



MINIMUM PLAN SUBMITTAL REQUIREMENTS FOR PRESCRIPTIVE LATERAL WALL BRACING

This guide is intended to be a step-by-step tool aiding one and two-family dwelling designers in applying the Oregon Residential Specialty Code (ORSC) prescriptive lateral bracing requirements.¹ This guide contains three sections; Wall Bracing, Continuous Sheathing Corner Panel Placement, and Braced Wall Foundations. This is not an exhaustive treatise and the reader should exercise due diligence in understanding and applying the ORSC wall bracing provisions. If the structure you are designing cannot meet the ORSC prescriptive methods, a calculated design in conformance with accepted engineering practices is required. You will need a copy of the current ORSC in order to create a prescriptive lateral wall bracing design. All lateral bracing plans and each braced wall line must be evaluated for both Wind (135 mph) and Seismic (D₂) forces with the most restrictive governing the design on each braced wall line.

The prescriptive design must not exceed the following:

- ▶ 15 psf roof or ceiling dead loads
- ▶ 10 psf floor dead load
- ▶ 12' wall height
- ▶ 30' structure height
- ▶ 20' eave to ridge height
- ▶ Irregular Buildings

ORSC R301.2.2.2.5 The seismic provisions of this code shall not be used for irregular structures located in Seismic Design Category D₂. Irregular portions of structures shall be designed in accordance with accepted engineering practice to the extent the irregular features affect the performance of the remaining structural system. This code section lists seven building elements that are considered irregular thereby prohibiting a prescriptive wall bracing design. The designer must take this code section under consideration when creating the lateral bracing design.

Section One – Wall Bracing

Determining the amount of required bracing for each braced wall line involves the following five steps.

Step One: Determine Braced Wall Methods

Please note Braced Wall Lines (BWL) and Braced Wall Panels (BWP) are distinct from one another and have very different meanings in the ORSC.²

Braced wall construction shall use either intermittent or continuously sheathed methods in R602.10.4 and Table R602.10.4. Identify which method is used on the submitted plans. See ORSC Table R602.10.4 included in this handout.

Mixing of bracing methods is allowed as follows: (See section R602.10.4.1 and R602.10.6 for additional information and limitations)

¹ In the instance a specific element of this guide conflicts with the ORSC, the adopted code shall govern.

² BRACED WALL LINE. A straight line through the building plan that represents the location of the lateral resistance provided by the wall bracing. BRACED WALL PANEL. A full-height section of wall constructed to resist in-plane shear loads through interaction of framing members, sheathing material and anchors. The panel's length meets the requirements of its particular bracing method, and contributes toward the total amount of bracing required along its braced wall line in accordance with Section R602.10.1. See ORSC Figure R602.10.1(1) included in this handout.

- ▶ Mixing intermittent bracing and continuous sheathing methods from story to story shall be permitted.
- ▶ Mixing intermittent bracing methods from braced wall line to braced wall line within a story shall be permitted.
- ▶ Mixing of continuous sheathing methods CS-WSP, CS-G and CS-PF along a braced wall line shall be permitted.
- ▶ Intermittent methods ABW, PFH and PFG shall be permitted to be used along a braced wall line with continuous sheathing methods.

Continuously sheathed panels³ consist of the following;

- ▶ CS-WSP (wood structural panel)
- ▶ CS- PF (portal frame)
- ▶ CS-G (garage)

Intermittent panels³ consist of the following;

- ▶ LIB (let in bracing)
- ▶ DWB (diagonal wood boards)
- ▶ WSP (wood structural panel)
- ▶ BV-WSP (masonry veneer with wood structural panels)
- ▶ SFB (structural fiberboard)
- ▶ GB (gypsum board)
- ▶ PBS (particleboard sheathing)
- ▶ PCP (Portland cement plaster)
- ▶ HPS (hardboard panel siding)
- ▶ ABW (alternate braced wall)
- ▶ PFH (portal frame with hold-downs)
- ▶ PFG (portal frame at garage)

Step Two: Determine the Spacing and Length of Braced Wall Lines (BWL)

BWLs must be shown on the construction drawings. See ORSC Figure R602.10.1.1 included in this packet. It is most helpful to use a separate floor plan view demonstrating the following;

- A- The maximum spacing between parallel BWLs is 25'. Dimensions must be shown. See Table R602.10.1.3. This spacing may be increased to 30' and 35' with the appropriate adjustment factors in Table R602.10.3(2) and Table R602.10.3(4). This spacing may also be increased to 35' for one room with an area not greater than 900 sq. ft. between two BWLs.
- B- BWPs may be offset up to 4' from the BWLs. See Figure 3.3 included in this packet.
- C- BWLs must be identified by numbers (1, 2, 3...) in one plan direction and letters (A, B, C...) in the transverse plan direction.
- D- Required Length of Bracing. The required length of bracing along each braced wall line shall be determined as follows:
All buildings in Seismic Design Categories D2 shall use the greater value determined from Table R602.10.3(1) or Table R602.10.3(3) and the applicable adjustment factors in Table R602.10.3(2) or Table R602.10.3(4), respectively. This step must be completed for each BWL separately, based on the bracing method in Step One.
- E- The minimum BWP length is determined in and shall comply with Table R602.10.5.
For method CS-WSP, the minimum panel length shall be based on the adjacent clear opening height in accordance with Table R602.10.5 and Figure R602.10.5. Where a panel has an opening on either side of differing heights, the taller opening height shall be used to determine the panel length. For purposes of computing the required length of bracing in Tables R602.10.3(1) and R602.10.3(3), the contributing length of each BWP shall be as specified in Table R602.10.5. Only those BWP lengths meeting the required measurements of Table R602.10.5 are contributing BWPs.
- F- BWL End Conditions. Ends of each BWL with continuous sheathing shall have one of the end/corner conditions shown in Figure R602.10.7. See Section #2, page #5 of this guide.
- G- BWP Spacing. The distance between adjacent edges of BWPs along a given BWL shall not be greater than 20 feet as shown in Figure R602.10.2.2. See page #8 of this guide.

³ Table R602.10.4 Please see the additional information and limitations located in the foot notes of this table.

Step Three: Wind Adjustment Factors

You will reference Tables R602.10.3(1) and R602.10.3(2) for each of the wind adjustment factors in Step Three. Linear interpolation is permitted.

