

CENTRAL LOFTS

CALCULATION FOR PERMIT REVISION

PORTLAND, OREGON
(JONES ARCHITECTURE)



NOVEMBER 16, 2020
JOB NUMBER: 16-T149



FROELICH
ENGINEERS

*** LIMITATIONS ***

ENGINEER WAS RETAINED IN A LIMITED CAPACITY FOR THIS PROJECT.
DESIGN IS BASED UPON INFORMATION PROVIDED BY THE CLIENT, WHO IS SOLELY
RESPONSIBLE FOR ACCURACY OF SAME. NO RESPONSIBILITY AND / OR
LIABILITY IS ASSUMED BY, OR IS TO BE ASSIGNED TO THE ENGINEER
FOR ITEMS BEYOND THAT SHOWN ON THESE SHEETS.

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☐ DENVER OFFICE	940 Kimbark St., Suite # 3 Longmont, Colorado 80501	720-799-1001



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Scope of Work

Client: Jones Architecture
Project: Central Lofts
Project Number: 16-T149
Date: November 16, 2020
By: TWN

Permit Revisions:

The following elements were revised on this project at the roof level:

- Stairs to roof and stair structure above the main roof have been removed.
- Roof decks and roof access have been removed.
- Roof hatch and ships ladder have been added.
- New door at level one. Shortens shear wall on grid D

Roof beams have been revised for reduced load since roof access and decks have gone away. Beams at ships ladder have been added. Due to reduced loads connection details 8/S700 and 9/S700 are no longer applicable and have been removed.

Also included are the following items:

- Updated calcs at exposed GL columns. Column types, C7, C8 and C9 have been upsized for revision to 1-hour fire resistance in Wood Works calc.
- Detail 39/S602 added for correct connection by grid A-8 at 2nd floor.

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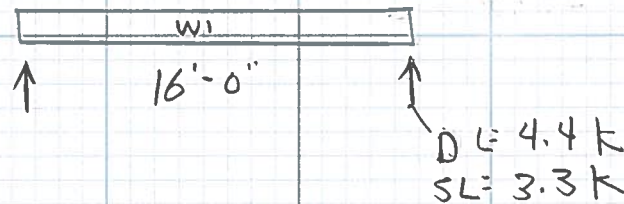
DATE:

BY:

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R-B1.

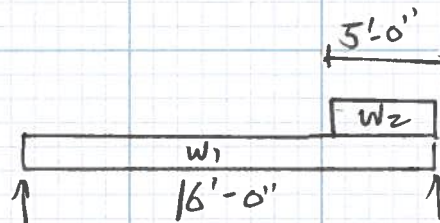
1-hr fire-rated



$$w_1: DL = 16'(30 \text{ psf}) = 480 \text{ plf}$$
$$SL = 16'(25 \text{ psf}) = 400 \text{ plf}$$

R-B2

1-hr fire rated



$$w_1: DL = 16'(30 \text{ psf}) = 480 \text{ plf}$$
$$SL = 16'(25 \text{ psf}) = 400 \text{ plf}$$

$$w_2: \text{Mech. Unit: max Wt} = 1800 \text{ lbs}$$
$$= 215 \text{ plf}$$



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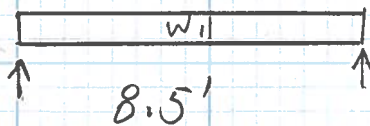
Central Lofts
8/12/2020

Roof VE

Roof Beams @ Ships Ladder opening

R-B3

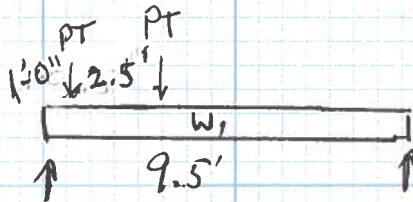
5 1/2 x 9" GL
Fire Rated



$$w_1: DL = 4' (29 \text{ psf}) = 116 \text{ plf}$$
$$SL = 4' (25 \text{ psf}) = 100 \text{ plf}$$

R-B4

5 1/2 x 9" GL
fire rated.



$$w_1: DL = 2' (29 \text{ psf}) = 58 \text{ plf}$$
$$SL = 2' (25 \text{ psf}) = 50 \text{ plf}$$

PT1: R-B1.

$$DL = 493 \text{ lbs.}$$

$$SL = 425 \text{ lbs.}$$

$$PT2: DL = 125 \text{ lbs.}$$

$$SL = 107 \text{ lbs.}$$



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Nov. 16, 2020 13:04

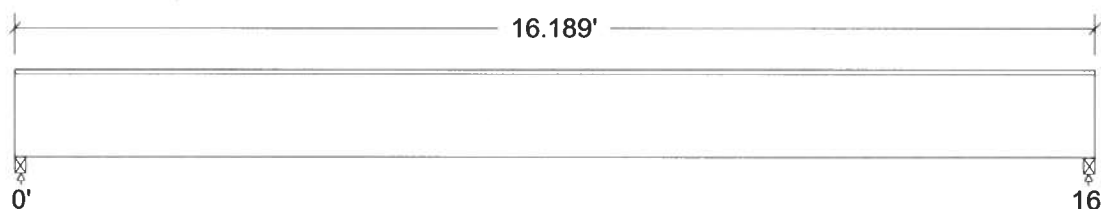
R-B1.wwb

Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 1)

Loads:

Load	Type	Distribution	Pat- tern	Location [ft] Start End	Magnitude Start End	Unit
Load1	Dead	Full UDL			480.0	plf
Load3	Snow	Full UDL			400.0	plf
Self-weight	Dead	Full UDL			23.3	plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :

Unfactored:			
Dead	4072		4072
Snow	3238		3238
Factored:			
Total	7310		7310
Bearing:			
Capacity			
Beam	8775		8775
Support	8437		8437
Des ratio			
Beam	0.83		0.83
Support	0.87		0.87
Load comb	#2		#2
Length	2.00		2.00
Min req'd	1.73**		1.73**
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.00		1.00
Fcp sup	625		625

**Minimum bearing length governed by the required width of the supporting member.

Glulam-Unbalan., West Species, 24F-1.8E WS, 6-3/4"x15"

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 16.19'; Clear span: 15.856'; Volume = 11.4 cu.ft.; 10 laminations, 6-3/4" maximum width,

Lateral support: top = continuous, bottom = at supports;

Exposed to fire on both d-faces and one b-face;

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 89	Fv' = 305	psi	fv/Fv' = 0.29
Bending(+)	fb = 1370	Fb' = 2698	psi	fb/Fb' = 0.51
Live Defl'n	0.17 = < L/999	0.53 = L/360	in	0.32
Total Defl'n	0.39 = L/492	0.80 = L/240	in	0.49
Fire				
Shear	fv = 222	Fv' = 729	psi	fv/Fv' = 0.31
Bending(+)	fb = 3792	Fb' = 6687	psi	fb/Fb' = 0.57

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrr	Notes	Cn*Cvr	LC#
Fv'	265	1.15	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	2400	1.15	1.00	1.00	1.000	0.978	-	-	1.00	1.00	-	2
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million	-	1.00	1.00	-	-	-	-	1.00	-	-	2
Eminy'	0.85 million	-	1.00	1.00	-	-	-	-	1.00	-	-	2
Fv' (f)	265	-	-	-	-	-	-	-	1.00	1.00	1.00	4
Fb'+ (f)	2400	-	-	-	1.000	0.978	-	-	-	-	-	4

CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = D+S

Bending(+): LC #2 = D+S

Deflection: LC #2 = D+S (live)

LC #2 = D+S (total)

Bearing : Support 1 - LC #2 = D+S

Support 2 - LC #2 = D+S

Shear : LC #4 = D+S (fire)

Bending(+): LC #4 = D+S (fire)

D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake f=fire

All LC's are listed in the Analysis output

Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.2

CALCULATIONS:

V max = 7226, V design = 6032 lbs; M(+) = 28906 lbs-ft

EI = 3417.13e06 lb-in²

"Live" deflection is due to all non-dead loads (live, wind, snow...)

Total deflection = 1.0 dead + "live"

Fire: Required resistance = 1 h; Char depth = 1.80 in.

Residual section = 3.15" x 13.20"

Adjustment factors: Fb x 2.85, Fv x 2.75, FbE x 2.03

Design Notes:

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2018), the National Design Specification (NDS 2018), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012
4. GLULAM: bxd = actual breadth x actual depth.
5. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
6. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).



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Nov. 16, 2020 13:03

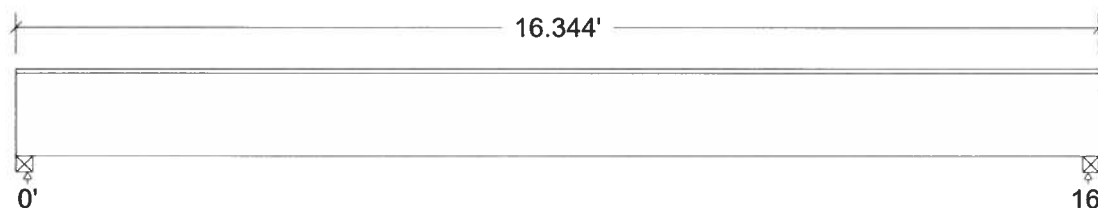
R-B2.wwb

Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 1)

Loads:

Load	Type	Distribution	Pat- tern	Location [ft] Start End	Magnitude Start End	Unit
Load1	Dead	Full UDL			480.0	plf
Load3	Snow	Full UDL			400.0	plf
Load4	Dead	Partial UDL		11.00 16.00	215.0 215.0	plf
Self-weight	Dead	Full UDL			23.3	plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :

Unfactored:			
Dead	4290		5003
Snow	3270		3267
Factored:			
Total	7561		8270
Bearing:			
Capacity			
Beam	13162		13162
Support	12656		12656
Des ratio			
Beam	0.57		0.63
Support	0.60		0.65
Load comb	#2		#2
Length	3.00		3.00
Min req'd	1.79**		1.96**
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.00		1.00
Fcp sup	625		625

**Minimum bearing length governed by the required width of the supporting member.

Glulam-Unbalan., West Species, 24F-1.8E WS, 6-3/4"x15"

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 16.34'; Clear span: 15.844'; Volume = 11.5 cu.ft.; 10 laminations, 6-3/4" maximum width,

Lateral support: top = continuous, bottom = at supports;

Exposed to fire on both d-faces and one b-face;

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 99	Fv' = 305	psi	fv/Fv' = 0.32
Bending(+)	fb = 1439	Fb' = 2698	psi	fb/Fb' = 0.53
Live Defl'n	0.17 = < L/999	0.53 = L/360	in	0.32
Total Defl'n	0.53 = L/361	0.80 = L/240	in	0.66
Fire				
Shear	fv = 247	Fv' = 729	psi	fv/Fv' = 0.34
Bending(+)	fb = 3983	Fb' = 6687	psi	fb/Fb' = 0.60

Additional Data:

FACTORS:	F/E (psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrr	Notes	Cn*Cvr	LC#
Fv'	265	1.15	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	2400	1.15	1.00	1.00	1.000	0.978	-	-	1.00	1.00	-	2
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million	-	1.00	1.00	-	-	-	-	1.00	-	-	2
Eminy'	0.85 million	-	1.00	1.00	-	-	-	-	1.00	-	-	2
Fv' (f)	265	-	-	-	-	-	-	-	1.00	1.00	1.00	4
Fb'+ (f)	2400	-	-	-	1.000	0.978	-	-	-	-	-	4

CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = D+S

Bending(+): LC #2 = D+S

Deflection: LC #2 = D+S (live)

LC #2 = D+S (total)

Bearing : Support 1 - LC #2 = D+S

Support 2 - LC #2 = D+S

Shear : LC #4 = D+S (fire)

Bending(+): LC #4 = D+S (fire)

D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake f=fire

All LC's are listed in the Analysis output

Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.2

CALCULATIONS:

V max = 8122, V design = 6682 lbs; M(+) = 30361 lbs-ft

EI = 3417.13e06 lb-in²

"Live" deflection is due to all non-dead loads (live, wind, snow...)

Total deflection = 1.5 dead + "live"

Fire: Required resistance = 1 h; Char depth = 1.80 in.

Residual section = 3.15" x 13.20"

Adjustment factors: Fb x 2.85, Fv x 2.75, FbE x 2.03

Design Notes:

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2018), the National Design Specification (NDS 2018), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012
4. GLULAM: bxd = actual breadth x actual depth.
5. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
6. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).



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PROJECT

Aug. 12, 2020 16:28

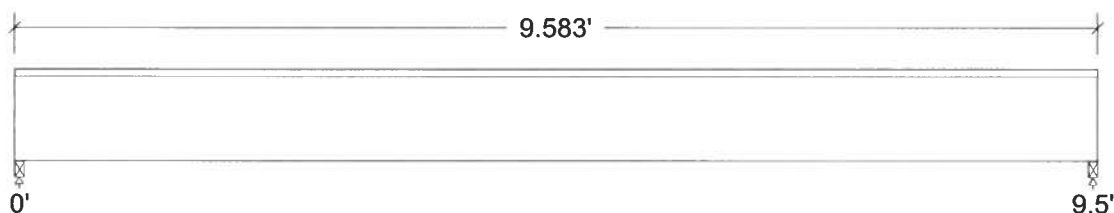
R-B3.wwb

Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 1)

Loads:

Load	Type	Distribution	Pat- tern	Location [ft] Start End	Magnitude Start End	Unit
Load1	Dead	Full UDL			116.0	plf
Load2	Snow	Full UDL			100.0	plf
Self-weight	Dead	Full UDL			11.4	plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :

Unfactored:			
Dead	610		610
Snow	479		479
Factored:			
Total	1089		1089
Bearing:			
Capacity			
Beam	3575		3575
Support	3672		3672
Des ratio			
Beam	0.30		0.30
Support	0.30		0.30
Load comb	#2		#2
Length	1.00*		1.00*
Min req'd	1.00*		1.00*
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.07		1.07
Fcp sup	625		625

*Minimum bearing length setting used: 1" for end supports

Glulam-Unbalan., West Species, 24F-1.8E WS, 5-1/2"x9"

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 9.58'; Clear span: 9.417'; Volume = 3.3 cu.ft.; 6 laminations, 5-1/2" maximum width,

Lateral support: top = continuous, bottom = at supports;

Exposed to fire on all four faces;

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	$f_v = 27$	$F_v' = 305$	psi	$f_v/F_v' = 0.09$
Bending (+)	$f_b = 415$	$F_b' = 2760$	psi	$f_b/F_b' = 0.15$
Live Defl'n	$0.03 = < L/999$	$0.32 = L/360$	in	0.10
Total Defl'n	$0.09 = < L/999$	$0.47 = L/240$	in	0.19
Fire				
Shear	$f_v = 142$	$F_v' = 729$	psi	$f_v/F_v' = 0.19$
Bending (+)	$f_b = 3334$	$F_b' = 6840$	psi	$f_b/F_b' = 0.49$

Additional Data:

FACTORS:	F/E (psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrr	Notes	Cn*Cvr	LC#
F_v'	265	1.15	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
$F_b' +$	2400	1.15	1.00	1.00	1.000	1.000	-	-	1.00	1.00	-	2
F_{cp}'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million	1.00	1.00	1.00	-	-	-	-	1.00	-	-	2
E_{min}'	0.85 million	1.00	1.00	1.00	-	-	-	-	1.00	-	-	2
$F_v' (f)$	265	-	-	-	-	-	-	-	1.00	1.00	1.00	4
$F_b' + (f)$	2400	-	-	-	1.000	1.000	-	-	-	-	-	4

CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = D+S

Bending(+): LC #2 = D+S

Deflection: LC #2 = D+S (live)

LC #2 = D+S (total)

Bearing : Support 1 - LC #2 = D+S

Support 2 - LC #2 = D+S

Shear : LC #4 = D+S (fire)

Bending(+): LC #4 = D+S (fire)

D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake f=fire

All LC's are listed in the Analysis output

Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.2

CALCULATIONS: $V_{max} = 1080$, $V_{design} = 900$ lbs; $M(+) = 2565$ lbs-ft $EI = 601.42e06$ lb-in²

"Live" deflection is due to all non-dead loads (live, wind, snow...)

Total deflection = 1.5 dead + "live"

Fire: Required resistance = 1 h; Char depth = 1.80 in.

Residual section = 1.90" x 5.40"

Adjustment factors: $F_b \times 2.85$, $F_v \times 2.75$, $F_{bE} \times 2.03$ **Design Notes:**

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2018), the National Design Specification (NDS 2018), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012
4. GLULAM: bxd = actual breadth x actual depth.
5. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
6. GLULAM: bearing length based on smaller of $F_{cp}(\text{tension})$, $F_{cp}(\text{comp'n})$.



