STRUCTURAL CALCS

Derkashani Residence
8151 SE 48th St
Mercer Island, WA

Javid Abdi, PE, SE
6810 NE 149th St.
Kenmore, WA – 98028
Atlas.CSE@gmail.com
206-427-7233

ATLAS
CONSULTING ENGINEERS INC.

Project:	Derkashani Residence (8151 SE 48th St)	By:	JDA
Proj No:	167-2020	Date:	4/1/2021

Summary

The project consists of an extensive remodel to an existing single-family residence located at the above address. The existing residence will comprise the southern half of the remodeled structure, however the entire roof structure will be new. Existing foundations and main floor framing will remain where feasible, and be detailed so-as to be tied to the new structure and create a continuous lateral force resisting system.

The remodeled two-story residence will consist of a 1632 SF living space and 910 SF garage at the lower floor; and a 3170 SF main floor. The structure will be set into the sloping site and daylight to the south.

The residence will be comprised of the following: reinforced concrete strip and spread footings; concrete slab-on-grade garage space; wood framed TJI floors supported on interior and exterior wood framed load bearing walls, beams, and posts at each level; and a flat-rafter roof system comprised of dimensional lumber and TJI's. The lateral systems will consist of wood sheathed diaphragms and shear walls (tongue & groove plywood floor sheathing, OSB roof and wall sheathing), and Simpson StrongTie holdowns.

See pages 2 - 3 for lateral design. Site seismic variables are shown on page 4; shear wall line tributary areas shown on pages 5 - 6; wind areas shown on page 7; and wind load derivation shown on pages 8 - 14. Seismic and wind loads were determined using ASCE 7-16 procedures. As shown on pages 2-3, shearwalls with 8d nails spaced at 6" o.c. (SW-6), 4" oc (SW-4), 3" o.c. (SW-3), 2" o.c. (SW-2), and 3" oc each side (SW-33) are required. Use a Simpson StrongWall for tall wall with only 2'-0" wide shearwall panels. Demand in wall piers is 1,687# and capacity is 3,525# fASD from Simpson literature. Shearwalls have been detailed to meet the ASD shearwall capacity values as listed in 1/S6.5. LTP4 and A34 clips have an ASD capacity of 540# and 550# per clip; SDS screws have an ASD capacity of 400# per screws; 5/8" and 3/4" diameter anchor bolts have an ASD capacity of 1485# and 2039# with doug fir plates. The required spacing of these connectors is shown in the shearwall table in the plans. Each shearwall will have a different uplift demand, as shown on pages 2 - 3. Simpson holdowns will be used as shown in the plans, sized to ensure ASD uplift capacity. Anchorage of the HDU's into concrete were designed for worst case LRFD load when including the seismic overstrength factor. To preclude breakout, additional reinforcing hairpins are detailed to transfer shear force into new foundation walls. At existing walls, customized holdowns are required because epoxy anchorage doesn't have capacity in tension. Design custom tension ties to behave in shear and design anchorage for overstrength LRFD load, and SDS screws into wood post for ASD loads. See pages 15-38 for anchorage design. Use SDS seismic capacity of 400#/screw and detail screws to provide suitable spacing. Steel will be a tension only member with minimum width of 3"...use 33 ksi for 12 gage steel and 50 ksi for 10 and 8 gage steel to provide LRFD capacity.

Gravity system was designed for 25 psf roof snow load, 20 psf roof dead load, 40 psf floor live load, 60 psf deck live load, and 25 psf floor dead load. See pages 39 -40 for framing key; and pages 41 - 78 for member designs. Uplift for each member considering 0.6D+0.6W will be resisted by straps at headers/beams; and H2.5a hurricane ties at rafters and trusses. Note that where applicable, overstrength seismic chord forces were considered in beam designs but not for serviceability beam deflection considerations.

Size footings and walls for an allowable soil pressure = 3,000 psf; lateral earth pressure (restrained/unrestrained) = 35 pcf/ 45 pcf; passive earth pressure = 300 pcf; seismic surcharge = 8h psf (uniform); and coefficient of friction = 0.50. Per ACI Table 11.6-1, provide minimum longitudinal reinforcing of 0.0012 and transverse reinforcing of 0.002 in the walls; and 0.0018 per ACI Table 7.6.1.1. See retaining wall design on page 78. Bearing walls will be braced at bottom by slab and at top by framing...worst case gravity load is 5.67' of floor framing; 12' of stud wall; 9' of 8" concrete wall; and slab...equates to ASD max load of 1413 plf...with a 24"x10"dp footing, results in a soil bearing of 832 psf when weight of footing is considered...no issue. See page 79 for design of foundation wall during temporary condition where it will be required to act as a retaining wall (i.e. framing has not been set yet to brace it). See page 80 - 84 for cantilevered retaining wall design.

Design new bump-out to be supported on 6 ton capacity pipe piles and pile cap. Worst case demand will be 1450# live, 2310# dead, 260# snow, 245# (up-down), 207# (left-right), and 319# (uplift) seismic. With two pile caps we would provide 12 ton (24 K) capacity so can see there's no issue...batter piles in opposing directions for stability. Provide minimum reinforcing per ACI.

R	6.5		ASCE 7-16 Table 12.2-1
Ω_o	2.5		
C_d	4		
V	39.0	Kips	= CsW ~ ASCE 7-16 (12.8-1)
C_s	0.178		
	0.178		= Sds / (R/Ie) ~ ASCE 7-16 (12.8-2)
	0.495		< Sd1 / T(R/Ie) ~ if T<TL, ASCE 7-16 (12.8-3)
	-		< Sd1TL / T2(R/Ie) ~ if T>TL, ASCE 7-16 (12.8-3)
	0.051		>0.044Sdsle ~ ASCE 7-16 (12.8-5)
	0.01		>0.01 ~ ASCE 7-16 (12.8-5)
	-		>0.5S1 / (R/Ie) ~ if S1>0.6g, ASCE 7-16 (12.8-6)
W	219	Kips	
I_e	1		ATC Hazard
F_v	1.8		Table 11.4-2 and Section 11.4.8 Exception
F_a	1.2		ATC Hazard
S_S	1.443	g	ATC Hazard
S_1	0.501	g	ATC Hazard
S_{mS}	1.732	g	ATC Hazard
S_{m1}	0.9018	g	= $F_v S_1$ ~ ASCE 7-16 (11.4-1)
S_{ds}	1.155	g	ATC Hazard
S_{d1}	0.6012	g	= 2/3 S_{m1} ~ ASCE 7-16 (11.4-4)
S_{DC}	D		
T_a	0.187	seconds	= Cthnx ~ ASCE 7-16 (12.8-7)
C_t	0.02		ASCE 7-16 Table 12.8-2
h_n	19.66	feet	
x	0.75		ASCE 7-16 Table 12.8-2
T_L	6	seconds	USGS Seismic Values
T_S	0.521	seconds	= S_{d1} /S_{ds}, ASCE 7-16 (11.4-3)
$1.5T_S$	0.781	seconds	

EXCEPTION: A ground motion hazard analysis is not required for structures other than seismically isolated structures and structures with damping systems where:

1. Structures on Site Class E sites with S_S greater than or equal to 1.0, provided the site coefficient F_a is taken as equal to that of Site Class C.
2. Structures on Site Class D sites with S_1 greater than or equal to 0.2, provided the value of the seismic response coefficient C_s is determined by Eq. (12.8-2) for values of $T \le 1.5T_s$ and taken as equal to 1.5 times the value computed in accordance with either Eq. (12.8-3) for $T_L \ge T > 1.5T_s$ or Eq. (12.8-4) for $T > T_L$.
3. Structures on Site Class E sites with S_1 greater than or equal to 0.2, provided that T is less than or equal to T_s and the equivalent static force procedure is used for design.

Table 11.4-2 Long-Period Site Coefficient, F_v

Site Class	Mapped Risk-Targeted Maximum Considered Earthquake (MCE$_R$) Spectral Response Acceleration Parameter at 1-s Period					
	$S_1 \le 0.1$	$S_1 = 0.2$	$S_1 = 0.3$	$S_1 = 0.4$	$S_1 = 0.5$	$S_1 \ge 0.6$
A	0.8	0.8	0.8	0.8	0.8	0.8
B	0.8	0.8	0.8	0.8	0.8	0.8
C	1.5	1.5	1.5	1.5	1.5	1.4
D	2.4	2.2[a]	2.0[a]	1.9[a]	1.8[a]	1.7[a]
E	4.2	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8
F	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8	See Section 11.4.8

Note: Use straight line interpolation for intermediate values of S_1.
[a]Also, see requirements for site-specific ground motions in Section 11.4.8.

Story	Weight (Kips)	Height (ft)	Wh (Kip-ft)	C_{vx} (Wh/∑Wh)	F_{xE}, Kips (C_{vx} V)	∑F_{xE}, Kips 1.1RD	F_{xE}, Kips (C_{vx} V)	∑F_{xE}, Kips ASD	∑F_{xW}, Kips West ASD	∑F_{xW}, Kips South ASD
Roof	103.86	19.66	2,042	0.66	*25.8*	*25.8*	*18.077*	***18.077***	*7.630*	*5.366*
Main Floor	115.36	9.00	1,038	0.34	*13.1*	*39.0*	*9.192*	***27.3***	*17.731*	*13.204*
∑W	219.23									

UP-to-DOWN RUNNING WALLS

Main-to-Roof

	%	Length (ft)	# in Wall	SEISMIC PLF	Chord F (#)	# in Wall	WIND PLF	Chord F (#)	Wall W (#)	GRAVITY LOADING (plf) Snow	Dead	Live	Uplift	Comp	Anchorage	9.34 ft / 12.33333 ft		
A	9.2%	25.33	1,669			705												
388	100.0%	25.33	1,669	66	615	705	28	260	2,957	90	54	0	0	2,534	1,032	6 OK	HDU2	OK
B	24.0%	9.00	4,332			1,829												
1007	24.1%	2.17	1,043	481	5,936	440	203	1,898	334	325	195	0	5,805	6,390	20,997	33 OK	HDU8	OK
	48.6%	4.38	2,106	481	5,936	889	203	1,898	674	325	195	0	5,671	6,603	20,789	33 OK	HDU8	OK
	27.3%	2.46	1,183	481	5,936	499	203	1,898	379	325	195	0	5,787	6,418	20,970	33 OK	HDU8	OK
C	23.6%	15.00	4,263			1,799												
991	14.4%	2.17	616	284	3,505	260	120	1,120	334	325	195	0	3,374	3,959	12,315	2 OK	HDU4	OK
	85.6%	12.83	3,647	284	3,505	1,540	120	1,120	1,978	325	195	0	2,726	4,988	11,309	4 OK	HDU2	OK
D	24.1%	16.73	4,354			1,838												
1012	13.1%	2.19	569	260	2,431	240	110	1,026	255	365	219	0	2,303	2,864	8,483	4 OK	HDU2	OK
	33.1%	5.54	1,442	260	2,431	609	110	1,026	647	365	219	0	2,107	3,109	8,179	4 OK	HDU2	OK
	53.8%	9.00	2,342	260	3,210	989	110	1,026	1,388	294	176	0	2,692	4,299	10,660	4 OK	MSTC52	OK
E	17.8%	14.83	3,214			1,356												
747	53.7%	7.96	1,724	217	2,023	728	91	854	929	365	219	0	1,559	2,879	6,506	6 OK	HDU2	OK
	46.3%	6.88	1,489	217	2,672	629	91	854	1,060	294	176	0	2,277	3,556	8,929	6 OK	HDU2	OK
F	1.4%	10.00	245			104												
57	100.0%	10.00	245	25	229	104	10	97	1,168	25	15	0	0	979	462	6 OK	HDU2	OK

Lower-to-Main

	%	Length (ft)	# in Wall	SEISMIC PLF	Chord F (#)	# in Wall	WIND PLF	Chord F (#)	Wall W (#)	GRAVITY LOADING (plf) Snow	Dead	Live	Uplift	Comp	Anchorage	9 ft		
C	29.2%	52.50	6,944			6,972												
967	5.4%	2.83	375			376												
	14.6%	7.67	1,014	132	1,190	1,018	133	1,195	863	0	0	0	1,040	1,730	4,019	6 OK	HDU2	OK
	21.6%	11.33	1,499	132	1,190	1,505	133	1,195	1,275	0	0	0	969	1,989	3,907	6 OK	HDU2	OK
	58.4%	30.67	4,056			4,072												
D	28.4%	19.46	6,965			5,038												
942	74.7%	14.54	5,205			3,765												
	25.3%	4.92	1,760	358	3,222	1,273	259	2,330	553	0	0	0	5,818	7,867	11,357	4 OK	HDU8	OK
E	24.3%	21.17	5,696			4,316												
807		16.5	2,826	171	1,541	2,141	130	1,168	1,856	0	0	0	2,777	5,582	5,004		HDU2	OK
	21.3%	4.50	1,211	269		918	204									4		
	28.3%	6.00	1,615	269		1,224	204									4		
		19.67	2,871	146	1,313	2,175	111	995	2,213	0	0	0	3,205	6,255	4,093		HDU4	OK
	36.2%	7.67	2,063	269		1,563	204									4		
	14.2%	3.00	807	269		612	204									4		

LEFT-to-RIGHT RUNNING WALLS

Main-to-Roof

				SEISMIC			WIND	GRAVITY LOADING (plf)										
	%	Length (ft)	# in Wall	PLF	Chord F (#)	# in Wall	PLF	Chord F (#)	Wall W (#)	Snow	Dead	Live	Uplift	Comp	Anchorage	*9.34 ft*		
1	7.1%	20.17	1,278			379										*12.33333 ft*		
297		23.17	1,278	55	515	379	16	153	2,705	0	0	0	45	2,208	1,110		HDU2	OK
	77.1%	15.54	985	63		292	19									6 OK		
	22.9%	4.63	293	63		87	19									6 OK		
2	41.3%	26.08	7,470			2,217												
1736	8.6%	2.25	644	286	2,675	191	85	794	263	0	0	0	2,629	2,839	9,482	3 OK	HDU2	OK
	33.5%	8.75	2,506	286	2,675	744	85	794	1,022	0	0	0	2,497	3,314	9,277	4 OK	HDU2	OK
	16.8%	4.38	1,253	286	3,532	372	85	1,048	674	0	0	0	3,415	3,954	12,432	4 OK	HDU4	OK
	16.8%	4.38	1,253	286	3,532	372	85	1,048	674	0	0	0	3,415	3,954	12,432	4 OK	HDU4	OK
	11.5%	3.00	859	286	2,675	255	85	794	350	0	0	0	2,614	2,894	9,458	4 OK	HDU2	OK
	12.8%	3.33	955	286	2,675	283	85	794	389	0	0	0	2,607	2,918	9,448	4 OK	HDU2	OK
3	8.6%	9.17	1,558			462												
362	100.0%	9.17	1,558	170	1,587	462	50	471	1,070	0	0	0	1,401	2,257	5,379	6 OK	HDU2	OK
4	18.7%	4.92	3,373			1,001												
784	50.0%	2.46	1,687	686	8,462	501	204	2,512	379	0	0	0	8,396	8,700	30,120	33 OK	HDU11	OK
	50.0%	2.46	1,687	686	8,462		0	0	379	0	0	0	8,396	8,700	30,120	33 OK	HDU11	OK
5	17.8%	13.42	3,214			954												
747	50.0%	6.71	1,607	240	2,238	477	71	664	783	0	0	0	2,101	2,728	7,780	6 OK	HDU2	OK
	50.0%	6.71	1,607	240	2,238	477	71	664	783	0	0	0	2,101	2,728	7,780	6 OK	MSTC40	OK
6	5.4%	7.17	977			290												
227	50.0%	3.58	488	136	1,681	145	40	499	552	0	0	0	1,585	2,027	5,854	6 OK	MSTC40	OK
	50.0%	3.58	488	136	1,681	145	40	499	552	0	0	0	1,585	2,027	5,854	6 OK	MSTC40	OK
7	1.1%	4.67	207			61												
48	100.0%	4.67	207	44	413	61	13	123	545	0	0	0	319	754	1,329	6 OK	HDU2	OK

Lower-to-Main

				SEISMIC			WIND	GRAVITY LOADING (plf)										
	%	Length (ft)	# in Wall	PLF	Chord F (#)	# in Wall	PLF	Chord F (#)	Wall W (#)	Snow	Dead	Live	Uplift	Comp	Anchorage	*9 ft*		
161	5.0%		1,738			1,939												
1239	38.5%		11,009			12,554												
770	23.9%		7,131			8,091												
5	23.3%	9.88	5,359			3,081												
751	39.2%	3.88	2,103	543	4,885	1,209	312	2,808	436	0	0	0	6,910	7,885	17,327	2 OK	HDU8	OK
	60.8%	6.00	3,256	543	4,885	1,872	312	2,808	675	0	0	0	4,767	5,307	17,262	2 OK	HDU5	OK
6	9.2%	15.17	2,032			1,219	80											
297		23.17	2,032	88	789	1,219	53	473	2,606	0	0	0	1,921	4,448	2,115		HDU2	OK
	76.4%	11.58	1,552	134		931	80									6 OK		

Hazards by Location

Search Information

Address: 8151 SE 48th St, Mercer Island, WA 98040, USA

Coordinates: 47.5596565, -122.2280274

Elevation: 165 ft

Timestamp: 2021-02-22T19:26:30.692Z

Hazard Type: Seismic

Reference Document: ASCE7-16

Risk Category: II

Site Class: D-default

Basic Parameters

Name	Value	Description
S_S	1.443	MCE_R ground motion (period=0.2s)
S_1	0.501	MCE_R ground motion (period=1.0s)
S_{MS}	1.732	Site-modified spectral acceleration value
S_{M1} 0.902	~~null~~	Site-modified spectral acceleration value
S_{DS}	1.155	Numeric seismic design value at 0.2s SA
S_{D1} 0.601	~~null~~	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1.2	Site amplification factor at 0.2s
F_v 1.8	~~* null~~	Site amplification factor at 1.0s
CR_S	0.902	Coefficient of risk (0.2s)
CR_1	0.898	Coefficient of risk (1.0s)
PGA	0.618	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	0.742	Site modified peak ground acceleration
T_L	6	Long-period transition period (s)
T_S 0.521		
SsRT	1.443	Probabilistic risk-targeted ground motion (0.2s)
SsUH	1.6	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	3.988	Factored deterministic acceleration value (0.2s)
S1RT	0.501	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.558	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.562	Factored deterministic acceleration value (1.0s)
PGAd	1.343	Factored deterministic acceleration value (PGA)

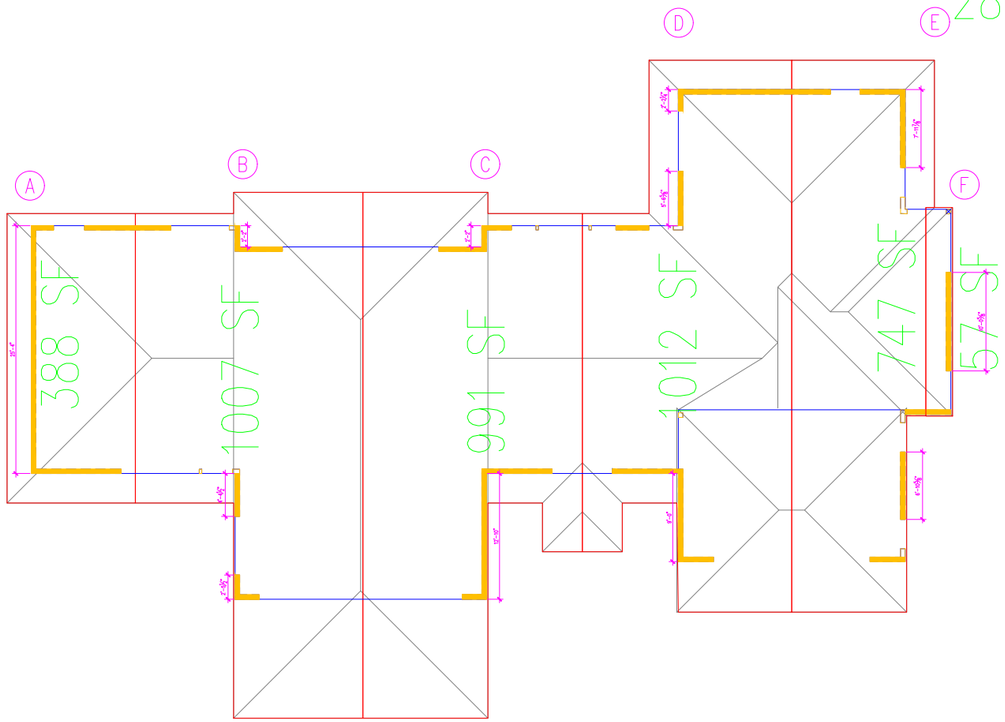
* See Section 11.4.8

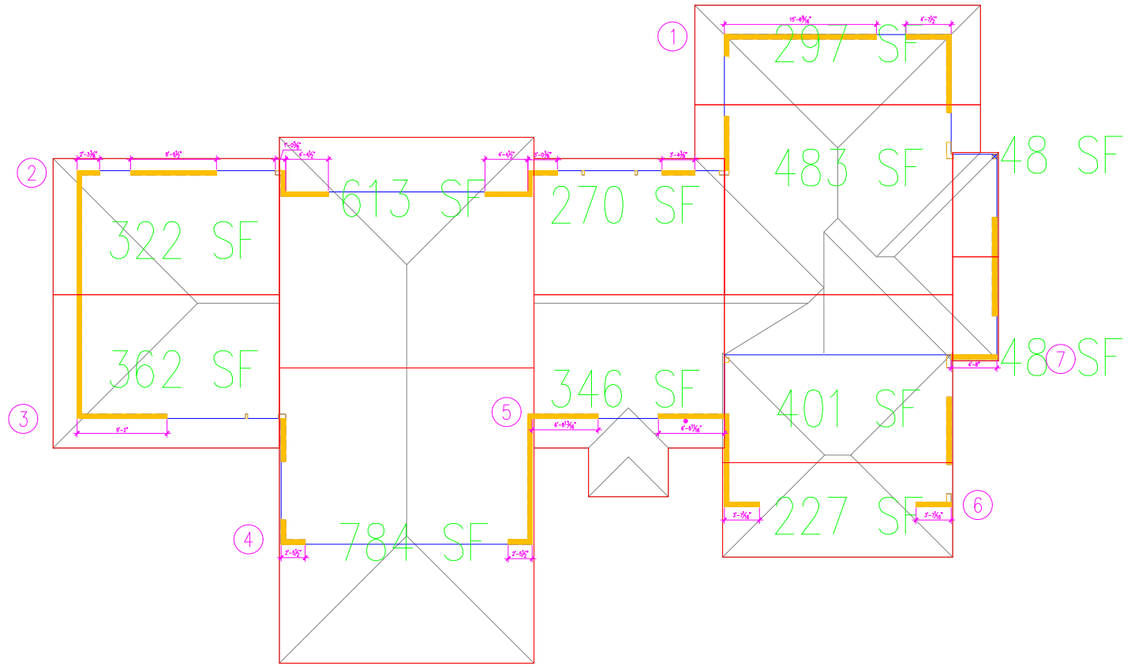
The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

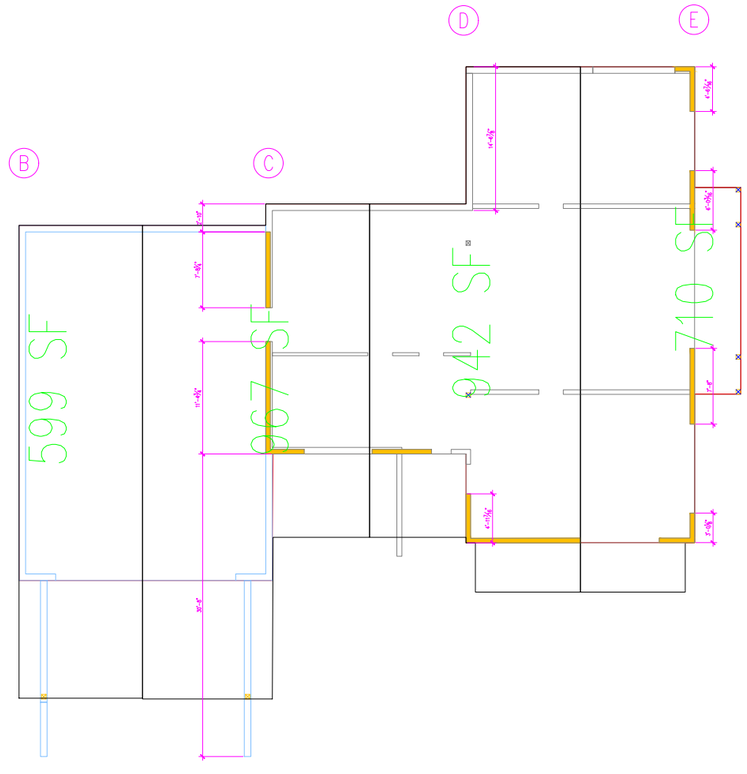
Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

