

ICC-ES Evaluation Report

ESR-1040

Reissued September 1, 2010

This report is subject to re-examination in two years.

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A Subsidiary of the International Code Council®

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 17 13—Laminated Veneer Lumber

REPORT HOLDER:

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EVALUATION SUBJECT:

VERSA-LAM® AND VERSA-RIM® LAMINATED VENEER LUMBER

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2009 *International Building Code*® (2009 IBC)
- 2009 *International Residential Code*® (2009 IRC)
- 2006 *International Building Code*® (2006 IBC)
- 2006 *International Residential Code*® (2006 IRC)

Properties evaluated:

- Structural
- Fire resistance
- Fireblocking material

2.0 USES

VERSA-LAM® is used for structural applications such as beams, headers, joists, rafters, wall studs and rim joists. VERSA-RIM® is used in rim joist applications.

3.0 DESCRIPTION

VERSA-LAM® and VERSA-RIM® are structural composite lumber products complying with ASTM D 5456. They consist of laminated veneer lumber (LVL), manufactured with the wood fibers primarily oriented parallel to the length of the member such that the veneers are vertical (joist orientation) when the member is installed in its primary application. Qualified adhesives, veneer species and veneer grades are as specified in the approved Quality Control Manual.

VERSA-LAM® is available in various grades as indicated in Table 1. VERSA-LAM® is produced in thicknesses up to 7 inches (178 mm), with depths up to 48 inches (1219 mm) and lengths up to 66 feet (20.1 m). VERSA-RIM® is

available in thicknesses up to 1 1/4 inches (38 mm), with depths up to 20 inches (610 mm) and lengths up to 66 feet (20.1 m).

VERSA-LAM® is also distributed under the proprietary name of VERSA-STUD®, and is manufactured to match commonly available solid-sawn lumber sizes.

4.0 DESIGN AND INSTALLATION

4.1 General:

The design provisions for structural composite lumber in the AF&PA National Design Specification for Wood Construction (NDS), are applicable to VERSA-LAM® and VERSA-RIM® unless otherwise noted in this report. Reference design values for dry conditions of use of VERSA-LAM® are indicated in Table 1.

4.2 Connections:

The design of connections for VERSA-LAM® and VERSA-RIM® must be in accordance with the NDS for solid wood species with an equivalent specific gravity. The equivalent specific gravity characteristics for nail and bolt design for dry-use conditions are found in Table 4. Allowable connector spacing is indicated in Table 3.

4.3 Fire Blocking:

VERSA-LAM® and VERSA-RIM® may be substituted for solid-sawn lumber fireblocking provided the minimum sizes of LVL, as indicated in this report, are as specified by the applicable code for solid-sawn material.

4.4 Rim Board:

For the purposes of this evaluation report, rim boards are defined as continuously supported structural members (except as noted in the last sentence of Section 4.4 of this report), located at the joist elevation either perpendicular to, or parallel to, the joist framing, that are the full depth of the joist space and that are used for the following purposes:

1. Transfer, from above to below, of vertical loads at the rim board location. Allowable vertical loads are noted in Table 2.
2. Providing diaphragm attachment (sheathing to top edge of rim board).
3. Transferring in-plane lateral loads from the diaphragm to the wall plate below.
4. Providing lateral support to the joist or rafter (resistance against rotation) through attachments to the joist or rafter.

5. Providing closure for ends of joists or rafters.
6. Providing an attachment base for siding or exterior deck ledger.

Allowable vertical and lateral load transfer capacities for VERSA-LAM® and VERSA-RIM® are provided in Table 2. Rim board must be installed in accordance with the prescriptive provisions of the applicable code. Design of rim board installed over wall openings must be based on the reference design values noted in Table 1.

4.5 Calculated Fire Resistance:

For applications under the 2009 IBC, the fire resistance of exposed VERSA-LAM® members may be calculated in accordance with Chapter 16 of the ANSI/AF&PA National Design Specification for Wood Construction (NDS).

4.6 Wall Studs:

4.6.1 General: VERSA-LAM® may be used as wall stud material in accordance with the prescriptive requirements in Section 2308.9 of the IBC and Section R602 of the IRC, subject to the following conditions:

1. VERSA-LAM® used as wall studs must have a thickness of $1\frac{1}{2}$ inches (38 mm) or greater.
2. Cutting, notching and boring of nominally 2-by-4 and 2-by-6 VERSA-LAM® studs is permitted in accordance with Sections 2308.9.10 and 2308.9.11 of the IBC and Section R602.6 of the IRC.

Allowable shear values for nailed wood structural panel shear walls utilizing VERSA-LAM® framing members may be determined using Table 2306.3 of the 2009 IBC or Table 2306.4.1 of the 2006 IBC, for shear walls with framing of Douglas fir-Larch, subject to the following conditions:

1. A double VERSA-LAM® stud must be used at adjoining wood structural panel edges. Studs must be stitch nailed together with two staggered rows of 0.148 inch (3.8 mm) diameter (10d common) nails spaced at 8 inches on center in each row.
2. Nails at panel edges must be staggered along two nailing lines spaced approximately $\frac{1}{2}$ inch (12.7 mm) apart. Nails at panel edges must also be at least $\frac{3}{8}$ inch (9.5 mm) from the edges of the VERSA-LAM® stud and the wood structural panel.
3. The tabulated shear values for nailed wood structural panel shear walls using 8d or 10d box or common nails at a panel edge nail spacing of 2 inches (51 mm) must be multiplied by a factor of 0.90.
4. The tabulated shear values for nailed wood structural panel shear walls using 10d box or common nails at a panel edge nail spacing of 3 inches (76 mm) must be multiplied by a factor of 0.90.

4.6.2 Fire-resistance-rated Wall Construction: VERSA-LAM® is permitted to be used in fire-resistance-rated wall construction as follows:

1. For conventional light-frame construction, VERSA-LAM® is permitted to be used as a direct replacement for solid-sawn lumber in any 1-hour fire-resistance-rated wall assembly listed in Table 720.1(2) of the IBC, provided the following conditions are met:
 - a. The VERSA-LAM® studs have a minimum depth of $5\frac{1}{2}$ inches (140 mm) (nominal 2-by-6).

- b. Tape and joint compound must be applied to fastener heads and gypsum wallboard joints on the exposed surface(s).

