

TORNADO SHELTER

DESIGN CRITERIA

BUILDING DESIGN CODE ----- INTERNATIONAL BUILDING CODE (IBC 2021)
STRUCTURAL DESIGN CODE ----- (ANSI/ASCE 7-16), ICC/NSA (ICC500-2020)
STEEL DESIGN CODE ----- AISC MANUAL OF STEEL CONSTRUCTION
FIFTEENTH EDITION

CONCRETE DESIGN CODES ----- ACI 301-05 AND ALL REFERENCED
(LATEST EDITION) ACI SPECIFICATIONS THEREIN
ASTM SPECIFICATIONS THEREIN

- ACI 318R-14
- ACI 302.1 R-04
- ACI 530-13

MASONRY DESIGN CODE -----

BUILDING ROOF; 100 PSF LIVE LOAD
BUILDING FLOOR; SLAB ON GRADE --- 100 PSF (MINIMUM)
(LIVE LOADS)

GROUND SNOW LOAD: $P_g = 5$ PSF

QUALITY ASSURANCE CRITERIA

THE STORM SHELTER CONSTRUCTION SHALL INCLUDE A QUALITY ASSURANCE PLAN IN ACCORDANCE WITH ICC 500. THE STORM SHELTER CONSTRUCTION INCLUDES NEW CONCRETE FOUNDATIONS, PERIMETER REINFORCED CMU WALLS, STEEL ROOF FRAMING, AND METAL ROOF DECK. REFERENCE SHEETS S101 THROUGH S301.

• THE MWFRS AND C&C WIND RESISTING SYSTEM INCLUDES THE METAL DECK DIAPHRAGM, STEEL ROOF FRAMING, PERIMETER REINFORCED CMU SHEAR WALLS, AND PERIMETER CONCRETE GRADE BEAM.

• THE STORM SHELTER INSPECTIONS SHALL INCLUDE COMPACTION TESTING OF THE SUBGRADE, COMPRESSIVE STRENGTH TESTING OF THE CONCRETE FOUNDATIONS AND CMU CONCRETE INFILL, INSPECTION OF THE POST-INSTALLED EPOXY ANCHORS, AND INSPECTION OF THE WELDS.

• MATERIAL TESTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY AND REPORTS PROVIDED TO THE OWNER, CONTRACTOR, ARCHITECT, AND ENGINEER.

• REFERENCE ICC-500, SECTIONS 106, 107, AND 110 FOR ADDITIONAL QUALITY ASSURANCE REQUIREMENTS AND CONTRACTOR'S RESPONSIBILITY FOR MATERIAL INSTALLATION AND TESTING.

WIND CRITERIA: (PER ICC 500)

- V_f ----- 250 MPH
- IMPORTANCE FACTOR ----- 1.0
- RISK CATEGORY ----- IV
- EXPOSURE CATEGORY ----- C
- INTERNAL PRESSURE COEFFICIENT ----- ± 0.55
- TOPOGRAPHIC FACTOR ----- 1.0
- DIRECTIONALITY FACTOR ----- 1.0

COMPONENTS & CLADDING PRESSURES (NET)

TORNADO SHELTER						
COMPONENTS & CLADDING [PITCHED ROOF]						
(ASCE 7-16, FIGURE 30.5-1)						
SQUARE FOOTAGE (SF)	VERTICAL LOADING (PSF)			HORIZONTAL LOADING (PSF)		
	1	1'	2	4	5	
10	(+)116 (-)306	(+)116 (-)197	(+)116 (-)388	(+)116 (-)510	(+)211 (-)224	(+)211 (-)265
20	(+)109 (-)292	(+)116 (-)197	(+)109 (-)388	(+)109 (-)469	(+)204 (-)218	(+)204 (-)252
50	(+)102 (-)265	(+)102 (-)198	(+)102 (-)333	(+)102 (-)401	(+)190 (-)211	(+)190 (-)231
100	(+)102 (-)252	(+)102 (-)198	(+)102 (-)320	(+)102 (-)374	(+)184 (-)204	(+)184 (-)224

NOTES:
1) VENDOR MAY USE COMPONENT SELF WEIGHT TO REDUCE WIND LOAD PER ASCE 7 LOAD COMBINATIONS.

