STRUCTURAL CALCULATIONS

Mithalia Residence
3632 90th Ave SE
Mercer Island, WA - 98040

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

ATLAS CONSULTING ENGINEERS INC.

Project:	Mithalia Residence	By:	JDA
Proj No:	210-2022	Date:	10/17/2022

Summary

The project consists of a new single-family residence located in Mercer Island. The existing lot consists of a moderate sloping site at the east, from elevation 224' to 258', while the remaining portion of the lot remains relatively flat at an average of 266'.

The new three-story residential structure will be set into the sloped site at the west and daylight at the east. Based on the Geotechnical Evaluation Report authored by American Geoservices, the following foundation design considerations will be used: (1) Conventional shallow foundations with a maximum allowable bearing capacity of 2,000 psf with all footings being placed at least 3 feet below existing grades, (2) Passive earth pressure of 300 pcf and unfactored coefficient of friction value of 0.4, (3) Continuous foundation walls reinforced in the top and bottom to span an unsupported length of 8 feet to further aide in resisting differential movement, (4) Braced foundation wallsdesigned to resist an equivalent fluid density of 65 pcf. East of the setback line, foundations for the retaining wall, recessed patio area, and posts for the main floor deck will be founded on pin-pile supported grade beams.

The residence will be comprised of the following: reinforced concrete strip and spread footings; concrete slab-on-grade lower floor; wood framed connector plat truss main and upper floors supported on interior and exterior wood framed load bearing walls, beams, and posts at each level; and connector plate wood trusses framing the flat roof. The lateral systems will consist of wood sheathed diaphragms and shear walls (tongue & groove plywood floor/roof/wall sheathing), and Simpson StrongTie holdowns.

See pages 2-3 for lateral design. Site seismic variables are shown on page 4; seismic areas and shearwall lengths are shown on pages 5-9; wall and wind areas on pages 10; and wind load derivation is shown on pages 11 - 17 (Kzt of 1.6 used based on Mercer Island map) . Seismic and wind loads were determined using ASCE 7-16 procedures. As shown on pages 2-3, shearwalls with 10d nails spaced at 6" o.c. (SW-6), 4" o.c. (SW-4), 3" o.c. (SW-3), 2" o.c. (SW-2), 4" o.c. at each side (SW-4), 3" o.c. at each side (SW-33), and 2" o.c. at each side (SW-22) of wall are required. Shearwalls have been detailed to meet the ASD shearwall capacity values as listed in plans. 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. Note that transfer shearwalls (i.e. non-stacking shearwalls that occur atop framing) occur. Per ASCE 7, the supporting members have been designed to consider holdown forces with the 2.5 overstrength factor to ensure sufficient strength is provided...serviceability (i.e. deflection) does not consider overstrength. Strapped shearwalls were used to minimize holdowns and holdown demand where applicable...note that sheathing above and below opening is not considered when sizing shearwalls, only to distribute load across openings and determine strap forces. See pages 18 - 21 for force transfer around opening calculations. Diaphragm will use 3/4" T&G sheathing with 10d @ 6" oc at panel edges.

Gravity system was designed for 25 psf roof snow + 5 psf rain load, 15 psf roof dead load + 10 psf PV roof dead load, 40 psf floor live load, 60 psf roof deck load, and 25 psf floor dead load. See pages 22-24 for framing key; and pages 25 - 90 for member designs. Uplift for each member considering 0.6D+0.6W will be resisted by straps, holdowns, or post caps at headers/beams; and H2.5a hurricane ties at rafters and trusses.

Design footings for a 2000 psf bearing pressure, and walls for 65 pcf/50 pcf (restrained/unrestrained) lateral earth pressure. Provide minimum reinforcing in footings and walls per ACI. See pages 91 - 97 for design of grade beams, pages 98 - 103 for design of foundation walls and foundation wall bracing; and pages 104 - 105 for design of retaining walls

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R	6.5		*ASCE 7-16 Table 12.2-1*
Ω_o	2.5		
C_d	4		
V	50.9	Kips	= CsW ~ ASCE 7-16 (12.8-1)
C_s	0.173		
	0.173		= Sds / (R/Ie) ~ ASCE 7-16 (12.8-2)
	0.329		< 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)
	0.049		>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	295	Kips	
I_e	1		ATC Hazard
F_v	1.812		Table 11.4-2 and Section 11.4.8 Exception
F_a	1.2		ATC Hazard
S_S	1.403	g	ATC Hazard
S_1	0.488	g	ATC Hazard
S_{mS}	1.684	g	ATC Hazard
S_{m1}	0.884256	g	= $F_v S_1$ ~ ASCE 7-16 (11.4-1)
S_{ds}	1.122	g	ATC Hazard
S_{d1}	0.589504	g	= 2/3 S_{m1} ~ ASCE 7-16 (11.4-4)
S_{DC}	D		
T_a	0.275	seconds	= Ctlhnx ~ ASCE 7-16 (12.8-7)
C_t	0.02		*ASCE 7-16 Table 12.8-2*
h_n	33.00	feet	
x	0.75		*ASCE 7-16 Table 12.8-2*
T_L	6	seconds	USGS Seismic Values
T_S	0.525	seconds	= S_{m1} /S_{ds}, ASCE 7-16 (11.4-3)
$1.5T_S$	0.788	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* ($C_{vx}V$)	$\sum F_{xE}$, *Kips LRFD*	F_{xE}, *Kips* ($C_{vx}V$)	$\sum F_{xE}$, *Kips ASD*	F_{xW}, *Kips East ASD*	F_{xW}, *Kips North ASD*
Roof	78.22	33.00	2,581	0.44	*22.3*	*22.3*	*15.580*	***15.580***	*3.396*	*4.397*
Upper	91.04	22.00	2,003	0.34	*17.3*	*39.5*	*12.089*	***27.670***	*6.621*	*8.795*
Main	125.64	10.50	1,319	0.22	*11.4*	*50.9*	*7.963*	***35.633***	*6.344*	*7.907*
∑W	294.90									

LEFT-to-RIGHT RUNNING WALLS

Upper - 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				
N	50.0%	23.04	7,790			1,698									*9*	*ft*		
		24.58	6,706	273	2,455	1,461	59	535	2,655	0	0	0	1,867	4,119	3	OK	MSTC40	OK
	36.5%	8.42	2,846	338		620									3	OK		
	30.4%	7.00	2,367	338		516									3	OK		
	19.2%	4.42	1,493	338		325									3	OK		
	13.9%	3.21	1,085	338	3,043	236	74	663	347	0	0	0	2,966	3,260	4	OK	MSTC52	OK
S	50.0%	8.88	7,790			1,698									*9*	*ft*		
	100.0%	8.88	7,790	878	7,900	1,698	191	1,722	959	0	0	0	7,688	8,501	44	OK	HDU8	OK

Main -to- Upper

	%	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				
N	38.8%	23.75	12,477			4,265										*10*	*ft*		
1129	81.4%	23.92	10,157	425	4,247	4,265	178	1,783	2,870	0	0	0	3,611	6,046	14,198	3	OK	MSTC66	OK
	24.6%	5.83	3,065	525		1,048	180									3	OK		
	16.1%	3.83	2,014	525		688	180									3	OK		
	16.1%	3.83	2,014	525		688	180									3	OK		
	24.6%	5.83	3,065	525		1,048	180									3	OK		
	18.6%	4.42	2,320	525	5,254	793	180	1,796	530	0	0	0	8,102	5,586	18,584	3	OK	HDU11	OK
M	43.7%	26.42	5,281			2,892										*10*	*ft*		
1272	25.2%	6.67	1,333	200	1,999	730	109	1,095	800	0	0	0	1,822	2,501	6,869	6	OK	MSTC40	OK
	47.3%	12.50	2,499	200	1,999	1,369	109	1,095	1,500	0	0	0	1,667	2,939	6,633	6	OK	MSTC40	OK
	9.5%	2.50	500	200	1,999	274	109	1,095	300	0	0	0	1,933	2,187	7,038	6	OK	MSTC40	OK
	18.0%	4.75	950	200	1,999	520	109	1,095	570	0	0	0	1,873	2,356	6,947	6	OK	MSTC40	OK
S	17.5%	26.75	9,912			2,860										*10*	*ft*		
511	100.0%	37.92	9,912	261	2,614	2,860	75	754	4,550	0	0	0	1,606	5,466	7,799	3	OK	MSTC40	OK
	12.8%	3.42	1,266	371		365	107									3	OK		
	23.1%	6.17	2,285	371		659	107									3	OK		
	14.6%	3.92	1,451	371		419	107									3	OK		
	49.5%	13.25	4,910	371		1,417	107									3	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				
N	50.0%	31.17	16,459			7,437										*10*	*ft*		
1165	63.6%	19.83	10,474	528	5,281	4,733	239	2,386	2,380	0	0	0	4,754	6,773	18,056	3	OK	HDU5	OK
	14.2%	4.42	2,332	528	5,281	1,054	239	2,386	530	0	0	0	5,164	5,613	18,681	3	OK	HDU5	OK
	22.2%	6.92	2,324	336	3,361	1,050	152	1,518	830	0	0	0	3,177	3,881	11,722	4	OK	HDU4	OK
M	50.0%	48.25	9,262			6,064										*10*	*ft*		
1333	13.8%	6.67	1,280	192	1,920	838	126	1,257	800	0	0	0	1,742	2,421	6,586	6	OK	HDU2	OK
	33.5%	16.17	3,103	192	1,920	2,032	126	1,257	1,940	0	0	0	1,490	3,136	6,201	6	OK	HDU2	OK
	5.2%	2.50	480	192	1,920	314	126	1,257	300	0	0	0	1,853	2,108	6,755	6	OK	HDU2	OK
	16.9%	8.17	1,568	192	1,920	1,026	126	1,257	980	0	0	0	1,703	2,534	6,525	6	OK	HDU2	OK
	26.4%	12.75	2,448	192	1,920	1,602	126	1,257	1,530	0	0	0	1,581	2,879	6,339	6	OK	HDU2	OK
	4.1%	2.00	384	192	1,920	251	126	1,257	240	0	0	0	1,866	2,070	6,775	6	OK	HDU2	OK
S	50.0%	25.17	13,893			3,537										*10*	*ft*		
614	40.1%	10.08	5,566	552	5,520	1,417	141	1,406	1,210	0	0	0	5,252	6,279	19,307	3	OK	HDU5	OK
	26.8%	6.75	3,726	552	5,520	949	141	1,406	810	0	0	0	5,341	6,028	19,442	3	OK	HDU5	OK
	16.6%	4.17	2,300	552	5,520	586	141	1,406	500	0	0	0	5,410	5,834	19,547	3	OK	HDU5	OK
	16.6%	4.17	2,300	552	5,520	586	141	1,406	500	0	0	0	5,410	5,834	19,547	3	OK	HDU5	OK

UP-to-DOWN RUNNING WALLS

Upper - 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				
W	50.0%	15.08	7,790	516		2,199	146								9	ft		
		17.08	7,790	456	4,104	2,199	129	1,158	1,845	0	0	0	3,696	5,261	3	OK	HDU4	OK
	49.2%	7.42	3,831	516		1,081	146								3	OK		
	50.8%	7.67	3,960	516		1,118	146								3	OK		
E	50.0%	7.08	7,790	1,100		2,199	310								9	ft		
	100.0%	7.08	7,790	1,100	9,898	2,199	310	2,794	765	0	0	0	9,729	10,378	33	OK	HDU11	OK

Main -to- Upper

				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				
W	22.5%	13.92	10,509			4,177										10	ft		
723	21.6%	3.00	2,265	755	7,551	900	300	3,001	360	0	0	0	7,472	7,777		44	OK	HDU8	OK
	21.6%	3.00	2,265	755	7,551	900	300	3,001	360	0	0	0	7,472	7,777		44	OK	HDU8	OK
	26.9%	3.75	2,832	755	7,551	1,125	300	3,001	450	0	0	0	7,452	7,833		44	OK	HDU8	OK
	29.9%	4.17	3,146	755	7,551	1,250	300	3,001	500	0	0	0	7,441	7,865		44	OK	HDU8	OK
M1	38.0%	23.08	4,591			3,340										10	ft		
1221	100.0%	23.08	4,591	199	1,989	4,177	181	1,809	2,770	0	0	0	1,376	3,725		4	OK	MSTC40	OK
M2	19.8%	3.25	2,392			1,740										10	ft		
636	100.0%	3.25	2,392	736	7,359	1,740	535	5,353	390	0	0	0	7,272	7,603		44	OK	HDU11	OK
E	19.8%	7.25	10,178	1,404		3,936	543									10	ft		
635	100.0%	7.25	10,178	1,404	14,039	3,936	543	5,429	870	0	0	0	13,846	14,584		22	OK	HDU14	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				
W	16.2%	40.00	11,796			5,454										10	ft		
503	60.0%	24.00	7,077	295	2,949	3,272	136	1,364	2,880	0	0	0	2,311	4,754		2	OK	HDU2	OK
	66.7%	16.00	7,864	491	4,915	3,636	227	2,273	1,920	0	0	0	4,490	6,118		2	OK	HDU4	OK
M1	22.9%	18.08	6,418			5,154										10	ft		
714	62.2%	11.25	3,993	355	3,549	3,206	285	2,850	1,350	0	0	0	3,250	4,395		4	OK	HDU4	OK
	37.8%	6.83	2,425	355	3,549	1,947	285	2,850	820	0	0	0	3,367	4,063		4	OK	HDU4	OK
M2	27.7%	12.25	4,599	375		3,932	321									10	ft		
863	68.7%	8.42	3,160	375	3,754	2,701	321	3,210	1,010	0	0	0	3,531	4,387		4	OK	HDU4	OK
	31.3%	3.83	1,439	375	3,754	1,230	321	3,210	460	0	0	0	3,652	4,043		4	OK	HDU4	OK
E	33.2%	19.33	12,820			6,559										10	ft		
1033	54.7%	10.58	7,018	663	6,631	3,591	339	3,393	1,270	0	0	0	6,350	7,427		2	OK	HDU8	OK
	34.9%	6.75	4,476	663	6,631	2,290	339	3,393	810	0	0	0	6,452	7,139		2	OK	HDU8	OK
	10.3%	2.00	1,326	663	6,631	679	339	3,393	240	0	0	0	6,578	6,782		2	OK	HDU8	OK

Hazards by Location

Search Information

Address:	3632 90th Ave SE, Mercer Island, WA 98040, USA
Coordinates:	47.5772184, -122.2181489
Elevation:	263 ft
Timestamp:	2022-07-16T15:08:57.346Z
Hazard Type:	Seismic
Reference Document:	ASCE7-16
Risk Category:	II
Site Class:	D-default

Basic Parameters

Name	Value	Description
S_S	1.403	MCE_R ground motion (period=0.2s)
S_1	0.488	MCE_R ground motion (period=1.0s)
S_{MS}	1.684	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	1.122	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

Additional Information

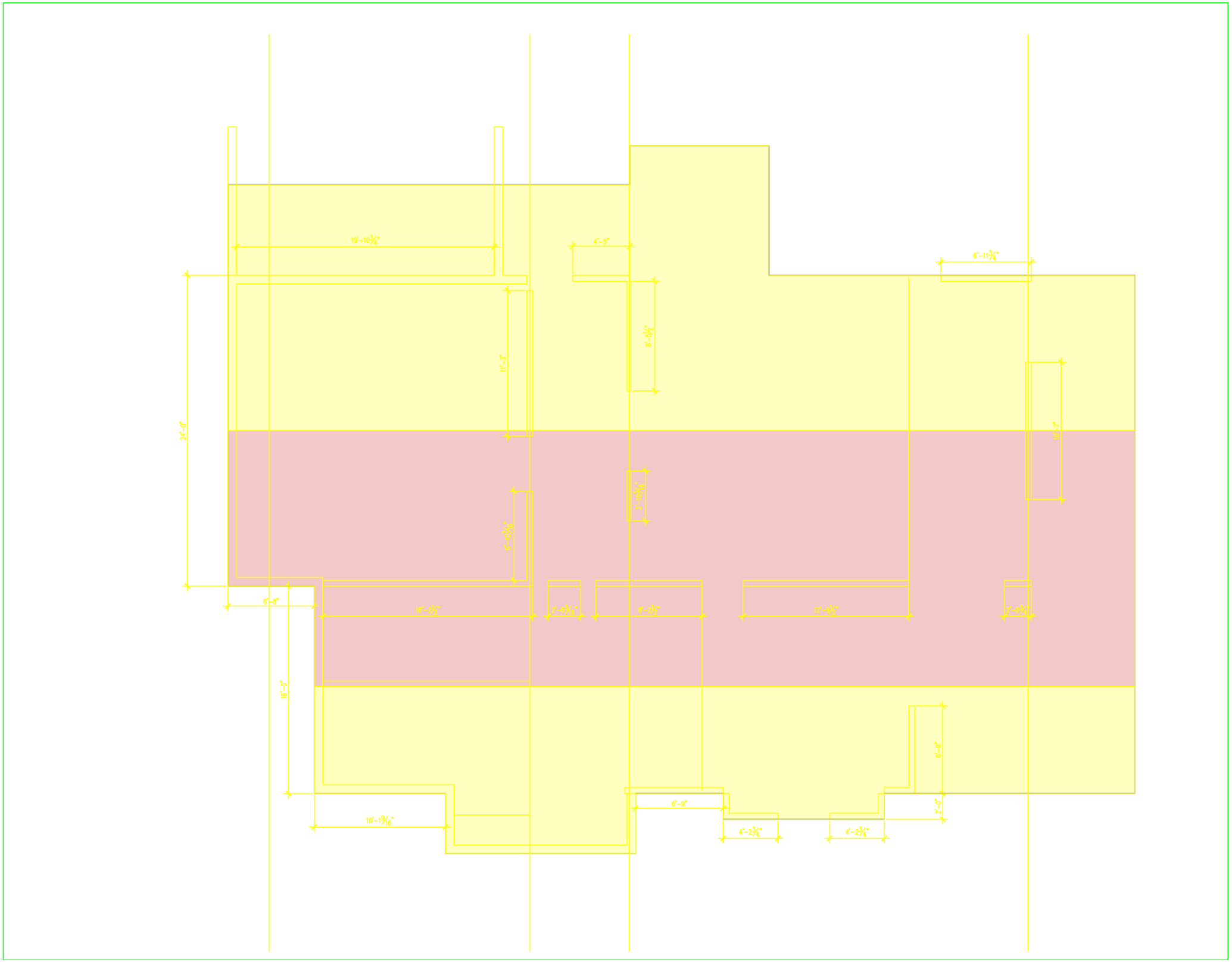
Name	Value	Description
SDC	* null	Seismic design category
F_a	1.2	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.903	Coefficient of risk (0.2s)
CR_1	0.897	Coefficient of risk (1.0s)
PGA	0.6	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	0.72	Site modified peak ground acceleration
T_L	6	Long-period transition period (s)
SsRT	1.403	Probabilistic risk-targeted ground motion (0.2s)
SsUH	1.554	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	3.533	Factored deterministic acceleration value (0.2s)
S1RT	0.488	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.544	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.42	Factored deterministic acceleration value (1.0s)
PGAd	1.208	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.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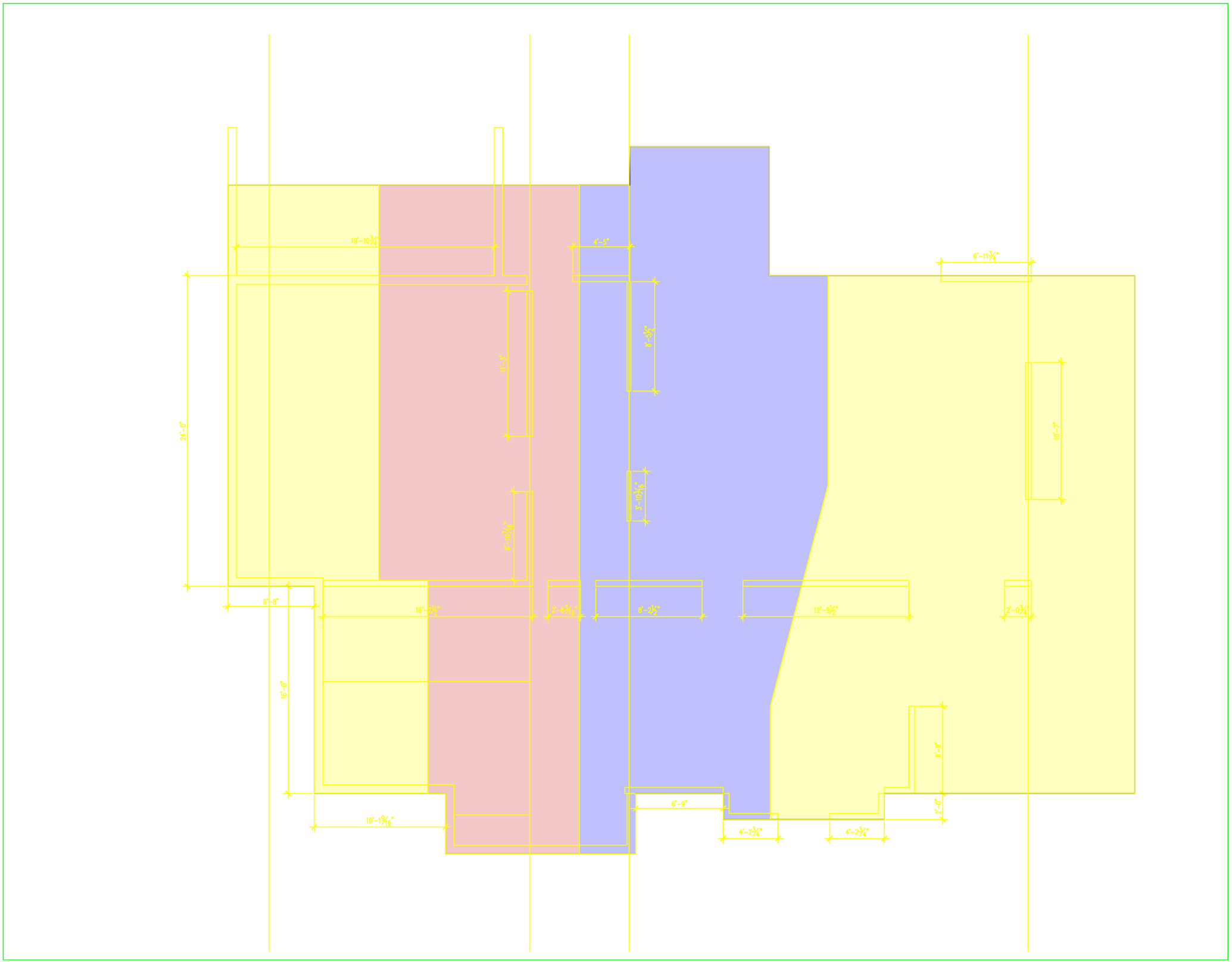
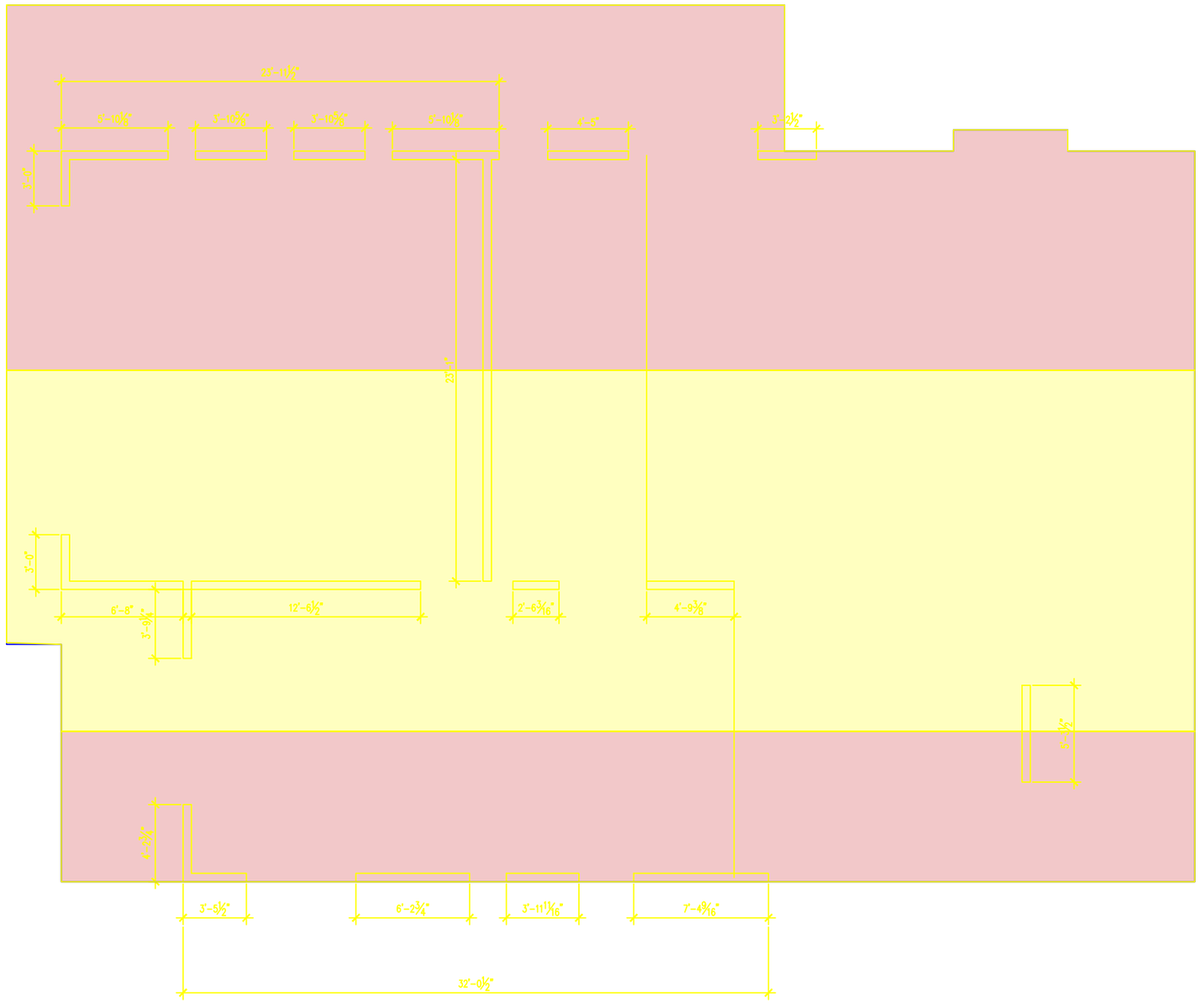
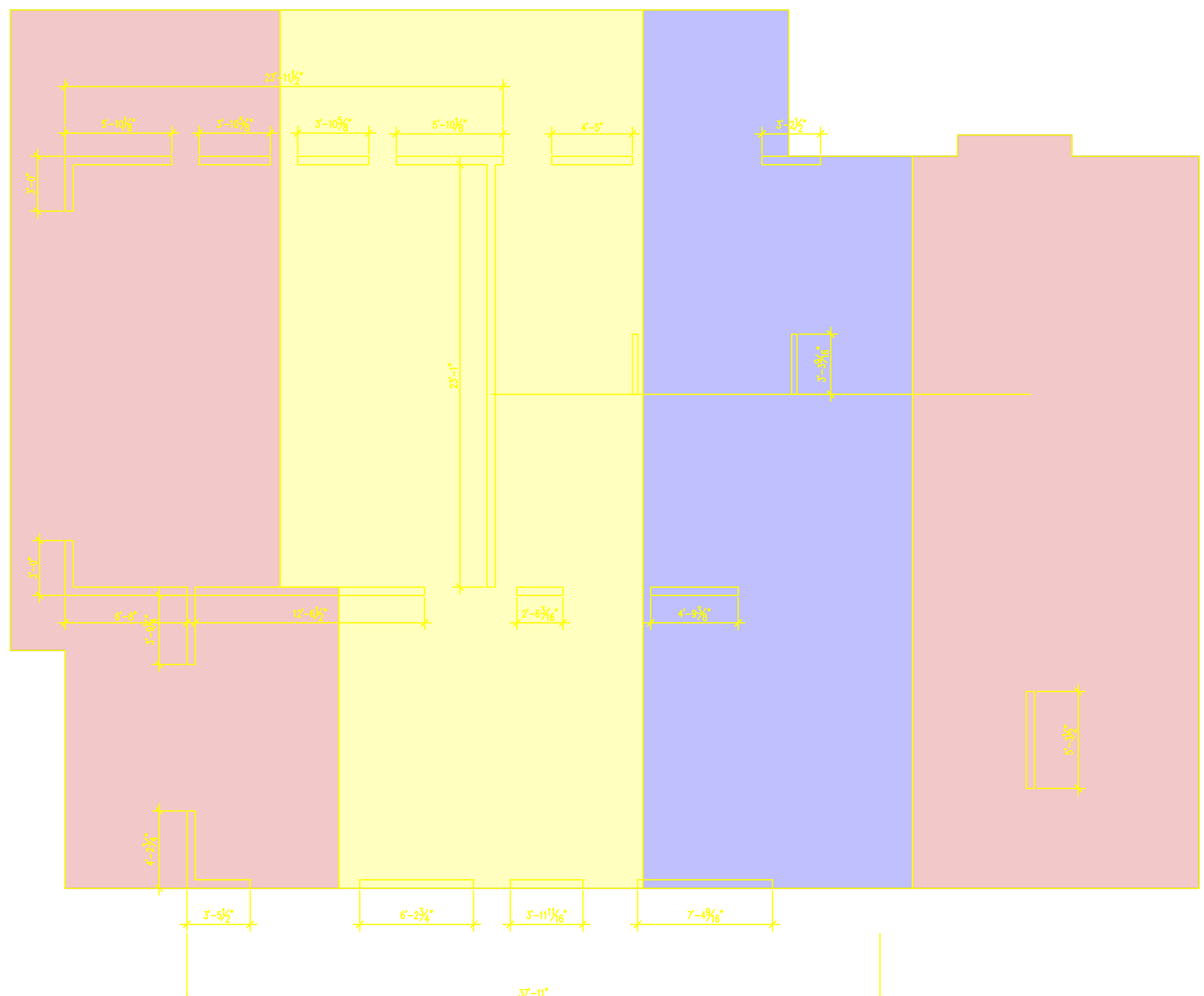
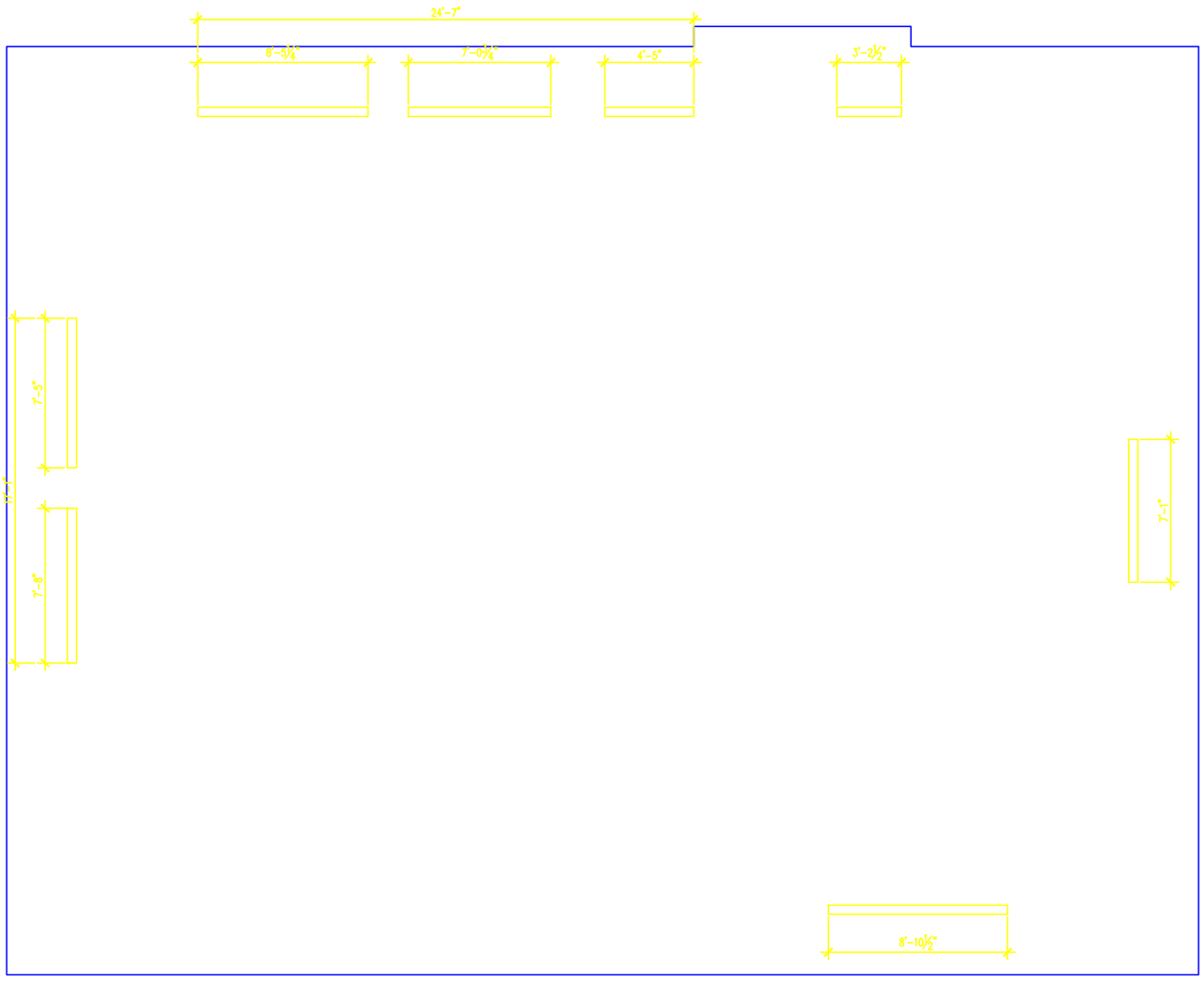
4'-5"
6'-11¾"
8'-5½"
11'-3"
24'-0"
6'-1⅜"
6'-6½"
10'-7"
6'-8"
16'-2½"
2'-8⅜"
8'-2½"
12'-8½"
2'-1⅜"
16'-0"
6'-9"
6'-9"
10'-1³⁄₁₆"
4'-2¾"
4'-2¾"
2'-9"


19'-10¾"
4'-5"
6'-11¾"
24'-0"
11'-3"
8'-4⅛"
10'-7"
6'-4⅞"
6'-6⅛"
6'-8"
16'-2½"
2'-6⅜"
8'-4½"
12'-9½"
2'-0¾"
16'-0"
6'-9"
10'-1⅜16"
6'-9"
4'-2¾"
4'-2¾"
2'-0"


28–1½"
5–10⅜"
3–10⅜"
3–10⅜"
5–10⅜"
4–#
3–2½"
2'-1"
23'-1"
3'-0"
6'–8"
3'–9¼"
12'–6½"
2'–6³⁄₁₆"
4'–9⅜"
6'–1½"
4'–3⅜"
3'–5½"
6'–2¾"
3'–11¹⁄₁₆"
7'–4⁹⁄₁₆"
32'–0½"



23'-11½"
5'-10⅛"
3'-10⅝"
3'-10⅝"
5'-10⅛"
4'-5"
3'-2½"
3'-0"
23'-1"
3'-3 9/16"
3'-0"
6'-8"
3'-9¼"
12'-6½"
2'-6 3/16"
4'-9⅜"
5'-3½"
4'-2¾"
3'-5½"
6'-2¾"
3'-11 11/16"
7'-4 9/16"
37'-11"


24'-7"
8'-5¾"
7'-0¾"
4'-5"
3'-2½"
7'-3"
7'-8"
7'-1"
8'-10½"

45 sf
x 6.3 psf

247 sf x 12.6 psf

91 sf
x 6.3 psf

480 sf x 12.6 psf

89 sf
x 6.3 psf

459 sf x 12.6 psf

16'-0"

16'-0"

8'-0"

8'-0"

9'-0"

10'-0"

33'-0"

5'-0"

5'-0"

5'-0"

5'-0"

9'-9"

3'-0"

40'-0"

3'-2"

5'-4"

6'-3"

6'-3"

5'-0"

5'-0"

5'-0"

8'-0"

BSMT 256

62'-0½"

8'-0"

EAST ELEV.