- A- Exposure Factor. Determine the Exposure Category B, C, or D from R301.2.1.3. If you are unsure of the correct Exposure Category for your specific job site, please call the Building Codes Division office for assistance.
- B- Eave Height Factor. The adjustment factor is determined by the number of floors and the eave height.
- C- Wall Height factor. The wall height factors are the same for any story. The wind and seismic provisions of the ORSC shall apply to buildings with story heights not exceeding the following: 1. For wood wall framing, the story height shall not exceed 11 feet 7 inches and the laterally unsupported bearing wall stud height permitted by Table R602.3(5). Walls exceeding this limitation will require engineering.⁴
- D- Number of BWLs Adjustment Factor.
- E- Additional 800 lb. hold-down device. This adjustment is allowed for one-story and top story of multiple story structures. The hold-down device must be placed at each end of each BWP in the BWL and must extend to the foundation. This adjustment is allowed with the following methods only: DWB, WSP, SFB, PBS, PCP, HPS.
- F- Interior Gypsum Board Finish. This applies only if omitted from the inside face of braced wall panels (Typically occurs at gable end or garage walls.) This adjustment is allowed with the following methods only: DWB, WSP, SFB, PBS, PCP, HPS, CS-WSP, CS-G.
- G- Gypsum Board Fastening. When gypsum board fastening is applied at 4 inches on center at panel edges, including top and bottom plates, with all horizontal joints blocked.
- H- Multiply the adjustment factors of items 1 through 7 and the required length of bracing from Table R602.10.3(1).

Example: Assume a 30' tall one-story structure with BWL spacing of 20', Exposure B, 15' roof to eave, 10' wall height, two BWLs, no additional hold-down devices, no omission of gypsum board, gypsum board with standard fastening, CS-WSP BWP construction method, floor dead load of 10 psf, roof/ceiling dead load of 15 psf.

At 135 mph wind speed, Table R602.10.3(1) requires a minimum total length of bracing of 4.5'.

Next, multiply the minimum total length of bracing, 4.5' by the factors in 1 through 7 above.

$$\begin{array}{ccccccccccc} 4.5 & \times & 1.0 & \times & 1.3 & \times & 1.0 & \times & 1.0 & = & 5.85' \\ \text{Factors: Table R602.10.3(2)} & & \text{(A)} & & \text{(B)} & & \text{(C)} & & \text{(D)} & & \text{(Required length of Bracing)} \end{array}$$

Step Four: Seismic Adjustment Factors

You will reference Tables R602.10.3(3) and R602.10.3(4) for each of the seismic adjustment factors in Step Four. Linear interpolation is permitted.

- A- Story Height. The wind and seismic provisions of the ORSC shall apply to buildings with story heights not exceeding the following: 1. For wood wall framing, the story height shall not exceed 11' 7" and the laterally unsupported bearing wall stud height permitted by Table R602.3(5). Walls exceeding this limitation will require engineering.⁴
- B- Braced Wall Line Spacing. Without adjustment, BWL spacing cannot exceed 25'. BWL spacing may be increased to > 25' and ≤ 30' using an adjustment factor of 1.2. BWL spacing may be increased to > 30' and ≤ 35' using an adjustment factor of 1.4.
- C- Wall Dead Load.⁵ Choose the appropriate item from the two options (> 8 psf and < 15 psf) or (< 8 psf).
- D- Roof/Ceiling Dead Load for Wall. Choose the appropriate item based on the three options.
- E- Walls with stone or masonry veneer, detached one- and two-family dwellings in SDC D2. See Table R602.10.6.5.
- F- Interior Gypsum Board Finish. This applies only if omitted from the inside face of braced wall panels (Typically occurs at gable end or garage walls.) This adjustment is allowed with the following methods only: DWB, WSP, PBS, PCP, HPS, CS-WSP, CS-G.
- G- Multiply the adjustment factors of items 1 through 6 and the required length of bracing from Table R602.10.3(3).

⁴ STORY HEIGHT. The vertical distance from top to top of two successive tiers of beams or finished floor surfaces; and, for the topmost story, from the top of the floor finish to the top of the ceiling joists or, where there is not a ceiling, to the top of the roof rafters. The wind and seismic provisions of this code shall apply to buildings with story heights not exceeding the following: 1. For wood wall framing, the story height shall not exceed 11 feet 7 inches and the laterally unsupported bearing wall stud height permitted by Table R602.3(5).

⁵ DEAD LOADS. The weight of the materials of construction incorporated into the building, including but not limited to walls, floors, roofs, ceilings, stairways, built-in partitions, finishes, cladding, and other similarly incorporated architectural and structural items, and fixed service equipment.

Example: Assume a 30' tall one-story structure with BWL length of 20', Exposure B, 15' roof to eave, 10' wall height, two BWLs, no additional hold-down devices, no omission of gypsum board, gypsum board with standard fastening, CS-WSP BWP construction method, floor dead load of 10 psf, roof/ceiling deal load of 15 psf.

In Seismic Design Category D₂, Table R602.10.3(3) requires a minimum total length of bracing of 4.3'.

Next, multiply the minimum total length of bracing, 4.3' by the factors in 1 through 6 above.

$$\begin{array}{ccccccccccc} 4.3 & & 1.0 & \times & 1.0 & \times & 1.0 & \times & 1.0 & \times & 1.0 & \times & 1.0 & = & 4.3' \\ \text{Factors: Table R602.10.3(4)} & & \text{(A)} & & \text{(B)} & & \text{(C)} & & \text{(D)} & & \text{(E)} & & \text{(F)} & & \text{(Required amount of bracing)} \end{array}$$

Step Five: Determine Which Governs

Compare the resulting figures of the Step Three and Four examples once all the adjustment factors are applied.

The amount of required bracing in Step Three for Wind is 5.85'.

The amount of required bracing in Step Four for Seismic is 4.3'.

The wind provisions will govern the lateral bracing design for this BWL.

Repeat Steps One through Five for each BWL. The greater amount of bracing required will determine which provisions will govern (wind or seismic) in each BWL.

This guide is intended to be a step-by-step tool aiding one and two-family dwelling designers in applying the Oregon Residential Specialty Code (ORSC) prescriptive lateral bracing requirements.⁶ This is not an exhaustive treatise and the reader should exercise due diligence in understanding and applying the ORSC wall bracing provisions. More provisions are contained in the ORSC, specifically chapters four and six and the designer must be aware of all code provisions. If the structure you are designing cannot meet the ORSC prescriptive methods, a calculated design in conformance with accepted engineering practices is required. You will need a copy of the current ORSC in order to create a prescriptive lateral wall bracing design.

