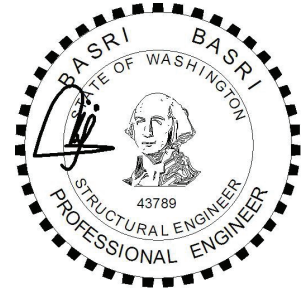




info@b2engineers.com  
425-318-7047 (O)  
425-318-0031 (C)

**TSO ADDITION  
8802 SE 37TH ST  
MERCER ISLAND, WA 98040**

**PROJECT NO: 22126    DATE:06/28/22  
PREPARED BY: BASRI BASRI PE, SE**



### Design Criteria

International Building Code (IBC) 2018  
American Society of Civil Engineers (ASCE) 7-16

### Project Description

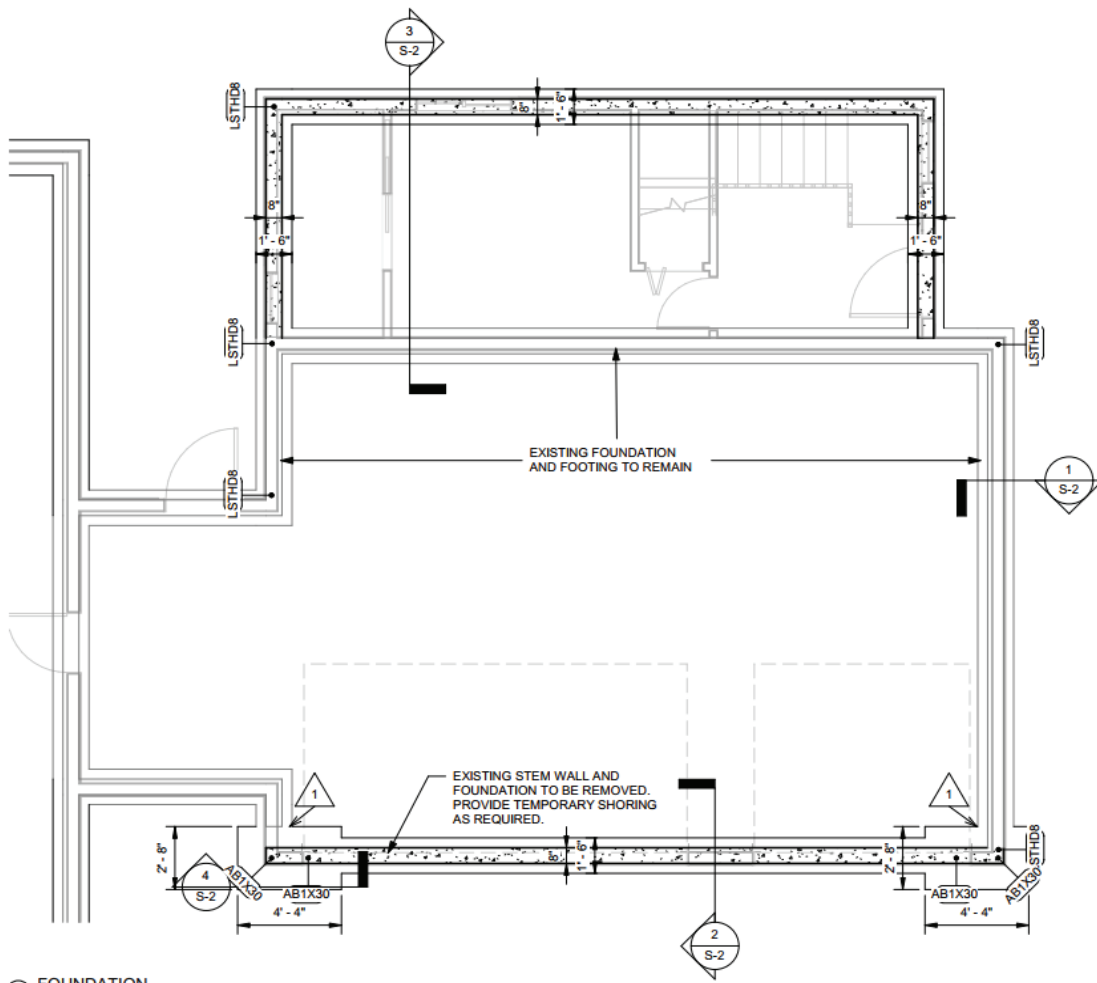
Structural design of second-story addition of 1000 sq. ft. above existing garage, utilizing conventional wood framing on shallow concrete foundation. The lateral system consists of plywood/OSB wall sheathing with Simpson holdown anchors. The seismic criteria are obtained from the ATC Hazards website and the wind criteria are obtained from City of Mercer Island Wind Mapping  
Please see attached calculations for your reference

### Seismic Criteria

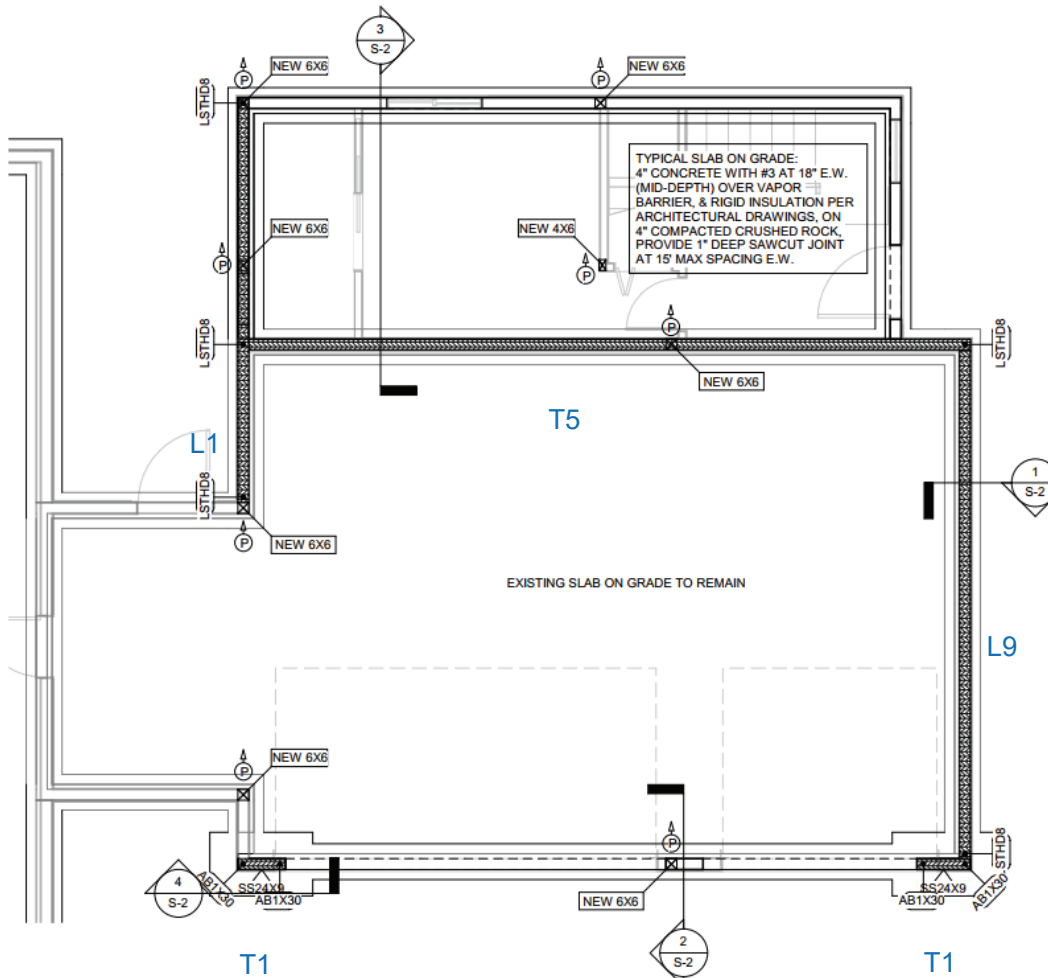
S <sub>s</sub> , %g	140
S <sub>1</sub> , %g	50
Risk Category	II
Site Class	D
Ductility Factor, R	6.5
Seismic Performance Category	D

