Norbord TallWall/Windstorm/QuakeZone® Rated Sheathing for Use with IRC Energy-Heel Trusses

PR-N133
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Products: Norbord TallWall/Windstorm/QuakeZone Rated Sheathing for Use with IRC Energy-Heel Trusses

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1. Basis of the product report:
   - 2018, 2015, and 2012 International Residential Code (IRC): Sections R104.11 Alternative Materials, R301.1.3 Engineered design, R602.3.5 Braced wall panel uplift load path, R602.10.2.1 Braced wall panel uplift load path, R602.10.8.2 Connections to roof framing, and R604.1 Identification and grade, and Tables R301.2(2), R301.2(3), and R802.11
   - ANSI/AWC WFCM-2018, Wood Frame Construction Manual for One and Two Family Dwellings
   - PS 2-10, Performance Standard for Wood-Based Structural-Use Panels
   - APA System Report SR-103, Use of Wood Structural Panels for Energy-Heel Trusses
   - NAHB Research Center reports dated August 8, 2011, February 15, 2012, and December 26, 2012

2. Product description:
   Norbord TallWall/Windstorm/QuakeZone oriented strand board (OSB) panels are made with strands of various species and strand classifications meeting the PS 2 requirements in accordance with the in-plant manufacturing standard approved by APA. The OSB panels are typically manufactured in lengths of 8 to 12 feet to eliminate horizontal panel joints between the top and bottom plates of a wall. When used in conjunction with 15-1/4- to 24-inch energy-heel trusses installed in accordance with Figure 2, the long-length panels permit the overlapping of the TallWall/Windstorm/QuakeZone panels over the heel of the trusses, meeting the uplift load-path requirements of the 2018, 2015, and 2012 IRC Sections R602.3.5 and R602.10.2.1, and the lateral load load-path requirements of R602.10.8.2. Norbord TallWall/Windstorm/QuakeZone OSB panels are edge sealed and available in Performance Categories from 3/8 to 1-1/8.

3. Design properties:
   Norbord TallWall/Windstorm/QuakeZone OSB panels meet the design properties specified in APA *Panel Design Specification*, Form D510 (www.apawood.org/publications). The OSB panels are permitted for use in conjunction with 15-1/4- to 24-inch energy-heel trusses in compliance with the 2018, 2015, and 2012 IRC Method CS-WSP bracing and uplift attachment requirements when the requirements of Table 1a or Table 1b of this report are met. Heel heights on energy-heel trusses along with corresponding anchor bolt requirements and sheathing attachment requirements, other than those described in this report, shall be permitted to be designed through engineering analysis. See APA Systems Report SR-101, *Design for Combined Shear and Uplift from Wind* (see link above), for reference.

4. Product installation:
   Norbord TallWall/Windstorm/QuakeZone OSB panels, when used as wall bracing Method CS-WSP in accordance with the 2018, 2015, and 2012 IRC Sections R602.10 through 12, shall be permitted for use in anchoring the heels of energy-heel trusses. The uplift requirements of the 2018, 2015, and 2012 IRC Sections R602.3.5 and R802.11, as well as the wind bracing attachment requirements of the 2018, 2015, and 2012 IRC Section

R602.10.8.2 shall be deemed to be satisfied by simply overlapping the TallWall/Windstorm/QuakeZone OSB panels over the truss heel with connection in accordance with Figure 2 and installing anchor bolts into the foundation in accordance with Tables 1a through 3b. If no solution is found in Tables 1a through 3b (the condition not covered or an "ED" is located in the cell within the table), an engineered design is required.

5. Fastener attachment:
Attachment of the Norbord TallWall/Windstorm/QuakeZone panels to framing shall be with 8d common nails (2 ½ inches x 0.131 inch) at 6 inches o.c. at the panel sides and bottom edges. Panels shall be attached at the top plate with 8d common nails at 4 inches o.c. All panel field nailing shall be 8d common nails at 12 inches on center except at raised heel of trusses. See Figure 2.

Attachment at the raised heel of the trusses shall be with 8d common nails. A single nail shall be placed through the panel into the bottom chord of the truss. The additional nails required shall be placed in the raised heel of the truss in two rows, with the nails staggered and spaced at 4 inches o.c. in each row. The 15-1/4-inch energy-heel truss shall require a total of 5 nails into the heel of each truss and the 24-inch truss shall require a total of 7 nails in each heel. For trusses between 15-1/4 and 24 inches, interpolation shall be permitted for determining the minimum number of nails required. See Figure 2.