WoodWorks®
SOFTWARE FOR WOOD DESIGN

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Aug. 12, 2020 16:28

R-B4.wwb

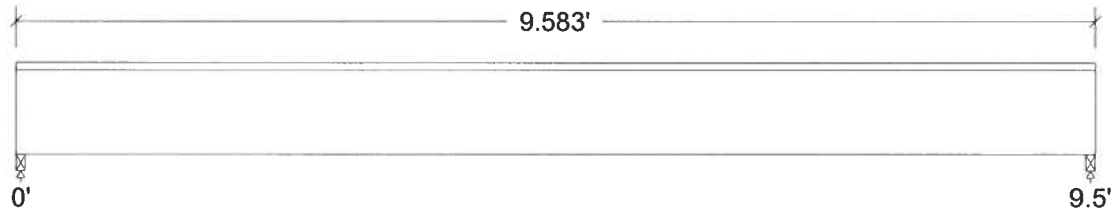
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 1)

Loads:

Load	Type	Distribution	Pat- tern	Location [ft] Start End	Magnitude Start End	Unit
Load1	Dead	Full UDL			58.0	plf
Load2	Snow	Full UDL			50.0	plf
Load3	Dead	Point		1.04	125	lbs
Load4	Snow	Point		1.04	107	lbs
Load5	Dead	Point		3.54	493	lbs
Load6	Snow	Point		3.54	425	lbs
Self-weight	Dead	Full UDL			11.4	plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



Unfactored:			
Dead	755		527
Snow	604		407
Factored:			
Total	1359		934
Bearing:			
Capacity			
Beam	3575		3575
Support	3672		3672
Des ratio			
Beam	0.38		0.26
Support	0.37		0.25
Load comb	#2		#2
Length	1.00*		1.00*
Min req'd	1.00*		1.00*
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.07		1.07
Fcp sup	625		625

*Minimum bearing length setting used: 1" for end supports

Glulam-Unbalan., West Species, 24F-1.8E WS, 5-1/2"x9"

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 9.58'; Clear span: 9.417'; Volume = 3.3 cu.ft.; 6 laminations, 5-1/2" maximum width,

Lateral support: top = continuous, bottom = at supports;

Exposed to fire on all four faces;

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	$f_v = 38$	$F_v' = 305$	psi	$f_v/F_v' = 0.13$
Bending(+)	$f_b = 554$	$F_b' = 2760$	psi	$f_b/F_b' = 0.20$
Live Defl'n	$0.04 = < L/999$	$0.32 = L/360$	in	0.12
Total Defl'n	$0.11 = < L/999$	$0.47 = L/240$	in	0.22
Fire				
Shear	$f_v = 189$	$F_v' = 729$	psi	$f_v/F_v' = 0.26$
Bending(+)	$f_b = 4457$	$F_b' = 6840$	psi	$f_b/F_b' = 0.65$

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrr	Notes	Cn*Cvr	LC#
Fv'	265	1.15	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	2400	1.15	1.00	1.00	1.000	1.000	-	-	1.00	1.00	-	2
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million	-	1.00	1.00	-	-	-	-	1.00	-	-	2
Eminy'	0.85 million	-	1.00	1.00	-	-	-	-	1.00	-	-	2
Fv' (f)	265	-	-	-	-	-	-	-	1.00	1.00	1.00	4
Fb'+ (f)	2400	-	-	-	1.000	1.000	-	-	-	-	-	4

CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = D+S

Bending(+): LC #2 = D+S

Deflection: LC #2 = D+S (live)

LC #2 = D+S (total)

Bearing : Support 1 - LC #2 = D+S

Support 2 - LC #2 = D+S

Shear : LC #4 = D+S (fire)

Bending(+): LC #4 = D+S (fire)

D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake f=fire

All LC's are listed in the Analysis output

Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.2

CALCULATIONS:

V max = 1355, V design = 1260 lbs; M(+) = 3429 lbs-ft

EI = 601.42e06 lb-in²

"Live" deflection is due to all non-dead loads (live, wind, snow...)

Total deflection = 1.5 dead + "live"

Fire: Required resistance = 1 h; Char depth = 1.80 in.

Residual section = 1.90" x 5.40"

Adjustment factors: Fb x 2.85, Fv x 2.75, FbE x 2.03

Design Notes:

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2018), the National Design Specification (NDS 2018), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012
4. GLULAM: bxd = actual breadth x actual depth.
5. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
6. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).

2nd Floor Plan for reference only



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CLIENT:

PROJECT: *Central Lofts*

NUMBER:

DATE: *11/13/2020*

BY:

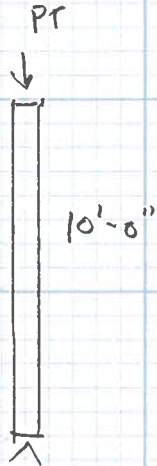
PAGE 14 of 39

2-C5

1-hr. fire rated

8 3/4" x 9" GL

P2

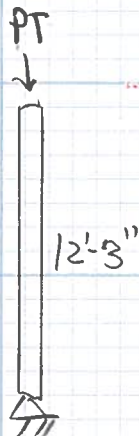


PT2: DL: 14,418 lbs
LL: 6,480 lbs
SL: 1,350 lbs

1-C1

8 3/4" x 12" GL

P17

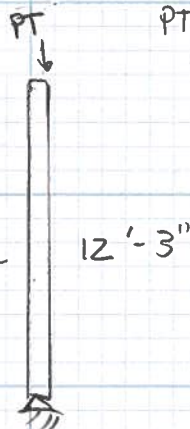


PT1: DL: 42,408 lbs
LL: 50,160 lbs
SL: 6,200 lbs

1-C2

8 3/4" x 10 1/2" GL

P5



PT1
DL: 23,628 lbs
LL: 15,840 lbs → (12,355 w/LL Red.)
SL: 3,300 lbs



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CLIENT:

PROJECT:

NUMBER:

DATE:

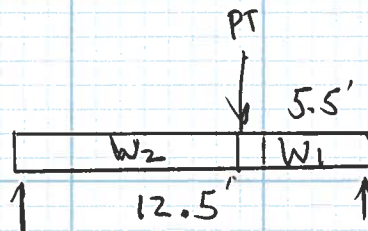
BY:

Central Lofts

7/31/2020

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2-B1 update



$$W_1: \begin{aligned} DL &= 16' (50 \text{ psf}) = 800 \text{ plf} \\ LL &= 16' (100 \text{ psf}) = 1600 \text{ plf} \quad (LL \text{ Red} = 1280 \text{ plf}) \end{aligned}$$

$$W_2: \begin{aligned} DL &= 50 \text{ psf} (16') \times 3 + 29 \text{ psf} (16') + 12 \text{ psf} (31.5') = 3242 \text{ plf} \\ LL &= 40 \text{ psf} (16') \times 3 = 1920 \text{ plf} \quad (LL \text{ Red} = 1536 \text{ plf}) \\ SL &= 25 \text{ psf} (16') = 400 \text{ plf} \end{aligned}$$

$$PT: \begin{aligned} DL &= 2.75' (16') (50 \text{ psf}) \times 2 + 2.75' (16') (29 \text{ psf}) = 5,676 \text{ lbs.} \\ LL &= 100 \text{ psf} (16') \times 2.75 \times 2 = 8,800 \text{ lbs.} \quad (LL \text{ Red} = 7,040 \text{ lbs.}) \\ SL &= 2.75' (16') (25 \text{ psf}) = 1,100 \text{ lbs.} \end{aligned}$$

$$\begin{aligned} LL \text{ Area} &= 512 \text{ ft}^2 \quad K_{LL} = 2 \\ \text{Reduction} &= 0.25 + \frac{15}{\sqrt{K_{LL} A T}} = 0.72 \\ &\quad \text{use } 0.8 \end{aligned}$$

use 8 3/4 x 22 1/2 GL



COMPANY

PROJECT

Nov. 16, 2020 13:29

2C-5 10.0 ft.wwc

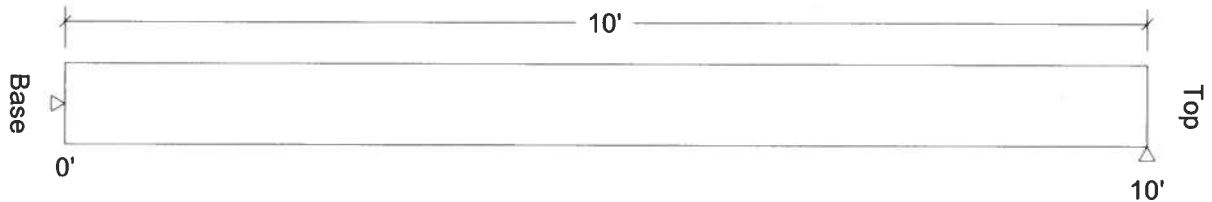
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 1)

Loads:

Load	Type	Distribution	Location [ft] Start End	Magnitude Start End	Unit
Load2	Dead	Axial	(Ecc. = 0.25")	14418	lbs
Load3	Live	Axial	(Ecc. = 0.25")	6480	lbs
Load4	Snow	Axial	(Ecc. = 0.25")	1350	lbs
Self-weight	Dead	Axial		181	lbs

Reactions (lbs):



Unfactored:			
Lateral:			
Dead	30		-30
Live	14		-14
Snow	3		-3
Axial:			
Dead	14599		14599
Live	6480		6480
Snow	1350		1350
Factored:			
R->L			-46
Load comb			#8
L->R	46		
Load comb	#8		#1

Glulam-Balanced, West Species, 24F-1.8E WS, 8-3/4"x9"

Support: Non-wood

Total length: 10.0'; Volume = 5.5 cu.ft.; 6 laminations, 8-3/4" maximum width,
Pinned base; Load face = width(b); $K_e \times L_b: 1.0 \times 10.0 = 10.0$ ft; $K_e \times L_d: 1.0 \times 10.0 = 10.0$ ft;
Exposed to fire on all four faces;

This section PASSES the design code check.

WoodWorks® Sizer**SOFTWARE FOR WOOD DESIGN**

2C-5 10.0 ft.wwc

WoodWorks® Sizer 2019 (Update 1)

Page 2

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 1	Fv' = 238	psi	fv/Fv' = 0.00
Bending(+)	fb = 44	Fb' = 2392	psi	fb/Fb' = 0.02
Axial	fc = 268	Fc' = 1499	psi	fc/Fc' = 0.18
Combined	(axial + eccentric moment)			Eq.15.4-3 = 0.05
Axial Bearing	fc = 268	Fc* = 1600	psi	fc/Fc* = 0.17
Live Defl'n	0.00 = < L/999	0.67 = L/180	in	0.00
Total Defl'n	0.01 = < L/999	0.67 = L/180	in	0.01
Fire				
Shear	fv = 3	Fv' = 729	psi	fv/Fv' = 0.00
Bending(+)	fb = 222	Fb' = 6821	psi	fb/Fb' = 0.03
Axial	fc = 807	Fc' = 2316	psi	fc/Fc' = 0.35
Combined	(axial + eccentric moment)			Eq.15.4-3 = 0.17

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL/CP	CV	Cfu	Cr	Cfrt	Notes	LC#
Fv'	265	0.90	1.00	1.00	-	-	-	-	1.00	1.00	1
Fb'+	2400	1.00	1.00	1.00	0.997	1.000	-	-	1.00	1.00	2
Fc'	1600	1.00	1.00	1.00	0.937	-	-	-	1.00	-	2
E'	1.8 million	1.00	1.00	1.00	-	-	-	-	1.00	-	2
Emin'	0.95 million	1.00	1.00	1.00	-	-	-	-	1.00	-	2
Eminy'	0.85 million	1.00	1.00	1.00	-	-	-	-	1.00	-	2
Fc*	1600	1.00	1.00	1.00	-	-	-	-	1.00	-	2
Fv' (f)	265	-	-	-	-	-	-	-	1.00	1.00	8
Fb'+ (f)	2400	-	-	-	0.997	1.000	-	-	-	-	8
Fc' (f)	1600	1.00	1.00	1.00	0.561	-	-	-	1.00	-	8

CRITICAL LOAD COMBINATIONS:

Shear : LC #1 = D only

Bending(+): LC #2 = D+L

Deflection: LC #2 = D+L (live)

LC #2 = D+L (total)

Axial : LC #2 = D+L

Combined : LC #2 = D+L Fb' = 2392

FcE = 4393 Pxe/S = fc(6xe/d) = 44

Shear : LC #8 = D+L+S (fire)

Bending(+): LC #8 = D+L+S (fire)

Axial : LC #8 = D+L+S (fire)

Combined : LC #8 = D+L+S (fire) Fb' = 6821

D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake f=fire

All LC's are listed in the Analysis output

Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.2

CALCULATIONS:

V = 30 lbs; M(+) = 435 lbs-ft; P = 21079 lbs

EI = 956.80e06 lb-in²

"Live" deflection is due to all non-dead loads (live, wind, snow...)

Total deflection = 1.0 dead + "live"

Fire: Required resistance = 1 h; Char depth = 1.80 in.

Residual section = 5.15" x 5.40"

Adjustment factors: Fb x 2.85, Fv x 2.75, Fc x 2.58, FbE x 2.03, FcE x 2.03

Lateral stability: Lu = 10' Le = 18'-6.63" RB = 5.1

Design Notes:

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2018), the National Design Specification (NDS 2018), and NDS Design Supplement.

2. Please verify that the default deflection limits are appropriate for your application.

3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012

4. GLULAM: bxd = actual breadth x actual depth.



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PROJECT

Nov. 16, 2020 13:36

1-C1 12.25 ft Update.wwc

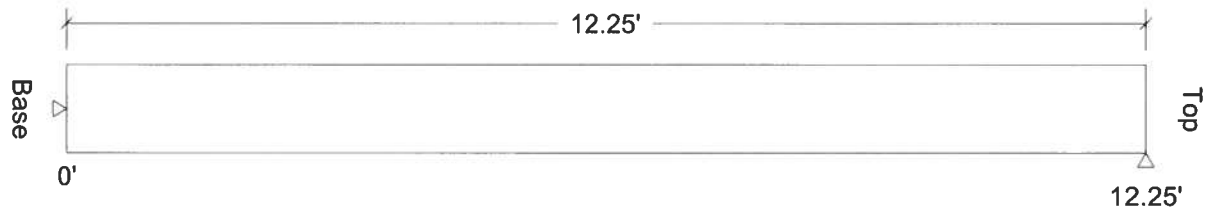
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 1)

Loads:

Load	Type	Distribution	Location [ft] Start End	Magnitude Start End	Unit
Load2	Dead	Axial	(Ecc. = 0.25")	42408	lbs
Load3	Live	Axial	(Ecc. = 0.25")	30096	lbs
Load4	Snow	Axial	(Ecc. = 0.25")	6200	lbs
Self-weight	Dead	Axial		296	lbs

Reactions (lbs):



Unfactored:			
Lateral:			
Dead	72		-72
Live	51		-51
Snow	11		-11
Axial:			
Dead	42704		42704
Live	30096		30096
Snow	6200		6200
Factored:			
R->L			-134
Load comb			#8
L->R	134		
Load comb	#8		#1

Glulam-Axial, West Species, 3 (DF L2D), 8-3/4"x12"

Support: Non-wood

Total length: 12.25'; Volume = 8.9 cu.ft.; 8 laminations, 8-3/4" maximum width,

Pinned base; Load face = width(b); $K_e \times L_b: 1.0 \times 12.25 = 12.25$ ft; $K_e \times L_d: 1.0 \times 12.25 = 12.25$ ft;

Exposed to fire on all four faces;

This section PASSES the design code check.

WoodWorks® Sizer**SOFTWARE FOR WOOD DESIGN**

1-C1 12.25 ft Update.wwc

WoodWorks® Sizer 2019 (Update 1)

Page 2

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 2	Fv' = 265	psi	fv/Fv' = 0.01
Bending(+)	fb = 86	Fb' = 1992	psi	fb/Fb' = 0.04
Axial	fc = 693	Fc' = 1925	psi	fc/Fc' = 0.36
Combined	(axial + eccentric moment)			Eq.15.4-3 = 0.18
Axial Bearing	fc = 693	Fc* = 2300	psi	fc/Fc* = 0.30
Live Defl'n	0.00 = < L/999	0.82 = L/180	in	0.01
Total Defl'n	0.01 = < L/999	0.82 = L/180	in	0.01
Fire				
Shear	fv = 4	Fv' = 729	psi	fv/Fv' = 0.01
Bending(+)	fb = 325	Fb' = 5679	psi	fb/Fb' = 0.06
Axial	fc = 1826	Fc' = 1952	psi	fc/Fc' = 0.94
Combined	(axial + eccentric moment)			Eq.15.4-3 = 0.97

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL/CP	CV	Cfu	Cr	Cfrt	Notes	LC#
Fv'	265	1.00	1.00	1.00	-	-	-	-	1.00	1.00	2
Fb'+	2000	1.00	1.00	1.00	0.996	1.000	-	-	1.00	1.00	2
Fc'	2300	1.00	1.00	1.00	0.837	-	-	-	1.00	-	2
E'	1.9 million	1.00	1.00	1.00	-	-	-	-	1.00	-	2
Emin'	1.00 million	1.00	1.00	1.00	-	-	-	-	1.00	-	2
Eminy'	1.00 million	1.00	1.00	1.00	-	-	-	-	1.00	-	2
Fc*	2300	1.00	1.00	1.00	-	-	-	-	1.00	-	2
Fv' (f)	265	-	-	-	-	-	-	-	1.00	1.00	6
Fb'+ (f)	2000	-	-	-	0.996	1.000	-	-	-	-	8
Fc' (f)	2300	1.00	1.00	1.00	0.329	-	-	-	1.00	-	8

CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = D+L
 Bending(+): LC #2 = D+L
 Deflection: LC #2 = D+L (live)
 LC #2 = D+L (total)
 Axial : LC #2 = D+L
 Combined : LC #2 = D+L Fb' = 1992
 FcE = 5478 Pxe/S = fc(6xe/d) = 86

Shear : LC #6 = D+L (fire)
 Bending(+): LC #8 = D+L+S (fire)
 Axial : LC #8 = D+L+S (fire)
 Combined : LC #8 = D+L+S (fire) Fb' = 5679

D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake f=fire

All LC's are listed in the Analysis output

Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.2

CALCULATIONS:

V = 123 lbs; M(+) = 1511 lbs-ft; P = 72800 lbs

EI = 2393.96e06 lb-in²

"Live" deflection is due to all non-dead loads (live, wind, snow...)

Total deflection = 1.0 dead + "live"

Fire: Required resistance = 1 h; Char depth = 1.80 in.

Residual section = 5.15" x 8.40"

Adjustment factors: Fb x 2.85, Fv x 2.75, Fc x 2.58, FbE x 2.03, FcE x 2.03

Lateral stability: Lu = 12'-3.00" Le = 22'-11.63" RB = 6.6

Design Notes:

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2018), the National Design Specification (NDS 2018), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012
4. GLULAM: bxd = actual breadth x actual depth.



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Nov. 16, 2020 13:41

1-C2 12.25 ft.wwc

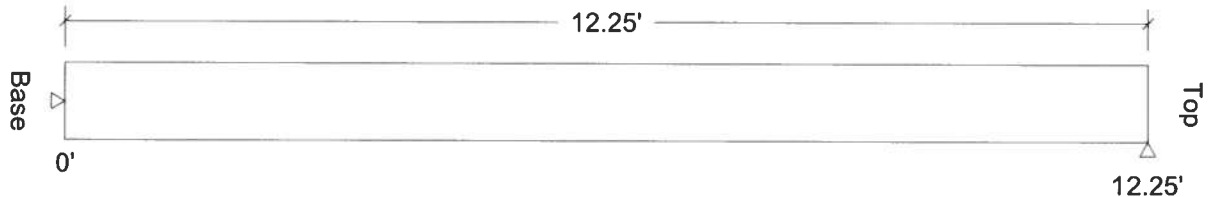
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 1)

Loads:

Load	Type	Distribution	Location [ft]		Magnitude		Unit
			Start	End	Start	End	
Load2	Dead	Axial	(Ecc. = 0.25")		23628		lbs
Load3	Live	Axial	(Ecc. = 0.25")		12355		lbs
Load4	Snow	Axial	(Ecc. = 0.25")		3300		lbs
Self-weight	Dead	Axial			259		lbs

Reactions (lbs):



Unfactored:			
Lateral:			
Dead	40		-40
Live	21		-21
Snow	6		-6
Axial:			
Dead	23887		23887
Live	12355		12355
Snow	3300		3300
Factored:			
R->L			-67
Load comb			#8
L->R	67		
Load comb	#8		#1

Glulam-Balanced, West Species, 24F-1.8E WS, 8-3/4"x10-1/2"

Support: Non-wood

Total length: 12.25'; Volume = 7.8 cu.ft.; 7 laminations, 8-3/4" maximum width,

Pinned base; Load face = width(b); $K_e \times L_b: 1.0 \times 12.25 = 12.25$ ft; $K_e \times L_d: 1.0 \times 12.25 = 12.25$ ft;

Exposed to fire on all four faces;

This section PASSES the design code check.