The user may find the following publication useful. [A Guide To The 2018 IRC Wood Wall Bracing Provisions.](https://www.iccsafe.org/) © 2018 This 281-page resource can be purchased at <https://www.iccsafe.org/>

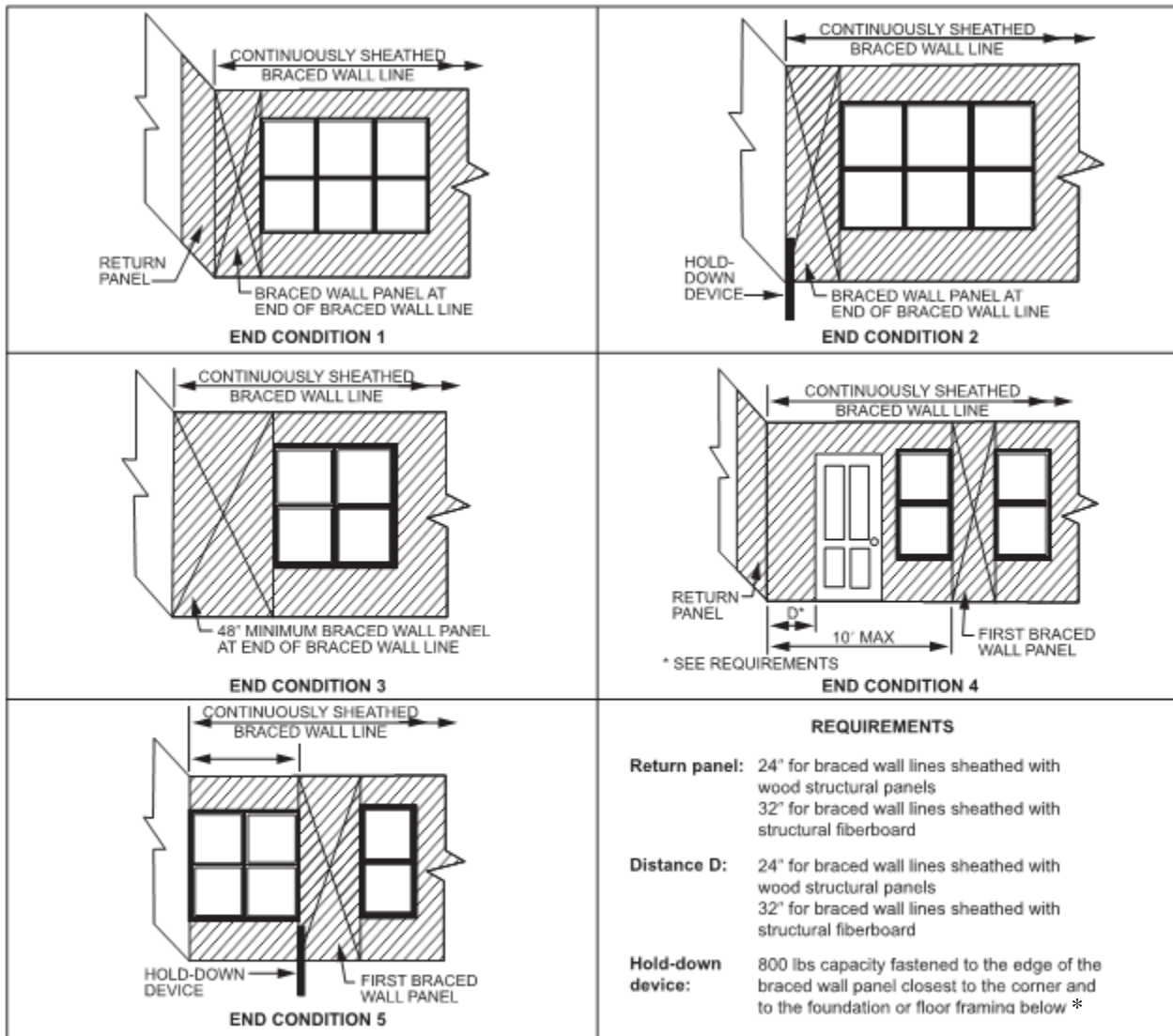
Special thanks to the Building Officials and staff of the cities of Seaside, Warrenton, Cannon Beach and Clatsop County for a consensus effort to produce this guide. It is the intent of those involved to create a user's guide to assist building designers in navigating the complex code provisions of wall bracing. Please contact your City of Scappoose code official with specific concerns as you use this guide.



⁶ In the instance a specific element of this guide conflicts with the ORSC, the adopted code shall govern.

Section Two - Continuous Sheathing Corner Panel Placement

Each end of a braced wall line with continuous sheathing shall have one of the conditions shown in Figure R602.10.7.



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 4.45 N.

FIGURE R602.10.7
END CONDITIONS FOR BRACED WALL LINES WITH CONTINUOUS SHEATHING

* This hold down device must be increase to 1,800 lbs. in Seismic Design Category D2.

Section Three - Braced Wall Panel Foundations

ORSC R403.1.2 Continuous footing in Seismic Design Categories D2.

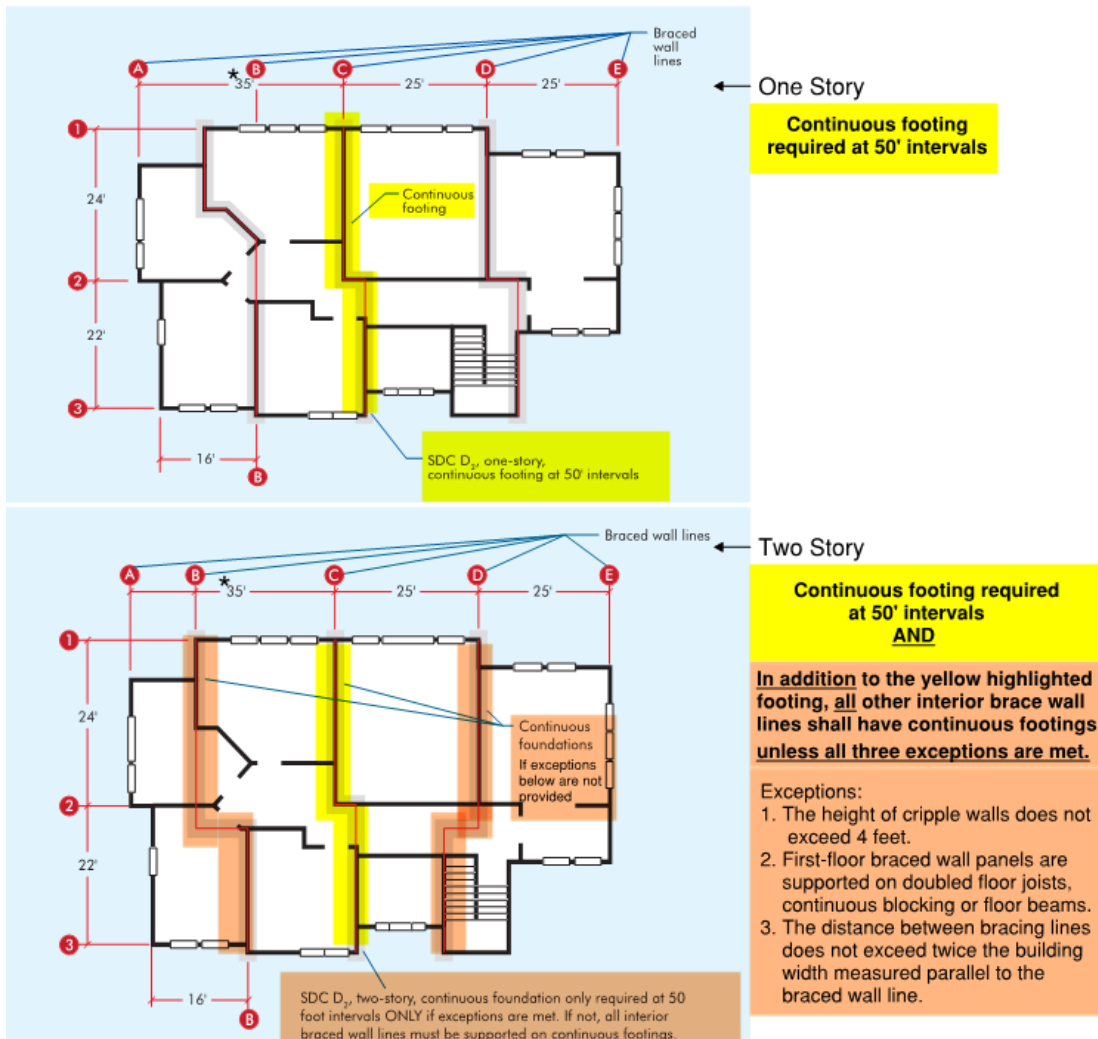
All exterior walls of buildings located in Seismic Design Categories D2 shall be supported by continuous solid or fully grouted masonry or concrete footings.