6. Limitations:
a) Norbord TallWall/Windstorm/QuakeZone OSB panels are limited for use in dry service conditions where the average equilibrium moisture content of sawn lumber is less than 16 percent.
b) Norbord TallWall/Windstorm/QuakeZone OSB panels shall be permitted for use with wall bracing Method CS-WSP, while meeting the IRC wind uplift attachment requirements in accordance with Tables 1a through 3b of this report.
c) Norbord TallWall/Windstorm/QuakeZone OSB panels shall be of sufficient capacity to resist the applied wind loads. See APA Technical Topics TT-110, *Wind Resistance of Wood Structural Panel Sheathed Wall* (www.apawood.org/publications).
d) This report is subject to re-examination in one year.

7. Identification:
Norbord TallWall/Windstorm/QuakeZone OSB panels described in this report shall be identified by a label or stamp bearing the manufacturer's name and/or trademark (Norbord TallWall/Windstorm/QuakeZone), the APA assigned plant number (424, 501, 502, 503, 504, 505, 506, 507, or 508), the product thickness and span rating, the APA logo, the report number PR-N133, and a means of identifying the date of manufacture.

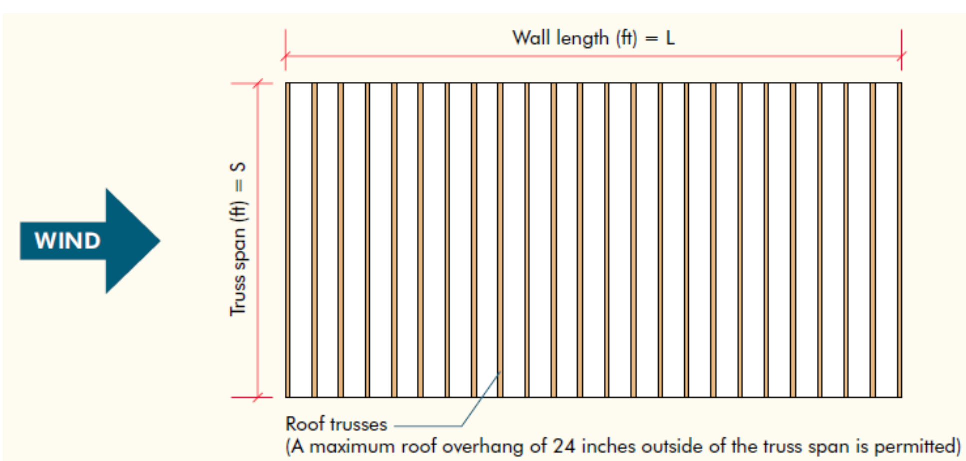

Figure 1. Definition of terms for Tables 1a - 3b

Table 1a. Minimum unadjusted anchor bolt spacing (inches) for TallWall/Windstorm/QuakeZone OSB Panel overlapping a 15-1/4- to 24-inch energy-heel roof trusses to provide shear and wind uplift [a,b,c,d,e]
L/S ≥ 2:1

Roof Span (ft)	Exposure B							
	Basic Wind Speed (mph)							
	≤ 85		90		100		110	
	Roof pitch							
	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12
12	42	42	42	42	42	42	36	36
18	42	42	42	42	36	36	36	36
24	42	42	42	42	36	36	36	36
28	42	42	36	42	36	36	36	36
32	42	42	36	42	36	36	36	36
36	42	42	36	36	36	36	36	36
Roof Span (ft)	Exposure C							
	Basic Wind Speed (mph)							
	≤ 85		90		100		110	
	Roof pitch							
	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12
12	42	42	36	42	36	36	36	36
18	36	36	36	36	36	36	36	36
24	36	36	36	36	36	36	32	36
28	36	36	36	36	36	36	32	32
32	36	36	36	36	32	36	24	32
36	36	36	36	36	32	36	24	32