46 sf
x 6.3 psf

326 sf x 12.6 psf

90 sf
x 6.3 psf

653 sf x 12.6 psf

77 sf
x 6.3 psf

589 sf x 12.6 psf

10'-0"

7'-0"

5'-0"

5'-0"

reversable
awning

3'-6"

5'-10"

2'-0"

9'-0"

5'-6"

5'-6"

egress

5'-0"

1'-6"

8'-1"

9'-0"

wood siding

6'-3"

6'-3"

5'-5"

MAIN 266.5

5'-0"

6'-0"

6'-3"

10'-9 15/16"

NORTH ELEV.

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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)	0.00 / 12	0.0 deg
Building length (L)	62.0 ft	
Least width (B)	40.0 ft	
Mean Roof Ht (h)	33.0 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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Wind Loads : ASCE 7- 10

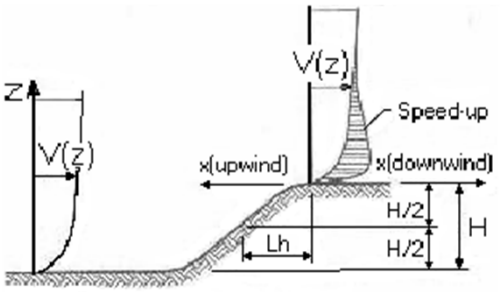
Ultimate Wind Speed	110 mph
Nominal Wind Speed	85.2 mph
Risk Category	II
Exposure Category	B
Enclosure Classif.	Enclosed Building
Internal pressure	+/-0.18
Directionality (Kd)	0.85
Kh case 1	0.720
Kh case 2	0.720
Type of roof	Gable

Topographic Factor (Kzt)

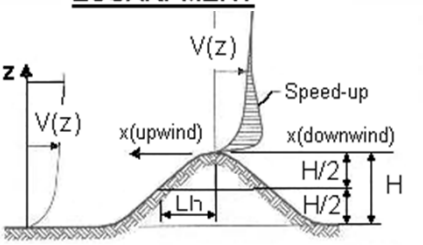
Topography		2D Escarpment
Hill Height	(H)	0.0 ft
Half Hill Length (Lh)		39.4 ft
Actual H/Lh	=	0.00
Use H/Lh	=	0.00
Modified Lh	=	39.4 ft
From top of crest: x =		0.0 ft
Bldg up/down wind?		upwind

H< 60ft;exp B
∴ Kzt=1.0

H/Lh= 0.00	K_1 =	0.000	
x/Lh = 0.00	K_2 =	1.000	
z/Lh = 0.84	K_3 =	0.123	
At Mean Roof Ht:			
$Kzt = (1+K_1K_2K_3)^2$ =		1.00	use 1.60



ESCARPMENT



2D RIDGE or 3D AXISYMMETRICAL HILL

Gust Effect Factor

h =	33.0 ft
B =	40.0 ft
/z (0.6h) =	30.0 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 = 0.83 Rigid structure

G = 0.85 Using rigid structure default

Rigid Structure

$\bar{e}$ =	0.33	
ℓ =	320 ft	
z_{min} =	30 ft	
c =	0.30	
g_Q, g_v =	3.4	
L_z =	310.0 ft	
Q =	0.89	
I_z =	0.30	
G =	0.86	use G = 0.85

Flexible or Dynamically Sensitive Structure

Natural Frequency (η_1) =	0.0 Hz				
Damping ratio (β) =	0				
/b =	0.45				
/α =	0.25				
Vz =	70.9				
N_1 =	0.00				
R_n =	0.000				
R_h =	28.282	η =	0.000	h =	33.0 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				

Enclosure Classification

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

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

Kz = Kh (case 1) = 0.72
Base pressure (qh) = **18.2 psf**
GCpi = +/-0.18

Edge Strip (a) = 4.0 ft
End Zone (2a) = 8.0 ft
Zone 2 length = 20.0 ft

Wind Pressure Coefficients

	CASE A				CASE B		
Surface	GCpf	θ = 0 deg 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		10.6	4.0		-4.9	-11.5
2		-9.3	-15.8		-9.3	-15.8
3		-3.5	-10.0		-3.5	-10.0
4		-2.0	-8.6		-4.9	-11.5
5					10.6	4.0
6					-2.0	-8.6
1E		14.4	7.8		-5.5	-12.0
2E		-16.2	-22.7		-16.2	-22.7
3E		-6.4	-12.9		-6.4	-12.9
4E		-4.5	-11.1		-5.5	-12.0
5E					14.4	7.8
6E					-4.5	-11.1

Parapet

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

Windward roof overhangs = 12.7 psf (upward) add to windward roof pressure

Horizontal MWFRS Simple Diaphragm Pressures (psf)

Transverse direction (normal to L)

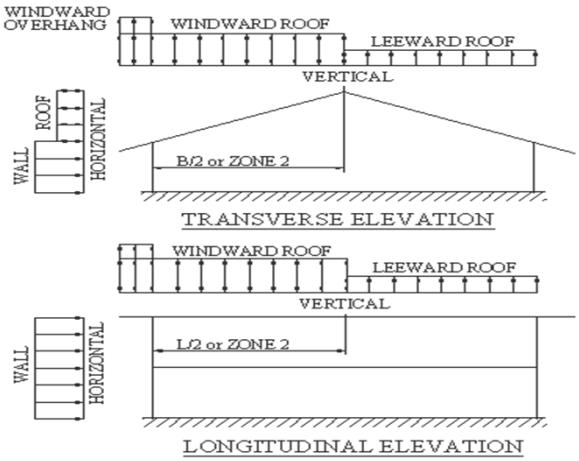
Interior Zone: Wall 12.6 psf
Roof -5.8 psf **
End Zone: Wall 18.9 psf
Roof -9.8 psf **

Longitudinal direction (parallel to L)

Interior Zone: Wall 12.6 psf
End Zone: Wall 18.9 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.



Location of MWFRS Wind Pressure Zones

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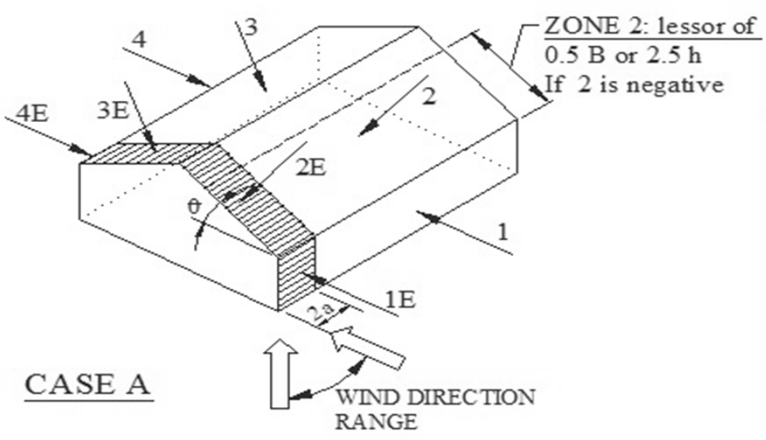
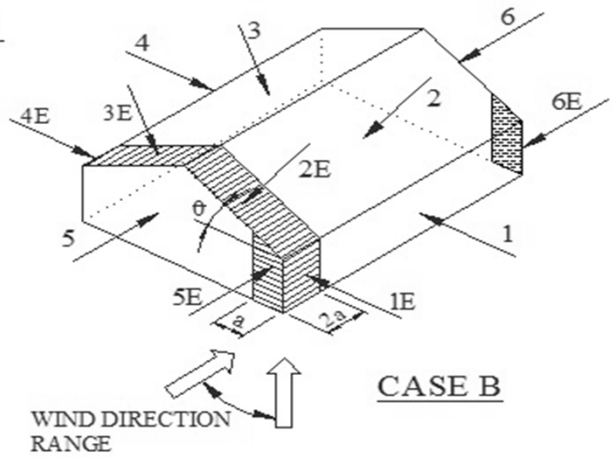
CALCULATED BY	JDA	**DATE**	7/16/22
CHECKED BY		**DATE**	





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) =	0.72	h =	33.0 ft
Base pressure (qh) =	**18.2 psf**	a =	4.0 ft
Minimum parapet ht =	0.0 ft	GCpi =	+/-0.18
Roof Angle (θ) =	0.0 deg		
Type of roof =	Gable		

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	-21.5	-20.2	-19.7	-21.5	-19.7
Negative Zone 2	-1.98	-1.49	-1.28	-36.0	-27.1	-23.3	-36.0	-23.3
Negative Zone 3	-2.98	-1.79	-1.28	-54.2	-32.6	-23.3	-54.2	-23.3
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	-30.9	-29.7	-29.1	-30.9	-26.9
Overhang Zone 3	-2.80	-1.40	-0.80	-51.0	-25.5	-14.6	-51.0	-14.6

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	10 sf	91 sf
Negative Zone 4	-1.17	-1.01	-0.90	-21.3	-18.4	-16.4	-21.3	-18.5
Negative Zone 5	-1.44	-1.12	-0.90	-26.2	-20.4	-16.4	-26.2	-20.7
Positive Zone 4 & 5	1.08	0.92	0.81	19.7	16.8	14.7	19.7	16.9

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

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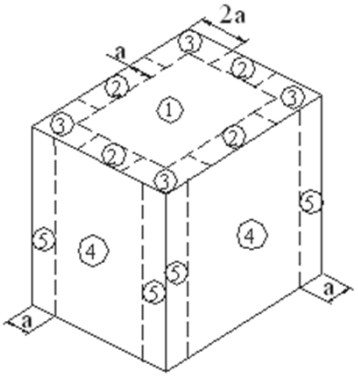
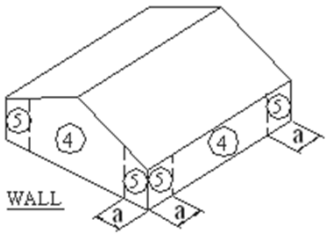
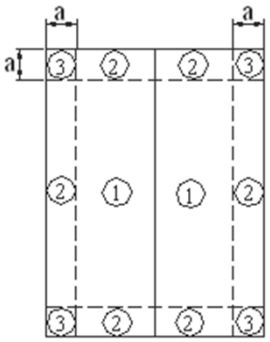
Location of C&C Wind Pressure Zones



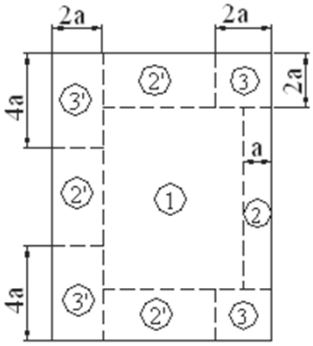
Roofs w/ θ ≤ 10°
and all walls
h > 60'



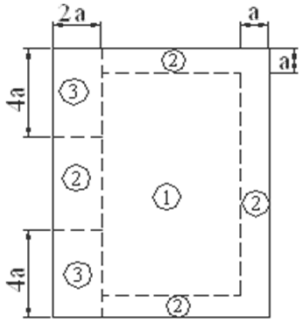
Walls h ≤ 60'
& alt design h<90'



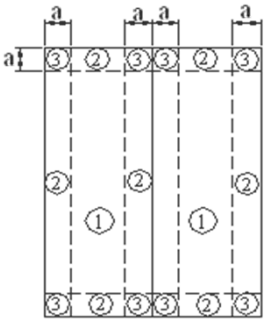
Gable, Sawtooth and
Multispan Gable θ ≤ 7 degrees &
Monoslope ≤ 3 degrees
h ≤ 60' & alt design h<90'



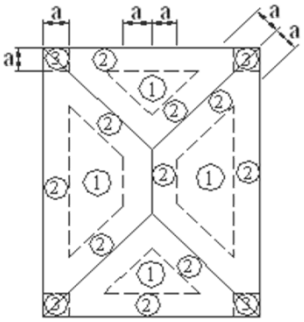
Monoslope roofs
3° < θ ≤ 10°
h ≤ 60' & alt design h<90'



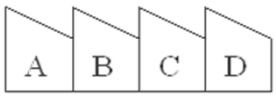
Monoslope roofs
10° < θ ≤ 30°
h ≤ 60' & alt design h<90'

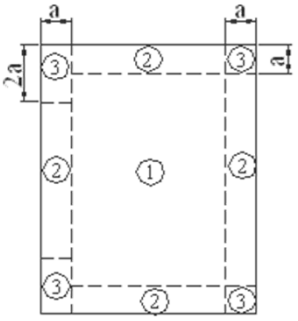


Multispan Gable &
Gable 7° < θ ≤ 45°

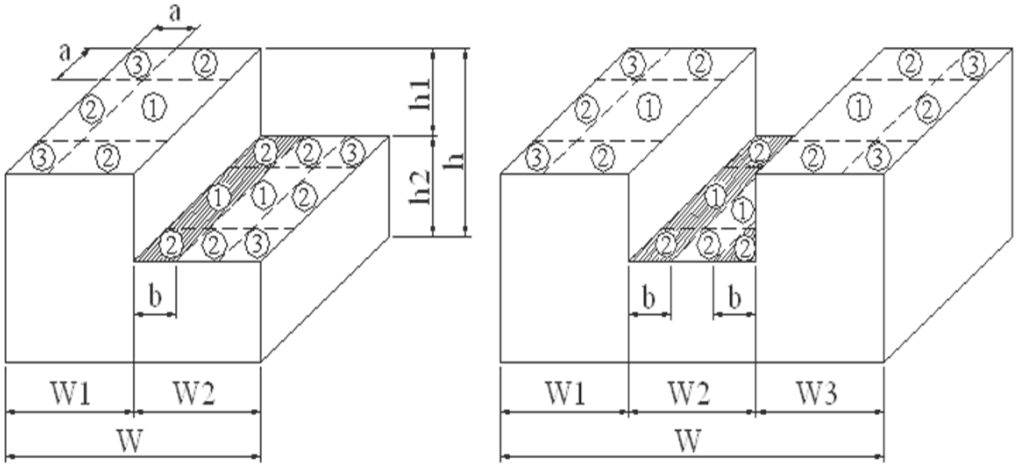


Hip 7° < θ ≤ 27°





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



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

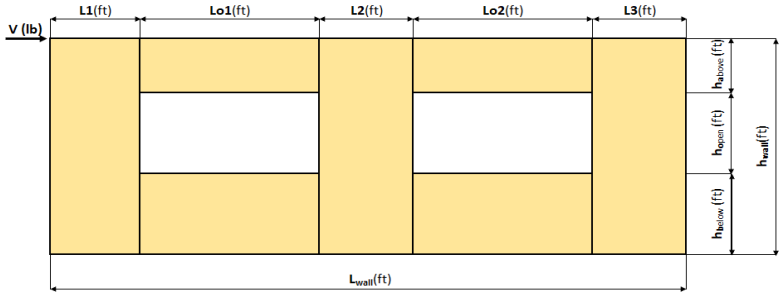
Force Transfer Around Openings Calculator

TWO OPENINGS

The force transfer around openings (FTAO) method of shear wall analysis is an approach that aims to reinforce the wall such that it performs as if there was no opening. This approach lends certain advantages over segmented shear walls: more versatility, because it allows for narrower wall segments while still meeting the height-to-width ratios and, often, fewer required hold-downs.

Project Information

Code:	**Date:** 10/17/2022
Designer:	2018 WBC
Client:	Centerline
Project:	Mithalia
Wall Line:	N - Upper to Roof



Shear Wall Calculation Variables

V	6706 lbf		Opening 1		Opening 2	Adj. Factor Method =	2bs/h
L1	8.42 ft	h_a1	2.00 ft	h_a2	2.00 ft	Wall Pier Aspect Ratio	Adj. Factor
L2	7.00 ft	h_o1	5.50 ft	h_o2	5.50 ft	P1=h_o/L1= 0.65	N/A
L3	4.42 ft	h_b1	3.00 ft	h_b2	3.00 ft	P2=h_o/L2= 0.79	N/A
h_{wall}	10.50 ft	Lo1	9.00 ft	Lo2	2.00 ft	P3=h_o/L3= 1.24	N/A
L_{wall}	30.84 ft						

1. Hold-down forces: H = Vh_{wall}/L_{wall} 2283 lbf

2. Unit shear above + below opening

First opening: va1 = vb1 = H/(h_a1+h_b1) = 457 plf

Second opening: va2 = vb2 = H/(h_a2+h_b2) = 457 plf

3. Total boundary force above + below openings

First opening: O1 = va1 x (Lo1) = 4110 lbf

Second opening: O2 = va2 x (Lo2) = 913 lbf

4. Corner forces

F1 = O1(L1)/(L1+L2) = 2244 lbf

F2 = O1(L2)/(L1+L2) = 1866 lbf

F3 = O2(L2)/(L2+L3) = 560 lbf

F4 = O2(L3)/(L2+L3) = 353 lbf

5. Tributary length of openings

T1 = (L1*Lo1)/(L1+L2) = 4.91 ft

T2 = (L2*Lo1)/(L1+L2) = 4.09 ft

T3 = (L2*Lo2)/(L2+L3) = 1.23 ft

T4 = (L3*Lo2)/(L2+L3) = 0.77 ft

6. Unit shear beside opening

v1 = (V/L)(L1+T1)/L1 = 344 plf

v2 = (V/L)(T2+L2+T3)/L2 = 382 plf

v3 = (V/L)(T4+L3)/L3 = 256 plf

Check v1*L1+v2*L2+v3*L3=V? 6706 lbf **OK**

7. Resistance to corner forces

R1 = v1*L1 = 2899 lbf

R2 = v2*L2 = 2677 lbf

R3 = v3*L3 = 1129 lbf

8. Difference corner force + resistance

R1-F1 = 655 lbf

R2-F2-F3 = 252 lbf

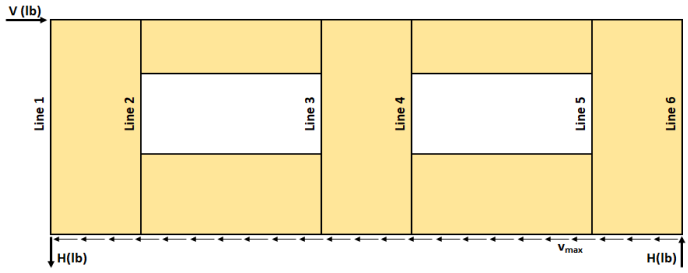
R3-F4 = 776 lbf

9. Unit shear in corner zones

vc1 = (R1-F1)/L1 = 78 plf

vc2 = (R2-F2-F3)/L2 = 36 plf

vc3 = (R3-F4)/L3 = 176 plf



Check Summary of Shear Values for Two Openings

Line 1: vc1(h_a1+h_b1)+v1(h_o1)=H?		389	1894	2283 lbf
Line 2: va1(h_a1+h_b1)-vc1(h_a1+h_b1)-v1(h_o1)=0?	2283	389	1894	0
Line 3: vc2(h_a1+h_b1)+v2(h_o1)-va1(h_a1+h_b1)=0?	180	2103	2283	0
Line 4: va2(h_a2+h_b2)-v2(h_o2)-vc2(h_a2+h_b2)=0?	2283	2103	180	0
Line 5: va2(h_a2+h_b2)-vc3(h_a2+h_b2)-v3(h_o2)=0?	2283	878	1405	0
Line 6: vc3(h_a2+h_b2)+ v3(h_o2) = H?		878	1405	2283 lbf

Design Summary*

Req. Sheathing Capacity	457 plf	**4-Term Deflection**	0.434 in.	**3-Term Deflection**	0.476 in.
Req. Strap Force	2244 lbf	**4-Term Story Drift %**	0.014 %	**3-Term Story Drift %**	0.015 %
Req. HD Force	2283 lbf				
Req. Shear Wall Anchorage Force	217 plf				

***The Design Summary assumes that the shear wall is designed as blocked.**

Force Transfer Around Openings Calculator

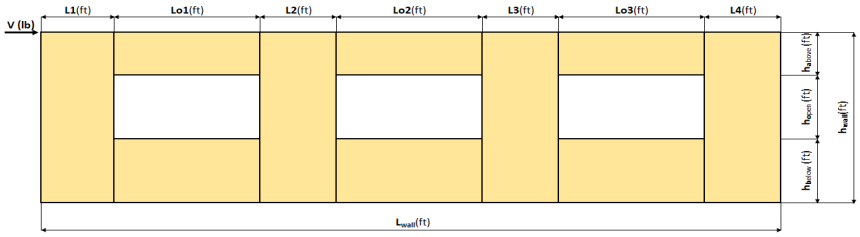
THREE OPENINGS

The force transfer around openings (FTAO) method of shear wall analysis is an approach that aims to reinforce the wall such that it performs as if there was no opening. This approach lends certain advantages over segmented shear walls: more versatility, because it allows for narrower wall segments while still meeting the height-to-width ratios and, often, fewer required hold-downs.

Project Information

Code:	2018 WBC
Designer:	JDA
Client:	Centerline
Project:	Mithalia
Wall Line:	N - Main to Upper

Date: 10/17/2022



Shear Wall Calculation Variables

		Opening 1		Opening 2		Opening 3	
V	10157 lbf						
L1	5.83 ft	h_a1	1.00 ft	h_a2	1.00 ft	h_a3	1.00 ft
L2	3.83 ft	h_o1	1.50 ft	h_o2	1.50 ft	h_o3	1.50 ft
L3	3.83 ft	h_b1	4.50 ft	h_b2	4.50 ft	h_b3	4.50 ft
L4	5.83 ft	Lo1	1.50 ft	Lo2	1.50 ft	Lo3	1.50 ft
h_{wall}	7.00 ft						
L_{wall}	23.82 ft						

Adj. Factor Method = 2bs/h

Wall Pier Aspect Ratio		Adj. Factor
P1=h_o/L1=	0.26	N/A
P2=h_o/L2=	0.39	N/A
P3=h_o/L3=	0.39	N/A
P4=h_o/L4=	0.26	N/A

1. Hold-down forces: H = Vh_{wall}/L_{wall} 2985 lbf

2. Unit shear above + below opening

First opening: va1 = vb1 = H/(h_a1+h_b1) =	543 plf
Second opening: va2 = vb2 = H/(h_a2+h_b2) =	543 plf
Third opening: va3 = vb3 = H/(h_a3+h_b3) =	543 plf

3. Total boundary force above + below openings

First opening: O1 = va1 x (Lo1) =	814 lbf
Second opening: O2 = va2 x (Lo2) =	814 lbf
Third opening: O3 = va3 x (Lo3) =	814 lbf

4. Corner forces

F1 = O1(L1)/(L1+L2) =	491 lbf
F2 = O1(L2)/(L1+L2) =	323 lbf
F3 = O2(L2)/(L2+L3) =	407 lbf
F4 = O2(L3)/(L2+L3) =	407 lbf
F5 = O3(L3)/(L3+L4) =	323 lbf
F6 = O3(L4)/(L3+L4) =	491 lbf

5. Tributary length of openings

T1 = (L1*Lo1)/(L1+L2) =	0.91 ft
T2 = (L2*Lo1)/(L1+L2) =	0.59 ft
T3 = (L2*Lo2)/(L2+L3) =	0.75 ft
T4 = (L3*Lo2)/(L2+L3) =	0.75 ft
T5 = (L3*Lo3)/(L3+L4) =	0.59 ft
T6 = (L4*Lo3)/(L3+L4) =	0.91 ft

6. Unit shear beside opening

v1 = (V/L)(L1+T1)/L1 =	493 plf
v2 = (V/L)(T2+L2+T3)/L2 =	576 plf
v3 = (V/L)(T4+L3+T5)/L3 =	576 plf
v4 = (V/L)(T6+L4)/L4 =	493 plf
Check v1*L1+v2*L2+v3*L3+v4*L4=V?	10157 lbf **OK**

7. Resistance to corner forces

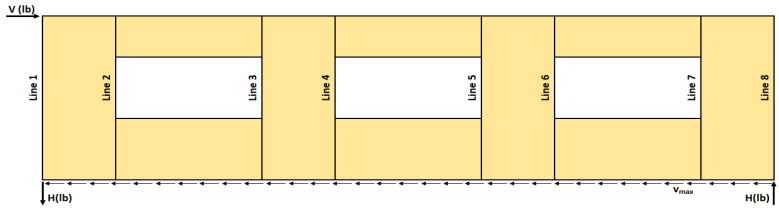
R1 = v1*L1 =	2872 lbf
R2 = v2*L2 =	2207 lbf
R3 = v3*L3 =	2207 lbf
R4 = v4*L4 =	2872 lbf

8. Difference corner force + resistance

R1-F1 =	2381 lbf
R2-F2-F3 =	1477 lbf
R3-F4-F5 =	1477 lbf
R4-F6 =	2381 lbf

9. Unit shear in corner zones

vc1 = (R1-F1)/L1 =	408 plf
vc2 = (R2-F2-F3)/L2 =	386 plf
vc3 = (R3-F4-F5)/L3 =	386 plf
vc4 = (R4-F6)/L4 =	408 plf



Check Summary of Shear Values for Three Openings

Line 1: vc1(h_a1+h_b1)+v1(h_o1)=H?		2246	739	2985 lbf
Line 2: va1(h_a1+h_b1)-vc1(h_a1+h_b1)-v1(h_o1)=0?	2985	2246	739	0
Line 3: vc2(h_a1+h_b1)+v2(h_o1)-va1(h_a1+h_b1)=0?	2121	864	2985	0
Line 4: va2(h_a2+h_b2)-v2(h_o2)-vc2(h_a2+h_b2)=0?	2985	864	2121	0
Line 5: va2(h_a2+h_b2)-vc3(h_a2+h_b2)-v3(h_o2)=0?	2985	2121	864	0
Line 6: va3(h_a3+h_b3)-v3(h_o3)-vc3(h_a3+h_b3)=0?	2985	864	2121	0
Line 7: va3(h_a3+h_b3)-vc4(h_a3+h_b3)-v4(h_o3)=0?	2985	2246	739	0
Line 8: vc4(h_a3+h_b3)+v4(h_o3)=H?		2246	739	2985 lbf

Design Summary*

Req. Sheathing Capacity	576 plf
Req. Strap Force	491 lbf
Req. HD Force (H)	2985 lbf
Req. Shear Wall Anchorage Force (v_{max})	426 plf

4-Term Deflection	0.146 in.
4-Term Story Drift %	0.007 %

3-Term Deflection	0.155 in.
3-Term Story Drift %	0.007 %

***The Design Summary assumes that the shear wall is designed as blocked.**

Force Transfer Around Openings Calculator

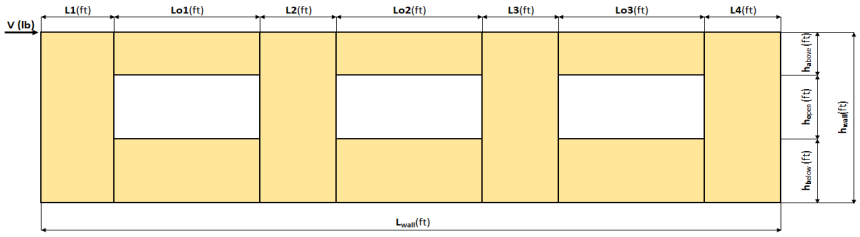
THREE OPENINGS

The force transfer around openings (FTAO) method of shear wall analysis is an approach that aims to reinforce the wall such that it performs as if there was no opening. This approach lends certain advantages over segmented shear walls: more versatility, because it allows for narrower wall segments while still meeting the height-to-width ratios and, often, fewer required hold-downs.

Project Information

Code:	2018 WBC
Designer:	JDA
Client:	Centerline
Project:	Mithalia
Wall Line:	S - Main to Upper

Date: 10/17/2022



Shear Wall Calculation Variables

			Opening 1		Opening 2		Opening 3
V	9912 lbf						
L1	3.42 ft	h_a1	2.00 ft	h_a2	2.00 ft	h_a3	2.00 ft
L2	6.17 ft	h_o1	5.00 ft	h_o2	5.00 ft	h_o3	5.00 ft
L3	3.92 ft	h_b1	3.00 ft	h_b2	3.00 ft	h_b3	3.00 ft
L4	13.25 ft	Lo1	6.00 ft	Lo2	2.00 ft	Lo3	3.00 ft
h_{wall}	10.00 ft						
L_{wall}	37.76 ft						

Adj. Factor Method = 2bs/h

Wall Pier Aspect Ratio		Adj. Factor
P1=h_o/L1=	1.46	N/A
P2=h_o/L2=	0.81	N/A
P3=h_o/L3=	1.28	N/A
P4=h_o/L4=	0.38	N/A

1. Hold-down forces: H = Vh_{wall}/L_{wall} 2625 lbf

2. Unit shear above + below opening

First opening: va1 = vb1 = H/(h_a1+h_b1) =	525 plf
Second opening: va2 = vb2 = H/(h_a2+h_b2) =	525 plf
Third opening: va3 = vb3 = H/(h_a3+h_b3) =	525 plf

3. Total boundary force above + below openings

First opening: O1 = va1 x (Lo1) =	3150 lbf
Second opening: O2 = va2 x (Lo2) =	1050 lbf
Third opening: O3 = va3 x (Lo3) =	1575 lbf

4. Corner forces

F1 = O1(L1)/(L1+L2) =	1123 lbf
F2 = O1(L2)/(L1+L2) =	2027 lbf
F3 = O2(L2)/(L2+L3) =	642 lbf
F4 = O2(L3)/(L2+L3) =	408 lbf
F5 = O3(L3)/(L3+L4) =	360 lbf
F6 = O3(L4)/(L3+L4) =	1215 lbf

5. Tributary length of openings

T1 = (L1*Lo1)/(L1+L2) =	2.14 ft
T2 = (L2*Lo1)/(L1+L2) =	3.86 ft
T3 = (L2*Lo2)/(L2+L3) =	1.22 ft
T4 = (L3*Lo2)/(L2+L3) =	0.78 ft
T5 = (L3*Lo3)/(L3+L4) =	0.68 ft
T6 = (L4*Lo3)/(L3+L4) =	2.32 ft

6. Unit shear beside opening

v1 = (V/L)(L1+T1)/L1 =	427 plf
v2 = (V/L)(T2+L2+T3)/L2 =	479 plf
v3 = (V/L)(T4+L3+T5)/L3 =	360 plf
v4 = (V/L)(T6+L4)/L4 =	308 plf
Check v1*L1+v2*L2+v3*L3+v4*L4=V?	9912 lbf **OK**

7. Resistance to corner forces

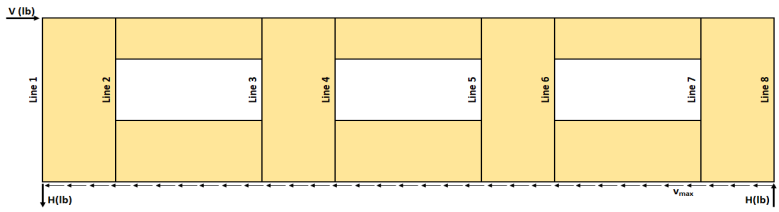
R1 = v1*L1 =	1459 lbf
R2 = v2*L2 =	2954 lbf
R3 = v3*L3 =	1413 lbf
R4 = v4*L4 =	4086 lbf

8. Difference corner force + resistance

R1-F1 =	336 lbf
R2-F2-F3 =	285 lbf
R3-F4-F5 =	645 lbf
R4-F6 =	2870 lbf

9. Unit shear in corner zones

vc1 = (R1-F1)/L1 =	98 plf
vc2 = (R2-F2-F3)/L2 =	46 plf
vc3 = (R3-F4-F5)/L3 =	165 plf
vc4 = (R4-F6)/L4 =	217 plf



Check Summary of Shear Values for Three Openings

Line 1: vc1(h_a1+h_b1)+v1(h_o1)=H?		491	2134	2625 lbf
Line 2: va1(h_a1+h_b1)-vc1(h_a1+h_b1)-v1(h_o1)=0?	2625	491	2134	0
Line 3: vc2(h_a1+h_b1)+v2(h_o1)-va1(h_a1+h_b1)=0?	231	2394	2625	0
Line 4: va2(h_a2+h_b2)-v2(h_o2)-vc2(h_a2+h_b2)=0?	2625	2394	231	0
Line 5: va2(h_a2+h_b2)-vc3(h_a2+h_b2)-v3(h_o2)=0?	2625	823	1802	0
Line 6: va3(h_a3+h_b3)-v3(h_o3)-vc3(h_a3+h_b3)=0?	2625	1802	823	0
Line 7: va3(h_a3+h_b3)-vc4(h_a3+h_b3)-v4(h_o3)=0?	2625	1083	1542	0
Line 8: vc4(h_a3+h_b3)+v4(h_o3)=H?		1083	1542	2625 lbf

Design Summary*

Req. Sheathing Capacity	525 plf	**4-Term Deflection**	0.406 in.	**3-Term Deflection**	0.424 in.
Req. Strap Force	2027 lbf	**4-Term Story Drift %**	0.014 %	**3-Term Story Drift %**	0.014 %
Req. HD Force (H)	2625 lbf				
Req. Shear Wall Anchorage Force (v_{max})	263 plf				

***The Design Summary assumes that the shear wall is designed as blocked.**

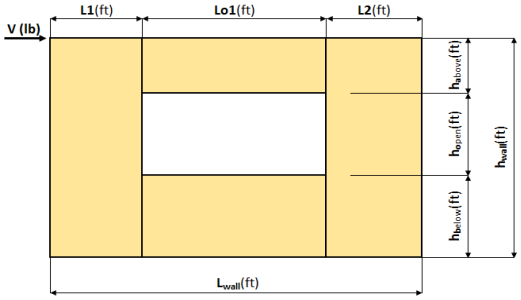
Force Transfer Around Openings Calculator

ONE OPENING

The force transfer around openings (FTAO) method of shear wall analysis is an approach that aims to reinforce the wall such that it performs as if there was no opening. This approach lends certain advantages over segmented shear walls: more versatility, because it allows for narrower wall segments while still meeting the height-to-width ratios and, often, fewer required hold-downs.