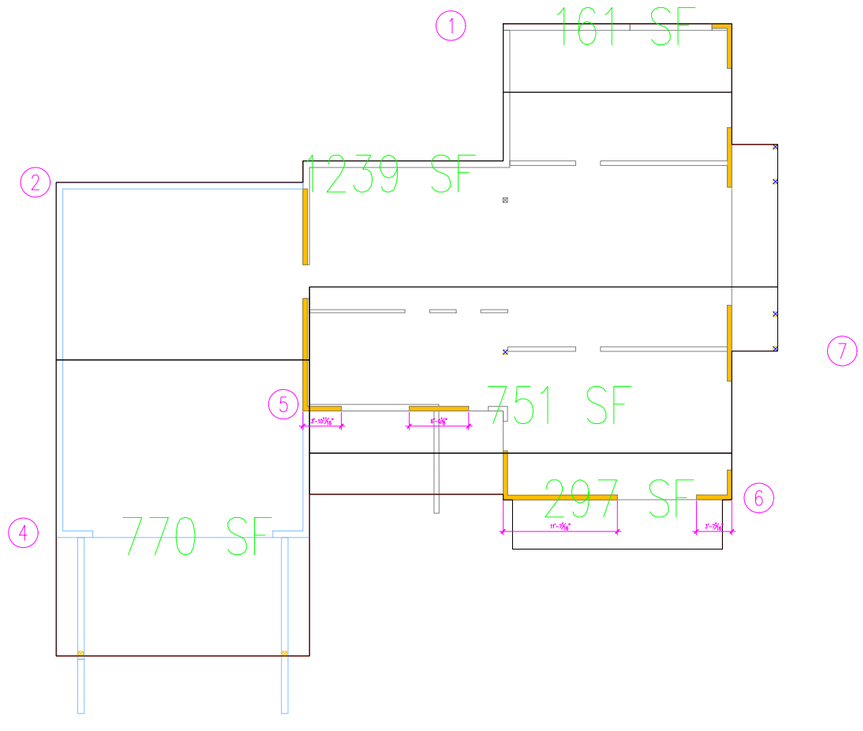
297.33 LF PERIMETER
2809 SF AREA MAIN FLOOR

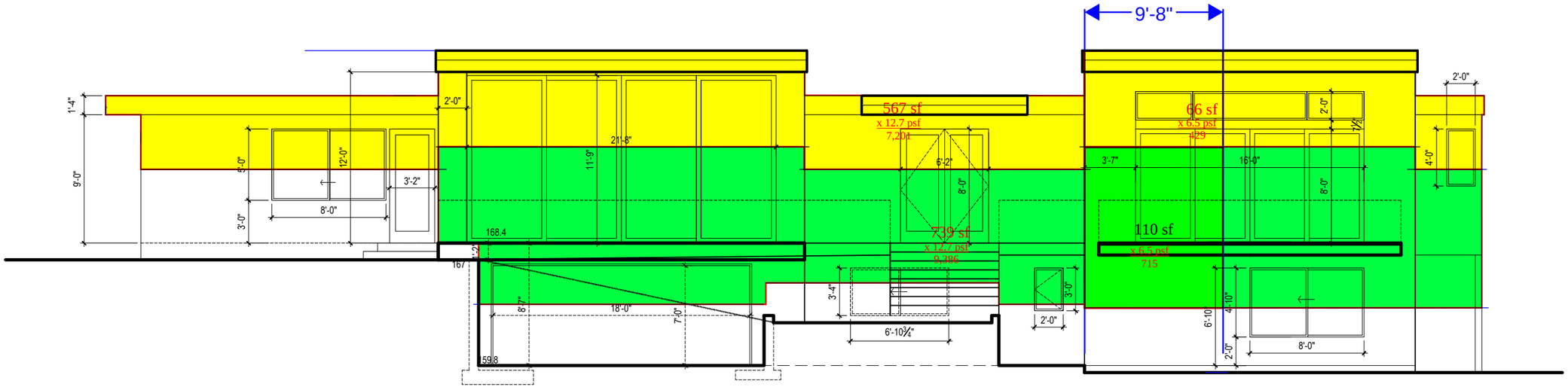




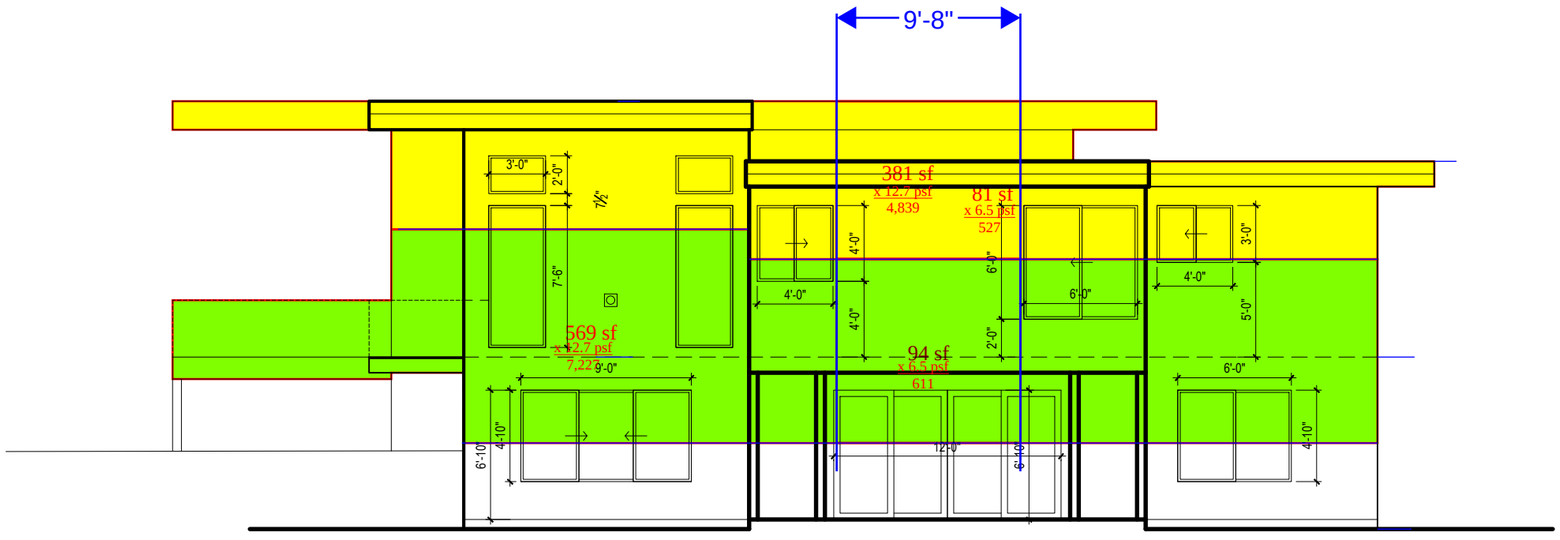
268.33 LF PERIMETER
2639 SF AREA LOW FLOOR







WEST ELEVATION



SOUTH ELEVATION

Atlas Consulting SE, Inc.
6810 NE 149th St
Kenmore, WA
206-427-7233

JOB TITLE Derkashani Residence

JOB NO. 167-2020 **SHEET NO.**
CALCULATED BY JDA **DATE** 2/23/21
CHECKED BY **DATE**

www.struware.com

Code Search

Code: ASCE 7 - 10

Occupancy:

Occupancy Group = R Residential

Risk Category & Importance Factors:

Risk Category =	II	
Wind factor =	1.00	use 0.60 NOTE: Output will be nominal wind pressures
Snow factor =	1.00	
Seismic factor =	1.00	

Type of Construction:

Fire Rating:

Roof =	0.0 hr
Floor =	0.0 hr

Building Geometry:

Roof angle (θ)	0.25 / 12	1.2 deg
Building length (L)	89.3 ft	
Least width (B)	48.3 ft	
Mean Roof Ht (h)	19.7 ft	
Parapet ht above grd	0.0 ft	
Minimum parapet ht	0.0 ft	

Live Loads:

Roof

0 to 200 sf:	20 psf	use 25.0 psf
200 to 600 sf:	25 psf	
over 600 sf:	25 psf	

Floor:

Typical Floor	40 psf
Partitions	N/A
Partitions	N/A
Partitions	N/A
Partitions	N/A

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JOB NO. 167-2020 **SHEET NO.**
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CHECKED BY **DATE**

Wind Loads : ASCE 7- 10

Ultimate Wind Speed	110 mph
Nominal Wind Speed	85.2 mph
Risk Category	II
Exposure Category	C
Enclosure Classif.	Enclosed Building
Internal pressure	+/-0.18
Directionality (Kd)	0.85
Kh case 1	0.899
Kh case 2	0.899
Type of roof	Monoslope

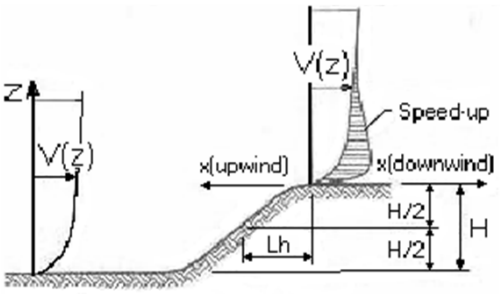
Topographic Factor (Kzt)

Topography		2D Escarpment
Hill Height	(H)	0.0 ft
Half Hill Length (Lh)		39.4 ft
Actual H/Lh	=	0.00
Use H/Lh	=	0.00
Modified Lh	=	39.4 ft
From top of crest: x =		0.0 ft
Bldg up/down wind?		upwind

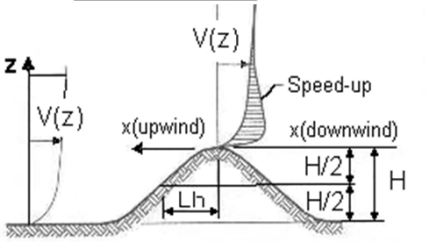
H< 15ft;exp C
∴ Kzt=1.0

H/Lh= 0.00 K_1 = 0.000
x/Lh = 0.00 K_2 = 1.000
z/Lh = 0.50 K_3 = 0.287

At Mean Roof Ht:
$Kzt = (1+K_1K_2K_3)^2$ = 1.00 use 1.30



ESCARPMENT



2D RIDGE or 3D AXISYMMETRICAL HILL

Gust Effect Factor

h = 19.7 ft
B = 48.3 ft
/z (0.6h) = 15.0 ft

Flexible structure if natural frequency < 1 Hz (T > 1 second).
However, if building h/B < 4 then probably rigid structure (rule of thumb).
h/B = 0.41 Rigid structure

G = 0.85 Using rigid structure default

Rigid Structure

$\bar{e}$ =	0.20	
ℓ =	500 ft	
z_{min} =	15 ft	
c =	0.20	
g_Q, g_v =	3.4	
L_z =	427.1 ft	
Q =	0.91	
I_z =	0.23	
G =	0.88	use G = 0.85

Flexible or Dynamically Sensitive Structure

Natural Frequency (η_1) =	0.0 Hz				
Damping ratio (β) =	0				
/b =	0.65				
/α =	0.15				
Vz =	92.9				
N_1 =	0.00				
R_n =	0.000				
R_h =	28.282	η =	0.000	h =	19.7 ft
R_B =	28.282	η =	0.000		
R_L =	28.282	η =	0.000		
g_R =	0.000				
R =	0.000				
G =	0.000				

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JOB TITLE Derkashani Residence

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CHECKED BY **DATE**

Enclosure Classification

Test for Enclosed Building: A building that does not qualify as open or partially enclosed.

Test for Open Building: All walls are at least 80% open.
Ao ≥ 0.8Ag

Test for Partially Enclosed Building:

	Input			Test	
Ao	0.0	sf	Ao ≥ 1.1Aoi	YES	
Ag	0.0	sf	Ao > 4' or 0.01Ag	NO	
Aoi	0.0	sf	Aoi / Agi ≤ 0.20	NO	Building is NOT
Agi	0.0	sf			Partially Enclosed

Conditions to qualify as Partially Enclosed Building. Must satisfy all of the following:
Ao ≥ 1.1Aoi
Ao > smaller of 4' or 0.01 Ag
Aoi / Agi ≤ 0.20
Where:
Ao = the total area of openings in a wall that receives positive external pressure.
Ag = the gross area of that wall in which Ao is identified.
Aoi = the sum of the areas of openings in the building envelope (walls and roof) not including Ao.
Agi = the sum of the gross surface areas of the building envelope (walls and roof) not including Ag.

Reduction Factor for large volume partially enclosed buildings (Ri) :

If the partially enclosed building contains a single room that is unpartitioned , the internal pressure coefficient may be multiplied by the reduction factor Ri.

Total area of all wall & roof openings (Aog): 0 sf
Unpartitioned internal volume (Vi) : 0 cf
Ri = 1.00

Altitude adjustment to constant 0.00256 (caution - see code) :

Altitude = 0 feet Average Air Density = 0.0765 lbm/ft^3
Constant = 0.00256

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Wind Loads - MWFRS h≤60' (Low-rise Buildings) Enclosed/partially enclosed only

Kz = Kh (case 1) = 0.90
Base pressure (qh) = **18.5 psf**
GCpi = +/-0.18

Edge Strip (a) = 4.8 ft
End Zone (2a) = 9.7 ft
Zone 2 length = 24.1 ft

Wind Pressure Coefficients

	CASE A				CASE B		
		θ = 1.2 deg					
Surface	GCpf	w/-GCpi	w/+GCpi		GCpf	w/-GCpi	w/+GCpi
1	0.40	0.58	0.22		-0.45	-0.27	-0.63
2	-0.69	-0.51	-0.87		-0.69	-0.51	-0.87
3	-0.37	-0.19	-0.55		-0.37	-0.19	-0.55
4	-0.29	-0.11	-0.47		-0.45	-0.27	-0.63
5					0.40	0.58	0.22
6					-0.29	-0.11	-0.47
1E	0.61	0.79	0.43		-0.48	-0.30	-0.66
2E	-1.07	-0.89	-1.25		-1.07	-0.89	-1.25
3E	-0.53	-0.35	-0.71		-0.53	-0.35	-0.71
4E	-0.43	-0.25	-0.61		-0.48	-0.30	-0.66
5E					0.61	0.79	0.43
6E					-0.43	-0.25	-0.61

Nominal Wind Surface Pressures (psf)

1		10.7	4.1		-5.0	-11.6
2		-9.4	-16.1		-9.4	-16.1
3		-3.5	-10.2		-3.5	-10.2
4		-2.0	-8.7		-5.0	-11.6
5					10.7	4.1
6					-2.0	-8.7
1E		14.6	7.9		-5.5	-12.2
2E		-16.4	-23.1		-16.4	-23.1
3E		-6.5	-13.1		-6.5	-13.1
4E		-4.6	-11.3		-5.5	-12.2
5E					14.6	7.9
6E					-4.6	-11.3

Parapet

Windward parapet = 0.0 psf (GCpn = +1.5)
Leeward parapet = 0.0 psf (GCpn = -1.0)

Windward roof overhangs = 12.9 psf (upward) add to windward roof pressure

Horizontal MWFRS Simple Diaphragm Pressures (psf)

Transverse direction (normal to L)

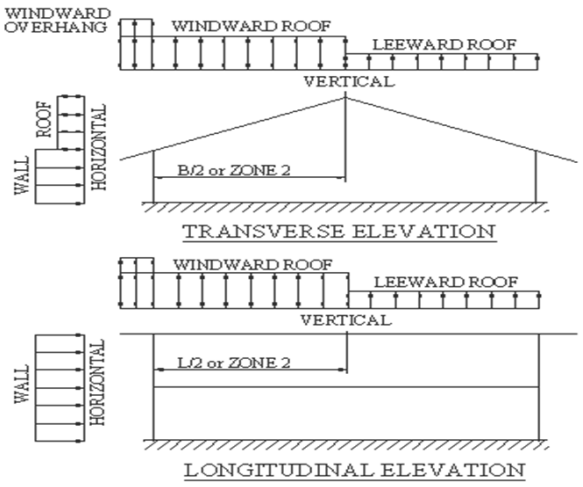
Interior Zone: Wall 12.7 psf
Roof -5.9 psf **
End Zone: Wall 19.2 psf
Roof -10.0 psf **

Longitudinal direction (parallel to L)

Interior Zone: Wall 12.7 psf
End Zone: Wall 19.2 psf

** NOTE: Total horiz force shall not be less than that determined by neglecting roof forces (except for MWFRS moment frames).

The code requires the MWFRS be designed for a min ultimate force of 16 psf multiplied by the wall area plus an 8 psf force applied to the vertical projection of the roof.



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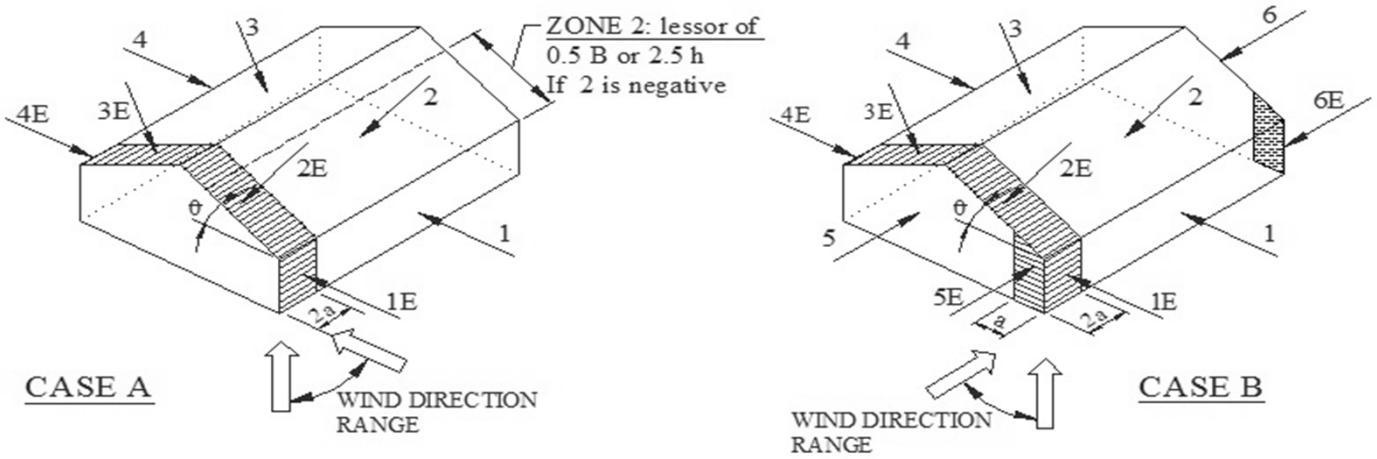
Location of MWFRS Wind Pressure Zones



NOTE: Torsional loads are 25% of zones 1 - 6. See code for loading diagram.

ASCE 7 -99 and ASCE 7-10 (& later)

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Nominal Wind Pressures

Wind Loads - Components & Cladding : h <= 60'

Kh (case 1) =	0.90	h =	19.7 ft
Base pressure (qh) =	**18.5 psf**	a =	4.8 ft
Minimum parapet ht =	0.0 ft	GCpi =	+/-0.18
Roof Angle (θ) =	1.2 deg		
Type of roof =	Monoslope		

Roof

	GCp +/- GCpi			Surface Pressure (psf)			**User input**	
Area	10 sf	50 sf	100 sf	10 sf	50 sf	100 sf	10 sf	147 sf
Negative Zone 1	-1.18	-1.11	-1.08	-21.8	-20.5	-19.9	-21.8	-19.9
Negative Zone 2	-1.98	-1.49	-1.28	-36.5	-27.5	-23.6	-36.5	-23.6
Negative Zone 3	-2.98	-1.79	-1.28	-55.0	-33.1	-23.6	-55.0	-23.6
Positive All Zones	0.48	0.41	0.38	10.0	10.0	10.0	10.0	10.0
Overhang Zone 1&2	-1.70	-1.63	-1.60	-31.4	-30.1	-29.5	-31.4	-27.3
Overhang Zone 3	-2.80	-1.40	-0.80	-51.7	-25.9	-14.8	-51.7	-14.8

Overhang pressures in the table above assume an internal pressure coefficient (Gcpi) of 0.0
Overhang soffit pressure equals adjacent wall pressure reduced by internal pressure of 3.3 psf

Parapet

qp = 0.0 psf

CASE A = pressure towards building (pos)
CASE B = pressure away from bldg (neg)

	Surface Pressure (psf)			**User input**
Solid Parapet Pressure	10 sf	100 sf	500 sf	40 sf
CASE A : Interior zone:	0.0	0.0	0.0	0.0
Corner zone:	0.0	0.0	0.0	0.0
CASE B : Interior zone:	0.0	0.0	0.0	0.0
Corner zone:	0.0	0.0	0.0	0.0

Walls

	GCp +/- GCpi			Surface Pressure (psf)			**User input**	
Area	10 sf	100 sf	500 sf	10 sf	100 sf	500 sf	50 sf	91 sf
Negative Zone 4	-1.17	-1.01	-0.90	-21.6	-18.7	-16.6	-19.5	-18.8
Negative Zone 5	-1.44	-1.12	-0.90	-26.6	-20.7	-16.6	-22.5	-21.0
Positive Zone 4 & 5	1.08	0.92	0.81	19.9	17.0	14.9	17.9	17.1

Note: GCp reduced by 10% due to roof angle <= 10 deg.

