ThermoWall
panel system

ENGINEERING QUICK REFERENCE GUIDE_

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Thermowall PS

DISCLOSURE AND ACCREDITATION

DISCLOSURE

The construction principles discussed within the pages of this manual are to be viewed as a reference source only. All materials contained within this manual, including but not limited to, calculations, details and schedules, are not intended to set limitations on design nor be interpreted as being the only design criterion. Structural design should be in accordance with local Building Code considerations and therefore, may not necessarily follow the guidelines suggested within this manual.

ACCREDITATION

All engineering calculations, equations, examples and details cited in this manual have been compiled by: Namdar Structural Engineering, Inc., Riverside,California. 2002.

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Introduction

SECTION 1

INTRODUCTION

The following sections contain applicable load information from the 1994 Uniform Building Code, design procedures, examples and tables for Allowable Uniform Loads, Concentrated Loads, Shear Walls, Lintels, Retaining, and Basement Walls.
The THERMOWALL PS® building system can be used for: exterior load bearing walls under axial and lateral loads. Interior load or non-load bearing walls, shear walls to resist in-plane shear loads, slender walls with combined eccentric axial and out-of-plane loads, columns carrying concentrated loads, especially on the side of openings partition walls curved walls lintels and beams carrying gravity and lateral loads elevated slabs with reinforcement post tensioned slabs carrying gravity and lateral loads basement and retaining walls foundation stem walls free-standing fences and planters, curved or straight roofs, flat or gabled.

Note:

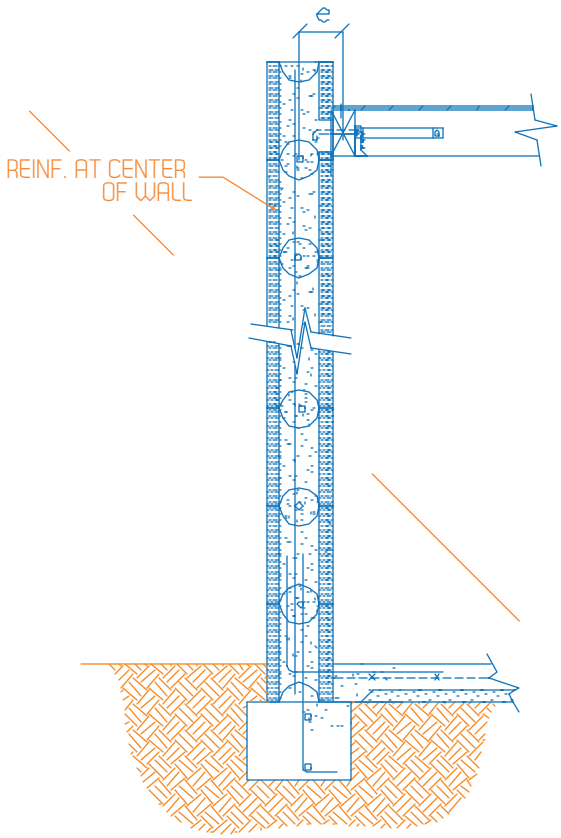
Based upon full-scale testing the following factors have been generated:
Shear Walls: Strength Reduction Factor $\varphi := .85$
Perform Wall Shape Reduction Factor $I := .85$
Slender Walls: Equivalent Thickness 4.75 for 6" diameter core
Shape Reduction Factor 6.75 for 8" diameter core

DESIGN TABLES

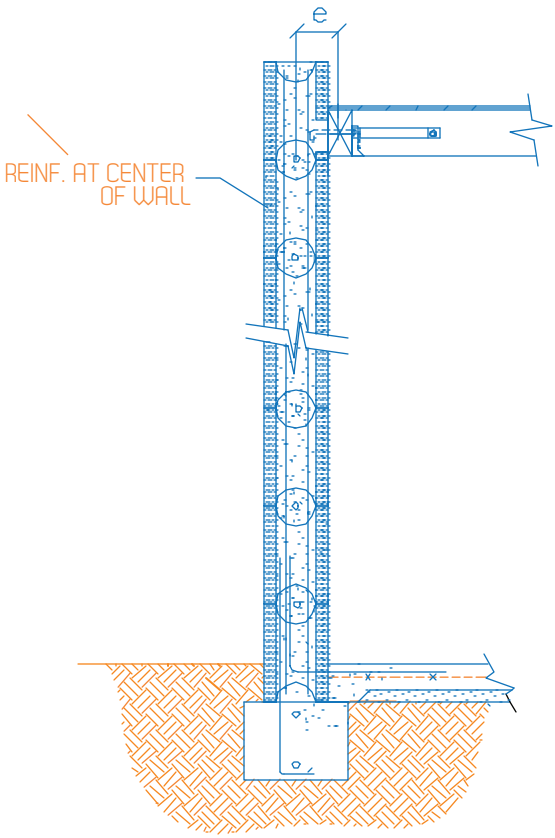
The following tables are an outline of possible designs and load bearing capacities. High exposures to wind and seismic loads have been assumed.The tables, however, are not supposed to set limitations to design possibilities. For various exposures, see equations in Chapter 3, "Design Procedures" of the comprehensive Engineering Design Manual.

SECTION 2 – SCHEDULES

10" Thermowall PS® Uniform Loads



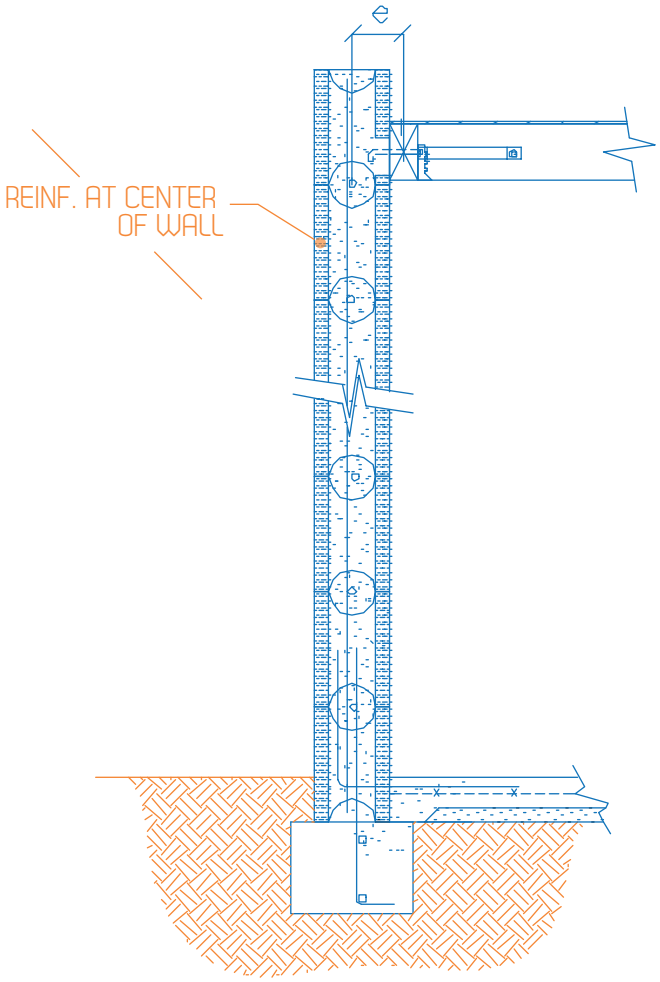
DETAIL - 1



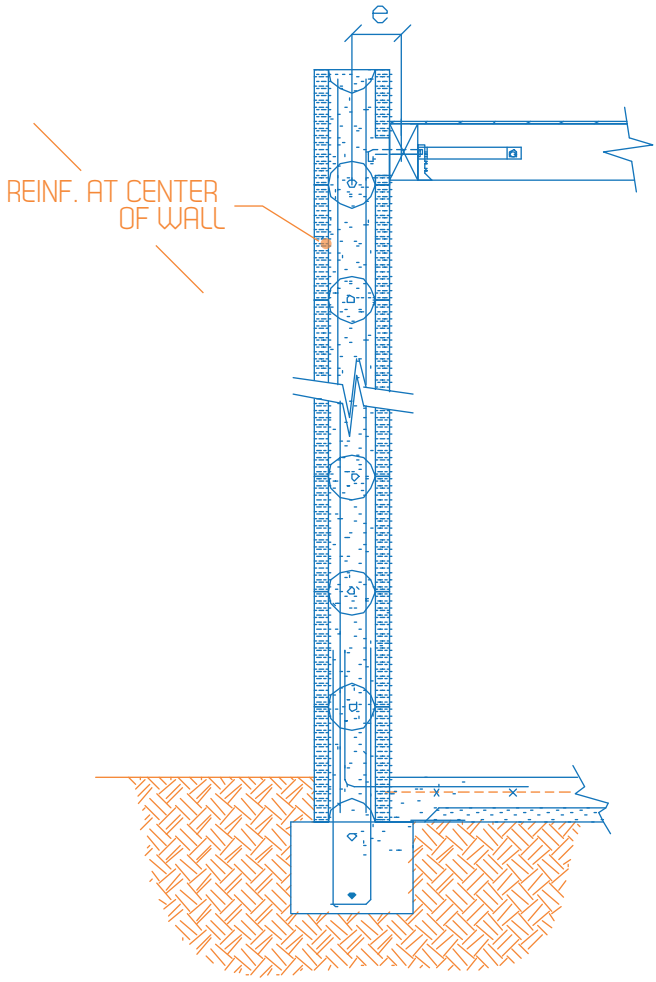
DETAIL - 2

ALLOWABLE UNIFORM LOADS ALLOWABLE AXIAL LOAD IN POUNDS PER LINEAL FOOT						DESIGN PARAMETERS
HEIGHT OF WALL FT.	REBAR & SPACING					ECCENTRICITY: e = 6 3/4"
	70 MPH (16.03 PSF)		80 MPH (28.86 PSF)			
	#4 @ 15o O.C	#5 @ 15o O.C	#5 @ 15o O.C	#5 @ 15o O.C (EACH FACE)	#6 @ 15o O.C (EACH FACE)	STEEL: 60,000 psi
8'- 0"	1,000	2,100	1,800	2,700	3,000	
10'- 0"	800	1,800	1,500	2,500	2,700	CONCRETE 2,500 psi
12'- 0"	600	1,500	1,200	2,400	2,500	
14'- 0"	400	1,200	750	2,200	2,400	
16'- 0"		600	400	1,500	1,600	SEISMIC ZONE ZONE - 4 , % = 0.40
18'- 0"				600	1,500	
20'- 0"					1,000	
22'- 0"					600	WIND EXPOSURE EXPOSURE - C
	SEE DETAIL - 1			SEE DETAIL - 2		

SECTION 2 – SCHEDULES
12" Thermowall PS® Uniform Loads



DETAIL - 1



DETAIL - 2

ALLOWABLE UNIFORM LOADS

ALLOWABLE AXIAL LOAD IN POUNDS PER LINEAL FOOT

HEIGHT OF WALL FT.	REBAR & SPACING				
	70 MPH (16.03 PSF)		80 MPH (28.86 PSF)		
	#4 @ 15o O.C	#5 @ 15o O.C	#5 @ 15o O.C	#5 @ 15o O.C (EACH FACE)	#6 @ 15o O.C (EACH FACE)
8'- 0"	1,400	2,400	2,400	3,400	3,600
10'- 0"	1,400	2,000	1,800	3,000	3,400
12'- 0"	800	1,700	1,400	3,000	3,200
14'- 0"	400	1,200	800	2,800	3,000
16'- 0"	300	800	300	1,200	1,800
18'- 0"				300	1,600
20'- 0"					1,200
22'- 0"					500
	SEE DETAIL - 1			SEE DETAIL - 2	

DESIGN PARAMETERS

ECCENTRICITY:
e = 7 3/4"

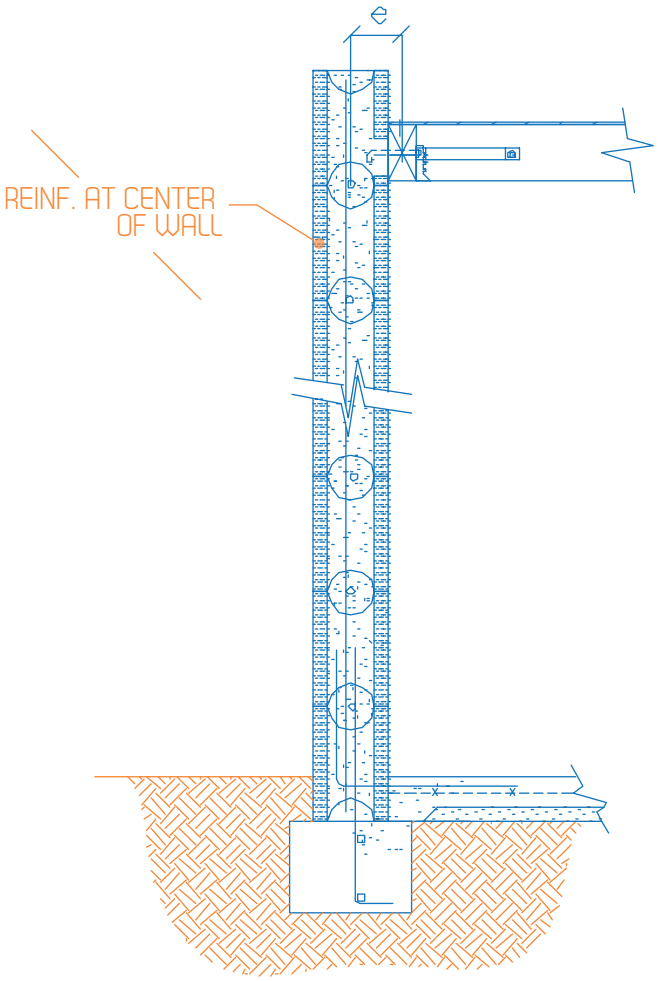
STEEL:
60,000 psi

CONCRETE
2,500 psi

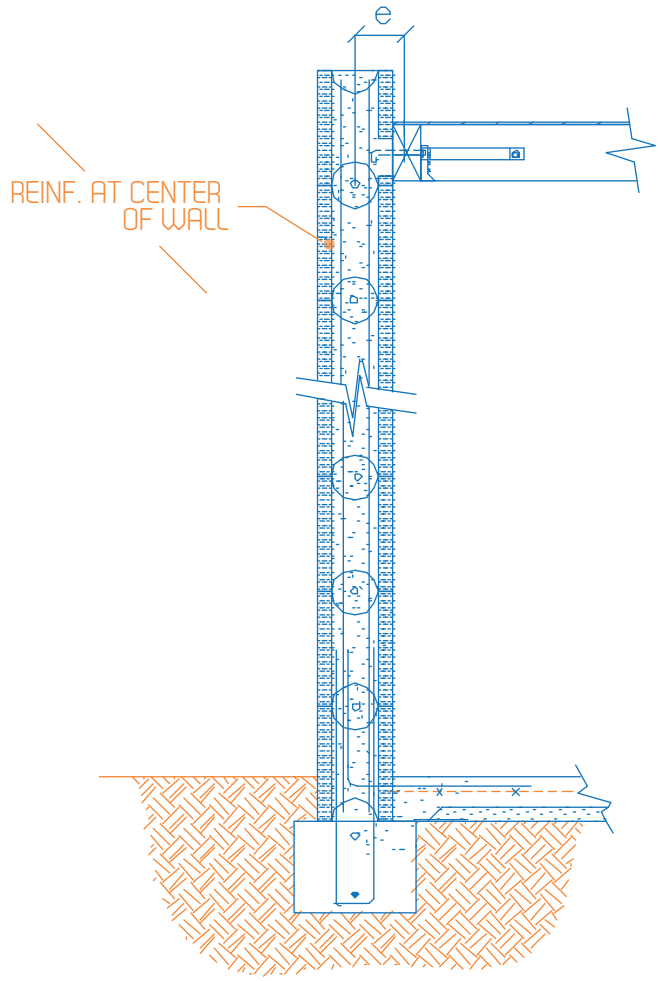
SEISMIC ZONE
ZONE - 4 , % = 0.40

WIND EXPOSURE
EXPOSURE - C

SECTION 2 – SCHEDULES
14" Thermowall PS® Uniform Loads



DETAIL - 1



DETAIL - 2

ALLOWABLE UNIFORM LOADS
ALLOWABLE AXIAL LOAD IN POUNDS PER LINEAL FOOT

HEIGHT OF WALL FT.	REBAR & SPACING				
	70 MPH (16.03 PSF)		80 MPH (28.86 PSF)		
	#4 @ 15o O.C	#5 @ 15o O.C	#5 @ 15o O.C	#5 @ 15o O.C (EACH FACE)	#6 @ 15o O.C (EACH FACE)
8'- 0"	1,400	2,000	2,000	3,000	3,200
10'- 0"	1,400	1,800	1,600	2,800	3,000
12'- 0"	800	1,400	1,200	2,600	2,800
14'- 0"	400	1,000	800	2,000	2,400
16'- 0"		600	200	1,000	1,400
18'- 0"					1,200
20'- 0"					1,000
22'- 0"					400
	SEE DETAIL - 1			SEE DETAIL - 2	

DESIGN PARAMETERS

ECCENTRICITY:
e = 8 3/4"

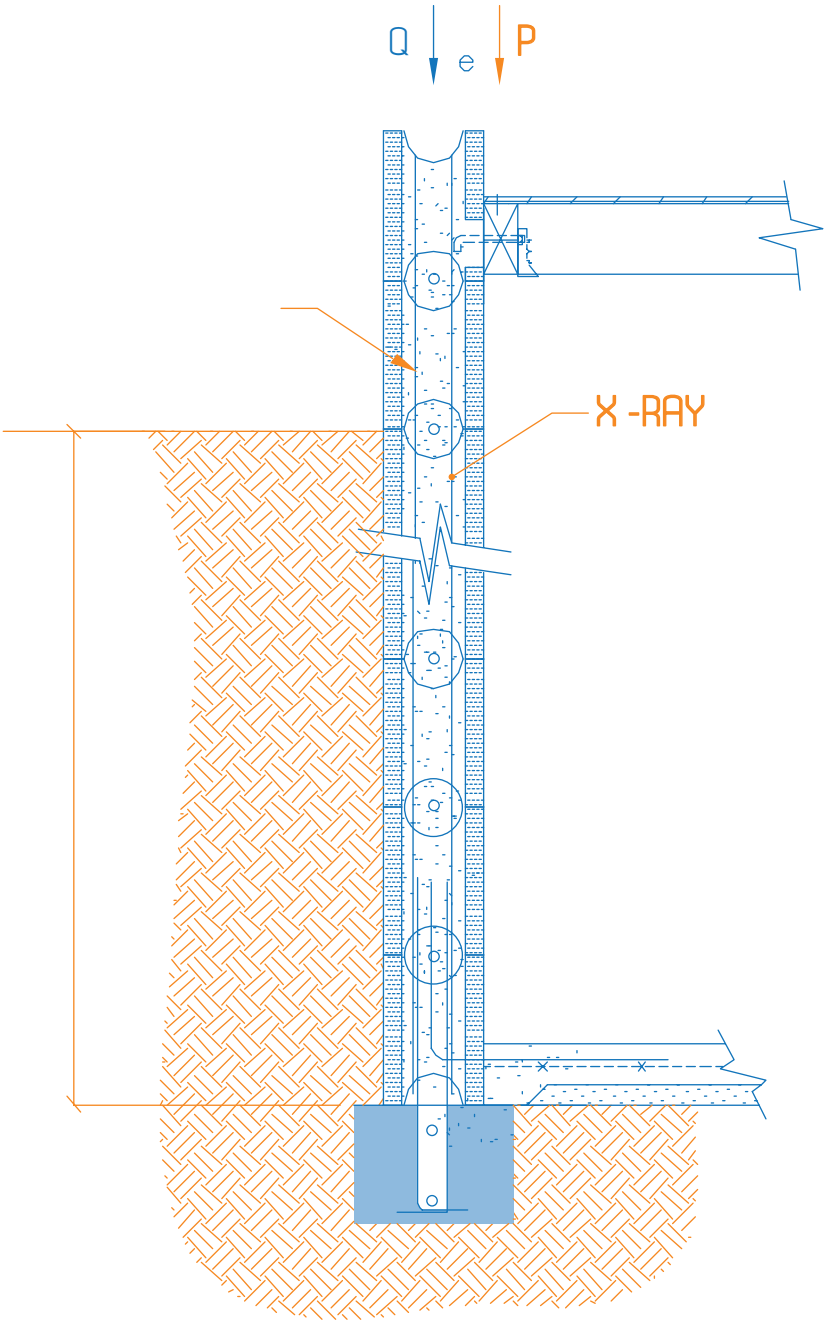
STEEL:
60,000 psi

CONCRETE
2,500 psi

SEISMIC ZONE
ZONE - 4 , % = 0.40

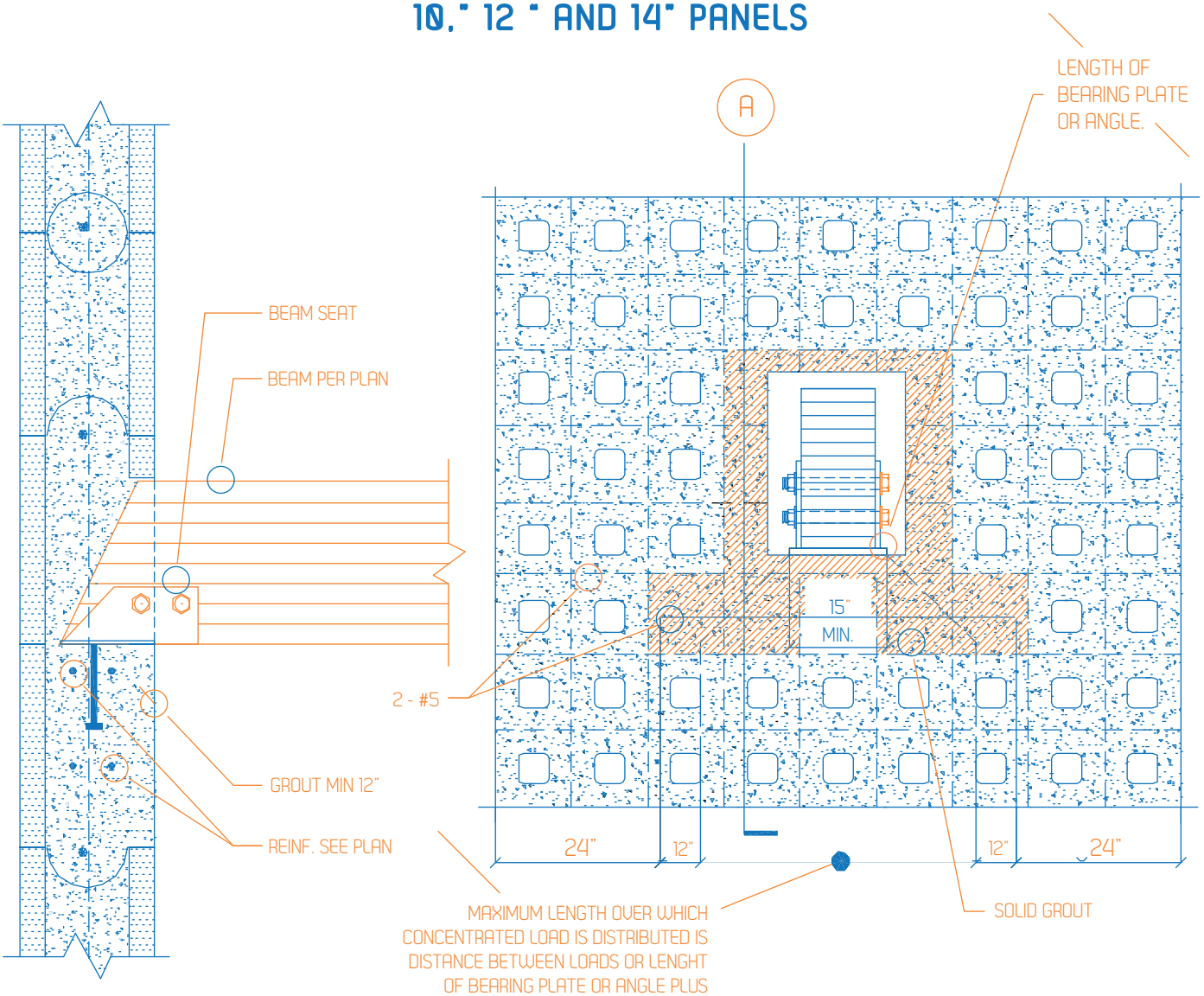
WIND EXPOSURE
EXPOSURE - C

SECTION 2 – SCHEDULES



BASEMENT WALL SHEDULE							DESIGN PARAMETERS
RETAINING HEIGHT	ECCENTRIC AXIAL LOAD (P) - (PLF)	AXIAL CENTRIC LOAD (Q) - (PLF)	X - BAR	Y - BAR	CONCRETE f'c	EQUIVALENT FLUID PRESSURE	ECCENTRICITY e = 7 3/4
3'-0"	500	≥ 10,000	1 - #4 @ 15" O.C	1 - #5 @ 15' O.C	2,500 PSI	50 PCF	CONCRETE PER SCHEDULE
4'-0"	600						
6'-0"	700		1 - #6 @ 15" O.C	1 - #6 @ 7.5" O.C	4,000 PSI		STEEL: 60,000 psi
8'-0"	600						

SECTION 2 – SCHEDULES
ALLOWABLE CONCENTRATED LOADS FOR 10." 12 " AND 14" PANELS



SECTION - A
SCALE : 2 : 1

ELEVATION "A"

ALLOWABLE CONCENTRATED LOADS
ALLOWABLE AXIAL LOAD IN POUNDS PER LINEAL FOOT

HEIGHT OF WALL FT.	#4 @ 15o O.C	#5 @ 15o O.C	#5 @ 15o O.C EA. FACE	#6 @ 15o O.C EA. FACE
8'-0"	3800	6000	7400	8000
10'-0"	3800	4800	6400	7400
12'-0"	2200	3800	6000	7000
14'-0"	1200	2800	5000	6500
16'-0"		1600	2600	3700
18'-0"				3200
20'-0"				2700

