



524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: ASF
Review/Check: ARA

Project Name: Breyman Shop
SRE Project #: 2025-10375
City and State: Idaho County, Idaho

Tall Walls and Lateral Calculations

Project Title: Breyman Shop

Location: Idaho County, Idaho

Job #: 2025-10375



Disclaimer:

1. Calculations are not to be used for determining lengths of structural members.
2. Calculations are single use and location specific to property listed above.
3. Calculations shall not to be reproduced, reused, or altered in any way.
4. Calculations based on drawings received prior to stamp date. Any changes made after stamp date must be reviewed and approved by Engineer of Record prior to construction.
5. All work to conform to all local, state, and national codes.

Prepared in accordance with 2018 IBC. Calculations expire by: **7/28/2026**



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SITE SPECIFIC DESIGN CRITERIA:

Snow Criteria:

Roof Load (P_f)	60 psf	
Ground Load (P_g)	60 psf	
Exposure Factor (C_e)	1.0	Partially
Thermal Factor (C_t)	1.0	Typical
Importance (I_s)	1.0	

Wind Criteria:

Wind Speed (V_3)	115 mph	
Wind Exposure	C	Open Terrain
Wind Importance (I_w)	1.0	
Building Category	II	

Seismic Criteria:

Site Class	D	Stiff Soil
Ss	0.33	Fa 1.60
S1	0.10	Fv 2.40
S _{D1}	0.35	S _{D1} 0.15
Risk Category	II	Other
Seismic Importance (I_E)	1.0	
Seismic Design Category (SDC)	C	

Seismic Criteria (continued):

Wall Material	Design Base Shear	Response Coeff., R	
OSB	.06Wp	6.5	Typ @ Ext
GYP	.21Wp	2	Typ @ Int
Cant. Col.	.28Wp	1.5	

Soil Criteria:

Brg. Strength	1500 psf
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STRUCTURE SPECIFIC DESIGN CRITERIA:

Live Loads:

Typ Residential	40 psf
Garage (P.V.)	50 psf
Sleeping Area's	30 psf

Roof Dead Loads:

Deck	1.5
Insulation	2.0
Roofing	3.0
Joist	2.5
Ceiling	3.0
Misc	4.5
TOTAL	17 psf

Roof not engineered for Tile, Slate or Concrete.

Exterior Wall Dead Loads:

Studs	2.0
Siding	2.5
Insulation	0.5
Gyp. Board	2.5
Sheathing	1.5
Misc	3.0
TOTAL	12 psf

Floor Dead Loads:

Deck	2.5
Joist	2.0
Ceiling	2.0
Flooring	2.5
Misc	3.0
TOTAL	12 psf

Floor joists not engineered for concrete overlay.

Interior Wall Dead Loads:

Studs	2.0
Gyp. Board	2.5
Misc	3.0
TOTAL	8 psf

Deck Dead Load

Decking	4.4
Joist	2.0
	0.0
Misc	3.0
TOTAL	10 psf

Deck not engineered for hot tub loading.

Deck not engineered for concrete overlay.



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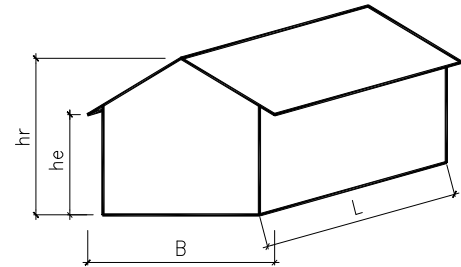
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WIND ANALYSIS: Low-rise Building - Based on IBC / ASCE 7

INPUT DATA

Exposure category (B, C or D, ASCE 7-16 26.7.3)		C	
Importance factor (ASCE 7-16 Table 1.5-2)	$I_w =$	1.00	for all Category
Basic wind speed (ASCE 7-16 26.5.1 or 2018 IBC)	$V =$	115	mph
Topographic factor (ASCE 7-16 26.8 & Table 26.8-1)	$K_{zt} =$	1.00	Flat
Building height to ridge	$h_r =$	27.50 ft	ft
Building height to eave	$h_e =$	15.00 ft	ft
Building width	$B =$	35.00 ft	ft
Building length	$L =$	55.00 ft	ft
Overhang sloped width	$O_h =$	3.00 ft	ft
Effective area of components (or Solar Panel area)	$A =$	75.0 ft ²	ft ² , <== Overhang? (Yes or No): Yes
Enclosed? (Y/N)		y	



ANALYSIS

Velocity pressure

$$q_h = 0.00256 K_z K_{zt} K_d K_e V^2 = 26.29 \text{ psf}$$

where: q_h = velocity pressure at mean roof height, h. (Eq. 26.10-1 page 268)

K_z = velocity pressure exposure coefficient evaluated at height, h, (Tab. 26.10-1, pg 266) = **0.91**

K_d = wind directionality factor. (Tab. 26.6-1, for building, page 266) = **0.85**

h = mean roof height = **21.25 ft**

K_e = ground elevation factor. (**1.0** per Sec. 26.9, page 268)

< 60 ft, [Satisfactory] (ASCE 7-16 26.2.1)

< Min (L, B), [Satisfactory] (ASCE 7-16 26.2.2)

Design pressures for MWFRS

$$p = q_h [(G C_{pf}) - (G C_{pi})]$$

where: p = pressure in appropriate zone. (Eq. 28.3-1, page 311).

$p_{min} = 16 \text{ psf}$ (ASCE 7-16 28.3.4)

$G C_{pf}$ = product of gust effect factor and external pressure coefficient, see table below. (Fig. 28.3-1, page 312 & 313)

$G C_{pi}$ = product of gust effect factor and internal pressure coefficient. (Tab. 26.13-1, Enclosed Building, page 271)

= **0.18** or **-0.18**

a = width of edge strips, Fig 28.3-1, page 312, $\text{MAX}[\text{MIN}(0.1B, 0.1L, 0.4h), \text{MIN}(0.04B, 0.04L), 3] = 3.50 \text{ ft}$

Net Pressures (psf), Basic Load Cases

Surface	Roof angle $q = 18.43$			Roof angle $q = 18.43$		
	$G C_{pf}$	Net Press. W/		$G C_{pf}$	Net Press. W/	
		(+GC _{pi})	(-GC _{pi})		(+GC _{pi})	(-GC _{pi})
1	0.52	8.84	18.31	-0.45	-16.56	-7.10
2	-0.69	-22.87	-13.41	-0.69	-22.87	-13.41
3	-0.47	-17.05	-7.58	-0.37	-14.46	-4.99
4	-0.42	-15.65	-6.19	-0.45	-16.56	-7.10
5				0.40	5.78	15.25
6				-0.29	-12.36	-2.89
1E	0.78	15.78	25.24	-0.48	-17.35	-7.89
2E	-1.07	-32.86	-23.40	-1.07	-32.86	-23.40
3E	-0.67	-22.43	-12.97	-0.53	-18.66	-9.20
4E	-0.62	-20.98	-11.52	-0.48	-17.35	-7.89
5E				0.61	11.30	20.77
6E				-0.43	-16.04	-6.57

Net Pressures (psf), Torsional Load Cases

Surface	Roof angle $q = 18.43$		
	$G C_{pf}$	Net Press. W/	
		(+GC _{pi})	(-GC _{pi})
1T	0.52	2.21	4.58
2T	-0.69	-5.72	-3.35
3T	-0.47	-4.26	-1.90
4T	0.00	-3.91	-1.55
Surface	Roof angle $q = 0.00$		
	$G C_{pf}$	Net Press. W/	
		(+GC _{pi})	(-GC _{pi})
5T	0.40	1.45	3.81
6T	-0.29	-3.09	-0.72

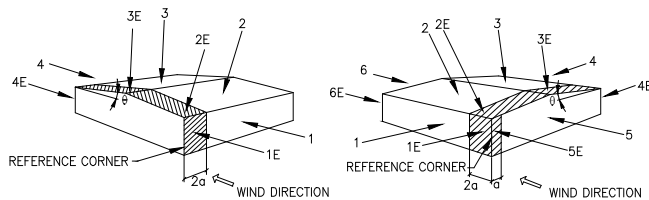
+ / - Wind Pressure 64%



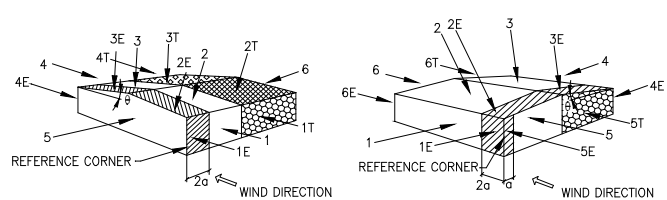
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Load Case A (Transverse) Load Case B (Longitudinal)
Basic Load Cases



Load Case A (Transverse) Load Case B (Longitudinal)
Torsional Load Cases

Design pressures for components and cladding

$$p = q_h [(G C_p) - (G C_{pi})]$$

where: p = pressure on component. (Eq. 30.3-1, pg 33)

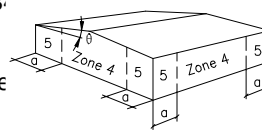
$p_{min} = 16.00$ psf (ASCE 7-16 30.2.2)

$G C_p = 1.00$ external pressure coefficient
see table below. (ASCE 7-16 30.3.2)

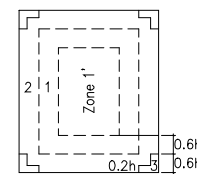
$q = 18.43$ °

$p_{overhang} = -90.69$ psf

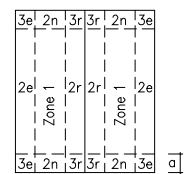
(ASCE 7-16 28.3.3)



Walls



Roof $\theta \leq 7^\circ$



Roof $\theta > 7^\circ$

Comp. & Cladding Coeffs.	Effective Area (ft ²)	Zone 1		Zone 1'		Zone 2		Zone 2e		Zone 2n		Zone 2r	
		GC _p	- GC _p	GC _p	- GC _p	GC _p	- GC _p	GC _p	- GC _p	GC _p	- GC _p	GC _p	- GC _p
	408	0.30	-0.80	0.30	-0.80	0.30	-2.20	0.30	-0.80	0.30	-1.00	0.30	-1.00
	Effective Area (ft ²)	Zone 3		Zone 3e		Zone 3r		Zone 4		Zone 5			
		GC _p	- GC _p	GC _p	- GC _p	GC _p	- GC _p	GC _p	- GC _p	GC _p	- GC _p		
	75	0.30	-2.50	0.30	-2.50	0.30	-1.80	0.96	-1.06	0.96	-1.32		

