:
 EFFECTIVE PEAK VELOCITY-RELATED ACCELERATION COEFFICIENT (A_v) = 0.193
 PEAK ACCELERATION COEFFICIENT (A_a) = 0.153
 SEISMIC HAZARD GROUP = II
 SEISMIC PERFORMANCE CATEGORY = D
 SITE COEFFICIENT (S) = 1.5
 RESPONSE MODIFICATION COEFFICIENT (R) = 3.5 (REINF. MASONRY)
 SEISMIC COEFFICIENT (C_s) = 0.109

SEISMIC DESIGN PER ASCE7-10:
 SHORT PERIOD SPECTRAL RESPONSE ACCELERATION (S_s) = 0.83g
 ONE SECOND SPECTRAL RESPONSE ACCELERATION (S_d) = 0.295g
 SITE CLASS = D
 RESPONSE MODIFICATION COEFFICIENT (R) = 5 (SPECIAL REINF. MASONRY)
 SEISMIC RESPONSE COEFFICIENT (C_s) = 0.162

FOUNDATIONS

1. SPREAD FOOTING FOUNDATIONS:

MAXIMUM ALLOWABLE BEARING PRESSURE:	2,000 PSF
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MATERIAL GRADES

CAST-IN-PLACE CONCRETE

1. CONCRETE SHALL BE NORMAL WEIGHT CONCRETE WITH TYPE I/II CEMENT CONFORMING TO ASTM C150 AND AGGREGATE CONFORMING TO ASTM C33. CONCRETE SHALL BE MIXED, PROPORTIONED, CONVEYED AND PLACED IN ACCORDANCE WITH ACI-301 AND IBC SECTION 1905. MIX DESIGNS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:

LOCATION	28 DAY STRENGTH	MAXIMUM W/C RATIO	MIN CEMENT PER CY (#)	SLUMP (IN)	% AIR
2ND FLOOR SLABS	5,000	0.40	575	3-5	0
INTERIOR S.O.G.	4,000	0.50	525	3-5	0
FOOTING & STEM WALLS	3,000	0.50	525	3-5	0

2. REINFORCING BARS SHALL BE ASTM A615-GRADE 60, UNLESS NOTED OTHERWISE.
3. REINFORCING BARS THAT ARE TO BE FIELD BENT OR WELDED SHALL BE ASTM A706-GRADE 60.
4. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.
5. ANCHOR BOLTS SHALL BE ASTM F1554-GRADE 36.
6. NON-SHRINK GROUT SHALL CONFORM TO ASTM C1107

STRUCTURAL STEEL

1. HOT ROLLED STRUCTURAL STEEL SHALL CONFORM TO ASTM A36, EXCEPT AS FOLLOWS OR AS OTHERWISE NOTED ON PLANS.
2. WIDE FLANGE SHAPES SHALL CONFORM TO ASTM A992.
3. TUBULAR STRUCTURAL STEEL SECTIONS SHALL CONFORM TO ASTM A500, GRADE B.
4. STRUCTURAL STEEL PIPE SHALL CONFORM TO ASTM A53, GRADE B.
5. BOLTS SHALL CONFORM TO ASTM A325-N UNLESS NOTED OTHERWISE.
6. WELDS SHALL BE MADE WITH E70XX ELECTRODES.
7. STEEL DECK SHALL CONFORM TO ASTM A611-GRADES C THRU E, OR ASTM A653-GRADE A (MINIMUM) WITH A MINIMUM YIELD STRENGTH OF 33KSI.
8. OPEN WEB STEEL JOISTS SHALL CONFORM TO THE SPECIFICATIONS OF THE STEEL JOIST INSTITUTE.

MASONRY

1. CONCRETE MASONRY BLOCK UNITS SHALL CONFORM TO ASTM C90, TYPE I, LIGHTWEIGHT, 8" NOM. WIDTH.
2. MORTAR SHALL CONFORM TO ASTM C270, TYPE S.
3. GROUT SHALL CONFORM TO ASTM A476 AND SHALL DEVELOP A 2500 PSI COMPRESSIVE STRENGTH AT 28 DAYS.
4. ALL MASONRY SHALL DEVELOP F'_m COMPRESSIVE STRENGTH IN 28 DAYS PER TABLE ON S13.
5. REINFORCING BARS SHALL BE ASTM A615-GRADE 60 EXCEPT FIELD BENT BARS WHICH SHALL BE ASTM A-706.
6. HORIZONTAL JOINT REINFORCING SHALL BE 9-GAGE DUR-O-WAL CONFORMING TO ASTM A82.

EXPANSION BOLTS

1. EXPANSION BOLTS CALLED FOR ON THE DRAWINGS SHALL BE WEDGE TYPE EXPANSION ANCHORS ONLY. ACCEPTABLE WEDGE ANCHORS ARE:
 - KWIK BOLT TZ BY HILTI CORPORATION
 - TRUBOLT+ BY ITW REDHEAD
 - POWERSTUD+ SD1 OR SD2 BY POWERS FASTENERS
 - STRONG-BOLT BY SIMPSON STRONG-TIE

EPOXY

1. EPOXY SHALL CONFORM TO ASTM C-881, TYPE IV, GRADE 2 WITH CLASS SUITABLE FOR ENVIRONMENTAL CONDITIONS. ACCEPTABLE EPOXIES FOR INSTALLING THREADED STEEL RODS INTO EXISTING CONCRETE ARE:
 - PE1000+ BY POWERS FASTENERS
 - HIT-RE 500-SD BY HILTI CORPORATION
 - SET-XP BY SIMPSON STRONG-TIE

Last Edit: 1/13/2014

NEHRP CONSULTANTS JOINT VENTURE
 FOR THE
 NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
 NATIONAL EARTHQUAKE HAZARDS REDUCTION PROGRAM

COST ANALYSES AND BENEFIT STUDIES FOR
 EARTHQUAKE RESISTANT CONSTRUCTION
 IN MEMPHIS, TENNESSEE

SCHOOL
 BUILDING

DEC. 2013

S0.1

DESIGN STUDY
 NOT FOR CONSTRUCTION

CONSTRUCTION PROVISIONS

GENERAL CONSTRUCTION PROVISION

1. THE REQUIREMENTS OF THE LATEST EDITION OF THE OSHA CONSTRUCTION STANDARDS SHALL BE FOLLOWED BY ALL CONTRACTORS, FABRICATORS, AND SUPPLIERS.
2. CONTRACTOR SHALL PROVIDE ADEQUATE BRACING AND SHORING TO THE EXISTING STRUCTURE WHERE REQUIRED TO PERFORM MODIFICATIONS OR WORK ADJACENT TO SAME.
3. DURING ERECTION OF THE FRAMING, THE CONTRACTOR SHALL BE RESPONSIBLE FOR TEMPORARY BRACING TO WITHSTAND ALL LOADS TO WHICH THE STRUCTURE MAY BE SUBJECTED, INCLUDING LATERAL LOADS, STOCKPILES OF MATERIALS, AND EQUIPMENT. SUCH BRACING SHALL BE LEFT IN PLACE AS LONG AS MAY BE REQUIRED FOR SAFETY AND UNTIL ALL STRUCTURAL FRAMING IS IN PLACE WITH CONNECTIONS COMPLETE AND ALL AT SUFFICIENT STRENGTH.

CAST-IN-PLACE CONCRETE CONSTRUCTION PROVISIONS

1. CONCRETE SHALL BE PROPORTIONED, MIXED, CONVEYED, AND PLACED IN ACCORDANCE WITH ACI 301.
2. CONCRETE PROTECTION FOR REINFORCEMENT (COVER) SHALL BE AS FOLLOWS:

CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH:	3"
CONCRETE EXPOSED TO EARTH OR WEATHER (#5 AND SMALLER):	1.5"
CONCRETE EXPOSED TO EARTH OR WEATHER (#6 AND LARGER):	2"
CONCRETE NOT EXPOSED TO EARTH OR WEATHER: SLABS, WALLS, AND JOISTS:	0.75"
3. DETAIL BARS IN ACCORDANCE WITH ACI 315 AND ACI 318.
4. NO SPLICES OF REINFORCEMENT SHALL BE MADE AND NO WELDING TO REINFORCING SHALL BE PERMITTED EXCEPT AS DETAILED OR AUTHORIZED BY THE STRUCTURAL ENGINEER. LAP SPLICES, WHERE PERMITTED, SHALL BE A MINIMUM OF 40 BAR DIAMETERS. WIRE FABRIC REINFORCEMENT MUST LAP ONE FULL MESH PLUS 2" AT SIDE AND END LAPS, BUT NOT LESS THAN 6", AND SHALL BE WIRED TOGETHER. MAKE ALL BARS CONTINUOUS AROUND CORNERS OR PROVIDE CORNER BARS OF EQUAL SIZE AND SPACING.
5. CONTINUOUS BARS IN WALLS, BEAMS AND GRADE BEAMS SHALL BE SPLICED AT MID-SPAN FOR TOP BARS AND OVER SUPPORTS FOR BOTTOM BARS.
6. PROVIDE ALL ACCESSORIES NECESSARY TO SUPPORT REINFORCING BARS AT POSITIONS SHOWN ON THE PLANS.
7. PLACE (2) #5 BARS (1 EA. FACE) WITH 2'-0" PROJECTION AROUND ALL OPENINGS IN CONCRETE.
8. CAST-IN-PLACE CONCRETE SHALL NOT HAVE CONSTRUCTION JOINTS IN A HORIZONTAL PLANE. ANY STOP IN CONCRETE WORK MUST BE MADE WITH VERTICAL BULKHEADS AND HORIZONTAL KEYS, UNLESS OTHERWISE SHOWN.
9. PROVIDE 3/4" CHAMFER AT ALL EXPOSED CORNERS.
10. ALL CONCRETE SHALL BE CONSOLIDATED BY VIBRATION, SPADING, OR RODDING SO THAT CONCRETE COMPLETELY SURROUNDS REINFORCING AND EMBEDDED ITEMS WITHOUT SEGREGATION.
11. FORMWORK SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH ACI 347.
12. SAWN JOINTS IN SLABS ON GRADE SHALL BE MADE AS SOON AS POSSIBLE WITHOUT CAUSING DAMAGE TO THE SURFACE. JOINTS SHALL BE AS SHOWN ON THE DRAWINGS.