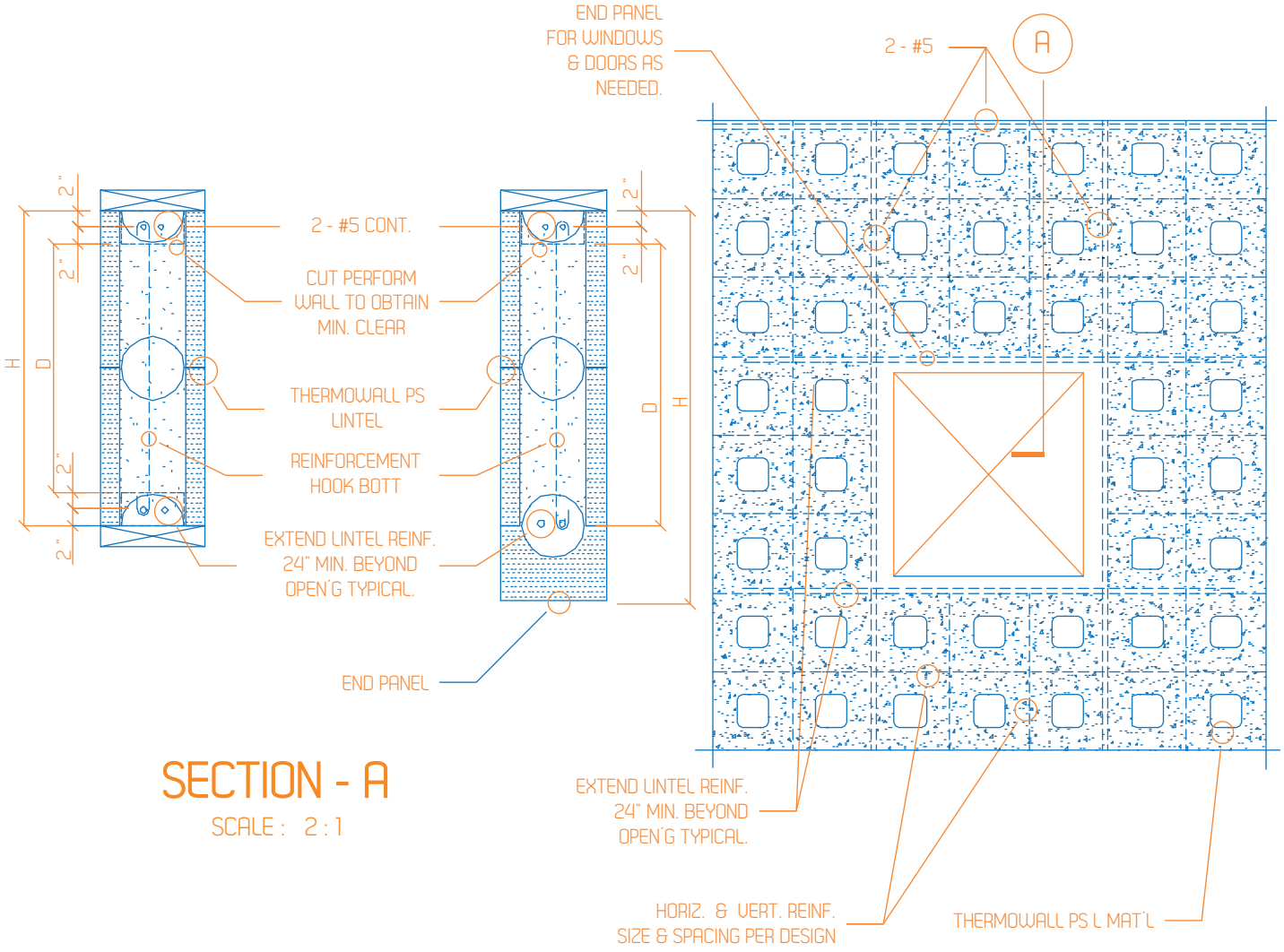
DESIGN PARAMETERS

ECCENTRICITY: e= 4"

CONCRETE	STEEL:
2,500 psi	60,000 psi

SEISMIC ZONE	WIND EXPOSURE
ZONE - 4 , % = 0.40	EXPOSURE - C

SECTION 2 – SCHEDULES
LINTEL SCHEDULE



SECTION - A

SCALE : 2 : 1

LINTEL SCHEDULE

FOR 8"OR 10"THERMOWALL PS - RESPECTTIVELY

MAX. SPAN	UNIFORM LOAD (PLF)		TOP. REINF.	BOTT. REINF.	REMARKS
	15" LINTELS H=15" . D=13"	30" LINTELS H=30" . D=28"			
3'- 0"	1600	2600	2- #5	2- #5	24"BEARING EACH END
4'- 0"	1400	2000			
6'- 0"	800	1600			
8'- 0"	600	1400			
10'- 0"	500	1000			
12'- 0"	400	800			
16'- 0"	200	600			

UNLESS OTHERWISE DRAW OR NOTED

DESIGN PARAMETERS

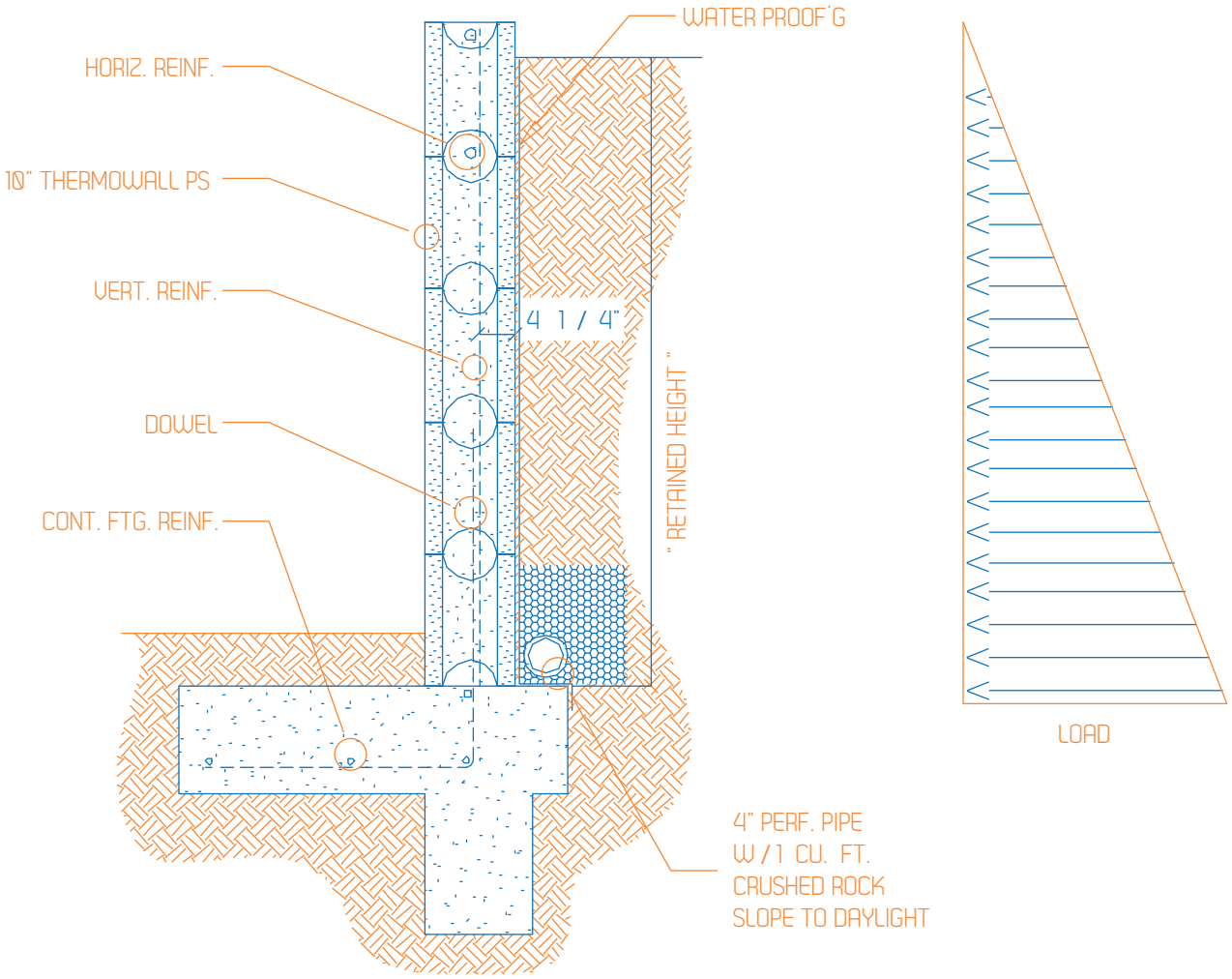
CONCRETE
2,500 psi

STEEL:
60,000 psi

SEISMIC ZONE
ZONE - 4 , % = 0.40

WIND EXPOSURE
EXPOSURE - C

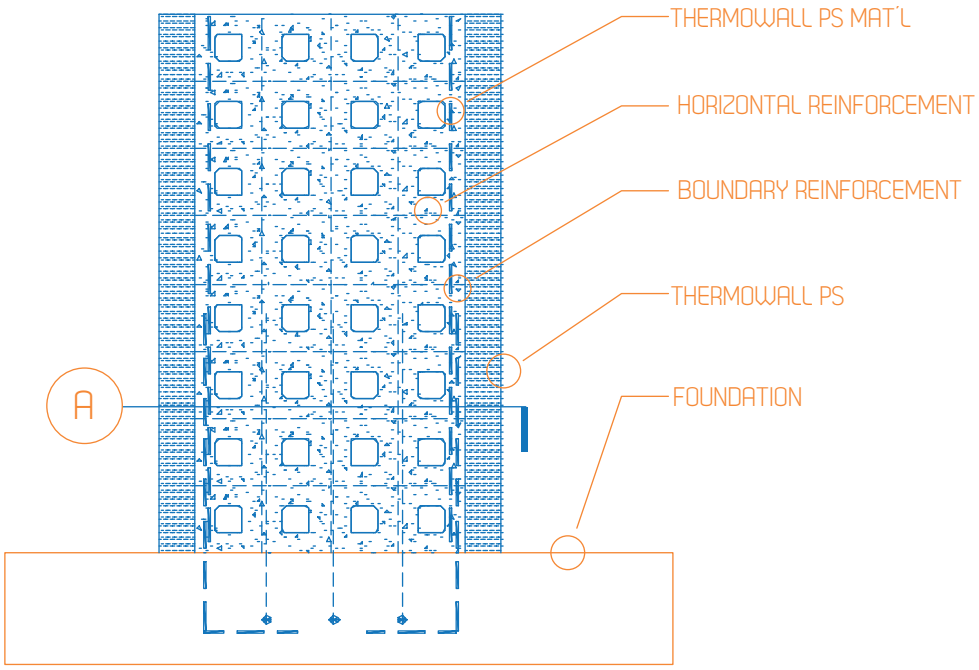
SECTION 2 – SCHEDULES
RETAINING WALL SCHEDULE

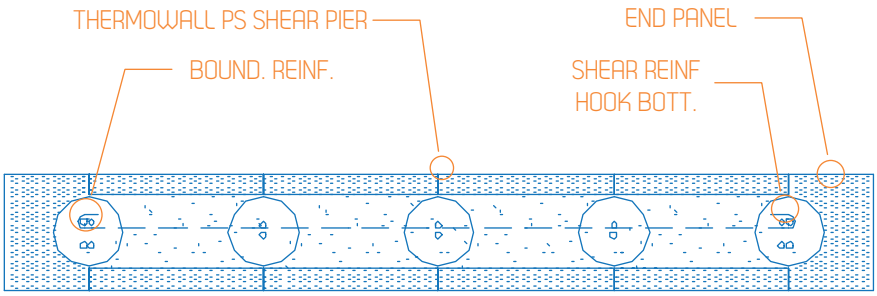


RETAINING WALL SCHEDULE STEEL 60,000 PSI					
RETAINED HT.	SIZE	HORIZ. REINF.	VERT. REINF.	REMARKS	EQUIV. FLUID PRES
3'-0"	10"	1-#4	#5 @ 15o O.C	2,500 psi CONCRETE	30 PCF (38 PCF FOR WALL)
4'-0"		1-#5			
6'-0"			#6 @ 15o O.C		
8'-0"			2-#6 15o O.C	3,000 psi CONCRETE	

SECTION 2 – SCHEDULES

SHEAR WALL SCHEDULE





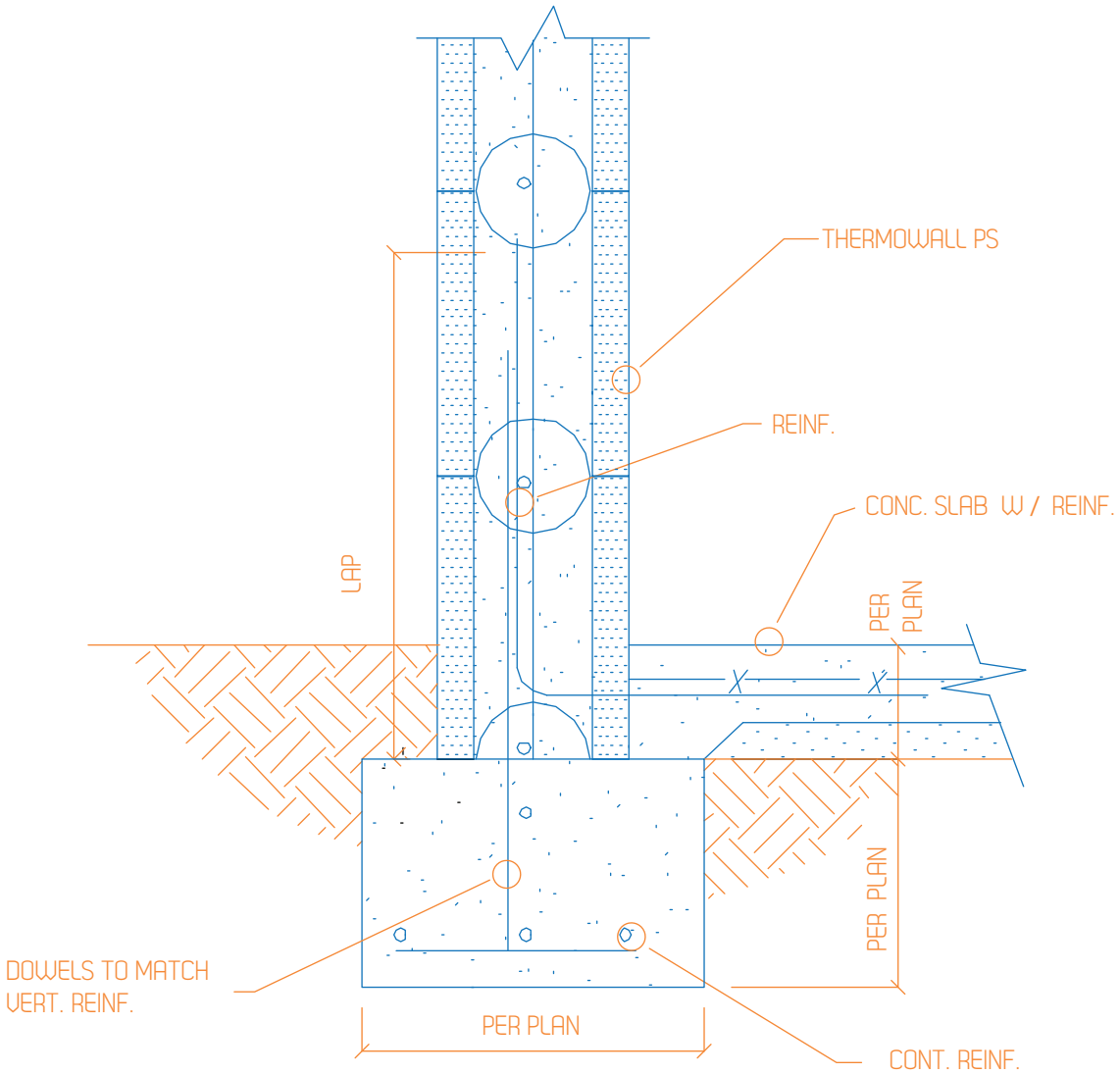
SECTION - A

SCALE : 2 : 1

SHEAR WALL SCHEDULE FOR 8″ OR 10″THERMOWALL PS - RESPECTIVELY				DESIGN PARAMETERS	
MAX. SPAN	LOADING (PLF)	BOUNDARY REINF.	REMARKS	CONCRETE 2,500 psi	STEEL: 80,000 psi
15″	2340	2 - #5	#5 @ 15o O.C HORIZONTALLY		
30″	4690				
45″	7030				
60″	11 710			SEISMIC ZONE ZONE - 4 , % = 0.40	WIND EXPOSURE EXPOSURE - C
75″	14 060				
120″	18 740				

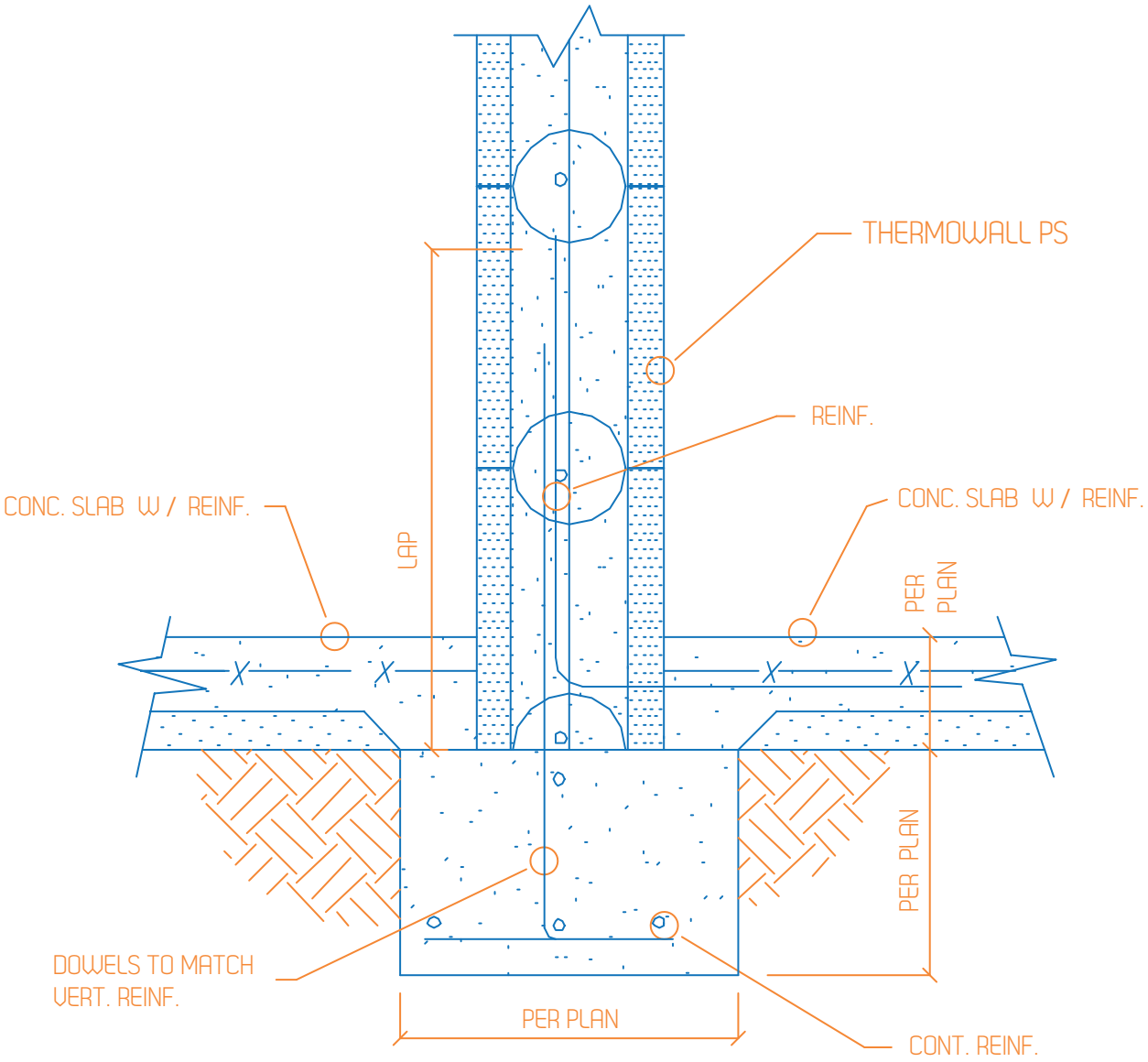
SECTION 3 – TYPICAL DETAILS
3.1 Foundation Details

