LONGITUDE
ONE TWENTY°
ENGINEERING & DESIGN

Structural Package for:

Eadie Residence

5411 96th Ave SE
Mercer Island, WA 98040

Project No: S240119-2

March 7, 2024

STRUCTURAL ENGINEER
L120 ENGINEERING & DESIGN
13150 91ST PL NE
KIRKLAND, WA 98034
CONTACT: MANS THURFJELL, PE
PHONE: 425-636-3313
MTHURFJELL@L120ENGINEERING.COM

Project Number:	Plan Name:	Sheet Number:
S220425-3	Eadie Remodel	DC
Engineer:	Specifics:	Date:
HK	Design Criteria	3/6/2024

Gravity Criteria: Code: IBC 2018

ROOF SYSTEM		
Live Load:		
Snow	25.0	psf
Dead Load:		
Composite Roofing	2.0	psf
19/32" Plywood Sheathing	2.5	psf
Trusses at 24" o.c.	3.0	psf
Insulation	1.8	psf
(2) Layers 5/8" GWB	4.4	psf
Misc/Mech	1.3	psf
Total	**15.0**	**psf**

FLOOR SYSTEM		
Live Load:		
Residential	40.0	psf
Dead Load:		
Flooring	3.0	psf
3/4" T & G Plywood	2.5	psf
Floor Joists at 16" o.c.	2.5	psf
Insulation	0.5	psf
(1) Layers 5/8" GWB	2.2	psf
Miscellaneous	4.3	psf
Total	**15.0**	**psf**

EXTERIOR WALL SYSTEM		
2x6 at 16" o.c.	1.7	psf
Insulation	1.0	psf
1/2" Plywood Sheathing	1.5	psf
(2) layers 5/8" GWB	4.4	psf
Misc	3.4	psf
Total	**12.0**	**psf**
Inclu. thinset stone veneer	5.0	psf
Total	**17.0**	**psf**

INTERIOR WALL SYSTEM		
2x4 at 16" o.c.	1.1	psf
Insulation	0.5	psf
(2) Layers 5/8" GWB	4.4	psf
Misc	2.0	psf
Total	**8.0**	**psf**

SEISMIC PARAMETERS:

Code Reference: ASCE 7-16
R = **6.5** Bearing Wall System, Wood Structural Panel Walls
Mapped Spectral Acceleration, Ss = **1.44**
Mapped Spectral Acceleration, S1 = **0.5**
Soil Site Class = **D**

WIND PARAMETERS:

Code Reference: ASCE 7-16
Basic Wind Speed (3 second Gust) = **100** mph
Exposure : **C**
Kzt = **1.00**

SOIL PARAMETERS:

Soil Bearing Pressure = **1,500** psf competent native soil or structural fill
1/3 increase for short-term wind or seismic loading is acceptable
Frost Depth = **18** in

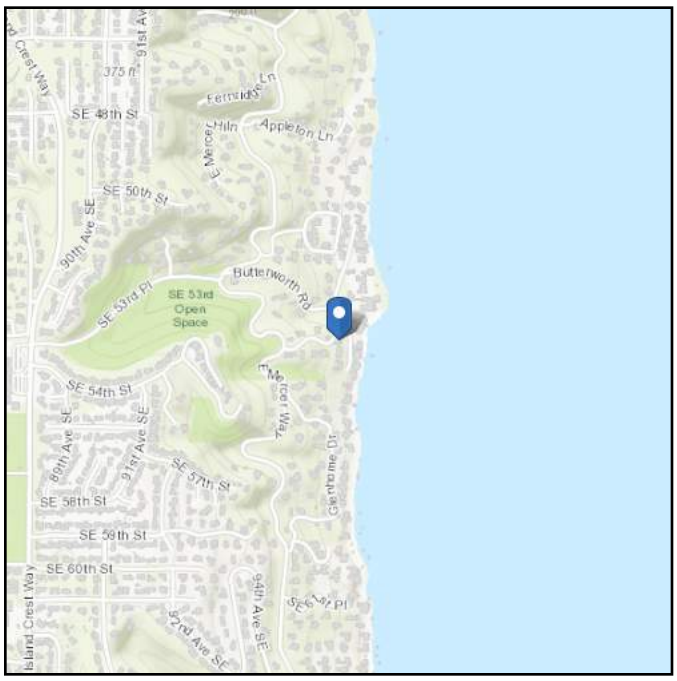
Lateral Wall Pressures:
Unrestrained Active Pressure = **35** pcf Cantilevered walls
Restrained Active Pressure = **55** pcf Plate Wall Design/Tank Walls
Passive Pressure = **250** pcf *Ignore top 2 ft
Soil Friction Coeff. = **0.4**

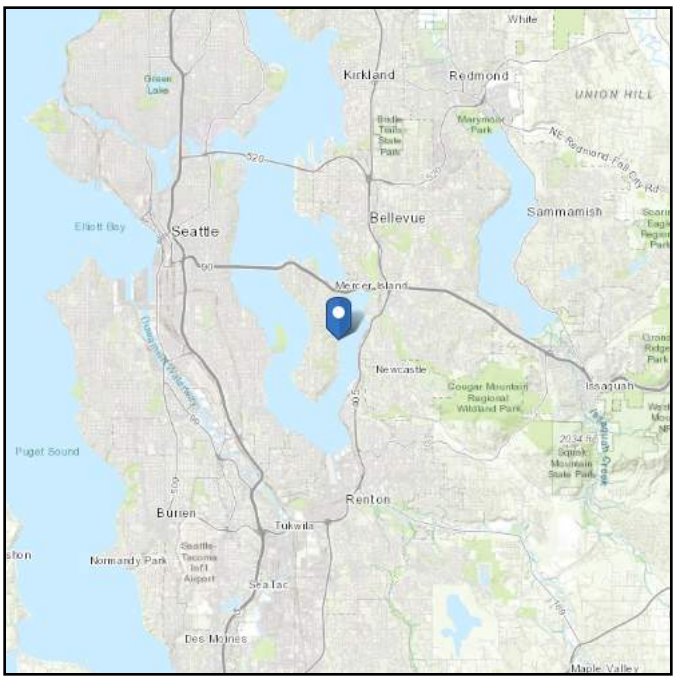
ASCE Hazards Report

Address:
5411 96th Ave SE
Mercer Island, Washington
98040

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Stiff Soil

Latitude: 47.55463
Longitude: -122.210626
Elevation: 0 ft (NAVD 88)





Wind

Results:

Wind Speed	98 Vmph
10-year MRI	67 Vmph
25-year MRI	74 Vmph
50-year MRI	78 Vmph
100-year MRI	83 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Wed Feb 07 2024

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

Seismic

Site Soil Class: D - Stiff Soil

Results:

S_S :	1.44	S_{D1} :	N/A
S_1 :	0.5	T_L :	6
F_a :	1	PGA :	0.616
F_v :	N/A	PGA_M :	0.678
S_{MS} :	1.44	F_{PGA} :	1.1
S_{M1} :	N/A	I_e :	1
S_{DS} :	0.96	C_v :	1.388

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Wed Feb 07 2024

Date Source: USGS Seismic Design Maps

The ASCE Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

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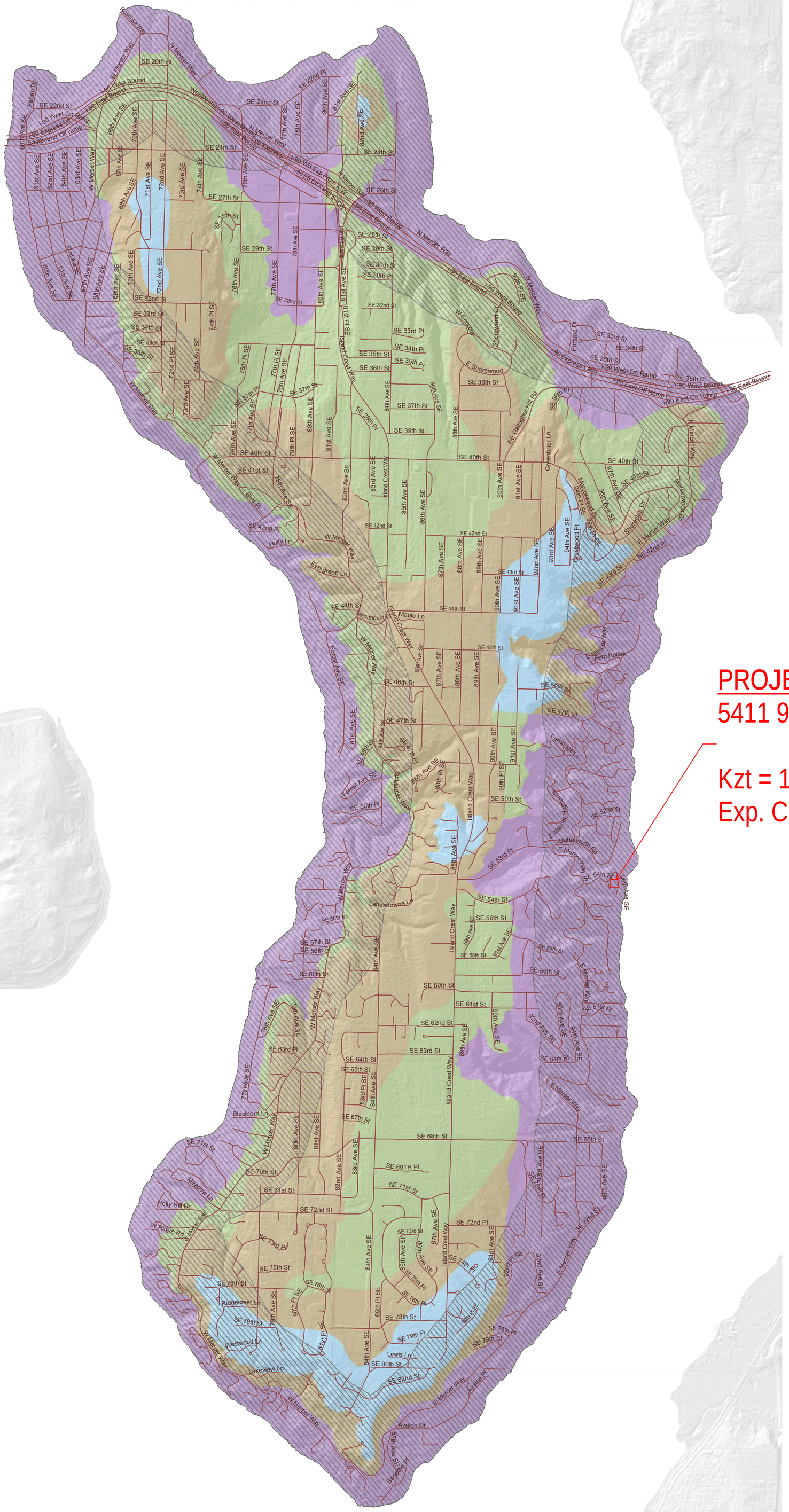
Mercer Island Wind Exposure and Wind Speed-Up (Topographic Effect)

by Development Services Group (DSG), City of Mercer Island
April 2009

0 0.5 1 Kilometers 1:12,000
0 0.5 1 Miles

N



WIND EXPOSURE CATEGORIES & WIND SPEED-UP FACTORS
(ICC Section 1609 & ASCE 7-05 Chapter 6)

It is the responsibility of the Owner (or their Design Professional) to review site conditions and determine the Kzt factor to be utilized for each specific project. The Kzt factors and wind exposure categories indicated on this map are the minimum values accepted by the City of Mercer Island without requiring the design professional to submit additional calculations and supporting topographic documentation (to verify the values utilized in their wind load determination).

Please note – The Kzt values indicated on this map are approximations based upon periodic calculations of representative samplings around Mercer Island. These values are intended for City of Mercer Island's plan review purposes only.

WIND EXPOSURE CATEGORIES:

Wind Exposure Category	
	Exposure 'C' (1500 feet from Lake)
	Exposure 'B' (all other areas)

WIND SPEED-UP (TOPOGRAPHIC EFFECT) - K_zt Factor :

K_zt Factor	
	$K_zt = 1.0$
	$K_zt = 1.3$
	$K_zt = 1.6$
	$K_zt = 1.9$

PROJECT LOCATION:
5411 96TH AVE SE

Kzt = 1.0
Exp. Cat = C

GENERAL NOTES FOR WIND EXPOSURE AND WIND SPEED-UP MAP

This map is the Wind Exposure Category and Wind Speed-up (Topographic Effects) Map for the City of Mercer island. This map shows the minimum wind exposure category and the minimum wind speed-up, "K_zt" factor, which will be accepted without site specific documentation and calculation.

Other wind speed phenomena may occur on Mercer Island that is not specifically indentified on this map. It is the responsibility of the Owner (or their Design Professional) to review site conditions and determine the appropriate design wind speed and exposure category for their specific project and location.

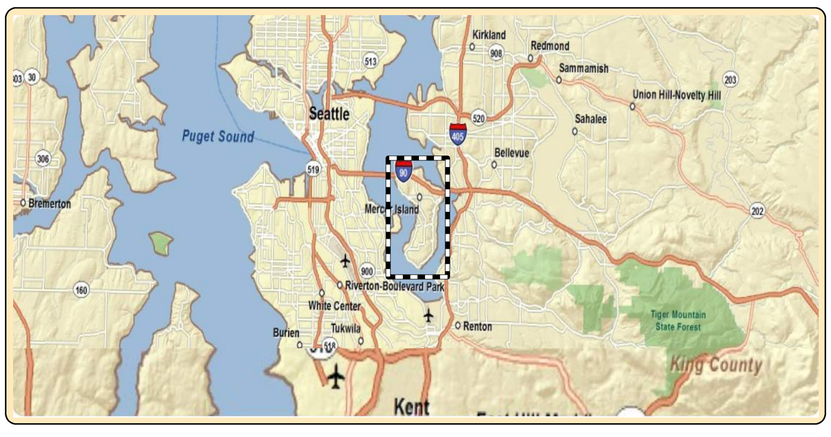
This map is for the sole use of the staff of the City of Mercer Island's Development Services Group (DSG) for the purposes of permit application evaluation. This map provides DSG staff a general assessment of Wind Exposure Category and Wind Speed-up (Topographic Effects). All areas have not been specifically evaluated and there may be locations that are not correctly represented on this map. It is the responsibility of individual property owners and map users to evaluate risk associated with their proposed development. No site-specific assessment of risk is implied or otherwise indicated by the City of Mercer Island with this map.

Information about data used for the map, references, and data limitation are all described the associated "Read Me" document. The digital version of this map is accompanied by a meta data file containing pertinent information about map construction. This data map is available on the City of Mercer Island website.

The City of Mercer Island is using guidance provided within ICC Section 1609 & ASCE 7-05 Chapter 6 regarding definitions used when creating this map.

DEFINITIONS:

K_zt factor:	The topographic effect of wind speed-up at isolated hills, ridges, and escarpments constituting abrupt changes in the general topography, located in any exposure category, that meet all of the conditions noted in ASCE 7-05 Minimum Design Loads for Buildings and Other Structures, Section 6.5.7.
Exposure B:	The wind exposure category that applies where the site in question is located a minimum of 1500 feet from the shoreline and the mean roof height is less than or equal to 30 feet per IBC 2006 section 1609.4.3.
Exposure C:	The wind exposure category that applies where the site in question is located within 1500 feet from the shoreline per IBC 2006 section 1609.4.3.
Wind Speed:	Minimum 85 mph 3-second gust per IRC Figure R301.2(4)



LONGITUDE
ONE TWENTY°
ENGINEERING & DESIGN

FRAMING CALCULATIONS

BEAM REFERENCE PER PLAN

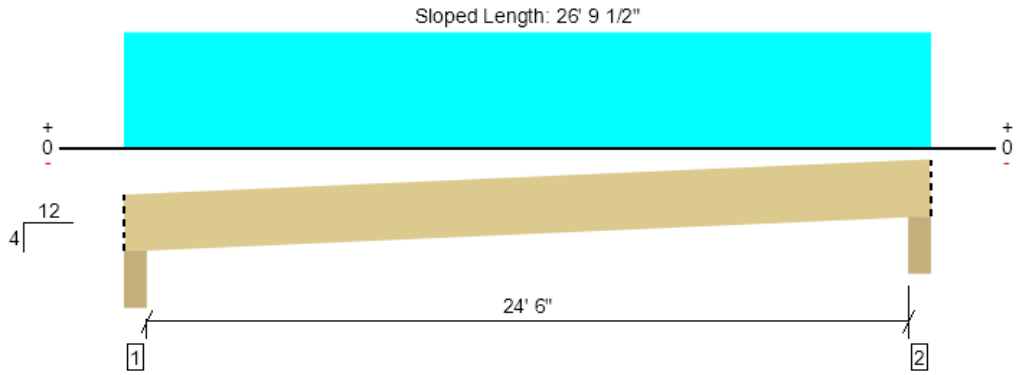
(425) 636 3313
L120Engineering.com

Roof			
Member Name	Results (Max UTIL %)	Current Solution	Comments
RJ-1	Passed (85% ΔT)	2 piece(s) 2 x 10 DF No.2 @ 16" OC	
RJ-2	Passed (92% M)	1 piece(s) 2 x 8 DF No.2 @ 16" OC	
RJ-3	Passed (89% ΔT)	2 piece(s) 2 x 8 DF No.2 @ 16" OC	
RB-1	Passed (83% ΔT)	1 piece(s) 3 1/2" x 9" 24F-V4 DF Glulam	
RB-2	Passed (34% R)	1 piece(s) 3 1/2" x 7 1/2" 24F-V4 DF Glulam	
RB-3	Passed (89% R)	1 piece(s) 5 1/2" x 12" 24F-V4 DF Glulam	
RB-4	Passed (52% ΔT)	1 piece(s) 5 1/2" x 12" 24F-V4 DF Glulam	
RB-5	Passed (36% R)	1 piece(s) 3 1/2" x 12" 24F-V4 DF Glulam	
RB-6	Passed (29% M+)	1 piece(s) 3 1/2" x 7 1/2" 24F-V4 DF Glulam	
RB-7	Passed (33% R)	1 piece(s) 4 x 8 DF No.2	
RB-8	Passed (86% ΔT)	1 piece(s) 5 1/2" x 10 1/2" 24F-V4 DF Glulam	
RB-9	Passed (59% M)	1 piece(s) 4 x 8 DF No.2	
RB-10	Passed (17% M)	1 piece(s) 4 x 8 DF No.2	
2nd Floor			
Member Name	Results (Max UTIL %)	Current Solution	Comments
2H-1	Passed (28% R)	1 piece(s) 6 3/4" x 10 1/2" 24F-V4 DF Glulam	
2H-2	Passed (40% R)	1 piece(s) 4 x 6 DF No.2	
2H-3	Passed (11% R)	1 piece(s) 4 x 8 DF No.2	
2H-4	Passed (17% M)	2 piece(s) 2 x 8 DF No.2	
2H-5 (with RB-1 in place)	Passed (6% R)	1 piece(s) 4 x 8 DF No.2	
2H-5 (without RB-1 in place)	Passed (23% R)	1 piece(s) 4 x 8 DF No.2	
2J-1	Passed (59% M)	2 piece(s) 2 x 10 DF No.2 @ 16" OC	
2J-2	Passed (73% ΔL)	1 piece(s) 2 x 10 DF No.2 @ 12" OC	
2J-3 (Upper Deck Joist)	Passed (27% M)	1 piece(s) 2 x 8 DF No.2 @ 16" OC	
2J-4	Passed (66% M)	1 piece(s) 2 x 10 DF No.2 @ 16" OC	
2J-5	Passed (76% M)	1 piece(s) 2 x 10 DF No.2 @ 12" OC	
2J-6	Passed (73% M)	1 piece(s) 2 x 10 DF No.2 @ 16" OC	
2B-1	Passed (38% R)	2 piece(s) 2 x 8 DF No.2	
2B-2	Passed (98% ΔL)	1 piece(s) 5 1/4" x 9 1/2" 2.2E Parallam® PSL	
2B-3	Passed (37% R)	2 piece(s) 2 x 10 DF No.2	
2B-4	Passed (80% M+)	1 piece(s) 3 1/2" x 9" 24F-V4 DF Glulam	
2B-5	Passed (39% ΔL)	1 piece(s) 3 1/2" x 9" 24F-V4 DF Glulam	
2B-6	Passed (76% M+)	1 piece(s) 3 1/2" x 9" 24F-V4 DF Glulam	
2B-7	Passed (60% R)	2 piece(s) 2 x 10 DF No.2	
2B-8	Passed (85% ΔT)	2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL	
2B-9	Passed (90% R)	1 piece(s) 5 1/4" x 11 1/4" 2.2E Parallam® PSL	
2B-10	Failed (180% ΔL)	1 piece(s) 5 1/4" x 9 1/4" 2.2E Parallam® PSL	
2B-11	Passed (85% ΔL)	1 piece(s) 5 1/4" x 14" 2.2E Parallam® PSL	
2B-12	Passed (34% M+)	1 piece(s) 3 1/2" x 9" 24F-V4 DF Glulam	
2B-13	Passed (100% R)	2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL	
2B-14	Passed (59% R)	1 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL	
2B-15	Passed (68% R)	2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL	
2B-16	Passed (102% ΔL)	1 piece(s) 6 3/4" x 18" 24F-V4 DF Glulam	
2B-17	Passed (99% R)	2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL	
2B-18	Passed (95% ΔL)	1 piece(s) 5 1/4" x 14" 2.2E Parallam® PSL	

1st Floor			
Member Name	Results (Max UTIL %)	Current Solution	Comments
1H-1	Passed (72% ΔT)	1 piece(s) 5 1/2" x 15" 24F-V4 DF Glulam	
1H-2	Passed (54% M)	2 piece(s) 2 x 8 DF No.2	
1H-3	Passed (75% M+)	1 piece(s) 5 1/2" x 10 1/2" 24F-V4 DF Glulam	
1J-1	Passed (84% M)	1 piece(s) 2 x 10 DF No.2 @ 16" OC	
1B-1	Passed (100% R)	1 piece(s) 5 1/4" x 9 1/4" 2.2E Parallam® PSL	
1B-2	Passed (25% R)	1 piece(s) 5 1/4" x 9 1/4" 2.2E Parallam® PSL	
Basement			
Member Name	Results (Max UTIL %)	Current Solution	Comments
BH-1	Passed (43% R)	1 piece(s) 3 1/2" x 7 1/2" 24F-V4 DF Glulam	
BH-2	Passed (21% R)	2 piece(s) 2 x 8 DF No.2	
BH-3	Passed (52% R)	1 piece(s) 5 1/2" x 12" 24F-V4 DF Glulam	
BH-1	Passed (72% M)	1 piece(s) 4 x 10 DF No.2	

Roof, RJ-1

2 piece(s) 2 x 10 DF No.2 @ 16" OC



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	638 @ 4 1/2"	6683 (5.50")	Passed (10%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	578 @ 1' 2 1/4"	3830	Passed (15%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3818 @ 12' 8 1/2"	4668	Passed (82%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.974 @ 12' 8 1/2"	1.300	Passed (L/320)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	1.468 @ 12' 8 1/2"	1.733	Passed (L/213)	--	1.0 D + 1.0 S (All Spans)

Member Length : 27' 9/16"
System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 4/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Beveled Plate - HF	5.50"	5.50"	1.50"	214	424	638	Blocking
2 - Beveled Plate - HF	5.50"	5.50"	1.50"	214	424	638	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 1" o/c	
Bottom Edge (Lu)	26' 9" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 25' 5"	16"	12.0	25.0	Roof Load

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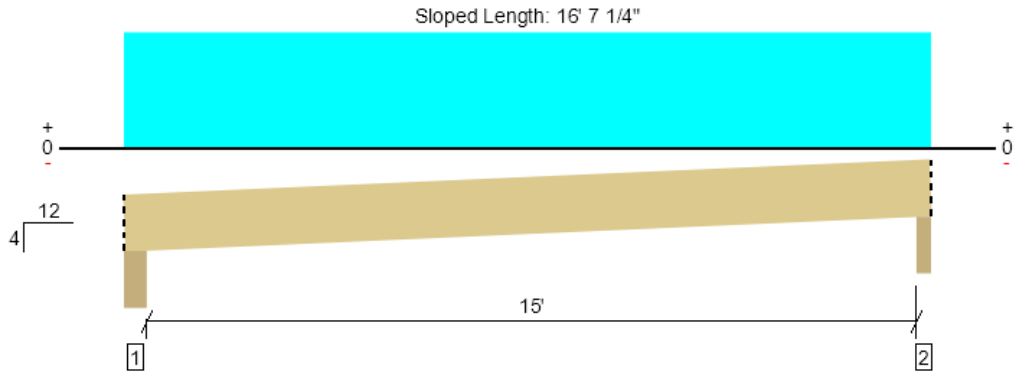
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, RJ-2

1 piece(s) 2 x 8 DF No.2 @ 16" OC



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	391 @ 15' 6 1/2"	2126 (3.50")	Passed (18%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	348 @ 1' 3/8"	1501	Passed (23%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1443 @ 7' 11 1/2"	1564	Passed (92%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.579 @ 7' 11 1/2"	0.799	Passed (L/332)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.871 @ 7' 11 1/2"	1.066	Passed (L/220)	--	1.0 D + 1.0 S (All Spans)

Member Length : 16' 9 5/8"
System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 4/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Beveled Plate - HF	5.50"	5.50"	1.50"	134	265	399	Blocking
2 - Beveled Plate - HF	3.50"	3.50"	1.50"	131	260	391	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 2" o/c	
Bottom Edge (Lu)	16' 7" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 15' 9"	16"	12.0	25.0	Roof Load

Weyerhaeuser Notes

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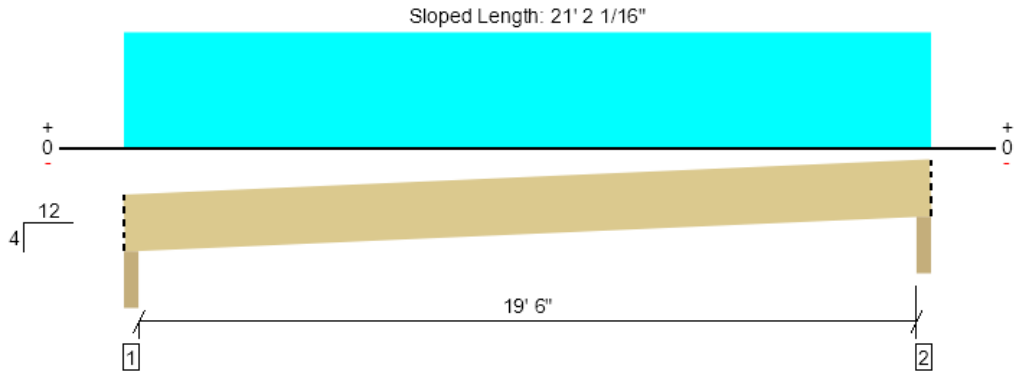
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, RJ-3

2 piece(s) 2 x 8 DF No.2 @ 16" OC



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	504 @ 2 1/2"	4253 (3.50")	Passed (12%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	461 @ 10 3/8"	3002	Passed (15%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2427 @ 10' 1/2"	3128	Passed (78%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.818 @ 10' 1/2"	1.037	Passed (L/304)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	1.232 @ 10' 1/2"	1.382	Passed (L/202)	--	1.0 D + 1.0 S (All Spans)

Member Length : 21' 4 7/16"
System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 4/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Beveled Plate - HF	3.50"	3.50"	1.50"	169	335	504	Blocking
2 - Beveled Plate - HF	3.50"	3.50"	1.50"	169	335	504	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	11' 11" o/c	
Bottom Edge (Lu)	21' 2" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 20' 1"	16"	12.0	25.0	Roof Load

Weyerhaeuser Notes

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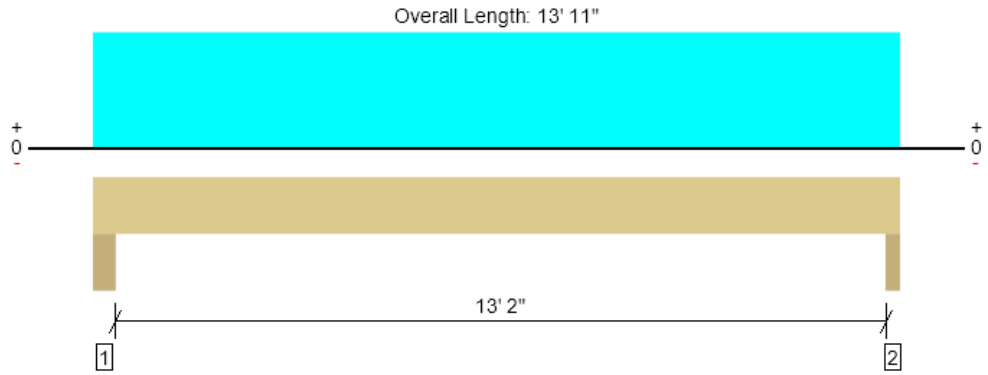
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

Roof, RB-1

1 piece(s) 3 1/2" x 9" 24F-V4 DF Glulam



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2693 @ 13' 9"	7963 (3.50")	Passed (34%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	2285 @ 1' 2 1/2"	6956	Passed (33%)	1.25	1.0 D + 1.0 Lr (All Spans)
Pos Moment (Ft-lbs)	8813 @ 7' 1/2"	11813	Passed (75%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.457 @ 7' 1/2"	0.671	Passed (L/352)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.746 @ 7' 1/2"	0.894	Passed (L/216)	--	1.0 D + 1.0 Lr (All Spans)

Member Length : 13' 11"
System : Roof
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 13' 5".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Roof Live	Factored	
1 - Trimmer - HF	5.50"	5.50"	1.50"	1068	1690	2758	None
2 - Trimmer - HF	3.50"	3.50"	1.50"	1043	1650	2693	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	13' 11" o/c	
Bottom Edge (Lu)	13' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 13' 11"	N/A	7.7	--	
1 - Uniform (PSF)	0 to 13' 11" (Front)	12'	12.0	20.0	Roof Load

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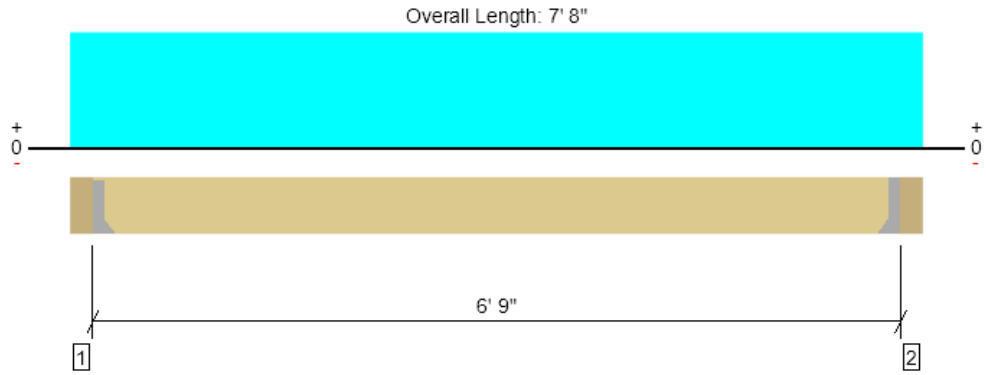
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

Roof, RB-2

1 piece(s) 3 1/2" x 7 1/2" 24F-V4 DF Glulam



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1145 @ 5 1/2"	3413 (1.50")	Passed (34%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	933 @ 1' 1"	5333	Passed (17%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	1933 @ 3' 10"	7547	Passed (26%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.047 @ 3' 10"	0.338	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.072 @ 3' 10"	0.450	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 6' 9"
System : Roof
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 6' 9".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Hanger on 7 1/2" GLB beam	5.50"	Hanger[1]	1.50"	436	863	1298	See note [1]
2 - Hanger on 7 1/2" GLB beam	5.50"	Hanger[1]	1.50"	436	863	1298	See note [1]

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 9" o/c	
Bottom Edge (Lu)	6' 9" o/c	

- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	LUS46	2.00"	N/A	4-16d	4-16d	
2 - Face Mount Hanger	LUS46	2.00"	N/A	4-16d	4-16d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	5 1/2" to 7' 2 1/2"	N/A	6.4	--	
1 - Uniform (PSF)	0 to 7' 8" (Front)	9'	12.0	25.0	Roof Load

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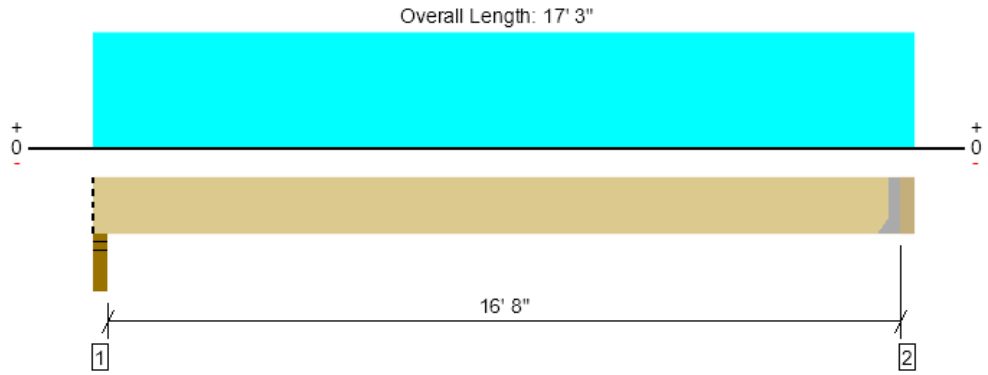
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

Roof, RB-3

1 piece(s) 5 1/2" x 12" 24F-V4 DF Glulam



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4794 @ 16' 11 1/2"	5363 (1.50")	Passed (89%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	4223 @ 15' 11 1/2"	13409	Passed (31%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	20126 @ 8' 6 3/4"	30360	Passed (66%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.471 @ 8' 6 3/4"	0.840	Passed (L/428)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.717 @ 8' 6 3/4"	1.119	Passed (L/281)	--	1.0 D + 1.0 S (All Spans)

Member Length : 16' 11 1/2"
System : Roof
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 16' 9 1/2".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - SPF	3.50"	3.50"	2.09"	1679	3211	4890	Blocking
2 - Hanger on 12" GLB beam	3.50"	Hanger[1]	1.50"	1698	3258	4956	See note [1]

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	17' o/c	
Bottom Edge (Lu)	17' o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	HGUS5.50/10	4.00"	N/A	46-10d	16-10d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 16' 11 1/2"	N/A	16.0	--	
1 - Uniform (PSF)	0 to 17' 3" (Top)	15'	12.0	25.0	Roof Load

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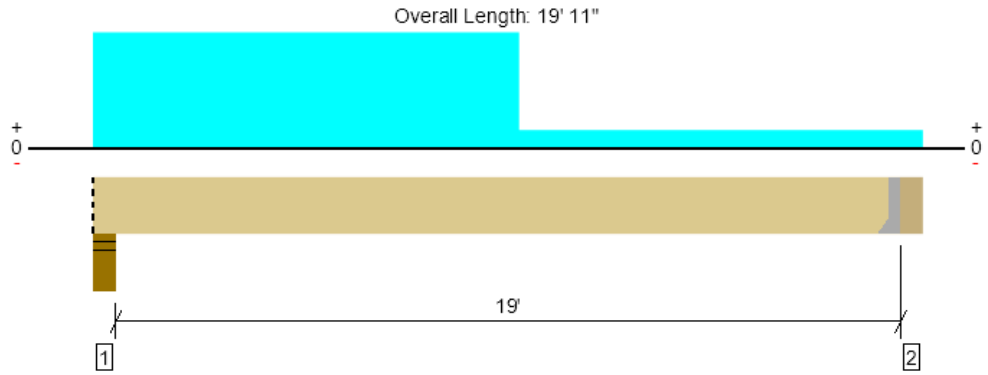
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

Roof, RB-4

1 piece(s) 5 1/2" x 12" 24F-V4 DF Glulam



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1961 @ 19' 5 1/2"	5363 (1.50")	Passed (37%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3340 @ 1' 5 1/2"	13409	Passed (25%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	15293 @ 8' 2 1/8"	30360	Passed (50%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.427 @ 9' 4 11/16"	0.956	Passed (L/538)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.665 @ 9' 5"	1.275	Passed (L/345)	--	1.0 D + 1.0 S (All Spans)

Member Length : 19' 5 1/2"
System : Roof
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 19' 1 1/2".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	5.50"	5.50"	1.82"	1426	2639	4065	Blocking
2 - Hanger on 12" GLB beam	5.50"	Hanger[1]	1.50"	751	1244	1995	See note [1]

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	19' 6" o/c	
Bottom Edge (Lu)	19' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	U610	2.00"	N/A	14-16d	6-10d	

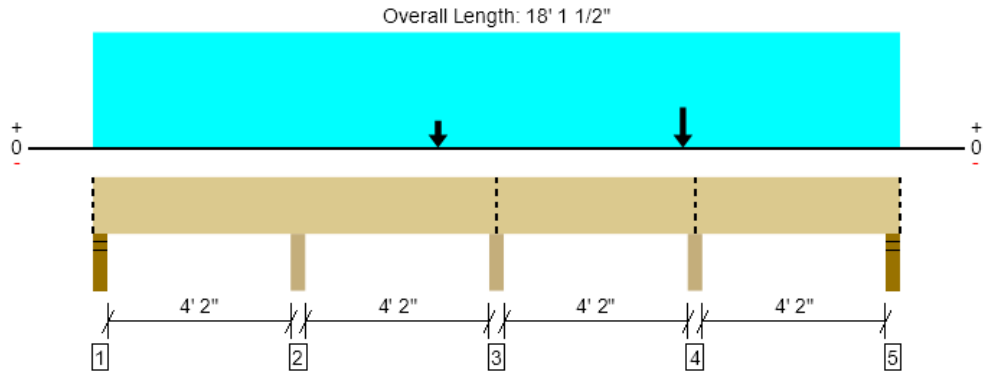
- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 19' 5 1/2"	N/A	16.0	--	
1 - Uniform (PSF)	0 to 19' 11" (Front)	1'	12.0	25.0	Roof Load
2 - Uniform (PSF)	10' 6" to 19' 11" (Front)	1'	12.0	25.0	Roof Load
3 - Uniform (PSF)	0 to 10' 6" (Back)	12'	12.0	25.0	Roof Load

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Roof, RB-5

1 piece(s) 3 1/2" x 12" 24F-V4 DF Glulam



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2864 @ 13' 6 1/4"	7963 (3.50")	Passed (36%)	--	1.0 D + 1.0 S (Adj Spans)
Shear (lbs)	1197 @ 7' 11"	8533	Passed (14%)	1.15	1.0 D + 1.0 S (Adj Spans)
Pos Moment (Ft-lbs)	887 @ 7' 9"	19320	Passed (5%)	1.15	1.0 D + 1.0 S (Alt Spans)
Neg Moment (Ft-lbs)	-881 @ 9' 3/4"	14893	Passed (6%)	1.15	1.0 D + 1.0 S (Adj Spans)
Live Load Defl. (in)	0.002 @ 7' 7/16"	0.223	Passed (L/999+)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.002 @ 7' 1/2"	0.297	Passed (L/999+)	--	1.0 D + 1.0 S (Alt Spans)

Member Length : 18' 1 1/2"
System : Roof
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 3' 3/16".
- Critical negative moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 2' 5 15/16".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	115	236	352	Blocking
2 - Column - DF	3.50"	3.50"	1.50"	480	913	1392	None
3 - Column - DF	3.50"	3.50"	1.50"	701	1376	2077	Blocking
4 - Column - DF	3.50"	3.50"	1.50"	1039	1824	2864	Blocking
5 - Stud wall - HF	3.50"	3.50"	1.50"	124	256	379	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

