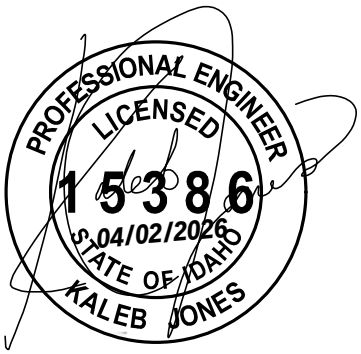
Lateral Calculations

Project Title: Eberle Residence

Address: Lot 52 Bear Basin Estates
Location: McCall (120), Idaho

Job #: 2026-11859



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. Calulations 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: 3/25/2027

SITE SPECIFIC DESIGN CRITERIA:

Snow Criteria:

Roof Load (P_f)	120 psf	
Ground Load (P_g)	120 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	0.47	Fa	1.42
S1	0.14	Fv	2.24
S_{DS}	0.45	S_{D1}	0.21
Risk Category	II		Other
Seismic Importance (I_E)	1.0		
Seismic Design Category (SDC)	D		

Seismic Criteria (continued):

Wall Material	Design Base Shear	Response Coeff., R	
OSB	.08Wp	6.5	Typ @ Ext
GYP	.27Wp	2	Typ @ Int
Cant. Col.	.36Wp	1.5	

Soil Criteria:

Brg. Strength	1500 psf

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**

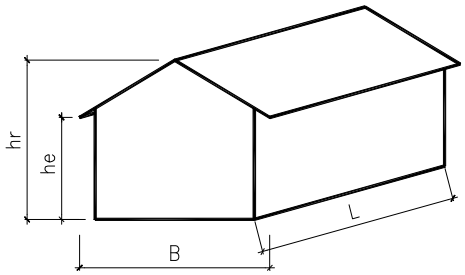
Deck not engineered for hot tub loading.

Deck not engineered for concrete overlay.

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 =	*30.67 ft*	*ft*
Building height to eave	h_e =	*9.00 ft*	*ft*
Building width	B =	*48.00 ft*	*ft*
Building length	L =	*106.00 ft*	*ft*
Overhang sloped width	O_h =	*3.00 ft*	*ft*
Effective area of components (or Solar Panel area)	A =	*27.0 ft²*	ft^2, <== Overhang? (Yes or No): Yes
Enclosed? (Y/N)		y	



ANALYSIS

Velocity pressure

$q_h = 0.00256\ K_z\ K_{zt}\ K_d\ K_e\ V^2$ = **25.91** 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 2 = **0.90**

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

h = mean roof height = **19.84** 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** 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, MAX[MIN(0.1B, 0.1L, 0.4h), MIN(0.04B, 0.04L), 3] = **4.80** **ft**

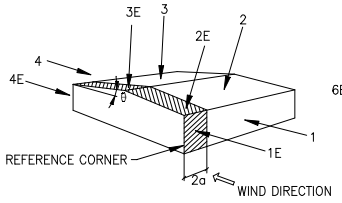
Net Pressures (psf), Basic Load Cases

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	8.72	18.04	-0.45	-16.32	-7.00
2	-0.69	-22.54	-13.21	-0.69	-22.54	-13.21
3	-0.47	-16.80	-7.48	-0.37	-14.25	-4.92
4	-0.42	-15.43	-6.10	-0.45	-16.32	-7.00
5				0.40	5.70	15.03
6				-0.29	-12.18	-2.85
1E	0.78	15.55	24.88	-0.48	-17.10	-7.77
2E	-1.07	-32.39	-23.06	-1.07	-32.39	-23.06
3E	-0.67	-22.11	-12.78	-0.53	-18.40	-9.07
4E	-0.62	-20.68	-11.35	-0.48	-17.10	-7.77
5E				0.61	11.14	20.47

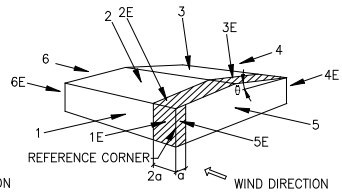
Net Pressures (psf), Torsional Load Cases

Surface	Roof angle q = 18.43		
	$G\ C_{pf}$	Net Press. W/	
		$(+GC_{pi})$	$(-GC_{pi})$
1T	0.52	2.18	4.51
2T	-0.69	-5.64	-3.30
3T	-0.47	-4.20	-1.87
4T	0.00	-3.86	-1.52
Surface	Roof angle q = 0.00		
	$G\ C_{pf}$	Net Press. W/	
		$(+GC_{pi})$	$(-GC_{pi})$
5T	0.40	1.42	3.76
6T	-0.29	-3.04	-0.71

+ / - Wind Pressure 64%

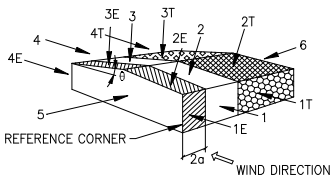


Load Case A (Transverse)

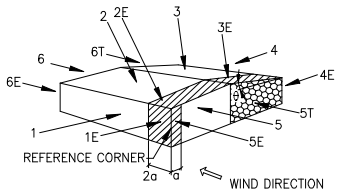


Load Case B (Longitudinal)

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)

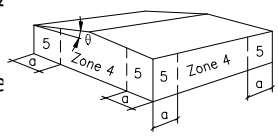
G C_p = 1.00 external pressure coefficie

see table below. (ASCE 7-16 30.3.2)

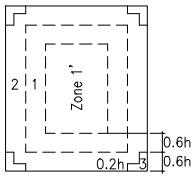
q = 18.43 °

$p_{overhang}$ = **-89.39** psf

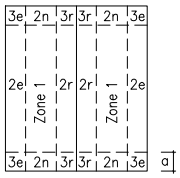
(ASCE 7-16 28.3.3)



Walls



Roof θ≤7°



Roof θ>7°

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
	768	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		
	27	0.30	-2.50	0.30	-2.50	0.30	-1.80	0.99	-1.09	0.99	-1.38		

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*
	12.44	-25.39	12.44	-25.39	12.44	-61.66	12.44	-25.39	12.44	-30.57	12.44	-30.57
	Zone 3		Zone 3e		Zone 3r		Zone 4		Zone 5			
	Positive	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*	*Positive*	*Negative*		
	12.44	-69.44	12.44	-69.44	12.44	-51.30	30.30	-32.89	30.30	-40.40		

(Max Pressure ***69.44*** *psf)*

LOAD CASE 'A' FACTORED LOADS	
$0.6*W_r = (Z_2 + Z_3) * 0.6 =$	**3.4 psf**
$0.6*W_{rE} = (Z_{2E} + Z_{3E}) * 0.6 =$	**6.2 psf**
$0.6*W_w = (Z_1 + Z_4) * 0.6 =$	**14.5 psf**
$0.6*W_{wE} = (Z_{1E} + Z4E) * 0.6 =$	**21.7 psf**

LOAD CASE 'B' FACTORED LOADS	
$0.6*W_r = (Z_2 + Z_3) * 0.6 =$	**5.0 psf**
$0.6*W_{rE} = (Z_{2E} + Z_{3E}) * 0.6 =$	**8.4 psf**
$0.6*W_w = (Z_5 + Z_6) * 0.6 =$	**10.7 psf**
$0.6*W_{wE} = (Z_{5E} + Z_{6E}) * 0.6 =$	**16.2 psf**

ROOF COMPONENTS FACTORED LOAD	
$0.6*Z_{r,c\&c} =$	**18.3 psf**

WALL COMPONENTS FACTORED LOAD	
$0.6*Z_{w,c\&c} =$	**19.7 psf**

OSB SEISMIC LOADING ANALYSIS

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

INPUT DATA

Typical floor height:	h =	9	*ft*
Typical floor weight:	w_x =	86.5	*kips*
Number of floors:	n =	1	
Importance factor (ASCE 11.5.1):	I_e =	1.00	
Design spectral response:	S_{DS} =	0.45	g
	S_{D1} =	0.21	g
Mapped spectral resp.:	S_1 =	0.14	g
Period Parameter, C_t: (ASCE Tab 12.8-2):	C_t =	0.020	
Resp. coefficient: (ASCE Tab. 12.2.1):	R =	6.5	
Seismic design category:	SDC =	D	
	h_n =	30.7	*ft*

DESIGN SUMMARY

$C_s = 1.2 * S_{DS} / (R / I_e)$ =	0.0825		**<= Applicable**
Period Parameter, x =	*0.75*	, ASCE Tab 12.8-2	
Period: $T_a = C_t (h_n)^x$ =	*0.26*	sec, ASCE 12.8.2.1	
$C_s < S_{D1} / [(R / I_e) T_a]$ =	*0.1241*	, ASCE Tab 12.8.1.1	**<= Not Applicable**
$C_s > 0.044 S_{DS} I_e$ =	*0.0197*	, ASCE Tab 12.8.1.1	**<= Not Applicable**
$C_s > 0.5 S_1 / (R / I_e)$ =	*0.0108*	, ASCE Tab 12.8.1.1	**<= Not Applicable**
k =	*2.06*	, (ASCE 12.8.3, page 91)	
$V = C_s W$ =	***0.0825***	W	
0.7 * V =	***0.0577***	W	
W =	***86***	*kips, total*	

SEISMIC COMPONENT & ANCHORING ANALYSIS

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

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

Lf: 10 ft ka: 1.1

$$F_p = 0.4 S_{DS} k_a I_e W_p \qquad (12.11\text{-}1)$$

= ***2.4*** psf ***<= 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)

$$F_{px} = 0.4 S_{DS} I_e w_{px} \qquad (12.10\text{-}3)$$

= ***3.04*** psf ***<= USE FOR ROOF FRAMING UPLIFT***

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

GYP SEISMIC LOADING ANALYSIS

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

INPUT DATA

Typical floor height:	h =	9	ft
Typical floor weight:	w_x =	86.5	kips
Number of floors:	n =	1	
Importance factor (ASCE 11.5.1):	I_e =	1.00	
Design spectral response:	S_{DS} =	0.45	g
	S_{D1} =	0.21	g
Mapped spectral resp.:	S_1 =	0.14	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 =	D	
	h_n =	30.7	ft

DESIGN SUMMARY

$C_s = 1.2 * S_{DS} / (R / I_e)$ =	0.2681		<= Applicable
Period Parameter, x =	0.75	, ASCE Tab 12.8-2	
Period: $T_a = C_t (h_n)^x$ =	0.26	sec, ASCE 12.8.2.1	
$C_s < S_{D1} / [(R / I_e) T_a]$ =	0.4032	, ASCE Tab 12.8.1.1	<= Not Applicable
$C_s > 0.044 S_{DS} I_e$ =	0.0197	, ASCE Tab 12.8.1.1	<= Not Applicable
$C_s > 0.5 S_1 / (R / I_e)$ =	0.0353	, ASCE Tab 12.8.1.1	<= Not Applicable
k =	2.06	, (ASCE 12.8.3, page 91)	
$V = C_s W$ =	**0.2681**	W	
0.7 * V =	**0.1877**	W	
W =	**86**	kips, total	

SEISMIC COMPONENT & ANCHORING ANALYSIS

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

$$w_{1,seismic} = MAX\left(0.4 I S_{DS} W_p \ , 0.1 W_p\right)$$ = **0.2** W_p = **0.2** psf **<= 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)

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

Where : F_{min} = **0.18** plf, **1.68** W_p = **179** 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)

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

= **3.36** W_p = **179** plf (Horizontal) **<= Applicable**

For connections (ASCE 7 Sec. 12.11.2.1)

= MAX [0.133 S... ... 0.5 W...] = **0.5** W_p = **0.5** plf (Horizontal)

WIND / SEISMIC SHEAR FORCE CALCULATIONS:

From ASCE 7-16 Wind & Seismic Loading Analysis

Wall Line	Roof / Floor					Wall					Load above				Loading		
	Wind Force (psf)	Diaph. Weight Wr, 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 (#)	*C_s (Wp)	=	**Wind Force (kips)**	**Seismic Force (kips)**	**Lateral Control**
X1-1	9.6	47	21.6	48.0	106.0	15.9	12.0	15.0	48.0				0.06	=	**7.84**	**7.40**	**Wind**
X2-1	9.6	47	21.6	48.0	106.0	15.9	12.0	15.0	48.0				0.06	=	**7.84**	**7.40**	**Wind**
Y1-1	9.6	47	21.6	22.0	48.0	17.6	12.0	9.0	22.0				0.06	=	**3.15**	**1.57**	**Wind**
Y2-1	9.6	47	21.6	22.0	48.0	17.6	8.0	9.0	22.0				0.19	=	**6.03**	**9.46**	**Seismic**
	9.6	47	21.6	20.0	48.0	18.0	8.0	9.0	20.0				0.19	=			
Y3-1	9.6	47	21.6	20.0	48.0	18.0	8.0	9.0	20.0				0.19	=	**5.49**	**8.56**	**Seismic**
	9.6	47	21.6	18.0	48.0	18.4	8.0	9.0	18.0				0.19	=			
Y4-1	9.6	47	21.6	18.0	48.0	18.4	8.0	9.0	18.0				0.19	=	**8.86**	**14.83**	**Seismic**
	9.6	47	15.8	46.0	48.0	16.0	8.0	15.0	46.0				0.19	=			
Y5-1	9.6	47	15.8	46.0	48.0	16.0	12.0	15.0	46.0				0.06	=	**6.25**	**3.47**	**Wind**

SHEAR WALL CALCULATIONS:

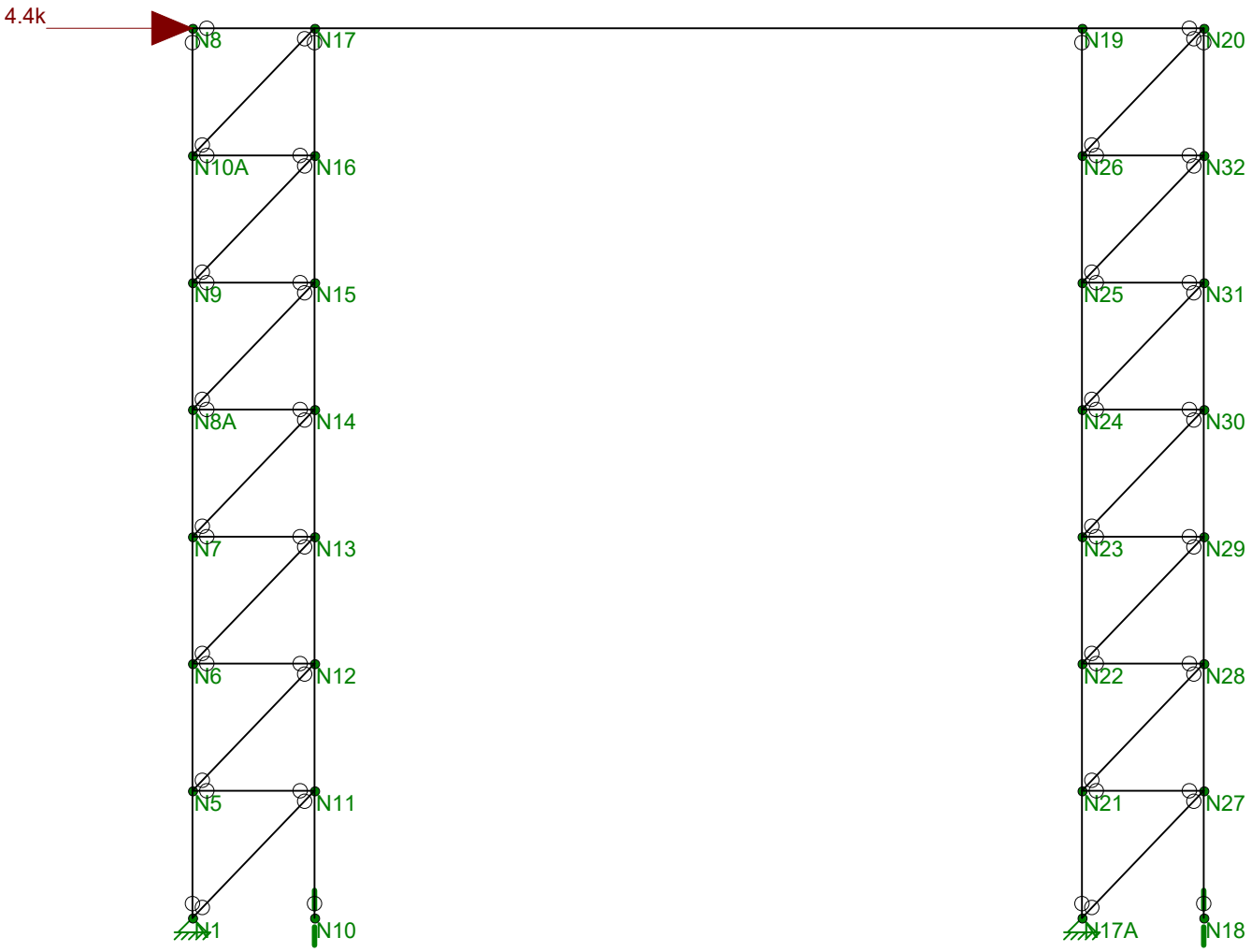
		X1-1	X1-1	X2-1	X2-1	X2-1	X2-1
Shear Wall Forces							
Number of Panels		1	1	1	1	1	1
Total length of wall		106.00 ft	106.00 ft	106.00 ft	106.00 ft	106.00 ft	106.00 ft
Total length of shear wall	L =	60.00 ft	46.00 ft	36.00 ft	18.34 ft	30.00 ft	16.00 ft
Total length of full ht seg.	L_w =	17.99 ft	34.92 ft	23.92 ft	5.64 ft	8.00 ft	4.00 ft
height of shear wall	H =	9.00 ft	15.00 ft	9.00 ft	9.00 ft	12.00 ft	15.00 ft
Maximum opening height	H' =	9.00 ft	15.00 ft	9.00 ft	4.00 ft	12.00 ft	12.00 ft
Total force at top of wall	V_1 =	2666 lbs	5175 lbs	4513 lbs	1064 lbs	1509 lbs	755 lbs
Self weight	$w_{DL\ self}$ =	108 plf	180 plf	108 plf	108 plf	144 plf	180 plf
Applied dead load	$w_{DL\ above}$ =	40 plf	40 plf	40 plf	40 plf	40 plf	40 plf
Prefered OSB thickness	in	7/16	7/16	7/16	7/16	7/16	7/16
Prefered Gyp thickness	in	1/2	1/2	1/2	1/2	1/2	1/2
Wall Connected to Concrete	y/n =	Y	Y	Y	Y	Y	Y
Shear Wall Segments							
		5.75	4.50	4.75	2.82	4.00	2.00
		3.25	6.00	8.00	2.82	4.00	2.00
		2.62	12.92	5.67			
		2.62	6.00	5.50			
		3.75	5.50				
Shear Transfer to Concrete							
	T =	Not Req'd	Not Req'd	435 lbs	Not Req'd	Not Req'd	3500 lbs
	1/2 Anchor Bolts @	72 '' O.C.	72 '' O.C.	72 '' O.C.	72 '' O.C.	72 '' O.C.	
	Provide:	Code Min.	Code Min.	Code Min.	Code Min.	Code Min.	
	Min # of 1/2 Anchor Bolts	(3) Min	(5) Min	(5) Min	(2) Min	(2) Min	
	Load From Above	0.00	0.00	0.00	0.00	0.00	0.00
				Perp. Wall			**HD3**
Shear Resisting System							
Force Calculated		355.69	219.57	315.26	232.20	465.35	386.74
		OSB	**OSB**	**OSB**	**OSB**	**OSB**	**B.F.**
Min Shear Wall Segment:		2.57 ft	4.29 ft	2.57 ft	2.57 ft	3.43 ft	1.33 ft
Provide:	Va=	**SW1**	**SW1**	**SW1**	**SW1**	**SW2**	**4400**
Min Shear Wall Segment:							
Provide:	Va=						
Blocking / Nailing Framing Attachment							
Blocking Unit Shear		25 plf	49 plf	43 plf	10 plf	14 plf	7 plf
Blocking		**NONE**	**NONE**	**NONE**	**NONE**	**NONE**	**NONE**
Nailing		**See SCHED**	**See SCHED**	**See SCHED**	**See SCHED**	**See SCHED**	**See SCHED**
Unit Base Shear							
% of full height segments	%fh = L_w/L =	0.300	0.759	0.664	0.308	0.267	0.250
% of maximum opening height	%oh = H'/H =	1.000	1.000	1.000	0.444	1.000	0.800
Shear cap adj factor	SCAF =	0.42	0.67	0.60	0.81	0.41	0.49
Unit base shear	vbase V_1/L_w =	148 plf	148 plf	189 plf	189 plf	189 plf	189 plf
Effective unit base shear	vreq=v_{base}/SCAF=	356 plf	220 plf	315 plf	232 plf	465 plf	387 plf
Ovrtrn. mo. Ttl. length of wall	OTM =	57.6 k-ft	115.0 k-ft	67.9 k-ft	11.8 k-ft	44.7 k-ft	23.2 k-ft
Shear wall adjustment factor							
Resist moment total L. of wall	RM =	266.0 k-ft	232.5 k-ft	95.8 k-ft	24.9 k-ft	82.7 k-ft	28.1 k-ft
	r=	0.2998	0.7591	0.6644	0.4998	0.2667	0.2941
	C_O=	0.4166	0.6749	0.5984	0.8125	0.4054	0.4878

SHEAR WALL CALCULATIONS:

		Y1-1		Y2-1	Y3-1	Y3-1	Y3-1
Shear Wall Forces							
Number of Panels		1		1	1	1	1
Total length of wall		42.00 ft		48.00 ft	48.00 ft	48.00 ft	48.00 ft
Total length of shear wall	L =	42.00 ft		33.50 ft	4.00 ft	26.92 ft	6.00 ft
Total length of full ht seg.	L_w =	14.58 ft		30.50 ft	4.00 ft	23.92 ft	6.00 ft
height of shear wall	H =	9.00 ft		9.00 ft	9.00 ft	9.00 ft	9.00 ft
Maximum opening height	H' =	6.00 ft		6.67 ft	0.00 ft	8.00 ft	0.00 ft
Total force at top of wall	V_1 =	3153 lbs		9458 lbs	1009 lbs	6035 lbs	1514 lbs
Self weight	$w_{DL\ self}$ =	108 plf		108 plf	108 plf	108 plf	108 plf
Applied dead load	$w_{DL\ above}$ =	40 plf		40 plf	40 plf	40 plf	40 plf
Prefered OSB thickness	in	7/16		7/16	7/16	7/16	7/16
Prefered 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							
		3.58		20.00	4.00	19.00	6.00
		3.50		10.50		4.92	
		7.50					
Shear Transfer to Concrete							
T =		Not Req'd		1465 lbs	2093 lbs	1349 lbs	2005 lbs
1/2 Anchor Bolts @		72 '' O.C.		60 '' O.C.	72 '' O.C.	72 '' O.C.	72 '' O.C.
Provide:		Code Min.		A5	Code Min.	Code Min.	Code Min.
Min # of 1/2 Anchor Bolts		(4) Min		(10) Min	(2) Min	(6) Min	(2) Min
Load From Above		0.00		0.00	0.00	0.00	0.00
				HD1	**HD1**	**HD1**	**HD1**
Shear Resisting System							
Force Calculated		357.38		344.08	252.29	299.14	252.29
		OSB		**OSB**	**OSB**	**OSB**	**OSB**
Min Shear Wall Segment:		2.57 ft		2.57 ft	2.57 ft	2.57 ft	2.57 ft
Provide:	Va=	**SW2**		**SW1**	**SW1**	**SW1**	**SW1**
				Gyp.		**Gyp.**	
Min Shear Wall Segment:				4.50 ft		4.50 ft	
Provide:	Va=			**SWF**		**SWF**	
Blocking / Nailing Framing Attachment							
Blocking Unit Shear		75 plf		197 plf	21 plf	126 plf	32 plf
Blocking		**NONE**		**B1**	**NONE**	**NONE**	**NONE**
Nailing		**See SCHED**		**T1**	**See SCHED**	**See SCHED**	**See SCHED**
Unit Base Shear							
% of full height segments	%fh = L_w/L =	0.347		0.910	1.000	0.889	1.000
% of maximum opening height	%oh = H'/H =	0.667		0.741	0.000	0.889	0.000
Shear cap adj factor	SCAF =	0.61		0.90	1.00	0.84	1.00
Unit base shear	vbase V_1/L_w =	216 plf		310 plf	252 plf	252 plf	252 plf
Effective unit base shear	vreq=v_{base}/SCAF=	357 plf		344 plf	252 plf	299 plf	252 plf
Ovrtrn. mo. Ttl. length of wall	OTM =	46.9 k-ft		94.5 k-ft	9.1 k-ft	64.4 k-ft	13.6 k-ft
Shear wall adjustment factor							
Resist moment total L. of wall	RM =	130.3 k-ft		82.9 k-ft	1.2 k-ft	53.5 k-ft	2.7 k-ft
	r=	0.4437		0.9321	1.0000	0.8997	1.0000
	C_O=	0.6050		0.9013	1.0000	0.8434	1.0000