2) PER ASCE 7, SECTION 30.2.2, THE FINAL VALUE (INCLUDING ALL PERMITTED REDUCTIONS) USED IN THE DESIGN SHALL NOT BE LESS THAN 16 PSF.

- DESIGN METHOD USED ----- ASCE 7-16 METHOD 2
- WIND BASE SHEAR ----- 10.6 kips (CONTROLS)
- $a = 3$ ft.

ROOF DECK:

- 1.5VL 20 GAGE GALVANIZED STEEL
 $t = .0358$ IN. $I_x = .222$ IN⁴/ft. $S_x = .231$ IN³/ft

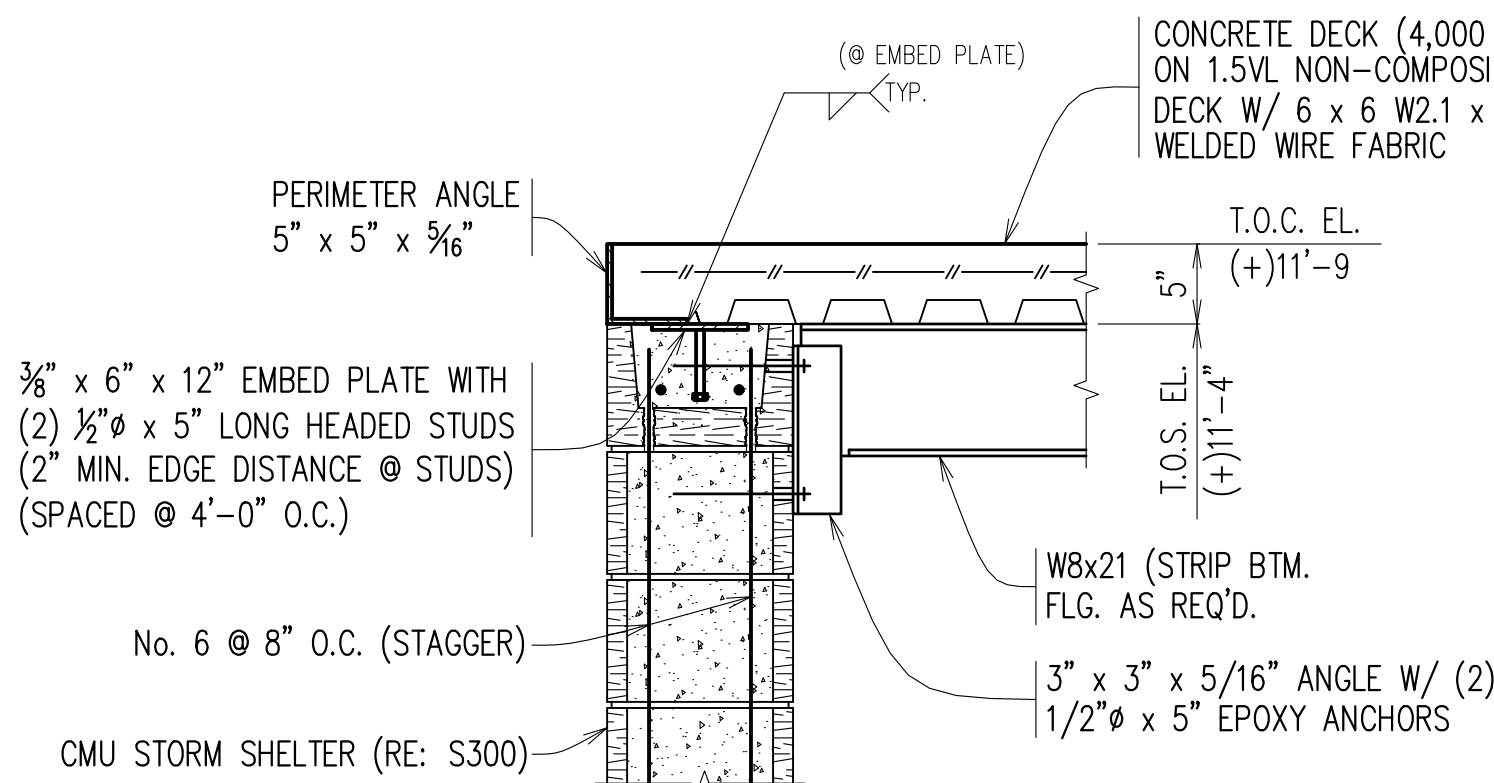
ANGLE 5" x 3 1/2" x 3/8" WITH
1/2" ϕ x 5" EXPANSION ANCHORS
SPACED @ 4'-0" O.C.