Project Information

Code:	2018 WBC	**Date:**	
Designer:	JDA		
Client:	Centerline		
Project:	Mithalia		
Wall Line:	W - Upper to Roof		



Shear Wall Calculation Variables

V	7790 lbf	Opening 1	
L1	7.42 ft	h_a	2.00 ft
L2	7.67 ft	h_o	5.50 ft
h_{wall}	10.50 ft	h_b	3.00 ft
L_{wall}	17.09 ft	Lo1	2.00 ft

Adj. Factor Method =		2bs/h
Wall Pier Aspect Ratio		Adj. Factor
P1=h_o/L1=	0.74	N/A
P2=h_o/L2=	0.72	N/A

1. Hold-down forces: H = Vh_{wall}/L_{wall} 4786 lbf

2. Unit shear above + below opening

First opening: va1 = vb1 = H/(h_a+h_b) = 957 plf

3. Total boundary force above + below openings

First opening: O1 = va1 x (Lo1) = 1914 lbf

4. Corner forces

F1 = O1(L1)/(L1+L2) = 941 lbf

F2 = O1(L2)/(L1+L2) = 973 lbf

5. Tributary length of openings

T1 = (L1*Lo1)/(L1+L2) = 0.98 ft

T2 = (L2*Lo1)/(L1+L2) = 1.02 ft

6. Unit shear beside opening

v1 = (V/L)(L1+T1)/L1 = 516 plf

v2 = (V/L)(T2+L2)/L2 = 516 plf

Check v1*L1+v2*L2=V? 7790 lbf **OK**

7. Resistance to corner forces

R1 = v1*L1 = 3830 lbf

R2 = v2*L2 = 3960 lbf

8. Difference corner force + resistance

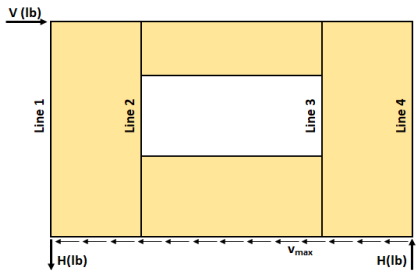
R1-F1 = 2889 lbf

R2-F2 = 2986 lbf

9. Unit shear in corner zones

vc1 = (R1-F1)/L1 = 389 plf

vc2 = (R2-F2)/L2 = 389 plf



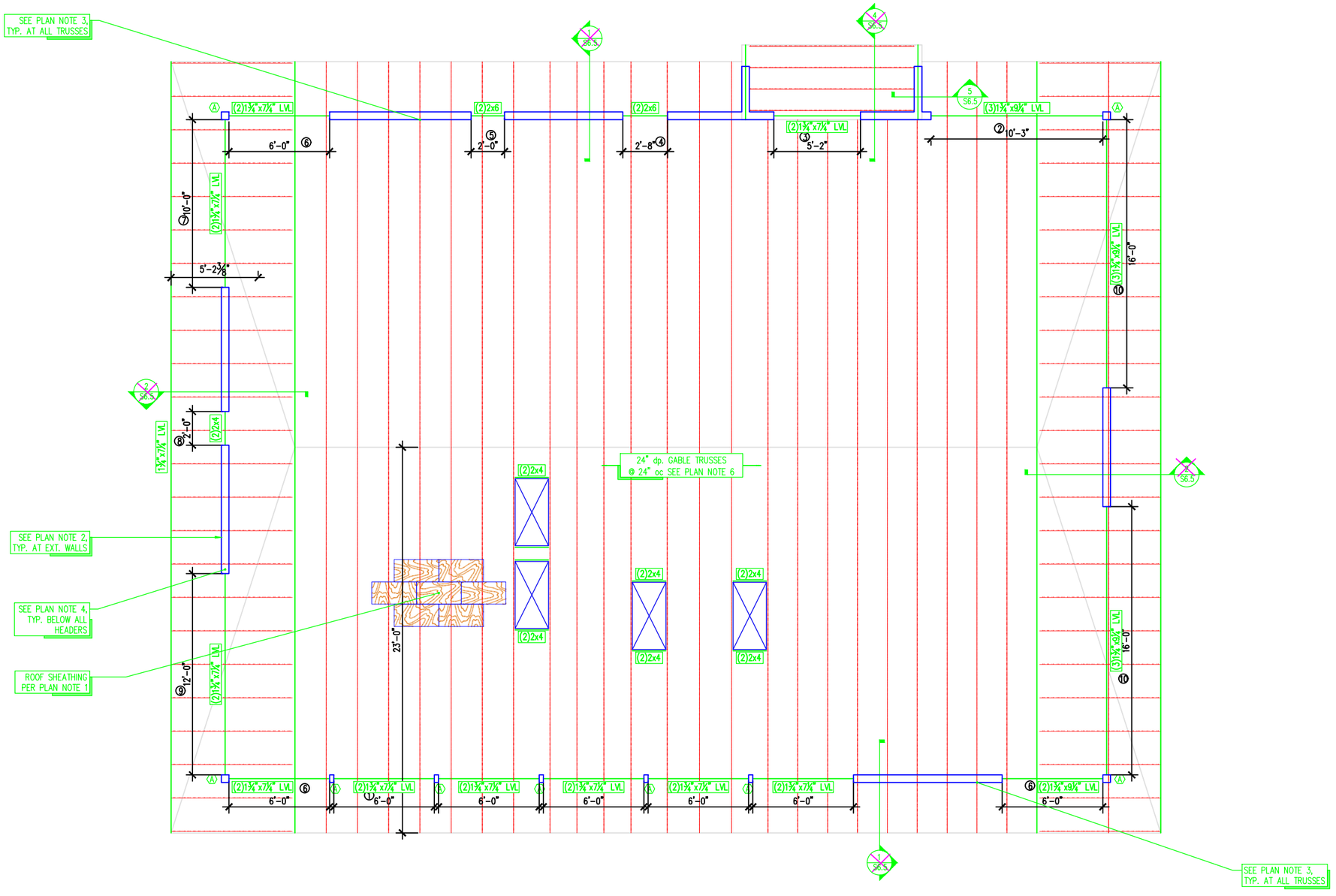
Check Summary of Shear Values for One Opening

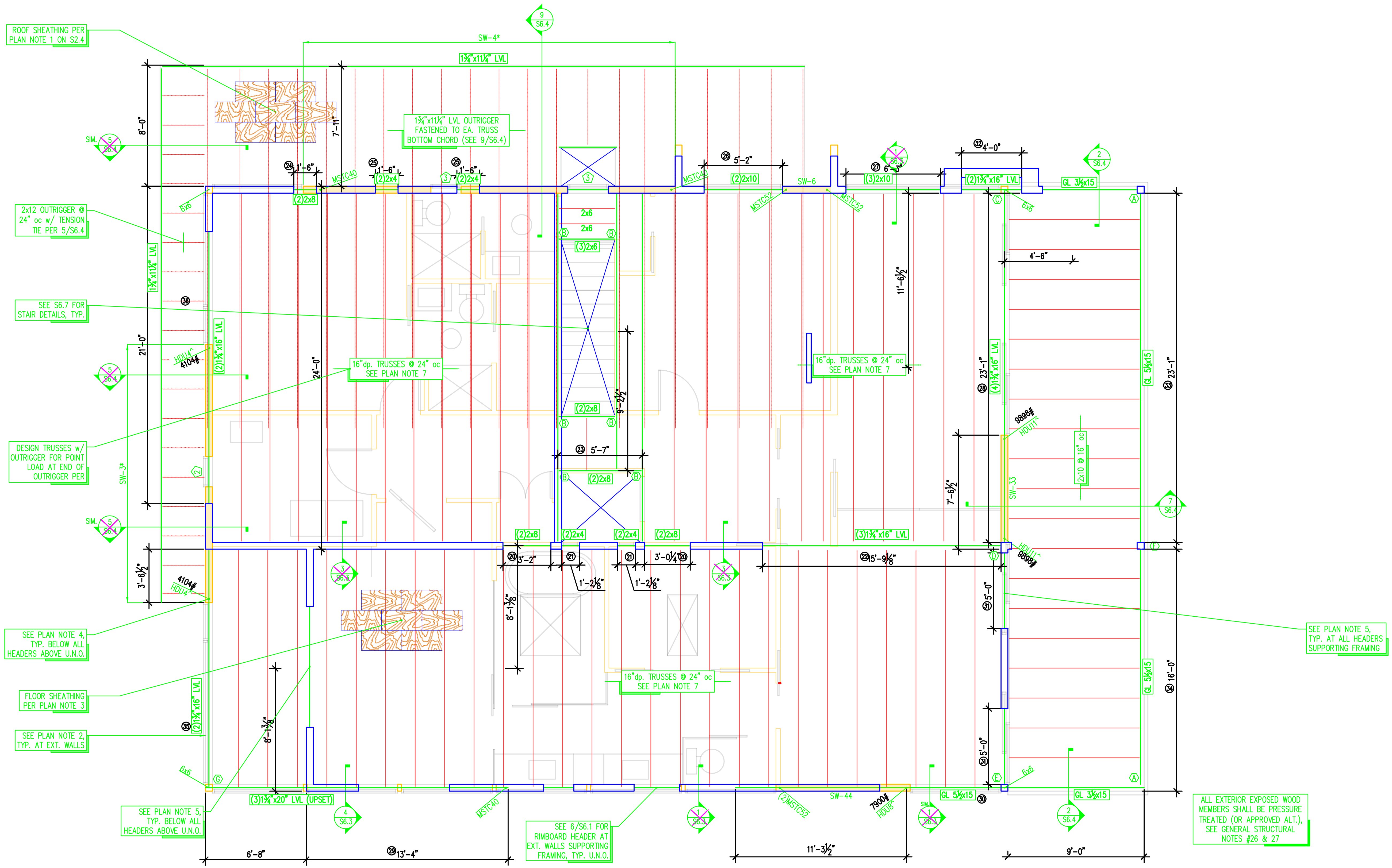
Line 1: vc1(h_a+h_b)+v1(h_o)=H?		1947	2839	4786 lbf
Line 2: va1(h_a+h_b)-vc1(h_a+h_b)-v1(h_o)=0?	4786	1947	2839	0
Line 3: va1(h_a+h_b)-vc2(h_a+h_b)-v1(h_o)=0?	4786	1947	2839	0
Line 4: vc2(h_a+h_b)+v2(h_o)=H?		1947	2839	4786 lbf

Design Summary*

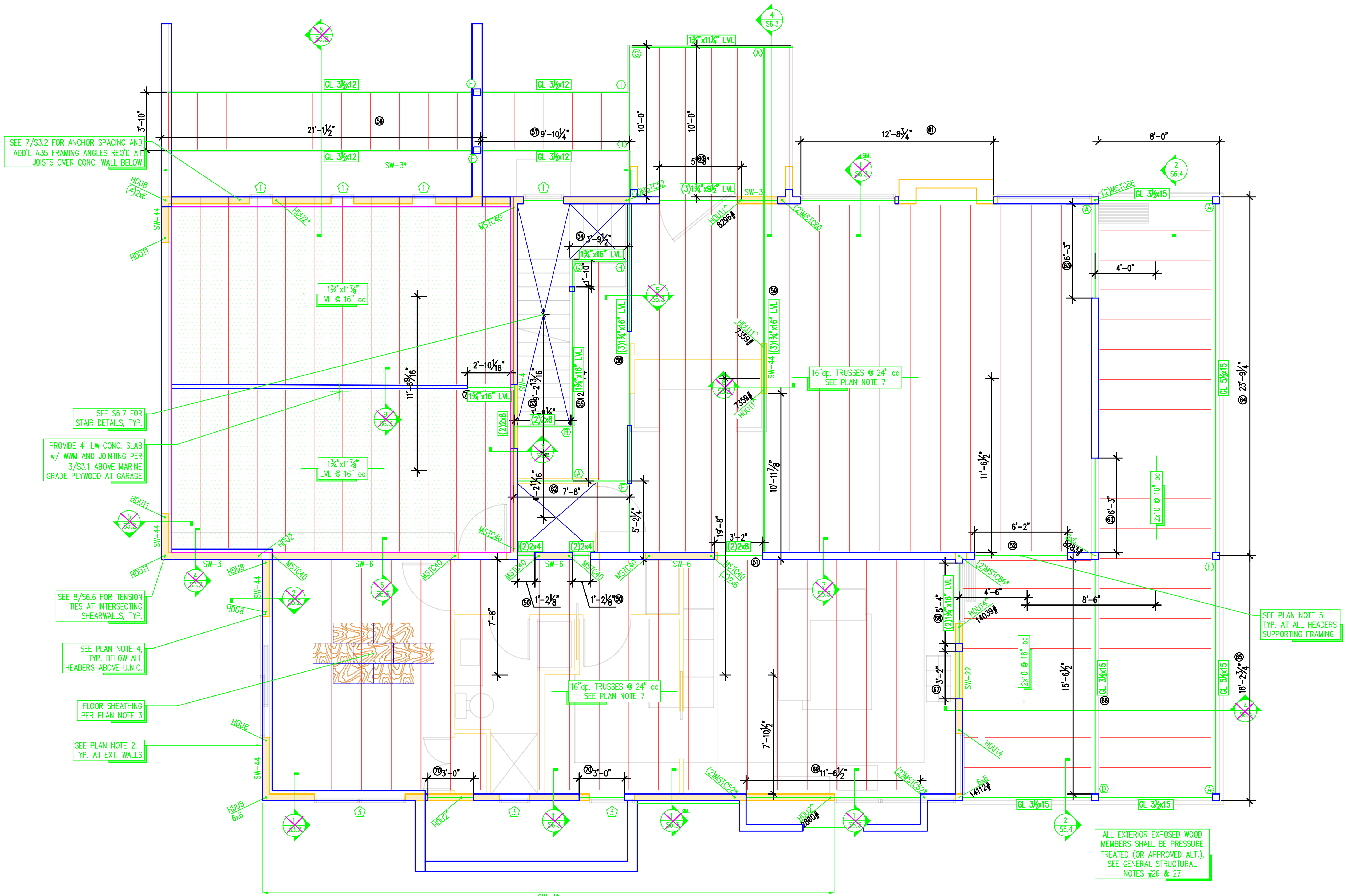
Req. Sheathing Capacity	957 plf	**4-Term Deflection**	0.348 in.	**3-Term Deflection**	0.373 in.
Req. Strap Force	973 lbf	**4-Term Story Drift %**	0.011 %	**3-Term Story Drift %**	0.012 %
Req. HD Force (H)	4786 lbf				
Req. Shear Wall Anchorage Force (v_{max})	456 plf				

***The Design Summary assumes that the shear wall is designed as blocked.**


SEE PLAN NOTE 3, TYP. AT ALL TRUSSES
1 S6.5
4 S6.5
5 S6.5
(2)1¾"x7¼" LVL
(2)2x6
(2)2x6
(2)1¾"x7¼" LVL
(3)1¾"x9¼" LVL
6'-0"
2'-0"
2'-8"
5'-2"
10'-3"
10'-0"
5'-2⅜"
(2)1¾"x7¼" LVL
(3)1¾"x9¼" LVL
16'-0"
2 S6.5
2'-0"
(2)2x4
(2)1¾"x7¼" LVL
24" dp. GABLE TRUSSES @ 24" oc SEE PLAN NOTE 6
S6.5
(2)2x4
(2)2x4
(2)2x4
(2)2x4
(2)2x4
(2)2x4
SEE PLAN NOTE 2, TYP. AT EXT. WALLS
SEE PLAN NOTE 4, TYP. BELOW ALL HEADERS
ROOF SHEATHING PER PLAN NOTE 1
12'-0"
(2)1¾"x7¼" LVL
23'-0"
(3)1¾"x9¼" LVL
16'-0"
(2)1¾"x7¼" LVL
6'-0"
(2)1¾"x7¼" LVL
6'-0"
(2)1¾"x7¼" LVL
6'-0"
(2)1¾"x7¼" LVL
6'-0"
(2)1¾"x7¼" LVL
6'-0"
(2)1¾"x7¼" LVL
6'-0"
(2)1¾"x9¼" LVL
6'-0"
1 S6.5
SEE PLAN NOTE 3, TYP. AT ALL TRUSSES



ROOF SHEATHING PER PLAN NOTE 1 ON S2.4
SW-4*
1¾"x11¼" LVL
1¾"x11¼" LVL OUTRIGGER FASTENED TO EA. TRUSS BOTTOM CHORD (SEE 9/S6.4)
2x12 OUTRIGGER @ 24" oc w/ TENSION TIE PER 5/S6.4
SEE S6.7 FOR STAIR DETAILS, TYP.
16"dp. TRUSSES @ 24" oc SEE PLAN NOTE 7
DESIGN TRUSSES w/ OUTRIGGER FOR POINT LOAD AT END OF OUTRIGGER PER
SEE PLAN NOTE 4, TYP. BELOW ALL HEADERS ABOVE U.N.O.
FLOOR SHEATHING PER PLAN NOTE 3
SEE PLAN NOTE 2, TYP. AT EXT. WALLS
SEE PLAN NOTE 5, TYP. BELOW ALL HEADERS ABOVE U.N.O.
(3)1¾"x20" LVL (UPSET)
SEE 6/S6.1 FOR RIMBOARD HEADER AT EXT. WALLS SUPPORTING FRAMING, TYP. U.N.O.
SEE PLAN NOTE 5, TYP. AT ALL HEADERS SUPPORTING FRAMING
ALL EXTERIOR EXPOSED WOOD MEMBERS SHALL BE PRESSURE TREATED (OR APPROVED ALT.). SEE GENERAL STRUCTURAL NOTES #26 & 27
SW-6
SW-3*
SW-33
SW-44
(2)2x8
(2)2x4
(2)2x10
(3)2x10
(3)2x6
(2)1¾"x16" LVL
(4)1¾"x16" LVL
(3)1¾"x16" LVL
GL 3⅛x15
GL 5⅛x15
2x10 @ 16" oc
MSTC40
MSTC52
HDU4
HDU11
HDU8
8'-0"
21'-0"
24'-0"
3'-6½"
7'-11"
23'-1"
16'-0"
11'-6½"
7'-6½"
6'-8"
13'-4"
11'-3½"
9'-0"
5'-7"
5'-2"
4'-0"
4'-6"

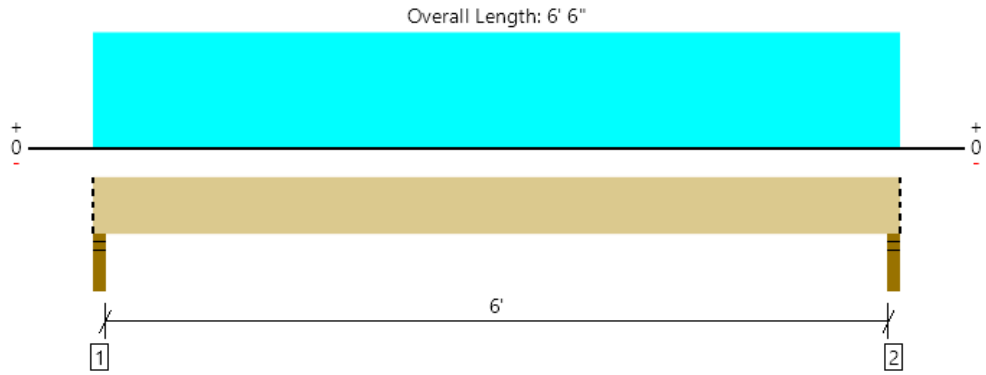

SEE 7/S3.2 FOR ANCHOR SPACING AND ADD'L A35 FRAMING ANGLES REQ'D AT JOISTS OVER CONC. WALL BELOW
SEE S6.7 FOR STAIR DETAILS, TYP.
PROVIDE 4" LW CONC. SLAB w/ WWM AND JOINTING PER 3/S3.1 ABOVE MARINE GRADE PLYWOOD AT GARAGE
SEE 8/S6.6 FOR TENSION TIES AT INTERSECTING SHEARWALLS, TYP.
SEE PLAN NOTE 4, TYP. BELOW ALL HEADERS ABOVE U.N.O.
FLOOR SHEATHING PER PLAN NOTE 3
SEE PLAN NOTE 2, TYP. AT EXT. WALLS
16"dp. TRUSSES @ 24" oc SEE PLAN NOTE 7
SEE PLAN NOTE 5, TYP. AT ALL HEADERS SUPPORTING FRAMING
ALL EXTERIOR EXPOSED WOOD MEMBERS SHALL BE PRESSURE TREATED (OR APPROVED ALT.), SEE GENERAL STRUCTURAL NOTES #26 & 27
1¾"x11⅞" LVL @ 16" oc
GL 3½x12
GL 3½x15
GL 5½x15
2x10 @ 16" oc
SW-3*
SW-4*
SW-44
SW-6
SW-22
HDU8
HDU11
HDU2
HDU14
MSTC40
(2)MSTC66
21'-1½"
12'-8¾"
8'-0"
23'-9¼"
16'-2¾"

Roof			
Member Name	Results	Current Solution	Comments
1	Passed	2 piece(s) 1 3/4" x 7 1/4" 2.0E Microllam® LVL	
2	Passed	3 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL	
3	Passed	2 piece(s) 2 x 10 DF No.1	
4	Passed	2 piece(s) 2 x 6 DF No.1	
5	Passed	2 piece(s) 2 x 6 DF No.1	
6	Passed	2 piece(s) 1 3/4" x 7 1/4" 2.0E Microllam® LVL	
7	Passed	2 piece(s) 1 3/4" x 5 1/2" 2.0E Microllam® LVL	
8	Passed	1 piece(s) 2 x 4 DF No.1	
9	Passed	2 piece(s) 1 3/4" x 7 1/4" 2.0E Microllam® LVL	
10	Passed	2 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL	
Upper			
Member Name	Results	Current Solution	Comments
Floor: Joist w/ Cant	Failed	1 piece(s) 20" TJI® 560 @ 24" OC	Right cantilever exceeds the maximum braced cantilever length of 7'.
Roof: Joist Cant	Failed	1 piece(s) 1 3/4" x 11 1/4" 2.0E Microllam® LVL @ 24" OC	Right cantilever exceeds the maximum braced cantilever length of 7'.
20	Passed	2 piece(s) 2 x 8 DF No.1	
21	Passed	2 piece(s) 2 x 4 DF No.1	
22	Passed	3 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
23	Passed	2 piece(s) 2 x 8 DF No.1	
24	Passed	2 piece(s) 2 x 8 DF No.1	
25	Passed	2 piece(s) 2 x 4 DF No.1	
26	Passed	2 piece(s) 2 x 10 DF No.1	
27	Passed	3 piece(s) 2 x 10 DF No.1	
28	Failed	3 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
28 (w_overstrength)	Failed	4 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	Multiple Failures/Errors
29	Failed	3 piece(s) 1 3/4" x 20" 2.0E Microllam® LVL	An excessive uplift of -1609 lbs at support located at 19' 8" failed this product.
30	Failed	1 piece(s) 5 1/2" x 15" 24F-V8 DF Glulam	Right cantilever exceeds the maximum braced cantilever length of 7'.
31	Passed	1 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
32	Passed	2 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
33	Passed	1 piece(s) 5 1/2" x 15" 24F-V4 DF Glulam	
34	Passed	1 piece(s) 5 1/2" x 15" 24F-V4 DF Glulam	
35	Passed	2 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
35 (w_overstrength)	Failed	2 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	Multiple Failures/Errors
36	Failed	2 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	Right cantilever exceeds the maximum braced cantilever length of 7'.

Main			
Member Name	Results	Current Solution	Comments
50	Passed	2 piece(s) 2 x 4 DF No.1	
51	Passed	2 piece(s) 2 x 8 DF No.1	
52	Passed	1 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
53	Passed	2 piece(s) 2 x 8 DF No.1	
54	Passed	1 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
55	Passed	1 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
56	Passed	1 piece(s) 3 1/2" x 12" 24F-V4 DF Glulam	
57	Passed	1 piece(s) 3 1/2" x 12" 24F-V4 DF Glulam	
58	Failed	3 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	Right cantilever exceeds the maximum braced cantilever length of 7'.
59	Failed	2 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	Right cantilever exceeds the maximum braced cantilever length of 7'.
59 (w_overstrength)	Failed	2 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	Multiple Failures/Errors
60	Failed	3 piece(s) 1 3/4" x 9 1/2" 2.0E Microllam® LVL	An excessive uplift of -2917 lbs at support located at 7' 8 1/2" failed this product.
60 (w_overstrength)	Failed	3 piece(s) 1 3/4" x 9 1/2" 2.0E Microllam® LVL	Multiple Failures/Errors
61	Passed	2 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
62	Passed	1 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
63	Passed	1 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
64	Passed	1 piece(s) 5 1/2" x 15" 24F-V4 DF Glulam	
65	Passed	1 piece(s) 5 1/2" x 15" 24F-V4 DF Glulam	
66	Passed	1 piece(s) 3 1/2" x 15" 24F-V4 DF Glulam	
67	Passed	1 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
68	Failed	2 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	Multiple Failures/Errors
69	Passed	2 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
69 (w_overstrength)	Failed	2 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	Multiple Failures/Errors
70	Passed	1 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
71	Passed	1 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
33+34	Passed	1 piece(s) 6 x 6 DF No.1	
33+34+66+63	Passed	1 piece(s) 6 x 6 DF No.1	
Garage Joists	Passed	1 piece(s) 1 3/4" x 11 1/4" 2.0E Microllam® LVL @ 16" OC	

Roof, 1

2 piece(s) 1 3/4" x 7 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)	4135 @ 1 1/2"	6563 (3.00")	Passed (63%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3048 @ 10 1/4"	5544	Passed (55%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	6213 @ 3' 3"	8182	Passed (76%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.122 @ 3' 3"	0.313	Passed (L/615)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.225 @ 3' 3"	0.417	Passed (L/334)	--	1.0 D + 1.0 S (All 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).
- 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	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.89"	1893	2243	4135	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.89"	1893	2243	4135	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 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	7.4	--	
1 - Uniform (PSF)	0 to 6' 6" (Top)	23'	25.0	30.0	Default Load

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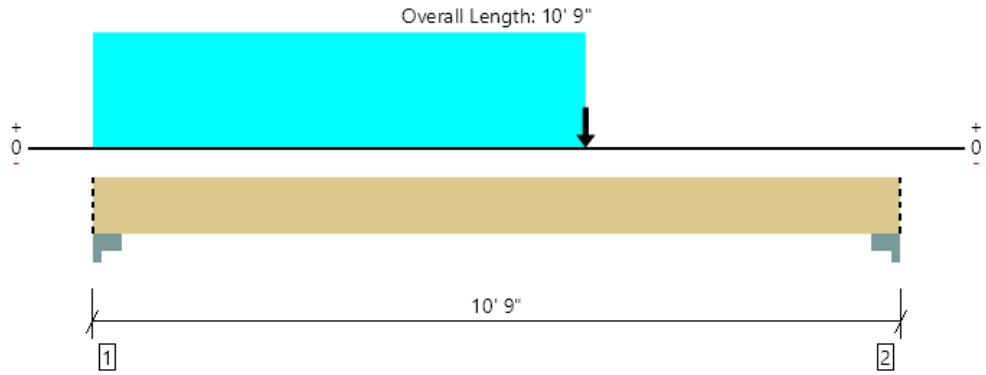
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

Roof, 2

3 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)	7036 @ 5 1/2"	27563 (7.00")	Passed (26%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	5303 @ 1' 4 1/4"	10611	Passed (50%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	16258 @ 5' 6"	19327	Passed (84%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.234 @ 5' 3 15/16"	0.492	Passed (L/504)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.434 @ 5' 3 15/16"	0.656	Passed (L/272)	--	1.0 D + 1.0 S (All 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).
- 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	Factored	
1 - Column Cap - steel	7.00"	7.00"	1.79"	3240	3796	7036	Blocking
2 - Column Cap - steel	7.00"	7.00"	1.50"	1950	2249	4199	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)	10' 9" o/c	
Bottom Edge (Lu)	10' 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 10' 9"	N/A	14.2	--	
1 - Uniform (PSF)	0 to 6' 6 3/4" (Top)	23'	25.0	30.0	Default Load
2 - Point (lb)	6' 6 3/4" (Top)	N/A	1264	1517	50.6 sf tributary

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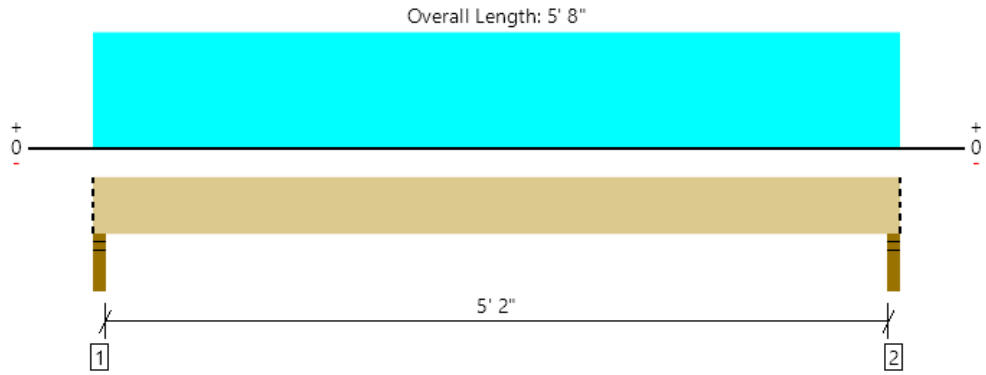
Roof, 3

2 piece(s) 2 x 10 DF 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)	3406 @ 1 1/2"	5625 (3.00")	Passed (61%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2179 @ 1' 1/4"	3830	Passed (57%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	4409 @ 2' 10"	4510	Passed (98%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.038 @ 2' 10"	0.271	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.069 @ 2' 10"	0.361	Passed (L/939)	--	1.0 D + 1.0 S (All 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).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.82"	1559	1847	3406	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.82"	1559	1847	3406	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' 11" o/c	
Bottom Edge (Lu)	5' 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 5' 8"	N/A	7.0	--	
1 - Uniform (PSF)	0 to 5' 8" (Top)	21' 8 3/4"	25.0	30.0	Default Load

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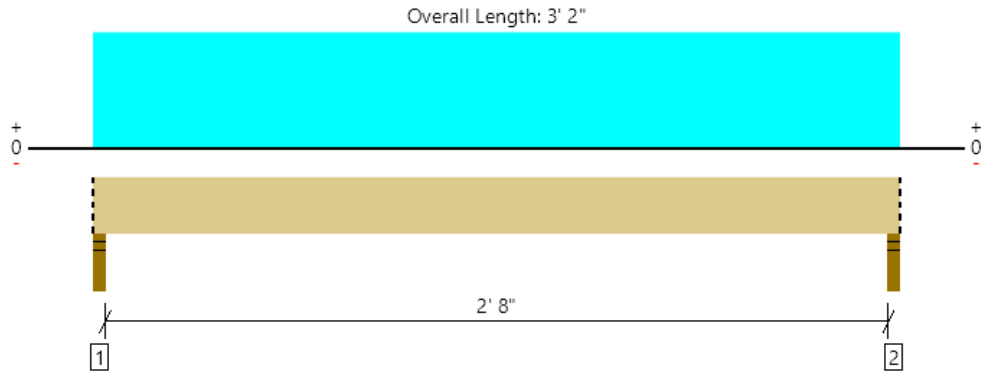
Roof, 4

2 piece(s) 2 x 6 DF 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)	2010 @ 1 1/2"	5625 (3.00")	Passed (36%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1111 @ 8 1/2"	2277	Passed (49%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1350 @ 1' 7"	1884	Passed (72%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.016 @ 1' 7"	0.146	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.029 @ 1' 7"	0.194	Passed (L/999+)	--	1.0 D + 1.0 S (All 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).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.50"	917	1093	2010	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	917	1093	2010	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' 2" o/c	
Bottom Edge (Lu)	3' 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 3' 2"	N/A	4.2	--	
1 - Uniform (PSF)	0 to 3' 2" (Top)	23'	25.0	30.0	Default Load

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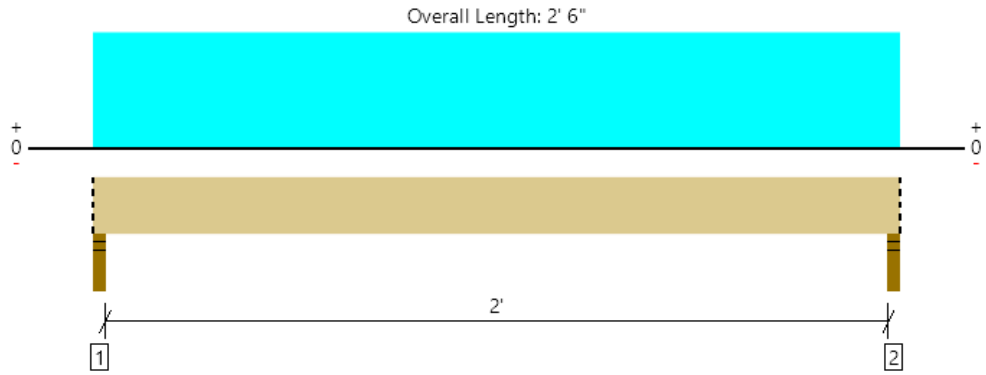
Roof, 5