SHEAR WALL CALCULATIONS:

		Y4-1		Y5-1			
Shear Wall Forces							
Number of Panels		1		1			
Total length of wall		42.00 ft		42.00 ft			
Total length of shear wall	L =	42.00 ft		42.00 ft			
Total length of full ht seg.	L_w =	37.50 ft		24.84 ft			
height of shear wall	H =	10.00 ft		15.00 ft			
Maximum opening height	H' =	6.67 ft		2.00 ft			
Total force at top of wall	V_1 =	14827 lbs		6253 lbs			
Self weight	$w_{DL\ self}$ =	120 plf		180 plf			
Applied dead load	$w_{DL\ above}$ =	40 plf		40 plf			
Prefered OSB thickness	in	7/16		7/16			
Prefered Gyp thickness	in	1/2		1/2			
Wall Connected to Concrete	y/n =	Y		Y			
Shear Wall Segments							
		4.00		8.50			
		5.00		5.50			
		28.50		5.50			
				5.34			
Shear Transfer to Concrete							
	T =	2123 lbs		Not Req'd			
	1/2 Anchor Bolts @	36 '' O.C.		72 '' O.C.			
	Provide:	A3		Code Min.			
	Min # of 1/2 Anchor Bolts	(15) Min		(7) Min			
	Load From Above	0.00		0.00			
	Holdown	**HD1**					
Shear Resisting System							
Force Calculated		437.79		251.73			
		OSB		**OSB**			
	Min Shear Wall Segment:	2.86 ft		4.29 ft			
	Provide: Va=	**SW3**		**SW1**			
	Min Shear Wall Segment:						
	Provide: Va=						
Blocking / Nailing Framing Attachment							
Blocking Unit Shear		353 plf		149 plf			
Blocking		**B1**		**NONE**			
Nailing		**T2**		**T1**			
Unit Base Shear							
% of full height segments	%fh = L_w/L =	0.893		0.591			
% of maximum opening height	%oh = H'/H =	0.667		0.133			
Shear cap adj factor	SCAF =	0.90		1.00			
Unit base shear	vbase V_1/L_w =	395 plf		252 plf			
Effective unit base shear	vreq=v_{base}/SCAF=	438 plf		252 plf			
Ovrtrn. mo. Ttl. length of wall	OTM =	164.2 k-ft		93.8 k-ft			
Shear wall adjustment factor							
Resist moment total L. of wall	RM =	140.9 k-ft		193.8 k-ft			
	r=	0.9259		0.9157			
	C_O=	0.9031		1.3248			



Loads: BLC 1, Wind Load
Envelope Only Solution

Wood Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	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	

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

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

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	0	1	0	0	1
57	M30	max	1.348	0	9	0	0	1	0	0	1
58		min	.041	0	18	0	0	1	0	0	1
59	M31	max	-.064	0	18	0	0	1	0	0	1
60		min	-2.027	0	9	0	0	1	0	0	1
61	M31A	max	2.656	0	17	1.807	14.096	9	3.329	13.93	9
62		min	-.004	0	1	-.785	13.93	9	-2.6	1.99	17

Envelope Member End Reactions

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

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

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

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

TALL WALL CALCULATIONS:

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

Description: Upper Gable	9' Tall Wall	King Stud (9' Max Opening)	9' Trimmer	King Stud (8' Max Opening)	9' Trimmer	
Type:	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	
Grade:	No. 2	No. 2	No. 2	No. 2	No. 2	
Nominal width, t =	(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	
Nominal depth, d =	6	6	6	6	6	
Actual depth =	5.50 in	5.50 in	5.50 in	5.50 in	5.50 in	
Span, L =	9.000 ft	9.000 ft	9.000 ft	9.000 ft	9.000 ft	
w/o Plates	8.750 ft	8.750 ft	8.750 ft	8.750 ft	8.750 ft	
Stud spacing, s =	16 in	64 in	16 in	58 in	16 in	
Lat. Pressure, w_{wind} =	15.53 psf	15.53 psf	5.00 psf	15.53 psf	5.00 psf	
Axial load, P =	427 lbs	50 lbs	1443 lbs	50 lbs	1282 lbs	
Eccentricity, e =	0 in	0 in	0 in	0 in	0 in	
K_{cE} =	0.3	0.3	0.3	0.3	0.3	
c =	0.8	0.8	0.8	0.8	0.8	
w =	20.7 plf	83.1 plf	6.7 plf	75.4 plf	6.7 plf	
Fb	900 psi	900 psi	900 psi	900 psi	900 psi	
Fv	180 psi	180 psi	180 psi	180 psi	180 psi	
Fc-prll	1,350 psi	1,350 psi	1,350 psi	1,350 psi	1,350 psi	
Fc-perp	625 psi	625 psi	625 psi	625 psi	625 psi	
C_d	1.60	1.60	1.15	1.60	1.15	
$C_{F,Fb}$	1.30	1.30	1.30	1.30	1.30	
$C_{F,Fcprll}$	1.10	1.10	1.10	1.10	1.10	
C_r	1.15	1.00	1.00	1.00	1.00	
C_p	0.47	0.47	0.60	0.47	0.60	
C_H	1.00	1.00	1.00	1.00	1.00	
C_b	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	
Emin	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**	**1872 psi**	**1346 psi**	
F'_v = $F'_v C_d C_H$ =	**288 psi**	**288 psi**	**207 psi**	**288 psi**	**207 psi**	
F^*_c = $F_c C_d C_F$ =	2376 psi	2376 psi	1708 psi	2376 psi	1708 psi	
F_{cE} = $(K_{cE} E')/(l_e/d)2$ =	1317 psi	1317 psi	1317 psi	1317 psi	1317 psi	
F'_c = $F_c C_d C_F C_p$ =	**1118 psi**	**1118 psi**	**1017 psi**	**1118 psi**	**1017 psi**	
$F'_{c\,perp}$ = $F_{c\,perp}$ Cb =	**668 psi**	**668 psi**	**668 psi**	**668 psi**	**668 psi**	
E' = E =	**1600000 psi**	**1600000 psi**	**1600000 psi**	**1600000 psi**	**1600000 psi**	
F_{bE} =	**2712 psi**	**2712 psi**	**2712 psi**	**2712 psi**	**2712 psi**	
Slenderness Ratio:	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	
R_B =	**16**	**16**	**16**	**16**	**16**	
Bending:	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	
M = $w L^2/8 + P e/12$ =	198 ft-lbs	796 ft-lbs	64 ft-lbs	721 ft-lbs	64 ft-lbs	
f_b = M/S =	**314 psi**	**1262 psi**	**101 psi**	**1145 psi**	**101 psi**	
S =	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**	
V = w L/2 =	91 lbs	364 lbs	29 lbs	330 lbs	29 lbs	
f_v = 1.5 V/A =	**16 psi**	**66 psi**	**5 psi**	**60 psi**	**5 psi**	
A =	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 = P/A =	**52 psi**	**6 psi**	**175 psi**	**6 psi**	**155 psi**	
Compression (perp.):	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	
$f_{c\,perp}$ = P/A =	**52 psi**	**6 psi**	**175 psi**	**6 psi**	**155 psi**	
Combined:	**≤ 1.0 OK**					
$(fc/Fc)2 + \{fb/[Fb(1-(fc/FcE)]\}$ =	0.15					
Deflection:	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	
D = 22.5 w L^4/E' I =	**0.08 in**	**0.33 in**	**0.03 in**	**0.30 in**	**0.03 in**	
I =	21 in^4	21 in^4	21 in^4	21 in^4	21 in^4	
SPAN /	**1280**	**319**	**3974**	**351**	**3974**	

TALL WALL CALCULATIONS:

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

Description: 15'	15' Tall Wall	King Stud (4' Max Opening)	15' Trimmer	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")	
Species:	DF-L	DF-L	DF-L	DF-L	DF-L	
Grade:	No. 2	No. 2	No. 2	No. 2	No. 2	
Nominal width, t =	(1) 2	(2) 2	(1) 2	(2) 2	(1) 2	
Actual width =	1.50 in	3.00 in	1.50 in	3.00 in	1.50 in	
Nominal depth, d =	6	6	6	6	6	
Actual depth =	5.50 in	5.50 in	5.50 in	5.50 in	5.50 in	
Span, L =	15.000 ft	15.000 ft	15.000 ft	15.000 ft	15.000 ft	
w/o Plates	14.750 ft	14.750 ft	14.750 ft	14.750 ft	14.750 ft	
Stud spacing, s =	16 in	34 in	16 in	28 in	16 in	
Lat. Pressure, w_{wind} =	15.53 psf	15.53 psf	5.00 psf	15.53 psf	5.00 psf	
Axial load, P =	1706 lbs	50 lbs	2559 lbs	50 lbs	1919 lbs	
Eccentricity, e =	0 in	0 in	0 in	0 in	0 in	
K_{cE} =	0.3	0.3	0.3	0.3	0.3	
c =	0.8	0.8	0.8	0.8	0.8	
w =	20.7 plf	44.3 plf	6.7 plf	36.6 plf	6.7 plf	
Fb	900 psi	900 psi	900 psi	900 psi	900 psi	
Fv	180 psi	180 psi	180 psi	180 psi	180 psi	
Fc-prll	1,350 psi	1,350 psi	1,350 psi	1,350 psi	1,350 psi	
Fc-perp	625 psi	625 psi	625 psi	625 psi	625 psi	
C_d	1.60	1.60	1.15	1.60	1.15	
$C_{F,Fb}$	1.30	1.30	1.30	1.30	1.30	
$C_{F,Fcprll}$	1.10	1.10	1.10	1.10	1.10	
C_r	1.15	1.00	1.00	1.00	1.00	
C_p	0.19	0.19	0.25	0.19	0.25	
C_H	1.00	1.00	1.00	1.00	1.00	
C_b	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	
Emin	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**	**1872 psi**	**1346 psi**	
F'_v = $F'_v C_d C_H$ =	**288 psi**	**288 psi**	**207 psi**	**288 psi**	**207 psi**	
F^*_c = $F_c C_d C_F$ =	2376 psi	2376 psi	1708 psi	2376 psi	1708 psi	
F_{cE} = $(K_{cE} E')/(l_e/d)2$ =	463 psi	463 psi	463 psi	463 psi	463 psi	
F'_c = $F_c C_d C_F C_p$ =	**443 psi**	**443 psi**	**434 psi**	**443 psi**	**434 psi**	
$F'_{c\,perp}$ = $F_{c\,perp}$ Cb =	**668 psi**	**668 psi**	**668 psi**	**668 psi**	**668 psi**	
E' = E =	**1600000 psi**	**1600000 psi**	**1600000 psi**	**1600000 psi**	**1600000 psi**	
F_{bE} =	**1609 psi**	**6435 psi**	**1609 psi**	**6435 psi**	**1609 psi**	
Slenderness Ratio:	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	
R_B =	**21**	**10**	**21**	**10**	**21**	
Bending:	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	
M = $w L^2/8 + P e/12$ =	563 ft-lbs	1205 ft-lbs	181 ft-lbs	994 ft-lbs	181 ft-lbs	
f_b = M/S =	**893 psi**	**956 psi**	**288 psi**	**789 psi**	**288 psi**	
S =	8 in^3	15 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**	
V = w L/2 =	153 lbs	327 lbs	49 lbs	270 lbs	49 lbs	
f_v = 1.5 V/A =	**28 psi**	**30 psi**	**9 psi**	**25 psi**	**9 psi**	
A =	8 in^2	17 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 = P/A =	**207 psi**	**3 psi**	**310 psi**	**3 psi**	**233 psi**	
Compression (perp.):	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	
$f_{c\,perp}$ = P/A =	**207 psi**	**3 psi**	**310 psi**	**3 psi**	**233 psi**	
Combined:	**≤ 1.0 OK**					
$(fc/Fc)2 + \{fb/[Fb(1-(fc/FcE)]\}$ =	0.97					
Deflection:	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	
D = 22.5 w L^4/E' I =	**0.66 in**	**0.71 in**	**0.21 in**	**0.58 in**	**0.21 in**	
I =	21 in^4	42 in^4	21 in^4	42 in^4	21 in^4	
SPAN /	**267**	**250**	**830**	**303**	**830**	