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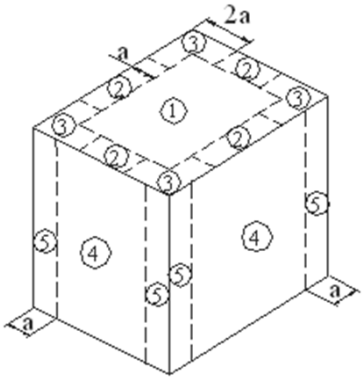
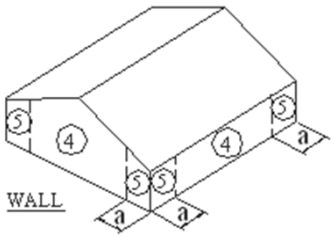
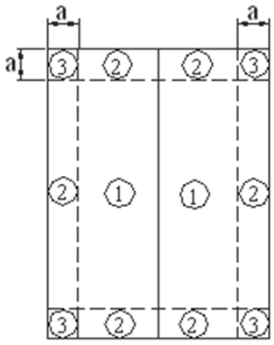
Location of C&C Wind Pressure Zones



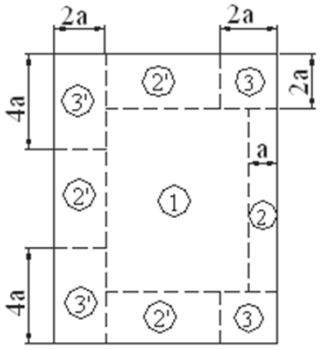
Roofs w/ θ ≤ 10°
and all walls
h > 60'



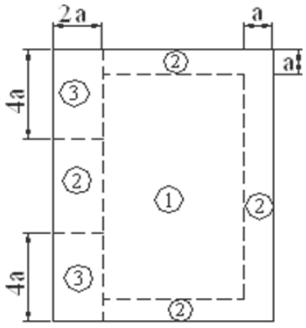
Walls h ≤ 60'
& alt design h<90'



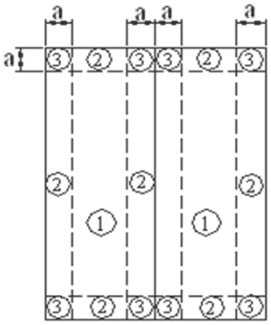
Gable, Sawtooth and
Multispan Gable θ ≤ 7 degrees &
Monoslope ≤ 3 degrees
h ≤ 60' & alt design h<90'



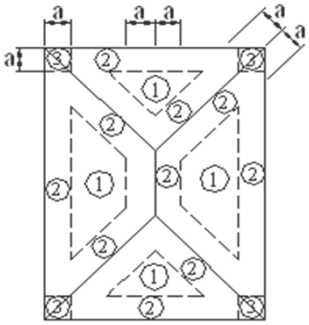
Monoslope roofs
3° < θ ≤ 10°
h ≤ 60' & alt design h<90'



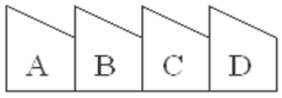
Monoslope roofs
10° < θ ≤ 30°
h ≤ 60' & alt design h<90'

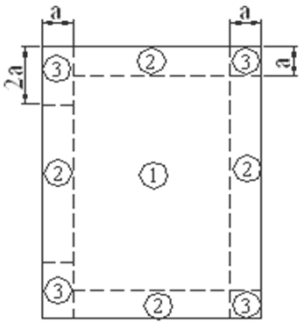


Multispan Gable &
Gable 7° < θ ≤ 45°

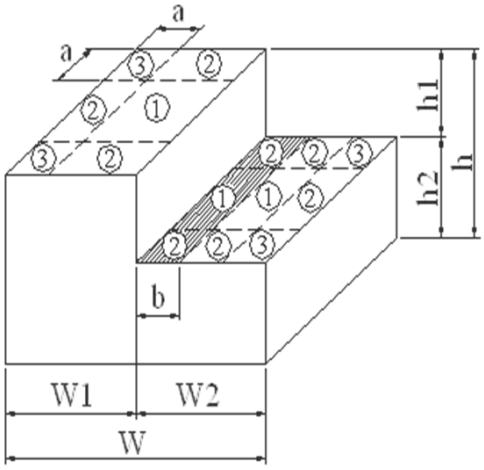


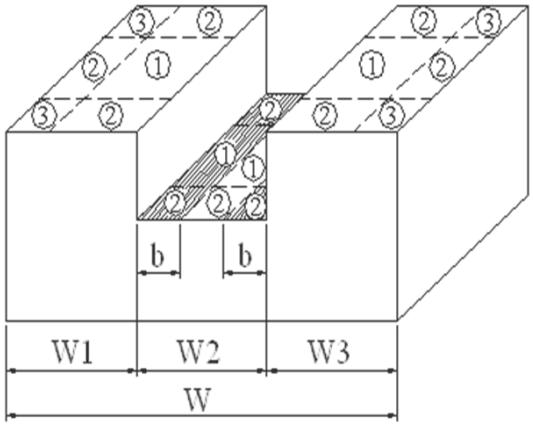
Hip 7° < θ ≤ 27°





Sawtooth 10° < θ ≤ 45°
h ≤ 60' & alt design h<90'





Stepped roofs θ ≤ 3°
h ≤ 60' & alt design h<90'

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Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU1.5	Date:	3/3/2021
Fastening point:			

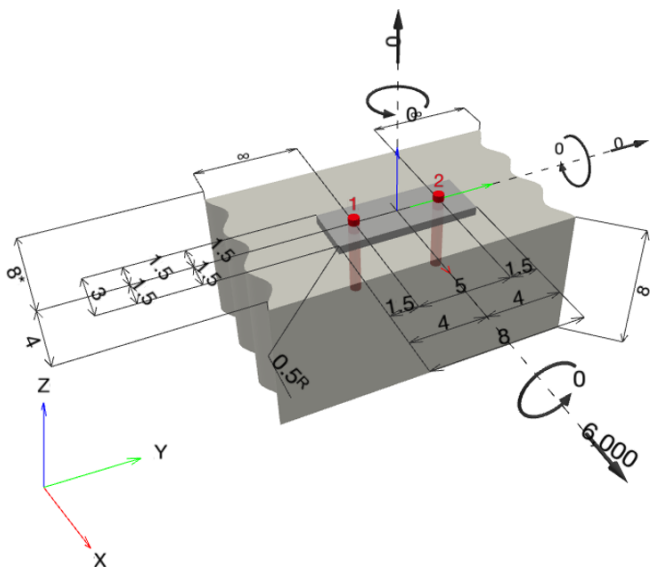
Specifier's comments:

1 Input data

Anchor type and diameter:	**KWIK HUS-EZ (KH-EZ) 5/8 (5)**
Item number:	418080 KH-EZ 5/8"x5 1/2"
Effective embedment depth:	$h_{ef,act}$ = 3.880 in., h_{nom} = 5.000 in.
Material:	Carbon Steel
Evaluation Service Report:	ESR-3027
Issued I Valid:	7/1/2020 | 12/1/2021
Proof:	Design Method ACI 318-14 / Mech
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate[R]:	l_x x l_y x t = 3.000 in. x 8.000 in. x 0.500 in.; (Recommended plate thickness: not calculated)
Profile:	no profile
Base material:	uncracked concrete, 4000, f_c' = 4,000 psi; h = 8.000 in.
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: condition A, shear: condition A; no supplemental splitting reinforcement present edge reinforcement: > No. 4 bar with stirrups
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (d)) Shear load: yes (17.2.3.5.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]



Company:		Page:	2
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU1.5	Date:	3/3/2021
Fastening point:			

1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 0; V_x = 6,000; V_y = 0; M_x = 0; M_y = 0; M_z = 0;	yes	100

Company:		Page:	3
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU1.5	Date:	3/3/2021
Fastening point:			

2 Proof I Utilization (Governing Cases)

		Design values [lb]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	-	-	-	- / -	N/A
Shear	Concrete edge failure in direction x+	6,000	6,001	- / 100	OK

Loading	**β_N**	**β_V**	**ζ**	**Utilization $\beta_{N,V}$ [%]**	**Status**
Combined tension and shear loads	-	-	-	-	N/A

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

Company:		Page:	4
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU1.5	Date:	3/3/2021
Fastening point:			

4 Remarks; Your Cooperation Duties

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Company:		Page:	1
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU2.5	Date:	3/3/2021
Fastening point:			

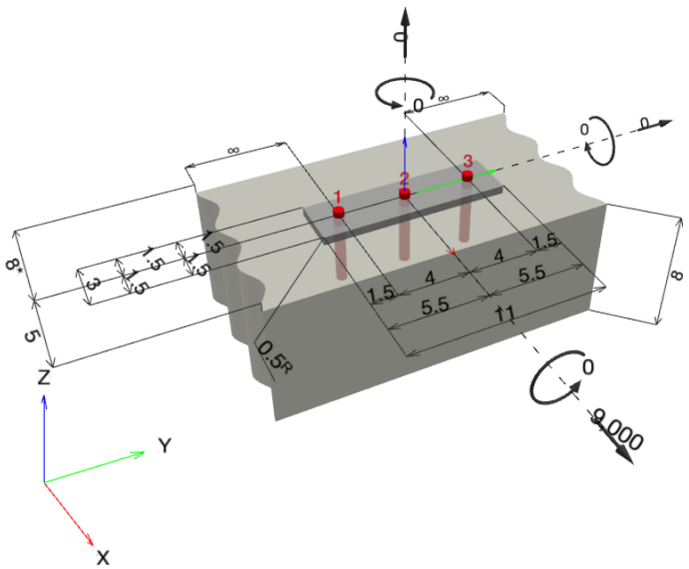
Specifier's comments:

1 Input data

Anchor type and diameter:	**KWIK HUS-EZ (KH-EZ) 5/8 (5)**
Item number:	418080 KH-EZ 5/8"x5 1/2"
Effective embedment depth:	$h_{ef,act}$ = 3.880 in., h_{nom} = 5.000 in.
Material:	Carbon Steel
Evaluation Service Report:	ESR-3027
Issued I Valid:	7/1/2020 | 12/1/2021
Proof:	Design Method ACI 318-14 / Mech
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate[R]:	l_x x l_y x t = 3.000 in. x 11.000 in. x 0.500 in.; (Recommended plate thickness: not calculated)
Profile:	no profile
Base material:	uncracked concrete, 4000, f_c' = 4,000 psi; h = 8.000 in.
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: condition A, shear: condition A; no supplemental splitting reinforcement present edge reinforcement: > No. 4 bar with stirrups
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (d)) Shear load: yes (17.2.3.5.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]



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Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU2.5	Date:	3/3/2021
Fastening point:			

1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 0; V_x = 9,000; V_y = 0; M_x = 0; M_y = 0; M_z = 0;	yes	100

Company:		Page:	3
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU2.5	Date:	3/3/2021
Fastening point:			

2 Proof I Utilization (Governing Cases)

		Design values [lb]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	-	-	-	- / -	N/A
Shear	Concrete edge failure in direction x+	9,000	9,077	- / 100	OK

Loading	**β_N**	**β_V**	**ζ**	**Utilization $\beta_{N,V}$ [%]**	**Status**
Combined tension and shear loads	-	-	-	-	N/A

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

Company:		Page:	4
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU2.5	Date:	3/3/2021
Fastening point:			

4 Remarks; Your Cooperation Duties

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Company:		Page:	1
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU3	Date:	3/3/2021
Fastening point:			

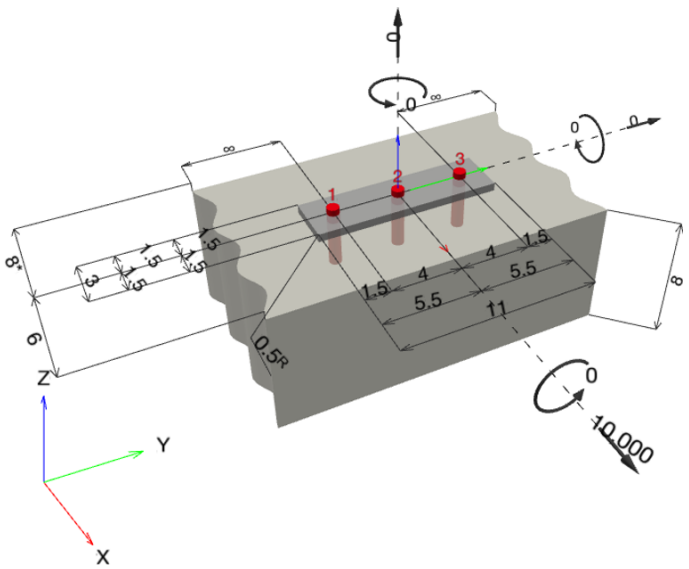
Specifier's comments:

1 Input data

Anchor type and diameter:	**KWIK HUS-EZ (KH-EZ) 3/4 (4)**
Item number:	418083 KH-EZ 3/4"x4 1/2"
Effective embedment depth:	$h_{ef,act}$ = 2.920 in., h_{nom} = 4.000 in.
Material:	Carbon Steel
Evaluation Service Report:	ESR-3027
Issued I Valid:	7/1/2020 | 12/1/2021
Proof:	Design Method ACI 318-14 / Mech
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate[R]:	l_x x l_y x t = 3.000 in. x 11.000 in. x 0.500 in.; (Recommended plate thickness: not calculated)
Profile:	no profile
Base material:	uncracked concrete, 4000, f_c' = 4,000 psi; h = 8.000 in.
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: condition A, shear: condition A; no supplemental splitting reinforcement present edge reinforcement: > No. 4 bar with stirrups
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (d)) Shear load: yes (17.2.3.5.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]



Company:		Page:	2
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU3	Date:	3/3/2021
Fastening point:			

1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 0; V_x = 10,000; V_y = 0; M_x = 0; M_y = 0; M_z = 0;	yes	95

Company:		Page:	3
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU3	Date:	3/3/2021
Fastening point:			

2 Proof I Utilization (Governing Cases)

		Design values [lb]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	-	-	-	- / -	N/A
Shear	Concrete edge failure in direction x+	10,000	10,575	- / 95	OK

Loading	**β_N**	**β_V**	**ζ**	**Utilization $\beta_{N,V}$ [%]**	**Status**
Combined tension and shear loads	-	-	-	-	N/A

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

Company:		Page:	4
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU3	Date:	3/3/2021
Fastening point:			

4 Remarks; Your Cooperation Duties

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Company:		Page:	1
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU3.5	Date:	3/3/2021
Fastening point:			

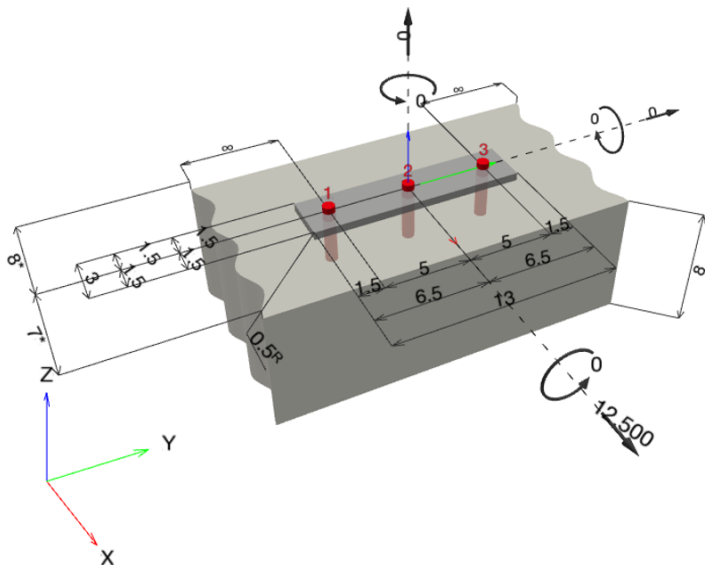
Specifier's comments:

1 Input data

Anchor type and diameter:	**KWIK HUS-EZ (KH-EZ) 3/4 (4)**
Item number:	418083 KH-EZ 3/4"x4 1/2"
Effective embedment depth:	$h_{ef,act}$ = 2.920 in., h_{nom} = 4.000 in.
Material:	Carbon Steel
Evaluation Service Report:	ESR-3027
Issued I Valid:	7/1/2020 | 12/1/2021
Proof:	Design Method ACI 318-14 / Mech
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate[R]:	l_x x l_y x t = 3.000 in. x 13.000 in. x 0.500 in.; (Recommended plate thickness: not calculated)
Profile:	no profile
Base material:	uncracked concrete, 4000, f_c' = 4,000 psi; h = 8.000 in.
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: condition A, shear: condition A; no supplemental splitting reinforcement present edge reinforcement: > No. 4 bar with stirrups
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (d)) Shear load: yes (17.2.3.5.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]



Company:		Page:	2
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU3.5	Date:	3/3/2021
Fastening point:			

1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 0; V_x = 12,500; V_y = 0; M_x = 0; M_y = 0; M_z = 0;	yes	100

Company:		Page:	3
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU3.5	Date:	3/3/2021
Fastening point:			

2 Proof I Utilization (Governing Cases)

		Design values [lb]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	-	-	-	- / -	N/A
Shear	Concrete edge failure in direction x+	12,500	12,608	- / 100	OK

Loading	**β_N**	**β_V**	**ζ**	**Utilization $\beta_{N,V}$ [%]**	**Status**
Combined tension and shear loads	-	-	-	-	N/A

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

4 Remarks; Your Cooperation Duties

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Company:		Page:	1
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU5	Date:	3/3/2021
Fastening point:			

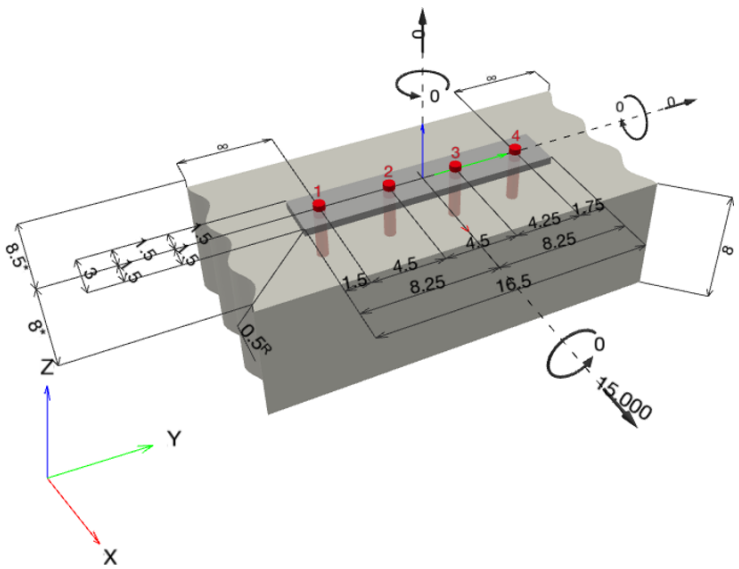
Specifier's comments:

1 Input data

Anchor type and diameter:	**KWIK HUS-EZ (KH-EZ) 3/4 (4)**
Item number:	418083 KH-EZ 3/4"x4 1/2"
Effective embedment depth:	$h_{ef,act}$ = 2.920 in., h_{nom} = 4.000 in.
Material:	Carbon Steel
Evaluation Service Report:	ESR-3027
Issued I Valid:	7/1/2020 | 12/1/2021
Proof:	Design Method ACI 318-14 / Mech
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate[R]:	l_x x l_y x t = 3.000 in. x 16.500 in. x 0.500 in.; (Recommended plate thickness: not calculated)
Profile:	no profile
Base material:	uncracked concrete, 4000, f_c' = 4,000 psi; h = 8.000 in.
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: condition A, shear: condition A; no supplemental splitting reinforcement present edge reinforcement: > No. 4 bar with stirrups
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (d)) Shear load: yes (17.2.3.5.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]



Company:		Page:	2
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU5	Date:	3/3/2021
Fastening point:			

1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 0; V_x = 15,000; V_y = 0; M_x = 0; M_y = 0; M_z = 0;	yes	100

Company:		Page:	3
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU5	Date:	3/3/2021
Fastening point:			

2 Proof I Utilization (Governing Cases)

		Design values [lb]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	-	-	-	- / -	N/A
Shear	Concrete edge failure in direction x+	15,000	15,072	- / 100	OK

Loading	**β_N**	**β_V**	**ζ**	**Utilization $\beta_{N,V}$ [%]**	**Status**
Combined tension and shear loads	-	-	-	-	N/A

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

Company:		Page:	4
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU5	Date:	3/3/2021
Fastening point:			

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Company:		Page:	1
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU6	Date:	3/3/2021
Fastening point:			

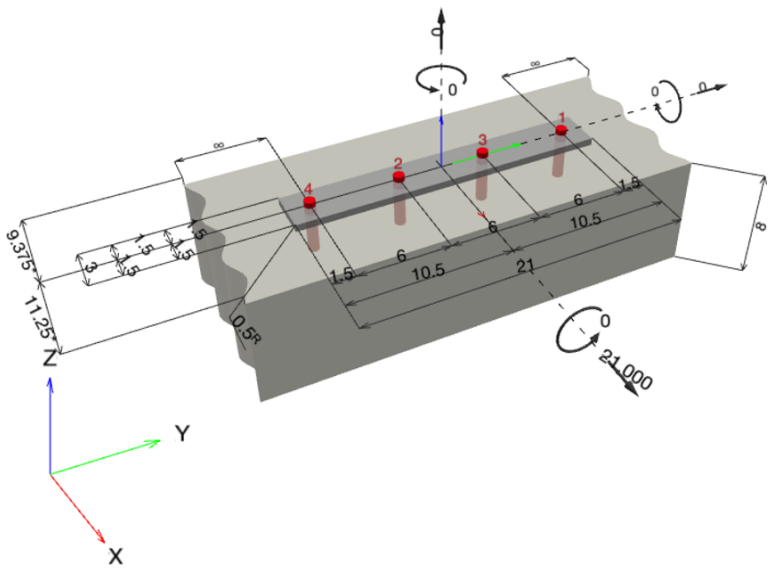
Specifier's comments:

1 Input data

Anchor type and diameter:	**KWIK HUS-EZ (KH-EZ) 3/4 (4)**
Item number:	418083 KH-EZ 3/4"x4 1/2"
Effective embedment depth:	$h_{ef,act}$ = 2.920 in., h_{nom} = 4.000 in.
Material:	Carbon Steel
Evaluation Service Report:	ESR-3027
Issued I Valid:	7/1/2020 | 12/1/2021
Proof:	Design Method ACI 318-14 / Mech
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate[R]:	l_x x l_y x t = 3.000 in. x 21.000 in. x 0.500 in.; (Recommended plate thickness: not calculated)
Profile:	no profile
Base material:	uncracked concrete, 4000, f_c' = 4,000 psi; h = 8.000 in.
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: condition A, shear: condition A; no supplemental splitting reinforcement present edge reinforcement: > No. 4 bar with stirrups
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (d)) Shear load: yes (17.2.3.5.3 (c))

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]



Company:		Page:	2
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU6	Date:	3/3/2021
Fastening point:			

1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 0; V_x = 21,000; V_y = 0; M_x = 0; M_y = 0; M_z = 0;	yes	100

Company:		Page:	3
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU6	Date:	3/3/2021
Fastening point:			

2 Proof I Utilization (Governing Cases)

		Design values [lb]		Utilization	
Loading	**Proof**	**Load**	**Capacity**	**β_N / β_V [%]**	**Status**
Tension	-	-	-	- / -	N/A
Shear	Concrete edge failure in direction x+	21,000	21,048	- / 100	OK

Loading	**β_N**	**β_V**	**ζ**	**Utilization $\beta_{N,V}$ [%]**	**Status**
Combined tension and shear loads	-	-	-	-	N/A

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

Company:		Page:	4
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	CU6	Date:	3/3/2021
Fastening point:			

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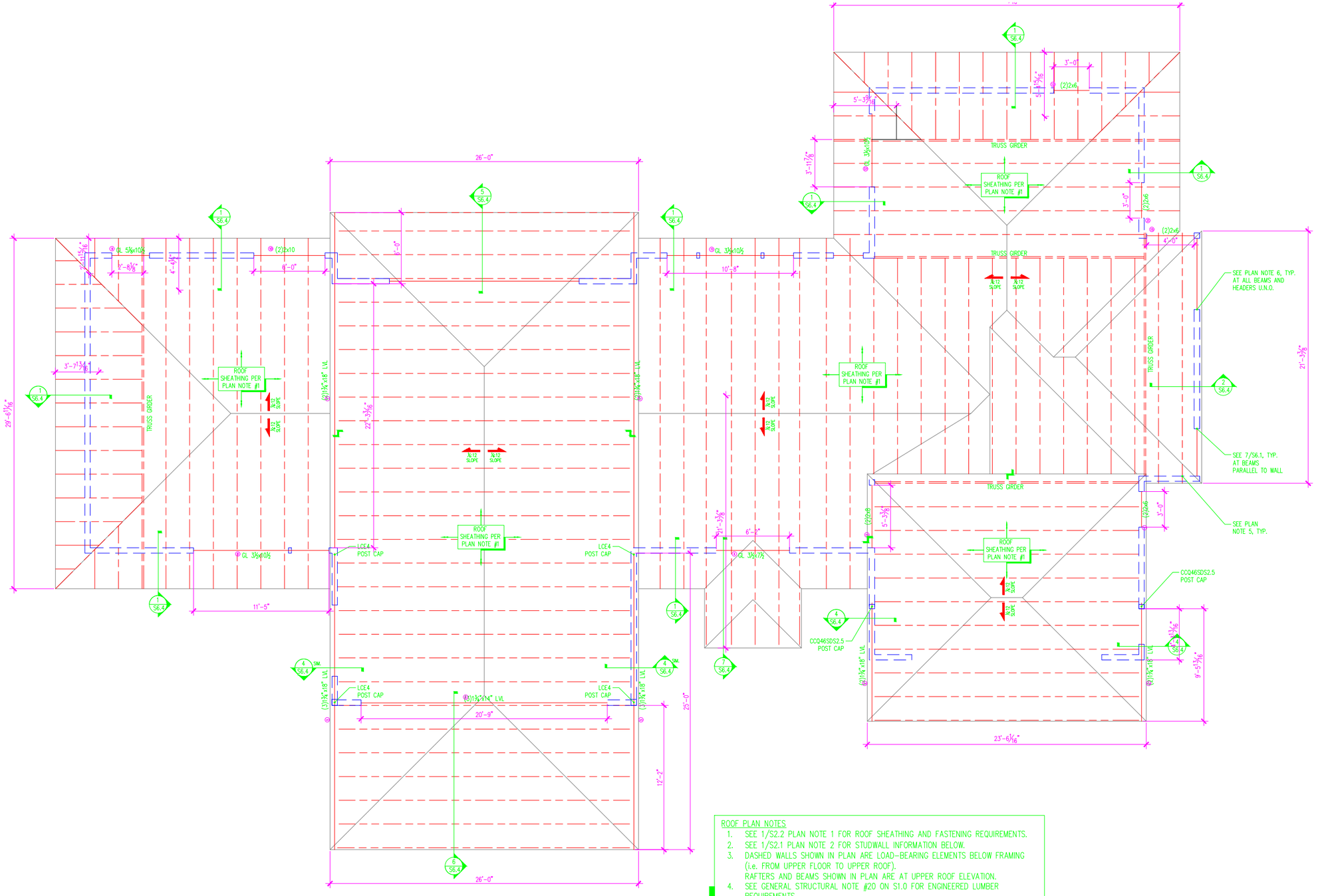