### Wind Criteria

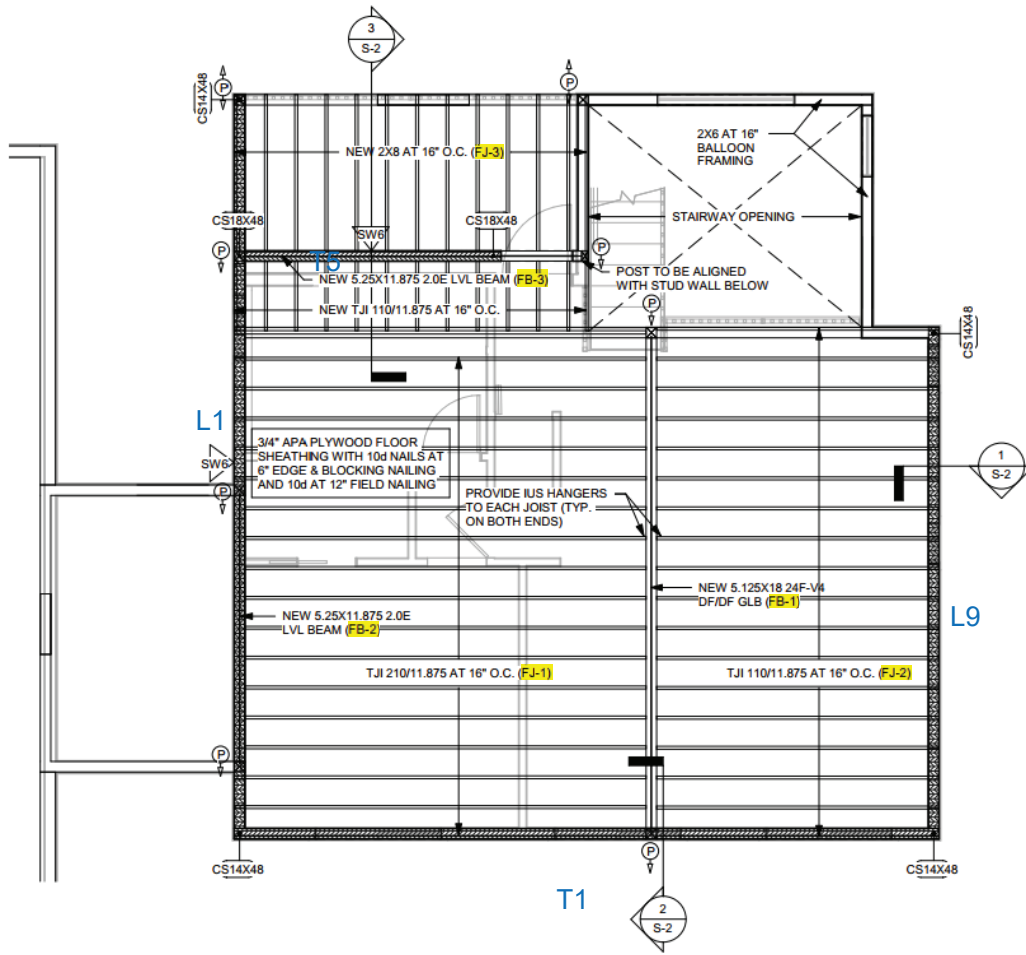
Ultimate Wind Speed, mph	97
Building Classifications	II
Wind Exposure Category	C
Topographic Effect, K <sub>zt</sub>	1.6



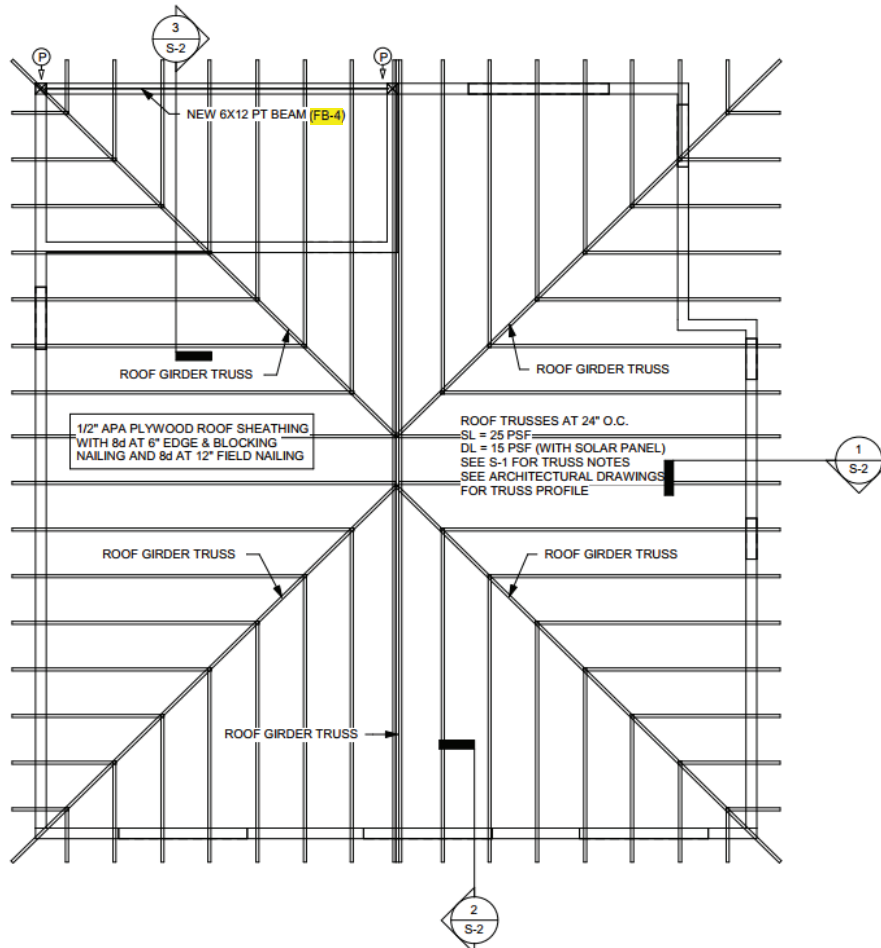
A FOUNDATION  
1/4" = 1'-0"



B MAIN LEVEL  
1/4" = 1'-0"



C UPPER LEVEL  
1/4" = 1'-0"



D ROOF PLAN  
1/4" = 1'-0"

Project: Tso Addition

Location: **FJ-1**

Floor Joist

[2015 International Building Code(2015 NDS)]

17.5 FT @ 16 O.C.

TJI 210 / 11.875 - iLevel Trus Joist

Section Adequate By: 3.9%

Controlling Factor: Deflection

Alex  
StruCalc 9.0

StruCalc Version 10.2.1.0

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<b>DEFLECTIONS</b>		Center
Live Load	0.39	IN L/533
Dead Load	0.17	in
Total Load	0.56	IN L/374
Live Load Deflection Criteria: L/480		Total Load Deflection Criteria: L/360

<b>REACTIONS</b>		A	B
Live Load	467	lb	467
Dead Load	198	lb	198
Total Load	665	lb	665
Bearing Length	1.75	in	3.50
Web Stiffeners	No		No

<b>SUPPORT LOADS</b>		A	B
Live Load	350	plf	350
Dead Load	149	plf	149
Total Load	499	plf	499

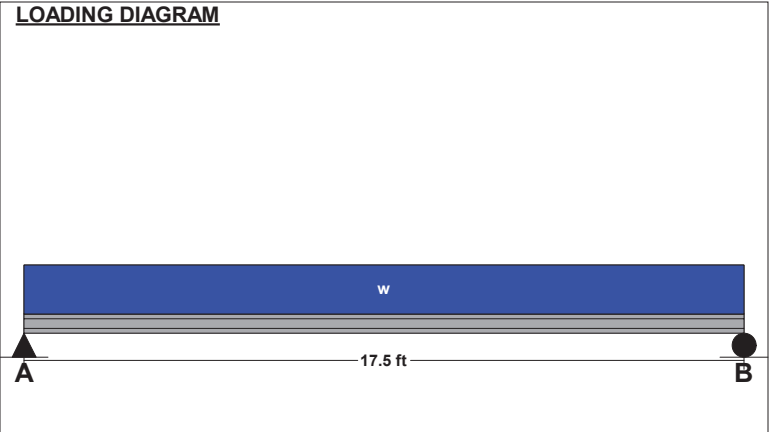
**I-JOIST PROPERTIES**  
TJI 210 / 11.875 - iLevel Trus Joist

Base Value Adjusted  
Moment Capacity:  $M_n = 10.3 \text{ k-ft}$   
 $C_d = 1.00$   
Shear Stress:  $V_n = 1655 \text{ lbs}$   
 $C_d = 1.00$   
Reaction A:  $R_n = 1005 \text{ lbs}$  Reaction B:  $R_n = 1005 \text{ lbs}$   
Reaction B:  $R_n = 1005 \text{ lbs}$  Reaction B:  $R_n = 1005 \text{ lbs}$   
E.I.:  $EI = 3.15 \text{ in}^2 \cdot 3.15 \text{ in}^2$

**Controlling Moment:**  
8.75 Ft from left support of span 3 (Right Span)  
Created by combining all dead and live loads.

