



Statewide Alternate Method
Rescinded Oct. 1, 2021

No. 97-1
Portal Frame Bracing

(Ref.: ORS 455.060)

Statewide Alternate Methods are approved by the Division administrator in consultation with the appropriate advisory board. The advisory board's review includes technical and scientific facts of the proposed alternate method. In addition:

- *Building officials shall approve the use of any material, design or method of construction addressed in a statewide alternate method;*
- *The decision to use a statewide alternate method is at the discretion of the designer; and*
- *Statewide alternate methods do not limit the authority of the building official to consider other proposed alternate methods encompassing the same subject matter.*

Code edition: 2017 Oregon Residential Specialty Code (ORSC)

Code section: Section R602.10

Date: Oct. 1, 2021 (Rescinded)
Nov. 1998 (Revised)

Initiated by: Building Codes Division

Subject: Alternate portal frame bracing method to the provisions in the 2017 ORSC

Background:

The 2017 ORSC includes alternate wall bracing provisions, and the Building Codes Division references the provisions of the 2008 ORSC as an approved Statewide Alternate Method. Therefore, the original alternate brace wall method in Interpretive Ruling 97-1 is no longer needed. However, the portal frame provisions are deemed appropriate and useful for the building industry and code enforcement agencies.

Discussion:

Portal frame technology is allowed in the 2017 ORSC but is limited to allowing panels at maximum 18 feet on center spacing. The portal frames are allowed to be as narrow as 16 inches in width in order to maximize bracing for available openings along the wall line. In some cases it is more advantageous to increase the wall portal frame width in order to increase the spacing of the overall allowable opening from 18 feet to 25 feet on center spacing of the bracing panels. In order to accommodate the increase in spacing between wall panels the wall width must be increased to accommodate the higher loading conditions tributary to each panel.



Conclusion

Section R104.11 of the 2017 ORSC, *Alternate materials, design and methods of construction and equipment*, allows acceptance of an alternate method that achieves the intent of the code and provides for equivalent effectiveness and safety for occupants and property.

Portal Frame Alternate Method

This alternate method provides at least the equivalent effectiveness of the wall bracing required in Section R602.10. The application of this method is limited to residential structures three stories or less in height by use of a portal frame in accordance with the following requirements:

Section 1 – Definitions

A portal frame wall constructed in accordance with these provisions may be substituted for any exterior braced wall line required by Section R602.10. A braced wall line shall consist of braced and or alternate braced wall panels that meet the requirements for location, type, and amount of bracing specified in the associated tables in Section R602.10 and are in line or offset from each other by not more than four feet.

Section 2 – General Description

A portal frame wall, for this alternate method, consists of one or more continuous headers and two or more structural panels, each of equal width and height, but not less than 22½ inches wide, and attached to a reinforced concrete or reinforced masonry foundation. Except for the extended foundation system, the portal frame shall not contain vertical or horizontal bends, corners, or offsets. In essence, the portal frame will be vertical, plumb and in a straight line.

Section 3 – Detailed Description

For the level immediately above the foundation of one- and two-story walls (Portal Frames are not allowed in three story structures and are limited to the first floor of single story or two story structures), the following provisions shall be followed for the use of a portal frame wall. The attached drawings, numbered 1 through 5, following this ruling are for reference only and not a part of these provisions.

- a. The portal frame header shall be continuous and extend to the outermost edge of each supporting wall panel. The header shall be sized in all cases for all gravity loads, but in no case shall the header be less than 4 × 12 nominal Douglas-Fir No. 2.
- b. The portal frame shall consist of one top plate located under the header, and two bottom plates, one of which may be the sill plate, and (2) 4 × 4 minimum uprights (studs) located one per end of each portal frame panel. Note: In no case shall the stud depth be less than the header width. Multiple members are not to be substituted.
- c. Except as properly braced gabled framing, the top header shall be located no more than one plate depth below the top of the wall.
- d. Each portal frame vertical 4 × 4 frame member shall be attached to the header with not less than (2) 1,000-pound rated connectors, with one connector on each side of the vertical frame member. Each vertical 4 × 4 frame member shall attach to the foundation with not less than one (1) 4,800-pound rated hold-down or anchor installed in accordance with the manufacturer's instructions.