Comp. & Cladding Pressures	Zone 1		Zone 1'		Zone 2		Zone 2e		Zone 2n		Zone 2r	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative
	12.62	-25.76	12.62	-25.76	12.62	-62.56	12.62	-25.76	12.62	-31.02	12.62	-31.02
	Zone 3		Zone 3e		Zone 3r		Zone 4		Zone 5		(Max Pressure 70.45 psf)	
	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative	Positive	Negative		
	12.62	-70.45	12.62	-70.45	12.62	-52.05	29.97	-32.60	29.97	-39.44		

LOAD CASE 'A' FACTORED LOADS

$$\begin{aligned} 0.6 * W_r &= (Z_2 + Z_3) * 0.6 = 3.5 \text{ psf} \\ 0.6 * W_{re} &= (Z_{2e} + Z_{3e}) * 0.6 = 6.3 \text{ psf} \\ 0.6 * W_w &= (Z_1 + Z_4) * 0.6 = 14.7 \text{ psf} \\ 0.6 * W_{we} &= (Z_{1e} + Z_{4e}) * 0.6 = 22.1 \text{ psf} \end{aligned}$$

LOAD CASE 'B' FACTORED LOADS

$$\begin{aligned} 0.6 * W_r &= (Z_2 + Z_3) * 0.6 = 5.0 \text{ psf} \\ 0.6 * W_{re} &= (Z_{2e} + Z_{3e}) * 0.6 = 8.5 \text{ psf} \\ 0.6 * W_w &= (Z_5 + Z_6) * 0.6 = 10.9 \text{ psf} \\ 0.6 * W_{we} &= (Z_{5e} + Z_{6e}) * 0.6 = 16.4 \text{ psf} \end{aligned}$$

ROOF COMPONENTS FACTORED LOAD

$$0.6 * Z_{r,c\&c} = 18.6 \text{ psf}$$

WALL COMPONENTS FACTORED LOAD

$$0.6 * Z_{w,c\&c} = 19.6 \text{ psf}$$



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OSB SEISMIC LOADING ANALYSIS

IBC / ASCE 7: Equivalent Lateral Force (ELF) Procedure:

INPUT DATA

DESIGN SUMMARY

Typical floor height:	$h = 15$ ft	$C_s = 1.2 * S_{DS} / (R / I_e) = 0.0650$	<= Applicable
Typical floor weight:	$w_x = 32.7$ kips	Period Parameter, $x = 0.75$	, ASCE Tab 12.8-2
Number of floors:	$n = 1$	Period: $T_a = C_t (h_n)^x = 0.24$ sec	, ASCE 12.8.2.1
Importance factor (ASCE 11.5.1):	$I_e = 1.00$	$C_s < S_{D1} / [(R / I_e) T_a] = 0.0974$	, ASCE Tab 12.8.1.1 <= Not Applicable
Design spectral response:	$S_{DS} = 0.35$ g	$C_s > 0.044 S_{DS} I_e = 0.0155$	, ASCE Tab 12.8.1.1 <= Not Applicable
	$S_{D1} = 0.15$ g	$C_s > 0.5 S_1 / (R / I_e) = 0.0073$	, ASCE Tab 12.8.1.1 <= Not Applicable
Mapped spectral resp.:	$S_1 = 0.10$ g	$k = 1.55$	, (ASCE 12.8.3, page 91)
Period Parameter, C_t :	(ASCE Tab 12.8-2): $C_t = 0.020$	$V = C_s W = 0.0650$ W	
Resp. coefficient: (ASCE Tab. 12.2.1):	$R = 6.5$	$0.7 * V = 0.0455$ W	
Seismic design category: SDC = C	$h_n = 27.5$ ft	$W = 33$ kips, total	

SEISMIC COMPONENT & ANCHORING ANALYSIS

Out-of-plane seismic force for wall design (ASCE 7, Sec.12.11.1)

$$k_a = 1.0 + \frac{L_f}{100} \quad (12.11-2)$$

Lf: 10 ft ka: 1.1

$$F_p = 0.4 S_{DS} k_a I_e W_p \quad (12.11-1) = 1.9 \text{ psf} \quad \leq \text{USE FOR O.O.P. WALL}$$

Where: $W_p = 12.0$ psf, $I_e = 1.00$

For seismic design category C and above, flexible diaphragm (ASCE 7)

$$F_{px} = 0.4 S_{DS} I_e W_{px} \quad (12.10-3) = 2.39 \text{ psf} \quad \leq \text{USE FOR ROOF FRAMING UPLIFT}$$

Where: $W_{px} = 17.0$ psf,



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GYP SEISMIC LOADING ANALYSIS

IBC / ASCE 7: Equivalent Lateral Force (ELF) Procedure:

INPUT DATA

Typical floor height: $h = 15$ ft
Typical floor weight: $w_x = 32.7$ kips
Number of floors: $n = 1$
Importance factor (ASCE 11.5.1): $I_e = 1.00$
Design spectral response: $S_{DS} = 0.35$ g
 $S_{D1} = 0.15$ g
Mapped spectral resp.: $S_1 = 0.10$ g
Period Parameter, C_t :
(ASCE Tab 12.8-2): $C_t = 0.020$
Resp. coefficient: (ASCE
Tab. 12.2.1): $R = 2$
Seismic design category: SDC = C
 $h_n = 27.5$ ft

DESIGN SUMMARY

$C_s = 1.2 * S_{DS} / (R / I_e) = 0.2112$ <= Applicable
Period Parameter, $x = 0.75$, ASCE Tab 12.8-2
Period: $T_a = C_t (h_n)^x = 0.24$ sec, ASCE 12.8.2.1
 $C_s < S_{D1} / [(R / I_e) T_a] = 0.3164$, ASCE Tab 12.8.1.1 <= Not Applicable
 $C_s > 0.044 S_{DS} I_e = 0.0155$, ASCE Tab 12.8.1.1 <= Not Applicable
 $C_s > 0.5 S_1 / (R / I_e) = 0.0238$, ASCE Tab 12.8.1.1 <= Not Applicable
 $k = 1.55$, (ASCE 12.8.3, page 91)
 $V = C_s W = 0.2112$ W
 $0.7 * V = 0.1478$ W
 $W = 33$ kips, total

SEISMIC COMPONENT & ANCHORING ANALYSIS

Out-of-plane seismic force for wall design (ASCE 7, Sec.12.11.1)

$$w_{1, seismic} = MAX(0.4 I_{DS} W_p, 0.1 W_p) = 0.1 W_p = 0.1 \text{ psf} \quad \leq \text{USE FOR DIAPHRAGMS}$$

Where: $W_p = 1.0$ psf, $I_e = 1.00$
(CBC / IBC Tab. 1604.5 & ASCE 7 Tab. 1.5-2)

Out-of-plane seismic force for anchorage design

For seismic design category A & B, any diaphragm (ASCE 7 Sec. 12.11.2)

$$F_{anch, seismic} = MAX \left[0.4 S_{DS} I W_p \frac{(h+h_p)^2}{2h}, 0.1 W_p \frac{(h+h_p)^2}{2h}, 400 S_{DS} I, F_{min} \right] =$$

Where: $F_{min} = 0.11$ plf, $1.69 W_p = 141$ plf (Horizontal) <= Not Applicable
(ASCE 7 Sec. 12.11.2 & 11.7.3)

For seismic design category C and above, flexible diaphragm (ASCE 7 Sec. 12.11.2.1)

$$F_{anch, seismic} = MAX \left[0.8 S_{DS} I W_p \frac{(h+h_p)^2}{2h}, 0.1 W_p \frac{(h+h_p)^2}{2h}, 400 S_{DS} I, F_{min} \right] =$$

= 3.39 $W_p = 141$ plf (Horizontal) <= Applicable

For connections (ASCE 7 Sec. 12.11.2.1)

$$F_{conn, seismic} = MAX [0.133 S_{DS} w_p, 0.5 w_p] = 0.5 W_p = 0.5 \text{ plf (Horizontal)}$$



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WIND / SEISMIC SHEAR FORCE CALCULATIONS:

From ASCE 7-16 Wind & Seismic Loading Analysis

Wall Line	Roof / Floor						Wall					Load above		*C _s (W/p)	=	Loading		
	Wind Force (psf)	Diaph. Weight	Wtr, We	truss trib (ft)	Area W (ft)	Area L (ft)	Wind Force (psf)	Wall DL (psf)	Wall ht (ft)	wall line dist (ft)	Upr. Flr Wall ht (ft)	Wind (#)	Seismic (#)			Wind Force (kips)	Seismic Force (kips)	Lateral Control

X1-1	9.6	32	12.5	35.0	55.0		16.2	12.0	15.0	35.0				0.05	=	4.22	1.69	Wind
X2-1	9.6	32	12.5	35.0	55.0		16.2	12.0	15.0	35.0				0.05	=	4.22	1.69	Wind

Y1-1	9.6	32	12.5	55.0	35.0		15.6	8.0	15.0	55.0				0.15	=	6.52	5.53	Wind
Y2-1	9.6	32	12.5	55.0	35.0		15.6	12.0	15.0	55.0				0.05	=	6.52	1.85	Wind



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SHEAR WALL CALCULATIONS:

	Y1-1	X1-1		Y2-1	Y2-1	Y2-1
Shear Wall Forces						
Number of Panels	1	1		1	1	1
Total length of wall	35.00 ft	55.00 ft		24.00 ft	11.00 ft	11.00 ft
Total length of shear wall	L = 35.00 ft	55.00 ft		24.00 ft	7.00 ft	11.00 ft
Total length of full ht seg.	L _w = 26.00 ft	17.67 ft		15.00 ft	7.00 ft	11.00 ft
height of shear wall	H = 13.00 ft	15.00 ft		13.00 ft	11.00 ft	13.00 ft
Maximum opening height	H' = 2.00 ft	2.00 ft		5.00 ft	0.00 ft	0.00 ft
Total force at top of wall	V ₁ = 6524 lbs	4222 lbs		2936 lbs	1305 lbs	2284 lbs
Self weight	w _{DL self} = 156 plf	180 plf		156 plf	132 plf	156 plf
Applied dead load	w _{DL above} = 40 plf	40 plf		40 plf	108 plf	201 plf
Preferred OSB thickness	in 7/16	7/16		7/16	7/16	7/16
Preferred Gyp thickness	in 1/2	1/2		1/2	1/2	1/2
Wall Connected to Concrete	y/n = Y	Y		Y	Y	Y
Shear Wall Segments						
	5.00	4.00		4.00	7.00	11.00
	5.00	9.67		3.50		
	8.00	4.00		3.50		
	8.00			4.00		
Shear Transfer to Concrete						
T =	495 lbs	Not Req'd		436 lbs	1547 lbs	1520 lbs
1/2 Anchor Bolts @	60 " O.C.	72 " O.C.		72 " O.C.	72 " O.C.	60 " O.C.
Provide:	A5	Code Min.		Code Min.	Code Min.	A5
Min # of 1/2 Anchor Bolts	(7) Min	(5) Min		(3) Min	(2) Min	(3) Min
Load From Above	0.00	0.00		0.00	0.00	0.00
Holdown	Perp. Wall			Perp. Wall	HD1	HD1
Shear Resisting System						
Force Calculated	250.94	238.94		207.03	186.41	207.60
	OSB	OSB		OSB	OSB	OSB
Min Shear Wall Segment:	3.71 ft	4.29 ft		3.71 ft	3.14 ft	3.71 ft
Provide: Va =	SW1	SW1		SW1	SW1	SW1
						Gyp.
Min Shear Wall Segment:						6.50 ft
Provide: Va =						SWD
Blocking / Nailing Framing Attachment						
Blocking Unit Shear	186 plf	77 plf		122 plf	119 plf	208 plf
Blocking	B1	NONE		NONE	NONE	B1
Nailing	T1	See SCHED		See SCHED	See SCHED	T1
Unit Base Shear						
% of full height segments	%fh = L _w /L = 0.743	0.321		0.625	1.000	1.000
% of maximum opening height	%oh = H'/H = 0.154	0.133		0.385	0.000	0.000
Shear cap adj factor	SCAF = 1.00	1.00		0.95	1.00	1.00
Unit base shear	vbase V ₁ /L _w = 251 plf	239 plf		196 plf	186 plf	208 plf
Effective unit base shear	vreq=v _{base} /SCAF = 251 plf	239 plf		207 plf	186 plf	208 plf
Ovrtrn. mo. Ttl. length of wall	OTM = 84.8 k-ft	63.3 k-ft		40.4 k-ft	14.4 k-ft	29.7 k-ft
Shear wall adjustment factor						
Resist moment total L. of wall	RM = 119.9 k-ft	332.4 k-ft		56.4 k-ft	5.9 k-ft	21.6 k-ft
	r = 0.9494	0.7802		0.8125	1.0000	1.0000
	C ₀ = 1.1607	1.6870		0.9455	1.0000	1.0000



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SHEAR WALL CALCULATIONS:

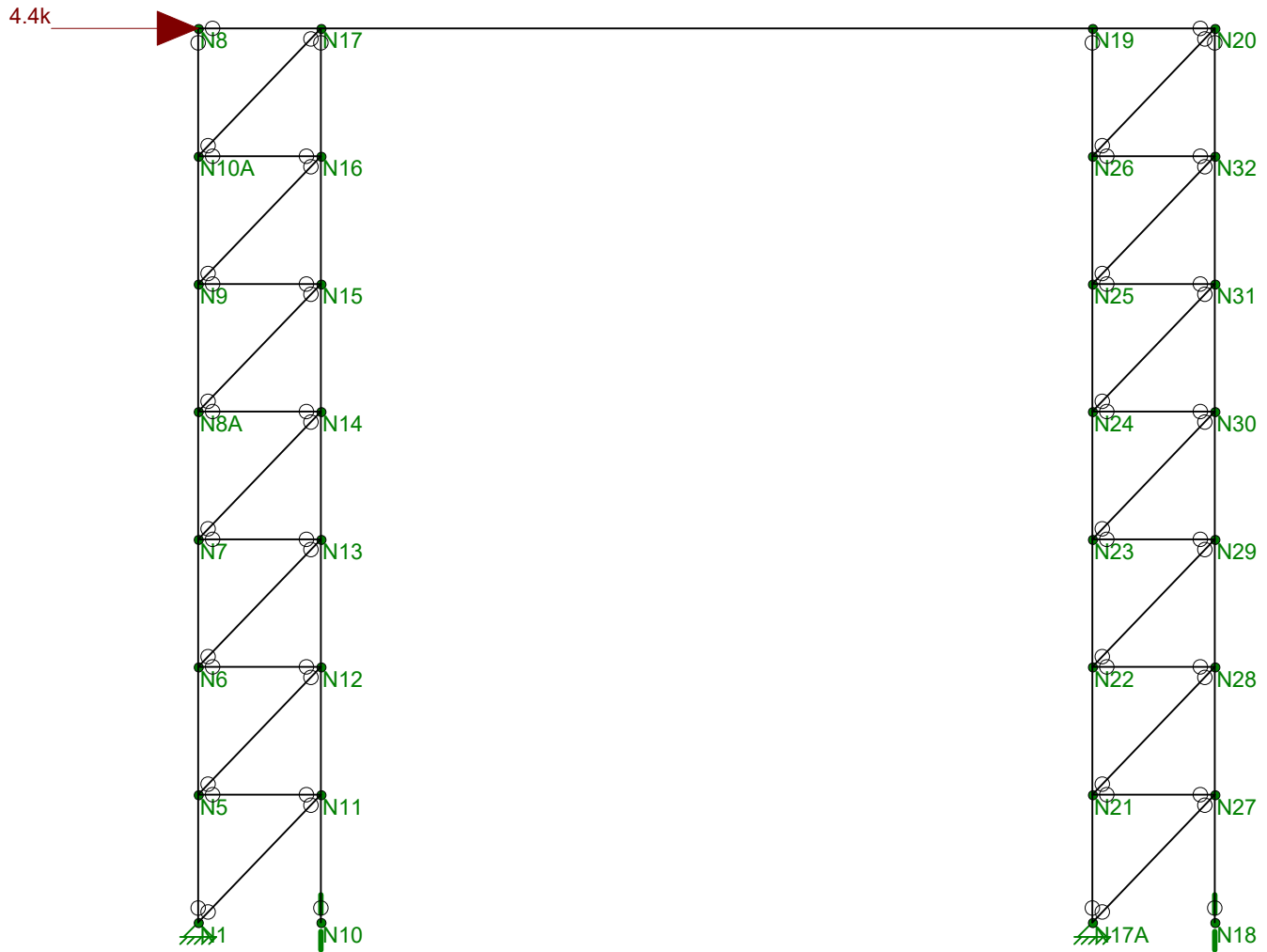
		X2-1	X2-1	X2-1			
Shear Wall Forces							
Number of Panels		1	2	1			
Total length of wall		10.00 ft	21.00 ft	17.00 ft			
Total length of shear wall	L =	3.00 ft	4.50 ft	17.00 ft			
Total length of full ht seg.	L _w =	3.00 ft	4.50 ft	5.00 ft			
height of shear wall	H =	11.00 ft	15.00 ft	13.00 ft			
Maximum opening height	H' =	0.00 ft	0.00 ft	12.00 ft			
Total force at top of wall	V ₁ =	760 lbs	1119 lbs	1224 lbs			
Self weight	W _{DL self} =	132 plf	180 plf	156 plf			
Applied dead load	W _{DL above} =	40 plf	40 plf	40 plf			
Prefered OSB thickness	in	7/16	7/16	7/16			
Prefered Gyp thickness	in	1/2	1/2	1/2			
Wall Connected to Concrete	y/n =	Y	Y	Y			
Shear Wall Segments							
		3.00	4.50	2.50			
				2.50			
Shear Transfer to Concrete							
	T =	2632 lbs	3433 lbs	3500 lbs			
1/2 Anchor Bolts @		72 " O.C.	72 " O.C.				
Provide:		Code Min.	Code Min.				
Min # of 1/2 Anchor Bolts		(2) Min	(2) Min				
Load From Above		0.00	0.00	0.00			
Holdown		HD2	HD3	HD3			
Shear Resisting System							
Force Calculated		253.33	248.64	550.71			
		OSB	OSB	B.F.			
Min Shear Wall Segment:		3.14 ft	4.29 ft	1.33 ft			
Provide: Va=		SW1	SW1	4400			
Min Shear Wall Segment:							
Provide: Va=							
Blocking / Nailing Framing Attachment							
Blocking Unit Shear		76 plf	107 plf	72 plf			
Blocking		NONE	NONE	NONE			
Nailing		See SCHED	See SCHED	See SCHED			
Unit Base Shear							
% of full height segments	%fh = L _w /L =	1.000	1.000	0.294			
% of maximum opening height	%oh = H'/H =	0.000	0.000	0.923			
Shear cap adj factor	SCAF =	1.00	1.00	0.44			
Unit base shear	vbase V ₁ /L _w =	253 plf	249 plf	245 plf			
Effective unit base shear	vreq=v _{base} /SCAF=	253 plf	249 plf	551 plf			
Ovrtrn. mo. Ttl. length of wall	OTM =	8.4 k-ft	16.8 k-ft	35.8 k-ft			
Shear wall adjustment factor							
Resist moment total L. of wall	RM =	0.8 k-ft	2.2 k-ft	28.3 k-ft			
	r=	1.0000	1.0000	0.3110			
	C _o =	1.0000	1.0000	0.4447			



524 CLEVELAND BLVD. #230
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Loads: BLC 1, Wind Load
Envelope Only Solution



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Wood Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in ²]	I (90,270) ... I (0,180) [i...
1	Chord	4.5X5.5FS	Column	Rectangular	DF/L #2	Typical	24.75	41.766 62.391
2	Web	2X6	Beam	None	DF/L #2	Typical	8.25	1.547 20.797
3	Beam	4X12	Beam	None	24F-1.8E DF Balanced	Typical	39.375	40.195 415.283

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Temp [F]
1	N1	0	0	0
2	N8	0	14	0
3	N10	1.92	0	0
4	N17	1.92	14	0
5	N5	0	2	0
6	N6	0	4	0
7	N7	0	6	0
8	N8A	0	8	0
9	N9	0	10	0
10	N10A	0	12	0
11	N11	1.92	2	0
12	N12	1.92	4	0
13	N13	1.92	6	0
14	N14	1.92	8	0
15	N15	1.92	10	0
16	N16	1.92	12	0
17	N17A	14	0	0
18	N18	15.92	0	0
19	N19	14	14	0
20	N20	15.92	14	0
21	N21	14	2	0
22	N22	14	4	0
23	N23	14	6	0
24	N24	14	8	0
25	N25	14	10	0
26	N26	14	12	0
27	N27	15.92	2	0
28	N28	15.92	4	0
29	N29	15.92	6	0
30	N30	15.92	8	0
31	N31	15.92	10	0
32	N32	15.92	12	0

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Rotation[k-ft/rad]
1	N1	Reaction	Reaction	
2	N18		Reaction	
3	N10		Reaction	
4	N17A	Reaction	Reaction	