TALL WALL CALCULATIONS:

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

Description: 15'	15' Tall Wall	King Stud (4' Max Opening)	15' 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 =	6	6	6			
Actual depth =	5.50 in	5.50 in	5.50 in			
Span, L =	15.000 ft	15.000 ft	15.000 ft			
w/o Plates	14.750 ft	14.750 ft	14.750 ft			
Stud spacing, s =	16 in	34 in	16 in			
Lat. Pressure, w_{wind} =	15.53 psf	15.53 psf	5.00 psf			
Axial load, P =	427 lbs	50 lbs	641 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 =	20.7 plf	44.3 plf	6.7 plf			
Fb	900 psi	900 psi	900 psi			
Fv	180 psi	180 psi	180 psi			
Fc-prll	1,350 psi	1,350 psi	1,350 psi			
Fc-perp	625 psi	625 psi	625 psi			
C_d	1.60	1.60	1.15			
$C_{F,Fb}$	1.30	1.30	1.30			
$C_{F,Fcprll}$	1.10	1.10	1.10			
C_r	1.15	1.00	1.00			
C_p	0.19	0.19	0.25			
C_H	1.00	1.00	1.00			
C_b	1.07	1.07	1.07			
E	1,600,000 psi	1,600,000 psi	1,600,000 psi			
Emin	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**			
F'_v = $F'_v C_d C_H$ =	**288 psi**	**288 psi**	**207 psi**			
F^*_c = $F_c C_d C_F$ =	2376 psi	2376 psi	1708 psi			
F_{cE} = $(K_{cE} E')/(l_e/d)2$ =	463 psi	463 psi	463 psi			
F'_c = $F_c C_d C_F C_p$ =	**443 psi**	**443 psi**	**434 psi**			
$F'_{c\,perp}$ = $F_{c\,perp}$ Cb =	**668 psi**	**668 psi**	**668 psi**			
E' = E =	**1600000 psi**	**1600000 psi**	**1600000 psi**			
F_{bE} =	**1609 psi**	**6435 psi**	**1609 psi**			
Slenderness Ratio:	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**			
R_B =	**21**	**10**	**21**			
Bending:	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**			
M = $w L^2/8 + P e/12$ =	563 ft-lbs	1205 ft-lbs	181 ft-lbs			
f_b = M/S =	**893 psi**	**956 psi**	**288 psi**			
S =	8 in^3	15 in^3	8 in^3			
Shear:	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**			
V = w L/2 =	153 lbs	327 lbs	49 lbs			
f_v = 1.5 V/A =	**28 psi**	**30 psi**	**9 psi**			
A =	8 in^2	17 in^2	8 in^2			
Compression:	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**			
f_c = P/A =	**52 psi**	**3 psi**	**78 psi**			
Compression (perp.):	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**			
$f_{c\,perp}$ = P/A =	**52 psi**	**3 psi**	**78 psi**			
Combined:	**≤ 1.0 OK**					
$(fc/Fc)2 + \{fb/[Fb(1-(fc/FcE)]\}$ =	0.48					
Deflection:	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**			
D = 22.5 w $L^4/E' I$ =	**0.66 in**	**0.71 in**	**0.21 in**			
I =	21 in^4	42 in^4	21 in^4			
SPAN /	**267**	**250**	**830**			

TALL WALL CALCULATIONS:

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

Description: 10' Walls	10' Tall Wall	King Stud (10' Max Opening)	10' Trimmer	King Stud (4' Max Opening)	10' Trimmer	
Type:	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	
Grade:	No. 2	No. 2	No. 2	No. 2	No. 2	
Nominal width, t =	(1) 2	(1) 2	(3) 2	(1) 2	(1) 2	
Actual width =	1.50 in	1.50 in	4.50 in	1.50 in	1.50 in	
Nominal depth, d =	6	6	6	6	6	
Actual depth =	5.50 in	5.50 in	5.50 in	5.50 in	5.50 in	
Span, L =	10.000 ft	10.000 ft	10.000 ft	10.000 ft	10.000 ft	
w/o Plates	9.750 ft	9.750 ft	9.750 ft	9.750 ft	9.750 ft	
Stud spacing, s =	16 in	70 in	16 in	34 in	16 in	
Lat. Pressure, w_{wind} =	15.53 psf	15.53 psf	5.00 psf	15.53 psf	5.00 psf	
Axial load, P =	3259 lbs	50 lbs	12220 lbs	50 lbs	4888 lbs	
Eccentricity, e =	0 in	0 in	0 in	0 in	0 in	
K_{cE} =	0.3	0.3	0.3	0.3	0.3	
c =	0.8	0.8	0.8	0.8	0.8	
w =	20.7 plf	90.9 plf	6.7 plf	44.3 plf	6.7 plf	
Fb	900 psi	900 psi	900 psi	900 psi	900 psi	
Fv	180 psi	180 psi	180 psi	180 psi	180 psi	
Fc-prll	1,350 psi	1,350 psi	1,350 psi	1,350 psi	1,350 psi	
Fc-perp	625 psi	625 psi	625 psi	625 psi	625 psi	
C_d	1.60	1.60	1.15	1.60	1.15	
$C_{F,Fb}$	1.30	1.30	1.30	1.30	1.30	
$C_{F,Fcprll}$	1.10	1.10	1.10	1.10	1.10	
C_r	1.15	1.00	1.00	1.00	1.00	
C_p	0.39	0.39	0.51	0.39	0.51	
C_H	1.00	1.00	1.00	1.00	1.00	
C_b	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	
Emin	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**	**1872 psi**	**1346 psi**	
F'_v = $F'_v C_d C_H$ =	**288 psi**	**288 psi**	**207 psi**	**288 psi**	**207 psi**	
F^*_c = $F_c C_d C_F$ =	2376 psi	2376 psi	1708 psi	2376 psi	1708 psi	
F_{cE} = $(K_{cE} E')/(l_e/d)2$ =	1061 psi	1061 psi	1061 psi	1061 psi	1061 psi	
F'_c = $F_c C_d C_F C_p$ =	**938 psi**	**938 psi**	**876 psi**	**938 psi**	**876 psi**	
$F'_{c\,perp}$ = $F_{c\,perp}$ Cb =	**668 psi**	**668 psi**	**668 psi**	**668 psi**	**668 psi**	
E' = E =	**1600000 psi**	**1600000 psi**	**1600000 psi**	**1600000 psi**	**1600000 psi**	
F_{bE} =	**2434 psi**	**2434 psi**	**21902 psi**	**2434 psi**	**2434 psi**	
Slenderness Ratio:	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	
R_B =	**17**	**17**	**6**	**17**	**17**	
Bending:	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	
M = $w L^2/8 + P e/12$ =	246 ft-lbs	1080 ft-lbs	79 ft-lbs	527 ft-lbs	79 ft-lbs	
f_b = M/S =	**390 psi**	**1714 psi**	**42 psi**	**836 psi**	**126 psi**	
S =	8 in^3	8 in^3	23 in^3	8 in^3	8 in^3	
Shear:	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	
V = w L/2 =	101 lbs	443 lbs	33 lbs	216 lbs	33 lbs	
f_v = 1.5 V/A =	**18 psi**	**81 psi**	**2 psi**	**39 psi**	**6 psi**	
A =	8 in^2	8 in^2	25 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 = P/A =	**395 psi**	**6 psi**	**494 psi**	**6 psi**	**593 psi**	
Compression (perp.):	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	
$f_{c\,perp}$ = P/A =	**395 psi**	**6 psi**	**494 psi**	**6 psi**	**593 psi**	
Combined:	**≤ 1.0 OK**					
(fc/Fc)2 + {fb/[Fb(1-(fc/FcE)]} =	0.47					
Deflection:	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	
D = 22.5 w L^4/E' I =	**0.13 in**	**0.56 in**	**0.01 in**	**0.27 in**	**0.04 in**	
I =	21 in^4	21 in^4	62 in^4	21 in^4	21 in^4	
SPAN /	**925**	**211**	**8616**	**432**	**2872**	

TALL WALL CALCULATIONS:

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

Description: 9ft Int Load	9' Tall Wall	King Stud (3' Max Opening)	9' 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	(1) 2	(1) 2			
Actual width =	1.50 in	1.50 in	1.50 in			
Nominal depth, d =	6	6	6			
Actual depth =	5.50 in	5.50 in	5.50 in			
Span, L =	9.000 ft	9.000 ft	9.000 ft			
w/o Plates	8.750 ft	8.750 ft	8.750 ft			
Stud spacing, s =	16 in	28 in	16 in			
Lat. Pressure, w_{wind} =	15.53 psf	15.53 psf	5.00 psf			
Axial load, P =	3898 lbs	50 lbs	4385 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 =	20.7 plf	36.6 plf	6.7 plf			
Fb	900 psi	900 psi	900 psi			
Fv	180 psi	180 psi	180 psi			
Fc-prll	1,350 psi	1,350 psi	1,350 psi			
Fc-perp	625 psi	625 psi	625 psi			
C_d	1.60	1.60	1.15			
$C_{F,Fb}$	1.30	1.30	1.30			
$C_{F,Fcprll}$	1.10	1.10	1.10			
C_r	1.15	1.00	1.00			
C_p	0.47	0.47	0.60			
C_H	1.00	1.00	1.00			
C_b	1.07	1.07	1.07			
E	1,600,000 psi	1,600,000 psi	1,600,000 psi			
Emin	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**			
F'_v = $F'_v C_d C_H$ =	**288 psi**	**288 psi**	**207 psi**			
F^*_c = $F_c C_d C_F$ =	2376 psi	2376 psi	1708 psi			
F_{cE} = $(K_{cE} E')/(l_e/d)2$ =	1317 psi	1317 psi	1317 psi			
F'_c = $F_c C_d C_F C_p$ =	**1118 psi**	**1118 psi**	**1017 psi**			
$F'_{c\,perp}$ = $F_{c\,perp}$ Cb =	**668 psi**	**668 psi**	**668 psi**			
E' = E =	**1600000 psi**	**1600000 psi**	**1600000 psi**			
F_{bE} =	**2712 psi**	**2712 psi**	**2712 psi**			
Slenderness Ratio:	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**			
R_B =	**16**	**16**	**16**			
Bending:	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**			
M = $w L^2/8 + P e/12$ =	198 ft-lbs	350 ft-lbs	64 ft-lbs			
f_b = M/S =	**314 psi**	**555 psi**	**101 psi**			
S =	8 in^3	8 in^3	8 in^3			
Shear:	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**			
V = w L/2 =	91 lbs	160 lbs	29 lbs			
f_v = 1.5 V/A =	**16 psi**	**29 psi**	**5 psi**			
A =	8 in^2	8 in^2	8 in^2			
Compression:	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**			
f_c = P/A =	**472 psi**	**6 psi**	**532 psi**			
Compression (perp.):	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**			
$f_{c\,perp}$ = P/A =	**472 psi**	**6 psi**	**532 psi**			
Combined:	**≤ 1.0 OK**					
$(fc/Fc)2 + \{fb/[Fb(1-(fc/FcE)]\}$ =	0.41					
Deflection:	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**			
D = 22.5 w $L^4/E' I$ =	**0.08 in**	**0.14 in**	**0.03 in**			
I =	21 in^4	21 in^4	21 in^4			
SPAN /	**1280**	**725**	**3974**			