CONCRETE DECK (4,000 P.S.I.)
W/ 6 x 6 W2.1 x W2.1 WELDED
WIRE FABRIC

3/8" x 6" x 12" EMBED PLATE WITH
(2) 1/2" ϕ x 5" LONG HEADED STUDS
(2" MIN. EDGE DISTANCE @ STUDS)
(SPACED @ 4'-0" O.C.)

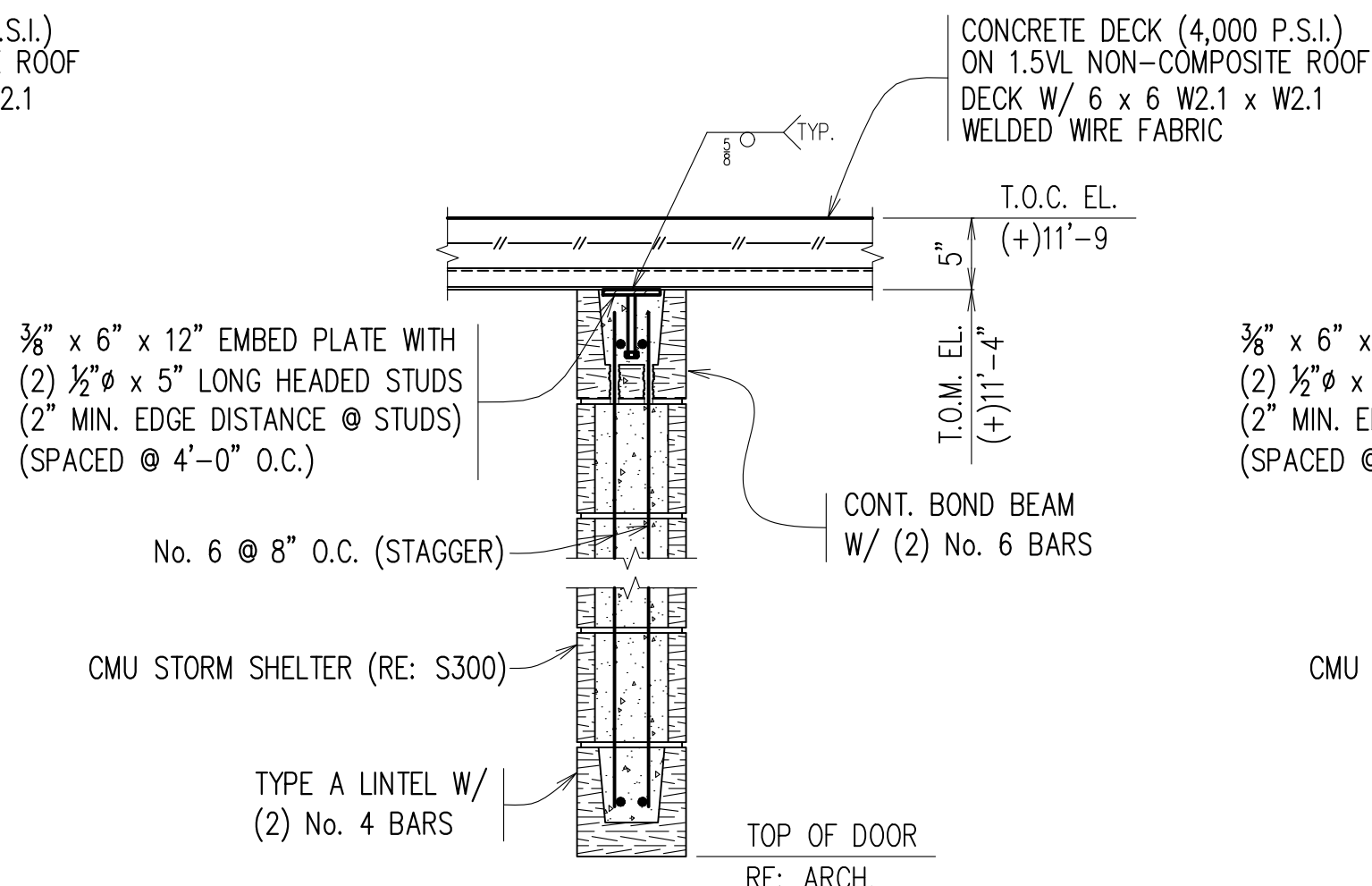
5 SECTION

SCALE: 1" = 1'-0"
RE: S300 / ARCH.