EXTERIOR FOOTING

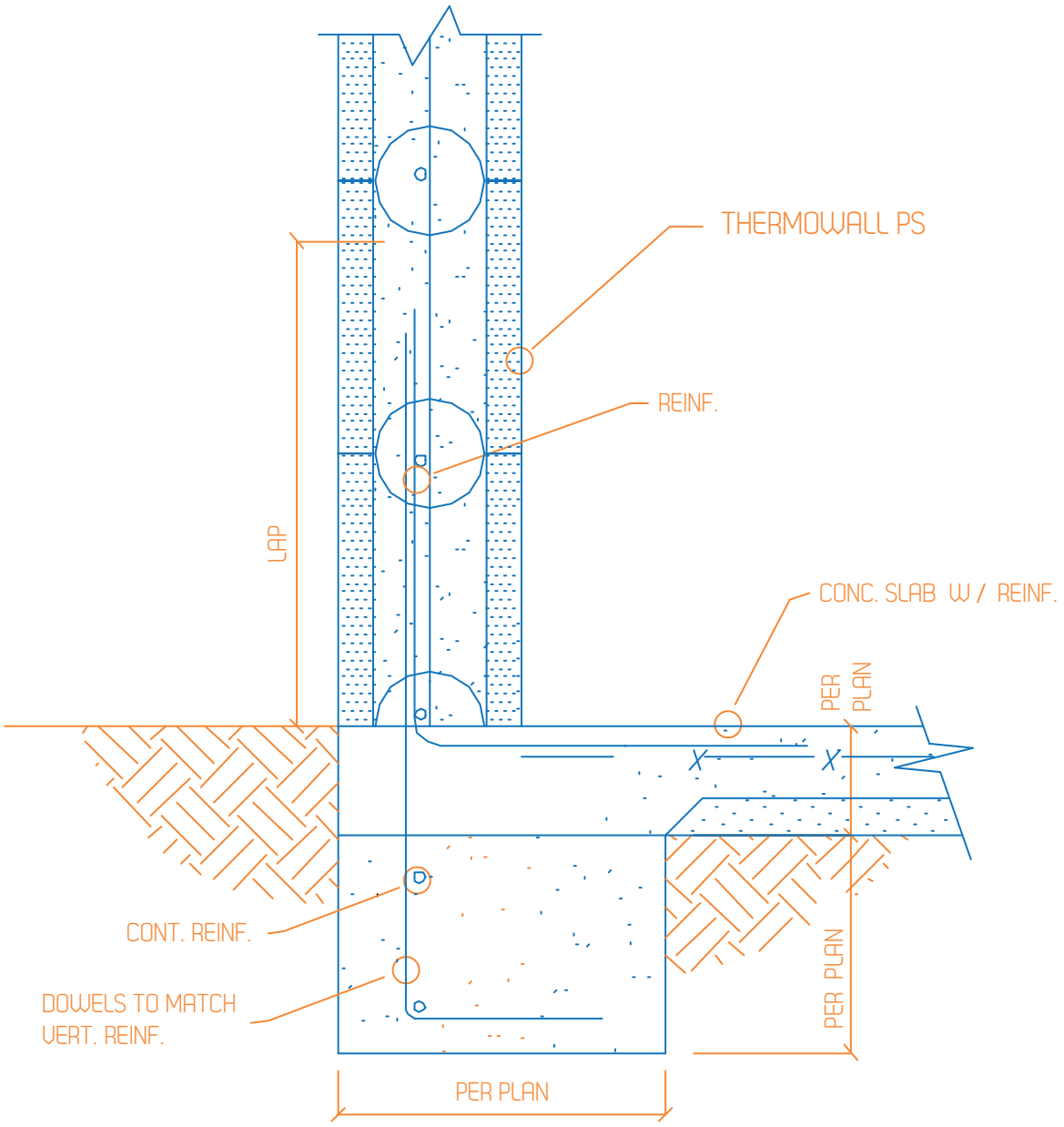


SECTION 3 – TYPICAL DETAILS
3.1 Foundation Details

INTERIOR FOOTING

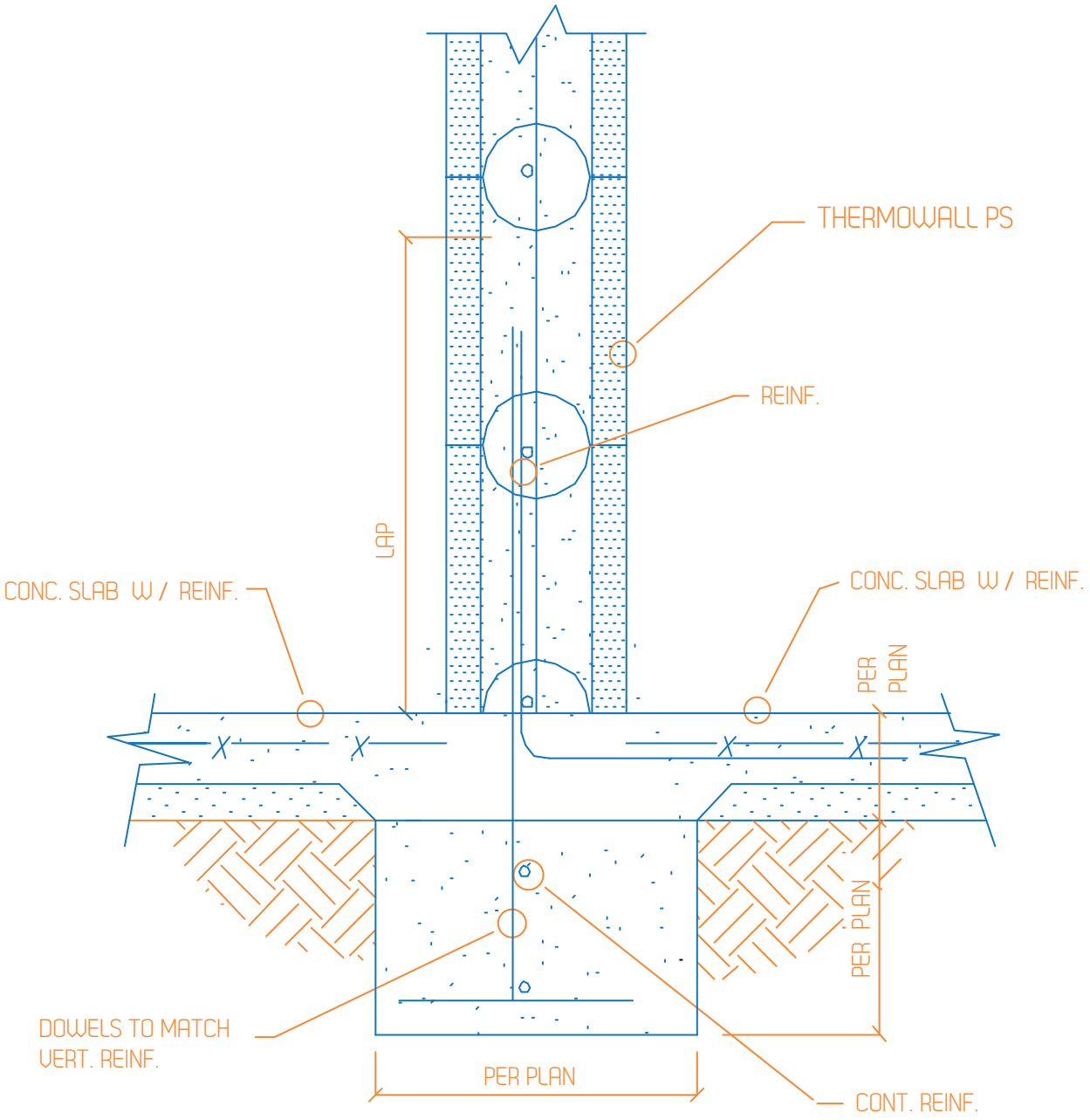


SECTION 3 – TYPICAL DETAILS
3.1 Foundation Details
EDGE FOOTING

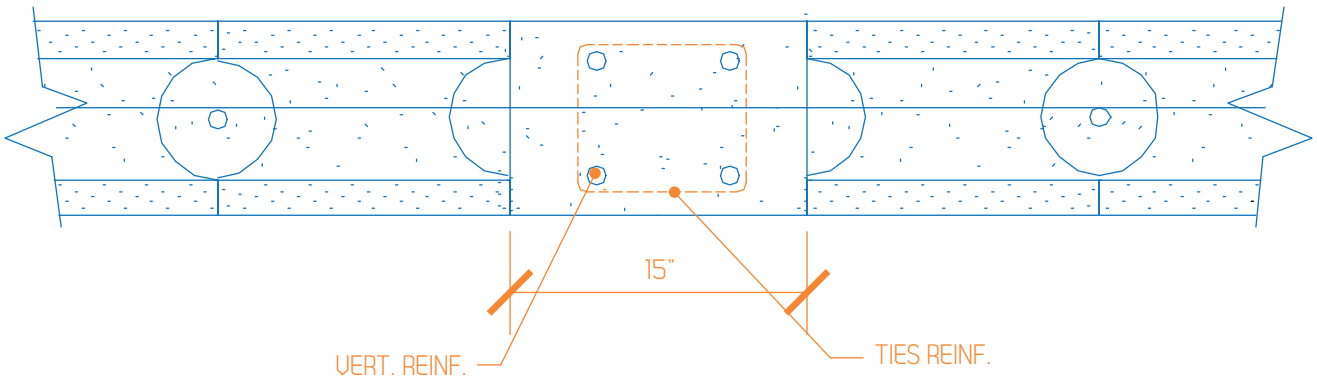


SECTION 3 – TYPICAL DETAILS
3.1 Foundation Details

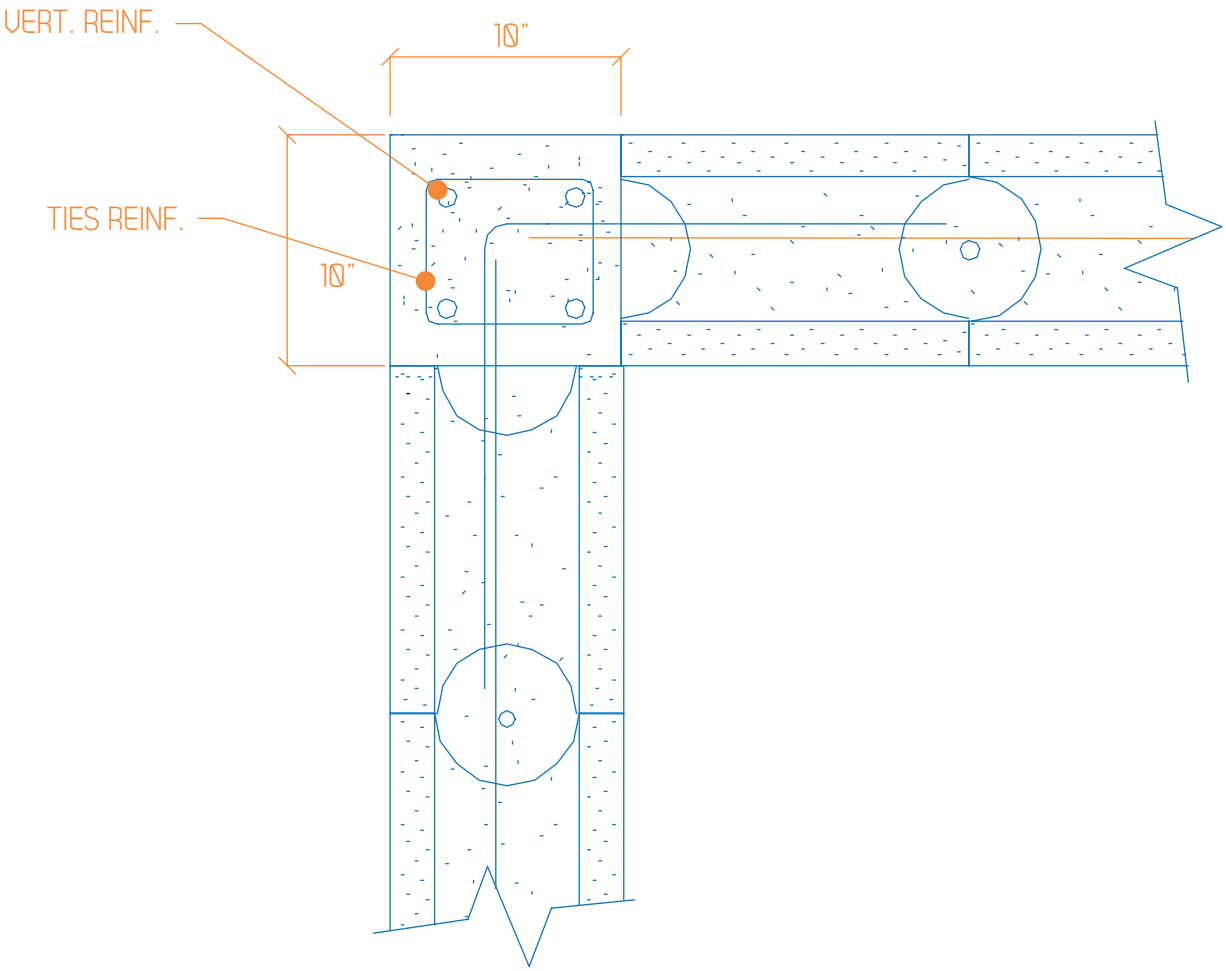
INTERIOR FOOTING WITH WALL RESTING ON SLAB



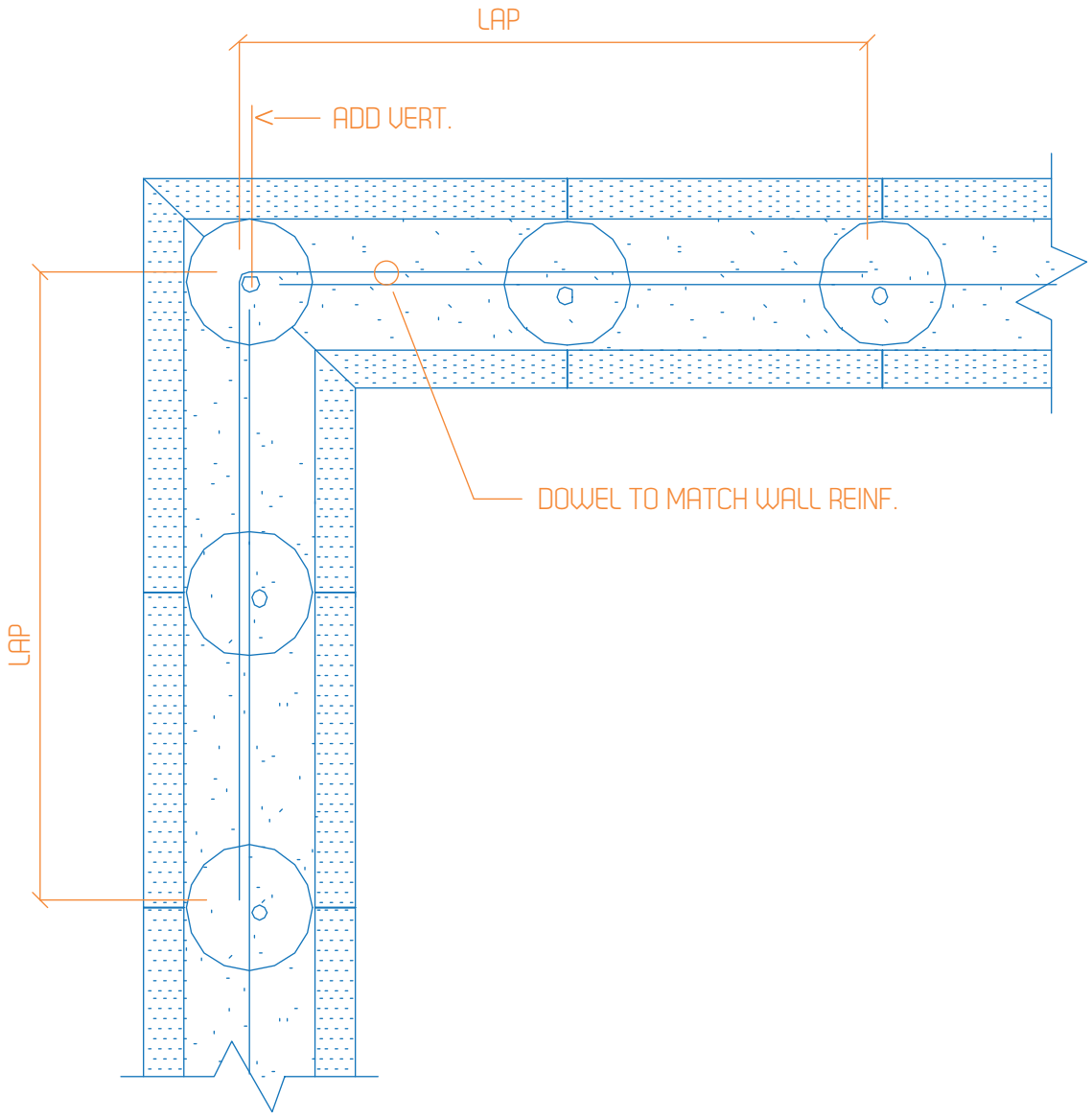
3.2 Pilaster Details
FLUSH PILASTER



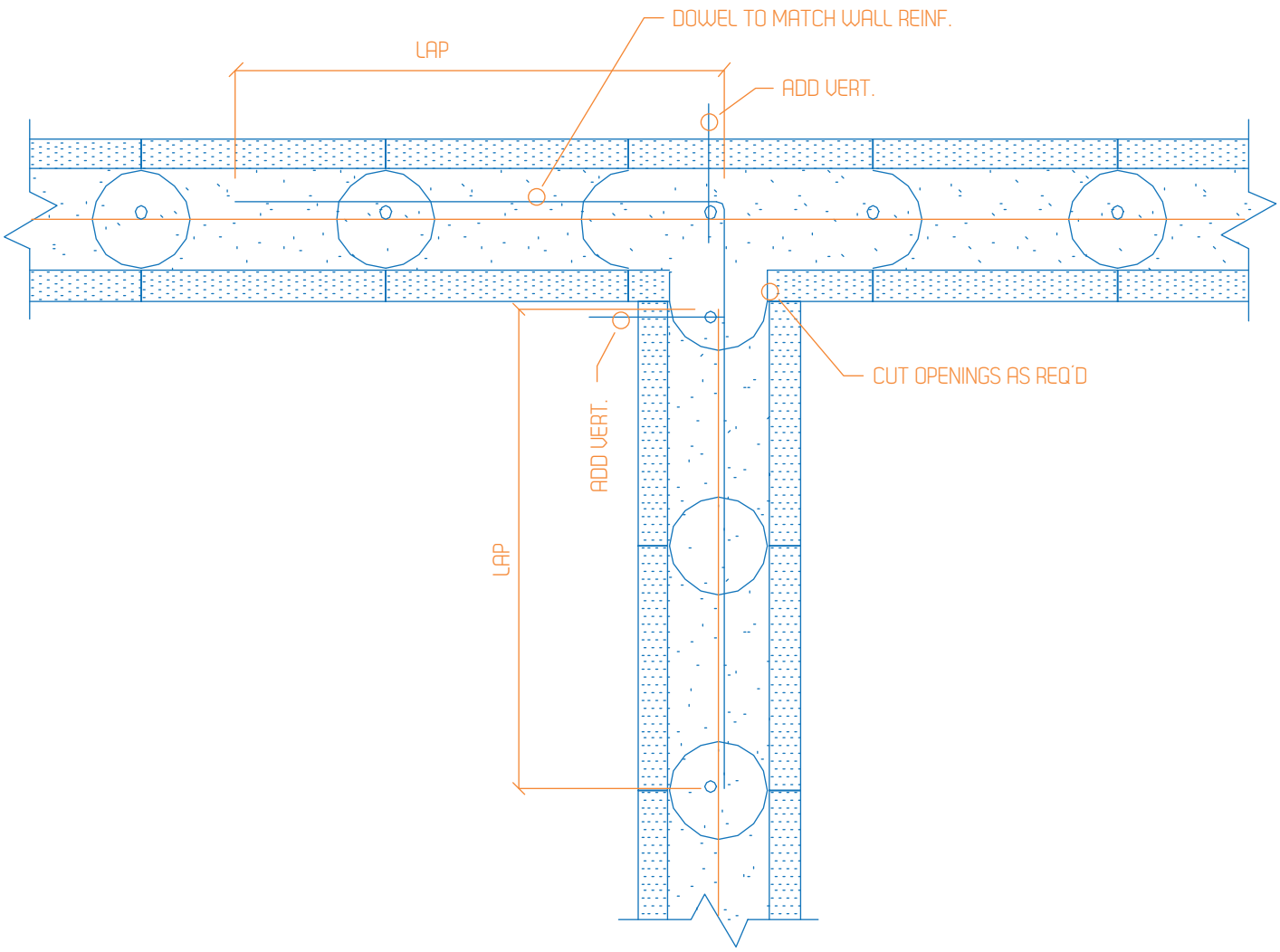
3.2 Pilaster Details
FLUSH PILASTER AT CORNER



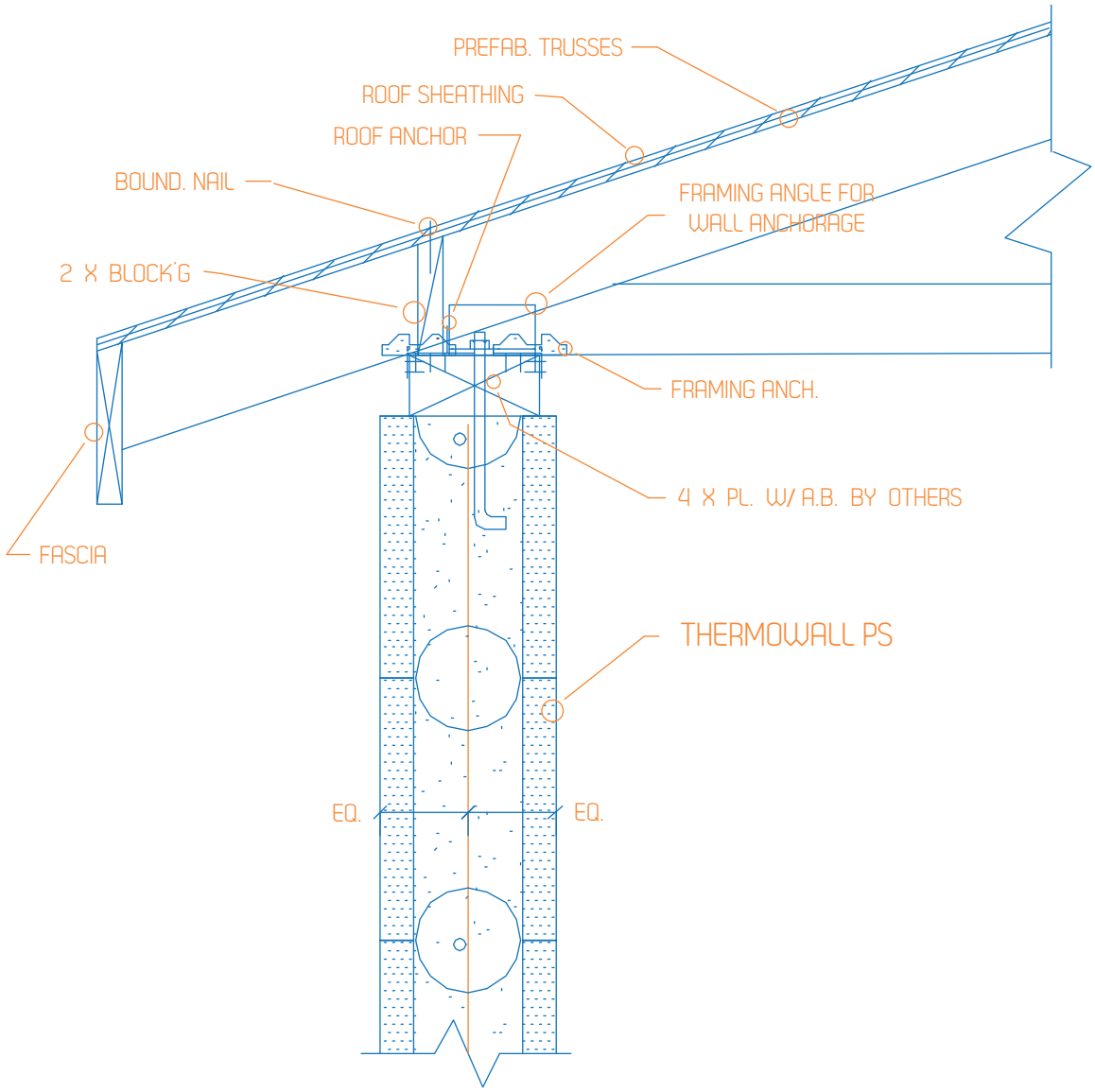
3.3 Wall to Wall Connection
CORNER CONNECTION