STRUCTURAL STEEL CONSTRUCTION REQUIREMENTS

1. ALL WELDS SHALL BE 3/16" FILLET WELDS WHERE NO SIZE IS PROVIDED, AND ALL WELDS SHALL BE CONTINUOUS WHERE NO LENGTH IS PROVIDED.
2. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED, AND ERECTED IN ACCORDANCE WITH LATEST PROVISIONS OF AISC CODE OF STANDARD PRACTICE.
3. ALL WELDERS SHALL HAVE EVIDENCE OF PASSING THE A.W.S. STANDARD QUALIFICATION TESTS FOR THE WELDS THEY WILL BE PERFORMING.
4. STEEL DECK SHALL BE ERECTED IN ACCORDANCE WITH DECK MANUFACTURERS SPECIFICATIONS. STEEL DECK PROPERTIES SHALL MEET OR EXCEED THOSE SHOWN ON THE PLANS, AND STEEL DECK CONNECTIONS SHALL BE AS DETAILED ON THE PLANS.
5. STEEL DECK SHALL BE INSTALLED IN A 3 SPAN CONTINUOUS CONDITION WHENEVER POSSIBLE.
6. STEEL DECK SHALL HAVE A MINIMUM OF 2" BEARING.
7. CONTRACTOR SHALL PROVIDE CLOSURE PLATES AND ALL OTHER LIGHT GAUGE METAL SHAPES AS REQUIRED TO COMPLETE THE WORK.
8. JOIST BRIDGING SHALL BE PROVIDED AND SPACED IN CONFORMANCE WITH SJI SPECIFICATIONS. JOIST BRIDGING AND ANCHORS SHALL BE COMPLETELY INSTALLED BEFORE CONSTRUCTION LOADS ARE PLACED ON JOISTS. THE ENDS OF ALL BRIDGING LINES TERMINATING AT WALLS OR BEAMS SHALL BE ANCHORED THERETO.
9. OPEN WEB STEEL JOISTS SHALL BEAR 2" MINIMUM ON STEEL AND 4" MINIMUM ON MASONRY. WELD ALL JOISTS TO STEEL MEMBERS, EXCEPT AT COLUMNS, WHERE BOLTED CONNECTIONS SHALL BE PROVIDED.

MASONRY CONSTRUCTION REQUIREMENTS

1. TMS 602-11 SPECIFICATION FOR MASONRY STRUCTURES SHALL BE FOLLOWED, AS AMENDED BY THE FOLLOWING NOTES:

ALL CONCRETE MASONRY UNIT WALLS SHALL BE LAID IN A RUNNING BOND.
SEE REINFORCEMENT SCHEDULE ON S13.
2. PROVIDE STANDARD TRUSS HORIZONTAL JOINT REINFORCING AT 16" ON CENTER, UNLESS NOTED OTHERWISE. JOINT REINFORCING SHALL BE CONTINUOUS BETWEEN VERTICAL CONTROL JOINTS, AND SHALL NOT BE CONTINUOUS ACROSS VERTICAL CONTROL JOINTS.
3. VERTICAL REINFORCING SHOWN ON THE DRAWINGS SHALL EXTEND FOR THE FULL HEIGHT OF THE WALL AND SHALL BE GROUTED IN PLACE. WHERE THE GROUT POUR EXCEEDS 4'-0", PROVIDE CLEANOUTS.
4. PROVIDE 1-#5 (#4 IN 4" AND 6" WALLS) VERTICAL BAR AT ALL CORNERS, ENDS OF WALLS, EACH SIDE OF OPENINGS, AND EACH SIDE OF CONTROL JOINTS, UNLESS NOTED OTHERWISE.
5. FILL ALL VOIDS AND BLOCK CELLS SOLIDLY WITH GROUT FOR A DISTANCE OF 24" BENEATH AND 12" EACH SIDE OF ALL BEAM REACTIONS OR OTHER CONCENTRATED LOADS, UNLESS NOTED OTHERWISE. FILL IN BEAM POCKETS WITH MASONRY TO MATCH SURROUNDING PATTERN.
6. PROVIDE ALL ACCESSORIES NECESSARY TO SUPPORT REINFORCING BARS AT POSITIONS SHOWN. VERTICAL REINFORCING BARS SHALL BE SECURED IN THEIR CORRECT LOCATION WITH ANCHORS LOCATED AT A SPACING NOT TO EXCEED 200 BAR DIAMETERS, OR AT THE TOP OF EACH LIFT IF LOW LIFT GROUTING IS USED.
6. REINFORCEMENT LAP SPLICES SHALL BE A MINIMUM OF 48 BAR DIAMETERS.
7. ALL CELLS TO BE GROUTED SHALL BE CLEAN AND FREE OF EXCESS MORTAR OVERHANGS OR DROPPINGS. BOTTOMS OF CELLS SHALL BE CLEAN AND FREE OF LOOSE DEBRIS BEFORE GROUTING.
8. MASONRY WALL REINFORCEMENT SHOP DETAILING DRAWINGS (SHOP DRAWINGS) SHALL INCLUDE ELEVATIONS ON PLACING DRAWINGS FOR EACH WALL ELEMENT. SEE CAST-IN-PLACE CONCRETE CONSTRUCTION PROVISIONS FOR ADDITIONAL DETAILING REQUIREMENTS.

EXPANSION BOLT AND EPOXY ANCHOR INSTALLATION REQUIREMENTS

1. HOLES SHALL BE DRILLED AT A DIAMETER AND DEPTH SPECIFIED BY THE MANUFACTURER USING A COARSE CUTTING ROCK CHISEL OR HAMMER DRILL. CORE DRILLS OR OTHER SMOOTH CUTTING DRILLS ARE NOT ALLOWED.
2. HOLES SHALL BE THOROUGHLY CLEANED WITH A BRUSH, THEN VACUUMED OR BLOWN CLEAN WITH OIL FREE COMPRESSED AIR TO REMOVE ALL RESIDUE FROM THE DRILLING OPERATION.
3. EXPANSION BOLTS SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS.
4. NOTIFY ENGINEER TO INSPECT HOLES FOR DEPTH, DIAMETER, AND CLEANLINESS PRIOR TO THE PLACEMENT OF EPOXY.

QUALITY ASSURANCE

1. SPECIAL INSPECTION SHALL BE PERFORMED FOR THE WORK INDICATED BELOW. SPECIAL INSPECTION SHALL BE PERFORMED IN ACCORDANCE WITH SECTIONS 109 AND 1704 OF THE IBC. WHERE DESIGNATED IN THESE NOTES, INSPECTIONS SHALL BE PERFORMED BY THE ENGINEER. A QUALIFIED TESTING AGENCY APPROVED BY THE BUILDING DEPARTMENT, & RETAINED BY THE OWNER SHALL PERFORM ALL OTHER SPECIAL INSPECTION. THE SPECIAL INSPECTOR SHALL FURNISH COPIES OF ALL INSPECTION RESULTS TO THE OWNER, ARCHITECT, ENGINEER, CONTRACTOR, AND BUILDING DEPARTMENT.

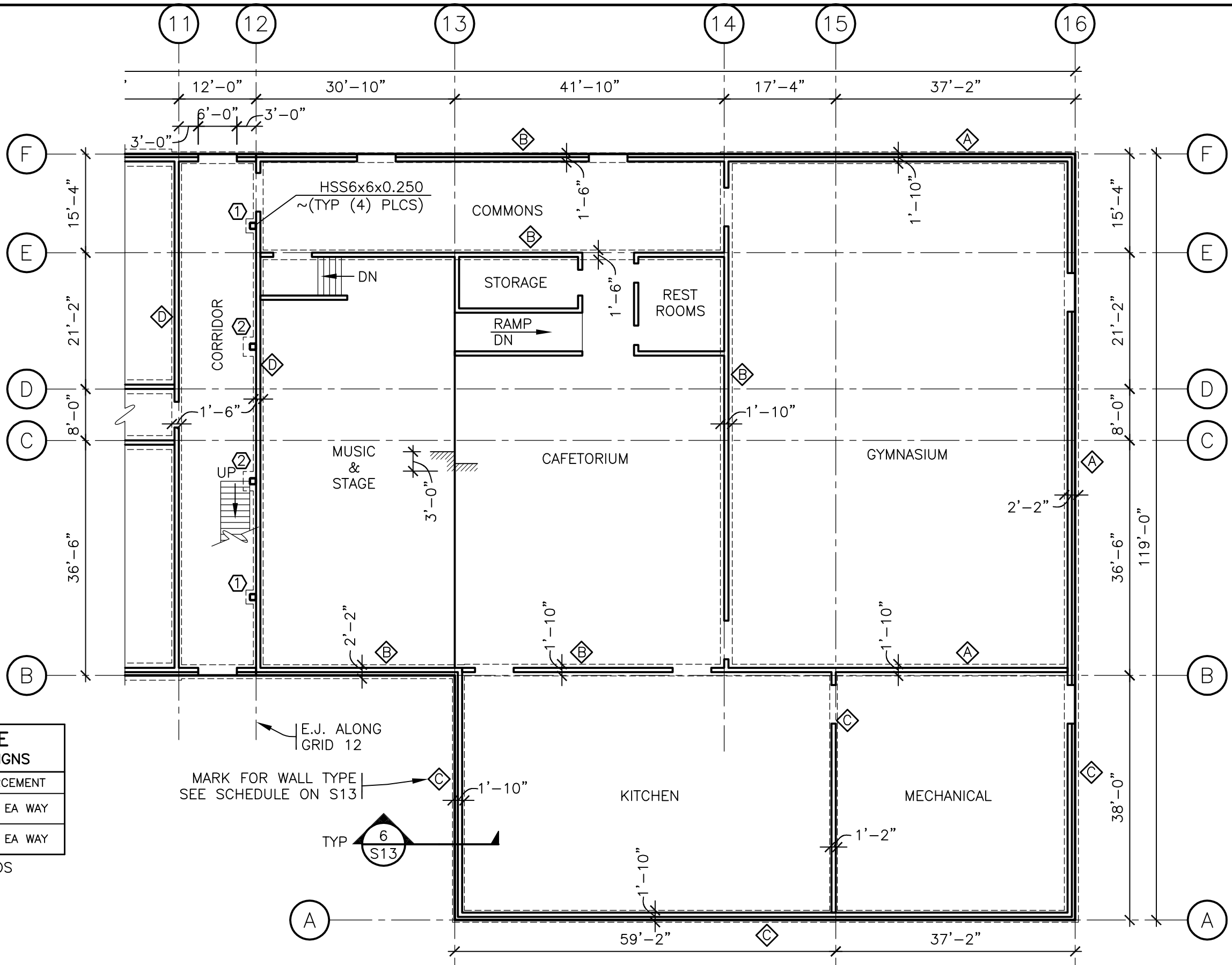
THE CONTRACTOR SHALL NOTIFY THE SPECIAL INSPECTOR THAT THE WORK IS READY FOR INSPECTION AT LEAST 24 HOURS BEFORE SUCH INSPECTION IS TO OCCUR. ALL WORK REQUIRING SPECIAL INSPECTION SHALL REMAIN ACCESSIBLE AND EXPOSED UNTIL IT HAS BEEN OBSERVED AND INDICATED TO BE IN CONFORMANCE BY THE SPECIAL INSPECTOR. THE CONTRACTOR SHALL MAINTAIN JOBSITE COPIES OF ALL REPORTS SUBMITTED BY THE SPECIAL INSPECTOR.