Exception: For the first story of two-story structures, each vertical 4 × 4 frame members shall be attached to the header with not less than (1) 4,000-pound rated connector, with one connector on each side of the vertical frame member or (2) 2,000-pound rated connectors,

with two connectors on each side of the vertical frame member. Each vertical 4×4 frame member shall attach to the foundation with not less than one (1) 5,300-pound rated hold-down or anchor installed in accordance with the manufacturer's instructions.

- e. The portal frame panel face shall not be less than $\frac{3}{8}$ inches CDX plywood or $\frac{7}{16}$ inches WOOD STRUCTURAL PANEL SHEATHING. (STRUCTURAL USE PANEL SIDING IS NOT ACCEPTABLE.) The panel shall be attached at the top, bottom, sides and header/plate with 2 rows of 8d common nails spaced at 3 inches on center (O/C). Where two members occur (double bottom plate or single plate and header), one row of nails shall be applied to each member.

Note: This face may occur on either side of the panel.

Exception: For the first story of two-story structures, the panel face shall occur on both sides of the portal frame.

- f. The portal frame foundation system shall consist of a minimum 8-inch thick concrete or masonry wall, 17 inches to 48 inches tall measured from the top of the footing, reinforced with not less than (1) #4 horizontal reinforcement bar located within the top two inches of the wall. The wall shall be connected to a minimum 15 inches \times 7 inches continuous concrete footing, centered under the wall, by not less than (2) #4 vertical reinforcement bars with a minimum 6-inch hook located in the footing. The footing shall be reinforced with not less than (2) #4 continuous reinforcement bars located a minimum of 3 inches from the bottom of the footing, and the reinforcing bars shall extend not less than 10 feet beyond the structural panel on each side of the panel. At garage door and other door openings, a turned down slab edge, of minimum size 12 inches \times 12 inches with (2) #4 continuous bars lapped with the foundation reinforcement may be provided across the opening in lieu of the requirement for continuous footings. Where the frost depth is more than 12 inches the greater depth shall be used for a turned down slab on edge. Reinforcement laps shall not be less than 12 inches. All reinforcement shall be supported in place as required by the ORSC.
- g. The portal frame panels shall not be spaced more than 25 feet on center. Where multiple frames are desirable an intermediate panel not less than $22\frac{1}{2}$ inches wide and constructed as described above shall be provided. The frame spacing shall not be less than 8 feet or that which would allow the installation of one standard 8-foot-wide overhead door. Headers may be spliced at this panel provided that four 1,000# straps are installed over the splice parallel to the beams (two per side) and provided that two vertical 2×4 's are installed centered under the splice joint (in addition to the required 4×4 vertical uprights).

The technical and scientific facts for this Statewide Alternate Method are approved.

(Signature on file)