3.3 Wall to Wall Connection
INTERIOR WALL TO EXTERIOR WALL CONNECTION

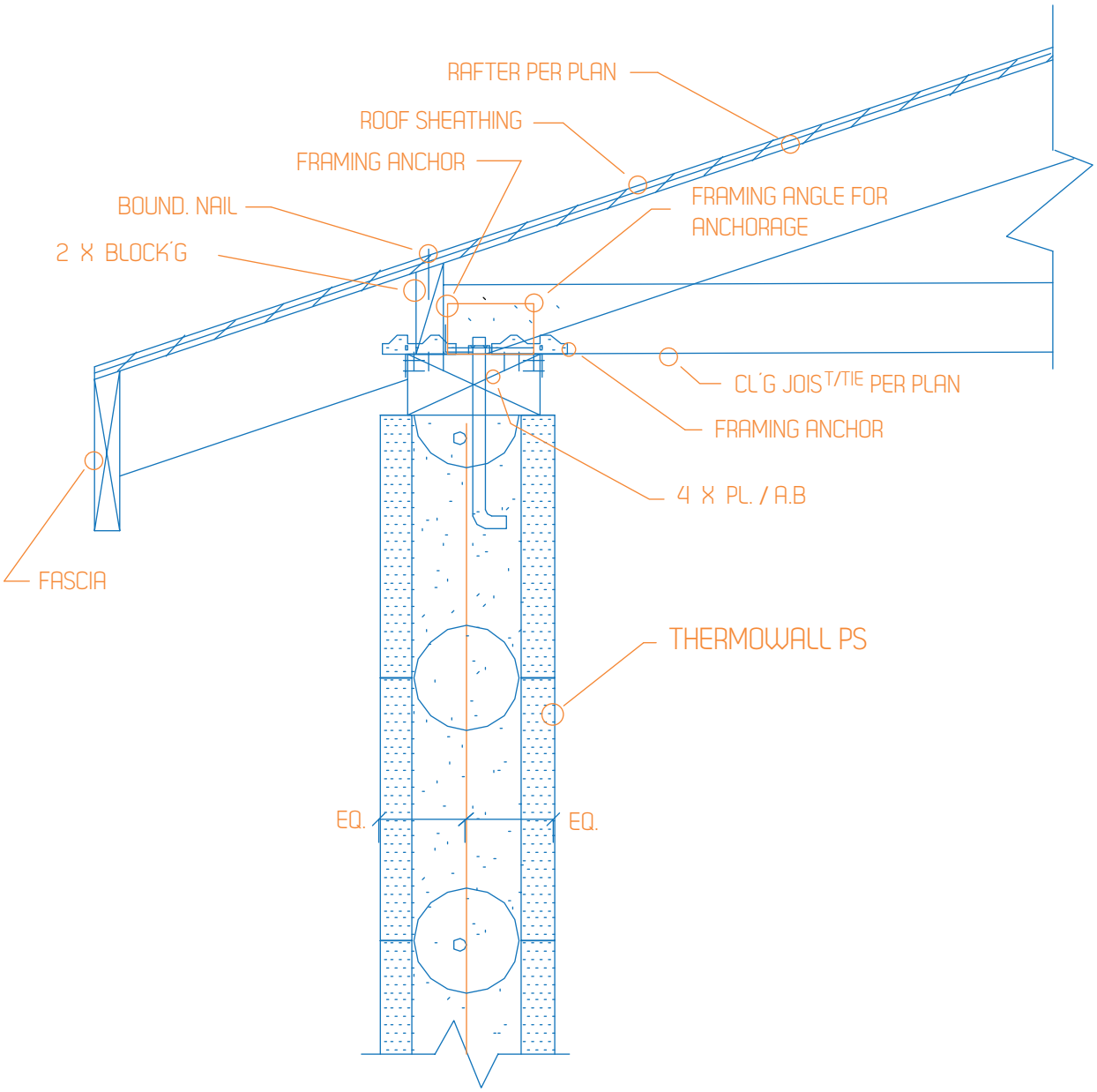


3.4 Roof to Wall Connection Details
ROOF TRUSS / WALL CONNECTION

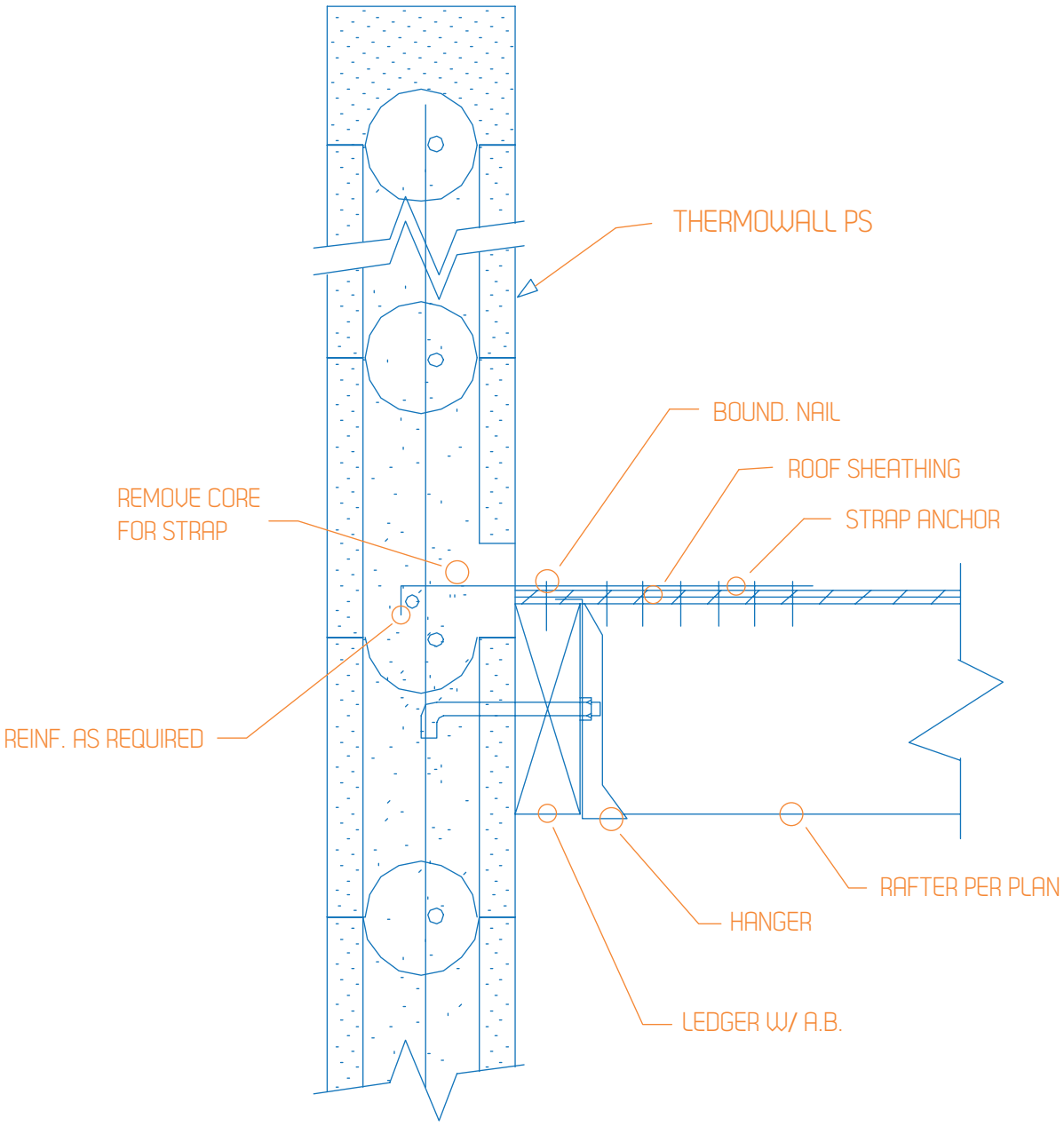


3.4 Roof to Wall Connection Details

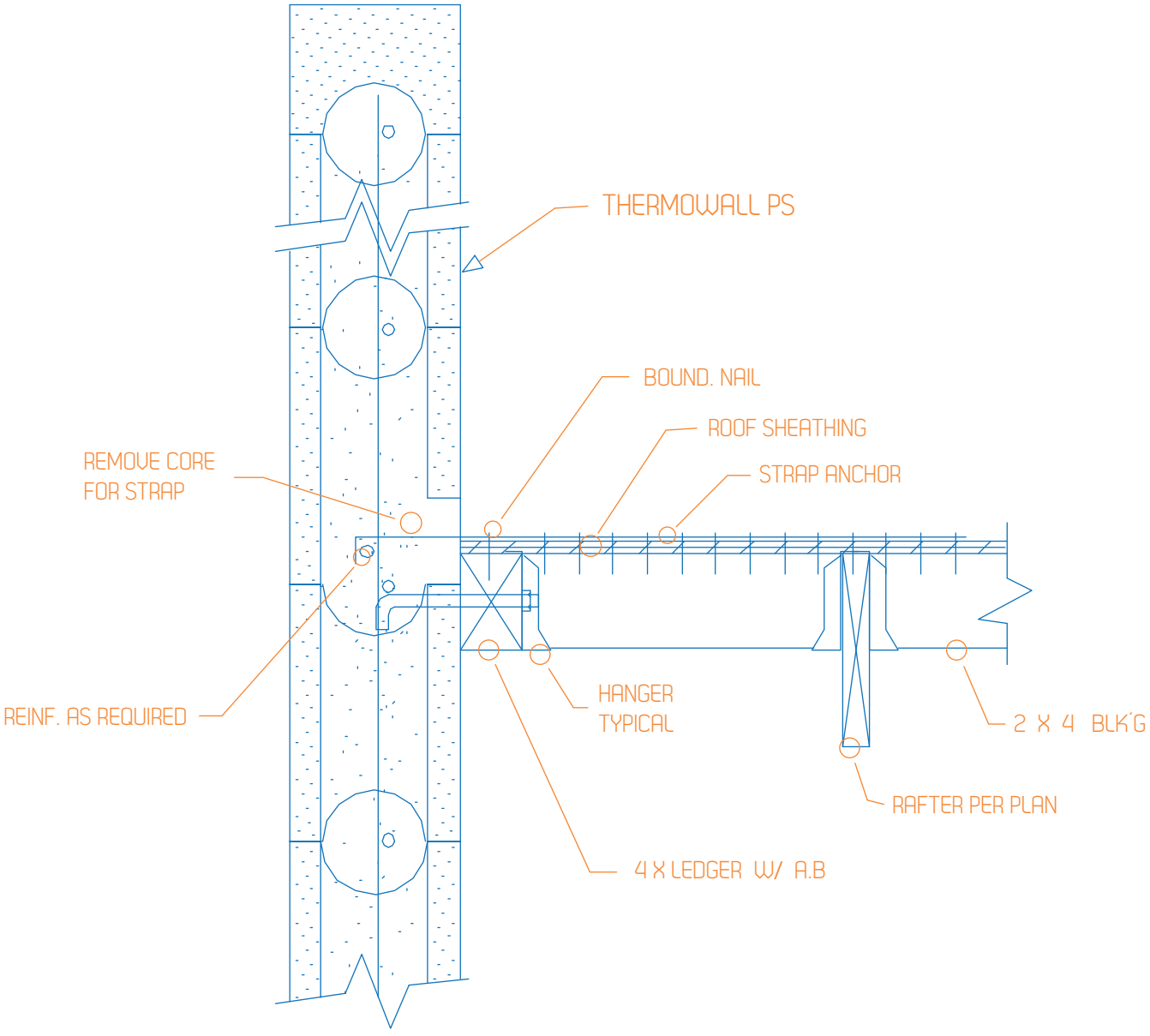
ROOF RAFTER / WALL CONNECTION



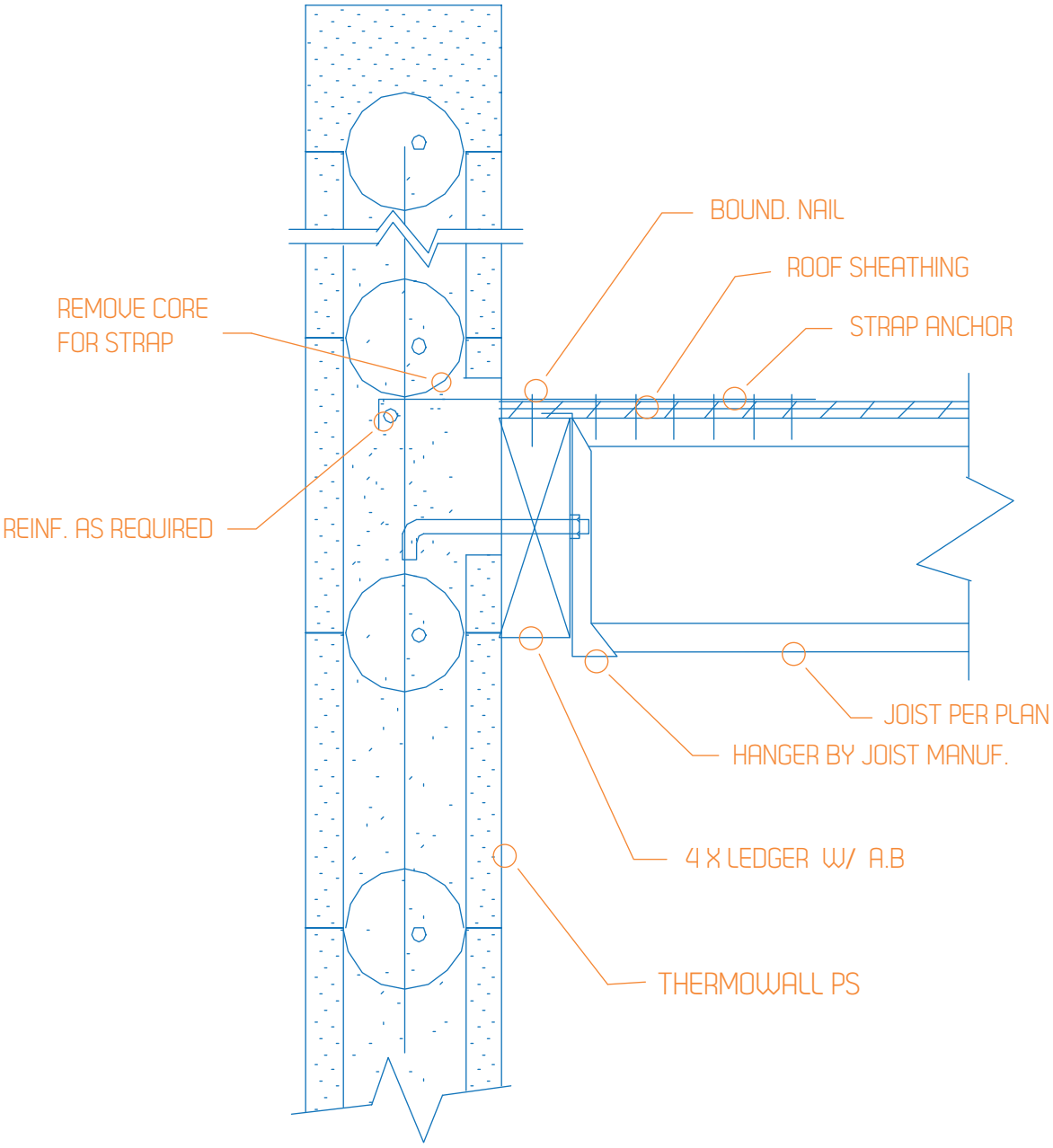
3.4 Roof to Wall Connection Details
WALL WITH PARAPET / ROOF CONNECTION



3.4 Roof to Wall Connection Details
WALL WITH PARAPET TO ROOF CONNECTION, WALL PARALLEL TO JOIST

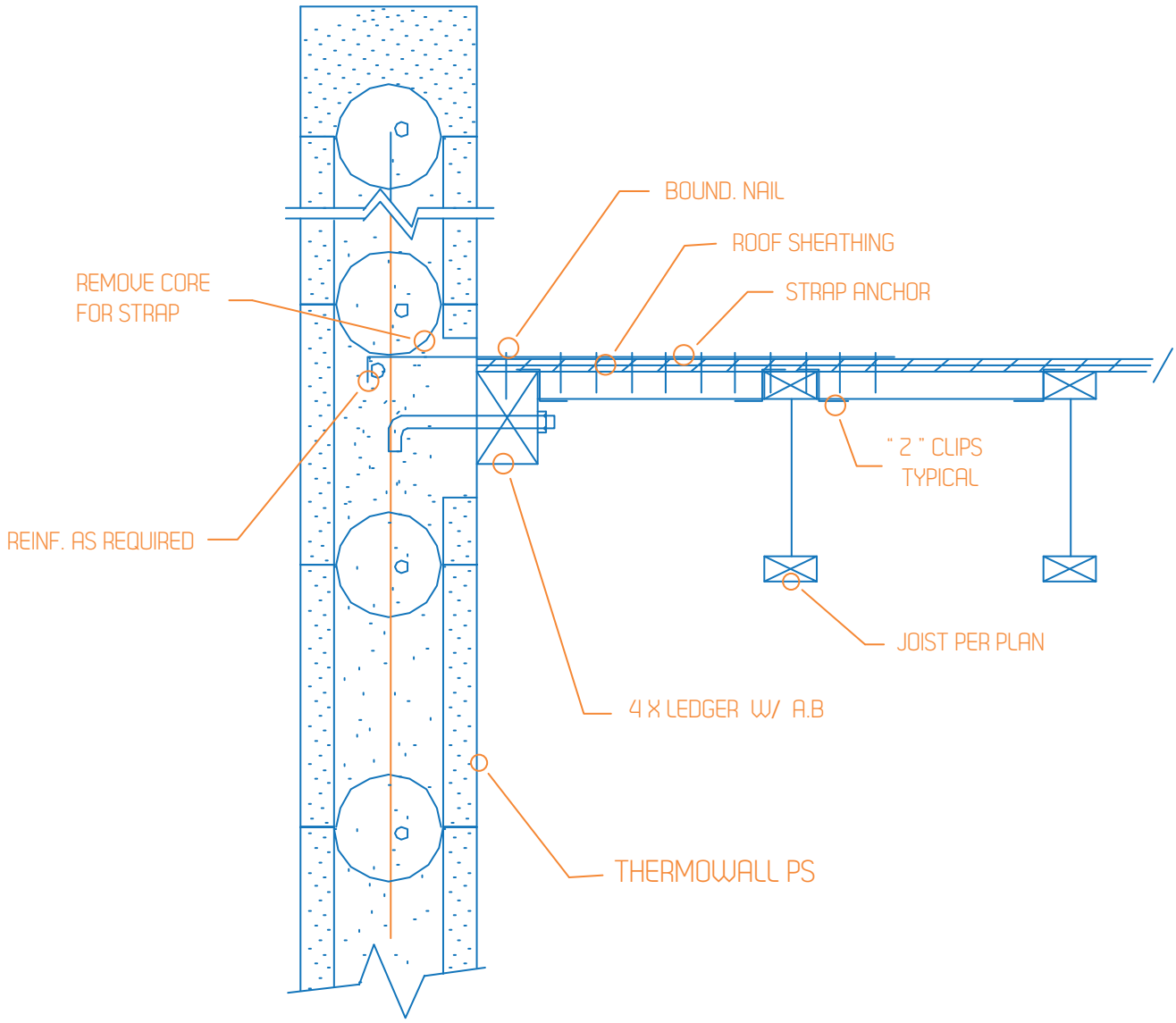


3.4 Roof to Wall Connection Details
WALL WITH PARAPET / ROOF JOIST CONNECTION, JOIST PARALLEL TO WALL

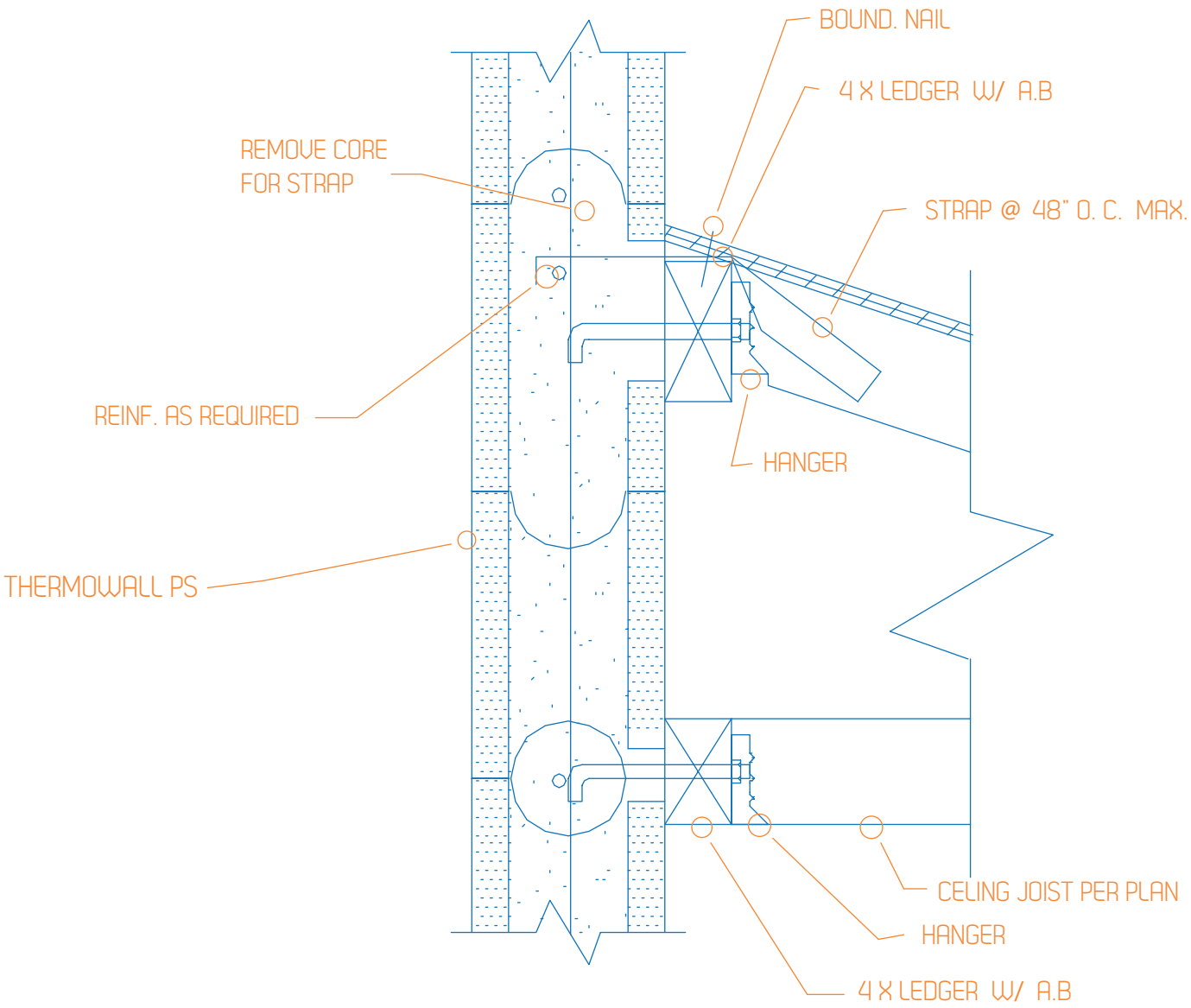


3.4 Roof to Wall Connection Details

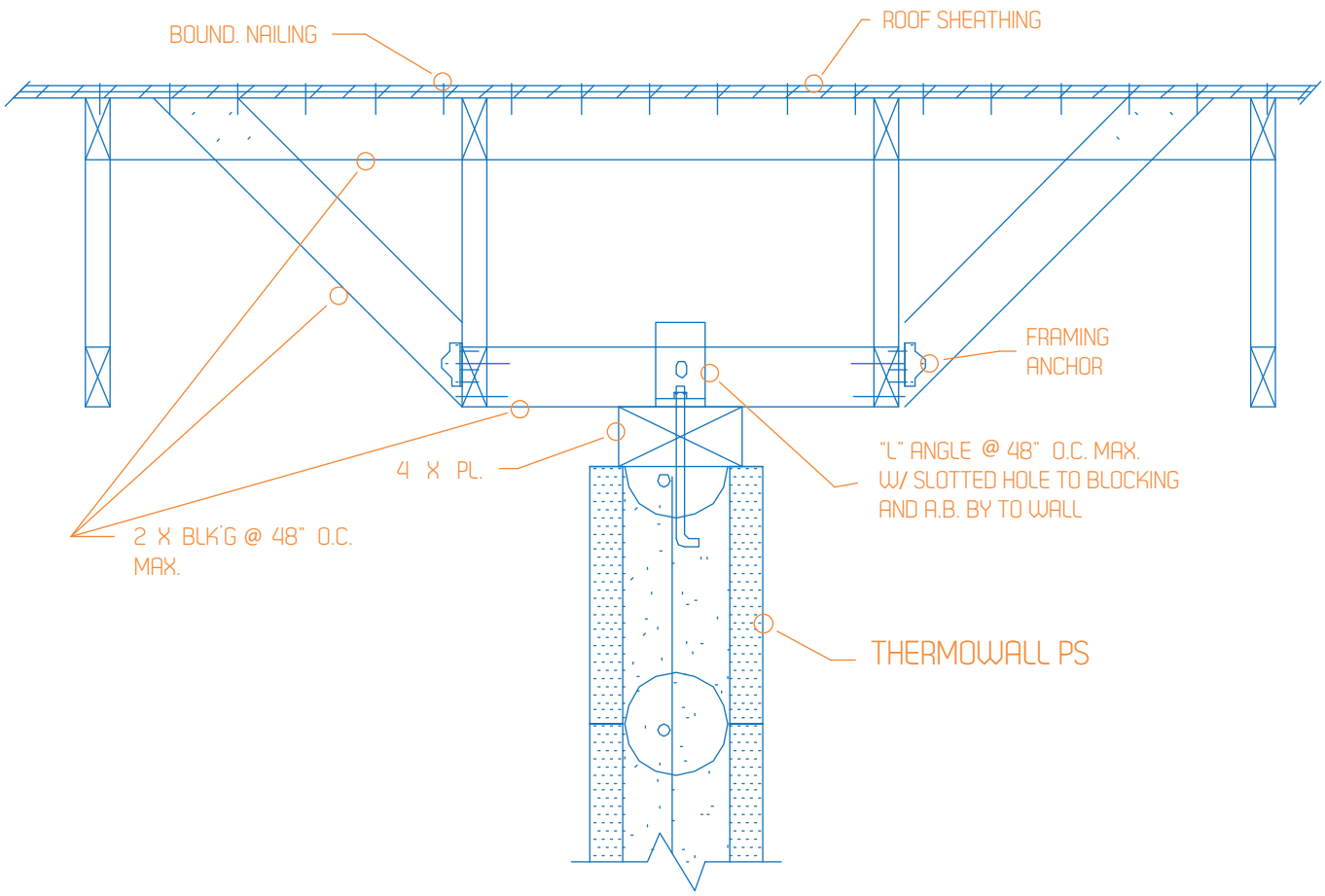
WALL WITH PARAPET / ROOF JOIST CONNECTION, PRE-FAB JOIST PARALLEL TO WALL



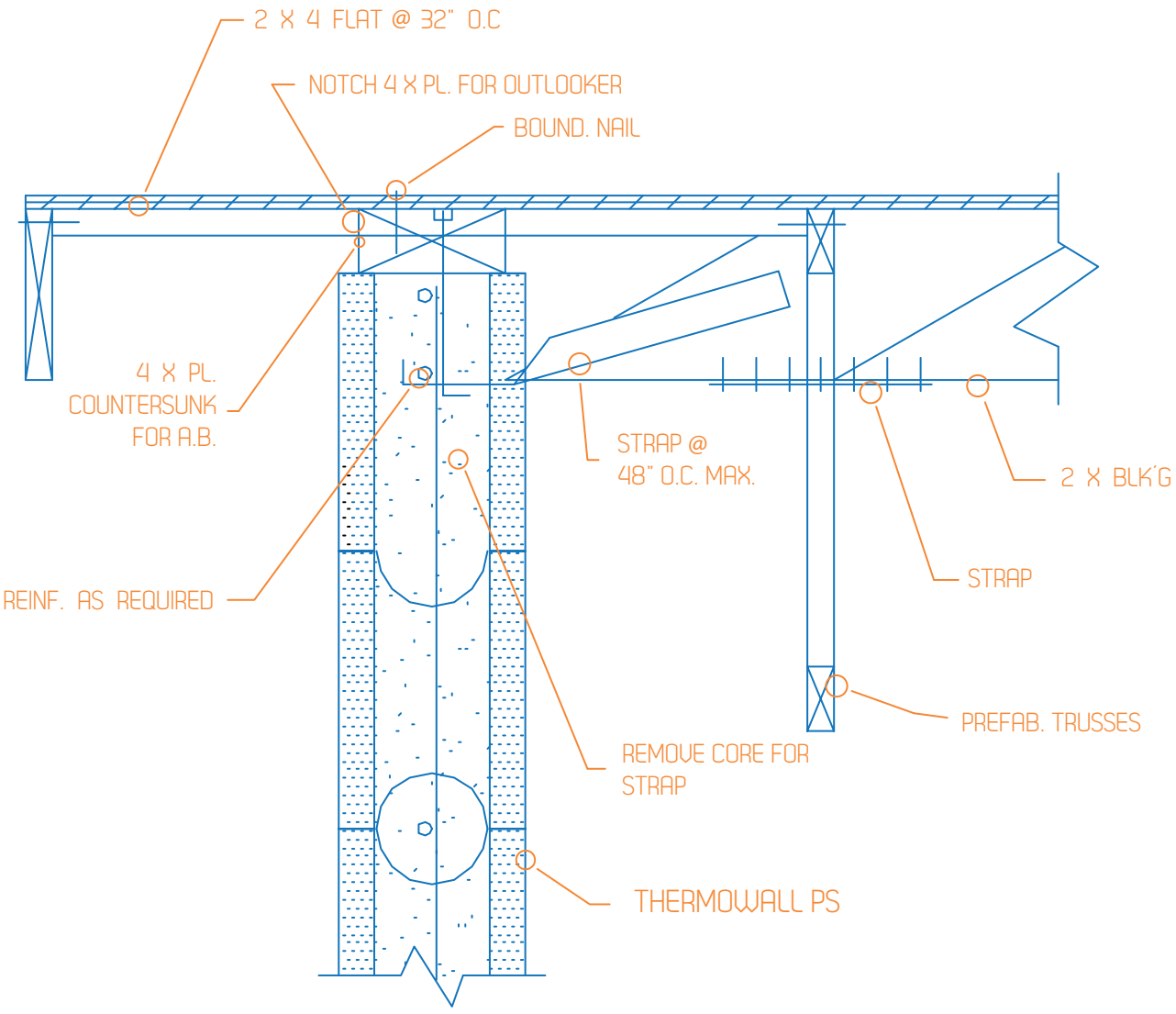
3.4 Roof to Wall Connection Details
ROOF TO WALL CONNECTION



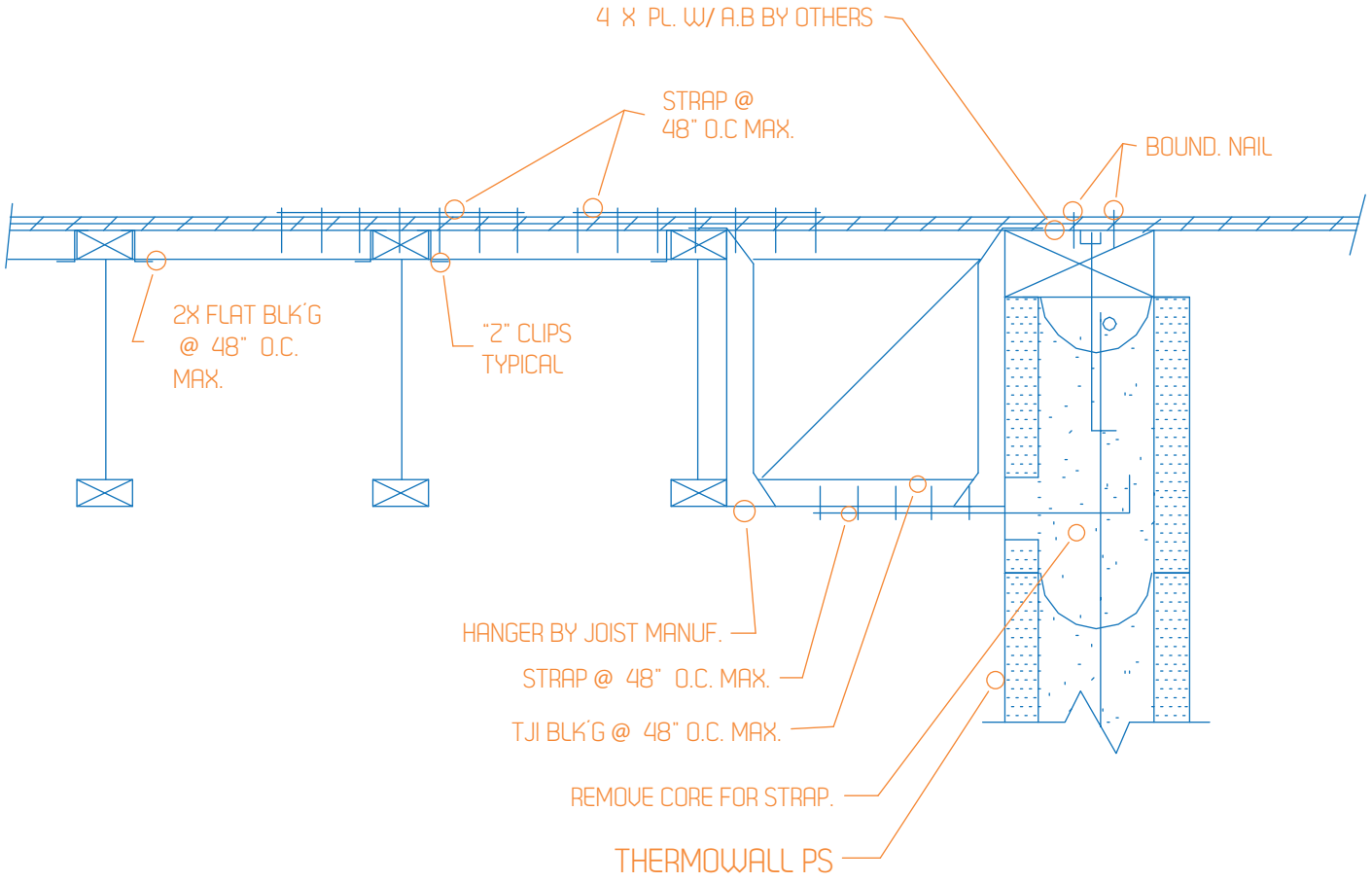
3.4 Roof to Wall Connection Details
INTERIOR NON - BEARING WALL TO ROOF CONNECTION



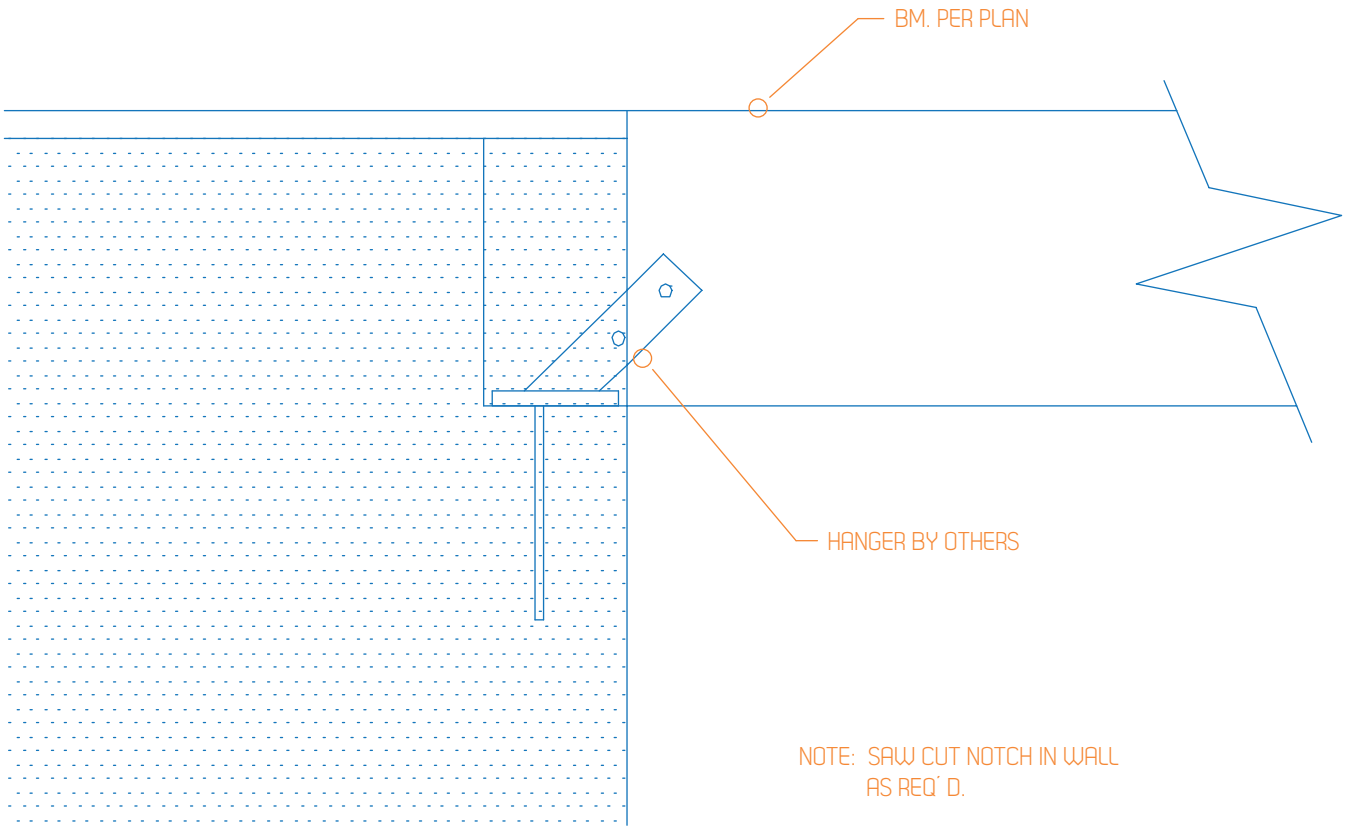
3.4 Roof to Wall Connection Details
GABLE END WALL TO ROOF CONNECTION