**Controlling Shear:**  
At left support of span 2 (Center Span)  
Created by combining all dead and live loads.

**Reactions with required sections:**  
E.I. 3082-6158-lb xE6  
Moment 379-lb  
Shear 1655



<b>JOIST DATA</b>		Center
Span Length	17.5	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	0	ft
Floor sheathing applied to top of joists-top of joists fully braced.		
Floor Duration Factor	1.00	

<b>JOIST LOADING</b>		Center
<b>Uniform Floor Loading</b>		
Live Load	LL =	40 psf
Dead Load	DL =	17 psf
Total Load	TL =	57 psf
TL Adj. For Joist Spacing wT =		76 plf

Project: Tso Addition

Location: **FJ-2**

Floor Joist

[2015 International Building Code(2015 NDS)]

12.0 FT @ 16 O.C.

TJI 110 / 11.875 - iLevel Trus Joist

Section Adequate By: 99.6%

Controlling Factor: End Reaction

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<b>DEFLECTIONS</b>		Center
Live Load	0.11	IN L/1304
Dead Load	0.05	in
Total Load	0.16	IN L/915
Live Load Deflection Criteria: L/480		Total Load Deflection Criteria: L/360

<b>REACTIONS</b>		A	B
Live Load	320	lb	320
Dead Load	136	lb	136
Total Load	456	lb	456
Bearing Length	1.75	in	3.50
Web Stiffeners	No		No

<b>SUPPORT LOADS</b>		A	B
Live Load	240	plf	240
Dead Load	102	plf	102
Total Load	342	plf	342

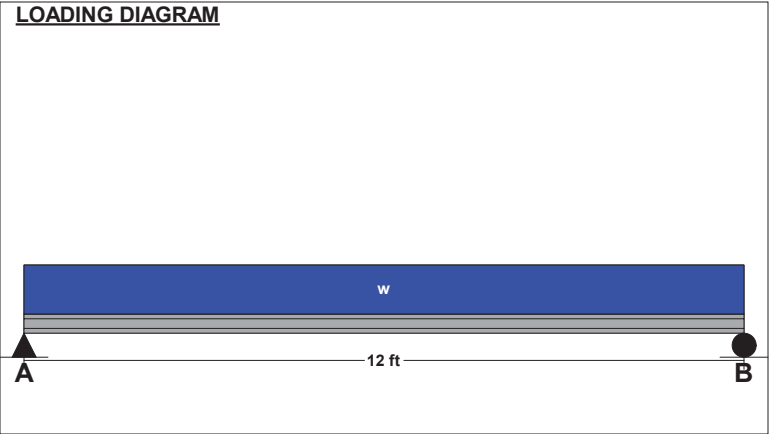
**I-JOIST PROPERTIES**  
TJI 110 / 11.875 - iLevel Trus Joist

Base Value Adjusted  
Moment Capacity:  $M_n = 1000$  ft-lb  
 $C_d = 1.00$   
Shear Stress:  $V_n = 1000$  lbs  
 $C_d = 1.00$   
Reaction A:  $R_n = 320$  lb  
Reaction B:  $R_n = 320$  lb  
E.I.:  $EI = 267$  in<sup>2</sup>

**Controlling Moment:**  
6.0 Ft from left support of span 3 (Right Span)  
Created by combining all dead and live loads.

**Controlling Shear:**  
At left support of span 2 (Center Span)  
Created by combining all dead and live loads.

**Reactions with required sections:**  
E.I. 1052-2678-lb xE6  
Moment 3160  
Shear 1560



<b>JOIST DATA</b>		Center
Span Length	12	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	0	ft
Floor sheathing applied to top of joists-top of joists fully braced.		
Floor Duration Factor	1.00	

<b>JOIST LOADING</b>		Center
<b>Uniform Floor Loading</b>		
Live Load	LL =	40 psf
Dead Load	DL =	17 psf
Total Load	TL =	57 psf
TL Adj. For Joist Spacing wT =	76	plf

Project: Tso Addition

Location: **FJ-3**

Floor Joist

[2015 International Building Code(2015 NDS)]

1.5 IN x 7.25 IN x 6.75 FT @ 16 O.C.

#2 - Douglas-Fir-Larch - Wet Use

Section Adequate By: 155.9%

Controlling Factor: Moment

Alex  
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of**DEFLECTIONS**

Center

Live Load	0.05	IN L/1487
Dead Load	0.01	in
Total Load	0.06	IN L/1275
Live Load Deflection Criteria:		L/480
Total Load Deflection Criteria:		L/360

**REACTIONS**

A B

Live Load	270 lb	270 lb
Dead Load	45 lb	45 lb
Total Load	315 lb	315 lb
Bearing Length	0.50 in	0.50 in

**SUPPORT LOADS**

A B

Live Load	203 plf	203 plf
Dead Load	34 plf	34 plf
Total Load	236 plf	236 plf

**MATERIAL PROPERTIES**

#2 - Douglas-Fir-Larch

	Base Values	Adjusted
Bending Stress:	Fb = 900 psi	Fb' = 1242 psi
	Cd=1.00 CF=1.20 Cr=1.15	
Shear Stress:	Fv = 180 psi	Fv' = 175 psi
	Cd=1.00 Cm=0.97	
Modulus of Elasticity:	E = 1600 ksi	E' = 1440 ksi
	Cm=0.90	
Comp. $\perp$ to Grain:	Fc $\perp$ = 625 psi	Fc $\perp$ ' = 419 psi
	Cm=0.67	

**Controlling Moment:** 532 ft-lb

3.38 Ft from left support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2

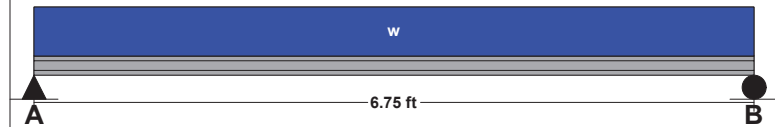
**Controlling Shear:** 315 lb

At left support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2

**Comparisons with required sections:**

	Req'd	Provided
Section Modulus:	5.14 in <sup>3</sup>	13.14 in <sup>3</sup>
Area (Shear):	2.71 in <sup>2</sup>	10.88 in <sup>2</sup>
Moment of Inertia (deflection):	15.37 in <sup>4</sup>	47.63 in <sup>4</sup>
Moment:	532 ft-lb	1360 ft-lb
Shear:	315 lb	1266 lb

**LOADING DIAGRAM****JOIST DATA**

Center

Span Length	6.75 ft
Unbraced Length-Top	0 ft
Unbraced Length-Bottom	0 ft
Floor sheathing applied to top of joists-top of joists fully braced.	
Floor Duration Factor	1.00

**JOIST LOADING****Uniform Floor Loading**

Center

Live Load	LL = 60 psf
Dead Load	DL = 10 psf
Total Load	TL = 70 psf
TL Adj. For Joist Spacing wT =	93.3 plf

Project: Tso Addition

Location: **FB-1**

Uniformly Loaded Floor Beam

[2015 International Building Code(2015 NDS)]

5.125 IN x 18.0 IN x 21.33 FT

24F-V4 - Visually Graded Western Species - Dry Use

Section Adequate By: 12.3%

Controlling Factor: Moment

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page  
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of**CAUTIONS**

The design dead load deflection exceeds the default maximum of 1/4" on spans (2).

**DEFLECTIONS**

Center

Live Load	0.61	IN	L/418
Dead Load	0.25	in	
Total Load	0.86	IN	L/296
Live Load Deflection Criteria: L/360    Total Load Deflection Criteria: L/240			

**REACTIONS**

A                  B

Live Load	6292	lb	6292	lb
Dead Load	2573	lb	2573	lb
Total Load	8865	lb	8865	lb
Bearing Length	2.66	in	2.66	in

**BEAM DATA**

Center

Span Length	21.33	ft
Unbraced Length-Top	0	ft
Floor Duration Factor	1.00	
Camber Adj. Factor	1.5	
Camber Required	0.38	
Notch Depth	0.00	

**MATERIAL PROPERTIES**

24F-V4 - Visually Graded Western Species

	Base Values	Adjusted
Bending Stress:	Fb = 2400 psi	Controlled by:
	Fb_cmpr = 1850 psi	Fb' = 2301 psi
	Cd=1.00 Cv=0.96	
Shear Stress:	Fv = 265 psi	Fv' = 265 psi
	Cd=1.00	
Modulus of Elasticity:	E = 1800 ksi	E' = 1800 ksi
Comp. $\perp$ to Grain:	Fc - $\perp$ = 650 psi	Fc - $\perp$ ' = 650 psi

**Controlling Moment:** 47274 ft-lb

10.665 ft from left support

Created by combining all dead and live loads.

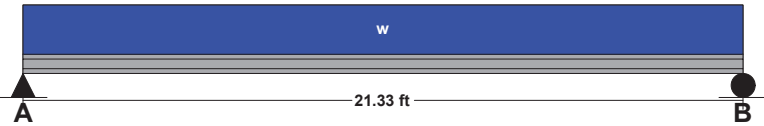
**Controlling Shear:** -8865 lb

At support.

Created by combining all dead and live loads.