WoodWorks® Sizer**SOFTWARE FOR WOOD DESIGN**

1-C2 12.25 ft.wwc

WoodWorks® Sizer 2019 (Update 1)

Page 2

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 1	Fv' = 265	psi	fv/Fv' = 0.00
Bending(+)	fb = 56	Fb' = 2389	psi	fb/Fb' = 0.02
Axial	fc = 394	Fc' = 1412	psi	fc/Fc' = 0.28
Combined	(axial + eccentric moment)			Eq.15.4-3 = 0.10
Axial Bearing	fc = 394	Fc* = 1600	psi	fc/Fc* = 0.25
Live Defl'n	0.00 = < L/999	0.82 = L/180	in	0.00
Total Defl'n	0.01 = < L/999	0.82 = L/180	in	0.01
Fire				
Shear	fv = 3	Fv' = 729	psi	fv/Fv' = 0.00
Bending(+)	fb = 240	Fb' = 6810	psi	fb/Fb' = 0.04
Axial	fc = 1113	Fc' = 1634	psi	fc/Fc' = 0.68
Combined	(axial + eccentric moment)			Eq.15.4-3 = 0.52

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL/CP	CV	Cfu	Cr	Cfrt	Notes	LC#
Fv'	265	1.00	1.00	1.00	-	-	-	-	1.00	1.00	2
Fb'+	2400	1.00	1.00	1.00	0.995	1.000	-	-	1.00	1.00	2
Fc'	1600	1.00	1.00	1.00	0.883	-	-	-	1.00	-	2
E'	1.8 million	1.00	1.00	-	-	-	-	-	1.00	-	2
Emin'	0.95 million	1.00	1.00	-	-	-	-	-	1.00	-	2
Eminy'	0.85 million	1.00	1.00	-	-	-	-	-	1.00	-	2
Fc*	1600	1.00	1.00	1.00	-	-	-	-	1.00	-	2
Fv' (f)	265	-	-	-	-	-	-	-	1.00	1.00	6
Fb'+ (f)	2400	-	-	-	0.996	1.000	-	-	-	-	8
Fc' (f)	1600	1.00	1.00	1.00	0.396	-	-	-	1.00	-	8

CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = D+L

Bending(+): LC #2 = D+L

Deflection: LC #2 = D+L (live)
LC #2 = D+L (total)

Axial : LC #2 = D+L

Combined : LC #2 = D+L Fb' = 2389
FcE = 3984 Pxe/S = fc(6xe/d) = 56

Shear : LC #6 = D+L (fire)

Bending(+): LC #8 = D+L+S (fire)

Axial : LC #8 = D+L+S (fire)

Combined : LC #8 = D+L+S (fire) Fb' = 6810

D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake f=fire

All LC's are listed in the Analysis output

Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.2

CALCULATIONS:

V = 61 lbs; M(+) = 750 lbs-ft; P = 36242 lbs

EI = 1519.36e06 lb-in²

"Live" deflection is due to all non-dead loads (live, wind, snow...)

Total deflection = 1.0 dead + "live"

Fire: Required resistance = 1 h; Char depth = 1.80 in.

Residual section = 5.15" x 6.90"

Adjustment factors: Fb x 2.85, Fv x 2.75, Fc x 2.58, FbE x 2.03, FcE x 2.03

Lateral stability: Lu = 12'-3.00" Le = 22'-7.13" RB = 6.1

Design Notes:

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2018), the National Design Specification (NDS 2018), and NDS Design Supplement.

2. Please verify that the default deflection limits are appropriate for your application.

3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012

4. GLULAM: bxd = actual breadth x actual depth.



WoodWorks®
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PROJECT

Aug. 12, 2020 11:06

2-B1 - revised 7-31-2020.wwb

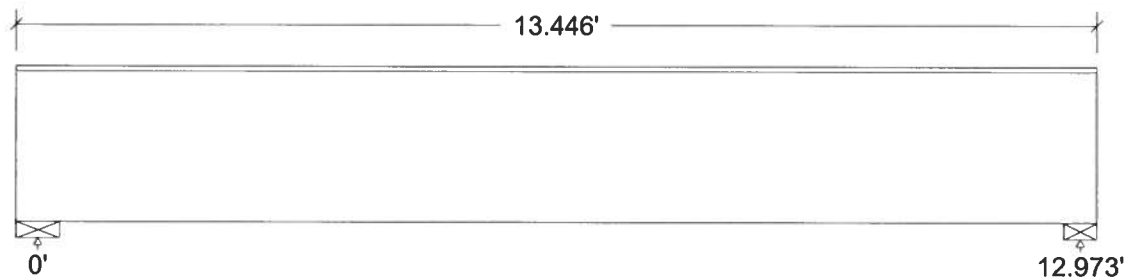
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 1)

Loads:

Load	Type	Distribution	Pat- tern	Location [ft]		Magnitude		Unit
				Start	End	Start	End	
Load1	Dead	Partial UDL		0.54	7.54	3242.0	3242.0	plf
Load2	Live	Partial UDL		0.00	7.00	1536.0	1536.0	plf
Load3	Snow	Partial UDL		0.00	7.00	400.0	400.0	plf
Load4	Dead	Partial UDL		7.00	12.50	800.0	800.0	plf
Load5	Live	Partial UDL		7.00	12.50	1280.0	1280.0	plf
Load6	Dead	Point		7.54		5676		lbs
Load7	Live	Point		7.59		7040		lbs
Load8	Snow	Point		7.54		1100		lbs
Self-weight	Dead	Full UDL				45.3		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



Unfactored:			
Dead	20070		13288
Live	13037		11795
Snow	2586		1314
Factored:			
Total	35693		26397
Bearing:			
Capacity			
Beam	37120		27453
Support	35693		26397
Des ratio			
Beam	0.96		0.96
Support	1.00		1.00
Load comb	#8		#8
Length	6.53		4.83
Min req'd	6.53**		4.83**
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.00		1.00
Fcp sup	625		625

**Minimum bearing length governed by the required width of the supporting member.

WoodWorks® Sizer**SOFTWARE FOR WOOD DESIGN**

2-B1 - revised 7-31-2020.wwb

WoodWorks® Sizer 2019 (Update 1)

Page 2

Glulam-Unbalan., West Species, 24F-1.8E WS, 8-3/4"x22-1/2"

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 13.45'; Clear span: 12.5'; Volume = 18.4 cu.ft.; 15 laminations, 8-3/4" maximum width,

Lateral support: top = continuous, bottom = at supports;

Exposed to fire on both d-faces and one b-face;

This section PASSES the design code check.**Analysis vs. Allowable Stress and Deflection using NDS 2018 :**

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 181	Fv' = 265	psi	fv/Fv' = 0.68
Bending (+)	fb = 1897	Fb' = 2242	psi	fb/Fb' = 0.85
Live Defl'n	0.10 = < L/999	0.43 = L/360	in	0.22
Total Defl'n	0.29 = L/537	0.65 = L/240	in	0.45
Fire				
Shear	fv = 368	Fv' = 729	psi	fv/Fv' = 0.50
Bending (+)	fb = 4054	Fb' = 6389	psi	fb/Fb' = 0.63

Additional Data:

FACTORS:	F/E (psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cn*Cvr	LC#
Fv'	265	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	2400	1.00	1.00	1.00	1.000	0.934	-	-	1.00	1.00	-	2
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million	1.00	1.00	-	-	-	-	-	1.00	-	-	2
Eminy'	0.85 million	1.00	1.00	-	-	-	-	-	1.00	-	-	2
Fv' (f)	265	-	-	-	-	-	-	-	1.00	1.00	1.00	8
Fb'+ (f)	2400	-	-	-	1.000	0.934	-	-	-	-	-	8

CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = D+L

Bending(+): LC #2 = D+L

Deflection: LC #2 = D+L (live)

LC #2 = D+L (total)

Bearing : Support 1 - LC #8 = D+L+S(f)

Support 2 - LC #8 = D+L+S(f)

Shear : LC #8 = D+L+S (fire)

Bending(+): LC #8 = D+L+S (fire)

D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake f=fire

All LC's are listed in the Analysis output

Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.2

CALCULATIONS:

V max = 32690, V design = 23754 lbs; M(+) = 116693 lbs-ft

EI = 14949e06 lb-in²

"Live" deflection is due to all non-dead loads (live, wind, snow...)

Total deflection = 1.5 dead + "live"

Fire: Required resistance = 1 h; Char depth = 1.80 in.

Residual section = 5.15" x 20.70"

Adjustment factors: Fb x 2.85, Fv x 2.75, FbE x 2.03

Design Notes:

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2018), the National Design Specification (NDS 2018), and NDS Design Supplement.

2. Please verify that the default deflection limits are appropriate for your application.

3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012

4. GLULAM: bxd = actual breadth x actual depth.

5. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.

6. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).

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Flexible Seismic Design

Shear wall shortened on grid D. (wall line 5 in this output).

SHEAR RESULTS (flexible seismic design)

N-S Shearlines	W Gp	For Dir	ASD Shear Force [plf]			Asp-Cub			Allowable Shear [plf]				V [lbs]	Resp. Ratio
			v	vmax	V [lbs]	Int	Ext	Int	Ext	Co	C	Cmb		
Line 1														
Level 4														
Ln1, Lev4	-	Both	-	-	4970	-	-	-	-	-	-	-	16320	-
Wall 1-1	8	Both	103.5	-	2485	-	1.0	-	340	-	-	340	8160	0.30
Wall 1-3	8	Both	103.5	-	2485	-	1.0	-	340	-	-	340	8160	0.30
Level 3														
Ln1, Lev3	8	Both	109.6	-	9756	-	1.0	-	340	-	-	340	30260	0.32
Level 2														
Ln1, Lev2	8	Both	147.0	-	13085	-	1.0	-	340	-	-	340	30260	0.43
Level 1														
Ln1, Lev1	4	Both	168.3	-	14974	-	1.0	-	510	-	-	510	45390	0.33
Line 4														
Level 4														
Ln4, Lev4	-	Both	-	-	9829	-	-	-	-	-	-	-	11730	-
Wall 4-1	4	Both	427.4	-	9829	-	1.0	-	510	-	-	510	11730	0.84
Level 3														
Ln4, Lev3	-	Both	-	-	19251	-	-	-	-	-	-	-	23460	-
Wall 4-1	1	Both	837.0	-	19251	1.0	1.0	510	510	-	A	1020	23460	0.82
Level 2														
Ln4, Lev2	-	Both	-	-	25812	-	-	-	-	-	-	-	30590	-
Wall 4-1	7	Both	1122.3	-	25812	1.0	1.0	665	665	-	A	1330	30590	0.84
Level 1														
Ln4, Lev1	-	Both	-	-	29528	-	-	-	-	-	-	-	30590	-
Wall 4-1	7^	Both	1283.8	-	29528	1.0	1.0	665	665	-	A	1330	30590	0.97
Line 5														
Level 4														
Ln5, Lev4	-	Both	-	-	9756	-	-	-	-	-	-	-	14630	-
Wall 5-1	14^	Both	443.4	-	9756	-	1.0	-	665	-	-	665	14630	0.67
Level 3														
Ln5, Lev3	-	Both	-	-	19124	-	-	-	-	-	-	-	23460	-
Wall 5-1	13^	Both	831.5	-	19124	1.0	1.0	510	510	-	A	1020	23460	0.82
Level 2														
Ln5, Lev2	-	Both	-	-	25649	-	-	-	-	-	-	-	30590	-
Wall 5-1	12	Both	1115.2	-	25649	1.0	1.0	665	665	-	A	1330	30590	0.84
Level 1														
Ln5, Lev1	-	Both	-	-	29343	-	-	-	-	-	-	-	30590	-
Wall 5-1	12^	Both	1275.8	-	29343	1.0	1.0	665	665	-	A	1330	30590	0.96
Line 6														
Level 4														
Ln6, Lev4	-	Both	-	-	12978	-	-	-	-	-	-	-	13633	-
Wall 6-1	2	Both	633.1	-	12978	-	1.0	-	665	-	-	665	13633	0.95
Level 3														
Ln6, Lev3	-	Both	-	-	25429	-	-	-	-	-	-	-	27265	-
Wall 6-1	7	Both	1240.4	-	25429	1.0	1.0	665	665	-	A	1330	27265	0.93
Level 2														
Ln6, Lev2	-	Both	-	-	34103	-	-	-	-	-	-	-	35670	-
Wall 6-1	15^	Both	1663.6	-	34103	1.0	1.0	870	870	-	A	1740	35670	0.96
Level 1														
Ln6, Lev1	-	Both	-	-	39013	-	-	-	-	-	-	-	45240	-
Wall 6-1	15	Both	1500.5	-	39013	1.0	1.0	870	870	-	A	1740	45240	0.86
Line 7														
Level 4														
Ln7, Lev4	-	Both	-	-	8238	-	-	-	-	-	-	-	21280	-
Wall 7-2	2	Both	274.4	-	3430	-	1.0	-	665	-	-	665	8313	0.41
Wall 7-4	2	Both	278.7	-	3623	-	1.0	-	665	-	-	665	8645	0.42
Wall 7-6	2	Both	182.3	-	1185	-	1.0	-	665	-	-	665	4323	0.27
Level 3														
Ln7, Lev3	-	Both	-	-	16163	-	-	-	-	-	-	-	32640	-
Wall 7-2	1	Both	534.3	-	6679	1.0	1.0	510	510	-	A	1020	12750	0.52
Wall 7-4	1	Both	541.7	-	7042	1.0	1.0	510	510	-	A	1020	13260	0.53
Wall 7-6	1	Both	375.7	-	2442	1.0	1.0	510	510	-	A	1020	6630	0.37
Level 2														
Ln7, Lev2	-	Both	-	-	21680	-	-	-	-	-	-	-	32640	-
Wall 7-2	1	Both	709.9	-	8873	1.0	1.0	510	510	-	A	1020	12750	0.70
Wall 7-4	1	Both	718.0	-	9334	1.0	1.0	510	510	-	A	1020	13260	0.70
Wall 7-6	1	Both	534.2	-	3472	1.0	1.0	510	510	-	A	1020	6630	0.52
Level 1														
Ln7, Lev1	-	Both	-	-	24807	-	-	-	-	-	-	-	31053	-
Wall 7-2	1	Both	867.3	-	10841	1.0	1.0	510	510	-	A	1020	12750	0.85
Wall 7-4	1	Both	855.8	-	10269	1.0	1.0	510	510	-	A	1020	12240	0.84

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SHEAR RESULTS (flexible seismic design, continued)

Wall 7-6	1	Both	616.1	-	3697	.99	.99	510	510	-	A	1010	6063	0.61
E-W Shearlines	W Gp	For Dir	ASD Shear Force [plf]			Asp-Cub		Allowable Shear [plf]				V [lbs]		Resp. Ratio
			v	vmax	V [lbs]	Int	Ext	Int	Ext	Co	C	Cmb		
Line A														
Level 4														
LnA, Lev4	-	Both	-	-	8430	-	-	-	-	-	-	-	18105	-
Wall A-1	4	Both	205.9	-	1441	-	1.0	-	510	-	-	510	3570	0.40
Wall A-3	4	Both	215.2	-	1614	-	1.0	-	510	-	-	510	3825	0.42
Wall A-5	4	Both	205.9	-	1441	-	1.0	-	510	-	-	510	3570	0.40
Wall A-7	4	Both	281.0	-	3934	-	1.0	-	510	-	-	510	7140	0.55
Level 3														
LnA, Lev3	-	Both	-	-	15176	-	-	-	-	-	-	-	23275	-
Wall A-1	2	Both	392.5	-	2747	-	1.0	-	665	-	-	665	4655	0.59
Wall A-3	2	Both	377.9	-	2457	-	1.0	-	665	-	-	665	4323	0.57
Wall A-5	2	Both	405.4	-	3040	-	1.0	-	665	-	-	665	4988	0.61
Wall A-7	2	Both	495.1	-	6931	-	1.0	-	665	-	-	665	9310	0.74
Level 2														
LnA, Lev2	-	Both	-	-	19871	-	-	-	-	-	-	-	23940	-
Wall A-1	2	Both	503.3	-	3523	-	1.0	-	665	-	-	665	4655	0.76
Wall A-3	2	Both	503.3	-	3523	-	1.0	-	665	-	-	665	4655	0.76
Wall A-5	2	Both	529.5	-	4236	-	1.0	-	665	-	-	665	5320	0.80
Wall A-7	2	Both	613.5	-	8588	-	1.0	-	665	-	-	665	9310	0.92
Level 1														
LnA, Lev1	-	Both	-	-	21363	-	-	-	-	-	-	-	36210	-
Wall A-1	1	Both	520.0	-	3640	1.0	1.0	510	510	-	A	1020	7140	0.51
Wall A-3	1	Both	542.7	-	4070	1.0	1.0	510	510	-	A	1020	7650	0.53
Wall A-5	1	Both	520.0	-	3640	1.0	1.0	510	510	-	A	1020	7140	0.51
Wall A-7	1	Both	715.2	-	10013	1.0	1.0	510	510	-	A	1020	14280	0.70
Line B														
LnB, Lev1	-	Both	-	-	2637	-	-	-	-	-	-	-	11475	-
Wall B-1	6	Both	117.2	-	2637	-	1.0	-	510	-	-	510	11475	0.23
Line C														
Level 3														
LnC, Lev3	-	Both	-	-	10021	-	-	-	-	-	-	-	10973	-
Wall C-1	2	Both	556.9	-	3620	-	1.0	-	665	-	-	665	4323	0.84
Wall C-2	2^	Both	640.1	-	6401	-	1.0	-	665	-	-	665	6650	0.96
Level 2														
LnC, Lev2	-	Both	-	-	17000	-	-	-	-	-	-	-	21945	-
Wall C-1	7	Both	918.2	-	5968	1.0	1.0	665	665	-	A	1330	8645	0.69
Wall C-2	7	Both	1103.2	-	11032	1.0	1.0	665	665	-	A	1330	13300	0.83
Level 1														
LnC, Lev1	-	Both	-	-	19489	-	-	-	-	-	-	-	21945	-
Wall C-1	7	Both	1038.0	-	6747	1.0	1.0	665	665	-	A	1330	8645	0.78
Wall C-2	7	Both	1274.2	-	12742	1.0	1.0	665	665	-	A	1330	13300	0.96
Line D														
Level 4														
LnD, Lev4	-	Both	-	-	10142	-	-	-	-	-	-	-	13515	-
Wall D-1	4	Both	382.7	-	10142	-	1.0	-	510	-	-	510	13515	0.75
Level 3														
LnD, Lev3	-	Both	-	-	15586	-	-	-	-	-	-	-	17623	-
Wall D-1	2	Both	588.1	-	15586	-	1.0	-	665	-	-	665	17623	0.88
Level 2														
LnD, Lev2	-	Both	-	-	19377	-	-	-	-	-	-	-	27030	-
Wall D-1	1	Both	731.2	-	19377	1.0	1.0	510	510	-	A	1020	27030	0.72
Level 1														
LnD, Lev1	-	Both	-	-	21523	-	-	-	-	-	-	-	27030	-
Wall D-1	1	Both	812.2	-	21523	1.0	1.0	510	510	-	A	1020	27030	0.80
Line E														
Level 4														
LnE, Lev4	-	Both	-	-	10019	-	-	-	-	-	-	-	14960	-
Wall E-1	8	Both	227.7	-	10019	-	1.0	-	340	-	-	340	14960	0.67
Level 3														
LnE, Lev3	-	Both	-	-	21993	-	-	-	-	-	-	-	44880	-
Wall E-1	1	Both	499.8	-	21993	1.0	1.0	510	510	-	A	1020	44880	0.49
Level 2														
LnE, Lev2	-	Both	-	-	30334	-	-	-	-	-	-	-	44880	-
Wall E-1	1	Both	689.4	-	30334	1.0	1.0	510	510	-	A	1020	44880	0.68
Level 1														
LnE, Lev1	-	Both	-	-	35054	-	-	-	-	-	-	-	58520	-
Wall E-1	7	Both	796.7	-	35054	1.0	1.0	665	665	-	A	1330	58520	0.60