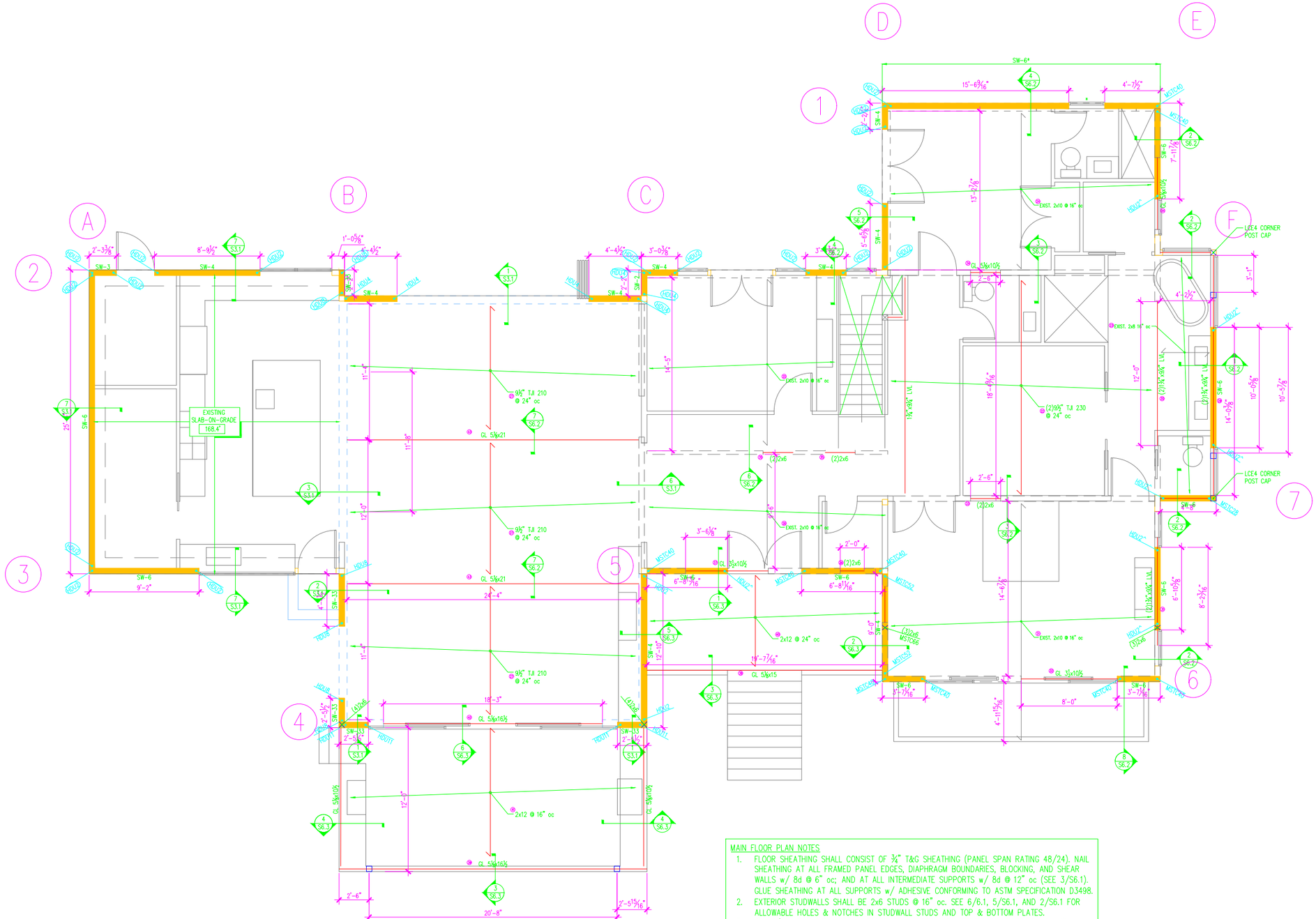
ROOF PLAN NOTES

1. SEE 1/S2.2 PLAN NOTE 1 FOR ROOF SHEATHING AND FASTENING REQUIREMENTS.
2. SEE 1/S2.1 PLAN NOTE 2 FOR STUDWALL INFORMATION BELOW.
3. DASHED WALLS SHOWN IN PLAN ARE LOAD-BEARING ELEMENTS BELOW FRAMING (i.e. FROM UPPER FLOOR TO UPPER ROOF). RAFTERS AND BEAMS SHOWN IN PLAN ARE AT UPPER ROOF ELEVATION.
4. SEE GENERAL STRUCTURAL NOTE #20 ON S1.0 FOR ENGINEERED LUMBER REQUIREMENTS.
5. PROVIDE H2.5A HURRICANE TIES AT END OF ALL RAFTERS AND TRUSSES. NOTE THAT H2.5A HURRICANE TIES MUST BE OBSERVABLE BY CITY INSPECTOR PRIOR TO INSPECTION APPROVAL.
6. ALL HEADERS SHALL HAVE A MINIMUM OF (2)2x POSTS AND (1)FULL HEIGHT TRIMMER STUD, U.N.O. IN PLAN (STUD DEPTH SHALL MATCH DEPTH OF THE WALL)

1 S2.3 ROOF FRAMING PLAN

1/4" = 1'-0"

NORTH



MAIN FLOOR PLAN NOTES

1. FLOOR SHEATHING SHALL CONSIST OF ¾" T&G SHEATHING (PANEL SPAN RATING 48/24). NAIL SHEATHING AT ALL FRAMED PANEL EDGES, DIAPHRAGM BOUNDARIES, BLOCKING, AND SHEAR WALLS w/ 8d @ 6" oc; AND AT ALL INTERMEDIATE SUPPORTS w/ 8d @ 12" oc (SEE 3/S6.1). GLUE SHEATHING AT ALL SUPPORTS w/ ADHESIVE CONFORMING TO ASTM SPECIFICATION D3498.
2. EXTERIOR STUDWALLS SHALL BE 2x6 STUDS @ 16" oc. SEE 6/6.1, 5/S6.1, AND 2/S6.1 FOR ALLOWABLE HOLES & NOTCHES IN STUDWALL STUDS AND TOP & BOTTOM PLATES.
3. SEE 8/S6.1 FOR CONNECTION DETAILS OF INTERIOR NON-STRUCTURAL PARTITION WALLS.
4. SOLID WALLS AND SHEARWALLS SHOWN IN PLAN ARE ABOVE FRAMING (i.e. FROM MAIN FLOOR LEVEL TO UPPER FLOOR/ROOF LEVEL).
   DASHED WALLS SHOWN IN PLAN ARE LOAD-BEARING ELEMENTS BELOW FRAMING (i.e. FROM FOUNDATION/LOWER FLOOR TO MAIN FLOOR).
   JOISTS AND BEAMS SHOWN IN PLAN ARE AT MAIN FLOOR ELEVATION.
5. SEE GENERAL STRUCTURAL NOTE #20 ON S1.0 FOR ENGINEERED LUMBER REQUIREMENTS.
6. ALL HEADERS/BEAMS SHALL HAVE A MINIMUM OF (2)2x POSTS AND (1)FULL HEIGHT TRIMMER STUD, U.N.O. IN PLAN (STUD DEPTH SHALL MATCH DEPTH OF THE WALL)

1 / S2.2 MAIN FLOOR FRAMING PLAN

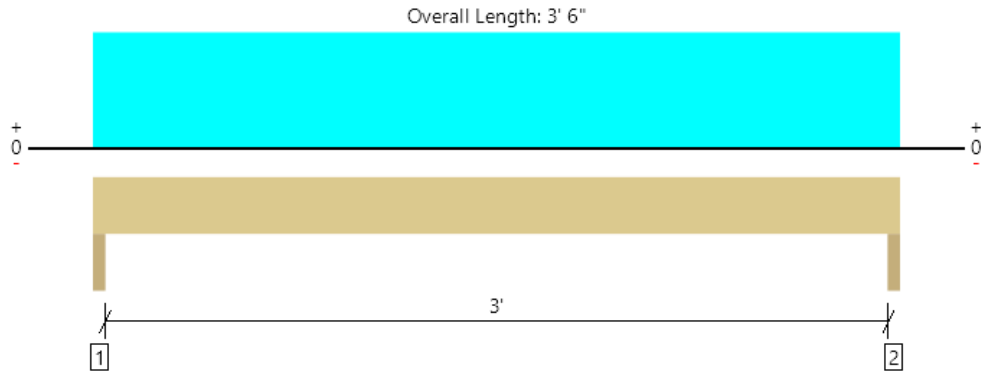
1/4" = 1'-0"

NORTH

Roof			
Member Name	Results	Current Solution	Comments
1	Passed	2 piece(s) 2 x 6 Douglas Fir-Larch No. 1	
2	Failed	2 piece(s) 1 3/4" x 18" 2.0E Microllam® LVL	Multiple Failures/Errors
3	Passed	2 piece(s) 2 x 8 Douglas Fir-Larch No. 1	
4	Passed	1 piece(s) 3 1/2" x 7 1/2" 24F-V4 DF Glulam	
5	Failed	3 piece(s) 1 3/4" x 18" 2.0E Microllam® LVL	Right cantilever exceeds the maximum braced cantilever length of 7'.
6	Passed	3 piece(s) 1 3/4" x 14" 2.0E Microllam® LVL	
7	Passed	2 piece(s) 1 3/4" x 18" 2.0E Microllam® LVL	
8	Passed	1 piece(s) 3 1/2" x 10 1/2" 24F-V4 DF Glulam	
9	Passed	2 piece(s) 2 x 8 Douglas Fir-Larch No. 1	
10	Passed	2 piece(s) 2 x 10 Douglas Fir-Larch No. 1	
11	Passed	1 piece(s) 3 1/2" x 10 1/2" 24F-V4 DF Glulam	
12	Passed	1 piece(s) 3 1/2" x 9" 24F-V4 DF Glulam	
13	Passed	2 piece(s) 2 x 4 Douglas Fir-Larch No. 1	
14	Passed	2 piece(s) 2 x 4 Douglas Fir-Larch No. 1	
15	Passed	2 piece(s) 2 x 6 Douglas Fir-Larch No. 1	
Main Floor			
Member Name	Results	Current Solution	Comments
21	Passed	1 piece(s) 2 x 10 Douglas Fir-Larch No. 1 @ 16" OC	
22	Passed	2 piece(s) 9 1/2" TJI® 230 @ 24" OC	
23	Passed	1 piece(s) 2 x 10 Douglas Fir-Larch No. 1 @ 16" OC	
24	Passed	1 piece(s) 2 x 10 Douglas Fir-Larch No. 1 @ 16" OC	
25	Passed	1 piece(s) 2 x 10 Douglas Fir-Larch No. 1 @ 16" OC	
26	Passed	1 piece(s) 2 x 10 Douglas Fir-Larch No. 1 @ 16" OC	
27	Passed	1 piece(s) 9 1/2" TJI® 210 @ 24" OC	
29	Passed	2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL	
30	Passed	2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL	
31	Failed	2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL	Multiple Failures/Errors
32	Passed	1 piece(s) 3 1/2" x 10 1/2" 24F-V4 DF Glulam	
33	Passed	2 piece(s) 2 x 6 Douglas Fir-Larch No. 1	
34	Passed	2 piece(s) 2 x 6 Douglas Fir-Larch No. 1	
35	Passed	2 piece(s) 2 x 6 Douglas Fir-Larch No. 1	
36	Passed	2 piece(s) 2 x 4 Douglas Fir-Larch No. 1	
37	Passed	1 piece(s) 3 1/2" x 10 1/2" 24F-V4 DF Glulam	
38	Passed	1 piece(s) 5 1/8" x 15" 24F-V4 DF Glulam	
39	Passed	1 piece(s) 5 1/8" x 16 1/2" 24F-V4 DF Glulam	
40	Passed	1 piece(s) 2 x 12 Douglas Fir-Larch No. 1 @ 24" OC	
41	Passed	1 piece(s) 2 x 12 Douglas Fir-Larch No. 1 @ 24" OC	
43	Passed	1 piece(s) 5 1/8" x 16 1/2" 24F-V4 DF Glulam	
44	Passed	1 piece(s) 5 1/8" x 21" 24F-V4 DF Glulam	

Roof, 1

2 piece(s) 2 x 6 Douglas Fir-Larch No. 1



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)	933 @ 1 1/2"	5625 (3.00")	Passed (17%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	555 @ 8 1/2"	2277	Passed (24%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	704 @ 1' 9"	1884	Passed (37%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.010 @ 1' 9"	0.108	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.019 @ 1' 9"	0.162	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) 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	Snow	Total	
1 - Trimmer - DF	3.00"	3.00"	1.50"	419	514	933	None
2 - Trimmer - DF	3.00"	3.00"	1.50"	419	514	933	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 6" o/c	
Bottom Edge (Lu)	3' 6" 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' 6"	N/A	4.2	--	
1 - Uniform (PSF)	0 to 3' 6"	11' 9"	20.0	25.0	Default 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
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

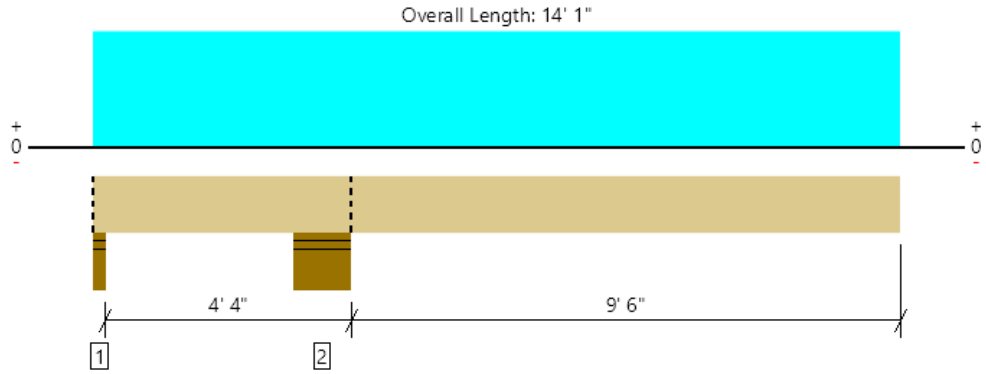
Weyerhaeuser

Roof, 2

2 piece(s) 1 3/4" x 18" 2.0E Microllam® LVL

Right cantilever exceeds the maximum braced cantilever length of 7'.

An excessive uplift of -6353 lbs at support located at 1 1/2" failed this product.



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)	13756 @ 4'	30625 (14.00")	Passed (45%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	7120 @ 1' 11"	13766	Passed (52%)	1.15	1.0 D + 1.0 S (Alt Spans)
Moment (Ft-lbs)	-27817 @ 4'	33424	Passed (83%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.317 @ 14' 1"	1.008	Passed (2L/764)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.589 @ 14' 1"	1.344	Passed (2L/410)	--	1.0 D + 1.0 S (Alt Spans)

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/180).
- Right cantilever length exceeds 1/3 member length or 1/2 back span length. Additional bracing should be considered.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Moment capacity over cantilever support 2 has been reduced by 25% to lessen the effects of buckling.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Stud wall - DF	3.00"	3.00"	1.50"	-2802	-3551	-6353	Blocking
2 - Stud wall - DF	14.00"	14.00"	6.29"	6371	7385	13756	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)	14' 1" 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 14' 1"	N/A	18.4	--	
1 - Uniform (PSF)	0 to 14' 1" (Front)	11' 9"	20.0	25.0	Default Load

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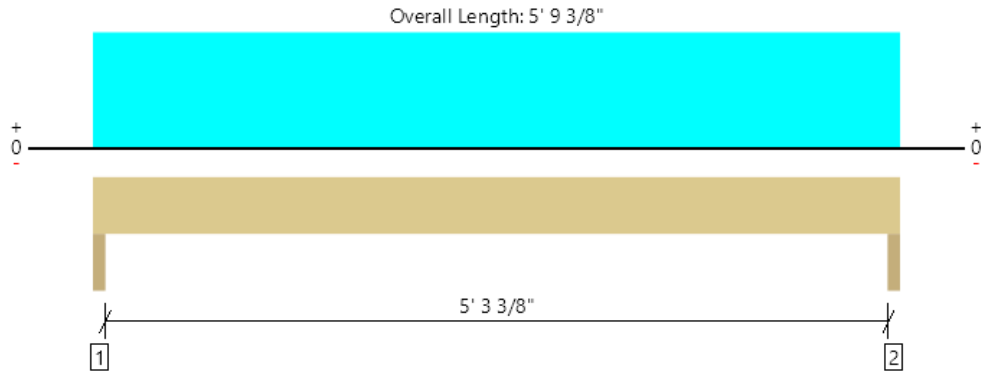
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Roof, 3

2 piece(s) 2 x 8 Douglas Fir-Larch No. 1



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)	1544 @ 1 1/2"	5625 (3.00")	Passed (27%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1088 @ 10 1/4"	3002	Passed (36%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2043 @ 2' 10 11/16"	3022	Passed (68%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.038 @ 2' 10 11/16"	0.184	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.069 @ 2' 10 11/16"	0.277	Passed (L/955)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) 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	Snow	Total	
1 - Trimmer - DF	3.00"	3.00"	1.50"	695	849	1544	None
2 - Trimmer - DF	3.00"	3.00"	1.50"	695	849	1544	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 9" o/c	
Bottom Edge (Lu)	5' 9" 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 5' 9 3/8"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 5' 9 3/8"	11' 9"	20.0	25.0	Default Load

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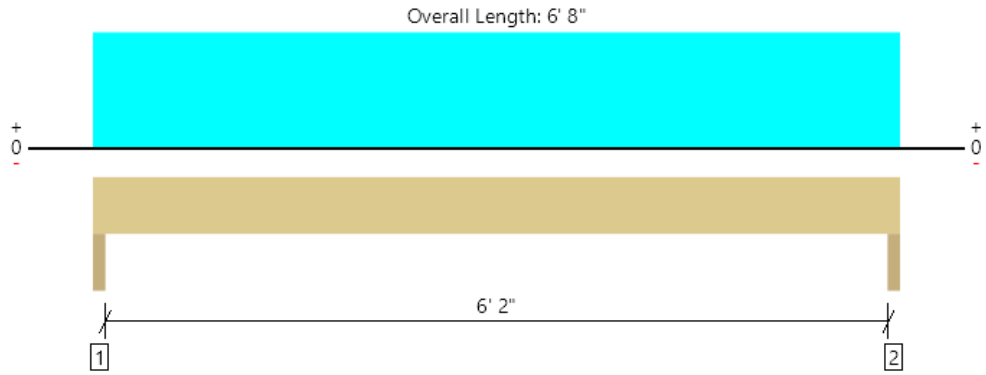
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, 4

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



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)	3214 @ 1 1/2"	6825 (3.00")	Passed (47%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2370 @ 10 1/2"	5333	Passed (44%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	4962 @ 3' 4"	7547	Passed (66%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.092 @ 3' 4"	0.214	Passed (L/840)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.166 @ 3' 4"	0.321	Passed (L/464)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 6' 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	Total	
1 - Trimmer - DF	3.00"	3.00"	1.50"	1440	1773	3213	None
2 - Trimmer - DF	3.00"	3.00"	1.50"	1440	1773	3213	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 8" o/c	
Bottom Edge (Lu)	6' 8" 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' 8"	N/A	6.4	--	
1 - Uniform (PSF)	0 to 6' 8"	21' 3 3/8"	20.0	25.0	Default Load

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

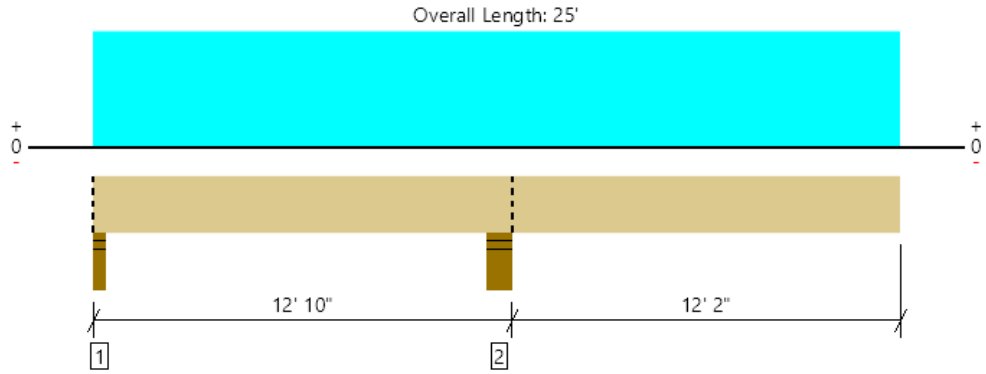
ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Roof, 5

3 piece(s) 1 3/4" x 18" 2.0E Microllam® LVL

Right cantilever exceeds the maximum braced cantilever length of 7'.



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)	15213 @ 12' 7"	19688 (6.00")	Passed (77%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	6535 @ 10' 10"	20648	Passed (32%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-47225 @ 12' 7"	50137	Passed (94%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.740 @ 25'	1.242	Passed (2L/402)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	1.346 @ 25'	1.656	Passed (2L/222)	--	1.0 D + 1.0 S (Alt Spans)

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/180).
- Right cantilever length exceeds 1/3 member length or 1/2 back span length. Additional bracing should be considered.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Moment capacity over cantilever support 2 has been reduced by 25% to lessen the effects of buckling.
- -930 lbs uplift at support located at 1 1/2". Strapping or other restraint may be required.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Stud wall - SPF	3.00"	3.00"	1.50"	48	1060/-978	1108/-978	Blocking
2 - Stud wall - DF	6.00"	6.00"	4.64"	7143	8071	15214	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)	25' o/c	
Bottom Edge (Lu)	7' 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 25'	N/A	27.6	--	
1 - Uniform (PSF)	0 to 25' (Front)	13'	20.0	25.0	Default Load

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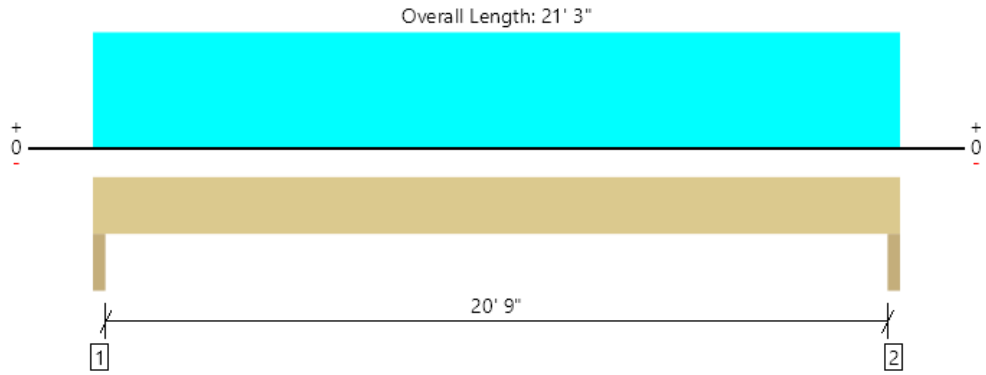
Roof, 6

3 piece(s) 1 3/4" x 14" 2.0E Microllam® LVL



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)	3681 @ 1 1/2"	11813 (3.00")	Passed (31%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2730 @ 1' 5"	12569	Passed (22%)	0.90	1.0 D (All Spans)
Moment (Ft-lbs)	16342 @ 10' 7 1/2"	32749	Passed (50%)	0.90	1.0 D (All Spans)
Live Load Defl. (in)	0.095 @ 10' 7 1/2"	0.700	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.661 @ 10' 7 1/2"	1.050	Passed (L/381)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) 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	Snow	Total	
1 - Trimmer - DF	3.00"	3.00"	1.50"	3150	531	3681	None
2 - Trimmer - DF	3.00"	3.00"	1.50"	3150	531	3681	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	17' 8" o/c	
Bottom Edge (Lu)	21' 3" 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 21' 3"	N/A	21.5	--	
1 - Uniform (PSF)	0 to 21' 3"	2'	20.0	25.0	Default Load
2 - Uniform (PSF)	0 to 21' 3"	11' 9"	20.0	-	Weight of Hung Door

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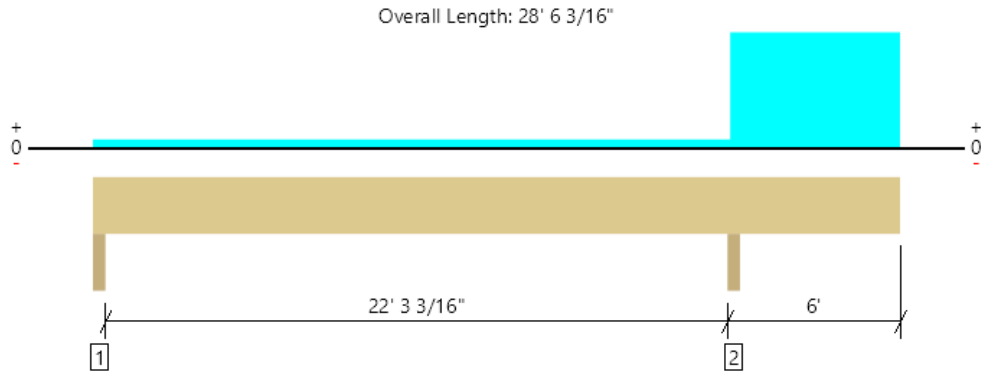
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, 7