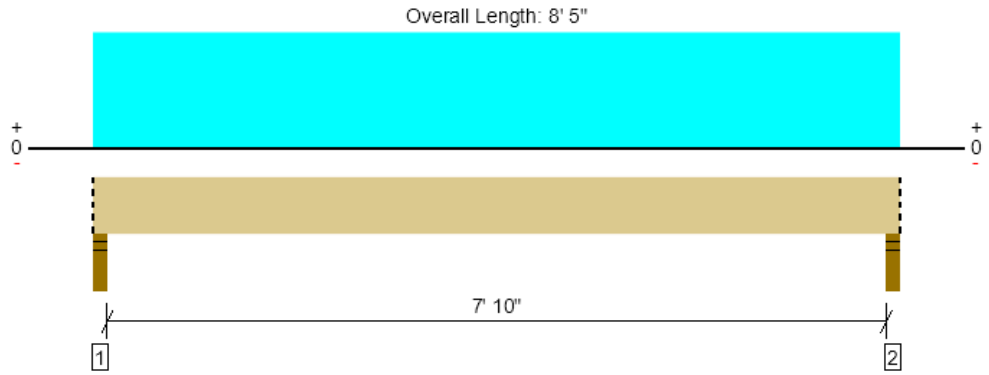
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	18' 2" o/c	
Bottom Edge (Lu)	18' 2" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 18' 1 1/2"	N/A	10.2	--	
1 - Uniform (PSF)	0 to 18' 1 1/2" (Front)	5'	12.0	25.0	Roof Load
2 - Point (lb)	7' 9" (Front)	N/A	436	863	Linked from: RB-2, Support 2
3 - Point (lb)	13' 3" (Front)	N/A	751	1244	Linked from: RB-4, Support 2

Roof, RB-6

1 piece(s) 3 1/2" x 7 1/2" 24F-V4 DF Glulam



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1109 @ 2"	5206 (3.50")	Passed (21%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	867 @ 11"	5333	Passed (16%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	2152 @ 4' 2 1/2"	7547	Passed (29%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.060 @ 4' 2 1/2"	0.404	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.114 @ 4' 2 1/2"	0.539	Passed (L/849)	--	1.0 D + 1.0 S (All Spans)

Member Length : 8' 5"
System : Roof
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 8' 1".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - SPF	3.50"	3.50"	1.50"	530	579	1109	Blocking
2 - Stud wall - SPF	3.50"	3.50"	1.50"	530	579	1109	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' 5" o/c	
Bottom Edge (Lu)	8' 5" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 8' 5"	N/A	6.4	--	
1 - Uniform (PSF)	0 to 8' 5" (Front)	5' 6"	12.6	25.0	Roof Load
2 - Uniform (PLF)	0 to 8' 5" (Top)	N/A	50.0	-	Wall Load Above

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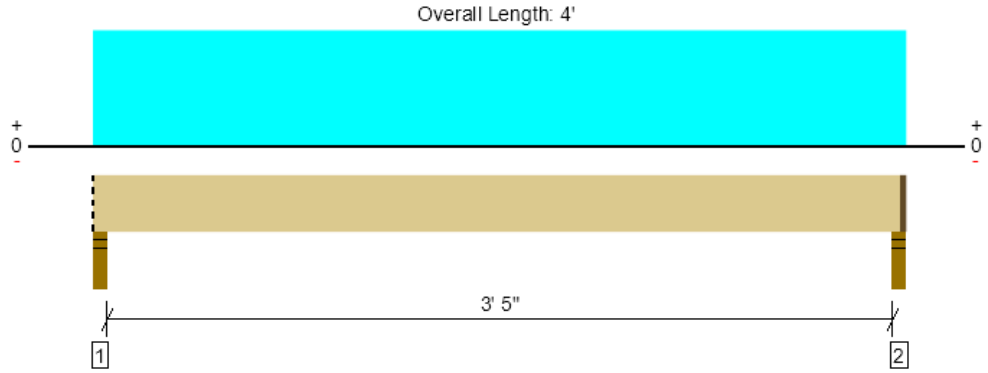
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

Roof, RB-7

1 piece(s) 4 x 8 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	930 @ 3' 10"	2835 (2.00")	Passed (33%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	548 @ 10 3/4"	3502	Passed (16%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	833 @ 2'	3438	Passed (24%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.007 @ 2'	0.183	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.011 @ 2'	0.244	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 3' 10 1/2"
System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	342	650	992	Blocking
2 - Stud wall - HF	3.50"	2.00"	1.50"	341	650	991	1 1/2" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 11" o/c	
Bottom Edge (Lu)	3' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 3' 10 1/2"	N/A	6.4	--	
1 - Uniform (PSF)	0 to 4' (Front)	13'	12.6	25.0	Roof Load

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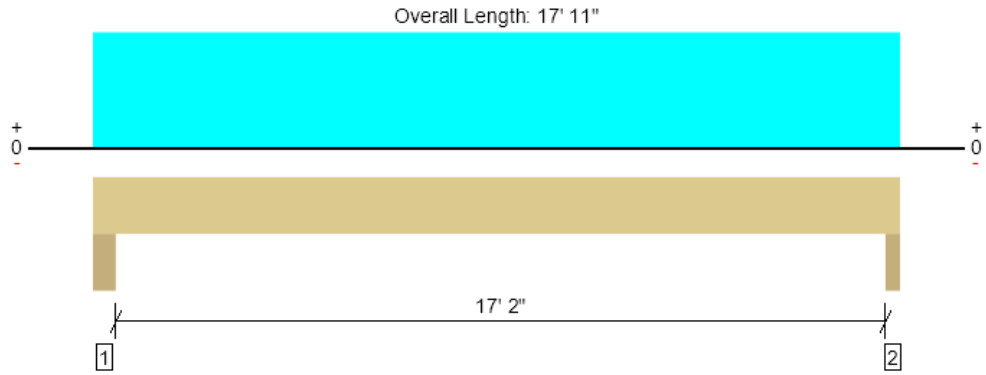
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

Roof, RB-8

1 piece(s) 5 1/2" x 10 1/2" 24F-V4 DF Glulam



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4065 @ 17' 9"	12513 (3.50")	Passed (32%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3531 @ 1' 4"	11733	Passed (30%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	17368 @ 9' 1/2"	23244	Passed (75%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.650 @ 9' 1/2"	0.871	Passed (L/321)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.993 @ 9' 1/2"	1.161	Passed (L/210)	--	1.0 D + 1.0 S (All Spans)

Member Length : 17' 11"
System : Roof
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 17' 5".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	5.50"	5.50"	1.50"	1429	2713	4141	None
2 - Trimmer - HF	3.50"	3.50"	1.50"	1403	2663	4065	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	17' 11" o/c	
Bottom Edge (Lu)	17' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 17' 11"	N/A	14.0	--	
1 - Uniform (PSF)	0 to 17' 11" (Front)	12'	12.0	25.0	Roof Load

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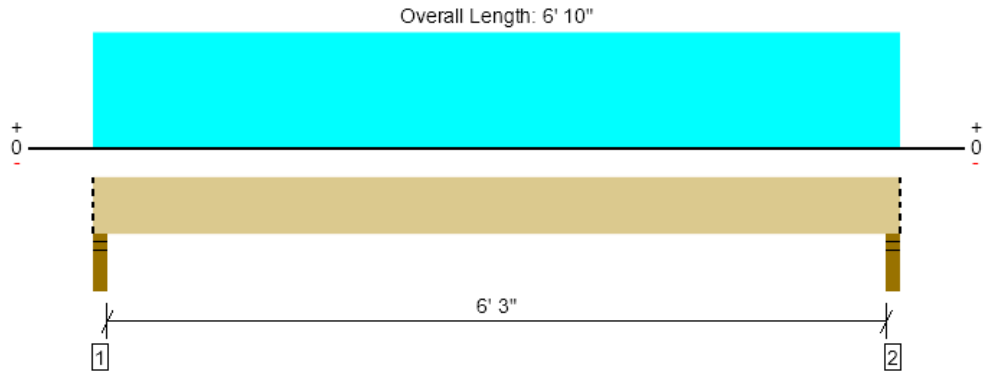
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

Roof, RB-9

1 piece(s) 4 x 8 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1308 @ 2"	4961 (3.50")	Passed (26%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	965 @ 10 3/4"	3502	Passed (28%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2022 @ 3' 5"	3438	Passed (59%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.056 @ 3' 5"	0.325	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.086 @ 3' 5"	0.433	Passed (L/902)	--	1.0 D + 1.0 S (All Spans)

Member Length : 6' 10"
System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	454	854	1308	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	454	854	1308	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 10" o/c	
Bottom Edge (Lu)	6' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 10"	N/A	6.4	--	
1 - Uniform (PSF)	0 to 6' 10" (Front)	10'	12.6	25.0	Roof Load

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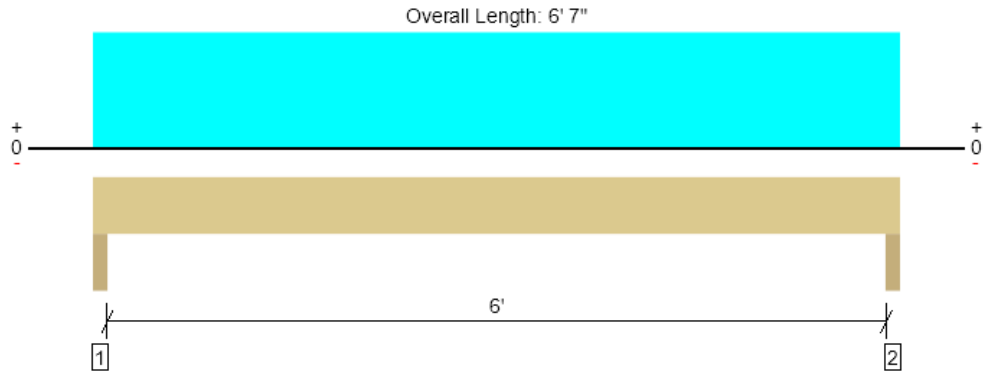
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, RB-10

1 piece(s) 4 x 8 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	387 @ 2"	7656 (3.50")	Passed (5%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	281 @ 10 3/4"	3502	Passed (8%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	573 @ 3' 3 1/2"	3438	Passed (17%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.014 @ 3' 3 1/2"	0.313	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.023 @ 3' 3 1/2"	0.417	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 6' 7"
System : Roof
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	3.50"	3.50"	1.50"	140	247	387	None
2 - Trimmer - HF	3.50"	3.50"	1.50"	140	247	387	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 7" o/c	
Bottom Edge (Lu)	6' 7" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 7"	N/A	6.4	--	
1 - Uniform (PSF)	0 to 6' 7" (Top)	3'	12.0	25.0	Roof Load

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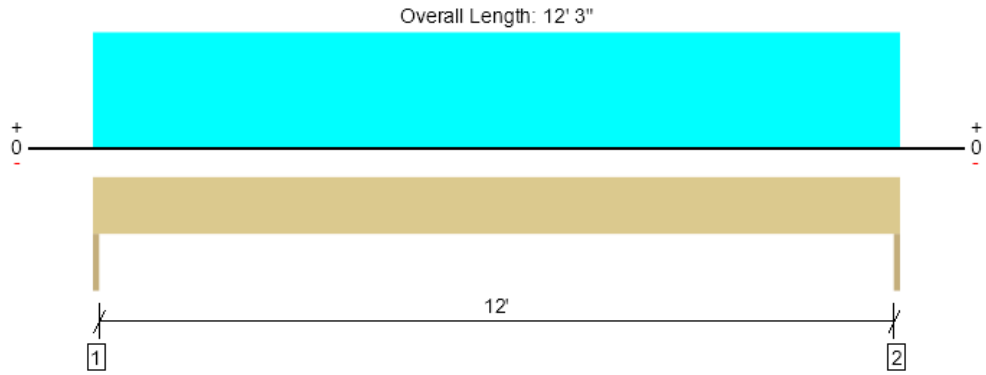
2nd Floor, 2H-1

1 piece(s) 6 3/4" x 10 1/2" 24F-V4 DF Glulam



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1835 @ 0	6581 (1.50")	Passed (28%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1535 @ 1'	14399	Passed (11%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	5620 @ 6' 1 1/2"	28278	Passed (20%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.081 @ 6' 1 1/2"	0.408	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.130 @ 6' 1 1/2"	0.613	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 12' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- A 0.9% decrease in the moment capacity has been added to account for lateral stability.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 12' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	687	1148	1835	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	687	1148	1835	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 12' 3"	N/A	17.2	--	
1 - Uniform (PSF)	0 to 12' 3"	7' 6"	12.6	25.0	Roof Load

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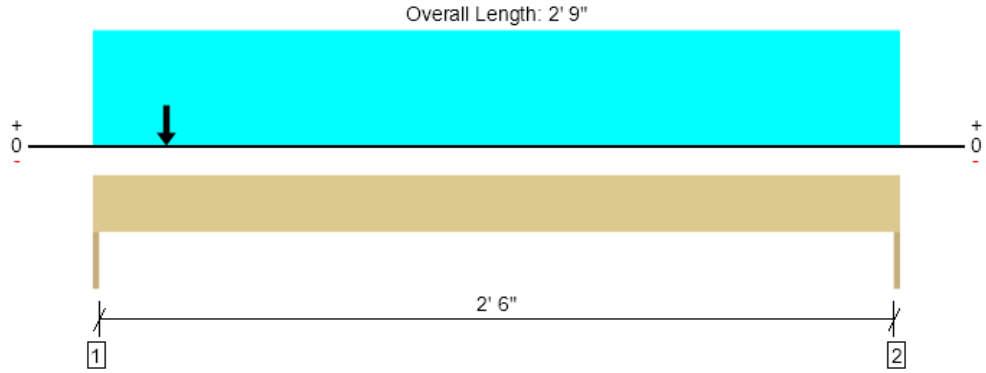
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2H-2
1 piece(s) 4 x 6 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1298 @ 0	3281 (1.50")	Passed (40%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	387 @ 7"	2657	Passed (15%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	322 @ 3"	1972	Passed (16%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.003 @ 1' 3 1/4"	0.092	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.005 @ 1' 3 1/4"	0.138	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 2' 9"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- A 0.3% decrease in the moment capacity has been added to account for lateral stability.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	452	845	1298	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	81	146	227	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 2' 9"	N/A	4.9	--	
1 - Uniform (PSF)	0 to 2' 9"	2'	12.0	25.0	Roof Load
2 - Point (lb)	3"	N/A	454	854	Linked from: RB-9, Support 1

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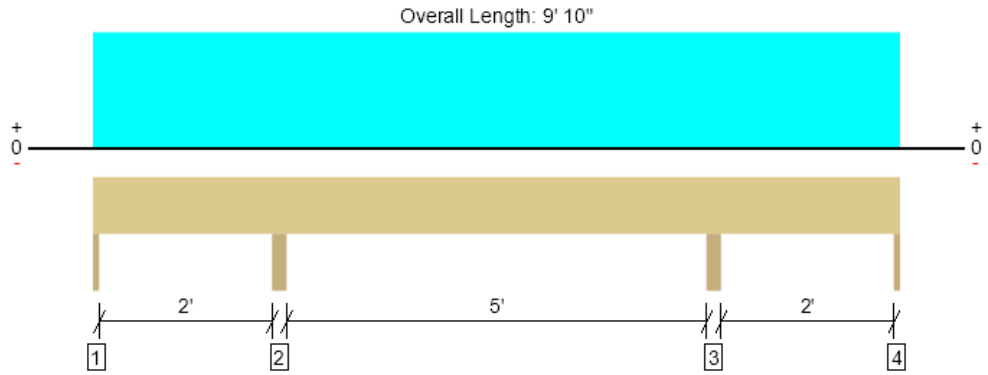
2nd Floor, 2H-3
1 piece(s) 4 x 8 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	879 @ 2' 3 1/4"	7656 (3.50")	Passed (11%)	--	1.0 D + 0.7 E (Adj Spans)
Shear (lbs)	361 @ 3' 1/4"	4872	Passed (7%)	1.60	1.0 D + 0.7 E (Adj Spans)
Moment (Ft-lbs)	-375 @ 7' 6 3/4"	4665	Passed (8%)	1.60	1.0 D + 0.7 E (Adj Spans)
Live Load Defl. (in)	0.000 @ 0	0.076	Passed (2L/999+)	--	1.0 D (All Spans)
Total Load Defl. (in)	0.003 @ 4' 11"	0.265	Passed (L/999+)	--	1.0 D (All Spans)

Member Length : 9' 10"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- A 2.5% decrease in the moment capacity has been added to account for lateral stability.
- -268 lbs uplift at support located at 2' 3 1/4". Strapping or other restraint may be required.
- -268 lbs uplift at support located at 7' 6 3/4". Strapping or other restraint may be required.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Seismic	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	22	161/-161	135/-99	None
2 - Trimmer - HF	3.50"	3.50"	1.50"	382	710/-710	879/-268	None
3 - Trimmer - HF	3.50"	3.50"	1.50"	382	710/-710	879/-268	None
4 - Trimmer - HF	1.50"	1.50"	1.50"	22	161/-161	135/-99	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 9' 10"	N/A	6.4	--	
1 - Uniform (PSF)	0 to 9' 10"	6'	12.6	25.0	Roof Load

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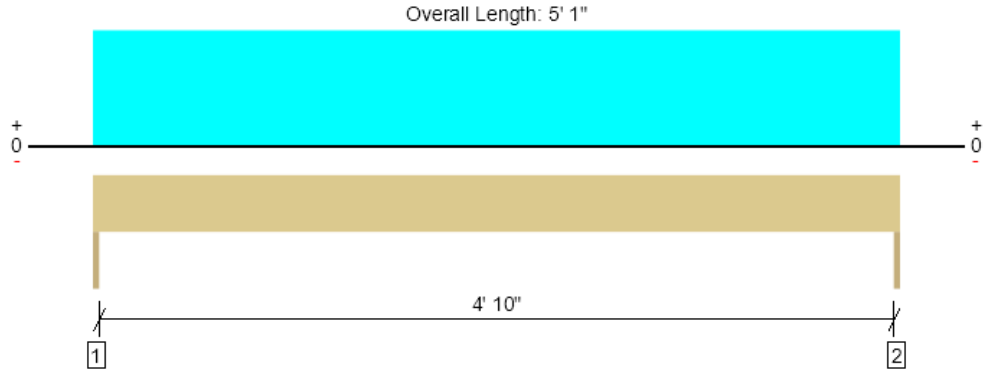
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2H-4
2 piece(s) 2 x 8 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	474 @ 0	2813 (1.50")	Passed (17%)	--	1.0 D + 0.7 E (All Spans)
Shear (lbs)	338 @ 8 3/4"	4176	Passed (8%)	1.60	1.0 D + 0.7 E (All Spans)
Moment (Ft-lbs)	602 @ 2' 6 1/2"	3547	Passed (17%)	1.60	1.0 D + 0.7 E (All Spans)
Live Load Defl. (in)	0.000 @ 0	0.169	Passed (2L/999+)	--	1.0 D (All Spans)
Total Load Defl. (in)	0.008 @ 2' 6 1/2"	0.254	Passed (L/999+)	--	1.0 D (All Spans)

Member Length : 5' 1"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- A 6.3% decrease in the moment capacity has been added to account for lateral stability.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Seismic	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	207	381/-381	474/-143	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	207	381/-381	474/-143	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 5' 1"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 5' 1"	6'	12.6	25.0	Roof Load

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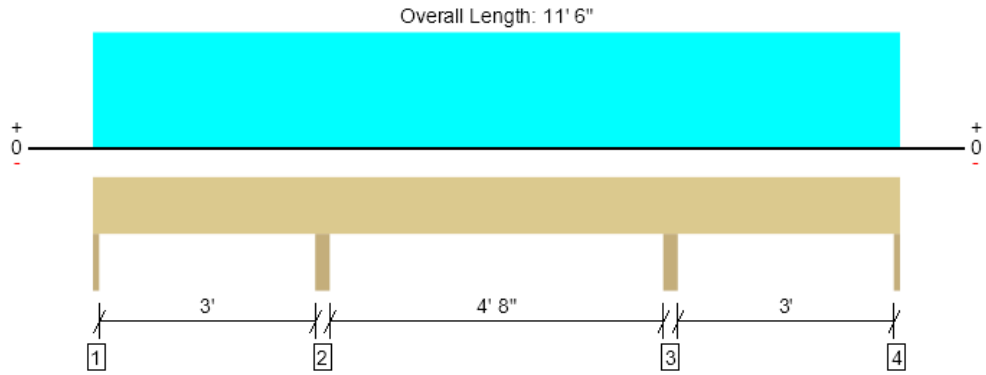
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2H-5 (with RB-1 in place)
1 piece(s) 4 x 8 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	464 @ 3' 3 1/4"	7656 (3.50")	Passed (6%)	--	1.0 D + 0.7 E (Adj Spans)
Shear (lbs)	176 @ 4' 1/4"	4872	Passed (4%)	1.60	1.0 D + 0.7 E (Adj Spans)
Moment (Ft-lbs)	-187 @ 3' 3 1/4"	4634	Passed (4%)	1.60	1.0 D + 0.7 E (Adj Spans)
Live Load Defl. (in)	0.000 @ 0	0.109	Passed (2L/999+)	--	1.0 D (All Spans)
Total Load Defl. (in)	0.001 @ 5' 9"	0.248	Passed (L/999+)	--	1.0 D (All Spans)

Member Length : 11' 6"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- A 3.1% decrease in the moment capacity has been added to account for lateral stability.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Seismic	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	48	113/-113	127/-51	None
2 - Trimmer - HF	3.50"	3.50"	1.50"	207	366/-366	464/-132	None
3 - Trimmer - HF	3.50"	3.50"	1.50"	207	366/-366	464/-132	None
4 - Trimmer - HF	1.50"	1.50"	1.50"	48	113/-113	127/-51	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 11' 6"	N/A	6.4	--	
1 - Uniform (PSF)	0 to 11' 6"	3'	12.6	25.0	Roof Load

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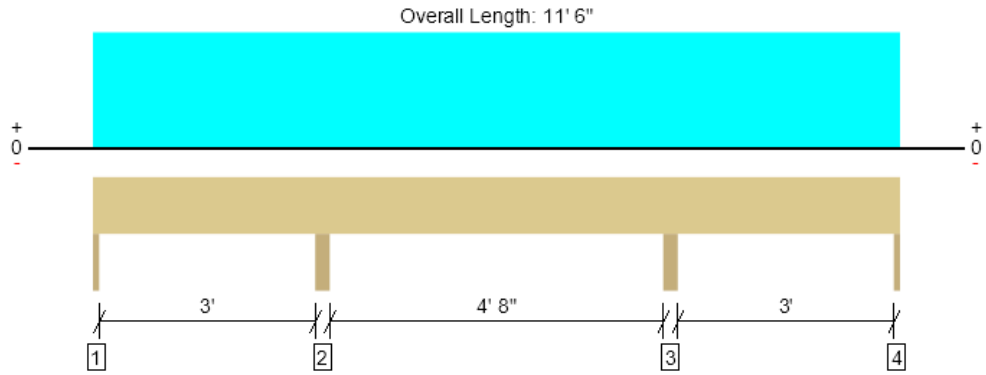
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

2nd Floor, 2H-5 (without RB-1 in place)
1 piece(s) 4 x 8 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1765 @ 3' 3 1/4"	7656 (3.50")	Passed (23%)	--	1.0 D + 0.7 E (Adj Spans)
Shear (lbs)	669 @ 4' 1/4"	4872	Passed (14%)	1.60	1.0 D + 0.7 E (Adj Spans)
Moment (Ft-lbs)	-711 @ 8' 2 3/4"	4634	Passed (15%)	1.60	1.0 D + 0.7 E (Adj Spans)
Live Load Defl. (in)	0.000 @ 0	0.109	Passed (2L/999+)	--	1.0 D (All Spans)
Total Load Defl. (in)	0.003 @ 5' 9"	0.248	Passed (L/999+)	--	1.0 D (All Spans)

Member Length : 11' 6"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- A 3.1% decrease in the moment capacity has been added to account for lateral stability.
- -215 lbs uplift at support located at 0". Strapping or other restraint may be required.
- -581 lbs uplift at support located at 3' 3 1/4". Strapping or other restraint may be required.
- -581 lbs uplift at support located at 8' 2 3/4". Strapping or other restraint may be required.
- -215 lbs uplift at support located at 11' 6". Strapping or other restraint may be required.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Seismic	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	170	453/-453	487/-215	None
2 - Trimmer - HF	3.50"	3.50"	1.50"	740	1465/-1465	1765/-581	None
3 - Trimmer - HF	3.50"	3.50"	1.50"	740	1465/-1465	1765/-581	None
4 - Trimmer - HF	1.50"	1.50"	1.50"	170	453/-453	487/-215	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 11' 6"	N/A	6.4	--	
1 - Uniform (PSF)	0 to 11' 6"	12'	12.6	25.0	Roof Load

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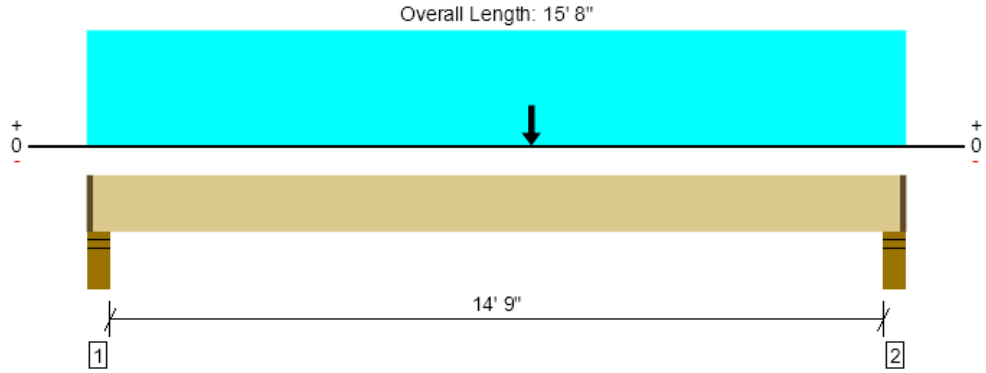
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2J-1
2 piece(s) 2 x 10 DF No.2 @ 16" OC



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	607 @ 15' 3 1/2"	7500 (4.00")	Passed (8%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	531 @ 14' 5 1/4"	3330	Passed (16%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2406 @ 8' 6"	4059	Passed (59%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.188 @ 7' 10"	0.373	Passed (L/954)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.294 @ 7' 10 3/8"	0.746	Passed (L/609)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

Member Length : 15' 5"
System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - DF	5.50"	4.00"	1.50"	186	418	604	1 1/2" Rim Board
2 - Stud wall - DF	5.50"	4.00"	1.50"	198	418	616	1 1/2" Rim Board

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 15' 8"	16"	12.0	40.0	Floor Load
2 - Point (PLF)	8' 6"	16"	100.0	-	Wall Load Above
3 - Point (PLF)	0	16"	-	-	DL = 12psf * 13 = 156 SL = 25psf * 13 = 325

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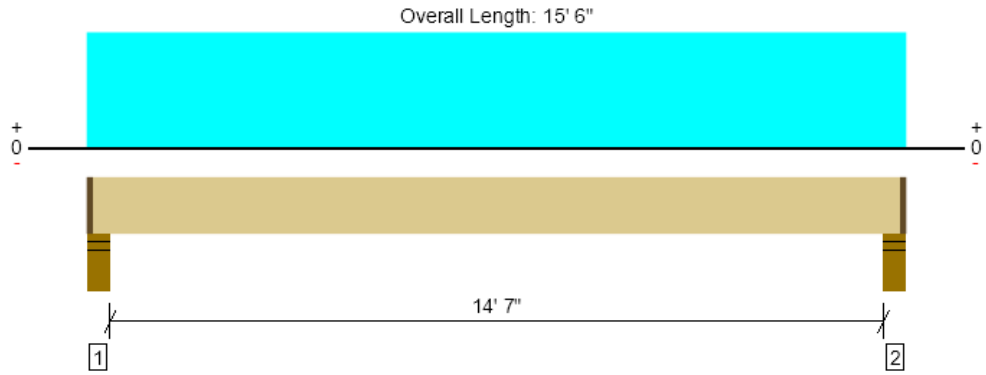
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2J-2
1 piece(s) 2 x 10 DF No.2 @ 12" OC



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	397 @ 4 1/2"	3750 (4.00")	Passed (11%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	339 @ 1' 2 3/4"	1665	Passed (20%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1414 @ 7' 9"	2029	Passed (70%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.269 @ 7' 9"	0.369	Passed (L/658)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.350 @ 7' 9"	0.738	Passed (L/506)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

Member Length : 15' 3"
System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - DF	5.50"	4.00"	1.50"	93	310	403	1 1/2" Rim Board
2 - Stud wall - DF	5.50"	4.00"	1.50"	93	310	403	1 1/2" Rim Board

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 15' 6"	12"	12.0	40.0	Floor Load

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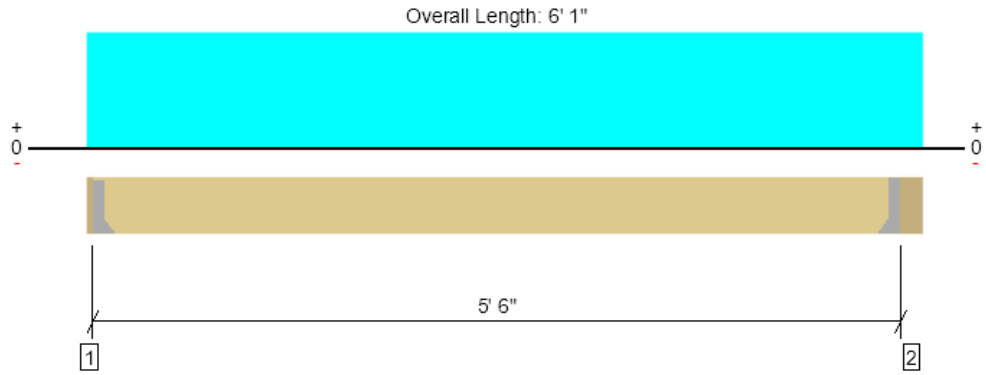
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2J-3 (Upper Deck Joist)
1 piece(s) 2 x 8 DF No.2 @ 16" OC



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	278 @ 1 1/2"	1406 (1.50")	Passed (20%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	206 @ 8 3/4"	1305	Passed (16%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	363 @ 2' 10 1/2"	1360	Passed (27%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.023 @ 2' 10 1/2"	0.138	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.027 @ 2' 10 1/2"	0.275	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

Member Length : 5' 6"
System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Hanger on 7 1/4" DF beam	1.50"	Hanger[1]	1.50"	46	230	96	290	See note [1]
2 - Hanger on 7 1/4" DF beam	5.50"	Hanger[1]	1.50"	51	257	107	324	See note [1]

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	LU26	1.50"	N/A	6-10dx1.5	4-10dx1.5	
2 - Face Mount Hanger	LU26	1.50"	N/A	6-10dx1.5	4-10dx1.5	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 6' 1"	16"	12.0	60.0	25.0	Deck Load

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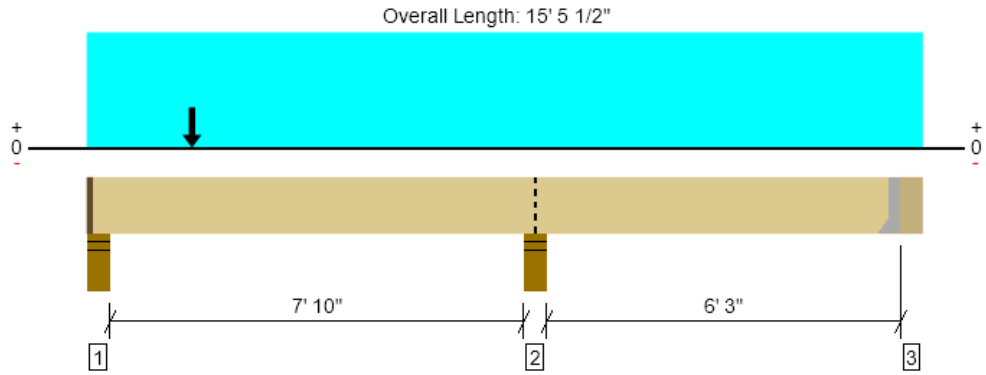
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2J-4

1 piece(s) 2 x 10 DF No.2 @ 16" OC



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	724 @ 8' 6 1/4"	3341 (5.50")	Passed (22%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	522 @ 1' 2 3/4"	1915	Passed (27%)	1.15	1.0 D + 0.75 L + 0.75 S (Alt Spans)
Moment (Ft-lbs)	-596 @ 8' 6 1/4"	899	Passed (66%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.029 @ 3' 11 9/16"	0.204	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (Alt Spans)
Total Load Defl. (in)	0.048 @ 3' 10 7/16"	0.407	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (Alt Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

Member Length : 14' 10 1/2"
System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- A 55.7% decrease in the moment capacity has been added to account for lateral stability.
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Stud wall - DF	5.50"	4.00"	1.50"	254	207/-9	243	591	1 1/2" Rim Board
2 - Stud wall - HF	5.50"	5.50"	1.50"	232	493	104	724	Blocking
3 - Hanger on 9 1/4" DF beam	5.50"	Hanger[1]	1.50"	24	178/-14	-22	202/-2	See note [1]

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
3 - Face Mount Hanger	LU28	1.50"	N/A	8-10dx1.5	6-10dx1.5	

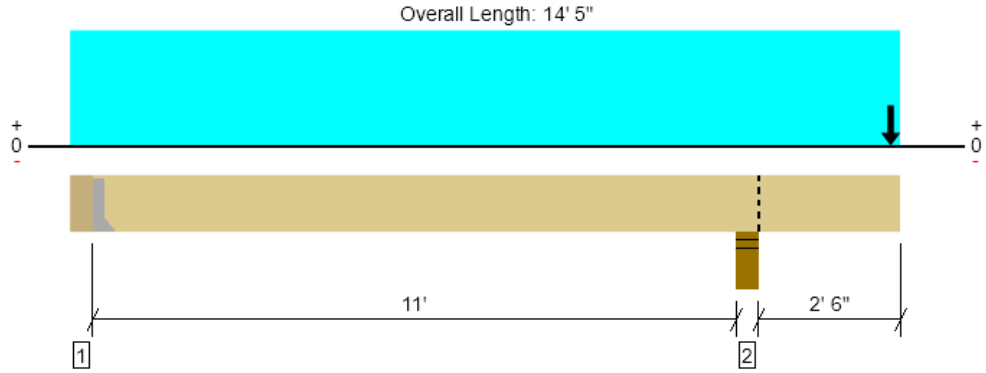
- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 15' 5 1/2"	16"	12.0	40.0	-	Floor Load
2 - Point (PLF)	2'	16"	197.0	-	244.0	DL = 12psf * 9.75ft + 80 plf SL = 25psf * 9.75ft

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2J-5
1 piece(s) 2 x 10 DF No.2 @ 12" OC



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	249 @ 5 1/2"	1406 (1.50")	Passed (18%)	--	1.0 D + 1.0 L (Alt Spans)
Shear (lbs)	357 @ 12' 8 1/4"	1915	Passed (19%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	-885 @ 11' 8 1/4"	1160	Passed (76%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.090 @ 6' 7/8"	0.281	Passed (L/999+)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.100 @ 14' 5"	0.273	Passed (2L/656)	--	1.0 D + 0.75 L + 0.75 S (Alt Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

Member Length : 13' 11 1/2"
System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Overhang deflection criteria: LL (2L/480) and TL (2L/240).
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- A 50.3% decrease in the moment capacity has been added to account for lateral stability.
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Hanger on 9 1/4" GLB beam	5.50"	Hanger[1]	1.50"	30	243	-34	273/-5	See note [1]
2 - Stud wall - DF	5.50"	5.50"	1.50"	315	347	184	714	Blocking

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	LU28	1.50"	N/A	8-10dx1.5	6-10dx1.5	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 14' 5"	12"	12.0	40.0	-	Floor Load
2 - Point (PLF)	14' 3"	12"	172.0	-	150.0	DL = 100plf + 12psf*6 SL = 25psf * 6

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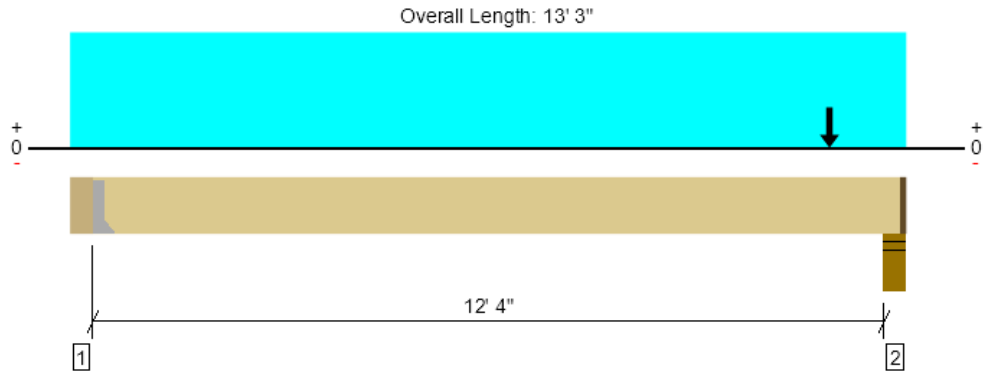
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2J-6

1 piece(s) 2 x 10 DF No.2 @ 16" OC



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	943 @ 12' 10 1/2"	2430 (4.00")	Passed (39%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	881 @ 12' 1/4"	1915	Passed (46%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	1482 @ 6' 11 15/16"	2029	Passed (73%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.180 @ 6' 7 15/16"	0.310	Passed (L/827)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.264 @ 6' 9 1/8"	0.621	Passed (L/564)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

Member Length : 12' 8"
System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Hanger on 9 1/4" GLB beam	5.50"	Hanger[1]	1.50"	130	356	28	485	See note [1]
2 - Stud wall - HF	5.50"	4.00"	1.55"	408	351	372	950	1 1/2" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	LU28	1.50"	N/A	8-10dx1.5	6-10dx1.5	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 13' 3"	16"	12.0	40.0	-	Floor Load
2 - Point (PLF)	12'	16"	244.0	-	300.0	DL = 12psf * 12ft + 100 SL = 25psf * 12ft

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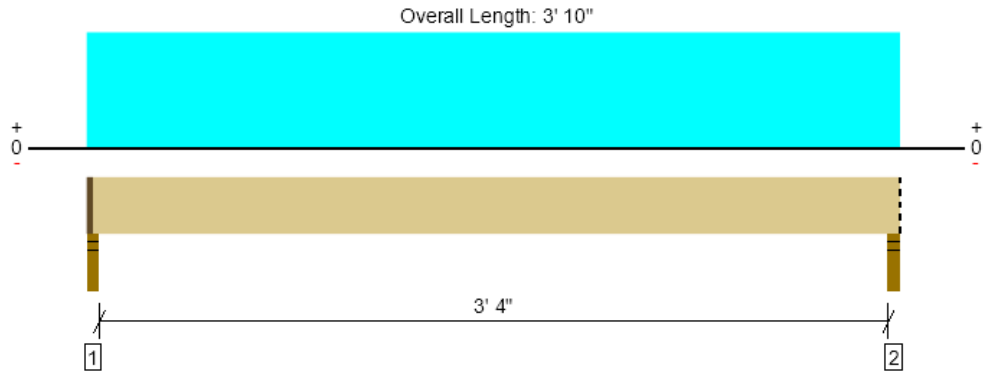
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-1
2 piece(s) 2 x 8 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	692 @ 1 1/2"	1823 (1.50")	Passed (38%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	410 @ 10 1/4"	3002	Passed (14%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	620 @ 1' 11"	2720	Passed (23%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.005 @ 1' 11"	0.090	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.009 @ 1' 11"	0.179	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