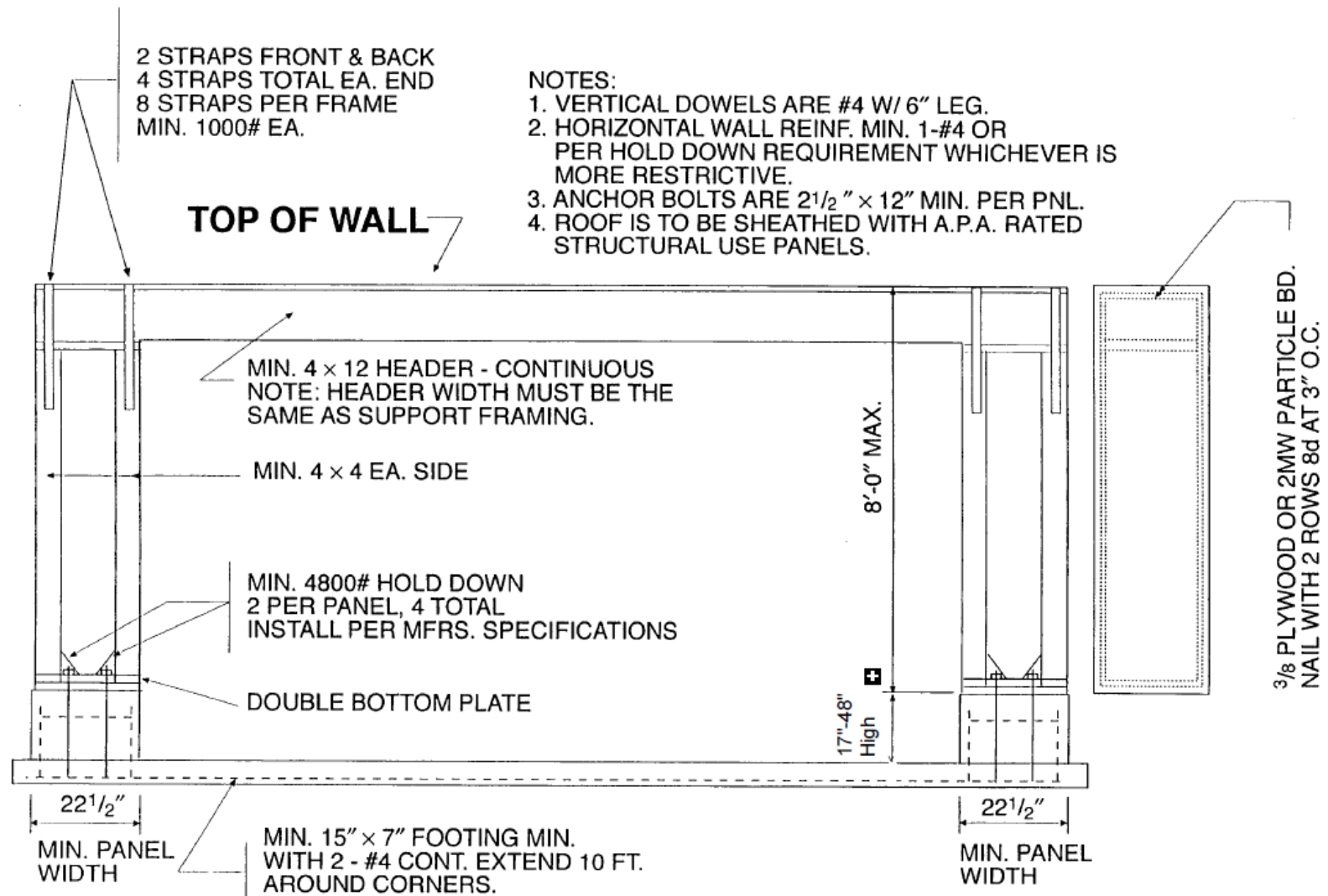
Mark Long, Administrator
Building Codes Division