2 piece(s) 1 3/4" x 18" 2.0E Microllam® LVL



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)	5093 @ 22' 7 11/16"	7875 (3.00")	Passed (65%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2756 @ 24' 3 3/16"	13766	Passed (20%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-11191 @ 22' 7 11/16"	44566	Passed (25%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.155 @ 28' 6 3/16"	0.392	Passed (2L/910)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.248 @ 28' 6 3/16"	0.587	Passed (2L/568)	--	1.0 D + 1.0 S (Alt Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) 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	Snow	Total	
1 - Trimmer - DF	3.00"	3.00"	1.50"	208	151/-126	359/-126	None
2 - Trimmer - DF	3.00"	3.00"	1.94"	2447	2646	5093	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	28' 6" o/c	
Bottom Edge (Lu)	19' 4" 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 28' 6 3/16"	N/A	18.4	--	
1 - Uniform (PSF)	0 to 28' 6 3/16"	1'	20.0	25.0	Default Load
2 - Uniform (PSF)	22' 6 3/16" to 28' 6 3/16"	13'	20.0	25.0	

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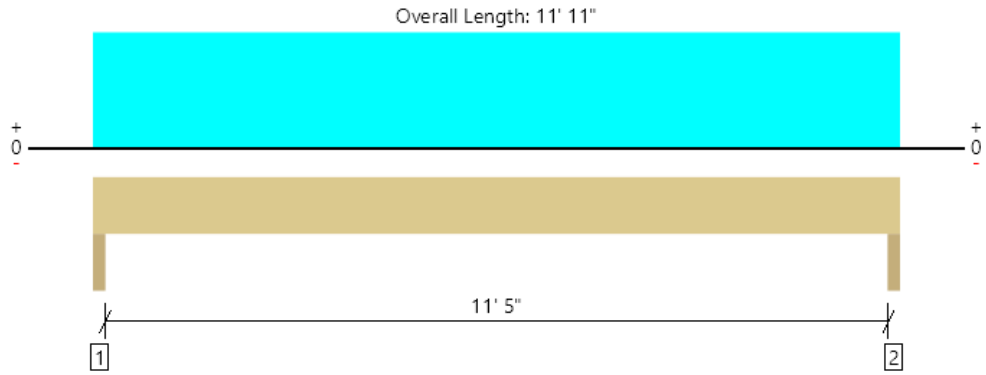
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, 8

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



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)	4020 @ 1 1/2"	6825 (3.00")	Passed (59%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3261 @ 1' 1 1/2"	7466	Passed (44%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	11478 @ 5' 11 1/2"	14792	Passed (78%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.254 @ 5' 11 1/2"	0.389	Passed (L/552)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.463 @ 5' 11 1/2"	0.583	Passed (L/303)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 11' 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	Snow	Total	
1 - Trimmer - DF	3.00"	3.00"	1.77"	1816	2203	4019	None
2 - Trimmer - DF	3.00"	3.00"	1.77"	1816	2203	4019	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	11' 11" o/c	
Bottom Edge (Lu)	11' 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 11' 11"	N/A	8.9	--	
1 - Uniform (PSF)	0 to 11' 11"	14' 9 1/2"	20.0	25.0	Default Load

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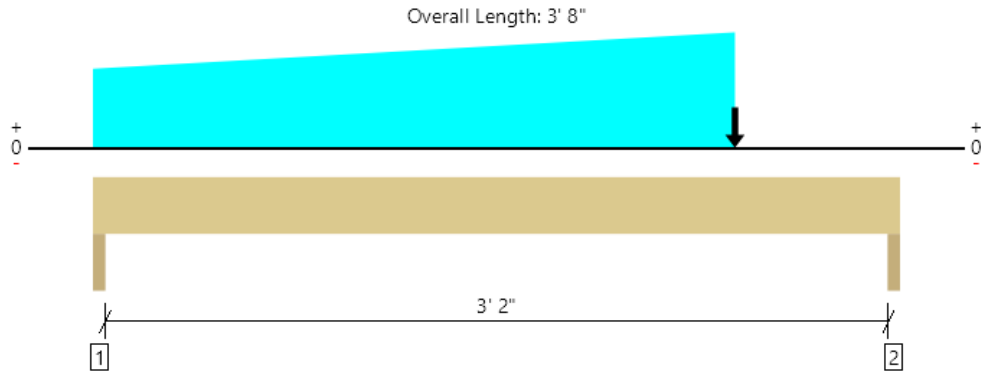
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Roof, 9

2 piece(s) 2 x 8 Douglas Fir-Larch No. 1



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)	3264 @ 3' 6 1/2"	5625 (3.00")	Passed (58%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2595 @ 2' 9 3/4"	3002	Passed (86%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2038 @ 2' 11"	3022	Passed (67%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.011 @ 1' 11 5/16"	0.114	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.021 @ 1' 11 5/16"	0.171	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) 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	Snow	Total	
1 - Trimmer - DF	3.00"	3.00"	1.50"	439	536	975	None
2 - Trimmer - DF	3.00"	3.00"	1.74"	1456	1808	3264	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 8" o/c	
Bottom Edge (Lu)	3' 8" 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' 8"	N/A	5.5	--	
1 - Tapered (PSF)	0 to 2' 11"	3' to 4' 4 1/2"	20.0	25.0	Default Load
2 - Point (lb)	2' 11"	N/A	1660	2075	83 SF from Truss Girder

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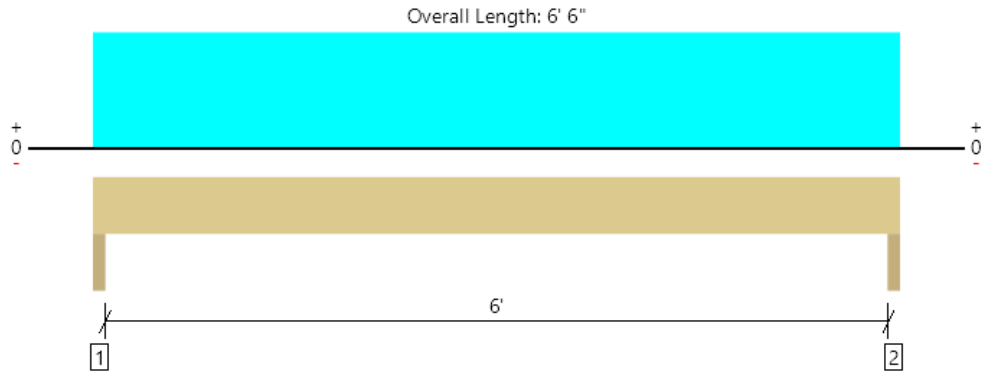
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, 10

2 piece(s) 2 x 10 Douglas Fir-Larch No. 1



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)	2192 @ 1 1/2"	5625 (3.00")	Passed (39%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1504 @ 1' 1/4"	3830	Passed (39%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3294 @ 3' 3"	4510	Passed (73%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.038 @ 3' 3"	0.208	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.069 @ 3' 3"	0.313	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) 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	Snow	Total	
1 - Trimmer - DF	3.00"	3.00"	1.50"	987	1205	2192	None
2 - Trimmer - DF	3.00"	3.00"	1.50"	987	1205	2192	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 6" o/c	
Bottom Edge (Lu)	6' 6" 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' 6"	N/A	7.0	--	
1 - Uniform (PSF)	0 to 6' 6"	14' 10"	20.0	25.0	Default Load

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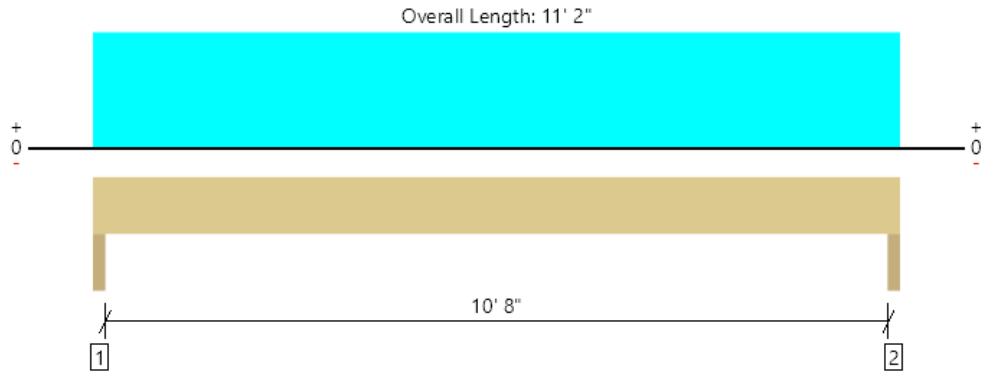
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Roof, 11

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



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)	3777 @ 1 1/2"	6825 (3.00")	Passed (55%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3016 @ 1' 1 1/2"	7466	Passed (40%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	10078 @ 5' 7"	14792	Passed (68%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.195 @ 5' 7"	0.364	Passed (L/672)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.356 @ 5' 7"	0.546	Passed (L/368)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 10' 11".
- 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	Total	
1 - Trimmer - DF	3.00"	3.00"	1.66"	1707	2070	3777	None
2 - Trimmer - DF	3.00"	3.00"	1.66"	1707	2070	3777	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	11' 2" o/c	
Bottom Edge (Lu)	11' 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 11' 2"	N/A	8.9	--	
1 - Uniform (PSF)	0 to 11' 2"	14' 10"	20.0	25.0	Default Load

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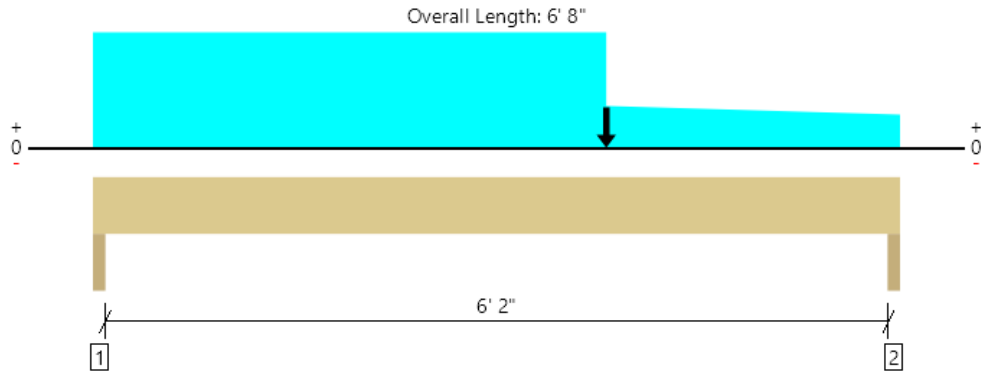
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, 12

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



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)	3656 @ 6' 6 1/2"	6825 (3.00")	Passed (54%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3449 @ 5' 8"	6400	Passed (54%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	7789 @ 4' 2 7/8"	10868	Passed (72%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.075 @ 3' 5 1/16"	0.214	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.135 @ 3' 5 1/16"	0.321	Passed (L/571)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 6' 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	Total	
1 - Trimmer - DF	3.00"	3.00"	1.50"	1500	1842	3342	None
2 - Trimmer - DF	3.00"	3.00"	1.61"	1639	2017	3656	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 8" o/c	
Bottom Edge (Lu)	6' 8" 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' 8"	N/A	7.7	--	
1 - Uniform (PSF)	0 to 4' 2 7/8"	14' 7"	20.0	25.0	Default Load
2 - Point (lb)	4' 2 7/8"	N/A	1620	2025	81 SF from truss girder
3 - Tapered (PSF)	4' 2 7/8" to 6' 8"	5' 3 9/16" to 4' 2 1/2"	20.0	25.0	Default Load

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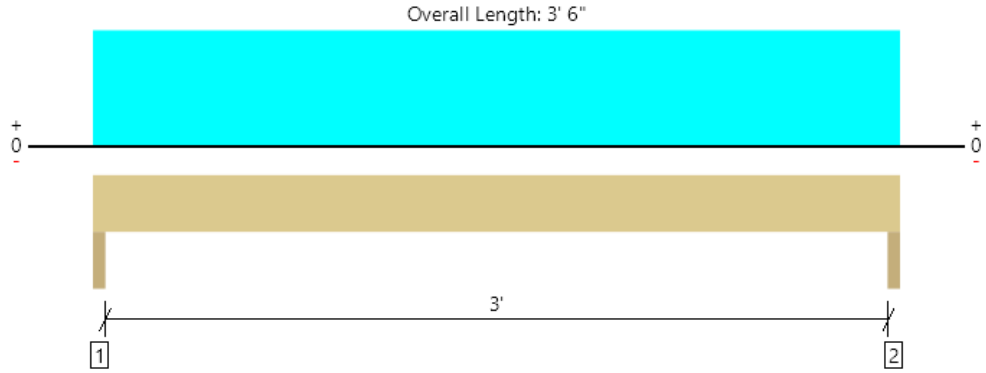
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, 13

2 piece(s) 2 x 4 Douglas Fir-Larch No. 1



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)	431 @ 1 1/2"	5625 (3.00")	Passed (8%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	298 @ 6 1/2"	1449	Passed (21%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	325 @ 1' 9"	880	Passed (37%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.019 @ 1' 9"	0.108	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.034 @ 1' 9"	0.162	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) 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	Snow	Total	
1 - Trimmer - DF	3.00"	3.00"	1.50"	194	237	431	None
2 - Trimmer - DF	3.00"	3.00"	1.50"	194	237	431	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 6" o/c	
Bottom Edge (Lu)	3' 6" 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' 6"	N/A	2.7	--	
1 - Uniform (PSF)	0 to 3' 6"	5' 5"	20.0	25.0	Default Load

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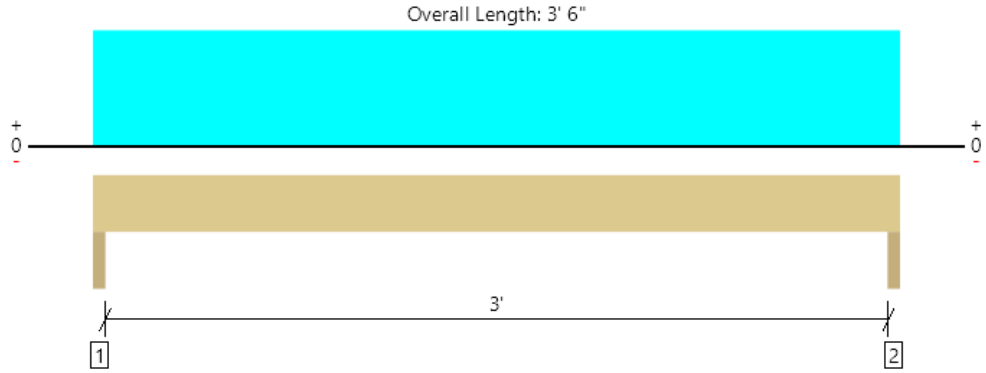
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Roof, 14

2 piece(s) 2 x 4 Douglas Fir-Larch No. 1



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)	1153 @ 1 1/2"	5625 (3.00")	Passed (21%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	796 @ 6 1/2"	1449	Passed (55%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	870 @ 1' 9"	880	Passed (99%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.050 @ 1' 9"	0.108	Passed (L/777)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.091 @ 1' 9"	0.162	Passed (L/430)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) 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	Snow	Total	
1 - Trimmer - DF	3.00"	3.00"	1.50"	515	638	1153	None
2 - Trimmer - DF	3.00"	3.00"	1.50"	515	638	1153	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 6" o/c	
Bottom Edge (Lu)	3' 6" 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' 6"	N/A	2.7	--	
1 - Uniform (PSF)	0 to 3' 6"	14' 7"	20.0	25.0	Default Load

Weyerhaeuser Notes

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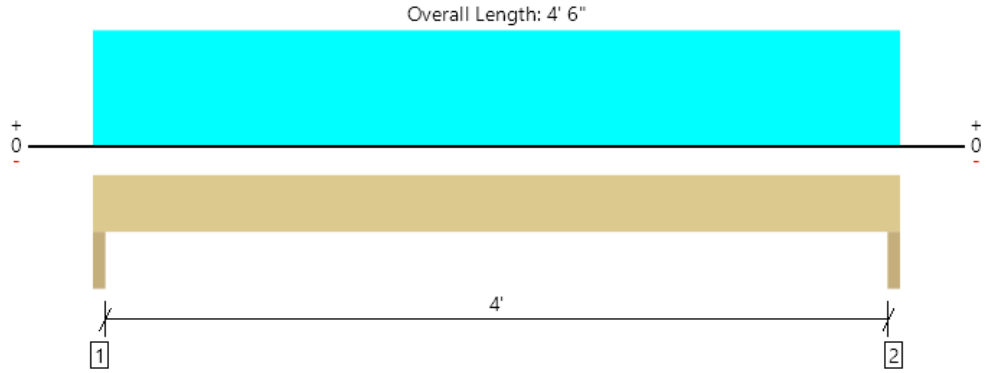
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Roof, 15

2 piece(s) 2 x 6 Douglas Fir-Larch No. 1



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)	1090 @ 1 1/2"	5625 (3.00")	Passed (19%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	747 @ 8 1/2"	2277	Passed (33%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1093 @ 2' 3"	1884	Passed (58%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.028 @ 2' 3"	0.142	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.050 @ 2' 3"	0.213	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) 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	Snow	Total	
1 - Trimmer - DF	3.00"	3.00"	1.50"	490	600	1090	None
2 - Trimmer - DF	3.00"	3.00"	1.50"	490	600	1090	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 6" o/c	
Bottom Edge (Lu)	4' 6" 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 4' 6"	N/A	4.2	--	
1 - Uniform (PSF)	0 to 4' 6"	10' 8"	20.0	25.0	Default Load

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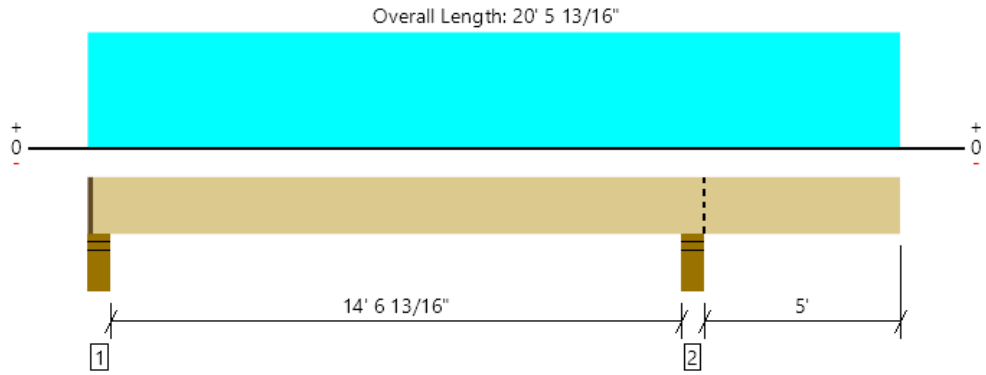
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Main Floor, 21

1 piece(s) 2 x 10 Douglas Fir-Larch No. 1 @ 16" OC



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)	1178 @ 15' 3 1/16"	5156 (5.50")	Passed (23%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	638 @ 14' 3 1/16"	1665	Passed (38%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2177 @ 7' 5 9/16"	2255	Passed (97%)	1.00	1.0 D + 1.0 L (Alt Spans)
Live Load Defl. (in)	0.350 @ 7' 9 13/16"	0.372	Passed (L/510)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.504 @ 7' 8 3/16"	0.744	Passed (L/354)	--	1.0 D + 1.0 L (Alt Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Overhang deflection criteria: LL (2L/480) and TL (2L/240). Upward deflection on right cantilever exceeds overhang deflection criteria.
- 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.
- Upward deflection on right cantilever exceeds 0.4".
- 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	Total	
1 - Stud wall - DF	5.50"	4.25"	1.50"	230	417/-43	647/-43	1 1/4" Rim Board
2 - Stud wall - DF	5.50"	5.50"	1.50"	453	725	1178	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)	2' 6" o/c	
Bottom Edge (Lu)	11' 8" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 20' 5 13/16"	16"	25.0	40.0	Default Load

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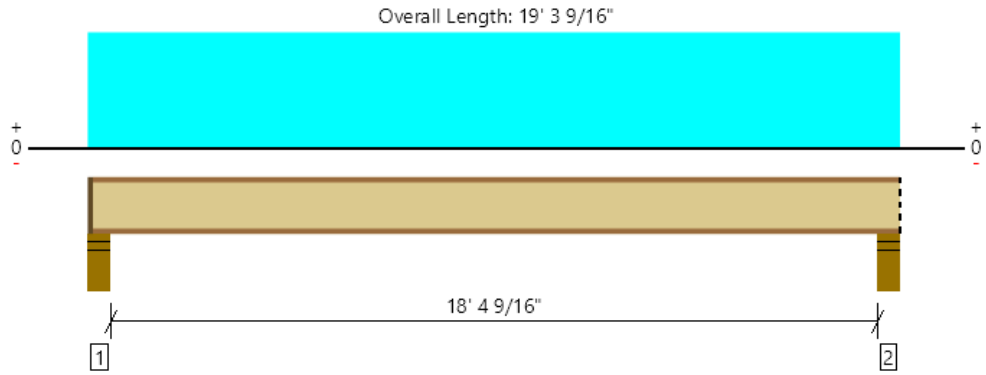
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Main Floor, 22
2 piece(s) 9 1/2" TJI® 230 @ 24" OC



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)	1254 @ 18' 11 1/16"	2970 (3.50")	Passed (42%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1195 @ 5 1/2"	2660	Passed (45%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	5590 @ 9' 7 13/16"	6660	Passed (84%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.473 @ 9' 7 13/16"	0.464	Passed (L/471)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.768 @ 9' 7 13/16"	0.927	Passed (L/290)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	30	Any	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - DF	5.50"	4.25"	1.75"	482	772	1254	1 1/4" Rim Board
2 - Stud wall - DF	5.50"	5.50"	1.75"	482	772	1254	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)	4' 4" o/c	
Bottom Edge (Lu)	19' 2" o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 19' 3 9/16"	24"	25.0	40.0	Default Load

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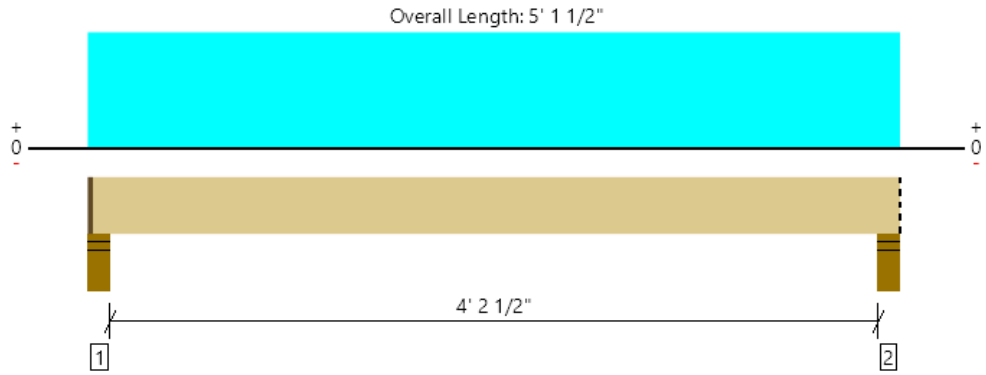
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Main Floor, 23

1 piece(s) 2 x 10 Douglas Fir-Larch No. 1 @ 16" OC



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)	213 @ 4 1/2"	3984 (4.25")	Passed (5%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	116 @ 1' 2 3/4"	1665	Passed (7%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	207 @ 2' 6 3/4"	2255	Passed (9%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.003 @ 2' 6 3/4"	0.109	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.004 @ 2' 6 3/4"	0.219	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- 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.
- 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	Total	
1 - Stud wall - DF	5.50"	4.25"	1.50"	85	137	222	1 1/4" Rim Board
2 - Stud wall - DF	5.50"	5.50"	1.50"	85	137	222	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' o/c	
Bottom Edge (Lu)	5' o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 5' 1 1/2"	16"	25.0	40.0	Default Load

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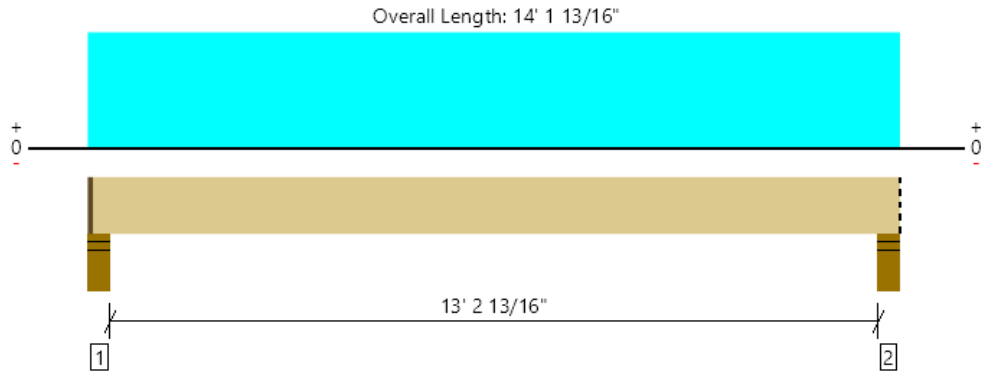
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Main Floor, 24