SPECIAL INSPECTION OF THE FOLLOWING TYPES OF CONSTRUCTION IS REQUIRED:

- CONCRETE CONSTRUCTION	PER TABLE 1704.4
- SOIL CONDITIONS, FILL PLACEMENT, AND DENSITY	PER TABLE 1704.7
- EXPANSION BOLT INSTALLATION	PER MANUFACTURER
- EPOXY ANCHOR INSTALLATION	PER MANUFACTURER
- MASONRY REINFORCEMENT AND GROUT	PER TABLE 1704.5
- STEEL DECK WELDING	PER TABLE 1704.3
 2. STRUCTURAL OBSERVATION SHALL BE PERFORMED BY THE ENGINEER OF RECORD IN ACCORDANCE WITH SECTIONS 1709 OF THE INTERNATIONAL BUILDING CODE FOR THE FOLLOWING BUILDING ELEMENTS:

- CONCRETE, MASONRY AND STEEL CONSTRUCTION
 3. FOR DESIGN LAT 3 SPECIAL INSPECTION (PERIODIC) IS REQUIRED FOR SHEAR WALLS WITH MARK "02."
- THE CONTRACTOR SHALL PROVIDE THE ENGINEER OF THE RECORD 48 HOUR NOTICE TO SCHEDULE APPROPRIATE SITE VISITS FOR STRUCTURAL OBSERVATION.

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FOOTING SCHEDULE SAME FOR ALL THREE DESIGNS		
MARK	DIM'S	REINFORCEMENT
①	2'-2"x2'-2"	(3) #4* EA WAY
②	3'-0"x3'-0"	(4) #4* EA WAY

* W/ STD HOOKS AT ENDS

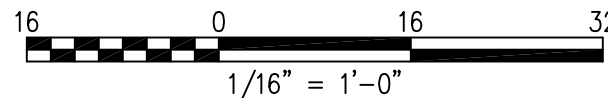


KEY PLAN

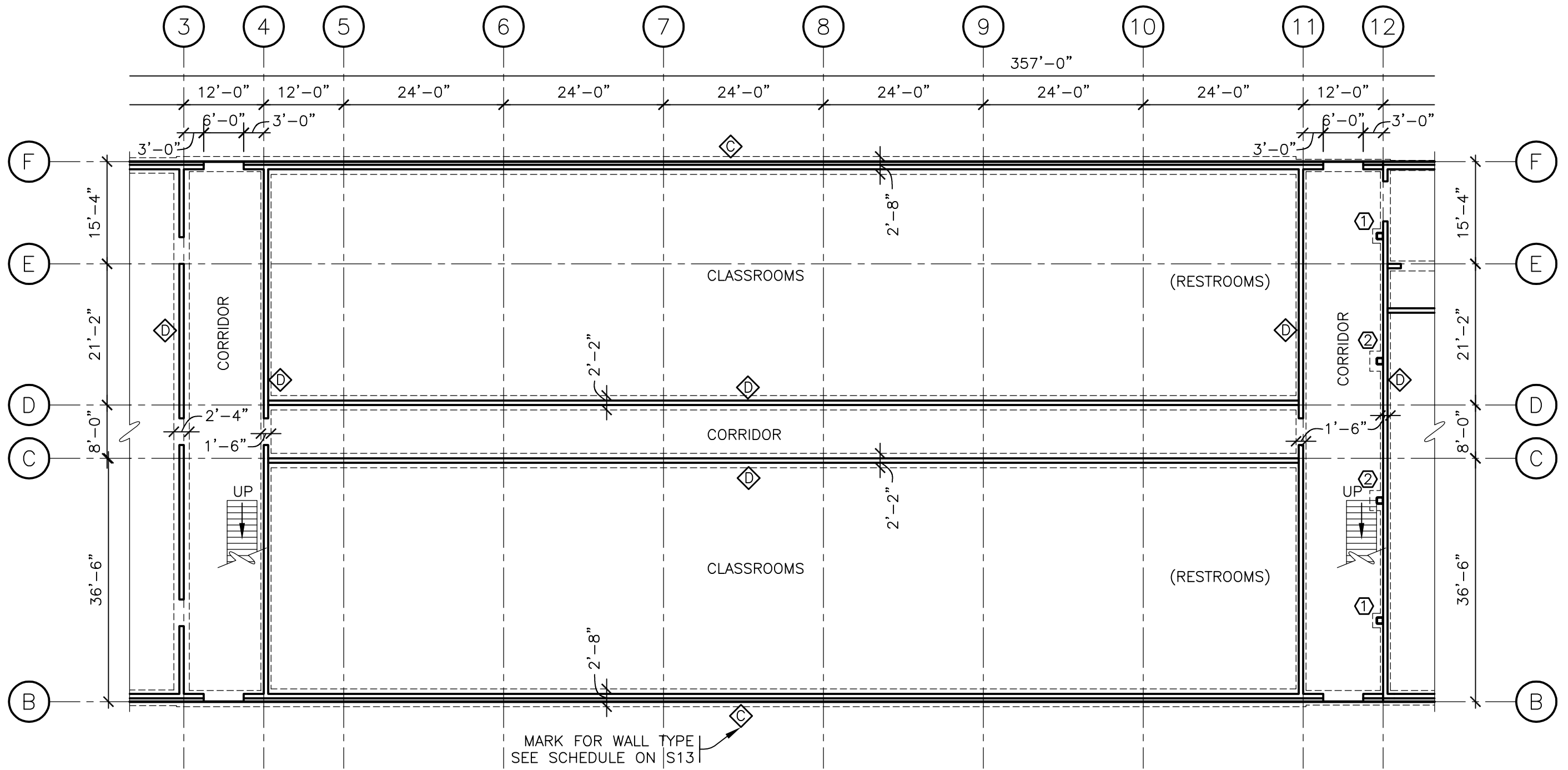
DESIGN STUDY
NOT FOR CONSTRUCTION

PARTIAL FOUNDATION & 1ST FLOOR PLAN

4" SLAB ON GRADE, SEE 6/S13
PROVIDE THICKENED SLAB AT ALL
INTERIOR NON-BEARING CMU PARTITION

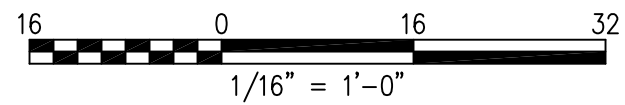


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PARTIAL FOUNDATION & 1ST FLOOR PLAN

SEE S1 FOR NOTES

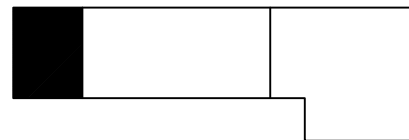


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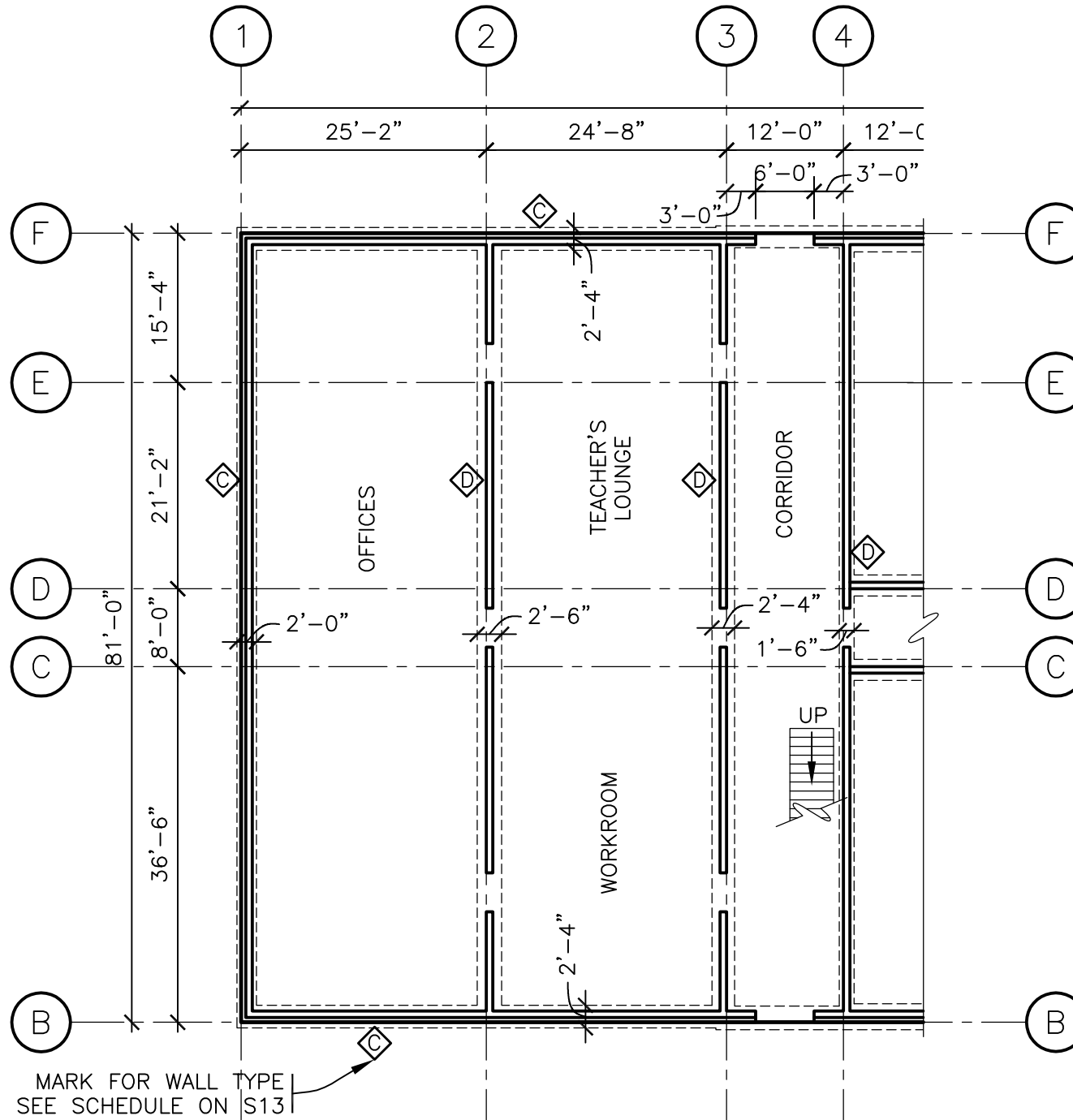
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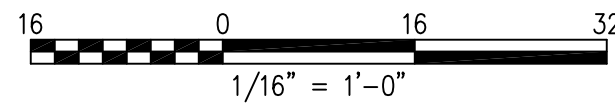