Dec. 18, 2002

Date

97-1.5

DRAWING 1



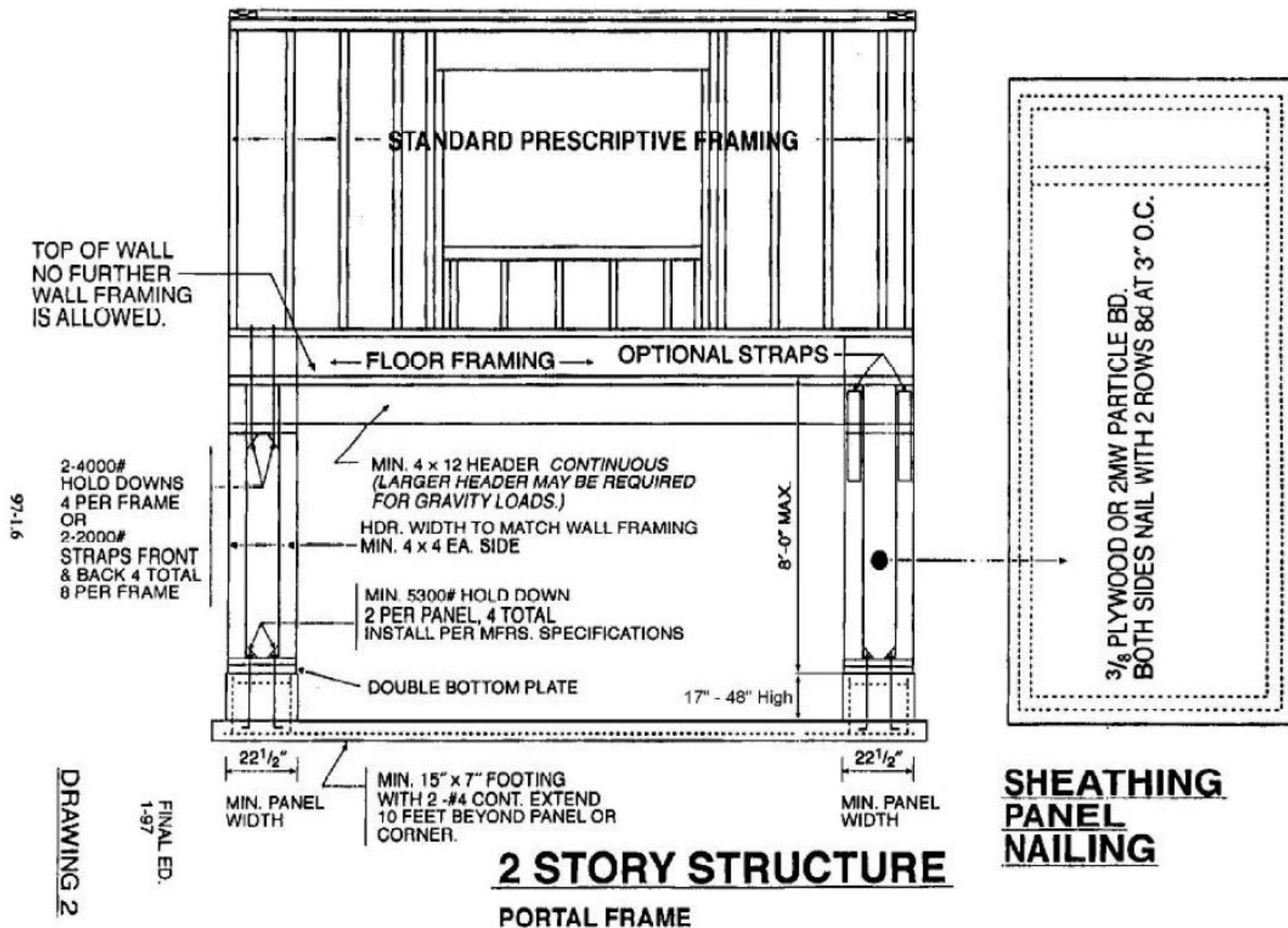
1 STORY STRUCTURE

THE PANELS AT EACH END OF EACH PORTAL FRAME MUST BE EQUAL WIDTH AND HEIGHT

PORTAL FRAME

MINIMUM BUILDING WIDTH IS 12 FEET

REV. ED
12/18/2002

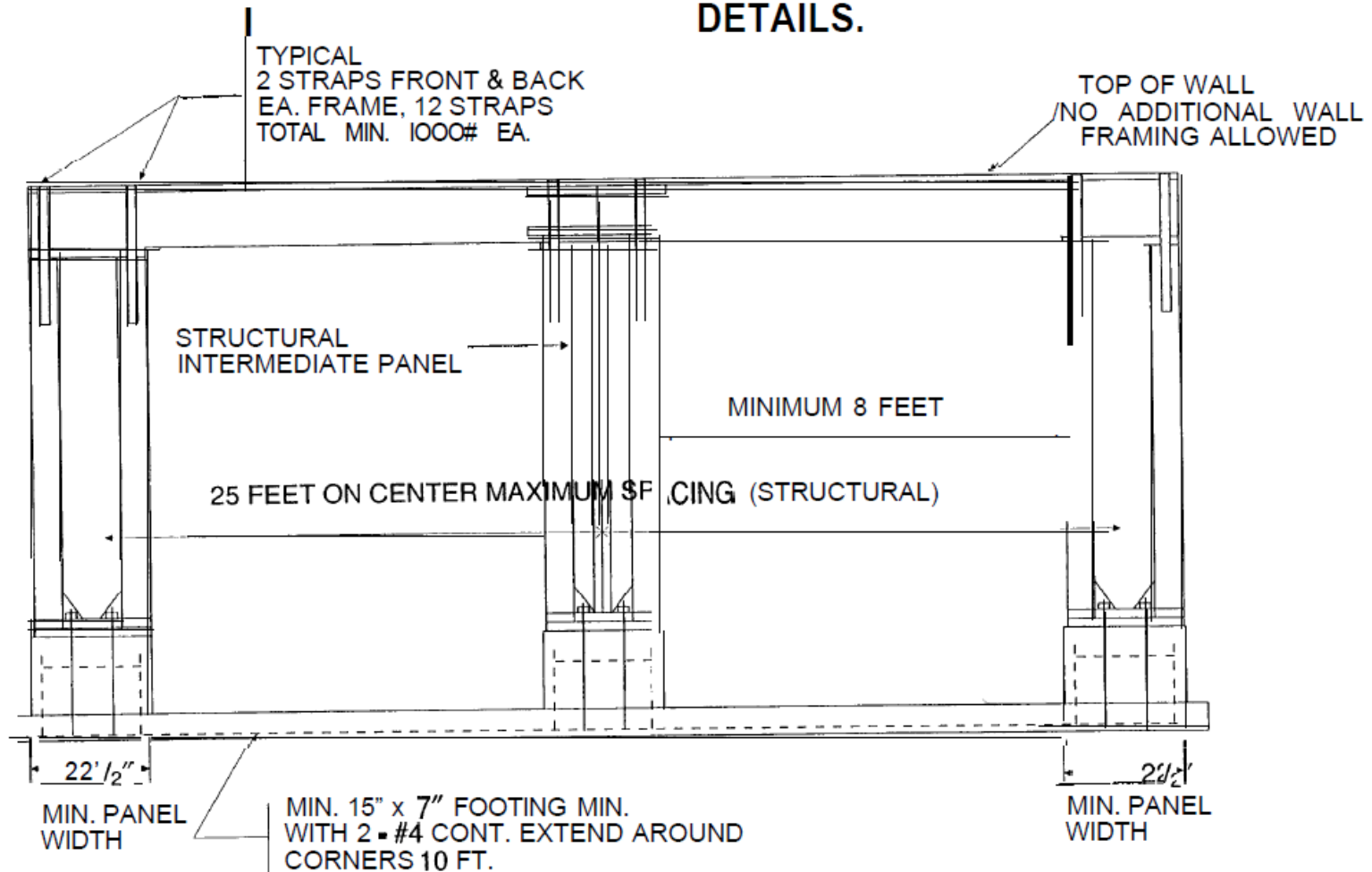


NOTE: Portal frames are allowed by prescriptive construction,
only on the first floor of one and two storied structures.
NOT ALLOWED IN THREE STORIED STRUCTURES.

THE PANELS AT THE END OF EACH PORTAL FRAME
MUST BE EQUAL WIDTH AND HEIGHT

12/18/2002

SEE 1 AND 2 STORY DETAILS
FOR SPECIFIC CONSTRUCTION
DETAILS.