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Wood Design Parameters

	Label	Shape	Length[...]	Le-out[ft]	Le-in[ft]	le-bend to...	le-bend bo...	K-out	K-in	CV	Cr	Out sw...	In sway
1	M1	Chord	14	2	2	Lb out							
2	M2	Chord	14	2	2								
3	M4	Web	2.772			Lb out							
4	M5	Web	1.92			Lb out							
5	M6	Web	2.772			Lb out							
6	M7	Web	1.92			Lb out							
7	M8	Web	2.772			Lb out							
8	M9	Web	1.92			Lb out							
9	M10	Web	2.772			Lb out							
10	M11	Web	1.92			Lb out							
11	M12	Web	2.772			Lb out							
12	M13	Web	1.92			Lb out							
13	M14	Web	2.772			Lb out							
14	M15	Web	1.92			Lb out							
15	M16	Web	2.772			Lb out							
16	M17	Chord	14	2	2								
17	M18	Chord	14	2	2								
18	M19	Web	2.772			Lb out							
19	M20	Web	1.92			Lb out							
20	M21	Web	2.772			Lb out							
21	M22	Web	1.92			Lb out							
22	M23	Web	2.772			Lb out							
23	M24	Web	1.92			Lb out							
24	M25	Web	2.772			Lb out							
25	M26	Web	1.92			Lb out							
26	M27	Web	2.772			Lb out							
27	M28	Web	1.92			Lb out							
28	M29	Web	2.772			Lb out							
29	M30	Web	1.92			Lb out							
30	M31	Web	2.772			Lb out							
31	M31A	Beam	15.92	0	0	Lb out							

Joint Loads and Enforced Displacements (BLC 1 : Wind Load)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	N8	L	X	4.4

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Joint	Point	Distributed
1	Wind Load	WL			1		
2	Dead Load	DL					1

Envelope Maximum Member Section Forces

	Member		Axial[k]	Loc[ft]	LC	Shear[k]	Loc[ft]	LC	Moment[k-ft]	Loc[ft]	LC
1	M1	max	1.391	12.104	17	.031	2.042	17	.143	2.042	17
2		min	-6.633	0	17	-.072	0	17	-.026	11.958	17
3	M2	max	7.869	0	9	.023	4.083	17	.111	4.083	9



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Envelope Maximum Member Section Forces (Continued)

	Member		Axial[k]	Loc[ft]	LC	Shear[k]	Loc[ft]	LC	Moment[k-ft]	Loc[ft]	LC
4		min	-.265	12.104	17	-.065	2.042	9	-.016	1.896	9
5	M4	max	.107	0	16	0	0	1	0	0	1
6		min	-1.891	0	17	0	0	1	0	0	1
7	M5	max	1.27	0	17	0	0	1	0	0	1
8		min	-.068	0	1	0	0	1	0	0	1
9	M6	max	.091	0	16	0	0	1	0	0	1
10		min	-1.815	0	17	0	0	1	0	0	1
11	M7	max	1.273	0	17	0	0	1	0	0	1
12		min	-.065	0	1	0	0	1	0	0	1
13	M8	max	.094	0	16	0	0	1	0	0	1
14		min	-1.837	0	17	0	0	1	0	0	1
15	M9	max	1.268	0	17	0	0	1	0	0	1
16		min	-.065	0	1	0	0	1	0	0	1
17	M10	max	.094	0	16	0	0	1	0	0	1
18		min	-1.835	0	17	0	0	1	0	0	1
19	M11	max	1.28	0	17	0	0	1	0	0	1
20		min	-.065	0	1	0	0	1	0	0	1
21	M12	max	.094	0	16	0	0	1	0	0	1
22		min	-1.829	0	17	0	0	1	0	0	1
23	M13	max	1.242	0	17	0	0	1	0	0	1
24		min	-.065	0	1	0	0	1	0	0	1
25	M14	max	.094	0	16	0	0	1	0	0	1
26		min	-1.918	0	17	0	0	1	0	0	1
27	M15	max	1.434	0	17	0	0	1	0	0	1
28		min	-.066	0	1	0	0	1	0	0	1
29	M16	max	.096	0	16	0	0	1	0	0	1
30		min	-1.967	0	17	0	0	1	0	0	1
31	M17	max	2.598	12.104	9	.033	10.063	9	.14	2.042	9
32		min	-5.997	0	17	-.071	0	9	-.046	11.958	9
33	M18	max	8.303	0	9	.024	4.083	9	.107	4.083	17
34		min	-.251	12.104	9	-.063	2.042	9	-.017	1.896	9
35	M19	max	-.058	0	18	0	0	1	0	0	1
36		min	-2.076	0	9	0	0	1	0	0	1
37	M20	max	1.509	0	9	0	0	1	0	0	1
38		min	.04	0	18	0	0	1	0	0	1
39	M21	max	-.056	0	18	0	0	1	0	0	1
40		min	-2.029	0	9	0	0	1	0	0	1
41	M22	max	1.319	0	9	0	0	1	0	0	1
42		min	.039	0	18	0	0	1	0	0	1
43	M23	max	-.056	0	18	0	0	1	0	0	1
44		min	-1.94	0	9	0	0	1	0	0	1
45	M24	max	1.357	0	9	0	0	1	0	0	1
46		min	.039	0	18	0	0	1	0	0	1
47	M25	max	-.056	0	18	0	0	1	0	0	1
48		min	-1.946	0	9	0	0	1	0	0	1
49	M26	max	1.345	0	9	0	0	1	0	0	1
50		min	.039	0	18	0	0	1	0	0	1
51	M27	max	-.057	0	18	0	0	1	0	0	1
52		min	-1.95	0	9	0	0	1	0	0	1
53	M28	max	1.352	0	9	0	0	1	0	0	1
54		min	.039	0	18	0	0	1	0	0	1
55	M29	max	-.055	0	18	0	0	1	0	0	1



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Envelope Maximum Member Section Forces (Continued)

Member		Axial[k]	Loc[ft]	LC	Shear[k]	Loc[ft]	LC	Moment[k-ft]	Loc[ft]	LC
56		min	-1.918	0	9	0	1	0	0	1
57	M30	max	1.348	0	9	0	1	0	0	1
58		min	.041	0	18	0	1	0	0	1
59	M31	max	-.064	0	18	0	1	0	0	1
60		min	-2.027	0	9	0	1	0	0	1
61	M31A	max	2.656	0	17	1.807	14.096	3.329	13.93	9
62		min	-.004	0	1	-.785	13.93	-2.6	1.99	17

Envelope Member End Reactions

Member	Member		Axial[k]	LC	Shear[k]	LC	Moment[k-ft]	LC
1	M1	I	max	.204	16	0	1	0
2			min	-6.633	17	-.072	17	0
3		J	max	1.391	17	.004	1	0
4			min	-.211	1	-.013	17	0
5	M2	I	max	7.869	9	.008	9	0
6			min	.08	18	0	1	0
7		J	max	.54	16	.003	1	0
8			min	-.265	17	-.002	17	0
9	M4	I	max	.107	16	0	1	0
10			min	-1.891	17	0	1	0
11		J	max	.107	16	0	1	0
12			min	-1.891	17	0	1	0
13	M5	I	max	1.27	17	0	1	0
14			min	-.068	1	0	1	0
15		J	max	1.27	17	0	1	0
16			min	-.068	1	0	1	0
17	M6	I	max	.091	16	0	1	0
18			min	-1.815	17	0	1	0
19		J	max	.091	16	0	1	0
20			min	-1.815	17	0	1	0
21	M7	I	max	1.273	17	0	1	0
22			min	-.065	1	0	1	0
23		J	max	1.273	17	0	1	0
24			min	-.065	1	0	1	0
25	M8	I	max	.094	16	0	1	0
26			min	-1.837	17	0	1	0
27		J	max	.094	16	0	1	0
28			min	-1.837	17	0	1	0
29	M9	I	max	1.268	17	0	1	0
30			min	-.065	1	0	1	0
31		J	max	1.268	17	0	1	0
32			min	-.065	1	0	1	0
33	M10	I	max	.094	16	0	1	0
34			min	-1.835	17	0	1	0
35		J	max	.094	16	0	1	0
36			min	-1.835	17	0	1	0
37	M11	I	max	1.28	17	0	1	0
38			min	-.065	1	0	1	0
39		J	max	1.28	17	0	1	0
40			min	-.065	1	0	1	0



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Envelope Member End Reactions (Continued)

	Member	Membe...		Axial[k]	LC	Shear[k]	LC	Moment[k-ft]	LC
41	M12	I	max	.094	16	0	1	0	1
42			min	-1.829	17	0	1	0	1
43		J	max	.094	16	0	1	0	1
44			min	-1.829	17	0	1	0	1
45	M13	I	max	1.242	17	0	1	0	1
46			min	-.065	1	0	1	0	1
47		J	max	1.242	17	0	1	0	1
48			min	-.065	1	0	1	0	1
49	M14	I	max	.094	16	0	1	0	1
50			min	-1.918	17	0	1	0	1
51		J	max	.094	16	0	1	0	1
52			min	-1.918	17	0	1	0	1
53	M15	I	max	1.434	17	0	1	0	1
54			min	-.066	1	0	1	0	1
55		J	max	1.434	17	0	1	0	1
56			min	-.066	1	0	1	0	1
57	M16	I	max	.096	16	0	1	0	1
58			min	-1.967	17	0	1	0	1
59		J	max	.096	16	0	1	0	1
60			min	-1.967	17	0	1	0	1
61	M17	I	max	.198	16	0	18	0	1
62			min	-5.997	17	-.071	9	0	1
63		J	max	2.598	9	-.003	18	0	1
64			min	.368	18	-.024	9	0	1
65	M18	I	max	8.303	9	.009	9	0	1
66			min	.166	18	0	18	0	1
67		J	max	-.078	18	-.002	18	0	1
68			min	-.251	9	-.007	9	0	1
69	M19	I	max	-.058	18	0	1	0	1
70			min	-2.076	9	0	1	0	1
71		J	max	-.058	18	0	1	0	1
72			min	-2.076	9	0	1	0	1
73	M20	I	max	1.509	9	0	1	0	1
74			min	.04	18	0	1	0	1
75		J	max	1.509	9	0	1	0	1
76			min	.04	18	0	1	0	1
77	M21	I	max	-.056	18	0	1	0	1
78			min	-2.029	9	0	1	0	1
79		J	max	-.056	18	0	1	0	1
80			min	-2.029	9	0	1	0	1
81	M22	I	max	1.319	9	0	1	0	1
82			min	.039	18	0	1	0	1
83		J	max	1.319	9	0	1	0	1
84			min	.039	18	0	1	0	1
85	M23	I	max	-.056	18	0	1	0	1
86			min	-1.94	9	0	1	0	1
87		J	max	-.056	18	0	1	0	1
88			min	-1.94	9	0	1	0	1
89	M24	I	max	1.357	9	0	1	0	1
90			min	.039	18	0	1	0	1
91		J	max	1.357	9	0	1	0	1
92			min	.039	18	0	1	0	1