TALL WALL CALCULATIONS:

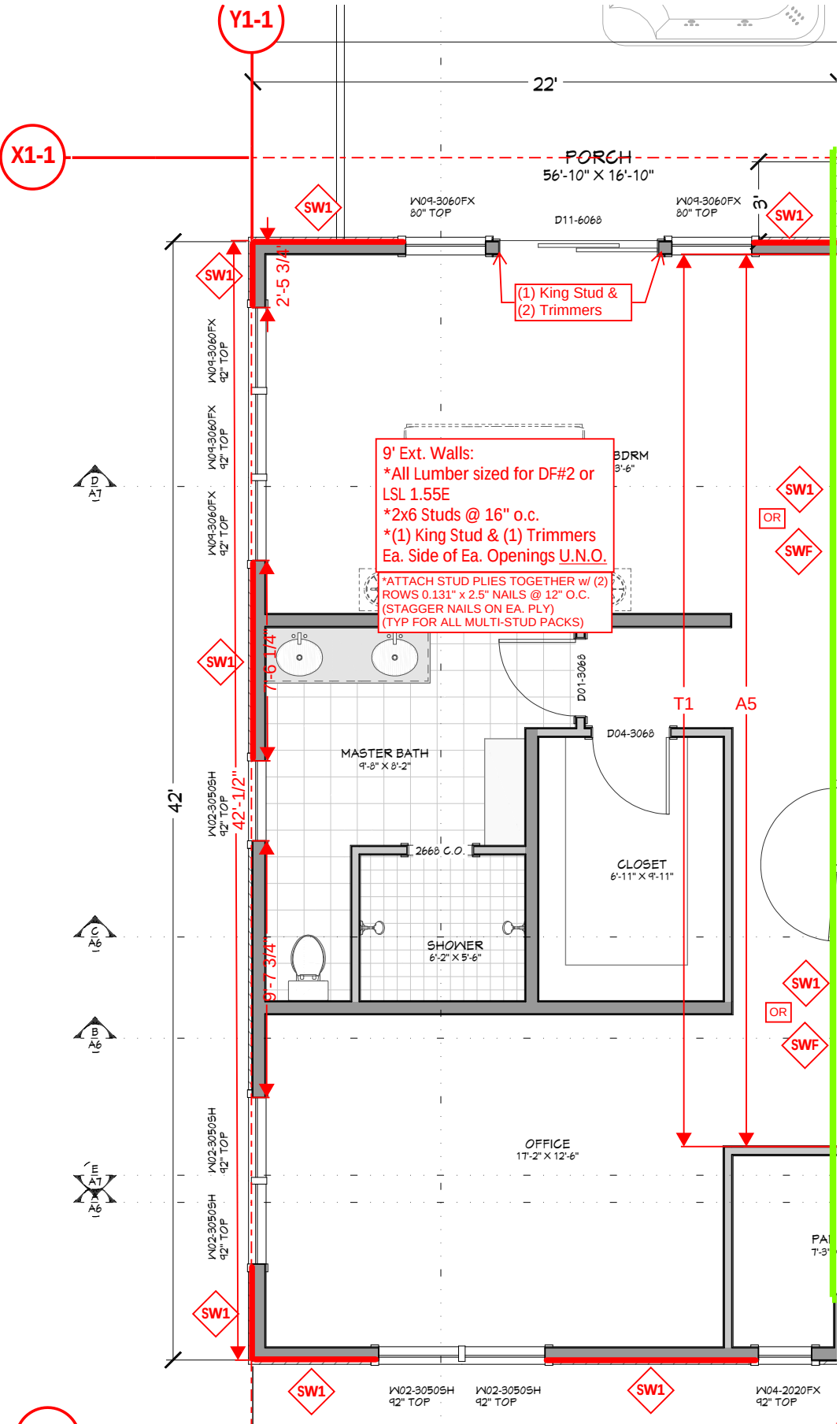
This spreadsheet is used for designing a stud wall according to the NDS.

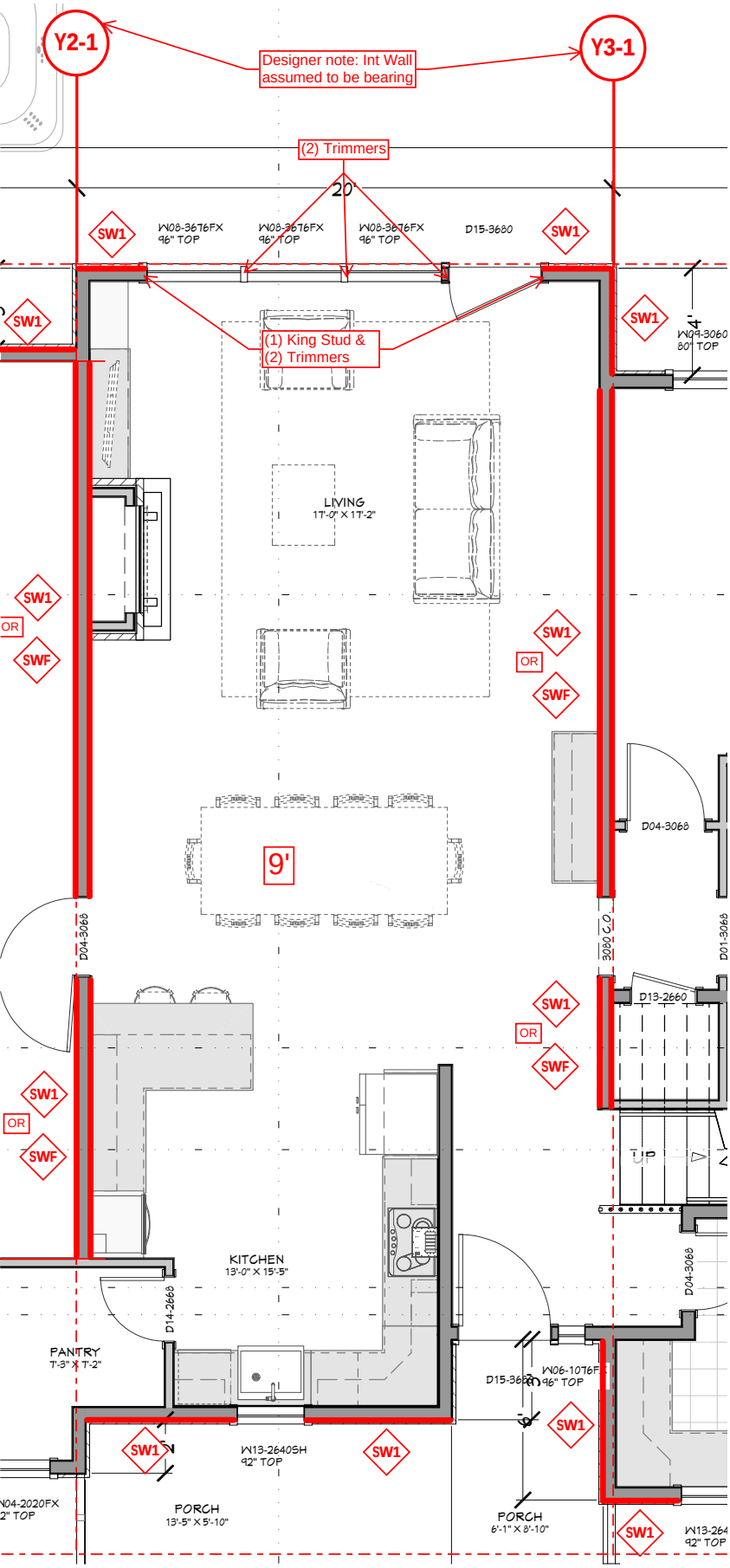
Description: 9ft Int Load	9' Tall Wall	King Stud (14' Max Opening)	9' Trimmer	9' Trimmer		
Type:	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")		
Species:	DF-L	DF-L	DF-L	DF-L		
Grade:	No. 2	No. 2	No. 2	No. 2		
Nominal width, t =	(1) 2	(1) 2	(2) 2	(1) 2		
Actual width =	1.50 in	1.50 in	3.00 in	1.50 in		
Nominal depth, d =	6	6	6	6		
Actual depth =	5.50 in	5.50 in	5.50 in	5.50 in		
Span, L =	9.000 ft	9.000 ft	9.000 ft	9.000 ft		
w/o Plates	8.750 ft	8.750 ft	8.750 ft	8.750 ft		
Stud spacing, s =	16 in	94 in	16 in	16 in		
Lat. Pressure, w_{wind} =	15.53 psf	15.53 psf	5.00 psf	5.00 psf		
Axial load, P =	4355 lbs	50 lbs	5716 lbs	4899 lbs		
Eccentricity, e =	0 in	0 in	0 in	0 in		
K_{cE} =	0.3	0.3	0.3	0.3		
c =	0.8	0.8	0.8	0.8		
w =	20.7 plf	121.9 plf	6.7 plf	6.7 plf		
Fb	900 psi	900 psi	900 psi	900 psi		
Fv	180 psi	180 psi	180 psi	180 psi		
Fc-prll	1,350 psi	1,350 psi	1,350 psi	1,350 psi		
Fc-perp	625 psi	625 psi	625 psi	625 psi		
C_d	1.60	1.60	1.15	1.15		
$C_{F,Fb}$	1.30	1.30	1.30	1.30		
$C_{F,Fcprll}$	1.10	1.10	1.10	1.10		
C_r	1.15	1.00	1.00	1.00		
C_p	0.47	0.47	0.60	0.60		
C_H	1.00	1.00	1.00	1.00		
C_b	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		
Emin	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**	**1346 psi**		
F'_v = $F'_v C_d C_H$ =	**288 psi**	**288 psi**	**207 psi**	**207 psi**		
F^*_c = $F_c C_d C_F$ =	2376 psi	2376 psi	1708 psi	1708 psi		
F_{cE} = $(K_{cE} E')/(l_e/d)2$ =	1317 psi	1317 psi	1317 psi	1317 psi		
F'_c = $F_c C_d C_F C_p$ =	**1118 psi**	**1118 psi**	**1017 psi**	**1017 psi**		
$F'_{c\,perp}$ = $F_{c\,perp}$ Cb =	**668 psi**	**668 psi**	**668 psi**	**668 psi**		
E' = E =	**1600000 psi**	**1600000 psi**	**1600000 psi**	**1600000 psi**		
F_{bE} =	**2712 psi**	**2712 psi**	**10847 psi**	**2712 psi**		
Slenderness Ratio:	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**		
R_B =	**16**	**16**	**8**	**16**		
Bending:	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**		
M = $w L^2/8 + P e/12$ =	198 ft-lbs	1167 ft-lbs	64 ft-lbs	64 ft-lbs		
f_b = M/S =	**314 psi**	**1852 psi**	**51 psi**	**101 psi**		
S =	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**		
V = w L/2 =	91 lbs	534 lbs	29 lbs	29 lbs		
f_v = 1.5 V/A =	**16 psi**	**97 psi**	**3 psi**	**5 psi**		
A =	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 = P/A =	**528 psi**	**6 psi**	**346 psi**	**594 psi**		
Compression (perp.):	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**		
$f_{c\,perp}$ = P/A =	**528 psi**	**6 psi**	**346 psi**	**594 psi**		
Combined:	**≤ 1.0 OK**					
$(fc/Fc)2 + \{fb/[Fb(1-(fc/FcE)]\}$ =	0.47					
Deflection:	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**		
D = 22.5 w L^4/E' I =	**0.08 in**	**0.48 in**	**0.01 in**	**0.03 in**		
I =	21 in^4	21 in^4	42 in^4	21 in^4		
SPAN /	**1280**	**217**	**7947**	**3974**		