2. For engineered, load-bearing wall construction, VERSA-LAM® is permitted to be used in 1-hour fire-resistance-rated wall assemblies provided the following conditions are met:

- a. The VERSA-LAM® studs have a minimum depth of $5\frac{1}{2}$ inches (140 mm) (nominal 2-by-6).
- b. Studs must be spaced no more than 16 inches (406 mm) on center.
- c. Minimum $\frac{5}{8}$ -inch (15.9 mm) Type X gypsum wallboard must be attached with $2\frac{1}{4}$ -inch-long (57 mm) Type S drywall screws spaced 7 inches (178 mm) on center along each stud.
- d. Tape and joint compound must be applied to fastener heads and gypsum wallboard joints on the exposed surface(s).
- e. The design axial compressive stress within the studs must not exceed the least of the following:
 - i. 525 psi (3620 kPa).
 - ii. $0.46F_c'$, where F_c' is the compression design value parallel-to-grain, adjusted by all applicable adjustment factors in accordance with the NDS, including the column stability factor, C_P .
 - iii. $0.46 F_c'$, where F_c' is calculated in accordance with the NDS assuming a slenderness ratio, l_e/d , of 21.

4.7 Installation:

VERSA-LAM® and VERSA-RIM® LVL must comply with this report and the wood construction requirements noted in the applicable code, as indicated in this report.

5.0 CONDITIONS OF USE

The VERSA-LAM® and VERSA-RIM® LVL described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 VERSA-LAM® and VERSA-RIM® LVL are manufactured by Boise Building Solutions Manufacturing, LLC, in White City, Oregon, and Alexandria, Louisiana, under a quality control program with inspections by PFS Corporation (AA-652).
- 5.2 The service conditions for the LVL described in this report must be a covered, dry condition of use. Dry conditions of use are those conditions of use represented by sawn lumber at which the moisture content is less than 16 percent.
- 5.3 Calculations and details for specific applications, demonstrating that the use of VERSA-LAM® and VERSA-RIM® LVL comply with this report, must be submitted to the code official upon request. The documents in question must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.4 Duration-of-load adjustments, as provided for wood members and their connections, may be applied in accordance with the limitations specified in the applicable code, as indicated in this report.

- 5.5 The use of treatments on the products listed in this report, such as preservatives and fire retardants, is outside the scope of this report.
- 5.6 Cutting and notching of VERSA-LAM® and VERSA-RIM® LVL is outside the scope of this report except when used as wall studs.

6.0 EVIDENCE SUBMITTED

- 6.1 Data in accordance with ICC-ES Acceptance Criteria for Structural Wood-based Products (AC47), dated October 2009 (corrected December 2009).
- 6.2 Data in accordance with ICC-ES Acceptance Criteria for Rim Board Products (AC124), dated October 2004 (editorially revised July 2010).
- 6.3 Data in accordance with ICC-ES Acceptance Criteria for Wood-based Studs (AC202), dated June 2009.
- 6.4 Reports of fire tests conducted in accordance with ASTM E 119.

7.0 IDENTIFICATION

VERSA-LAM® and VERSA-RIM® are identified with a stamp noting the manufacturer's name (Boise Cascade) and plant location, the product name (including MOE, design flexural stress and design axial tensile stress, as applicable), the date of manufacture, the evaluation report number (ESR-1040), and the name of the inspection agency (PFS Corporation). Unless otherwise identified, all products from White City, Oregon, are manufactured from primarily Douglas fir and all products from Alexandria, Louisiana, are manufactured from primarily southern yellow pine. VERSA-LAM® and VERSA-RIM® manufactured in White City, Oregon from primarily southern yellow pine or hemlock is identified with 'SYP' or 'HEM', respectively.

TABLE 1—REFERENCE DESIGN VALUES FOR VERSA-LAM® (pounds per square inch)^{1,2}

PRODUCT GRADE	MODULUS OF ELASTICITY ⁵ E (×10 ⁶ psi)	FLEXURAL STRESS, F _b		TENSION PARALLEL TO GRAIN ⁴ , F _t	COMP. PARALLEL TO GRAIN, F _c	COMPRESSION PERPENDICULAR TO GRAIN, F _{c⊥}		HORIZONTAL SHEAR, F _v	
		Joist ³	Plank			Perp. to Narrow Face (Plank)	Parallel to Narrow Face (Joist)	Parallel to Narrow Face (Plank)	Perp. to Narrow Face (Joist)
1.3 1600 ⁶	1.3	1600	1600	1100	2500	450	525	150	225
1.3 1750 ⁶	1.3	1750	1600	1100	2500	450	525	150	225
1.4 1800/1100	1.4	1800	1800	1100	2500	450	525	150	225
1.4 1950/1100	1.4	1950	1800	1100	2500	450	525	150	225
1.4 1800 ⁶	1.4	1800	1800	1250	2500	450	525	150	225
1.4 1950 ⁶	1.4	1950	1800	1250	2500	450	525	150	225
1.5 2050/1250	1.5	2050	2050	1250	2500	450	525	150	225
1.5 2250/1250	1.5	2250	2050	1250	2500	450	525	150	225
1.5 2050 ⁶	1.5	2050	2050	1400	2500	450	525	150	225
1.5 2250 ⁶	1.5	2250	2050	1400	2500	450	525	150	225
1.6 2250/1400	1.6	2250	2250	1400	2500	450	525	150	225
1.6 2450/1400	1.6	2450	2250	1400	2500	450	525	150	225
1.6 2250 ⁶	1.6	2250	2250	1500	2500	450	525	150	225
1.6 2450 ⁶	1.6	2450	2250	1500	2500	450	525	150	225
1.7 2400/1500	1.7	2400	2400	1500	3000	450	750	190	285
1.7 2650/1500	1.7	2650	2400	1500	3000	450	750	190	285
1.7 2400 ⁶	1.7	2400	2400	1650	3000	450	750	190	285
1.7 2650 ⁶	1.7	2650	2400	1650	3000	450	750	190	285
1.8 2500/1650	1.8	2500	2500	1650	3000	450	750	190	285
1.8 2750/1650	1.8	2750	2500	1650	3000	450	750	190	285
1.8 2500 ⁶	1.8	2500	2500	1825	3000	450	750	190	285
1.8 2750 ⁶	1.8	2750	2500	1825	3000	450	750	190	285
1.9 2600/1825	1.9	2600	2600	1825	3000	450	750	190	285
1.9 2850/1825	1.9	2850	2600	1825	3000	450	750	190	285
1.9 2600 ⁶	1.9	2600	2600	1950	3000	450	750	190	285
1.9 2850 ⁶	1.9	2850	2600	1950	3000	450	750	190	285
2.0 2800/1950	2.0	2800	2800	1950	3000	450	750	190	285
2.0 3100/1950	2.0	3100	2800	1950	3000	450	750	190	285
2.0 2800 ⁶	2.0	2800	2800	2150	3000	450	750	190	285
2.0 3100 ⁶	2.0	3100	2800	2150	3000	450	750	190	285
2.1 2900/2150	2.1	2900	2900	2150	3000	450	750	190	285
2.1 3200/2150	2.1	3200	2900	2150	3000	450	750	190	285
2.1 2900 ⁶	2.1	2900	2900	2250	3000	450	750	190	285
2.1 3200 ⁶	2.1	3200	2900	2250	3000	450	750	190	285
2.2 3100/2250	2.2	3100	3100	2250	3000	450	750	190	285
2.2 3400/2250	2.2	3400	3100	2250	3000	450	750	190	285
2.2 3100 ⁶	2.2	3100	3100	2425	3000	450	750	190	285
2.2 3400 ⁶	2.2	3400	3100	2425	3000	450	750	190	285

For SI: 1 psi=0.00689 MPa.