All required interior braced wall panels in buildings located in Seismic Design Categories D2 with plan dimensions greater than 50 feet shall be supported by continuous (from beginning to end of any wall line containing braced wall panels) solid or fully grouted masonry or concrete footings in accordance with Section R403.1.3.4, except for two story buildings in Seismic Design Category D2, in which all braced wall panels, interior and exterior, shall be supported on continuous foundations.

Exception: One- and two-story buildings shall be permitted to have interior braced wall panels supported on continuous foundations at intervals not exceeding 50 feet provided that:

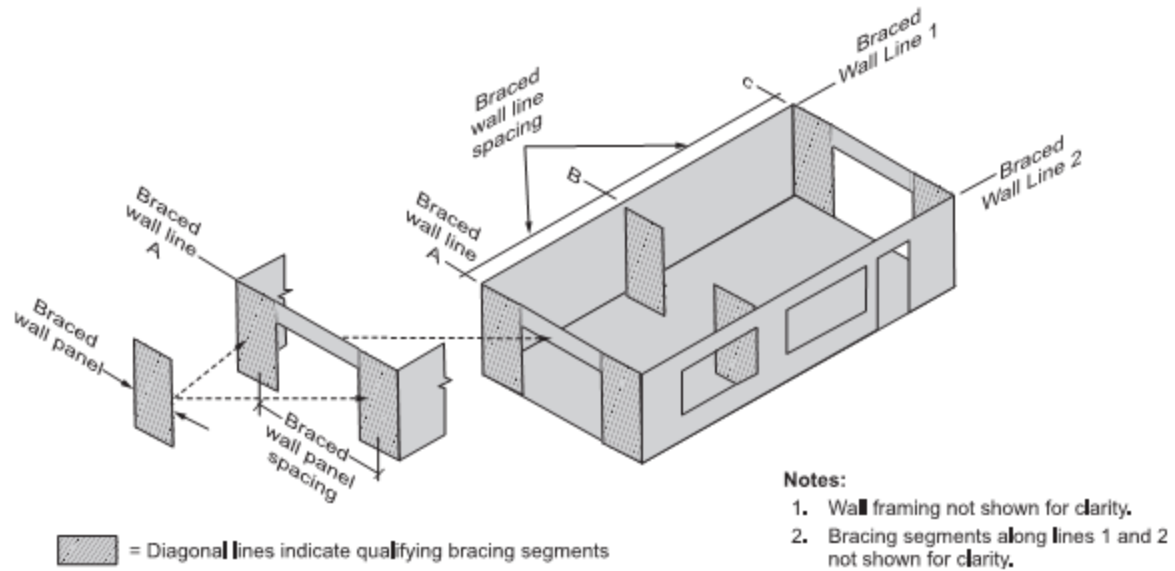
1. The height of cripple walls does not exceed 4 feet.
2. First-floor braced wall panels are supported on doubled floor joists, continuous blocking or floor beams.
3. The distance between bracing lines does not exceed twice the building width measured parallel to the braced wall line.

CONTINUOUS FOOTING EXAMPLE:



* Maximum BWL spacing is 25'. Up to 35' is allowed when length of required bracing per Table R602.10.3(3) is adjusted per Table R602.10.3(4).