Member Length : 3' 8 1/2"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Stud wall - HF	3.00"	1.50"	1.50"	359	268	240	740	1 1/2" Rim Board
2 - Stud wall - HF	3.00"	3.00"	1.50"	359	268	240	740	Blocking

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 9" o/c	
Bottom Edge (Lu)	3' 9" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	1 1/2" to 3' 10"	N/A	5.5	--	--	
1 - Uniform (PSF)	0 to 3' 10" (Front)	3' 6"	12.0	40.0	-	Floor Load
2 - Uniform (PLF)	0 to 3' 10" (Top)	N/A	80.0	-	-	Wall Load Above
3 - Uniform (PSF)	0 to 3' 10" (Front)	5'	12.0	-	25.0	Roof Load

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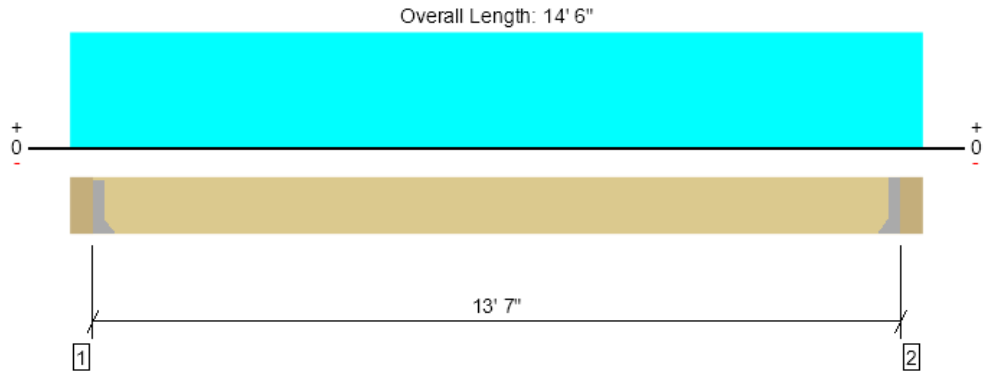
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-2

1 piece(s) 5 1/4" x 9 1/2" 2.2E Parallam® PSL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3108 @ 5 1/2"	4922 (1.50")	Passed (63%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	2746 @ 1' 3"	9643	Passed (28%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	10553 @ 7' 3"	19585	Passed (54%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.332 @ 7' 3"	0.340	Passed (L/491)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.447 @ 7' 3"	0.679	Passed (L/365)	--	1.0 D + 1.0 L (All Spans)

Member Length : 13' 7"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Hanger on 9 1/2" LVL beam	5.50"	Hanger[1]	1.50"	845	2465	3310	See note [1]
2 - Hanger on 9 1/2" LVL beam	5.50"	Hanger[1]	1.50"	845	2465	3310	See note [1]

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	13' 7" o/c	
Bottom Edge (Lu)	13' 7" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	HU612	2.50"	N/A	22-16d	8-16d	
2 - Face Mount Hanger	HU612	2.50"	N/A	22-16d	8-16d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	5 1/2" to 14' 1/2"	N/A	15.6	--	
1 - Uniform (PSF)	0 to 14' 6" (Front)	8' 6"	12.0	40.0	Floor Load

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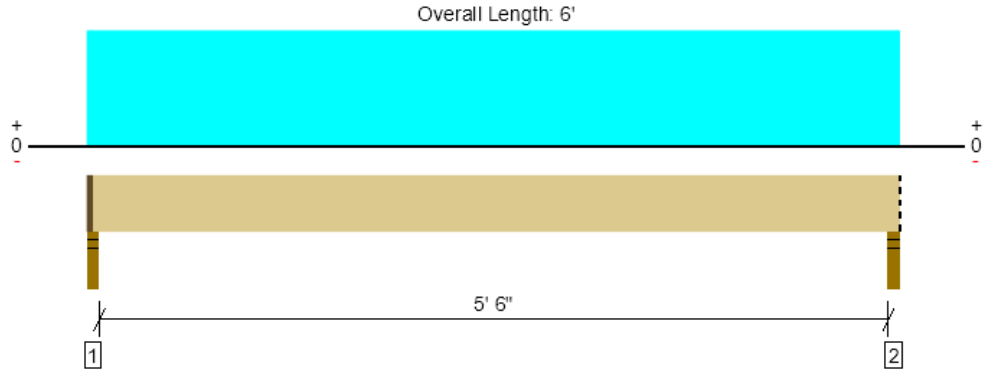
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-3
2 piece(s) 2 x 10 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	669 @ 1 1/2"	1823 (1.50")	Passed (37%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	426 @ 1' 1/4"	3330	Passed (13%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	889 @ 3'	3529	Passed (25%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.008 @ 3'	0.144	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.018 @ 3'	0.287	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

Member Length : 5' 10 1/2"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Stud wall - HF	3.00"	1.50"	1.50"	404	240	150	697	1 1/2" Rim Board
2 - Stud wall - HF	3.00"	3.00"	1.50"	405	240	150	698	Blocking

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 11" o/c	
Bottom Edge (Lu)	5' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	1 1/2" to 6'	N/A	7.0	--	--	
1 - Uniform (PSF)	0 to 6' (Front)	2'	12.0	40.0	-	Floor Load
2 - Uniform (PLF)	0 to 6' (Top)	N/A	80.0	-	-	Wall Load Above
3 - Uniform (PSF)	0 to 6' (Front)	2'	12.0	-	25.0	Roof Load

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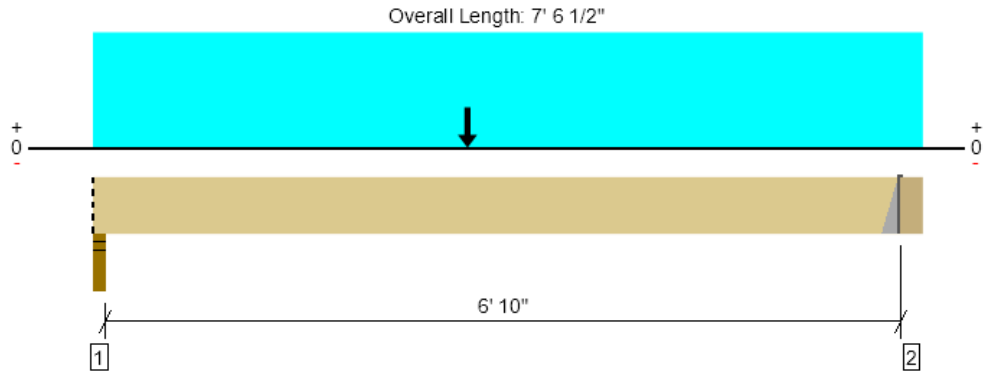
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

2nd Floor, 2B-4

1 piece(s) 3 1/2" x 9" 24F-V4 DF Glulam



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2306 @ 7' 1"	3413 (1.50")	Passed (68%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	2327 @ 1'	5565	Passed (42%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	7547 @ 3' 6"	9450	Passed (80%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.097 @ 3' 7"	0.174	Passed (L/864)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.141 @ 3' 7"	0.348	Passed (L/594)	--	1.0 D + 1.0 L (All Spans)

Member Length : 7' 1"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 6' 11 1/2".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Stud wall - HF	3.00"	3.00"	1.72"	757	1681	77	2439	Blocking
2 - Hanger on 9" GLB beam	5.50"	Hanger[1]	1.50"	727	1627	73	2354	See note [1]

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	7' 1" o/c	
Bottom Edge (Lu)	7' 1" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Top Mount Hanger	THA426	1.75"	4-16d	4-16d	6-16d	

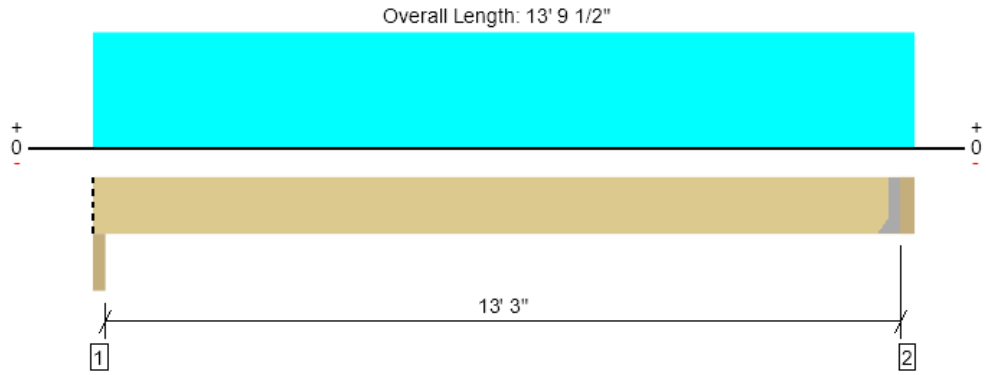
- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 7' 1"	N/A	7.7	--	--	
1 - Uniform (PSF)	0 to 7' 6 1/2" (Front)	2'	12.0	40.0	-	Floor Load
2 - Point (lb)	3' 6" (Back)	N/A	404	240	150	Linked from: 2B-3, Support 1
3 - Point (lb)	3' 6" (Front)	N/A	845	2465	-	Linked from: 2B-2, Support 2

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

2nd Floor, 2B-5

1 piece(s) 3 1/2" x 9" 24F-V4 DF Glulam



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	660 @ 13' 6"	3413 (1.50")	Passed (19%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	586 @ 12' 9"	5565	Passed (11%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	2206 @ 6' 9 3/4"	9450	Passed (23%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.132 @ 6' 9 3/4"	0.334	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.186 @ 6' 9 3/4"	0.669	Passed (L/865)	--	1.0 D + 1.0 L (All Spans)

Member Length : 13' 6"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 13' 4 1/2".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Column - HF	3.00"	3.00"	1.50"	195	477	672	Blocking
2 - Hanger on 9" GLB beam	3.50"	Hanger[1]	1.50"	198	489	686	See note [1]

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	13' 6" o/c	
Bottom Edge (Lu)	13' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	LUS48	2.00"	N/A	6-10dx1.5	4-10d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 13' 6"	N/A	7.7	--	
1 - Uniform (PSF)	0 to 13' 9 1/2" (Front)	1' 9"	12.0	40.0	Floor Load

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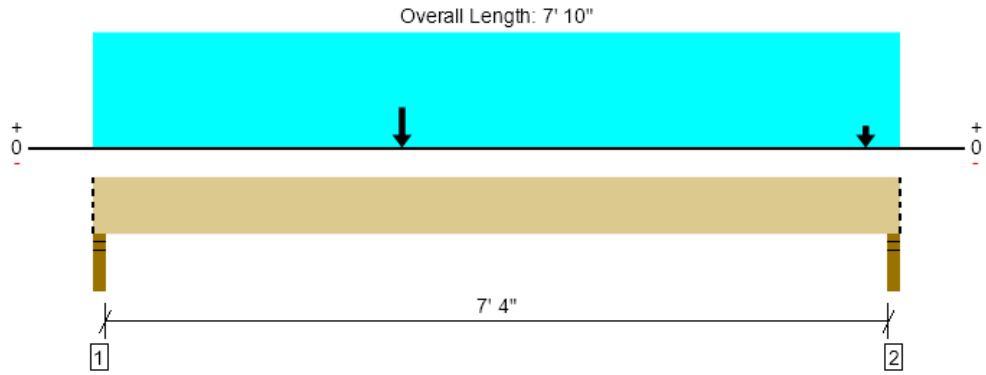
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-6

1 piece(s) 3 1/2" x 9" 24F-V4 DF Glulam



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2793 @ 1 1/2"	4253 (3.00")	Passed (66%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	2610 @ 1'	5565	Passed (47%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	7206 @ 3'	9450	Passed (76%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.103 @ 3' 9"	0.190	Passed (L/885)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.163 @ 3' 9 1/4"	0.379	Passed (L/557)	--	1.0 D + 1.0 L (All Spans)

Member Length : 7' 10"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 7' 7".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Stud wall - HF	3.00"	3.00"	1.97"	1093	1701	196	2793	Blocking
2 - Stud wall - HF	3.00"	3.00"	1.86"	1076	1567	196	2642	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	7' 10" o/c	
Bottom Edge (Lu)	7' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 7' 10"	N/A	7.7	--	--	
1 - Uniform (PSF)	0 to 7' 10" (Front)	1'	12.0	40.0	-	Floor Load
2 - Point (lb)	7' 6" (Front)	N/A	198	489	-	Linked from: 2B-5, Support 2
3 - Uniform (PLF)	0 to 7' 10" (Top)	N/A	100.0	-	-	Wall Load Above
4 - Uniform (PSF)	0 to 7' 10" (Top)	2'	12.0	-	25.0	Roof Load
5 - Point (lb)	3' (Front)	N/A	845	2465	-	Linked from: 2B-2, Support 1

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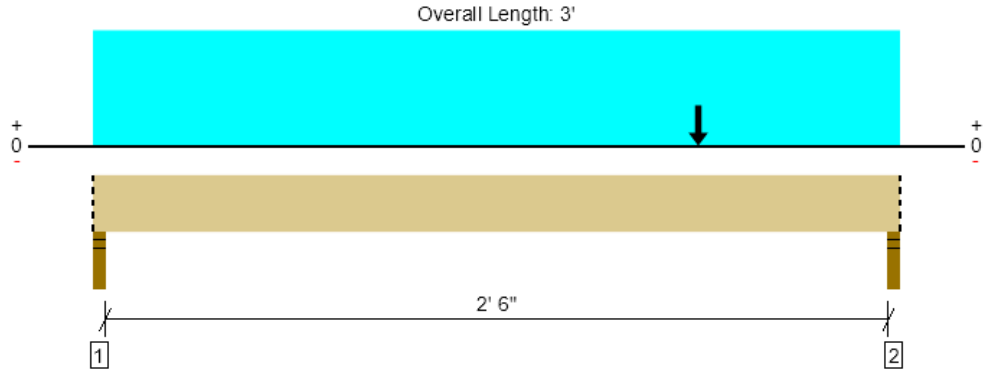
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-7
2 piece(s) 2 x 10 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2178 @ 2' 10 1/2"	3645 (3.00")	Passed (60%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	1397 @ 1' 11 3/4"	4163	Passed (34%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	1353 @ 2' 3"	4412	Passed (31%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.003 @ 1' 7"	0.069	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.004 @ 1' 7"	0.138	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)

Member Length : 3'
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Roof Live	Factored	
1 - Stud wall - HF	3.00"	3.00"	1.50"	289	120	384	673	Blocking
2 - Stud wall - HF	3.00"	3.00"	1.79"	872	120	1306	2178	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' o/c	
Bottom Edge (Lu)	3' o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 3'	N/A	7.0	--	--	
1 - Uniform (PSF)	0 to 3' (Front)	2'	12.0	40.0	-	Floor Load
2 - Point (lb)	2' 3" (Top)	N/A	1068	-	1690	Linked from: RB-1, Support 1

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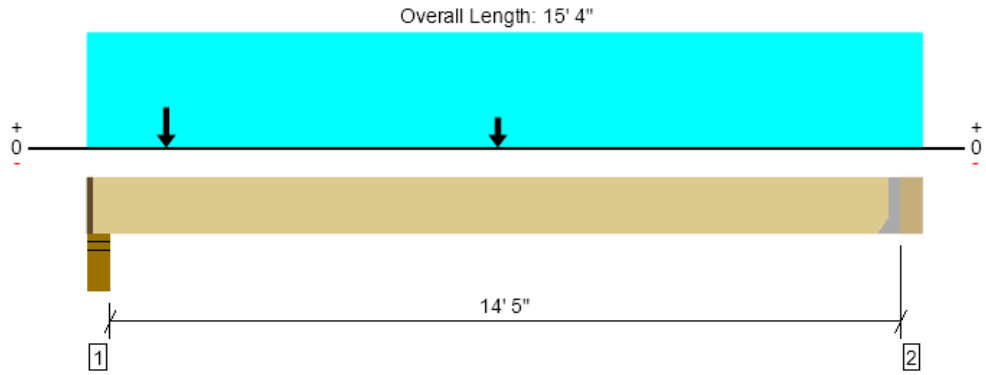
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

2nd Floor, 2B-8

2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2587 @ 4"	5670 (4.00")	Passed (46%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2453 @ 1' 2 3/4"	7074	Passed (35%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	7636 @ 7' 9"	12884	Passed (59%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.229 @ 7' 5 5/8"	0.364	Passed (L/763)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.618 @ 7' 6 3/16"	0.727	Passed (L/282)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

Member Length : 14' 9"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Stud wall - HF	5.50"	4.00"	1.83"	1506	304	1096	2601	1 1/2" Rim Board
2 - Hanger on 9 1/4" LVL beam	5.50"	Hanger[1]	1.50"	1145	309	399	1676	See note [1]

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	14' 9" o/c	
Bottom Edge (Lu)	14' 9" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	LUS410	2.00"	N/A	8-10d	6-10d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	1 1/2" to 14' 10 1/2"	N/A	9.4	--	--	
1 - Uniform (PSF)	0 to 15' 4" (Front)	1'	12.0	40.0	-	Floor Load
2 - Uniform (PLF)	0 to 15' 4" (Top)	N/A	100.0	-	-	Wall Load Above
3 - Point (lb)	1' 6" (Top)	N/A	452	-	845	Linked from: 2H-2, Support 1
4 - Point (lb)	7' 9" (Top)	N/A	342	-	650	Linked from: RB-7, Support 1

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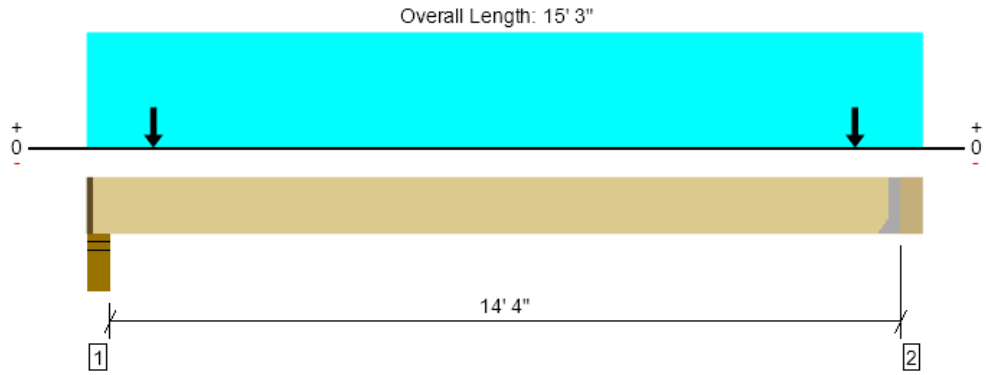
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-9

1 piece(s) 5 1/4" x 11 1/4" 2.2E Parallam® PSL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4415 @ 14' 9 1/2"	4922 (1.50")	Passed (90%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	3818 @ 13' 10 1/4"	13132	Passed (29%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	11678 @ 7' 6 9/16"	26955	Passed (43%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.251 @ 7' 6 11/16"	0.361	Passed (L/691)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.347 @ 7' 6 5/8"	0.723	Passed (L/500)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

Member Length : 14' 8"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Stud wall - HF	5.50"	4.00"	2.10"	1431	2458	1658	4518	1 1/2" Rim Board
2 - Hanger on 11 1/4" HF beam	5.50"	Hanger[1]	1.50"	1449	2498	1686	4588	See note [1]

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	14' 8" o/c	
Bottom Edge (Lu)	14' 8" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	HHUS5.50/10	3.00"	N/A	30-10d	10-10d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	1 1/2" to 14' 9 1/2"	N/A	18.5	--	--	
1 - Uniform (PSF)	0 to 15' 3" (Front)	4'	12.0	40.0	-	Floor Load
2 - Uniform (PSF)	0 to 15' 3" (Front)	2' 9"	12.0	60.0	25.0	Deck Load
3 - Point (lb)	1' 3" (Top)	N/A	687	-	1148	Linked from: 2H-1, Support 1
4 - Point (lb)	14' (Top)	N/A	687	-	1148	Linked from: 2H-1, Support 2

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

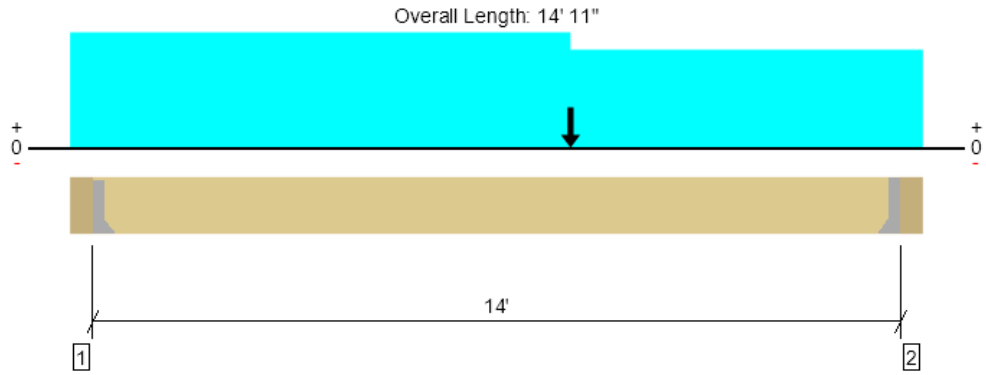
ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-10

1 piece(s) 5 1/4" x 9 1/4" 2.2E Parallam® PSL

(2) Beams are provided per plan, effectively doubling the moment capacity. Beams per plan are ok



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4709 @ 14' 5 1/2"	4922 (1.50")	Passed (96%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	4086 @ 13' 8 1/4"	9389	Passed (44%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	20362 @ 8' 9"	18623	Failed (109%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.629 @ 7' 8 7/16"	0.350	Failed (L/267)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.958 @ 7' 7 15/16"	0.700	Failed (L/175)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

Member Length : 14'
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Hanger on 9 1/4" PSL beam	5.50"	Hanger[1]	1.50"	1617	2347	1136	4230	See note [1]
2 - Hanger on 9 1/4" PSL beam	5.50"	Hanger[1]	1.50"	1501	2885	1543	4822	See note [1]

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6" o/c	
Bottom Edge (Lu)	14' o/c	

•Maximum allowable bracing intervals based on applied load.

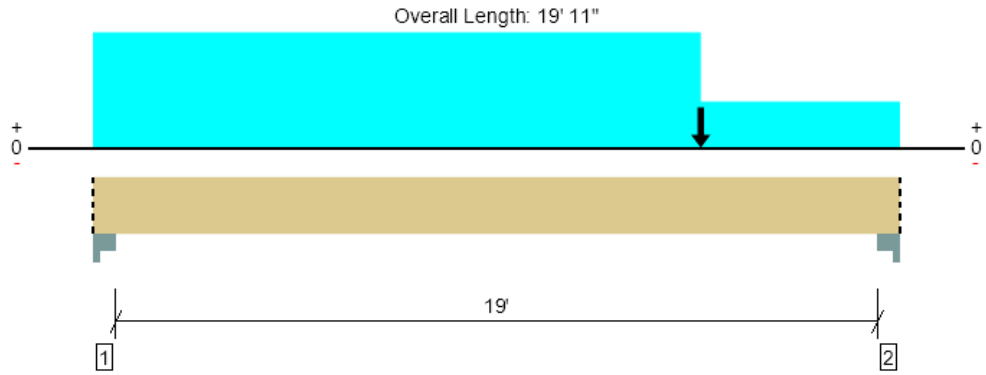
Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	HHUS5.50/10	3.00"	N/A	30-10d	10-10d	
2 - Face Mount Hanger	HHUS5.50/10	3.00"	N/A	30-10d	10-10d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	5 1/2" to 14' 5 1/2"	N/A	15.2	--	--	
1 - Uniform (PSF)	0 to 14' 11" (Front)	2' 3"	12.0	60.0	25.0	Deck Load
2 - Uniform (PSF)	0 to 8' 9" (Back)	1'	12.0	40.0	-	Floor Load
3 - Uniform (PSF)	8' 9" to 14' 11" (Back)	1'	12.0	60.0	25.0	Deck Load
4 - Uniform (PLF)	0 to 8' 9" (Top)	N/A	100.0	-	-	Wall Load Above
5 - Point (lb)	8' 9" (Back)	N/A	1449	2498	1686	Linked from: 2B-9, Support 2

2nd Floor, 2B-11

1 piece(s) 5 1/4" x 14" 2.2E Parallam® PSL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5292 @ 19' 7"	18047 (5.50")	Passed (29%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	4737 @ 18' 3 1/2"	14210	Passed (33%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	21277 @ 14' 9 3/4"	40743	Passed (52%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.408 @ 10' 6 3/8"	0.481	Passed (L/566)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.573 @ 10' 6 3/4"	0.962	Passed (L/403)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

Member Length : 19' 11"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Column Cap - steel	5.50"	5.50"	1.50"	875	2132	969	3201	Blocking
2 - Column Cap - steel	5.50"	5.50"	1.61"	1592	3298	1634	5292	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	19' 11" o/c	
Bottom Edge (Lu)	19' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 19' 11"	N/A	23.0	--	--	
1 - Uniform (PSF)	0 to 15' (Front)	2' 6"	12.0	60.0	25.0	Deck Load
2 - Uniform (PSF)	15' to 19' 11" (Front)	1'	12.0	60.0	25.0	Deck Load
3 - Point (lb)	15' (Front)	N/A	1501	2885	1543	Linked from: 2B-10, Support 2

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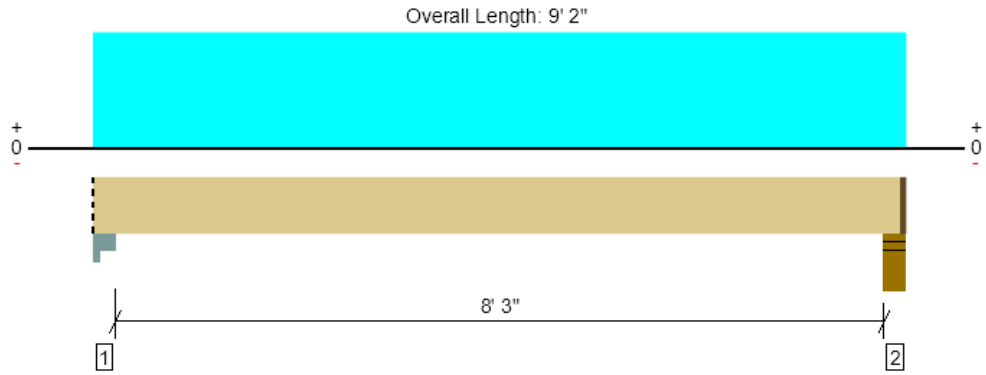
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

2nd Floor, 2B-12

1 piece(s) 3 1/2" x 9" 24F-V4 DF Glulam



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	1843 @ 8' 10"	5670 (4.00")	Passed (32%)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Shear (lbs)	1395 @ 1' 2 1/2"	6400	Passed (22%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Pos Moment (Ft-lbs)	3732 @ 4' 7"	10868	Passed (34%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Live Load Defl. (in)	0.064 @ 4' 7"	0.213	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Total Load Defl. (in)	0.127 @ 4' 7"	0.425	Passed (L/804)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]

Member Length : 9' 1/2"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 8' 6".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Column Cap - steel	5.50"	5.50"	1.50"	933	612/-48	669	1894	Blocking
2 - Stud wall - HF	5.50"	4.00"	1.50"	932	612/-48	671	1895	1 1/2" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 1" o/c	
Bottom Edge (Lu)	9' 1" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 9' 1/2"	N/A	7.7	--	--	
1 - Uniform (PLF)	0 to 9' 2" (Front)	N/A	18.0	133.5/-10.5	-16.5	Linked from: 2J-4, Support 3
2 - Uniform (PLF)	0 to 9' 2" (Top)	N/A	100.0	-	-	Wall Load Above
3 - Uniform (PSF)	0 to 9' 2" (Top)	6' 6"	12.0	-	25.0	Roof Load

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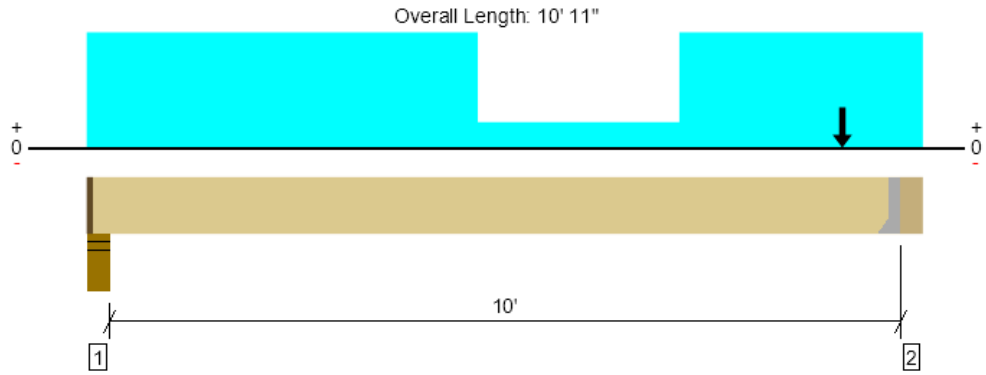
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-13

2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4541 @ 10' 5 1/2"	4541 (1.73")	Passed (100%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	4076 @ 9' 8 1/4"	7074	Passed (58%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3430 @ 8' 1 3/4"	12884	Passed (27%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.065 @ 5' 9 3/8"	0.253	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.153 @ 5' 7 1/2"	0.506	Passed (L/796)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

Member Length : 10' 4"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Stud wall - HF	5.50"	4.00"	1.50"	840	216	372	1281	1 1/2" Rim Board
2 - Hanger on 9 1/4" GLB beam	5.50"	Hanger[1]	1.73"	1987	221	2645	4631	See note [1]

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	10' 4" o/c	
Bottom Edge (Lu)	10' 4" o/c	

•Maximum allowable bracing intervals based on applied load.

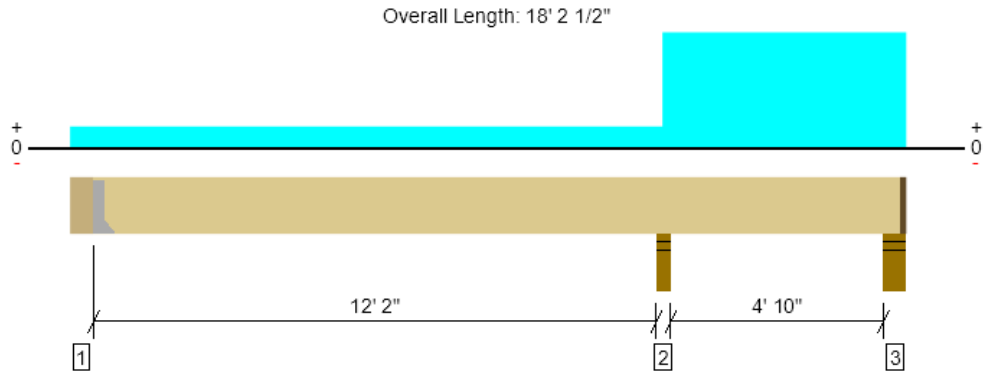
Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	HHUS48	3.00"	N/A	22-16d	8-16d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	1 1/2" to 10' 5 1/2"	N/A	9.4	--	--	
1 - Uniform (PSF)	0 to 10' 11" (Front)	1'	12.0	40.0	-	Floor Load
2 - Uniform (PLF)	0 to 5' 3" (Top)	N/A	142.0	-	42.0	DL = 12psf * 3.5ft + 100 SL = 25psf * 3.5ft
3 - Uniform (PLF)	7' 9" to 10' 11" (Top)	N/A	142.0	-	42.0	DL = 12psf * 3.5ft + 100 SL = 25psf * 3.5ft
4 - Point (lb)	9' 9" (Top)	N/A	1403	-	2663	Linked from: RB-8, Support 2

2nd Floor, 2B-14

1 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1529 @ 12' 9 1/4"	2603 (3.50")	Passed (59%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	761 @ 13' 8 1/4"	3537	Passed (22%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	-1221 @ 12' 9 1/4"	5602	Passed (22%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.077 @ 6' 1"	0.308	Passed (L/999+)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.094 @ 5' 11"	0.616	Passed (L/999+)	--	1.0 D + 1.0 L (Alt Spans)

Member Length : 17' 7 1/2"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Hanger on 9 1/4" HF beam	5.50"	Hanger[1]	1.50"	98	295	-11	393	See note [1]
2 - Stud wall - SPF	3.50"	3.50"	2.06"	730	677	389	1529	None
3 - Stud wall - HF	5.50"	4.00"	1.50"	449	144/-133	372	836	1 1/2" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	17' 8" o/c	
Bottom Edge (Lu)	17' 8" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	HUS1.81/10	3.00"	N/A	30-10dx1.5	10-10d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	5 1/2" to 18' 1"	N/A	4.7	--	--	
1 - Uniform (PSF)	0 to 18' 2 1/2" (Front)	1' 4"	12.0	40.0	-	Floor Load
2 - Uniform (PLF)	12' 9" to 18' 2 1/2" (Top)	N/A	166.0	-	138.0	DL= 12psf * 5.5ft +100 SL= 25psf * 5.5ft

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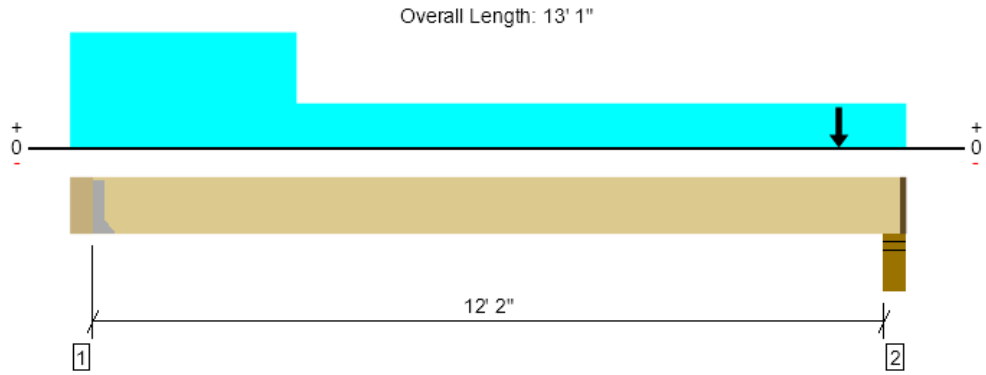
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-15

2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3832 @ 12' 9"	5670 (4.00")	Passed (68%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3117 @ 11' 10 1/4"	7074	Passed (44%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2960 @ 9' 3 1/16"	12884	Passed (23%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.094 @ 6' 10 5/8"	0.307	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.188 @ 7'	0.615	Passed (L/784)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

Member Length : 12' 6"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Hanger on 9 1/4" GLB beam	5.50"	Hanger[1]	1.50"	402	352	344	924	See note [1]
2 - Stud wall - HF	5.50"	4.00"	2.70"	2115	346	1718	3834	1 1/2" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	12' 6" o/c	
Bottom Edge (Lu)	12' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	LUS48	2.00"	N/A	6-10dx1.5	4-10d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	5 1/2" to 12' 11 1/2"	N/A	9.4	--	--	
1 - Uniform (PSF)	0 to 13' 1" (Front)	1' 4"	12.0	40.0	-	Floor Load
2 - Point (PLF)	12' (Top)	12'	172.0	-	150.0	DL= 12psf*6ft+100 SL= 25psf*6ft
3 - Uniform (PSF)	0 to 3' 6" (Top)	3'	12.0	-	25.0	Roof Load

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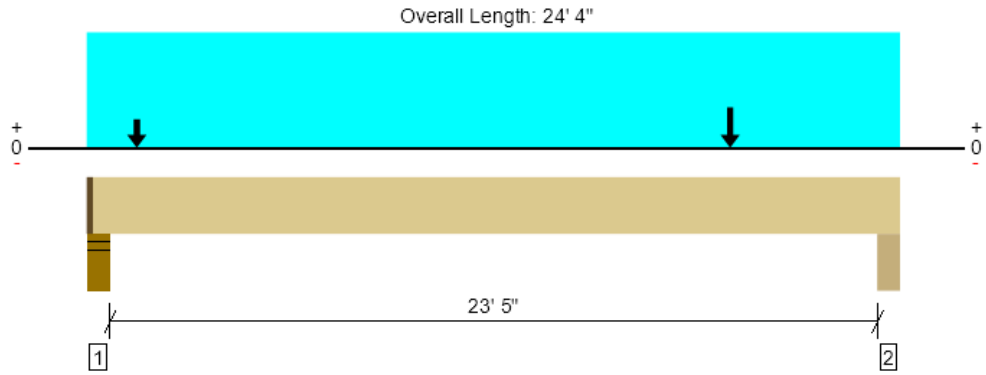
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-16

1 piece(s) 6 3/4" x 18" 24F-V4 DF Glulam



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	10748 @ 4"	10935 (4.00")	Passed (98%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	9122 @ 22' 4 1/2"	21465	Passed (42%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	53970 @ 12' 11 3/8"	67292	Passed (80%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.603 @ 12' 2 11/16"	0.592	Passed (L/471)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.938 @ 12' 4 3/16"	1.183	Passed (L/303)	--	1.0 D + 1.0 L (All Spans)

Member Length : 24' 2 1/2"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 0.92 that was calculated using length L = 23' 8".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Stud wall - HF	5.50"	4.00"	3.93"	3947	6190	2963	10811	1 1/2" Rim Board
2 - Trimmer - HF	5.50"	5.50"	2.44"	4091	6310	2512	10708	None

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	24' 3" o/c	
Bottom Edge (Lu)	24' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	1 1/2" to 24' 4"	N/A	29.5	--	--	
1 - Uniform (PSF)	0 to 24' 4" (Front)	12'	12.0	40.0	-	Floor Load
2 - Point (lb)	19' 3" (Back)	N/A	402	352	344	Linked from: 2B-15, Support 1
3 - Point (lb)	19' 3" (Front)	N/A	1987	221	2645	Linked from: 2B-13, Support 2
4 - Point (lb)	1' 6" (Front)	N/A	1430	247	2486	Linked from: 2B-17, Support 1

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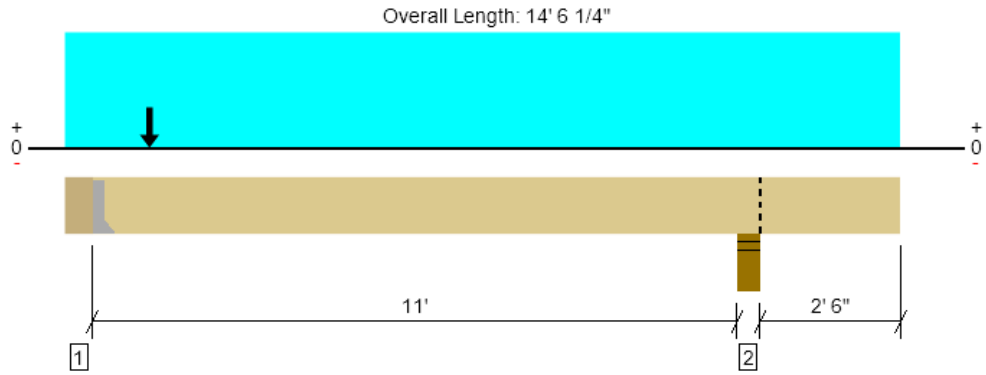
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-17

2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3909 @ 6 3/4"	3938 (1.50")	Passed (99%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3893 @ 1' 4"	7074	Passed (55%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3656 @ 1' 6"	12884	Passed (28%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.085 @ 5' 7 1/2"	0.281	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (Alt Spans)
Total Load Defl. (in)	0.143 @ 5' 7 1/4"	0.561	Passed (L/940)	--	1.0 D + 0.75 L + 0.75 S (Alt Spans)