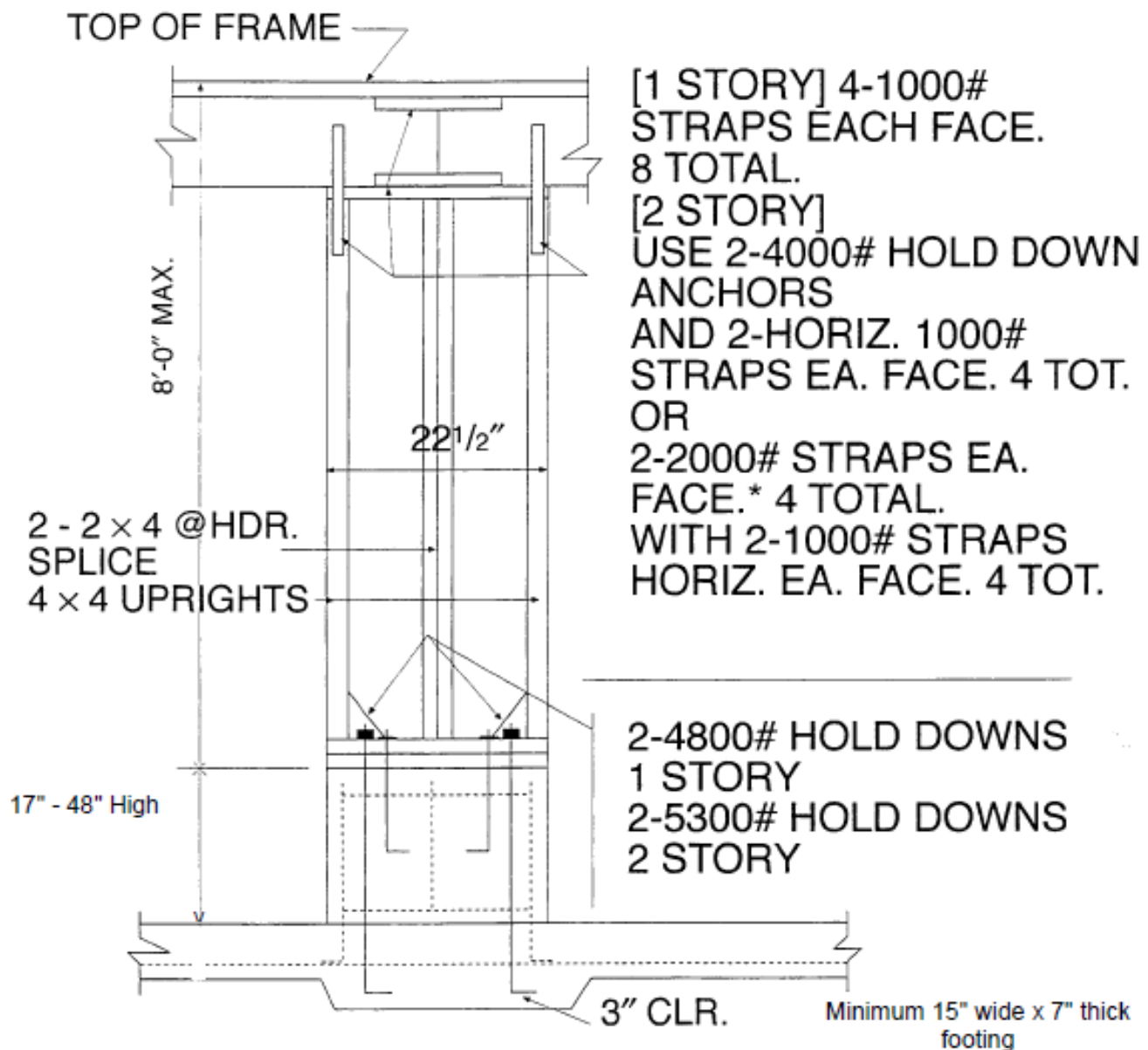


DRAWING 3

STRUCTURAL INTERMEDIATE PANEL

PORTAL FRAME

REV. ED
12/18/2002



SEE PORTAL FRAME DRAWINGS FOR FOUNDATION, HOLD DOWN AND PLYWOOD NAILING.