**Comparisons with required sections:**

	Req'd	Provided
Section Modulus:	246.53 in3	276.75 in3
Area (Shear):	50.18 in2	92.25 in2
Moment of Inertia (deflection):	2146.77 in4	2490.75 in4
Moment:	47274 ft-lb	53068 ft-lb
Shear:	-8865 lb	16298 lb

**LOADING DIAGRAM****FLOOR LOADING**

	Side 1	Side 2
Floor Live Load	FLL = 40 psf	0 psf
Floor Dead Load	FDL = 15 psf	0 psf
Floor Tributary Width	FTW = 14.8 ft	0 ft
Wall Load	WALL = 0 plf	

**BEAM LOADING**

Beam Total Live Load:	wL = 590 plf
Beam Total Dead Load:	wD = 221 plf
Beam Self Weight:	BSW = 20 plf
Total Maximum Load:	wT = 831 plf

Project: Tso Addition

Location: **FB-2**

Multi-Loaded Multi-Span Beam

[2015 International Building Code(2015 NDS)]

5.25 IN x 11.875 IN x 11.6 FT

1.8E-2600F - APA EWS LVL Stress Classes

Section Adequate By: 74.5%

Controlling Factor: Deflection

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of**DEFLECTIONS**

Center

Live Load	0.11	IN L/1288
Dead Load	0.11	in
Total Load	0.22	IN L/628
Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360		

**REACTIONS**

A B

Live Load	2030 lb	2030 lb
Dead Load	2130 lb	2130 lb
Total Load	4160 lb	4160 lb
Bearing Length	1.13 in	1.13 in

**BEAM DATA**

Center

Span Length	11.6	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	11.6	ft
Live Load Duration Factor	1.00	
Notch Depth	0.00	

**MATERIAL PROPERTIES**

1.8E-2600F - APA EWS LVL Stress Classes

	Base Values	Adjusted
Bending Stress:	Fb = 2600 psi Cd=1.00 CF=1.00	Fb' = 2603 psi
Shear Stress:	Fv = 285 psi Cd=1.00	Fv' = 285 psi
Modulus of Elasticity:	E = 1800 ksi	E' = 1800 ksi
Comp. $\perp$ to Grain:	Fc - $\perp$ = 700 psi	Fc - $\perp$ ' = 700 psi

**Controlling Moment:** 12063 ft-lb

5.8 Ft from left support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2

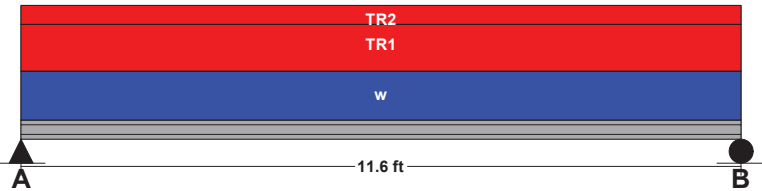
**Controlling Shear:** -4160 lb

12.0 Ft from left support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2

**Comparisons with required sections:**

	Req'd	Provided
Section Modulus:	55.6 in <sup>3</sup>	123.39 in <sup>3</sup>
Area (Shear):	21.89 in <sup>2</sup>	62.34 in <sup>2</sup>
Moment of Inertia (deflection):	419.73 in <sup>4</sup>	732.62 in <sup>4</sup>
Moment:	12063 ft-lb	26769 ft-lb
Shear:	-4160 lb	11845 lb

**LOADING DIAGRAM****UNIFORM LOADS**

Center

Uniform Live Load	0	plf
Uniform Dead Load	0	plf
Beam Self Weight	18	plf
Total Uniform Load	18	plf

**TRAPEZOIDAL LOADS - CENTER SPAN**

Load Number	One	Two
Left Live Load	350 plf	0 plf
Left Dead Load	149 plf	200 plf
Right Live Load	350 plf	0 plf
Right Dead Load	149 plf	200 plf
Load Start	0 ft	0 ft
Load End	11.6 ft	11.6 ft
Load Length	11.6 ft	11.6 ft



Project: Tso Addition

Location: **FB-3**

Multi-Loaded Multi-Span Beam

[2015 International Building Code(2015 NDS)]

5.25 IN x 11.875 IN x 14.75 FT

2.0E-2900F - APA EWS LVL Stress Classes

Section Adequate By: 60.6%

Controlling Factor: Deflection

Alex  
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of**DEFLECTIONS**

Center

Live Load	0.14	IN L/1296
Dead Load	0.17	in
Total Load	0.31	IN L/578
Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360		

**REACTIONS**

A

B

Live Load	1387 lb	1387 lb
Dead Load	1778 lb	1509 lb
Total Load	3165 lb	2896 lb
Bearing Length	0.80 in	0.74 in

**BEAM DATA**

Center

Span Length	14.75	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	14.75	ft
Live Load Duration Factor	1.00	
Notch Depth	0.00	

**MATERIAL PROPERTIES**

2.0E-2900F - APA EWS LVL Stress Classes

	Base Values	Adjusted
Bending Stress:	Fb = 2900 psi Cd=1.00 CF=1.00	Fb' = 2904 psi
Shear Stress:	Fv = 285 psi Cd=1.00	Fv' = 285 psi
Modulus of Elasticity:	E = 2000 ksi	E' = 2000 ksi
Comp. $\perp$ to Grain:	Fc - $\perp$ = 750 psi	Fc - $\perp$ ' = 750 psi

**Controlling Moment:** 11508 ft-lb

7.23 Ft from left support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2

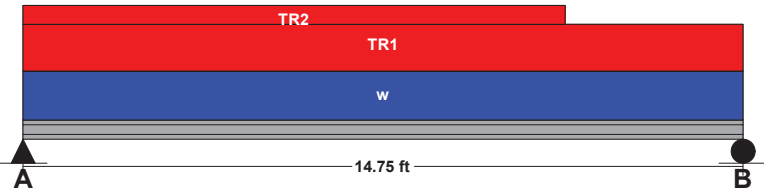
**Controlling Shear:** 3164 lb

At left support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2

**Comparisons with required sections:**

	Req'd	Provided
Section Modulus:	47.56 in <sup>3</sup>	123.39 in <sup>3</sup>
Area (Shear):	16.66 in <sup>2</sup>	62.34 in <sup>2</sup>
Moment of Inertia (deflection):	456.18 in <sup>4</sup>	732.62 in <sup>4</sup>
Moment:	11508 ft-lb	29858 ft-lb
Shear:	3164 lb	11845 lb

**LOADING DIAGRAM****UNIFORM LOADS**

Center

Uniform Live Load	0	plf
Uniform Dead Load	0	plf
Beam Self Weight	18	plf
Total Uniform Load	18	plf

**TRAPEZOIDAL LOADS - CENTER SPAN**

Load Number	One	Two
Left Live Load	188 plf	0 plf
Left Dead Load	130.9 plf	98 plf
Right Live Load	188 plf	0 plf
Right Dead Load	130.9 plf	98 plf
Load Start	0 ft	0 ft
Load End	14.75 ft	11.1 ft
Load Length	14.75 ft	11.1 ft

Project: Tso Addition

Location: **FB-4**

Roof Beam

[2015 International Building Code(2015 NDS)]

5.5 IN x 11.5 IN x 14.5 FT

#2 - Douglas-Fir-Larch - Wet Use

Section Adequate By: 22.8%

Controlling Factor: Moment

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StruCalc 9.0

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**DEFLECTIONS**

Center

Live Load	0.22	IN L/793
Dead Load	0.13	in
Total Load	0.35	IN L/504
Live Load Deflection Criteria: L/240 Total Load Deflection Criteria: L/180		

**REACTIONS**

	A	B
Live Load	1450 lb	1450 lb
Dead Load	833 lb	833 lb
Total Load	2283 lb	2283 lb
Bearing Length	0.99 in	0.99 in

**BEAM DATA**

Span Length	14.5	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	0	ft
Roof Pitch	4	:12
Roof Duration Factor	1.15	
Notch Depth	0.00	

**MATERIAL PROPERTIES**

#2 - Douglas-Fir-Larch

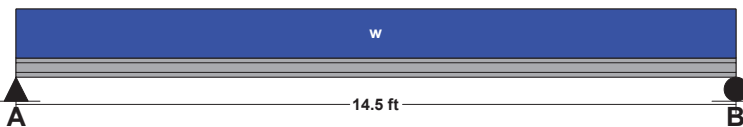
	Base Values	Adjusted
Bending Stress:	Fb = 875 psi <i>Cd=1.15 CF=1.00</i>	Fb' = 1006 psi
Shear Stress:	Fv = 170 psi <i>Cd=1.15</i>	Fv' = 196 psi
Modulus of Elasticity:	E = 1300 ksi	E' = 1300 ksi
Comp. $\perp$ to Grain:	Fc - $\perp$ = 625 psi <i>Cm=0.67</i>	Fc - $\perp$ ' = 419 psi

**Controlling Moment:** 8276 ft-lb  
7.25 ft from left support  
Created by combining all dead and live loads.

**Controlling Shear:** 2283 lb  
At support.  
Created by combining all dead and live loads.

Comparisons with required sections:	Req'd	Provided
Section Modulus:	98.7 in <sup>3</sup>	121.23 in <sup>3</sup>
Area (Shear):	17.52 in <sup>2</sup>	63.25 in <sup>2</sup>
Moment of Inertia (deflection):	249.2 in <sup>4</sup>	697.07 in <sup>4</sup>
Moment:	8276 ft-lb	10166 ft-lb
Shear:	2283 lb	8244 lb

**LOADING DIAGRAM**



**ROOF LOADING**

<b>Side One:</b>	
Roof Live Load: LL =	25 psf
Roof Dead Load: DL =	12 psf
Tributary Width: TW =	8 ft
<b>Side Two:</b>	
Roof Live Load: LL =	0 psf
Roof Dead Load: DL =	0 psf
Tributary Width: TW =	0 ft
Wall Load: WALL =	0 plf