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Envelope Member End Reactions (Continued)

	Member	Membe...		Axial[k]	LC	Shear[k]	LC	Moment[k-ft]	LC
93	M25	I	max	-.056	18	0	1	0	1
94			min	-1.946	9	0	1	0	1
95		J	max	-.056	18	0	1	0	1
96			min	-1.946	9	0	1	0	1
97	M26	I	max	1.345	9	0	1	0	1
98			min	.039	18	0	1	0	1
99		J	max	1.345	9	0	1	0	1
100			min	.039	18	0	1	0	1
101	M27	I	max	-.057	18	0	1	0	1
102			min	-1.95	9	0	1	0	1
103		J	max	-.057	18	0	1	0	1
104			min	-1.95	9	0	1	0	1
105	M28	I	max	1.352	9	0	1	0	1
106			min	.039	18	0	1	0	1
107		J	max	1.352	9	0	1	0	1
108			min	.039	18	0	1	0	1
109	M29	I	max	-.055	18	0	1	0	1
110			min	-1.918	9	0	1	0	1
111		J	max	-.055	18	0	1	0	1
112			min	-1.918	9	0	1	0	1
113	M30	I	max	1.348	9	0	1	0	1
114			min	.041	18	0	1	0	1
115		J	max	1.348	9	0	1	0	1
116			min	.041	18	0	1	0	1
117	M31	I	max	-.064	18	0	1	0	1
118			min	-2.027	9	0	1	0	1
119		J	max	-.064	18	0	1	0	1
120			min	-2.027	9	0	1	0	1
121	M31A	I	max	2.656	17	1.395	17	0	1
122			min	-.004	1	-.211	1	0	1
123		J	max	1.4	9	1.714	9	0	1
124			min	.042	18	.125	18	0	1

Envelope Wood Code Checks

	Member	Shape	Code Check	Loc[...LC	Shear..Loc[...LC	Fc' [k...Ft' [ksi]	Fb' [k...Fv' [k...	RB	CL	CP	Eqn
1	M1	4.5X5...	.415	1.896 17	.016 0	17 1.101	.756 1.194	.272 6.755	.995	.983	3.9-1
2	M2	4.5X5...	.289	0 9	.014 2.042	9 1.101	.756 1.194	.272 6.755	.995	.983	3.6.3
3	M4	2X6	.194	0 17	.000 0	18 .875	1.18 1.847	.288 9.018	.987	.368	3.9-1
4	M5	2X6	.102	0 17	.000 0	18 1.51	1.186 1.856	.288 7.505	.991	.635	3.6.3
5	M6	2X6	.186	0 17	.000 0	18 .875	1.18 1.847	.288 9.018	.987	.368	3.9-1
6	M7	2X6	.102	0 17	.000 0	18 1.51	1.186 1.856	.288 7.505	.991	.635	3.6.3
7	M8	2X6	.189	0 17	.000 0	18 .875	1.18 1.847	.288 9.018	.987	.368	3.9-1
8	M9	2X6	.102	0 17	.000 0	18 1.51	1.186 1.856	.288 7.505	.991	.635	3.6.3
9	M10	2X6	.188	0 17	.000 0	18 .875	1.18 1.847	.288 9.018	.987	.368	3.9-1
10	M11	2X6	.103	0 17	.000 0	18 1.51	1.186 1.856	.288 7.505	.991	.635	3.6.3
11	M12	2X6	.188	0 17	.000 0	18 .875	1.18 1.847	.288 9.018	.987	.368	3.9-1
12	M13	2X6	.100	0 17	.000 0	18 1.51	1.186 1.856	.288 7.505	.991	.635	3.6.3
13	M14	2X6	.197	0 17	.000 0	18 .875	1.18 1.847	.288 9.018	.987	.368	3.9-1
14	M15	2X6	.115	0 17	.000 0	18 1.51	1.186 1.856	.288 7.505	.991	.635	3.6.3
15	M16	2X6	.202	0 17	.000 0	18 .875	1.18 1.847	.288 9.018	.987	.368	3.9-1



524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: ASF
Review/Check: ARA

Project Name: Breyman Shop
SRE Project #: 2025-10375
City and State: Idaho County, Idaho

Envelope Wood Code Checks (Continued)

	Member	Shape	Code Check	Loc[...LC	Shear...Loc[...LC	Fc' [k...Ft' [ksi]	Fb' [k...Fv' [k...	RB	CL	CP	Eqn					
16	M17	4.5X5....	.380	1.896	17	.016	0	9	1.101	.756	1.194	.272	6.755	.995	.983	3.9-1
17	M18	4.5X5....	.305	0	9	.014	2.042	9	1.101	.756	1.194	.272	6.755	.995	.983	3.6.3
18	M19	2X6	.213	0	9	.000	0	18	.875	1.18	1.847	.288	9.018	.987	.368	3.9-1
19	M20	2X6	.121	0	9	.000	0	18	1.51	1.186	1.856	.288	7.505	.991	.635	3.6.3
20	M21	2X6	.208	0	9	.000	0	18	.875	1.18	1.847	.288	9.018	.987	.368	3.9-1
21	M22	2X6	.106	0	9	.000	0	18	1.51	1.186	1.856	.288	7.505	.991	.635	3.6.3
22	M23	2X6	.199	0	9	.000	0	18	.875	1.18	1.847	.288	9.018	.987	.368	3.9-1
23	M24	2X6	.109	0	9	.000	0	18	1.51	1.186	1.856	.288	7.505	.991	.635	3.6.3
24	M25	2X6	.200	0	9	.000	0	18	.875	1.18	1.847	.288	9.018	.987	.368	3.9-1
25	M26	2X6	.108	0	9	.000	0	18	1.51	1.186	1.856	.288	7.505	.991	.635	3.6.3
26	M27	2X6	.200	0	9	.000	0	18	.875	1.18	1.847	.288	9.018	.987	.368	3.9-1
27	M28	2X6	.109	0	9	.000	0	18	1.51	1.186	1.856	.288	7.505	.991	.635	3.6.3
28	M29	2X6	.197	0	9	.000	0	18	.875	1.18	1.847	.288	9.018	.987	.368	3.9-1
29	M30	2X6	.108	0	9	.000	0	18	1.51	1.186	1.856	.288	7.505	.991	.635	3.6.3
30	M31	2X6	.208	0	9	.000	0	18	.875	1.18	1.847	.288	9.018	.987	.368	3.9-1
31	M31A	4X12	.149	13.93	9	.162	14.0...	9	2.56	1.76	3.646	.424	11.97	.95	1	3.9-3



524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: ASF
Review/Check: ARA

Project Name: Breyman Shop
SRE Project #: 2025-10375
City and State: Idaho County, Idaho

TALL WALL CALCULATIONS:

This spreadsheet is used for designing a stud wall according to the NDS.

Description:

	13' Tall Wall	King Stud (3' Max Opening)	13' Trimmer	15' Tall Wall	King Stud (3' Max Opening)	15' Trimmer
Type:	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")
Species:	DF-L	DF-L	DF-L	DF-L	DF-L	DF-L
Grade:	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2
Nominal width, t =	(1) 2	(2) 2	(1) 2	(1) 2	(2) 2	(1) 2
Actual width =	1.50 in	3.00 in	1.50 in	1.50 in	3.00 in	1.50 in
Nominal depth, d =	6	6	6	6	6	6
Actual depth =	5.50 in	5.50 in	5.50 in	5.50 in	5.50 in	5.50 in
Span, L =	13.000 ft	13.000 ft	13.000 ft	15.000 ft	15.000 ft	15.000 ft
w/o Plates	12.750 ft	12.750 ft	12.750 ft	14.750 ft	14.750 ft	14.750 ft
Stud spacing, s =	16 in	28 in	16 in	16 in	28 in	16 in
Lat. Pressure, w_{wind} =	19.56 psf	19.56 psf	5.00 psf	19.56 psf	19.56 psf	5.00 psf
Axial load, P =	1370 lbs	50 lbs	1541 lbs	1370 lbs	50 lbs	1541 lbs
Eccentricity, e =	0 in	0 in	0 in	0 in	0 in	0 in
K_{CE} =	0.3	0.3	0.3	0.3	0.3	0.3
c =	0.8	0.8	0.8	0.8	0.8	0.8
w =	26.1 plf	46.1 plf	6.7 plf	26.1 plf	46.1 plf	6.7 plf
F_b	900 psi	900 psi	900 psi	900 psi	900 psi	900 psi
F_v	180 psi	180 psi	180 psi	180 psi	180 psi	180 psi
F_{c-prll}	1,350 psi	1,350 psi	1,350 psi	1,350 psi	1,350 psi	1,350 psi
F_{c-perp}	625 psi	625 psi	625 psi	625 psi	625 psi	625 psi
C_d	1.60	1.60	1.15	1.60	1.60	1.15
$C_{F,Fb}$	1.30	1.30	1.30	1.30	1.30	1.30
$C_{F,Fcprll}$	1.10	1.10	1.10	1.10	1.10	1.10
C_r	1.15	1.00	1.00	1.15	1.00	1.00
C_p	0.25	0.25	0.33	0.19	0.19	0.25
C_H	1.00	1.00	1.00	1.00	1.00	6.00
C_b	1.07	1.07	1.07	1.07	1.07	1.07
E	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi
E_{min}	580,000 psi	580,000 psi	580,000 psi	580,000 psi	580,000 psi	580,000 psi
Allowable Stress:						
$F'_b = F_b C_d C_F C_r$	2153 psi	1872 psi	1346 psi	2153 psi	1872 psi	1346 psi
$F'_v = F_v C_d C_H$	288 psi	288 psi	207 psi	288 psi	288 psi	1242 psi
$F'_c = F_c C_d C_F$	2376 psi	2376 psi	1708 psi	2376 psi	2376 psi	1708 psi
$F'_{CE} = (K_{CE} E') / (l/d)^2$	620 psi	620 psi	620 psi	463 psi	463 psi	463 psi
$F'_c = F_c C_d C_F C_p$	582 psi	582 psi	565 psi	443 psi	443 psi	434 psi
$F'_{c-perp} = F_{c-perp} C_b$	668 psi	668 psi	668 psi	668 psi	668 psi	668 psi
$E' = E$	1600000 psi	1600000 psi	1600000 psi	1600000 psi	1600000 psi	1600000 psi
$F_{bE} =$	1861 psi	7444 psi	1861 psi	1609 psi	6435 psi	1609 psi
Slenderness Ratio:	< 50 OK	< 50 OK	< 50 OK	< 50 OK	< 50 OK	< 50 OK
$R_b =$	19	10	19	21	10	21
Bending:	< F'b OK	< F'b OK	< F'b OK	< F'b OK	< F'b OK	< F'b OK
$M = w L^2 / 8 + P e / 12$	530 ft-lbs	936 ft-lbs	135 ft-lbs	709 ft-lbs	1252 ft-lbs	181 ft-lbs
$f_b = M / S$	841 psi	742 psi	215 psi	1125 psi	994 psi	288 psi
$S =$	8 in ³	15 in ³	8 in ³	8 in ³	15 in ³	8 in ³
Shear:	< F'v OK	< F'v OK	< F'v OK	< F'v OK	< F'v OK	< F'v OK
$V = w L / 2$	166 lbs	294 lbs	43 lbs	192 lbs	340 lbs	37 lbs
$f_v = 1.5 V / A$	30 psi	27 psi	8 psi	35 psi	31 psi	7 psi
$A =$	8 in ²	17 in ²	8 in ²	8 in ²	17 in ²	8 in ²
Compression:	< F'c OK	< F'c OK	< F'c OK	< F'c OK	< F'c OK	< F'c OK
$f_c = P / A$	166 psi	3 psi	187 psi	166 psi	3 psi	187 psi
Compression (perp.):	< F'c OK	< F'c OK	< F'c OK	< F'c OK	< F'c OK	< F'c OK
$f_{c-perp} = P / A$	166 psi	3 psi	187 psi	166 psi	3 psi	187 psi
Combined:	< 1.0 OK			< 1.0 OK		
$(f_c / F_c) + (f_b / (F_b (1 - (f_c / F_c) E))) =$	0.61			0.95		
Deflection:	> 180 OK	> 180 OK	> 180 OK	> 180 OK	> 180 OK	> 180 OK
$D = 22.5 w L^4 / E' I =$	0.47 in	0.41 in	0.12 in	0.83 in	0.74 in	0.21 in
$I =$	21 in ⁴	42 in ⁴	21 in ⁴	21 in ⁴	42 in ⁴	21 in ⁴
SPAN /	328	372	1284	212	240	830