¹Reference design values are based on dry conditions of use where the in-service moisture content of the LVL is less than 16 percent.

²Reference design values must be adjusted, as applicable, in accordance with Section 8.3 of the NDS.

³The tabulated reference flexural stress, F_b, is for LVL with a 12-inch depth. For other depths, multiply by the size factor C_t = (12/d)^{1/9}, where d is the member depth in inches.

⁴The tabulated reference tension stress, F_t, is for LVL with a 4-foot length. For longer lengths, multiply by the length factor C_L = (4/L)^{1/8}, where L is the member length in feet.

⁵The reference modulus of elasticity for beam stability and column stability calculations, E_{min}, must be calculated in accordance with Appendix D of the NDS. When calculating E_{min}, the coefficient of variation of modulus of elasticity, COV_E, may be taken as 0.10.

⁶Product may also be labeled according to both F_b and F_t. Example: 2.0 2800 is equivalent to 2.0 2800/2150.

For uniformly loaded, simple span beams, deflection is calculated as follows:

$$D = \frac{270WL^4}{Ebd^3}$$

where:

- D = Deflection (inches)
- W = Uniform load (plf)
- L = Span (feet)
- E = Modulus of elasticity (psi)
- b = Beam width (inches)
- d = Beam depth (inches)

TABLE 2—VERSA-LAM® AND VERSA-RIM® ALLOWABLE RIM BOARD DESIGN CAPACITIES^{1,2}

MODULUS OF ELASTICITY, E (x10 ⁶ psi)	MINIMUM THICKNESS (inches)	ALLOWABLE VERTICAL LOAD ³				LATERAL CAPACITY ^{6,7,8} (lb/ft)	CONTAINS CROSS-PLY VENEER
		Distributed Load (lb/ft)		Concentrated Load (3½ in. Min. Width) (lb)			
		d ≤ 16	16 < d ≤ 20	d ≤ 16	16 < d ≤ 20		
1.3 - 1.6	1	2000	N/A	N/A	N/A	190	No
	1 ¹ / ₁₆	2000	N/A	N/A	N/A	205	No
	1 ¹ / ₁₆ ⁹	4250	4000	3800	3800	205	Yes
	1 ¹ / ₈	2000	N/A	N/A	N/A	220	No
	1 ³ / ₁₆	2000	N/A	N/A	N/A	230	No
	1 ¹ / ₄	3250	3250	2250	2250	See Note 4	No
	1 ⁵ / ₁₆	6000	5450	4450	4450	See Note 4	Yes
	1 ¹ / ₂	6,480	5600 ¹⁰	4600	4450 ¹⁰	See Note 4	Yes
	2 ¹ / ₄	3250	3250	2250	2250	See Note 5	No
1.7 - 2.2	1	4250	3700	3700	3500	190	No
	1 ¹ / ₁₆	4250	3700	3700	3500	205	No
	1 ¹ / ₈	4250	3700	3700	3500	220	No
	1 ³ / ₁₆	4250	3700	3700	3500	230	No
	1 ¹ / ₄	4250	3700	3700	3500	See Note 4	No
2.0 - 2.2	1 ¹ / ₂	5450	4300	4300	3900	See Note 4	No
	1 ³ / ₄	5700	4300	4300	3900	See Note 4	No
	2 ¹ / ₄	5700	4300	4300	3900	See Note 5	No

For **SI**: 1 inch = 25.4 mm, 1 lb = 4.4 N, 1 lb/ft = 47.8 Pa.

¹The rim board must be used as a continuously supported member and installed in accordance with Section 4.4.

²Allowable loads given in this table are not permitted to be increased by the load duration factor, C_D.

³d = member depth (inches).

⁴The lateral capacity (in-plane shear) is as permitted in the applicable code for solid-sawn lumber framing in horizontal wood diaphragms with nominally 2-inch- thick framing.

⁵The lateral capacity (in-plane shear) is as permitted in the applicable code for solid-sawn lumber framing in horizontal wood diaphragms with nominally 3-inch- thick framing.

⁶VERSA-LAM® and VERSA-RIM®, used as rim joist, may be substituted for solid-sawn framing in horizontal wood diaphragms as shown in Table 2306.2.1(1) of the 2009 IBC and Table 2306.3.1 of the 2006 IBC (maximum horizontal shear values must be limited as noted).

⁷Toe-nailed connections are not limited by the 150 plf lateral load capacity noted for Seismic Design Categories D, E, and F in Section 4.1.7 of the ANSI/AF&PA SDPWS and Section 2305.1.4 of the 2006 IBC.

⁸See Table 3 for minimum nail spacing requirements.

⁹Values apply only to 1 1/16-inch VERSA-RIM®.

¹⁰The applicable depth range is between 16 inches and 24 inches for the indicated values corresponding to 1 1/2-inch-thick product with cross-ply veneers.

TABLE 3—ALLOWABLE NAIL SPACING FOR VERSA-LAM® AND VERSA-RIM® (inches)^{1,2}

CONNECTOR SIZE	NAILS PARALLEL TO THE GLUE LINE										NAILS PERP. TO THE GLUE LINE	
	Minimum Thickness 1 inch		Minimum Thickness 1 1/4 inches		Minimum Thickness ³ 1 1/2 inches		Minimum Thickness ³ 1 3/4 inches		Minimum Thickness ³ 3 1/2 inches		All Thicknesses ³	
	o.c.	End ⁴	o.c.	End ⁴	o.c.	End ⁴	o.c.	End ⁴	o.c.	End ⁴	o.c.	End ⁴
8d box	3	1 1/2	3	1 1/2	3	1 1/2	2	1	2	1 1/2	2	1 1/2
8d common	4	3	3	2	3	2	3	2	2	1	2	1
10d & 12d box	4	3	3	2	3	2	3	2	2	1	2	1
16d box	4	3	3	2	3	2	3	2	2	1	2	1
10d & 12d common	6	4	4	3	4	3	4	3	2	2	2	2
16d sinker	6	4	4	3	4	3	4	3	2	2	2	2
16d common	6	4	6	4	6	4	6	3	2	2	2	2

For SI: 1 inch = 25.4 mm.