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SHEAR RESULTS (flexible seismic design, continued)

Line G												
Level 4												
LnG, Lev4	-	Both	-	-	8167	-	-	-	-	-	10030	-
Wall G-1	8	Both	271.0	-	1897	-	1.0	-	340	-	340	0.80
Wall G-2	8	Both	278.7	-	2090	-	1.0	-	340	-	340	0.82
Wall G-4	8	Both	278.7	-	2090	-	1.0	-	340	-	340	0.82
Wall G-6	8	Both	278.7	-	2090	-	1.0	-	340	-	340	0.82
Level 3												
LnG, Lev3	-	Both	-	-	17934	-	-	-	-	-	19618	-
Wall G-1	2	Both	597.0	-	4179	-	1.0	-	665	-	665	0.90
Wall G-2	2	Both	611.3	-	4585	-	1.0	-	665	-	665	0.92
Wall G-4	2	Both	611.3	-	4585	-	1.0	-	665	-	665	0.92
Wall G-6	2	Both	611.3	-	4585	-	1.0	-	665	-	665	0.92
Level 2												
LnG, Lev2	-	Both	-	-	24735	-	-	-	-	-	30090	-
Wall G-1	1	Both	820.1	-	5741	1.0	1.0	510	510	-	A 1020	0.80
Wall G-2	1	Both	844.2	-	6332	1.0	1.0	510	510	-	A 1020	0.83
Wall G-4	1	Both	844.2	-	6332	1.0	1.0	510	510	-	A 1020	0.83
Wall G-6	1	Both	844.2	-	6332	1.0	1.0	510	510	-	A 1020	0.83
Level 1												
LnG, Lev1	-	Both	-	-	28586	-	-	-	-	-	30090	-
Wall G-1	1	Both	945.6	-	6619	1.0	1.0	510	510	-	A 1020	0.93
Wall G-2	1^	Both	976.3	-	7322	1.0	1.0	510	510	-	A 1020	0.96
Wall G-4	1^	Both	976.3	-	7322	1.0	1.0	510	510	-	A 1020	0.96
Wall G-6	1^	Both	976.3	-	7322	1.0	1.0	510	510	-	A 1020	0.96

Legend:

W Gp - Wall design group defined in Sheathing and Framing Materials tables, where it shows associated Standard Wall. "^" means that this wall is critical for all walls in the Standard Wall group.

For Dir - Direction of seismic force along shearline.

v - Design shear force on segment = ASD factored shear force per unit FHS

vmax - Collector shear force for perforated walls as per SDPWS eqn. 4.3-8 = $V/FHS/Co$. Full height sheathing (FHS) factored for narrow segments as per 4.3.4.3

V - ASD factored shear force. For shearline: total shearline force. For wall: total of all segments on wall. For segment: force on segment

Asp/Cub - For wall: Unblocked structural wood panel factor *Cub* from SDPWS 4.3.3.2. For segment: Aspect Ratio Factor from SDPWS 4.3.4.2.

Int - Unit shear capacity of interior sheathing; *Ext* - Unit shear capacity of exterior sheathing. For wall: Unfactored. For segment: Include *Cub* factor and aspect ratio adjustments.

Co - Adjustment factor for perforated walls from SDPWS Equation 4.3-5.

C - Sheathing combination rule, *A* = Add capacities, *S* = Strongest side or twice weakest, *G* = Stiffness-based using SDPWS 4.3-3.

Cmb - Combined interior and exterior unit shear capacity including perforated wall factor *Co*.

V - Total factored shear capacity of shearline, wall or segment.

Crit Resp - Response ratio = v/Cmb = design shear force/unit shear capacity. "W" indicates that the wind design criterion was critical in selecting wall.

Notes:

Refer to Elevation View diagrams for individual level for uplift anchorage force *t* for perforated walls given by SDPWS 4.3.6.4.2,4.

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HOLD-DOWN DESIGN (flexible seismic design)

Level 1 Line- Wall	Posit'n	Location [ft]		Tensile ASD Holddown Force [lbs]				Cmb'd	Hold-down	Cap [lbs]	Crit Resp.
		X	Y	Shear	Dead	Ev					
Line 1 1-1	L End	0.00	1.00	5866	37633						
	V Elem	0.00	23.00	1242	2974				Refer to upper level		
	V Elem	0.00	25.00		4549				Refer to upper level		
	V Elem	0.00	64.00		3870				Refer to upper level		
	V Elem	0.00	66.00	1242	2138				Refer to upper level		
	R End	0.00	88.00	5866	44911						
Line 4 4-1	L End	16.00	1.50	42932	22180	3757	24509		Threaded r	50000	0.49
	R End	16.00	22.50	42932	14259	2415	31089		Threaded r	50000	0.62
Line 5 5-1	L End	32.00	1.50	37544	18262	3094	22375		Threaded r	50000	0.45
	V Elem	32.00	2.00	5366	3769	638	2235		Refer to upper level		
	V Elem	32.00	22.00	5366	2489	422	3298		Refer to upper level		
	R End	32.00	22.50	37544	11740	1989	27793		Threaded r	50000	0.56
Line 6 6-1	L End	47.50	16.00	58365	17322	2934	43977		Threaded r	50000	0.88
	V Elem	47.50	34.50	38126	11734	1988	28380		Refer to upper level		
	R End	47.50	40.00	20238	3637	616	17217		Threaded r	50000	0.34
Line 7 7-1	L End	74.00	1.00		6030						
	R End	74.00	14.00		6030						
	L End	74.00	16.00	30445	5025	851	26271		Threaded r	50000	0.53
	R End	74.00	26.50	30445	5025	851	26271		Threaded r	50000	0.53
	L End	74.00	28.50		4472						
	V Elem	74.00	37.50		3330				Refer to upper level		
	R End	74.00	38.00		1142						
	V Elem	74.00	39.50	17691	3935	667	14422		Refer to upper level		
	L End	74.00	40.00	12785	1192	202	11796		Threaded r	50000	0.24
	R End	74.00	50.00	12785	1192	202	11796		Threaded r	50000	0.24
	V Elem	74.00	50.50	17691	3935	667	14422		Refer to upper level		
	L End	74.00	52.00		1142						
	V Elem	74.00	52.50		3178				Refer to upper level		
	V Elem	74.00	61.00		3178				Refer to upper level		
	R End	74.00	61.50		1142						
	V Elem	74.00	63.00	15318	1968	333	13684		Refer to upper level		
	L End	74.00	63.50	11506	596	101	11012		Threaded r	50000	0.22
	R End	74.00	67.50	26825	2563	434	24695		Threaded r	50000	0.49
L End	74.00	69.50		8241							
R End	74.00	88.00		8241							
Line A A-1	L End	1.00	0.00	24085	2972	503	21617		Threaded r	50000	0.43
	R End	6.00	0.00	24085	2972	503	21617		Threaded r	50000	0.43
	L End	8.00	0.00		3556						
	R End	14.00	0.00		1687						
	V Elem	14.50	0.00		908				Refer to upper level		
	V Elem	15.00	0.00		961				Refer to upper level		
	L End	16.00	0.00	12441	1582	268	11127		Threaded r	50000	0.22
	V Elem	16.50	0.00	6659	748	127	6038		Refer to upper level		
	V Elem	17.00	0.00	5159	694	118	4582		Refer to upper level		
	R End	21.50	0.00	24258	3024	512	21747		Threaded r	50000	0.43
	L End	23.50	0.00		3555						
	V Elem	29.50	0.00		854				Refer to upper level		
	R End	30.00	0.00		2700						
	V Elem	31.50	0.00	6672	854	145	5962		Refer to upper level		
	L End	32.00	0.00	17458	2277	386	15566		Threaded r	50000	0.31
	R End	37.00	0.00	12234	1476	250	11008		Threaded r	50000	0.22
	V Elem	37.50	0.00	11896	1655	280	10521		Refer to upper level		
	L End	39.00	0.00		1898						
V Elem	39.50	0.00		1816				Refer to upper level			
R End	46.00	0.00		3714							
L End	48.00	0.00	26216	7696	1304	19824		Threaded r	50000	0.40	
R End	60.00	0.00	26216	7965	1349	19600		Threaded r	50000	0.39	
L End	62.00	0.00		7406							
R End	73.00	0.00		7406							
Line B B-1	L End	49.00	15.00	1601	1856	314	60		HDU5-SDS2.	^5645	0.01
	R End	69.50	15.00	1601	1856	314	60		HDU5-SDS2.	^5645	0.01
Line C C-1	L End	7.00	27.00	38802	1942	329	37189		Threaded r	50000	0.74
	R End	11.50	27.00	38802	1942	329	37189		Threaded r	50000	0.74

WoodWorks® Shearwalls**Central Hotel - Woodworks Lateral O - Grid D**
shortened for door - .wsf Nov. 16, 2020 16:19:37**HOLD-DOWN DESIGN (flexible seismic design, continued)**

C-2	L End	17.50	27.00	40421	2988	506	37940	Threaded r	50000	0.76
C-2	R End	25.50	27.00	40421	2988	506	37940	Threaded r	50000	0.76
Line D										
D-1	L End	5.00	40.50	28976	8936	1514	21554	Threaded r	50000	0.43
D-1	R End	29.50	40.50	28976	8936	1514	21554	Threaded r	50000	0.43
Line E										
E-1	L End	5.00	49.00	24788	16181	2741	11348	Threaded r	50000	0.23
E-1	R End	47.00	49.00	24788	15817	2679	11650	Threaded r	50000	0.23
Line G										
G-1	L End	1.00	89.00	39404	2972	503	36936	Threaded r	50000	0.74
G-1	R End	6.00	89.00	39404	2972	503	36936	Threaded r	50000	0.74
G-2	L End	16.00	89.00	39512	3184	539	36868	Threaded r	50000	0.74
G-2	R End	21.50	89.00	39512	3184	539	36868	Threaded r	50000	0.74
G-3	L End	23.50	89.00		3608					
G-3	R End	30.00	89.00		3608					
G-4	L End	32.00	89.00	39512	3184	539	36868	Threaded r	50000	0.74
G-4	R End	37.50	89.00	39512	3184	539	36868	Threaded r	50000	0.74
G-5	L End	39.50	89.00		3608					
G-5	R End	46.00	89.00		3608					
G-6	L End	48.00	89.00	39512	3184	539	36868	Threaded r	50000	0.74
G-6	R End	53.50	89.00	39512	3184	539	36868	Threaded r	50000	0.74
G-7	L End	55.50	89.00		8278					
G-7	R End	73.00	89.00		8278					
Level 2				Tensile ASD						
Line-Wall	Posit'n	Location [ft]		Holddown Force [lbs]					Cap	Crit
		X	Y	Shear	Dead	Ev	Cmb'd	Hold-down	[lbs]	Resp.
Line 1										
1-1	L End	0.00	1.00	3723	29443			Refer to upper level Refer to upper level Refer to upper level Refer to upper level		
	V Elem	0.00	23.00	1242	2974					
	V Elem	0.00	25.00		4549					
	V Elem	0.00	64.00		3870					
	V Elem	0.00	66.00	1242	2138					
1-1	R End	0.00	88.00	3723	23349					
Line 4										
4-1	L End	16.00	1.50	25427	15935	2699	12191	Threaded r	50000	0.24
4-1	R End	16.00	22.50	25427	10244	1735	16918	Threaded r	50000	0.34
Line 5										
5-1	L End	32.00	1.50	20148	12017	2036	10167	Threaded r	50000	0.20
	V Elem	32.00	2.00	5366	3769	638	2235	Refer to upper level		
	V Elem	32.00	22.00	5366	2489	422	3298	Refer to upper level		
5-1	R End	32.00	22.50	20148	7725	1309	13731	Threaded r	50000	0.27
Line 6										
6-1	L End	47.50	16.00	38126	11734	1988	28380	Threaded r	50000	0.57
6-1	R End	47.50	34.50	38126	11734	1988	28380	Threaded r	50000	0.57
Line 7										
7-1	L End	74.00	1.00		4541			Threaded r Threaded r	50000 50000	0.29 0.29
7-1	R End	74.00	14.00		4541					
7-2	L End	74.00	16.00	17591	3784	641	14448			
7-2	R End	74.00	26.50	17591	3784	641	14448			
7-3	L End	74.00	28.50		3330					
7-3	R End	74.00	37.50		3330			Threaded r Threaded r	50000 50000	0.29 0.29
7-4	L End	74.00	39.50	17691	3935	667	14422			
7-4	R End	74.00	50.50	17691	3935	667	14422			
7-5	L End	74.00	52.50		3178					
7-5	R End	74.00	61.00		3178					
7-6	L End	74.00	63.00	15318	1968	333	13684	Threaded r	50000	0.27
7-6	R End	74.00	67.50	15318	1968	333	13684	Threaded r	50000	0.27
7-7	L End	74.00	69.50		6205			Refer to upper level Refer to upper level Refer to upper level Refer to upper level	50000 50000 50000 50000	0.12 0.12 0.12 0.12
7-7	R End	74.00	88.00		6205					
Line A										
A-1	L End	1.00	0.00	15022	2119	359	13262	Threaded r	50000	0.27
A-1	R End	6.00	0.00	15022	2119	359	13262	Threaded r	50000	0.27
A-2	L End	8.00	0.00		2582			Refer to upper level Refer to upper level Refer to upper level Refer to upper level	50000 50000 50000 50000	0.12 0.12 0.12 0.12
	V Elem	14.00	0.00		713					
A-2	R End	14.50	0.00		908					
	V Elem	15.00	0.00		961					
	V Elem	16.00	0.00	3228	668	113	2673			
A-3	L End	16.50	0.00	6659	748	127	6038	Threaded r	50000	0.12
	V Elem	17.00	0.00	5159	694	118	4582	Refer to upper level		
A-3	R End	21.50	0.00	15045	2110	357	13293	Threaded r	50000	0.27
A-4	L End	23.50	0.00		2520			Refer to upper level Threaded r	50000 50000	0.12 0.12
A-4	R End	29.50	0.00		854					
	V Elem	30.00	0.00		1665					
A-5	L End	31.50	0.00	6672	854	145	5962			