KEY PLAN



PARTIAL FOUNDATION & 1ST FLOOR PLAN

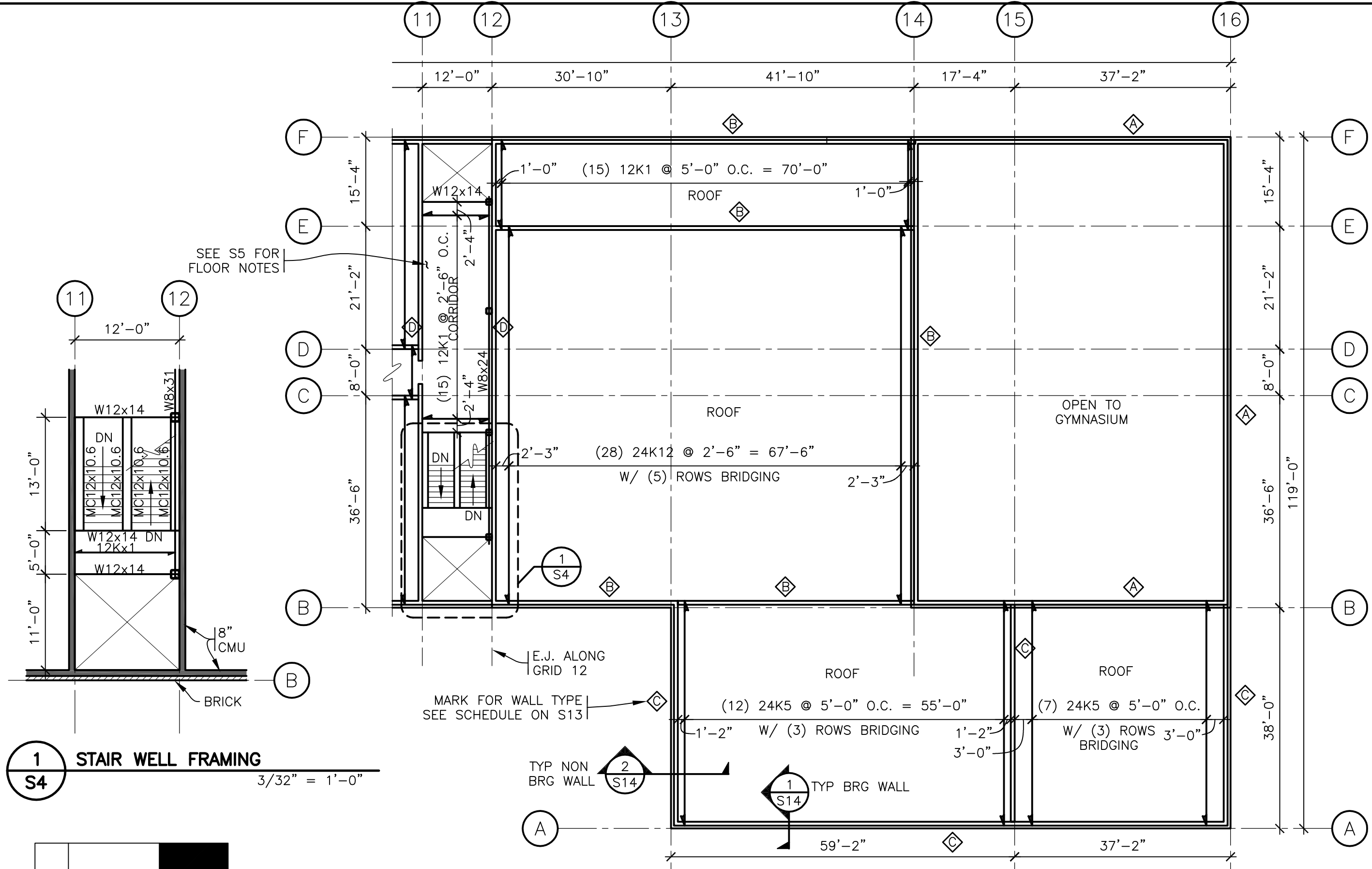
SEE S1 FOR NOTES



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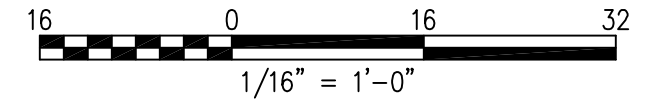
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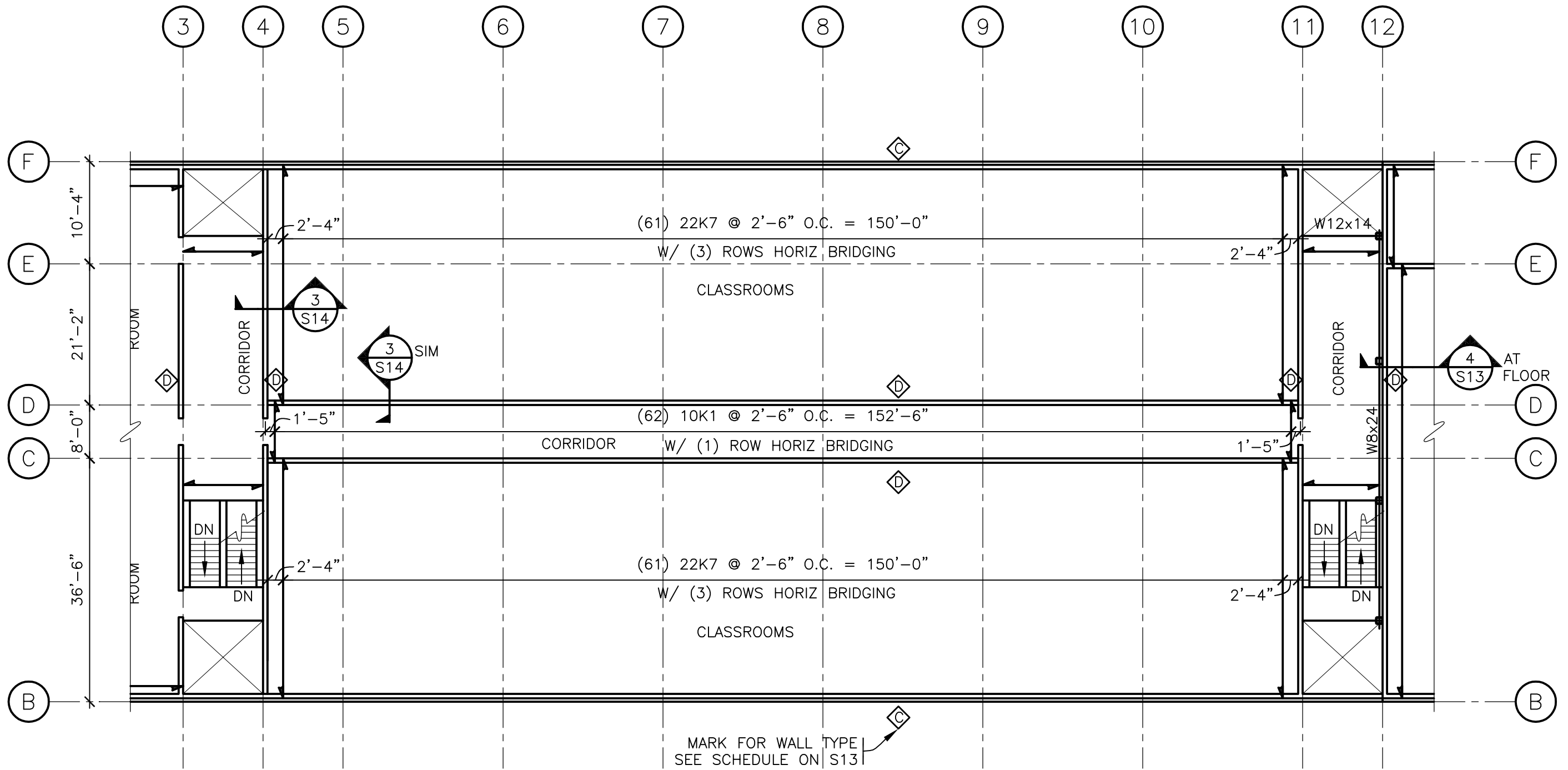
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LOW ROOF FRAMING PLAN

ALL ROOF DECK: 1.5 B22
SEE SCHEDULE ON 1/S14 FOR FASTENING

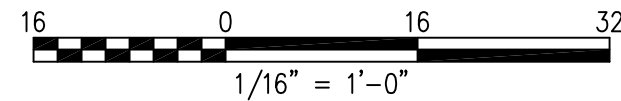


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PARTIAL 2ND FLOOR FRAMING PLAN

1. 4" CONCRETE SLAB WITH W6x6-W1.4xW1.4.
2. ALL FORM DECK: 0.6 C24.
3. SEE SCHEDULE ON 3/S14 FOR DOWELS FROM FLOOR TO WALL FOR EACH DESIGN.

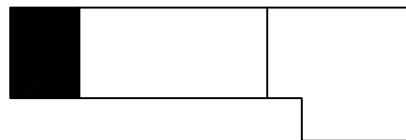


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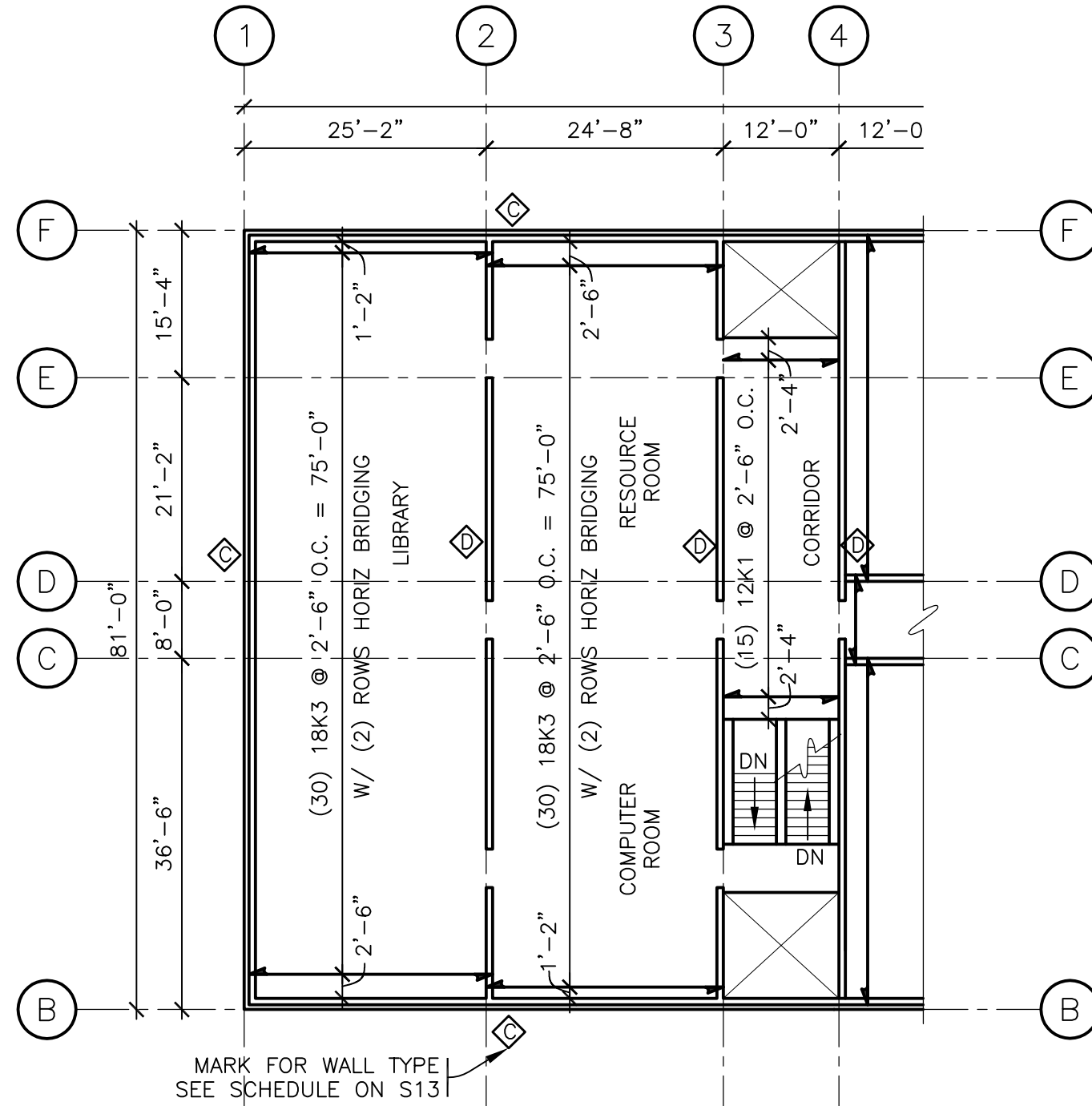
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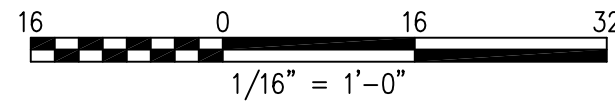
KEY PLAN