1 piece(s) 2 x 10 Douglas Fir-Larch No. 1 @ 16" OC



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)	604 @ 4 1/2"	3984 (4.25")	Passed (15%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	507 @ 1' 2 3/4"	1665	Passed (30%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1946 @ 7' 15/16"	2255	Passed (86%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.230 @ 7' 15/16"	0.335	Passed (L/699)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.374 @ 7' 15/16"	0.670	Passed (L/430)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- 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.
- 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	Total	
1 - Stud wall - DF	5.50"	4.25"	1.50"	236	377	613	1 1/4" Rim Board
2 - Stud wall - DF	5.50"	5.50"	1.50"	236	377	613	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' 1" o/c	
Bottom Edge (Lu)	14' 1" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 14' 1 13/16"	16"	25.0	40.0	Default Load

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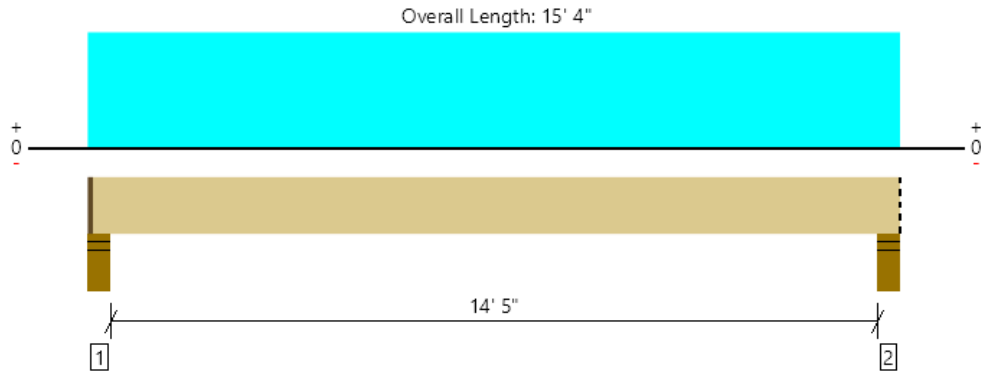
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Main Floor, 25

1 piece(s) 2 x 10 Douglas Fir-Larch No. 1 @ 16" OC



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)	655 @ 4 1/2"	3984 (4.25")	Passed (16%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	558 @ 1' 2 3/4"	1665	Passed (34%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2304 @ 7' 8"	2255	Passed (102%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.323 @ 7' 8"	0.365	Passed (L/542)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.524 @ 7' 8"	0.729	Passed (L/334)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- 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.
- 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	Total	
1 - Stud wall - DF	5.50"	4.25"	1.50"	256	409	665	1 1/4" Rim Board
2 - Stud wall - DF	5.50"	5.50"	1.50"	256	409	665	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)	6" o/c	
Bottom Edge (Lu)	15' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 15' 4"	16"	25.0	40.0	Default Load

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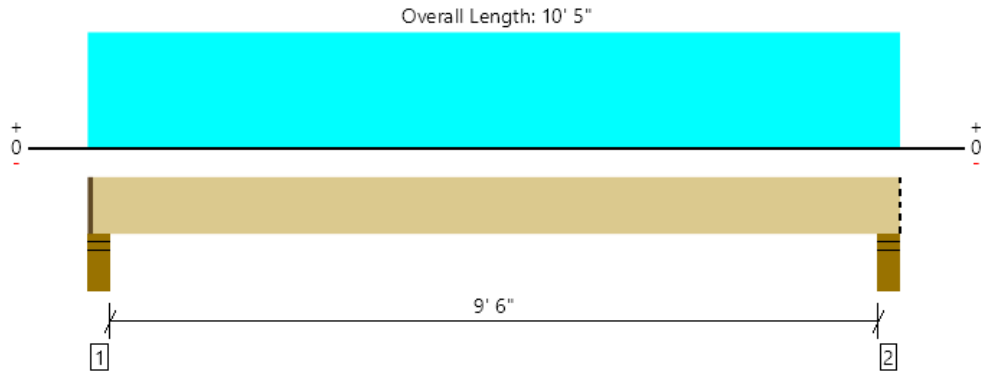
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Main Floor, 26

1 piece(s) 2 x 10 Douglas Fir-Larch No. 1 @ 16" OC



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)	442 @ 4 1/2"	3984 (4.25")	Passed (11%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	345 @ 1' 2 3/4"	1665	Passed (21%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1012 @ 5' 2 1/2"	2255	Passed (45%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.062 @ 5' 2 1/2"	0.242	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.101 @ 5' 2 1/2"	0.483	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- 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.
- 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	Total	
1 - Stud wall - DF	5.50"	4.25"	1.50"	174	278	452	1 1/4" Rim Board
2 - Stud wall - DF	5.50"	5.50"	1.50"	174	278	452	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)	10' 4" o/c	
Bottom Edge (Lu)	10' 4" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 10' 5"	16"	25.0	40.0	Default Load

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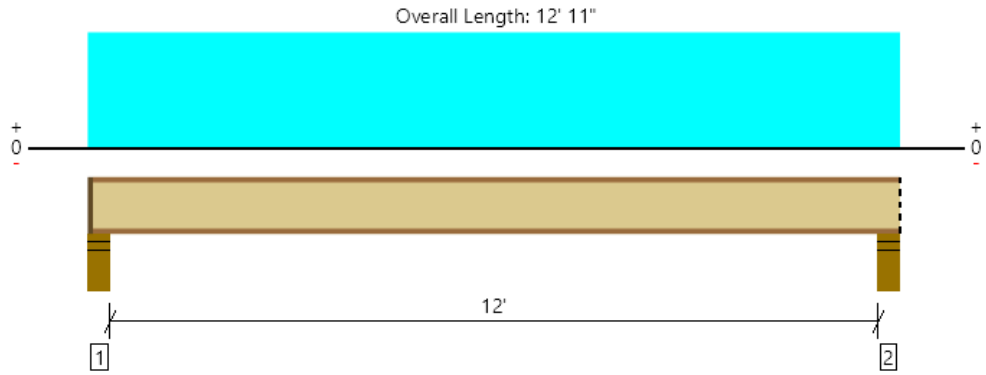
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Main Floor, 27
1 piece(s) 9 1/2" TJI® 210 @ 24" OC



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)	840 @ 12' 6 1/2"	1460 (3.50")	Passed (58%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	780 @ 5 1/2"	1330	Passed (59%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2405 @ 6' 5 1/2"	3000	Passed (80%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.194 @ 6' 5 1/2"	0.304	Passed (L/754)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.315 @ 6' 5 1/2"	0.608	Passed (L/464)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	42	Any	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - DF	5.50"	4.25"	1.75"	323	517	840	1 1/4" Rim Board
2 - Stud wall - DF	5.50"	5.50"	1.75"	323	517	840	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)	4' 1" o/c	
Bottom Edge (Lu)	12' 10" o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 12' 11"	24"	25.0	40.0	Default Load

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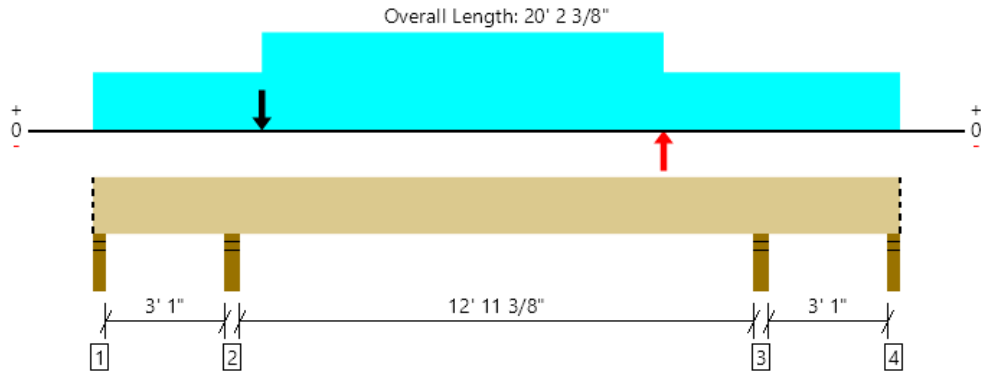
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Main Floor, 29

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



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)	3197 @ 3' 5 3/4"	5206 (3.50")	Passed (61%)	--	1.0 D + 1.0 L (Adj Spans)
Shear (lbs)	1647 @ 4' 4 3/4"	6151	Passed (27%)	1.00	1.0 D + 1.0 L (Adj Spans)
Moment (Ft-lbs)	-3605 @ 3' 5 3/4"	11204	Passed (32%)	1.00	1.0 D + 1.0 L (Adj Spans)
Live Load Defl. (in)	0.057 @ 10' 1 3/16"	0.331	Passed (L/999+)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.155 @ 10' 13/16"	0.662	Passed (L/999+)	--	1.0 D + 1.0 L (Alt Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- -932 lbs uplift at support located at 1 1/2". Strapping or other restraint may be required.
- -893 lbs uplift at support located at 20' 7/8". Strapping or other restraint may be required.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Seismic	Total	
1 - Stud wall - DF	3.00"	3.00"	1.50"	-550	179/-383	13/-13	192/-946	Blocking
2 - Stud wall - SPF	3.50"	3.50"	2.15"	1948	1249	502/-502	3699/-502	None
3 - Stud wall - SPF	3.50"	3.50"	2.04"	1742	1249	690/-690	3681/-690	None
4 - Stud wall - DF	3.00"	3.00"	1.50"	-511	179/-383	200/-200	379/-1094	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)	20' 2" o/c	
Bottom Edge (Lu)	20' 2" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 20' 2 3/8"	N/A	9.4	--	--	
1 - Uniform (PLF)	0 to 20' 2 3/8" (Front)	N/A	63.8	102.8	-	Linked from: 23, Support 2
2 - Point (lb)	4' 2 3/4" (Top)	N/A	-	-	573	229 # chord w/ overstrength
3 - Point (lb)	14' 3 3/8" (Top)	N/A	-	-	-573	229 # chord w/ overstrength
4 - Uniform (PSF)	4' 2 3/4" to 14' 3 3/8" (Top)	9' 2"	12.5	-	-	

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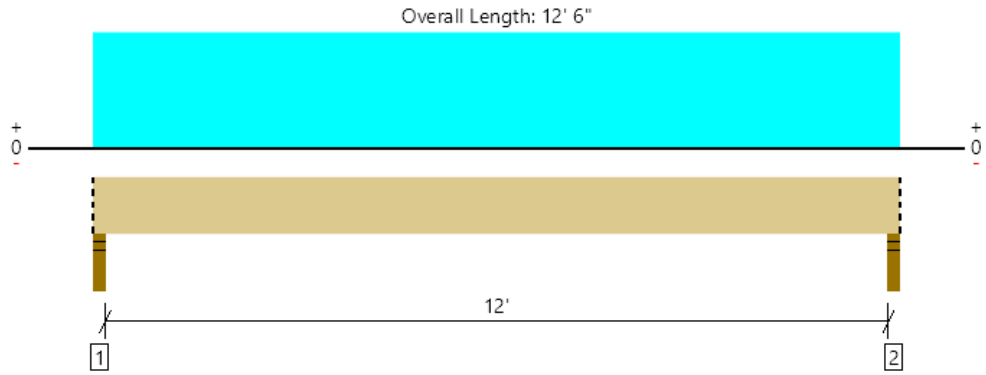
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Main Floor, 30

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



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)	1912 @ 1 1/2"	6563 (3.00")	Passed (29%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1600 @ 1' 1/4"	6151	Passed (26%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	5739 @ 6' 3"	11204	Passed (51%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.213 @ 6' 3"	0.306	Passed (L/691)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.356 @ 6' 3"	0.613	Passed (L/413)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
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	Total	
1 - Stud wall - DF	3.00"	3.00"	1.50"	770	1142	1912	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	770	1142	1912	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)	12' 6" o/c	
Bottom Edge (Lu)	12' 6" 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)	0 to 12' 6"	N/A	9.4	--	
1 - Uniform (PLF)	0 to 12' 6" (Front)	N/A	63.8	102.8	Linked from: 23, Support 2
2 - Uniform (PSF)	0 to 12' 6" (Top)	2'	25.0	40.0	

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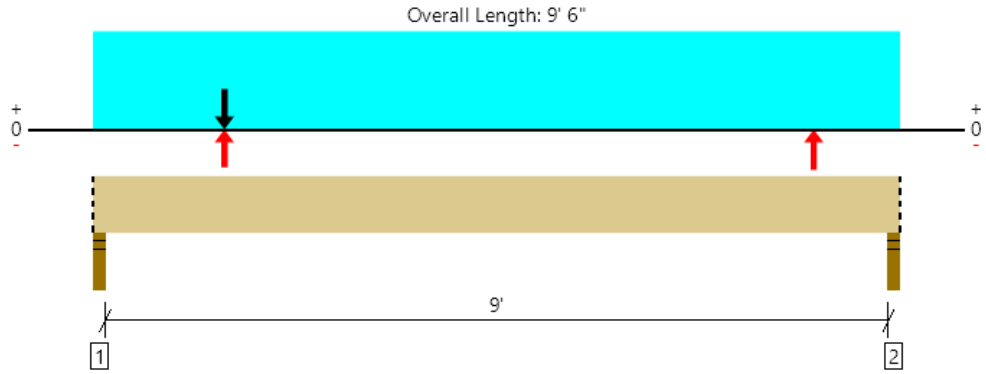
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Main Floor, 31

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

An excessive uplift of -1969 lbs at support located at 1 1/2" failed this product.

An excessive uplift of -2057 lbs at support located at 9' 4 1/2" failed this product.



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)	2791 @ 1 1/2"	6563 (3.00")	Passed (43%)	--	0.6 D + 0.6 W (All Spans)
Shear (lbs)	3275 @ 1' 6 9/16"	7074	Passed (46%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3846 @ 5' 11 15/16"	12884	Passed (30%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.062 @ 3' 1"	0.231	Passed (L/999+)	--	1.0 D + 0.6 W (All Spans)
Total Load Defl. (in)	0.134 @ 4' 9 1/2"	0.463	Passed (L/826)	--	1.0 D + 0.45 W + 0.75 L + 0.75 S (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
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	Wind	Total	
1 - Stud wall - DF	3.00"	3.00"	1.50"	-359	190	-1610	5010	5200/-1969	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	1582	190	849	-5010	2621/-5010	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' 6" o/c	
Bottom Edge (Lu)	9' 6" 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)	Wind (1.60)	Comments
0 - Self Weight (PLF)	0 to 9' 6"	N/A	9.4	--	--	--	
1 - Uniform (PSF)	0 to 9' 6" (Top)	1'	25.0	40.0	-	-	
2 - Point (lb)	1' 6 9/16" (Top)	N/A	-2802	-	-3551	-	Linked from: 2, Support 1
3 - Uniform (PSF)	0 to 9' 6" (Top)	11' 9"	20.0	-	25.0	-	
4 - Uniform (PSF)	0 to 9' 6" (Top)	12' 4"	12.5	-	-	-	Wall Above
5 - Point (lb)	1' 6 9/16" (Top)	N/A	-	-	-	6680	2672# chord force with over strength
6 - Point (lb)	8' 5 13/16" (Top)	N/A	-	-	-	-6680	2672# chord force with over strength

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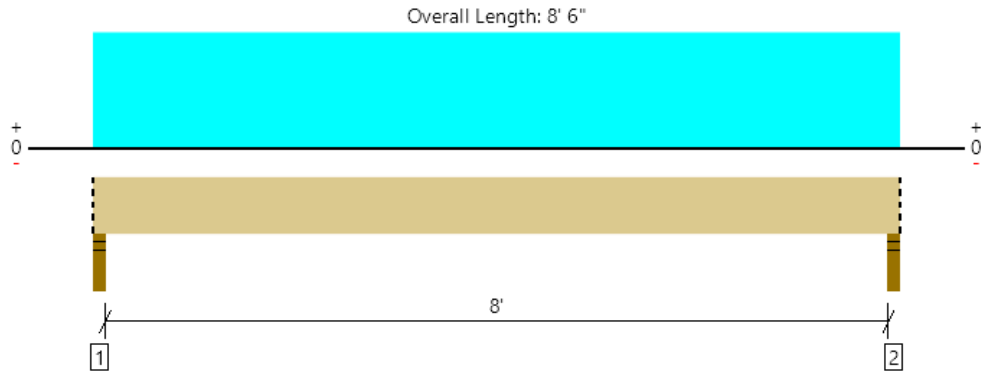
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Main Floor, 32

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



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)	3793 @ 1 1/2"	6563 (3.00")	Passed (58%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	2789 @ 1' 1 1/2"	6493	Passed (43%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	7593 @ 4' 3"	12863	Passed (59%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.093 @ 4' 3"	0.206	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.153 @ 4' 3"	0.412	Passed (L/647)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
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 factor of 1.00 that was calculated using length L = 8' 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	Total	
1 - Stud wall - DF	3.00"	3.00"	1.73"	1482	2311	3793	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.73"	1482	2311	3793	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' 6" o/c	
Bottom Edge (Lu)	8' 6" 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)	0 to 8' 6"	N/A	8.9	--	
1 - Uniform (PLF)	0 to 8' 6" (Top)	N/A	339.8	543.8	Linked from: 21, Support 2

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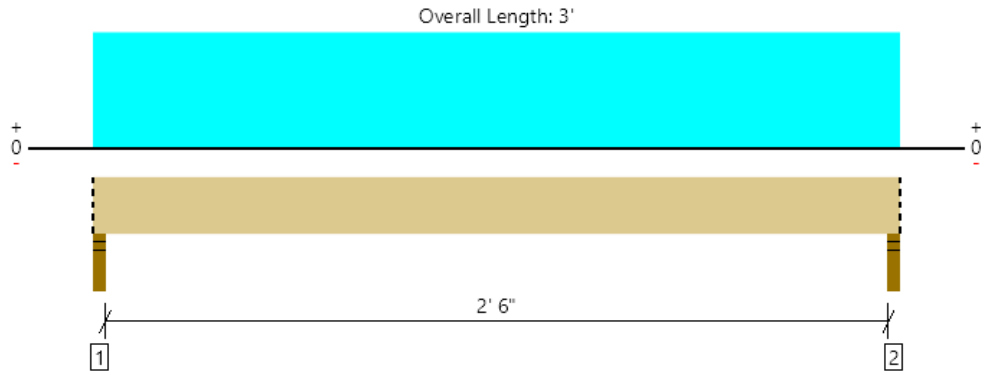
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Main Floor, 33

2 piece(s) 2 x 6 Douglas Fir-Larch No. 1



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)	1675 @ 1 1/2"	5625 (3.00")	Passed (30%)	--	1.0 D + 1.0 L (All Spans) [1]
Shear (lbs)	884 @ 8 1/2"	1980	Passed (45%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Moment (Ft-lbs)	1055 @ 1' 6"	1639	Passed (64%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Live Load Defl. (in)	0.013 @ 1' 6"	0.069	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans) [1]
Total Load Defl. (in)	0.020 @ 1' 6"	0.138	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans) [1]

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
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	Total	
1 - Stud wall - DF	3.00"	3.00"	1.50"	627	1048	1675	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	627	1048	1675	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)	Comments
0 - Self Weight (PLF)	0 to 3'	N/A	4.2	--	
1 - Uniform (PLF)	0 to 3' (Top)	N/A	172.5	312.8/-32.3	Linked from: 21, Support 1
2 - Uniform (PLF)	0 to 3' (Top)	N/A	241.0	386.0	Linked from: 22, Support 1

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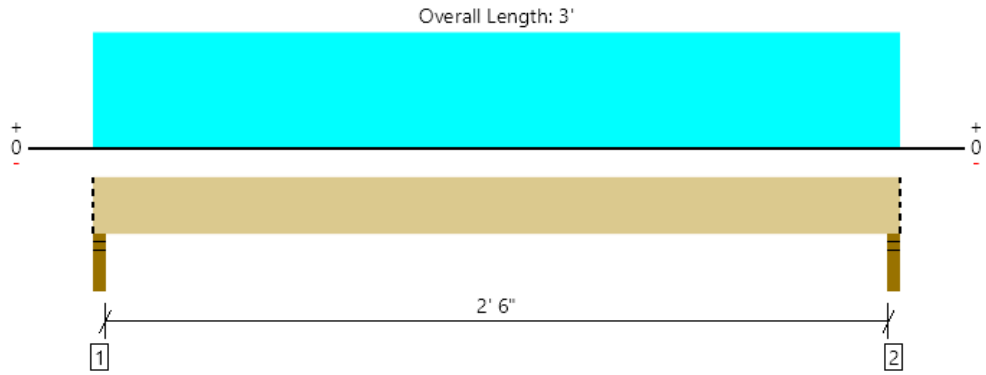
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Main Floor, 34

2 piece(s) 2 x 6 Douglas Fir-Larch No. 1



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)	985 @ 1 1/2"	5625 (3.00")	Passed (18%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	500 @ 8 1/2"	1980	Passed (25%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	597 @ 1' 6"	1639	Passed (36%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.007 @ 1' 6"	0.069	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.011 @ 1' 6"	0.138	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
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	Total	
1 - Stud wall - DF	3.00"	3.00"	1.50"	383	603	986	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	368	579	947	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)	Comments
0 - Self Weight (PLF)	0 to 3'	N/A	4.2	--	
1 - Uniform (PLF)	0 to 3' (Top)	N/A	241.0	386.0	Linked from: 22, Support 1
2 - Uniform (PLF)	0 (Top)	N/A	177.0	282.8	Linked from: 24, Support 1

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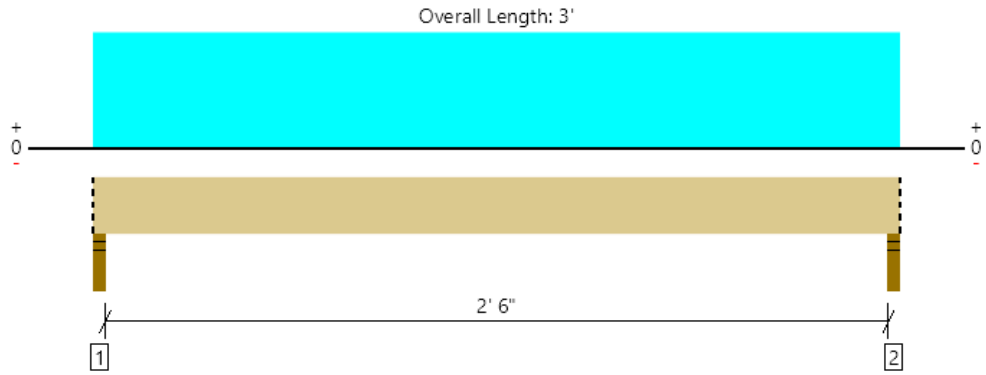
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Main Floor, 35

2 piece(s) 2 x 6 Douglas Fir-Larch No. 1



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)	793 @ 1 1/2"	5625 (3.00")	Passed (14%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	398 @ 8 1/2"	1980	Passed (20%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	475 @ 1' 6"	1639	Passed (29%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.006 @ 1' 6"	0.069	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.009 @ 1' 6"	0.138	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
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	Total	
1 - Stud wall - DF	3.00"	3.00"	1.50"	309	484	793	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	294	460	754	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)	Comments
0 - Self Weight (PLF)	0 to 3'	N/A	4.2	--	
1 - Uniform (PLF)	0 (Top)	N/A	177.0	282.8	Linked from: 24, Support 1
2 - Uniform (PLF)	0 to 3' (Top)	N/A	192.0	306.8	Linked from: 25, Support 1

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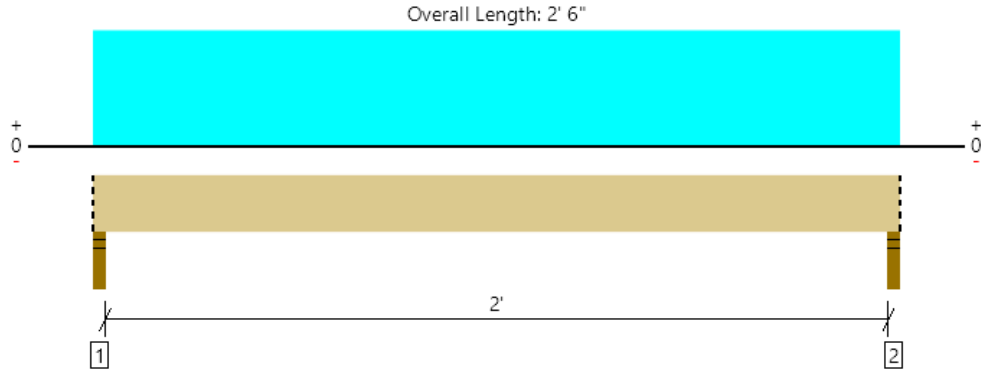
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Main Floor, 36