[a] Anchor bolts shall be ½-inch-diameter with 3- x 3- x 0.229-inch square-plate washers spaced as shown in the table above.
[b] See Figure 1 for wall configuration.
[c] Based on the following assumptions. Wall is installed and attached in accordance with Figure 2. (Conditions beyond all assumptions listed above are outside the scope of this report).
Max mean roof height = 33 feet
Roof heel height = 15 ¼ to 24 inches
Max roof span = S = 36 feet
Max roof and ceiling assembly load = 15 psf
Max roof eave-to-roof height = 15 feet
Max wall height = 9 feet
Max roof slope = 12:12
Min wall length = L = 18 feet
Max roof overhang = 24 inches
[d] Extrapolation shall not be permitted.
[e] The minimum, unadjusted anchor bolt spacing provided above can be further adjusted by three simple steps below:
1. Go through the steps above to determine if overlapping the energy-heel truss with Tallwall/Windstorm/QuakeZone OSB panel is acceptable. If so, record the anchor bolt spacing derived from the table above.
2. Determine the ratio of the uninterrupted braced wall-line segment length over the actual amount of bracing in that segment.
3. Multiply the anchor bolt spacing found in step 1 by the ratio calculated in step 2, remembering that the maximum required, code-accepted anchor bolt spacing cannot exceed 60 inches for low seismic regions. (When two or more stories, 48 inches maximum for all wood light-frame structures in SDCs D_0, D_1, and D_2, and light-frame wood townhouses in SDC C).

Table 1b. Minimum unadjusted anchor bolt spacing (inches) for TallWall/Windstorm/QuakeZone OSB Panel overlapping a 15-1/4- to 24-inch energy-heel roof trusses to provide shear and wind uplift [a,b,c,d,e]
L/S ≥ 2:1

Roof Span (ft)	Exposure B							
	Ultimate Wind Speed (mph)							
	≤ 110		115		130		140	
	Roof pitch							
	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12
12	42	42	42	42	42	42	36	36
18	42	42	42	42	36	36	36	36
24	42	42	42	42	36	36	36	36
28	42	42	36	42	36	36	36	36
32	42	42	36	42	36	36	36	36
36	42	42	36	36	36	36	36	36
Roof Span (ft)	Exposure C							
	Ultimate Wind Speed (mph)							
	≤ 110		115		130		140	
	Roof pitch							
	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12
12	42	42	36	42	36	36	36	36
18	36	36	36	36	36	36	36	36
24	36	36	36	36	36	36	32	36
28	36	36	36	36	36	36	32	32
32	36	36	36	36	32	36	24	32
36	36	36	36	36	32	36	24	32

(a) Anchor bolts shall be ½-inch-diameter with 3- x 3- x 0.229-inch square-plate washers spaced as shown in the table above.
(b) See Figure 1 for wall configuration.
(c) Based on the following assumptions. Wall is installed and attached in accordance with Figure 2. (Conditions beyond all assumptions listed above are outside the scope of this report).
Max mean roof height = 33 feet
Roof heel height = 15 ¼ to 24 inches
Max roof span = S = 36 feet
Max roof and ceiling assembly load = 15 psf
Max roof eave-to-roof height = 15 feet
Max wall height = 9 feet
Max roof slope = 12:12
Min wall length = L = 18 feet
Max roof overhang = 24 inches
(d) Extrapolation shall not be permitted.
(e) The minimum, unadjusted anchor bolt spacing provided above can be further adjusted by three simple steps below:
1. Go through the steps above to determine if overlapping the energy-heel truss with Tallwall/Windstorm/QuakeZone OSB panel is acceptable. If so, record the anchor bolt spacing derived from the table above.
2. Determine the ratio of the uninterrupted braced wall-line segment length over the actual amount of bracing in that segment.
3. Multiply the anchor bolt spacing found in step 1 by the ratio calculated in step 2, remembering that the maximum required, code-accepted anchor bolt spacing cannot exceed 60 inches for low seismic regions. (When two or more stories, 48 inches maximum for all wood light-frame structures in SDCs D_0, D_1, and D_2, and light-frame wood townhouses in SDC C).

Table 2a. Minimum unadjusted anchor bolt spacing (inches) for TallWall/Windstorm/QuakeZone OSB Panels overlapping a 15-1/4- to 24-inch energy-heel roof trusses to provide shear and wind uplift [a,b,c,d,e,f]
2:1 > L/S ≥ 1:1

Roof Span (ft)	Exposure B							
	Basic Wind Speed (mph)							
	≤ 85		90		100		110	
	Roof pitch							
	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12
12	42	42	42	42	42	42	36	36
18	42	42	42	42	36	36	36	36
24	42	42	42	42	36	36	36	36
28	42	42	36	42	36	36	36	36
32	42	42	36	42	36	36	36	36
36	42	42	36	36	36	36	36	36
Roof Span (ft)	Exposure C							
	Basic Wind Speed (mph)							
	≤ 85		90		100		110	
	Roof pitch							
	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12
12	42	42	36	42	36	36	36	36
18	36	36	36	36	36	36	36	36
24	36	36	36	36	36	36	32	36
28	36	36	36	36	36	36	32	32
32	36	36	36	36	32	36	24	32
36	36	36	36	36	32	32	ED	ED