MARK FOR WALL TYPE
SEE SCHEDULE ON S13

PARTIAL 2ND FLOOR FRAMING PLAN

SEE S5 FOR NOTES



DESIGN STUDY
NOT FOR CONSTRUCTION



COST ANALYSES AND BENEFIT STUDIES FOR
EARTHQUAKE RESISTANT CONSTRUCTION
IN MEMPHIS, TENNESSEE

SCHOOL
BUILDING

DEC. 2013

S6

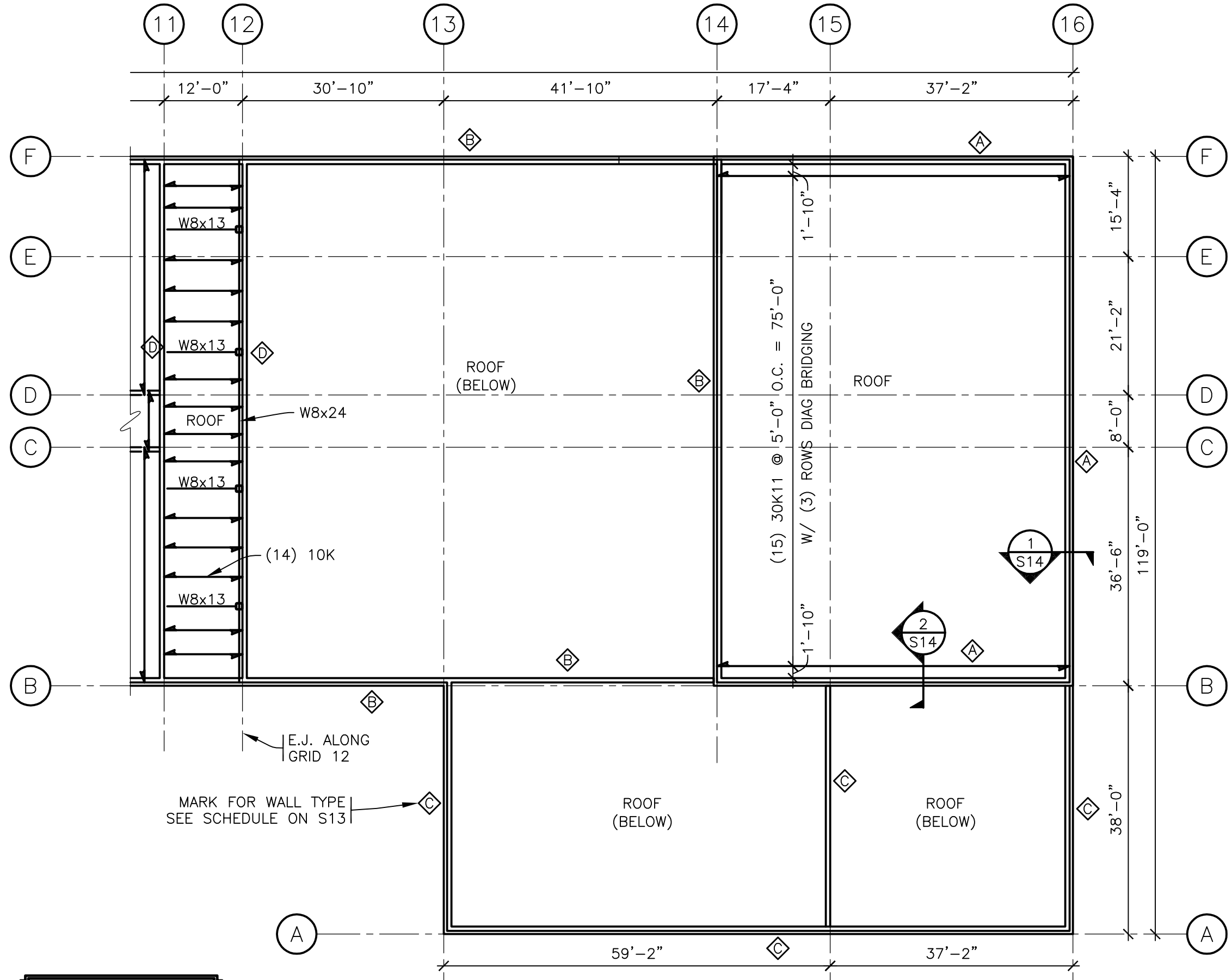
NEHRP CONSULTANTS JOINT VENTURE
FOR THE
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
NATIONAL EARTHQUAKE HAZARDS REDUCTION PROGRAM

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KEY PLAN

DESIGN STUDY
NOT FOR CONSTRUCTION



PARTIAL ROOF FRAMING PLAN

SEE S4 FOR NOTES

1/16" = 1'-0"

NEHRP CONSULTANTS JOINT VENTURE
FOR THE
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
NATIONAL EARTHQUAKE HAZARDS REDUCTION PROGRAM

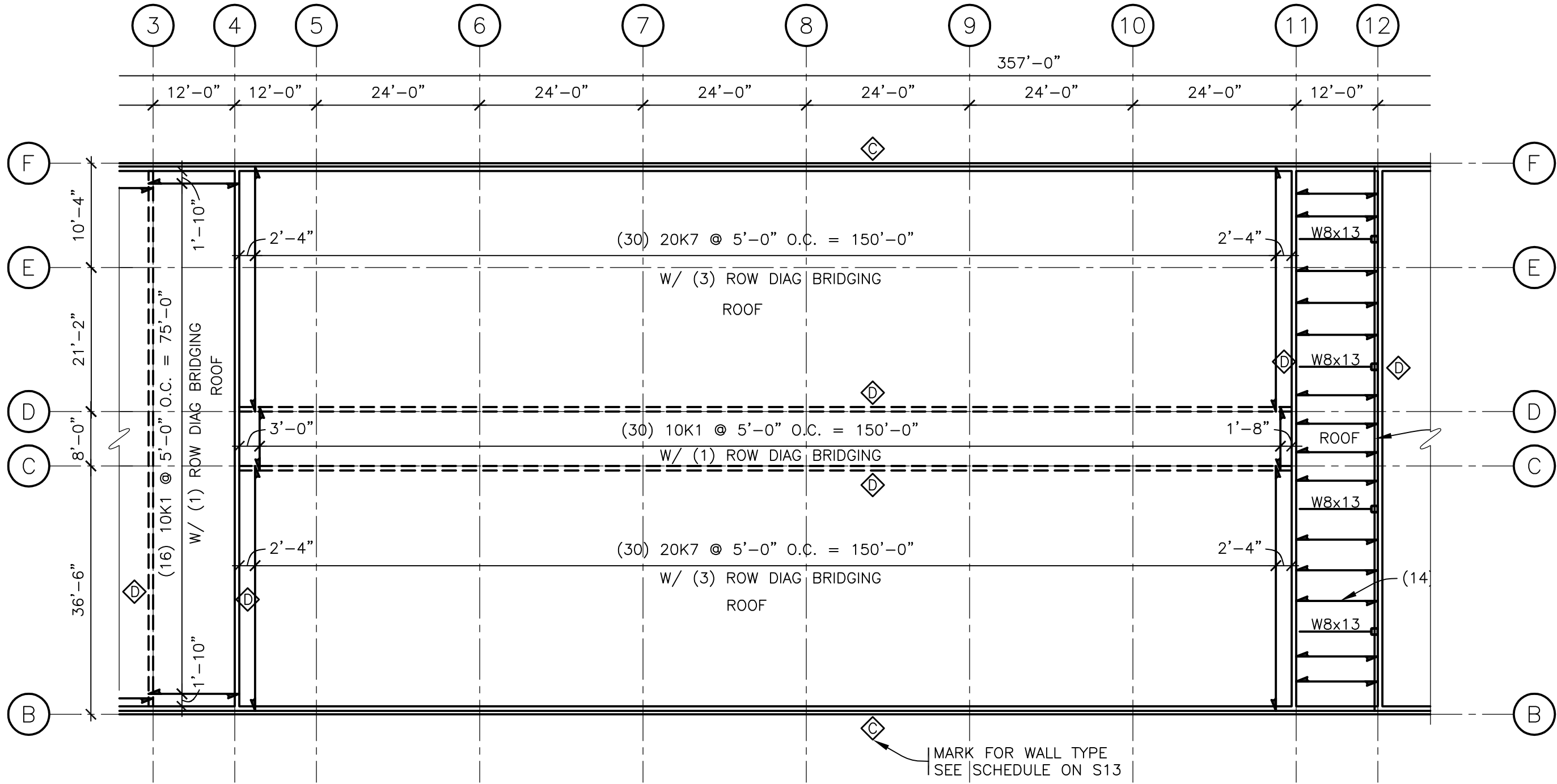
COST ANALYSES AND BENEFIT STUDIES FOR
EARTHQUAKE RESISTANT CONSTRUCTION
IN MEMPHIS, TENNESSEE

SCHOOL
BUILDING

DEC. 2013

S7

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PARTIAL ROOF FRAMING PLAN

SEE S4 FOR NOTES

1/16" = 1'-0"