¹Spacing requirements and maximum nail size for panel edge nailing of wall sheathing at adjoining panels must also be in accordance with Section 4.6.

²Edge distances must be sufficient to prevent splitting.

³For multiple rows of fasteners, the rows must be offset 1/2 inch or more from each other, equally spaced from the centerline of the LVL member and staggered.

⁴“End” refers to the minimum distance between the nail and the end(s) of the piece(s) being connected.

TABLE 4—EQUIVALENT SPECIFIC GRAVITIES FOR CONNECTOR DESIGN

PRODUCT	MODULUS OF ELASTICITY, E (x10 ⁶ psi)	NAILS					
		Lateral Installed into Wide Face		Lateral Installed into Narrow Face		Withdrawal	
		Loaded Parallel to Length	Loaded Perpendicular to Length	Loaded Parallel to Length	Loaded Perpendicular to Length	Installed into Wide Face	Installed into Narrow Face
VERSA-LAM®	1.3 – 1.6	0.42	0.42	0.42	0.42	0.42	0.42
	1.7 – 2.2	0.50	0.50	0.50	0.50	0.50	0.50
VERSA-RIM®	All	0.50	0.50	0.50	0.50	0.50	0.46

PRODUCT	MODULUS OF ELASTICITY, E (x10 ⁶ psi)	BOLTS			
		Lateral Installed into Wide face		Lateral Installed into Narrow Face	
		Loaded Parallel to Length	Loaded Perpendicular to Length	Loaded Parallel to Length	Loaded Perpendicular to Length
VERSA-LAM®	1.3 – 1.6	0.38	0.38	0.34	0.34
	1.7 – 2.2	0.50	0.50	0.50	0.50
VERSA-RIM®	All	0.50	0.50	0.50	0.50

ICC-ES SAVE: Verification of Attributes Report™

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES

Section: 06 17 13—Laminated Veneer Lumber

Section: 06 17 33—Wood I-joists

Section: 06 18 13—Glued-Laminated Beams

REPORT HOLDER:

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EVALUATION SUBJECT:

Structural Wood Products:

BCI® Wood I-Joists

ALLJoist® Wood I-Joists

VERSA-LAM® Laminated Veneer Lumber

VERSA-STUD® Laminated Veneer Lumber

VERSA-RIM® Laminated Veneer Lumber

BOISE GLULAM® Beams

Software Products:

BOISE CASCADE SOFTWARE SOLUTIONS (BC CALC®, BC FRAMER® AND BOISE TQBuild™)

1.0 EVALUATION SCOPE

Compliance with the following evaluation guidelines:

- ICC-ES Evaluation Guideline for Determination of Biobased Material Content (EG102), dated October 2008
- ICC-ES Evaluation Guideline for Determination of Regionally Extracted, Harvested or Manufactured Materials or Products (EG104), dated October 2008
- ICC-ES Evaluation Guideline for Determination of Formaldehyde Emissions of Composite Wood and Engineered Wood Products (EG108), dated October 2008
- ICC-ES Evaluation Guideline for Determination of Certified Wood and Certified Wood Content in Products (EG109), dated October 2008

Compliance eligibility with the applicable sections of the following green building rating systems, standards and codes:

- National Green Building Standard (ICC 700-2008) (see Table 2 for details)
- LEED for Homes 2008 (see Table 3 for details)

- LEED 2009 for New Construction and Major Renovations (see Table 4 for details)
- LEED 2009 for Schools New Construction and Major Renovations (see Table 5 for details)
- LEED for Core and Shell 2009 (see Table 6 for details)
- LEED for Commercial Interiors 2009 (see Table 7 for details)
- LEED for Existing Buildings 2008 (see Table 8 for details)
- 2010 California Green Building Standards Code (CALGreen), Title 24, Part 11 (see Table 9 for details)
- ANSI/GBI 01-2010 - Green Building Assessment Protocol for Commercial Construction (see Table 10 for details)
- International Green Construction Code – Public Version 2.0 (IGCC PV2.0) (see Table 11 for details)
- ANSI/ASHRAE/USGBC/IES Standard 189.1-2009 – Standard for the Design of High-Performance Green Buildings, Except Low-Rise Residential Buildings (see Table 12 for details)

2.0 USES

Boise Cascade structural wood products are used for a variety of interior and exterior framing and sheathing applications. Boise Cascade software assists designers and builders to optimize cut packages and designs as well as customize designs for optimization of resources that assists in the optimal use of materials and minimization of waste.

3.0 DESCRIPTION

3.1 Boise Cascade Structural Wood Products:

Boise Cascade structural wood products are manufactured from various wood species bonded with structural adhesives (where applicable) complying with applicable ICC-ES reports as indicated in Table 1.

3.2 Boise Cascade Software:

BC CALC® software provides single member design and structural solutions to given inputs. The software output provides a ratio of actual design versus allowable design and a selection list of optimal solutions for the given input conditions.

BC FRAMER® software provides optimized framing layouts to assist in the proper placement of product at the jobsite. The input data is verified through links to the BC CALC® software to verify that the products selected are acceptable structurally for the given load and span conditions.

BOISE TQBuild™ software allows dealers and builders to integrate design information into pre-cut framing packages, which results in optimization of inventory and minimization of waste.

4.0 CONDITIONS

4.1 Code Compliance:

The Boise Cascade structural products that have been evaluated for compliance with, or otherwise deemed to comply with, the requirements of the International Codes are listed in Table 1 of this report.

The evaluation of the BOISE GLULAM beams and BC CALC®, BC FRAMER® and BOISE TQBuild™ optimization software for compliance with the requirements of the International Codes is outside the scope of this evaluation report. Compliance with all applicable code requirements must be demonstrated to the satisfaction of the Authority Having Jurisdiction (AHJ).

4.2 Green Rating Systems, Standards and Code Eligibility:

The information presented in Tables 2 through 12 of this report provides a matrix of areas of evaluation and corresponding limitations and/or additional project-specific requirements, and offer benefit to individuals who are assessing eligibility for credits or points.

The information on Life Cycle Assessment (LCA) is limited to the boundary conditions, the Life Cycle Inventory (LCI) inputs that consist of aggregated data and the methodology contained in the documentation noted in Section 5.8 of this report. The acceptance of this LCA information rests with the end-user. See Appendix A of this report for additional discussion on LCA.

The final interpretation of the specific requirements of the respective green building rating system and/or standard rests with the developer of that specific rating system or standard or the AHJ, as applicable.

Decisions on compliance for those items noted as “Eligible for Points” in Tables 2 through 12 rests with the user of this report, and those items are subject to the conditions noted. The user is advised of the project-specific provisions that may be contingent upon meeting specific conditions, and the verification of those conditions is outside the scope of this report. Rating systems or standards often provide supplemental information as guidance. Compliance for items noted as “Verified Attribute” is also subject to any conditions noted in the tables.