2 piece(s) 2 x 4 Douglas Fir-Larch No. 1



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)	1042 @ 1 1/2"	5625 (3.00")	Passed (19%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	591 @ 6 1/2"	1260	Passed (47%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	528 @ 1' 3"	766	Passed (69%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.016 @ 1' 3"	0.056	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.026 @ 1' 3"	0.112	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
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	Total	
1 - Stud wall - DF	3.00"	3.00"	1.50"	430	613	1043	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	430	613	1043	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)	2' 6" o/c	
Bottom Edge (Lu)	2' 6" 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)	0 to 2' 6"	N/A	2.7	--	
1 - Uniform (PLF)	0 to 2' 6" (Top)	N/A	130.5	208.5	Linked from: 26, Support 1
2 - Uniform (PLF)	0 to 2' 6" (Top)	N/A	94.0	281.5	Linked from: 40, Support 1
3 - Uniform (PSF)	0 to 2' 6" (Top)	9' 4"	12.5	-	

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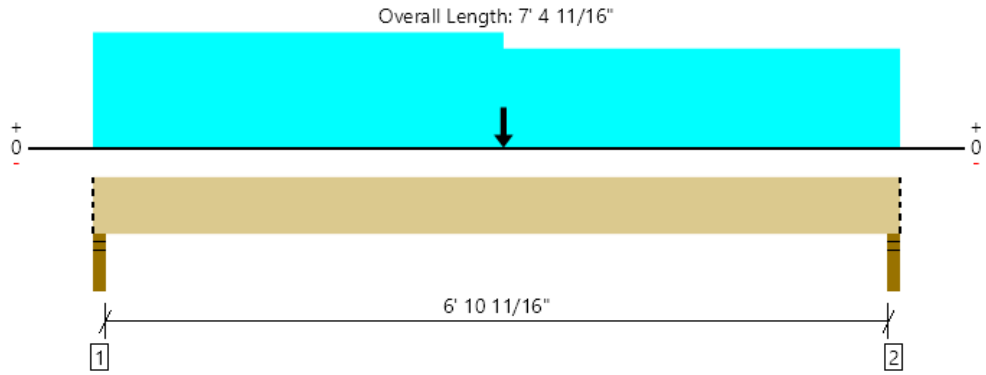
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Main Floor, 37

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



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)	3787 @ 1 1/2"	6563 (3.00")	Passed (58%)	--	1.0 D + 0.45 W + 0.75 L + 0.75 Lr (All Spans)
Shear (lbs)	2059 @ 1' 1 1/2"	6493	Passed (32%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	8700 @ 3' 9 1/8"	20580	Passed (42%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr (All Spans)
Live Load Defl. (in)	0.090 @ 3' 8 7/16"	0.179	Passed (L/956)	--	1.0 D + 0.45 W + 0.75 L + 0.75 Lr (All Spans)
Total Load Defl. (in)	0.118 @ 3' 8 1/4"	0.357	Passed (L/727)	--	1.0 D + 0.45 W + 0.75 L + 0.75 Lr (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
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 factor of 1.00 that was calculated using length L = 7' 1 11/16".
- 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	Floor Live	Wind	Total	
1 - Stud wall - DF	3.00"	3.00"	1.73"	1193	1811	2746	5750	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.65"	971	1811	2849	5631	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' 5" o/c	
Bottom Edge (Lu)	7' 5" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Wind (1.60)	Comments
0 - Self Weight (PLF)	0 to 7' 4 11/16"	N/A	8.9	--	--	
1 - Uniform (PLF)	0 to 7' 4 11/16" (Top)	N/A	130.5	208.5	-	Linked from: 26, Support 1
2 - Uniform (PLF)	0 to 7' 4 11/16" (Top)	N/A	94.0	281.5	-	Linked from: 40, Support 1
3 - Uniform (PSF)	0 to 3' 9 1/8" (Top)	9' 4"	12.5	-	-	
4 - Point (lb)	3' 9 1/8" (Top)	N/A	-	-	5595	2238# chord force w/ over strength

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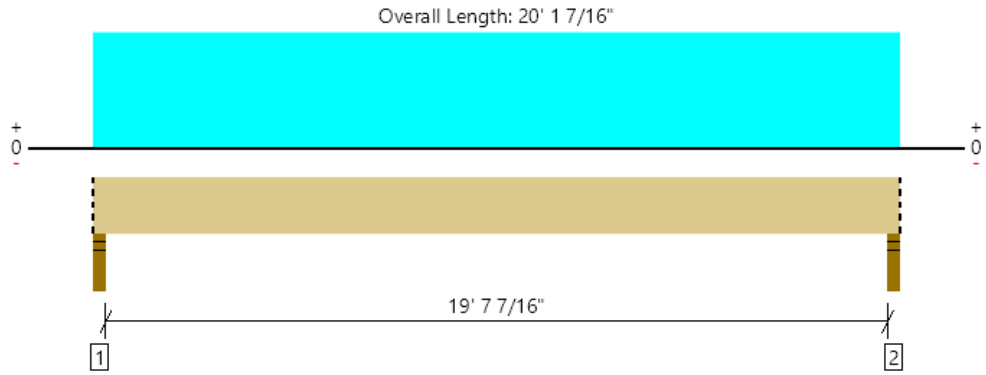
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Main Floor, 38

1 piece(s) 5 1/8" x 15" 24F-V4 DF Glulam



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)	3965 @ 1 1/2"	9609 (3.00")	Passed (41%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	3374 @ 1' 6"	13581	Passed (25%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	19453 @ 10' 3/4"	37798	Passed (51%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.381 @ 10' 11/16"	0.497	Passed (L/627)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.533 @ 10' 11/16"	0.993	Passed (L/447)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
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 factor of 0.98 that was calculated using length L = 19' 10 7/16".
- 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	Floor Live	Total	
1 - Stud wall - DF	3.00"	3.00"	1.50"	1134	2832	3966	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	1134	2832	3966	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)	20' 1" o/c	
Bottom Edge (Lu)	20' 1" 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)	0 to 20' 1 7/16"	N/A	18.7	--	
1 - Uniform (PLF)	0 to 20' 1 7/16" (Front)	N/A	94.0	281.5	Linked from: 40, Support 1

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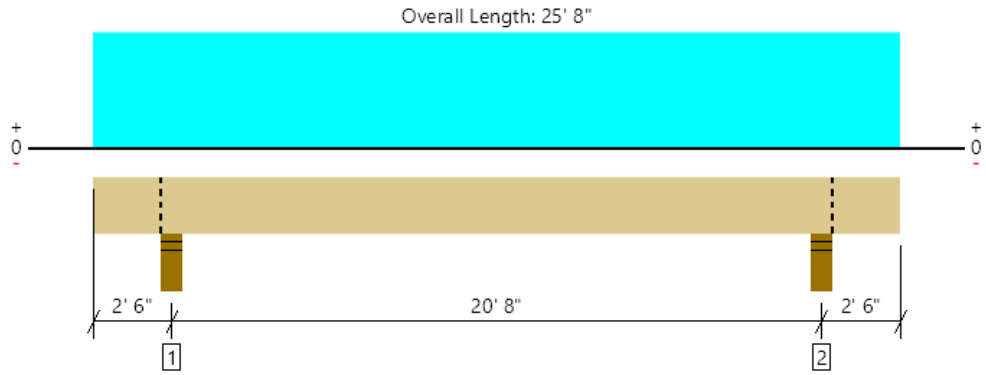
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Main Floor, 39

1 piece(s) 6 3/4" x 13 1/2" 24F-V4 DF Glulam



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)	6971 @ 2' 6"	23203 (5.50")	Passed (30%)	--	1.0 D + 1.0 L (Adj Spans)
Shear (lbs)	4895 @ 3' 10 1/4"	16099	Passed (30%)	1.00	1.0 D + 1.0 L (Adj Spans)
Pos Moment (Ft-lbs)	28286 @ 12' 10"	39521	Passed (72%)	1.00	1.0 D + 1.0 L (Alt Spans)
Neg Moment (Ft-lbs)	-1683 @ 2' 6"	31609	Passed (5%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.638 @ 12' 10"	0.689	Passed (L/388)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.870 @ 12' 10"	1.033	Passed (L/285)	--	1.0 D + 1.0 L (Alt Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240). Upward deflection on left and right cantilevers exceeds overhang deflection criteria.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume factor of 0.96 that was calculated using length L = 20' 5 15/16".
- Critical negative moment adjusted by a volume factor of 1.00 that was calculated using length L = 2' 9 11/16".
- 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	Floor Live	Total	
1 - Stud wall - DF	5.50"	5.50"	1.65"	1940	5032	6972	Blocking
2 - Stud wall - DF	5.50"	5.50"	1.65"	1940	5032	6972	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)	25' 8" o/c	
Bottom Edge (Lu)	25' 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)	0 to 25' 8"	N/A	22.1	--	
1 - Uniform (PLF)	0 to 25' 8" (Front)	N/A	129.0	387.5	Linked from: 41, Support 1

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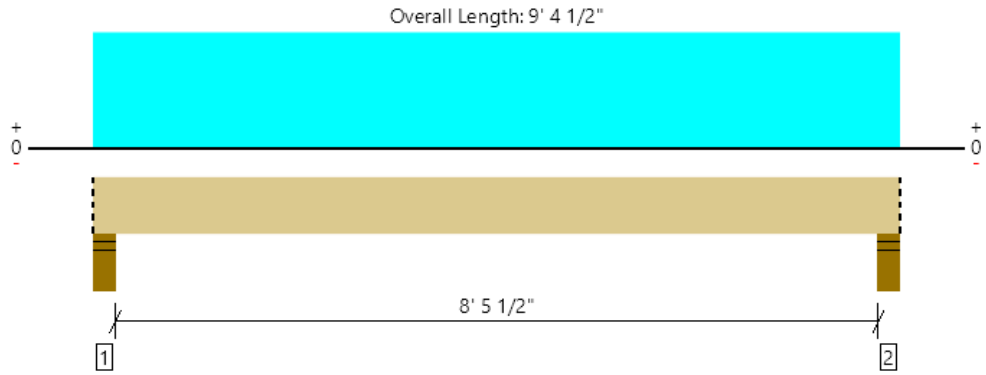
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Main Floor, 40

1 piece(s) 2 x 12 Douglas Fir-Larch No. 1 @ 24" OC



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)	750 @ 4 1/2"	5156 (5.50")	Passed (15%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	527 @ 1' 4 3/4"	2025	Passed (26%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1488 @ 4' 8 1/4"	3032	Passed (49%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.049 @ 4' 8 1/4"	0.216	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.066 @ 4' 8 1/4"	0.431	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- 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.
- 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	Total	
1 - Stud wall - DF	5.50"	5.50"	1.50"	188	563	751	Blocking
2 - Stud wall - DF	5.50"	5.50"	1.50"	188	563	751	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' 5" o/c	
Bottom Edge (Lu)	9' 5" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 9' 4 1/2"	24"	20.0	60.0	Default Load

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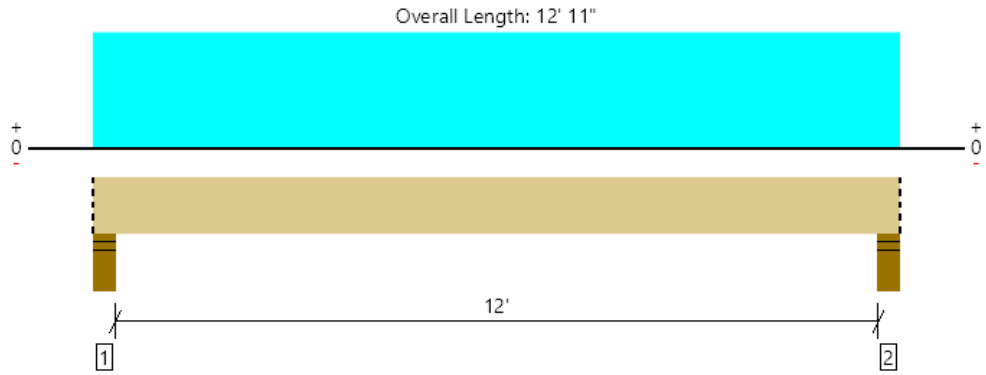
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Main Floor, 41

1 piece(s) 2 x 12 Douglas Fir-Larch No. 1 @ 24" OC



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)	1033 @ 4 1/2"	5156 (5.50")	Passed (20%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	810 @ 1' 4 3/4"	2025	Passed (40%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2961 @ 6' 5 1/2"	3032	Passed (98%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.196 @ 6' 5 1/2"	0.304	Passed (L/747)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.261 @ 6' 5 1/2"	0.608	Passed (L/560)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- 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.
- 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	Total	
1 - Stud wall - DF	5.50"	5.50"	1.50"	258	775	1033	Blocking
2 - Stud wall - DF	5.50"	5.50"	1.50"	258	775	1033	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)	1' 9" o/c	
Bottom Edge (Lu)	12' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 12' 11"	24"	20.0	60.0	Default Load

Weyerhaeuser Notes

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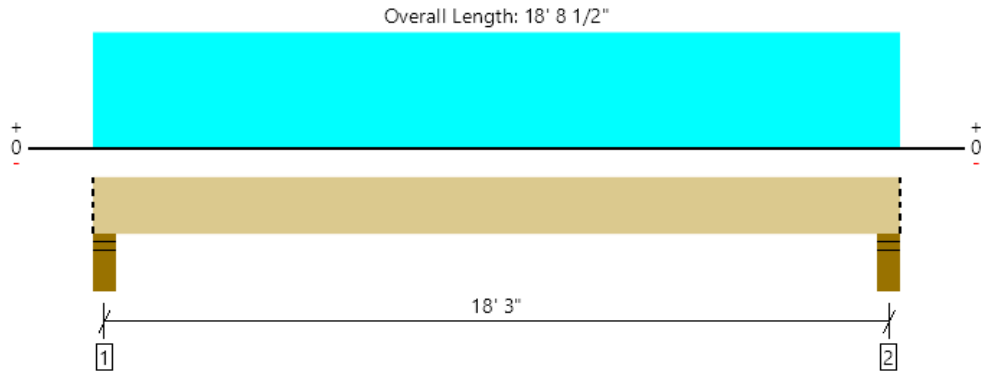
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Main Floor, 43

1 piece(s) 6 3/4" x 16 1/2" 24F-V4 DF Glulam



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)	9013 @ 4"	23203 (5.50")	Passed (39%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	7247 @ 1' 10"	19676	Passed (37%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	39205 @ 9' 4 1/4"	58608	Passed (67%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.339 @ 9' 4 1/4"	0.451	Passed (L/639)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.505 @ 9' 4 1/4"	0.902	Passed (L/429)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
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 factor of 0.96 that was calculated using length L = 18' 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	Total	
1 - Stud wall - DF	5.50"	5.50"	2.14"	2971	6043	9014	Blocking
2 - Stud wall - DF	5.50"	5.50"	2.14"	2971	6043	9014	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' 9" o/c	
Bottom Edge (Lu)	18' 9" 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)	0 to 18' 8 1/2"	N/A	27.1	--	
1 - Uniform (PLF)	0 to 18' 8 1/2" (Back)	N/A	161.5	258.5	Linked from: 27, Support 1
2 - Uniform (PLF)	0 to 18' 8 1/2" (Front)	N/A	129.0	387.5	Linked from: 41, Support 1

Weyerhaeuser Notes

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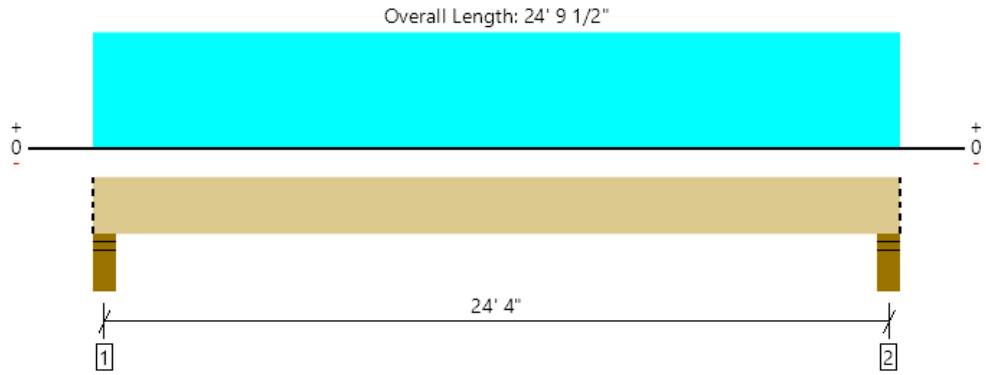
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Main Floor, 44

1 piece(s) 5 1/8" x 21" 24F-V4 DF Glulam



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)	9724 @ 4"	17617 (5.50")	Passed (55%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	7992 @ 2' 2 1/2"	19014	Passed (42%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	57073 @ 12' 4 3/4"	70256	Passed (81%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.500 @ 12' 4 3/4"	0.603	Passed (L/579)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.840 @ 12' 4 3/4"	1.206	Passed (L/345)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
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 factor of 0.93 that was calculated using length L = 24' 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	Floor Live	Total	
1 - Stud wall - DF	5.50"	5.50"	3.04"	3940	5785	9725	Blocking
2 - Stud wall - DF	5.50"	5.50"	3.04"	3940	5785	9725	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)	24' 10" o/c	
Bottom Edge (Lu)	24' 10" 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)	0 to 24' 9 1/2"	N/A	26.2	--	
1 - Uniform (PSF)	0 to 24' 9 1/2" (Front)	5' 8"	25.0	40.0	
2 - Uniform (PSF)	0 to 24' 9 1/2" (Back)	6'	25.0	40.0	

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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
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

CANTILEVER RETAINING WALL EXTERNAL STABILITY

limitations: uses Rankine coefficients for noncohesive soils, external moment at top of wall does not contribute to restoring moment (overturning only), no deflection or service load checks, soil on low side of wall does not brace wall against overturning (sliding only)

reference: Nilson & Winter, Design of Concrete Structures, 11th Edition, page 680

file author: S. Frech last modified: 4/25/2002

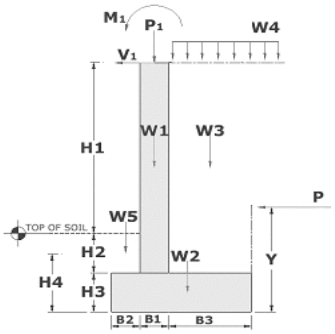
SOIL DATA

w	130	(pcf)	soil unit weight
phi	35	(deg)	soil internal angle of friction
del	0	(deg)	surface angle incline
	0.5		coeff. friction w/Concrete
	0.819		cosine(phi)
	1.000		cosine(del)
Ca	0.271	*35.23 psf*	coeff. of active pressure
Cp	2.307	*299.91 psf*	coeff. of passive pressure

Coeff. Friction			
Unit Weight	Int Friction	w. Conc	Soil
110-120	33-40	0.5-0.6	Sand or gravel, no fines
120-130	25-35	0.4-0.5	Sand or gravel, w/ fines
110-120	23-30	0.3-0.4	Silty sand, high clay
100-120	25-35	0.2-0.4	Medium or stiff clay
90-110	20-25	0.2-0.3	Soft clay, silt

WALL GEOMETRY

H1	5.25	(ft)	soil retained
H2	0.1666667	(ft)	soil depth above toe
H3	0.8333333	(ft)	footing thickness
H4	1	(ft)	passive pressure soil depth
B1	0.6666667	(ft)	wall width
B2	1.3333333	(ft)	toe width
B3	0	(ft)	heel width
H	6.25	(ft)	total height
B	2	(ft)	total base
	150	(pcf)	concrete unit weight



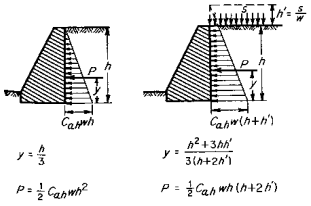
EXTERNAL LOADS

$P_{applied}$	412.5	(lb/ft)
$V_{applied}$	0	(lb/ft)
$M_{applied}$	0	(lb-ft / ft)
Surcharge	43.333333	(psf)

LOAD CALCULATIONS

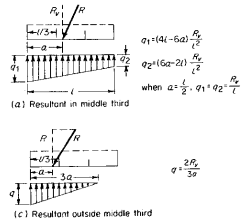
lateral soil force and overturning moment

H_{prime}	0.33	(ft)	converted surcharge
Y	2.18	(ft)	distance to soil load resultant
P	761	(lbs)	soil load resultant
	1660	(lb-ft)	Mo, soil + surcharge
	0	(lb-ft)	Mo, external load
	1,660	(lb-ft)	total overturning Moment



wall restoring forces

component	weight (#)	arm (ft)	moment (#-ft)
w1 (concrete)	542	1.67	903
w2 (concrete)	250	1.00	250
w3 (heel soil)	0	2.00	0
w4 (surcharge)	0	2.00	0
w5 (toe soil)	29	0.67	19
P applied	412.5	1.67	688
vert. force	1,233	moment	1,860

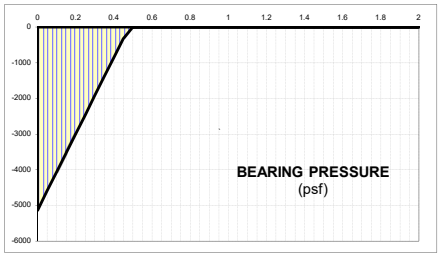


lateral sliding resistance

150	(lb)	passive pressure sliding resistance
617	(lb)	soil friction force
767	(lb)	total sliding resistance

STABILITY FACTOR OF SAFETY CHECKS

	1		F.S. overturning
	1		F.S. sliding
overturning	1.12	OK	Mr / Mo
sliding	1.01	OK	(PP+F)/(Ph+V)



SOIL BEARING

a	0.16	(ft)	distance to resultant
	0.67' to 1.33'		middle third of footing
q1	5138	(psf)	bearing pressure @ toe
q2	N.A.	(psf)	bearing pressure @ heel

FACTORED (1.7) STEM LOAD FORCES

5.4166667	(ft)	H1 + H2
1.90	(ft)	line of action (above base)
580	(lbs)	P (arm only)
580	(lbs)	Ph (arm only)
1.9	(kip-ft)	Mu (arm moment)

FACTORED (1.7) FOOTING LOADS

7.4	(kip-ft)	Mu @ Toe (Bot Reinf)
0.0	(kip-ft)	Mu @ Heel (Top Reinf)
6.29	(kip)	Vu @ Toe
0.00	(kip)	Vu @ Heel

Footing			**Wall**		
ØVc	7,969	10" thick	ØVc	5,692	8" thick
As	0.24	#4 @ 10"	As	0.15	#4 @ 16"
a	0.0004		a	0.0002	
ØMn	7.56	k-ft	ØMn	4.05	k-ft
	0.6	3-#4			
	0.0025	Reinf. Ratio			

LRFD soil	0	psf @	0.853333333	ft from Wall
	8734.6	'psf @ Toe		
	6288.912	# in Toe @	1.173333333	ft from Wall

CANTILEVER RETAINING WALL EXTERNAL STABILITY

limitations: uses Rankine coefficients for noncohesive soils, external moment at top of wall does not contribute to restoring moment (overturning only), no deflection or service load checks, soil on low side of wall does not brace wall against overturning (sliding only)

reference: Nilson & Winter, Design of Concrete Structures, 11th Edition, page 680

file author: S. Frech last modified: 4/25/2002

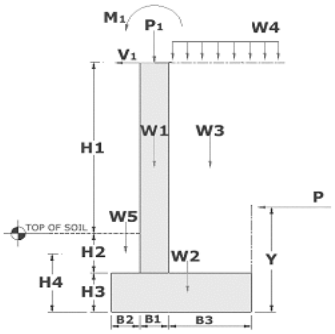
SOIL DATA

w	130	(pcf)	soil unit weight
phi	35	(deg)	soil internal angle of friction
del	0	(deg)	surface angle incline
	0.5		coeff. friction w/Concrete
	0.819		cosine(phi)
	1.000		cosine(del)
Ca	0.271	*35.23 psf*	coeff. of active pressure
Cp	2.307	*299.91 psf*	coeff. of passive pressure

Coeff. Friction			
Unit Weight	Int Friction	w. Conc	Soil
110-120	33-40	0.5-0.6	Sand or gravel, no fines
120-130	25-35	0.4-0.5	Sand or gravel, w/ fines
110-120	23-30	0.3-0.4	Silty sand, high clay
100-120	25-35	0.2-0.4	Medium or stiff clay
90-110	20-25	0.2-0.3	Soft clay, silt

WALL GEOMETRY

H1	4.3333333	(ft)	soil retained
H2	0.1666667	(ft)	soil depth above toe
H3	0.8333333	(ft)	footing thickness
H4	1	(ft)	passive pressure soil depth
B1	0.6666667	(ft)	wall width
B2	2	(ft)	toe width
B3	0	(ft)	heel width
H	5.3333333	(ft)	total height
B	2.6666667	(ft)	total base
	150	(pcf)	concrete unit weight