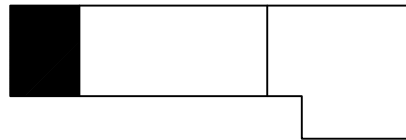


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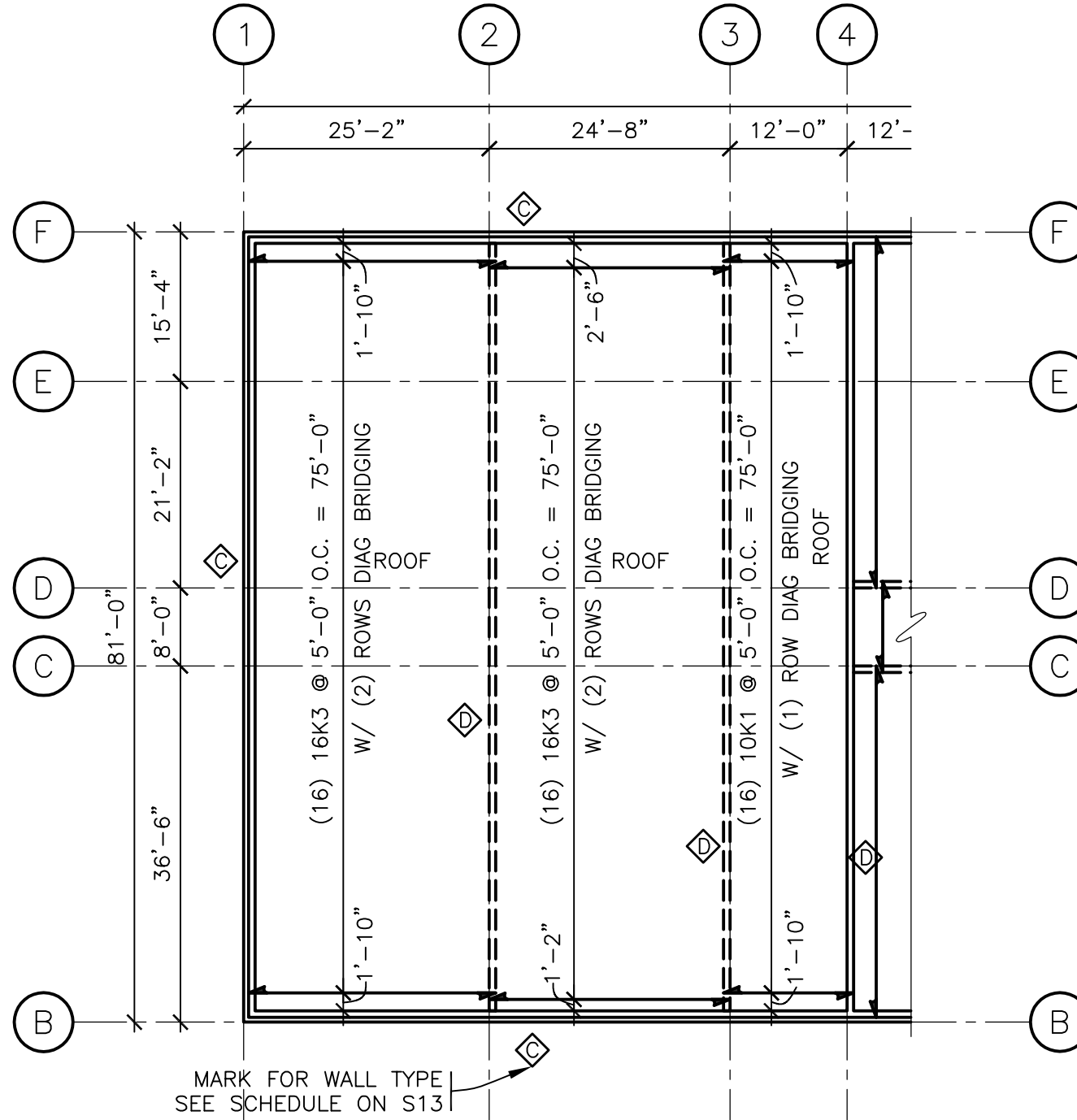
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KEY PLAN



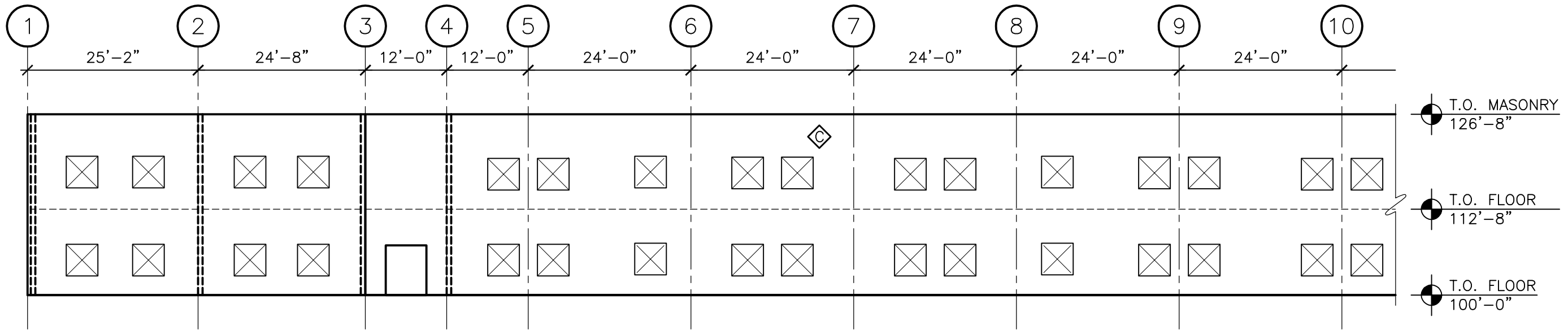
PARTIAL ROOF FRAMING PLAN

SEE S4 FOR NOTES

1/16" = 1'-0"

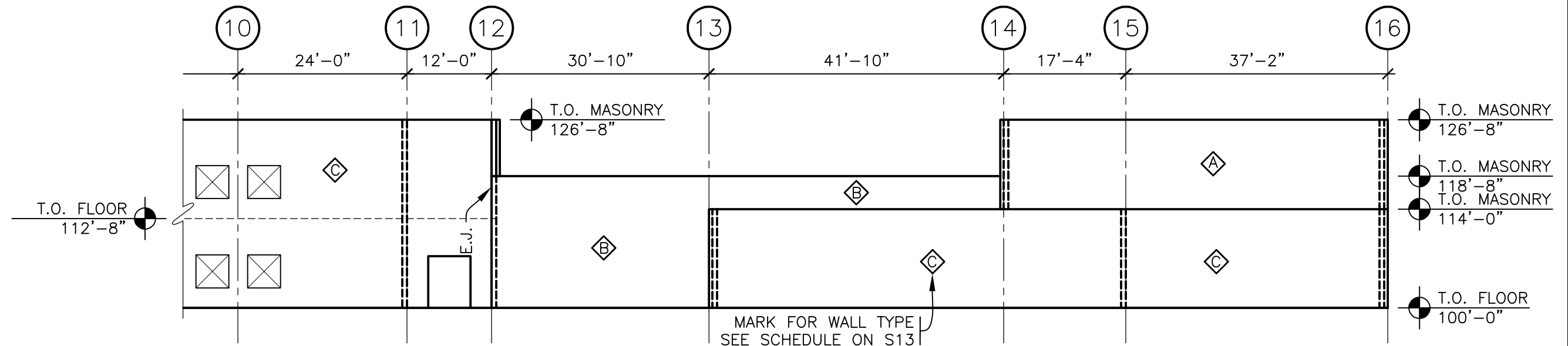
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PARTIAL SOUTH ELEVATION

1/16" = 1'-0"



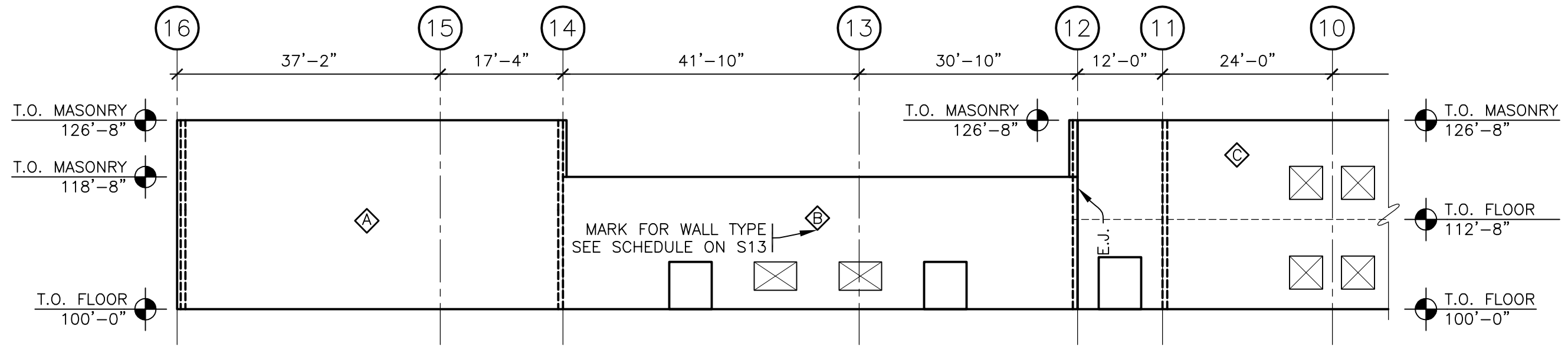
PARTIAL SOUTH ELEVATION

1/16" = 1'-0"

DESIGN STUDY
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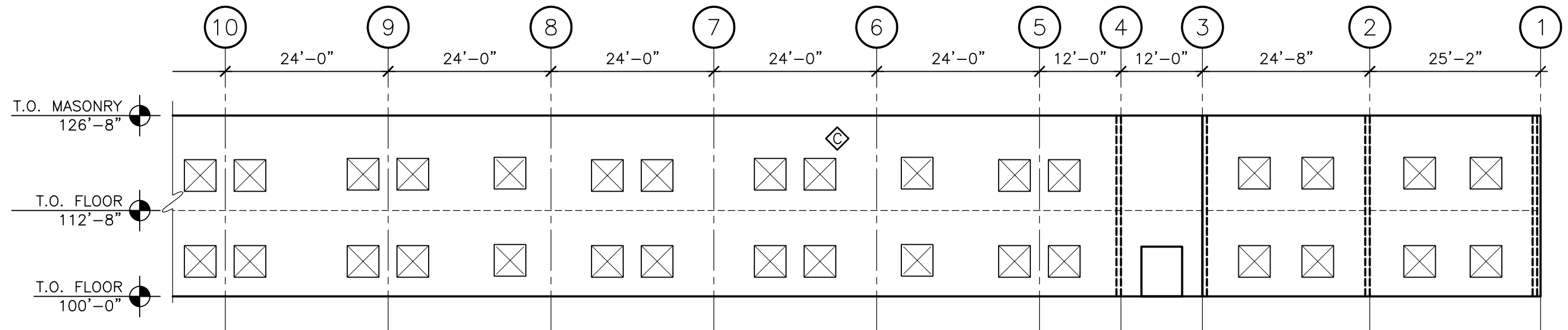