Member Length : 13' 11 1/2"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Overhang deflection criteria: LL (2L/480) and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Hanger on 9 1/4" GLB beam	6.75"	Hanger[1]	1.50"	1430	247	2486	3916	See note [1]
2 - Stud wall - HF	5.50"	5.50"	1.50"	305	347	227	735	Blocking

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	14' o/c	
Bottom Edge (Lu)	14' o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	HHUS48	3.00"	N/A	22-10d	8-10d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	6 3/4" to 14' 6 1/4"	N/A	9.4	--	--	
1 - Uniform (PSF)	0 to 14' 6 1/4" (Front)	1'	12.0	40.0	-	Floor Load
2 - Point (lb)	1' 6" (Top)	N/A	1429	-	2713	Linked from: RB-8, Support 1

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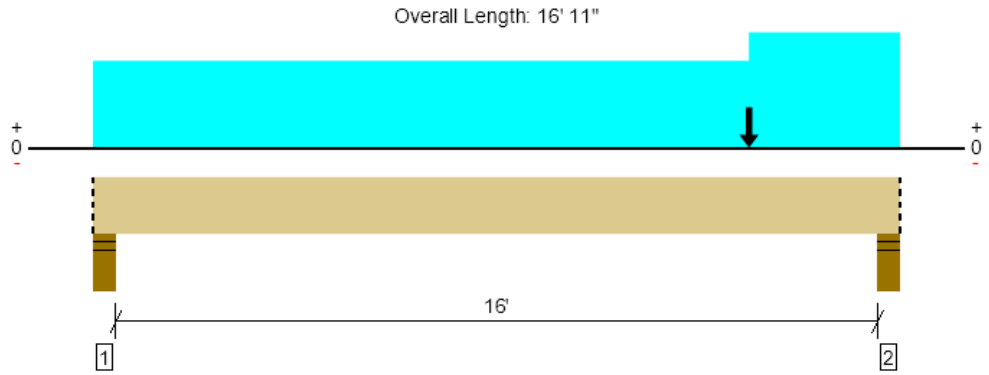
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

2nd Floor, 2B-18

1 piece(s) 5 1/4" x 14" 2.2E Parallam® PSL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	9992 @ 16' 7"	11694 (5.50")	Passed (85%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	8915 @ 15' 3 1/2"	14210	Passed (63%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	29758 @ 9' 11 1/8"	40743	Passed (73%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.386 @ 8' 8 1/16"	0.406	Passed (L/505)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.587 @ 8' 9 1/4"	0.813	Passed (L/332)	--	1.0 D + 1.0 L (All Spans)

Member Length : 16' 11"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Stud wall - HF	5.50"	5.50"	3.02"	1927	4493	314	6421	Blocking
2 - Stud wall - HF	5.50"	5.50"	4.70"	4090	5903	1816	9992	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	16' 11" o/c	
Bottom Edge (Lu)	16' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 16' 11"	N/A	23.0	--	--	
1 - Uniform (PSF)	0 to 13' 9" (Front)	12'	12.0	40.0	-	Floor Load
2 - Uniform (PSF)	13' 9" to 16' 11" (Front)	7' 6"	12.0	40.0	-	Floor Load
3 - Uniform (PSF)	13' 9" to 16' 11" (Back)	1'	12.0	60.0	25.0	Deck Load
4 - Uniform (PLF)	13' 9" to 16' 11" (Top)	N/A	178.0	-	163.0	DL= 12psf *6.5ft +100 SL= 25psf *6.5ft
5 - Point (lb)	13' 9" (Front)	N/A	1145	309	399	Linked from: 2B-8, Support 2
6 - Point (lb)	13' 9" (Back)	N/A	1617	2347	1136	Linked from: 2B-10, Support 1

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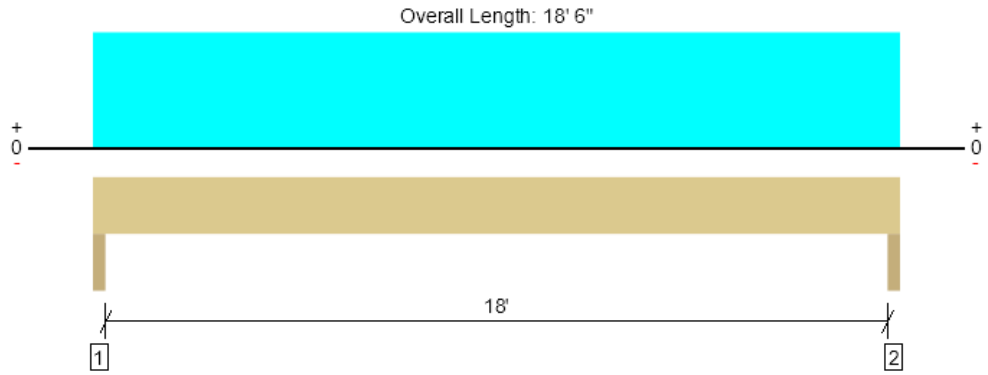
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

1st Floor, 1H-1

1 piece(s) 5 1/2" x 15" 24F-V4 DF Glulam



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	6778 @ 1 1/2"	10725 (3.00")	Passed (63%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	5679 @ 1' 6"	16761	Passed (34%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Pos Moment (Ft-lbs)	30506 @ 9' 3"	45472	Passed (67%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.365 @ 9' 3"	0.608	Passed (L/601)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.657 @ 9' 3"	0.913	Passed (L/333)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

Member Length : 18' 6"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- A 4.1% decrease in the moment capacity has been added to account for lateral stability.
- Critical positive moment adjusted by a volume/size factor of 0.98 that was calculated using length L = 18' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	1.90"	3016	2435	2581	6778	None
2 - Trimmer - HF	3.00"	3.00"	1.90"	3016	2435	2581	6778	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 18' 6"	N/A	20.0	--	--	
1 - Uniform (PLF)	0 to 18' 6"	N/A	306.0	263.3	279.0	Linked from: 2J-6, Support 2

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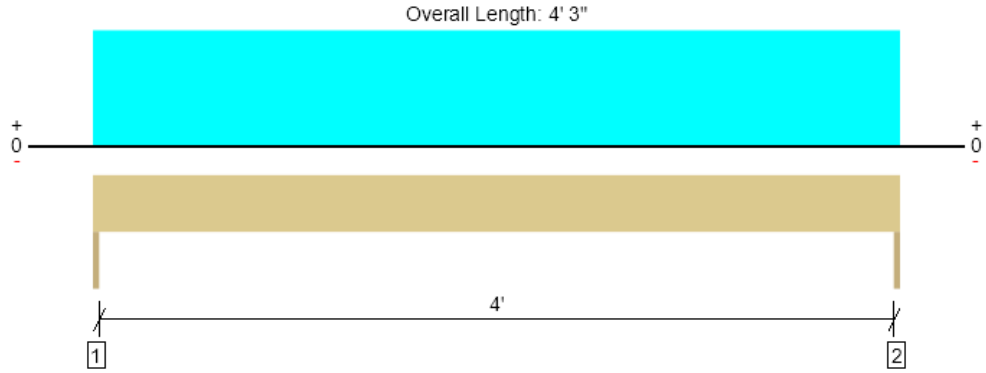
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

1st Floor, 1H-2
2 piece(s) 2 x 8 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1167 @ 0	2813 (1.50")	Passed (41%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	767 @ 8 3/4"	2610	Passed (29%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1240 @ 2' 1 1/2"	2310	Passed (54%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.018 @ 2' 1 1/2"	0.142	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.026 @ 2' 1 1/2"	0.213	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

Member Length : 4' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- A 2.3% decrease in the moment capacity has been added to account for lateral stability.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	381	786	166	1167	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	381	786	166	1167	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 4' 3"	N/A	5.5	--	--	
1 - Uniform (PLF)	0 to 4' 3"	N/A	174.0	369.8	78.0	Linked from: 2J-4, Support 2

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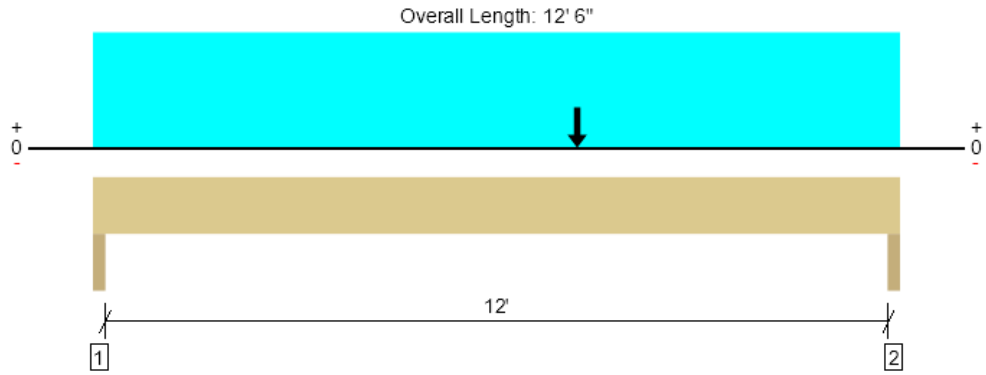
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

1st Floor, 1H-3
1 piece(s) 5 1/2" x 10 1/2" 24F-V4 DF Glulam



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4211 @ 12' 4 1/2"	10725 (3.00")	Passed (39%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	3858 @ 11' 4 1/2"	11733	Passed (33%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Pos Moment (Ft-lbs)	17253 @ 7' 6"	22913	Passed (75%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.232 @ 6' 6 7/16"	0.408	Passed (L/633)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.414 @ 6' 5 7/8"	0.613	Passed (L/355)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

Member Length : 12' 6"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- A 1.4% decrease in the moment capacity has been added to account for lateral stability.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 12' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Trimmer - HF	3.00"	3.00"	1.50"	1606	978	1129	195/-195	3289	None
2 - Trimmer - HF	3.00"	3.00"	1.50"	1898	1480	1467	195/-195	4211	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 12' 6"	N/A	14.0	--	--	--	
1 - Uniform (PSF)	0 to 12' 6"	1' 3"	12.6	-	-	25.0	Roof Load
2 - Point (lb)	7' 6"	N/A	1431	2458	1658	-	Linked from: 2B-9, Support 1
3 - Uniform (PLF)	0 to 12' 6"	N/A	100.0	-	-	-	Wall Load Above
4 - Uniform (PSF)	0 to 12' 6"	3'	12.0	-	25.0	-	Roof Load

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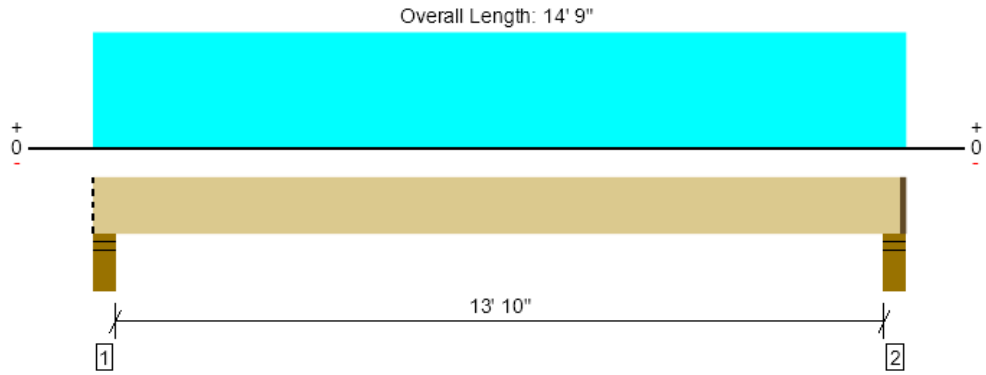
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

1st Floor, 1J-1
1 piece(s) 2 x 10 DF No.2 @ 16" OC



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	503 @ 14' 4 1/2"	3750 (4.00")	Passed (13%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	426 @ 1' 2 3/4"	1665	Passed (26%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1699 @ 7' 4 1/2"	2029	Passed (84%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.291 @ 7' 4 1/2"	0.350	Passed (L/577)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.379 @ 7' 4 1/2"	0.700	Passed (L/444)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

Member Length : 14' 7 1/2"
System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - DF	5.50"	5.50"	1.50"	118	393	511	Blocking
2 - Stud wall - DF	5.50"	4.00"	1.50"	118	393	511	1 1/2" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	End Bearing Points	

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 14' 9"	16"	12.0	40.0	Floor Load

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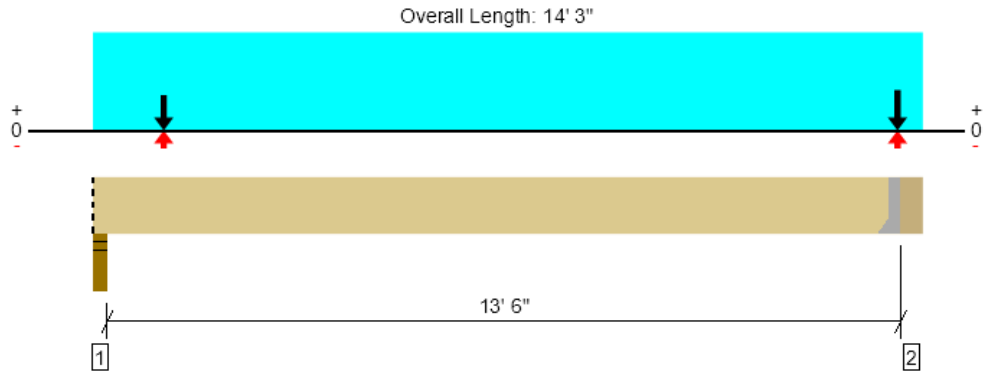
ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

1st Floor, 1B-1

1 piece(s) 5 1/4" x 9 1/4" 2.2E Parallam® PSL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	6660 @ 13' 9 1/2"	6660 (2.03")	Passed (100%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Shear (lbs)	4515 @ 1' 3/4"	9389	Passed (48%)	1.00	1.0 D + 1.0 L (All Spans) [8]
Moment (Ft-lbs)	9839 @ 6' 4 15/16"	18623	Passed (53%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Live Load Defl. (in)	0.200 @ 6' 10 3/16"	0.341	Passed (L/818)	--	1.0 D + 1.0 L (All Spans) [1]
Total Load Defl. (in)	0.462 @ 6' 9 15/16"	0.681	Passed (L/354)	--	1.0 D + 1.0 L (All Spans) [8]

Member Length : 13' 9 1/2"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Stud wall - HF	3.50"	3.50"	2.48"	2882	2017	1039	179/-179	5269	Blocking
2 - Hanger on 9 1/4" PSL beam	5.50"	Hanger[1]	2.03"	3481	2721	1557	211/-211	6800	See note [1]

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	13' 10" o/c	
Bottom Edge (Lu)	13' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

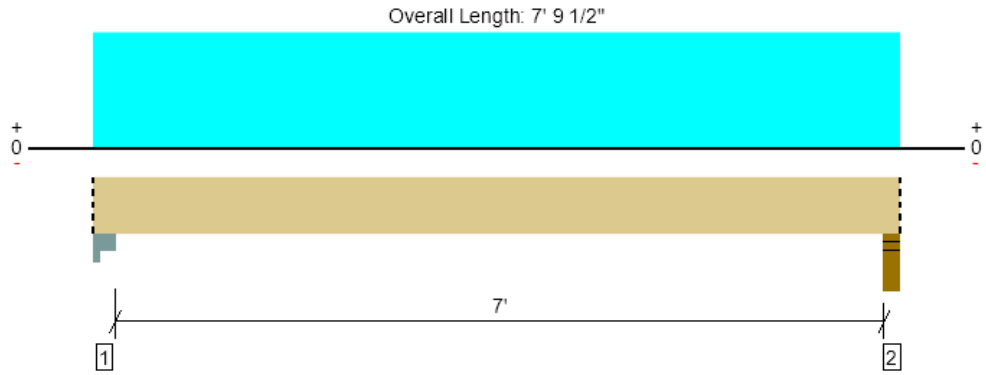
Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	HGUS5.50/8	4.00"	N/A	36-16d	12-16d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 13' 9 1/2"	N/A	15.2	--	--	--	
1 - Uniform (PSF)	0 to 14' 3" (Back)	1'	12.0	40.0	-	-	Floor Load
2 - Uniform (PSF)	0 to 14' 3" (Front)	2'	12.0	60.0	-	-	Covered Deck Load
3 - Uniform (PLF)	0 to 14' 3" (Top)	N/A	150.0	-	-	-	Wall Load Above
4 - Point (lb)	1' 3" (Top)	N/A	1606	978	1129	195/-195	Linked from: 1H-3, Support 1
5 - Point (lb)	13' 9" (Top)	N/A	1898	1480	1467	195/-195	Linked from: 1H-3, Support 2

1st Floor, 1B-2

1 piece(s) 5 1/4" x 9 1/4" 2.2E Parallam® PSL



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2105 @ 7' 7"	8505 (4.00")	Passed (25%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1499 @ 1' 2 3/4"	9389	Passed (16%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	3608 @ 3' 11 1/2"	18623	Passed (19%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.019 @ 3' 11 1/2"	0.181	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.053 @ 3' 11 1/2"	0.363	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

Member Length : 7' 9 1/2"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Column Cap - steel	5.50"	5.50"	1.50"	1382	792	198	2174	Blocking
2 - Stud wall - HF	4.00"	4.00"	1.50"	1339	767	192	2105	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	7' 10" o/c	
Bottom Edge (Lu)	7' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 7' 9 1/2"	N/A	15.2	--	--	
1 - Uniform (PSF)	0 to 7' 9 1/2" (Front)	5'	12.0	40.0	-	Floor Load
2 - Uniform (PLF)	0 to 7' 9 1/2" (Top)	N/A	250.0	-	-	Wall Load Above
3 - Uniform (PSF)	0 to 7' 9 1/2" (Front)	2'	12.0	-	25.0	Roof Load

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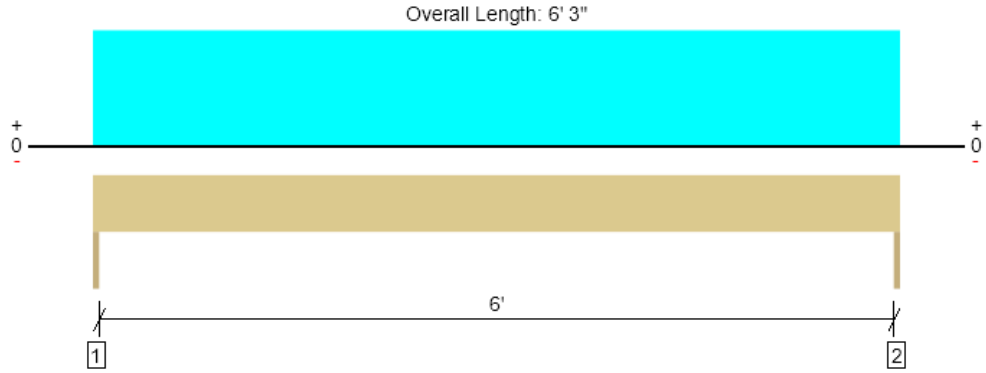
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

Basement, BH-1

1 piece(s) 3 1/2" x 7 1/2" 24F-V4 DF Glulam



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1482 @ 0	3413 (1.50")	Passed (43%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1127 @ 9"	4638	Passed (24%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	2316 @ 3' 1 1/2"	6489	Passed (36%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.056 @ 3' 1 1/2"	0.208	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.074 @ 3' 1 1/2"	0.313	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

Member Length : 6' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- A 1.1% decrease in the moment capacity has been added to account for lateral stability.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 6' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	357	1125	1482	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	357	1125	1482	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 6' 3"	N/A	6.4	--	
1 - Uniform (PSF)	0 to 6' 3"	9'	12.0	40.0	Floor Load

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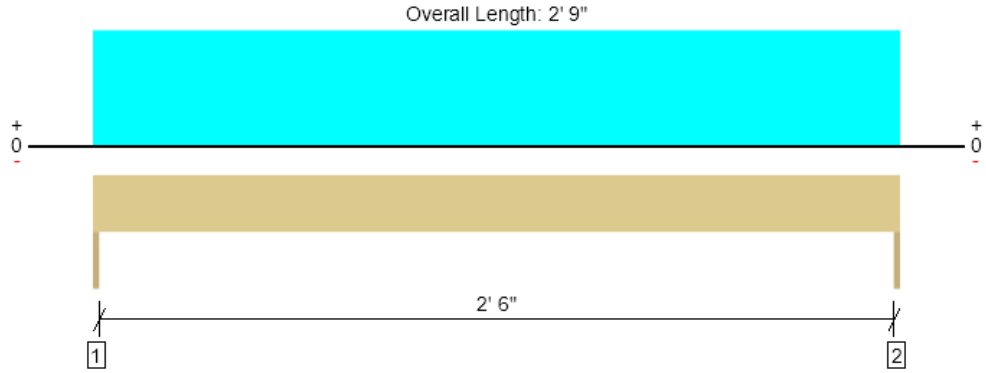
ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

Basement, BH-2

2 piece(s) 2 x 8 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	580 @ 0	2813 (1.50")	Passed (21%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	272 @ 8 3/4"	2610	Passed (10%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	398 @ 1' 4 1/2"	2334	Passed (17%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.003 @ 1' 4 1/2"	0.092	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.004 @ 1' 4 1/2"	0.138	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

Member Length : 2' 9"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- A 1.3% decrease in the moment capacity has been added to account for lateral stability.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	140	440	580	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	140	440	580	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 2' 9"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 2' 9"	8'	12.0	40.0	Floor Load

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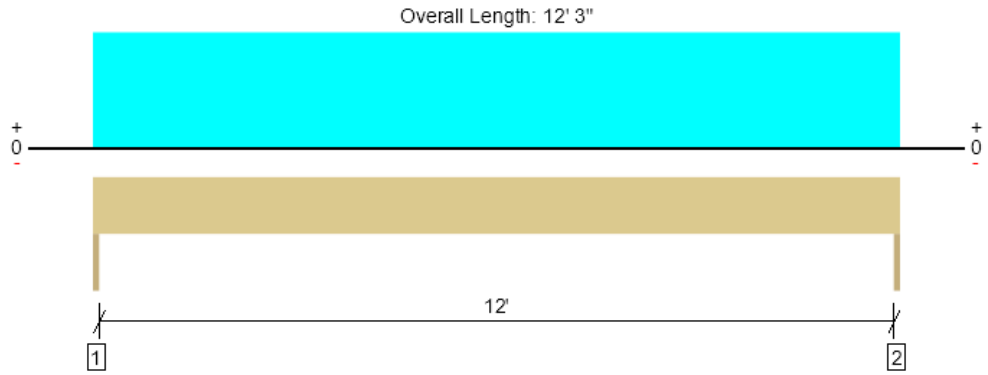
Basement, BH-3

1 piece(s) 5 1/2" x 12" 24F-V4 DF Glulam



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2772 @ 0	5363 (1.50")	Passed (52%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	2000 @ 1' 1 1/2"	11660	Passed (17%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	7504 @ 6' 1 1/2"	26018	Passed (29%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.104 @ 6' 1 1/2"	0.408	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.161 @ 6' 1 1/2"	0.613	Passed (L/914)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

Member Length : 12' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- A 1.4% decrease in the moment capacity has been added to account for lateral stability.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 12' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	980	1470	919	2772	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	980	1470	919	2772	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 12' 3"	N/A	16.0	--	--	
1 - Uniform (PSF)	0 to 12' 3"	6'	12.0	40.0	-	Floor Load
2 - Uniform (PSF)	0 to 12' 3"	6'	12.0	-	25.0	Roof Load

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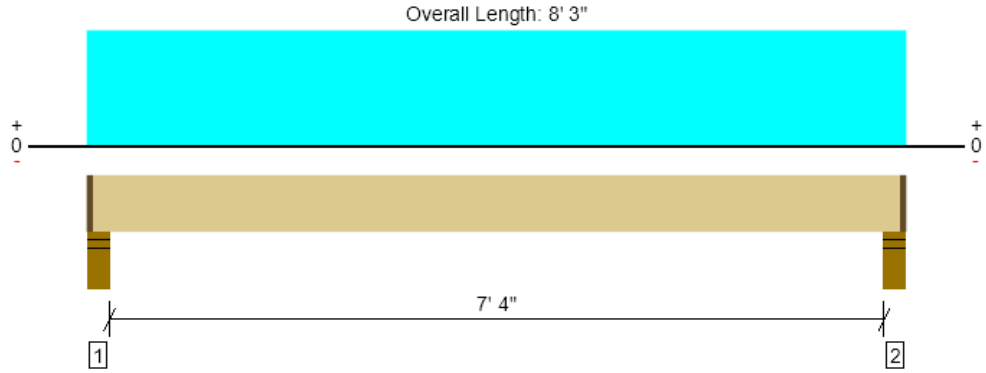
ForteWEB Software Operator	Job Notes
Harrison Kliegl L120 Engineering (425) 636-3313 hkliegl@l120engineering.com	

Weyerhaeuser

Basement, BH-1
1 piece(s) 4 x 10 DF No.2



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1801 @ 4"	5670 (4.00")	Passed (32%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1304 @ 1' 2 3/4"	3885	Passed (34%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	3236 @ 4' 1 1/2"	4492	Passed (72%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.068 @ 4' 1 1/2"	0.190	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.091 @ 4' 1 1/2"	0.379	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

Member Length : 8'
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - HF	5.50"	4.00"	1.50"	454	1403	1856	1 1/2" Rim Board
2 - Stud wall - HF	5.50"	4.00"	1.50"	454	1403	1856	1 1/2" Rim Board

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' o/c	
Bottom Edge (Lu)	8' o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 1/2" to 8' 1 1/2"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 8' 3" (Front)	8' 6"	12.0	40.0	Floor Load

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LONGITUDE
ONE TWENTY°
ENGINEERING & DESIGN

LATERAL CALCULATIONS

(425) 636 3313
L120Engineering.com

Project Number:	Plan Name:	Sheet Number:
S220425-3	Eadie Remodel	DC
Engineer:	Specifics:	Date:
HK	Design Criteria	3/6/2024

Gravity Criteria: Code: IBC 2018

ROOF SYSTEM		
Live Load:		
Snow	25.0	psf
Dead Load:		
Composite Roofing	2.0	psf
19/32" Plywood Sheathing	2.5	psf
Trusses at 24" o.c.	3.0	psf
Insulation	1.8	psf
(2) Layers 5/8" GWB	4.4	psf
Misc/Mech	1.3	psf
Total	**15.0**	**psf**

FLOOR SYSTEM		
Live Load:		
Residential	40.0	psf
Dead Load:		
Flooring	3.0	psf
3/4" T & G Plywood	2.5	psf
Floor Joists at 16" o.c.	2.5	psf
Insulation	0.5	psf
(1) Layers 5/8" GWB	2.2	psf
Miscellaneous	4.3	psf
Total	**15.0**	**psf**

EXTERIOR WALL SYSTEM		
2x6 at 16" o.c.	1.7	psf
Insulation	1.0	psf
1/2" Plywood Sheathing	1.5	psf
(2) layers 5/8" GWB	4.4	psf
Misc	3.4	psf
Total	**12.0**	**psf**
Inclu. thinset stone veneer	5.0	psf
Total	**17.0**	**psf**

INTERIOR WALL SYSTEM		
2x4 at 16" o.c.	1.1	psf
Insulation	0.5	psf
(2) Layers 5/8" GWB	4.4	psf
Misc	2.0	psf
Total	**8.0**	**psf**

SEISMIC PARAMETERS:

Code Reference: ASCE 7-16
R = **6.5** Bearing Wall System, Wood Structural Panel Walls
Mapped Spectral Acceleration, Ss = **1.44**
Mapped Spectral Acceleration, S1 = **0.5**
Soil Site Class = **D**

WIND PARAMETERS:

Code Reference: ASCE 7-16
Basic Wind Speed (3 second Gust) = **100** mph
Exposure : **C**
Kzt = **1.00**

SOIL PARAMETERS:

Soil Bearing Pressure = **1,500** psf competent native soil or structural fill
1/3 increase for short-term wind or seismic loading is acceptable
Frost Depth = **18** in

Lateral Wall Pressures:
Unrestrained Active Pressure = **35** pcf Cantilevered walls
Restrained Active Pressure = **55** pcf Plate Wall Design/Tank Walls
Passive Pressure = **250** pcf *Ignore top 2 ft
Soil Friction Coeff. = **0.4**

Project Number:	Plan:	Sheet Number:
S220425-3	**Eadie Remodel**	**L1**
Engineer:	**Specifics:**	**Date**
HK	**WIND FORCES**	**3/6/2024**

IBC 2018 Section 1609 → ASCE 7-16 Section 28.5 - Simplified Procedure → Main Wind-Force Resisting System

LOAD CRITERIA:

Basic Wind Speed, V_s =	100	mph	(ASCE 7-16, Section 26.5)
Exposure =	C		(ASCE 7-16, Section 26.7)

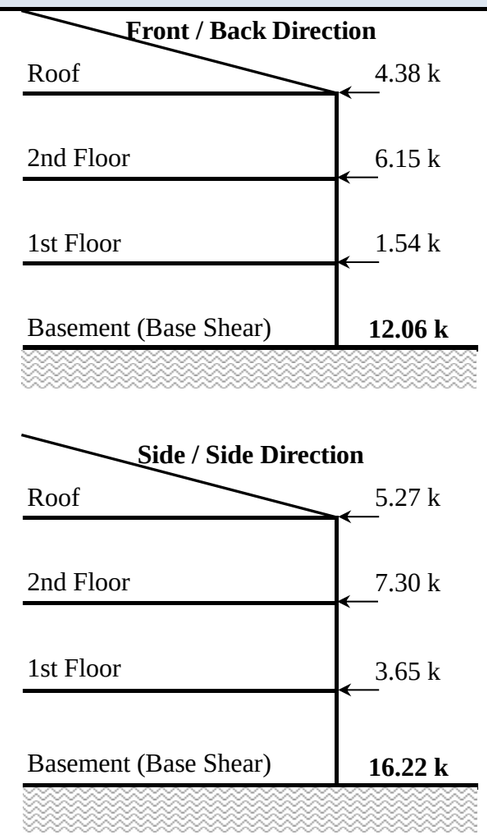
BUILDING GEOMETRY:

Roof Slope =	1.00	:12	=	4.76	degrees
Loads From Front/Back - Width (ft)=	54.00	ft		Roof:	Hip
Loads From Side - Width (ft) =	65.00	ft		Roof:	Hip
Average Eave Height =	23.00	ft			
Mean Roof Ht. , h =	29.00	ft	(ASCE 7-16, Figure 27.5-2)		
Edge Strip Width, a =	5.4	ft	(ASCE 7-16, Figure 28.5-1)		
End Zone Width, 2a =	10.80	ft	(ASCE 7-16, Figure 28.5-1)		

DESIGN:

Topographic Factor , Kzt =	**1.00**	(ASCE 7-16, Section 26.8)
Adjustment Factor, λ =	1.40	(ASCE 7-16, Figure 28.5-1)

WIND LOAD SUMMARY:

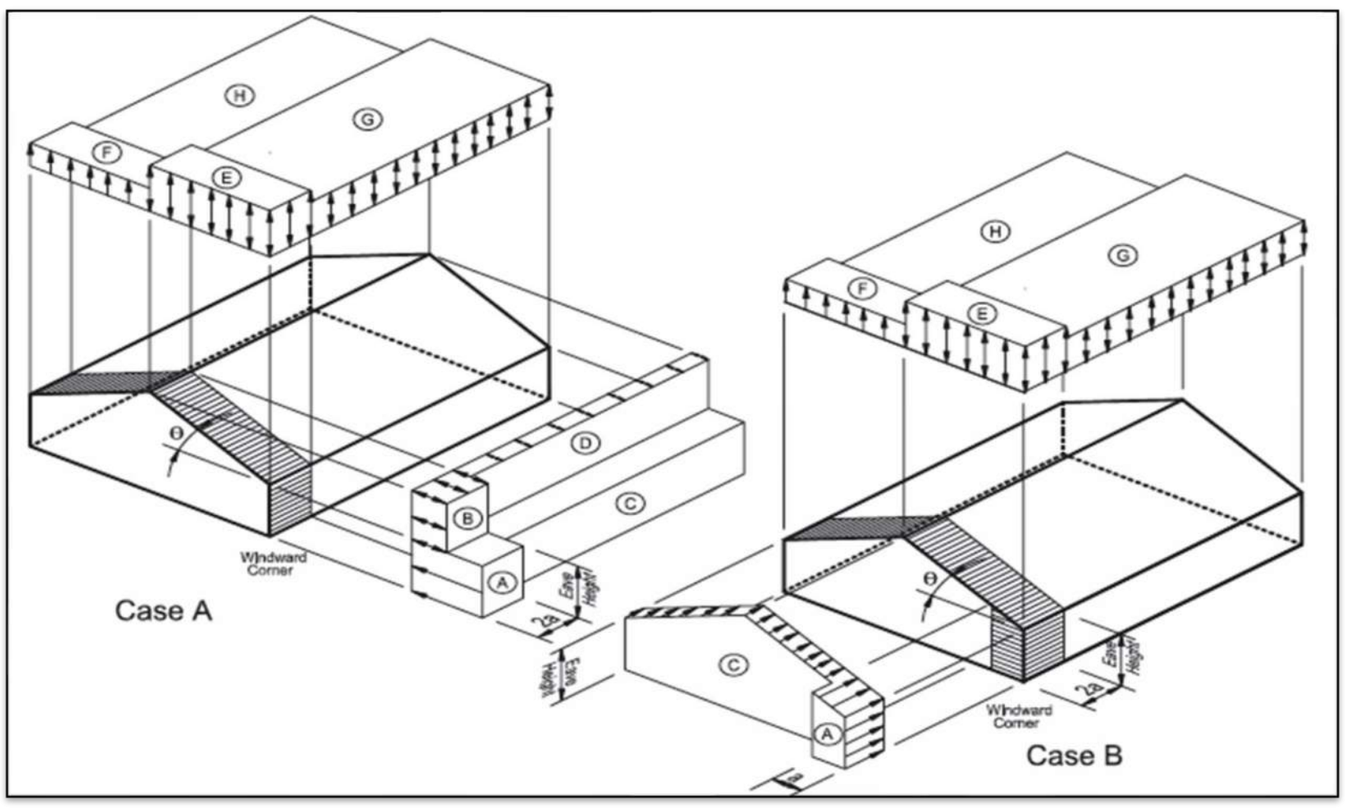


SIMPLIFIED DESIGN WIND PRESSURE, P_{S30} (psf)

(Exposure B at h = 30ft.)