**SLOPE/PITCH ADJUSTED LENGTHS AND LOADS**

Adjusted Beam Length:	Ladj =	14.5	ft
Beam Self Weight:	BSW =	14	plf
Beam Uniform Live Load:	wL =	200	plf
Beam Uniform Dead Load:	wD_adj =	115	plf
Total Uniform Load:	wT =	315	plf

**SEISMIC BASE SHEAR CALCULATIONS PER IBC 2018 (ASCE 7-16)**

Response Spectral Acc. (0.2 sec)  $S_s = 140.50\%g$  = 1.405g Figure 22-1 through 22-14  
 Response Spectral Acc. (1.0 sec)  $S_1 = 48.90\%g$  = 0.489g Figure 22-1 through 22-14

Soil Site Class **D** Table 20-3-1, Default = D

Site Coefficient  $F_a = 1.200$  Table 11.4-1

Site Coefficient  $F_v = 1.812$  Table 11.4-2

Max Considered Earthquake Acc.  $S_{MS} = F_a \cdot S_s$  = 1.686 (11.4-1)

Max Considered Earthquake Acc.  $S_{M1} = F_v \cdot S_1$  = 0.886 (11.4-2)

@ 5% Damped Design  $S_{DS} = 2/3(S_{MS})$  = 1.124 (11.4-3)

$S_{D1} = 2/3(S_{M1})$  = 0.591 (11.4-4)

Building Occupancy Categories **II, Standard** Table 1-1

**Design Category Consideration:** **Flexible Diaphragm** with dist. between seismic resisting system >40ft

Seismic Design Category for 0.1sec **D** Table 11.6-1

Seismic Design Category for 1.0sec **D** Table 11.6-2

$S_1 < .75g$  **NA** Section 11.6

Since  $T_a < .8T_s$  (see below), **SDC = D** **Control (exception of Section 11.6 does not apply)**

**Comply with Seismic Design Category D** **IRC, Seismic Design Category = D2** T-R301.2.2.1.1

**12.8 Equivalent lateral force procedure**

**A. BEARING WALL SYSTEMS** T-12.2-

**Seismic Force Resisting Systems** **13. Light-framed walls sheathed with wood structural panels rated for shear resistance or steel shee**

$C_s = 0.02$   $x = 0.75$  T-12.8-2

Building ht.  $H_n = 25.2$  ft Limited Building Height (ft) = **65**

$C_s = 1.400$  for  $S_{D1}$  of 0.591g Table 12.8-1

Approx Fundamental period,  $T_a = C_s(h_n)^x = 0.225$  12.8-7  $T_L = 6.000$  Sec

Calculated T shall not exceed  $\leq C_u \cdot T_a$  Use  $T = 0.225$  sec.

$0.8T_s = 0.8(S_{D1}/S_{DS}) = 0.420$  Control (exception of Section 11.6 does not apply)

**Is structure Regular &  $\leq 5$  stories?** **Yes** 12.8.1.3

Response Spectral Acc. (0.2 sec)  $S_s = 1.405g$  **Max  $S_s \leq 1.5g$**

$F_a = 1.20$

@ 5% Damped Design  $S_{DS} = 2/3(F_a \cdot S_s) = 1.124g$  (11.4-3)

Response Modification Coef.  $R = 6.5$  Table-12.2-1

Over Strength Factor  $\Omega_o = 2.5$  **foot note g**

Importance factor  $I = 1$  Table 11.5-1

Seismic Base Shear  $V = C_s W$

$C_s = \frac{S_{DS}}{R/I} = 0.173$  (12.8-2)

or need not to exceed,  $C_s = \frac{S_{D1}}{(R/I) \cdot T} = 0.404$  For  $T \leq T_L$  (12.8-3)

or  $C_s = \frac{S_{D1} \cdot T_L}{T^2(R/I)}$  N/A For  $T > T_L$  (12.8-4)

$C_s$  shall not be less than = 0.01 (12.8-5)

Min  $C_s = 0.5S_1/R$  N/A For  $S_1 \geq 0.6g$  (12.8-6)

Use  $C_s = 0.173$

**Design base shear  $V = 0.173 W$  Control**

**WIND FORCES CALCULATIONS PER IBC 2018 (ASCE 7-16)**

Ultimate wind speed = 97 MPH  
 Bldg. Classification = II  
 Exposure = C  
 $K_{zt} = 1.600$   
 Roof Pitch = 4.00:12  
 Mean Roof Height h = 25 ft

**CHAPTER 28-MWFRS (ENVELOPE PROCEDURE)**

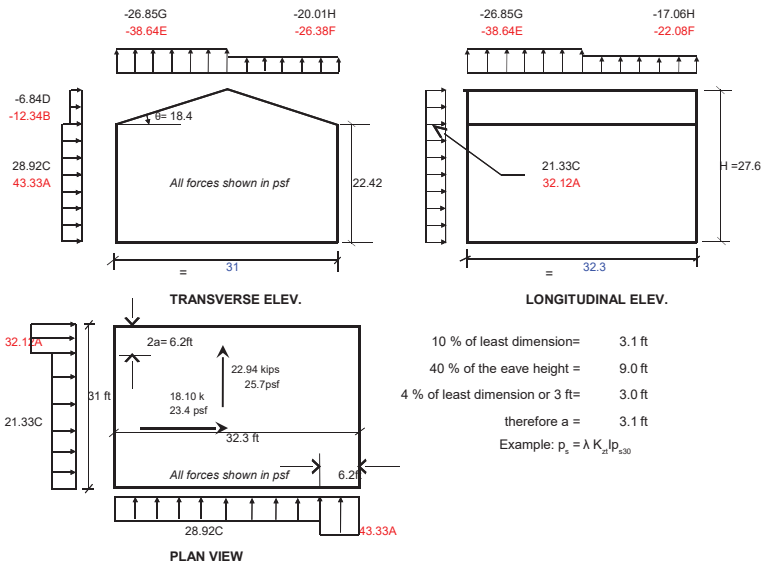


FIGURE 28.4-1, Main Wind Force System


**MWFRS**

Load Direction	Roof Angle	Horizontal Loads				Vertical Loads					
		End Zone		Interior zone		End Zone		Interior zone		Overhang	
		Wall (A)	Roof (B)	Wall (C)	Roof (D)	WW (E)	LW (F)	WW (G)	LW (H)	$E_{OH}$	$G_{OH}$
Transverse	18.4	43.33	-12.34	28.92	-6.84	-38.64	-26.38	-26.85	-20.01	-54.20	-42.40
Longitudinal	All	32.12	-16.81	21.33	-10.04	-38.64	-22.08	-26.85	-17.06	-54.2	-42.4

\* If roof pressure under horizontal loads is less than zero, use zero

Plus and minus signs signify pressures acting toward and away from projected surfaces, respectively.

For the design of the longitudinal MWFRS use  $\theta = 0^\circ$ , and locate the zone E/F, G/H boundary at the mid-length of the building


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**WIND FORCES:**

LOCATION	WIDTH	HEIGHT	INTERIOR PRESSURE	END ZONE PRESSURE		FORCE	SUBTOT
<b>Transverse Direction</b>							
END ZONE WIDTH	6.2	FT					
<b>ROOF</b>							
T.O. Roof to Parapet	32.3	0.0	-6.84	-12.34	=	0	
T.O. Roof TO MID	32.3	5.00	28.92	43.33	=	5563	
							5563
<b>5<sup>th</sup> FLOOR</b>							
MID TO FLOOR	32.3		28.92	43.33	=	0	
FLOOR TO MID	32.3		28.92	43.33	=	0	
							0
<b>4<sup>th</sup> FLOOR</b>							
MID TO FLOOR	32.3		28.92	43.33	=	0	
FLOOR TO MID	32.3		28.92	43.33	=	0	
							0
<b>3<sup>rd</sup> FLOOR</b>							
MID TO FLOOR	32.3		28.92	43.33	=	0	
FLOOR TO MID	32.3		28.92	43.33	=	0	
							0
<b>2<sup>nd</sup> FLOOR</b>							
MID TO FLOOR	32.3	5.00	28.92	43.33	=	5563	
FLOOR TO MID	32.3	5.00	28.92	43.33	=	5563	
							11126
TOTAL FOR WALL SHEAR:							<b>16.69 Kips</b>

**Longitudinal Direction**


<b>ROOF</b>							
T.O. Roof to Parapet	31	0.0	21.33	32.12	=	0	
T.O. Roof TO MID	31	5.00	21.33	32.12	=	3975	
							3975
<b>5<sup>th</sup> FLOOR</b>							
MID TO FLOOR	31	0.0	21.33	32.12	=	0	
FLOOR TO MID	31	0.0	21.33	32.12	=	0	
							0
<b>4<sup>th</sup> FLOOR</b>							
MID TO FLOOR	31	0.0	21.33	32.12	=	0	
FLOOR TO MID	31	0.0	21.33	32.12	=	0	
							0
<b>3<sup>rd</sup> FLOOR</b>							
MID TO FLOOR	31	0.00	21.33	32.12	=	0	
FLOOR TO MID	31	0.00	21.33	32.12	=	0	
							0
<b>2<sup>nd</sup> FLOOR</b>							
MID TO FLOOR	31	5.00	21.33	32.12	=	3975	
FLOOR TO MID	31	5.00	21.33	32.12	=	3975	
							7950
TOTAL FOR WALL SHEAR:							<b>11.93 Kips</b>