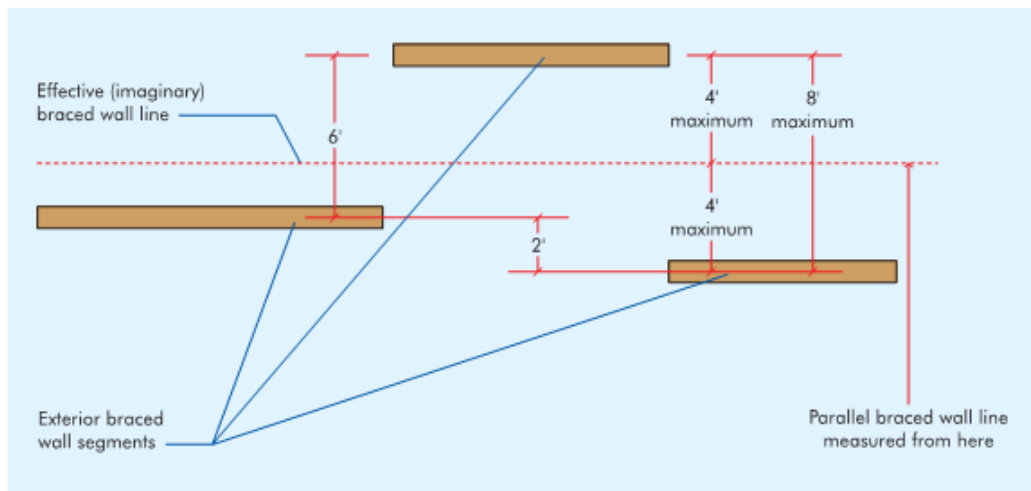
Useful Tables - Figures - Examples



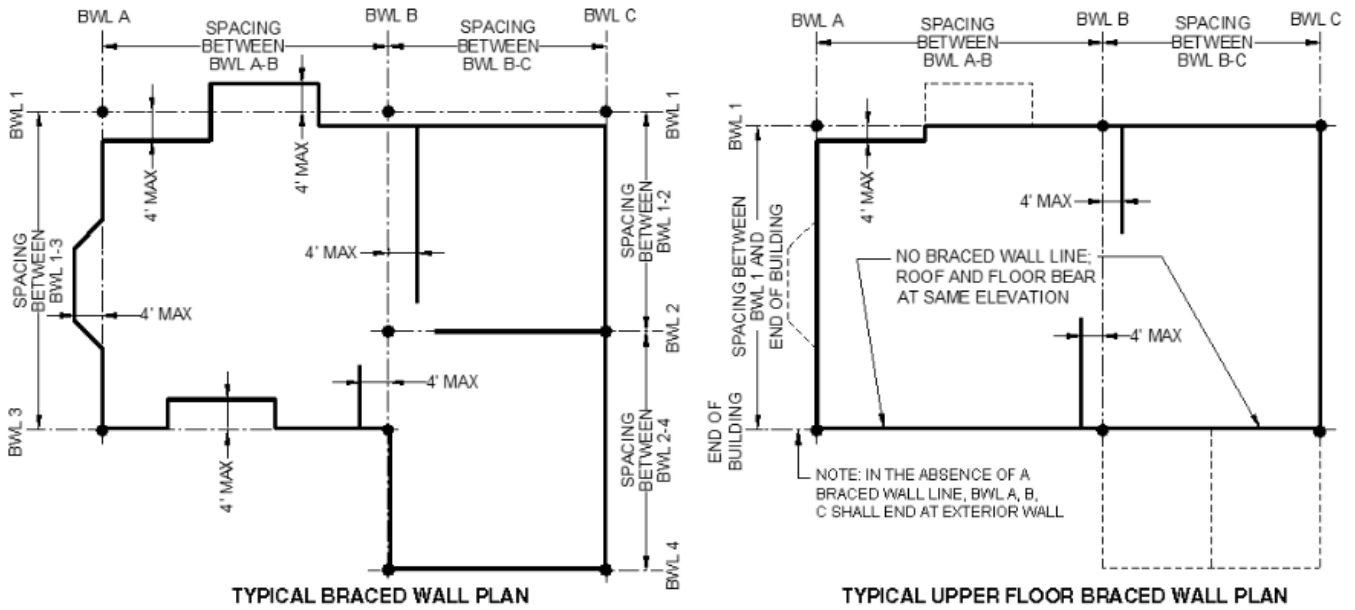
**Commentary Figure R602.10.1(1)
WALL BRACING TERMINOLOGY**

FIGURE 3.3

Effective (imaginary) braced wall line

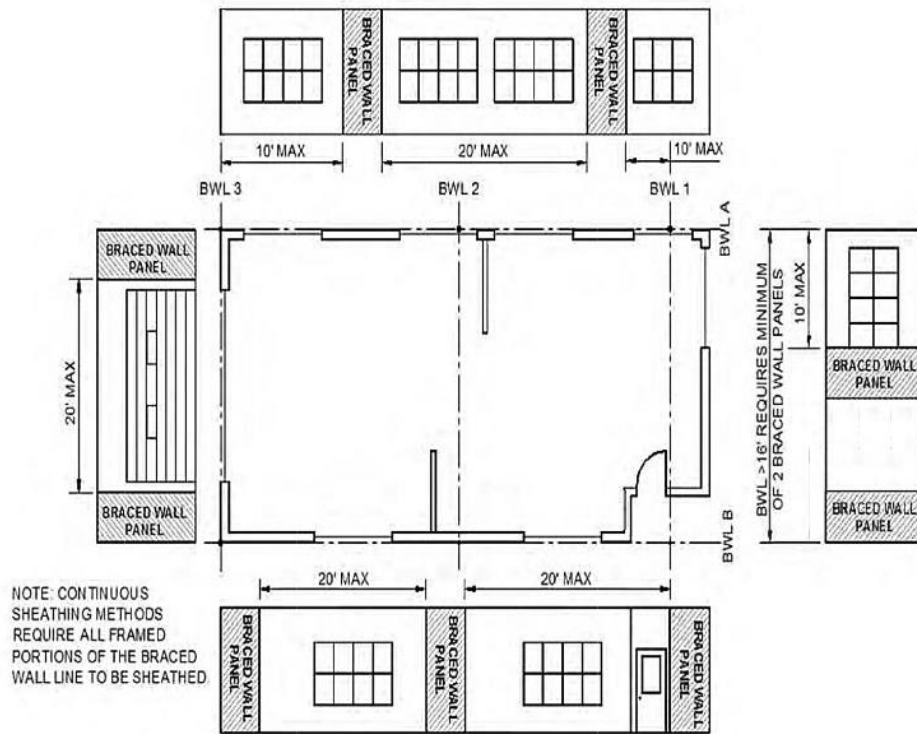


**Braced Wall Line Example
R602.10.1 & R602.10.1.2**



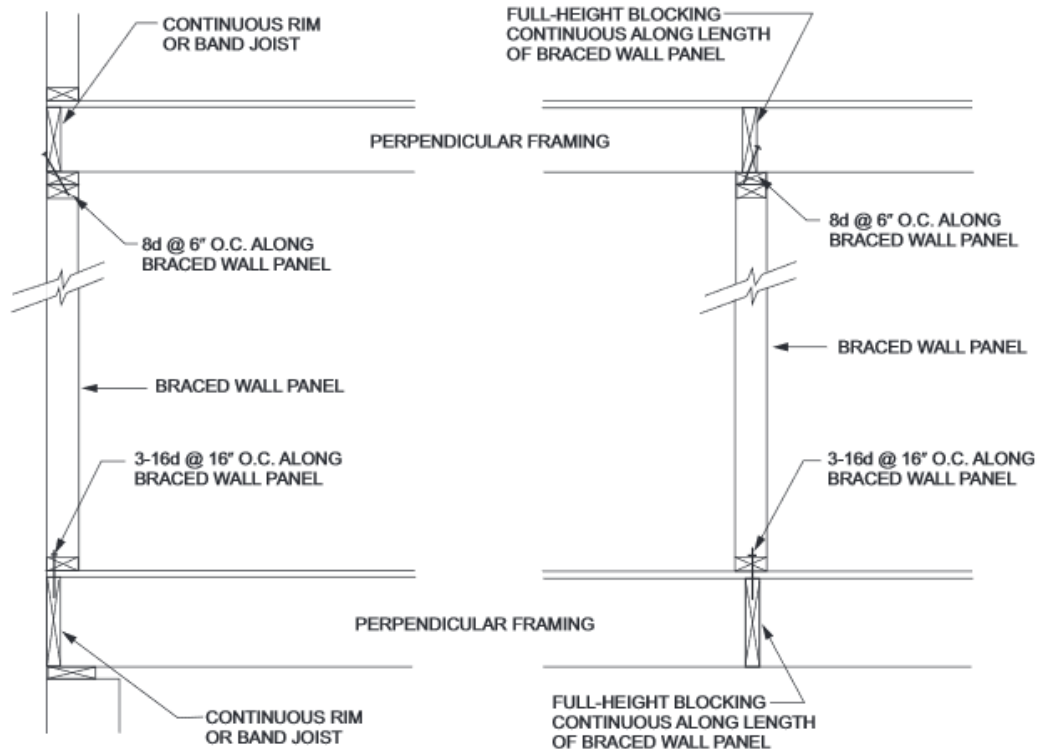
For SI: 1 foot = 304.8 mm.