WoodWorks® Shearwalls**Central Hotel - Woodworks Lateral O - Grid D**
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A-5	V Elem	32.00	0.00	8394	1425	241	7211	Refer to upper level		
	V Elem	37.00	0.00	3171	624	106	2652	Refer to upper level		
	R End	37.50	0.00	11896	1655	280	10521	Threaded r	50000	0.21
A-6	V Elem	39.00	0.00		802			Refer to upper level		
A-6	L End	39.50	0.00		1816					
A-6	R End	46.00	0.00		2618					
A-7	L End	48.00	0.00	15828	5628	953	11153	Threaded r	50000	0.22
A-7	R End	60.00	0.00	15828	5842	990	10975	Threaded r	50000	0.22
A-8	L End	62.00	0.00		5433					
A-8	R End	73.00	0.00		5433					
Line C										
C-1	L End	7.00	27.00	20135	1260	213	19089	Threaded r	50000	0.38
C-1	R End	11.50	27.00	20135	1260	213	19089	Threaded r	50000	0.38
C-2	L End	17.50	27.00	20592	1938	328	18982	Threaded r	50000	0.38
C-2	R End	25.50	27.00	20592	1938	328	18982	Threaded r	50000	0.38
Line D										
D-1	L End	5.00	40.50	18039	6964	1180	12255	Threaded r	50000	0.25
D-1	R End	29.50	40.50	18039	6964	1180	12255	Threaded r	50000	0.25
Line E										
E-1	L End	5.00	49.00	14397	11562	1959	4794	Threaded r	50000	0.10
E-1	R End	47.00	49.00	14397	11302	1915	5010	Threaded r	50000	0.10
Line G										
G-1	L End	1.00	89.00	22922	2119	359	21162	Threaded r	50000	0.42
G-1	R End	6.00	89.00	22922	2119	359	21162	Threaded r	50000	0.42
G-2	L End	16.00	89.00	22937	2270	385	21051	Threaded r	50000	0.42
G-2	R End	21.50	89.00	22937	2270	385	21051	Threaded r	50000	0.42
G-3	L End	23.50	89.00		2573					
G-3	R End	30.00	89.00		2573					
G-4	L End	32.00	89.00	22937	2270	385	21051	Threaded r	50000	0.42
G-4	R End	37.50	89.00	22937	2270	385	21051	Threaded r	50000	0.42
G-5	L End	39.50	89.00		2573					
G-5	R End	46.00	89.00		2573					
G-6	L End	48.00	89.00	22937	2270	385	21051	Threaded r	50000	0.42
G-6	R End	53.50	89.00	22937	2270	385	21051	Threaded r	50000	0.42
G-7	L End	55.50	89.00		5903					
G-7	R End	73.00	89.00		5903					
Level 3				Tensile ASD						
Line-Wall	Posit'n	Location [ft]		Holddown Force [lbs]				Hold-down	Cap [lbs]	Crit Resp.
		X	Y	Shear	Dead	Ev	Cmb'd			
Line 1										
1-1	L End	0.00	1.00	2302	16208					
	V Elem	0.00	23.00	1242	2974			Refer to upper level		
	V Elem	0.00	25.00		4549			Refer to upper level		
	V Elem	0.00	64.00		3870			Refer to upper level		
	V Elem	0.00	66.00	1242	2138			Refer to upper level		
1-1	R End	0.00	88.00	2302	12744					
Line 4										
4-1	L End	16.00	1.50	13811	9927	1682	5566	Threaded r	50000	0.11
4-1	R End	16.00	22.50	13811	6381	1081	8511	Threaded r	50000	0.17
Line 5										
5-1	L End	32.00	1.50	8606	6009	1018	3615	Threaded r	50000	0.07
	V Elem	32.00	2.00	5366	3769	638	2235	Refer to upper level		
	V Elem	32.00	22.00	5366	2489	422	3298	Refer to upper level		
5-1	R End	32.00	22.50	8606	3863	654	5398	Threaded r	50000	0.11
Line 6										
6-1	L End	47.50	16.00	20706	7343	1244	14607	Threaded r	50000	0.29
6-1	R End	47.50	34.50	20706	7343	1244	14607	Threaded r	50000	0.29
Line 7										
7-1	L End	74.00	1.00		2939					
7-1	R End	74.00	14.00		2939					
7-2	L End	74.00	16.00	9605	2449	415	7571	Threaded r	50000	0.15
7-2	R End	74.00	26.50	9605	2449	415	7571	Threaded r	50000	0.15
7-3	L End	74.00	28.50		2155					
7-3	R End	74.00	37.50		2155					
7-4	L End	74.00	39.50	9672	2547	431	7557	Threaded r	50000	0.15
7-4	R End	74.00	50.50	9672	2547	431	7557	Threaded r	50000	0.15
7-5	L End	74.00	52.50		2057					
7-5	R End	74.00	61.00		2057					
7-6	L End	74.00	63.00	8026	1273	216	6968	Threaded r	50000	0.14
7-6	R End	74.00	67.50	8026	1273	216	6968	Threaded r	50000	0.14
7-7	L End	74.00	69.50		4016					
7-7	R End	74.00	88.00		4016					
Line A										
A-1	L End	1.00	0.00	8363	1371	232	7224	Threaded r	50000	0.14

WoodWorks® Shearwalls**Central Hotel - Woodworks Lateral O - Grid D**
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A-1	R End	6.00	0.00	8363	1371	232	7224	Threaded r	50000	0.14
A-2	L End	8.00	0.00		1674					
	V Elem	14.00	0.00		713			Refer to upper level		
A-2	R End	15.00	0.00		961					
	V Elem	16.00	0.00	3228	668	113	2673	Refer to upper level		
A-3	L End	17.00	0.00	5159	694	118	4582	Threaded r	50000	0.09
A-3	R End	21.50	0.00	8387	1362	231	7255	Threaded r	50000	0.15
A-4	L End	23.50	0.00		1665					
A-4	R End	30.00	0.00		1665					
A-5	L End	32.00	0.00	8394	1425	241	7211	Threaded r	50000	0.14
	V Elem	37.00	0.00	3171	624	106	2652	Refer to upper level		
A-5	R End	37.50	0.00	5224	801	136	4558	Threaded r	50000	0.09
	V Elem	39.00	0.00		802			Refer to upper level		
A-6	L End	39.50	0.00		908					
A-6	R End	46.00	0.00		1710					
A-7	L End	48.00	0.00	9064	3771	639	5932	Threaded r	50000	0.12
A-7	R End	60.00	0.00	9064	3929	666	5801	Threaded r	50000	0.12
A-8	L End	62.00	0.00		3654					
A-8	R End	73.00	0.00		3654					
Line C										
C-1	L End	7.00	27.00	7602	647	110	7064	Threaded r	50000	0.14
C-1	R End	11.50	27.00	7602	647	110	7064	Threaded r	50000	0.14
C-2	L End	17.50	27.00	7561	996	169	6734	Threaded r	50000	0.13
C-2	R End	25.50	27.00	7561	996	169	6734	Threaded r	50000	0.13
Line D										
D-1	L End	5.00	40.50	10565	4468	757	6854	Threaded r	50000	0.14
D-1	R End	29.50	40.50	10565	4468	757	6854	Threaded r	50000	0.14
Line E										
E-1	L End	5.00	49.00	7572	7417	1257	1411	Threaded r	50000	0.03
E-1	R End	47.00	49.00	7572	7251	1228	1550	Threaded r	50000	0.03
Line G										
G-1	L End	1.00	89.00	12072	1371	232	10933	Threaded r	50000	0.22
G-1	R End	6.00	89.00	12072	1371	232	10933	Threaded r	50000	0.22
G-2	L End	16.00	89.00	12058	1469	249	10838	Threaded r	50000	0.22
G-2	R End	21.50	89.00	12058	1469	249	10838	Threaded r	50000	0.22
G-3	L End	23.50	89.00		1665					
G-3	R End	30.00	89.00		1665					
G-4	L End	32.00	89.00	12058	1469	249	10838	Threaded r	50000	0.22
G-4	R End	37.50	89.00	12058	1469	249	10838	Threaded r	50000	0.22
G-5	L End	39.50	89.00		1665					
G-5	R End	46.00	89.00		1665					
G-6	L End	48.00	89.00	12058	1469	249	10838	Threaded r	50000	0.22
G-6	R End	53.50	89.00	12058	1469	249	10838	Threaded r	50000	0.22
G-7	L End	55.50	89.00		3820					
G-7	R End	73.00	89.00		3820					
Level 4										
Line-Wall				Tensile ASD						
Posit'n		Location [ft]		Holddown Force [lbs]						
		X	Y	Shear	Dead	Ev	Cmb'd	Hold-down	Cap [lbs]	Crit Resp.
Line 1										
1-1	L End	0.00	1.00	1242	2974					
1-1	R End	0.00	23.00	1242	2974					
1-2	L End	0.00	25.00		4549					
1-2	R End	0.00	64.00		3870					
1-3	L End	0.00	66.00	1242	2138					
1-3	R End	0.00	88.00	1242	2138					
Line 4										
4-1	L End	16.00	1.50	5149	3918	664	1894	Threaded r	50000	0.04
4-1	R End	16.00	22.50	5149	2519	427	3057	Threaded r	50000	0.06
Line 5										
5-1	L End	32.00	2.00	5366	3769	638	2235	Threaded r	50000	0.04
5-1	R End	32.00	22.00	5366	2489	422	3298	Threaded r	50000	0.07
Line 6										
6-1	L End	47.50	16.00	7717	2952	500	5265	Threaded r	50000	0.11
6-1	R End	47.50	34.50	7717	2952	500	5265	Threaded r	50000	0.11
Line 7										
7-1	L End	74.00	1.00		1337					
7-1	R End	74.00	14.00		1337					
7-2	L End	74.00	16.00	3594	1114	189	2669	Threaded r	50000	0.05
7-2	R End	74.00	26.50	3594	1114	189	2669	Threaded r	50000	0.05
7-3	L End	74.00	28.50		980					
7-3	R End	74.00	37.50		980					
7-4	L End	74.00	39.50	3623	1158	196	2661	Threaded r	50000	0.05
7-4	R End	74.00	50.50	3623	1158	196	2661	Threaded r	50000	0.05

WoodWorks® Shearwalls**Central Hotel - Woodworks Lateral O - Grid D**
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7-5	L End	74.00	52.50		936					
7-5	R End	74.00	61.00		936					
7-6	L End	74.00	63.00	2897	579	98	2416	Threaded r	50000	0.05
7-6	R End	74.00	67.50	2897	579	98	2416	Threaded r	50000	0.05
7-7	L End	74.00	69.50		1827					
7-7	R End	74.00	88.00		1827					
Line A										
A-1	L End	1.00	0.00	3171	624	106	2652	Threaded r	50000	0.05
A-1	R End	6.00	0.00	3171	624	106	2652	Threaded r	50000	0.05
A-2	L End	8.00	0.00		713					
A-2	R End	14.00	0.00		713					
A-3	L End	16.00	0.00	3228	668	113	2673	Threaded r	50000	0.05
A-3	R End	21.50	0.00	3228	668	113	2673	Threaded r	50000	0.05
A-4	L End	23.50	0.00		757					
A-4	R End	30.00	0.00		757					
A-5	L End	32.00	0.00	3171	624	106	2652	Threaded r	50000	0.05
A-5	R End	37.00	0.00	3171	624	106	2652	Threaded r	50000	0.05
A-6	L End	39.00	0.00		802					
A-6	R End	46.00	0.00		802					
A-7	L End	48.00	0.00	3606	1914	324	2016	Threaded r	50000	0.04
A-7	R End	60.00	0.00	3606	2016	342	1931	Threaded r	50000	0.04
A-8	L End	62.00	0.00		1876					
A-8	R End	73.00	0.00		1876					
Line D										
D-1	L End	5.00	40.50	4554	1972	334	2916	Threaded r	50000	0.06
D-1	R End	29.50	40.50	4554	1972	334	2916	Threaded r	50000	0.06
Line E										
E-1	L End	5.00	49.00	2624	3273					
E-1	R End	47.00	49.00	2624	3200					
Line G										
G-1	L End	1.00	89.00	4173	624	106	3655	Threaded r	50000	0.07
G-1	R End	6.00	89.00	4173	624	106	3655	Threaded r	50000	0.07
G-2	L End	16.00	89.00	4180	668	113	3625	Threaded r	50000	0.07
G-2	R End	21.50	89.00	4180	668	113	3625	Threaded r	50000	0.07
G-3	L End	23.50	89.00		757					
G-3	R End	30.00	89.00		757					
G-4	L End	32.00	89.00	4180	668	113	3625	Threaded r	50000	0.07
G-4	R End	37.50	89.00	4180	668	113	3625	Threaded r	50000	0.07
G-5	L End	39.50	89.00		757					
G-5	R End	46.00	89.00		757					
G-6	L End	48.00	89.00	4180	668	113	3625	Threaded r	50000	0.07
G-6	R End	53.50	89.00	4180	668	113	3625	Threaded r	50000	0.07
G-7	L End	55.50	89.00		1737					
G-7	R End	73.00	89.00		1737					

Legend:**Line-Wall:**

At wall or opening – Shearline and wall number

At vertical element - Shearline

Posit'n - Position of stud that hold-down is attached to:

V Elem - Vertical element: column or strengthened studs required where not at wall end or opening

L or R End - At left or right wall end

L or R Op n - At left or right side of opening n

Location - Co-ordinates in Plan View**Hold-down Forces:**

Shear – Seismic shear overturning component, factored for ASD by 0.7. For perforated walls, T from SDPWS 4.3-8 is used

Dead – Dead load resisting component, factored for ASD by 0.60

Ev – Vertical seismic load effect from ASCE 7 12.4.2.2 = $-0.2S_d \times \text{ASD seismic factor} \times \text{unfactored } D = 0.169 \times \text{factored } D$. Refer to Seismic Information table for more details.

Cmb'd - Sum of ASD-factored overturning, dead and vertical seismic forces. May also include the uplift force t for perforated walls from SDPWS 4.3.6.2.1 when openings are staggered.

Hold-down – Device used from hold-down database

Cap – Allowable ASD tension load

Crit. Resp. – Critical Response = Combined ASD force/Allowable ASD tension load

Notes:

^WARNING - This hold-down does not have design capacities for the thickness of end studs selected, so additional jack studs or blocking required. Shear overturning force is horizontal seismic load effect Eh from ASCE 7 12.4.2.

Uses load combination 8 from ASCE 7 2.4.1 = $0.6D + 0.7(E_h - E_v)$.

Anchor bolts must have minimum 0.229" x 3" x 3" steel plate washers, conforming to specifications in SDPWS 4.3.6.4.3 and 4.4.1.6.

Refer to Shear Results table for factor Co, and shearline dimensions table for the sum of Li, used to calculate tension force T for perforated walls

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SHEAR RESULTS (rigid seismic design)**Rigid Seismic Design**

N-S Shearlines	W Gp	For Dir	ASD Shear Force [plf]			Asp-Cub			Allowable Shear [plf]				V [lbs]	Resp. Ratio
			v	vmax	V [lbs]	Int	Ext	Int	Ext	Co	C	Cmb		
Line 1														
Level 4														
Ln1, Lev4	-	Both	-	-	11901	-	-	-	-	-	-	-	16320	-
Wall 1-1	8	Both	247.9	-	5950	-	1.0	-	340	-	-	340	8160	0.73
Wall 1-3	8	Both	247.9	-	5950	-	1.0	-	340	-	-	340	8160	0.73
Level 3														
Ln1, Lev3	8	S->N	267.7	-	23826	-	1.0	-	340	-	-	340	30260	0.79
	8	N->S	277.8	-	24727	-	1.0	-	340	-	-	340	30260	0.82
Level 2														
Ln1, Lev2	8^	Both	326.9	-	29097	-	1.0	-	340	-	-	340	30260	0.96
Level 1														
Ln1, Lev1	4^	Both	429.3	-	38204	-	1.0	-	510	-	-	510	45390	0.84
Line 4														
Level 4														
Ln4, Lev4	-	Both	-	-	7065	-	-	-	-	-	-	-	11730	-
Wall 4-1	4	Both	307.2	-	7065	-	1.0	-	510	-	-	510	11730	0.60
Level 3														
Ln4, Lev3	-	S->N	-	-	16134	-	-	-	-	-	-	-	23460	-
	-	N->S	-	-	14308	-	-	-	-	-	-	-	23460	-
Wall 4-1	1	S->N	701.5	-	16134	1.0	1.0	510	510	-	A	1020	23460	0.69
	1	N->S	622.1	-	14308	1.0	1.0	510	510	-	A	1020	23460	0.61
Level 2														
Ln4, Lev2	-	Both	-	-	20793	-	-	-	-	-	-	-	30590	-
Wall 4-1	7	Both	904.0	-	20793	1.0	1.0	665	665	-	A	1330	30590	0.68
Level 1														
Ln4, Lev1	-	Both	-	-	20232	-	-	-	-	-	-	-	30590	-
Wall 4-1	7	Both	879.6	-	20232	1.0	1.0	665	665	-	A	1330	30590	0.66
Line 5														
Level 4														
Ln5, Lev4	-	Both	-	-	8414	-	-	-	-	-	-	-	14630	-
Wall 5-1	14	Both	382.4	-	8414	-	1.0	-	665	-	-	665	14630	0.58
Level 3														
Ln5, Lev3	-	S->N	-	-	14614	-	-	-	-	-	-	-	23460	-
	-	N->S	-	-	14953	-	-	-	-	-	-	-	23460	-
Wall 5-1	13	S->N	635.4	-	14614	1.0	1.0	510	510	-	A	1020	23460	0.62
	13	N->S	650.1	-	14953	1.0	1.0	510	510	-	A	1020	23460	0.64
Level 2														
Ln5, Lev2	-	Both	-	-	21432	-	-	-	-	-	-	-	30590	-
Wall 5-1	12	Both	931.8	-	21432	1.0	1.0	665	665	-	A	1330	30590	0.70
Level 1														
Ln5, Lev1	-	Both	-	-	21663	-	-	-	-	-	-	-	30590	-
Wall 5-1	12	Both	941.9	-	21663	1.0	1.0	665	665	-	A	1330	30590	0.71
Line 6														
Level 4														
Ln6, Lev4	-	Both	-	-	8354	-	-	-	-	-	-	-	13633	-
Wall 6-1	2	Both	407.5	-	8354	-	1.0	-	665	-	-	665	13633	0.61
Level 3														
Ln6, Lev3	-	S->N	-	-	17390	-	-	-	-	-	-	-	27265	-
	-	N->S	-	-	17684	-	-	-	-	-	-	-	27265	-
Wall 6-1	7	S->N	848.3	-	17390	1.0	1.0	665	665	-	A	1330	27265	0.64
	7	N->S	862.6	-	17684	1.0	1.0	665	665	-	A	1330	27265	0.65
Level 2														
Ln6, Lev2	-	Both	-	-	28314	-	-	-	-	-	-	-	35670	-
Wall 6-1	15	Both	1381.2	-	28314	1.0	1.0	870	870	-	A	1740	35670	0.79
Level 1														
Ln6, Lev1	-	Both	-	-	39003	-	-	-	-	-	-	-	45240	-
Wall 6-1	15	Both	1500.1	-	39003	1.0	1.0	870	870	-	A	1740	45240	0.86
Line 7														
Level 4														
Ln7, Lev4	-	Both	-	-	12900	-	-	-	-	-	-	-	21280	-
Wall 7-2	2	Both	422.8	-	5284	-	1.0	-	665	-	-	665	8313	0.64
Wall 7-4	2	Both	427.6	-	5558	-	1.0	-	665	-	-	665	8645	0.64
Wall 7-6	2	Both	316.4	-	2057	-	1.0	-	665	-	-	665	4323	0.48
Level 3														
Ln7, Lev3	-	S->N	-	-	23840	-	-	-	-	-	-	-	32640	-
	-	N->S	-	-	24046	-	-	-	-	-	-	-	32640	-
Wall 7-2	1	S->N	778.6	-	9733	1.0	1.0	510	510	-	A	1020	12750	0.76
	1	N->S	785.5	-	9819	1.0	1.0	510	510	-	A	1020	12750	0.77
Wall 7-4	1	S->N	787.1	-	10232	1.0	1.0	510	510	-	A	1020	13260	0.77
	1	N->S	794.0	-	10322	1.0	1.0	510	510	-	A	1020	13260	0.78

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SHEAR RESULTS (rigid seismic design, continued)