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DEAD LOAD WEIGHTS FOR SEISMIC FORCE CALCULATIONS:

Unit Roof Weight: 10 psf  
 Unit Floor Weight: 12 psf  
 Unit Exterior Wall Weight: 9 psf  
 Unit Interior Corridor Wall Weight: 0 psf  
 Unit Interior Party Wall Weight: 0 psf  
 Unit Interior Partition Wall Weight: 6.5 psf

LOCATION	LENGTH	HEIGHT	UNIT WT.	TOTAL WEIGHT	SUB TOTAL
<b>ROOF DIAPHRAGM</b>					
Roof	972	1	10	= 9720	
Ext. Wall Below	118	4.50	9	= 4779	psf
Corridor Wall Below	0		0	= 0	17
Party Wall Below	0		0	= 0	
Partition Wall Below	70	4.50	6.5	= 2048	
					16547
<b>FIFTH FLOOR DIAPHRAGM</b>					
Floor		1	12	= 0	
Ext. Wall Above			9	= 0	
Corridor Wall Above	0		0	= 0	
Party Wall Above	0		0	= 0	
Partition Wall Above			6.5	= 0	
Ext. Wall Below			9	= 0	psf
Corridor Wall Below	0		0	= 0	#DIV/0!
Party Wall Below			0	= 0	
Partition Wall Below			6.5	= 0	
					0
<b>FOURTH FLOOR DIAPHRAGM</b>					
Floor		1	12	= 0	
Ext. Wall Above			9	= 0	
Corridor Wall Above	0		0	= 0	
Party Wall Above	0		0	= 0	
Partition Wall Above			6.5	= 0	
Ext. Wall Below			9	= 0	psf
Corridor Wall Below	0		0	= 0	#DIV/0!
Party Wall Below			0	= 0	
Partition Wall Below			6.5	= 0	
					0
<b>THIRD FLOOR DIAPHRAGM</b>					
Floor		1	12	= 0	
Ext. Wall Above			9	= 0	
Corridor Wall Above			0	= 0	
Party Wall Above			0	= 0	
Partition Wall Above			6.5	= 0	
Ext. Wall Below			9	= 0	psf
Corridor Wall Below			0	= 0	#DIV/0!
Party Wall Below			0	= 0	
Partition Wall Below			6.5	= 0	
					0
<b>SECOND FLOOR DIAPHRAGM</b>					
Floor	972	1	12	= 11664	
Ext. Wall Above	118	4.50	9	= 4779	
Corridor Wall Above			0	= 0	
Party Wall Above			0	= 0	
Partition Wall Above	70	4.50	6.5	= 2048	
Ext. Wall Below	105	4.50	9	= 4253	psf
Corridor Wall Below	0		0	= 0	24
Party Wall Below			0	= 0	
Partition Wall Below	20	4.50	6.5	= 585	
					23329
STRUCTURE WEIGHT FOR BASE SHEAR TOTAL:				<b>39.9</b>	<b>Kips</b>

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**Vertical Seismic Distribution**


Cs = 0.17 W  
 W = 39.9 kips  
 V = 6.9 kips  
 Rho = 1

**Important:** It is assumed that the R value is the same for both directions

Floor	Story Height Hi (ft)	Total Height Ht (ft)	Story Weight Wi (kips)	Wi*Ht (k-ft)	N/S Direction		E/W Direction		Mot E (kip-ft)
					Story Force Fi (kips)	Story Shear E (kips)	Story Force Fi (kips)	Story Shear E (kips)	
Roof	9.00	18.00	16.5	298	4.0	<b>4.0</b>	4.0	<b>4.0</b>	<b>72.8</b>
5 <sup>th</sup>	0.00	9.00	0.0	0	0.0	<b>0.0</b>	0.0	<b>0.0</b>	<b>0</b>
4 <sup>th</sup>	0.00	9.00	0.0	0	0.0	<b>0.0</b>	0.0	<b>0.0</b>	<b>0</b>
3 <sup>rd</sup>	0.00	9.00	0.0	0	0.0	<b>0.0</b>	0.0	<b>0.0</b>	<b>0</b>
2 <sup>nd</sup>	9.00	9.00	23.3	210	2.9	<b>2.9</b>	2.9	<b>2.9</b>	<b>25.66</b>
			39.9	508	6.9	<b>6.90</b>		<b>6.90</b>	<b>98.46</b>

**Diaphragm Seismic Distribution**

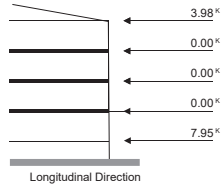
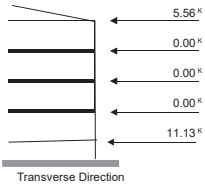
Floor	Story Height Hi (ft)	Total Height Ht (ft)	Story Weight Wi (kips)	Force Distribution Fx (kips)	Calculated Fpx (kips)	Max Fpx (kips)	Min Fpx (kips)	Governing Fpx (kips)	Transverse Fpx (plf)	Longitudinal Fpx (plf)
Roof	9.00	18.00	16.5	4.0	4.0	7.4	3.7	<b>4.0</b>	<b>129</b>	<b>134</b>
5 <sup>th</sup>	0.00	9.00	0.0	0.0	0.0	0.0	0.0	<b>0.0</b>	<b>#DIV/0!</b>	<b>#DIV/0!</b>
4 <sup>th</sup>	0.00	9.00	0.0	0.0	0.0	0.0	0.0	<b>0.0</b>	<b>#DIV/0!</b>	<b>#DIV/0!</b>
3 <sup>rd</sup>	0.00	9.00	0.0	0.0	0.0	0.0	0.0	<b>0.0</b>	<b>#DIV/0!</b>	<b>#DIV/0!</b>
2 <sup>nd</sup>	9.00	9.00	23.3	2.9	4.0	10.5	5.2	<b>5.2</b>	<b>5.2</b>	<b>5.2</b>
			39.9	6.9						

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Lateral Forces Summary

Level	Wind (Trans.) (kips)	Wind (Long.) (kips)	Seismic (Trans.) (kips)	Seismic (Long.) (kips)
Roof	5.56	3.98	4.04	4.04
Fifth	0.00	0.00	0.00	0.00
Fourth	0.00	0.00	0.00	0.00
Third	0.00	0.00	0.00	0.00
Second	11.13	7.95	2.85	2.85
Total	16.69	11.93	6.90	6.90

**Controlling:**  
 Transverse - **Wind**  
 Longitudinal - **Wind**





SECOND STORY

Shearwall forces -Transverse Direction

Story shear(kips) = 5.56 (WIND CONTROLS) Accumulated shear(kips)= 5.56  
 Story height (ft) = 9.00  
 Floor depth (ft) = 1.00  
 Total Width(Ft) = 31.00

SEG- SEGMENTAL SHEARWALL METHOD  
 PERF = PERFORATED SHEARWALL METHOD  
 FTM = SHEAR TRANSFER METHOD

Story	Wall	Method	Wall D(ft)	Σ Opening Width (ft)	FTM Opening Width (ft)	FTM Opening Height (ft)	PERE/FTM Wall Width(ft)	PERF Co	Trib.Width (ft)	Story DL(klf)	Sheathing Ratio	h/w Ratio	%Sharing	Story V(kips)	Sum V(kips)	Sum DL(klf)	Wall Shear (plf)	Sum OTM(k-ft)	RM (k-ft)	Resultant HD(kips)	FTM Bound. Shear(k)	Force at Opening(k)
2	T1	PERF	31.0	14.10			16.90	0.8	11.50	0.16	0.55	0.47	1.00	2.06	2.06	0.16	153	18.56	76.40	-3.71	0.00	0.00
2	T2	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T3	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T4	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T5	SEG	11.8						19.50	0.16	1.00	0.68	1.00	3.50	3.50	0.16	296	31.48	11.07	1.82	0.00	0.00
2	T6	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T7	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T8	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T9	SEG	0.0								1.00	8000.00	1.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
2	T10	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T11	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T12	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T13	SEG	0.0								1.00	8000.00	1.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
2	T14	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T15	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T16	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T17	SEG	0.0								1.00	8000.00	1.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
2	T18	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T19	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T20	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T21	SEG	0.0								1.00	8000.00	1.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
2	T22	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T23	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T24	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T25	SEG	0.0								1.00	8000.00	1.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
2	T26	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T27	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T28	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T29	SEG	0.0								1.00	8000.00	1.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
2	T30	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T31	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
2	T32	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
	Sum		42.8		0.00				31.00					5.56	5.56							

FIRST STORY

Shearwall forces -Transverse Direction

Story shear(kips) = 11.13  
 Story height (ft) = 9.00  
 Floor depth (ft) = 1.00  
 Total Width(Ft) = 31.00