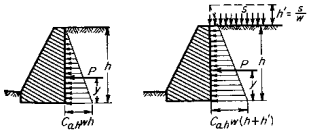
EXTERNAL LOADS

$P_{applied}$	0	(lb/ft)
$V_{applied}$	0	(lb/ft)
$M_{applied}$	0	(lb-ft / ft)
Surcharge	36	(psf)

LOAD CALCULATIONS

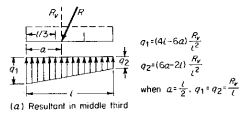
lateral soil force and overturning moment

H_{prime}	0.28	(ft)	converted surcharge
Y	1.86	(ft)	distance to soil load resultant
P	554	(lbs)	soil load resultant
	1030	(lb-ft)	Mo, soil + surcharge
	0	(lb-ft)	Mo, external load
	1,030	(lb-ft)	total overturning Moment



wall restoring forces

component	weight (#)	arm (ft)	moment (#-ft)
w1 (concrete)	450	2.33	1050
w2 (concrete)	333	1.33	444
w3 (heel soil)	0	2.67	0
w4 (surcharge)	0	2.67	0
w5 (toe soil)	43	1.00	43
P applied	0	2.33	0
vert. force	827	moment	1,538

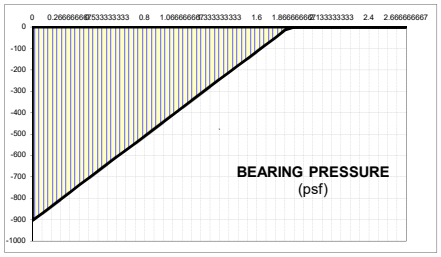


lateral sliding resistance

150	(lb)	passive pressure sliding resistance
414	(lb)	soil friction force
564	(lb)	total sliding resistance

STABILITY FACTOR OF SAFETY CHECKS

	1		F.S. overturning
	1		F.S. sliding
overturning	1.49	OK	Mr / Mo
sliding	1.02	OK	(PP+F)/(Ph+V)



SOIL BEARING

a	0.61	(ft)	distance to resultant
	0.89' to 1.78'		middle third of footing
q1	904	(psf)	bearing pressure @ toe
q2	N.A.	(psf)	bearing pressure @ heel

FACTORED (1.7) STEM LOAD FORCES

4.5	(ft)	H1 + H2
1.58	(ft)	line of action (above base)
401	(lbs)	P (arm only)
401	(lbs)	Ph (arm only)
1.1	(kip-ft)	Mu (arm moment)

FACTORED (1.7) FOOTING LOADS

5.9	(kip-ft)	Mu @ Toe (Bot Reinf)
0.0	(kip-ft)	Mu @ Heel (Top Reinf)
4.22	(kip)	Vu @ Toe
0.00	(kip)	Vu @ Heel

Footing			**Wall**		
ØVc	7,969	10" thick	ØVc	5,692	8" thick
As	0.2	#4 @ 12"	As	0.15	#4 @ 16"
a	0.0003		a	0.0002	
ØMn	6.30	k-ft	ØMn	4.05	k-ft
	0.6	3-#4			
	0.001875	Reinf. Ratio			

LRFD soil	0	psf @	0.17 ft from Wall
	1536.8	'psf @ Toe	
	4218.516	# in Toe @	1.39 ft from Wall

CANTILEVER RETAINING WALL EXTERNAL STABILITY

limitations: uses Rankine coefficients for noncohesive soils, external moment at top of wall does not contribute to restoring moment (overturning only), no deflection or service load checks, soil on low side of wall does not brace wall against overturning (sliding only)

reference: Nilson & Winter, Design of Concrete Structures, 11th Edition, page 680

file author: S. Frech last modified: 4/25/2002

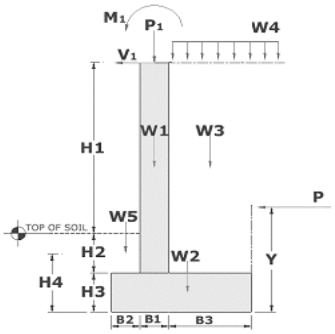
SOIL DATA

w	130	(pcf)	soil unit weight
phi	35	(deg)	soil internal angle of friction
del	0	(deg)	surface angle incline
	0.5		coeff. friction w/Concrete
	0.819		cosine(phi)
	1.000		cosine(del)
Ca	0.271	*35.23 psf*	coeff. of active pressure
Cp	2.307	*299.91 psf*	coeff. of passive pressure

Coeff. Friction			
Unit Weight	Int Friction	w. Conc	Soil
110-120	33-40	0.5-0.6	Sand or gravel, no fines
120-130	25-35	0.4-0.5	Sand or gravel, w/ fines
110-120	23-30	0.3-0.4	Silty sand, high clay
100-120	25-35	0.2-0.4	Medium or stiff clay
90-110	20-25	0.2-0.3	Soft clay, silt

WALL GEOMETRY

H1	5.3333333	(ft)	soil retained
H2	0.1666667	(ft)	soil depth above toe
H3	0.8333333	(ft)	footing thickness
H4	1	(ft)	passive pressure soil depth
B1	0.6666667	(ft)	wall width
B2	3.25	(ft)	toe width
B3	0	(ft)	heel width
H	6.3333333	(ft)	total height
B	3.9166667	(ft)	total base
	150	(pcf)	concrete unit weight



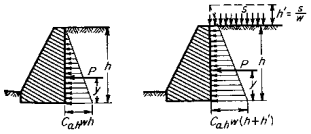
EXTERNAL LOADS

$P_{applied}$	150	(lb/ft)	
$V_{applied}$	450	(lb/ft)	1.5
$M_{applied}$	0	(lb-ft / ft)	
Surcharge	44	(psf)	

LOAD CALCULATIONS

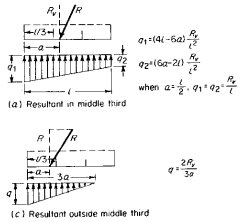
lateral soil force and overturning moment

H_{prime}	0.34	(ft)	converted surcharge
Y	2.21	(ft)	distance to soil load resultant
P	782	(lbs)	soil load resultant
	1730	(lb-ft)	Mo, soil + surcharge
	-675	(lb-ft)	Mo, external load
	1,060	(lb-ft)	total overturning Moment



wall restoring forces

component	weight (#)	arm (ft)	moment (#-ft)
w1 (concrete)	550	3.58	1971
w2 (concrete)	490	1.96	959
w3 (heel soil)	0	3.92	0
w4 (surcharge)	0	3.92	0
w5 (toe soil)	70	1.63	114
P applied	150	0.33	50
vert. force	1,260	moment	3,094



lateral sliding resistance

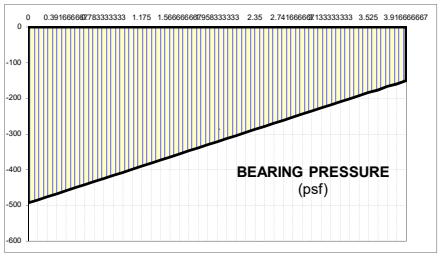
	150	(lb)	passive pressure sliding resistance
	630	(lb)	soil friction force
	780	(lb)	total sliding resistance

STABILITY FACTOR OF SAFETY CHECKS

	1		F.S. overturning
	1		F.S. sliding
overturning	2.92	OK	Mr / Mo
sliding	2.35	OK	(PP+F)/(Ph+V)

SOIL BEARING

a	1.61	(ft)	distance to resultant
	1.31' to 2.61'		middle third of footing
q1	493	(psf)	bearing pressure @ toe
q2	150	(psf)	bearing pressure @ heel



FACTORED (1.7) STEM LOAD FORCES

	5.5	(ft)	H1 + H2
	1.93	(ft)	line of action (above base)
	599	(lbs)	P (arm only)
	599	(lbs)	Ph (arm only)
	6.2	(kip-ft)	Mu (arm moment)

FACTORED (1.7) FOOTING LOADS

3.6	(kip-ft)	Mu @ Toe (Bot Reinf)
0.0	(kip-ft)	Mu @ Heel (Top Reinf)
1.94	(kip)	Vu @ Toe
0.00	(kip)	Vu @ Heel

Footing			**Wall**		
ØVc	7,969	10" thick	ØVc	5,692	8" thick
As	0.2	#4 @ 12"	As	0.24	#4 @ 10"
a	0.0003		a	0.0004	
ØMn	6.30	k-ft	ØMn	6.48	k-ft
	1	5-#4			
	0.0021277	Reinf. Ratio			

LRFD soil 354.25106 psf @ Wall interface
838.1 'psf @ Toe

786.25452 # in Toe @ 2.166666667 ft from Wall
1151.316 # in Toe @ 1.625 ft from Wall

CANTILEVER RETAINING WALL EXTERNAL STABILITY

limitations: uses Rankine coefficients for noncohesive soils, external moment at top of wall does not contribute to restoring moment (overturning only), no deflection or service load checks, soil on low side of wall does not brace wall against overturning (sliding only)

reference: Nilson & Winter, Design of Concrete Structures, 11th Edition, page 680

file author: S. Frech last modified: 4/25/2002

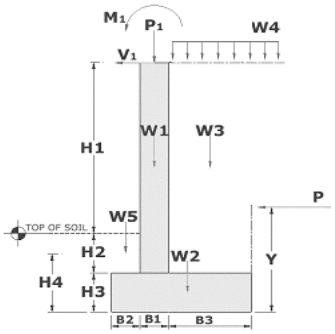
SOIL DATA

w	130	(pcf)	soil unit weight
phi	35	(deg)	soil internal angle of friction
del	0	(deg)	surface angle incline
	0.5		coeff. friction w/Concrete
	0.819		cosine(phi)
	1.000		cosine(del)
Ca	0.271	*35.23 psf*	coeff. of active pressure
Cp	2.307	*299.91 psf*	coeff. of passive pressure

Coeff. Friction			
Unit Weight	Int Friction	w. Conc	Soil
110-120	33-40	0.5-0.6	Sand or gravel, no fines
120-130	25-35	0.4-0.5	Sand or gravel, w/ fines
110-120	23-30	0.3-0.4	Silty sand, high clay
100-120	25-35	0.2-0.4	Medium or stiff clay
90-110	20-25	0.2-0.3	Soft clay, silt

WALL GEOMETRY

H1	6.3333333	(ft)	soil retained
H2	0.1666667	(ft)	soil depth above toe
H3	0.8333333	(ft)	footing thickness
H4	1	(ft)	passive pressure soil depth
B1	0.6666667	(ft)	wall width
B2	4.25	(ft)	toe width
B3	0	(ft)	heel width
H	7.3333333	(ft)	total height
B	4.9166667	(ft)	total base
	150	(pcf)	concrete unit weight



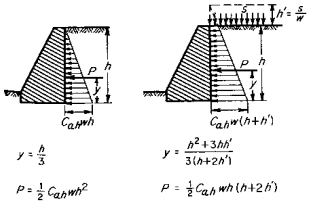
EXTERNAL LOADS

$P_{applied}$	150	(lb/ft)	
$V_{applied}$	450	(lb/ft)	1.5
$M_{applied}$	0	(lb-ft / ft)	
Surcharge	52	(psf)	

LOAD CALCULATIONS

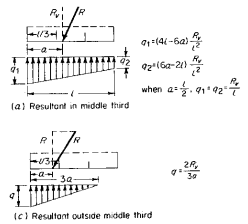
lateral soil force and overturning moment

H_{prime}	0.40	(ft)	converted surcharge
Y	2.56	(ft)	distance to soil load resultant
P	1051	(lbs)	soil load resultant
	2690	(lb-ft)	Mo, soil + surcharge
	-675	(lb-ft)	Mo, external load
	2,020	(lb-ft)	total overturning Moment



wall restoring forces

component	weight (#)	arm (ft)	moment (#-ft)
w1 (concrete)	650	4.58	2979
w2 (concrete)	615	2.46	1511
w3 (heel soil)	0	4.92	0
w4 (surcharge)	0	4.92	0
w5 (toe soil)	92	2.13	196
P applied	150	0.33	50
vert. force	1,507	moment	4,736

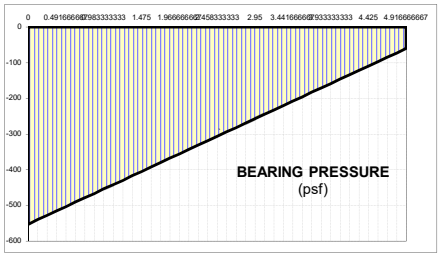


lateral sliding resistance

	150	(lb)	passive pressure sliding resistance
	754	(lb)	soil friction force
	904	(lb)	total sliding resistance

STABILITY FACTOR OF SAFETY CHECKS

	1		F.S. overturning
	1		F.S. sliding
overturning	2.34	OK	Mr / Mo
sliding	1.50	OK	(PP+F)/(Ph+V)



SOIL BEARING

a	1.80	(ft)	distance to resultant
	1.64' to 3.28'		middle third of footing
q1	553	(psf)	bearing pressure @ toe
q2	60	(psf)	bearing pressure @ heel

FACTORED (1.7) STEM LOAD FORCES

	6.5	(ft)	H1 + H2
	2.29	(ft)	line of action (above base)
	836	(lbs)	P (arm only)
	836	(lbs)	Ph (arm only)
	8.2	(kip-ft)	Mu (arm moment)

FACTORED (1.7) FOOTING LOADS

6.3	(kip-ft)	Mu @ Toe (Bot Reinf)
0.0	(kip-ft)	Mu @ Heel (Top Reinf)
2.46	(kip)	Vu @ Toe
0.00	(kip)	Vu @ Heel

Footing			**Wall**		
ØVc	7,969	10" thick	ØVc	5,692	8" thick
As	0.2325	#5 @ 16"	As	0.372	#5 @ 10"
a	0.0003		a	0.0005	
ØMn	7.32	k-ft	ØMn	10.04	k-ft
	1.55	5-#5			
	0.0026271	Reinf. Ratio			

LRFD soil 215.64068 psf @ Wall interface
940.1 'psf @ Toe

1539.4761 # in Toe @ 2.833333333 ft from Wall
916.47288 # in Toe @ 2.125 ft from Wall

CANTILEVER RETAINING WALL EXTERNAL STABILITY

limitations: uses Rankine coefficients for noncohesive soils, external moment at top of wall does not contribute to restoring moment (overturning only), no deflection or service load checks, soil on low side of wall does not brace wall against overturning (sliding only)

reference: Nilson & Winter, Design of Concrete Structures, 11th Edition, page 680

file author: S. Frech last modified: 4/25/2002

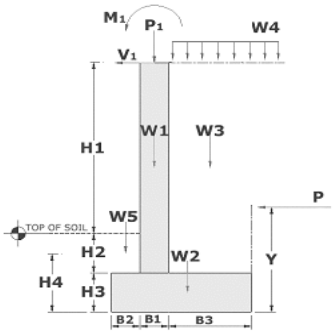
SOIL DATA

w	130	(pcf)	soil unit weight
phi	35	(deg)	soil internal angle of friction
del	0	(deg)	surface angle incline
	0.5		coeff. friction w/Concrete
	0.819		cosine(phi)
	1.000		cosine(del)
Ca	0.271	*35.23 psf*	coeff. of active pressure
Cp	2.307	*299.91 psf*	coeff. of passive pressure

Coeff. Friction			
Unit Weight	Int Friction	w. Conc	Soil
110-120	33-40	0.5-0.6	Sand or gravel, no fines
120-130	25-35	0.4-0.5	Sand or gravel, w/ fines
110-120	23-30	0.3-0.4	Silty sand, high clay
100-120	25-35	0.2-0.4	Medium or stiff clay
90-110	20-25	0.2-0.3	Soft clay, silt

WALL GEOMETRY

H1	7.3333333	(ft)	soil retained
H2	0.1666667	(ft)	soil depth above toe
H3	0.8333333	(ft)	footing thickness
H4	1	(ft)	passive pressure soil depth
B1	0.6666667	(ft)	wall width
B2	5.5	(ft)	toe width
B3	0	(ft)	heel width
H	8.3333333	(ft)	total height
B	6.1666667	(ft)	total base
	150	(pcf)	concrete unit weight



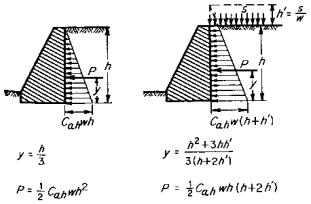
EXTERNAL LOADS

$P_{applied}$	150	(lb/ft)	
$V_{applied}$	450	(lb/ft)	1.5
$M_{applied}$	0	(lb-ft / ft)	
Surcharge	60	(psf)	

LOAD CALCULATIONS

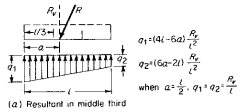
lateral soil force and overturning moment

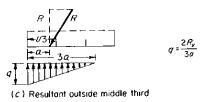
H_{prime}	0.46	(ft)	converted surcharge
Y	2.92	(ft)	distance to soil load resultant
P	1358	(lbs)	soil load resultant
	3970	(lb-ft)	Mo, soil + surcharge
	-675	(lb-ft)	Mo, external load
	3,300	(lb-ft)	total overturning Moment



wall restoring forces

component	weight (#)	arm (ft)	moment (#-ft)
w1 (concrete)	750	5.83	4375
w2 (concrete)	771	3.08	2377
w3 (heel soil)	0	6.17	0
w4 (surcharge)	0	6.17	0
w5 (toe soil)	119	2.75	328
P applied	150	0.33	50
vert. force	1,790	moment	7,129



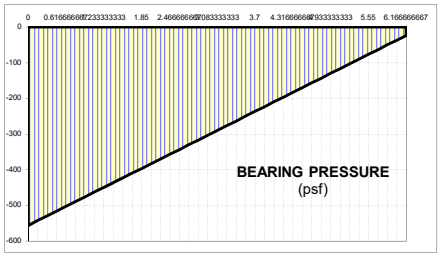


lateral sliding resistance

150	(lb)	passive pressure sliding resistance
895	(lb)	soil friction force
1045	(lb)	total sliding resistance

STABILITY FACTOR OF SAFETY CHECKS

	1		F.S. overturning
	1		F.S. sliding
overturning	2.16	OK	Mr / Mo
sliding	1.15	OK	(PP+F)/(Ph+V)



SOIL BEARING

a	2.14	(ft)	distance to resultant
	2.06' to 4.11'		middle third of footing
q1	557	(psf)	bearing pressure @ toe
q2	24	(psf)	bearing pressure @ heel

FACTORED (1.7) STEM LOAD FORCES

7.5	(ft)	H1 + H2
2.64	(ft)	line of action (above base)
1112	(lbs)	P (arm only)
1112	(lbs)	Ph (arm only)
10.7	(kip-ft)	Mu (arm moment)

FACTORED (1.7) FOOTING LOADS

10.2	(kip-ft)	Mu @ Toe (Bot Reinf)
0.0	(kip-ft)	Mu @ Heel (Top Reinf)
2.99	(kip)	Vu @ Toe
0.00	(kip)	Vu @ Heel

Footing			**Wall**		
ØVc	7,969	10" thick	ØVc	5,692	8" thick
As	0.372	#5 @ 10"	As	0.465	#5 @ 8"
a	0.0005		a	0.0007	
ØMn	11.72	k-ft	ØMn	12.55	k-ft
	1.55	5-#5			
	0.0020946	Reinf. Ratio			

LRFD soil 138.75676 psf @ Wall interface
946.9 'psf @ Toe

2222.3939 # in Toe @ 3.666666667 ft from Wall
763.16216 # in Toe @ 2.75 ft from Wall

CANTILEVER RETAINING WALL EXTERNAL STABILITY

limitations: uses Rankine coefficients for noncohesive soils, external moment at top of wall does not contribute to restoring moment (overturning only), no deflection or service load checks, soil on low side of wall does not brace wall against overturning (sliding only)

reference: Nilson & Winter, Design of Concrete Structures, 11th Edition, page 680

file author: S. Frech last modified: 4/25/2002

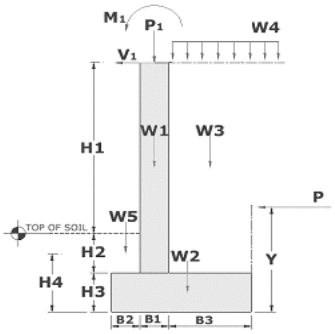
SOIL DATA

w	130	(pcf)	soil unit weight
phi	35	(deg)	soil internal angle of friction
del	0	(deg)	surface angle incline
	0.5		coeff. friction w/Concrete
	0.819		cosine(phi)
	1.000		cosine(del)
Ca	0.271	*35.23 psf*	coeff. of active pressure
Cp	2.307	*299.91 psf*	coeff. of passive pressure

Coeff. Friction			
Unit Weight	Int Friction	w. Conc	Soil
110-120	33-40	0.5-0.6	Sand or gravel, no fines
120-130	25-35	0.4-0.5	Sand or gravel, w/ fines
110-120	23-30	0.3-0.4	Silty sand, high clay
100-120	25-35	0.2-0.4	Medium or stiff clay
90-110	20-25	0.2-0.3	Soft clay, silt

WALL GEOMETRY

H1	8.3333333	(ft)	soil retained
H2	0.1666667	(ft)	soil depth above toe
H3	0.8333333	(ft)	footing thickness
H4	1	(ft)	passive pressure soil depth
B1	0.6666667	(ft)	wall width
B2	6.5	(ft)	toe width
B3	0	(ft)	heel width
H	9.3333333	(ft)	total height
B	7.1666667	(ft)	total base
	150	(pcf)	concrete unit weight



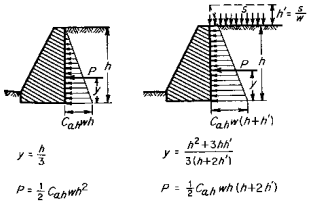
EXTERNAL LOADS

$P_{applied}$	200	(lb/ft)	
$V_{applied}$	600	(lb/ft)	2
$M_{applied}$	0	(lb-ft / ft)	
Surcharge	68	(psf)	

LOAD CALCULATIONS

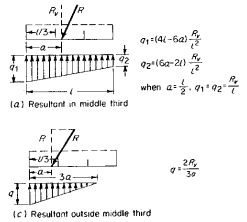
lateral soil force and overturning moment

H_{prime}	0.52	(ft)	converted surcharge
Y	3.27	(ft)	distance to soil load resultant
P	1705	(lbs)	soil load resultant
	5580	(lb-ft)	Mo, soil + surcharge
	-1200	(lb-ft)	Mo, external load
	4,380	(lb-ft)	total overturning Moment



wall restoring forces

component	weight (#)	arm (ft)	moment (#-ft)
w1 (concrete)	850	6.83	5808
w2 (concrete)	896	3.58	3210
w3 (heel soil)	0	7.17	0
w4 (surcharge)	0	7.17	0
w5 (toe soil)	141	3.25	458
P applied	200	0.33	67
vert. force	2,087	moment	9,543

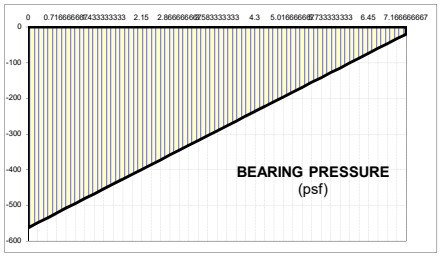


lateral sliding resistance

	150	(lb)	passive pressure sliding resistance
	1044	(lb)	soil friction force
	1194	(lb)	total sliding resistance

STABILITY FACTOR OF SAFETY CHECKS

	1		F.S. overturning
	1		F.S. sliding
overturning	2.18	OK	Mr / Mo
sliding	1.08	OK	(PP+F)/(Ph+V)



SOIL BEARING

a	2.47	(ft)	distance to resultant
	2.39' to 4.78'		middle third of footing
q1	563	(psf)	bearing pressure @ toe
q2	20	(psf)	bearing pressure @ heel

FACTORED (1.7) STEM LOAD FORCES

	8.5	(ft)	H1 + H2
	2.99	(ft)	line of action (above base)
	1428	(lbs)	P (arm only)
	1428	(lbs)	Ph (arm only)
	15.9	(kip-ft)	Mu (arm moment)

FACTORED (1.7) FOOTING LOADS

14.3	(kip-ft)	Mu @ Toe (Bot Reinf)
0.0	(kip-ft)	Mu @ Heel (Top Reinf)
3.50	(kip)	Vu @ Toe
0.00	(kip)	Vu @ Heel

Footing			**Wall**		
ØVc	7,969	10" thick	ØVc	5,692	8" thick
As	0.465	#5 @ 8"	As	0.62	#5 @ 6"
a	0.0007		a	0.0009	
ØMn	14.65	k-ft	ØMn	16.74	k-ft
	0.6	3-#4			
	0.0006977	Reinf. Ratio			

LRFD soil 119.86977 psf @ Wall interface
957.1 'psf @ Toe

2720.9983 # in Toe @ 4.333333333 ft from Wall
779.15349 # in Toe @ 3.25 ft from Wall