Wall 7-6	1	S->N	596.2	-	3875	1.0	1.0	510	510	-	A	1020	6630	0.58
	1	N->S	600.9	-	3906	1.0	1.0	510	510	-	A	1020	6630	0.59
Level 2														
Ln7, Lev2	-	Both	-	-	28332	-	-	-	-	-	-	-	32640	-
Wall 7-2	1	Both	921.7	-	11521	1.0	1.0	510	510	-	A	1020	12750	0.90
Wall 7-4	1	Both	930.8	-	12100	1.0	1.0	510	510	-	A	1020	13260	0.91
Wall 7-6	1	Both	724.7	-	4711	1.0	1.0	510	510	-	A	1020	6630	0.71
Level 1														
Ln7, Lev1	-	Both	-	-	27917	-	-	-	-	-	-	-	31053	-
Wall 7-2	1	Both	973.1	-	12164	1.0	1.0	510	510	-	A	1020	12750	0.95
Wall 7-4	1	Both	960.8	-	11530	1.0	1.0	510	510	-	A	1020	12240	0.94
Wall 7-6	1	Both	704.0	-	4224	.99	.99	510	510	-	A	1010	6063	0.70
E-W Shearlines	W Gp	For Dir	ASD Shear Force [plf]			Asp-Cub		Allowable Shear [plf]				V [lbs]		Resp. Ratio
			v	vmax	V [lbs]	Int	Ext	Int	Ext	Co	C	Cmb	V [lbs]	
Line A														
Level 4														
LnA, Lev4	-	Both	-	-	9869	-	-	-	-	-	-	-	18105	-
Wall A-1	4	Both	243.8	-	1706	-	1.0	-	510	-	-	510	3570	0.48
Wall A-3	4	Both	254.1	-	1906	-	1.0	-	510	-	-	510	3825	0.50
Wall A-5	4	Both	243.8	-	1706	-	1.0	-	510	-	-	510	3570	0.48
Wall A-7	4	Both	325.0	-	4550	-	1.0	-	510	-	-	510	7140	0.64
Level 3														
LnA, Lev3	-	W->E	-	-	15534	-	-	-	-	-	-	-	23275	-
	-	E->W	-	-	15540	-	-	-	-	-	-	-	23275	-
Wall A-1	2	W->E	402.2	-	2815	-	1.0	-	665	-	-	665	4655	0.60
	2	E->W	402.3	-	2816	-	1.0	-	665	-	-	665	4655	0.60
Wall A-3	2	W->E	387.1	-	2516	-	1.0	-	665	-	-	665	4323	0.58
	2	E->W	387.3	-	2517	-	1.0	-	665	-	-	665	4323	0.58
Wall A-5	2	W->E	415.4	-	3115	-	1.0	-	665	-	-	665	4988	0.62
	2	E->W	415.6	-	3117	-	1.0	-	665	-	-	665	4988	0.62
Wall A-7	2	W->E	506.3	-	7088	-	1.0	-	665	-	-	665	9310	0.76
	2	E->W	506.4	-	7090	-	1.0	-	665	-	-	665	9310	0.76
Level 2														
LnA, Lev2	-	Both	-	-	19527	-	-	-	-	-	-	-	23940	-
Wall A-1	2	Both	493.7	-	3456	-	1.0	-	665	-	-	665	4655	0.74
Wall A-3	2	Both	493.7	-	3456	-	1.0	-	665	-	-	665	4655	0.74
Wall A-5	2	Both	520.1	-	4161	-	1.0	-	665	-	-	665	5320	0.78
Wall A-7	2	Both	603.9	-	8454	-	1.0	-	665	-	-	665	9310	0.91
Level 1														
LnA, Lev1	-	Both	-	-	22974	-	-	-	-	-	-	-	36210	-
Wall A-1	1	Both	561.9	-	3933	1.0	1.0	510	510	-	A	1020	7140	0.55
Wall A-3	1	Both	585.7	-	4393	1.0	1.0	510	510	-	A	1020	7650	0.57
Wall A-5	1	Both	561.9	-	3933	1.0	1.0	510	510	-	A	1020	7140	0.55
Wall A-7	1	Both	765.4	-	10715	1.0	1.0	510	510	-	A	1020	14280	0.75
Line B														
LnB, Lev1	-	Both	-	-	6709	-	-	-	-	-	-	-	11475	-
Wall B-1	6^	Both	298.2	-	6709	-	1.0	-	510	-	-	510	11475	0.58
Line C														
Level 3														
LnC, Lev3	-	W->E	-	-	6824	-	-	-	-	-	-	-	10973	-
	-	E->W	-	-	6825	-	-	-	-	-	-	-	10973	-
Wall C-1	2	Both	370.5	-	2408	-	1.0	-	665	-	-	665	4323	0.56
Wall C-2	2	Both	441.6	-	4416	-	1.0	-	665	-	-	665	6650	0.66
Level 2														
LnC, Lev2	-	Both	-	-	13193	-	-	-	-	-	-	-	21945	-
Wall C-1	7	Both	697.8	-	4535	1.0	1.0	665	665	-	A	1330	8645	0.52
Wall C-2	7	Both	865.8	-	8658	1.0	1.0	665	665	-	A	1330	13300	0.65
Level 1														
LnC, Lev1	-	Both	-	-	11640	-	-	-	-	-	-	-	21945	-
Wall C-1	7	Both	599.6	-	3898	1.0	1.0	665	665	-	A	1330	8645	0.45
Wall C-2	7	Both	774.2	-	7742	1.0	1.0	665	665	-	A	1330	13300	0.58
Line D														
Level 4														
LnD, Lev4	-	Both	-	-	8774	-	-	-	-	-	-	-	13515	-
Wall D-1	4	Both	331.1	-	8774	-	1.0	-	510	-	-	510	13515	0.65
Level 3														
LnD, Lev3	-	Both	-	-	13150	-	-	-	-	-	-	-	17623	-
Wall D-1	2	Both	496.2	-	13150	-	1.0	-	665	-	-	665	17623	0.75
Level 2														
LnD, Lev2	-	Both	-	-	22763	-	-	-	-	-	-	-	27030	-
Wall D-1	1	Both	859.0	-	22763	1.0	1.0	510	510	-	A	1020	27030	0.84

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Shear Results (rigid seismic design, continued)

Level 1													
LnD, Lev1	-	Both	-	-	22121	-	-	-	-	-	-	27030	-
Wall D-1	1	Both	834.8	-	22121	1.0	1.0	510	510	-	A	1020	27030 0.82
Line E													
Level 4													
LnE, Lev4	-	Both	-	-	12540	-	-	-	-	-	-	14960	-
Wall E-1	8	Both	285.0	-	12540	-	1.0	-	340	-	-	340	14960 0.84
Level 3													
LnE, Lev3	-	W->E	-	-	35635	-	-	-	-	-	-	44880	-
		E->W	-	-	35639	-	-	-	-	-	-	44880	-
Wall E-1	1	W->E	809.9	-	35635	1.0	1.0	510	510	-	A	1020	44880 0.79
	1	E->W	810.0	-	35639	1.0	1.0	510	510	-	A	1020	44880 0.79
Level 2													
LnE, Lev2	-	Both	-	-	40197	-	-	-	-	-	-	44880	-
Wall E-1	1	Both	913.6	-	40197	1.0	1.0	510	510	-	A	1020	44880 0.90
Level 1													
LnE, Lev1	-	Both	-	-	50218	-	-	-	-	-	-	58520	-
Wall E-1	7	Both	1141.3	-	50218	1.0	1.0	665	665	-	A	1330	58520 0.86
Line G													
Level 4													
LnG, Lev4	-	Both	-	-	7480	-	-	-	-	-	-	10030	-
Wall G-1	8	Both	247.6	-	1733	-	1.0	-	340	-	-	340	2380 0.73
Wall G-2	8	Both	255.4	-	1916	-	1.0	-	340	-	-	340	2550 0.75
Wall G-4	8	Both	255.4	-	1916	-	1.0	-	340	-	-	340	2550 0.75
Wall G-6	8	Both	255.4	-	1916	-	1.0	-	340	-	-	340	2550 0.75
Level 3													
LnG, Lev3	-	W->E	-	-	13755	-	-	-	-	-	-	19618	-
		E->W	-	-	13765	-	-	-	-	-	-	19618	-
Wall G-1	2	W->E	455.5	-	3189	-	1.0	-	665	-	-	665	4655 0.69
	2	E->W	455.9	-	3191	-	1.0	-	665	-	-	665	4655 0.69
Wall G-2	2	W->E	469.6	-	3522	-	1.0	-	665	-	-	665	4988 0.71
	2	E->W	470.0	-	3525	-	1.0	-	665	-	-	665	4988 0.71
Wall G-4	2	W->E	469.6	-	3522	-	1.0	-	665	-	-	665	4988 0.71
	2	E->W	470.0	-	3525	-	1.0	-	665	-	-	665	4988 0.71
Wall G-6	2	W->E	469.6	-	3522	-	1.0	-	665	-	-	665	4988 0.71
	2	E->W	470.0	-	3525	-	1.0	-	665	-	-	665	4988 0.71
Level 2													
LnG, Lev2	-	Both	-	-	22005	-	-	-	-	-	-	30090	-
Wall G-1	1	Both	727.5	-	5092	1.0	1.0	510	510	-	A	1020	7140 0.71
Wall G-2	1	Both	751.7	-	5638	1.0	1.0	510	510	-	A	1020	7650 0.74
Wall G-4	1	Both	751.7	-	5638	1.0	1.0	510	510	-	A	1020	7650 0.74
Wall G-6	1	Both	751.7	-	5638	1.0	1.0	510	510	-	A	1020	7650 0.74
Level 1													
LnG, Lev1	-	Both	-	-	22751	-	-	-	-	-	-	30090	-
Wall G-1	1	Both	750.0	-	5250	1.0	1.0	510	510	-	A	1020	7140 0.74
Wall G-2	1	Both	777.8	-	5834	1.0	1.0	510	510	-	A	1020	7650 0.76
Wall G-4	1	Both	777.8	-	5834	1.0	1.0	510	510	-	A	1020	7650 0.76
Wall G-6	1	Both	777.8	-	5834	1.0	1.0	510	510	-	A	1020	7650 0.76

Legend:

W Gp - Wall design group defined in Sheathing and Framing Materials tables, where it shows associated Standard Wall. "A" means that this wall is critical for all walls in the Standard Wall group.

For Dir - Direction of seismic force along shearline.

v - Design shear force on segment = ASD factored shear force per unit FHS

vmax - Collector shear force for perforated walls as per SDPWS eqn. 4.3-8 = V/FHS/Co. Full height sheathing (FHS) factored for narrow segments as per 4.3.4.3

V - ASD factored shear force. For shearline: total shearline force. For wall: total of all segments on wall. For segment: force on segment

Asp/Cub - For wall: Unblocked structural wood panel factor Cub from SDPWS 4.3.3.2. For segment: Aspect Ratio Factor from SDPWS 4.3.4.2.

Int - Unit shear capacity of interior sheathing; Ext - Unit shear capacity of exterior sheathing. For wall: Unfactored. For segment: Include Cub factor and aspect ratio adjustments.

Co - Adjustment factor for perforated walls from SDPWS Equation 4.3-5.

C - Sheathing combination rule, A = Add capacities, S = Strongest side or twice weakest, G = Stiffness-based using SDPWS 4.3-3.

Cmb - Combined interior and exterior unit shear capacity including perforated wall factor Co.

V - Total factored shear capacity of shearline, wall or segment.

Crit Resp - Response ratio = v/Cmb = design shear force/unit shear capacity. "W" indicates that the wind design criterion was critical in selecting wall.

Notes:

Refer to Elevation View diagrams for individual level for uplift anchorage force t for perforated walls given by SDPWS 4.3.6.4.2.4.

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HOLD-DOWN DESIGN (rigid seismic design)

Level 1				Tensile ASD				Hold-down	Cap [lbs]	Crit Resp.
Line- Wall	Posit'n	Location [ft]		Holddown Force [lbs]						
		X	Y	Shear	Dead	Ev	Cmb'd			
Line 1										
1-1	L End	0.00	1.00	14191	37633					
	V Elem	0.00	23.00	2975	2974	504	505	Refer to upper level		
	V Elem	0.00	25.00		4549			Refer to upper level		
	V Elem	0.00	64.00		3870			Refer to upper level		
	V Elem	0.00	66.00	2975	2138	362	1199	Refer to upper level		
1-1	R End	0.00	88.00	14289	44911					
Line 4										
4-1	L End	16.00	1.50	32312	22180	3757	13889	Threaded r	50000	0.28
4-1	R End	16.00	22.50	31491	14259	2415	19647	Threaded r	50000	0.39
Line 5										
5-1	L End	32.00	1.50	29064	18262	3094	13895	Threaded r	50000	0.28
	V Elem	32.00	2.00	4628	3769	638	1497	Refer to upper level		
	V Elem	32.00	22.00	4628	2489	422	2560	Refer to upper level		
5-1	R End	32.00	22.50	29216	11740	1989	19465	Threaded r	50000	0.39
Line 6										
6-1	L End	47.50	16.00	48546	17322	2934	34158	Threaded r	50000	0.68
	V Elem	47.50	34.50	28463	11734	1988	18717	Refer to upper level		
6-1	R End	47.50	40.00	20233	3637	616	17212	Threaded r	50000	0.34
Line 7										
7-1	L End	74.00	1.00		6030					
7-1	R End	74.00	14.00		6030					
7-2	L End	74.00	16.00	39073	5025	851	34899	Threaded r	50000	0.70
7-2	R End	74.00	26.50	39148	5025	851	34974	Threaded r	50000	0.70
7-3	L End	74.00	28.50		4472					
	V Elem	74.00	37.50		3330			Refer to upper level		
7-3	R End	74.00	38.00		1142					
	V Elem	74.00	39.50	24732	3935	667	21463	Refer to upper level		
7-4	L End	74.00	40.00	14351	1192	202	13362	Threaded r	50000	0.27
7-4	R End	74.00	50.00	14351	1192	202	13362	Threaded r	50000	0.27
	V Elem	74.00	50.50	24806	3935	667	21537	Refer to upper level		
7-5	L End	74.00	52.00		1142					
	V Elem	74.00	52.50		3178			Refer to upper level		
	V Elem	74.00	61.00		3178			Refer to upper level		
7-5	R End	74.00	61.50		1142					
	V Elem	74.00	63.00	23113	1968	333	21479	Refer to upper level		
7-6	L End	74.00	63.50	13163	596	101	12668	Threaded r	50000	0.25
7-6	R End	74.00	67.50	36354	2563	434	34225	Threaded r	50000	0.68
7-7	L End	74.00	69.50		8241					
7-7	R End	74.00	88.00		8241					
Line A										
A-1	L End	1.00	0.00	25457	2972	503	22989	Threaded r	50000	0.46
A-1	R End	6.00	0.00	25460	2972	503	22991	Threaded r	50000	0.46
A-2	L End	8.00	0.00		3556					
A-2	R End	14.00	0.00		1687					
	V Elem	14.50	0.00		908			Refer to upper level		
A-3	L End	15.00	0.00		961					
A-3	L End	16.00	0.00	13777	1582	268	12463	Threaded r	50000	0.25
	V Elem	16.50	0.00	6540	748	127	5919	Refer to upper level		
	V Elem	17.00	0.00	5297	694	118	4721	Refer to upper level		
A-3	R End	21.50	0.00	25616	3024	512	23105	Threaded r	50000	0.46
A-4	L End	23.50	0.00		3555					
	V Elem	29.50	0.00		854			Refer to upper level		
A-4	R End	30.00	0.00		2700					
	V Elem	31.50	0.00	6553	854	145	5843	Refer to upper level		
A-5	L End	32.00	0.00	18945	2277	386	17053	Threaded r	50000	0.34
A-5	R End	37.00	0.00	13591	1476	250	12365	Threaded r	50000	0.25
	V Elem	37.50	0.00	11909	1655	280	10534	Refer to upper level		
A-6	L End	39.00	0.00		1898					
	V Elem	39.50	0.00		1816			Refer to upper level		
A-6	R End	46.00	0.00		3714					
A-7	L End	48.00	0.00	27467	7696	1304	21075	Threaded r	50000	0.42
A-7	R End	60.00	0.00	27469	7965	1349	20853	Threaded r	50000	0.42
A-8	L End	62.00	0.00		7406					
A-8	R End	73.00	0.00		7406					
Line B										
B-1	L End	49.00	15.00	4074	1856	314	2532	HDU5-SDS2.	^5645	0.45
B-1	R End	69.50	15.00	4074	1856	314	2532	HDU5-SDS2.	^5645	0.45
Line C										
C-1	L End	7.00	27.00	25365	1942	329	23752	Threaded r	50000	0.48
C-1	R End	11.50	27.00	25366	1942	329	23753	Threaded r	50000	0.48