Accumulated shear(kips)= 16.69

SEG- SEGMENTAL SHEARWALL METHOD  
 PERF - PERFORATED SHEARWALL METHOD  
 FTM = SHEAR TRANSFER METHOD

Story	Wall	Method	Wall D(ft)	Σ Opening Width (ft)	FTM Opening Width (ft)	FTM Opening Height (ft)	PERE/FTM Wall Width(ft)	PERF Co	Trib.Width (ft)	Story DL(klf)	Sheathing Ratio	h/w Ratio	%Sharing	Story V(kips)	Sum V(kips)	Sum DL(klf)	Wall Shear (plf)	Sum OTM(k-ft)	RM (k-ft)	Resultant HD(kips)	FTM Bound. Shear(k)	Force at Opening(k)
1	T1	SEG	2.0						11.00	0.20	1.00	4.00	0.50	1.97	2.96	0.35	2961	45.21	0.71	22.29	0.00	0.00
1	T2	SEG	2.0						11.00	0.20	1.00	4.00	0.50	1.97	2.96	0.35	2961	45.21	0.71	22.29	0.00	0.00
1	T3	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T4	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T5	SEG	31.0						20.00	0.20	1.00	0.26	1.00	7.18	10.77	0.35	347	128.39	170.10	-4.80	0.00	0.00
1	T6	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T7	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T8	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T9	SEG	0.0								1.00	8000.00	1.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
1	T10	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T11	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T12	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T13	SEG	0.0								1.00	8000.00	1.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
1	T14	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T15	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T16	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T17	SEG	0.0								1.00	8000.00	1.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
1	T18	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T19	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T20	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T21	SEG	0.0								1.00	8000.00	1.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
1	T22	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T23	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T24	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T25	SEG	0.0								1.00	8000.00	1.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
1	T26	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T27	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T28	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T29	SEG	0.0								1.00	8000.00	1.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
1	T30	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T31	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	T32	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
	Sum		35.0		0.00				31.00					11.13	16.69							

**SECOND STORY**  
**Shearwall forces -Longitudinal Direction**

Story shear(kips) = 3.98  
 Story height (ft) = 9.00  
 Floor depth (ft) = 1.00  
 Total Width(Ft) = 32.30

Accumulated shear(kips)= 3.98

SEG- SEGMENTAL SHEARWALL METHOD  
 PERF = PERFORATED SHEARWALL METHOD  
 FTM = SHEAR TRANSFER METHOD

Story	Wall	Method	Wall D(ft)	Σ Opening Width (ft)	FTM Opening Width (ft)	FTM Opening Height (ft)	PERE/FTM Wall Width(ft)	PERF Co	Trib.Width (ft)	Story DL(klf)	Sheathing Ratio	h/w Ratio	%Sharing	Story V(kips)	Sum V(kips)	Sum DL(klf)	Wall Shear (plf)	Sum OTM(k-ft)	RM (k-ft)	Resultant HD(kips)	FTM Bound. Shear(k)	Force at Opening(k)
1	L1	SEG	32.3						16.15	0.25	1.00	0.25	1.00	1.99	1.99	0.25	62	17.91	130.13	-3.07	0.00	0.00
1	L2	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L3	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L4	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L5	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L6	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L7	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L8	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L9	SEG	22.33						16.15	0.25	1.00	0.36	1.00	1.99	1.99	0.25	89	17.91	62.08	-1.70	0.00	0.00
1	L10	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L11	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L12	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L13	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L14	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L15	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L16	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L17	SEG	0.0								1.00	8000.00	1.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
1	L18	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L19	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L20	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L21	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L22	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L23	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L24	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L25	SEG	0.0								1.00	8000.00	1.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
1	L26	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L27	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L28	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L29	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L30	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L31	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L32	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
	Sum		54.7		0.00				32.30					3.98	3.98							

**FIRST STORY**

**Shearwall forces -Longitudinal Direction**

Story shear(kips) = 7.95  
 Story height (ft) = 9.00  
 Floor depth (ft) = 1.00  
 Total Width(Ft) = 32.30

Accumulated shear(kips)= 11.93

SEG= SEGMENTAL SHEARWALL METHOD  
 PERF = PERFORATED SHEARWALL METHOD  
 FTM = SHEAR TRANSFER METHOD

Story	Wall	Method	Wall D(ft)	Σ Opening Width (ft)	FTM Opening Width (ft)	FTM Opening Height (ft)	PERE/FTM Wall Width(ft)	PERF Co	Trib.Width (ft)	Story DL(klf)	Sheathing Ratio	h/w Ratio	%Sharing	Story V(kips)	Sum V(kips)	Sum DL(klf)	Wall Shear (plf)	Sum OTM(k-ft)	RM (k-ft)	Resultant HD(kips)	FTM Bound. Shear(k)	Force at Opening(k)
1	L1	SEG	17.00						16.15	0.25	1.00	0.47	1.00	3.98	5.97	0.50	351	71.60	71.96	0.40	0.00	0.00
1	L2	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L3	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L4	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L5	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L6	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L7	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L8	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L9	SEG	22.33						16.15	0.25	1.00	0.36	1.00	3.98	5.97	0.50	267	71.60	124.16	-1.80	0.00	0.00
1	L10	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L11	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L12	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L13	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L14	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L15	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L16	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L17	SEG	0.00								1.00	8000.00	1.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
1	L18	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L19	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L20	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L21	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L22	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L23	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L24	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L25	SEG	0.0								1.00	8000.00	1.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00
1	L26	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L27	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L28	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L29	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L30	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L31	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
1	L32	SEG									1.00	#DIV/0!	0.00	0.00	0.00	0.00	#DIV/0!	0.00	0.00	#DIV/0!	#DIV/0!	0.00
Sum			39.3		0.00				32.30					7.95	11.93							

## SHEARWALL, DIAPHRAGM, STRAP AND HOLDOWN CAPACITY TABLE PER IBC 2012

PLYWOOD SHEATHED SHEARWALL	LRFD CAPACITY (SEISMIC/WIND)	COMMENT
SW6 (15/32" PLYWOOD WITH 10d AT 6" AT EDGE, 10d AT 12" FIELD NAILING)	496 PLF/ 696 PLF	SDPWS TABLE 4.3A
SW4 (15/32" PLYWOOD WITH 10d AT 4" AT EDGE, 10d AT 12" FIELD NAILING)	736 PLF/ 1032 PLF	MULTIPLY VALUES BY TWO IF SHEATHING
SW3 (15/32" PLYWOOD WITH 10d AT 3" AT EDGE, 10d AT 12" FIELD NAILING)	960 PLF/ 1344PLF	APPLIED ON BOTH SIDES
SW2 (15/32" PLYWOOD WITH 10d AT 2" AT EDGE, 10d AT 12" FIELD NAILING)	1232 PLF/ 1724 PLF	
UNBLOCKED FLOOR DIAPHRAGM	LRFD CAPACITY (SEISMIC/WIND)	COMMENT
15/32" PLYWOOD WITH 8d AT 6" AT EDGE, 8d AT 12" FIELD NAILING	368 PLF/ 516 PLF	SDPWS TABLE 4.2B
15/32" PLYWOOD WITH 10d AT 6" AT EDGE, 10d AT 12" FIELD NAILING	408 PLF/ 572 PLF	
19/32" PLYWOOD WITH 10d AT 6" AT EDGE, 10d AT 12" FIELD NAILING	456 PLF/ 640 PLF	
SIMPSON'S FLOOR STRAP	LRFD CAPACITY (SEISMIC/WIND)	COMMENT
CS16	1916 LBS/ 2190 LBS	12" END LENGTH
CS16	2363 LBS/ 2700 LBS	14" END LENGTH
CS14	3487 LBS/ 3985 LBS	20" END LENGTH
CMSTC16	6236 LBS/ 7336 LBS	26" END LENGTH
CMSTC14	9086 LBS/ 10384 LBS	36" END LENGTH
SIMPSON'S HOLDOWN	LRFD CAPACITY (SEISMIC/WIND)	COMMENT
HDU2	4305 LBS/ 4920 LBS	
HDU4	6391 LBS/ 7304 LBS	
HDU5	7905 LBS/ 9032 LBS	
..	8372 LBS/ 9568 LBS	
LSTD8/ LSTD8RJ AT 6" STEMWALL	2730 LBS/ 3120 LBS	CRACKED CONCRETE (CORNER CONDITION)
STHD10/ STH10RJ AT 6" STEMWALL	3700 LBS/ 4224 LBS	CRACKED CONCRETE (CORNER CONDITION)
STHD14/ STHD14RJ AT 6" STEMWALL	5173 LBS/ 5912 LBS	CRACKED CONCRETE (CORNER CONDITION)
LSTD8/ LSTD8RJ AT 8" STEMWALL	2730 LBS/ 3120 LBS	CRACKED CONCRETE (CORNER CONDITION)
STHD10/ STH10RJ AT 8" STEMWALL	4116 LBS/ 4700 LBS	CRACKED CONCRETE (CORNER CONDITION)
STHD14/ STHD14RJ AT 8" STEMWALL	5340 LBS/ 6100 LBS	CRACKED CONCRETE (CORNER CONDITION)
SIMPSON'S ANCHOR BOLT FOR SHEARWALL HOLDOWNS	LRFD CAPACITY (SEISMIC/WIND)	COMMENT
SSTB16 (5/8" DIAMETER, 12 5/8" MIN. EMBED., 6" STEMWALL)	3570 LBS/ 5776 LBS	2500 PSI MIN. CONCRETE (CORNER CONDITION)
SSTB20 (5/8" DIAMETER, 16 5/8" MIN. EMBED., 6" STEMWALL)	4403 LBS/ 6464 LBS	1 3/4" MIN. EDGE DISTANCE
SB 5/8"X24 (5/8" DIAMETER, 18" MIN. EMBED., 6" STEMWALL)	8022 LBS/ 10680 LBS	
SB 7/8"X24 (7/8" DIAMETER, 18" MIN. EMBED., 8" STEMWALL)	10997 LBS/ 14968 LBS	
SB 1"X30 (1" DIAMETER, 24" MIN. EMBED., 8" STEMWALL)	11640 LBS/ 15848 LBS	