Basic Wind Speed, Vs (mph)	Roof Angle (Degrees)	Load Case	ZONES*									
			Horizontal Pressure				Vertical Presssure				Overhang	
			A	B	C	D	E	F	G	H	E_{OH}	G_{OH}
100	4.76	A	15.90	-8.20	10.50	-4.90	-19.10	-10.80	-13.30	-8.40	-26.70	-20.90

* *Values Interpolated from Figure 28.5-1 ASCE 7 - 16*



Project Number:	Plan:	Sheet Number:
S220425-3	**Eadie Remodel**	**L1**
Engineer:	Specifics:	Date
HK	**WIND FORCES**	**3/6/2024**

IBC 2018 Section 1609 → ASCE 7-16 Section 28.5 - Simplified Procedure → Main Wind-Force Resisting System

Full Impact at Basement? NO (No = 1/4 Impact)

HORIZONTAL LOADS (psf) $p_s = \lambda * Kzt * Ps30$				**MIN. LOADS (psf)** *Per ASCE 7-16, 28.6.3*	
End zone		Interior zone		Roof	Wall
A (Wall)	B (Roof)	C (Wall)	D (Roof)		
22.26	-11.48	14.70	-6.86	8.0	16.0

ASD WIND FORCES: FRONT / BACK LOADING DIRECTION

	Location	Width (ft)	Height (ft)	Plane	End Zone Length (ft)	End Zone Pressure (W) (psf)	Interior zone Length (ft)	Interior zone Pressure (W) (psf)	Force 0.6 ω*W (kips)	Min Force 0.6 ω*W (kips)
ROOF	"Height" of Roof to Plate (see note)	54.0	4.00	(roof)	10.8	-11.48	43.2	-6.86	0.00	1.35
	Plate to Mid 2nd LVL	54.0	4.50	(wall)	10.8	22.26	43.2	14.70	3.07	3.03
								Σ =	3.07	4.38
2nd FLOOR	Mid 2nd LVL to Floor	54.0	4.50	(wall)	10.8	22.26	43.2	14.70	3.07	3.03
	"Height" Low-Roof to Plate (see note)	0.0	0.00	(roof)	10.8	-11.48	-10.8	-6.86	0.00	0.00
	Floor to Mid 1st LVL	54.0	4.50	(wall)	10.8	22.26	43.2	14.70	3.07	3.03
								Σ =	6.15	6.07
1st FLOOR	Mid 1st LVL to Floor	54.0	4.50	(wall)	10.8	22.26	43.2	14.70	3.07	3.03
	"Height" Low-Roof to Plate (see note)	0.0	0.00	(roof)	10.8	-11.48	-10.8	-6.86	0.00	0.00
	Floor to Mid Basement LVL	54.0	4.50	(wall)	10.8	22.26	43.2	14.70	3.07	3.03
								Σ =	1.54	1.52
								Total Wind Base Shear (kips)	10.75	11.96

Full Impact at Basement? YES (No = 1/4 Impact)

ASD WIND FORCES: SIDE / SIDE LOADING DIRECTION

	Location	Width (ft)	Height (ft)	Plane	End Zone Length (ft)	End Zone Pressure (W) (psf)	Interior zone Length (ft)	Interior zone Pressure (W) (psf)	Force 0.6 ω*W kips	Min Force 0.6 ω*W kips
ROOF	"Height" of Roof to Plate (see note)	65.0	4.00	(roof)	10.8	-11.48	54.2	-6.86	0.00	1.62
	Plate to Mid 2nd LVL	65.0	4.50	(wall)	10.8	22.26	54.2	14.70	3.64	3.65
								Σ =	3.64	5.27
2nd FLOOR	Mid 2nd LVL to Floor	65.0	4.50	(wall)	10.8	22.26	54.2	14.70	3.64	3.65
	"Height" Low-Roof to Plate (see note)	0.0	0.00	(roof)	10.8	-11.48	-10.8	-6.86	0.00	0.00
	Floor to Mid 1st LVL	65.0	4.50	(wall)	10.8	22.26	54.2	14.70	3.64	3.65
								Σ =	7.28	7.30
1st FLOOR	Mid 1st LVL to Floor	65.0	4.50	(wall)	10.8	22.26	54.2	14.70	3.64	3.65
	"Height" Low-Roof to Plate (see note)	0.0	0.00	(roof)	10.8	-11.48	-10.8	-6.86	0.00	0.00
	Floor to Mid Basement LVL	65.0	4.50	(wall)	10.8	22.26	54.2	14.70	3.64	3.65
								Σ =	3.64	3.65
								Total Wind Base Shear (kips)	14.56	16.22

Project Number:	Plan Name:	Sheet Number:
S220425-3	**Eadie Remodel**	**L2**
Engineer:	**Specifics:**	**Date:**
HK	**SEISMIC WEIGHTS**	**3/6/2024**

Unit Weights (psf)

Roof:	15	psf
Floor:	15	psf
Exterior Wall:	12	psf
Ext Wall w/Stone Veneer:	0	psf
Interior Wall:	8	psf

Seismic Weights include: (REF §12.7)

25% of storage Live loads

Actual partition weight or 10 psf min if applicable

Operating weight of permenant equipment

20% of uniform design snow loads for areas where Pf > 30 psf

LEVEL	ITEM	AREA / LENGTH	HEIGHT (ft)	UNIT WEIGHT (psf)		Item Total Weight. (lbs)	Level Sub-Total (kips)	Average Pressure (psf)
ROOF:								
	Roof	1,860	1.02	15	=	28,387		
	Ext. Wall Below	240	4.50	12	=	12,960		
	Corridor Wall Below	150	4.50	8	=	5,400		
							47	**25**
2nd FLOOR:								
	Floor	1,780	1.00	15	=	26,700		
	Low Roof	400	1.02	15	=	6,105		
	Ext. Wall Above	240	4.50	12	=	12,960		
	Corridor Wall Above	150	4.50	8	=	5,400		
	Ext. Wall Below	256	4.50	12	=	13,824		
	Ext. Wall w/Stone Veneer Below	0	0.00	0	=	0		
	Corridor Wall Below	200	4.50	8	=	7,200		
							72	**33**
1st FLOOR:								
	Floor	1,670	1.00	15	=	25,050		
	Low Roof	0	1.02	15	=	0		
	Ext. Wall Above	256	4.50	12	=	13,824		
	Ext. Wall w/Stone Veneer Above	0	0.00	0	=	0		
	Corridor Wall Above	200	4.50	8	=	7,200		
	Ext. Wall Below	153	4.50	12	=	8,262		
	Ext. Wall w/Stone Veneer Below	0	0.00	0	=	0		
	Corridor Wall Below	115	4.50	8	=	4,140		
							58	**35**
BASEMENT:								
	Ext. Wall Above	153	4.50	12	=	8,262		
	Ext. Wall w/Stone Veneer Above	0	0.00	0	=	0		
	Corridor Wall Above	115	4.50	8	=	4,140		
							12	

STRUCTURE WEIGHT FOR SEISMIC BASE SHEAR: **177** **kips**

TOTAL WEIGHT OF STRUCTURE: **190** **kips**

(Includes Basement Dead Load)

Project Number:	Plan Name:	Sheet Number:
S220425-3	**Eadie Remodel**	**L3**
Engineer:	Specifics:	Date:
HK	**SEISMIC FORCES**	**3/6/2024**

Equivelant Lateral Force Analysis per IBC 2018 1613.1 →ASCE 7-16 Table 12.6-1 →Sec 12.8

Data generated by: Seismic Design Values for Buildings **"Java Ground Motion Parameter Calculation"**

S_1 =	0.5		Maps
S_{DS} =	0.96		(ASCE 7 EQ 11.4.-3)
S_{D1} =	0.60702		(ASCE 7 EQ 11.4.-4)
Seismic Importance Factor =	1.00		(ASCE 7 Table 11.5-1)
Seismic Design Category =	D		(ASCE 7 Table 11.6-1 & 11.6.2)
Response Modification Factor, R =	6.5		(ASCE 7 Table 12.2-1)
Seismic Force-Resisting System Description =	A.13 - light framed walls		
Building Height, h_n =	31.0	ft	
Building Period Coefficient, C_T =	0.020		(ASCE 7 Table 12.8.-2)
Approx. Fundamental Period, T_a =	0.263	$(C_{T*}(h_n^{0.75})$	(ASCE 7 EQ 12.8.-7)
Approx. Fundamental Period, T_L =	6.0	sec	(ASCE 7 11.4.6)

Seismic Response Coefficient

$C_s = S_{DS}/(R/I)$	C_s =	0.148		(ASCE 7 EQ 12.8.-2)

Seismic Response Coefficient, Maximum

$C_{s,\,MAX} = S_{D1}/(T*R/I)$	$C_{s,\,MAX}$ =	0.355	$T \le T_L$	(ASCE 7 EQ 12.8.-3)
$C_{s,\,MAX} = S_{D1}\,T_L/(T^2*R/I)$	$C_{s,\,MAX}$ =	NA	$T > T_L$	(ASCE 7 EQ 12.8.-4)

Seismic Response Coefficient, Minimum

$C_{s,\,MIN} = 0.01$	$C_{s,\,MIN}$ =	0.010		(ASCE 7 EQ 12.8.-5)
$C_{s,\,MIN} = 0.5\,S_1/(R/I)$	$C_{s,\,MIN}$ =	NA	if S1 > 0.6	(ASCE 7 EQ 12.8.-6)

C_s =	**0.148**		
Dead Load W =	177	kips	
V = Cs W =	26.2	kips	(ASCE 7 EQ 12.8.-1)
$Q_E = V$ =	26.2	kips	(ASCE 7 EQ 12.4-3)
ρ =	1.0		(ASCE 7 12.3.4.2)
$E_H = \rho\,Q_E$	26.2	kips	(ASCE 7 EQ 12.4-3)
Ev = .2 S_{DS} D =	0.19	x D kips	

Factor for Alternate Basic Load conbinations - 2018 IBC

$E_H/1.4$ =	**18.7**	**kips**	IBC 2018 1605.3.2
k =	1		(ASCE 7 12.8.3)

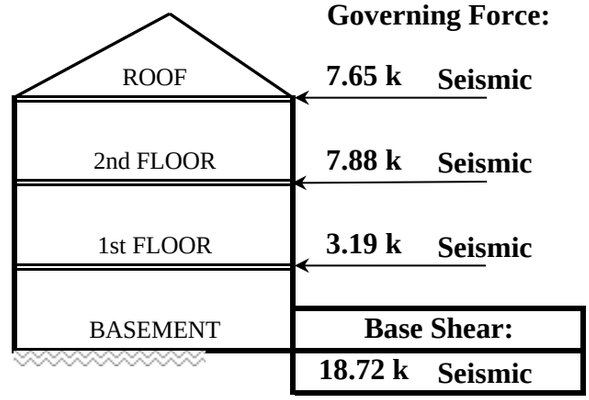
VERTICAL DISTRIBUTION (Per ASCE 7 - 12.8.3)

Floor	Area (ft²)	Story Height H (ft)	Total Height h_x (ft)	Story Weight w_x (kips)	$w_x h_x^{\kappa}$ (k-ft)	Vert Dist Factor Cvx	Story Force Fx (kips)	Factored Story Force (ASD) Fx ρ/1.4 = E_H/1.4 (kips)
Roof	1,860	9.00	27.00	47	1,262	0.41	10.7	**7.7**
2nd	1,780	9.00	18.00	72	1,299	0.42	11.0	**7.9**
1st	1,670	9.00	9.00	58	526	0.17	4.5	**3.2**
				Sum =	3,088	1.000	26.2	**18.7**

Project Number:	Plan Name:	Sheet Number:
S220425-3	**Eadie Remodel**	**L4**
Engineer:	**Specifics:**	**Date:**
HK	**DESIGN LOADS**	**3/6/2024**

FRONT / BACK DIRECTION

Wind Force *0.6 ω * $W_{F/B}$ (kips)*		Seismic Force *E/1.4 (kips)*	
Per Level	Sum	Per Level	Sum
4.38	4.38	7.65	7.65
6.15	10.53	7.88	15.53
1.54	12.06	3.19	18.72



Governing Force:

7.65 k Seismic

7.88 k Seismic

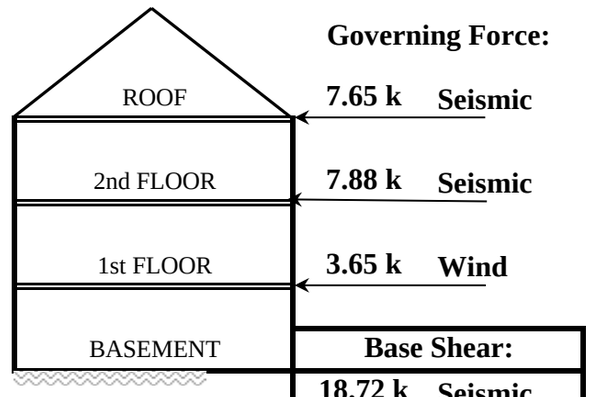
3.19 k Seismic

Base Shear:

18.72 k Seismic

SIDE / SIDE DIRECTION

Wind Force *0.6 ω * W_S (kips)*		Seismic Force *E/1.4 (kips)*	
Per Level	Sum	Per Level	Sum
5.27	5.27	7.65	7.65
7.30	12.57	7.88	15.53
3.65	16.22	3.19	18.72



Governing Force:

7.65 k Seismic

7.88 k Seismic

3.65 k Wind

Base Shear:

18.72 k Seismic

Project Number:	Plan Name:	Sheet Number:
S220425-3	**Eadie Remodel**	**L5**
Engineer:	Specifics:	Date:
HK	**Shear walls (front/back)**	**3/6/2024**

Notes:

* All walls designed with Force-Transfer should meet a minimum height to width ratio of 2:1 at Pier (SDPWS 2018, Table 4.3.4)
* Maximum allowed height to width ratio 3.5:1 for walls w/o openings (increased shear design values per SDPWS 2018, Table 4.3.4)
* Shear panel height is height to underside or roof or floor framing.

RED = Update Formula as required - Important
BLUE = Review and update as required - Typical Input

2nd Story Walls (Front - Back Direction)

Stud Species HF

Story shear(kips) = 7.65
Story height (ft) = 9.00
Shear Panel height (ft) = 9.00
Total Diaphragm Area (sq ft) = 1860.00

100% story shear YES

Governing Force (F/B Direction) = Seismic
Dead load factor (F/B Direction) = 0.90 IBC 2018 Equation 16-22
Shear panel capacity (Wind or Seismic) = Seismic
load balance check = all loads do not match story shear

2nd Story Walls (Front - Back Direction)
Hold downs and window straps

Story	Wall Mark	Wall L(ft)	Opening Width (ft)	Opening Height (ft)	Opening (max) to Edge (ft)	Plate to Opening (ft)	Effective Length (ft)	Trib. Area (sq ft)	Percent Sharing (%)	Effective Trib. Area	Story V(kips)	Sum V(kips)	Panel Shear (plf)	Height/Width Reduction (%) R = 2*L/H	Design Panel Shear (plf)	Wall Type	Roof DL Trib(ft)	Sum DL(klf)	Sum DL(klf)	OTM (k-ft)	RM (k-ft)	Resultant HD(kips)	HD TYPE	HD/Strap to DF or HF?	HD location Edge/Interior?	Resultant HD	Force at Window (Kips)	Window Strap
2	1.1	4.83					4.83	260.00	0.50	130.00	0.53	0.53	111	1.00	111	SW6	2.00	0.18	0.18	4.8	1.9	0.67	flr-flr	HF	Edge	MST37	0.00	No strap
2	1.2	4.83					4.83	260.00	0.50	130.00	0.53	0.53	111	1.00	111	SW6	2.00	0.18	0.18	4.8	1.9	0.67	flr-beam	HF	Edge	MSTC48B3	0.00	No strap
2	2.1	6.00					6.00	810.00	0.45	366.79	1.51	1.51	251	1.00	251	SW4	2.00	0.18	0.18	13.6	3.0	1.93	flr-beam	HF	Edge	MSTC48B3	0.00	No strap
2	2.2	7.25					7.25	810.00	0.55	443.21	1.82	1.82	251	1.00	251	SW4	2.00	0.18	0.18	16.4	4.3	1.79	flr-flr	HF	Edge	MST37	0.00	No strap
2	3.1	10.50					10.50	845.00	1.00	845.00	3.48	3.48	331	1.00	331	SW4	2.00	0.18	0.18	31.3	9.1	2.22	flr-flr	HF	Edge	MST37	0.00	No strap
S =	33.41					Total OSB wall length = (feet)	22.91			S =	1915.00	7.88	7.88	Warning-Wall l		Total OSB Capacity (kips)	7.65											

1st Story Walls (Front - Back Direction)

Shear panel capacity (Wind or Seismic) = Seismic

Story shear(kips) = 7.88
Story height (ft) = 9.00
Shear Panel height (ft) = 9.00
Total Diaphragm Area (sq ft) = 1780.00

Accumulated Shear = 15.53
load balance check = OK

1st Story Walls (Front - Back Direction)
Hold downs and window straps

Story	Wall Mark	Wall L(ft)	Opening Width (ft)	Opening Height (ft)	Opening (max) to Edge (ft)	Plate to Opening (ft)	Effective Length (ft)	Trib. Area (sq ft)	Percent Sharing (%)	Effective Trib. Width	Story V(kips)	Sum V(kips)	Panel Shear (plf)	Height/Width Reduction (%) R = 2*L/H	Design Panel Shear (plf)	Wall Type	Floor DL Trib(ft)	Story DL(klf)	Walls/DL Stacks?	Sum DL(klf)	OTM (k-ft)	RM (k-ft)	Resultant HD(kips)	HD TYPE	HD/Strap to DF or HF?	HD location Edge/Interior?	Resultant HD	Force at Window (Kips)	Window Strap
1	1.1	23.00					23.00	400.00	1.00	400.00	1.77	2.84	123	1.00	123	SW6	2.00	0.18	NO	0.18	25.6	43.6	-0.80	flr-conc	HF	Edge	No HD	0.00	No strap
1	2.1	10.00	3.00	3.50	3.00	1.50	7.00	780.00	0.28	218.40	0.97	1.90	271	1.00	271	SW4	6.00	0.24	NO	0.24	17.1	10.9	0.65	flr-beam	HF	Edge	HDU2	1.76	CS14
1	2.2	18.00					18.00	780.00	0.72	561.60	2.48	4.88	271	1.00	271	SW4	6.00	0.24	NO	0.24	44.0	35.4	0.49	flr-flr	HF	Edge	No HD	0.00	No strap
1	3.1	13.83					13.83	590.00	0.68	401.36	1.78	4.14	299	1.00	299	SW4	6.00	0.24	NO	0.24	37.3	20.9	1.23	flr-beam	HF	Edge	HDU2	0.00	No strap
1	3.2	10.50	4.00	3.67	2.50	1.50	6.50	590.00	0.32	188.64	0.83	1.95	299	1.00	299	SW4	6.00	0.24	NO	0.24	17.5	12.1	0.55	flr-conc	HF	Edge	HDU2	1.66	CS16
S =	75.33					Total OSB wall length = (feet)	68.33			S =	1770.00	7.83	15.71	OK		Total OSB Capacity (kips)	7.88											

Basement Walls (Front - Back Direction)

Story shear(kips) = 3.19
Story height (ft) = 9.00
Shear Panel height (ft) = 9.00
Total Diaphragm Area (sq ft) = 1670.00

Accumulated Shear = 18.72 **The rest of the story shear from above has been transferred into foundation**
load balance check = OK

Basement Walls (Front - Back Direction)
Hold downs and window straps

Story	Wall Mark	Wall L(ft)	Opening Width (ft)	Opening Height (ft)	Opening (max) to Edge (ft)	Plate to Opening (ft)	Effective Length (ft)	Trib. Area (sq ft)	Percent Sharing (%)	Effective Trib. Width	Story V(kips)	Sum V(kips)	Panel Shear (plf)	Height/Width Reduction (%) R = 2*L/H	Design Panel Shear (plf)	Wall Type	Story DL(klf)	Sum DL(klf)		OTM (k-ft)	RM (k-ft)	Resultant HD(kips)	HD TYPE			Resultant HD	Force at Window (Kips)	Window Strap
B	1.0	20.00					20.00	0.00	1.00	0.00	0.00	2.84	142	1.00	CONCRETE FOUNDATION											CONCRETE FOUNDATION		
B	2.0	20.00					20.00	440.00	1.00	440.00	0.84	7.62	381	1.00	CONCRETE FOUNDATION											CONCRETE FOUNDATION		
B	3.1	8.25					8.25	450.00	0.44	198.00	0.38	4.52	548	1.00	548	SW2	4.00	0.21	NO	0.21	40.7	6.5	4.41	flr-conc	HF	Edge	HDU8	0.00	No strap
B	3.2	10.50					10.50	450.00	0.56	252.00	0.48	2.43	231	1.00	CONCRETE FOUNDATION											CONCRETE FOUNDATION		
B	4.1	12.00	5.00	3.75	2.00	1.50	7.00	775.00	0.52	401.85	0.77	0.77	110	1.00	110	SW6	5.00	0.23	NO	0.23	6.9	14.8	-0.68	flr-conc	HF	Edge	No HD	0.49	CS16
B	4.2	12.50	6.00	6.00	2.00	1.25	6.50	775.00	0.48	373.15	0.71	0.71	110	1.00	110	SW6	5.00	0.23	NO	0.23	6.4	16.0	-0.80	flr-conc	HF	Edge	No HD	0.75	CS16
S =	83.25									S =	1665.00	3.18	18.89	OK														

Project Number:	Plan Name:	Sheet Number:
S220425-3	**Eadie Remodel**	**L6**
Engineer:	Specifics:	Date:
HK	**Shear walls (side/side)**	**3/6/2024**

Notes:

* All walls designed with Force-Transfer should meet a minimum height to width ratio of 2:1 at Pier (SDPWS 2018, Table 4.3.4)
* Maximum allowed height to width ratio 3.5:1 for walls w/o openings (increased shear design values per SDPWS 2018, Table 4.3.4)
* Shear panel height is height to underside or roof or floor framing.

RED = Update Formula as required - Important
BLUE = Review and update as required - Typical Input

2nd Story Walls (Side / Side Direction)

2nd Story Walls (Side / Side Direction)
Hold downs and window straps

Stud Species: HF

Story shear(kips) = 7.65
Story height (ft) = 9.00
Shear Panel height (ft) = 9.00
Total Diaphragm Area (sq ft) = 1860.00

100% story shear YES

Governing Force (F/B Direction) = Seismic
Dead load factor (F/B Direction) = 0.90 IBC 2018 Equation 16-22
Shear panel capacity (Wind or Seismic) = Seismic
load balance check = Warning-Wall loads do not match story shear

Story	Wall Mark	Wall L(ft)	Opening Width (ft)	Opening Height (ft)	Opening (max) to Edge (ft)	Plate to Opening (ft)	Effective Length (ft)	Trib. Area (sq ft)	Percent Sharing (%)	Effective Trib. Area	Story V(kips)	Sum V(kips)	Panel Shear (plf)	Height/Width Reduction (%) R = 2*L/H	Design Panel Shear (plf)	Wall Type	Wall Mark	Roof DL Trib(ft)	Story DL(klf)	Sum DL(klf)	OTM (k-ft)	RM (k-ft)	Resultant HD(kips)	HD TYPE	HD/Strap to DF or HF?	HD location Edge/Interior?	Resultant HD	Force at Window (Kips)	Window Strap
2	B1	7.83					7.83	360.00	1.00	360.00	1.48	1.48	189	1.00	189	SW6	B1	7.00	0.26	0.26	13.3	7.1	0.85	flr-flr	HF	Edge	MST37	0.00	No strap
2	C1	23.75					23.75	460.00	1.00	460.00	1.89	1.89	80	1.00	80	SW6	C1	14.00	0.36	0.36	17.0	92.1	-3.23	flr-beam	HF	Edge	No HD	0.00	No strap
2	D1	6.25					6.25	630.00	0.58	366.28	1.51	1.51	241	1.00	241	SW4	D1	2.00	0.18	0.18	13.6	3.2	1.80	flr-beam	HF	Edge	MSTC48B3	0.00	No strap
2	D2	8.50	4.00	4.50	2.00	2.00	4.50	630.00	0.42	263.72	1.08	1.08	241	1.00	241	SW4	D2	2.00	0.18	0.18	9.8	5.9	0.48	flr-flr	HF	Edge	No HD	1.02	CS16
2	E1	14.00	9.50	4.00	2.00	2.00	4.50	400.00	0.38	153.19	0.63	0.63	140	1.00	140	SW6	E1	8.00	0.27	0.27	5.7	24.1	-1.36	flr-flr	HF	Edge	No HD	0.56	CS16
2	E2	7.25					7.25	400.00	0.62	246.81	1.02	1.02	140	1.00	140	SW6	E2	2.00	0.18	0.18	9.1	4.3	0.71	flr-beam	HF	Edge	MSTC48B3	0.00	No strap
	S =	67.58				Total OSB wall length = (feet)	42.33		S =	1850.00	5.96	**5.96**	Warning-Wall		Total OSB Capacity (kips)	**7.65**														

1st Story Walls (Side / Side Direction)

1st Story Walls (Side / Side Direction)
Hold downs and window straps

Shear panel capacity (Wind or Seismic) = Seismic

Story shear(kips) = 7.88
Story height (ft) = 9.00
Shear Panel height (ft) = 9.00
Total Diaphragm Area (sq ft) = 1780.00

Accumulated Shear = 15.53
load balance check = Warning-Wall loads do not match story shear

Story	Wall Mark	Wall L(ft)	Opening Width (ft)	Opening Height (ft)	Opening (max) to Edge (ft)	Plate to Opening (ft)	Effective Length (ft)	Trib. Area (sq ft)	Percent Sharing (%)	Effective Trib. Area	Story V(kips)	Sum V(kips)	Panel Shear (plf)	Height/Width Reduction (%) R = 2*L/H	Design Panel Shear (plf)	Wall Type	Wall Mark	Floor DL Trib(ft)	Story DL(klf)	Walls/DL Stacks?	Sum DL(klf)	OTM (k-ft)	RM (k-ft)	Resultant HD(kips)	HD TYPE	HD/Strap to DF or HF?	HD location Edge/Interior?	Resultant HD	Force at Window (Kips)	Window Strap
1	B1	3.25					3.25	215.00	0.45	96.38	0.43	1.09	335	0.72	464	SW2	B1	4.00	0.19	YES	0.45	9.8	2.1	2.79	flr-beam	HF	Edge	MSTC48B3	0.00	No strap
1	B2	4.00					4.00	215.00	0.55	118.62	0.52	1.34	335	0.89	377	SW3	B2	4.00	0.19	YES	0.56	12.1	4.0	2.30	flr-flr	HF	Edge	MST37	0.00	No strap
1	C1	5.67					5.67	320.00	1.00	320.00	1.42	3.31	583	1.00	583	SW2	C1	3.00	0.18	YES	0.36	29.8	5.2	4.75	flr-beam	HF	Edge	HDU8	0.00	No strap
1	D1	4.00					4.00	485.00	1.00	485.00	2.15	3.44	860	0.89	968	2W2	D1	8.00	0.25	NO	0.25	31.0	1.8	8.33	flr-conc	DF-L	Edge	HD12	0.00	No strap
2	D.5	6.83					6.83	420.00	1.00	420.00	1.86	3.15	462	1.00	462	SW2	D.5	2.00	0.16	NO	0.16	28.4	3.4	3.94	flr-conc	HF	Edge	HDU5	0.00	No strap
1	E1	18.50					18.50	320.00	0.64	204.14	0.90	1.53	83	1.00	83	SW6	E1	5.00	0.21	NO	0.21	13.8	32.2	-1.02	flr-beam	HF	Edge	No HD	0.00	No strap
1	E2	13.50	3.00	4.00	3.00	1.50	10.50	320.00	0.36	115.86	0.51	1.53	146	1.00	146	SW6	E2	5.00	0.21	NO	0.21	13.7	17.1	-0.26	flr-conc	HF	Edge	No HD	1.02	CS16
	S =	55.75				Total OSB wall length = (feet)	12.92		S =	1760.00	2.37	**15.40**	Warning-Wall		Total OSB Capacity (kips)	**7.88**														

Basement Walls (Side / Side Direction)

Basement Walls (Side / Side Direction)
Hold downs and window straps

Shear panel capacity (Wind or Seismic) = Wind

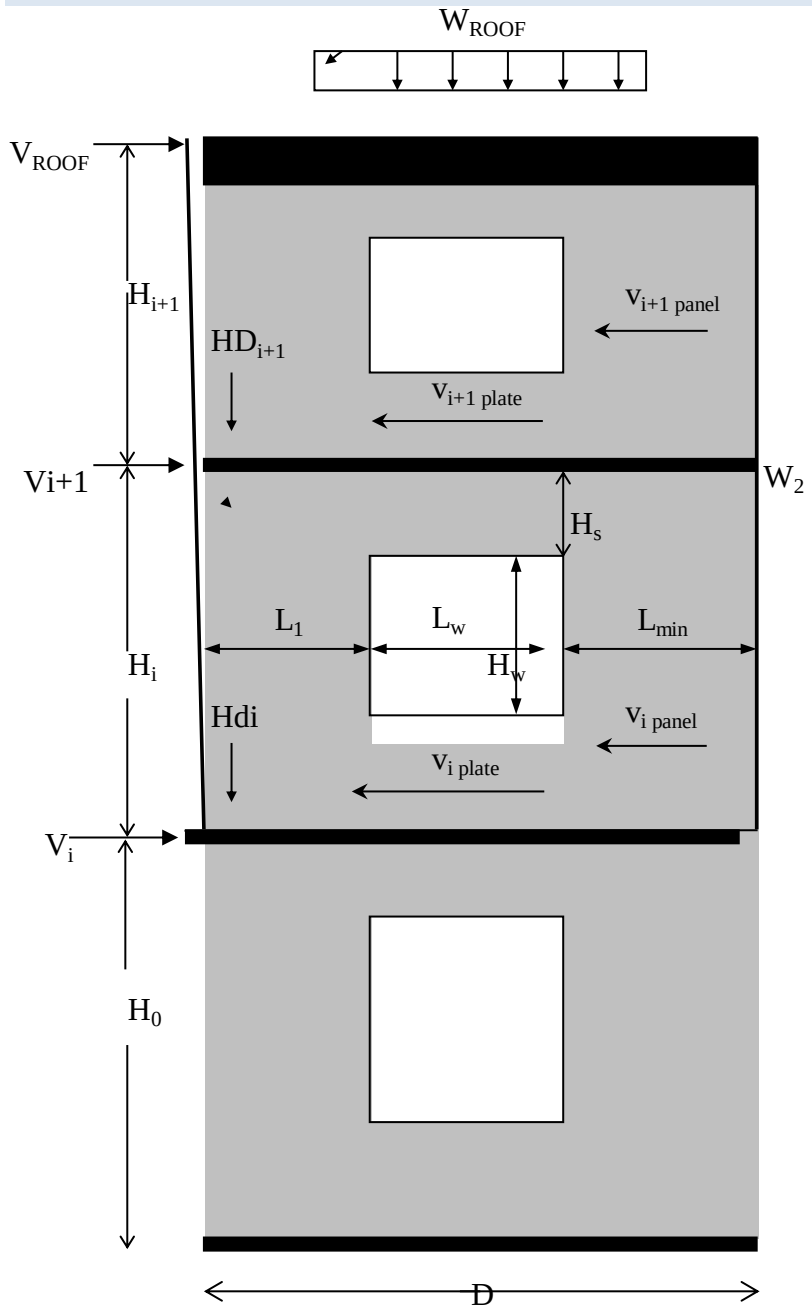
Story shear(kips) = 3.65
Story height (ft) = 9.00
Shear Panel height (ft) = 9.00
Total Diaphragm Area (sq ft) = 1670.00

Accumulated Shear = 19.18 **The rest of the story shear from above has been transferred into foundation**
load balance check = OK

Story	Wall Mark	Wall L(ft)	Opening Width (ft)	Opening Height (ft)	Opening (max) to Edge (ft)	Plate to Opening (ft)	Effective Length (ft)	Trib. Area (sq ft)	Percent Sharing (%)	Effective Trib. Width	Story V(kips)	Sum V(kips)	Panel Shear (plf)	Height/Width Reduction (%) R = 2*L/H	Design Panel Shear (plf)	Wall Type	Wall Mark	Floor DL Trib(ft)	Story DL(klf)	Walls/DL Stacks?	Sum DL(klf)	OTM (k-ft)	RM (k-ft)	Resultant HD(kips)	HD TYPE	HD/Strap to DF or HF?	HD location Edge/Interior?	Resultant HD	Force at Window (Kips)	Window Strap
B	A1	12.00					12.00	270.00	1.00	270.00	0.59	0.59	49	1.00	49	SW6	A1	2.00	0.16	NO	0.16	5.3	10.6	-0.46	flr-conc	HF	Edge	No HD	0.00	No strap
B	B1	6.50					6.50	500.00	0.43	216.67	0.47	1.53	235	1.00	235	SW6	B1	2.00	0.16	NO	0.16	13.7	3.1	1.77	flr-conc	HF	Edge	STHD14	0.00	No strap
B	B2	8.50					8.50	500.00	0.57	283.33	0.62	2.00	235	1.00	235	SW6	B2	2.00	0.16	NO	0.16	18.0	5.3	1.58	flr-conc	HF	Edge	STHD14	0.00	No strap
B	C	7.10					7.10	275.00	1.00	275.00	0.60	3.91	551	1.00	551	SW2	C	10.00	0.28	NO	0.28	35.2	6.4	4.35	flr-conc	HF	Edge	HDU8	0.00	No strap
B	D	20.00					20.00	400.00	1.00	400.00	0.87	4.32	216	1.00	216	SW6	D	11.00	0.30	NO	0.30	38.8	53.8	-0.77	flr-conc	HF	Edge	No HD	0.00	No strap
B	D.5	7.00					7.00	210.00	1.00	210.00	0.46	3.61	516	1.00	516	SW2	D.5	12.00	0.31	NO	0.31	32.5	6.9	3.94	flr-conc	HF	Edge	HDU5	0.00	No strap
B	E	20.00					20.00	20.00	1.00	20.00	0.04	3.10	155	1.00	155	CONCRETE FOUNDATION												CONCRETE FOUNDATION		
	S =	81.10				Total OSB wall length = (feet)	18.50		S =	1675.00	3.66	**19.06**	OK		Total OSB Capacity (kips)	**3.65**														

Project	Sheet number:
Eadie Remodel	**L7**
Subject	Date
SHEAR WALL EQUATION DIAGRAM	**3/6/2024**

SHEAR WALL WITH WINDOW BASED ON SHEAR TRANSFER:



Where:

V_i = Story Shear
W_i = Story Dead Load
HD_i = Story Holdown
M_{OTi} = Story Over Turning Moment
M_{Ri} = Story Resisting Moment

$M_{OT\ ROOF} = V_{ROOF} \times H_{1+1}$

$M_{OTi} = [(V_{i+1} + V_{ROOF}) \times H_i] + M_{OT\ ROOF}$

$M_{R\ ROOF} = 0.6 \times W_{ROOF} \times D^{2}/2$

$M_{Ri} = 0.6 \times (W_{i+1} + W_{ROOF}) \times D^{2}/2$

$HD_{i+1} = (M_{OT\ ROOF} - M_{R\ ROOF})/(D - 6'')$

$HD_i = (M_{OTi} - M_{R1i})/(D - 6'')$

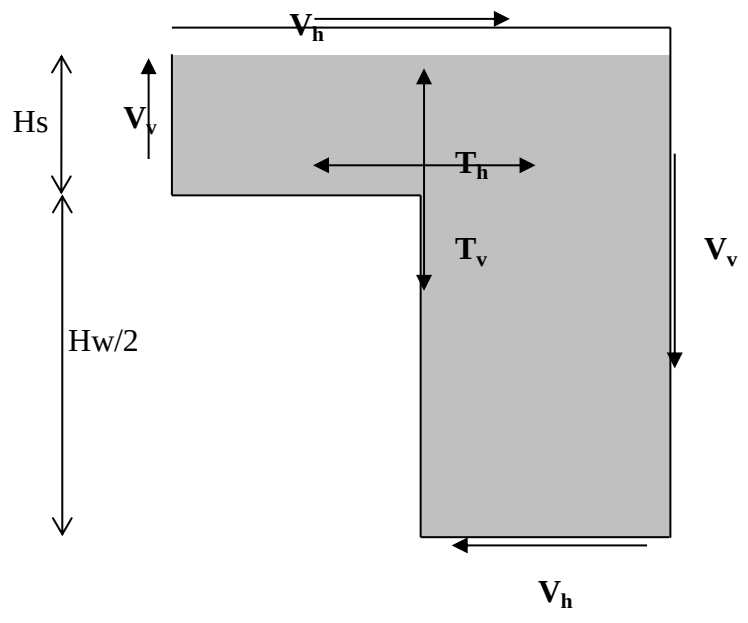
$V_{i+1\ panel} = V_{ROOF} / (L_1 + L_{max})$

$V_{i\ panel} = (V_{ROOF} + V_{i+1}) / (L_1 + L_{max})$

$V_{i+1\ plate} = V_{ROOF} / D$

$V_{i\ plate} = (V_{ROOF} + V_{i+1}) / D$

FORCE TRANSFER AROUND WINDOW CALCULATION (CANTILEVER PIER METHOD)



$V_h = v_{i\ panel} \times L_{max}$

$V_v = HD_i$

$T_h = V_h\ (H_w / 2 + H_s) / H_s$

T_v = Is resisted by the continuous stud adjacent to the window.

LONGITUDE
ONE TWENTY°
ENGINEERING & DESIGN

FOUNDATION CALCULATIONS

FOOTING REFERENCE PER PLAN

(425) 636 3313
L120Engineering.com

Project: Foundation calculations - 1500 psf

Location: 16" continous footing (max loading) - bearing Footing

StruCalc 9.0

page of

Footing Size: 16.0 IN Wide x 8.0 IN Deep Continuous Footing With 8.0 IN Thick x 18.0 IN Tall Stemwall
LongitudinalReinforcement: (2) Continuous #4 Bars
TransverseReinforcement: #4 Bars @ 12.00 IN. O.C. (unnecessary)
Section Footing Design Adequate

FOOTING PROPERTIES

Allowable Soil Bearing Pressure:	Qs =	1500	psf
Concrete Compressive Strength:	F'c =	2500	psi
Reinforcing Steel Yield Strength:	Fy =	40000	psi
Concrete Reinforcement Cover:	c =	3	in

FOOTING SIZE

Width:	W =	16	in
Depth:	Depth =	8	in
Effective Depth to Top Layer of Steel:	d =	4.25	in

STEMWALL SIZE

Stemwall Width:	8	in
Stemwall Height:	18	in
Stemwall Weight:	150	pcf

FOOTING CALCULATIONS

Bearing Calculations:

Ultimate Bearing Pressure:	Qu =	1388	psf
Effective Allowable Soil Bearing Pressure:	Qe =	1400	psf
Width Required:	Wreq =	1.32	ft

Beam Shear Calculations (One Way Shear):

Beam Shear:	Vu1 =	0	lb
Allowable Beam Shear:	Vc1 =	3825	lb

Transverse Direction:

Bending Calculations:

Factored Moment:	Mu =	1310	in-lb
Nominal Moment Strength:	Mn =	0	in-lb

Reinforcement Calculations:

Concrete Compressive Block Depth:	a =	0.30	in
Steel Required Based on Moment:	As(1) =	0.01	in2
Min. Code Req'd Reinf. Shrink./Temp. (ACI-10.5.4)	As(2) =	0.19	in2
Controlling Reinforcing Steel:	As-reqd =	0.19	in2
Selected Reinforcement:	Trans: #4's @ 12.0 in. o.c.		
Reinforcement Area Provided:	As =	0.19	in2

Development Length Calculations:

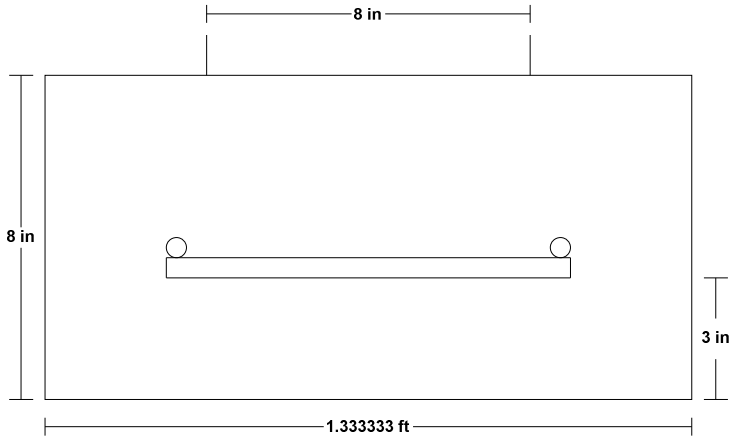
Development Length Required:	Ld =	15	in
Development Length Supplied:	Ld-sup =	1	in

Longitudinal Direction:

Reinforcement Calculations:

Min. Code Req'd Reinf. Shrink./Temp. (ACI-10.5.4):	As(2) =	0.26	in2
Controlling Reinforcing Steel:	As-reqd =	0.26	in2
Selected Reinforcement:	Longitudinal: (2) Cont. #4 Bars		
Reinforcement Area Provided:	As =	0.39	in2

LOADING DIAGRAM



FOOTING LOADING

Live Load:	PL =	1000	plf
Dead Load:	PD =	700	plf
Total Load:	PT =	1850	plf
Ultimate Factored Load:	Pu =	2620	plf

Loading Demand on Existing Footing:

Roof = (15 psf * 12ft)D + (25 psf * 12 ft)S

Wall Load = 100 plf D

$W_{TOT\ (ASD)}$ = (280 PLF)D + (300 PLF)S
$W_{TOT\ (LRFD)}$ = 1.2(280) + 1.6(300)S = 816 PLF < 2620 PLF

DCR = 0.31, THEREFORE EXISTING FOOTING DESIGN OK ASSUMING 16"W X 8" DP

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

DESCRIPTION: 16" (non retaining) stemwall footing - max point load (1500psf)

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : IBC 2018

General Information

Material Properties

f'c : Concrete 28 day strength	=	2.5	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	1.50	ksf
Soil Density	=	110.0	pcf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	250.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=	1.0	ft
Allow press. increase per foot of depth	=		ksf
when footing base is below	=		ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=		ksf
when max. length or width is greater than	=		ft

Dimensions

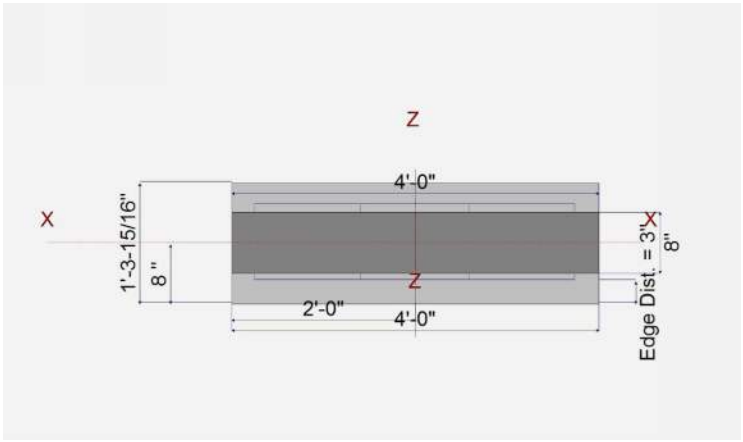
Width parallel to X-X Axis	=	4.0 ft
Length parallel to Z-Z Axis	=	1.330 ft
Footing Thickness	=	8.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	48.0 in
pz : parallel to Z-Z Axis	=	8.0 in
Height	=	18.0 in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in



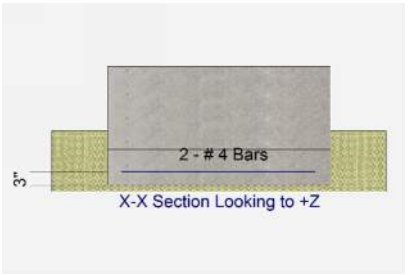
Reinforcing

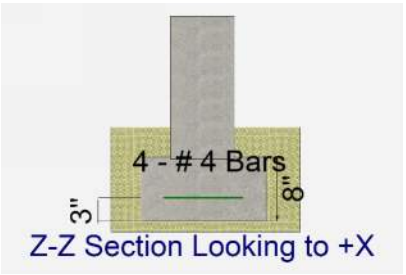
Bars parallel to X-X Axis			
Number of Bars	=		2.0
Reinforcing Bar Size	=	#	4
Bars parallel to Z-Z Axis			
Number of Bars	=		4.0
Reinforcing Bar Size	=	#	4