WoodWorks® Shearwalls**Central Hotel - Woodworks Lateral O - Grid D**
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C-2	L End	17.50	27.00	27491	2988	506	25009	Threaded r	50000	0.50
C-2	R End	25.50	27.00	27492	2988	506	25010	Threaded r	50000	0.50
Line D										
D-1	L End	5.00	40.50	29032	8936	1514	21610	Threaded r	50000	0.43
D-1	R End	29.50	40.50	29033	8936	1514	21610	Threaded r	50000	0.43
Line E										
E-1	L End	5.00	49.00	35233	16181	2741	21793	Threaded r	50000	0.44
E-1	R End	47.00	49.00	35234	15817	2679	22096	Threaded r	50000	0.44
Line G										
G-1	L End	1.00	89.00	32581	2972	503	30113	Threaded r	50000	0.60
G-1	R End	6.00	89.00	32585	2972	503	30117	Threaded r	50000	0.60
G-2	L End	16.00	89.00	32761	3184	539	30117	Threaded r	50000	0.60
G-2	R End	21.50	89.00	32765	3184	539	30121	Threaded r	50000	0.60
G-3	L End	23.50	89.00		3608					
G-3	R End	30.00	89.00		3608					
G-4	L End	32.00	89.00	32761	3184	539	30117	Threaded r	50000	0.60
G-4	R End	37.50	89.00	32765	3184	539	30121	Threaded r	50000	0.60
G-5	L End	39.50	89.00		3608					
G-5	R End	46.00	89.00		3608					
G-6	L End	48.00	89.00	32761	3184	539	30117	Threaded r	50000	0.60
G-6	R End	53.50	89.00	32765	3184	539	30121	Threaded r	50000	0.60
G-7	L End	55.50	89.00		8278					
G-7	R End	73.00	89.00		8278					
Level 2										
Line-Wall				Tensile ASD						
	Posit'n	Location [ft]		Holddown Force [lbs]					Cap	Crit
		X	Y	Shear	Dead	Ev	Cmb'd	Hold-down	[lbs]	Resp.
Line 1										
1-1	L End	0.00	1.00	8724	29443					
	V Elem	0.00	23.00	2975	2974	504	505	Refer to upper level		
	V Elem	0.00	25.00		4549			Refer to upper level		
	V Elem	0.00	64.00		3870			Refer to upper level		
	V Elem	0.00	66.00	2975	2138	362	1199	Refer to upper level		
1-1	R End	0.00	88.00	8822	23349					
Line 4										
4-1	L End	16.00	1.50	20318	15935	2699	7082	Threaded r	50000	0.14
4-1	R End	16.00	22.50	19496	10244	1735	10988	Threaded r	50000	0.22
Line 5										
5-1	L End	32.00	1.50	16221	12017	2036	6239	Threaded r	50000	0.12
	V Elem	32.00	2.00	4628	3769	638	1497	Refer to upper level		
	V Elem	32.00	22.00	4628	2489	422	2560	Refer to upper level		
5-1	R End	32.00	22.50	16374	7725	1309	9957	Threaded r	50000	0.20
Line 6										
6-1	L End	47.50	16.00	28313	11734	1988	18567	Threaded r	50000	0.37
6-1	R End	47.50	34.50	28463	11734	1988	18717	Threaded r	50000	0.37
Line 7										
7-1	L End	74.00	1.00		4541					
7-1	R End	74.00	14.00		4541					
7-2	L End	74.00	16.00	24654	3784	641	21511	Threaded r	50000	0.43
7-2	R End	74.00	26.50	24728	3784	641	21585	Threaded r	50000	0.43
7-3	L End	74.00	28.50		3330					
7-3	R End	74.00	37.50		3330					
7-4	L End	74.00	39.50	24732	3935	667	21463	Threaded r	50000	0.43
7-4	R End	74.00	50.50	24806	3935	667	21537	Threaded r	50000	0.43
7-5	L End	74.00	52.50		3178					
7-5	R End	74.00	61.00		3178					
7-6	L End	74.00	63.00	23113	1968	333	21479	Threaded r	50000	0.43
7-6	R End	74.00	67.50	23191	1968	333	21557	Threaded r	50000	0.43
7-7	L End	74.00	69.50		6205					
7-7	R End	74.00	88.00		6205					
Line A										
A-1	L End	1.00	0.00	15643	2119	359	13883	Threaded r	50000	0.28
A-1	R End	6.00	0.00	15645	2119	359	13885	Threaded r	50000	0.28
A-2	L End	8.00	0.00		2582					
	V Elem	14.00	0.00		713			Refer to upper level		
A-2	R End	14.50	0.00		908					
	V Elem	15.00	0.00		961			Refer to upper level		
	V Elem	16.00	0.00	3823	668	113	3268	Refer to upper level		
A-3	L End	16.50	0.00	6540	748	127	5919	Threaded r	50000	0.12
	V Elem	17.00	0.00	5297	694	118	4721	Refer to upper level		
A-3	R End	21.50	0.00	15663	2110	357	13910	Threaded r	50000	0.28
A-4	L End	23.50	0.00		2520					
A-4	R End	29.50	0.00		854					
	V Elem	30.00	0.00		1665			Refer to upper level		
A-5	L End	31.50	0.00	6553	854	145	5843	Threaded r	50000	0.12

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HOLD-DOWN DESIGN (rigid seismic design, continued)

A-5	V Elem	32.00	0.00	9131	1425	241	7947	Refer to upper level			
	V Elem	37.00	0.00	3776	624	106	3258	Refer to upper level			
	R End	37.50	0.00	11909	1655	280	10534	Threaded r	50000	0.21	
	V Elem	39.00	0.00		802			Refer to upper level			
	A-6	L End	39.50	0.00		1816					
	A-6	R End	46.00	0.00		2618					
	A-7	L End	48.00	0.00	16371	5628	953	11696	Threaded r	50000	0.23
	A-7	R End	60.00	0.00	16373	5842	990	11521	Threaded r	50000	0.23
	A-8	L End	62.00	0.00		5433					
A-8	R End	73.00	0.00		5433						
Line C											
C-1	L End	7.00	27.00	14581	1260	213	13535	Threaded r	50000	0.27	
C-1	R End	11.50	27.00	14582	1260	213	13536	Threaded r	50000	0.27	
C-2	L End	17.50	27.00	15443	1938	328	13833	Threaded r	50000	0.28	
C-2	R End	25.50	27.00	15444	1938	328	13834	Threaded r	50000	0.28	
Line D											
D-1	L End	5.00	40.50	17791	6964	1180	12007	Threaded r	50000	0.24	
D-1	R End	29.50	40.50	17791	6964	1180	12007	Threaded r	50000	0.24	
Line E											
E-1	L End	5.00	49.00	20347	11562	1959	10743	Threaded r	50000	0.21	
E-1	R End	47.00	49.00	20347	11302	1915	10960	Threaded r	50000	0.22	
Line G											
G-1	L End	1.00	89.00	19495	2119	359	17735	Threaded r	50000	0.35	
G-1	R End	6.00	89.00	19499	2119	359	17739	Threaded r	50000	0.35	
G-2	L End	16.00	89.00	19560	2270	385	17674	Threaded r	50000	0.35	
G-2	R End	21.50	89.00	19564	2270	385	17678	Threaded r	50000	0.35	
G-3	L End	23.50	89.00		2573						
G-3	R End	30.00	89.00		2573						
G-4	L End	32.00	89.00	19560	2270	385	17674	Threaded r	50000	0.35	
G-4	R End	37.50	89.00	19564	2270	385	17678	Threaded r	50000	0.35	
G-5	L End	39.50	89.00		2573						
G-5	R End	46.00	89.00		2573						
G-6	L End	48.00	89.00	19560	2270	385	17674	Threaded r	50000	0.35	
G-6	R End	53.50	89.00	19564	2270	385	17678	Threaded r	50000	0.35	
G-7	L End	55.50	89.00		5903						
G-7	R End	73.00	89.00		5903						
Level 3				Tensile ASD							
Line-Wall	Posit'n	Location [ft]		Holddown Force [lbs]				Cap	Crit		
		X	Y	Shear	Dead	Ev	Cmb'd	Hold-down	[lbs]	Resp.	
Line 1											
1-1	L End	0.00	1.00	5563	16208						
	V Elem	0.00	23.00	2975	2974	504	505	Refer to upper level			
	V Elem	0.00	25.00		4549			Refer to upper level			
	V Elem	0.00	64.00		3870			Refer to upper level			
1-1	V Elem	0.00	66.00	2975	2138	362	1199	Refer to upper level			
	R End	0.00	88.00	5661	12744						
Line 4											
4-1	L End	16.00	1.50	10961	9927	1682	2716	Threaded r	50000	0.05	
4-1	R End	16.00	22.50	10139	6381	1081	4839	Threaded r	50000	0.10	
Line 5											
5-1	L End	32.00	1.50	6576	6009	1018	1585	Threaded r	50000	0.03	
	V Elem	32.00	2.00	4628	3769	638	1497	Refer to upper level			
	V Elem	32.00	22.00	4628	2489	422	2560	Refer to upper level			
5-1	R End	32.00	22.50	6729	3863	654	3521	Threaded r	50000	0.07	
Line 6											
6-1	L End	47.50	16.00	13850	7343	1244	7751	Threaded r	50000	0.16	
6-1	R End	47.50	34.50	14000	7343	1244	7901	Threaded r	50000	0.16	
Line 7											
7-1	L End	74.00	1.00		2939						
7-1	R End	74.00	14.00		2939						
7-2	L End	74.00	16.00	14293	2449	415	12259	Threaded r	50000	0.25	
7-2	R End	74.00	26.50	14368	2449	415	12334	Threaded r	50000	0.25	
7-3	L End	74.00	28.50		2155						
7-3	R End	74.00	37.50		2155						
7-4	L End	74.00	39.50	14346	2547	431	12231	Threaded r	50000	0.24	
7-4	R End	74.00	50.50	14420	2547	431	12305	Threaded r	50000	0.25	
7-5	L End	74.00	52.50		2057						
7-5	R End	74.00	61.00		2057						
7-6	L End	74.00	63.00	13178	1273	216	12120	Threaded r	50000	0.24	
7-6	R End	74.00	67.50	13256	1273	216	12199	Threaded r	50000	0.24	
7-7	L End	74.00	69.50		4016						
7-7	R End	74.00	88.00		4016						
Line A											
A-1	L End	1.00	0.00	9103	1371	232	7964	Threaded r	50000	0.16	

WoodWorks® Shearwalls**Central Hotel - Woodworks Lateral O - Grid D**
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A-1	R End	6.00	0.00	9105	1371	232	7966	Threaded r	50000	0.16		
A-2	L End	8.00	0.00		1674							
	V Elem	14.00	0.00		713							
A-2	R End	15.00	0.00		961							
	V Elem	16.00	0.00	3823	668	113	3268	Refer to upper level				
A-3	L End	17.00	0.00	5297	694			118	4721	Threaded r	50000	0.09
A-3	R End	21.50	0.00	9123	1362			231	7991	Threaded r	50000	0.16
A-4	L End	23.50	0.00		1665							
A-4	R End	30.00	0.00		1665							
A-5	L End	32.00	0.00	9131	1425	241	7947			Threaded r	50000	0.16
	V Elem	37.00	0.00	3776	624	106	3258	Refer to upper level				
A-5	R End	37.50	0.00	5356	801	136	4691	Threaded r	50000	0.09		
	V Elem	39.00	0.00		802			Refer to upper level				
A-6	L End	39.50	0.00		908							
A-6	R End	46.00	0.00		1710							
A-7	L End	48.00	0.00	9720	3771	639	6588	Threaded r	50000	0.13		
A-7	R End	60.00	0.00	9722	3929	666	6459	Threaded r	50000	0.13		
A-8	L End	62.00	0.00		3654							
A-8	R End	73.00	0.00		3654							
Line C												
C-1	L End	7.00	27.00	5057	647	110	4519	Threaded r	50000	0.09		
C-1	R End	11.50	27.00	5058	647	110	4520	Threaded r	50000	0.09		
C-2	L End	17.50	27.00	5216	996	169	4389	Threaded r	50000	0.09		
C-2	R End	25.50	27.00	5217	996	169	4389	Threaded r	50000	0.09		
Line D												
D-1	L End	5.00	40.50	9011	4468	757	5300	Threaded r	50000	0.11		
D-1	R End	29.50	40.50	9011	4468	757	5300	Threaded r	50000	0.11		
Line E												
E-1	L End	5.00	49.00	11302	7417	1257	5141	Threaded r	50000	0.10		
E-1	R End	47.00	49.00	11303	7251	1228	5281	Threaded r	50000	0.11		
Line G												
G-1	L End	1.00	89.00	9862	1371	232	8723	Threaded r	50000	0.17		
G-1	R End	6.00	89.00	9866	1371	232	8727	Threaded r	50000	0.17		
G-2	L End	16.00	89.00	9876	1469	249	8656	Threaded r	50000	0.17		
G-2	R End	21.50	89.00	9881	1469	249	8660	Threaded r	50000	0.17		
G-3	L End	23.50	89.00		1665							
G-3	R End	30.00	89.00		1665							
G-4	L End	32.00	89.00	9876	1469	249	8656	Threaded r	50000	0.17		
G-4	R End	37.50	89.00	9881	1469	249	8660	Threaded r	50000	0.17		
G-5	L End	39.50	89.00		1665							
G-5	R End	46.00	89.00		1665							
G-6	L End	48.00	89.00	9876	1469	249	8656	Threaded r	50000	0.17		
G-6	R End	53.50	89.00	9881	1469	249	8660	Threaded r	50000	0.17		
G-7	L End	55.50	89.00		3820							
G-7	R End	73.00	89.00		3820							
Level 4				Tensile ASD								
Line-Wall	Posit'n	Location [ft]		Holddown Force [lbs]								
		X	Y	Shear	Dead	Ev	Cmb'd	Hold-down	Cap [lbs]	Crit Resp.		
Line 1												
1-1	L End	0.00	1.00	2975	2974	504	505	Threaded r	50000	0.01		
1-1	R End	0.00	23.00	2975	2974	504	505	Threaded r	50000	0.01		
1-2	L End	0.00	25.00		4549							
1-2	R End	0.00	64.00		3870							
1-3	L End	0.00	66.00	2975	2138	362	1199	Threaded r	50000	0.02		
1-3	R End	0.00	88.00	2975	2138	362	1199	Threaded r	50000	0.02		
Line 4												
4-1	L End	16.00	1.50	3701	3918	664	446	Threaded r	50000	0.01		
4-1	R End	16.00	22.50	3701	2519	427	1609	Threaded r	50000	0.03		
Line 5												
5-1	L End	32.00	2.00	4628	3769	638	1497	Threaded r	50000	0.03		
5-1	R End	32.00	22.00	4628	2489	422	2560	Threaded r	50000	0.05		
Line 6												
6-1	L End	47.50	16.00	4967	2952	500	2515	Threaded r	50000	0.05		
6-1	R End	47.50	34.50	4967	2952	500	2515	Threaded r	50000	0.05		
Line 7												
7-1	L End	74.00	1.00		1337							
7-1	R End	74.00	14.00		1337							
7-2	L End	74.00	16.00	5534	1114	189	4609	Threaded r	50000	0.09		
7-2	R End	74.00	26.50	5534	1114	189	4609	Threaded r	50000	0.09		
7-3	L End	74.00	28.50		980							
7-3	R End	74.00	37.50		980							
7-4	L End	74.00	39.50	5556	1158	196	4594	Threaded r	50000	0.09		
7-4	R End	74.00	50.50	5556	1158	196	4594	Threaded r	50000	0.09		

WoodWorks® Shearwalls**Central Hotel - Woodworks Lateral O - Grid D**
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7-5	L End	74.00	52.50		936					
7-5	R End	74.00	61.00		936					
7-6	L End	74.00	63.00	5037	579	98	4556	Threaded r	50000	0.09
7-6	R End	74.00	67.50	5037	579	98	4556	Threaded r	50000	0.09
7-7	L End	74.00	69.50		1827					
7-7	R End	74.00	88.00		1827					
Line A										
A-1	L End	1.00	0.00	3776	624	106	3258	Threaded r	50000	0.07
A-1	R End	6.00	0.00	3776	624	106	3258	Threaded r	50000	0.07
A-2	L End	8.00	0.00		713					
A-2	R End	14.00	0.00		713					
A-3	L End	16.00	0.00	3823	668	113	3268	Threaded r	50000	0.07
A-3	R End	21.50	0.00	3823	668	113	3268	Threaded r	50000	0.07
A-4	L End	23.50	0.00		757					
A-4	R End	30.00	0.00		757					
A-5	L End	32.00	0.00	3776	624	106	3258	Threaded r	50000	0.07
A-5	R End	37.00	0.00	3776	624	106	3258	Threaded r	50000	0.07
A-6	L End	39.00	0.00		802					
A-6	R End	46.00	0.00		802					
A-7	L End	48.00	0.00	4147	1914	324	2557	Threaded r	50000	0.05
A-7	R End	60.00	0.00	4147	2016	342	2472	Threaded r	50000	0.05
A-8	L End	62.00	0.00		1876					
A-8	R End	73.00	0.00		1876					
Line D										
D-1	L End	5.00	40.50	3939	1972	334	2302	Threaded r	50000	0.05
D-1	R End	29.50	40.50	3939	1972	334	2302	Threaded r	50000	0.05
Line E										
E-1	L End	5.00	49.00	3284	3273	554	566	Threaded r	50000	0.01
E-1	R End	47.00	49.00	3284	3200	542	627	Threaded r	50000	0.01
Line G										
G-1	L End	1.00	89.00	3820	624	106	3302	Threaded r	50000	0.07
G-1	R End	6.00	89.00	3820	624	106	3302	Threaded r	50000	0.07
G-2	L End	16.00	89.00	3829	668	113	3274	Threaded r	50000	0.07
G-2	R End	21.50	89.00	3829	668	113	3274	Threaded r	50000	0.07
G-3	L End	23.50	89.00		757					
G-3	R End	30.00	89.00		757					
G-4	L End	32.00	89.00	3829	668	113	3274	Threaded r	50000	0.07
G-4	R End	37.50	89.00	3829	668	113	3274	Threaded r	50000	0.07
G-5	L End	39.50	89.00		757					
G-5	R End	46.00	89.00		757					
G-6	L End	48.00	89.00	3829	668	113	3274	Threaded r	50000	0.07
G-6	R End	53.50	89.00	3829	668	113	3274	Threaded r	50000	0.07
G-7	L End	55.50	89.00		1737					
G-7	R End	73.00	89.00		1737					

Legend:**Line-Wall:**

At wall or opening – Shearline and wall number

At vertical element - Shearline

Posit'n - Position of stud that hold-down is attached to:

V Elem - Vertical element: column or strengthened studs required where not at wall end or opening

L or R End - At left or right wall end

L or R Op n - At left or right side of opening n

Location - Co-ordinates in Plan View**Hold-down Forces:**

Shear – Seismic shear overturning component, factored for ASD by 0.7. For perforated walls, T from SDPWS 4.3-8 is used

Dead – Dead load resisting component, factored for ASD by 0.60

Ev – Vertical seismic load effect from ASCE 7 12.4.2.2 = $-0.2S_d \times \text{ASD seismic factor} \times \text{unfactored } D = 0.169 \times \text{factored } D$. Refer to Seismic Information table for more details.

Cmb'd - Sum of ASD-factored overturning, dead and vertical seismic forces. May also include the uplift force t for perforated walls from SDPWS 4.3.6.2.1 when openings are staggered.

Hold-down – Device used from hold-down database

Cap – Allowable ASD tension load

Crit. Resp. – Critical Response = Combined ASD force/Allowable ASD tension load

Notes:

^WARNING - This hold-down does not have design capacities for the thickness of end studs selected, so additional jack studs or blocking required. Shear overturning force is horizontal seismic load effect Eh from ASCE 7 12.4.2.

Uses load combination 8 from ASCE 7 2.4.1 = $0.6D + 0.7(E_h - E_v)$.

Anchor bolts must have minimum 0.229" x 3" x 3" steel plate washers, conforming to specifications in SDPWS 4.3.6.4.3 and 4.4.1.6.