**FIGURE R602.10.1.1
BRACED WALL LINES**



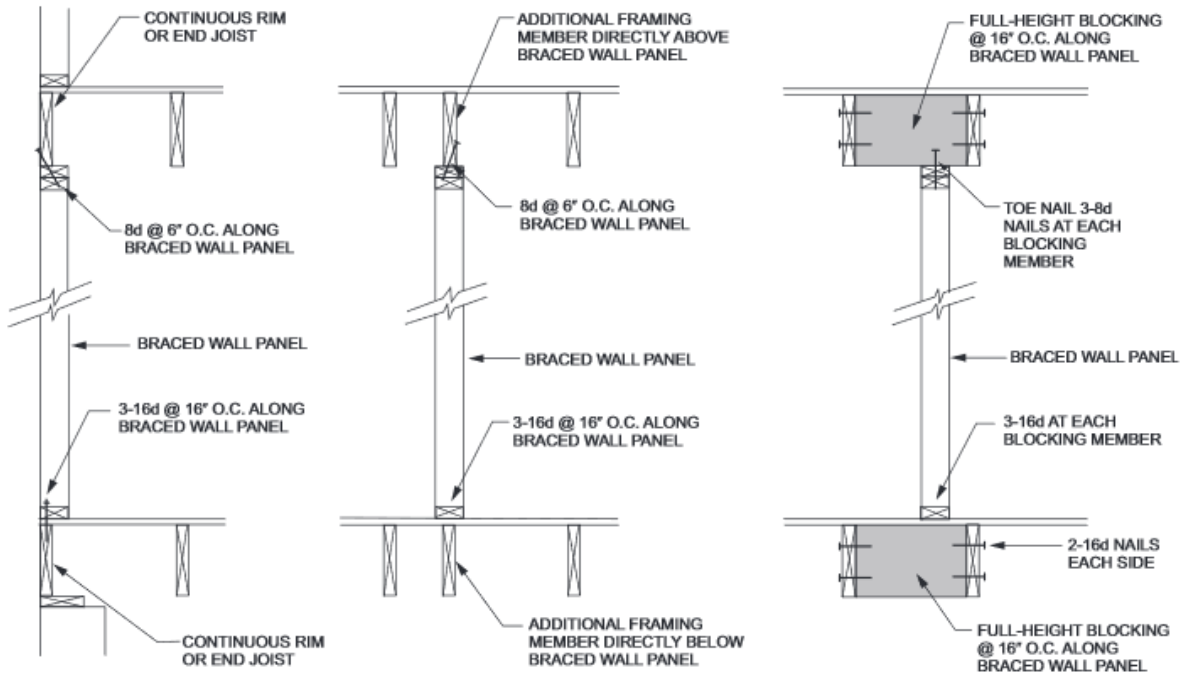
For SI: 1 foot = 304.8 mm.

**FIGURE R602.10.2.2
LOCATION OF BRACED WALL PANELS**



For SI: 1 inch = 25.4 mm.

FIGURE R602.10.8(1)
BRACED WALL PANEL CONNECTION WHEN PERPENDICULAR TO FLOOR/CEILING FRAMING



For SI: 1 inch = 25.4 mm.







FIGURE R602.10.8(2)
BRACED WALL PANEL CONNECTION WHEN PARALLEL TO FLOOR/CEILING FRAMING

**TABLE R602.10.4
BRACING METHODS**

METHODS, MATERIAL	MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA ^a	
			Fasteners	Spacing
Intermittent Bracing Method	LIB Let-in-bracing 1 × 4 wood or approved metal straps at 45° to 60° angles for maximum 16" stud spacing		Wood: 2-8d common nails or 3-8d (2 1/2" long x 0.113" dia.) nails	Wood: per stud and top and bottom plates
			Metal strap: per manufacturer	Metal: per manufacturer
	DWB Diagonal wood boards 3/4"(1" nominal) for maximum 24" stud spacing		2-8d (2 1/2" long x 0.113" dia.) nails or 2 - 1 3/4" long staples	Per stud
	WSP Wood structural panel (See Section R604) 3/8"		Exterior sheathing per Table R602.3(3)	6" edges 12" field
		Interior sheathing per Table R602.3(1) or R602.3(2)	Varies by fastener	
	BV-WSP^e Wood structural panels with stone or masonry veneer (See Section R602.10.6.5) 7/16"	See Figure R602.10.6.5	8d common (2 1/2" x 0.131) nails	4" at panel edges 12" at intermediate supports 4" at braced wall panel end posts
	SFB Structural fiberboard sheathing 1/2" or 25/32" for maximum 16" stud spacing		1 1/2" long x 0.12" dia. (for 1/2" thick sheathing) 1 3/4" long x 0.12" dia. (for 25/32" thick sheathing) galvanized roofing nails or 8d common (2 1/2" long x 0.131" dia.) nails	3" edges 6" field
	GB Gypsum board 1/2"		Nails or screws per Table R602.3(1) for exterior locations	For all braced wall panel locations: 7" edges (including top and bottom plates) 7" field
		Nails or screws per Table R702.3.5 for interior locations		
	PBS Particleboard sheathing (See Section R605) 3/8" or 1/2" for maximum 16" stud spacing		For 3/8", 6d common (2" long x 0.113" dia.) nails For 1/2", 8d common (2 1/2" long x 0.131" dia.) nails	3" edges 6" field
PCP Portland cement plaster See Section R703.6 for maximum 16" stud spacing			1 1/2" long, 11 gage, 7/16" dia. head nails or 7/8" long, 16 gage staples	6" o.c. on all framing members
HPS Hardboard panel siding 7/16" for maximum 16" stud spacing			0.092" dia., 0.225" dia. head nails with length to accommodate 1 1/2" penetration into studs	4" edges 8" field
ABW Alternate braced wall 3/8"			See Section R602.10.6.1	See Section R602.10.6.1

(continued)







TABLE R602.10.4—continued
BRACING METHODS

METHODS, MATERIAL		MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA ^a	
				Fasteners	Spacing
Intermittent Bracing Methods	PFH Portal frame with hold-downs	$\frac{3}{8}$ "		See Section R602.10.6.2	See Section R602.10.6.2
	PFG Portal frame at garage	$\frac{7}{16}$ "		See Section R602.10.6.3	See Section R602.10.6.3
Continuous Sheathing Methods	CS-WSP Continuously sheathed wood structural panel	$\frac{3}{8}$ "		Exterior sheathing per Table R602.3(3) Interior sheathing per Table R602.3(1) or R602.3(2)	6" edges 12" field Varies by fastener
	CS-G^{b, c} Continuously sheathed wood structural panel adjacent to garage openings	$\frac{3}{8}$ "		See Method CS-WSP	See Method CS-WSP
	CS-PF Continuously sheathed portal frame	$\frac{7}{16}$ "		See Section R602.10.6.4	See Section R602.10.6.4
	CS-SFB^d Continuously sheathed structural fiberboard	$\frac{1}{2}$ " or $\frac{25}{32}$ " for maximum 16" stud spacing		$1\frac{1}{2}$ " long \times 0.12" dia. (for $\frac{1}{2}$ " thick sheathing) $1\frac{3}{4}$ " long \times 0.12" dia. (for $\frac{25}{32}$ " thick sheathing) galvanized roofing nails or 8d common (2 $\frac{1}{2}$ " long \times 0.131" dia.) nails	3" edges 6" field

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 degree = 0.0175 rad, 1 pound per square foot = 47.8 N/m², 1 mile per hour = 0.447 m/s.