5.0 BASIS OF EVALUATION

The information in this report, including the “Verified Attribute,” is based upon the following supporting documentation:

- 5.1 ICC-ES EG102. [Evaluation applies to ICC 700 Section 606.1(2); CALGreen Section A5.405.2; ANSI/GBI 01-2010 Section 10.2.1.1; IGCC PV2.0 Section 503.2.4; ASHRAE 189.1 Section 9.4.1.3.]

- 5.2 ICC-ES EG104. [Evaluation applies to ICC 700 Section 608.1; LEED Homes Credit MR 2.2(c); LEED NC Credit MR 5; LEED Schools Credit MR 5; LEED C&S Credit MR 5; LEED CI Credit MR5; LEED EB Credit MR 3; CALGreen Section A5.405.1; ANSI/GBI 01-2010 Section 10.1.4.1; IGCC PV2.0 Section 503.2.5; ASHRAE 189.1 Section 9.4.1.2.]
- 5.3 ICC-ES EG108. [Evaluation applies to ICC 700 Section 901.4(6); LEED NC Credit EQ 4.4, LEED Schools Credit EQ 4.4; LEED C&S Credit EQ 4.4; LEED CI Credit EQ4.4; LEED EB Credit MR 3; IGCC PV2.0 Section 806.1.]
- 5.4 ICC-ES EG109. [Evaluation applies to ICC 700 Section 606.2(2); ANSI/GBI 01-2010 Section 10.3.2.1; ASHRAE 189.1 Section 9.4.1.3.1.]
- 5.5 Documentation demonstrating conformance with HUD PATH and DOE recommendations for advanced framing techniques, as summarized in Table 13 of this report. [Evaluation applies to ICC 700 Section 601.2; LEED Homes Credit MR 1.4.]
- 5.6 Software output of the BC CALC and BC FRAMER software with detailed framing or structural plans, material quantity lists and on-site cut lists for framing, structural materials, and sheathing materials, to assist with waste minimization. [Evaluation applies to ICC 700 Section 601.4; LEED Homes Credit MR 1.2, 1.3 & 1.5.]
- 5.7 Software output of the BOISE TQBuild software with detailed framing or structural plans, material quantity lists and pre-cut framing packages to assist in waste minimization. [Evaluation applies to ICC 700 Section 601.5(1); LEED Homes Credit MR 1.2, 1.3 & 1.5.]
- 5.8 Consortium for Research on Renewable Industrial Materials (CORRIM) Phase 1 report (available at http://www.corrim.org/reports/2006/final_phase_1/ind_ex.htm), containing an LCA analysis performed in accordance with ISO 14044. [Evaluation applies to ICC 700 Section 609.1; CALGreen Section A5.409.1; ASHRAE 189.1 Section 9.5.1.]
- 5.9 Documentation establishing that the environmental management system conforms to the requirements of ISO 14001 or equivalent. [Evaluation applies to ICC 700 Section 610.1.]

6.0 IDENTIFICATION

Boise Cascade structural wood products are identified with a stamp noting the name or logo of the manufacturer (Boise), the plant number, the product trade name and the ICC-ES evaluation report number (if applicable), and the name or logo of the inspection or grading agency. The report subjects are also identified on the product and/or packaging with the VAR number (VAR-1017) and the ICC-ES SAVE Mark, as applicable.

**TABLE 1—REFERENCE STANDARD OR EVALUATION REPORT NUMBER FOR
BOISE CASCADE STRUCTURAL WOOD PRODUCTS**

PRODUCT	REPORT NUMBER/ REFERENCE STANDARD
BCI® Wood I-Joists	ESR-1336
ALLJoist® Wood I-Joists	ESR-1144
VERSA-LAM® Laminated Veneer Lumber	ESR-1040
VERSA-STUD® Laminated Veneer Lumber	ESR-1040
VERSA-RIM® Laminated Veneer Lumber	ESR-1040

TABLES 2 THROUGH 12

Section #	Section Intent	Possible Points	Conditions of Use to Qualify for Points	BCI Wood I-Joist ALL Joist Wood I-Joists	VERSA-LAM LVL VERSA-STUD LVL VERSA-RIM LVL	Boise GLULAM Beams	BC CALC	BC FRAMER	BC TOBuild
TABLE 2—SUMMARY OF AREAS OF ELEGIBILITY WITH THE NATIONAL GREEN BUILDING STANDARD (ICC 700—2008)									
601.2	Building-code-compliant structural systems or advanced framing techniques are implemented that optimize material usage	3 each 9 max	To earn 3 points the framing methods listed in Table 13 must be used for floor, wall or roof framing. To earn 9 points they must be used for all floor, wall and roof framing	○	○	○			
601.4	Detailed framing or structural plans, material quantity lists and on-site cut lists for framing, structural materials, and sheathing materials are provided	4	To earn 4 points the software generated plans/lists must be on site				○	○	
601.5(1)	Precut or preassembled components, or panelized or precast assemblies are utilized for a minimum of 90 percent of the floor system	4	To earn 4 points the precut package must be used for 90% or more of the floor system						○
606.1(2)	Two types of biobased materials are used, each for more than 1 percent of the project's projected building material cost	6	To earn 6 points products must be at least 1% of the construction material cost AND another bio-based product at 1% of material cost must be used. 1 or 3 points are available for greater than 0.5%	●	●	●			
606.2(2)	Two certified wood-based products are used for major elements of the building, such as all walls, floors or roof	4	To earn 4 points a second certified wood product must also be used as a major element ¹	●	●	●			
607.1	Products containing fewer materials are used to achieve the same end-use requirements as conventional products	3 each 9 max	To earn 3 points at least 80% of framing products used in the building are Boise Cascade products	●	●	●			
608.1	Indigenous materials	2 each 10 max	To earn 2 points verify local products that are originated, produced, grow naturally or occur naturally within 500 miles (805 km) of the job site. Distance can be determined by a distance calculator found at: www.bc.com/wood/ewp/SustainableBuildingCredits.html ²	○	○	○			
609.1	A more environmentally preferable product or assembly is selected for an application based upon the use of a Life Cycle Assessment (LCA) tool complying with ISO 14044 or other recognized standards that compare the environmental impact of building materials, assemblies, or the whole building	3 each 15 max	To gain 15 points an ISO 14044-complaint LCA must be done on a whole building basis, such as that contained in the CORRIM report at www.corrim.org . 3 points may be earned where comparative LCA is done for individual products or systems	●	●	●			
610.1	Product manufacturer's operations and business practices include environmental management system concepts, and the production facility is ISO 14001 certified or equivalent	1 per % 10 max	1 point may be earned for each building products used that equals 1 percent or more of the estimated total building materials cost. Material cost breakdown to be verified and points adjusted to reflect actual percentage of all products from ISO 14001 facilities	●	●	●			
901.4(6)	Non-emitting products, which can include structural wood framing	4	A minimum of 85% of product in the building are the identified Boise Cascade products	●	●	●			
○	= Eligible for compliance								
●	= Verified attribute								
	= This provision does not apply to this product/service								

Note: Footnotes are located after Table 12.