3.4 Roof to Wall Connection Details
INTERIOR NON - BEARING WALL TO ROOF CONNECTION

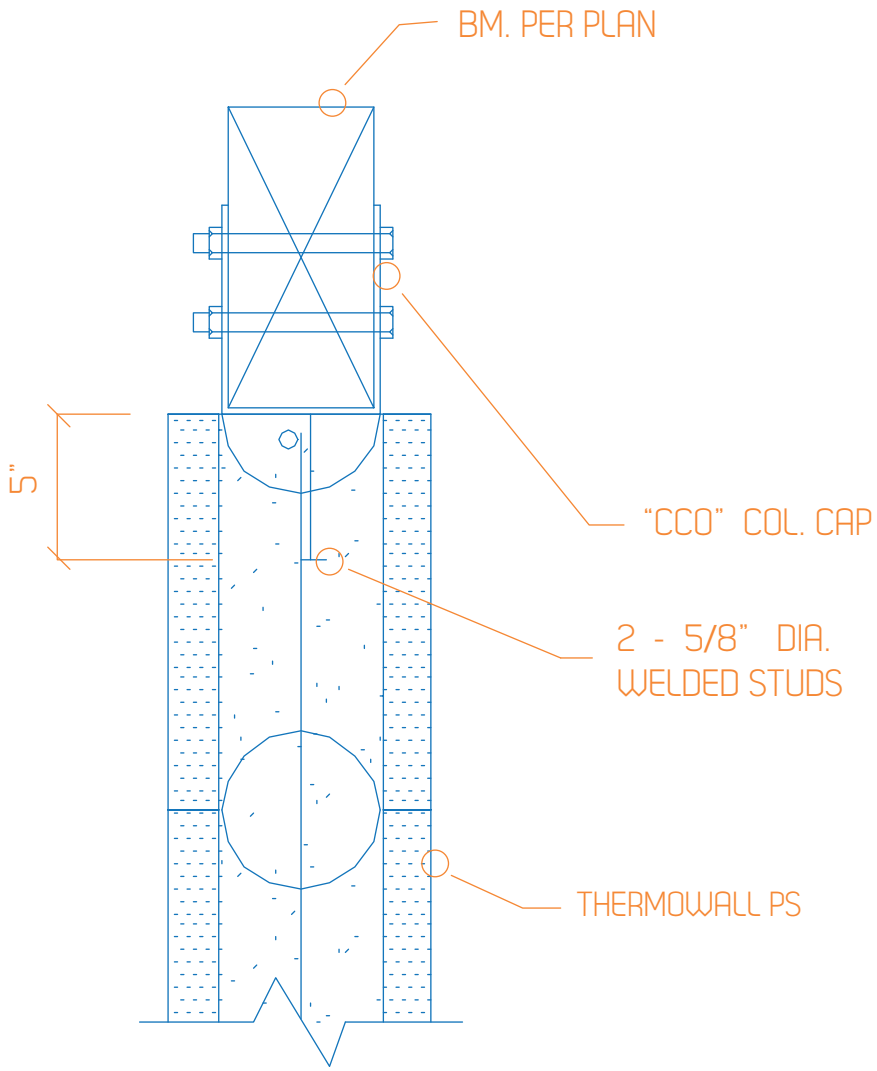


3.5 Wall to Wall Beam Connection
BEAM / WALL CONNECTION

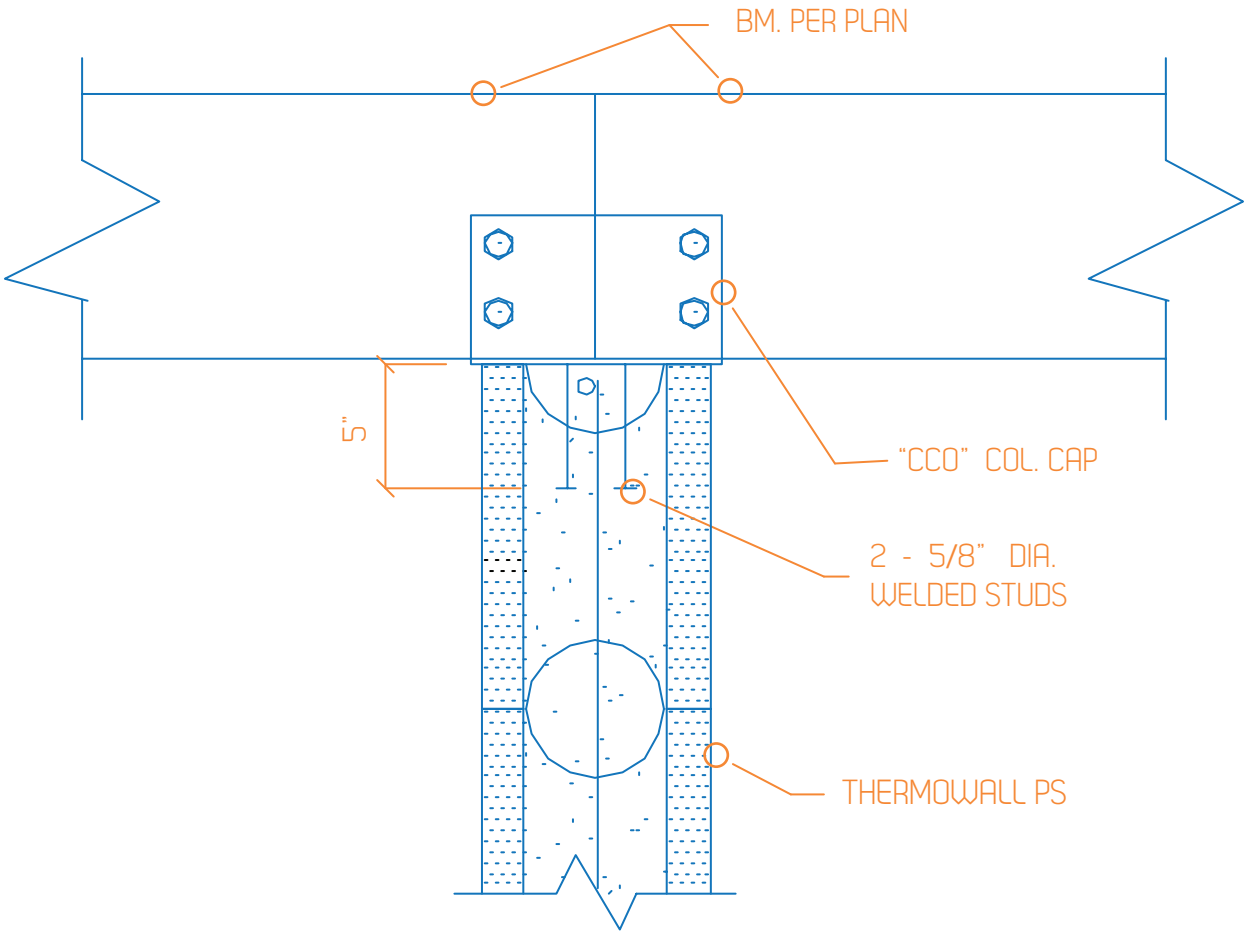


NOTE: SAW CUT NOTCH IN WALL
AS REQ'D.

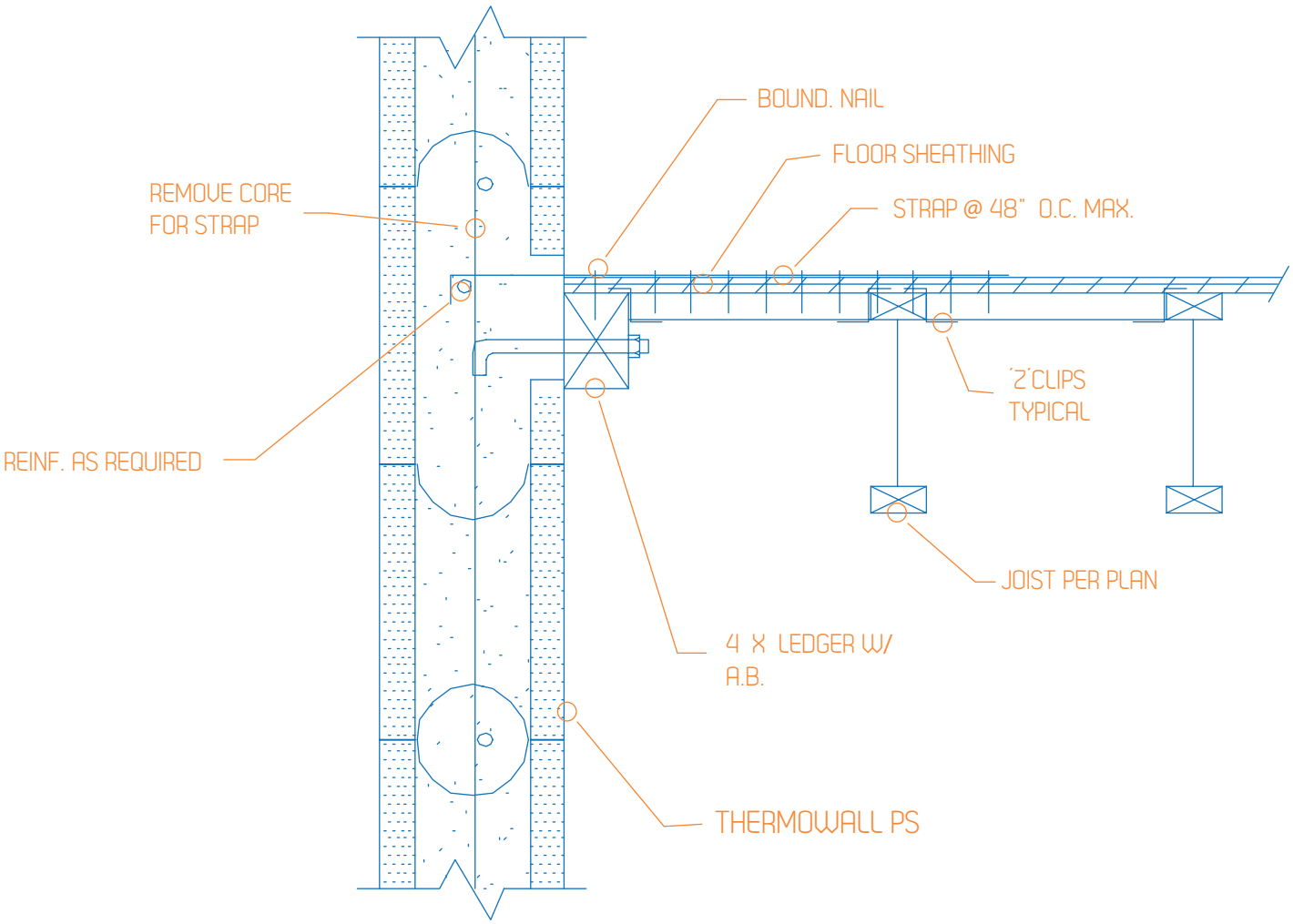
3.5 Wall to Wall Beam Connection
WOOD BEAM TO WALL CONNECTION



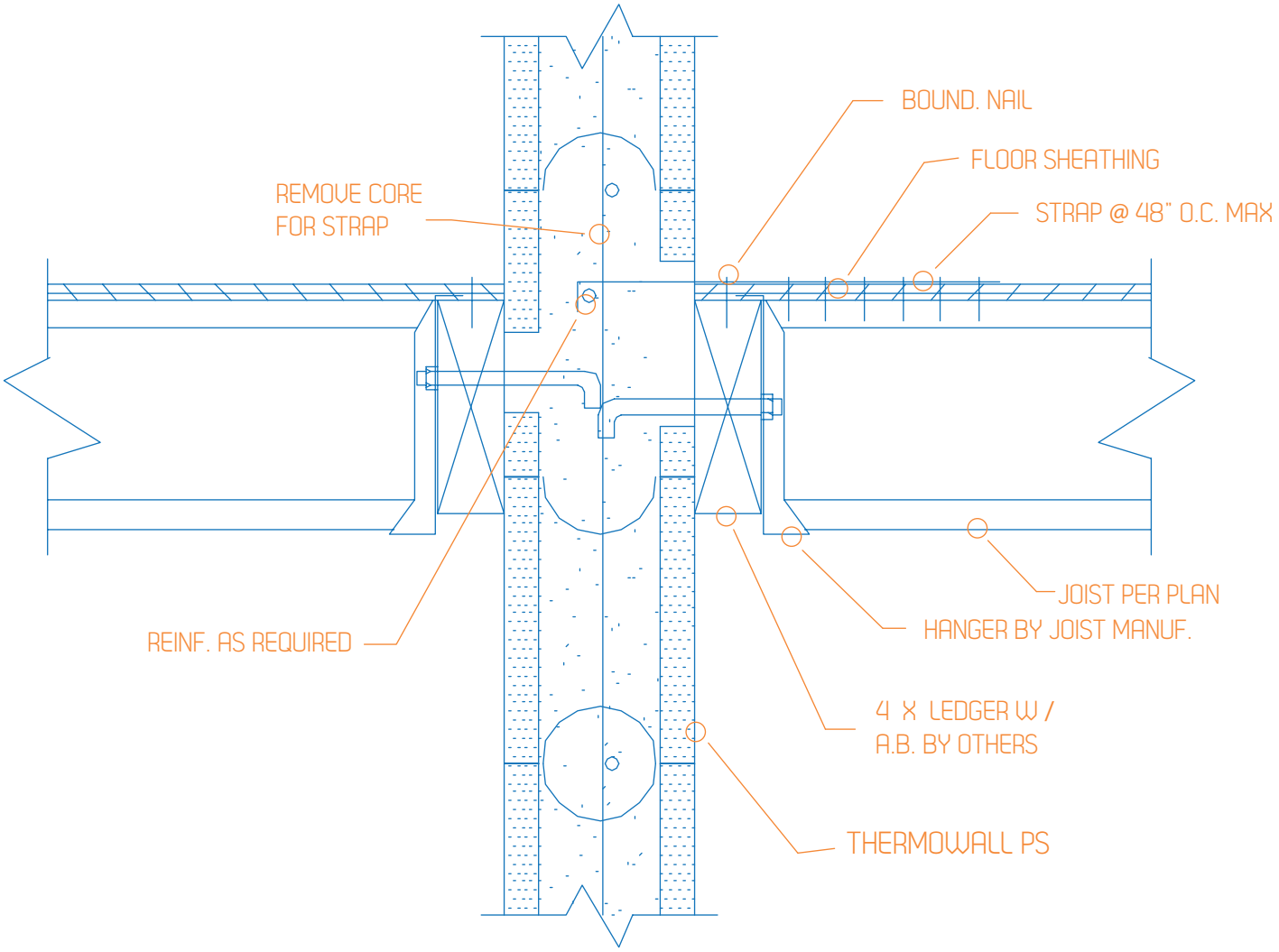
3.5 Wall to Wall Beam Connection
WOOD BEAM TO WALL CONNECTION



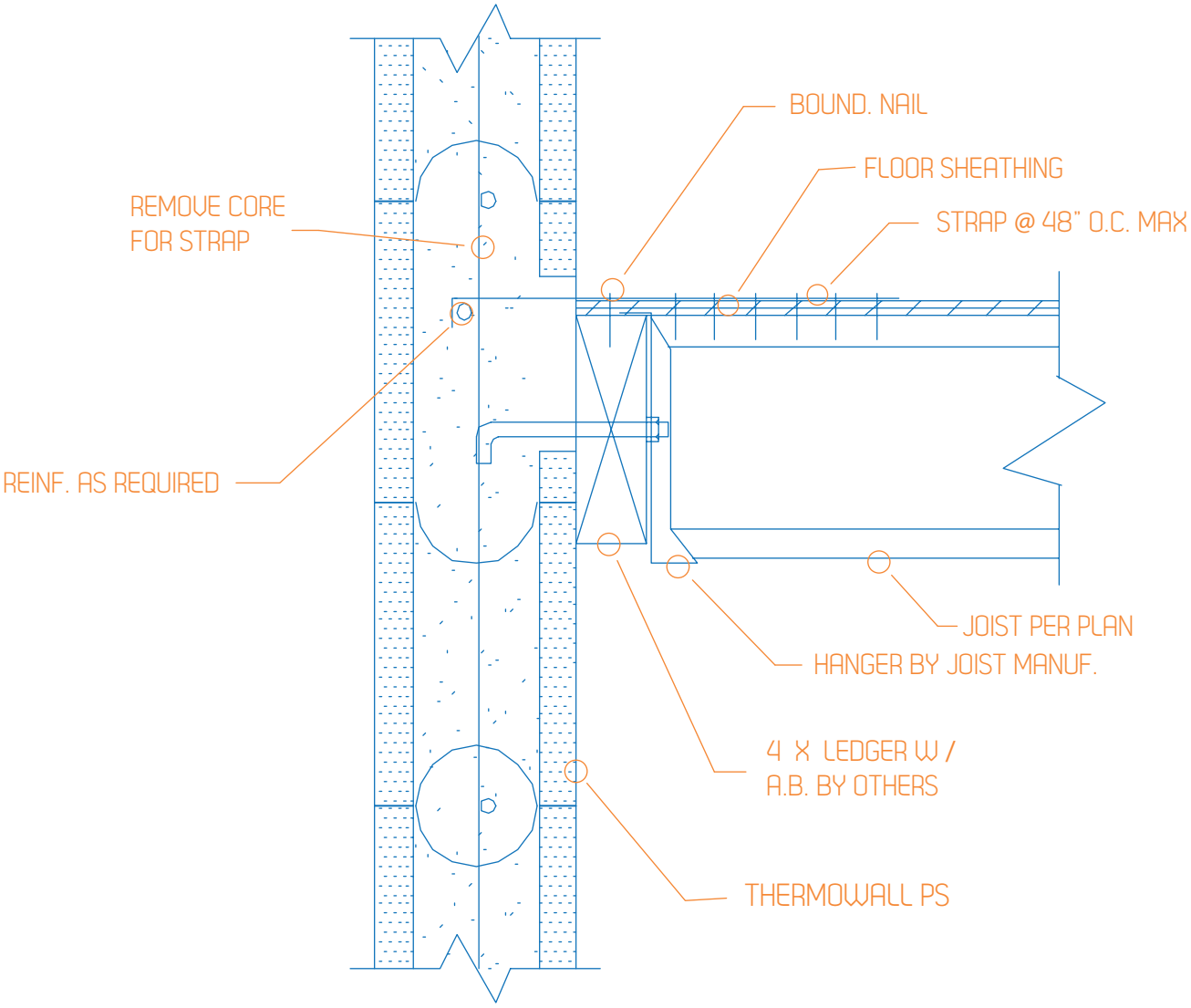
3.6 Floor to Wall Connection
WALL TO FLOOR CONNECTION, WALL PARALLEL TO JOIST



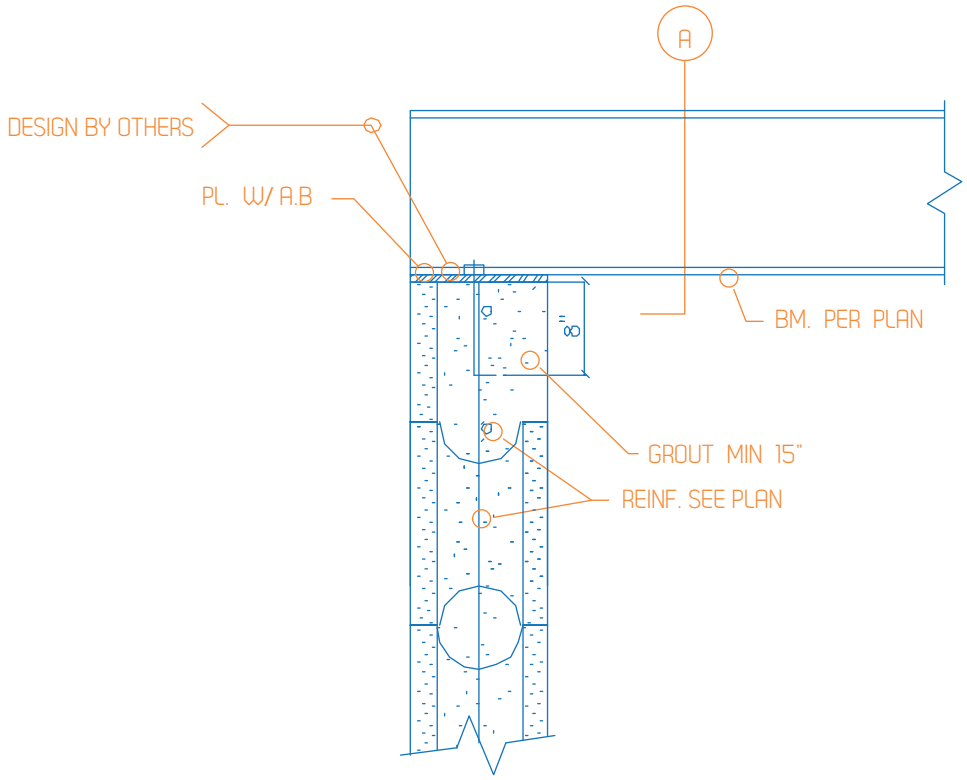
3.6 Floor to Wall Connection
INTERIOR WALL / JOIST CONNECTION, WALL PERPENDICULAR TO JOIST