Refer to Shear Results table for factor Co, and shearline dimensions table for the sum of Li, used to calculate tension force T for perforated walls

CENTRAL LOFTS

CALCULATIONS IN RESPONSE TO CITY COMMENTS

PORTLAND, OREGON
(JONES ARCHITECTURE)



FEBRUARY 23, 2021
JOB NUMBER: 16-T149



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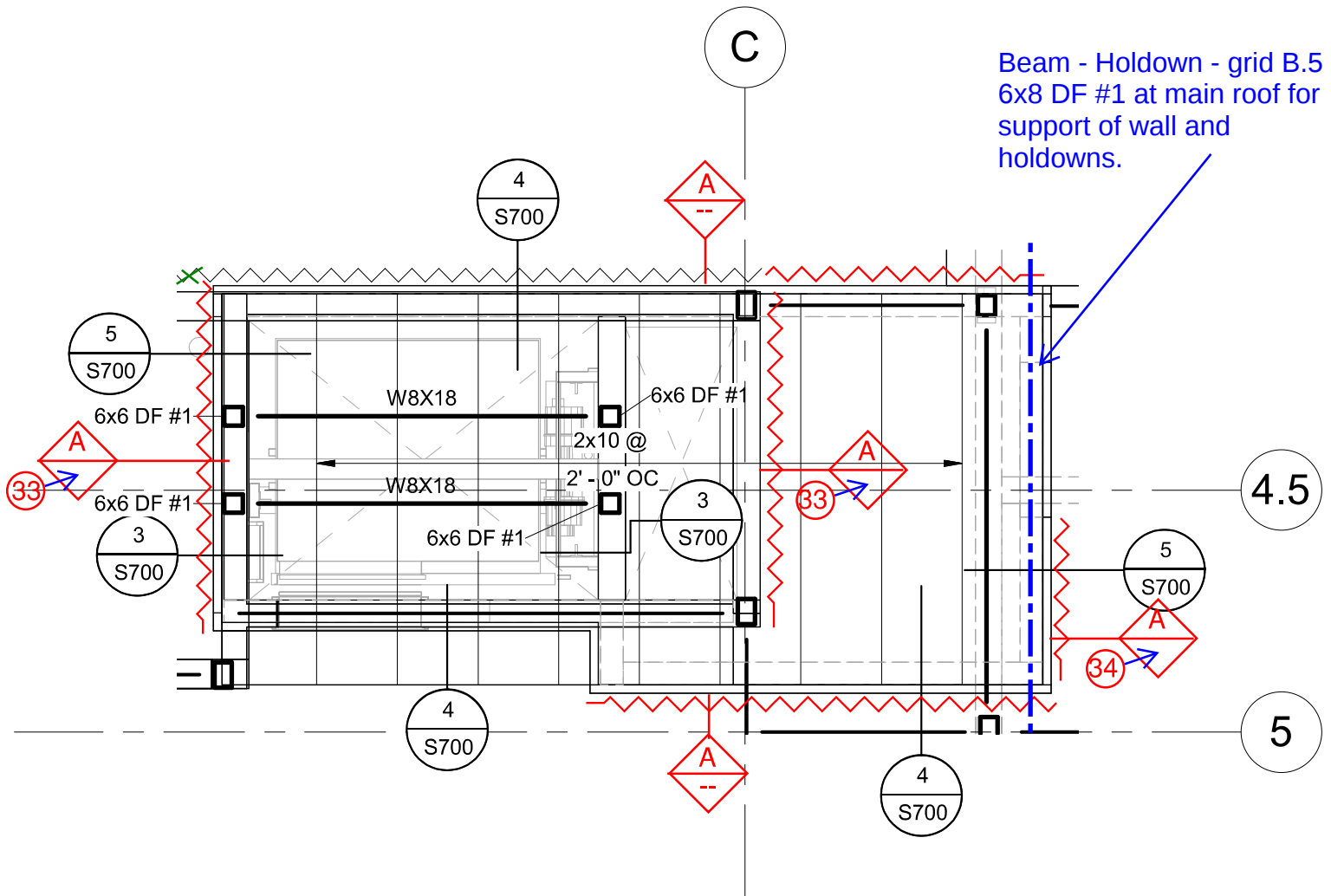
*** LIMITATIONS ***

ENGINEER WAS RETAINED IN A LIMITED CAPACITY FOR THIS PROJECT.
DESIGN IS BASED UPON INFORMATION PROVIDED BY THE CLIENT, WHO IS SOLELY
RESPONSIBLE FOR ACCURACY OF SAME. NO RESPONSIBILITY AND / OR
LIABILITY IS ASSUMED BY, OR IS TO BE ASSIGNED TO THE ENGINEER
FOR ITEMS BEYOND THAT SHOWN ON THESE SHEETS.

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33. SIMPSON DTT2Z HOLDOWNS PER DETAIL 11/S802.

34. SIMPSON DTT2Z HOLDOWN PER DETAIL 12/S802.



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CLIENT:

PROJECT: Central Lofts

NUMBER:

DATE: 1/4/2020

BY:

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Item #4

ASCE 29.5.1 Wind

Rooftop Structures

$$F_h = q_h (GC_r) A_f$$

$$A_f = 21' (9.25') = 194 \text{ ft}^2$$

$$\text{Vert. Area of building} = 74' (44') = 3256 \text{ ft}^2$$

$$194 / 3256 = 6\%$$

$$\therefore A_f < 0.1 B_h$$

$$GC_r = 1.9$$

$$q_h = 0.00256 k_z k_{zt} k_d V^2$$
$$= 26.7 \text{ psf}$$

$$V = 120 \text{ mph}$$

$$k_d = 0.85$$

$$k_z = 0.85$$

$$k_{zt} = 1.0$$

$$F_h = 26.7 (1.9) = 50.8 \text{ psf } (A_f)$$

$$\text{Wind} = 10^{1/2} (50.8 \text{ psf}) = 254 \text{ pcf}$$

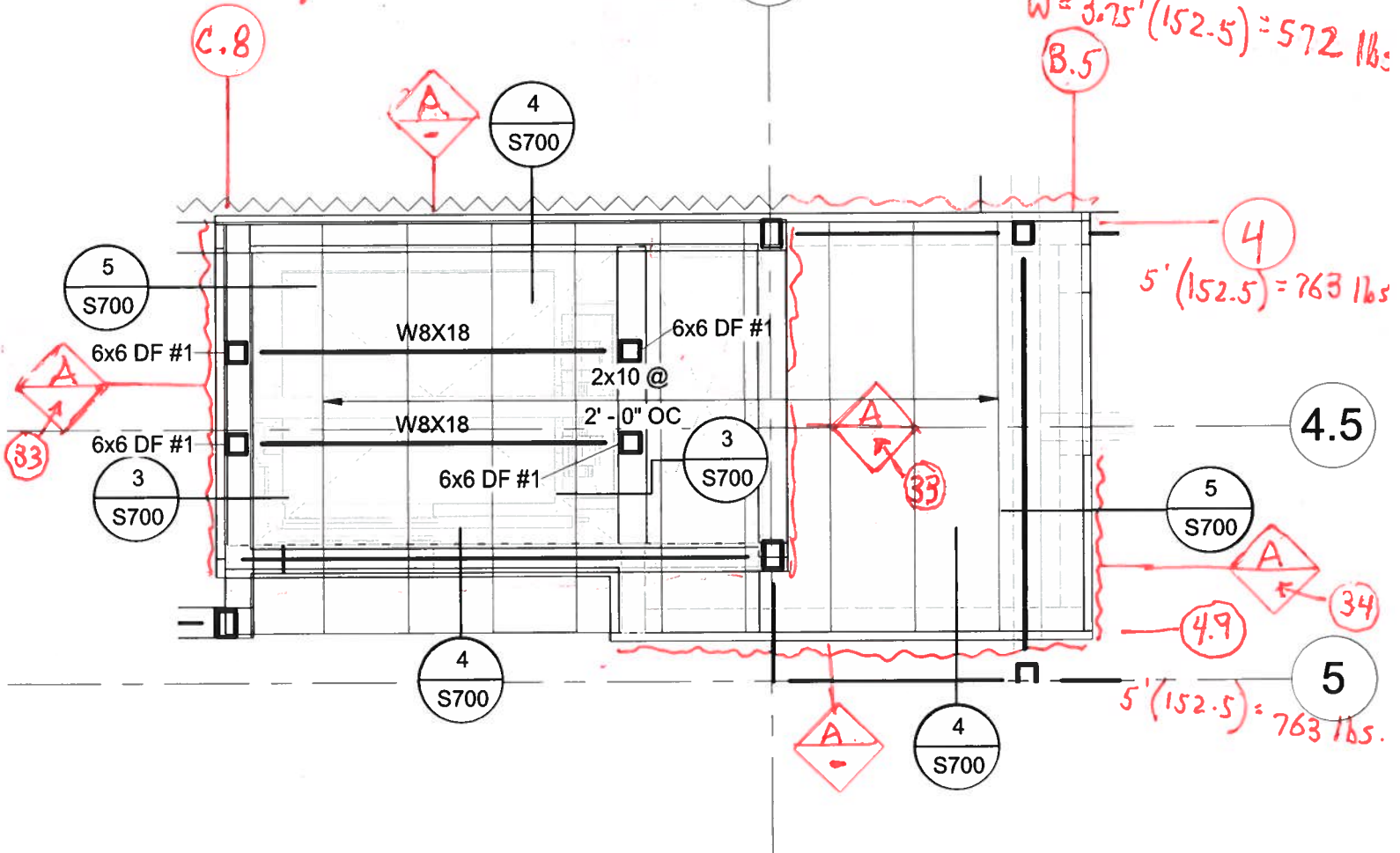
$$\underline{\text{ASD}} = 0.6 (254 \text{ pcf}) = \underline{152.5 \text{ pcf}}$$

SUBMITTED 2/26/21

$$9.58'(152.5) = 1461 \text{ lbs.}$$

$$W = 6.4'(152.5) = 976 \text{ lbs}$$

$$W = 3.25'(152.5) = 572 \text{ lbs}$$





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Shear Walls & Holdowns

Roof to 2nd Floor

Roof DL: 15 psf
Floor DL: 0 psf
Wall DL: 12 psf
Stud Spacing: 16 inches oc

Client:
Project:
Project #:
Date:
By:

L = Length of individual wall
Lt = Total length of wall along gridline
La = Length of moment arm in wall (if different than wall length)
h_{rf} = Wall Height flx to roof
h₄ = Height of wall flr3-flr4
h₃ = Height of wall flr2-flr3
h₂ = Height of wall flr1-flr2
V_{rf} = Horizontal force at gridline from roof
V₄ = Horizontal force at gridline from 4th flr
V₃ = Horizontal force at gridline from 3rd flr
V₂ = Horizontal force at gridline from 2nd flr
v = Unit shear in wall
Ms = Overturning moment when upper wall is stacked above lower wall
Mu = Overturning moment when upper wall is not stacked or does not exist
R_{trib}, W_{trib}, F_{trib} = Roof, wall, and floor tributary area, used for calculating dead load
Mr = Resisting moment due to dead load
Tu = Tension if walls not stacked
Ts = Tension if walls stacked
S = Stud spacing
Cs = Compression at ends, if walls stacked

$$v = (V_{rf} + V_4 + V_3 + V_2) / L_t$$

$$Ms = [V_{rf}(h_{rf} + h_3 + h_2 + 3) + V_4(h_4 + h_3 + h_2 + 2) + V_3(h_3 + h_2 + 1) + V_2(h_2)] \times \frac{L}{L_t}$$

$$Mu = [V_{rf}(h_i) + V_4(h_i) + V_3(h_i) + V_2(h_i)] \times \frac{L}{L_t}$$

$$Wind : Mr = 0.6[(R_{trib} \times RoofDL) + (W_{trib} \times WallIDL) + (F_{trib} \times FloorDL)] \times \frac{L^2}{2}$$

$$Seismic : Mr = (0.6 - .14 S_{ds})[(R_{trib} \times RoofDL) + (W_{trib} \times WallIDL) + (F_{trib} \times FloorDL)] \times \frac{L^2}{2}$$

$$Tu = \frac{Mu - Mr}{La} \quad Ts = \frac{Ms - Mr}{L}$$

$$Wind : C = \frac{Ms}{L} + \frac{S/2}{12} [(R_{trib} \times RoofDL) + (W_{trib} \times WallIDL) + (F_{trib} \times FloorDL)]$$

$$Seismic : Cs = \frac{Ms}{L} + \frac{S/2}{12} (1 + 0.14 S_{ds}) [(R_{trib} \times RoofDL) + (W_{trib} \times WallIDL) + (F_{trib} \times FloorDL)]$$

Wall Grid	L (ft)	Lt (ft)	La (ft)	h _{rf} (ft)	V _{rf} (lb)	v (plf)	Mu (lb-ft)	R _{trib} (ft)	W _{trib} (ft)	F _{trib} (ft)	Mr (lb-ft)	Cs (lbs)	Tu (lbs)	Comments	Holdowns	Shearwall Nailing	Controlling Event
Front-Back Event																	
B.5	4	4	3.5	10	572	143	5720	4	10	0	864	1754	1387			6/12	W
C	8	8	7.5	10	1461	183	14610	4	10	0	3456	2068	1487			6/12	W
C.8	8	8	7.5	10	976	122	9760	4	10	0	3456	1421	841			6/12	W
Side - Side Event																	
4	20.5	20.5	20	10	763	37	7630	4	10	0	22694	502	-753			6/12	W
4.9	11	11	10.5	10	763	69	7630	5	10	0	7079	857	53			6/12	W

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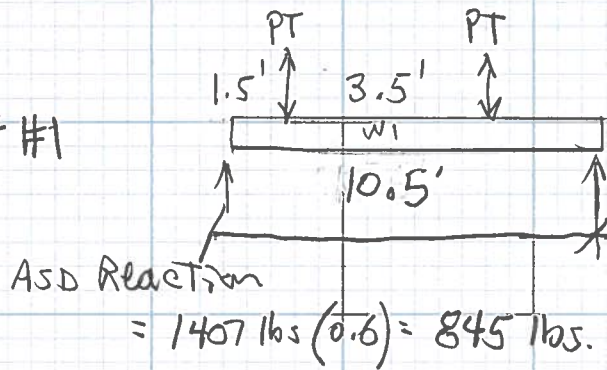
Item #4

Roof VE Comments

Item #4

Beam - Holdown Grid B.5

6x8 DP #1



• Simpson HU46 Hangers
to Beam.

PT: Wind overturning
ASD = 1387 lbs.

$$\text{Strength} = \frac{1387 \text{ lbs}}{0.6} = 2312 \text{ lbs.}$$

$$W_1: DL = 10' (12 \text{ psf}) + 50 = 170 \text{ plf}$$

$$LL = 50 \text{ plf}$$

SUBMITTED 2/26/21



WoodWorks®
SOFTWARE FOR WOOD DESIGN

COMPANY

PROJECT

Item #4

Jan. 20, 2021 10:41

Beam - Holdown Grid B.5.wwb

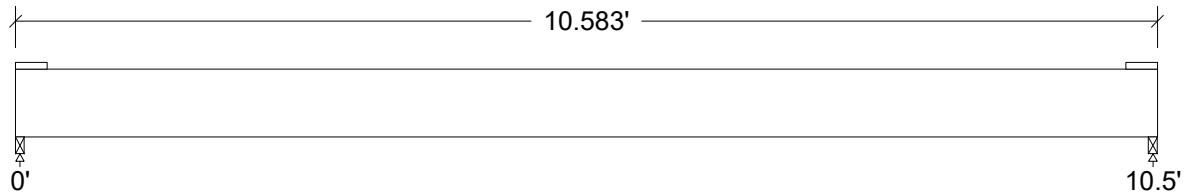
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 1)

Loads:

Load	Type	Distribution	Pat- tern	Location [ft] Start End	Magnitude Start End	Unit
Load1	Wind	Point		1.54	2312	lbs
Load2	Wind	Point		5.04	-2312	lbs
Load3	Dead	Full UDL			120.0	plf
Load4	Live	Full UDL			50.0	plf
Self-weight	Dead	Full UDL			9.8	plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



Unfactored:			
Dead	686		686
Live	265		265
Wind	771		-771
Factored:			
Uplift			-51
Total	1232		951
Bearing:			
Capacity			
Beam	3437		3437
Support	3672		3672
Des ratio			
Beam	0.36		0.28
Support	0.34		0.26
Load comb	#3		#2
Length	1.00*		1.00*
Min req'd	1.00*		1.00*
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.07		1.07
Fcp sup	625		625

*Minimum bearing length setting used: 1" for end supports

Timber-soft, D.Fir-L, No. 1, 6x8 (5-1/2"x7-1/2")

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 10.58'; Clear span: 10.417'; Volume = 3.0 cu.ft.; Post or timber

Lateral support: top = at supports, bottom = at supports;

This section PASSES the design code check.

SUBMITTED 2/26/21

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	$f_v = 30$	$F_v' = 170$	psi	$f_v/F_v' = 0.18$
Bending(+)	$f_b = 577$	$F_b' = 1200$	psi	$f_b/F_b' = 0.48$
Bending(-)	$f_b = 330$	$F_b' = 1920$	psi	$f_b/F_b' = 0.17$
Live Defl'n	$-0.11 = < L/999$	$0.35 = L/360$	in	0.31
Total Defl'n	$0.22 = L/582$	$0.52 = L/240$	in	0.41

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
F_v'	170	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
$F_b'+$	1200	1.00	1.00	1.00	1.000	1.000	-	1.00	1.00	1.00	-	2
$F_b'-$	1200	1.60	1.00	1.00	1.000	1.000	-	1.00	1.00	1.00	-	4
F_{cp}'	625	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.6 million	1.00	1.00	1.00	-	-	-	-	1.00	1.00	-	2

CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = D+L

Bending(+): LC #2 = D+L

Bending(-): LC #4 = .6D+.6W

Deflection: LC #4 = .6D+.6W (live)

LC #2 = D+L (total)

Bearing : Support 1 - LC #3 = D+.75(L+.6W)

Support 2 - LC #2 = D+L

Support 2 - LC #4 = .6D+.6W

D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake

All LC's are listed in the Analysis output

Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.2

CALCULATIONS: $V_{max} = 944$, $V_{design} = 824$ lbs; $M(+)$ = 2478 lbs-ft; $M(-)$ = 1418 lbs-ft $EI = 309.37e06$ lb-in²

"Live" deflection is due to all non-dead loads (live, wind, snow...)

Total deflection = 1.5 dead + "live"

Design Notes:

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2018), the National Design Specification (NDS 2018), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.