524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: ASF
Review/Check: ARA

Project Name: Breyman Shop
SRE Project #: 2025-10375
City and State: Idaho County, Idaho

TALL WALL CALCULATIONS:

This spreadsheet is used for designing a stud wall according to the NDS.

Description:

	11' Tall Wall	King Stud (3' Max Opening)	11' Trimmer	13' Tall Wall	King Stud (2' Max Opening)	13' Trimmer
Type:	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")
Species:	DF-L	DF-L	DF-L	DF-L	DF-L	DF-L
Grade:	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2
Nominal width, t =	(1) 2	(1) 2	(1) 2	(1) 2	(1) 2	(1) 2
Actual width =	1.50 in	1.50 in	1.50 in	1.50 in	1.50 in	1.50 in
Nominal depth, d =	6	6	6	6	6	6
Actual depth =	5.50 in	5.50 in	5.50 in	5.50 in	5.50 in	5.50 in
Span, L =	11.000 ft	11.000 ft	11.000 ft	13.000 ft	13.000 ft	13.000 ft
w/o Plates	10.750 ft	10.750 ft	10.750 ft	12.750 ft	12.750 ft	12.750 ft
Stud spacing, s =	16 in	28 in	16 in	16 in	22 in	16 in
Lat. Pressure, w_{wind} =	19.56 psf	19.56 psf	5.00 psf	19.56 psf	19.56 psf	5.00 psf
Axial load, P =	1370 lbs	50 lbs	1541 lbs	240 lbs	50 lbs	180 lbs
Eccentricity, e =	0 in	0 in	0 in	0 in	0 in	0 in
K_{CE} =	0.3	0.3	0.3	0.3	0.3	0.3
c =	0.8	0.8	0.8	0.8	0.8	0.8
w =	26.1 plf	46.1 plf	6.7 plf	26.1 plf	36.3 plf	6.7 plf
F_b	900 psi	900 psi	900 psi	900 psi	900 psi	900 psi
F_v	180 psi	180 psi	180 psi	180 psi	180 psi	180 psi
F_{c-prll}	1,350 psi	1,350 psi	1,350 psi	1,350 psi	1,350 psi	1,350 psi
F_{c-perp}	625 psi	625 psi	625 psi	625 psi	625 psi	625 psi
C_d	1.60	1.60	1.15	1.60	1.60	1.15
$C_{F,Fb}$	1.30	1.30	1.30	1.30	1.30	1.30
$C_{F,Fcprll}$	1.10	1.10	1.10	1.10	1.10	1.10
C_r	1.15	1.00	1.00	1.15	1.00	1.00
C_p	0.33	0.33	0.44	0.25	0.25	0.33
C_H	1.00	1.00	1.00	1.00	1.00	6.00
C_b	1.07	1.07	1.07	1.07	1.07	1.07
E	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi	1,600,000 psi
E_{min}	580,000 psi	580,000 psi	580,000 psi	580,000 psi	580,000 psi	580,000 psi
Allowable Stress:						
$F'_b = F_b C_d C_F C_r =$	2153 psi	1872 psi	1346 psi	2153 psi	1872 psi	1346 psi
$F'_v = F_v C_d C_H =$	288 psi	288 psi	207 psi	288 psi	288 psi	1242 psi
$F'_c = F_c C_d C_F =$	2376 psi	2376 psi	1708 psi	2376 psi	2376 psi	1708 psi
$F'_{CE} = (K_{CE} E')/(l/d)^2 =$	873 psi	873 psi	873 psi	620 psi	620 psi	620 psi
$F'_c = F_c C_d C_F C_p =$	793 psi	793 psi	754 psi	582 psi	582 psi	565 psi
$F'_{c-perp} = F_{c-perp} C_b =$	668 psi	668 psi	668 psi	668 psi	668 psi	668 psi
$E' =$	1600000 psi	1600000 psi	1600000 psi	1600000 psi	1600000 psi	1600000 psi
$F_{bE} =$	2207 psi	2207 psi	2207 psi	1861 psi	1861 psi	1861 psi
Slenderness Ratio:	< 50 OK	< 50 OK	< 50 OK	< 50 OK	< 50 OK	< 50 OK
$R_b =$	18	18	18	19	19	19
Bending:	< F'b OK	< F'b OK	< F'b OK	< F'b OK	< F'b OK	< F'b OK
$M = w L^2/8 + P e/12 =$	377 ft-lbs	665 ft-lbs	96 ft-lbs	530 ft-lbs	737 ft-lbs	135 ft-lbs
$f_b = M/S =$	598 psi	1056 psi	153 psi	841 psi	1169 psi	215 psi
$S =$	8 in ³	8 in ³	8 in ³	8 in ³	8 in ³	8 in ³
Shear:	< F'v OK	< F'v OK	< F'v OK	< F'v OK	< F'v OK	< F'v OK
$V = w L/2 =$	140 lbs	248 lbs	36 lbs	166 lbs	231 lbs	32 lbs
$f_v = 1.5 V/A =$	25 psi	45 psi	7 psi	30 psi	42 psi	6 psi
$A =$	8 in ²	8 in ²	8 in ²	8 in ²	8 in ²	8 in ²
Compression:	< F'c OK	< F'c OK	< F'c OK	< F'c OK	< F'c OK	< F'c OK
$f_c = P/A =$	166 psi	6 psi	187 psi	29 psi	6 psi	22 psi
Compression (perp.):	< F'c OK	< F'c OK	< F'c OK	< F'c OK	< F'c OK	< F'c OK
$f_{c-perp} = P/A =$	166 psi	6 psi	187 psi	29 psi	6 psi	22 psi
Combined:	< 1.0 OK			< 1.0 OK		
$((f_c/F_c) + ((f_b/(F_b(1-(f_c/F_cE))))) =$	0.39			0.41		
Deflection:	> 180 OK	> 180 OK	> 180 OK	> 180 OK	> 180 OK	> 180 OK
$D = 22.5 w L^4/E' I =$	0.24 in	0.42 in	0.06 in	0.47 in	0.65 in	0.12 in
$I =$	21 in ⁴	21 in ⁴	21 in ⁴	21 in ⁴	21 in ⁴	21 in ⁴
SPAN /	548	310	2143	328	236	1284



524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: ASF
Review/Check: ARA

Project Name: Breyman Shop
SRE Project #: 2025-10375
City and State: Idaho County, Idaho

TALL WALL CALCULATIONS:

This spreadsheet is used for designing a stud wall according to the NDS.

Description:

	11' Tall Wall	King Stud (14' Max Opening)	11' Trimmer			
Type:	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")			
Species:	DF-L	DF-L	DF-L			
Grade:	No. 2	No. 2	No. 2			
Nominal width, t =	(1) 2	(2) 2	(1) 2			
Actual width =	1.50 in	3.00 in	1.50 in			
Nominal depth, d =	8	8	8			
Actual depth =	7.25 in	7.25 in	7.25 in			
Span, L =	11.000 ft	11.000 ft	11.000 ft			
w/o Plates	10.750 ft	10.750 ft	10.750 ft			
Stud spacing, s =	16 in	94 in	16 in			
Lat. Pressure, w_{wind} =	19.56 psf	19.56 psf	5.00 psf			
Axial load, P =	240 lbs	50 lbs	1261 lbs			
Eccentricity, e =	0 in	0 in	0 in			
K_{CE} =	0.3	0.3	0.3			
c =	0.8	0.8	0.8			
w =	26.1 plf	153.6 plf	6.7 plf			
F_b	900 psi	900 psi	900 psi			
F_v	180 psi	180 psi	180 psi			
F_{c-prll}	1,350 psi	1,350 psi	1,350 psi			
F_{c-perp}	625 psi	625 psi	625 psi			
C_d	1.60	1.60	1.15			
$C_{F,Fb}$	1.20	1.20	1.20			
$C_{F,Fcprll}$	1.05	1.05	1.05			
C_r	1.15	1.00	1.00			
C_p	0.54	0.54	0.67			
C_H	1.00	1.00	1.00			
C_b	1.00	1.00	1.00			
E	1,600,000 psi	1,600,000 psi	1,600,000 psi			
E_{min}	580,000 psi	580,000 psi	580,000 psi			
Allowable Stress:						
$F'_b = F_b C_d C_F C_r$	1987 psi	1728 psi	1242 psi			
$F'_v = F_v C_d C_H$	288 psi	288 psi	207 psi			
$F'_c = F_c C_d C_F$	2268 psi	2268 psi	1630 psi			
$F'_{CE} = (K_{CE} E') / (l/d)^2$	1516 psi	1516 psi	1516 psi			
$F'_c = F_c C_d C_F C_p$	1227 psi	1227 psi	1085 psi			
$F'_{c-perp} = F_{c-perp} C_b$	625 psi	625 psi	625 psi			
E'	1600000 psi	1600000 psi	1600000 psi			
F_{bE}	1674 psi	6698 psi	1674 psi			
Slenderness Ratio:	< 50 OK	< 50 OK	< 50 OK			
R_b	20	10	20			
Bending:	< F'b OK	< F'b OK	< F'b OK			
M = $w L^2 / 8 + P e / 12$	377 ft-lbs	2219 ft-lbs	96 ft-lbs			
$f_b = M / S$	344 psi	1013 psi	88 psi			
S =	13 in ³	26 in ³	13 in ³			
Shear:	< F'v OK	< F'v OK	< F'v OK			
V = $w L / 2$	140 lbs	826 lbs	36 lbs			
$f_v = 1.5 V / A$	19 psi	57 psi	5 psi			
A =	11 in ²	22 in ²	11 in ²			
Compression:	< F'c OK	< F'c OK	< F'c OK			
$f_c = P / A$	22 psi	2 psi	116 psi			
Compression (perp.):	< F'c OK	< F'c OK	< F'c OK			
$f_{c-perp} = P / A$	22 psi	2 psi	116 psi			
Combined:	< 1.0 OK					
$(f_c / F_c) + (f_b / [F_b (1 - (f_c / F_c) E)])$	0.18					
Deflection:	> 180 OK	> 180 OK	> 180 OK			
D = $22.5 w L^4 / E' I$	0.10 in	0.30 in	0.03 in			
I =	48 in ⁴	95 in ⁴	48 in ⁴			
SPAN /	1255	426	4908			