3.6 Floor to Wall Connection
WALL TO FLOOR JOIST CONNECTION

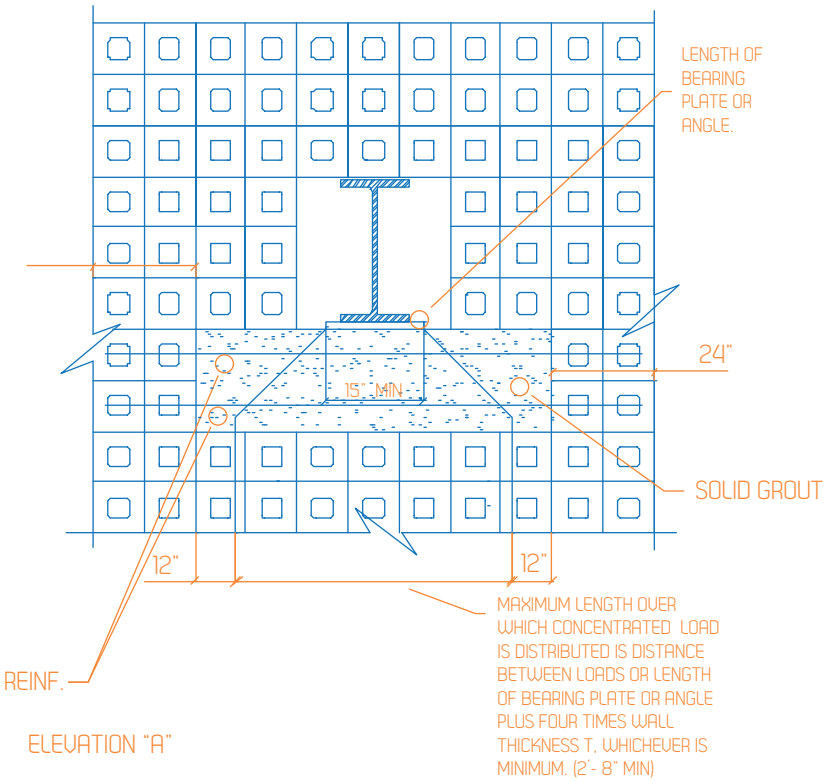


3.7 Steel Beam/Joist to Wall Connection
STEEL BEAM TO WALL CONNECTION



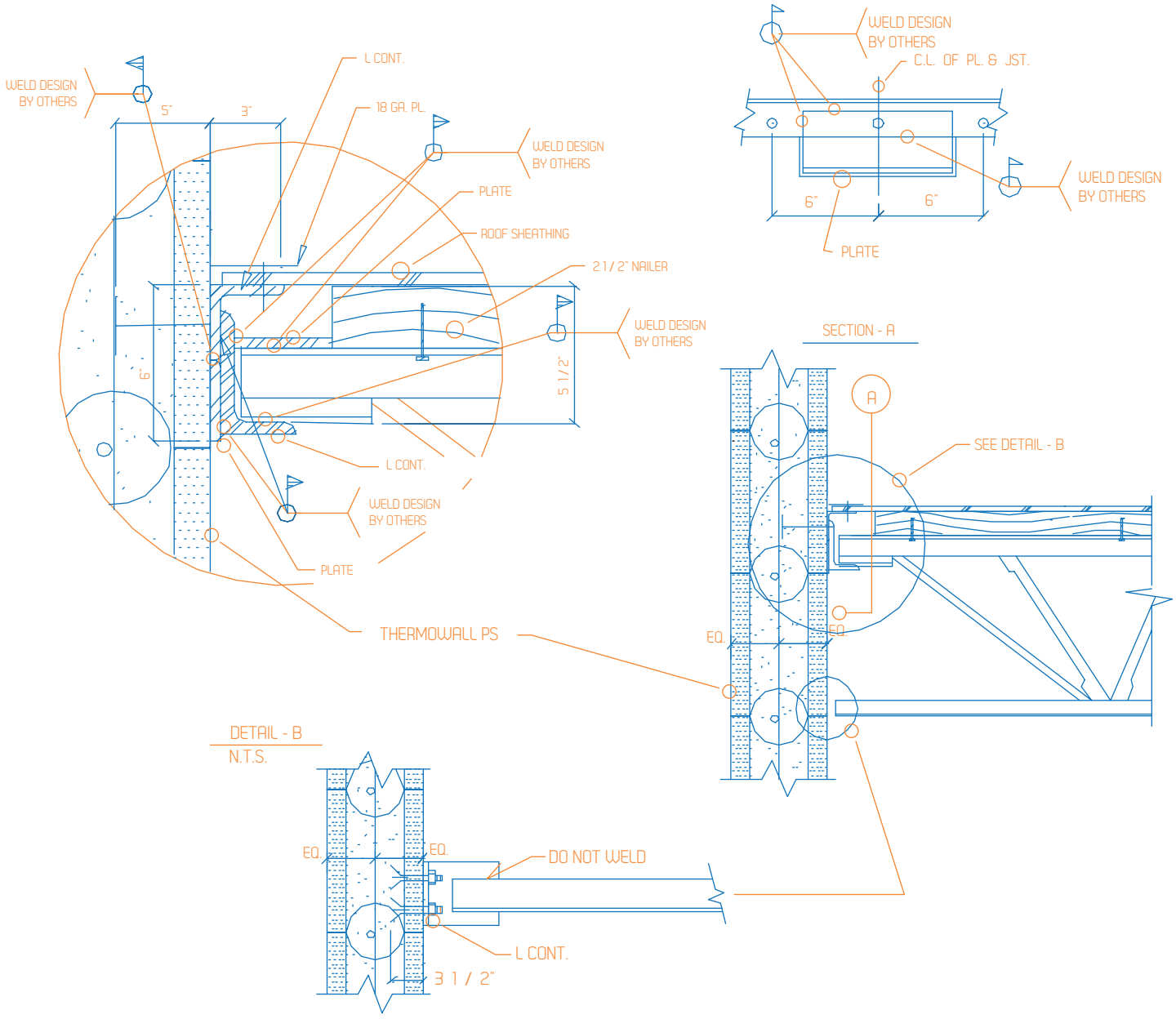
SECTION

F'c OF CONCRETE: 2,500 PSI
F'c OF REINFORCING STEEL: 60,000 PSI

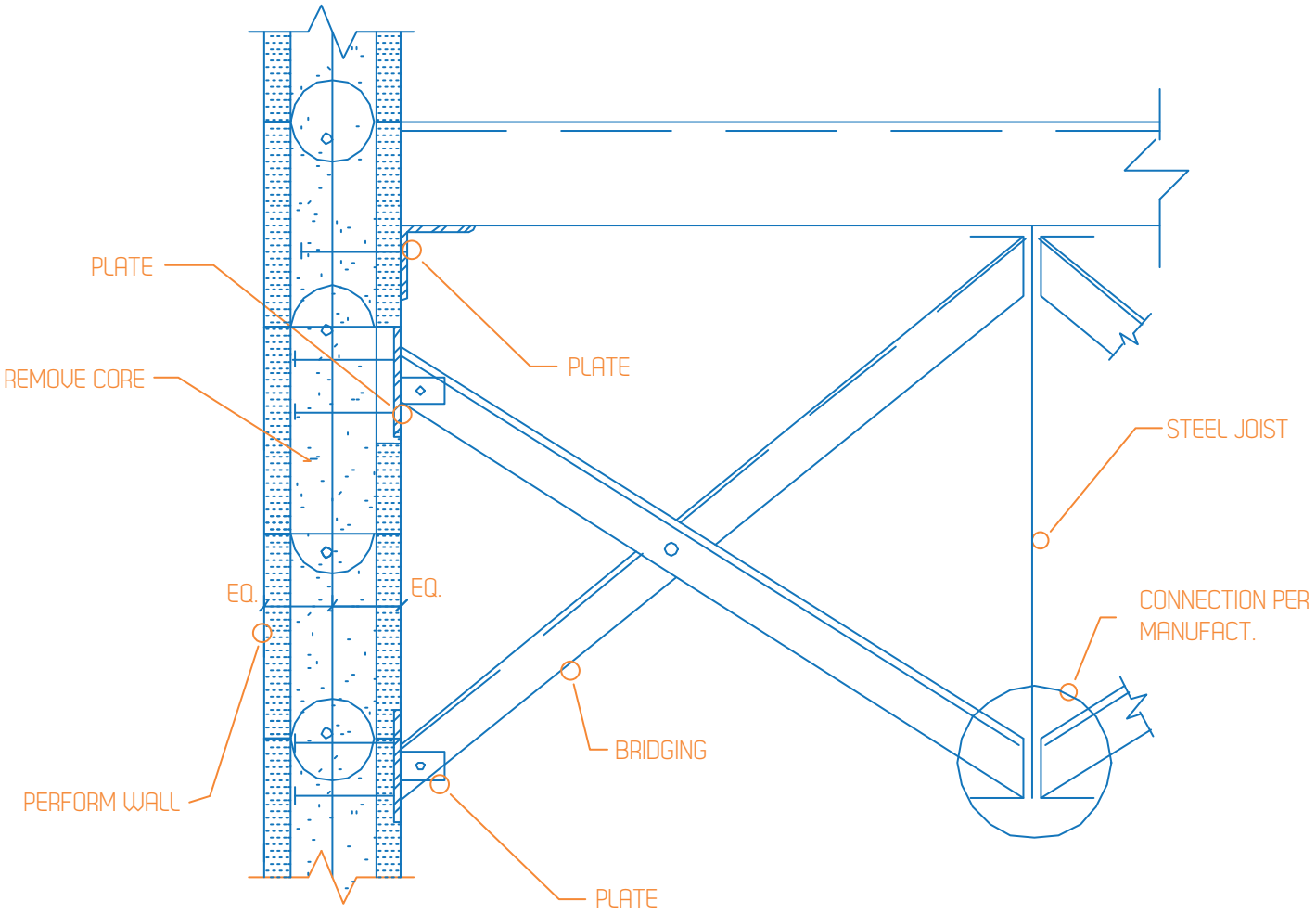


ELEVATION "A"

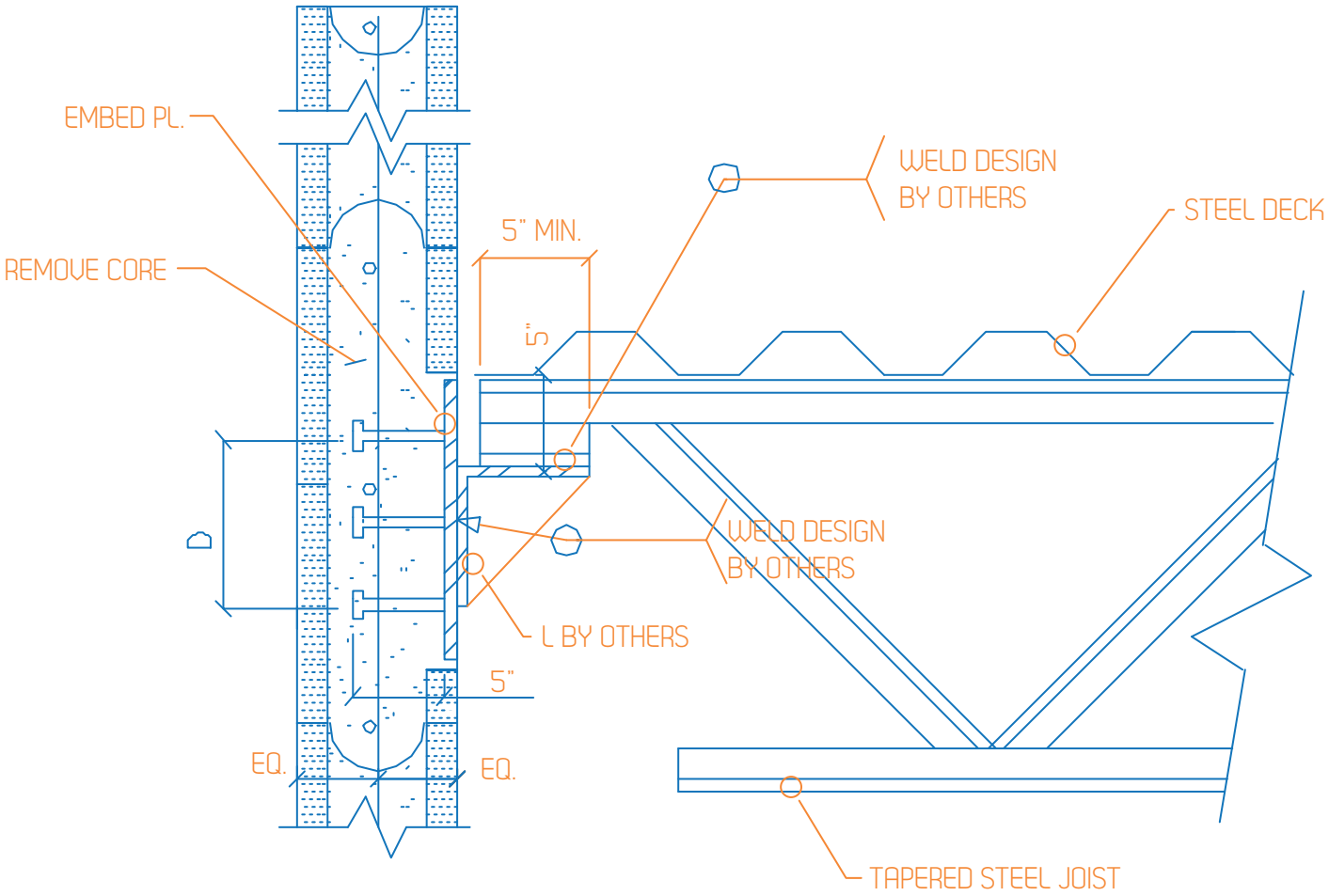
3.7 Steel Beam/Joist to Wall Connection
STEEL TRUSS TO WALL CONNECTION



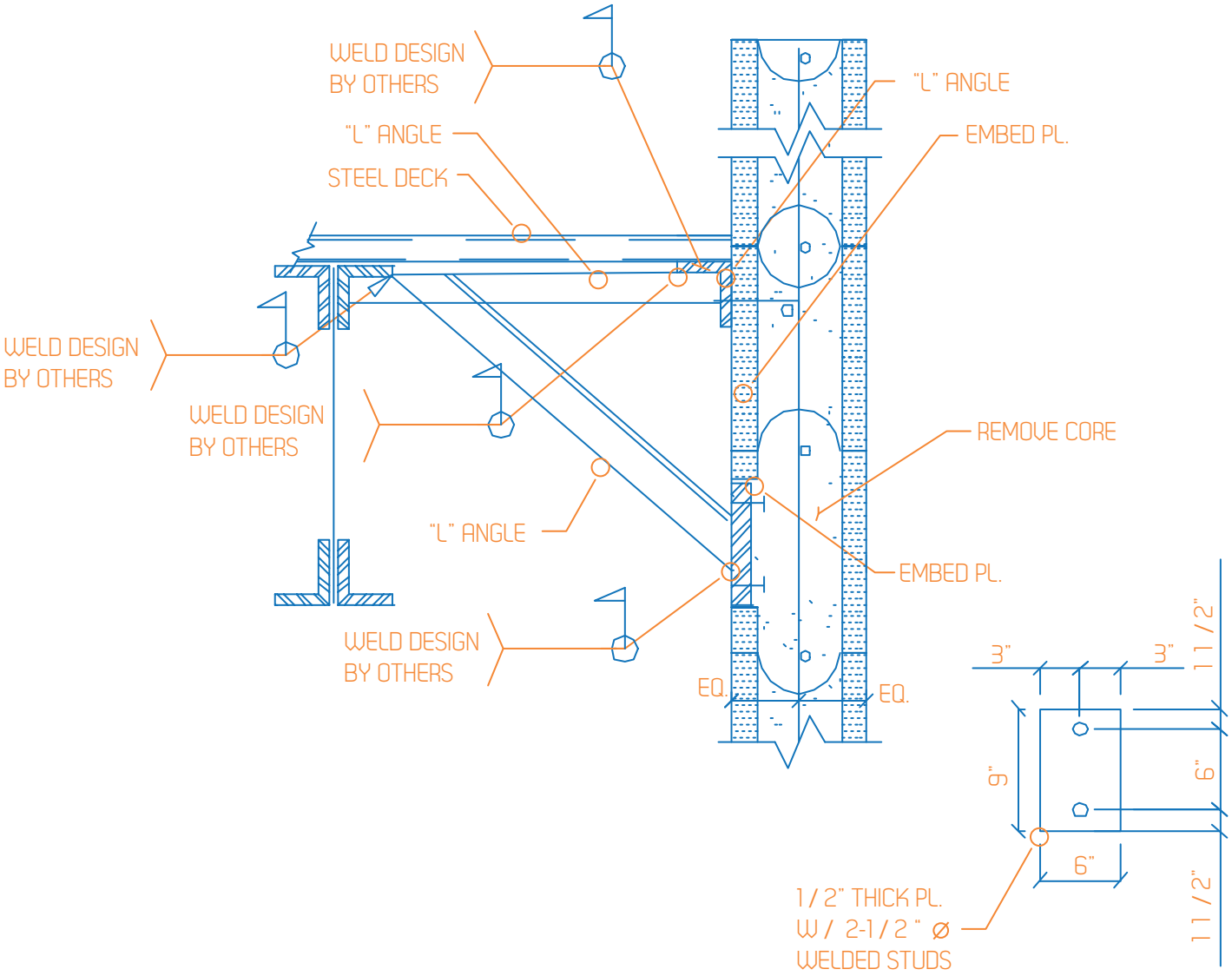
3.7 Steel Beam/Joist to Wall Connection
STEEL BRACING / BRIDGING TO WALL



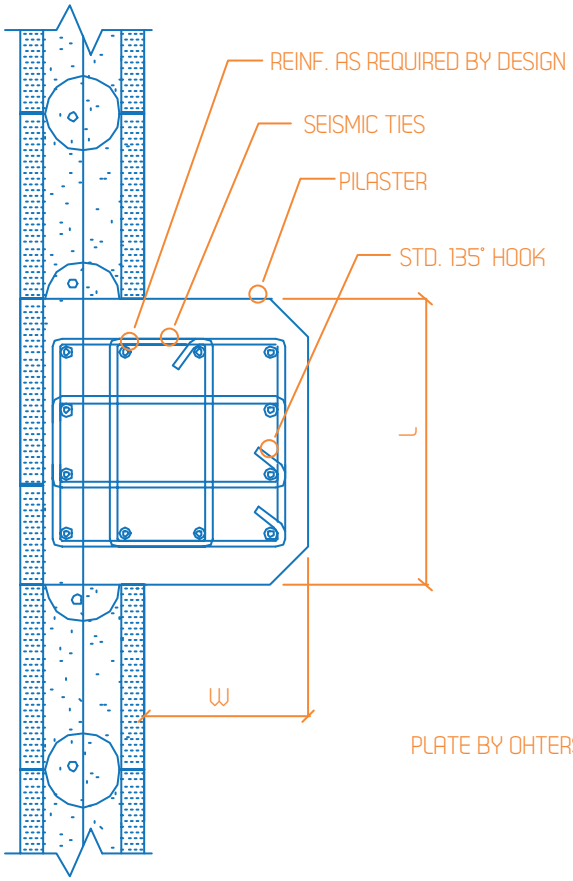
3.7 Steel Beam/Joist to Wall Connection
STEEL JOIST TO WALL



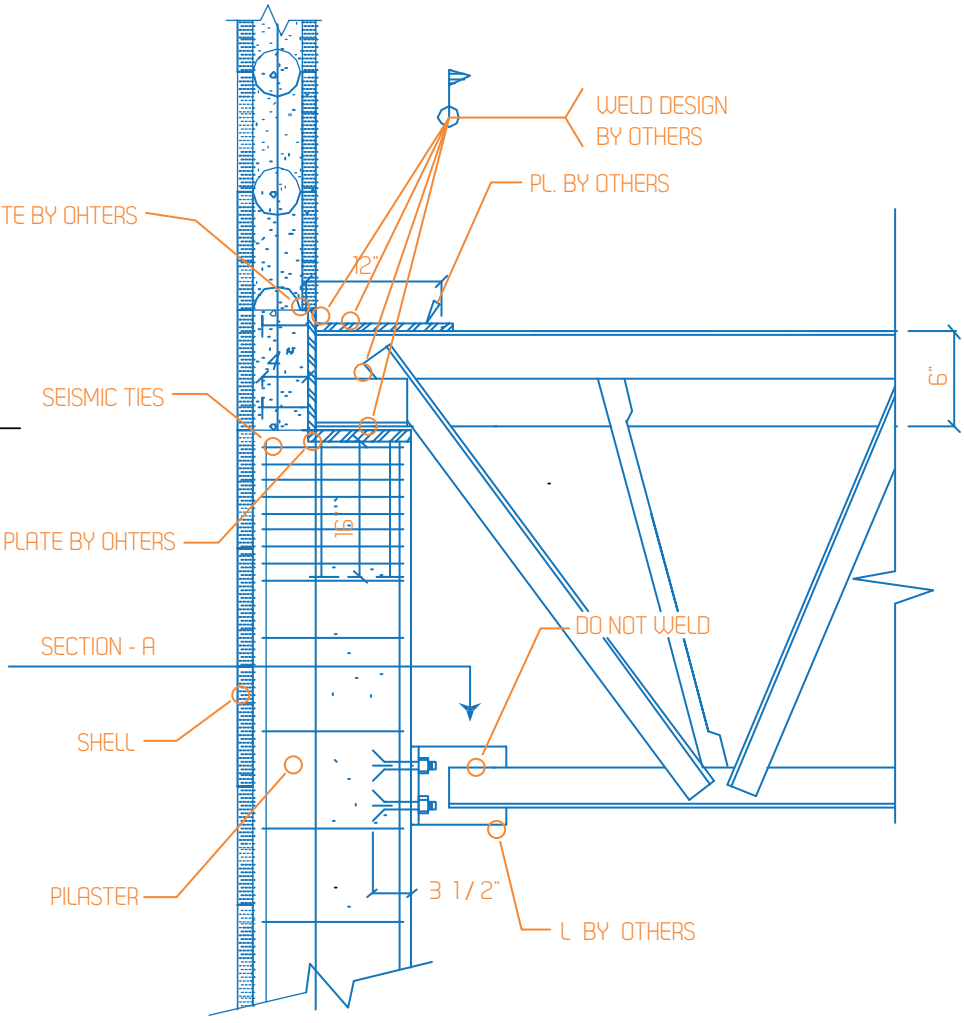
3.7 Steel Beam/Joist to Wall Connection
STEEL BRIDGING TO WALL



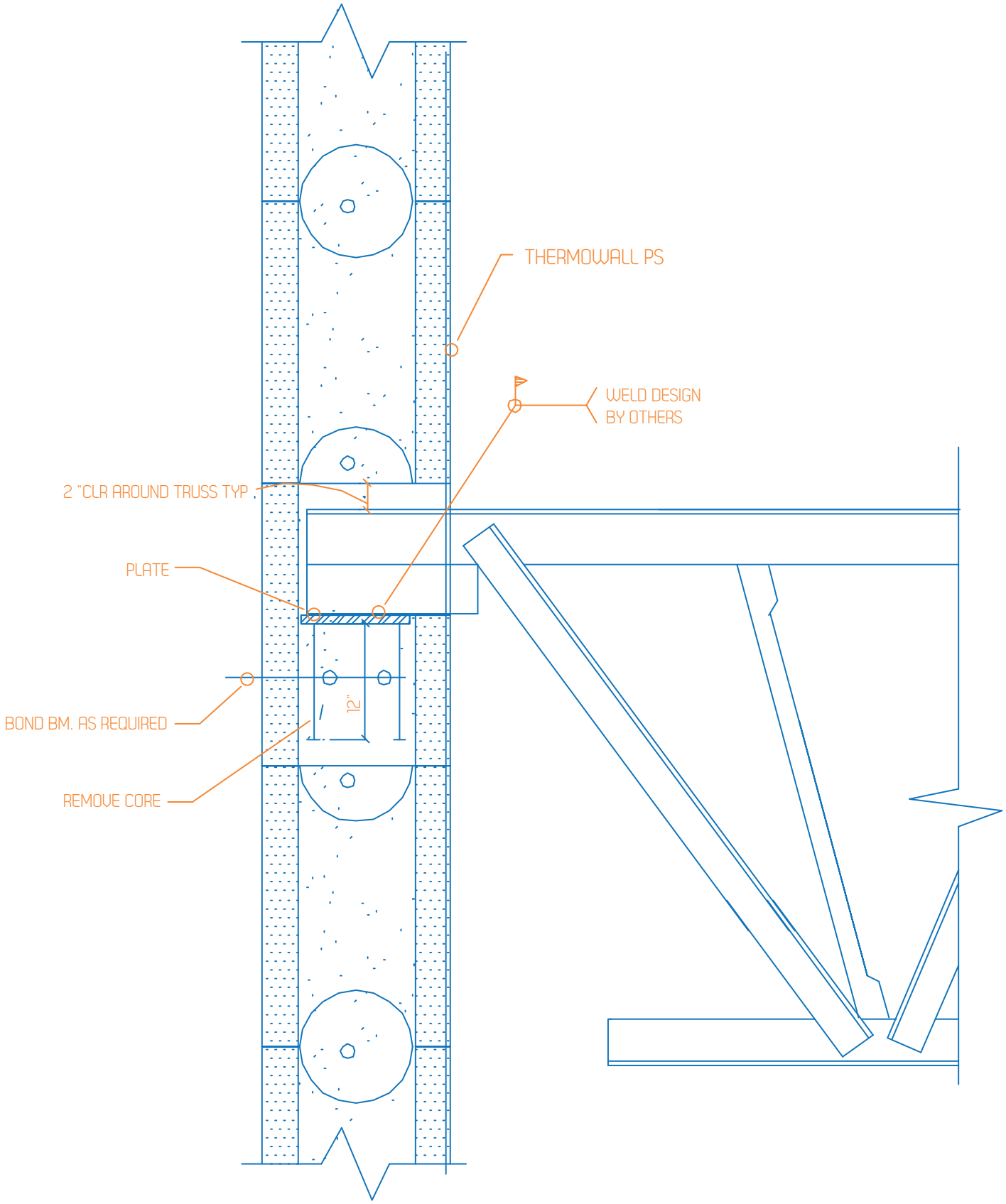
STEEL GIRDERS TO PILSTER



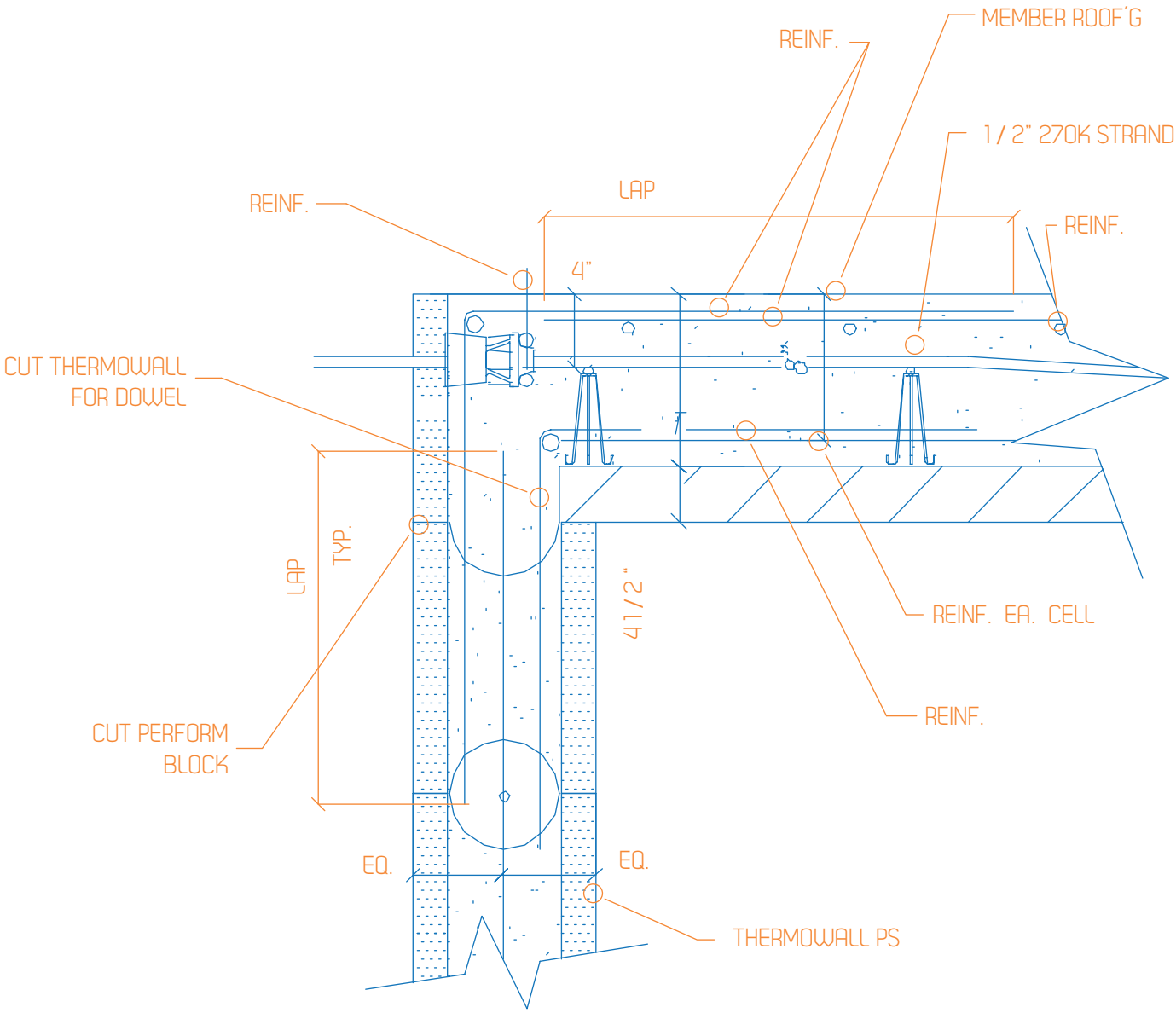
SECTION - A



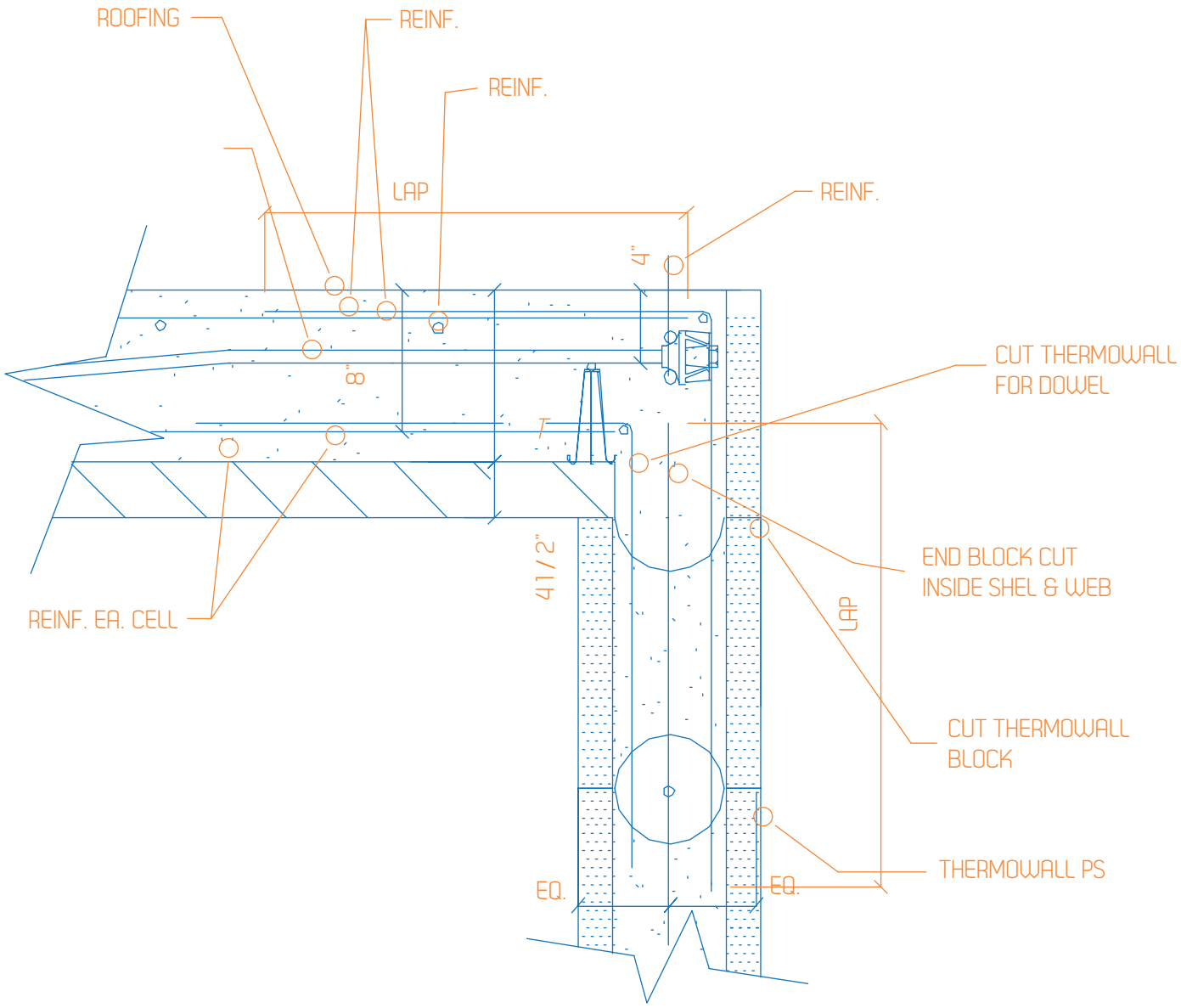
3.7 Steel Beam/Joist to Wall Connection
TYPICAL STEEL JOIST TO WALL CONNECTION