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation

	Bars along Z-Z Axis
# Bars required within zone	49.9 %
# Bars required on each side of zone	50.1 %





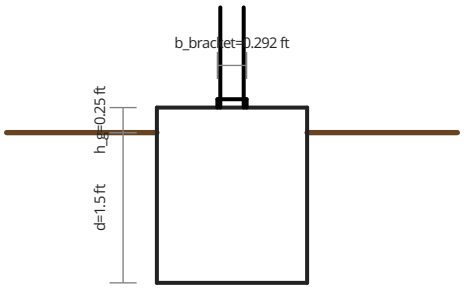
Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	3.0		4.30					k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

& O L H Q W ¸	' D W H ¸ Jun 3, 2022
$ X W K R U ¸ Harrison Kliegl	- R E ¸
3 U R M H F W ¸ Footing Checks	6 X E M H F W ¸ 6 R Q R W X E H S V 1 3 $ 6
5 H I H U H Q F H V ¸ IBC 2021, ACI 318-19	

Summary

	Lateral Soil Stress at 1/3 of Embedment Depth	$S_1' = 0$ psf	IBC 2021, Cl 1807.3.2.1
☐	Allowable Lateral Soil Stress	$S_a = 50$ psf	
	Gross Vertical Bearing Pressure	$q_s = 1500$ psf	
☐	Allowable Vertical Bearing Pressure	$q_a = 1500$ psf	
☐	Pier Compression and Bending Capacity	$\text{Int} = 0.0135$	ACI 318-19, Cl 14.5.4.1
	Shear Demand	$V_u = 0$ lb	
☐	Pier Shear Strength	$\phi V_n = 11\,500$ lb	ACI 318-19, Cl 14.5.5
	Ultimate Bearing Load	$P_u = 3090$ lb	
☐	Pier Bearing Capacity	$\phi B_n = 31\,200$ lb	



Pier Properties

Pier Diameter	$b = 18$ in	
Embedment Depth	$d = 1.5$ ft	
Height of Pier Above Ground	$h_g = 0.25$ ft	
Total Pier Length	$L_{pier} = 1$ ft, 9 in	
Lateral Constraint at Ground Surface	Nonconstrained	IBC 2021, Cl 1807.3.2

Concrete Properties

Concrete Strength	$f_c' = 2500$ psi	ACI 318-19 Table 19.2.1.1
Concrete Weight Classification	Normalweight	ACI 318-19, Cl 19.2.4.2 and Cl 19.2.4.3

Post Properties

Post and Connection Type	Post + Bracket / Bearing Plate

Bracket Bearing Width	$b_{\text{bracket}} = 3.5\ \text{in}$	
Bracket Bearing Length	$\ell_{\text{bracket}} = 3.5\ \text{in}$	
Bearing Area Diagonal Length	$\ell_{\text{diag}} = 4.95\ \text{in}$	

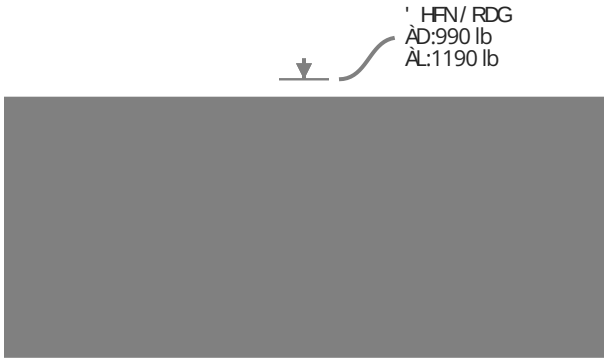
Soil Properties

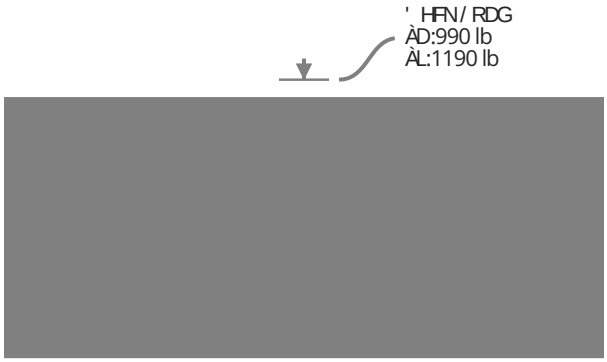
Allowable Soil Gross Bearing Capacity	$q_a = 1500\ \text{psf}$	IBC 2021, Cl 1806.2
Allowable Lateral Pressure per Unit Depth	$S = 100\ \text{psf/ft}$	IBC 2021, Cl 1806.1 and 1806.2

Applied Loads

Height Above Ground of Lateral Load Application	$h = 0.25\ \text{ft}$
Axial, Shear, & Moment Loads about X-axis	$V, P, M =$

Label	Location z (ft)	Axial Eccentricity y (ft)	Load Magnitudes V, P, M
Deck Load	0	0	D: 0 lb, 990 lb, 0 lb ft, L: 0 lb, 1190 lb, 0 lb ft





Use Reduced Companion Live Load?	No	ASCE 7-16 2.3.1.1
Consider Self Weight?	Yes	

Design Criteria

Design Code for Load Combinations	International Building Code (IBC) 2018
Design Standard Edition Note	Note that this calculation is using a newer edition of the concrete design standard (ACI 318-19, while the code only requires an older edition)

Total Unfactored Loads

Unfactored Loads $Loads =$

Load Type	Axial Load P (lb)	Lateral Load V (lb)	Moment Load M (lb · ft)
D	990	0	0
L	1190	0	0

ASD Load Combinations (ASCE 7-16, Ch. 2)

Service (ASD) Load Combinations $LC_{ASD} =$ IBC 2021, Cl 1605.2

Load Combination	Axial Load P (lb)	Lateral Load V (lb)	Pure Moment Load M (lb · ft)
D+F	1450	0	0
D+H+F + L	2640	0	0
D+H+F + L_r	1450	0	0
D+H+F + S	1450	0	0
D+H+F + R	1450	0	0
D+H+F + 0.75L + 0.75 L_r	2350	0	0
D+H+F + 0.75L + 0.75 S	2350	0	0
D+H+F + 0.75L + 0.75 R	2350	0	0
D+H+F + 0.6W,dn	1450	0	0
D+H+F + 0.7E	1450	0	0
D+H+F + 0.45W_dn + 0.75L + 0.75L_r	2350	0	0
D+H+F + 0.45W_dn + 0.75L + 0.75S	2350	0	0
D+H+F + 0.45W_dn + 0.75L + 0.75R	2350	0	0
D+H+F + 0.525E + 0.75L + 0.75S	2350	0	0
0.6D + 0.6W,up + H	872	0	0
0.6(D+F) - 0.7Ev + 0.7Eh + H	872	0	0

Governing ASD Axial Load $P_s = 2640 \text{ lb}$

LRFD Load Combinations (ASCE 7-16, Ch. 2 and ACI 318-19, Ch. 13)

Strength Load Combinations $LC_{str} =$

Load Combination	Factored Axial Load P_u (lb)	Ultimate Shear V_u (lb)	Ultimate Moment M_u (lb · ft)
1.4(D+F)	1390	0	0
1.2(D+F) + 1.6(L+H) + 0.5L_r	3090	0	0
1.2(D+F) + 1.6(L+H) + 0.5S	3090	0	0
1.2(D+F) + 1.6(L+H) + 0.5R	3090	0	0
1.2(D+F) + 1.6L_r + 1.6H + f_1L	2380	0	0
1.2(D+F) + 1.6L_r + 1.6H + 0.5W_dn	1190	0	0
1.2(D+F) + 1.6S + 1.6H + f_1L	2380	0	0
1.2(D+F) + 1.6S + 1.6H + 0.5W_dn	1190	0	0
1.2(D+F) + 1.6R + 1.6H + f_1L	2380	0	0
1.2(D+F) + 1.6R + 1.6H + 0.5W_dn	1190	0	0
1.2(D+F) + 1.0W_dn + f_1L + 0.5L_r	2380	0	0
1.2(D+F) + 1.0W_dn + f_1L + 0.5S	2380	0	0
1.2(D+F) + 1.0W_dn + f_1L + 0.5R	2380	0	0
1.2(D+F) + 1.0E_v + 1.0E_h + f_1L + 1.6H + f_2S	2380	0	0
0.9D + 1.0W_up + 1.6H	891	0	0
0.9(D+F) - 1.0E_v + 1.0E_h + 1.6H	891	0	0

Maximum Ultimate Axial Load $P_{umax} = 3090 \text{ lb}$

Maximum Ultimate Shear Load $V_{umax} = 0 \text{ lb}$

Maximum Ultimate Moment Load $M_{umax} = 0 \text{ lb} \cdot \text{ft}$

Pier Capacity (ACI 318-19, Ch. 21)

Pier Moment Capacity (Tension Face) $\phi M_{n,t} = 7160 \text{ lb} \cdot \text{ft}$ ACI 318-19, Cl 14.5.2.1

Pier Moment Capacity (Compression Face) $\phi M_{n,c} = 60\,800 \text{ lb} \cdot \text{ft}$ ACI 318-19, Cl 14.5.2.1

Pier Compression Capacity $\phi P_n = 229\,000 \text{ lb}$ ACI 318-19, Cl 14.5.3.1

Pier Embedment (IBC 2021, Ch. 18)

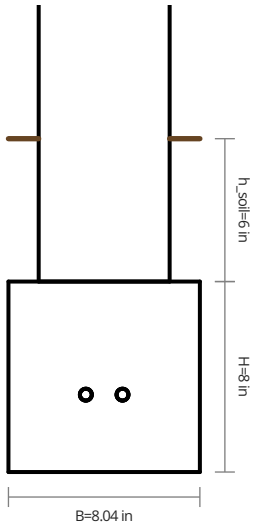
Solved Minimum Embedment Depth	$d_{\text{min,solved}} = 1 \text{ ft}, 6 \text{ in}$	IBC 2021, Eq. 18-1 and 18-2
Lateral Soil Stress at Designated Depth	$S' = 0 \text{ psf}$	IBC 2021, Eq. 18-1 and 18-2

Comments

&OLHQW,	'DWH, Jun 3, 2022
$XWKRU, Harrison Kliegl	-RE ,
3URMHFW, Footing Checks	6XEMHFW, 7KLFNHQHG 6 (GJH &KHFN 3$6
5HIHUHQFHV, ACI 318-19	

Summary

	Service Soil Bearing Stress	q_s	= 981 psf	
ˇˇ	Allowable Gross Soil Bearing Stress	q_a	= 1500 psf	ACI318-19, Cl 13.3.1.1
	Moment Demand	M_u	= 6.82 lb · ft/ft	ACI 318-19, Cl 13.2.7.1
	Factored Moment Capacity	ϕM_n	= 900 lb · ft/ft	ACI 318-19, 8.5.1.1a
	Shear Demand	V_u	= 0 plf	ACI 318-19, Cl 7.4.3.2
	Factored One-Way Shear Capacity	ϕV_n	= 2880 plf	ACI 318-19, Cl 7.5.1.1
	Stability	Status	= Footing in Total Compression	



Footing Properties

	Footing Width	B	= 0.67 ft	
	Footing Thickness	H	= 8 in	ACI 318-19, Cl 14.3.2.1 IBC 2021, Cl 1809.8 IRC 2021, Cl R403.1.1
	Wall Type		Concrete	
	Wall Width	b	= 5.5 in	
	Concrete Strength	f'_c	= 2500 psi	ACI 318-19, Table 19.2.1.1
	Concrete Weight Classification		Normalweight	ACI 318-19, Cl 19.2.4.2

Soil Properties

	Allowable Soil Gross Bearing Capacity	q_a	= 1500 psf	IBC 2021, Cl 1806.2
	Depth of Soil Over Footing	h_{soil}	= 0.5 ft	IBC 2021, Cl 1809.5
	Unit Weight of Soil	γ_s	= 100 pcf	
	Lateral Sliding Coefficient of Friction	μ	= 0.3	

Bottom Reinforcement

	Include Transverse Reinforcement?	No

Concrete Cover	$\text{cover} = 3\ \text{in}$	ACI 318-19, Table 20.5.1.3.1
Reinforcement Yield Strength	$f_y = 60\,000\ \text{psi}$	ACI 318-19, Table 20.2.2.4a

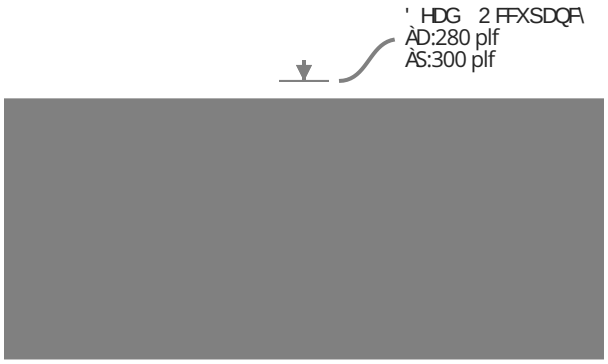
Longitudinal Reinforcement

Include Longitudinal Reinforcement?	Yes	ACI 318-19, Cl 14.1.4
Shrinkage/Temperature Reinforcement Size	#4	
Number of Shrinkage/Temperature Bars	$n_\ell = 2$	ACI 318-19, Cl 7.7.2.3
Required Number of Shrinkage/ Temperature Bars	$n_{\ell,reqd} = 2$	ACI 318-19, Cl 7.7.2.3

Applied Loads

Axial, Shear, & Moment Loads about X-axis $V, P, M =$

Label	Location z (ft)	Axial Eccentricity y (ft)	Load Magnitudes V, P, M
Dead + Occupancy	0	0	D: 0 plf, 280 plf, 0 (lb ft) / ft, S: 0 plf, 300 plf, 0 (lb ft) / ft



Use Reduced Companion Live Load?	No	ASCE 7-16 2.3.1.1
Self Weight of Concrete Footing	$SW = 67\ \text{plf}$	
Weight of Soil above Footing	$W_{soil} = 10.6\ \text{plf}$	

Design Criteria

Design Code for Load Combinations	International Building Code (IBC) 2018
Design Standard Edition Note	Note that this calculation is using a newer edition of the concrete design standard (ACI 318-19, while the code only requires an older edition)
Sliding and Overturning Minimum Factor of Safety	$FS_{\min} = 1.5$

Total Loads

Unfactored Loads $Loads =$

Load Type	Vertical Load P (plf)	Lateral Shear V_x (plf)	Moment M_x (lb · ft/ft)
D	280	0	0
S	300	0	0

ASD Load Combinations and Stress Distribution (ASCE 7-16, Ch. 2)

ASD Load Combinations $LC_{str,ASD} =$

Load Combination	Axial Load P (plf)	Lateral Load V (plf)	Moment Load M (lb · ft/ft)	Foundation Weight W_f (plf)	Eccentricity e (ft)
D+F	280	0	0	77.6	0
D+H+F + L	280	0	0	77.6	0
D+H+F + L_r	280	0	0	77.6	0
D+H+F + S	580	0	0	77.6	0
D+H+F + R	280	0	0	77.6	0
D+H+F + 0.75L + 0.75 L_r	280	0	0	77.6	0
D+H+F + 0.75L + 0.75 S	505	0	0	77.6	0
D+H+F + 0.75L + 0.75 R	280	0	0	77.6	0
D+H+F + 0.6W,dn	280	0	0	77.6	0
D+H+F + 0.7E	280	0	0	77.6	0
D+H+F + 0.45W_dn + 0.75L + 0.75L_r	280	0	0	77.6	0
D+H+F + 0.45W_dn + 0.75L + 0.75S	505	0	0	77.6	0
D+H+F + 0.45W_dn + 0.75L + 0.75R	280	0	0	77.6	0
D+H+F + 0.525E + 0.75L + 0.75S	505	0	0	77.6	0
0.6D + 0.6W,up + H	168	0	0	46.6	0
0.6(D+F) - 0.7Ev + 0.7Eh + H	168	0	0	46.6	0

Bearing Pressure % 3=

Combination	Eccentricity e (ft)	Maximum Bearing Pressure q_{max} (psf)	Sliding Factor of Safety FS_s	Overturning Factor of Safety FS_o
D+F	0	534	99	⚠
D+H+F + L	0	534	99	⚠
D+H+F + L_r	0	534	99	⚠
D+H+F + S	0	981	99	⚠
D+H+F + R	0	534	99	⚠
D+H+F + 0.75L + 0.75 L_r	0	534	99	⚠
D+H+F + 0.75L + 0.75 S	0	870	99	⚠
D+H+F + 0.75L + 0.75 R	0	534	99	⚠
D+H+F + 0.6W,dn	0	534	99	⚠
D+H+F + 0.7E	0	534	99	⚠
D+H+F + 0.45W_dn + 0.75L + 0.75L_r	0	534	99	⚠
D+H+F + 0.45W_dn + 0.75L + 0.75S	0	870	99	⚠
D+H+F + 0.45W_dn + 0.75L + 0.75R	0	534	99	⚠
D+H+F + 0.525E + 0.75L + 0.75S	0	870	99	⚠
0.6D + 0.6W,up + H	0	320	99	⚠
0.6(D+F) - 0.7Ev + 0.7Eh + H	0	320	99	⚠

Governing ASD Axial Load $P_s = 658 \text{ plf}$

LRFD Load Combinations and Footing Loads (ASCE 7-16, Ch. 2 and ACI 318-19, Ch. 13)

LRFD Strength Load Combinations $LC_{str,LRFD} =$

Load Combination	Factored Axial Load P_u (plf)	Factored Moment Load M_u (lb · ft/ft)	Factored Foundation Weight W_{uf} (plf)	Eccentricity e (ft)
1.4(D+F)	392	0	109	0
1.2(D+F) + 1.6(L+H) + 0.5L_r	336	0	93.1	0
1.2(D+F) + 1.6(L+H) + 0.5S	486	0	93.1	0
1.2(D+F) + 1.6(L+H) + 0.5R	336	0	93.1	0
1.2(D+F) + 1.6L_r + 1.6H + f_1L	336	0	93.1	0
1.2(D+F) + 1.6L_r + 1.6H + 0.5W_dn	336	0	93.1	0
1.2(D+F) + 1.6S + 1.6H + f_1L	816	0	93.1	0
1.2(D+F) + 1.6S + 1.6H + 0.5W_dn	816	0	93.1	0
1.2(D+F) + 1.6R + 1.6H + f_1L	336	0	93.1	0
1.2(D+F) + 1.6R + 1.6H + 0.5W_dn	336	0	93.1	0
1.2(D+F) + 1.0W_dn + f_1L + 0.5L_r	336	0	93.1	0
1.2(D+F) + 1.0W_dn + f_1L + 0.5S	486	0	93.1	0
1.2(D+F) + 1.0W_dn + f_1L + 0.5R	336	0	93.1	0
1.2(D+F) + 1.0E_v + 1.0E_h + f_1L + 1.6H + f_2S	396	0	93.1	0
0.9D + 1.0W_up + 1.6H	252	0	69.8	0
0.9(D+F) - 1.0E_v + 1.0E_h + 1.6H	252	0	69.8	0

LRFD Footing Loads (Shear)) / =

Combination	Eccentricity e (ft)	Max Bearing Pressure q_{umax} (psf)	Bearing Pressure at Column Face q_{uCol} (psf)	Bearing Pressure at Critical Shear Section q_{uV} (psf)	Ultimate Shear at Critical Section V_u (plf)
1.4(D+F)	0	747	747	1040	439
1.2(D+F) + 1.6(L+H) + 0.5L_r	0	640	640	892	377
1.2(D+F) + 1.6(L+H) + 0.5S	0	864	864	1200	489
1.2(D+F) + 1.6(L+H) + 0.5R	0	640	640	892	377
1.2(D+F) + 1.6L_r + 1.6H + f_1L	0	640	640	892	377
1.2(D+F) + 1.6L_r + 1.6H + 0.5W_dn	0	640	640	892	377
1.2(D+F) + 1.6S + 1.6H + f_1L	0	1360	1360	1890	737
1.2(D+F) + 1.6S + 1.6H + 0.5W_dn	0	1360	1360	1890	737
1.2(D+F) + 1.6R + 1.6H + f_1L	0	640	640	892	377
1.2(D+F) + 1.6R + 1.6H + 0.5W_dn	0	640	640	892	377
1.2(D+F) + 1.0W_dn + f_1L + 0.5L_r	0	640	640	892	377
1.2(D+F) + 1.0W_dn + f_1L + 0.5S	0	864	864	1200	489
1.2(D+F) + 1.0W_dn + f_1L + 0.5R	0	640	640	892	377
1.2(D+F) + 1.0E_v + 1.0E_h + f_1L + 1.6H + f_2S	0	730	730	1020	422
0.9D + 1.0W_up + 1.6H	0	480	480	669	282
0.9(D+F) - 1.0E_v + 1.0E_h + 1.6H	0	480	480	669	282

LRFD Footing Loads (Moment)) / $_m$ =

Combination	Eccentricity e (ft)	Max Bearing Pressure q_{umax} (psf)	Bearing Pressure at Column Face q_{uCol} (psf)	Ultimate Moment at Column Face M_u (lb · ft/ft)
1.4(D+F)	0	747	747	3.28
1.2(D+F) + 1.6(L+H) + 0.5L_r	0	640	640	2.81
1.2(D+F) + 1.6(L+H) + 0.5S	0	864	864	4.06
1.2(D+F) + 1.6(L+H) + 0.5R	0	640	640	2.81
1.2(D+F) + 1.6L_r + 1.6H + f_1L	0	640	640	2.81
1.2(D+F) + 1.6L_r + 1.6H + 0.5W_dn	0	640	640	2.81
1.2(D+F) + 1.6S + 1.6H + f_1L	0	1360	1360	6.82
1.2(D+F) + 1.6S + 1.6H + 0.5W_dn	0	1360	1360	6.82
1.2(D+F) + 1.6R + 1.6H + f_1L	0	640	640	2.81
1.2(D+F) + 1.6R + 1.6H + 0.5W_dn	0	640	640	2.81
1.2(D+F) + 1.0W_dn + f_1L + 0.5L_r	0	640	640	2.81
1.2(D+F) + 1.0W_dn + f_1L + 0.5S	0	864	864	4.06
1.2(D+F) + 1.0W_dn + f_1L + 0.5R	0	640	640	2.81
1.2(D+F) + 1.0E_v + 1.0E_h + f_1L + 1.6H + f_2S	0	730	730	3.31
0.9D + 1.0W_up + 1.6H	0	480	480	2.11
0.9(D+F) - 1.0E_v + 1.0E_h + 1.6H	0	480	480	2.11

Governing Axial Load $P_u = 816$ plf

Maximum Ultimate Net Bearing Pressure $q_{nu} = 1220$ psf

Flexural Analysis (ACI 318-19, Cl 22.2)

Resistance Factor in Bending $\phi_b = 0.6$ — ACI 318-19, Table 21.2.2

Moment Capacity $M_n = 1500$ lb · ft/ft — ACI 318-19, Cl 22.3.1.1 and 14.5.2.1 (plain concrete)

Factored Moment Capacity $\phi M_n = 900$ lb · ft/ft — ACI 318-19, Cl 8.5.1.1(a)

Ultimate Moment at Critical Section $M_u = 6.82$ lb · ft/ft — ACI 318-19, Cl 13.2.7.1

One-Way Shear (ACI 318-19, Cl 22.5)

Resistance Factor in Shear $\phi_v = 0.6$ — ACI 318-19, Table 21.2.1

Concrete Shear Strength $V_c = 4800$ plf — ACI 318-19, Cl 22.5.5.1 and 14.5.5.1 (plain concrete)

Factored One-Way Shear Capacity $\phi V_n = 2880$ plf — ACI 318-19, Cl 7.5.1.1

Ultimate Shear at Critical Section $V_u = 0$ plf — ACI 318-19, Cl 7.4.3.2 and Cl 22.5.1.2 for crushing strength

Comments

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

LIC# : KW-06011993, Build:20.22.1.5 L120 Engineering and Design

DESCRIPTION: 16" (non retaining) stemwall footing - max point load (1500psf)

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9913	Soil Bearing	1.487 ksf	1.50 ksf	+D+L about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.0	Z Flexure (+X)	0.0 k-ft/ft	0.0 k-ft/ft	No Moment
PASS	0.0	Z Flexure (-X)	0.0 k-ft/ft	0.0 k-ft/ft	No Moment
PASS	0.02530	X Flexure (+Z)	0.1071 k-ft/ft	4.235 k-ft/ft	+1.20D+1.60L
PASS	0.02530	X Flexure (-Z)	0.1071 k-ft/ft	4.235 k-ft/ft	+1.20D+1.60L
PASS	n/a	1-way Shear (+X)	0.0 psi	67.082 psi	n/a
PASS	n/a	1-way Shear (-X)	0.0 psi	67.082 psi	n/a
PASS	n/a	1-way Shear (+Z)	0.0 psi	67.082 psi	n/a
PASS	n/a	1-way Shear (-Z)	0.0 psi	67.082 psi	n/a
PASS	n/a	2-way Punching	0.0 psi	67.082 psi	n/a

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	1.50	n/a	0.0	0.6789	0.6789	n/a	n/a	0.453
X-X, +D+L	1.50	n/a	0.0	1.487	1.487	n/a	n/a	0.991
X-X, +D+0.750L	1.50	n/a	0.0	1.285	1.285	n/a	n/a	0.857
X-X, +0.60D	1.50	n/a	0.0	0.4073	0.4073	n/a	n/a	0.272
Z-Z, D Only	1.50	0.0	n/a	n/a	n/a	0.6789	0.6789	0.453
Z-Z, +D+L	1.50	0.0	n/a	n/a	n/a	1.487	1.487	0.991
Z-Z, +D+0.750L	1.50	0.0	n/a	n/a	n/a	1.285	1.285	0.857
Z-Z, +0.60D	1.50	0.0	n/a	n/a	n/a	0.4073	0.4073	0.272

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	0.04201	+Z	Bottom	0.1728	AsMin	0.20	4.235	OK
X-X, +1.40D	0.04201	-Z	Bottom	0.1728	AsMin	0.20	4.235	OK
X-X, +1.20D+1.60L	0.1071	+Z	Bottom	0.1728	AsMin	0.20	4.235	OK
X-X, +1.20D+1.60L	0.1071	-Z	Bottom	0.1728	AsMin	0.20	4.235	OK
X-X, +1.20D+0.50L	0.05823	+Z	Bottom	0.1728	AsMin	0.20	4.235	OK
X-X, +1.20D+0.50L	0.05823	-Z	Bottom	0.1728	AsMin	0.20	4.235	OK
X-X, +1.20D	0.03601	+Z	Bottom	0.1728	AsMin	0.20	4.235	OK
X-X, +1.20D	0.03601	-Z	Bottom	0.1728	AsMin	0.20	4.235	OK
X-X, +0.90D	0.0270	+Z	Bottom	0.1728	AsMin	0.20	4.235	OK
X-X, +0.90D	0.0270	-Z	Bottom	0.1728	AsMin	0.20	4.235	OK
Z-Z, +1.40D	0.0	-X	Top	0.1728	AsMin	0.3008	6.168	OK
Z-Z, +1.40D	0.0	+X	Top	0.1728	AsMin	0.3008	6.168	OK
Z-Z, +1.20D+1.60L	0.0	-X	Top	0.1728	AsMin	0.3008	6.168	OK
Z-Z, +1.20D+1.60L	0.0	+X	Top	0.1728	AsMin	0.3008	6.168	OK
Z-Z, +1.20D+0.50L	0.0	-X	Top	0.1728	AsMin	0.3008	6.168	OK
Z-Z, +1.20D+0.50L	0.0	+X	Top	0.1728	AsMin	0.3008	6.168	OK
Z-Z, +1.20D	0.0	-X	Top	0.1728	AsMin	0.3008	6.168	OK

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

DESCRIPTION: 16" (non retaining) stemwall footing - max point load (1500psf)

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
Z-Z, +1.20D	0.0	+X	Top	0.1728	AsMin	0.3008	6.168	OK
Z-Z, +0.90D	0.0	-X	Top	0.1728	AsMin	0.3008	6.168	OK
Z-Z, +0.90D	0.0	+X	Top	0.1728	AsMin	0.3008	6.168	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	67.08 psi	0.00	OK
+1.20D+1.60L	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	67.08 psi	0.00	OK
+1.20D+0.50L	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	67.08 psi	0.00	OK
+1.20D	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	67.08 psi	0.00	OK
+0.90D	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	67.08 psi	0.00	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	0.00 psi	89.44 psi	0	OK
+1.20D+1.60L	0.00 psi	89.44 psi	0	OK
+1.20D+0.50L	0.00 psi	89.44 psi	0	OK
+1.20D	0.00 psi	89.44 psi	0	OK
+0.90D	0.00 psi	89.44 psi	0	OK

LONGITUDE
ONE TWENTY°
ENGINEERING & DESIGN

SUPPLEMENTAL CALCULATIONS

Post Installed Hold-Down Anchors

Ledger Calculations

(425) 636 3313
L120Engineering.com

Company:	L120 Engineering & Design	Date:	3/18/2022
Engineer:		Page:	1/5
Project:			
Address:			
Phone:			
E-mail:			

1.Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

General
Design method:ACI 318-14
Units: Imperial units

Anchor Information:
Anchor type: Bonded anchor
Material: F1554 Grade 36
Diameter (inch): 0.625
Effective Embedment depth, h_{ef} (inch): 10.000
Code report: ICC-ES ESR-4057
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 11.38
c_{ac} (inch): 22.57
C_{min} (inch): 1.75
S_{min} (inch): 3.00

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Hole condition: Dry concrete
Inspection: Continuous
Temperature range, Short/Long: 150/110°F
Ignore 6do requirement: Not applicable
Build-up grout pad: No

Recommended Anchor
Anchor Name: SET-3G - SET-3G w/ 5/8"Ø F1554 Gr. 36
Code Report: ICC-ES ESR-4057

Post Installed HDU 5 Uplift Capacity (Wind Controlled)

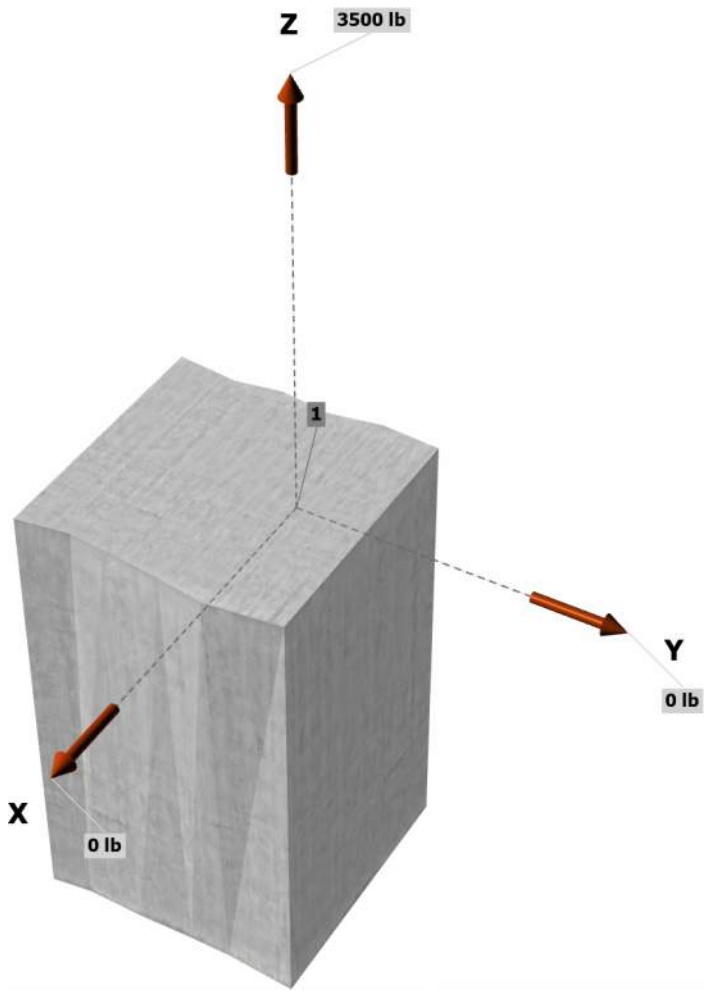
Load and Geometry
Load factor source: ACI 318 Section 5.3
Load combination: not set
Seismic design: No
Anchors subjected to sustained tension: No
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: Yes

Strength level loads:

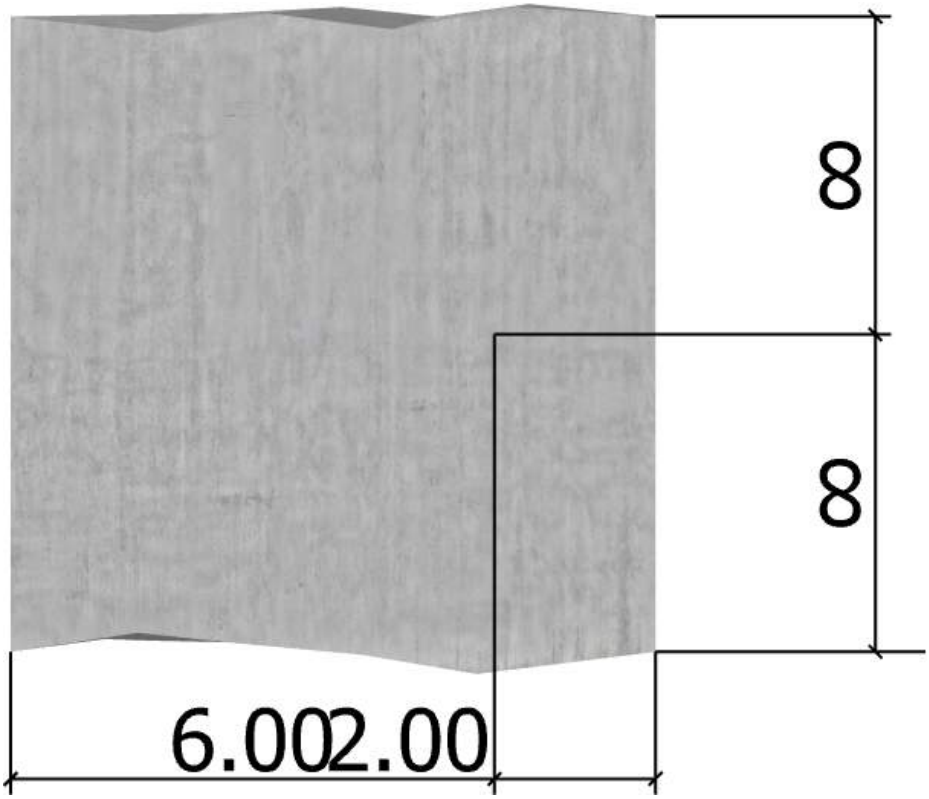
N_{ua} [lb]: 3500
V_{uax} [lb]: 0
V_{uay} [lb]: 0

<Figure 1>

Post Installed HDU 5 Uplift Capacity (Wind Controlled)



<Figure 2>



3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	3500.0	0.0	0.0	0.0
Sum	3500.0	0.0	0.0	0.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 3500
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00

4. Steel Strength of Anchor in Tension (Sec. 17.4.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
13110	0.75	9833

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.4.2)

$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5}$ (Eq. 17.4.2.2a)

k_c	λ_a	f'_c (psi)	h_{ef} (in)	N_b (lb)
17.0	1.00	2500	10.000	26879

$\phi N_{cb} = \phi \, (A_{Nc} / A_{Nco}) \, \Psi_{ed,N} \, \Psi_{c,N} \, \Psi_{cp,N} N_b$ (Sec. 17.3.1 & Eq. 17.4.2.1a)

A_{Nc} (in²)	A_{Nco} (in²)	$c_{a,min}$ (in)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cb} (lb)
240.00	900.00	2.00	0.740	1.00	1.000	26879	0.65	3448

6. Adhesive Strength of Anchor in Tension (Sec. 17.4.5)

$\tau_{k,cr} = \tau_{k,cr} f_{short\text{-}term} K_{sat} (f'_c / 2{,}500)^n$

$\tau_{k,cr}$ (psi)	$f_{short\text{-}term}$	K_{sat}	f'_c (psi)	n	$\tau_{k,cr}$ (psi)
1356	1.00	1.00	2500	0.24	1356

$N_{ba} = \lambda_a \tau_{cr} \pi d_a h_{ef}$ (Eq. 17.4.5.2)

λ_a	τ_{cr} (psi)	d_a (in)	h_{ef} (in)	N_{ba} (lb)
1.00	1356	0.63	10.000	26625

$\phi N_a = \phi \, (A_{Na} / A_{Na0}) \, \Psi_{ed,Na} \, \Psi_{cp,Na} N_{ba}$ (Sec. 17.3.1 & Eq. 17.4.5.1a)

A_{Na} (in²)	A_{Na0} (in²)	c_{Na} (in)	$c_{a,min}$ (in)	$\Psi_{ed,Na}$	$\Psi_{cp,Na}$	N_{ba} (lb)	ϕ	ϕN_a (lb)
140.19	307.10	8.76	2.00	0.768	1.000	26625	0.65	6071

11. Results

11. Interaction of Tensile and Shear Forces (Sec. D.7)?

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	3500	9833	0.36	Pass
Concrete breakout	**3500**	**3448**	**1.02**	**Fail (Governs)**
Adhesive	3500	6071	0.58	Pass

FAIL! Selected anchor type and embedment do not meet the selected design criteria.

12. Warnings

- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer's product literature for hole cleaning and installation instructions.