** SPECIAL FRAMING REQUIRED TO ACCOMMODATE STRAPS.*

INTERMEDIATE FRAME

THIS IS NOT AN ALTERNATE BRACE PANEL

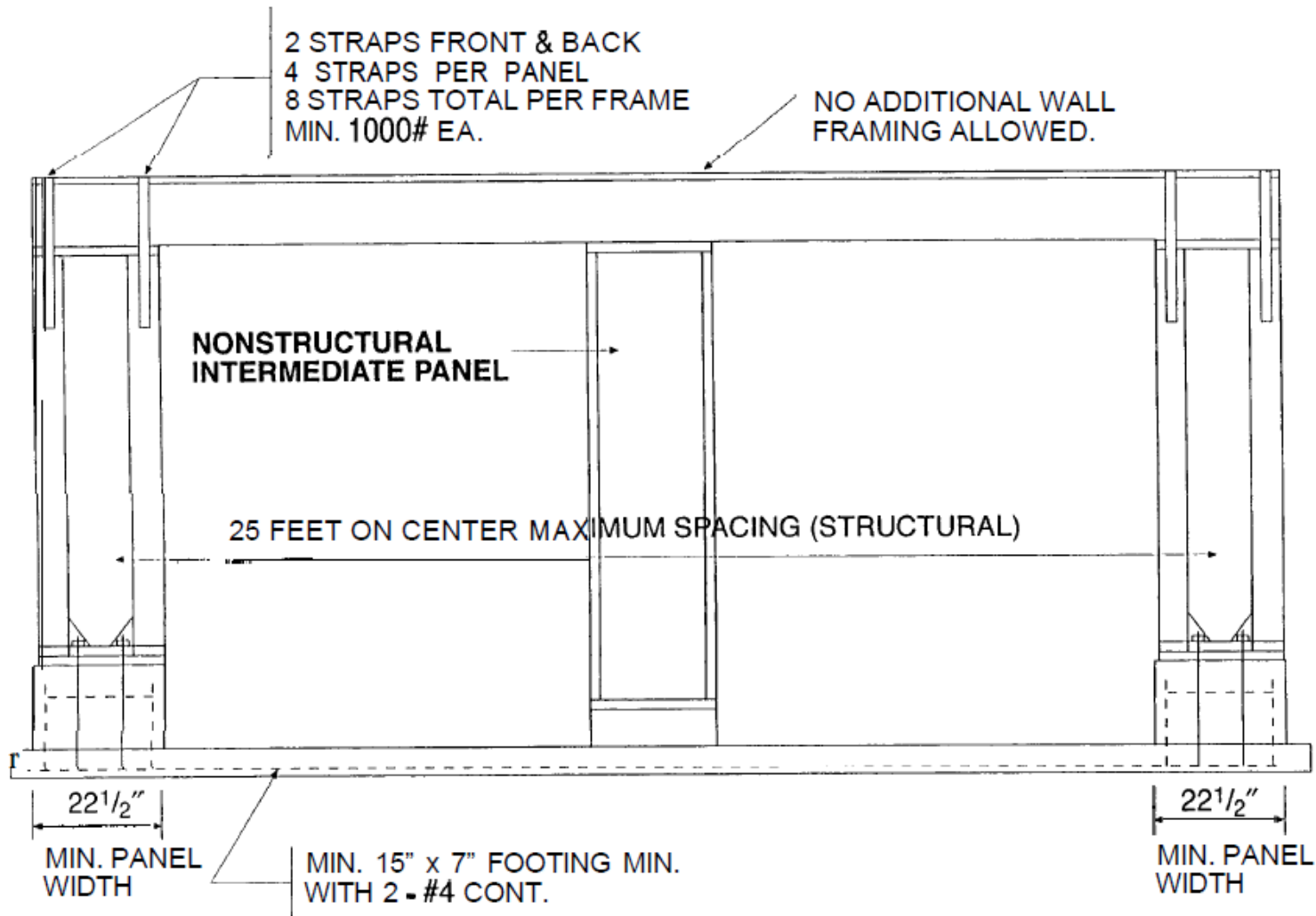
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1-97

97-1.8

DRAWING 4

97-1.9



DRAWING 35

NONSTRUCTURAL INTERMEDIATE PANEL

PORTAL FRAME

FINAL ED
12/18/2002