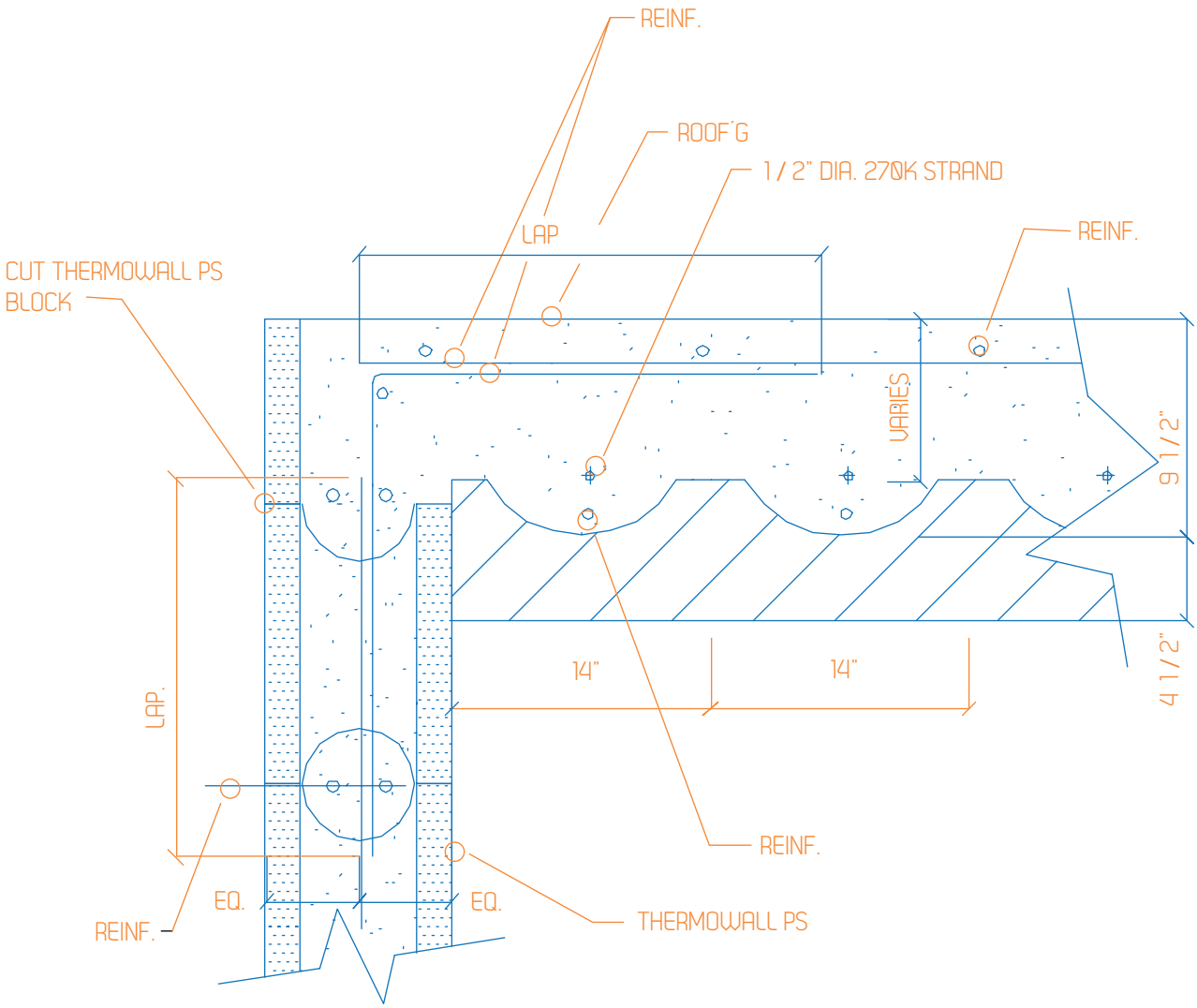
3.8 Concrete to Wall Connection
POST TENSION SLAB TO WALL CONNECTION



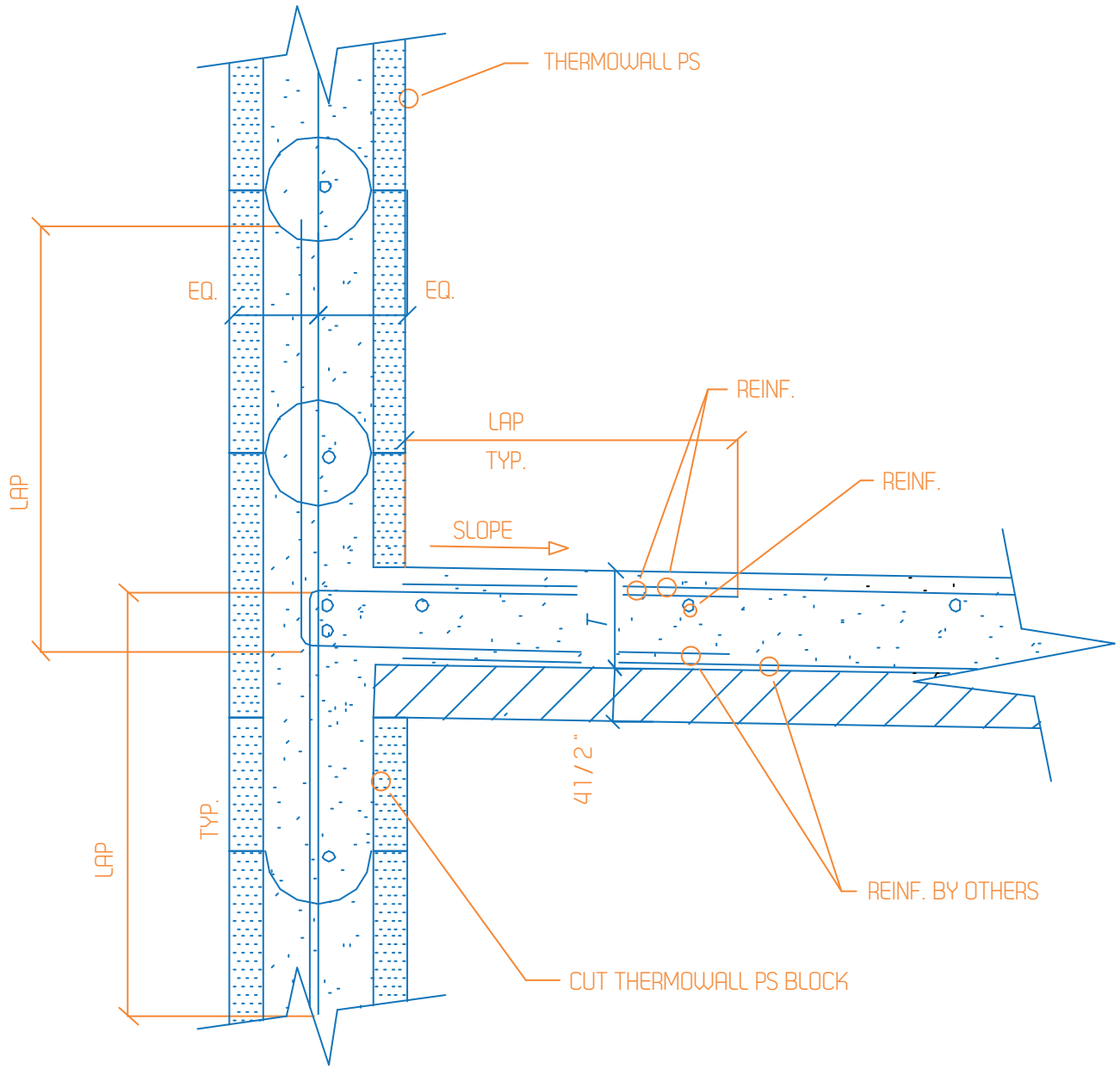
3.8 Concrete to Wall Connection
POST TENSION SLAB TO WALL CONNECTION



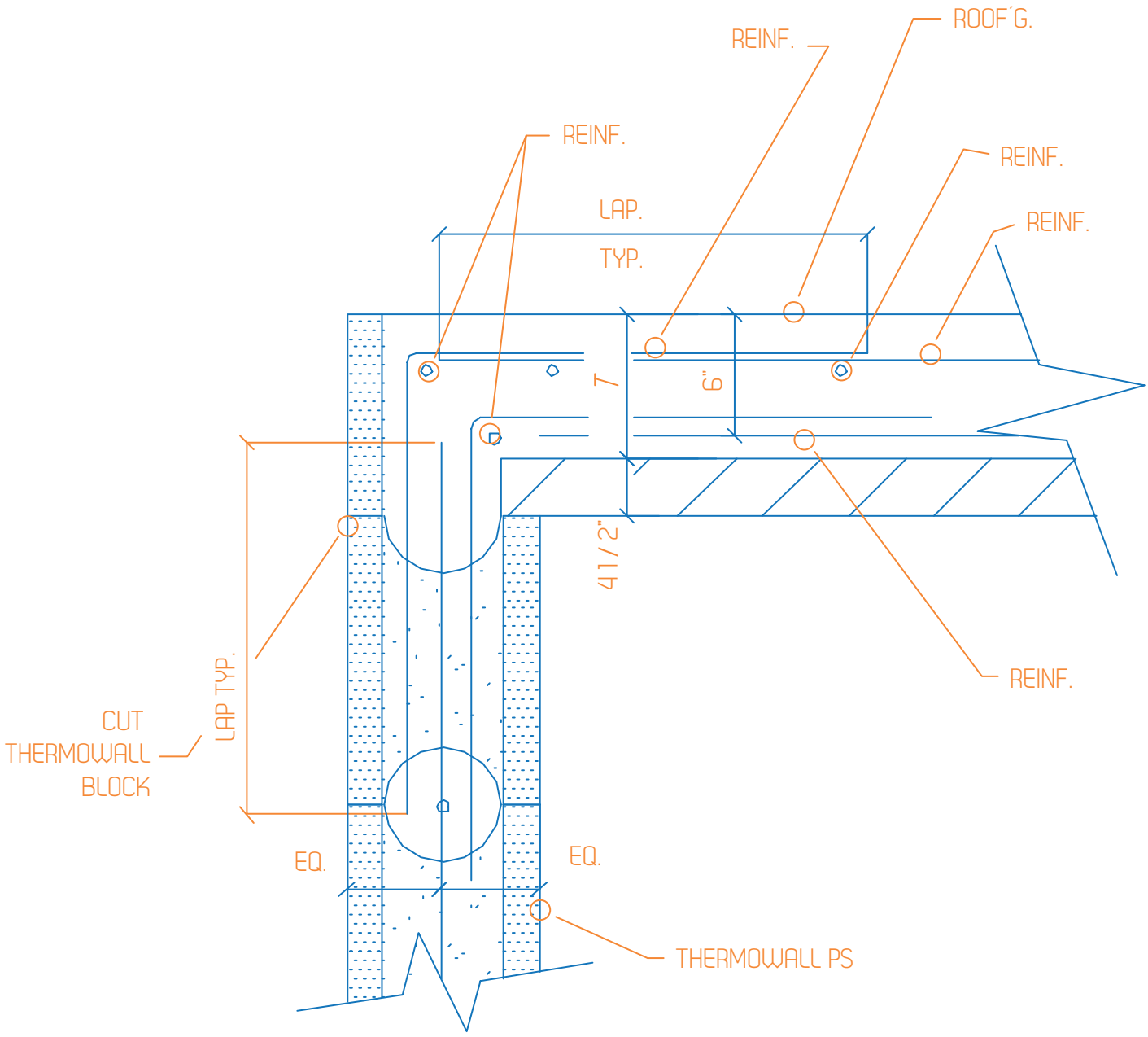
3.8 Concrete to Wall Connection
CONCRETE SLAB TO WALL CONNECTION



3.8 Concrete to Wall Connection
CONCRETE SLAB TO WALL CONNECTION



3.8 Concrete to Wall Connection
CONCRETE SLAB TO WALL CONNECTION



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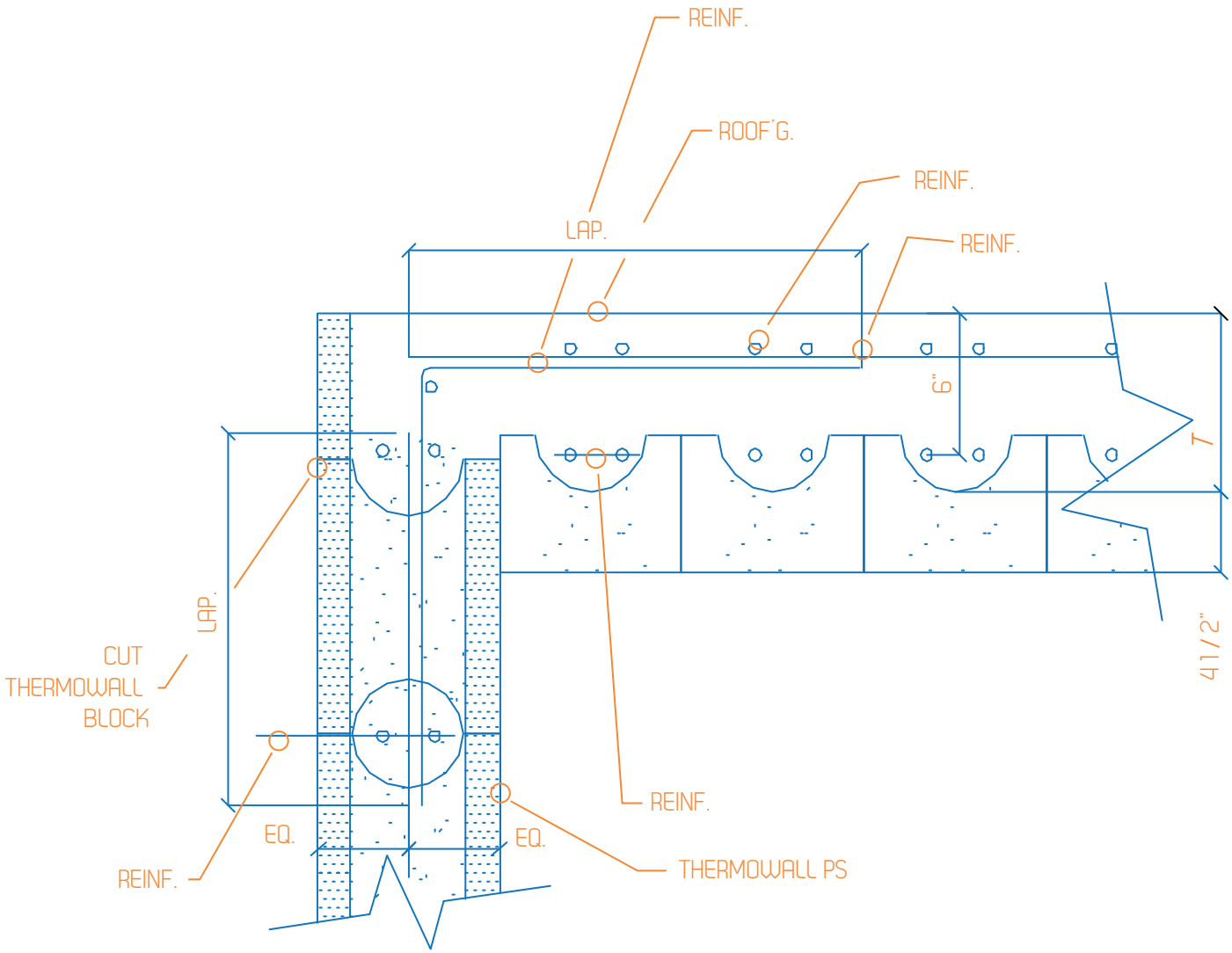
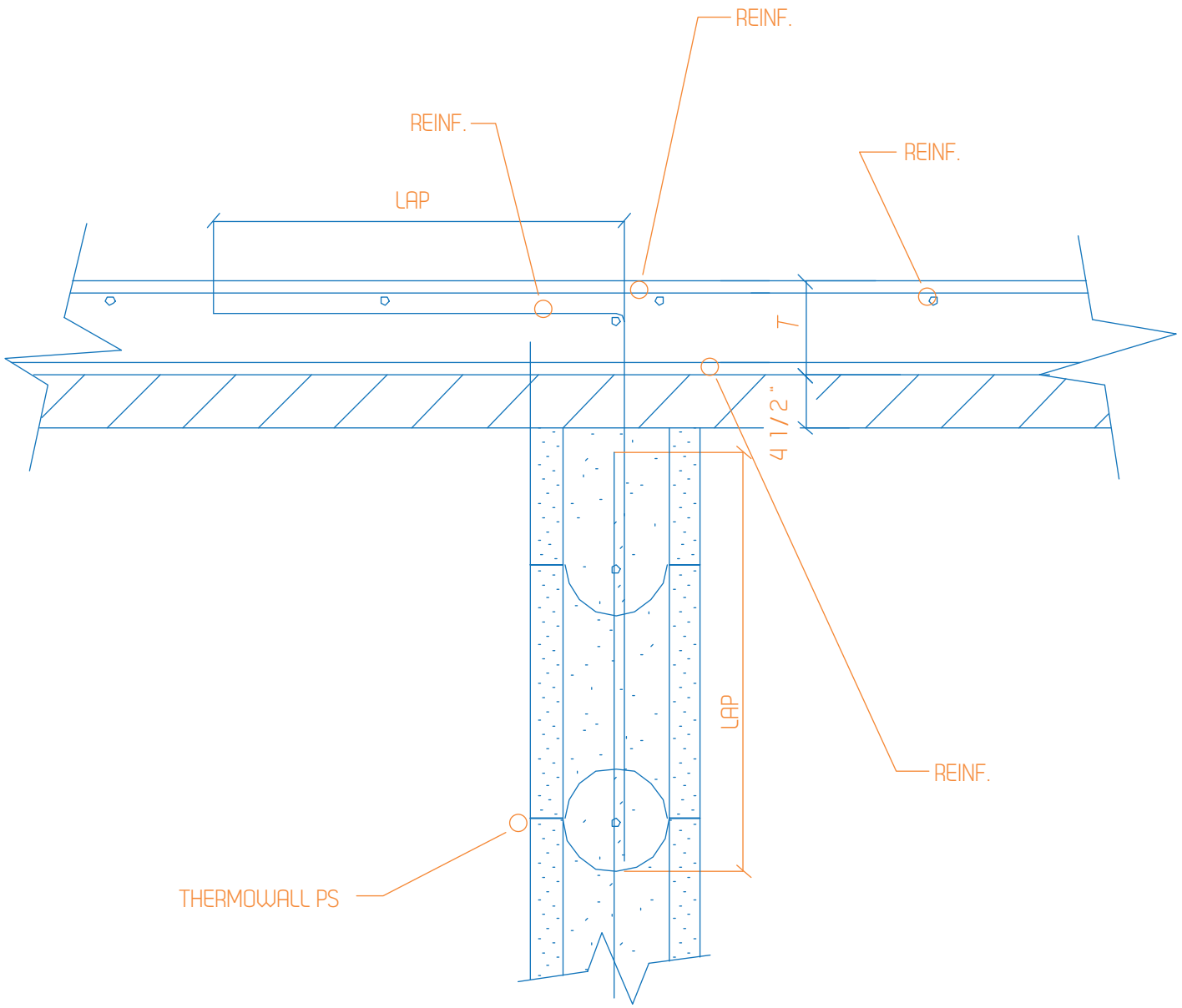
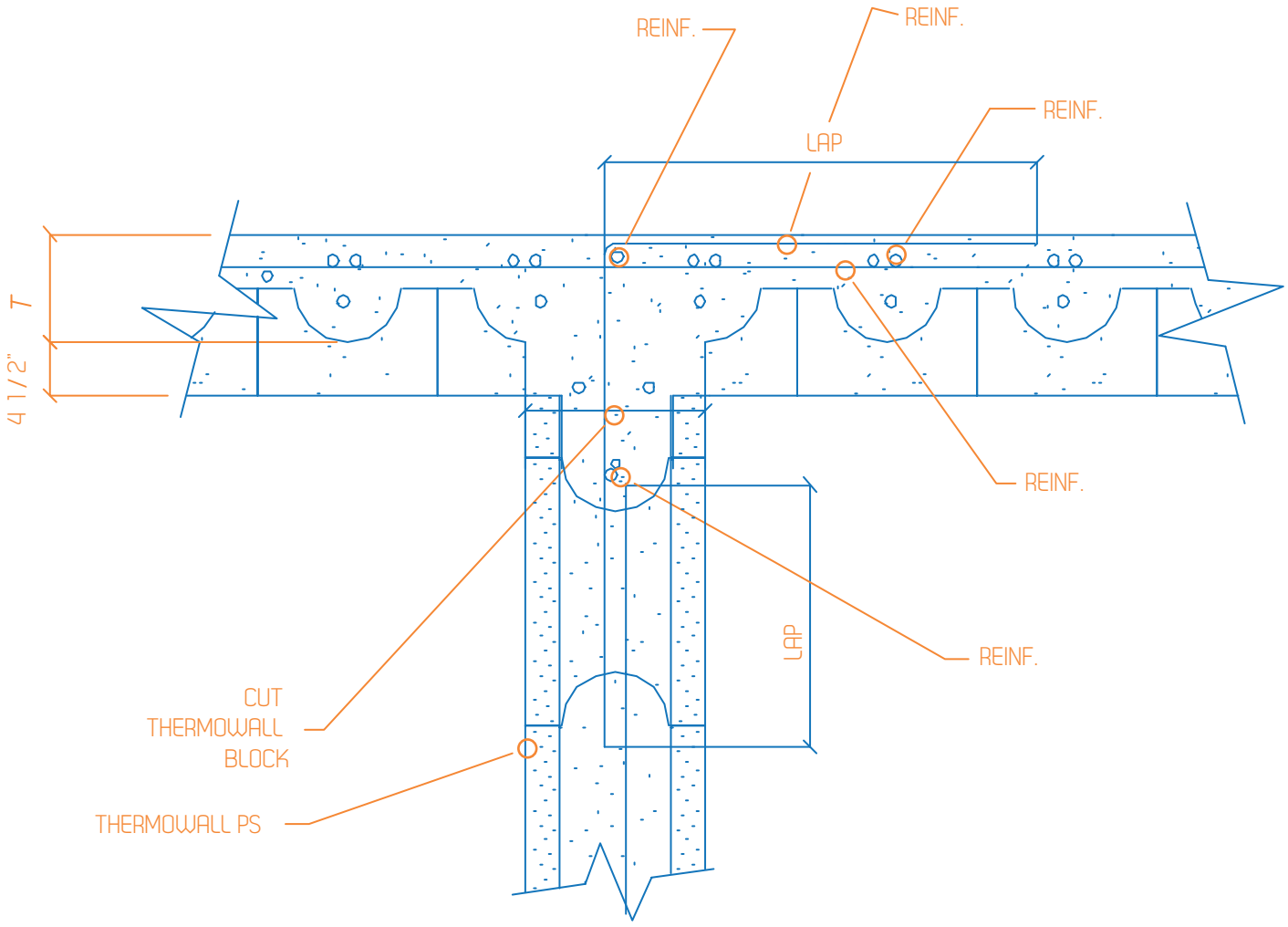
CONCRETE SLAB TO WALL CONNECTION



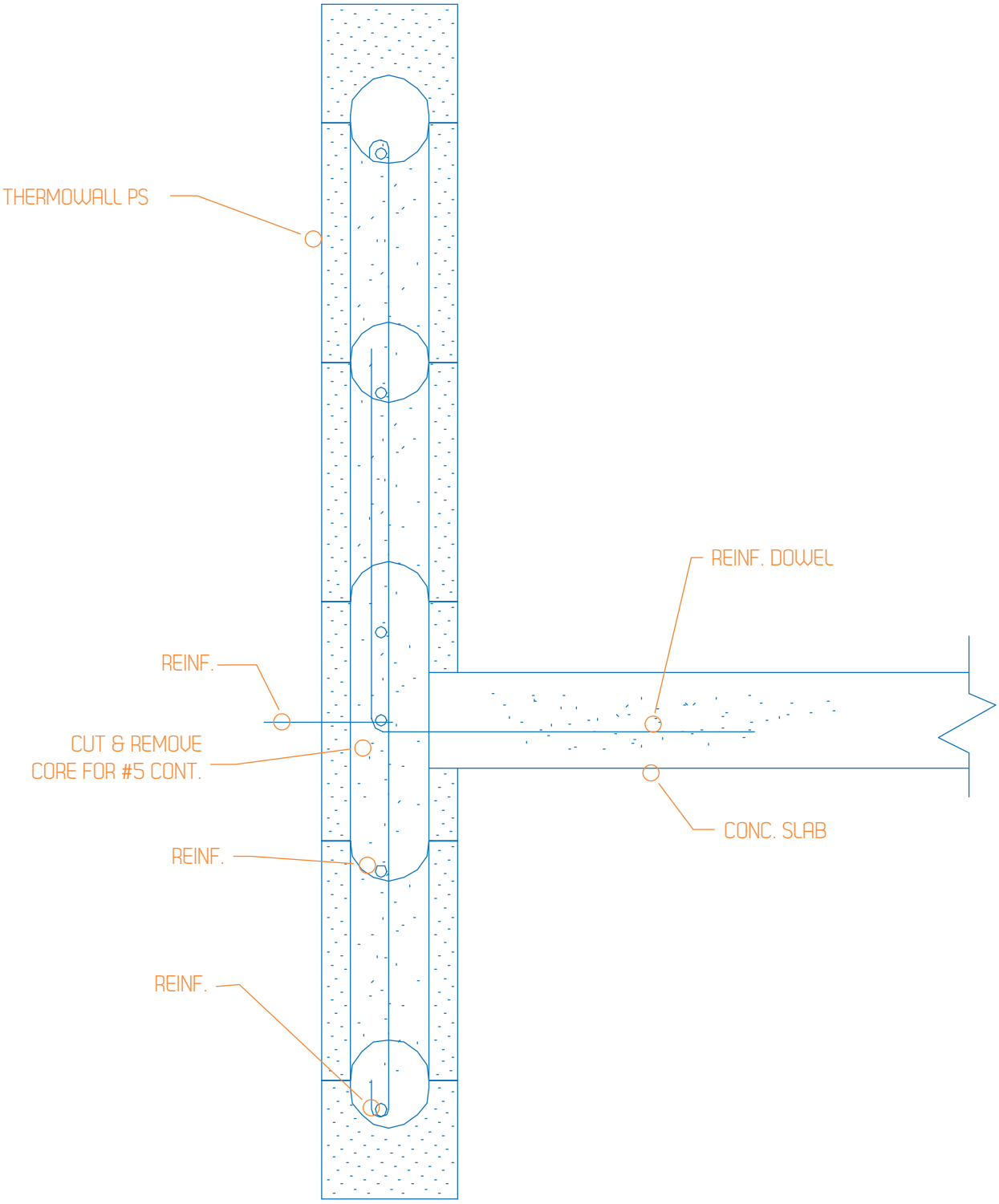
3.8 Concrete to Wall Connection
CONCRETE SLAB TO WALL CONNECTION