2 piece(s) 2 x 6 DF 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)	1586 @ 1 1/2"	5625 (3.00")	Passed (28%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	687 @ 8 1/2"	2277	Passed (30%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	803 @ 1' 3"	1884	Passed (43%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.006 @ 1' 3"	0.112	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.010 @ 1' 3"	0.150	Passed (L/999+)	--	1.0 D + 1.0 S (All 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).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.50"	724	863	1586	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	724	863	1586	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)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 2' 6"	N/A	4.2	--	
1 - Uniform (PSF)	0 to 2' 6" (Top)	23'	25.0	30.0	Default Load

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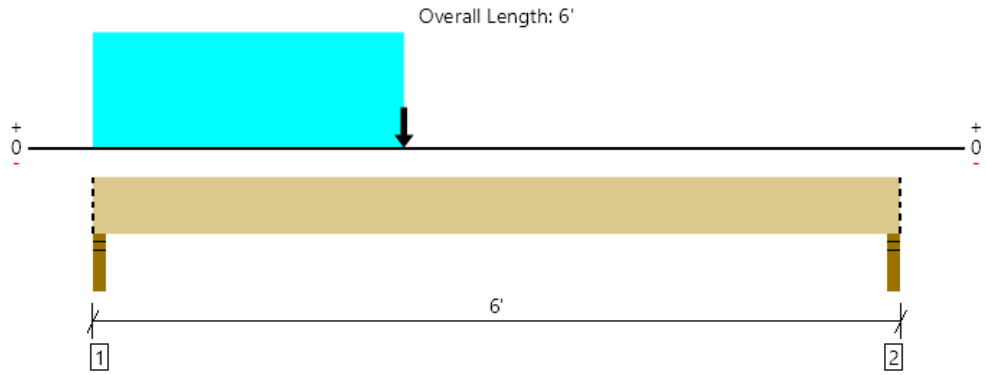
Roof, 6

2 piece(s) 1 3/4" x 7 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)	4144 @ 1 1/2"	6563 (3.00")	Passed (63%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3057 @ 10 1/4"	5544	Passed (55%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	5673 @ 2' 3 3/4"	8182	Passed (69%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.080 @ 2' 9 13/16"	0.287	Passed (L/868)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.147 @ 2' 9 13/16"	0.383	Passed (L/470)	--	1.0 D + 1.0 S (All 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).
- 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	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.89"	1896	2248	4144	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	742	864	1607	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' o/c	
Bottom Edge (Lu)	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'	N/A	7.4	--	
1 - Uniform (PSF)	0 to 2' 3 3/4" (Top)	23'	25.0	30.0	Default Load
2 - Point (lb)	2' 3 3/4" (Top)	N/A	1264	1517	50.6 sf tributary

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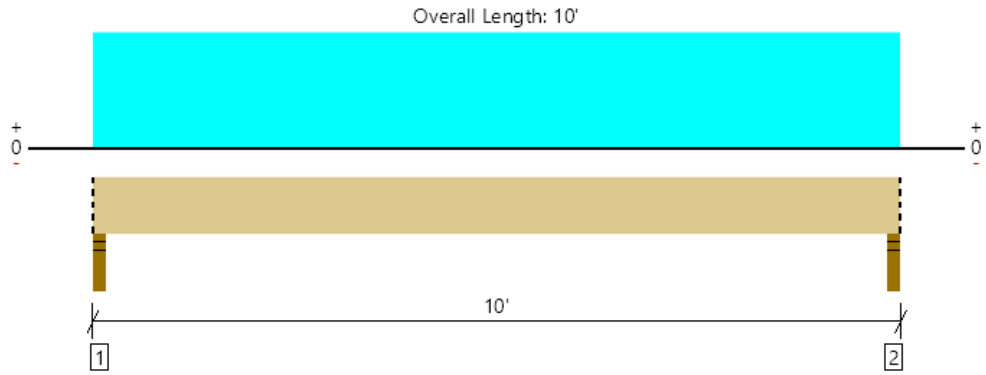
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, 7

2 piece(s) 1 3/4" x 5 1/2" 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)	1458 @ 1 1/2"	6563 (3.00")	Passed (22%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1251 @ 8 1/2"	4206	Passed (30%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3464 @ 5'	4889	Passed (71%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.338 @ 5'	0.488	Passed (L/346)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.631 @ 5'	0.650	Passed (L/185)	--	1.0 D + 1.0 S (All 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).
- 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	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.50"	678	780	1458	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	678	780	1458	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)	10' o/c	
Bottom Edge (Lu)	10' o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 10'	N/A	5.6	--	
1 - Uniform (PSF)	0 to 10' (Top)	5' 2 3/8"	25.0	30.0	Default Load

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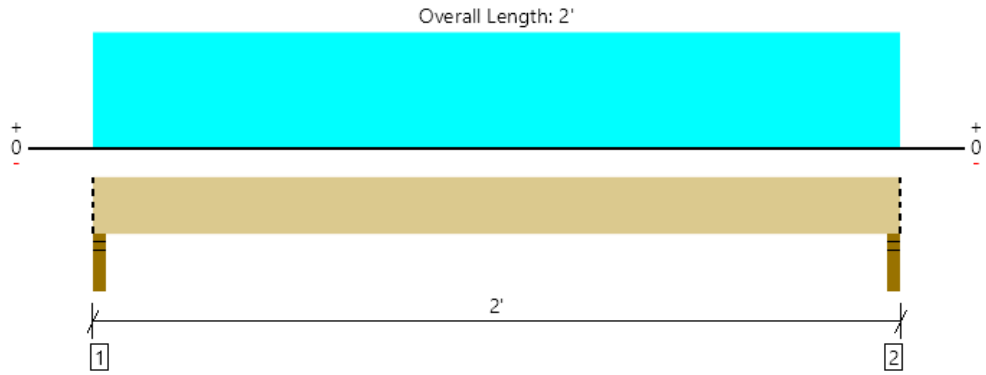
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

Roof, 8

1 piece(s) 2 x 4 DF 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)	287 @ 1 1/2"	2813 (3.00")	Passed (10%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	132 @ 6 1/2"	725	Passed (18%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	110 @ 1'	440	Passed (25%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.004 @ 1'	0.087	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.007 @ 1'	0.117	Passed (L/999+)	--	1.0 D + 1.0 S (All 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).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.50"	131	156	287	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	131	156	287	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' o/c	
Bottom Edge (Lu)	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 2'	N/A	1.3	--	
1 - Uniform (PSF)	0 to 2' (Top)	5' 2 3/8"	25.0	30.0	Default Load

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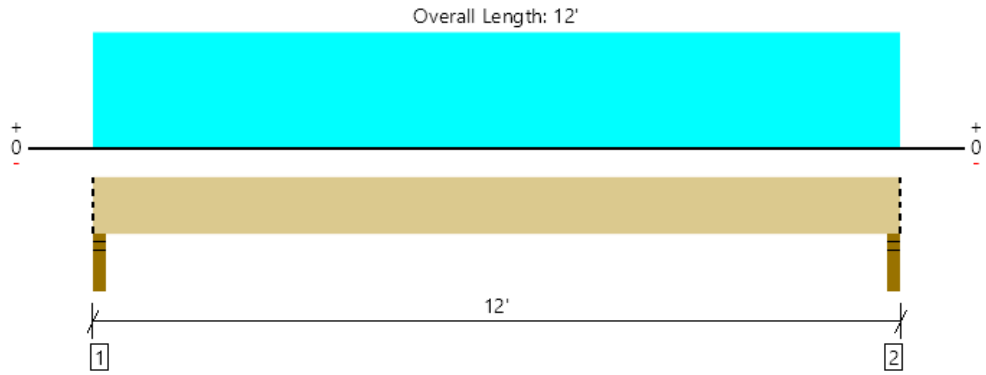
Roof, 9

2 piece(s) 1 3/4" x 7 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)	1760 @ 1 1/2"	6563 (3.00")	Passed (27%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1509 @ 10 1/4"	5544	Passed (27%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	5061 @ 6'	8182	Passed (62%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.313 @ 6'	0.587	Passed (L/450)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.589 @ 6'	0.783	Passed (L/239)	--	1.0 D + 1.0 S (All 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).
- 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	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.50"	824	936	1760	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	824	936	1760	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' o/c	
Bottom Edge (Lu)	12' 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 12'	N/A	7.4	--	
1 - Uniform (PSF)	0 to 12' (Top)	5' 2 3/8"	25.0	30.0	Default Load

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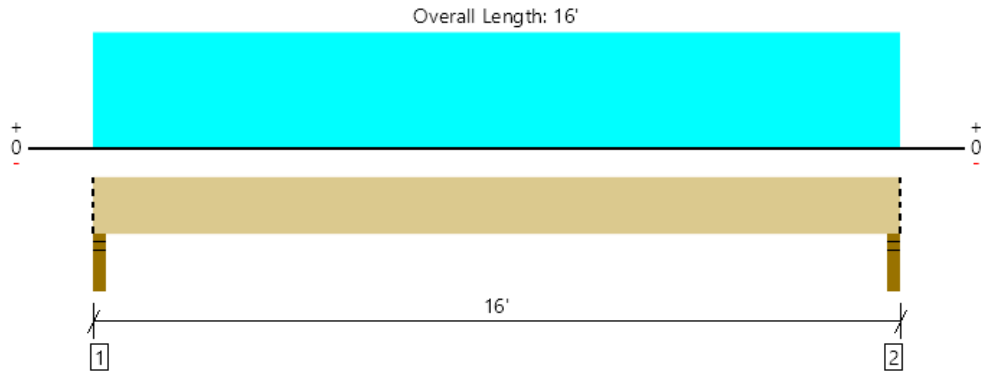
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

Roof, 10

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)	2363 @ 1 1/2"	6563 (3.00")	Passed (36%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2061 @ 1' 1/4"	7074	Passed (29%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	9157 @ 8'	12884	Passed (71%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.485 @ 8'	0.788	Passed (L/390)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.918 @ 8'	1.050	Passed (L/206)	--	1.0 D + 1.0 S (All 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).
- 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	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.50"	1115	1248	2363	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	1115	1248	2363	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	11' 9" o/c	
Bottom Edge (Lu)	16' 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 16'	N/A	9.4	--	
1 - Uniform (PSF)	0 to 16' (Top)	5' 2 3/8"	25.0	30.0	Default Load

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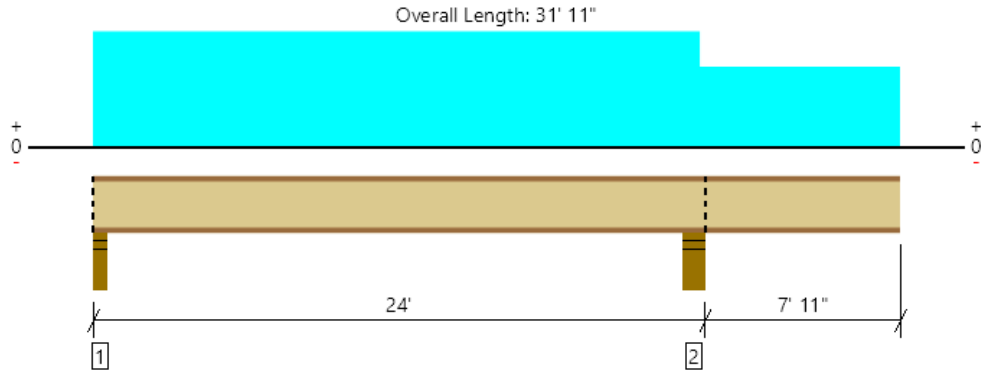
ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Upper, Floor: Joist w/ Cant
1 piece(s) 20" TJI® 560 @ 24" OC

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)	1516 @ 2 1/2"	1725 (3.50")	Passed (88%)	1.00	1.0 D + 1.0 L (Alt Spans)
Shear (lbs)	1478 @ 3 1/2"	3345	Passed (44%)	1.00	1.0 D + 1.0 L (Alt Spans)
Moment (Ft-lbs)	8531 @ 11' 8"	16165	Passed (53%)	1.00	1.0 D + 1.0 L (Alt Spans)
Live Load Defl. (in)	0.283 @ 11' 11 7/8"	0.589	Passed (L/998)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.435 @ 11' 10 1/2"	1.178	Passed (L/650)	--	1.0 D + 1.0 L (Alt Spans)
TJ-Pro™ Rating	42	40	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).
- Overhang deflection criteria: LL (2L/480) and TL (2L/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	Snow	Factored	
1 - Stud wall - DF	3.50"	3.50"	2.71"	557	959	-84	1516	Blocking
2 - Stud wall - DF	5.50"	5.50"	3.50"	880	961	559	2021	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' o/c	
Bottom Edge (Lu)	13' 11" o/c	

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

Vertical Loads	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 24'	24"	25.0	40.0	-	Default Load
2 - Uniform (PSF)	24' to 31' 11"	24"	15.0	-	30.0	Default Load

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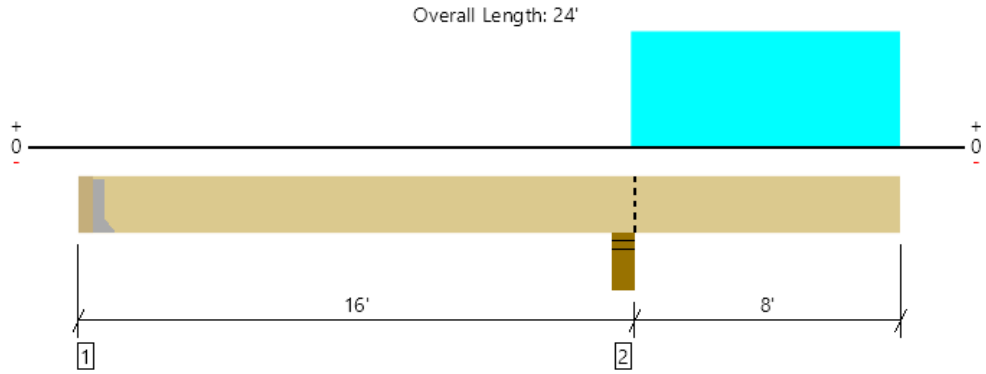
ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Upper, Roof: Joist Cant

1 piece(s) 1 3/4" x 11 1/4" 2.0E Microllam® LVL @ 24" OC

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)	917 @ 15' 9 1/4"	6016 (5.50")	Passed (15%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	636 @ 16' 11 1/4"	4302	Passed (15%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-3045 @ 15' 9 1/4"	7237	Passed (42%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.514 @ 24'	0.823	Passed (2L/384)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.770 @ 24'	1.097	Passed (2L/256)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Joist
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.
- A 4% increase in the moment capacity has been added to account for repetitive member usage.
- 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	Factored	
1 - Hanger on 11 1/4" DF beam	3.50"	Hanger[1]	1.50"	-66	-131	-197	See note [1]
2 - Stud wall - DF	5.50"	5.50"	1.50"	306	611	917	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	23' 9" o/c	
Bottom Edge (Lu)	14' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	IUS1.81/9.5	2.00"	N/A	8-10dx1.5	2-10dx1.5	

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

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	16' to 24'	24"	15.0	30.0	Default Load

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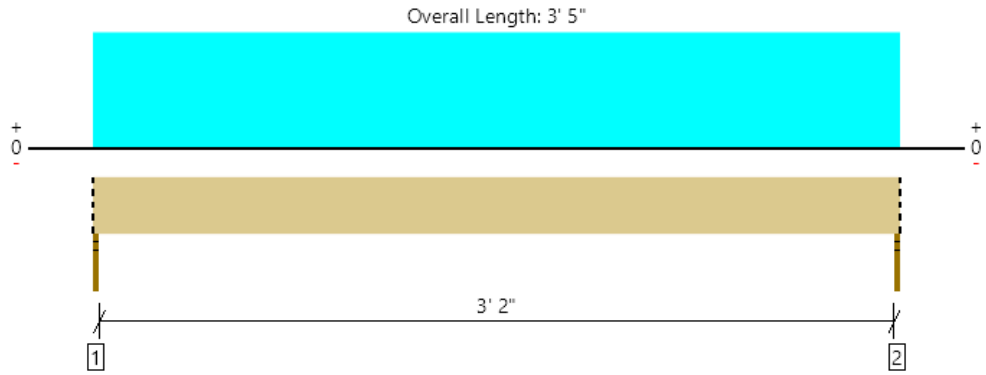
ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Upper, 20
2 piece(s) 2 x 8 DF 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)	2222 @ 0	2813 (1.50")	Passed (79%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1273 @ 8 3/4"	2610	Passed (49%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1898 @ 1' 8 1/2"	2628	Passed (72%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.015 @ 1' 8 1/2"	0.085	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.025 @ 1' 8 1/2"	0.171	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	Snow	Factored	
1 - Stud wall - DF	1.50"	1.50"	1.50"	838	1384	-72	2222	Blocking
2 - Stud wall - DF	1.50"	1.50"	1.50"	838	1384	-72	2222	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' 5" o/c	
Bottom Edge (Lu)	3' 5" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 3' 5"	N/A	5.5	--	--	
1 - Uniform (PSF)	0 to 3' 5" (Top)	8' 3 1/8"	25.0	40.0	-	Default Load
2 - Uniform (PLF)	0 to 3' 5" (Front)	N/A	278.5	479.5	-42.0	Linked from: Floor: Joist w/ Cant, Support 1

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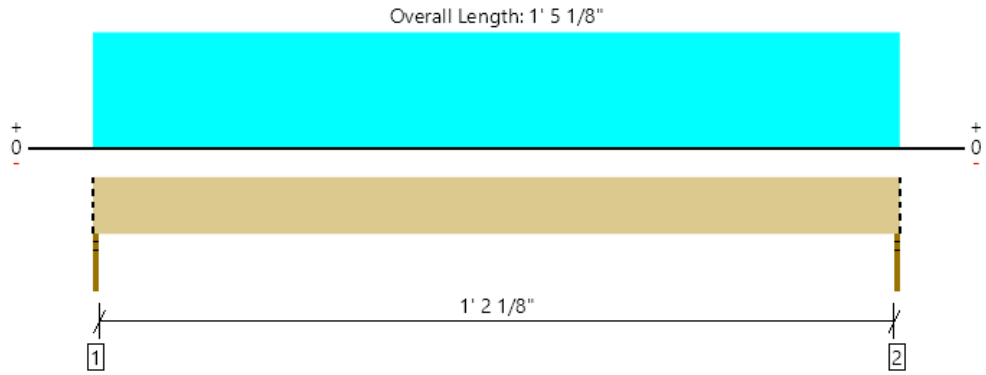
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Upper, 21
2 piece(s) 2 x 4 DF 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)	385 @ 0	2813 (1.50")	Passed (14%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	160 @ 5"	1260	Passed (13%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	137 @ 8 9/16"	766	Passed (18%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.002 @ 8 9/16"	0.036	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.003 @ 8 9/16"	0.071	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	Factored	
1 - Stud wall - DF	1.50"	1.50"	1.50"	149	236	385	Blocking
2 - Stud wall - DF	1.50"	1.50"	1.50"	149	236	385	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' 5" o/c	
Bottom Edge (Lu)	1' 5" 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 1' 5 1/8"	N/A	2.7	--	
1 - Uniform (PSF)	0 to 1' 5 1/8" (Top)	8' 3 1/8"	25.0	40.0	Default Load

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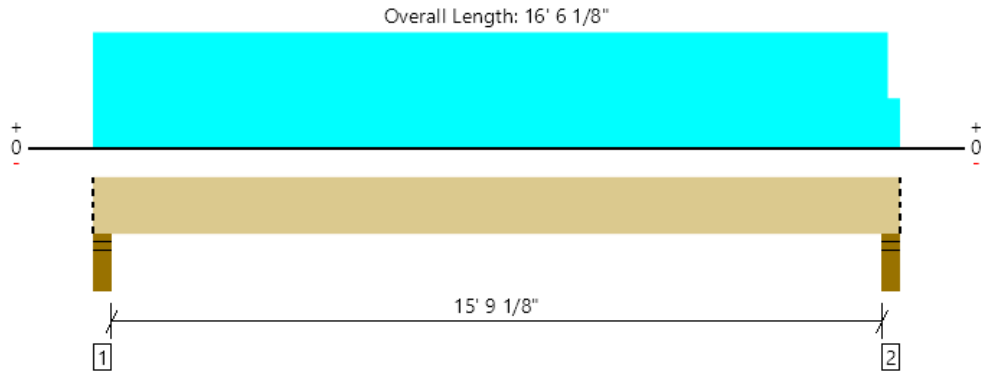
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Upper, 22

3 piece(s) 1 3/4" x 16" 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)	10892 @ 3"	14766 (4.50")	Passed (74%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	8638 @ 1' 8 1/2"	15960	Passed (54%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	42277 @ 8' 3 1/16"	46671	Passed (91%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.370 @ 8' 3 1/16"	0.400	Passed (L/520)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.602 @ 8' 3 1/16"	0.801	Passed (L/319)	--	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	Snow	Factored	
1 - Stud wall - DF	4.50"	4.50"	3.32"	4206	6686	-347	10892	Blocking
2 - Stud wall - DF	4.50"	4.50"	3.26"	4136	6566	-336	10703	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)	5' 8" o/c	
Bottom Edge (Lu)	16' 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)	Comments
0 - Self Weight (PLF)	0 to 16' 6 1/8"	N/A	24.5	--	--	
1 - Uniform (PSF)	0 to 16' 6 1/8" (Top)	8' 3 1/8"	25.0	40.0	-	Default Load
2 - Uniform (PLF)	0 to 16' 3 1/8" (Front)	N/A	278.5	479.5	-42.0	Linked from: Floor: Joist w/ Cant, Support 1

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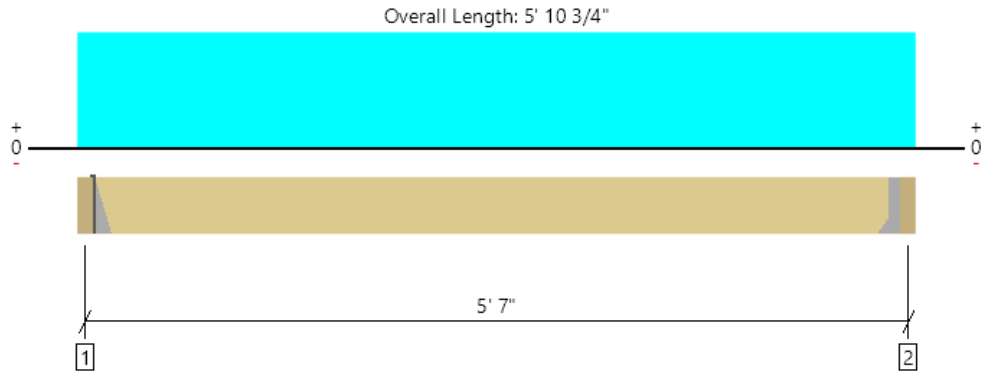
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Upper, 23
2 piece(s) 2 x 8 DF 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)	1592 @ 3 3/4"	2813 (1.50")	Passed (57%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1227 @ 11"	2610	Passed (47%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2098 @ 2' 11 3/8"	2628	Passed (80%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.039 @ 2' 11 3/8"	0.132	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.065 @ 2' 11 3/8"	0.264	Passed (L/977)	--	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	Factored	
1 - Hanger on 7 1/4" DF beam	3.75"	Hanger[1]	1.50"	693	1086	1779	See note [1]
2 - Hanger on 7 1/4" DF beam	3.75"	Hanger[1]	1.50"	693	1086	1779	See note [1]

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 3" o/c	
Bottom Edge (Lu)	5' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Top Mount Hanger	BA28-2	3.00"	6-10dx1.5	4-10dx1.5	2-10dx1.5	
2 - Face Mount Hanger	HUS28-2	2.00"	N/A	6-16d	6-16d	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	3 3/4" to 5' 7"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 5' 10 3/4" (Top)	9' 2 1/2"	25.0	40.0	Default Load

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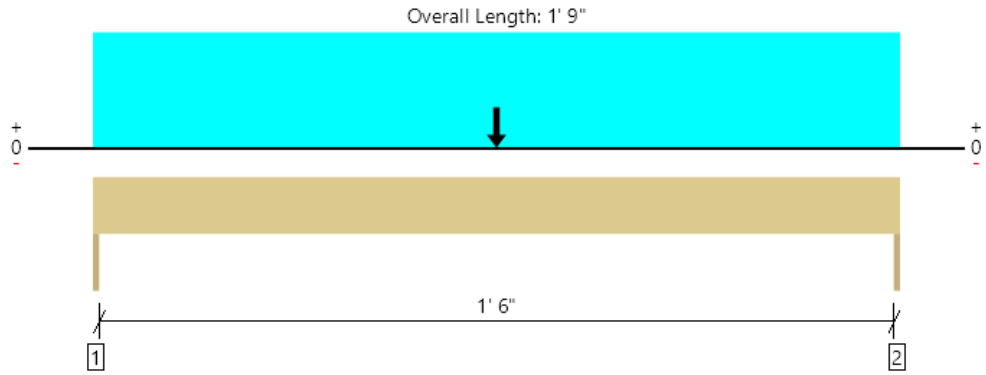
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

Upper, 24

2 piece(s) 2 x 8 DF 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)	2706 @ 0	2813 (1.50")	Passed (96%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2178 @ 8 3/4"	3002	Passed (73%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2091 @ 10 1/2"	3022	Passed (69%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.003 @ 10 1/2"	0.058	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.006 @ 10 1/2"	0.087	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	Floor Live	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	1338	420	1369	2706	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	1338	420	1369	2706	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 1' 9"	N/A	5.5	--	--	
1 - Uniform (PLF)	0 to 1' 9"	N/A	440.0	480.5	279.5	Linked from: Floor: Joist w/ Cant, Support 2
2 - Point (lb)	10 1/2"	N/A	1896	-	2248	Linked from: 6, Support 1

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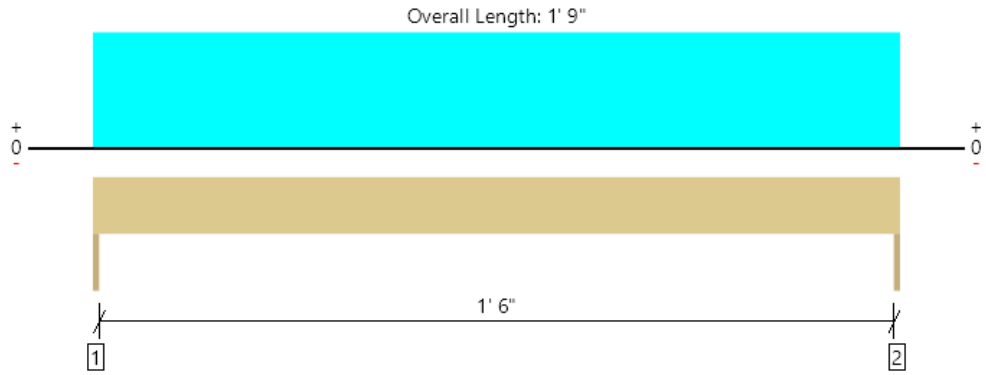
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Upper, 25
2 piece(s) 2 x 4 DF 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)	1937 @ 0	2813 (1.50")	Passed (69%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	1014 @ 5"	1449	Passed (70%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	847 @ 10 1/2"	880	Passed (96%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.013 @ 10 1/2"	0.058	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.026 @ 10 1/2"	0.087	Passed (L/819)	--	1.0 D + 0.75 L + 0.75 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	Floor Live	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	985	420	848	1937	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	985	420	848	1937	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 1' 9"	N/A	2.7	--	--	
1 - Uniform (PLF)	0 to 1' 9"	N/A	440.0	480.5	279.5	Linked from: Floor: Joist w/ Cant, Support 2
2 - Uniform (PSF)	0 to 1' 9"	23'	25.0	-	30.0	
3 - Uniform (PSF)	0 to 1' 9"	9'	12.0	-	-	

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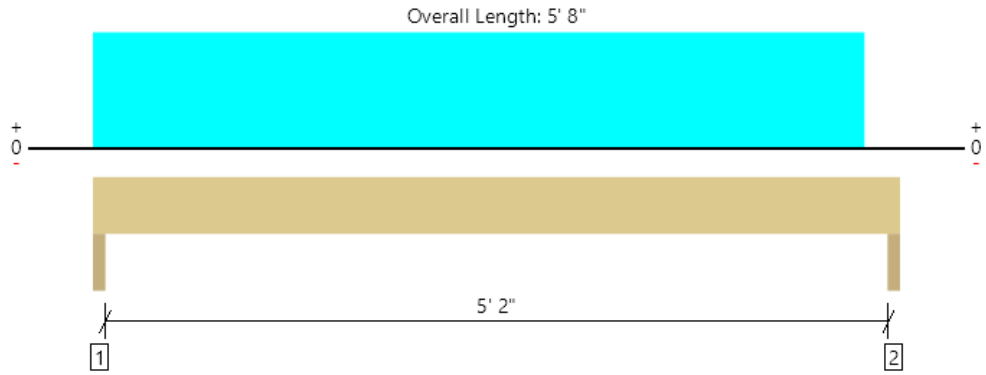
Upper, 26
2 piece(s) 2 x 10 DF No.1



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)	2880 @ 1 1/2"	5625 (3.00")	Passed (51%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	1682 @ 4' 7 3/4"	3330	Passed (51%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	3398 @ 2' 10"	3922	Passed (87%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.033 @ 2' 10 1/16"	0.181	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.058 @ 2' 10 1/16"	0.271	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 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	Floor Live	Snow	Factored	
1 - Trimmer - DF	3.00"	3.00"	1.54"	1266	1361	792	2880	None
2 - Trimmer - DF	3.00"	3.00"	1.50"	1157	1242	722	2631	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 8"	N/A	7.0	--	--	
1 - Uniform (PLF)	0 to 5' 5"	N/A	440.0	480.5	279.5	Linked from: Floor: Joist w/ Cant, Support 2

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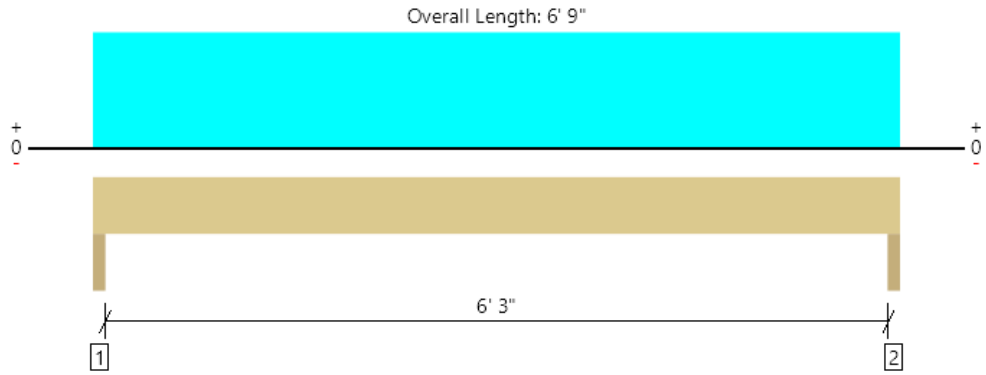
Upper, 27

3 piece(s) 2 x 10 DF 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)	2568 @ 1 1/2"	8438 (3.00")	Passed (30%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1791 @ 1' 1/4"	4995	Passed (36%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	4018 @ 3' 4 1/2"	5882	Passed (68%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.037 @ 3' 4 1/2"	0.217	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.061 @ 3' 4 1/2"	0.325	Passed (L/999+)	--	1.0 D + 1.0 L (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	Floor Live	Factored	
1 - Trimmer - DF	3.00"	3.00"	1.50"	1009	1558	2568	None
2 - Trimmer - DF	3.00"	3.00"	1.50"	1009	1558	2568	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 6' 9"	N/A	10.6	--	
1 - Uniform (PSF)	0 to 6' 9"	11' 6 1/2"	25.0	40.0	

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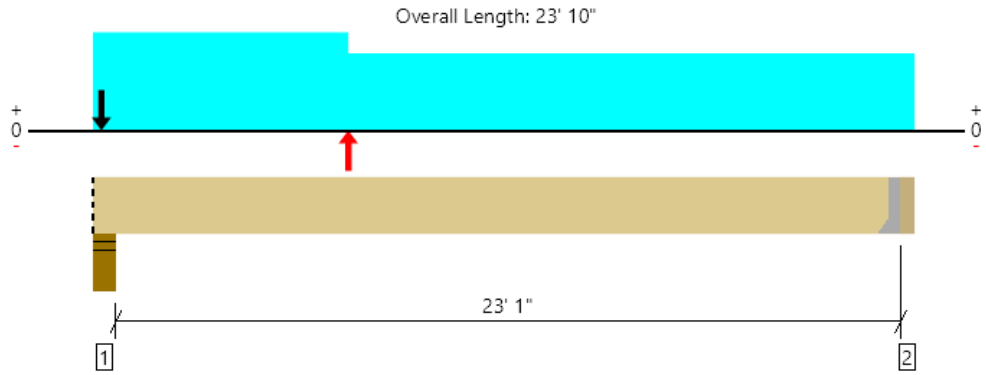
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Upper, 28

3 piece(s) 1 3/4" x 16" 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)	6326 @ 23' 6 1/2"	6326 (1.61")	Passed (100%)	--	1.0 D - 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	5345 @ 1' 9 1/2"	15960	Passed (33%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	33357 @ 11' 7 13/16"	46671	Passed (71%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	1.005 @ 11' 3 11/16"	0.774	Failed (L/277)	--	1.0 D - 0.525 E + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	1.364 @ 11' 5 1/16"	1.160	Failed (L/204)	--	1.0 D - 0.525 E + 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/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- -529 lbs uplift at support located at 4". Strapping or other restraint may be required.
- -919 lbs uplift at support located at 23' 6 1/2". Strapping or other restraint may be required.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Seismic	Factored	
1 - Stud wall - DF	5.50"	5.50"	2.16"	2705	3701	3074/-3074	7094/-529	Blocking
2 - Hanger on 16" LVL beam	3.50"	Hanger[1]	1.61"	2054	3688	3074/-3074	6434/-919	See note [1]

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 3" o/c	
Bottom Edge (Lu)	13' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	HGUS5.50/12	4.00"	N/A	56-10d	20-10d	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 23' 6 1/2"	N/A	24.5	--	--	
1 - Uniform (PSF)	0 to 23' 10" (Top)	4' 6"	25.0	60.0	-	Default Load
2 - Uniform (PSF)	0 to 23' 10" (Top)	1'	25.0	40.0	-	Default Load
3 - Uniform (PSF)	0 to 7' 6 1/2" (Top)	10'	12.0	-	-	Default Load
4 - Point (lb)	3" (Front)	N/A	-	-	9898	
5 - Point (lb)	7' 6 1/2" (Front)	N/A	-	-	-9898	

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

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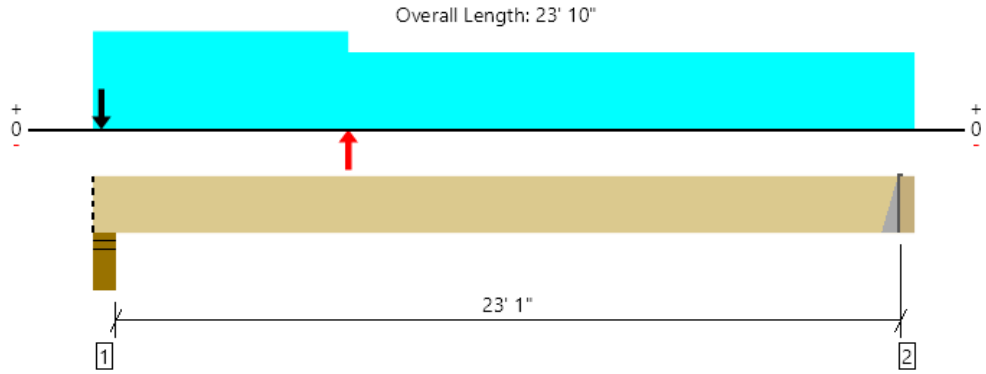
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Upper, 28 (w_overstrength)

4 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL

An excessive uplift of -3699 lbs at support located at 4" failed this product.