TABLES 2 THROUGH 12 (Continued)

Section #	Section Intent	Possible Points	Conditions of Use to Qualify for Points	BCI Wood I-Joist ALL Joist Wood I-Joists	VERSA-LAM LVL VERSA-STUD LVL VERSA-RIM LVL	Boise GLULAM Beams	BC CALC	BC FRAMER	BC TQBuild
TABLE 3—SUMMARY OF AREAS OF ELEGIBILITY WITH USGBC'S LEED FOR HOMES 2008									
MR 1.2	Detailed framing documents	1	Visually verify detailed framing plans and/or scopes of work					○	○
MR 1.3	Detailed cut list and lumber order	1	To earn 1 point verify that detailed framing cut list and lumber order are used						○
MR 1.4	Framing efficiencies	3 max	To earn 1 point verify that advanced framing measures in Table 13 are used for floors, walls OR roof framing	○	○	○			
MR 1.5	Off-site fabrication	4	To earn 4 points use off-site panelized or modular, prefabricated construction ³						○
MR 2.1	FSC certified tropical wood	0.5 each 8 max	To earn 0.5 point per component use FSC-certified tropical wood ⁴	4	4	4			
MR 2.2(c)	Environmentally preferable products for roof, wall and floors; interior and exterior framing and sheathing	0.5 each 8 max	To earn points use products that are extracted, processed and manufactured within 500 miles (805 km) of the site for a minimum of 90% (by weight or volume of the component). Distance can be determined by a distance calculator found at: www.bc.com/wood/ewp/SustainableBuildingCredits.html ²	○	○	○			
TABLE 4—SUMMARY OF AREAS OF ELEGIBILITY WITH USGBC'S LEED 2009 FOR NEW CONSTRUCTION AND MAJOR RENOVATIONS									
MR 5 (MR 5.1)	Regional materials (10% of content)	1	To earn 1 point use products that are extracted, processed and manufactured within 500 miles (805 km) of the site for a minimum of 10% (by cost) of total materials value. To earn 2 points use a minimum of 20%. Distance can be determined by a distance calculator found at: www.bc.com/wood/ewp/SustainableBuildingCredits.html ²	○	○	○			
MR 5 (MR 5.2)	Regional materials (20% of content)	2		○	○	○			
MR 7	Certified wood	1	To earn 1 point use a minimum 50% (based on cost) of wood-based materials/products certified to FSC requirements ⁴	○ ⁴	○ ⁴	○ ⁴			
EQ 4.4	Low emitting materials	1	To earn 1 point use wood composite wood products containing no-added urea-formaldehyde resins	●	●	●			
TABLE 5—SUMMARY OF AREAS OF ELEGIBILITY WITH USGBC'S LEED 2009 FOR SCHOOLS NEW CONSTRUCTION AND MAJOR RENOVATIONS									
MR 5 (MR 5.1)	Regional materials (10% of content)	1	To earn 1 point use products that are extracted, processed and manufactured within 500 miles (805 km) of the site for a minimum of 10% (by cost) of total materials value. To earn 2 points use a minimum of 20%. Distance can be determined by a distance calculator found at: www.bc.com/wood/ewp/SustainableBuildingCredits.html ²	○	○	○			
MR 5 (MR 5.2)	Regional materials (20% of content)	2		○	○	○			
MR 7	Certified wood	1	To earn 1 point use a minimum 50% (based on cost) of wood-based materials/products certified to FSC requirements ⁴	○ ⁴	○ ⁴	○ ⁴			
EQ 4.4	Low emitting materials	1	Based on the LEED for Schools PIECAP, it is permissible to substitute LEED 2009 for New Construction EQ 4 Low-Emitting Materials credits in place of corresponding LEED 2009 for Schools EQ 4 Low-Emitting Materials credits.	●	●	●			
○	= Eligible for compliance								
●	= Verified attribute								
	= This provision does not apply to this product/service								

Note: Footnotes are located after Table 12.

TABLES 2 THROUGH 12 (Continued)

Section #	Section Intent	Possible Points	Conditions of Use to Qualify for Points	BCI Wood I-Joist ALL Joist Wood I-Joists	VERSA-LAM LVL VERSA-STUD LVL VERSA-RIM LVL	Boise GLULAM Beams	BC CALC	BC FRAMER	BC TQBuild
TABLE 6—SUMMARY OF AREAS OF ELEGIBILITY WITH USGBC'S LEED 2009 FOR CORE AND SHELL DEVELOPMENT									
MR 5 (MR 5.1)	Regional materials (10% of content)	1	To earn 1 point use products that are extracted, processed and manufactured within 500 miles (805 km) of the site for a minimum of 10% (by cost) of total materials value. To earn 2 points use a minimum of 20%. Distance can be determined by a distance calculator found at: www.bc.com/wood/ewp/SustainableBuildingCredits.html ²	○	○	○			
MR 5 (MR 5.2)	Regional materials (20% of content)	2		○	○	○			
MR 7	Certified wood	1	To earn 1 point use a minimum 50% (based on cost) of wood-based materials/products certified to FSC requirements ⁴	○ ⁴	○ ⁴	○ ⁴			
EQ 4.4	Low emitting materials	1	To earn 1 point use wood composite wood products containing no-added urea-formaldehyde resins	●	●	●			
TABLE 7—SUMMARY OF AREAS OF ELEGIBILITY WITH USGBC'S LEED 2009 FOR COMMERCIAL INTERIORS									
MR 5 (Option 1)	Regional materials (20% of content)	1	To earn 1 point use products that are extracted, processed and manufactured within 500 miles (805 km) of the site for a minimum of 20% (by cost) of total materials value, including furniture.	○	○	○			
MR 5 (Option 2)	Regional materials (Meet Option 1 + 10% of content)	2	To earn 2 points use a minimum of 20% + 10%. Distance can be determined by a distance calculator found at: www.bc.com/wood/ewp/SustainableBuildingCredits.html ²	○	○	○			
MR 7	Certified wood	1	To earn 1 point use a minimum 50% (based on cost) of wood-based materials/products certified to FSC requirements ⁴ . Furniture material value is also included in determination of certified wood content	○ ⁴	○ ⁴	○ ⁴			
EQ 4.4	Low emitting materials	1	To earn 1 point use wood composite wood products containing no-added urea-formaldehyde resins	●	●	●			
TABLE 8—SUMMARY OF AREAS OF ELEGIBILITY WITH USGBC'S LEED FOR EXISTING BUILDING 2008									
MR 3	Regional materials	1	Maintain a sustainable purchasing program where the purchase of products contain a minimum of 50% materials (by cost) are extracted, processed and manufactured within 500 miles (805 km) of the site. Distance can be determined by a distance calculator found at: www.bc.com/wood/ewp/SustainableBuildingCredits.html ²	○	○	○			
	Certified wood		Maintain a sustainable purchasing program where the purchase of products contain a minimum 50% (by cost) of wood-based materials/products certified to FSC requirements ⁴	○ ⁴	○ ⁴	○ ⁴			
	Low emitting materials		Maintain a sustainable purchasing program where the purchase of wood composite wood products are those that contain no-added urea-formaldehyde resins	●	●	●			
○ = Eligible for compliance									
● = Verified attribute									
= This provision does not apply to this product/service									