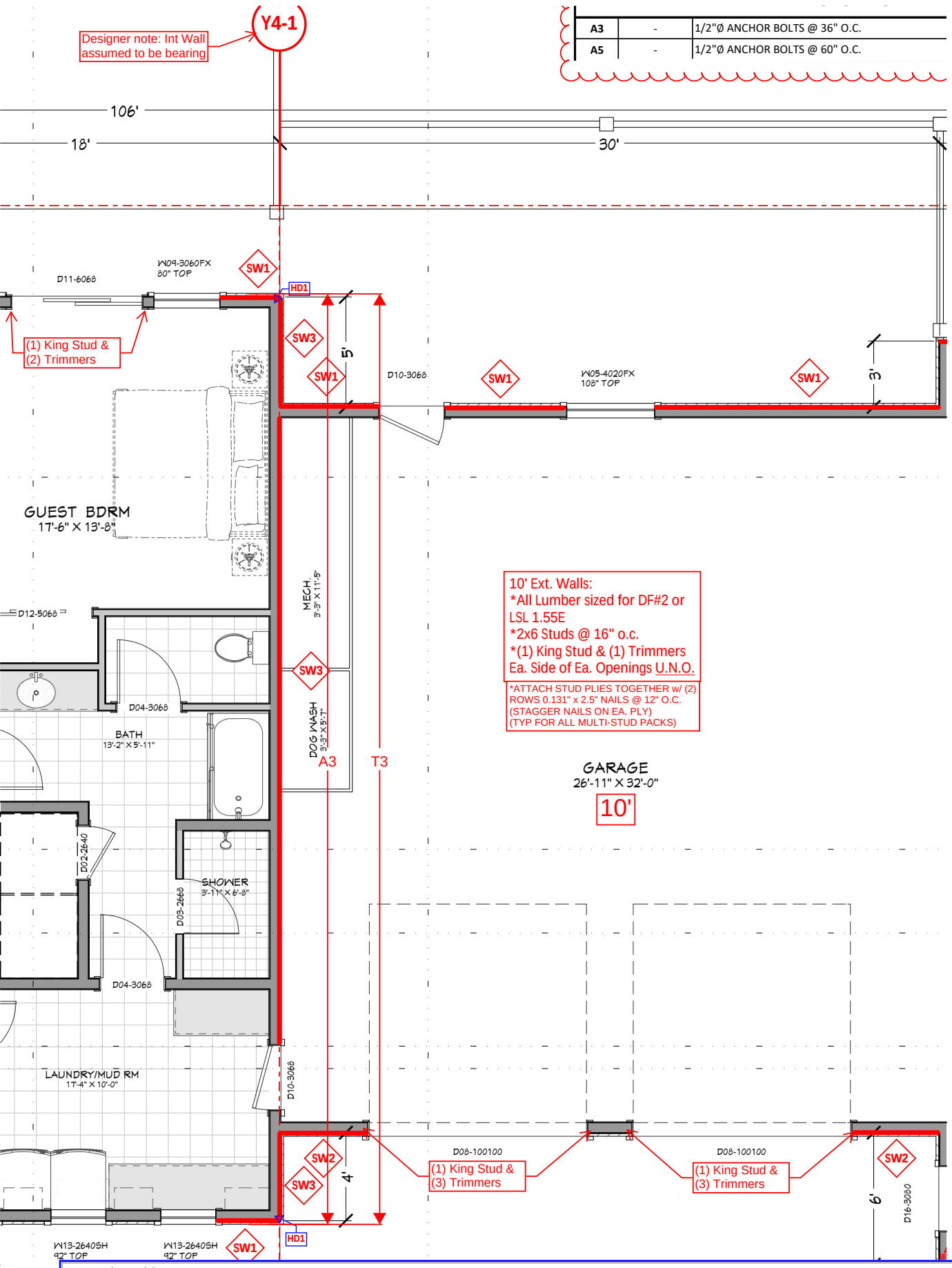
TALL WALL CALCULATIONS:

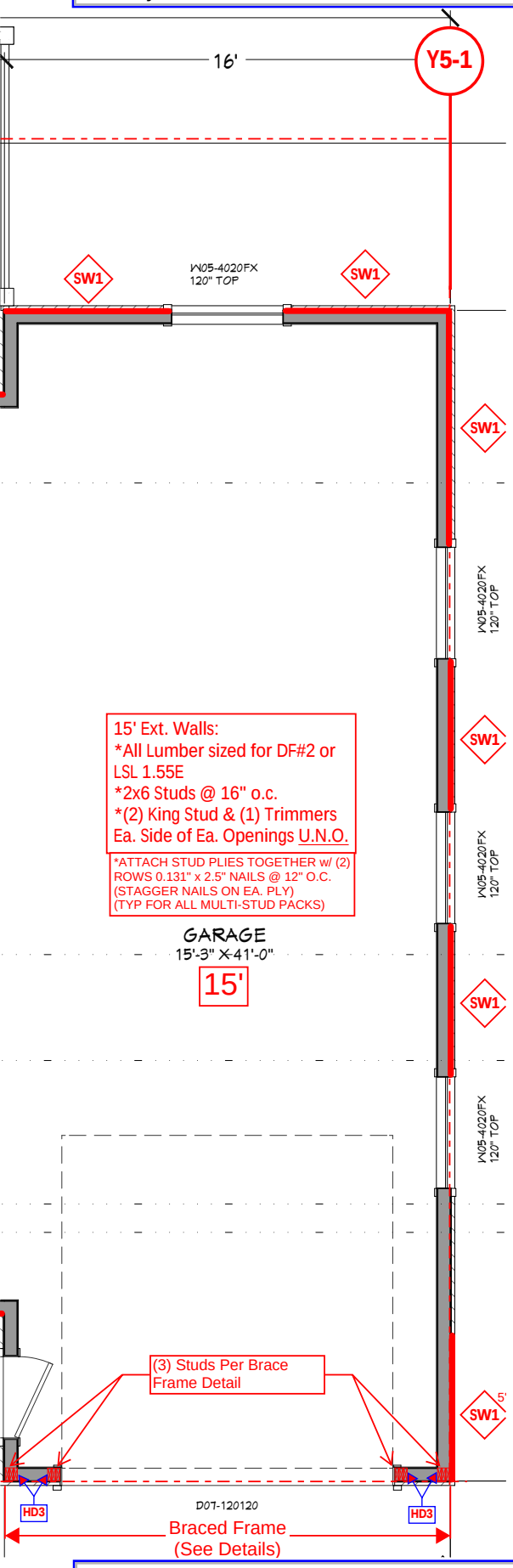
This spreadsheet is used for designing a stud wall according to the NDS.

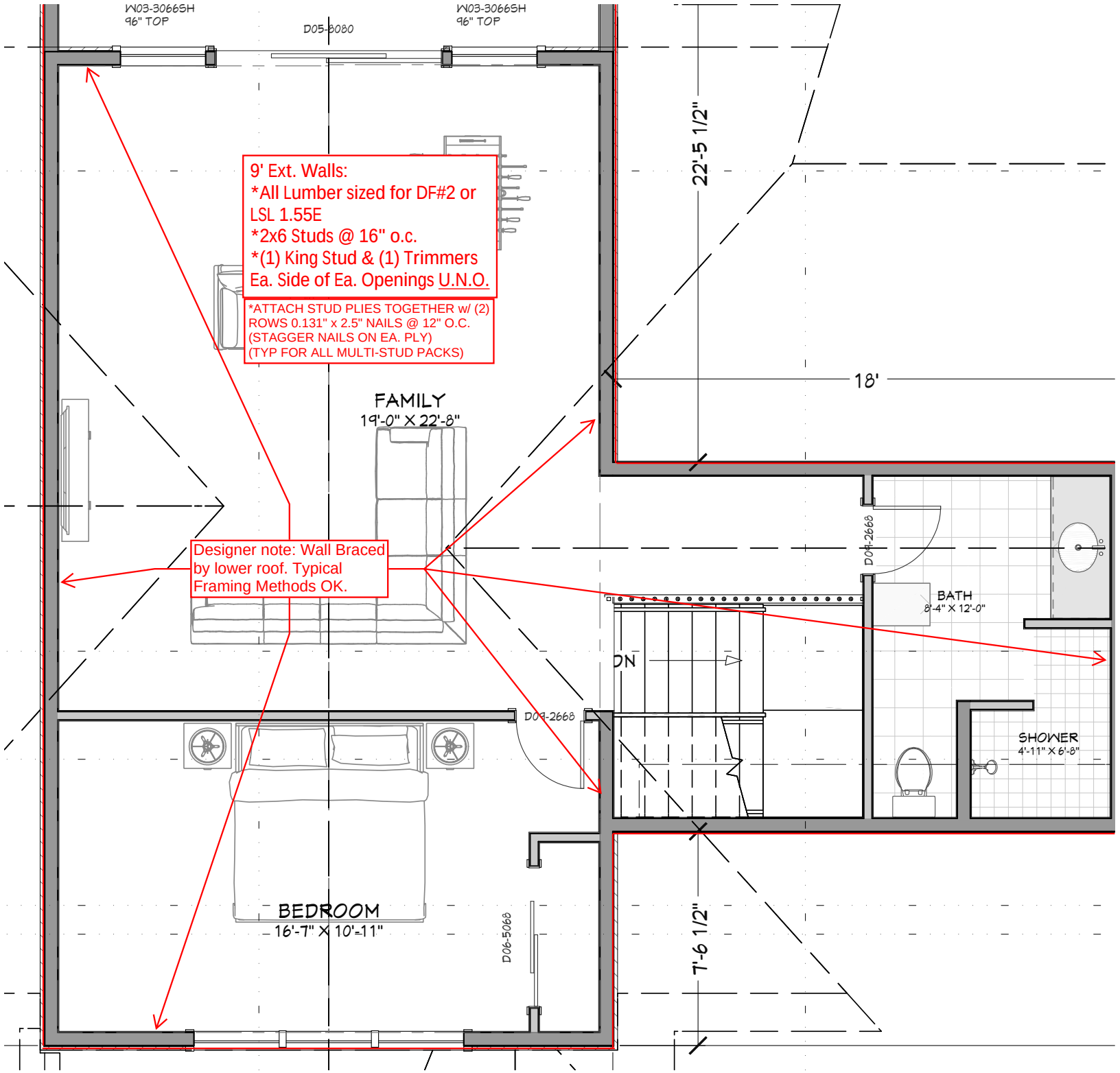
Description: 9ft Walls	9' Tall Wall	King Stud (6' Max Opening)	9' Trimmer	King Stud (3' Max Opening)	9' Trimmer	
Type:	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	2x Lumber (2"-4")	
Species:	DF-L	DF-L	DF-L	DF-L	DF-L	
Grade:	No. 2	No. 2	No. 2	No. 2	No. 2	
Nominal width, t =	(1) 2	(1) 2	(2) 2	(1) 2	(1) 2	
Actual width =	1.50 in	1.50 in	3.00 in	1.50 in	1.50 in	
Nominal depth, d =	6	6	6	6	6	
Actual depth =	5.50 in	5.50 in	5.50 in	5.50 in	5.50 in	
Span, L =	9.000 ft	9.000 ft	9.000 ft	9.000 ft	9.000 ft	
w/o Plates	8.750 ft	8.750 ft	8.750 ft	8.750 ft	8.750 ft	
Stud spacing, s =	16 in	46 in	16 in	28 in	16 in	
Lat. Pressure, w_{wind} =	15.53 psf	15.53 psf	5.00 psf	15.53 psf	5.00 psf	
Axial load, P =	4081 lbs	50 lbs	9182 lbs	50 lbs	4591 lbs	
Eccentricity, e =	0 in	0 in	0 in	0 in	0 in	
K_{cE} =	0.3	0.3	0.3	0.3	0.3	
c =	0.8	0.8	0.8	0.8	0.8	
w =	20.7 plf	59.8 plf	6.7 plf	36.6 plf	6.7 plf	
Fb	900 psi	900 psi	900 psi	900 psi	900 psi	
Fv	180 psi	180 psi	180 psi	180 psi	180 psi	
Fc-prll	1,350 psi	1,350 psi	1,350 psi	1,350 psi	1,350 psi	
Fc-perp	625 psi	625 psi	625 psi	625 psi	625 psi	
C_d	1.60	1.60	1.15	1.60	1.15	
$C_{F,Fb}$	1.30	1.30	1.30	1.30	1.30	
$C_{F,Fcprll}$	1.10	1.10	1.10	1.10	1.10	
C_r	1.15	1.00	1.00	1.00	1.00	
C_p	0.47	0.47	0.60	0.47	0.60	
C_H	1.00	1.00	1.00	1.00	1.00	
C_b	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	
Emin	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**	**1872 psi**	**1346 psi**	
F'_v = $F'_v C_d C_H$ =	**288 psi**	**288 psi**	**207 psi**	**288 psi**	**207 psi**	
F^*_c = $F_c C_d C_F$ =	2376 psi	2376 psi	1708 psi	2376 psi	1708 psi	
F_{cE} = $(K_{cE} E')/(l_e/d)2$ =	1317 psi	1317 psi	1317 psi	1317 psi	1317 psi	
F'_c = $F_c C_d C_F C_p$ =	**1118 psi**	**1118 psi**	**1017 psi**	**1118 psi**	**1017 psi**	
$F'_{c\,perp}$ = $F_{c\,perp}$ Cb =	**668 psi**	**668 psi**	**668 psi**	**668 psi**	**668 psi**	
E' = E =	**1600000 psi**	**1600000 psi**	**1600000 psi**	**1600000 psi**	**1600000 psi**	
F_{bE} =	**2712 psi**	**2712 psi**	**10847 psi**	**2712 psi**	**2712 psi**	
Slenderness Ratio:	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	**≤ 50 OK**	
R_B =	**16**	**16**	**8**	**16**	**16**	
Bending:	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	**≤ F'b OK**	
M = $w L^2/8 + P e/12$ =	198 ft-lbs	573 ft-lbs	64 ft-lbs	350 ft-lbs	64 ft-lbs	
f_b = M/S =	**314 psi**	**909 psi**	**51 psi**	**555 psi**	**101 psi**	
S =	8 in^3	8 in^3	15 in^3	8 in^3	8 in^3	
Shear:	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	**≤ F'v OK**	
V = w L/2 =	91 lbs	262 lbs	29 lbs	160 lbs	29 lbs	
f_v = 1.5 V/A =	**16 psi**	**48 psi**	**3 psi**	**29 psi**	**5 psi**	
A =	8 in^2	8 in^2	17 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 = P/A =	**495 psi**	**6 psi**	**556 psi**	**6 psi**	**556 psi**	
Compression (perp.):	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	**≤ F'c OK**	
$f_{c\,perp}$ = P/A =	**495 psi**	**6 psi**	**556 psi**	**6 psi**	**556 psi**	
Combined:	**≤ 1.0 OK**					
(fc/Fc)2 + {fb/[Fb(1-(fc/FcE)]} =	0.43					
Deflection:	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	**≥ 180 OK**	
D = 22.5 w L^4/E' I =	**0.08 in**	**0.24 in**	**0.01 in**	**0.14 in**	**0.03 in**	
I =	21 in^4	21 in^4	42 in^4	21 in^4	21 in^4	
SPAN /	**1280**	**443**	**7947**	**725**	**3974**	