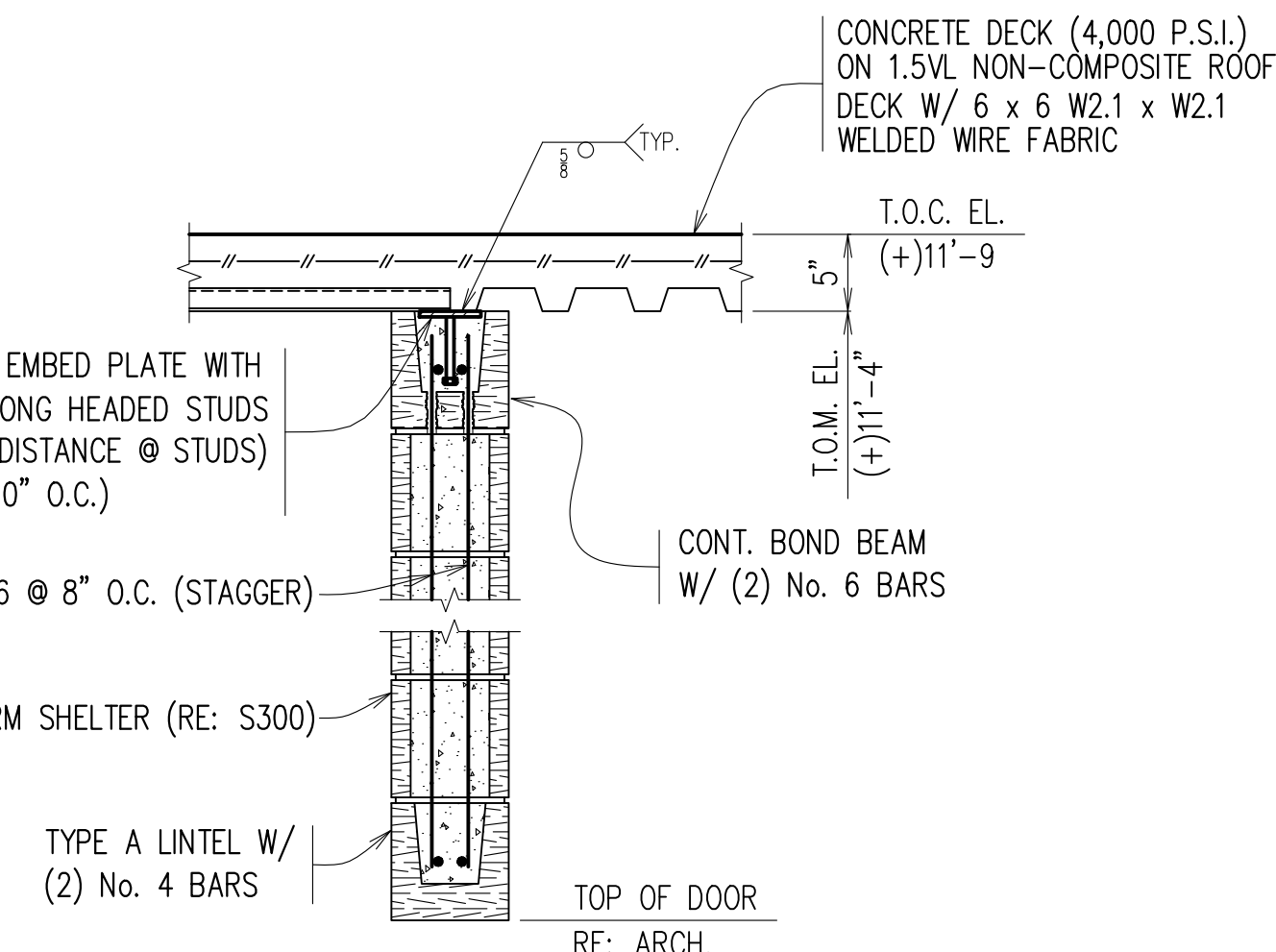
8 SECTION

SCALE: 1" = 1'-0"
RE: 3/S300



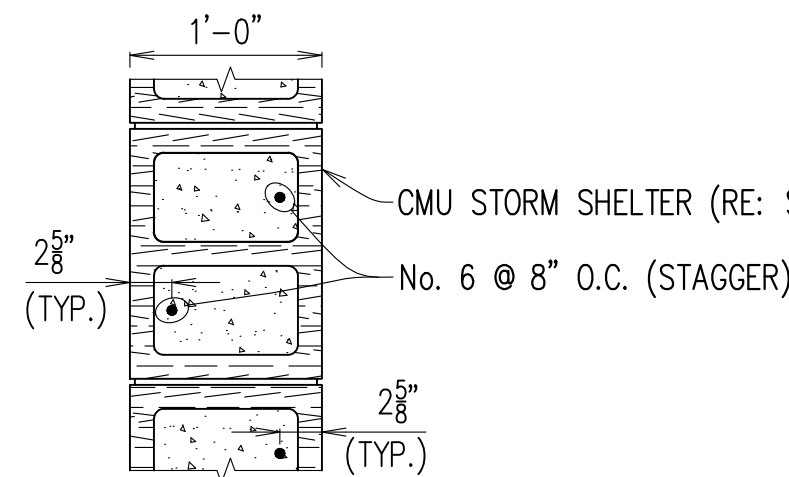
9 SECTION

SCALE: 1" = 1'-0"
RE: 3/S300



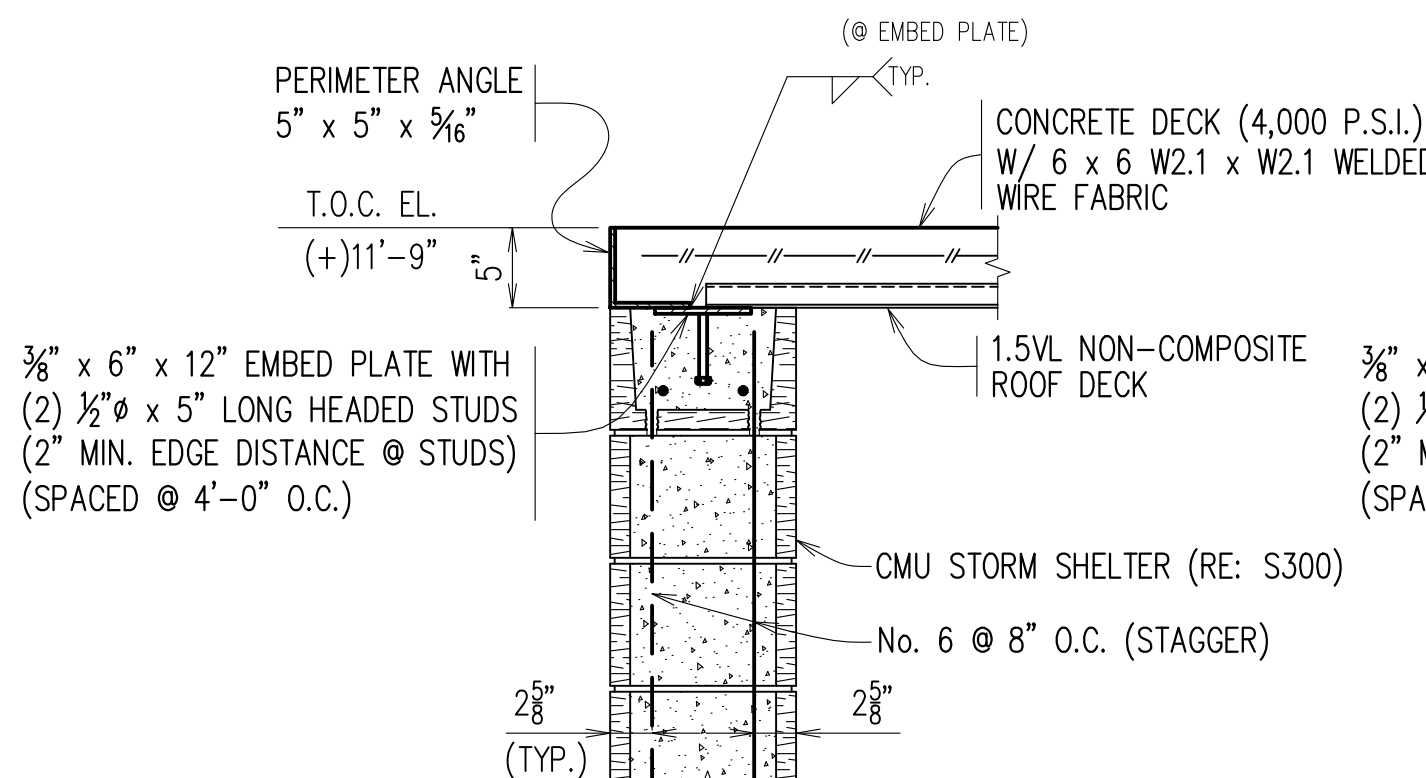