Company:		Date:	9/14/2022
Engineer:		Page:	1/5
Project:			
Address:			
Phone:			
E-mail:			

1.Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

General
Design method:ACI 318-14
Units: Imperial units

Anchor Information:
Anchor type: Bonded anchor
Material: F1554 Grade 36
Diameter (inch): 1.000
Effective Embedment depth, h_{ef} (inch): 12.000
Code report: ICC-ES ESR-4057
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 14.25
c_{ac} (inch): 28.14
C_{min} (inch): 1.75
S_{min} (inch): 3.00

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 15.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: A tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Hole condition: Dry concrete
Inspection: Continuous
Temperature range, Short/Long: 150/110°F
Ignore 6do requirement: Not applicable
Build-up grout pad: No

Recommended Anchor
Anchor Name: SET-3G - SET-3G w/ 1"Ø F1554 Gr. 36
Code Report: ICC-ES ESR-4057

Post Installed HDU 8 Uplift Capacity (Wind Controlled)

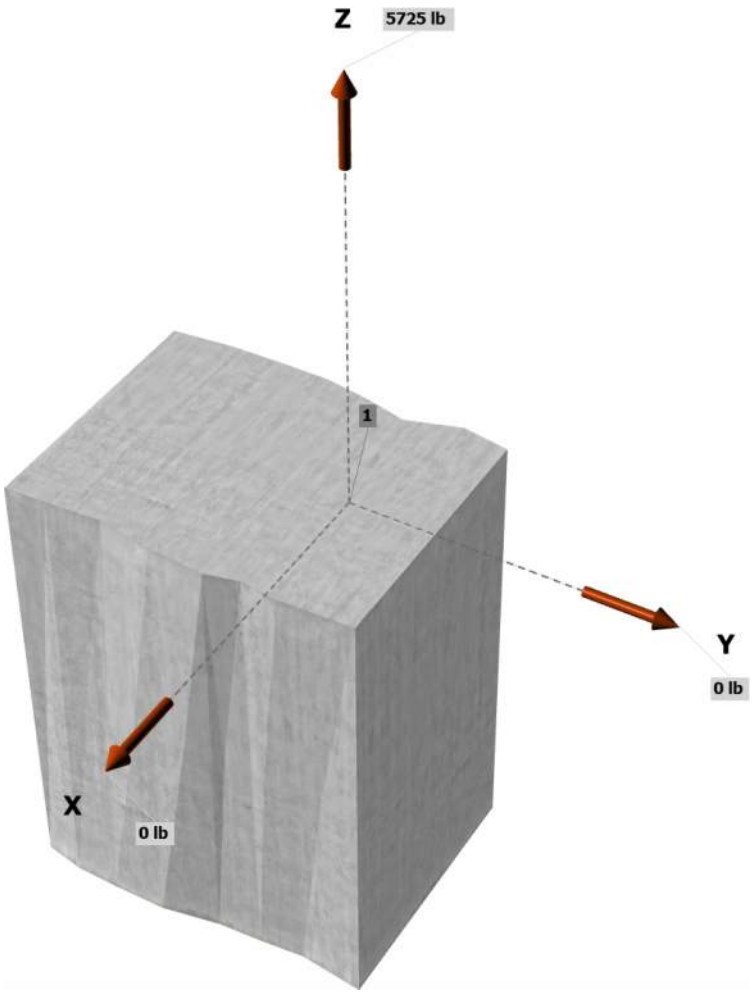
Load and Geometry
Load factor source: ACI 318 Section 5.3
Load combination: not set
Seismic design: No
Anchors subjected to sustained tension: No
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: Yes

Strength level loads:

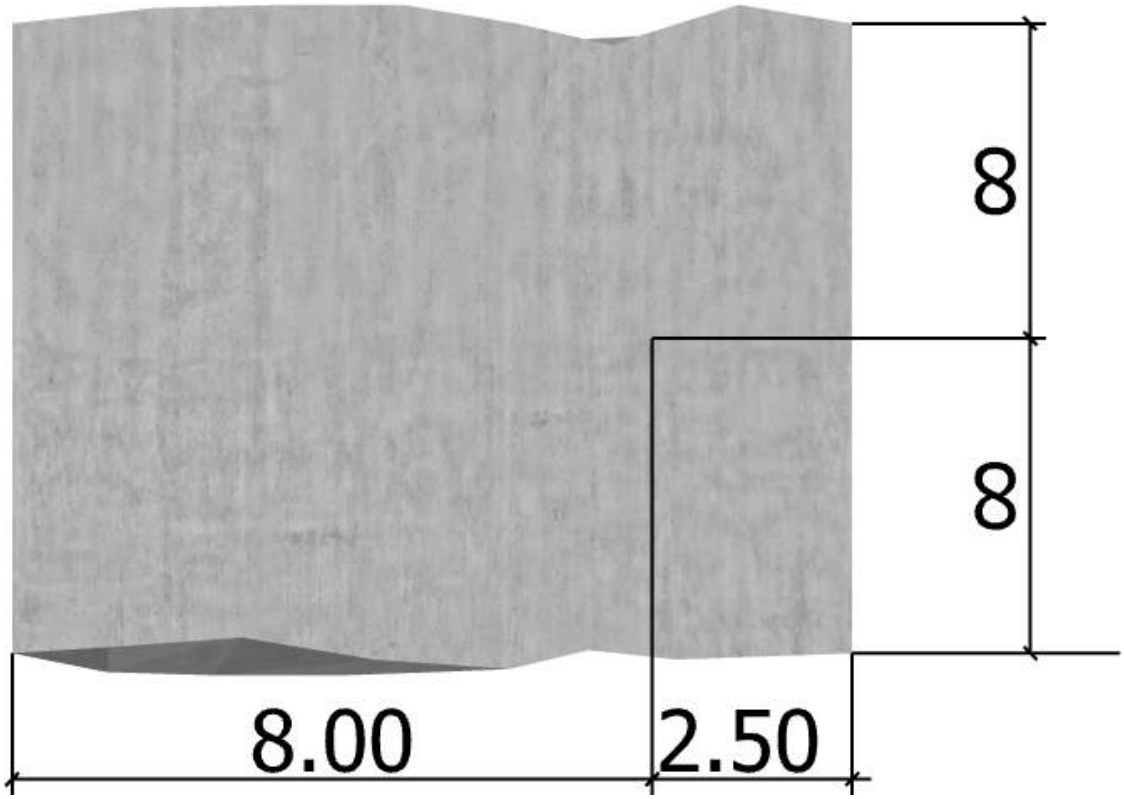
N_{ua} [lb]: 5725
V_{uax} [lb]: 0
V_{uay} [lb]: 0

<Figure 1>

Post Installed HDU 8 Uplift Capacity (Wind Controlled)



<Figure 2>



3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	5725.0	0.0	0.0	0.0
Sum	5725.0	0.0	0.0	0.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 5725
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00

4. Steel Strength of Anchor in Tension (Sec. 17.4.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
35150	0.75	26363

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.4.2)

$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5}$ (Eq. 17.4.2.2a)

k_c	λ_a	f'_c (psi)	h_{ef} (in)	N_b (lb)
17.0	1.00	2500	12.000	35334

$\phi N_{cb} = \phi \, (A_{Nc} / A_{Nco}) \, \Psi_{ed,N} \, \Psi_{c,N} \, \Psi_{cp,N} N_b$ (Sec. 17.3.1 & Eq. 17.4.2.1a)

A_{Nc} (in^2)	A_{Nco} (in^2)	$c_{a,min}$ (in)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cb} (lb)
378.00	1296.00	2.50	0.742	1.00	1.000	35334	0.75	5733

6. Adhesive Strength of Anchor in Tension (Sec. 17.4.5)

$\tau_{k,cr} = \tau_{k,cr} f_{short\text{-}term} K_{sat} (f'_c / 2{,}500)^n$

$\tau_{k,cr}$ (psi)	$f_{short\text{-}term}$	K_{sat}	f'_c (psi)	n	$\tau_{k,cr}$ (psi)
1219	1.00	1.00	2500	0.24	1219

$N_{ba} = \lambda_a \tau_{cr} \pi d_a h_{ef}$ (Eq. 17.4.5.2)

λ_a	τ_{cr} (psi)	d_a (in)	h_{ef} (in)	N_{ba} (lb)
1.00	1219	1.00	12.000	45955

$\phi N_a = \phi \, (A_{Na} / A_{Na0}) \, \Psi_{ed,Na} \, \Psi_{cp,Na} N_{ba}$ (Sec. 17.3.1 & Eq. 17.4.5.1a)

A_{Na} (in^2)	A_{Na0} (in^2)	c_{Na} (in)	$c_{a,min}$ (in)	$\Psi_{ed,Na}$	$\Psi_{cp,Na}$	N_{ba} (lb)	ϕ	ϕN_a (lb)
273.66	679.27	13.03	2.50	0.758	1.000	45955	0.65	9117

11. Results

11. Interaction of Tensile and Shear Forces (Sec. D.7)?

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	5725	26363	0.22	Pass
Concrete breakout	**5725**	**5733**	**1.00**	**Pass (Governs)**
Adhesive	5725	9117	0.63	Pass

SET-3G w/ 1"Ø F1554 Gr. 36 with hef = 12.000 inch meets the selected design criteria.

12. Warnings

- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer's product literature for hole cleaning and installation instructions.

Strong-Drive®
SDWS TIMBER Screw

Structural Wood-to-Wood Connections Including Ledgers, Indoor/Outdoor Projects

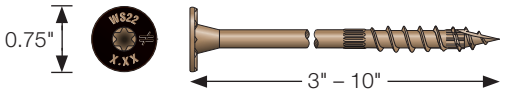
Designed to provide an easy-to-install, high-strength alternative to through-bolting and traditional lag screws. The Strong-Drive SDWS Timber screws are ideal for the contractor and do-it-yourselfer alike.

Double-barrier coating provides corrosion resistance equivalent to hot-dip galvanization, making it suitable for certain exterior and preservative-treated wood applications, as described in the evaluation report.

Codes/Standards: IAPMO-UES ER-192, State of Florida FL13975

US Patent 9,523,383

For more information, see p. 53, C-F-2019 Fastening Systems Catalog



SDWS Timber Screw — Allowable Shear Loads — Douglas Fir–Larch and Southern Pine Lumber

Size Dia.x L (in.)	Model No.	Thread Length (in.)	Reference DFL/SP Allowable Shear Loads (lb.)								
			Wood Side Member Thickness (in.)								
			1.5	2	2.5	3	3.5	4	4.5	6	8
0.22 x 3	SDWS22300DB	1½	255	—	—	—	—	—	—	—	—
0.22 x 4	SDWS22400DB	2⅜	405	405	305	—	—	—	—	—	—
0.22 x 5	SDWS22500DB	2¾	405	405	360	360	325	—	—	—	—
0.22 x 6	SDWS22600DB	2¾	405	405	405	405	365	365	355	—	—
0.22 x 8	SDWS22800DB	2¾	405	405	405	405	395	395	395	395	—
0.22 x 10	SDWS221000DB	2¾	405	405	405	405	395	395	395	395	395

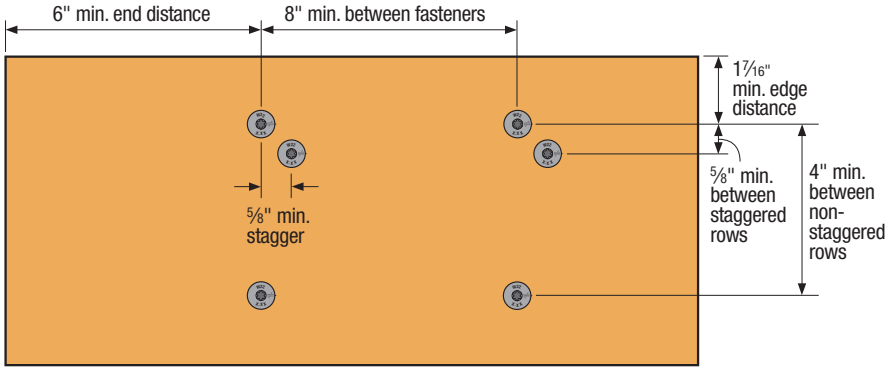
See footnotes below.

SDWS Timber Screw — Allowable Shear Loads — Spruce-Pine-Fir and Hem-Fir Lumber

Size Dia.x L (in.)	Model No.	Thread Length (in.)	Reference SPF/HF Allowable Shear Loads (lb.)								
			Wood Side Member Thickness (in.)								
			1.5	2	2.5	3	3.5	4	4.5	6	8
0.22 x 3	SDWS22300DB	1½	190	—	—	—	—	—	—	—	—
0.22 x 4	SDWS22400DB	2⅜	385	285	215	—	—	—	—	—	—
0.22 x 5	SDWS22500DB	2¾	405	290	290	290	195	—	—	—	—
0.22 x 6	SDWS22600DB	2¾	405	365	365	365	310	310	210	—	—
0.22 x 8	SDWS22800DB	2¾	405	365	365	365	310	310	280	280	—
0.22 x 10	SDWS221000DB	2¾	405	365	365	365	310	310	280	280	280

1. All applications are based on full penetration into the main member. Full penetration is the screw length minus the side member thickness.
2. Allowable loads are shown at the wood load duration factor of C_D = 1.0. Loads may be increased for load duration per the building code up to a C_D = 1.6. Tabulated values must be multiplied by all applicable adjustment factors per the NDS.
3. Minimum fastener spacing requirements to achieve table loads: 6" end distance, 1 7⁄16" edge distance, ⅝" between staggered rows of fasteners, 4" between non-staggered rows of fasteners and 8" between fasteners in a row.
4. For in-service moisture content greater than 19%, use C_M = 0.7.
5. Loads are based on installation into the side grain of the wood with the screw axis perpendicular to the face of the member.

Strong-Drive® SDWS TIMBER Screw (cont.)



SDWS Timber Screw Spacing Requirements

SDWS Timber Screw — Allowable Withdrawal Loads — Douglas Fir–Larch, Southern Pine, Spruce-Pine-Fir and Hem-Fir Lumber

Model No.	Fastener Length (in.)	Thread Length (in.)	Reference Withdrawal Design Value, W (lb./in.)		Max. Reference Withdrawal Design Value, W_{max} (lb.)	
			DFL and SP Main Member	HF and SPF Main Member	DFL and SP Main Member	HF and SPF Main Member
SDWS22300DB	3	1½	164	151	245	225
SDWS22400DB	4	2⅜	179	160	425	380
SDWS22500DB	5	2¾	214	187	590	495
SDWS22600DB	6	2¾	214	187	590	495
SDWS22800DB	8	2¾	214	187	590	495
SDWS221000DB	10	2¾	214	187	590	495

1. The tabulated reference withdrawal design value, W, is in pounds per inch of the thread penetration into the side grain of the main member.
2. The tabulated reference withdrawal design value, W_{Max}, is in pounds where the entire thread length must penetrate into the side grain of the main member.
3. Tabulated reference withdrawal design values, W and W_{Max}, are shown at a C_D = 1.0. Loads may be increased for load duration per the building code up to a C_D = 1.6. Tabulated values must be multiplied by all applicable adjustment factors from the NDS as referenced in the IBC or IRC.
4. Embedded thread length is that portion held in the main member including the screw tip.
5. Values are based on the lesser of withdrawal from the main member or pull-through of a 1½" side member.
6. For in-service moisture content greater than 19%, use C_M = 0.7.

Strong-Drive® SDWS TIMBER Screw with Gypsum Board Interlayer(s)

The Strong-Drive SDWS Timber screw may be installed with one or two layers of ⅝" gypsum board. This layer of gypsum is to be located between the side member and main member for a standard connection. See the tables below for the required screw lengths and allowable loads for these applications. Loads are derived from assembly testing based on ICC-ES AC233.

SDWS Timber Screw — Douglas Fir–Larch and Southern Pine Lumber Allowable Single Shear Loads with One Layer of ⅝" Gypsum Board

Size (in.)	Model No.	Thread Length (in.)	Reference DFL/SP Allowable Shear Loads (lb.)								
			Wood Side Member Thickness (in.)								
			1.5	2.0	2.5	3.0	3.5	4.0	4.5	6.0	8.0
0.22 x 4	SDWS22400DB	2.375	265	—	—	—	—	—	—	—	—
0.22 x 5	SDWS22500DB	2.75	265	265	235	—	—	—	—	—	—
0.22 x 6	SDWS22600DB	2.75	265	265	265	265	235	—	—	—	—
0.22 x 8	SDWS22800DB	2.75	265	265	265	265	255	255	255	—	—
0.22 x 10	SDWS221000DB	2.75	265	265	265	265	255	255	255	255	—

See footnotes on next page.

SDWS Timber Screw — Douglas Fir–Larch and Southern Pine Lumber Allowable Single Shear Loads with Two Layers of ⅝" Gypsum Board

Size (in.)	Model No.	Thread Length (in.)	Reference DFL/SP Allowable Shear Loads (lb.)								
			Wood Side Member Thickness (in.)								
			1.5	2.0	2.5	3.0	3.5	4.0	4.5	6.0	8.0
0.22 x 4	SDWS22400DB	2.375	—	—	—	—	—	—	—	—	—
0.22 x 5	SDWS22500DB	2.75	265	265	—	—	—	—	—	—	—
0.22 x 6	SDWS22600DB	2.75	265	265	265	265	—	—	—	—	—
0.22 x 8	SDWS22800DB	2.75	265	265	265	265	255	255	255	—	—
0.22 x 10	SDWS221000DB	2.75	265	265	265	265	255	255	255	255	—

See footnotes on next page.

Strong-Drive® SDWS TIMBER Screw with Gypsum Board Interlayer(s) (cont.)

SDWS Timber Screw — Spruce-Pine-Fir and Hem-Fir Lumber Allowable Single Shear Loads with One Layer of ⅝" Gypsum Board

Size (in.)	Model No.	Thread Length (in.)	Reference SPF/HF Allowable Shear Loads (lb.)								
			Wood Side Member Thickness (in.)								
			1.5	2.0	2.5	3.0	3.5	4.0	4.5	6.0	8.0
0.22 x 4	SDWS22400DB	2.375	250	—	—	—	—	—	—	—	—
0.22 x 5	SDWS22500DB	2.75	260	190	190	—	—	—	—	—	—
0.22 x 6	SDWS22600DB	2.75	260	235	235	235	200	—	—	—	—
0.22 x 8	SDWS22800DB	2.75	260	235	235	235	200	200	180	—	—
0.22 x 10	SDWS221000DB	2.75	260	235	235	235	200	200	180	180	—

See notes below.

SDWS Timber Screw — Spruce-Pine-Fir and Hem-Fir Lumber Allowable Single Shear Loads with Two Layers of ⅝" Gypsum Board

Size (in.)	Model No.	Thread Length (in.)	Reference SPF/HF Allowable Shear Loads (lb.)								
			Wood Side Member Thickness (in.)								
			1.5	2.0	2.5	3.0	3.5	4.0	4.5	6.0	8.0
0.22 x 4	SDWS22400DB	2.375	—	—	—	—	—	—	—	—	—
0.22 x 5	SDWS22500DB	2.75	260	190	—	—	—	—	—	—	—
0.22 x 6	SDWS22600DB	2.75	260	235	235	235	—	—	—	—	—
0.22 x 8	SDWS22800DB	2.75	260	235	235	235	200	200	180	—	—
0.22 x 10	SDWS221000DB	2.75	260	235	235	235	200	200	180	180	—

1. All applications are based on full penetration which equals fastener length minus side member thickness.
2. Allowable loads are shown at the wood load duration factor of C_D =1.0. Loads may be increased for load duration per the building code up to a C_D =1.6. Tabulated values must be multiplied by all applicable adjustment factors per the NDS.
3. Minimum fastener spacing requirements: 6" end distance, 1 1/16" edge distance, ⅝" between staggered rows of fasteners, 4" between non-staggered rows of fasteners and 8" between fasteners in a row. Refer to SDWS Spacing Requirements figure on p. 23.
4. For in-service moisture content greater than 19% use C_M = 0.7.
5. Gypsum board must be attached as required per the building code.

Ledger Structural Fastening Applications

Strong-Drive® SDWS TIMBER Screw in Ledger-to-Stud Applications

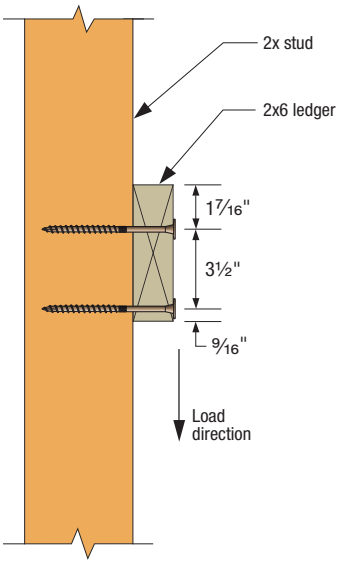
Strong-Drive SDWS Timber screws may be used to attach a ledger to the narrow face of nominal 2x lumber studs according to the following table. Tests and analyses were performed in accordance with ICC-ES Acceptance Criteria AC233.

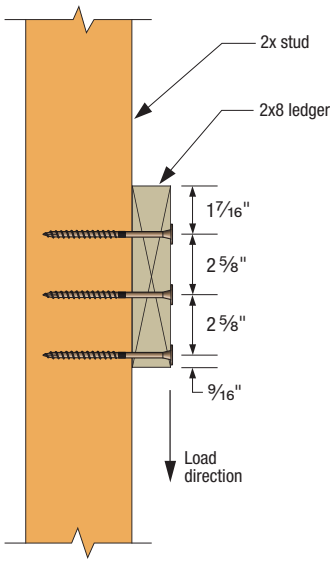
For more information, see p. 53, C-F-2019 Fastening Systems Catalog

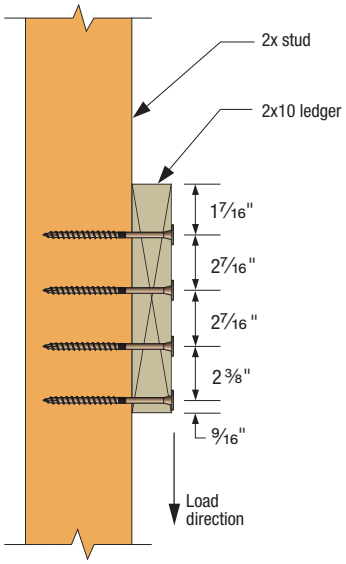
SDWS Timber Screw — Allowable Shear Loads for Ledger to Studs

Size (in.)	Model No.	Ledger Nominal Size (in.)	Number of Screws per Stud	Reference Allowable Shear Load (lb.)		
				SP	DFL	SPF/HF
0.22 x 4	SDWS22400DB	2x6	2	785	630	565
		2x8	3	1,060	890	855
		2x10	4	—	1,040	1,040

1. Allowable loads shall be limited to parallel-to-grain loaded solid sawn main members (minimum 2" nominal). Wood side members shall be loaded perpendicular to grain.
2. Allowable loads are based on DFL, SPF/HF, and SP wood members having a minimum specific gravity of 0.50, 0.42, and 0.55, respectively. Where the side and main members have different specific gravities, the lower values shall be used.
3. Allowable loads are shown at the wood load duration factor of C_D = 1.00. Loads may be increased for load duration as permitted by the building code up to a C_D = 1.60. All adjustment factors shall be applied per the 2012 National Design Specification (NDS). For in-service moisture content greater than 19%, use C_M = 0.70.
4. Fasteners shall be centered in the stud and spaced as shown in the figure. The stud minimum end distance is 6" when loaded toward the end and 2½" when loaded away from the end. The ledger end distance is 6" for full values. For ledger end distances between 2" and 6" use 50% of the table loads. For end distances between 2" and 4", predrill using a 5⁄32" bit for SDWS.
5. Screws may be installed with an intermediate layer of wood structural panel between the side and main member provided the wood structural panel is fastened to the main member per code and the minimum screw penetration of 2½" into the main member (excluding the wood structural panel) is met. Longer lengths of the screw series may be used.
6. For LRFD values, the reference connection design values shall be adjusted in accordance with the NDS-2018, section 11.3.
7. For 2x10 SP ledgers, use the number of screws and allowable loads of the 2x8 SP ledger.
8. For 2x8 ledgers with two screws, use 2x6 values. For 2x10 ledgers with three screws, use 2x8 values. Spacings and edge distances shown in the figure are minimum dimensions.
9. For loads in the opposite direction from that shown in the figure, use the table values multiplied by: 0.50 for two-screw connections, 0.67 for three-screw connections, and 0.75 for four-screw connections.





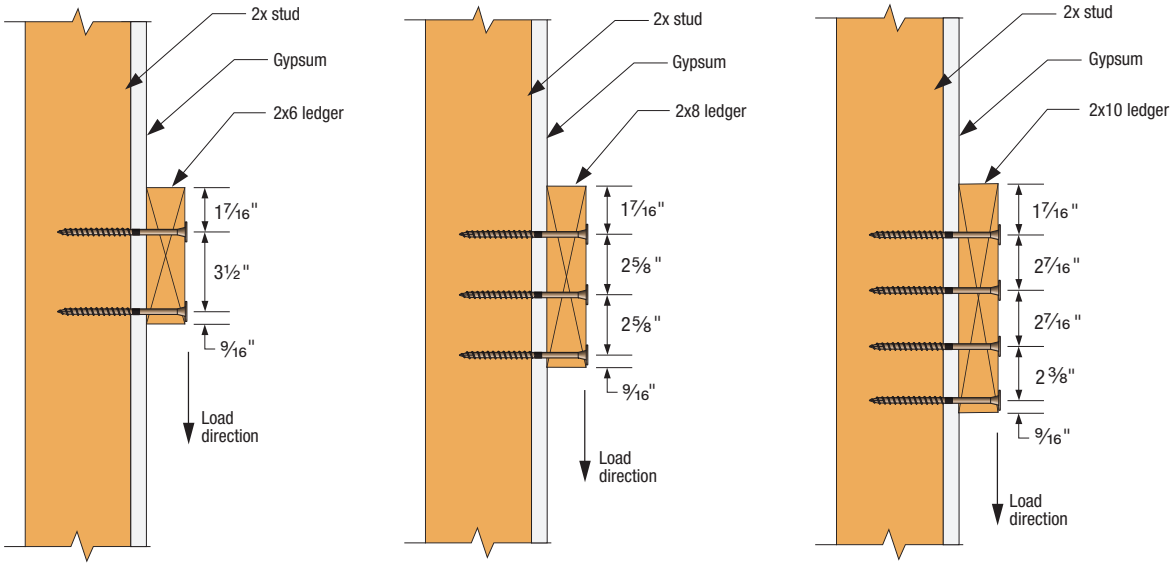


Strong-Drive®
SDWS **TIMBER** Screw with Gypsum Board Interlayer(s) (cont.)

SDWS Timber Screw — Allowable Shear Loads for Ledger Attachment to Studs with One or Two Layers of Gypsum Board

Size (in.)	Model No.	Ledger Size	Number of Screws per Stud	Reference Allowable Shear Load (lb.)		
				SP	DFL	SPF/HF
0.22 x 6	SDWS22600DB	2x6	2	510	410	365
		2x8	3	690	580	555
		2x10	4	—	675	675

1. Allowable loads shall be limited to parallel-to-grain loaded solid sawn main members (minimum 2" nominal). Wood side members shall be loaded perpendicular to grain.
2. Allowable loads are based on DFL, SPF/HF, and SP wood members having a minimum specific gravity of 0.50, 0.42, and 0.55, respectively. Where the side and main members have different specific gravities, the lower values shall be used.
3. Allowable loads are shown at the wood load duration factor of C_D = 1.00. Loads may be increased for load duration as permitted by the building code up to a C_D = 1.60. All adjustment factors shall be applied per the National Design Specification (NDS). For in-service moisture content greater than 19%, use C_M = 0.70.
4. Fasteners shall be centered in the stud and spaced as shown in the figure. The ledger minimum end distance is 6". The stud minimum end distance is 6" when the load is toward the end and 2½" when the load is away from the end.
5. Screws may be installed with an interlayer of wood structural panel (WSP) between the framing and the gypsum panel(s). When a WSP is present, it shall be a maximum of ½" thick, adjacent to the framing and fastened directly to the framing per code. Minimum screw penetration into the framing of 2½" shall be required; longer screw lengths shall be used to achieve the required penetration.
6. For LRFD values, the reference connection design values shall be adjusted in accordance with NDS-18, section 11.3.
7. For 2x10 SP ledgers, use the number of screws and allowable loads of the 2x8 SP ledger.
8. For 2x8 ledgers with two screws, use 2x6 values. For 2x10 ledgers with three screws, use 2x8 values. Spacings and edge distances shown in the figure are minimum dimensions.
9. For loads in the opposite direction from that shown in the figure, use the table values multiplied by: 0.50 for two-screw connections, 0.67 for three-screw connections, and 0.75 for four-screw connections.
10. Gypsum board must be attached as required per the building code.
11. For ledger end distances between 2" and 6", use 50% of load and predrill with 5⁄32" drill bit.



Note: Minimum stud dimension is nominal 2 x 6.

Notes to Installer Regarding the Attachment of Ledgers to Studs:

The screws must be installed into the middle of the stud with a tolerance of 3⁄16" either side of center. Various methods can be used to ensure proper placement of the screws in the stud including snapping a chalk line, using a stud finder or prerocking (attaching only a strip of gypsum at the ledger location until the ledger is fastened to the studs). If proper screw placement into the stud cannot be achieved in the field, blocking should be installed between studs to receive and support the ledger screws.

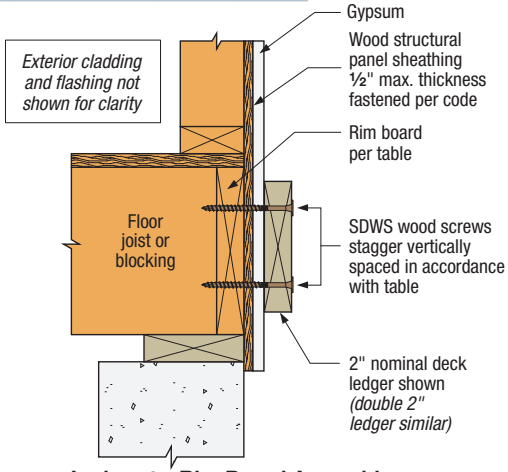
Ledger Structural Fastening Applications

Strong-Drive®
SDWS **TIMBER** Screw with Gypsum Board Interlayer(s) (cont.)

SDWS Timber Screw — 2015 and 2018 IRC Compliant Spacing for a Sawn Lumber Ledger to Rim Board with One or Two Layers of ⅝" Gypsum Board

Loading Condition	Nominal Ledger Thickness (in.)	Model No.	Rim Board Material and Minimum Size	Maximum Deck Joist Span						
				Up to 6 ft.	Up to 8 ft.	Up to 10 ft.	Up to 12 ft.	Up to 14 ft.	Up to 16 ft.	Up to 18 ft.
				Maximum On-Center Spacing of Fasteners (in.)						
40 psf Live 10 psf Dead	2x	For one layer of gypsum board use: SDWS22400DB For two layers of gypsum board use: SDWS22500DB	1" OSB 1" LVL	13	10	8	6	6	5	4
			1⅛" OSB 1⁵⁄₁₆" LVL 1¼" LSL	15	11	9	8	7	6	5
			2x SP, DFL 2x SPF, HF	20	15	12	10	9	8	7
100 psf Live 10 psf Dead	2x	For one layer of gypsum board use: SDWS22400DB For two layers of gypsum board use: SDWS22500DB	1" OSB 1" LVL	6	4	4	—	—	—	—
			1⅛" OSB 1⁵⁄₁₆" LVL 1¼" LSL	8	6	5	4	—	—	—
			2x SP, DFL 2x SPF, HF	9	7	5	5	4	—	—
100 psf Live 10 psf Dead	(2) 2x	For one layer of gypsum board use: SDWS22600DB	1" OSB 1" LVL	7	5	4	—	—	—	—
			1⅛" OSB 1⁵⁄₁₆" LVL 1¼" LSL	7	5	4	—	—	—	—
			2x SP, DFL 2x SPF, HF	7	5	4	—	—	—	—
60 psf Live 10 psf Dead	2x	For one layer of gypsum board use: SDWS22400DB For two layers of gypsum board use: SDWS22500DB	1" OSB 1" LVL	9	7	6	5	4	—	—
			1⅛" OSB 1⁵⁄₁₆" LVL 1¼" LSL	11	8	7	5	5	4	4
			2x SP, DFL 2x SPF, HF	14	11	9	7	6	5	5
40 psf Live 10 psf Dead	(2) 2x	For one layer of gypsum board use: SDWS22600DB	1" OSB 1" LVL	14	11	9	7	6	5	5
			1⅛" OSB 1⁵⁄₁₆" LVL 1¼" LSL	15	11	9	8	7	6	5
			2x SP, DFL 2x SPF, HF	15	11	9	8	7	6	5
60 psf Live 10 psf Dead	(2) 2x	For one layer of gypsum board use: SDWS22600DB	1" OSB 1" LVL	10	8	6	5	5	4	—
			1⅛" OSB 1⁵⁄₁₆" LVL 1¼" LSL	11	8	6	5	5	4	4
			2x SP, DFL 2x SPF, HF	11	8	6	5	5	4	4

1. Sawn rim board shall be spruce-pine-fir, hem-fir, Douglas fir–larch, or southern pine species. Ledger shall be hem-fir, Douglas fir–larch, or southern pine species.
2. Fastener spacings are based on the lesser of single fastener ICC-ES AC233 testing of the Strong-Drive® SDWS screw with a safety factor of 5.0 or ledger assembly testing based on ICC-ES AC13 with a factor of safety of 3.0. Spacing does NOT include NDS wet service factor adjustment.
3. Multiple ledger plies shall be fastened together per code independent of the SDWS screws.
4. SDWS screw spacing values are equivalent to 2018 IRC Table R507.9.1.3(1) and 2012/2015 IRC Table R507.2. The table also provides SDWS screw spacing for a wider range of materials commonly used for rim boards, and an alternate loading condition as required by some jurisdictions.
5. Rows of screws shall be vertically offset and evenly staggered. Screws shall be placed 1½" to 2" from the top and bottom of the ledger or rim board with 3" minimum and 6" maximum between rows and spaced per the table. End screws shall be located 6" from the end and at 1½" to 2" from the bottom of the ledger. For screws located at least 2" but less than 6" from the end, use 50% of the load per screw and 50% of the table spacing between the end screw and the adjacent screw, and for screws located between 2" and 4" from the end, predrill using a ⅝₃₂" drill.
6. The design installation permits a wood structural panel (WSP) interlayer in addition to one or two layers of gypsum board. If present, the WSP shall be a maximum of ½" thick, adjacent to the framing and fastened directly to the framing per the code.
7. Gypsum board must be attached as required per the building code.



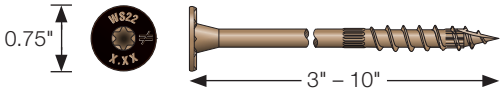
Ledger-to-Rim Board Assembly
(wood-framed lower floor acceptable, concrete wall shown for illustration purposes)

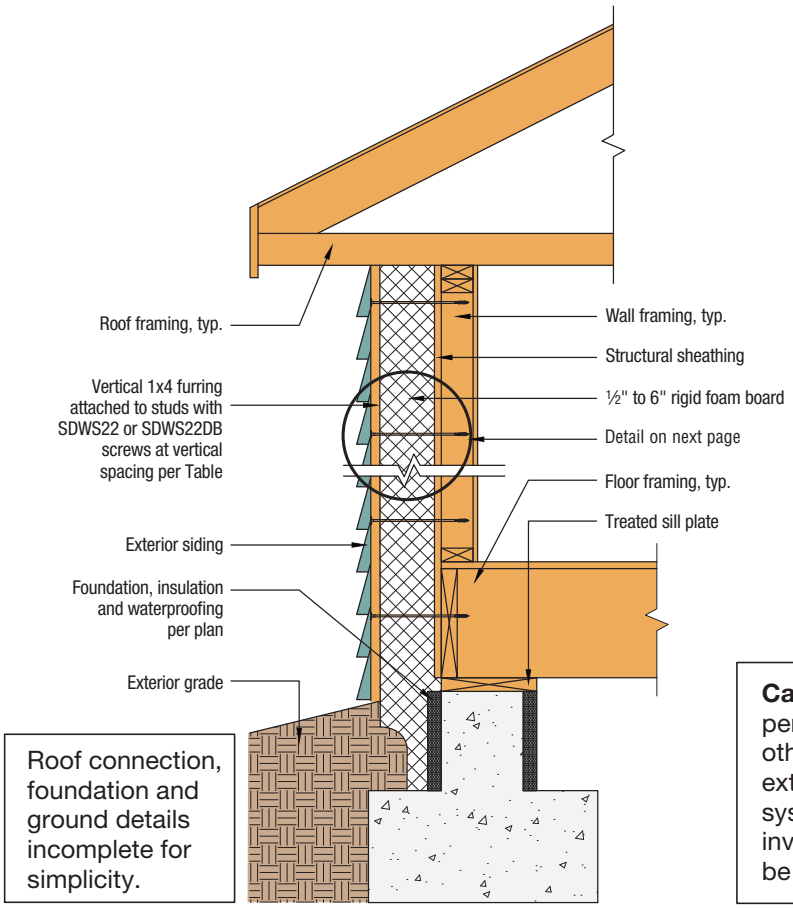
Exterior Foam-to-Wood Fastening

Strong-Drive®
SDWS **TIMBER** Screw
for Attaching Exterior Foam Insulation

Simpson Strong-Tie® Strong-Drive SDWS Timber screws may be used for installing exterior rigid-foam board insulation over wood structural panel (WSP) sheathing. Each fastener installs through furring strips, rigid-foam board and WSP sheathing into the wood wall stud framing. The fasteners do not typically require predrilling. Preservative-treated wood suitable for dry-service (AWPA UC1, UC2, UC3A) and untreated wood may be used depending on the protection needs of the construction. The SDWS products with "DB" in the model number have a double-barrier coating that provides corrosion resistance equivalent to hot-dip galvanization, while the products without "DB" in the model number can only be used in conditions with dry-service and no wood treatment chemicals. The table on p. 53 provides recommended spacing for fastening to vertical furring strips through ½" to 6" of rigid foam insulation board into each wall stud. The SDWS22DB and SDWS22 screws were evaluated as alternate threaded fasteners using ICC-ES AC233 and are the subject of IAPMO-UES ER-192. The Strong-Drive SDWS22DB Structural Wood screws were evaluated for corrosion resistance using ICC-ES AC257.

For more information, see p. 53, C-F-2019 Fastening Systems Catalog





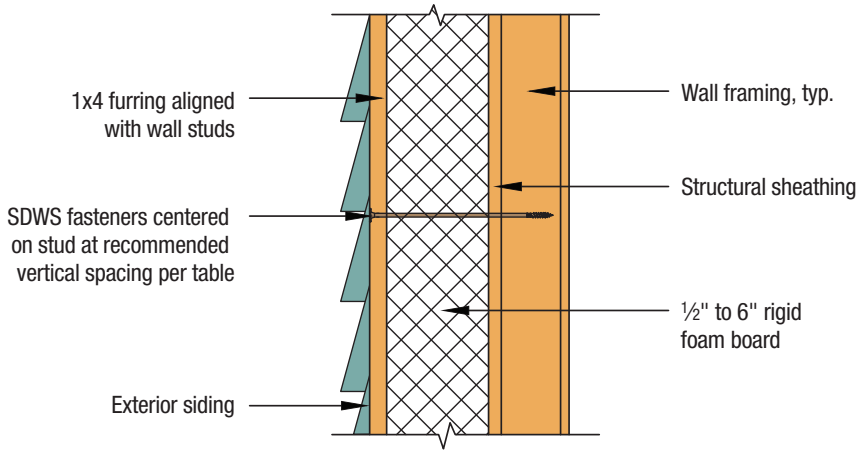
Roof connection, foundation and ground details incomplete for simplicity.

Caution: Fasteners can penetrate wiring, plumbing and other mechanical systems in exterior walls. All mechanical systems in the exterior wall involved with the fastening shall be mapped before driving screws.

Wall Cross-Section

Exterior Foam-to-Wood Fastening

Strong-Drive® SDWS **TIMBER** Screw for Attaching Exterior Foam Insulation (cont.)



Furring and Rigid Foam Attachment Detail

Recommended Vertical Fastener Spacing

Size (in.)	Model No.	Foam Thickness (in.)	Stud Spacing (in.)	Maximum Allowable Cladding Weight to be Supported (psf)		
				≤ 20	25	30
0.220 x 4	SDWS22400DB	½	16	24" o.c.	24" o.c.	24" o.c.
			24			
0.220 x 5	SDWS22500DB	1 to 1½	16			
			24			
0.220 x 6	SDWS22600DB	2	16			
			24			
0.220 x 8	SDWS22800DB SDWS22800	4	16			
			24			
0.220 x 10	SDWS221000DB SDWS221000	6	16			
			24		18" o.c.	18" o.c.

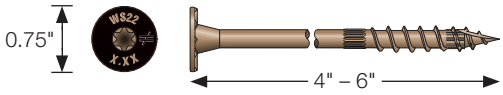
1. Caution: Fasteners can penetrate wiring, plumbing and other mechanical systems in exterior walls. All mechanical systems in the exterior wall involved with the fastening shall be mapped before driving screws.
2. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.
3. Wood wall framing (studs) shall be a minimum of 2" nominal thickness. Wood framing and furring shall be a minimum spruce-pine-fir species with specific gravity of 0.42 or greater. Table assumes furring strip thickness of ¾" and full thread embedment in the framing member.
4. Wood framing, furring and WSP sheathing shall meet the design requirements in accordance with the applicable building codes. WSP sheathing shall be fastened to the framing as required by the applicable building code.
5. Each fastener is capable of resisting 172 lb. of out-of-plane wind loading (C_D = 1.60) with no further increase allowed.
6. Spacing recommendations are based on a loading that produced 0.015" of assembly movement with 6"-thick rigid foam board insulation.
7. Maximum allowable cladding weight shall be the additive weight of furring, cladding including foam insulation, environmental effects (i.e. ice) and other supported materials.
8. Metal fasteners conduct heat, and it is recommended that exposed screw heads are covered with foam and sealed.
9. Screws shall be installed such that they close gaps between connected components. Furring and sheathing shall provide the required thickness and performance for siding manufacturer installation instructions.