Y1-1
X1-1
22'
PORCH
56'-10" X 16'-10"
SW1
W09-3060FX
80" TOP
D11-6068
W09-3060FX
80" TOP
SW1
SW1
2'-5 3/4"
(1) King Stud &
(2) Trimmers
W04-3060FX
42" TOP
W04-3060FX
42" TOP
W04-3060FX
42" TOP
9' Ext. Walls:
*All Lumber sized for DF#2 or
LSL 1.55E
*2x6 Studs @ 16" o.c.
*(1) King Stud & (1) Trimmers
Ea. Side of Ea. Openings U.N.O.
*ATTACH STUD PLIES TOGETHER w/ (2)
ROWS 0.131" x 2.5" NAILS @ 12" O.C.
(STAGGER NAILS ON EA. PLY)
(TYP FOR ALL MULTI-STUD PACKS)
BDRM
SW1
OR
SWF
SW1
7'-6 1/4"
D01-3068
T1
A5
D04-3068
MASTER BATH
9'-8" X 8'-2"
W02-3050SH
42" TOP
42'-1/2"
42'
2668 C.O.
CLOSET
6'-11" X 9'-11"
SHOWER
6'-2" X 5'-6"
9'-7 3/4"
SW1
OR
SWF
OFFICE
17'-2" X 12'-6"
W02-3050SH
42" TOP
W02-3050SH
42" TOP
SW1
SW1
W02-3050SH
92" TOP
W02-3050SH
92" TOP
SW1
W04-2020FX
92" TOP
D
A7
C
A6
B
A6
E
A7
A
A6

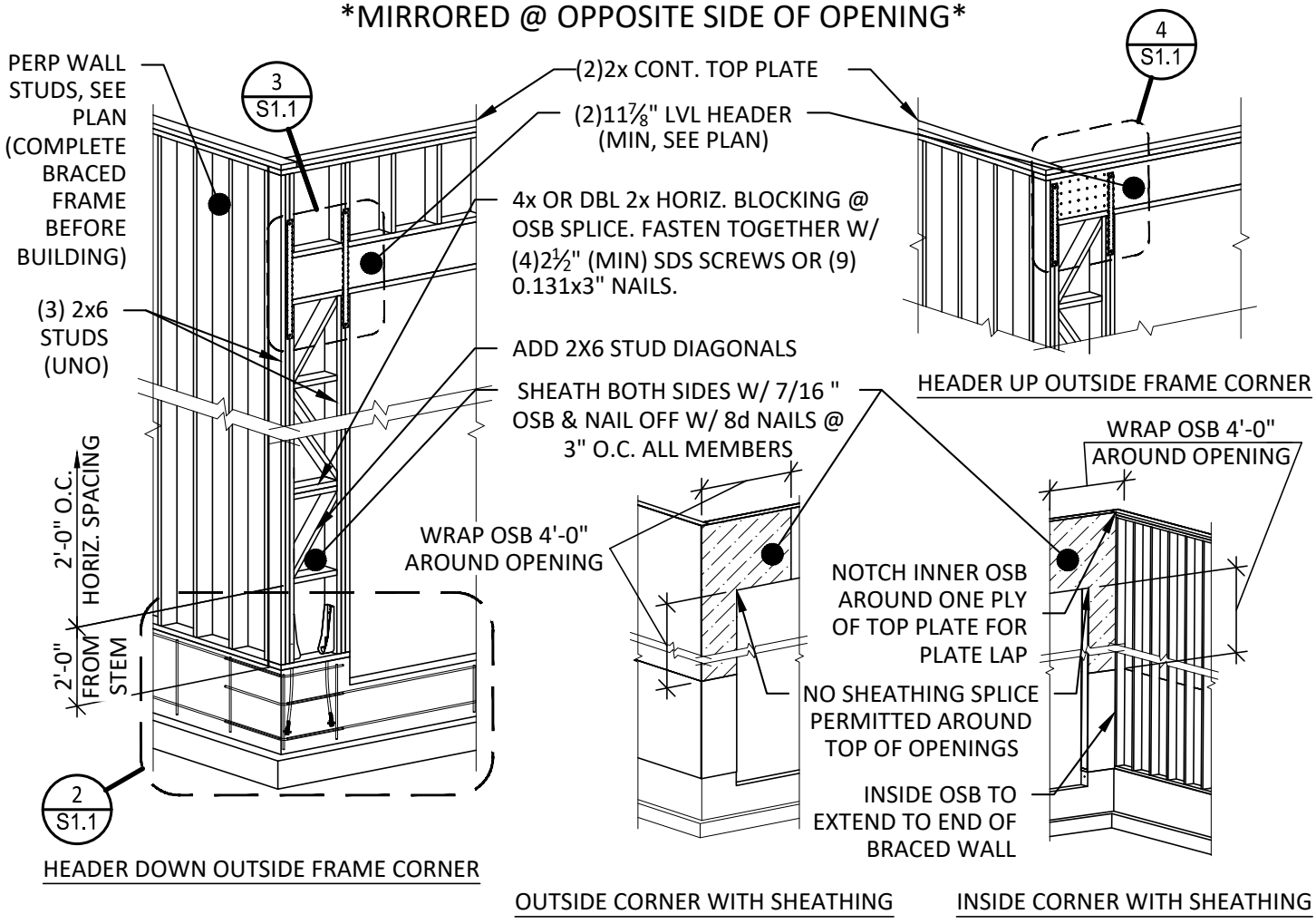

Y2-1
Y3-1
Designer note: Int Wall assumed to be bearing
(2) Trimmers
20'
SW1
W08-3676FX 96" TOP
W08-3676FX 96" TOP
W08-3676FX 96" TOP
D15-3680
(1) King Stud & (2) Trimmers
W09-3060 80" TOP
LIVING 17'-0" X 17'-2"
OR
SWF
9'
D04-3068
D04-3065
3068 C.O.
D01-3068
D13-2660
KITCHEN 13'-0" X 15'-5"
D14-2668
PANTRY 7'-9" X 7'-2"
D15-3680
W06-1076FX 96" TOP
W13-2640SH 92" TOP
PORCH 13'-5" X 5'-10"
PORCH 6'-1" X 8'-10"
W13-264 92" TOP
D04-3068
UP


Y4-1
Designer note: Int Wall assumed to be bearing
A3 - 1/2"Ø ANCHOR BOLTS @ 36" O.C.
A5 - 1/2"Ø ANCHOR BOLTS @ 60" O.C.
106'
18'
30'
W09-3060FX 80" TOP
D11-6068
SW1
HD1
SW3
SW1
5'
D10-3068
SW1
W05-4020FX 108" TOP
SW1
3'
(1) King Stud & (2) Trimmers
GUEST BDRM 17'-6" X 13'-8"
MECH 3'-3" X 11'-5"
D12-5068
SW3
D04-3068
BATH 13'-2" X 5'-11"
DOG WASH 3'-3" X 5'-7"
A3
T3
10' Ext. Walls:
*All Lumber sized for DF#2 or LSL 1.55E
*2x6 Studs @ 16" o.c.
*(1) King Stud & (1) Trimmers Ea. Side of Ea. Openings U.N.O.
*ATTACH STUD PLIES TOGETHER w/ (2) ROWS 0.131" x 2.5" NAILS @ 12" O.C. (STAGGER NAILS ON EA. PLY) (TYP FOR ALL MULTI-STUD PACKS)
GARAGE 26'-11" X 32'-0"
10'
D02-2640
SHOWER 3'-11" X 6'-8"
D03-2668
D04-3068
LAUNDRY/MUD RM 11'-4" X 10'-0"
D10-3068
SW2
SW3
4'
D08-100100
(1) King Stud & (3) Trimmers
D08-100100
(1) King Stud & (3) Trimmers
SW2
6'
D16-3080
W13-2640SH 92" TOP
W13-2640SH 92" TOP
SW1
HD1