An excessive uplift of -4090 lbs at support located at 23' 6 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)	8842 @ 23' 6 1/2"	8842 (1.68")	Passed (100%)	--	1.0 D - 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	14224 @ 1' 9 1/2"	34048	Passed (42%)	1.60	1.0 D - 0.7 E (All Spans)
Moment (Ft-lbs)	98041 @ 7' 6 1/2"	99565	Passed (98%)	1.60	1.0 D - 0.7 E (All Spans)
Live Load Defl. (in)	-1.410 @ 10' 9 7/8"	0.774	Failed (L/197)	--	1.0 D + 0.7 E (All Spans)
Total Load Defl. (in)	1.689 @ 10' 11 9/16"	1.160	Failed (L/165)	--	1.0 D - 0.7 E (All 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).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Member should be side-loaded from both sides of the member or braced to prevent rotation.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Seismic	Factored	
1 - Stud wall - DF	5.50"	5.50"	2.20"	2802	3701	7686/-7686	9612/-3699	Blocking
2 - Hanger on 16" LVL beam	3.50"	Hanger[1]	1.68"	2149	3688	7686/-7686	8950/-4090	See note [1]

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	1' 5" o/c	
Bottom Edge (Lu)	6' 1" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Top Mount Hanger	EGQ7.25-SDS3 H=15.938	6.00"	N/A	28-SDS25300	12-SDS25300	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 23' 6 1/2"	N/A	32.7	--	--	
1 - Uniform (PSF)	0 to 23' 10" (Top)	4' 6"	25.0	60.0	-	Default Load
2 - Uniform (PSF)	0 to 23' 10" (Top)	1'	25.0	40.0	-	Default Load
3 - Uniform (PSF)	0 to 7' 6 1/2" (Top)	10'	12.0	-	-	Default Load
4 - Point (lb)	3" (Front)	N/A	-	-	24745	
5 - Point (lb)	7' 6 1/2" (Front)	N/A	-	-	-24745	

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

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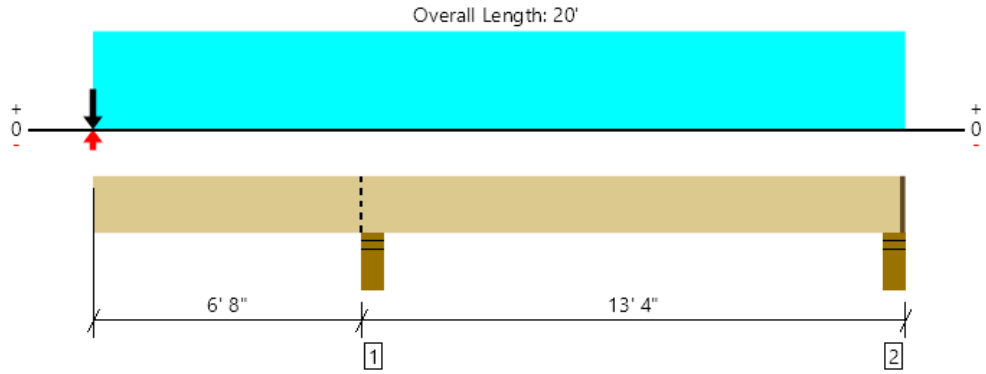
Upper, 29

3 piece(s) 1 3/4" x 20" 2.0E Microllam® LVL

An excessive uplift of -1609 lbs at support located at 19' 8" 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) [Group]
Member Reaction (lbs)	17841 @ 6' 10 3/4"	18047 (5.50")	Passed (99%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Shear (lbs)	7315 @ 5'	19950	Passed (37%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Moment (Ft-lbs)	-50453 @ 6' 10 3/4"	81355	Passed (62%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Live Load Defl. (in)	0.278 @ 0	0.460	Passed (2L/594)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (Alt Spans) [1]
Total Load Defl. (in)	0.594 @ 0	0.690	Passed (2L/278)	--	1.0 D - 0.525 E + 0.75 L + 0.75 S (Alt Spans) [8]

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).
- Left 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.

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Stud wall - DF	5.50"	5.50"	5.44"	10227	6066	3095	1415/-1415	17841	Blocking
2 - Stud wall - SPF	5.50"	4.25"	1.50"	-80	2220/-953	-1085	496/-496	2140/-1870	1 1/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	19' 11" o/c	
Bottom Edge (Lu)	7' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 19' 10 3/4"	N/A	30.6	--	--	--	
1 - Uniform (PSF)	0 to 20' (Top)	8' 3 1/8"	25.0	40.0	-	-	Default Load
2 - Point (lb)	0 (Top)	N/A	742	-	864	-	Linked from: 6, Support 2
3 - Uniform (PSF)	0 to 20' (Top)	9'	12.0	-	-	-	Default Load
4 - Point (lb)	0 (Front)	N/A	2505	690	1146	919/-919	Linked from: 35, Support 2

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

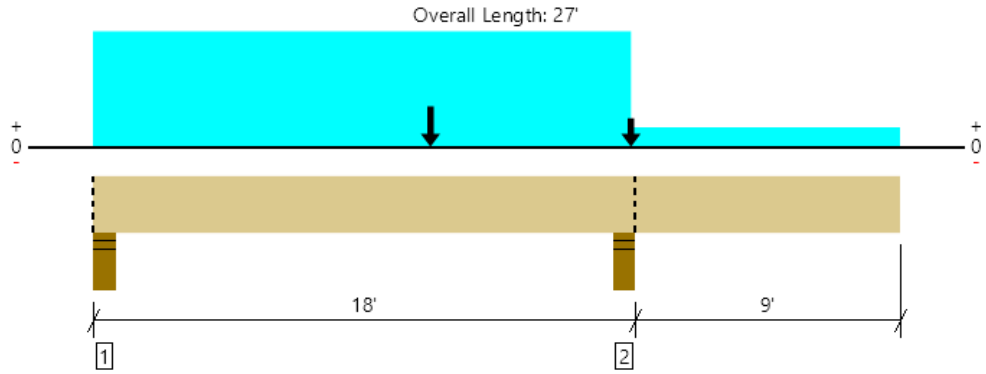
ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Upper, 30

1 piece(s) 5 1/2" x 15" 24F-V8 DF Glulam

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)	14112 @ 17' 9 1/4"	18906 (5.50")	Passed (75%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	5128 @ 16' 3 1/2"	14575	Passed (35%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	22619 @ 8' 7"	41035	Passed (55%)	1.00	1.0 D + 1.0 L (Alt Spans)
Neg Moment (Ft-lbs)	-17449 @ 11' 3 1/2"	62577	Passed (28%)	1.60	0.6 D - 0.7 E (All Spans)
Live Load Defl. (in)	0.610 @ 27'	0.615	Passed (2L/362)	--	0.6 D - 0.7 E (All Spans)
Total Load Defl. (in)	0.630 @ 9' 2 1/4"	0.872	Passed (L/332)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (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 right cantilever exceeds overhang deflection criteria.
- 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.
- Critical positive moment adjusted by a volume factor of 0.99 that was calculated using length L = 16' 5 15/16".
- Critical negative moment adjusted by a volume factor of 0.95 that was calculated using length L = 26' 8".
- Upward deflection on right cantilever exceeds 0.4".
- -425 lbs uplift at support located at 4". Strapping or other restraint may be required.
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Stud wall - DF	5.50"	5.50"	1.89"	2715	2991	-	2935/-2935	6500/-425	Blocking
2 - Stud wall - DF	5.50"	5.50"	4.11"	7055	3822	2112	4965/-4965	14112	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)	27' o/c	
Bottom Edge (Lu)	27' 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)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 27'	N/A	20.0	--	--	--	
1 - Uniform (PSF)	0 to 18' (Top)	8' 3 1/8"	25.0	40.0	-	-	Default Load
2 - Point (lb)	18' (Top)	N/A	742	-	864	-	Linked from: 6, Support 2
3 - Point (lb)	18' (Front)	N/A	1115	-	1248	-	Linked from: 10, Support 1
4 - Uniform (PSF)	0 to 27' (Top)	9'	12.0	-	-	-	Default Load
5 - Point (lb)	11' 3 1/2" (Top)	N/A	-	-	-	7900	
6 - Point (lb)	18' (Front)	N/A	739	865	-	-	Linked from: 31, Support 1

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

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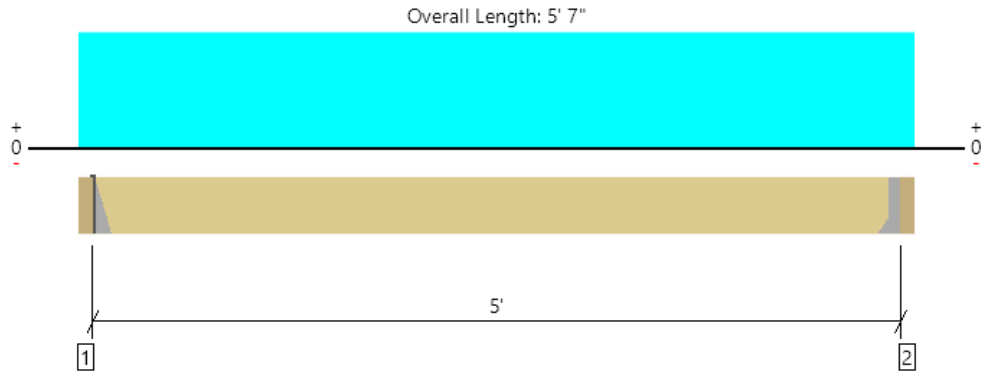
Upper, 31

1 piece(s) 1 3/4" x 16" 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)	1439 @ 3 1/2"	1969 (1.50")	Passed (73%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	672 @ 1' 7 1/2"	5320	Passed (13%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1799 @ 2' 9 1/2"	15557	Passed (12%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.008 @ 2' 9 1/2"	0.167	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.014 @ 2' 9 1/2"	0.250	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/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	Floor Live	Factored	
1 - Hanger on 16" DF beam	3.50"	Hanger[1]	1.50"	739	865	1605	See note [1]
2 - Hanger on 16" DF beam	3.50"	Hanger[1]	1.50"	739	865	1605	See note [1]

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

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

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Top Mount Hanger	ITS1.81/16	2.00"	4-10dx1.5	4-10dx1.5	4-10dx1.5	
2 - Face Mount Hanger	IUS1.81/14	2.00"	N/A	14-10d	2-10dx1.5	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	3 1/2" to 5' 3 1/2"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 5' 7" (Top)	4' 6"	25.0	60.0	Default Load
2 - Uniform (PSF)	0 to 5' 7" (Top)	1'	25.0	40.0	Default Load
3 - Uniform (PSF)	0 to 5' 7" (Top)	10'	12.0	-	Default Load

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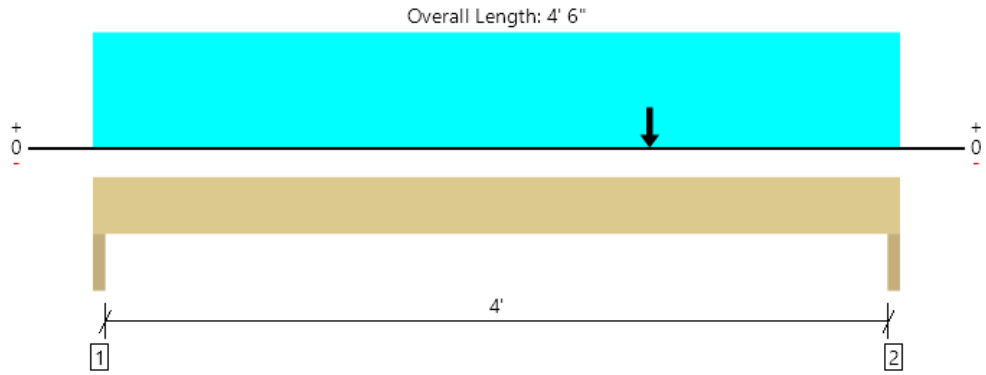
ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Upper, 32

2 piece(s) 1 3/4" x 16" 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)	5452 @ 4' 4 1/2"	7875 (3.00")	Passed (69%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	3880 @ 2' 11"	12236	Passed (32%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	6423 @ 3' 1 1/4"	35781	Passed (18%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.009 @ 3' 1 1/4"	0.142	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.019 @ 3' 1 1/4"	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.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Trimmer - DF	3.00"	3.00"	1.50"	1602	1039	1046	3166	None
2 - Trimmer - DF	3.00"	3.00"	2.08"	2834	1039	2451	5452	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	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 4' 6"	N/A	16.3	--	--	
1 - Uniform (PSF)	0 to 4' 6"	11' 6 1/2"	25.0	40.0	-	
2 - Point (lb)	3' 1 1/4"	N/A	1950	-	2249	Linked from: 2, Support 2
3 - Point (lb)	3' 1 1/4"	N/A	1115	-	1248	Linked from: 10, Support 1

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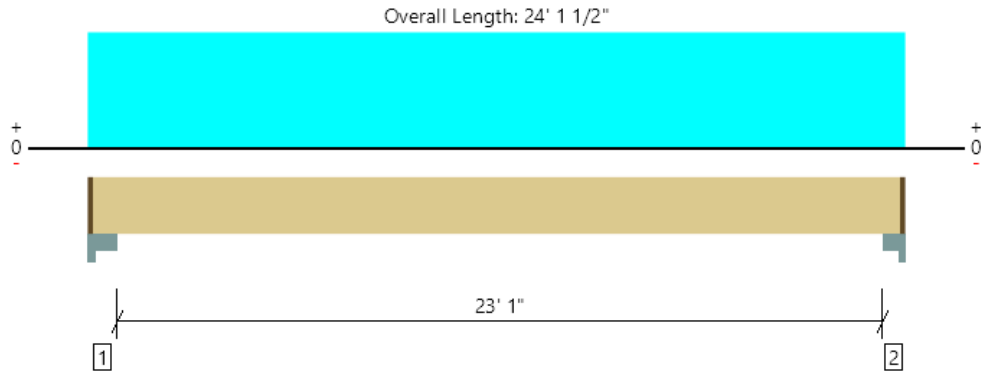
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Upper, 33

1 piece(s) 5 1/2" 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)	4789 @ 23' 9 1/2"	15194 (4.25")	Passed (32%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	4143 @ 1' 10"	14575	Passed (28%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	27396 @ 12' 1 1/2"	39636	Passed (69%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.647 @ 12' 1 1/2"	0.778	Passed (L/433)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.964 @ 12' 1 1/2"	1.167	Passed (L/290)	--	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/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 0.96 that was calculated using length L = 23' 4".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Column Cap - steel	7.00"	5.75"	1.50"	1605	3274	4879	1 1/4" Rim Board
2 - Column Cap - steel	5.50"	4.25"	1.50"	1589	3240	4829	1 1/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	23' 11" o/c	
Bottom Edge (Lu)	23' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 1/4" to 24' 1/4"	N/A	20.0	--	
1 - Uniform (PSF)	0 to 24' 1 1/2" (Top)	4' 6"	25.0	60.0	Default Load

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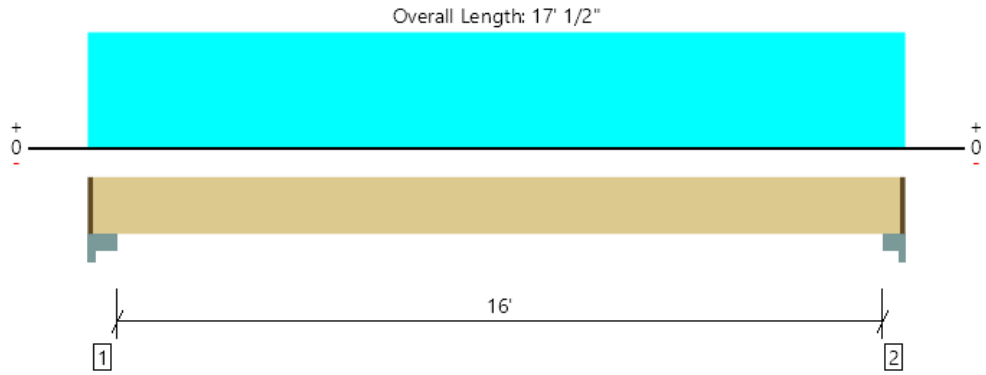
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Upper, 34

1 piece(s) 5 1/2" 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)	3363 @ 16' 8 1/2"	15194 (4.25")	Passed (22%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	2717 @ 1' 10"	14575	Passed (19%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	13287 @ 8' 7"	41096	Passed (32%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.152 @ 8' 7"	0.542	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.227 @ 8' 7"	0.813	Passed (L/860)	--	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/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 = 16' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Column Cap - steel	7.00"	5.75"	1.50"	1136	2318	3453	1 1/4" Rim Board
2 - Column Cap - steel	5.50"	4.25"	1.50"	1119	2284	3403	1 1/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	16' 10" o/c	
Bottom Edge (Lu)	16' 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)	1 1/4" to 16' 11 1/4"	N/A	20.0	--	
1 - Uniform (PSF)	0 to 17' 1/2" (Top)	4' 6"	25.0	60.0	Default Load

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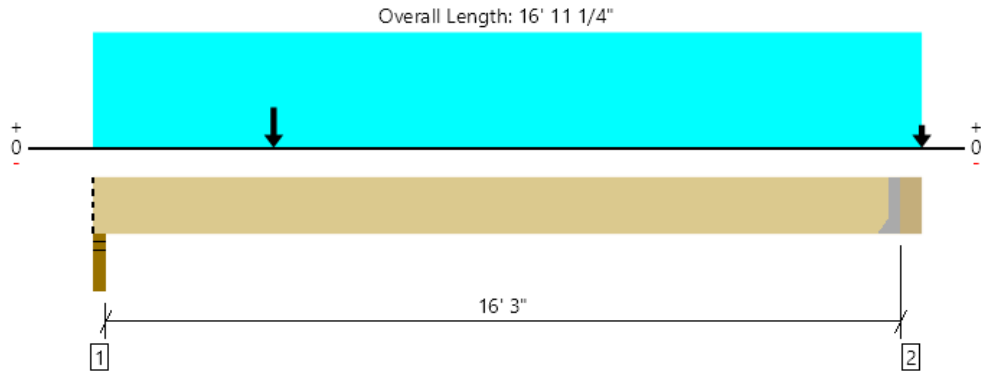
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Upper, 35

2 piece(s) 1 3/4" x 16" 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)	4804 @ 1 1/2"	6563 (3.00")	Passed (73%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	4433 @ 1' 7"	17024	Passed (26%)	1.60	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	10102 @ 7' 7 1/16"	31114	Passed (32%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.177 @ 7' 6 11/16"	0.546	Passed (L/999+)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.343 @ 7' 9 15/16"	0.819	Passed (L/572)	--	1.0 D + 0.525 E + 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/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- -976 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	Floor Live	Snow	Seismic	Factored	
1 - Stud wall - DF	3.00"	3.00"	2.20"	2089	665	726	3185/-3185	4804/-976	Blocking
2 - Hanger on 16" LVL beam	5.25"	Hanger[1]	1.50"	2505	690	1146	919/-919	4364	See note [1]

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	11' 4" o/c	
Bottom Edge (Lu)	16' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	Connector not found	N/A	N/A	N/A	N/A	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 16' 6"	N/A	16.3	--	--	--	
1 - Uniform (PSF)	0 to 16' 11 1/4" (Top)	2'	25.0	40.0	-	-	Default Load
2 - Uniform (PSF)	0 to 16' 11 1/4" (Top)	9'	12.0	-	-	-	Default Load
3 - Point (lb)	16' 11 1/4" (Top)	N/A	824	-	936	-	Linked from: 9, Support 1
4 - Point (lb)	3' 9 1/2" (Top)	N/A	824	-	936	-	Linked from: 9, Support 2
5 - Point (lb)	3' 9 1/2" (Front)	N/A	-	-	-	4104	

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

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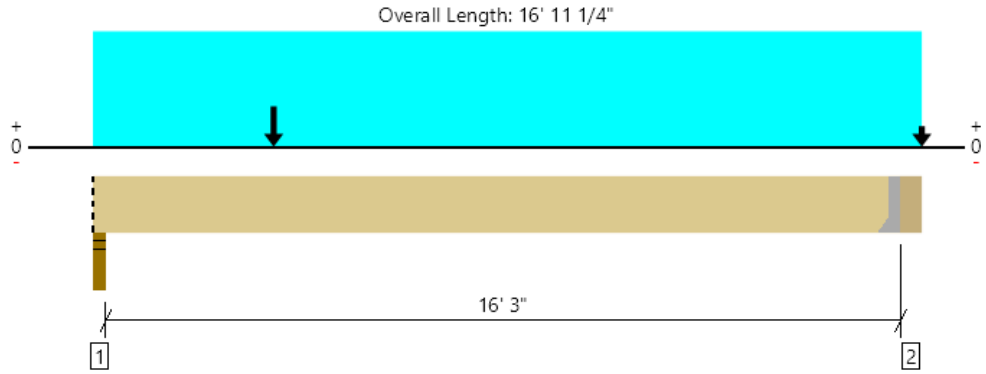
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Upper, 35 (w_overstrength)

2 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL

Support 1 failed reaction check due to insufficient bearing capacity.

An excessive uplift of -4321 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)	7662 @ 1 1/2"	6563 (3.00")	Failed (117%)	--	1.0 D + 0.7 E (All Spans)
Shear (lbs)	7386 @ 1' 7"	17024	Passed (43%)	1.60	1.0 D + 0.7 E (All Spans)
Moment (Ft-lbs)	26844 @ 3' 9 1/2"	49783	Passed (54%)	1.60	1.0 D + 0.7 E (All Spans)
Live Load Defl. (in)	-0.334 @ 7' 3 9/16"	0.546	Passed (L/589)	--	0.6 D - 0.7 E (All Spans)
Total Load Defl. (in)	0.499 @ 7' 6 13/16"	0.819	Passed (L/394)	--	1.0 D + 0.7 E (All 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).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Stud wall - DF	3.00"	3.00"	3.50"	2089	665	726	7963/-7963	7662/-4321	Blocking
2 - Hanger on 16" LVL beam	5.25"	Hanger[1]	1.50"	2505	690	1146	2297/-2297	5088/-105	See note [1]

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 4" o/c	
Bottom Edge (Lu)	10' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	Connector not found	N/A	N/A	N/A	N/A	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 16' 6"	N/A	16.3	--	--	--	
1 - Uniform (PSF)	0 to 16' 11 1/4" (Top)	2'	25.0	40.0	-	-	Default Load
2 - Uniform (PSF)	0 to 16' 11 1/4" (Top)	9'	12.0	-	-	-	Default Load
3 - Point (lb)	16' 11 1/4" (Top)	N/A	824	-	936	-	Linked from: 9, Support 1
4 - Point (lb)	3' 9 1/2" (Top)	N/A	824	-	936	-	Linked from: 9, Support 2
5 - Point (lb)	3' 9 1/2" (Front)	N/A	-	-	-	10260	

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

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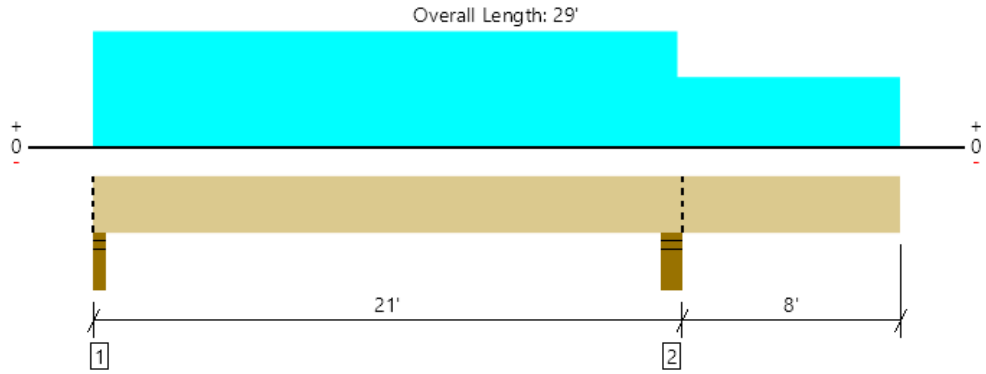
Upper, 36

2 piece(s) 1 3/4" x 16" 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)	3384 @ 1 1/2"	6563 (3.00")	Passed (52%)	--	1.0 D + 0.75 L + 0.75 S (Alt Spans)
Shear (lbs)	3377 @ 19' 2 3/4"	12236	Passed (28%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	14458 @ 9' 11 7/16"	31114	Passed (46%)	1.00	1.0 D + 1.0 L (Alt Spans)
Live Load Defl. (in)	0.181 @ 29'	0.548	Passed (2L/999+)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.537 @ 10' 2 5/16"	1.033	Passed (L/462)	--	1.0 D + 0.75 L + 0.75 S (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).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Upward deflection on right cantilever exceeds 0.4".

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.55"	2143	836	818	3384	Blocking
2 - Stud wall - DF	5.25"	5.25"	2.57"	3193	844	2394	5622	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	11' 1" o/c	
Bottom Edge (Lu)	24' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 29'	N/A	16.3	--	--	
1 - Uniform (PSF)	0 to 21' (Top)	2'	25.0	40.0	-	Default Load
2 - Uniform (PSF)	0 to 21' (Top)	9'	12.0	-	-	Default Load
3 - Uniform (PSF)	21' to 29' (Top)	2'	15.0	-	30.0	Default Load
4 - Uniform (PSF)	0 to 29' (Top)	3'	15.0	-	30.0	Default Load

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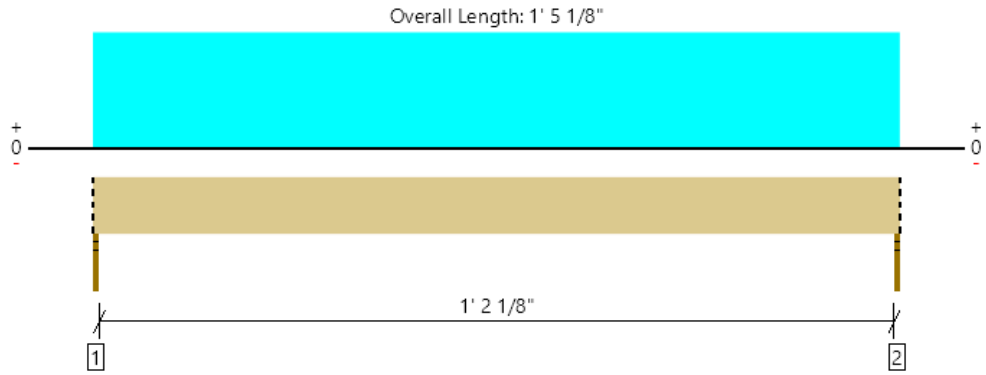
ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Main, 50
2 piece(s) 2 x 4 DF 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)	357 @ 0	2813 (1.50")	Passed (13%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	149 @ 5"	1260	Passed (12%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	128 @ 8 9/16"	766	Passed (17%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.002 @ 8 9/16"	0.036	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.003 @ 8 9/16"	0.071	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	Factored	
1 - Stud wall - DF	1.50"	1.50"	1.50"	139	219	357	Blocking
2 - Stud wall - DF	1.50"	1.50"	1.50"	139	219	357	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' 5" o/c	
Bottom Edge (Lu)	1' 5" 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 1' 5 1/8"	N/A	2.7	--	
1 - Uniform (PSF)	0 to 1' 5 1/8" (Top)	7' 8"	25.0	40.0	Default Load

Weyerhaeuser Notes

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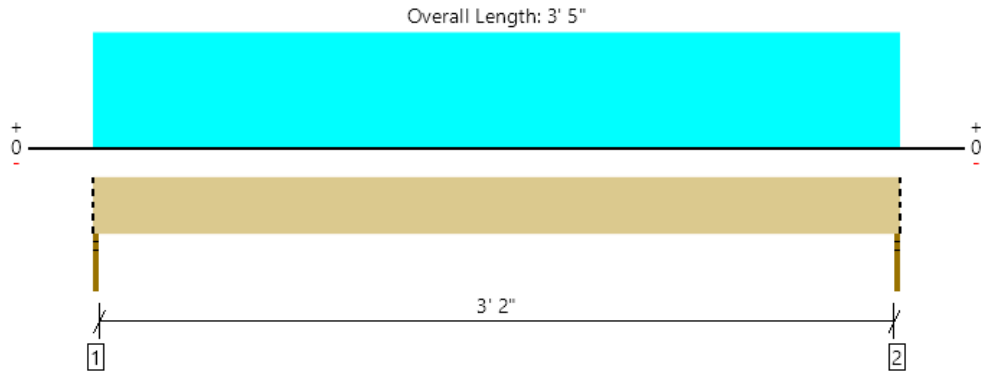
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Main, 51
2 piece(s) 2 x 8 DF 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)	2193 @ 0	2813 (1.50")	Passed (78%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1257 @ 8 3/4"	2610	Passed (48%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1873 @ 1' 8 1/2"	2628	Passed (71%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.015 @ 1' 8 1/2"	0.085	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.024 @ 1' 8 1/2"	0.171	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	Factored	
1 - Stud wall - DF	1.50"	1.50"	1.50"	849	1344	2193	Blocking
2 - Stud wall - DF	1.50"	1.50"	1.50"	849	1344	2193	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' 5" o/c	
Bottom Edge (Lu)	3' 5" 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' 5"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 3' 5" (Top)	19' 8"	25.0	40.0	Default Load

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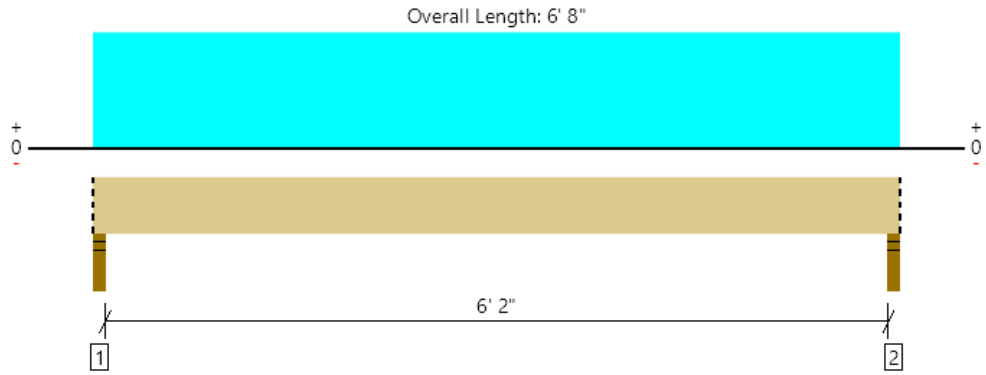
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Main, 52

1 piece(s) 1 3/4" x 16" 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)	2528 @ 1 1/2"	3281 (3.00")	Passed (77%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1327 @ 1' 7"	5320	Passed (25%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	3903 @ 3' 4"	15557	Passed (25%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.025 @ 3' 4"	0.160	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.040 @ 3' 4"	0.321	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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - DF	3.00"	3.00"	2.31"	989	1539	2528	Blocking
2 - Stud wall - DF	3.00"	3.00"	2.31"	989	1539	2528	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 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)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 6' 8"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 6' 8" (Top)	11' 6 1/2"	25.0	40.0	Default Load

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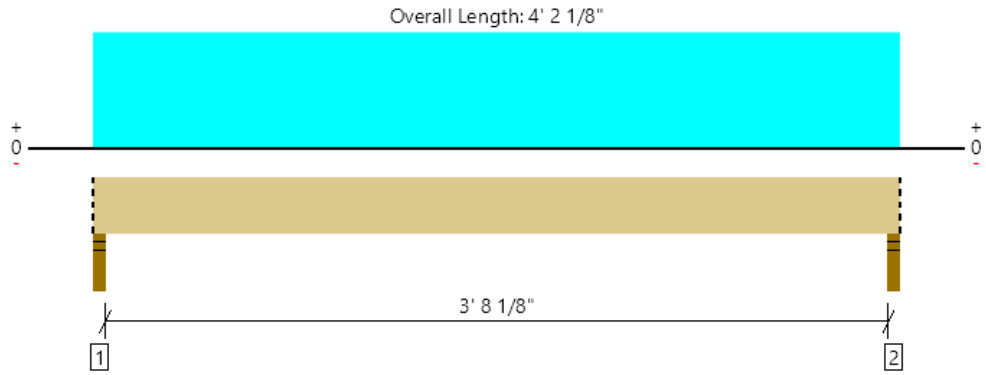
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

Main, 53
2 piece(s) 2 x 8 DF 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)	1267 @ 1 1/2"	5625 (3.00")	Passed (23%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	749 @ 10 1/4"	2610	Passed (29%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1170 @ 2' 1 1/16"	2628	Passed (45%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.012 @ 2' 1 1/16"	0.098	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.020 @ 2' 1 1/16"	0.196	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	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.50"	494	773	1267	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	494	773	1267	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 2" o/c	
Bottom Edge (Lu)	4' 2" 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 4' 2 1/8"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 4' 2 1/8" (Top)	9' 3"	25.0	40.0	Default Load