Sole/Top Plate-to-Rim Fastening

Strong-Drive® SDWS TIMBER Screw

Sole-to-Rim Connections

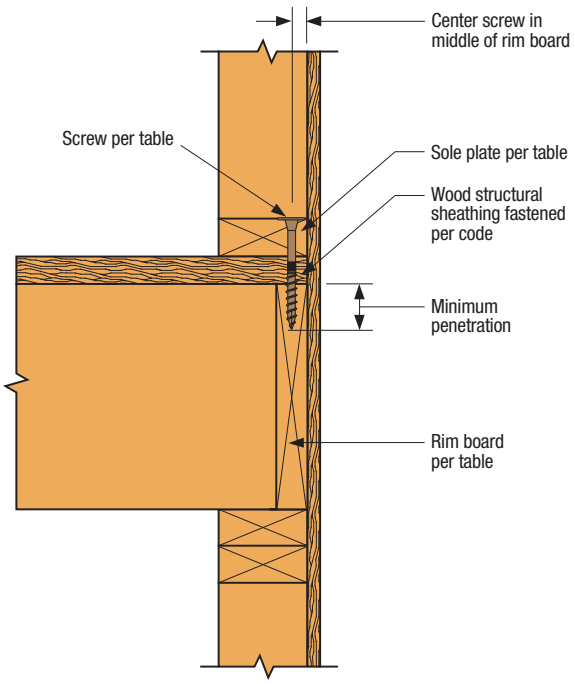
For more information, see p. 53, C-F-2019 Fastening Systems Catalog



SDWS Timber Screw — Allowable Shear Loads for Sole-to-Rim Connections

Size (in.)	Model No.	Sole Plate Nominal Thickness (in.)	Minimum Penetration into Rim Board (in.)	Reference Allowable Loads (lb.) per Screw							
				2x DFL/SP Rim Board		2x SPF/HF Rim Board		1¼" Min. LVL Rim Board		1¼" Min. LSL Rim Board	
				DFL/SP Sole Plate	SPF/HF Sole Plate	DFL/SP Sole Plate	SPF/HF Sole Plate	DFL/SP Sole Plate	SPF/HF Sole Plate	DFL/SP Sole Plate	SPF/HF Sole Plate
0.22 x 4	SDWS22400DB	2x	1.75	345	295	295	295	275	275	275	275
0.22 x 5	SDWS22500DB	2x	2	345	295	295	295	275	275	275	275
0.22 x 6	SDWS22600DB	2x, 3x, (2)-2x	2	345	295	295	295	275	275	275	275

1. Allowable loads are based on testing per ICC-ES AC233 and are limited to parallel-to-grain loading.
2. Allowable loads are shown at the wood load duration factor of C_D = 1.00. Loads may be increased for load duration by the building code up to a C_D = 1.60.
3. Minimum spacing of the SDWS is 6" o.c., minimum end distance is 6", and minimum edge distance is ⅝".
4. Wood structural panel up to 1⅛" thick (²³⁄₃₂" for SDWS22400DB) is permitted between the sole plate and rim board provided it is fastened to the rim board per code and the minimum penetration of the screw into the rim board is met.
5. A double 2x sole plate/top plate is permitted provided it is independently fastened per the code and the minimum screw penetration per the table is met.
6. Minimum rim board height shall be 9¼" when using SDWS screws for sole and top plate fastening.
7. Sole-to-rim loads can be achieved without a wall below.



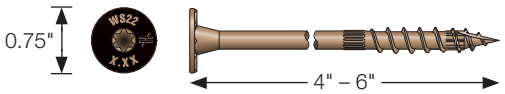
Sole-to-Rim Board Assembly
(Other fasteners not shown for clarity)

Sole/Top Plate-to-Rim Fastening

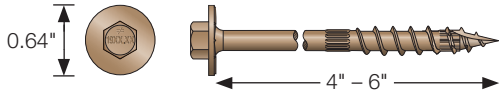
Strong-Drive®
SDWS **TIMBER** Screw and SDWH **TIMBER-HEX** Screw

Sole Plate/Top Plate to Rim/Blocking Shear Load Transfer with Reduced Fastener Spacing

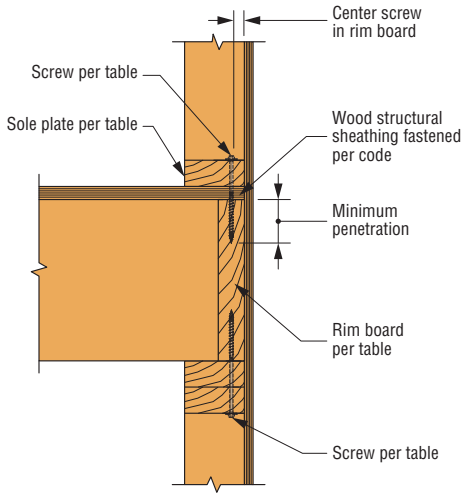
Strong-Drive SDWS Timber and Strong-Drive SDWH Timber-Hex structural screws may be used to attach a sole plate or top plate to a rim board and blocking material according to the following details and loading information. Allowable loads are based on testing per ICC-ES AC233 and are limited to parallel-to-grain or in-plane-shear loading. Each test assembly consisted of multiple fasteners, a sole plate, sheathing and a rim board or blocking material. Please see the following for allowable load tables.



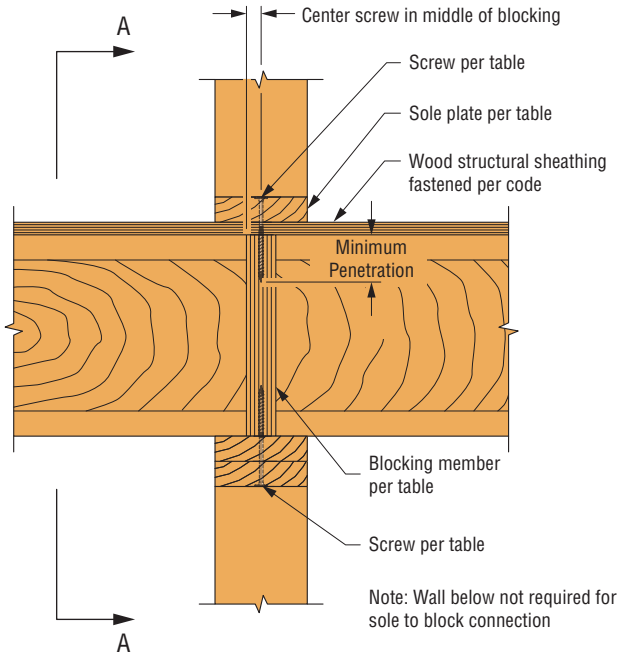
Strong-Drive SDWS TIMBER Screw



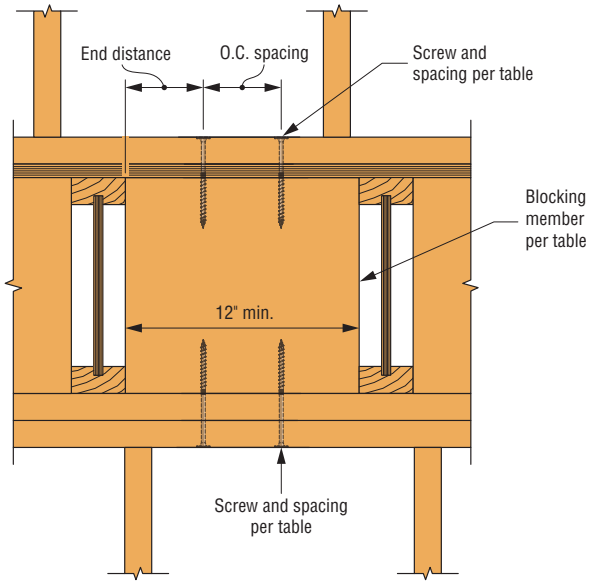
Strong-Drive SDWH TIMBER-HEX Screw



Sole-to-Rim and Top Plate-to-Rim Connection



Sole-to-Block and Top Plate-to-Block Connection



Sole-to-Block and Top Plate-to-Block Connection

Sole/Top Plate-to-Rim Fastening

Strong-Drive®
SDWS **TIMBER** Screw and SDWH **TIMBER-HEX** Screw (cont.)

SDWS Timber/SDWH Timber-Hex Single-Fastener, Allowable Loads for Sole-to-Rim (or Blocking) and Top Plate-to-Rim (or Blocking) Connection

Min. Screw Length (in)	Sole Plate or Top Plate Nominal Thickness		Model No.	Min. Penetration into Rim or Block (in.)	Reference Allowable Shear Loads (lb.) per Screw DFL/SP Sole Plate and Top Plate					
					Rim and Blocking Material					
					2x Min. DFL/SP		1¼" Min. LVL	1¾" Min. LVL	1¼" Min. LSL	1¾" Min. LSL
					6" O.C. 6" End Distance	3" O.C. 3" End Distance	6" O.C. 6" End Distance	4" O.C. 4" End Distance	6" O.C. 6" End Distance	4" O.C. 4" End Distance
4	Sole Plate	2x	SDWH19400DB	1.75	315	220	255	260	275	230
4		2x	SDWS22400DB	1.75	345	240	275	305	275	350
5		2x	SDWS22500DB	2	345	240	275	360	275	345
6		3x	SDWH19600DB	2	315	225	255	260	275	230
6		3x	SDWS22600DB	2	345	240	275	360	275	345
6		(2) 2x	SDWH19600DB	1.75	315	220	255	260	275	230
6		(2) 2x	SDWS22600DB	1.75	345	240	275	305	275	350
8		(2) 2x	SDWH19800DB	2	315	225	255	260	275	230
8		(2) 2x	SDWS22800DB	2	345	240	275	360	275	345
5	Top Plate	(2) 2x	SDWS22500DB	2	345	240	275	360	275	345
6		(2) 2x	SDWH19600DB	2	315	225	255	260	275	230
6		(2) 2x	SDWS22600DB	2	345	240	275	360	275	345

1. Allowable loads are shown at the wood load duration factor of C_D = 1.00. Loads may be increased for load duration by the building code up to a C_D = 1.60.
2. For 2x solid sawn members and 1¼" LVL or LSL members the minimum edge distance is ⅝". For 1¾" LVL or LSL members the minimum edge distance is ⅞".
3. Wood structural panel up to 1⅛" thick (²³⁄₃₂ for 4" fasteners) is permitted between sole plate and rim board provided it is fastened to the rim board per code and the minimum penetration of the screw into the rim/block is met.
4. Double sole plate and top plate fastened minimum per code.
5. Minimum rim height is 9¼" when using fasteners on the top and bottom. Sole to blocking loads can be achieved with or without a wall below.
6. For assemblies using SPF/HF lumber for the sole plate, top plate, or rim/blocking members, multiply table values by 0.86.

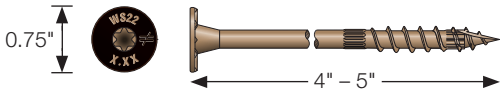
Spacing for Multiple Rows of Fasteners

Material	O.C. Spacing/ End Distance Spacing (in.)	Row Offset (in.)	Row Stagger (in.)
Solid Sawn	3	1¼	1¼
	6		
LVL or LSL	4	1¾	1¾
	6	1¼	1¼

1. The material must be wide enough to accommodate minimum edge distance, row offset and row stagger.

Deck Construction — Ledgers

Strong-Drive® SDWS TIMBER Screw

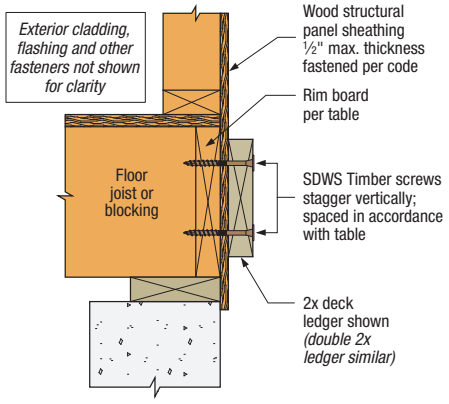


For more information, see p. 53, C-F-2019 Fastening Systems Catalog

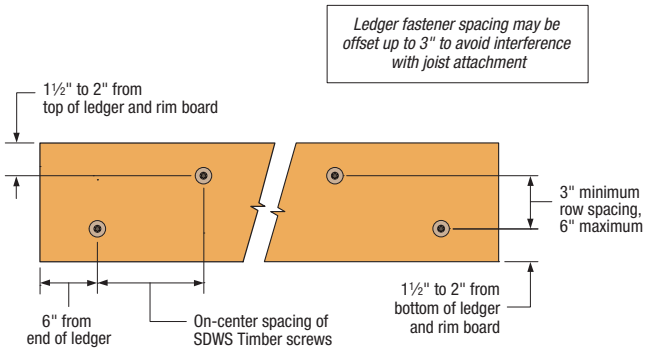
SDWS Timber Screw — 2015 and 2018 IRC Compliant Spacing for a Sawn Lumber Deck Ledger-to-Rim Board

Loading Condition	Nominal Ledger Size (in.)	Size (in.)	Model No.	Rim Board Material and Minimum Size	Maximum Deck Joist Span						
					Up to 6 ft.	Up to 8 ft.	Up to 10 ft.	Up to 12 ft.	Up to 14 ft.	Up to 16 ft.	Up to 18 ft.
					Maximum On-Center Spacing of Fasteners (in.)						
40 psf Live 10 psf Dead	2x	0.22 x 4	SDWS22400DB	1" OSB	14	10	8	7	6	5	5
				1" LVL							
				1⅛" OSB	16	12	10	8	7	6	5
				1⁵⁄₁₆" LVL							
				1¼" LSL							
				2x SP, DFL — 2x SPF, HF	22	16	13	11	9	8	7
60 psf Live 10 psf Dead	2x	0.22 x 4	SDWS22400DB	1" OSB	10	7	6	5	4	4	—
				1" LVL							
				1⅛" OSB	12	9	7	6	5	4	4
				1⁵⁄₁₆" LVL							
				1¼" LSL							
				2x SP, DFL — 2x SPF, HF	15	12	9	8	7	6	5
40 psf Live 10 psf Dead	(2) 2x	0.22 x 5	SDWS22500DB	1" OSB	15	12	9	8	7	6	5
				1" LVL							
				1⅛" OSB	16	12	10	8	7	6	5
				1⁵⁄₁₆" LVL							
				1¼" LSL							
				2x SP, DFL — 2x SPF, HF	16	12	10	8	7	6	5
60 psf Live 10 psf Dead	(2) 2x	0.22 x 5	SDWS22500DB	1" OSB	11	8	7	6	5	4	4
				1" LVL							
				1⅛" OSB	12	9	7	6	5	4	4
				1⁵⁄₁₆" LVL							
				1¼" LSL							
				2x SP, DFL — 2x SPF, HF	12	9	7	6	5	4	4

1. SDWS screw spacing values are equivalent to 2018 IRC Table R507.9.1.3(1) and 2015 IRC Table R507.2. The table above also provides SDWS screw spacing for a wide range of materials commonly used for rim board, and an alternate loading condition as required by some jurisdictions.
2. Sawn lumber rim board shall be spruce-pine-fir, hem-fir, Douglas fir–larch, or southern pine species. Ledger shall be hem-fir, Douglas fir–larch, or southern pine species.
3. Fastener spacings are based on the lesser of single fastener ICC-ES AC233 testing of the Strong-Drive SDWS Timber screw with a safety factor of 5.0 or ICC-ES AC13 assembly testing with a factor of safety of 5.0. Spacing includes NDS wet service factor adjustment.
4. Multiple ledger plies shall be fastened together per code independent of the SDWS screws.
5. Rows of screws shall be vertically offset and evenly staggered. Screws shall be placed 1½" to 2" from the top and bottom of the ledger or rim board with 3" minimum and 6" maximum between rows and spaced per the table. End screws shall be located 6" from the end and at 1½" to 2" from the bottom of the ledger. For screws located at least 2" but less than 6" from the end, use 50% of the load per screw and 50% of the table spacing between the end screw and the adjacent screw, and for screws located between 2" and 4" from the end, predrill using a ⁵⁄₃₂" drill.
6. Structural sheathing between the ledger and rim board shall be a maximum of ½" thick and fastened per code.
7. See pp. 109–110 for ledger-to-rim attachment with ½" gap.



Ledger-to-Rim Board Assembly
(wood-framed lower floor acceptable,concrete wall shown for illustration purposes; other fasteners not shown for clarity.)



SDWS Timber Screw Spacing Detail for Ledgers

Deck Construction — Ledgers

Strong-Drive® SDWH TIMBER-HEX and SDWS TIMBER Screw

2015 and 2018 IRC Compliant Spacing and Allowable Shear Loads for Fastening a Sawn Lumber Deck Ledger-to-Rim Board with ½" Gap

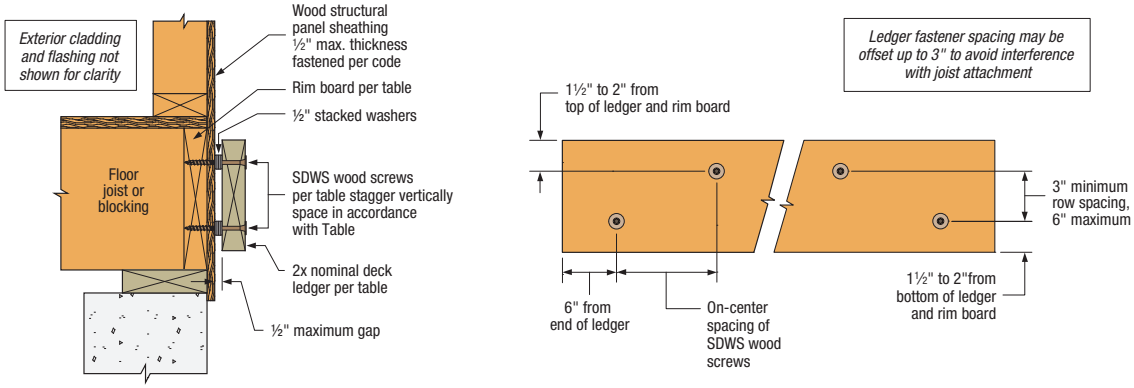


Table below lists the allowable shear loads for SDWS Timber screws and SDWH Timber-Hex screws when attaching a 2x ledger with up to ½" thickness of stacked washers to the listed rim board.

Single-Fastener Allowable Shear Loads for Fastening a Sawn Lumber Deck Ledger-to-Rim Board with ½" Gap

Nominal Ledger Size (in.)	Rim Board	Size (in.)	Model No.	Reference Allowable Load (lb.)
2x	2x SPF, DFL, SP #2	0.220 x 4	SDWS22400DB	270
		0.195 x 4	SDWH19400DB	260
	1⅛" LSL	0.220 x 4	SDWS22400DB	255
		0.195 x 4	SDWH19400DB	245
	1¾" LVL	0.220 x 4	SDWS22400DB	290
		0.195 x 4	SDWH19400DB	255

1. Sawn lumber 2x ledger shall have a minimum specific gravity of 0.42 (HF or SPF) and be grade No. 2 or better.
2. Rim board is to be dry lumber (specific gravity at least 0.42) or EWP rim board product (equivalent specific gravity of at least 0.42 for nails and screws installed in the face orientation).
3. Fastener spacings are based on the lesser of single fastener testing following ICC-ES AC233 or ledger assembly testing following ICC-ES AC13 using a safety factor of 5.0.
4. Screws shall be placed 1½" to 2" from the top and bottom of the ledger board or rim board, 6" from the end of the ledger with 3" minimum and 6" maximum between rows. Minimum on-center spacing is 4".
5. Wood structural panel sheathing between the ledger and rim board shall be a maximum of ½" thick and fastened per code.
6. Screws shall be tightened such that the washer stack is tightly compressed between the ledger and the rim board.
7. Maximum ½" gap created by stacked hot-dip galvanized or stainless-steel 5/16" Type A plain washers (N-narrow) with an outside diameter equal to 0.688" and inside diameter equal to 0.344".
8. Allowable loads are shown at the wood load duration factor of C_D = 1.0. Loads may be increased for load duration per the building code up to a C_D = 1.6. Tabulated values must be multiplied by all applicable adjustment factors per the NDS, including wet service factor.

Strong-Drive® SDWH TIMBER-HEX and SDWS TIMBER Screw (cont.)

2015 and 2018 IRC Compliant Spacing and Allowable Shear Loads for Fastening a Sawn Lumber Deck Ledger-to-Rim Board with ½" Gap

Strong-Drive® SDWS Timber screws and SDWH Timber-Hex screws are suitable for installing ledgers with up to ½" drainage gap between the ledger and the rim board. These fasteners do not require predrilling and have a double-barrier coating providing corrosion resistance equivalent to hot-dip galvanization. The gap is formed by stacking hot-dip galvanized or stainless-steel 5⁄16" Type A plain washers (0.688" outside diameter, 0.344" inside diameter) on the shank of the screws between the ledger and the rim board. Weather proofing shall be the responsibility of the installer. The table below lists the maximum on-center spacing of SDWS Timber screws and SDWH Timber-Hex screws when attaching a 2x ledger to the listed rim board of various widths with a maximum ½" gap between them.

Loading Condition: 40 PSF Live Load and 10 PSF Dead Load

Ledger Nominal Size (in.)	Rim Board Material (in.)	Size (in.)	Model No.	Maximum Deck Joist Span						
				Up to 6 ft.	Up to 8 ft.	Up to 10 ft.	Up to 12 ft.	Up to 14 ft.	Up to 16 ft.	Up to 18 ft.
				Maximum On-Center Spacing of Fasteners (in.)						
2x	2x DFL, SP, SPF #2	0.220 x 4	SDWS22400DB	15	11	9	7	6	5	5
		0.195 x 4	SDWH19400DB	14	11	8	7	6	5	4
	1.125" LSL	0.220 x 4	SDWS22400DB	14	10	8	7	6	5	4
		0.195 x 4	SDWH19400DB	13	10	8	6	5	5	4
	1.75" LVL	0.220 x 4	SDWS22400DB	16	12	9	8	7	6	5
		0.195 x 4	SDWH19400DB	14	10	8	7	6	5	4

1. Sawn lumber ledger shall have minimum specific gravity of 0.42 (HF or SPF) and shall be grade No. 2 or better. Rim board is to be dry lumber (specific gravity at least 0.42) or EWP rim board product (equivalent specific gravity of at least 0.42 for nails and screws installed in the face orientation).
2. Fastener spacings are based on the lesser of single fastener testing following ICC-ES AC233 or ledger assembly testing following ICC-ES AC13 using a safety factor of 5.0. Spacing includes NDS wet service factor adjustment.
3. Screws shall be placed 1½" to 2" from the top and bottom of the ledger board or rim board, 6" from the end of the ledger with 3" minimum and 6" maximum between rows. End screws shall be located near the bottom of the ledger. See figure on the following page.
4. Wood structural panel sheathing between the ledger and rim board shall be a maximum of ½" thick and fastened per code.
5. Screws shall be tightened such that the washer stacks are tightly compressed between the ledger and the rim board.
6. Maximum ½" gap formed by stacked hot-dip galvanized or stainless-steel 5⁄16" Type A plain washers (N-narrow) with a nominal outside diameter of 0.688" and inside diameter of 0.344".
7. The fastener specifications in this table meet the prescriptive deck ledger attachment solutions and loading requirements per 2018 IRC Table R507.9.1.3(1) and Table R507.2 of the 2012 and 2015 IRC.

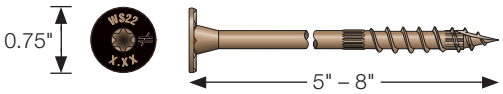
Deck Construction — Guard Posts

Strong-Drive® SDWS **TIMBER** Screw for Guard Post Installations

For more information, see p. 52, C-F-2019 Fastening Systems Catalog

Framed guard post installations fastened with SDWS Timber screws were tested in accordance with ICC-ES AC273 and met the 600 lb. concentrated ultimate load applied at the top of a single post in an outward direction and the post deflection limit at the 200 lb. design level. For a required uniform load of 150 plf in AC273 for guard and handrail systems, the screw was not tested as excepted for one- and two-family dwellings in IBC 2015 Section 1607.8.1. The following details were tested:

- Detail A: Interior Post on Rim Board
- Detail B: Interior Post at Corner
- Detail C: Interior Post on Rim Joist with Adjacent Joist
- Detail D: Interior Post on Rim Joist between Joists



The SDWS Timber screws are the subject of IAPMO-UES ER-192. The following table lists the SDWS Timber screw information and total quantity of fasteners required for each guard post detail. The guard post details are shown on pp. 116–118.

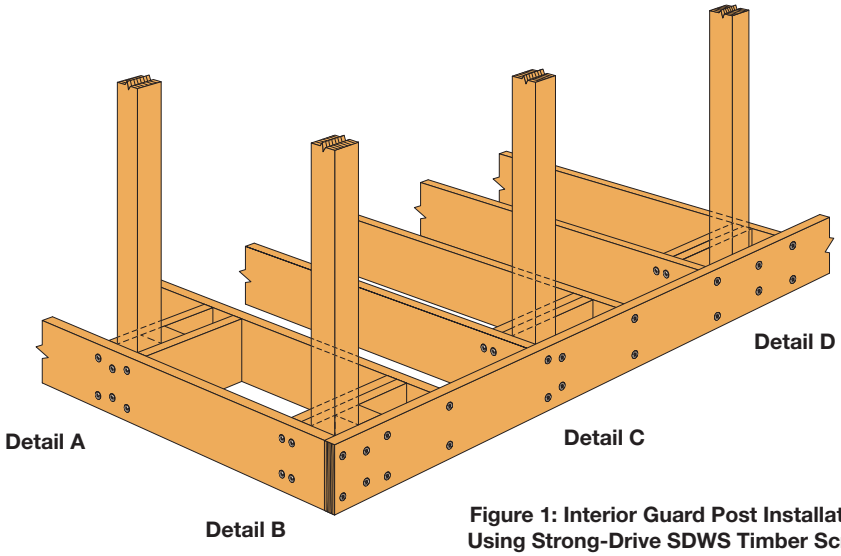


Figure 1: Interior Guard Post Installations Using Strong-Drive SDWS Timber Screws

Code-Compliant Guard Post Connection Details

Installation Scope:

For 36” Guard Post Height
(above deck surface, refer to T-F-GRDPSTRL)

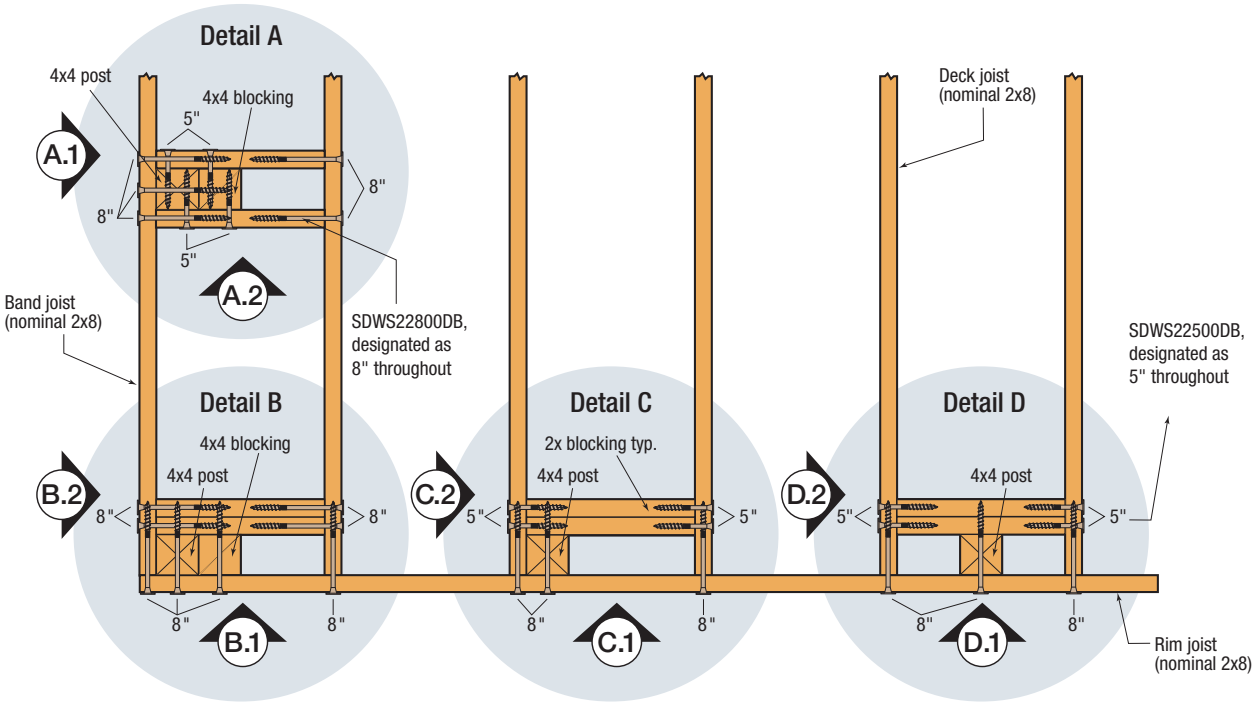
- Use Nominal 4” x 4” guard post
- Use Nominal 2” x 8” rim board/rim joist, 2x blocking and 4x blocking
- Framing lumber should be HF, DFL or SP, pressure treated with chemical retention not greater than UC4A
- Full-depth blocking required
- Interior post installation (post positioned inside the rim board, rim joist)
- Fastener position tolerance: ± 1⁄16”

For 42” Guard Post Height
(above deck surface, refer to L-F-SDWS42GRD)

- Use Nominal 4” x 4” guard post
- Use Nominal 2” x 8” rim board/rim joist, 2x blocking and 4x blocking
- Framing lumber should be DFL (No. 2 grade, minimum) or SP (Construction grade, minimum), pressure treated with chemical retention not greater than UC4A
- Full-depth blocking required
- Interior post installation (post positioned inside the rim board, rim joist)
- Fastener position tolerance: ± 1⁄16”

Deck Construction — Guard Posts

Strong-Drive® SDWS TIMBER Screw for Guard Post Installations (cont.)



Plan View Showing Details of Four Guard Post Connections Using Strong-Drive SDWS Timber Screws

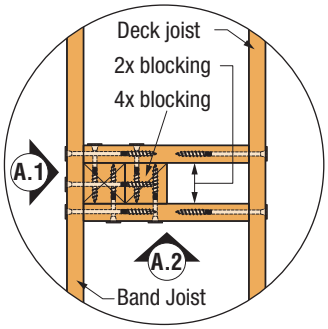
SDWS22DB Screw Information for Guard Post Details

Detail	Size (in.)	Model No.	Quantity Required
A	0.220 x 5	SDWS22500DB	4
	0.220 x 8	SDWS22800DB	10
B	0.220 x 8	SDWS22800DB	16
C	0.220 x 5	SDWS22500DB	8
	0.220 x 8	SDWS22800DB	6
D	0.220 x 5	SDWS22500DB	8
	0.220 x 8	SDWS22800DB	6

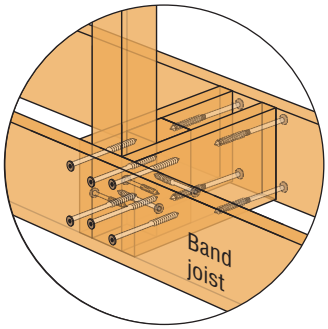
1. SDWS Timber screws install best with a low-speed ½" drill and a T-40 6-lobe bit. The matched bit included with the screws is recommended for best results.
2. Predrilling is typically not required. Where predrilling is necessary, use a 5⁄32" drill bit for Strong-Drive SDWS Timber screws.
3. Screw heads that are countersunk flush to the wood surface are acceptable if the screw has not spun out.
4. Deck joists shall be fastened to rim joist and ledger as required by the code. See p. 118 for rim joist connection.

Strong-Drive® SDWS TIMBER Screw for Guard Post Installations (cont.)

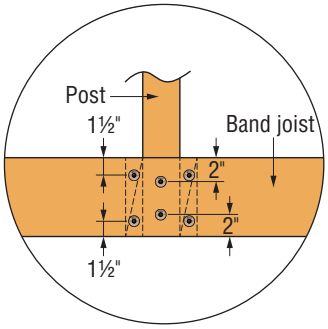
Detail A — Interior Post on Rim Board



Detail A Plan View

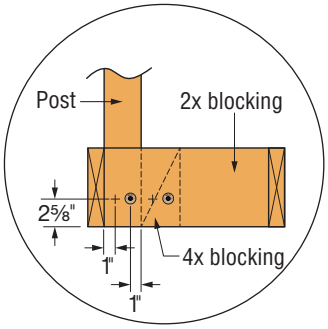


Detail A Isometric View



Detail A.1 Front Elevation

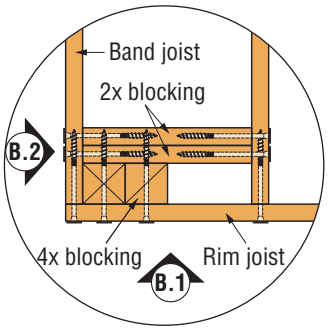
1. Rim board to 2x blocking 1½" from top and bottom edges using 8" SDWS22800DB.
2. Rim board to post and 4x blocking 2" from top and bottom edges using 8" SDWS22800DB.



Detail A.2 Side Elevation

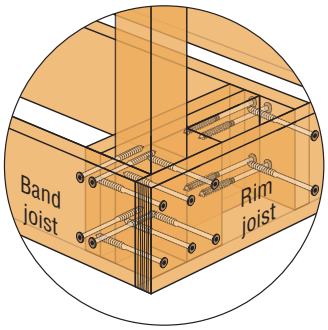
1. 2x blocking to post — opposing screws 1" from outer edges of post, 2⅝" from bottom edge of 2x blocking using 5" SDWS22500DB.
2. 2x blocking to 4x blocking — opposing screws 1" from outer edges of 4x blocking, 2⅝" from bottom edge of 2x blocking using 5" SDWS22500DB.

Detail B — Interior Post on Corner

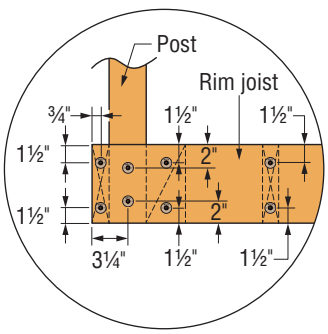


Detail B Plan View

Note: For fastening rim joist to rim board and deck joists, predrilling for the SDWS22800DB screws is recommended using a ⅝₃₂" drill bit.

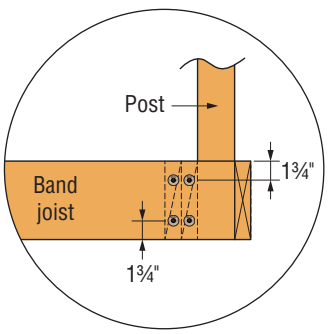


Detail B Isometric View



Detail B.1 Front Elevation

1. Rim joist to rim board or deck joists 1½" from top and bottom edges, ¾" from side edge using 8" SDWS22800DB.
2. Rim joist to post and 2x blocking 2" from top and bottom edges, centered on post using 8" SDWS22800DB.
3. Rim joist to 4x blocking and 2x blocking 1½" from top and bottom edges centered on 4x blocking using 8" SDWS22800DB.

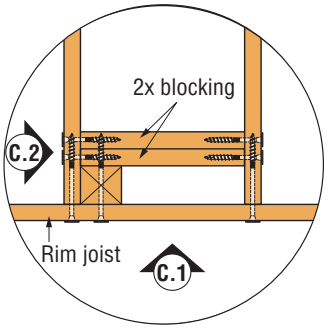


Detail B.2 Side Elevation

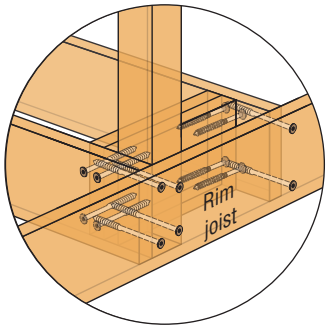
1. Rim board to 2x blocking 1¾" from top and bottom edges using 8" SDWS22800DB.

Strong-Drive® SDWS TIMBER Screw for Guard Post Installations (cont.)

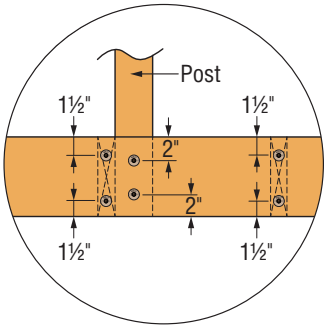
Detail C — Interior Post on Rim Joist with Adjacent Joist



Detail C Plan View

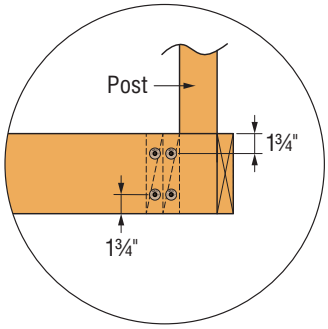


Detail C Isometric View



Detail C.1 Front Elevation

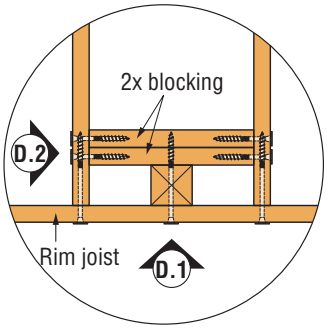
1. Rim joist to deck joist 1½" from top and bottom edges using 8" SDWS22800DB.
2. Rim joist to post and 2x blocking 2" from top and bottom edges using 8" SDWS22800DB.



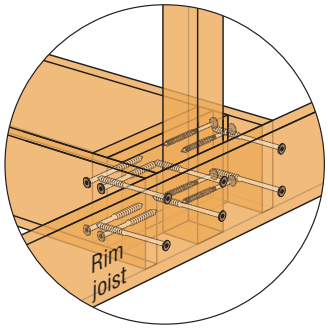
Detail C.2 Side Elevation

1. Deck joist to 2x blocking 1¾" from top and bottom edges using 5" SDWS22500DB.

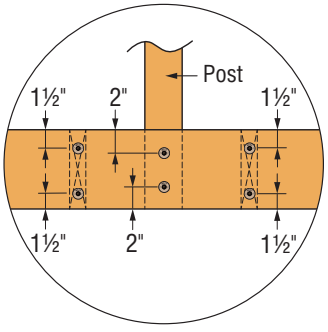
Detail D — Interior Post on Rim Joist Between Joists



Detail D Plan View

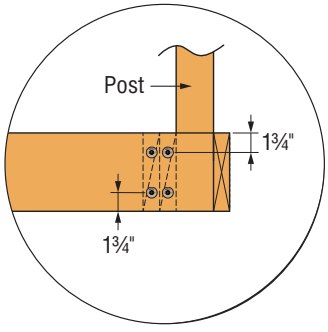


Detail D Isometric View



Detail D.1 Front Elevation

1. Rim joist to deck joists 1½" from top and bottom edges using 8" SDWS22800DB.
2. Rim joist to post and 2x blocking 2" from top and bottom edges using 8" SDWS22800DB.



Detail D.2 Side Elevation

1. Deck joist to 2x blocking 1¾" from top and bottom edges using 5" SDWS22500DB.