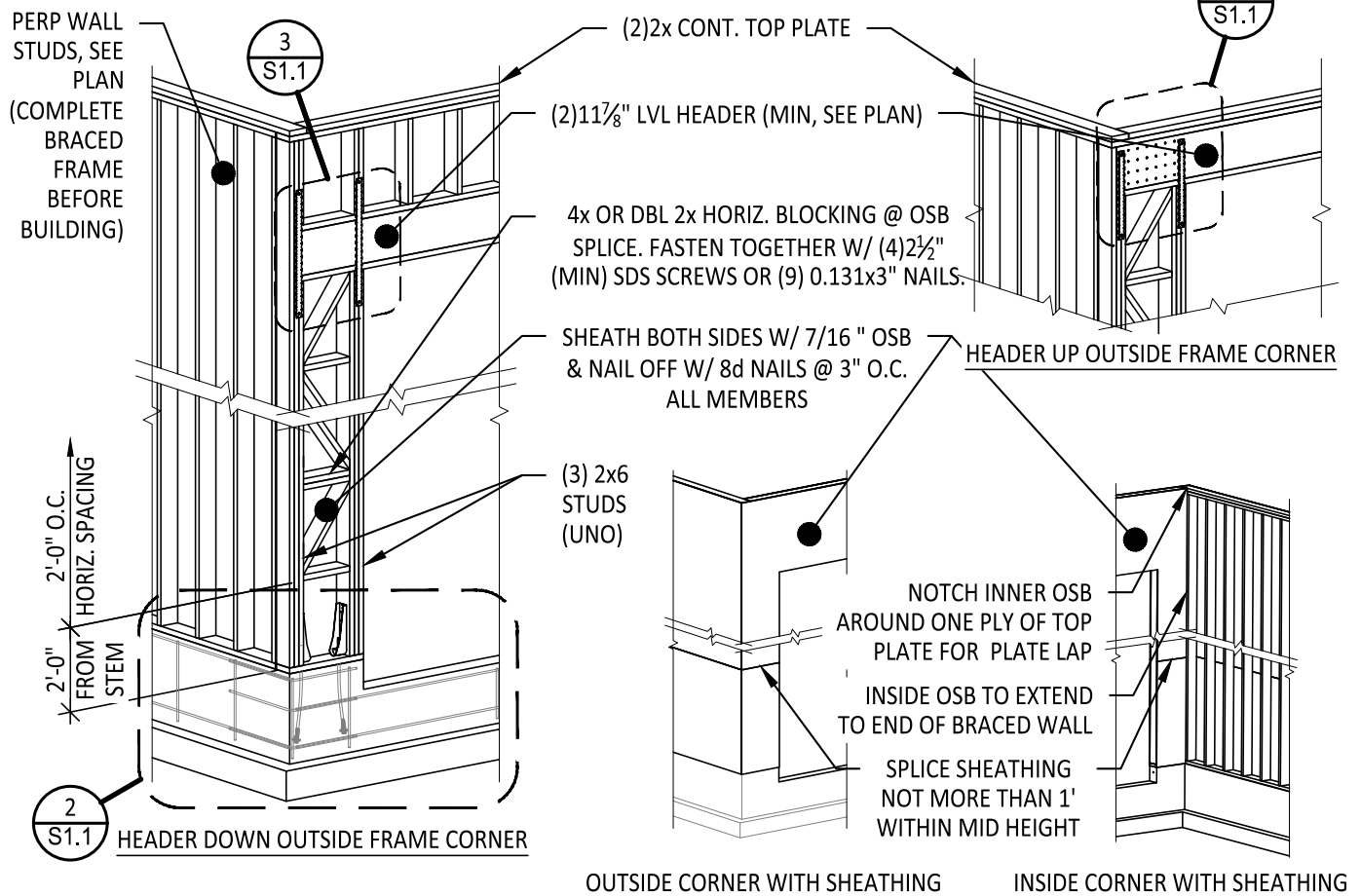


524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: ASF
Review/Check: ARA

Project Name: Breyman Shop
SRE Project #: 2025-10375
City and State: Idaho County, Idaho

MIRRORED @ OPPOSITE SIDE OF OPENING



1
S1.1

ENG. BRACE FRAME

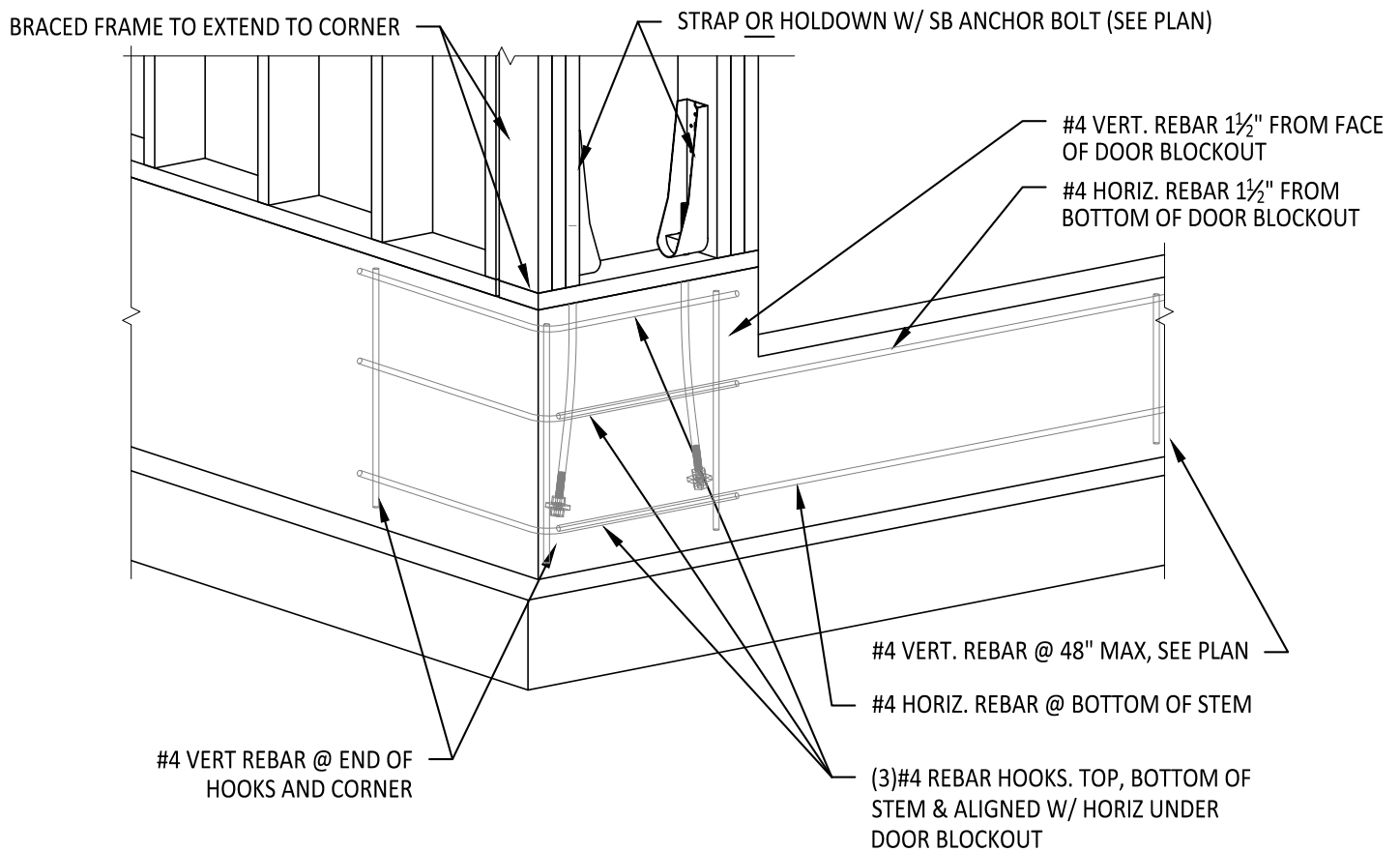
SCALE: 1/4" = 1'-0"



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(208) 453-6512

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SRE Project #: 2025-10375
City and State: Idaho County, Idaho