- > a. Adhesive attachment of wall sheathing, including Method GB, shall not be permitted in Seismic Design Categories C, D₁ and D₂.
- > b. Applies to panels next to garage door opening where supporting gable end wall or roof load only. Shall only be used on one wall of the garage. In Seismic Design Categories D₁ and D₂, roof covering dead load shall not exceed 3 psf.
- > c. Garage openings adjacent to a Method CS-G panel shall be provided with a header in accordance with Table R602.7(1). A full-height clear opening shall not be permitted adjacent to a Method CS-G panel.
- > d. Method CS-SFB does not apply in Seismic Design Categories D₁ and D₂.
- > e. Method applies to detached one- and two-family dwellings in Seismic Design Categories D₁ through D₂ only.

**TABLE R602.10.3(1)—continued
BRACING REQUIREMENTS BASED ON WIND SPEED**

<ul style="list-style-type: none"> • EXPOSURE CATEGORY B • 30-FOOT MEAN ROOF HEIGHT • 10-FOOT WALL HEIGHT • 2 BRACED WALL LINES 			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE ^a			
Ultimate Design Wind Speed (mph)	Story Location	Braced Wall Line Spacing ^c (feet)	Method LIB ^b	Method GB	Methods DWB, WSP, SFB, PBS, PCP, HPS, BV-WSP, ABW, PFH, PFG, CS-SFB	Methods CS-WSP, CS-G, CS-PF
≤ 135		10	5.0	5.0	3.0	2.5
		20	9.5	9.5	5.5	4.5
		30	13.0	13.0	7.5	6.5
		40	17.0	17.0	10.0	8.5
		50	21.0	21.0	12.0	10.5
		60	25.0	25.0	14.0	12.0
		10	9.5	9.5	5.5	5.0
		20	17.5	17.5	10.5	8.5
		30	25.0	25.0	14.5	12.5
		40	32.5	32.5	19.0	16.0
		50	40.0	40.0	23.0	19.5
		60	47.5	47.5	27.0	23.5
		10	NP	14.0	8.0	7.0
		20	NP	26.0	15.0	12.5
		30	NP	37.0	21.5	18.5
		40	NP	48.0	27.5	23.5
		50	NP	59.5	34.0	29.0
		60	NP	70.5	40.5	34.0
< 140		10	5.5	5.5	3.0	2.5
		20	10.0	10.0	5.5	5.0
		30	14.0	14.0	8.0	7.0
		40	18.0	18.0	10.5	9.0
		50	22.5	22.5	13.0	11.0
		60	26.5	26.5	15.0	13.0
		10	10.0	10.0	6.0	5.0
		20	18.5	18.5	11.0	9.0
		30	27.0	27.0	15.5	13.0
		40	35.0	35.0	20.0	17.0
		50	43.0	43.0	24.5	21.0
		60	51.0	51.0	29.0	25.0
		10	NP	15.0	8.5	7.5
		20	NP	27.5	16.0	13.5
		30	NP	39.5	23.0	19.5
		40	NP	51.5	29.5	25.0
		50	NP	63.5	36.5	31.0
		60	NP	75.5	43.0	36.5

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.

- a. Linear interpolation shall be permitted.
- b. Method LIB shall have gypsum board fastened to not less than one side with nails or screws in accordance with Table R602.3(1) for exterior sheathing or Table R702.3.5 for interior gypsum board. Spacing of fasteners at panel edges shall not exceed 8 inches.
- c. Where a braced wall line has parallel braced wall lines on one or both sides of differing dimensions, the average dimension shall be permitted to be used for braced wall line spacing.

**TABLE R602.10.3(2)
WIND ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING**

ITEM NUMBER	ADJUSTMENT BASED ON	STORY/SUPPORTING	CONDITION	ADJUSTMENT FACTOR ^{a, b} [multiply length from Table R602.10.3(1) by this factor]	APPLICABLE METHODS
1	Exposure category	One-story structure	B	1.00	All methods
			C	1.20	
			D	1.50	
		Two-story structure	B	1.00	
			C	1.30	
			D	1.60	
		Three-story structure	B	1.00	
			C	1.40	
			D	1.70	
2	Roof eave-to-ridge height	Roof only	≤ 5 feet	0.70	All methods
			10 feet	1.00	
			15 feet	1.30	
			20 feet	1.60	
		Roof + 1 floor	≤ 5 feet	0.85	
			10 feet	1.00	
			15 feet	1.15	
			20 feet	1.30	
		Roof + 2 floors	≤ 5 feet	0.90	
			10 feet	1.00	
			15 feet	1.10	
			20 feet	Not permitted	
3	Wall height adjustment	Any story	8 feet	0.90	All methods
			9 feet	0.95	
			10 feet	1.00	
			11 feet	1.05	
			12 feet	1.10	
4	Number of braced wall lines (per plan direction) ^c	Any story	2	1.00	All methods
			3	1.30	
			4	1.45	
			≥ 5	1.60	
5	Additional 800-pound hold-down device	Top story only	Fastened to the end studs of each braced wall panel and to the foundation or framing below	0.80	DWB, WSP, SFB, PBS, PCP, HPS
6	Interior gypsum board finish (or equivalent)	Any story	Omitted from inside face of braced wall panels	1.40	DWB, WSP, SFB, PBS, PCP, HPS, CS-WSP, CS-G, CS-SFB
7	Gypsum board fastening	Any story	4 inches o.c. at panel edges, including top and bottom plates, and all horizontal joints blocked	0.7	GB




For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 4.48 N.

a. Linear interpolation shall be permitted.

b. The total adjustment factor is the product of all applicable adjustment factors.

c. The adjustment factor is permitted to be 1.0 when determining bracing amounts for intermediate braced wall lines provided the bracing amounts on adjacent braced wall lines are based on a spacing and number that neglects the intermediate braced wall line.