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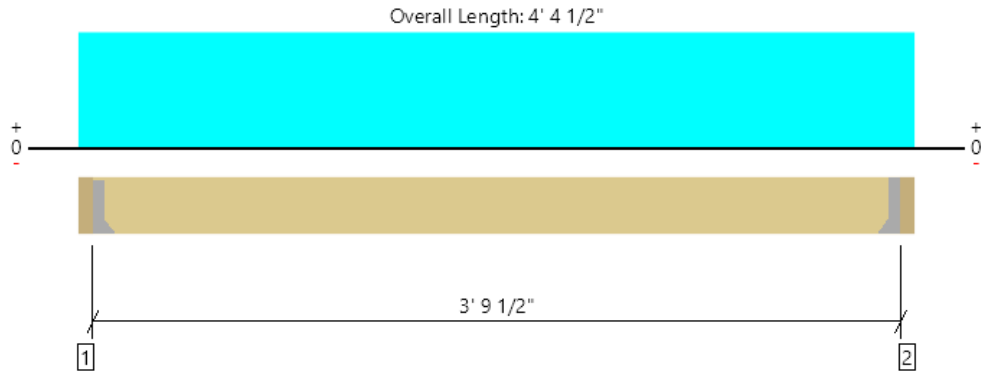
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Main, 54

1 piece(s) 1 3/4" x 16" 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)	1155 @ 3 1/2"	1969 (1.50")	Passed (59%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	343 @ 1' 7 1/2"	5320	Passed (6%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1095 @ 2' 2 1/4"	15557	Passed (7%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.004 @ 2' 2 1/4"	0.095	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.007 @ 2' 2 1/4"	0.190	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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Hanger on 16" DF beam	3.50"	Hanger[1]	1.50"	521	809	1331	See note [1]
2 - Hanger on 16" DF beam	3.50"	Hanger[1]	1.50"	521	809	1331	See note [1]

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 10" o/c	
Bottom Edge (Lu)	3' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	HUCQ1.81/11-SDS	3.00"	N/A	10-SDS25134	4-SDS25134	
2 - Face Mount Hanger	IUS1.81/11.88	2.00"	N/A	10-10d	2-10dx1.5	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	3 1/2" to 4' 1"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 4' 4 1/2" (Top)	9' 3"	25.0	40.0	Default Load

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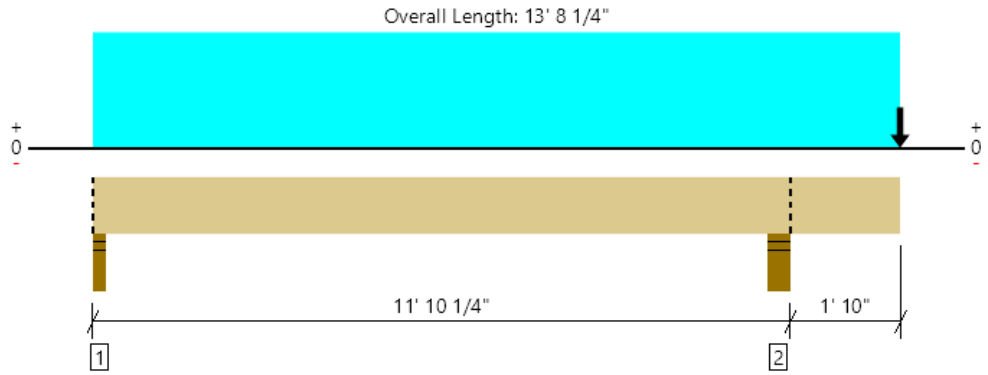
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

Main, 55

1 piece(s) 1 3/4" x 16" 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)	2674 @ 11' 7 1/2"	6016 (5.50")	Passed (44%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1399 @ 13' 2 1/4"	5320	Passed (26%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	-3037 @ 11' 7 1/2"	15557	Passed (20%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.032 @ 13' 8 1/4"	0.200	Passed (2L/999+)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.042 @ 13' 8 1/4"	0.206	Passed (2L/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).
- Overhang deflection criteria: LL (0.2") and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.50"	238	470/-160	708	Blocking
2 - Stud wall - DF	5.50"	5.50"	2.44"	1080	1594	2674	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)	13' 8" o/c	
Bottom Edge (Lu)	13' 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 13' 8 1/4"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 13' 8 1/4" (Top)	2'	25.0	40.0	Default Load
2 - Point (lb)	13' 8 1/4" (Front)	N/A	521	809	Linked from: 54, Support 1

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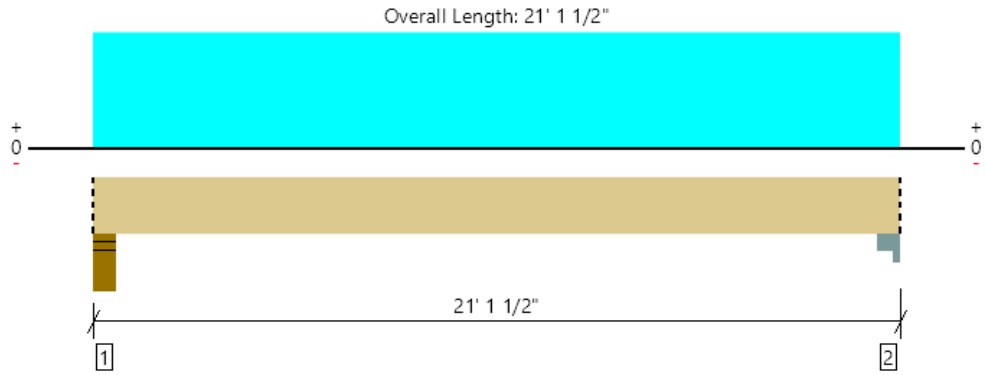
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Main, 56

1 piece(s) 3 1/2" x 12" 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)	1903 @ 4"	12031 (5.50")	Passed (16%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1641 @ 1' 5 1/2"	7420	Passed (22%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	9428 @ 10' 6 3/4"	16800	Passed (56%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.521 @ 10' 6 3/4"	0.511	Passed (L/471)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.783 @ 10' 6 3/4"	1.023	Passed (L/314)	--	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 = 20' 5 1/2".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - DF	5.50"	5.50"	1.50"	636	1268	1903	Blocking
2 - Column Cap - steel	5.50"	5.50"	1.50"	636	1268	1903	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)	21' 2" o/c	
Bottom Edge (Lu)	21' 2" 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 21' 1 1/2"	N/A	10.2	--	
1 - Uniform (PSF)	0 to 21' 1 1/2" (Top)	2'	25.0	60.0	Default Load

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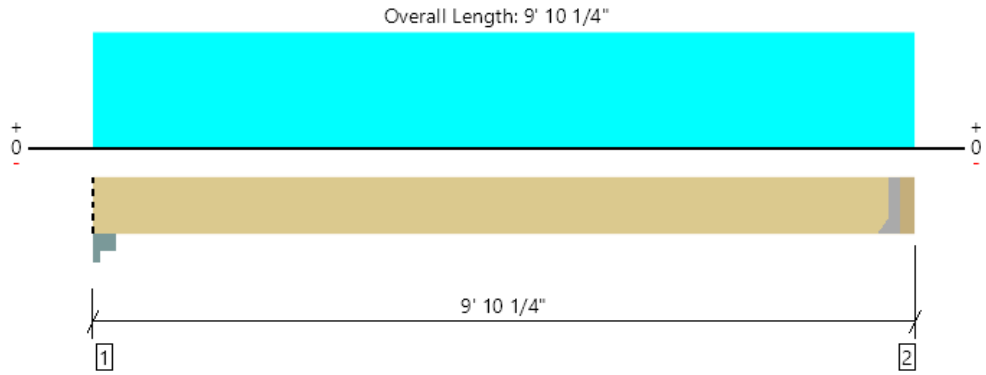
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

Main, 57

1 piece(s) 3 1/2" x 12" 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)	832 @ 9' 6 3/4"	3413 (1.50")	Passed (24%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	651 @ 8' 6 3/4"	7420	Passed (9%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	1919 @ 4' 11 3/8"	16800	Passed (11%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.022 @ 4' 11 3/8"	0.231	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.032 @ 4' 11 3/8"	0.461	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.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 9' 2 3/4".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Column Cap - steel	5.50"	5.50"	1.50"	298	594	892	Blocking
2 - Hanger on 12" LVL beam	3.50"	Hanger[1]	1.50"	292	589	881	See note [1]

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 7" o/c	
Bottom Edge (Lu)	9' 7" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	LUS410	2.00"	N/A	8-10dx1.5	6-10d	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 9' 6 3/4"	N/A	10.2	--	
1 - Uniform (PSF)	0 to 9' 10 1/4" (Top)	2'	25.0	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

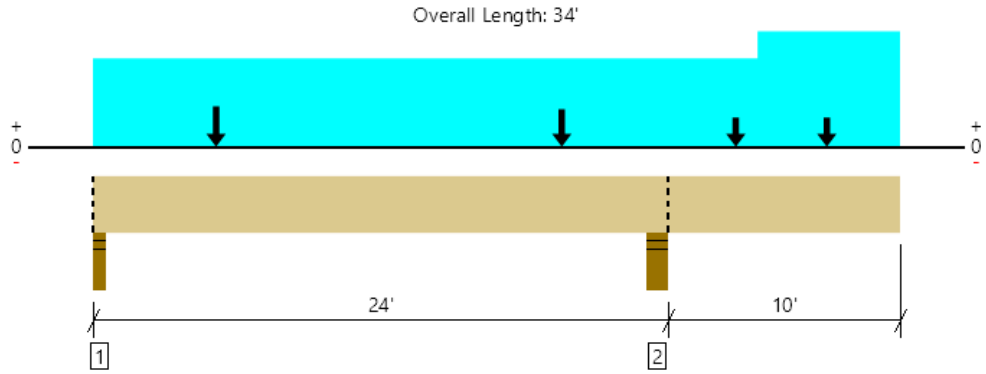
ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Main, 58

3 piece(s) 1 3/4" x 16" 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)	7634 @ 23' 9 1/4"	18047 (5.50")	Passed (42%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	3810 @ 22' 2 1/2"	15960	Passed (24%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	-19032 @ 23' 9 1/4"	35003	Passed (54%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.634 @ 34'	0.682	Passed (2L/388)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.681 @ 34'	1.023	Passed (2L/360)	--	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).
- 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	Floor Live	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.50"	1133	1807/-511	2940	Blocking
2 - Stud wall - DF	5.50"	5.50"	2.33"	3075	4559	7634	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)	27' 2" 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 34'	N/A	24.5	--	
1 - Uniform (PSF)	0 to 28' (Top)	2'	25.0	40.0	Default Load
2 - Point (lb)	19' 9" (Front)	N/A	521	809	Linked from: 54, Support 1
3 - Point (lb)	27' 1" (Front)	N/A	292	589	Linked from: 57, Support 2
4 - Point (lb)	30' 11" (Front)	N/A	292	589	Linked from: 57, Support 2
5 - Uniform (PSF)	28' to 34' (Top)	2'	25.0	60.0	Default Load
6 - Point (lb)	5' 2 1/4" (Front)	N/A	570	908	Linked from: 62, Support 1

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

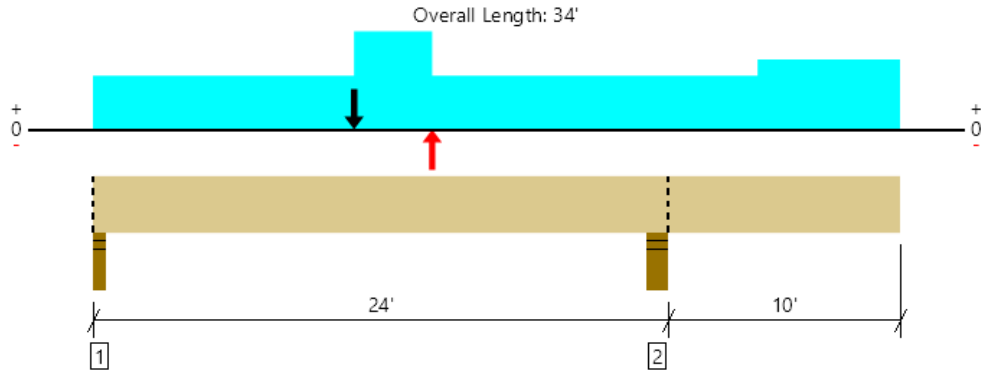
ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Main, 59

2 piece(s) 1 3/4" x 16" 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)	4052 @ 23' 9 1/4"	12031 (5.50")	Passed (34%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	4925 @ 14' 3 1/2"	17024	Passed (29%)	1.60	1.0 D + 0.7 E (All Spans)
Moment (Ft-lbs)	-9391 @ 23' 9 1/4"	23336	Passed (40%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.473 @ 34'	0.682	Passed (2L/520)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.385 @ 34'	1.023	Passed (2L/638)	--	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).
- 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.
- Upward deflection on right cantilever exceeds 0.4".
- -229 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	Floor Live	Seismic	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.50"	813	956/-250	1024/-1024	2068/-229	Blocking
2 - Stud wall - DF	5.50"	5.50"	1.85"	1798	2255	1024/-1024	4052	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)	20' 11" 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 34'	N/A	16.3	--	--	
1 - Uniform (PSF)	0 to 28' (Top)	2'	25.0	40.0	-	Default Load
2 - Uniform (PSF)	28' to 34' (Top)	2'	25.0	60.0	-	Default Load
3 - Uniform (PSF)	11' to 14' 3 1/2" (Top)	9'	12.0	-	-	Default Load
4 - Point (lb)	11' (Top)	N/A	-	-	7359	Default Load
5 - Point (lb)	14' 3 1/2" (Top)	N/A	-	-	-7359	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	

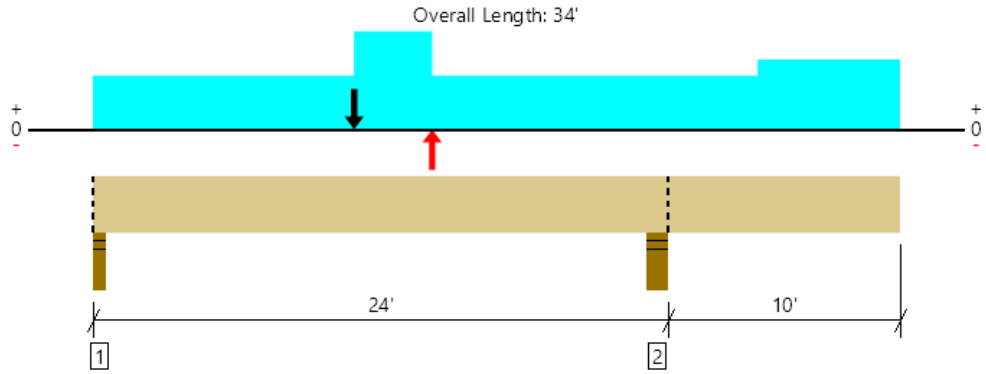
Weyerhaeuser

Main, 59 (w_overstrength)

2 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL

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

An excessive uplift of -1305 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)	2875 @ 1 1/2"	6563 (3.00")	Passed (44%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (Alt Spans)
Shear (lbs)	11576 @ 14' 3 1/2"	17024	Passed (68%)	1.60	1.0 D + 0.7 E (All Spans)
Moment (Ft-lbs)	24326 @ 11'	49783	Passed (49%)	1.60	1.0 D + 0.7 E (All Spans)
Live Load Defl. (in)	0.473 @ 34'	0.682	Passed (2L/520)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.534 @ 9' 6 7/16"	1.182	Passed (L/531)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (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).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Upward deflection on right cantilever exceeds 0.4".
- -714 lbs uplift at support located at 23' 9 1/4". Strapping or other restraint may be required.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Seismic	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.50"	813	956/-250	2561/-2561	2875/-1305	Blocking
2 - Stud wall - DF	5.50"	5.50"	2.21"	1798	2255	2561/-2561	4833/-714	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	7' o/c	
Bottom Edge (Lu)	10' 10" 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 34'	N/A	16.3	--	--	
1 - Uniform (PSF)	0 to 28' (Top)	2'	25.0	40.0	-	Default Load
2 - Uniform (PSF)	28' to 34' (Top)	2'	25.0	60.0	-	Default Load
3 - Uniform (PSF)	11' to 14' 3 1/2" (Top)	9'	12.0	-	-	Default Load
4 - Point (lb)	11' (Top)	N/A	-	-	18398	Default Load
5 - Point (lb)	14' 3 1/2" (Top)	N/A	-	-	-18398	Default Load

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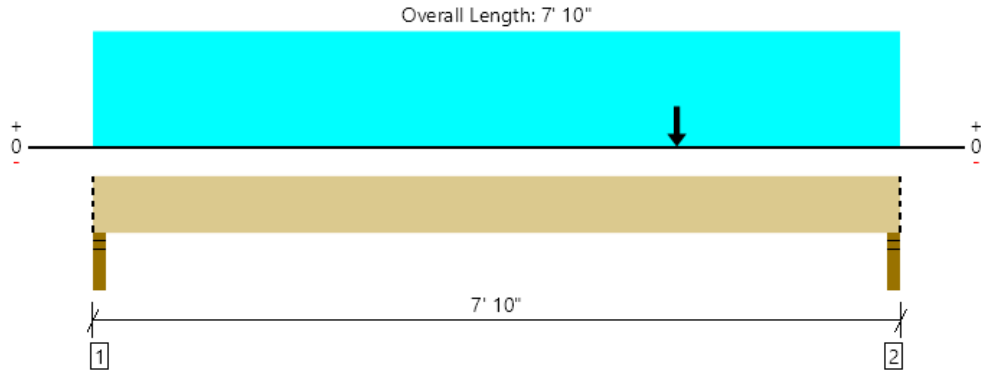
ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Main, 60

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

An excessive uplift of -2917 lbs at support located at 7' 8 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)	8566 @ 7' 8 1/2"	9844 (3.00")	Passed (87%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	4728 @ 1' 1/2"	9476	Passed (50%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	11822 @ 3' 11"	17662	Passed (67%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.171 @ 4' 1 1/8"	0.253	Passed (L/531)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.237 @ 4' 1/2"	0.379	Passed (L/385)	--	1.0 D + 0.525 E + 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/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- -237 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	Floor Live	Seismic	Factored	
1 - Stud wall - DF	3.00"	3.00"	2.00"	2211	4230	2234/-2234	6556/-237	Blocking
2 - Stud wall - DF	3.00"	3.00"	2.61"	2211	4230	6062/-6062	8566/-2917	Blocking

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 7' 10"	N/A	14.5	--	--	
1 - Uniform (PSF)	0 to 7' 10" (Top)	12'	25.0	40.0	-	Default Load
2 - Uniform (PSF)	0 to 7' 10" (Top)	10'	25.0	60.0	-	Default Load
3 - Point (lb)	5' 8" (Front)	N/A	-	-	8296	

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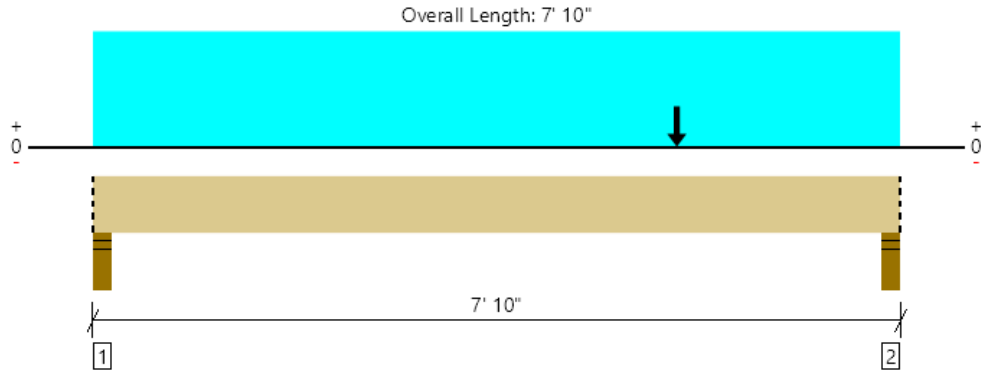
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Main, 60 (w_overstrength)
3 piece(s) 1 3/4" x 9 1/2" 2.0E Microllam® LVL

An excessive uplift of -2468 lbs at support located at 3" failed this product.

An excessive uplift of -9397 lbs at support located at 7' 7" 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)	13426 @ 7' 7"	14766 (4.50")	Passed (91%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	12276 @ 6' 8"	15162	Passed (81%)	1.60	1.0 D + 0.7 E (All Spans)
Moment (Ft-lbs)	23484 @ 5' 8"	28260	Passed (83%)	1.60	1.0 D + 0.7 E (All Spans)
Live Load Defl. (in)	0.257 @ 4' 2 1/4"	0.244	Failed (L/342)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.314 @ 4' 1 5/8"	0.367	Passed (L/280)	--	1.0 D + 0.525 E + 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/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	Floor Live	Seismic	Factored	
1 - Stud wall - DF	4.50"	4.50"	2.51"	2211	4230	5421/-5421	8229/-2468	Blocking
2 - Stud wall - DF	4.50"	4.50"	4.09"	2211	4230	15319/-15319	13426/-9397	Blocking

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 7' 10"	N/A	14.5	--	--	
1 - Uniform (PSF)	0 to 7' 10" (Top)	12'	25.0	40.0	-	Default Load
2 - Uniform (PSF)	0 to 7' 10" (Top)	10'	25.0	60.0	-	Default Load
3 - Point (lb)	5' 8" (Front)	N/A	-	-	20740	

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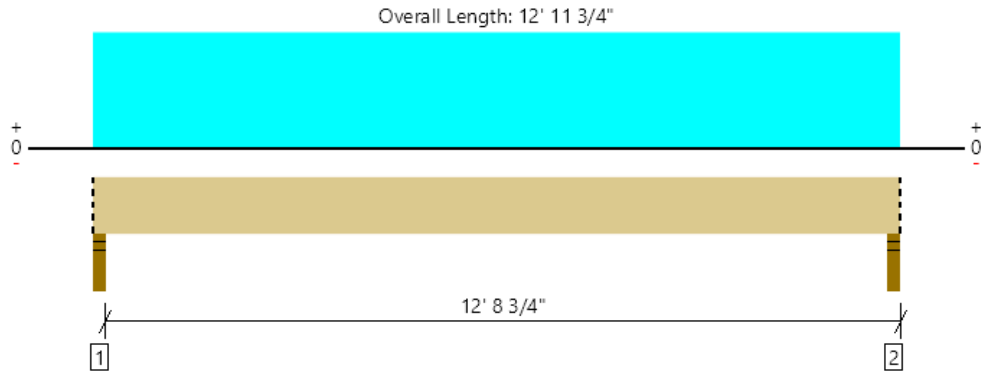
Weyerhaeuser

Main, 61

2 piece(s) 1 3/4" x 16" 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)	5168 @ 1 1/2"	6563 (3.00")	Passed (79%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	3907 @ 1' 7"	10640	Passed (37%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	16129 @ 6' 5 7/8"	31114	Passed (52%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.139 @ 6' 5 7/8"	0.424	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.230 @ 6' 5 7/8"	0.636	Passed (L/664)	--	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/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	Floor Live	Factored	
1 - Stud wall - DF	3.00"	3.00"	2.36"	2053	3115	5168	Blocking
2 - Stud wall - DF	3.00"	3.00"	2.36"	2053	3115	5168	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)	10' 11" o/c	
Bottom Edge (Lu)	13' 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' 11 3/4"	N/A	16.3	--	
1 - Uniform (PSF)	0 to 12' 11 3/4" (Top)	12'	25.0	40.0	Default Load

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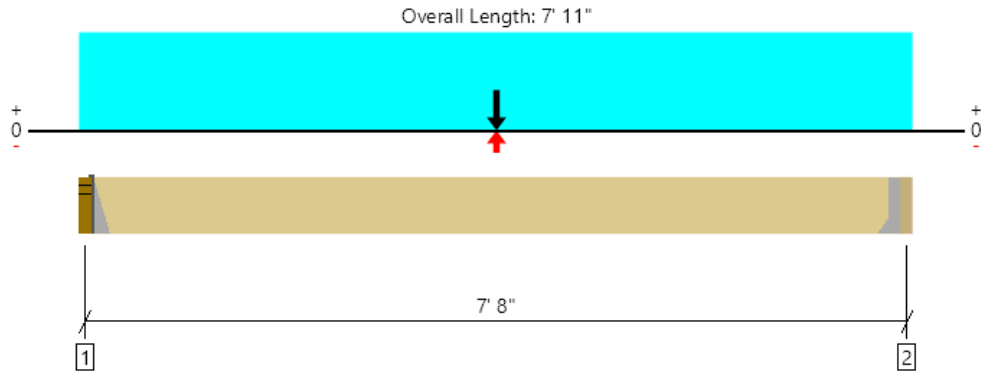
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

Main, 62

1 piece(s) 1 3/4" x 16" 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) [Group]
Member Reaction (lbs)	1409 @ 3"	1969 (1.50")	Passed (72%)	--	1.0 D + 1.0 L (All Spans) [1]
Shear (lbs)	1029 @ 1' 7"	5320	Passed (19%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Moment (Ft-lbs)	3268 @ 3' 11 1/2"	15557	Passed (21%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Live Load Defl. (in)	0.024 @ 3' 11 1/2"	0.247	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans) [1]
Total Load Defl. (in)	0.038 @ 3' 11 1/2"	0.371	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/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	Floor Live	Factored	
1 - Hanger on DF studWall	3.00"	Hanger[1]	1.50"	570	908	1478	See note [1]
2 - Hanger on 16" DF beam	3.00"	Hanger[1]	1.50"	570	908	1478	See note [1]

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	7' 5" o/c	
Bottom Edge (Lu)	7' 5" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Top Mount Hanger	Connector not found	N/A	N/A	N/A	N/A	
2 - Face Mount Hanger	IUS1.81/14	2.00"	N/A	12-10d	2-10dx1.5	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	3" to 7' 8"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 7' 11" (Top)	4' 3"	25.0	40.0	Default Load
2 - Point (lb)	3' 11 1/2" (Front)	N/A	238	470/-160	Linked from: 55, Support 1

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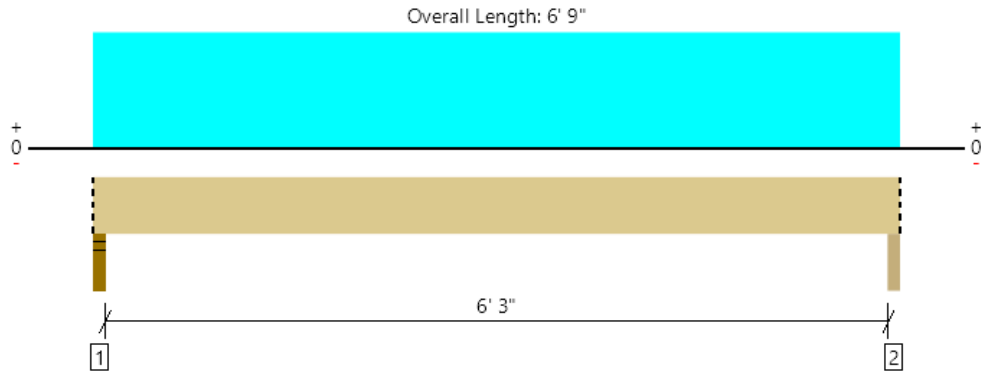
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

Main, 63

1 piece(s) 1 3/4" x 16" 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)	1394 @ 1 1/2"	3281 (3.00")	Passed (42%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	740 @ 1' 7"	5320	Passed (14%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2182 @ 3' 4 1/2"	15557	Passed (14%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.015 @ 3' 4 1/2"	0.217	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.023 @ 3' 4 1/2"	0.325	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/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	Floor Live	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.50"	449	945	1394	Blocking
2 - Beam - DF	3.00"	3.00"	1.50"	449	945	1394	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 9" o/c	
Bottom Edge (Lu)	6' 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 6' 9"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 6' 9" (Top)	4'	25.0	60.0	Default Load
2 - Uniform (PSF)	0 to 6' 9" (Top)	1'	25.0	40.0	Default Load

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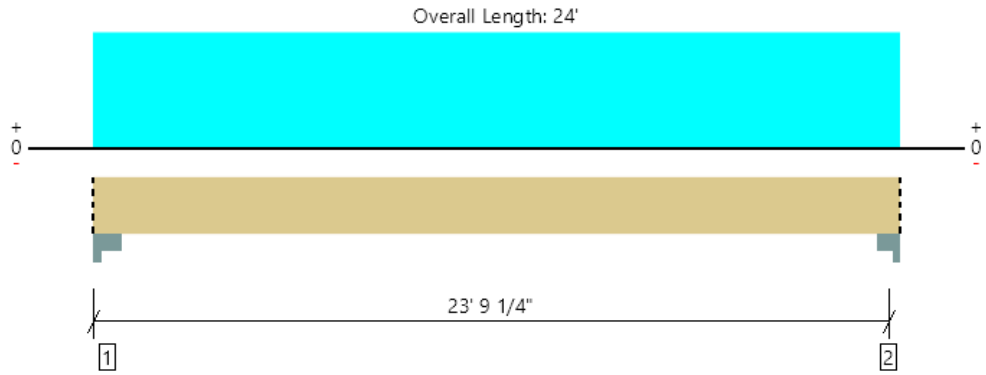
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Main, 64

1 piece(s) 5 1/2" 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)	4298 @ 23' 8"	19663 (5.50")	Passed (22%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	3683 @ 1' 10"	14575	Passed (25%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	24242 @ 12' 3/4"	39657	Passed (61%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.563 @ 12' 3/4"	0.774	Passed (L/495)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.844 @ 12' 3/4"	1.160	Passed (L/330)	--	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/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 0.96 that was calculated using length L = 23' 2 1/2".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Column Cap - steel	7.00"	7.00"	1.50"	1448	2895	4343	Blocking
2 - Column Cap - steel	5.50"	5.50"	1.50"	1433	2865	4298	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' o/c	
Bottom Edge (Lu)	24' 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'	N/A	20.0	--	
1 - Uniform (PSF)	0 to 24' (Top)	4'	25.0	60.0	Default Load

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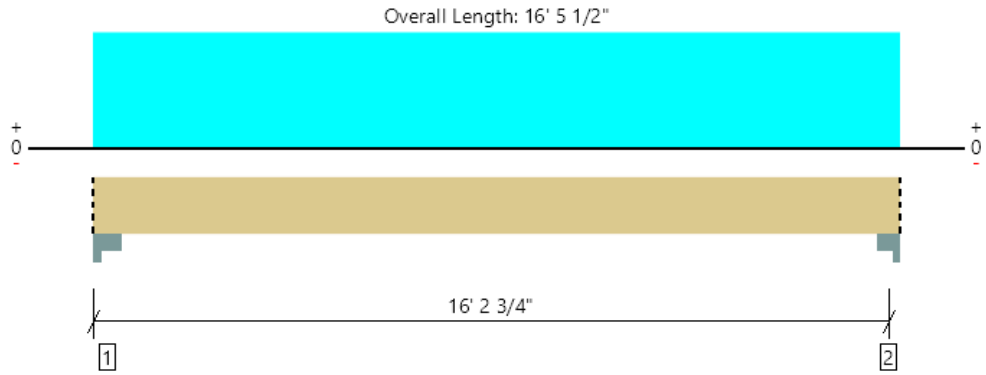
ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser

Main, 65

1 piece(s) 5 1/2" 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)	2940 @ 16' 1 1/2"	19663 (5.50")	Passed (15%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	2325 @ 1' 10"	14575	Passed (16%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	11047 @ 8' 3 1/2"	41247	Passed (27%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.117 @ 8' 3 1/2"	0.522	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.175 @ 8' 3 1/2"	0.783	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/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 = 15' 8".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Column Cap - steel	7.00"	7.00"	1.50"	995	1990	2985	Blocking
2 - Column Cap - steel	5.50"	5.50"	1.50"	980	1960	2940	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	16' 6" o/c	
Bottom Edge (Lu)	16' 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 16' 5 1/2"	N/A	20.0	--	
1 - Uniform (PSF)	0 to 16' 5 1/2" (Top)	4'	25.0	60.0	Default Load

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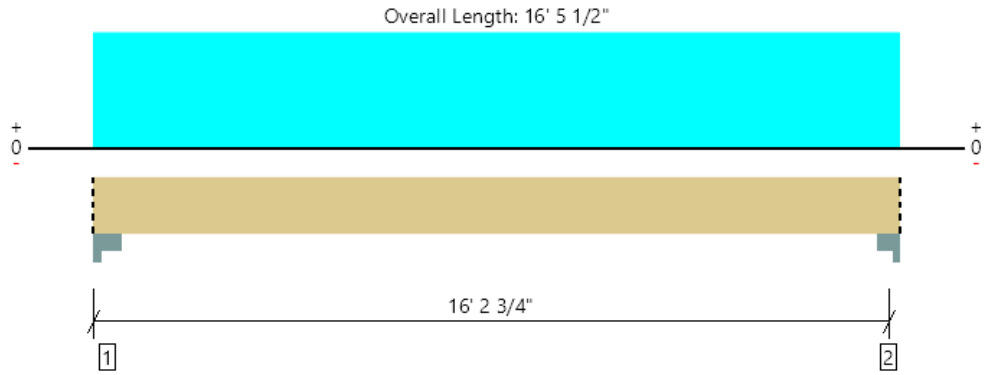
Main, 66

1 piece(s) 3 1/2" 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)	6005 @ 16' 1 1/2"	12513 (5.50")	Passed (48%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	4749 @ 1' 10"	9275	Passed (51%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	22558 @ 8' 3 1/2"	26250	Passed (86%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.390 @ 8' 3 1/2"	0.522	Passed (L/482)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.562 @ 8' 3 1/2"	0.783	Passed (L/334)	--	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/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 = 15' 8".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Column Cap - steel	7.00"	7.00"	2.68"	1868	4229	6097	Blocking
2 - Column Cap - steel	5.50"	5.50"	2.64"	1840	4165	6005	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)	15' 5" o/c	
Bottom Edge (Lu)	16' 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 16' 5 1/2"	N/A	12.8	--	
1 - Uniform (PSF)	0 to 16' 5 1/2" (Top)	8' 6"	25.0	60.0	Default Load

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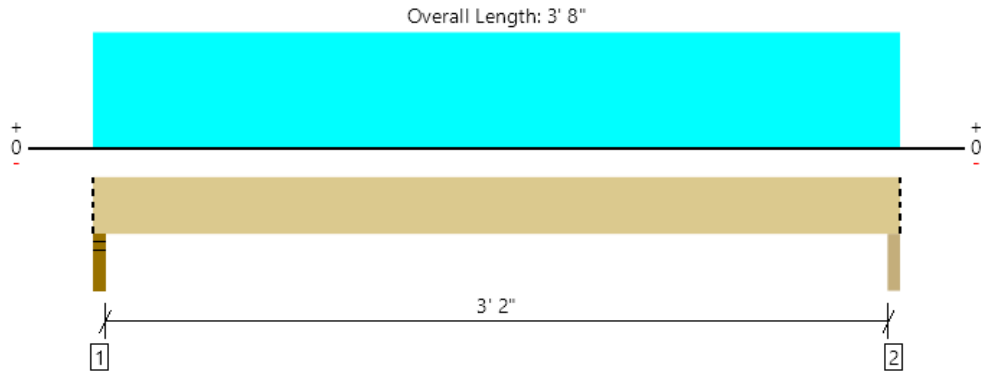
Main, 67

1 piece(s) 1 3/4" x 16" 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)	1033 @ 1 1/2"	3281 (3.00")	Passed (31%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	141 @ 1' 7"	5320	Passed (3%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	823 @ 1' 10"	15557	Passed (5%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.003 @ 1' 10"	0.114	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.005 @ 1' 10"	0.171	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/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	Floor Live	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.50"	465	568	1033	Blocking
2 - Beam - DF	3.00"	3.00"	1.50"	465	568	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)	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)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 3' 8"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 3' 8" (Top)	4' 6"	25.0	60.0	Default Load
2 - Uniform (PSF)	0 to 3' 8" (Top)	1'	25.0	40.0	Default Load
3 - Uniform (PSF)	0 to 3' 8" (Top)	9'	12.0	-	Default Load

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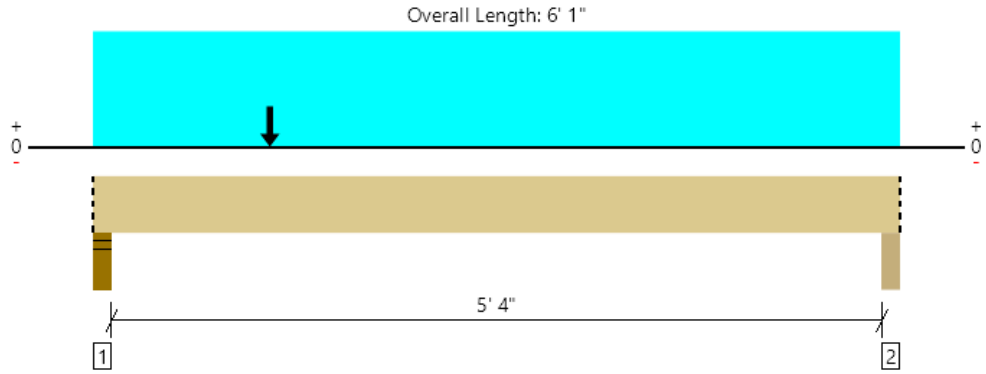
Main, 68

2 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL

An excessive uplift of -7443 lbs at support located at 3" failed this product.