**TABLE A2—ALLOWABLE ASD IN-PLANE SHEAR FOR STANDARD APPLICATION STRONG-WALL WOOD SHEARWALL (WSW) ON CONCRETE FOUNDATION**

Strong-Wall Wood Shearwall Model	Allow. Vertical Load, P (lb.)	2,500 psi Concrete						3,000 psi Concrete					
		Seismic			Wind			Seismic			Wind		
		Allow. ASD Shear Load, V (lb.)	Drift at Allow. Shear, Δ (in.)	Anchor Tension at Allow. Shear, T (lb.)	Allow. ASD Shear, V (lb.)	Drift at Allow. Shear, Δ (in.)	Anchor Tension at Allow. Shear, T (lb.)	Allow. ASD Shear, V (lb.)	Drift at Allow. Shear, Δ (in.)	Anchor Tension at Allow. Shear, T (lb.)	Allow. ASD Shear, V (lb.)	Drift at Allow. Shear, Δ (in.)	Anchor Tension at Allow. Shear, T (lb.)
WSW12x7	1,000	1,065	0.31	10,285	1,380	0.43	13,375	1,065	0.31	10,285	1,380	0.43	13,375
	4,000	1,065	0.31	10,285	1,380	0.43	13,375	1,065	0.31	10,285	1,380	0.43	13,375
	7,500	1,065	0.31	10,285	1,380	0.43	13,370	1,065	0.31	10,285	1,380	0.43	13,375
WSW18x7	1,000	2,475	0.31	13,865	2,980	0.40	16,675	2,475	0.31	13,865	3,225	0.43	18,040
	4,000	2,475	0.31	13,865	2,710	0.36	15,160	2,475	0.31	13,865	3,225	0.43	18,040
	7,500	2,475	0.31	13,865	2,395	0.32	13,395	2,475	0.31	13,865	2,910	0.39	16,280
WSW24x7	1,000	5,515	0.29	22,710	5,515	0.32	22,710	5,515	0.29	22,710	5,515	0.32	22,710
	4,000	5,515	0.29	22,710	5,400	0.31	22,240	5,515	0.29	22,710	5,515	0.32	22,710
	7,500	5,515	0.29	22,710	4,950	0.29	20,390	5,515	0.29	22,710	5,515	0.32	22,710
WSW12x8	1,000	960	0.39	11,125	1,245	0.53	14,420	960	0.39	11,125	1,245	0.53	14,420
	4,000	960	0.39	11,125	1,245	0.53	14,420	960	0.39	11,125	1,245	0.53	14,420
	7,500	960	0.39	11,125	1,155	0.49	13,370	960	0.39	11,125	1,245	0.53	14,420
WSW18x8	1,000	2,430	0.39	16,245	2,490	0.42	16,675	2,430	0.39	16,245	2,925	0.50	19,560
	4,000	2,430	0.39	16,245	2,265	0.38	15,160	2,430	0.39	16,245	2,695	0.46	18,045
	7,500	2,430	0.39	16,245	2,000	0.34	13,395	2,430	0.39	16,245	2,435	0.41	16,280
WSW24x8	1,000	4,945	0.37	24,355	4,840	0.40	23,830	4,945	0.37	24,355	5,515	0.45	27,150
	4,000	4,945	0.37	24,355	4,515	0.37	22,240	4,945	0.37	24,355	5,360	0.44	26,395
	7,500	4,945	0.37	24,355	4,140	0.34	20,390	4,945	0.37	24,355	4,985	0.41	24,540
WSW12x9	1,000	790	0.43	10,310	1,020	0.60	13,335	790	0.43	10,310	1,020	0.60	13,335
	4,000	790	0.43	10,310	1,020	0.60	13,335	790	0.43	10,310	1,020	0.60	13,335
	7,500	790	0.43	10,310	1,020	0.60	13,335	790	0.43	10,310	1,020	0.60	13,335
WSW18x9	1,000	1,920	0.43	14,505	2,210	0.53	16,675	1,920	0.43	14,505	2,515	0.60	18,980
	4,000	1,920	0.43	14,505	2,010	0.48	15,160	1,920	0.43	14,505	2,390	0.57	18,045
	7,500	1,920	0.43	14,505	1,775	0.42	13,395	1,920	0.43	14,505	2,155	0.51	16,280
WSW24x9	1,000	4,190	0.43	23,275	4,290	0.46	23,830	4,190	0.43	23,275	5,035	0.54	27,985
	4,000	4,190	0.43	23,275	4,000	0.43	22,240	4,190	0.43	23,275	4,750	0.51	26,395
	7,500	4,190	0.43	23,275	3,670	0.40	20,390	4,190	0.43	23,275	4,415	0.48	24,540
WSW12x10	1,000	630	0.50	9,175	810	0.67	11,810	630	0.50	9,175	810	0.67	11,810
	4,000	630	0.50	9,175	810	0.67	11,810	630	0.50	9,175	810	0.67	11,810
	7,500	630	0.50	9,175	810	0.67	11,810	630	0.50	9,175	810	0.67	11,810
WSW18x10	1,000	1,715	0.49	14,440	1,980	0.59	16,675	1,715	0.49	14,440	2,225	0.67	18,715
	4,000	1,715	0.49	14,440	1,800	0.54	15,160	1,715	0.49	14,440	2,145	0.64	18,045
	7,500	1,715	0.49	14,440	1,590	0.48	13,395	1,715	0.49	14,440	1,935	0.58	16,280
WSW24x10	1,000	3,675	0.48	22,740	3,850	0.54	23,830	3,675	0.48	22,740	4,520	0.63	27,985
	4,000	3,675	0.48	22,740	3,590	0.50	22,240	3,675	0.48	22,740	4,265	0.60	26,395
	7,500	3,675	0.48	22,740	3,295	0.46	20,390	3,675	0.48	22,740	3,965	0.55	24,540
WSW12x11	1,000	575	0.55	9,190	735	0.73	11,810	575	0.55	9,190	735	0.73	11,810
	4,000	575	0.55	9,190	735	0.73	11,810	575	0.55	9,190	735	0.73	11,810
	7,500	575	0.55	9,190	735	0.73	11,810	575	0.55	9,190	735	0.73	11,810
WSW18x11	1,000	1,510	0.53	14,010	1,800	0.67	16,675	1,510	0.53	14,010	1,975	0.73	18,335
	4,000	1,510	0.53	14,010	1,635	0.61	15,160	1,510	0.53	14,010	1,945	0.72	18,045
	7,500	1,510	0.53	14,010	1,445	0.54	13,395	1,510	0.53	14,010	1,755	0.65	16,280
WSW24x11	1,000	3,295	0.53	22,485	3,490	0.58	23,830	3,295	0.53	22,485	4,100	0.69	27,985
	4,000	3,295	0.53	22,485	3,260	0.55	22,240	3,295	0.53	22,485	3,865	0.65	26,395
	7,500	3,295	0.53	22,485	2,985	0.50	20,390	3,295	0.53	22,485	3,595	0.60	24,540
WSW12x12	1,000	485	0.62	8,540	625	0.80	10,915	485	0.62	8,540	625	0.80	10,915
	4,000	485	0.62	8,540	625	0.80	10,915	485	0.62	8,540	625	0.80	10,915
	7,500	485	0.62	8,540	625	0.80	10,915	485	0.62	8,540	625	0.80	10,915
WSW18x12	1,000	1,340	0.58	13,580	1,645	0.75	16,675	1,340	0.58	13,580	1,755	0.80	17,770
	4,000	1,340	0.58	13,580	1,495	0.68	15,160	1,340	0.58	13,580	1,755	0.80	17,770
	7,500	1,340	0.58	13,580	1,320	0.60	13,395	1,340	0.58	13,580	1,605	0.73	16,280
WSW24x12	1,000	2,920	0.58	21,795	3,195	0.66	23,830	2,920	0.58	21,795	3,750	0.77	27,985
	4,000	2,920	0.58	21,795	2,980	0.61	22,240	2,920	0.58	21,795	3,540	0.73	26,395
	7,500	2,920	0.58	21,795	2,735	0.56	20,390	2,920	0.58	21,795	3,290	0.68	24,540

See footnotes on next page.