Note: Footnotes are located after Table 12.

TABLES 2 THROUGH 12 (Continued)

Section #	Section Intent	Possible Points	Conditions of Use to Qualify for Points	BCI Wood I-Joist ALL Joist Wood I-Joists	VERSA-LAM LVL VERSA-STUD LVL VERSA-RIM LVL	Boise GLULAM Beams	BC CALC	BC FRAMER	BC TQBuild
TABLE 9—SUMMARY OF AREAS OF ELEGIBILITY WITH 2010 CALIFORNIA GREEN BUILDING STANDARDS CODE (CALGREEN)									
4.504.5, 5.504.4.5	Composite wood product emissions	Mandatory	EWP and lumber products do not apply to the composite wood product definition ⁶						
A4.404.3	Products containing fewer materials are used to achieve the same end-use requirements as conventional products	Residential Elective	Use premanufactured building systems as a substitute for solid lumber	●	●	●			
A4.404.4	Detailed cut list and material order	Residential Elective	Material lists are included in the plans which specify material quantity and provide direction for on-site cuts.					○	○
A4.405.4 (3) & (5)	Renewable sources	Residential Elective	Materials from renewable sources (such as engineered wood and solid wood products)	●	●	●			
A5.404.1	Advanced wood framing techniques	Commercial Elective	Advanced framing methods shall not conflict with structural framing methods or fire-rated assemblies required by the California Building Code. (See Table 13)	○	○	○			
A5.405.1	Regional materials	Commercial Elective	Verify local products that are extracted, processed and manufactured within California or 500 miles (805 km) of the job site. Distance can be determined by a distance calculator found at: www.bc.com/wood/ewp/SustainableBuildingCredits.html ²	○	○	○			
A5.405.2	Bio-based materials	Commercial Elective	All Boise Cascade wood products are qualified as biobased	●	●	●			
A5.405.2.1	Certified wood	Commercial Elective	Under review by California Building Standards Commission ⁵	N/A	N/A	N/A			
A5.409.1	Life cycle assessment	Commercial Elective	Select materials or assemblies based on an LCA done in accordance with ISO 14044, such as that contained in the CORRIM report at www.corrim.org	○	○	○			
TABLE 10—SUMMARY OF AREAS OF ELEGIBILITY WITH ANSI/GBI01-2010—GREEN BUILDING ASSESSMENT PROTOCOL FOR COMMERCIAL BUILDINGS									
10.1.1.1	Life cycle impact - building assemblies	33 max	Use Green Globes LCA Credit Calculator	○	○	○			
10.1.2.2	Biobased Products - building assemblies	7 max	All Boise Cascade wood products are qualified as biobased	●	●	●			
10.1.4.1	Regional Materials - building assemblies	5 max	To earn credits use products that are extracted, processed and manufactured within 500 miles (805 km) of the site for a minimum of 90% (by weight or volume of the component. Distance can be determined by a distance calculator found at: www.bc.com/wood/ewp/SustainableBuildingCredits.html ²	○	○	○			
10.3.2.1	Certified wood	6	Between 10% and 60% or more of wood-based products used in the building are third party certified	○	○	○			
○	= Eligible for compliance								
●	= Verified attribute								
	= This provision does not apply to this product/service								

Note: Footnotes are located after Table 12.

TABLES 2 THROUGH 12 (Continued)

Section #	Section Intent	Possible Points	Conditions of Use to Qualify for Points	BCI Wood I-Joist ALL Joist Wood I-Joists	VERSA-LAM LVL VERSA-STUD LVL VERSA-RIM LVL	Boise GLULAM Beams	BC CALC	BC FRAMER	BC TQBuild
TABLE 11—SUMMARY OF AREAS OF ELEGIBILITY WITH INTERNATIONAL GREEN CONSTRUCTION CODE - PUBLIC VERSION 2.0 (IGCC PV2.0)									
503.2.4(2)	Biobased products	N/A	All Boise Cascade wood products are labeled in accordance with the SFI Standard fiber procurement system. Manufacturer's fiber procurement systems is audited by an accredited third-party	●	●	●			
503.2.5	Indigenous materials	N/A	To qualify products must be extracted, processed and manufactured within 500 miles (805 km) of the site. Boise I-Joists, the web stock is transported by rail so the distance to the building site can be determined by multiplying the distance that the resources are transported by rail by 0.25, and adding that number to the distance transported by means other than water or rail. Distances for all products can be determined by a distance calculator found at: www.bc.com/wood/ewp/SustainableBuildingCredits.html ²	○	○	○			
806.1	Formaldehyde emissions	N/A	Boise Glulam beams do not use urea-formaldehyde resins and qualify under the exception 1 to Section 806.1			●			
		N/A	Boise Wood I-Joists comply with ASTM D 5055 (See Table 1 of this report) and meet the requirements of Table 806.1	●					
		N/A	Boise LVL products comply with ASTM D 5456 (See Table 1 of this report) and meet the requirements of Table 806.1		●				
TABLE 12—SUMMARY OF AREAS OF ELEGIBILITY WITH ASHRAE STANDARD 189.1—2009									
8.4.2.4	Composite wood product emissions	Prescriptive option	EWP and lumber products exempt from the composite wood product emissions requirements ⁶						
9.3.2	Extracting, harvesting and manufacturing	Mandatory	Wood products containing wood from endangered species shall conform to trade requirement of CITES	●	●	●			
9.4.1.2	Regional materials	Prescriptive option	A minimum of 15% of building materials or products used are extracted/harvested/recoverd or manufactured within 500 miles (805 km) of the site. Source distance can be done by use of the regional distance calculator at www.bc.com/wood/ewp/SustainableBuildingCredits.html ²	○	○	○			
9.4.1.3	Biobased products	Prescriptive option	All Boise Cascade wood products are qualified as biobased	●	●	●			
9.4.1.3.1	Wood Building Components	Prescriptive option	Chain of custody compliance is through one of three available options: 1) an on-product chain of custody label, 2) chain of custody paperwork, or 3) vendors may supply to the AHJ a statement that the annual average amount of certified content of the total annual wood products purchased by the vendor is 60% or greater, for which they have chain of custody verification not older than two years ⁴	○ ⁴	○ ⁴	○ ⁴			
9.5.1	Life cycle assessment	Performance option	Select materials or assemblies based on an LCA done in accordance with ISO 14044, such as that contained in the CORRIM report at www.corrim.org	○	○	○			
○	= Eligible for compliance								
●	= Verified attribute								
	= This provision does not apply to this product/service								