(a) Anchor bolts shall be ½-inch-diameter with 3- x 3- x 0.229-inch square-plate washers spaced as shown in the table above.
(b) See Figure 1 for wall configuration.
(c) Based on the following assumptions. Wall is installed and attached in accordance with Figure 2. (Conditions beyond all assumptions listed above are outside the scope of this report).
Max mean roof height = 33 feet
Roof heel height = 15 ¼ to 24 inches
Max roof span = S = 36 feet
Max roof and ceiling assembly load = 15 psf
Max roof eave-to-roof height = 15 feet
Max wall height = 9 feet
Max roof slope = 12:12
Min wall length = L = 18 feet
Max roof overhang = 24 inches
(d) Extrapolation shall not be permitted.
(e) ED = Engineered design required.
(f) The minimum, unadjusted anchor bolt spacing provided above can be further adjusted by three simple steps below:
1. Go through the steps above to determine if overlapping the energy-heel truss with Tallwall/Windstorm/QuakeZone OSB panel is acceptable. If so, record the anchor bolt spacing derived from the table above.
2. Determine the ratio of the uninterrupted braced wall-line segment length over the actual amount of bracing in that segment.
3. Multiply the anchor bolt spacing found in step 1 by the ratio calculated in step 2, remembering that the maximum required, code-accepted anchor bolt spacing cannot exceed 60 inches for low seismic regions. (When two or more stories, 48 inches maximum for all wood light-frame structures in SDCs D_0, D_1, and D_2, and light-frame wood townhouses in SDC C).

Table 2b. Minimum unadjusted anchor bolt spacing (inches) for TallWall/Windstorm/QuakeZone OSB Panels overlapping a 15-1/4- to 24-inch energy-heel roof trusses to provide shear and wind uplift [a,b,c,d,e,f]
2:1 > L/S ≥ 1:1

Roof Span (ft)	Exposure B							
	Ultimate Wind Speed (mph)							
	≤ 110		115		130		140	
	Roof pitch							
	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12
12	42	42	42	42	42	42	36	36
18	42	42	42	42	36	36	36	36
24	42	42	42	42	36	36	36	36
28	42	42	36	42	36	36	36	36
32	42	42	36	42	36	36	36	36
36	42	42	36	36	36	36	36	36
Roof Span (ft)	Exposure C							
	Ultimate Wind Speed (mph)							
	≤ 110		115		130		140	
	Roof pitch							
	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12
12	42	42	36	42	36	36	36	36
18	36	36	36	36	36	36	36	36
24	36	36	36	36	36	36	32	36
28	36	36	36	36	36	36	32	32
32	36	36	36	36	32	36	24	32
36	36	36	36	36	32	32	ED	ED

(a) Anchor bolts shall be ½-inch-diameter with 3- x 3- x 0.229-inch square-plate washers spaced as shown in the table above.
(b) See Figure 1 for wall configuration.
(c) Based on the following assumptions. Wall is installed and attached in accordance with Figure 2. (Conditions beyond all assumptions listed above are outside the scope of this report).
Max mean roof height = 33 feet
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Max roof span = S = 36 feet
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Max roof eave-to-roof height = 15 feet
Max wall height = 9 feet
Max roof slope = 12:12
Min wall length = L = 18 feet
Max roof overhang = 24 inches
(d) Extrapolation shall not be permitted.
(e) ED = Engineered design required.
(f) The minimum, unadjusted anchor bolt spacing provided above can be further adjusted by three simple steps below:
1. Go through the steps above to determine if overlapping the energy-heel truss with Tallwall/Windstorm/QuakeZone OSB panel is acceptable. If so, record the anchor bolt spacing derived from the table above.
2. Determine the ratio of the uninterrupted braced wall-line segment length over the actual amount of bracing in that segment.
3. Multiply the anchor bolt spacing found in step 1 by the ratio calculated in step 2, remembering that the maximum required, code-accepted anchor bolt spacing cannot exceed 60 inches for low seismic regions. (When two or more stories, 48 inches maximum for all wood light-frame structures in SDCs D_0, D_1, and D_2, and light-frame wood townhouses in SDC C).