16'
Y5-1
SW1
W05-4020FX
120" TOP
SW1
SW1
W05-4020FX
120" TOP
15' Ext. Walls:
*All Lumber sized for DF#2 or LSL 1.55E
*2x6 Studs @ 16" o.c.
*(2) King Stud & (1) Trimmers Ea. Side of Ea. Openings U.N.O.
*ATTACH STUD PLIES TOGETHER w/ (2) ROWS 0.131" x 2.5" NAILS @ 12" O.C. (STAGGER NAILS ON EA. PLY) (TYP FOR ALL MULTI-STUD PACKS)
SW1
W05-4020FX
120" TOP
GARAGE
15'-3" X 41'-0"
15'
SW1
W05-4020FX
120" TOP
(3) Studs Per Brace Frame Detail
5'
SW1
HD3
D0T-120120
HD3
Braced Frame
(See Details)

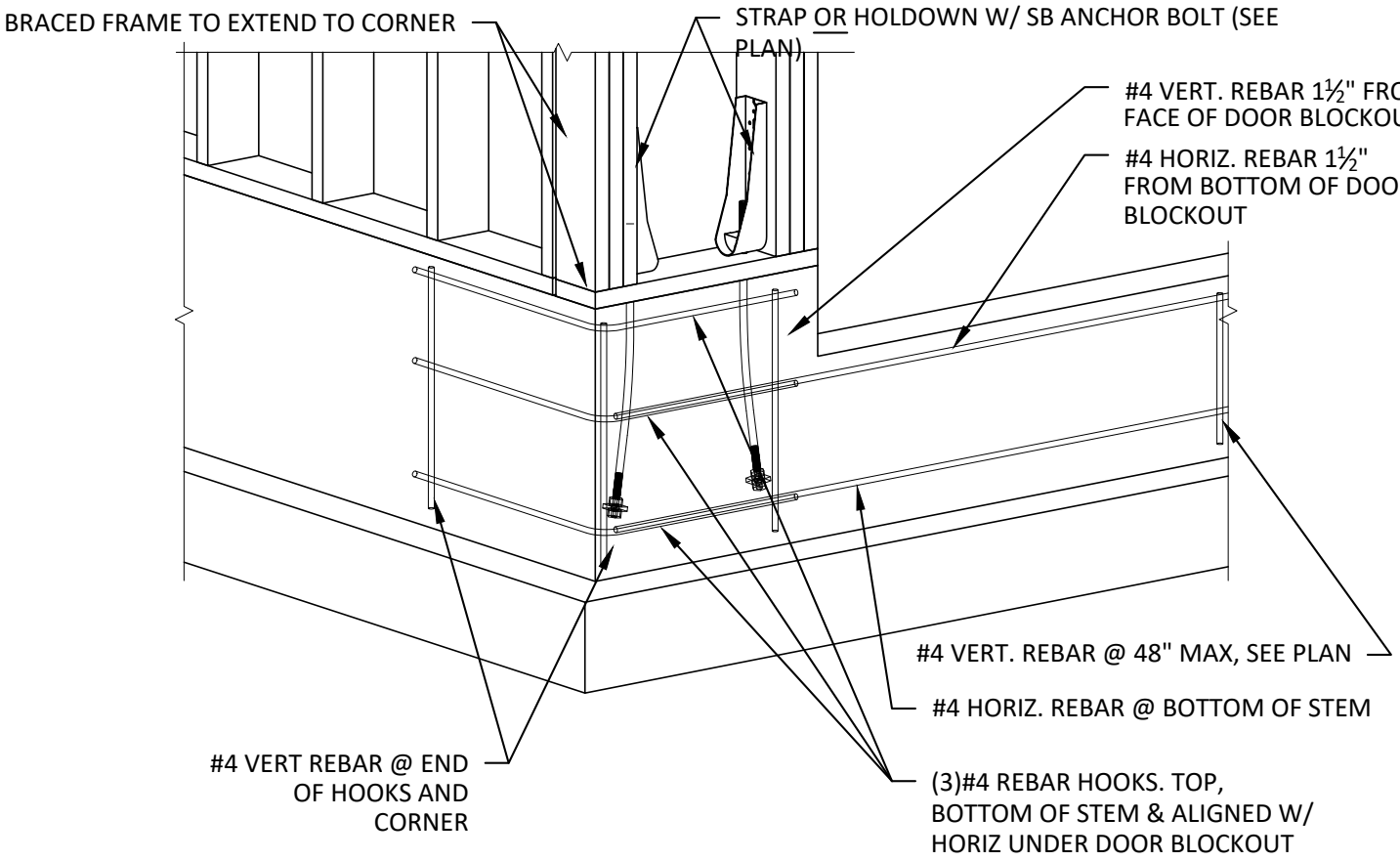

W03-3066SH
96" TOP
D05-3080
W03-3066SH
96" TOP
9' Ext. Walls:
*All Lumber sized for DF#2 or LSL 1.55E
*2x6 Studs @ 16" o.c.
*(1) King Stud & (1) Trimmers Ea. Side of Ea. Openings U.N.O.
*ATTACH STUD PLIES TOGETHER w/ (2) ROWS 0.131" x 2.5" NAILS @ 12" O.C. (STAGGER NAILS ON EA. PLY) (TYP FOR ALL MULTI-STUD PACKS)
22'-5 1/2"
18'
FAMILY
19'-0" X 22'-8"
Designer note: Wall Braced by lower roof. Typical Framing Methods OK.
D04-2668
BATH
8'-4" X 12'-0"
D04-2668
SHOWER
4'-11" X 6'-8"
BEDROOM
16'-7" X 10'-11"
D06-5068
7'-6 1/2"

MIRRORED @ OPPOSITE SIDE OF OPENING



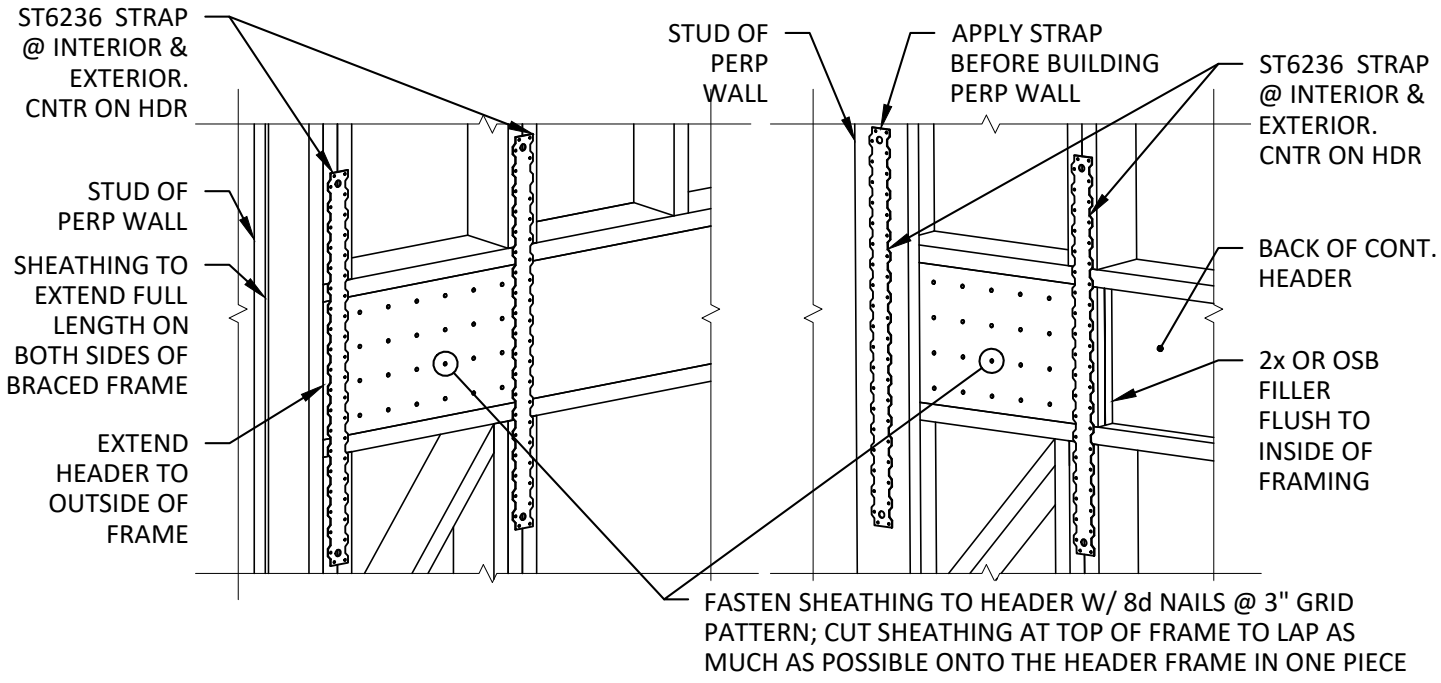
1 S1.1 ENG. BRACE FRAME

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



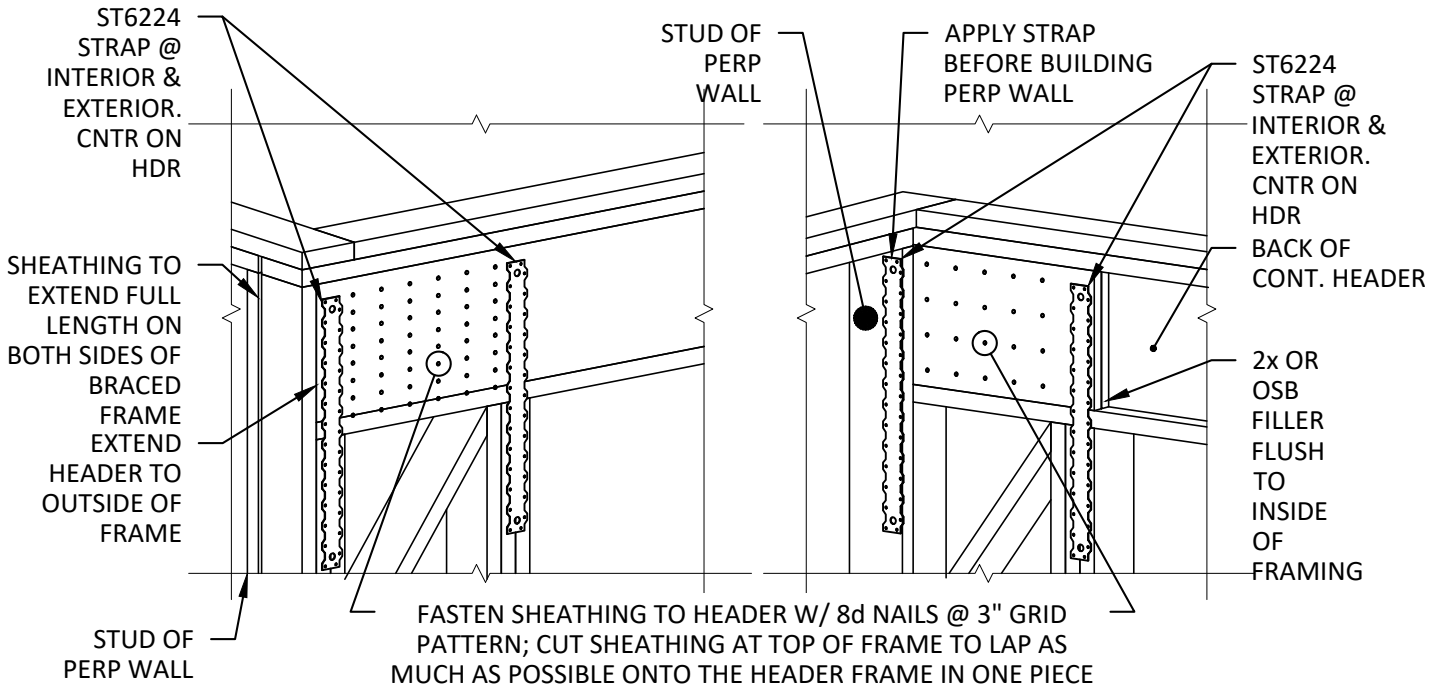
2 / S1.1 ENG. BRACE FRAME

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



3 / S1.1 ENG. BRACE FRAME

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



4 / S1.1 ENG. BRACE FRAME

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