¹Certification is required of the manufacturer only. Vendor Chain of Custody is not required to qualify for this point.²Information on how to determine both the distance from source to mill and mill to site is located on the distance calculator web page.³Applicable only when a third-party prefabricates the framing package prior to arrival on the site. TQBuild allows for either prefabrication off-site or assembly on-site using materials labeled and cut to precision-end-trim dimensions off-site.⁴Forest certification credit currently resources FSC. The specific BOISE products and manufacturing locations that are FSC certified can be viewed at www.bc.com/sustainability/certification.html and by reviewing FSC License Codes: FSC-C084674, FSC-C019369 and FSC-C041295 at <http://info.fsc.org>. Credit for products or plants listed under other certification schemes is at the discretion of the verifier.⁵CALGreen recognizes importance of use of certified forest products however the specific requirements are currently under development.⁶This area is not be confused with the provisions of EQ 4.4 in LEED (Tables 4, 5, 6, 7 and 8) because the California Air Resources Board (CARB) does not regulate engineered wood product emissions and are exempt in ASHRAE 189.1.

N/A = Not applicable

TABLE 13—ADVANCED FRAMING TECHNIQUES

	RATING SYSTEM/CODES ¹		
	ICC-700	LEED-HOMES	CALGREEN
PRESCRIPTIVE-BASED COMPLIANCE CRITERIA			
19.2- or 24-inch OC floor framing	✓	✓	✓
19.2- or 24-inch OC bearing walls	✓	✓	✓
24-inch OC roof framing	✓	✓	✓
24-inch OC interior partitions	✓	✓	✓
Single top plate walls	✓	See footnote 3	✓
Right sized or insulated headers (where required)	✓	✓	✓
Eliminate headers in non-bearing walls	✓	✓	✓
Doubling rim joist in lieu of header (2x6 or deeper wall)	✓	See footnote 3	See footnote 4
Ladder blocking at interior wall-to-exterior wall intersections	✓	✓	See footnote 4
Two stud corner framing	✓	✓	✓
Doubling rim joist in lieu of header (2x6 or deeper wall)	✓	See footnote 3	See footnote 4
Other measures that reduce material usage	See footnote 2	See footnote 3	See footnote 4
PERFORMANCE-BASED COMPLIANCE CRITERIA			
Optimized design per Wood Frame Construction Manual	✓	See footnote 3	See footnote 4
Optimized design per National Design Specification for Wood Construction	✓	See footnote 3	See footnote 4
Precut framing packages	N/A	✓	See footnote 4

For **SI**: 1 inch = 25.4 mm.

¹✓ represents that the criteria is deemed to comply when conditions are met.

²In ICC-700 Section 601.2, 3 points may be gained for each advanced framing technique that exceeds 80% usage in the building up to 9 points maximum. See references in 601.2 commentary for additional details on prescriptive-based compliance criteria.

³In LEED for Homes Section MR 1.4, Table 23, alternative measures to Table 23 are eligible for points if they save comparable amounts of framing material.

⁴Other framing techniques as permitted by the U.S. Department of Energy's Office of Building Technology, State and Community Programs, subject to approval by the AHJ.

Appendix A

Discussion Related to Life-Cycle Assessment

A1.0 GENERAL

The following information is intended to provide some general background on LCA provisions in existing rating systems and standards. Users are advised that the science of LCA is still evolving and there are no standardized procedures for such an analysis. It must be noted that Section 609.1 of ICC 700, Section A5.409.1 of CALGreen, Section 9.5.1 of ASHRAE 189.1, and Section 10.1.1 of Green Globes encourage the use of comparative LCA as means of selecting preferable materials, systems or building assemblies. However, LCA results should not be interpreted beyond the scope of the boundary limits used in performing the LCA.

This VAR indicates that Boise products may be eligible for points related to LCA by use of the information contained in the documentation noted in Section 5.8 of this report. This appendix discusses additional information required by the user of this report related to achieving points or demonstrating compliance based on LCA output.

A2.0 DISCUSSION RELATED TO ICC 700

As indicated in the ICC 700 Commentary, points can be obtained based on the results of an analysis based on an LCA. For the purpose of compliance with the intent of ICC 700, the following steps (as a minimum) are recommended:

- Fully define the benchmark material, product, assembly, or structure
- Fully define the product or assembly proposed as more environmentally friendly
- Fully define the endpoints or boundaries of the analysis (so-called cradle-to-gate, cradle-to-grave, cradle-to-cradle, gate-to-gate, etc). For analyses that go beyond cradle-to-gate, a separate report is recommended for each application or use category. Such reports are also recommended to include a discussion of the sensitivity of the analysis to major assumptions for major parameters.
- Employ an LCA method complying with ISO 14044.
- Report all applicable attributes of the benchmark analysis and the proposed product/assembly analysis that are relevant to the LCA.
- The involvement of an individual with experience in the field of LCA and who is knowledgeable in the latest research and standards related to LCA, from the earliest planning stages through completion of the final assessment, is recommended.
- An independent peer review of the entire LCA methodology and its conclusions by an individual knowledgeable in LCA is recommended.

Examples of an LCA that meets these requirements can be found in the series of CORRIM reports (www.corrim.org) that address a broad range of wood-based building materials.

A3.0 DISCUSSION RELATED TO CALGREEN AND ASHRAE 189.1

Similar to the requirements of ICC 700, Section A5.409.1 of CALGreen and Section 9.5.1 of ASHRAE 189.1 allows the use of selected materials or assemblies based on LCA done in accordance with ISO 14044.

A4.0 DISCUSSION RELATED TO ANSI/GBI 01-2010

Although life-cycle assessment in its broad sense is too complex for standardization at this time, the use of a specific tool (e.g., Green Globes LCA Credit Calculator) in strict accordance with the rating system intent of comparative analysis of specific components of the building is reasonable. However, users are advised to consult with persons familiar with LCA tools when conducting this analysis. Additional guidance regarding the Green Globes LCA Credit Calculator is provided in Appendix N of the Green Globes document.