Table 3a. Minimum unadjusted anchor bolt spacing (inches) for TallWall/Windstorm/QuakeZone OSB Panels overlapping a 15-1/4- to 24-inch energy-heel roof trusses to provide shear and wind uplift[(a,b,c,d,e,f)]
1:1 > L/S ≥ ½:1

Roof Span (ft)	Exposure B							
	Basic Wind Speed (mph)							
	≤ 85		90		100		110	
	Roof pitch							
	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12
12	42	32	42	32	42	32	36	24
18	42	32	42	32	36	24	36	24
24	42	32	42	32	36	24	36	24
28	42	32	36	32	36	24	36	24
32	42	32	36	24	36	24	36	24
36	42	32	36	24	36	24	36	24
Roof Span (ft)	Exposure C							
	Basic Wind Speed (mph)							
	≤ 85		90		100		110	
	Roof pitch							
	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12
12	32	24	24	19.2	24	19.2	24	19.2
18	24	19.2	24	19.2	24	19.2	24	ED
24	24	19.2	24	19.2	24	19.2	ED	ED
28	24	19.2	24	19.2	24	ED	ED	ED
32	24	19.2	24	19.2	24	ED	ED	ED
36	24	19.2	24	ED	ED	ED	ED	ED

(a) Anchor bolts shall be ½-inch-diameter with 3- x 3- x 0.229-inch square-plate washers spaced as shown in the table above.
(b) See Figure 1 for wall configuration.
(c) Based on the following assumptions. Wall is installed and attached in accordance with Figure 2. (Conditions beyond all assumptions listed above are outside the scope of this report).
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Max roof eave-to-roof height = 15 feet
Max wall height = 9 feet
Max roof slope = 12:12
Min wall length = L = 18 feet
Max roof overhang = 24 inches
(d) Extrapolation shall not be permitted.
(e) ED = Engineered design required.
(f) The minimum, unadjusted anchor bolt spacing provided above can be further adjusted by three simple steps below:
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Table 3b. Minimum unadjusted anchor bolt spacing (inches) for TallWall/Windstorm/QuakeZone OSB Panels overlapping a 15-1/4- to 24-inch energy-heel roof trusses to provide shear and wind uplift[a,b,c,d,e,f]
1:1 > L/S ≥ ½:1

Roof Span (ft)	Exposure B							
	Ultimate Wind Speed (mph)							
	≤ 110		115		130		140	
	Roof pitch							
	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12
12	42	32	42	32	42	32	36	24
18	42	32	42	32	36	24	36	24
24	42	32	42	32	36	24	36	24
28	42	32	36	32	36	24	36	24
32	42	32	36	24	36	24	36	24
36	42	32	36	24	36	24	36	24
Roof Span (ft)	Exposure C							
	Ultimate Wind Speed (mph)							
	≤ 110		115		130		140	
	Roof pitch							
	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12	< 5:12	5:12 to 12:12
12	32	24	24	19.2	24	19.2	24	19.2
18	24	19.2	24	19.2	24	19.2	24	ED
24	24	19.2	24	19.2	24	19.2	ED	ED
28	24	19.2	24	19.2	24	ED	ED	ED
32	24	19.2	24	19.2	24	ED	ED	ED
36	24	19.2	24	ED	ED	ED	ED	ED