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PARTIAL NORTH ELEVATION

1/16" = 1'-0"



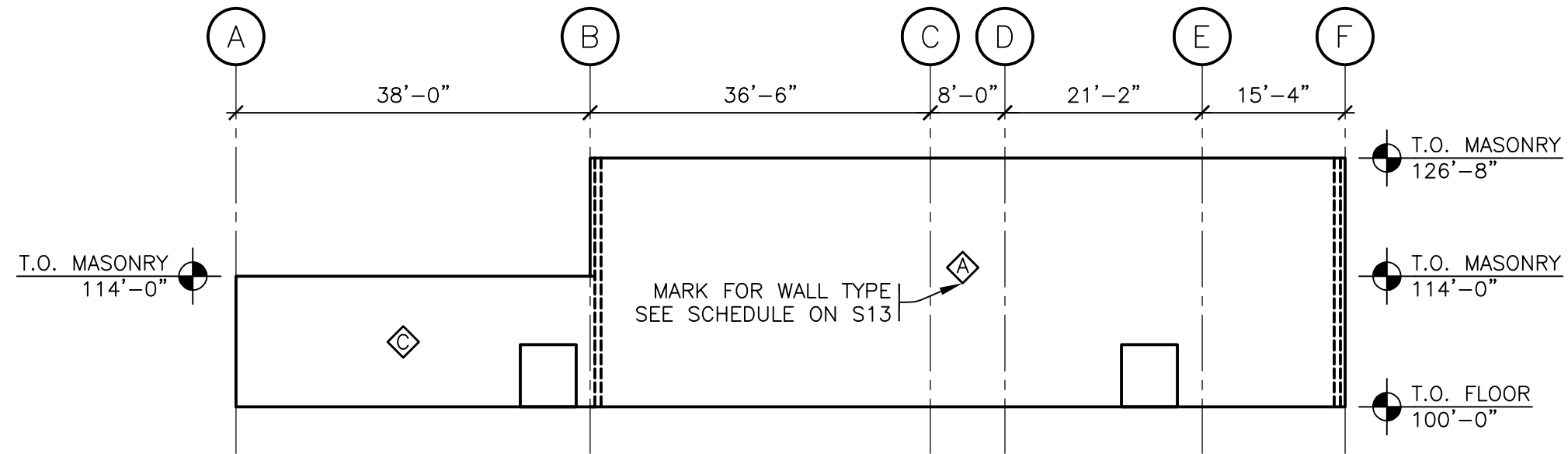
PARTIAL NORTH ELEVATION

1/16" = 1'-0"

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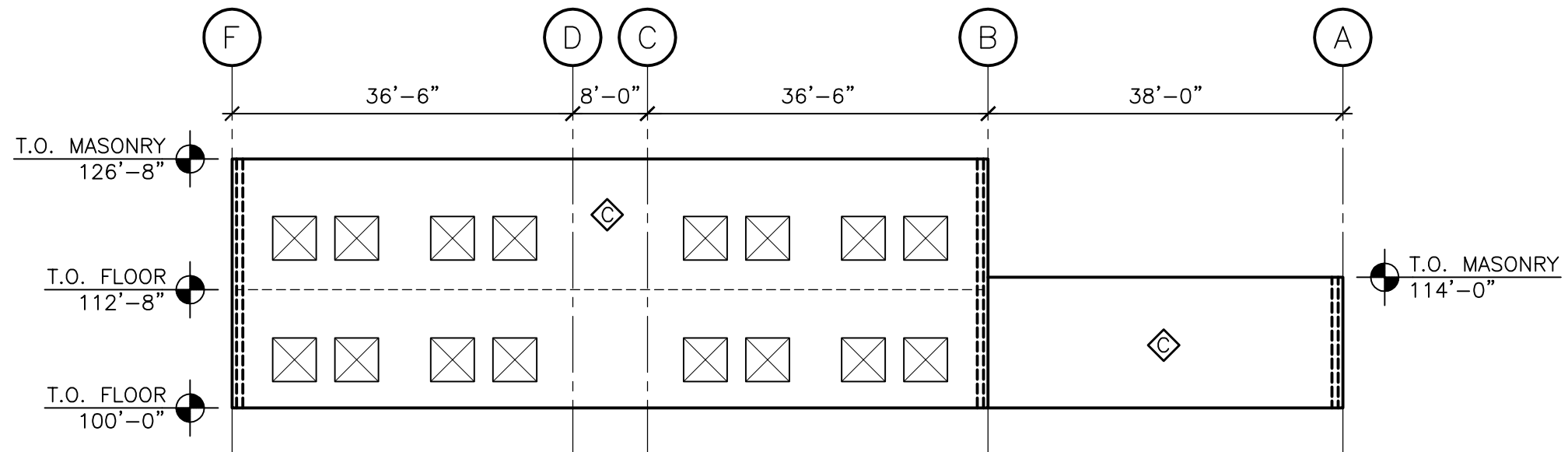


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EAST ELEVATION

1/16" = 1'-0"



WEST ELEVATION

1/16" = 1'-0"

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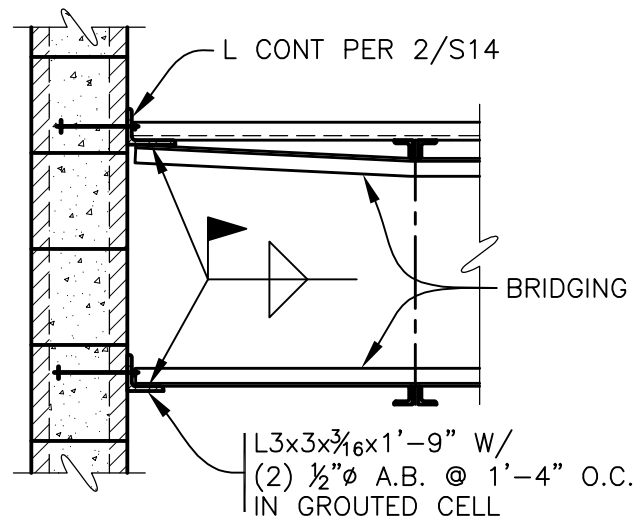
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SCHOOL HAS BEEN DESIGNED BY THREE SETS OF CRITERIA.
SEE THE DRAWING SET AND TABLE BELOW FOR MASONRY DESIGN:

ITEM	ASCE7-05 WIND	SBC-99 WIND & SEISMIC	ASCE7-10 SEISMIC
f'm	1,500 PSI	1,500 PSI	1,500 PSI
WALL TYPE A	#6 @ 16" VERT 9 GA @ 16" HORIZ	#6 @ 16" VERT BB W/ #6 @ 48" HORIZ	#6 @ 16" VERT BB W/ #6 @ 48" HORIZ
WALL TYPE B	#6 @ 48" VERT 9 GA @ 16" HORIZ	#6 @ 48" VERT BB W/ #6 @ 48" HORIZ	#6 @ 48" VERT BB W/ #6 @ 48" HORIZ
WALL TYPE C	#5 @ 48" VERT 9 GA @ 16" HORIZ	#5 @ 48" VERT BB W/ #6 @ 48" HORIZ	#5 @ 48" VERT BB W/ #6 @ 48" HORIZ
WALL TYPE D	#4 @ 120" VERT 9 GA @ 16" HORIZ	#5 @ 48" VERT BB W/ #6 @ 48" HORIZ	#5 @ 48" VERT BB W/ #6 @ 48" HORIZ
CMU CONTROL JOINTS	PER NCMA TEK 10-2C, 24' MAX O.C.	NO CMU CONTROL JOINTS	NO CMU CONTROL JOINTS

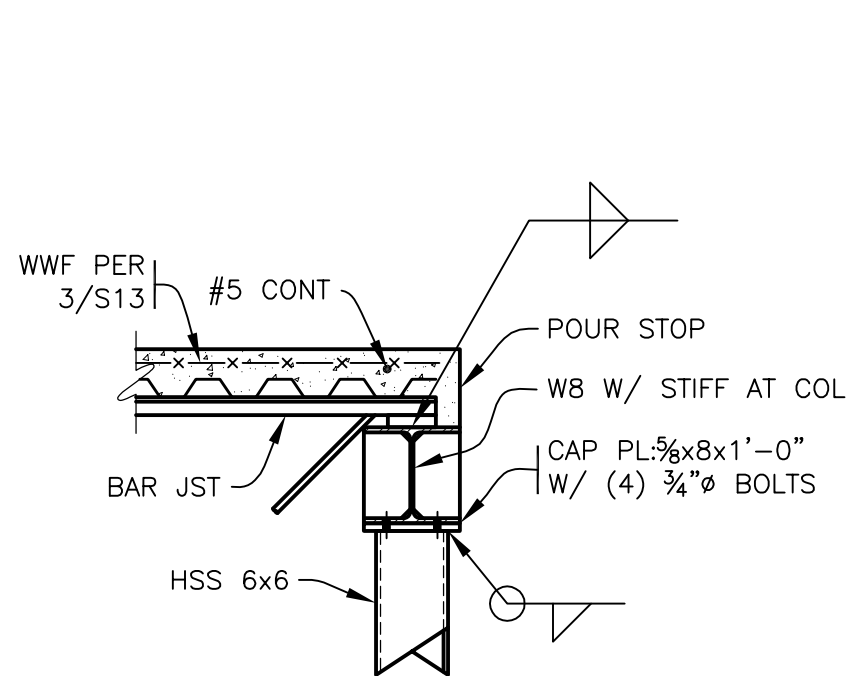
NOTES:

- ALL WALL TYPES HAVE BOND BEAMS W/ (1) #6 AT TOP OF PARAPET, AND AT ROOF, AND FLOOR LINES FOR LEDGER ANGLES, AND BAR JOIST ANCHORAGES, AND OVER ALL DOOR & WINDOW OPENINGS.
- ALL BRICK VENEER AT EXTERIOR WALLS SHALL HAVE EXPANSION JOINTS PER BIA TECH NOTE 18A, 36'-0" MAX O.C.