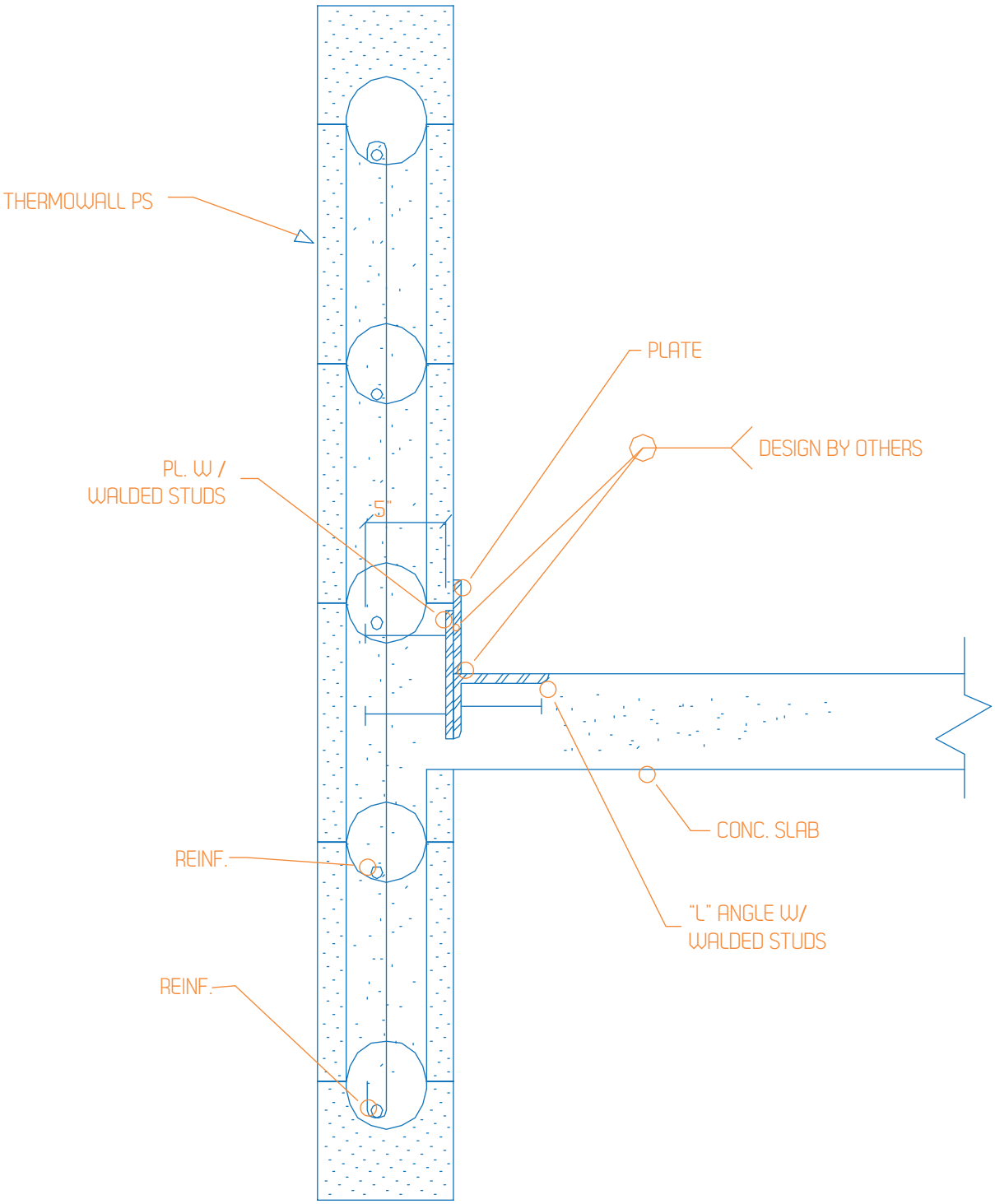
3.8 Concrete to Wall Connection
CONCRETE SLAB TO WALL CONNECTION



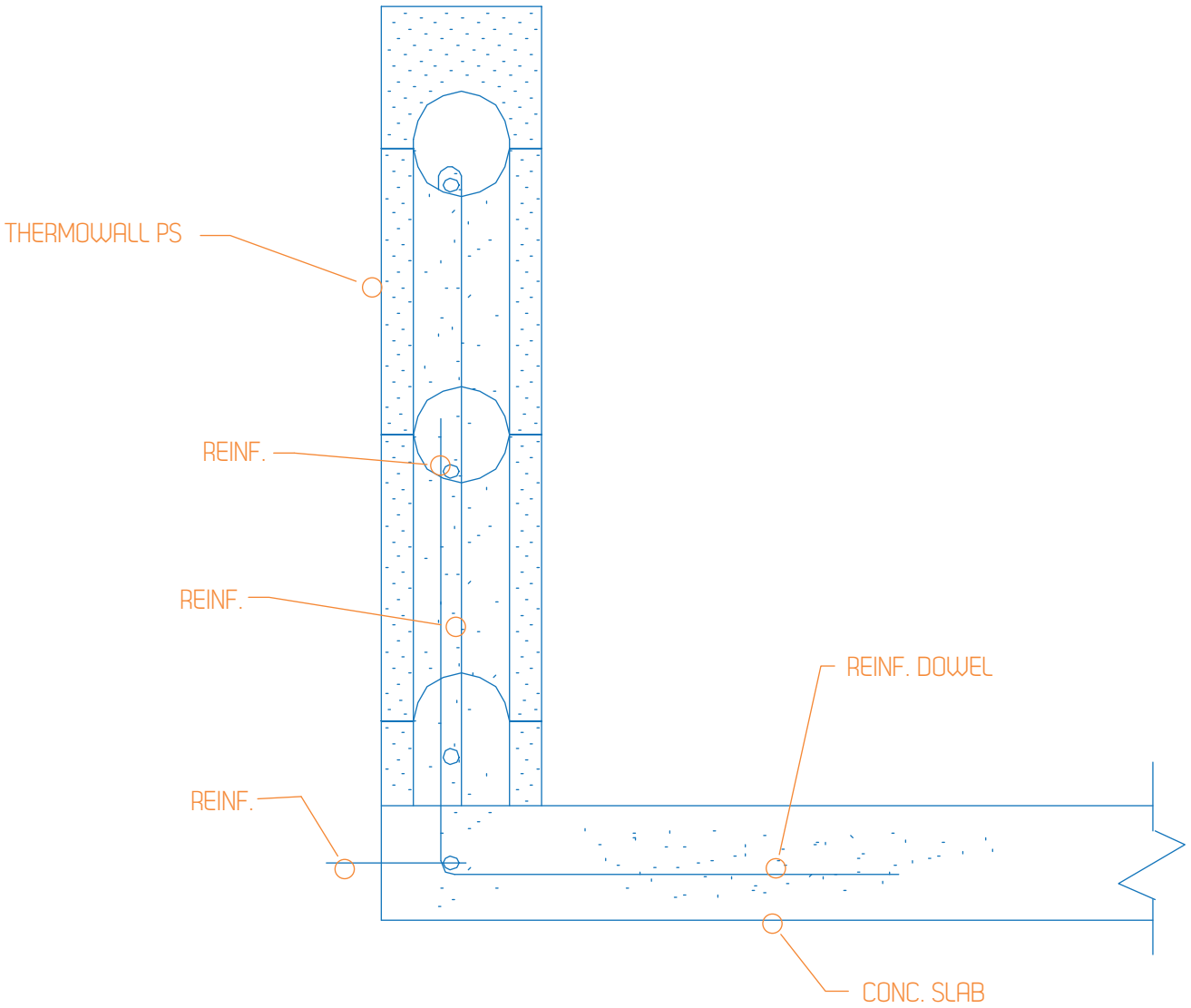
3.8 Concrete to Wall Connection
SLAB TO SPANDRELL PANEL CONNECTION



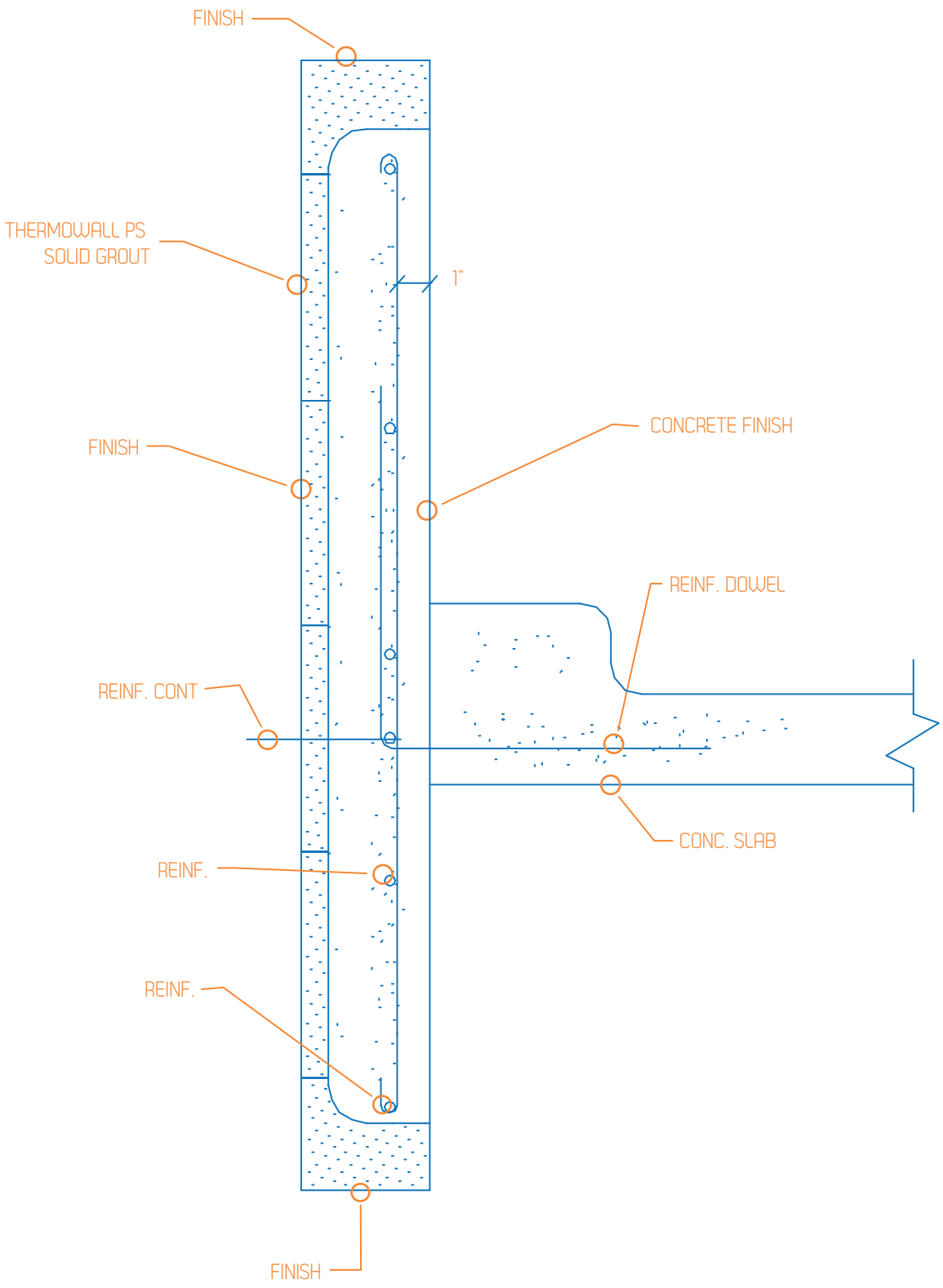
3.8 Concrete to Wall Connection
SLAB TO SPANDRELL PANEL CONNECTION



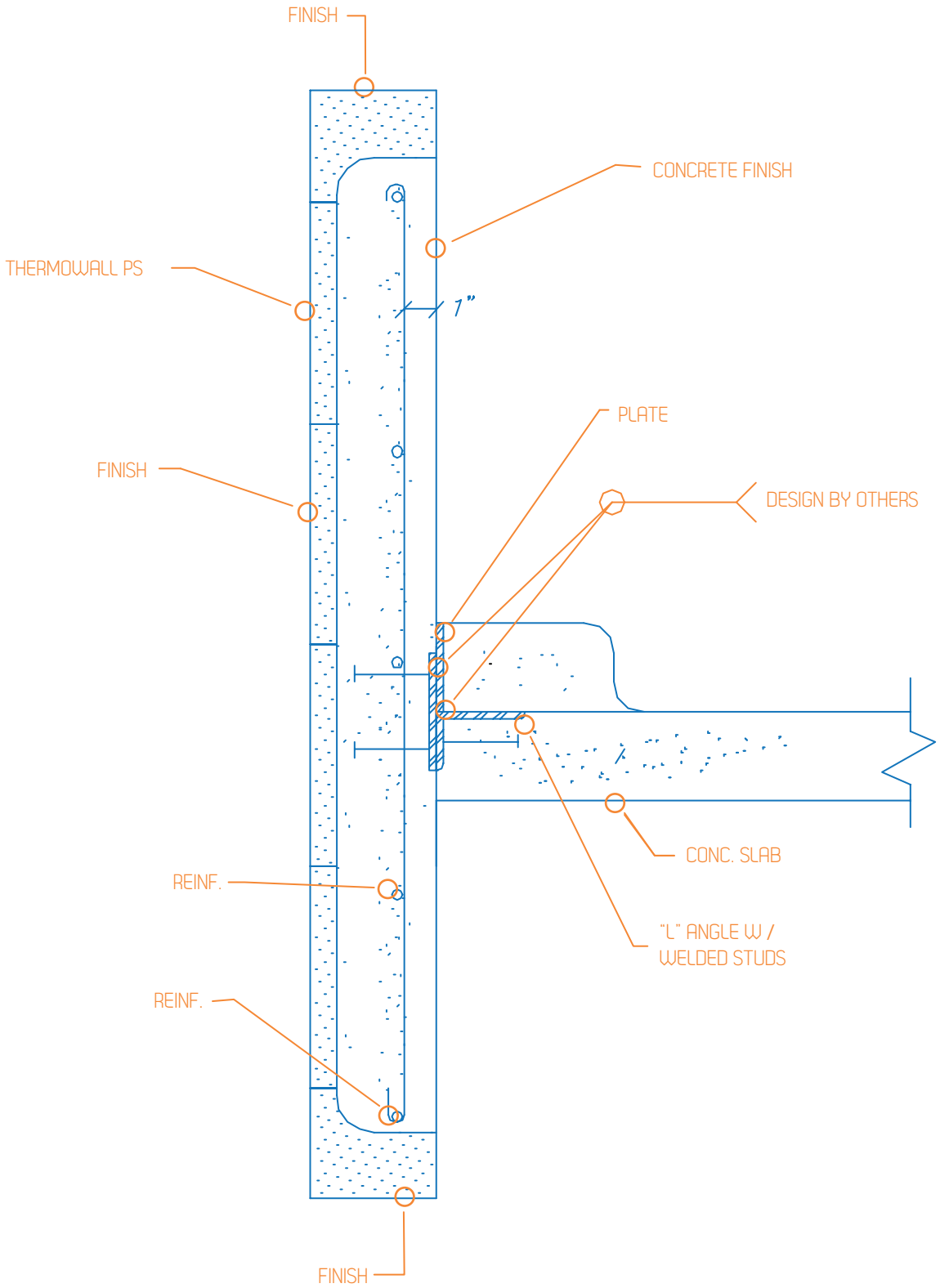
3.8 Concrete to Wall Connection
SLAB TO SPANDRELL PANEL CONNECTION



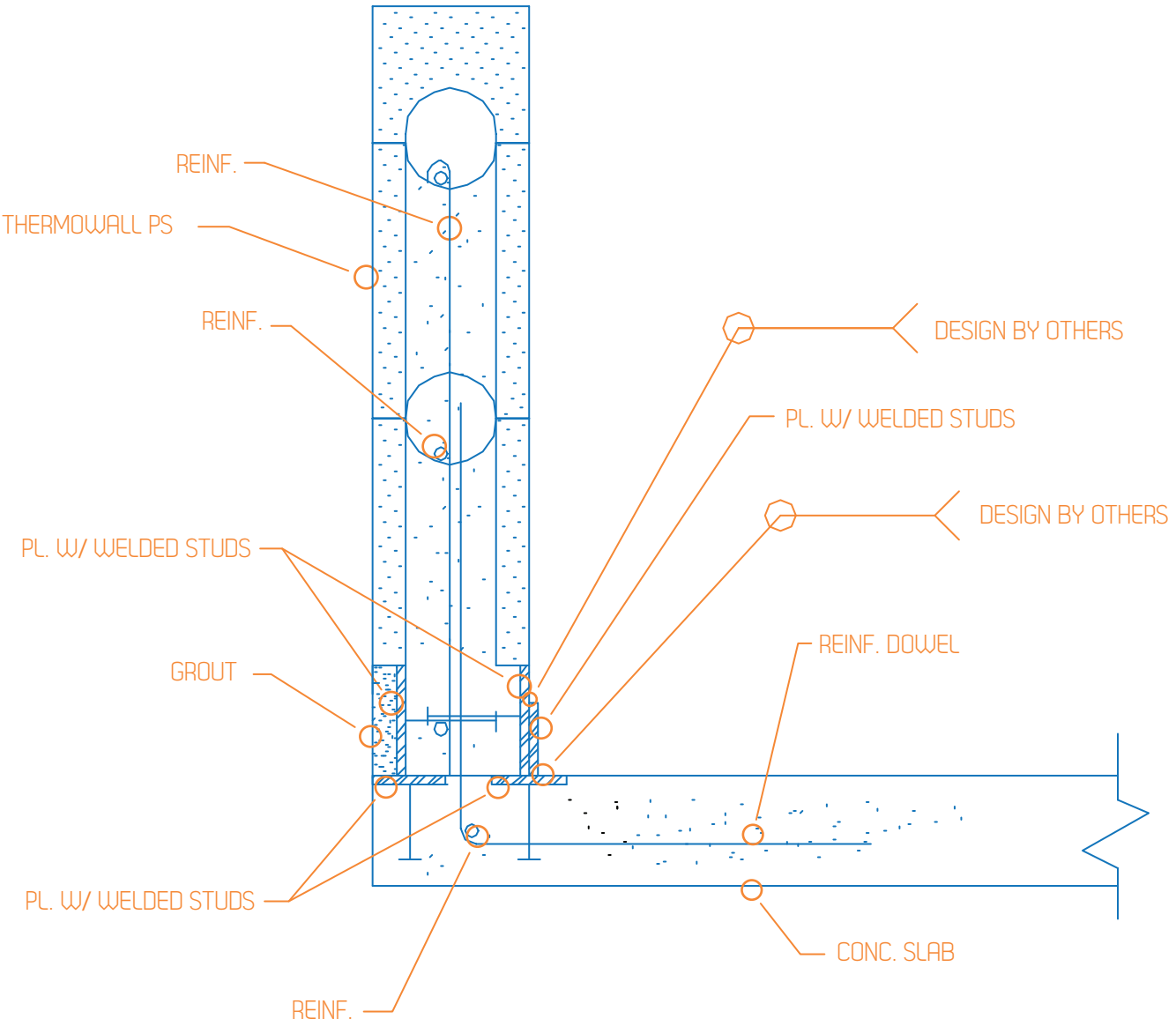
3.8 Concrete to Wall Connection
SLAB TO SPANDRELL PANEL CONNECTION



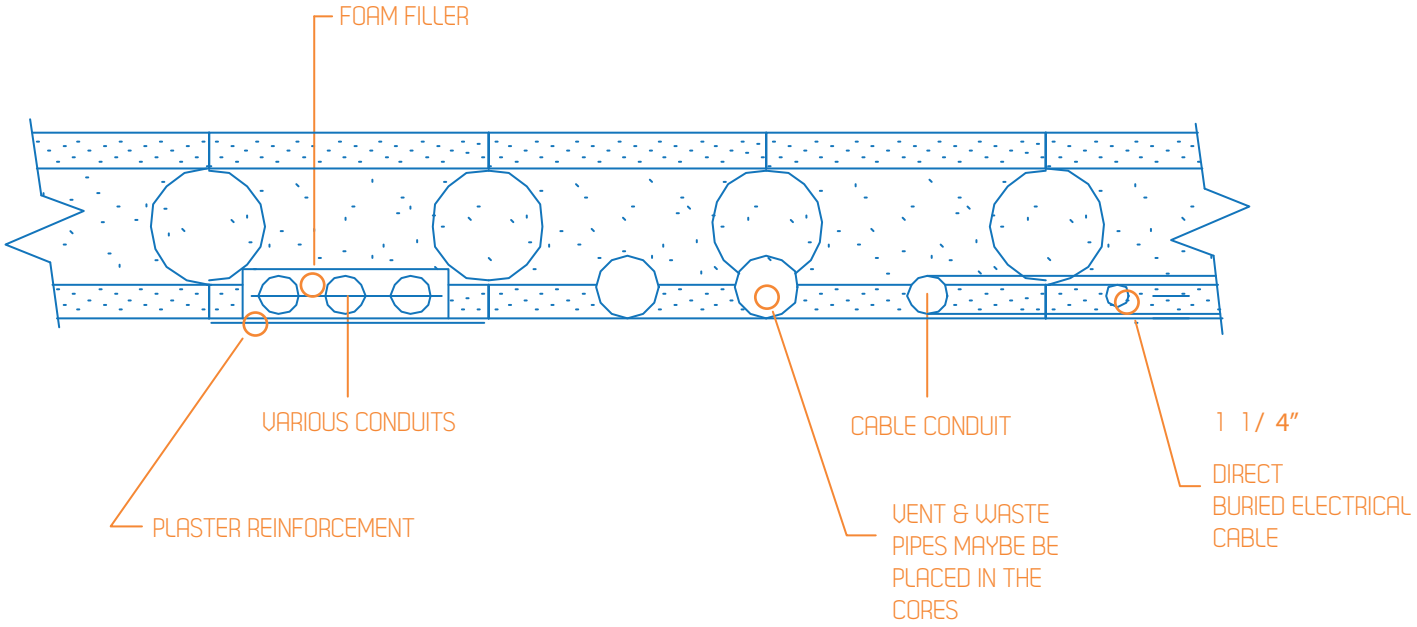
3.8 Concrete to Wall Connection
SLAB TO SPANDRELL PANEL CONNECTION

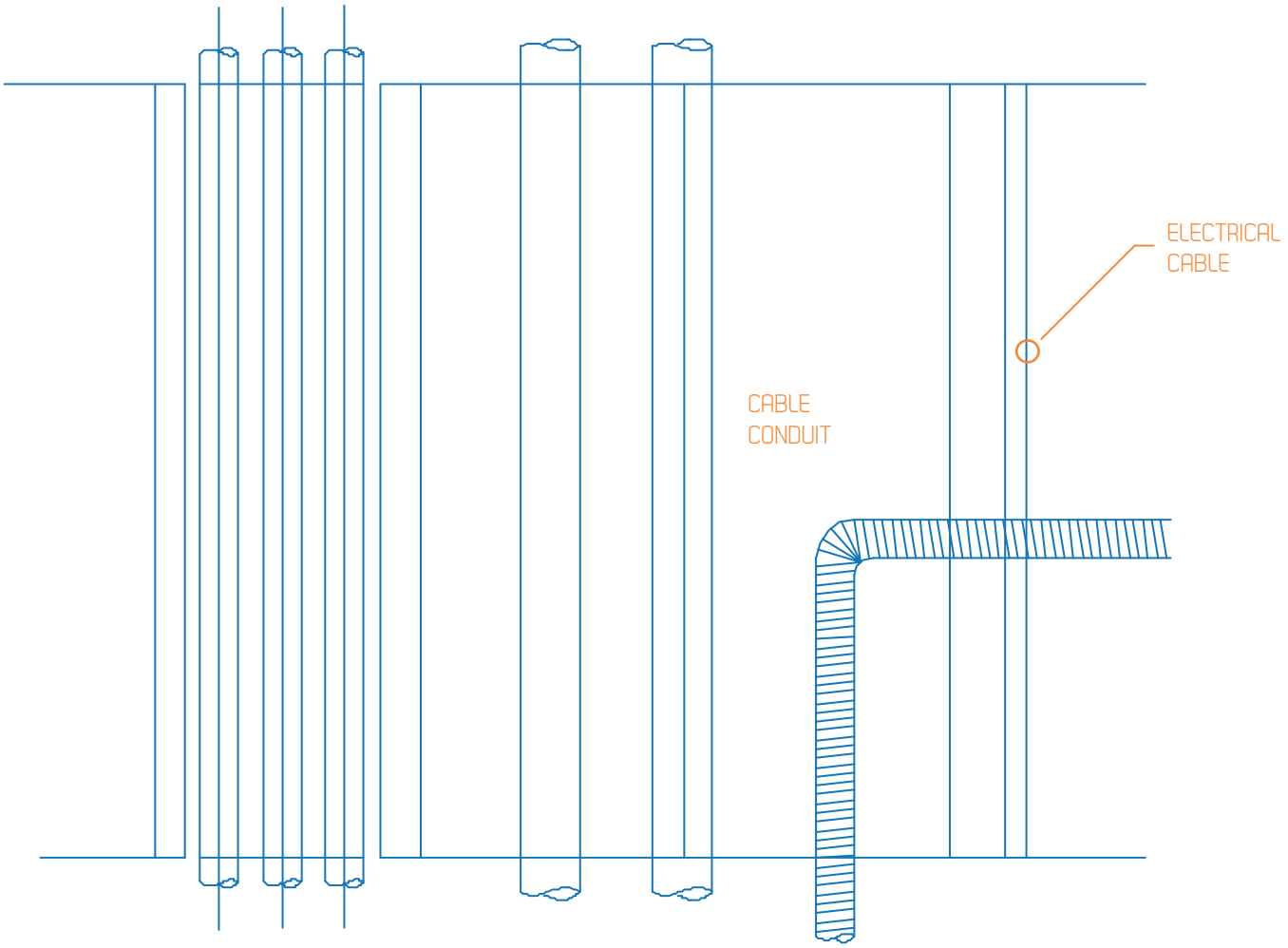


3.8 Concrete to Wall Connection
SLAB TO SPANDRELL PANEL CONNECTION



3.9 Miscellaneous Details
TYPICAL CONDUIT EMBED





3.9 Miscellaneous Details
TYPICAL RAIL CONNECTION