10 SECTION

SCALE: 1" = 1'-0"
RE: 3/S300



1 PLAN SECTION - STORM SHELTER

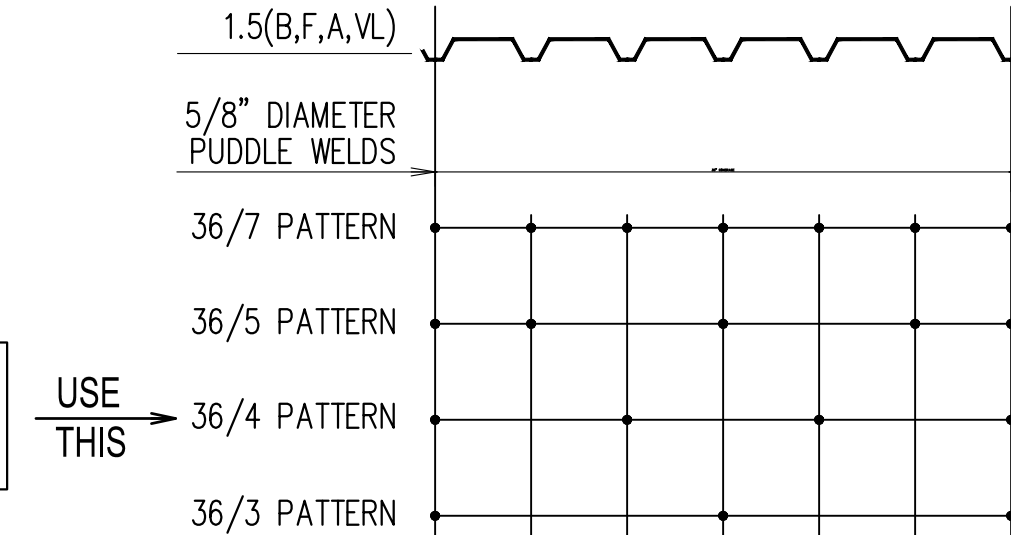
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RE: S300