**TABLE R602.10.3(3)—continued
BRACING REQUIREMENTS BASED ON SEISMIC DESIGN CATEGORY**

<ul style="list-style-type: none"> • SOIL CLASS D^b • WALL HEIGHT = 10 FEET • 10 PSF FLOOR DEAD LOAD • 15 PSF ROOF/CEILING DEAD LOAD • BRACED WALL LINE SPACING ≤ 25 FEET 			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE ^a				
Seismic Design Category	Story Location	Braced Wall Line Length (feet) ^c	Method LIB ^d	Method GB	Methods DWB, SFB, PBS, PCP, HPS, CS-SFB ^e	Method WSP	Methods CS-WSP, CS-G
D₂		10	NP	4.0	4.0	2.5	2.1
		20	NP	8.0	8.0	5.0	4.3
		30	NP	12.0	12.0	7.5	6.4
		40	NP	16.0	16.0	10.0	8.5
		50	NP	20.0	20.0	12.5	10.6
		10	NP	7.5	7.5	5.5	4.7
		20	NP	15.0	15.0	11.0	9.4
		30	NP	22.5	22.5	16.5	14.0
		40	NP	30.0	30.0	22.0	18.7
		50	NP	37.5	37.5	27.5	23.4
		10	NP	NP	NP	NP	NP
		20	NP	NP	NP	NP	NP
		30	NP	NP	NP	NP	NP
		40	NP	NP	NP	NP	NP
		50	NP	NP	NP	NP	NP
	Cripple wall below one- or two-story dwelling	10	NP	NP	NP	7.5	6.4
		20	NP	NP	NP	15.0	12.8
		30	NP	NP	NP	22.5	19.1
		40	NP	NP	NP	30.0	25.5
		50	NP	NP	NP	37.5	31.9

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

- a. Linear interpolation shall be permitted.
- b. Wall bracing lengths are based on a soil site class "D." Interpolation of bracing length between the S_{ds} values associated with the seismic design categories shall be permitted when a site-specific S_{ds} value is determined in accordance with Section 1613.3 of the *International Building Code*.
- c. Where the braced wall line length is greater than 50 feet, braced wall lines shall be permitted to be divided into shorter segments having lengths of 50 feet or less, and the amount of bracing within each segment shall be in accordance with this table.
- d. Method LIB shall have gypsum board fastened to not less than one side with nails or screws in accordance with Table R602.3(1) for exterior sheathing or Table R702.3.5 for interior gypsum board. Spacing of fasteners at panel edges shall not exceed 8 inches.
- e. Method CS-SFB does not apply in Seismic Design Categories D₁ and D₂.

**TABLE R602.10.3(4)
SEISMIC ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING**

ITEM NUMBER	ADJUSTMENT BASED ON:	STORY	CONDITION	ADJUSTMENT FACTOR ^{a, b} [Multiply length from Table R602.10.3(3) by this factor]	APPLICABLE METHODS
1	Story height (Section 301.3)	Any story	≤ 10 feet	1.0	All methods
			> 10 feet and ≤ 12 feet	1.2	
2	Braced wall line spacing, townhouses in SDC C	Any story	≤ 35 feet	1.0	
			> 35 feet and ≤ 50 feet	1.43	
3	Braced wall line spacing, in SDC D ₁ , D ₂ ^c	Any story	> 25 feet and ≤ 30 feet	1.2	
			> 30 feet and ≤ 35 feet	1.4	
4	Wall dead load	Any story	> 8 psf and < 15 psf < 8 psf	1.0 0.85	
5	Roof/ceiling dead load for wall supporting	1-, 2- or 3-story building	≤ 15 psf	1.0	
		2- or 3-story building	> 15 psf and ≤ 25 psf	1.1	
		1-story building	> 15 psf and ≤ 25 psf	1.2	
6	Walls with stone or masonry veneer, townhouses in SDC C ^{d, e}		1.0	All methods	
			1.5		
			1.5		
7	Walls with stone or masonry veneer, detached one- and two-family dwellings in SDC D ₂ ^{d, f}	Any story	See Table R602.10.6.5	BV-WSP	
8	Interior gypsum board finish (or equivalent)	Any story	Omitted from inside face of braced wall panels	1.5	DWB, WSP, SFB, PBS, PCP, HPS, CS-WSP, CS-G, CS-SFB

For SI: 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

- Linear interpolation shall be permitted.
- The total length of bracing required for a given wall line is the product of all applicable adjustment factors.
- The length-to-width ratio for the floor/roof *diaphragm* shall not exceed 3:1. The top plate lap splice nailing shall be in accordance with Table R602.3(1), Item 13.
- Applies to stone or masonry veneer exceeding the first story height.
- The adjustment factor for stone or masonry veneer shall be applied to all exterior *braced wall lines* and all *braced wall lines* on the interior of the building, backing or perpendicular to and laterally supported veneered walls.
- See Section R602.10.6.5 for requirements where stone or masonry veneer does not exceed the first-story height.

PRESCRIPTIVE WALL BRACING WORKSHEET

NOTICE: This worksheet shall be submitted for review along with one and two family dwelling plan document submittals.

WIND WORKSHEET										
Brace Wall Line (BWL)	1	2	3	4	5	A	B	C	D	E
Brace Wall Panel (BWP) Method										
BWL Spacing**										
Required Bracing Length per Table R602.10.3(1)* (135 design wind speed)										
WIND ADJUSTMENT FACTORS (Reference Table R602.10.3(2))	1-Exposure Category									
	2-Roof to Ridge Height									
	3-Wall Height									
	4-Number of Braced Wall Lines (per plan direction)									
	5-Additional 800lbs Hold Down Device									
	6-Interior Gypsum (GB) Omitted									
	7-Gypsum (GB) Fastening Reduction									
	FACTOR TOTAL (multiply all adjustment factors)									
Total Adjusted Bracing Length (required bracing length multiplied by adjustment factor product)										
Bracing Length Provided										

PRESCRIPTIVE WALL BRACING WORKSHEET

NOTICE: This worksheet shall be submitted for review along with one and two family dwelling plan document submittals.

SEISMIC WORKSHEET											
Brace Wall Line (BWL)		1	2	3	4	5	A	B	C	D	E
Brace Wall Panel (BWP) Method											
BWL Spacing											
Required Bracing Length per Table R602.10.3(3)* (D2 Seismic Design Cat .)											
SEISMIC ADJUSTMENT FACTORS (Reference Table R602.10.3(4))	1-Story Height										
	2-Does not Apply	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	3-BWL Spacing in Seismic D2										
	4-Wall Dead Load										
	5-Roof Ceiling Dead Load (for supporting wall)										
	6-Does not Apply	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	7-Stone or Masonry Veneer in SDC D2										
	8-Interior Gypsum (GB) or Interior Finish Omitted										
	FACTOR TOTAL (multiply all adjustment factors)										
Total Adjusted Bracing Length (required bracing length multiplied by adjustment factor product)											
Bracing Length Provided											