An excessive uplift of -1429 lbs at support located at 5' 10" 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)	8717 @ 3"	9844 (4.50")	Passed (89%)	--	1.0 D + 0.7 E (All Spans)
Shear (lbs)	5506 @ 1' 8 1/2"	17024	Passed (32%)	1.60	1.0 D + 0.7 E (All Spans)
Moment (Ft-lbs)	9219 @ 1' 4"	49783	Passed (19%)	1.60	1.0 D + 0.7 E (All Spans)
Live Load Defl. (in)	-0.028 @ 1' 4"	0.186	Passed (L/999+)	--	0.6 D - 0.7 E (All Spans)
Total Load Defl. (in)	0.031 @ 2' 8 7/8"	0.279	Passed (L/999+)	--	1.0 D + 0.7 E (All 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).
- 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	Seismic	Factored	
1 - Stud wall - DF	4.50"	4.50"	3.98"	796	943	11315/-11315	8717/-7443	Blocking
2 - Beam - DF	4.50"	4.50"	1.50"	796	943	2724/-2724	2934/-1429	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 1" o/c	
Bottom Edge (Lu)	6' 1" 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 6' 1"	N/A	16.3	--	--	
1 - Uniform (PSF)	0 to 6' 1" (Top)	4' 6"	25.0	60.0	-	Default Load
2 - Uniform (PSF)	0 to 6' 1" (Top)	1'	25.0	40.0	-	Default Load
3 - Uniform (PSF)	0 to 6' 1" (Top)	9'	12.0	-	-	Default Load
4 - Point (lb)	1' 4" (Front)	N/A	-	-	14039	

Weyerhaeuser Notes

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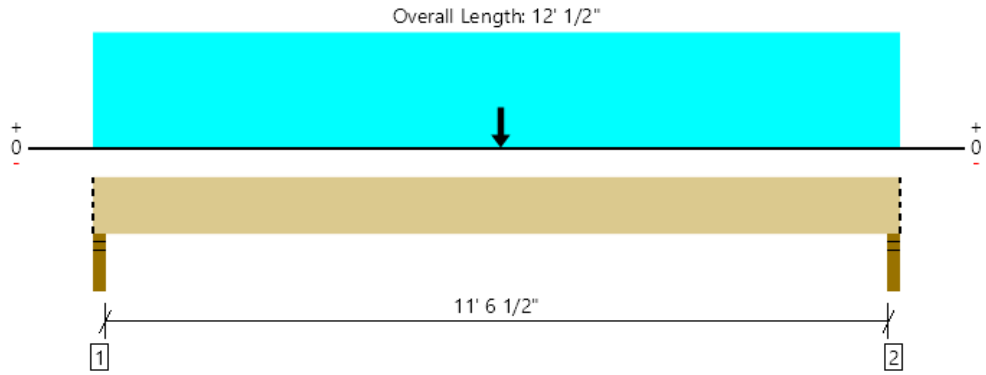
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

Main, 69

2 piece(s) 1 3/4" x 16" 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)	3506 @ 11' 11"	6563 (3.00")	Passed (53%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	2380 @ 1' 7"	10640	Passed (22%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	9322 @ 6' 1/4"	31114	Passed (30%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.098 @ 6' 1"	0.393	Passed (L/999+)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.146 @ 6' 1"	0.590	Passed (L/972)	--	1.0 D + 0.525 E + 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/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- -209 lbs uplift at support located at 1 1/2". Strapping or other restraint may be required.
- -230 lbs uplift at support located at 11' 11". Strapping or other restraint may be required.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Seismic	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.60"	1303	1927	1415/-1415	3490/-209	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.60"	1303	1927	1445/-1445	3506/-230	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' 1" o/c	
Bottom Edge (Lu)	12' 1" 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 12' 1/2"	N/A	16.3	--	--	
1 - Uniform (PSF)	0 to 12' 1/2" (Top)	8'	25.0	40.0	-	Default Load
2 - Point (lb)	6' 1" (Front)	N/A	-	-	2860	

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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	

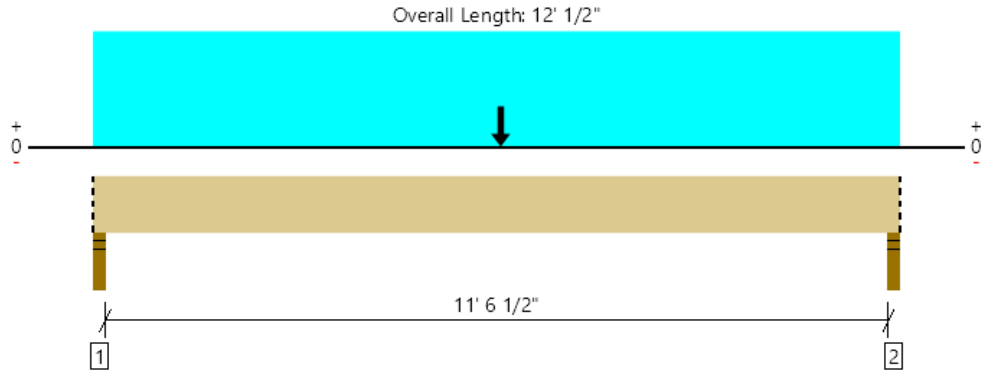
Weyerhaeuser

Main, 69 (w_overstrength)

2 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL

An excessive uplift of -1694 lbs at support located at 1 1/2" failed this product.

An excessive uplift of -1748 lbs at support located at 11' 11" 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)	4644 @ 11' 11"	6563 (3.00")	Passed (71%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	3922 @ 10' 5 1/2"	17024	Passed (23%)	1.60	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	18995 @ 6' 1"	49783	Passed (38%)	1.60	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.168 @ 6' 1"	0.393	Passed (L/844)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.215 @ 6' 1"	0.590	Passed (L/659)	--	1.0 D + 0.525 E + 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/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	Floor Live	Seismic	Factored	
1 - Stud wall - DF	3.00"	3.00"	2.10"	1303	1927	3537/-3537	4604/-1694	Blocking
2 - Stud wall - DF	3.00"	3.00"	2.12"	1303	1927	3613/-3613	4644/-1748	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' 2" o/c	
Bottom Edge (Lu)	12' 1" 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 12' 1/2"	N/A	16.3	--	--	
1 - Uniform (PSF)	0 to 12' 1/2" (Top)	8'	25.0	40.0	-	Default Load
2 - Point (lb)	6' 1" (Front)	N/A	-	-	7150	

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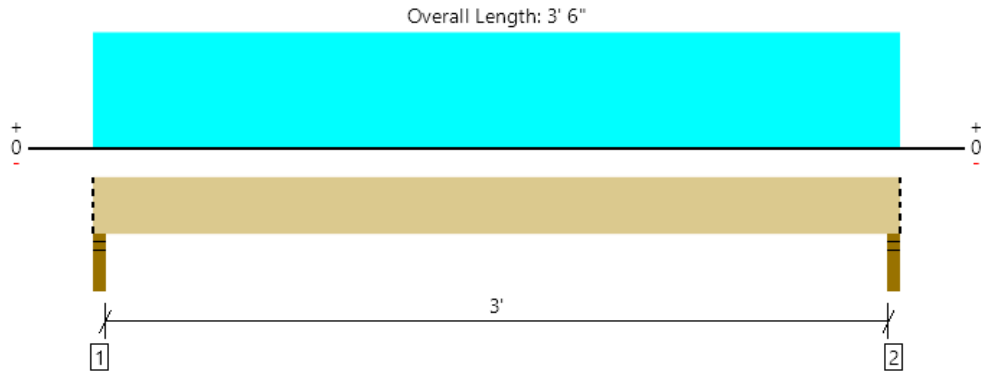
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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

Weyerhaeuser

Main, 70

1 piece(s) 1 3/4" x 16" 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)	924 @ 1 1/2"	3281 (3.00")	Passed (28%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	88 @ 1' 7"	5320	Passed (2%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	697 @ 1' 9"	15557	Passed (4%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.002 @ 1' 9"	0.108	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.004 @ 1' 9"	0.162	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/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	Floor Live	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.50"	364	560	924	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	364	560	924	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' 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)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 3' 6"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 3' 6" (Top)	8'	25.0	40.0	Default Load

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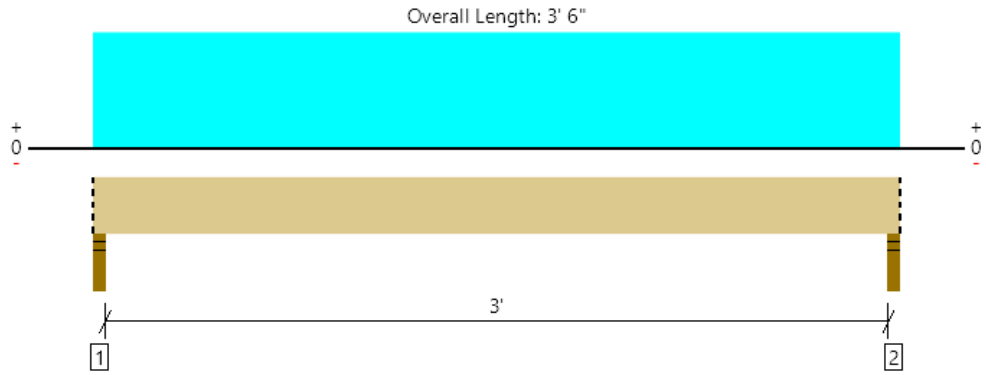
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Main, 71

1 piece(s) 1 3/4" x 16" 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)	1332 @ 1 1/2"	3281 (3.00")	Passed (41%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	127 @ 1' 7"	5320	Passed (2%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1005 @ 1' 9"	15557	Passed (6%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.003 @ 1' 9"	0.108	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.006 @ 1' 9"	0.162	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/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	Floor Live	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.50"	521	811	1332	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	521	811	1332	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' 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)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 3' 6"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 3' 6" (Top)	11' 7"	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, 33+34
1 piece(s) 6 x 6 DF No.1

Post Height: 10'

Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	22	50	Passed (44%)	--	--
Compression (lbs)	8283	20918	Passed (40%)	1.00	1.0 D + 1.0 L
Base Bearing (lbs)	8283	898425	Passed (1%)	--	1.0 D + 1.0 L
Bending/Compression	0.49	1	Passed (49%)	1.00	1.0 D + 1.0 L

- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.

Supports	Type	Material
Base	Beam	Steel

Max Unbraced Length	Comments
Full Member Length	No bracing assumed.

Member Type : Free Standing Post
Building Code : IBC 2015
Design Methodology : ASD

Vertical Loads	Dead (0.90)	Floor Live (1.00)	Comments
1 - Point (lb)	1589	3240	Linked from: 33, Support 2
2 - Point (lb)	1136	2318	Linked from: 34, Support 1

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

Main, 33+34+66+63
1 piece(s) 6 x 6 DF No.1

Post Height: 10'

Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	22	50	Passed (44%)	--	--
Compression (lbs)	15774	20918	Passed (75%)	1.00	1.0 D + 1.0 L
Base Bearing (lbs)	15774	898425	Passed (2%)	--	1.0 D + 1.0 L
Bending/Compression	N/A	1	Passed (N/A)	--	N/A

- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.

Supports	Type	Material
Base	Beam	Steel

Max Unbraced Length	Comments
Full Member Length	No bracing assumed.

Member Type : Free Standing Post
Building Code : IBC 2015
Design Methodology : ASD

Vertical Loads	Dead (0.90)	Floor Live (1.00)	Comments
1 - Point (lb)	1589	3240	Linked from: 33, Support 2
2 - Point (lb)	1136	2318	Linked from: 34, Support 1
3 - Point (lb)	1868	4229	Linked from: 66, Support 1
4 - Point (lb)	449	945	Linked from: 63, Support 1

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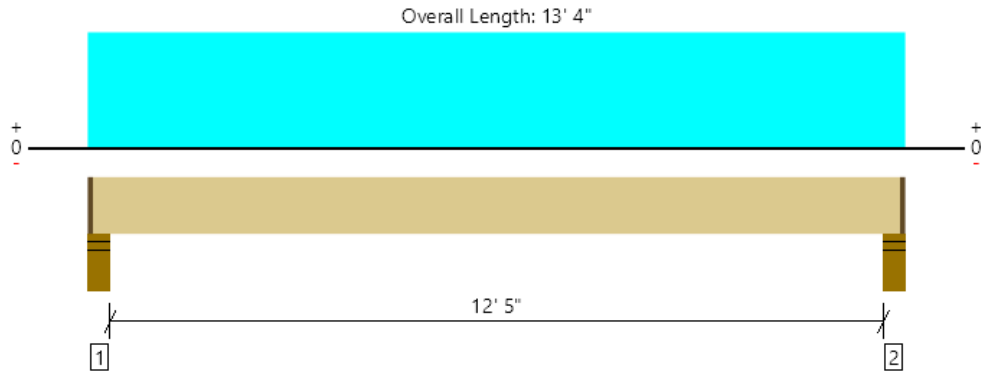
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Main, Garage Joists

1 piece(s) 1 3/4" x 11 1/4" 2.0E Microllam® LVL @ 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)	1006 @ 4 1/2"	4648 (4.25")	Passed (22%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	808 @ 1' 4 3/4"	3741	Passed (22%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	3035 @ 6' 8"	8391	Passed (36%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.071 @ 6' 8"	0.315	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.205 @ 6' 8"	0.629	Passed (L/737)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	61	40	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 4% increase in the moment capacity has been added to account for repetitive member usage.
- 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	Factored	
1 - Stud wall - DF	5.50"	4.25"	1.50"	667	356	1022	1 1/4" Rim Board
2 - Stud wall - DF	5.50"	4.25"	1.50"	667	356	1022	1 1/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	13' 2" o/c	
Bottom Edge (Lu)	13' 2" 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 13' 4"	16"	75.0	40.0	Default Load

Weyerhaeuser Notes

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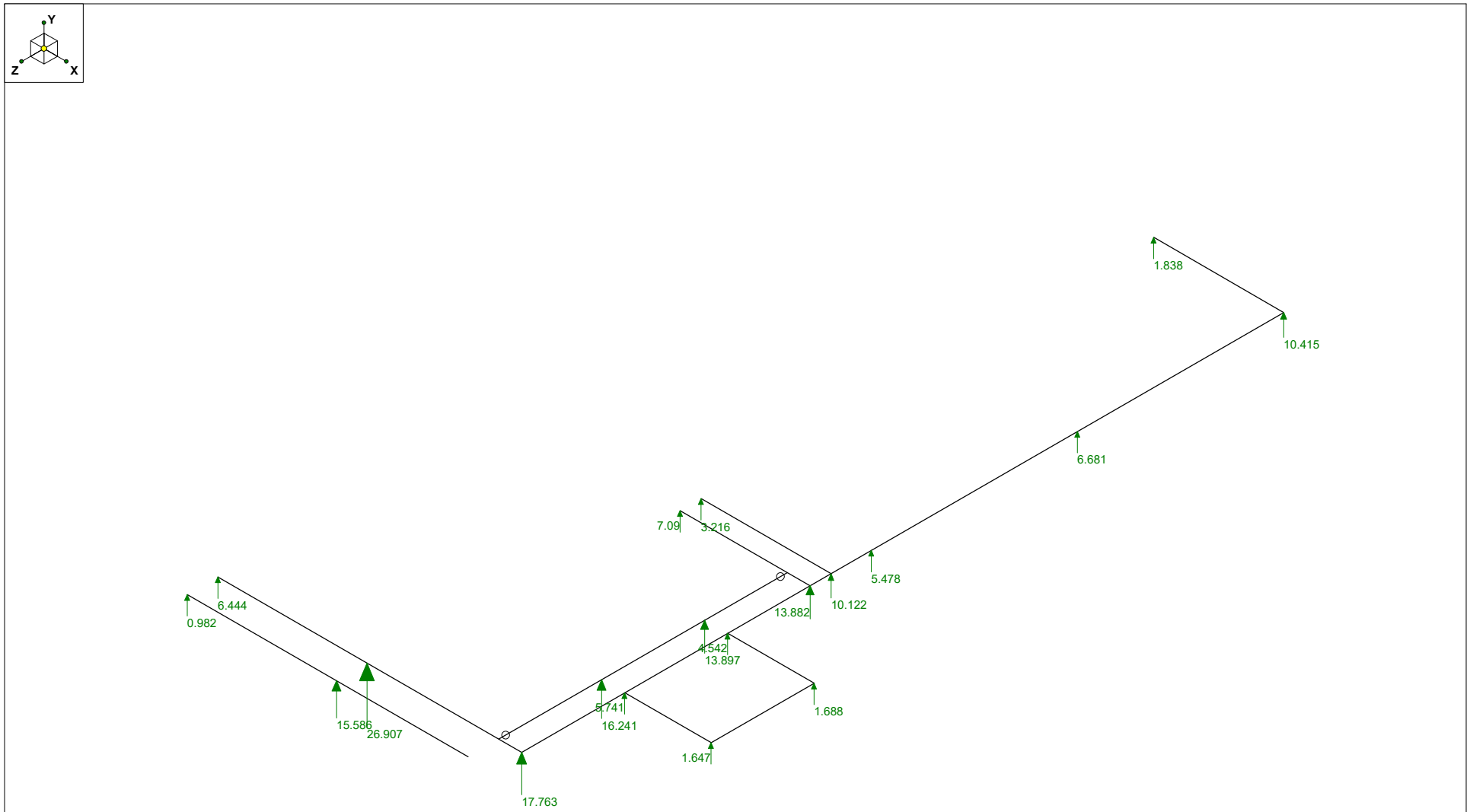
ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	

Weyerhaeuser



Results for LC 5, 1.2DL+1.6LL
Reaction and Moment Units are k and k-ft

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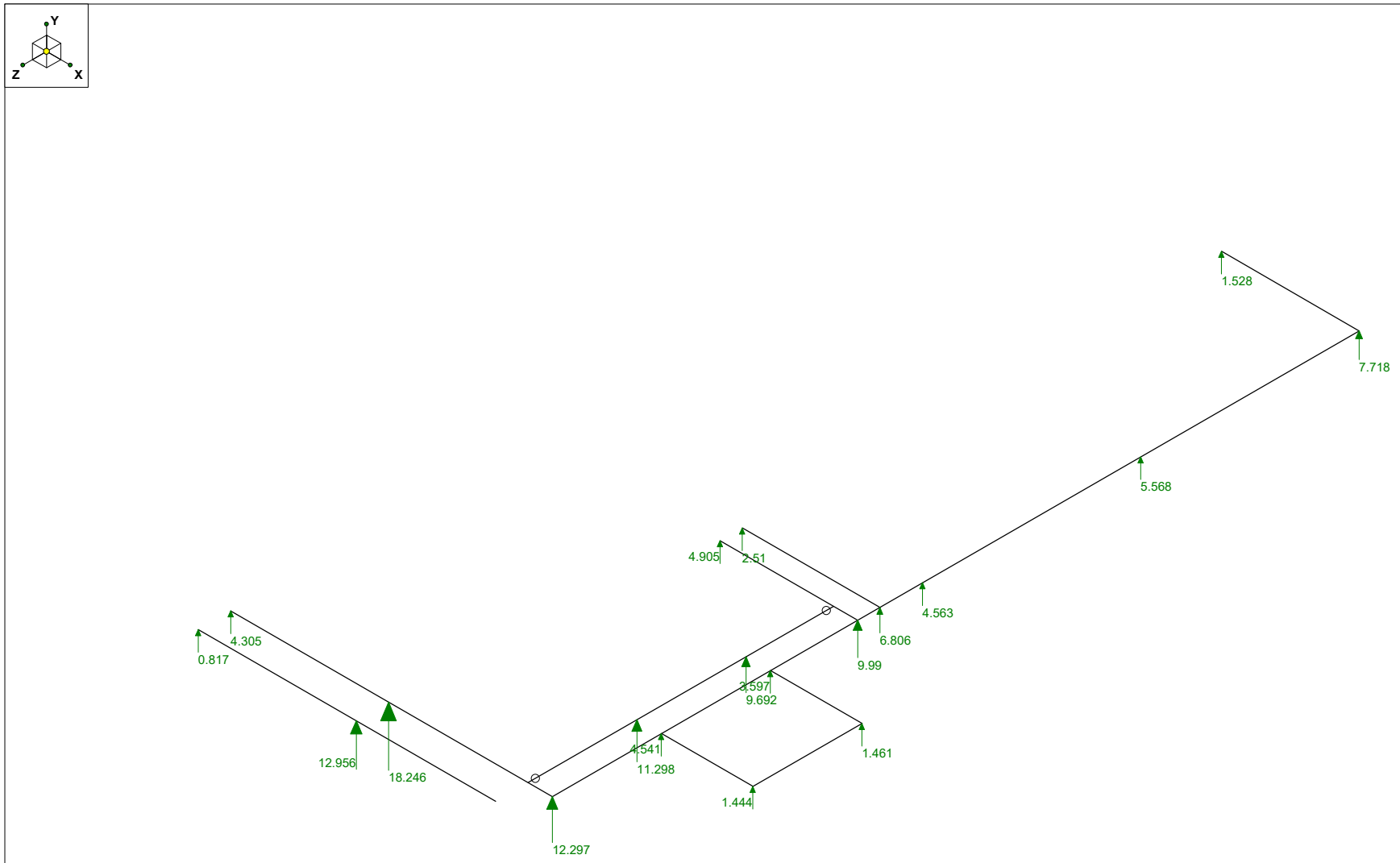

Results for LC 3, DL+LL
Reaction and Moment Units are k and k-ft

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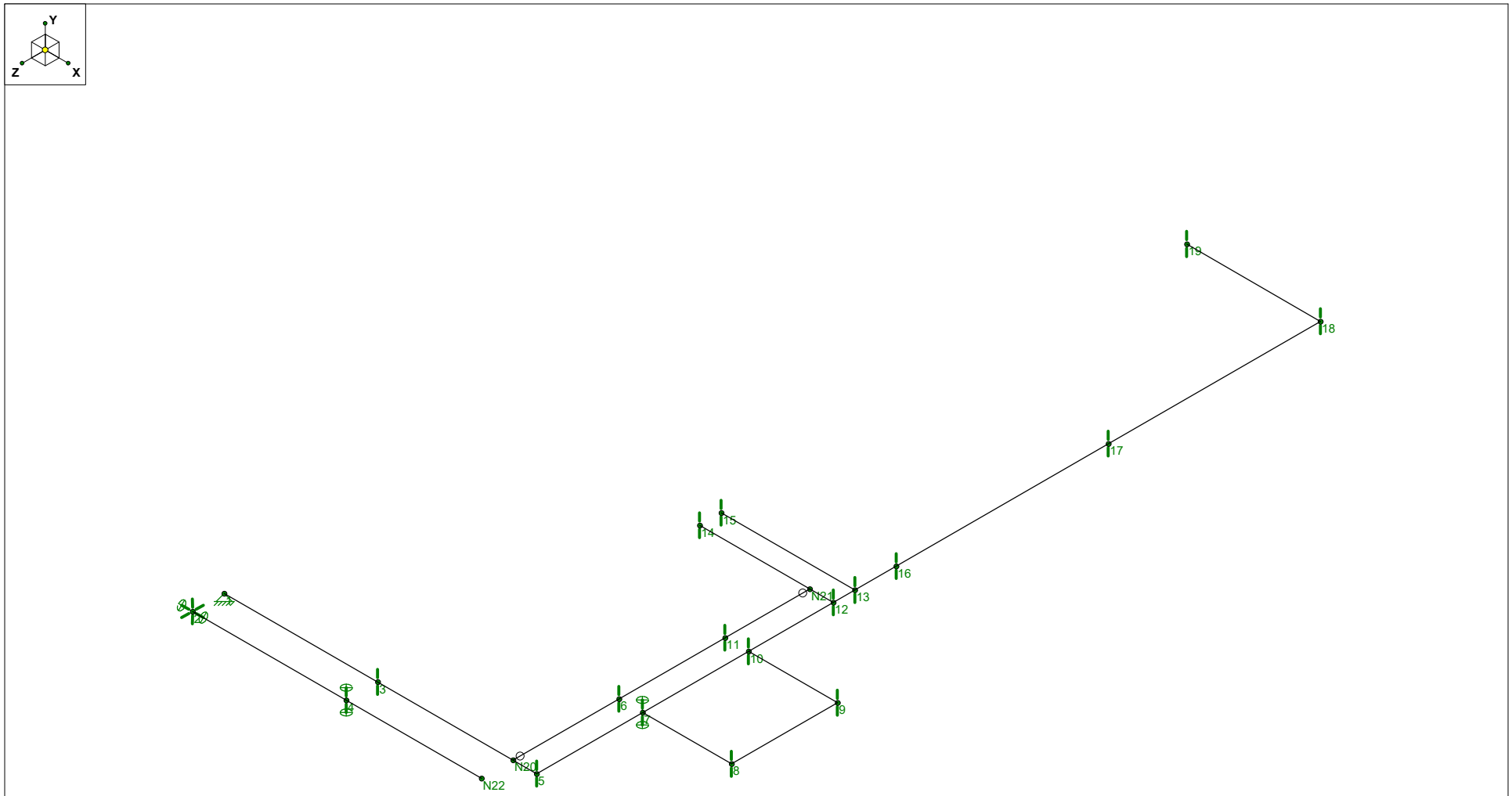

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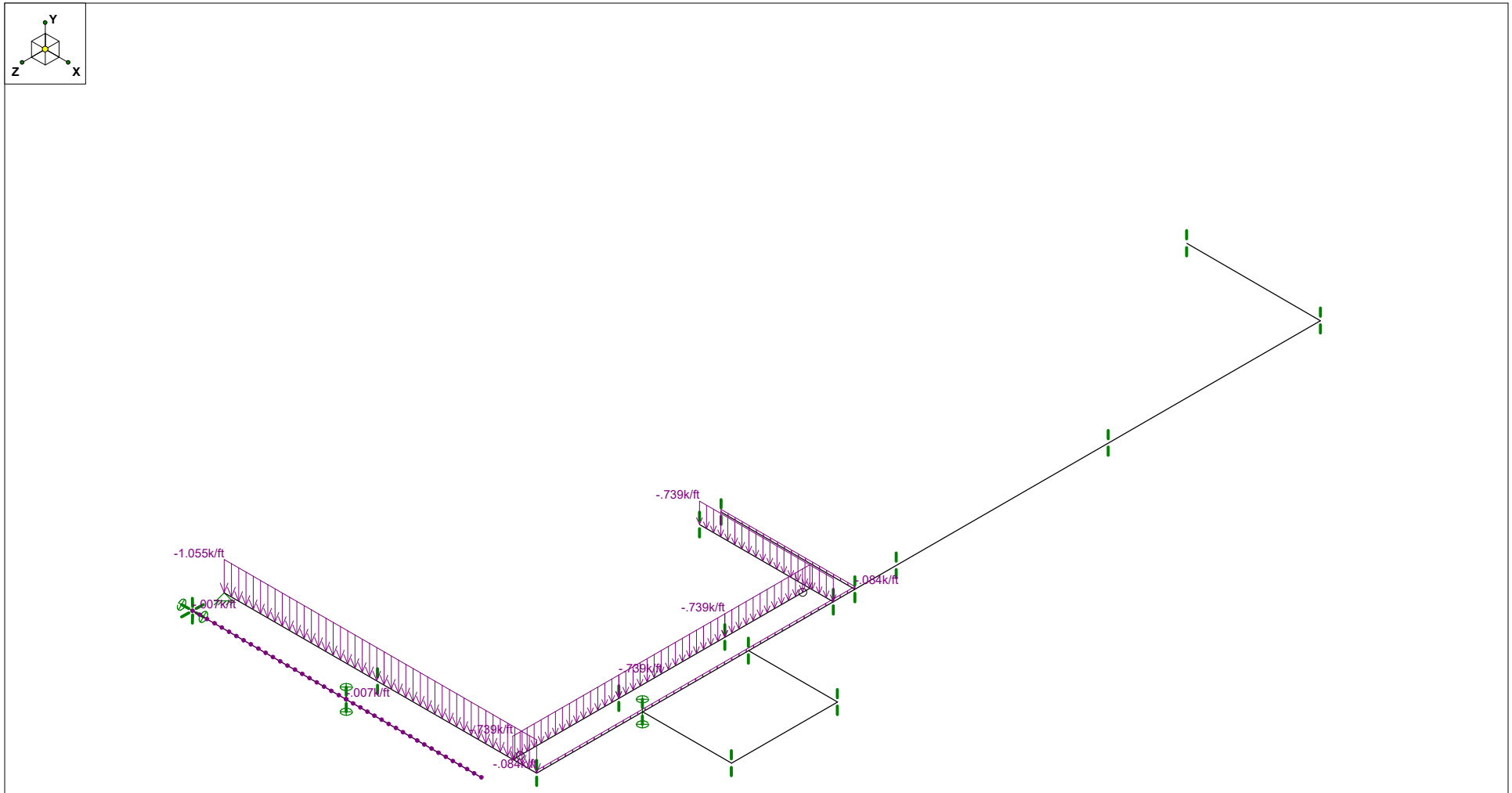
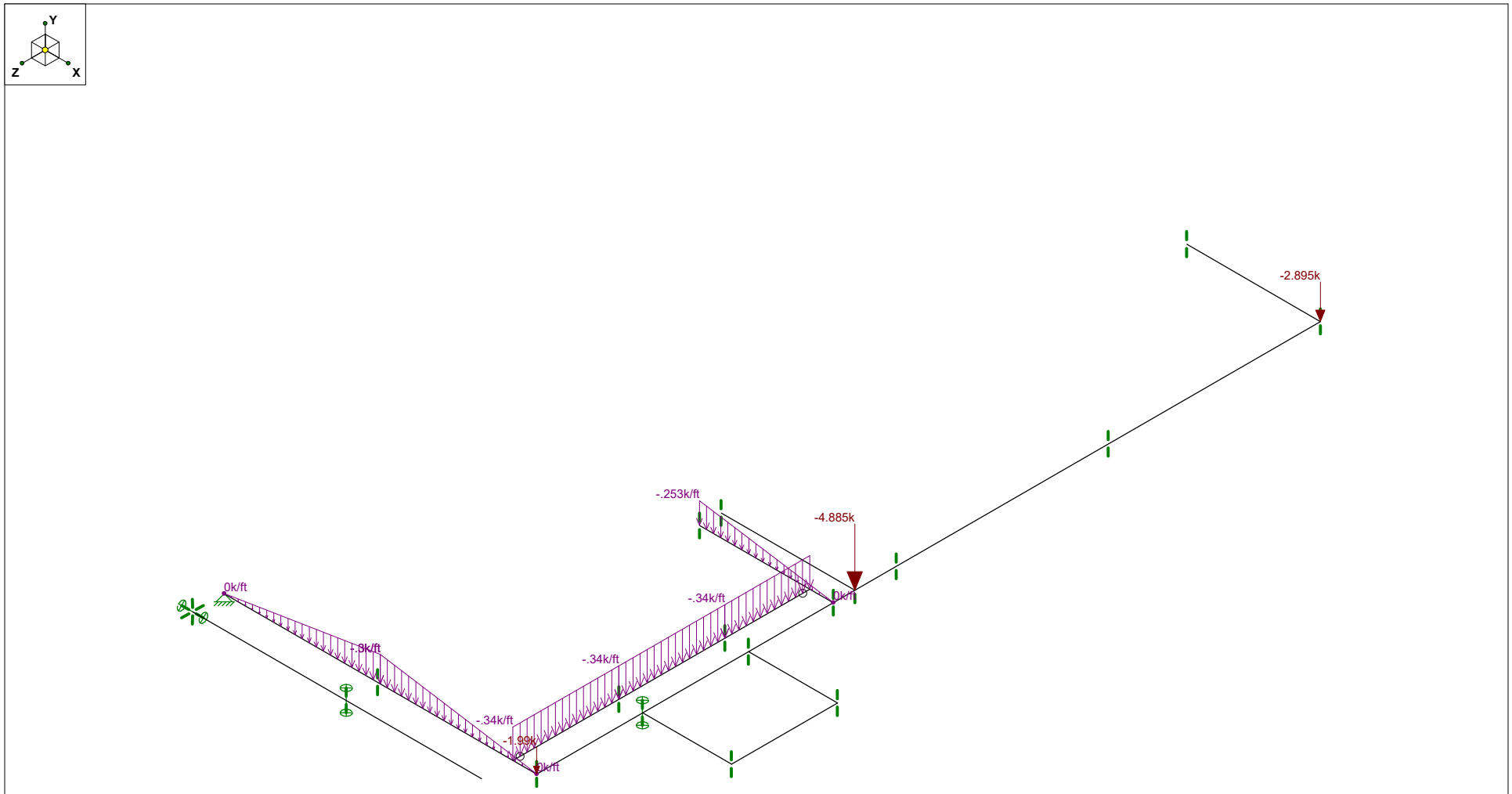