3 SECTION

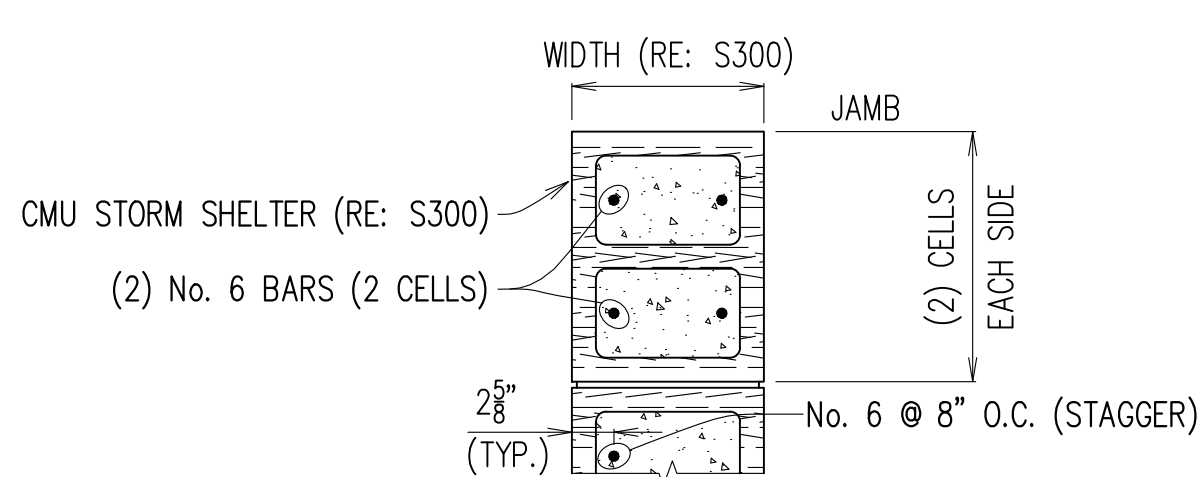
SCALE: 1" = 1'-0"
RE: S300 / ARCH.

SIDE LAP FASTENERS
(6) #10 TEK SCREWS
PER SPAN (MINIMUM)