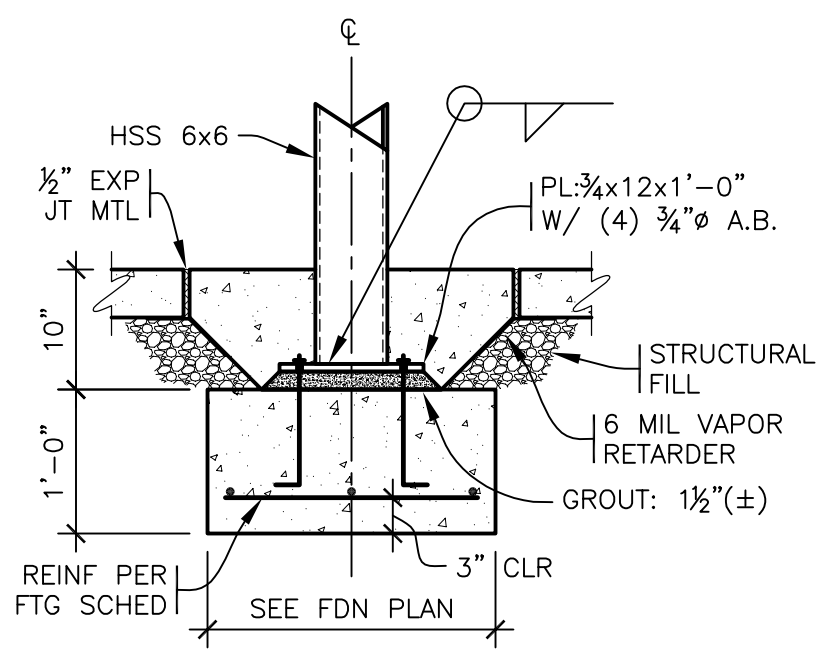


1 JOIST BRIDGING DETAIL
S13 3/4" = 1'-0"
(HORIZ. BRIDGING SHOWN-DIAG BRIDGING SIM.)

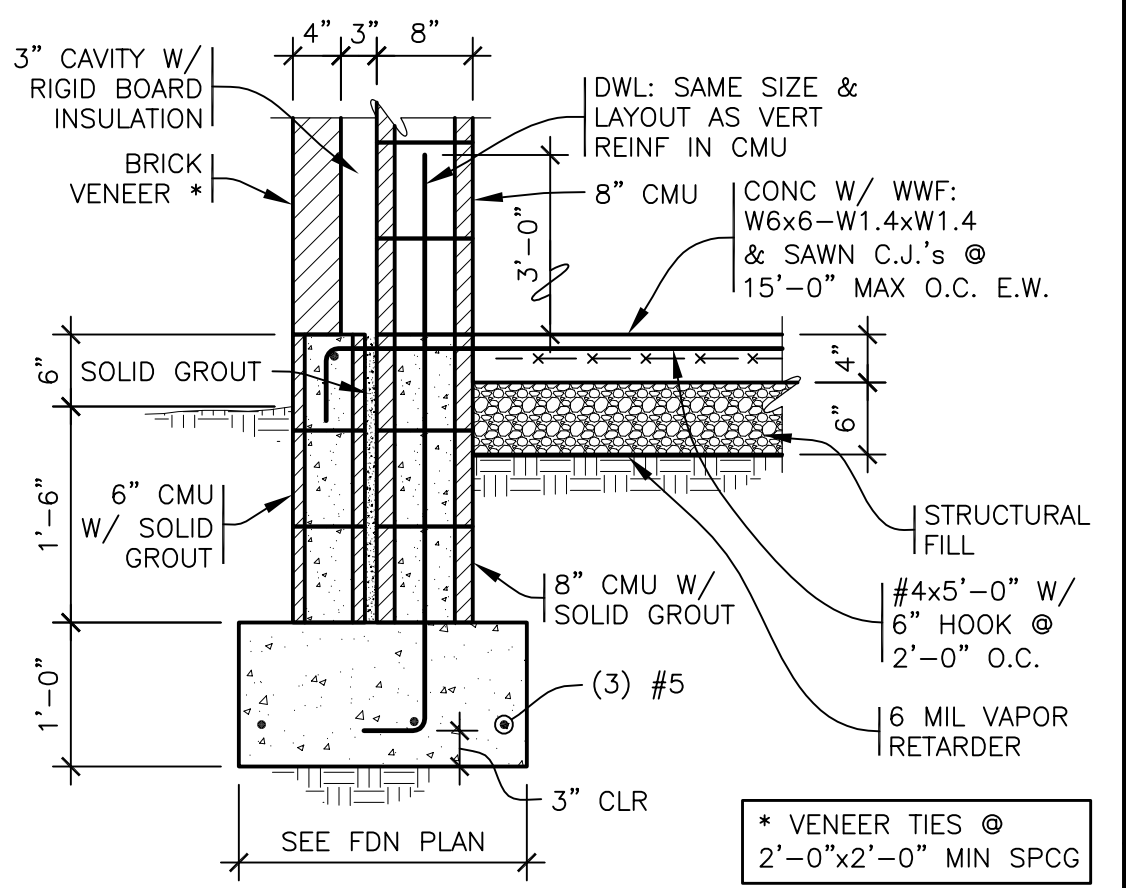
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4 FLOOR BEAM CONNECTION DETAIL
S13 3/4" = 1'-0"



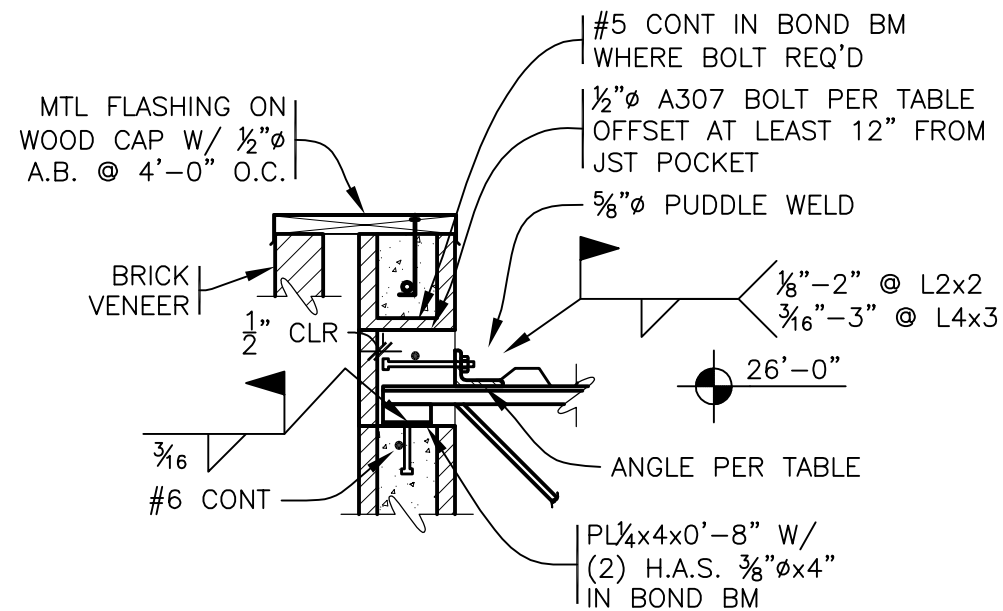
5 FOOTING AT COLUMN
S13 3/4" = 1'-0"



6 FOOTING
S13 3/4" = 1'-0"

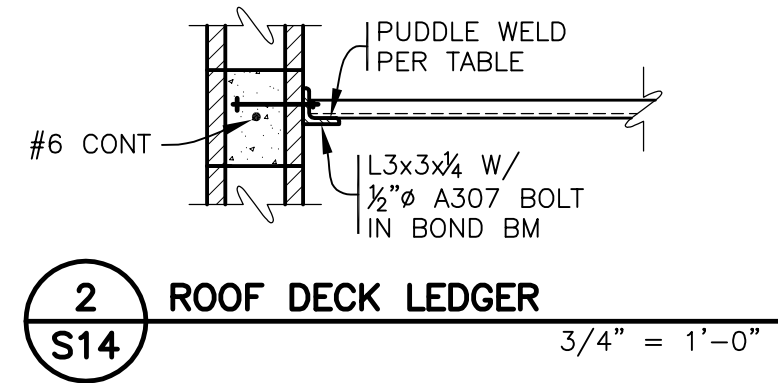
* VENEER TIES @ 2'-0"x2'-0" MIN SPCG

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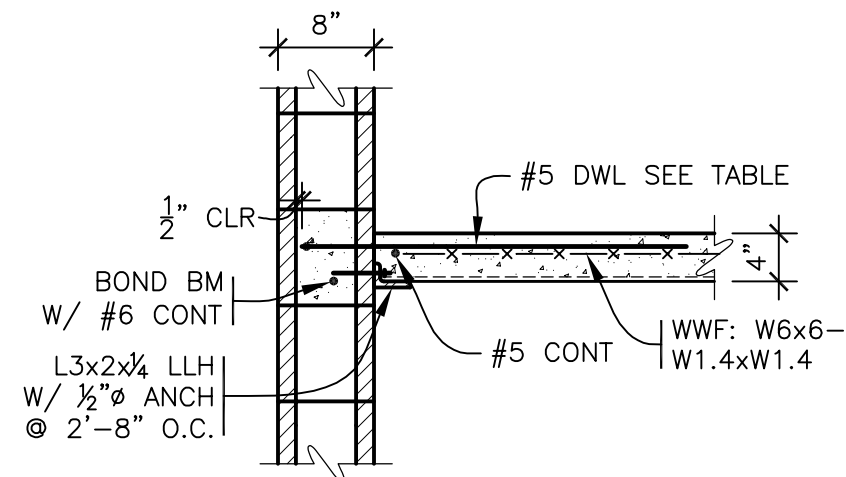
1 JOIST BRG DETAIL AT ROOF
S14 3/4" = 1'-0"

	WIND ASCE7-05	SEISMIC SBC-99	SEISMIC ASCE7-10
DECK	1.5B22	1.5B22	1.5B22
ANGLE	NO ANGLE	L2x2x3/16 CONT	L4x3x5/16LLH CONT
BOLT	NO BOLT	NO BOLT	1/2"Øx8" @ 5'-0" W/ HVY HEX HD. @ EMBEDDED END
DECK FASTENER TO JOIST & L	5/8"Ø PUDDLE WELD @ 12" O.C.	5/8"Ø PUDDLE WELD @ 6" O.C.	5/8"Ø PUDDLE WELD @ 6" O.C.
SIDLAP FASTENER	NONE	TEK #10 (4)/SPAN	TEK #10 (10)/SPAN



2 ROOF DECK LEDGER
S14 3/4" = 1'-0"

	WIND ASCE7-05	SEISMIC SBC-99	SEISMIC ASCE7-10
DECK	1.5B22	1.5B22	1.5B22
SUPPORT FASTENER	5/8"Ø PUDDLE WELD 36/4 PATTERN	5/8"Ø PUDDLE WELD 36/7 PATTERN	5/8"Ø PUDDLE WELD 36/7 PATTERN
BOLT SPACING	72" O.C.	36" O.C.	24" O.C.



3 2ND FLOOR WALL CONNECTION
S14 3/4" = 1'-0"

DETAIL AT JOIST BEARING IS SIMILAR, WITHOUT ANGLE AND BOLT, BUT ADD JOIST BEARING PLATE AS SHOWN IN 1/S14 AND BOND BEAM IS BELOW JOIST BEARING.

SPACING OF #5 DOWELS FROM WALL TO SLAB		
WIND	SEISMIC SBC	SEISMIC 7-10
48"	24"	16"

USE #5x1" 2'-6" AT EXTERIOR WALLS AND USE #5x5'-0" STRAIGHT THROUGH AT INTERIOR WALLS. AT JOIST BEARING WALLS CUT FACE SHELL AND PLACE FLOOR CONCRETE IN CELL.

DESIGN STUDY
NOT FOR CONSTRUCTION

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