2
S1.1

ENG. BRACE FRAME

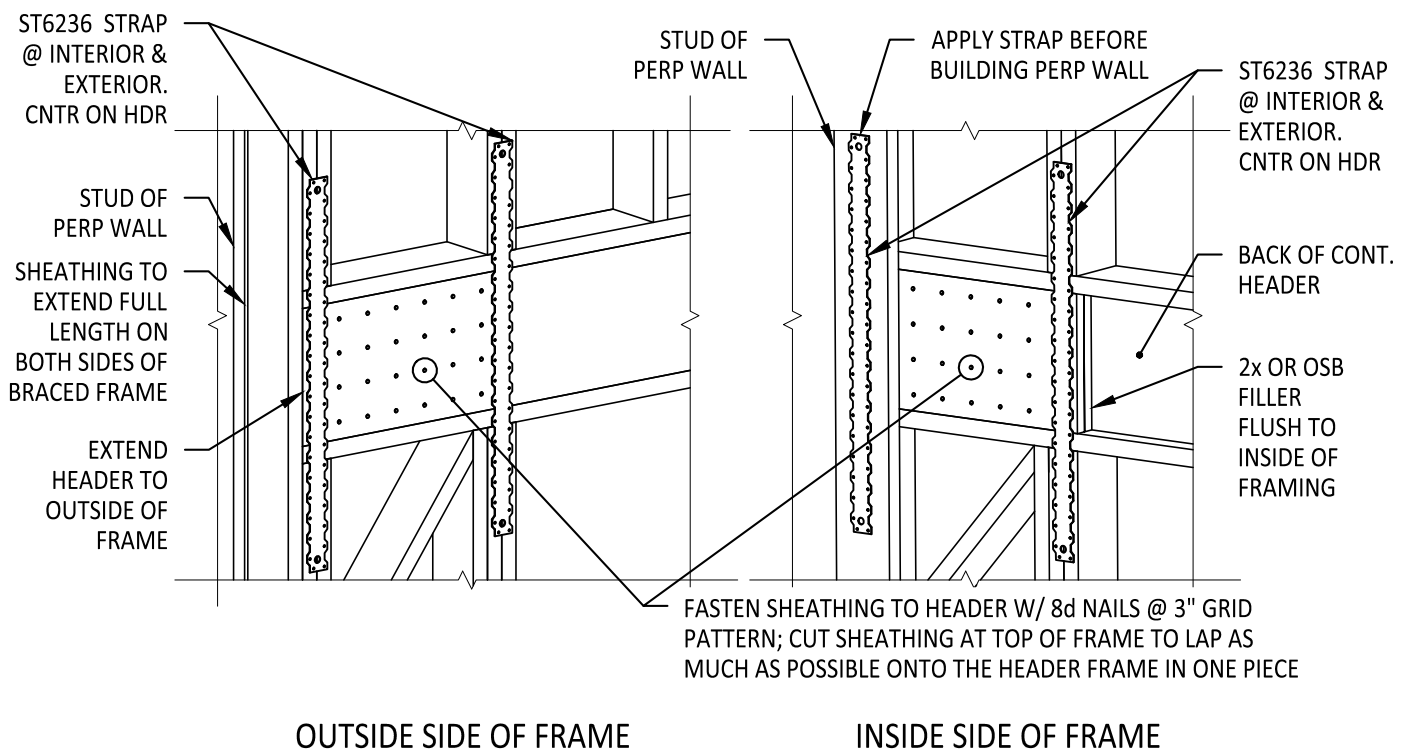
SCALE: $\frac{3}{4}$ " = 1'-0"



524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: ASF
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Project Name: Breyman Shop
SRE Project #: 2025-10375
City and State: Idaho County, Idaho



3
S1.1

ENG. BRACE FRAME

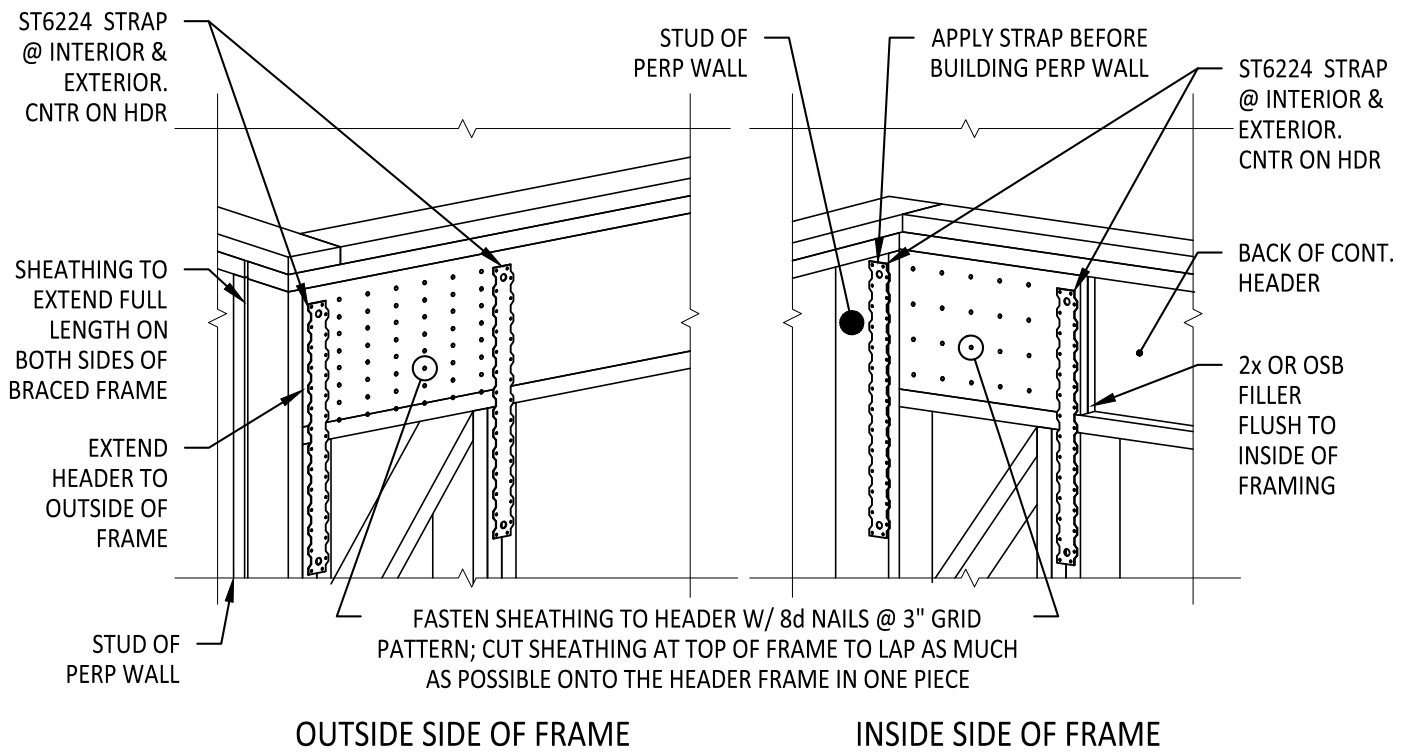
SCALE: 3/4" = 1'-0"



524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: ASF
Review/Check: ARA

Project Name: Breyman Shop
SRE Project #: 2025-10375
City and State: Idaho County, Idaho



4
S1.1

ENG. BRACE FRAME

SCALE: 3/4" = 1'-0"



524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: ASF
Review/Check: ARA

Project Name: Breyman Shop
SRE Project #: 2025-10375
City and State: Idaho County, Idaho

OSB SHEAR WALL SCHEDULE:

MARK	SHEATHING	SIDES OF WALL	SHEET NAILING PERIMETER / FIELD		SHEET STAPLING PERIMETER / FIELD	BLKG	NAILING (UNO) BOTTOM PLATE INTO RIM
SW1	7/16" APA RATED	1	8d @ 6 / 12	OR	16ga x 1-1/2" @ 3 / 12 (NOT FOR WALLS >10')	YES	(2) 16d NAILS PER 16" BAY

GYP. SHEAR WALL SCHEDULE:

SWD	1/2" GYP. BOARD (MIN)	2	5d COOLER @ 6 / 6 (6d @ 5/8" GYP.)	OR	#6 TYPE S OR W DRYWALL SCREWS 1-1/4" LONG 6 / 6	NO	(2) 16d NAILS PER 16" BAY
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TYP. NOTES:

- 1 ALL SHEATHING PANEL EDGES SHALL BE BLOCKED UNO
- 2 PROVIDE SAME NAILING PATTERN ABOVE AND BELOW OPENINGS AS ADJACENT SHEAR PANEL.
- 3 ALL EXTERIOR WALLS SHALL BE SHEARWALL "SW1" WITHOUT BLKG UNO
- 4 FASTEN GABLE/RIM TO SHEAR WALLS BELOW W/ 10d TOENAILS @ 12" O.C. UNO
- 5 FASTEN TRUSS HEELS TO SHEAR WALLS W/ H2.5A AND (2) 10d TOENAILS @ EACH
- 6 GYP BOARD SHEAR WALLS MAY BE SUBSTITUTED WITH AN SW1 SHEAR WALL @ CONTRACTOR'S OPTION
- 7 WALL SHEATHING CAN BE APPLIED TO EITHER SIDE OF THE WALL. (UNLESS NOTED OTHERWISE)

HOLDOWN SCHEDULE:

MARK	STRAP TYPE	STRAP FASTENERS	# OF STUDS		ANCHOR BOLT TYPE	# OF STUDS	ANCHOR BOLT FASTENERS
HD1	LSTHD8 OR LSTHD8RJ W/ RIM	(20) 16d SINKERS	2	OR	DTT2Z W/1/2"Øx10"	2	(8) 1/4"x1-1/2" SDS
HD2	STHD10 OR STHD10RJ W/ RIM	(24) 16d SINKERS	2	OR	HDU2- SDS2.5 W/ SB5/8x24 OR PAB5 @ INT. PONY WALLS	2	(6) 1/4"x2-1/2" SDS
HD3	STHD14 OR STHD14RJ W/ RIM	(30) 16d SINKERS	2	OR	HDU5-SDS2.5 W/ SB5/8x24 OR PAB5 @ INT. PONY WALLS	2	(14) 1/4"x2-1/2" SDS



524 CLEVELAND BLVD. #230
CALDWELL, IDAHO 83605
(208) 453-6512

Completed by: ASF
Review/Check: ARA

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BLOCKING KEY NOTES:

MARK

DESCRIPTION

B1

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FULL HEIGHT BLOCKING BETWEEN EVERY OTHER TRUSS BAYS
W/ (6)10d TOENAILS FROM BLOCKING TO TOP PLATE,
NAIL ROOF SHEATHING TO BLOCKING 3" O.C.

TYP. NOTES:

- 1 FASTEN GABLE/RIM TO SHEAR WALLS BELOW W/ 10d TOENAILS @ 12" O.C. UNO
- 2 FASTEN TRUSS HEELS TO SHEAR WALLS W/ H2.5A AND (2) 10d TOENAILS @ EACH

GABLE / DRAG TRUSS OR RIM KEY NOTES:

T1

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ATTACH GABLE / DRAG TRUSS OR RIM TO TOP PLATE
W/ 10d TOENAILS @ 6" O.C., EDGE NAIL SHEATHING ABOVE TO TRUSS OR RIM