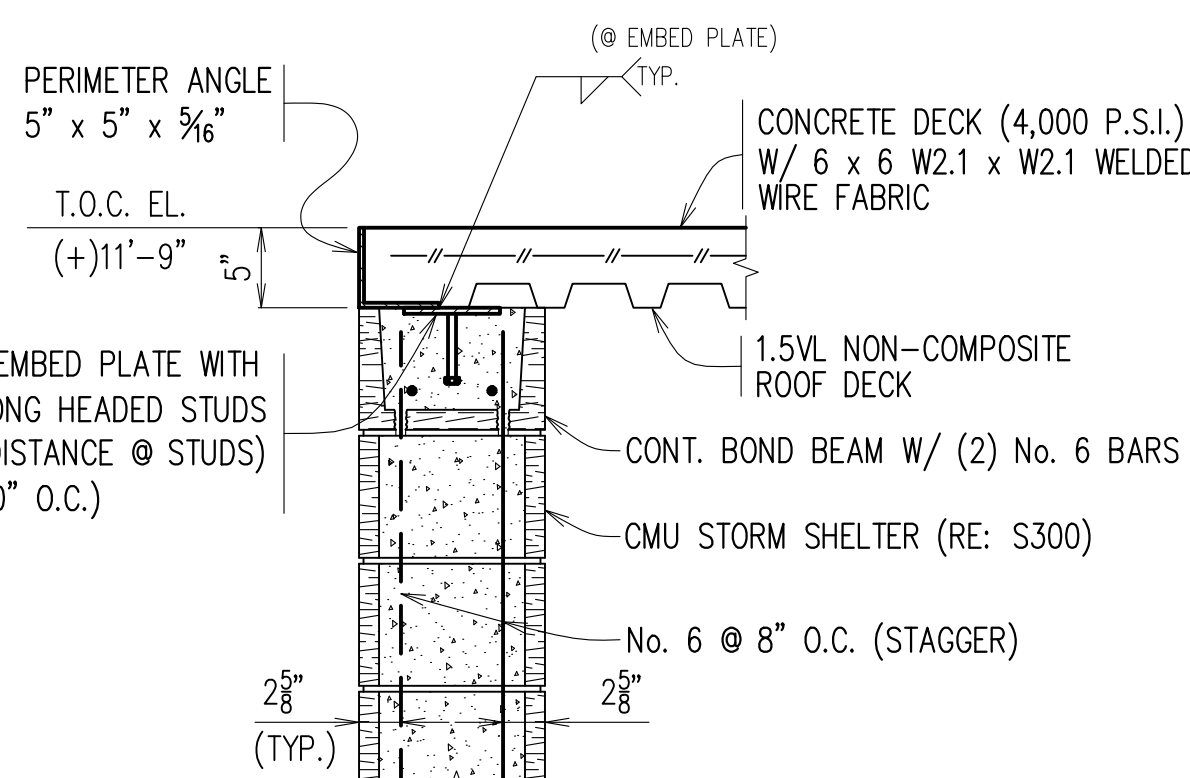
6 TYP. ROOF DECK FASTENER LAYOUTS

N.T.S. RE: S300



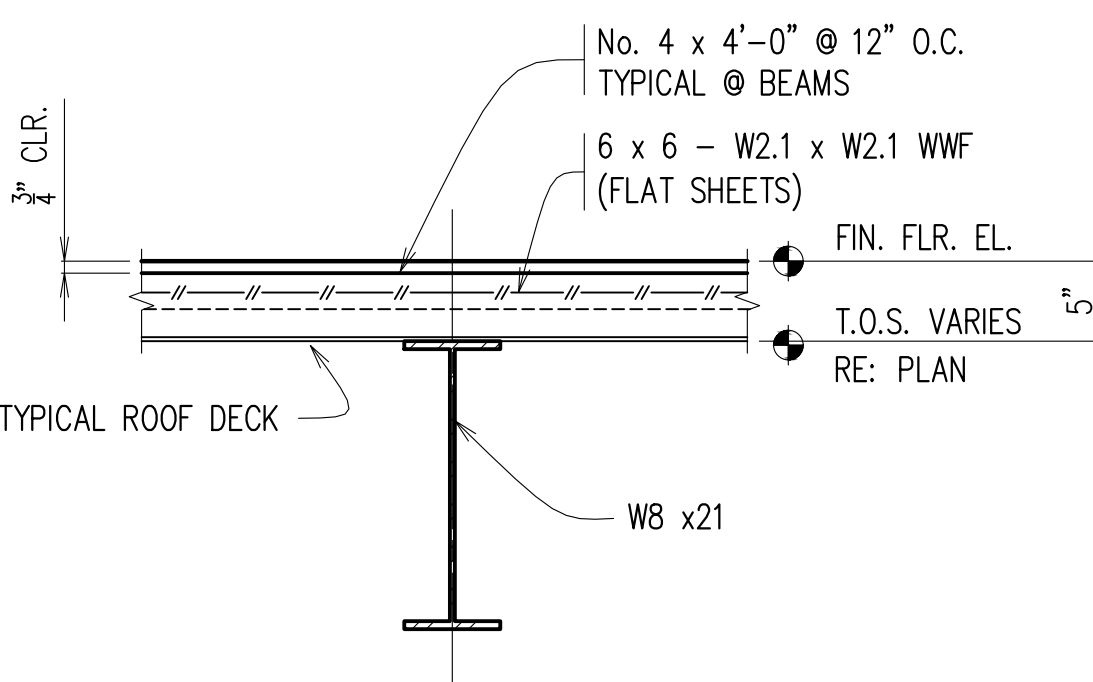
2 STORM SHELTER - JAMB REINF.

SCALE: 1" = 1'-0"
RE: S300



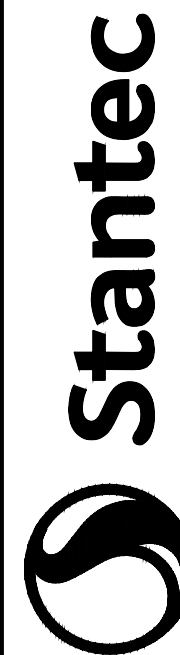
4 SECTION

SCALE: 1" = 1'-0"
RE: S300 / ARCH.



7 TYPICAL DETAIL @ ROOF BEAM

SCALE: 1" = 1'-0"
RE: S300



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Consultant

By:
App'd:
Revision

Design Phase Acceptance

Permit/Seal



Client/Project
CITY OF NATCHITOCHES

NEW FIRE STATION NO. 3

NATCHITOCHES, LOUISIANA

Project No.: 222706059

File Name: 7824_GENERAL NOTES & TYPICAL

Scale:

2025.09.26

Dwn: Dign: Chkd: YYYYMMDD

Title STORM SHELTER NOTES & DETAILS

Revision: Sheet: of

Drawing No.

S101



MEYER, MEYER, LACROIX & HIXSON, Inc.
ENGINEERS & LAND SURVEYORS
ALEXANDRIA, LOUISIANA

PROJ. NO. 7824

DATE: 7/11/25

DESIGN: WLM

DRAWN: GO