(a) Anchor bolts shall be ½-inch-diameter with 3- x 3- x 0.229-inch square-plate washers spaced as shown in the table above.
(b) See Figure 1 for wall configuration.
(c) Based on the following assumptions. Wall is installed and attached in accordance with Figure 2. (Conditions beyond all assumptions listed above are outside the scope of this report).
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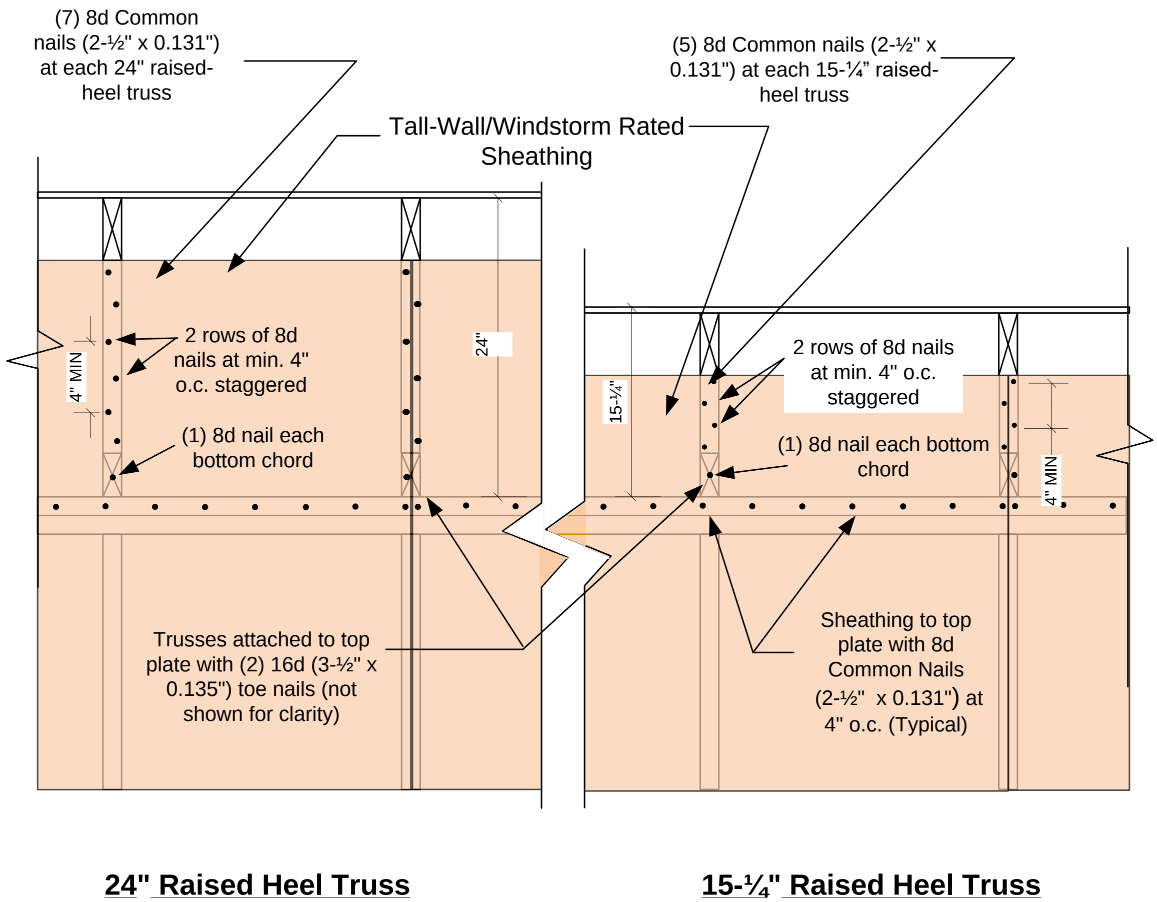
(e) ED = Engineered design required.
(f) The minimum, unadjusted anchor bolt spacing provided above can be further adjusted by three simple steps below:
1. Go through the steps above to determine if overlapping the energy-heel truss with Tallwall/Windstorm/QuakeZone OSB panel is acceptable. If so, record the anchor bolt spacing derived from the table above.
2. Determine the ratio of the uninterrupted braced wall-line segment length over the actual amount of bracing in that segment.
3. Multiply the anchor bolt spacing found in step 1 by the ratio calculated in step 2, remembering that the maximum required, code-accepted anchor bolt spacing cannot exceed 60 inches for low seismic regions. (When two or more stories, 48 inches maximum for all wood light-frame structures in SDCs D_0, D_1, and D_2, and light-frame wood townhouses in SDC C).



Sheathing attached to panel vertical edges and field, 8d Common nails (2-½" x 0.131") at 6" o.c. and 12" o.c., respectively. Sheathing attached to top plate with 8d Common nails (2-½" x 0.131") at 4" o.c. Normal panel nailing not shown for clarity.

Figure 2. 15-¼-inch and 24-inch energy-heel truss examples resisting the 2018, 2015, and 2012 IRC wind uplift and wind bracing attachment using Norbord TallWall/Windstorm/QuakeZone OSB panels

APA – The Engineered Wood Association is an approved national standards developer accredited by American National Standards Institute (ANSI). APA publishes ANSI standards and Voluntary Product Standards for wood structural panels and engineered wood products. APA is an accredited certification body under ISO/IEC 17065 by Standards Council of Canada (SCC), an accredited inspection agency under ISO/IEC 17020 by International Code Council (ICC) International Accreditation Service (IAS), and an accredited testing organization under ISO/IEC 17025 by IAS. APA is also an approved Product Certification Agency, Testing Laboratory, Quality Assurance Entity, and Validation Entity by the State of Florida, and an approved testing laboratory by City of Los Angeles.

APA – THE ENGINEERED WOOD ASSOCIATION
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(253) 620-7400 ▪ *E-mail Address*: help@apawood.org

DISCLAIMER