Loads: BLC 1, Soil

		SK - 4
		Oct 18, 2022 at 11:04 AM
		untitled.r3d



Loads: BLC 2, Live

		SK - 5
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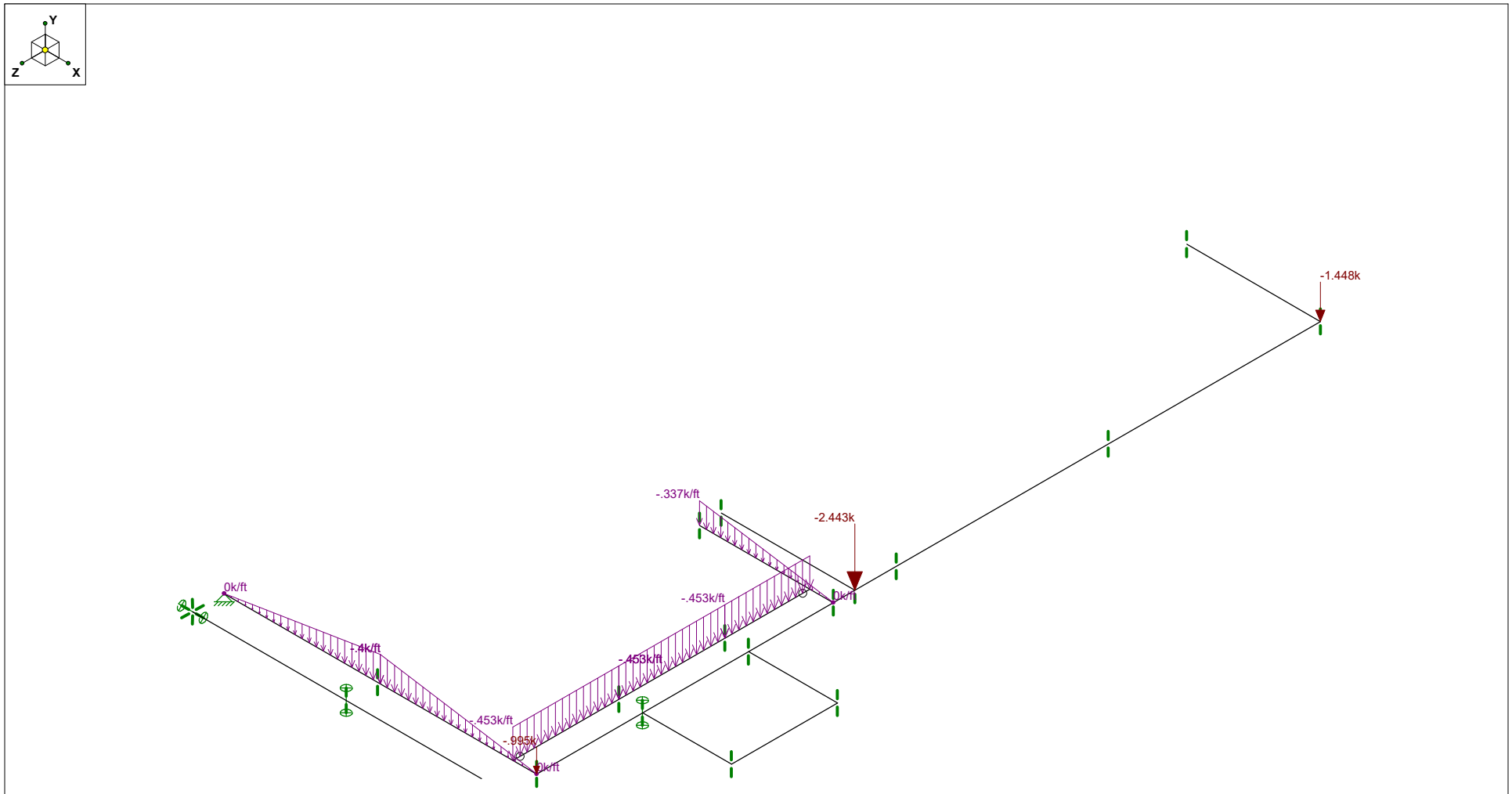

Loads: BLC 3, Dead

		SK - 6
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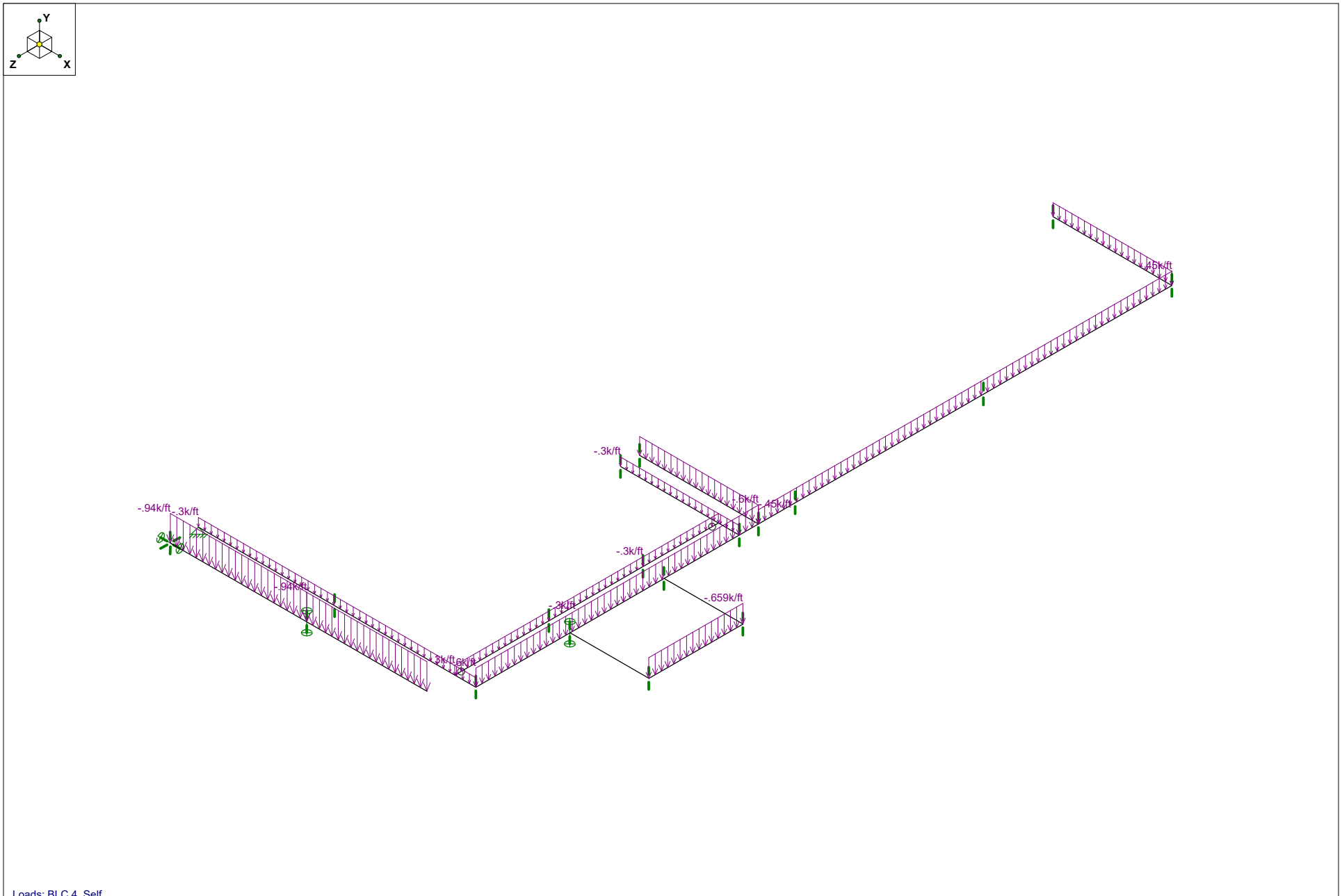

Loads: BLC 4, Self

		SK - 7
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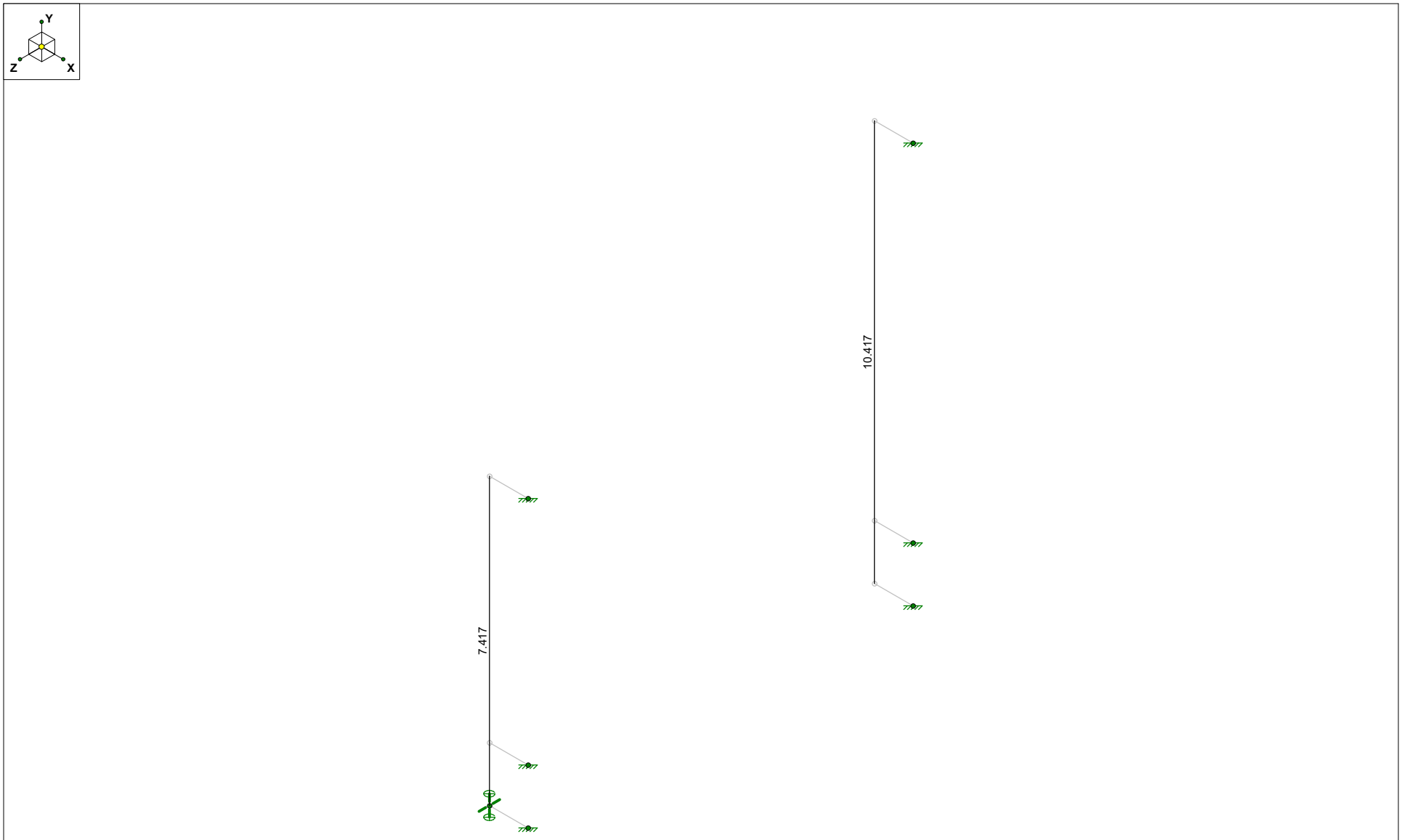
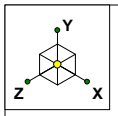
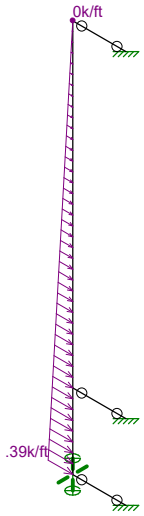
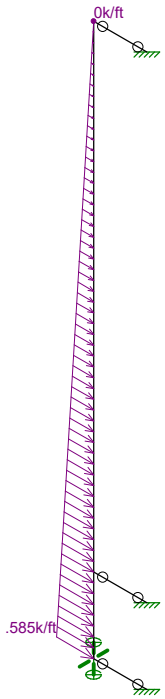


Member Length (ft) Displayed

		SK - 1
		Oct 18, 2022 at 11:07 AM
		Mithalia.r3d







Loads: BLC 1, soil

		SK - 2
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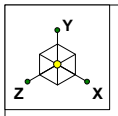
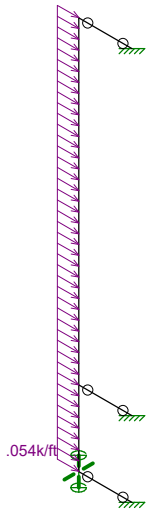
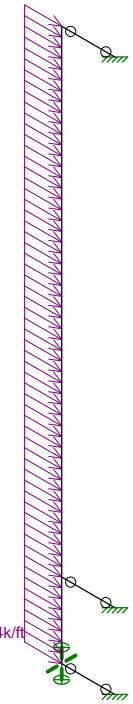
		Mithalia.r3d

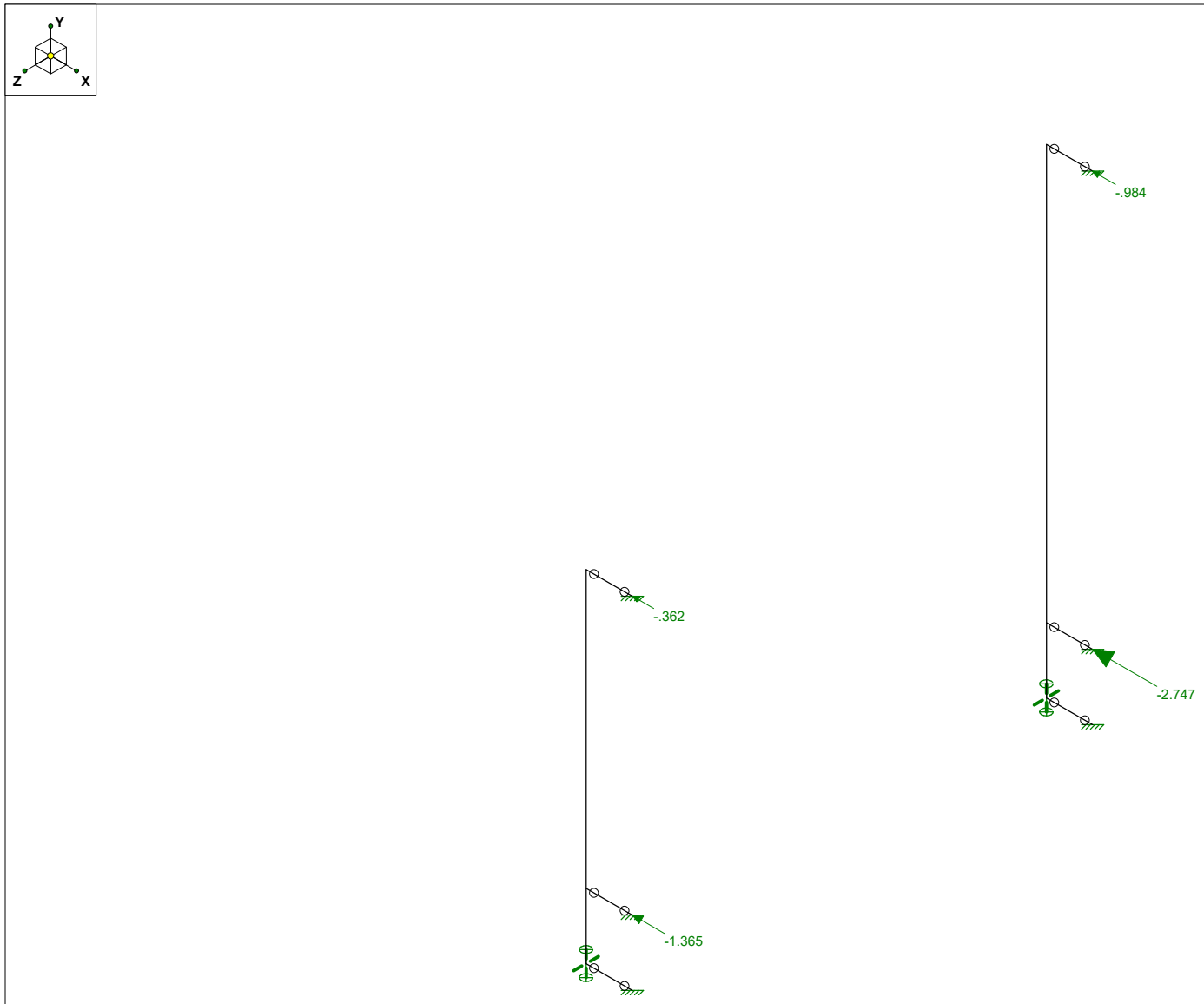






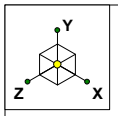
Loads: BLC 2, seismic

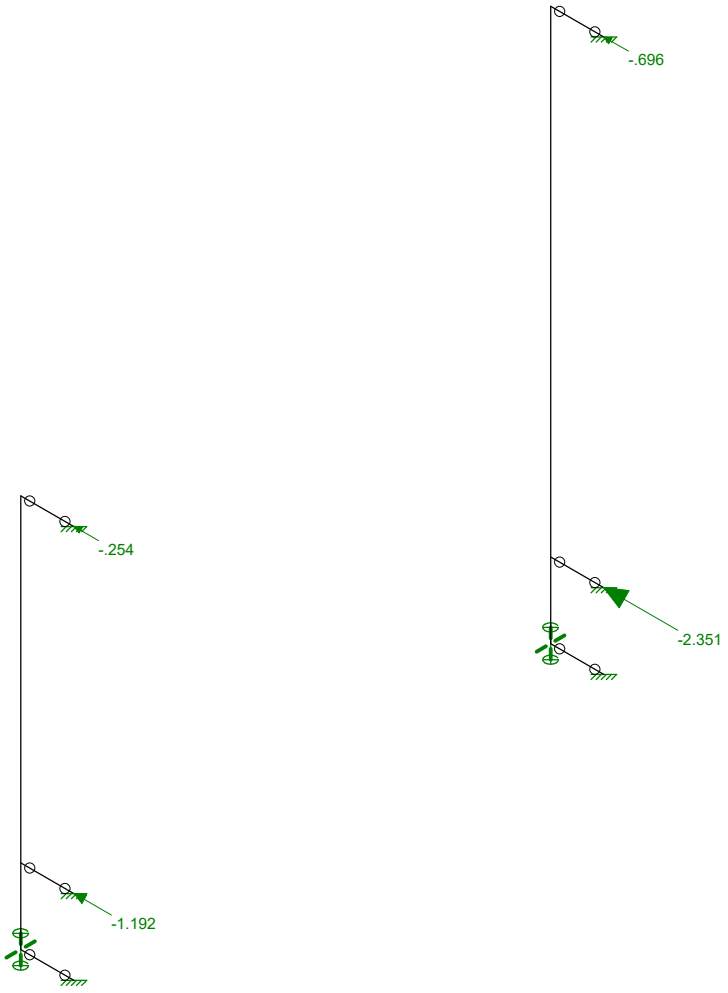
		SK - 3
		Oct 18, 2022 at 11:08 AM
		Mithalia.r3d



Results for LC 1, Soil+0.7Seismic
Reaction and Moment Units are k and k-ft

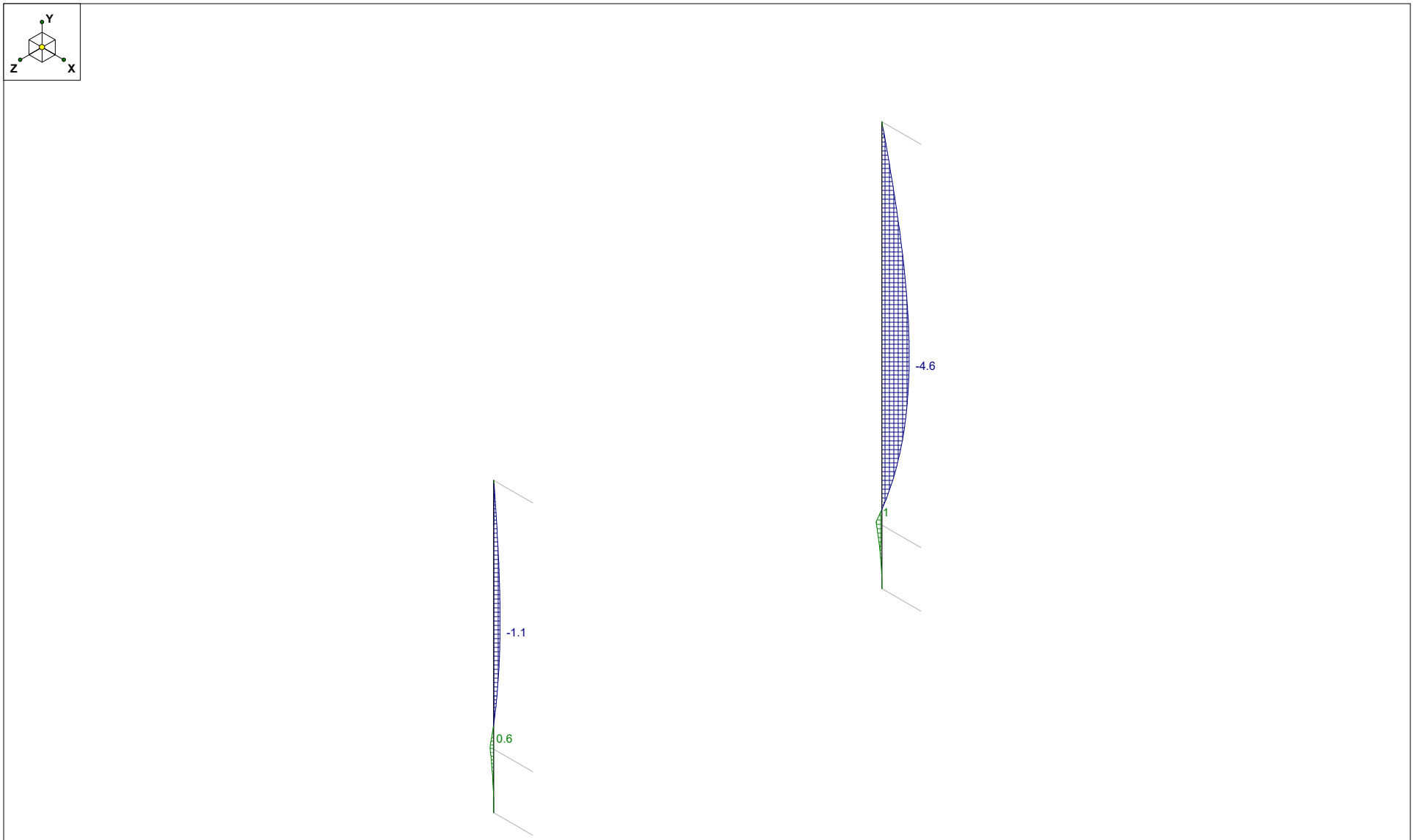
		SK - 4
		Oct 18, 2022 at 11:09 AM
		Mithalia.r3d





Results for LC 2, Soil
Reaction and Moment Units are k and k-ft

		SK - 5
		Oct 18, 2022 at 11:09 AM
		Mithalia.r3d



Results for LC 3, 1.6Soil+1.0Seismic
Member z Bending Moments (k-ft)
Reaction and Moment Units are k and k-ft

		SK - 6
		Oct 18, 2022 at 11:10 AM
		Mithalia.r3d

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

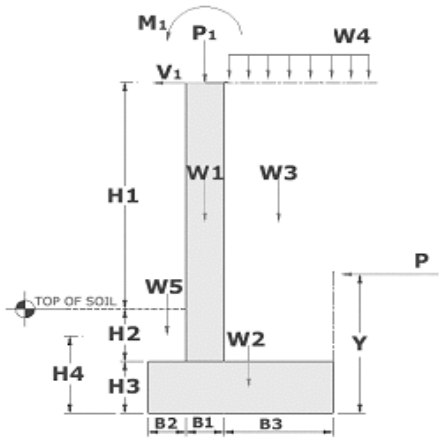
SOIL DATA

w	120	(pcf)	soil unit weight
phi	35	(deg)	soil internal angle of friction
del	0	(deg)	surface angle incline
	0.4		coeff. friction w/Concrete
	0.819		cosine(phi)
	1.000		cosine(del)
Ca	0.417	*50 psf*	coeff. of active pressure
Cp	2.500	*300 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	4.5	(ft)	soil retained
H2	0.5833333	(ft)	soil depth above toe
H3	1.25	(ft)	footing thickness
H4	1.8333333	(ft)	passive pressure soil depth
B1	0.6666667	(ft)	wall width
B2	2	(ft)	toe width
B3	1	(ft)	heel width
H	6.3333333	(ft)	total height
B	3.6666667	(ft)	total base
	150	(pcf)	concrete unit weight



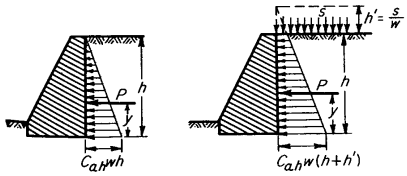
EXTERNAL LOADS

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

LOAD CALCULATIONS

lateral soil force and overturning moment

H_{prime}	0.00	(ft)	converted surcharge
Y	2.11	(ft)	distance to soil load resultant
P	1003	(lbs)	soil load resultant
	2120	(lb-ft)	Mo, soil + surcharge
	0	(lb-ft)	Mo, external load
	2,120	(lb-ft)	total overturning Moment

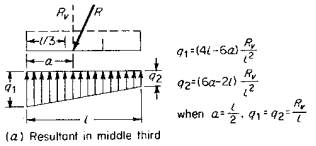


$y = \frac{h}{3}$ $\quad P = \frac{1}{2} C_a h w h^2$

$y = \frac{h^2+3hh'}{3(h+2h')}$ $\quad P = \frac{1}{2} C_a h w h (h+2h')$

wall restoring forces

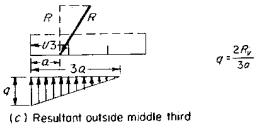
component	weight (#)	arm (ft)	moment (#-ft)
w1 (concrete)	508	2.33	1186
w2 (concrete)	688	1.83	1260
w3 (heel soil)	610	3.17	1932
w4 (surcharge)	0	3.17	0
w5 (toe soil)	140	1.00	140
P applied	0	2.33	0
vert. force	1,946	moment	4,518



$q_1 = (4l-6a)\frac{R_v}{l^2}$

$q_2 = (6a-2l)\frac{R_v}{l^2}$

when $a = \frac{l}{2}$, $q_1 = q_2 = \frac{R_v}{l}$



$q = \frac{2R_v}{3a}$

lateral sliding resistance

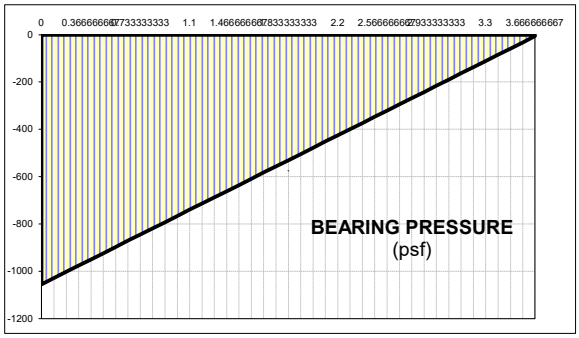
504	(lb)	passive pressure sliding resistance
778	(lb)	soil friction force
1282	(lb)	total sliding resistance

STABILITY FACTOR OF SAFETY CHECKS

	1		F.S. overturning
	1		F.S. sliding
overturning	2.13	OK	Mr / Mo
sliding	1.28	OK	(PP+F)/(Ph+V)

SOIL BEARING

a	1.23	(ft)	distance to resultant
	1.22' to 2.44'		middle third of footing
q1	1055	(psf)	bearing pressure @ toe
q2	7	(psf)	bearing pressure @ heel



FACTORED (1.7) STEM LOAD FORCES

5.0833333	(ft)	H1 + H2
1.69	(ft)	line of action (above base)
646	(lbs)	P (arm only)
646	(lbs)	Ph (arm only)
1.9	(kip-ft)	Mu (arm moment)

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

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	0.819		cosine(phi)
	1.000		cosine(del)
Ca	0.417	*50 psf*	coeff. of active pressure
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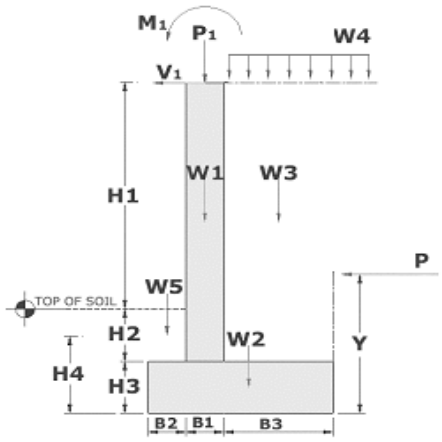
100-120	25-35	0.2-0.4	Medium or stiff clay
90-110	20-25	0.2-0.3	Soft clay, silt

WALL GEOMETRY

H1	2.5	(ft)	soil retained
H2	0.5833333	(ft)	soil depth above toe
H3	1.25	(ft)	footing thickness
H4	1.8333333	(ft)	passive pressure soil depth
B1	0.6666667	(ft)	wall width
B2	1.5	(ft)	toe width
B3	0.5	(ft)	heel width
H	4.3333333	(ft)	total height
B	2.6666667	(ft)	total base
	150	(pcf)	concrete unit weight



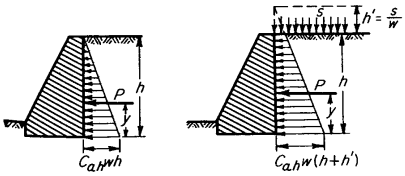
EXTERNAL LOADS

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

LOAD CALCULATIONS

lateral soil force and overturning moment

H_{prime}	0.00	(ft)	converted surcharge
Y	1.44	(ft)	distance to soil load resultant
P	469	(lbs)	soil load resultant
	680	(lb-ft)	Mo, soil + surcharge
	0	(lb-ft)	Mo, external load
	680	(lb-ft)	total overturning Moment

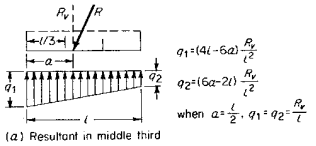


$y = \frac{h}{3}$ $\quad P = \frac{1}{2} C_a h w h^2$

$y = \frac{h^2+3hh'}{3(h+2h')}$ $\quad P = \frac{1}{2} C_a h w (h+2h')$

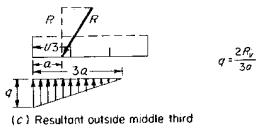
wall restoring forces

component	weight (#)	arm (ft)	moment (#-ft)
w1 (concrete)	308	1.83	565
w2 (concrete)	500	1.33	667
w3 (heel soil)	185	2.42	447
w4 (surcharge)	0	2.42	0
w5 (toe soil)	105	0.75	79
P applied	0	1.83	0
vert. force	1,098	moment	1,758



$q_1 = (4l-6a)\frac{R_v}{l^2}$ $\quad q_2 = (6a-2l)\frac{R_v}{l^2}$

when $a = \frac{l}{2}$, $q_1 = q_2 = \frac{R_v}{l}$



$q = \frac{2R_v}{3a}$

lateral sliding resistance

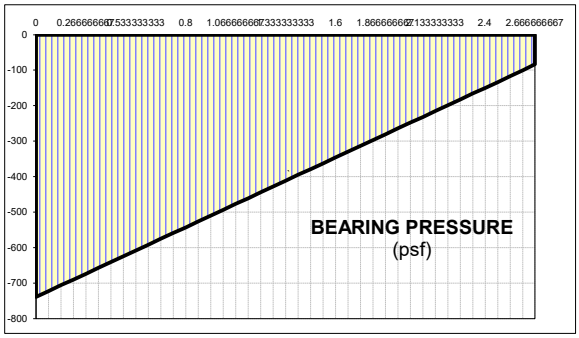
	504	(lb)	passive pressure sliding resistance
	439	(lb)	soil friction force
	943	(lb)	total sliding resistance

STABILITY FACTOR OF SAFETY CHECKS

	1		F.S. overturning
	1		F.S. sliding
overturning	2.59	OK	Mr / Mo
sliding	2.01	OK	(PP+F)/(Ph+V)

SOIL BEARING

a	0.98	(ft)	distance to resultant
	0.89' to 1.78'		middle third of footing
q1	739	(psf)	bearing pressure @ toe
q2	84	(psf)	bearing pressure @ heel



FACTORED (1.7) STEM LOAD FORCES

3.0833333	(ft)	H1 + H2
1.03	(ft)	line of action (above base)
238	(lbs)	P (arm only)
238	(lbs)	Ph (arm only)
0.4	(kip-ft)	Mu (arm moment)