

STRUCTURAL CALCULATIONS

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



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Project: Mithalia Residence

By: JDA

Proj No: 210-2022

Date: 04/25/2023

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 updated Geotechnical Engineering Investigation authored by GEO Group NW, 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 18" below grades; (2) Passive earth pressure of 350 pcf and coefficient of friction value of 0.35, (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 walls designed to resist an equivalent fluid density of 50 pcf.

The residence will be comprised of the following: reinforced concrete strip and spread footings; concrete slab-on-grade lower floor; wood framed connector plate 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 + 15 psf for 1-1/2" gypcrete. See pages 22-24 for framing key; and pages 25 - 91 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, increased by 1/3 (2667 psf) when considering seismic loads, and walls for 45 pcf lateral earth pressure (this is restrained lateral earth pressure from geotech, used conservatively instead of 35 pcf unrestrained earth pressure to minimize and wall deflection in foundation walls). All foundation walls will be cantilevered retaining walls braced from sliding at ground level by slab on grade. Provide minimum reinforcing in footings and walls per ACI. See pages 93-96 for retaining wall calculations, showing overturning stability and LRFD strength checks for flexure and shear.



Subject: Calculation Overview

Project: Mithalia Residence

Client: CenterLine

Project No.: 210-2022

Date: 04/25/2023

UP-to-DOWN RUNNING WALLS

Upper - to- Roof																		
	%	Length (ft)	SEISMIC			WIND			GRAVITY LOADING (plf)					Uplift	Comp	Anchorage		
			# in Wall	PLF	Chord F (#)	# in Wall	PLF	Chord F (#)	Wall W (#)	Snow	Dead	Live						
W	50.0%	14.83	6,336	427		2,199	148								9	ft		
		16.83	6,336	376	3,387	2,199	131	1,176	1,818	0	0	0	2,962	4,527	4	OK	MSTC52	OK
	50.0%	7.42	3,168	427		1,099	148								4	OK		
E	50.0%	6.33	6,336	1,000		2,199	347								9	ft		
	100.0%	6.33	6,336	1,000	9,004	2,199	347	3,124	684	0	0	0	8,843	9,432	33	OK	HDU11	OK
Main -to- Upper																		
	%	Length (ft)	SEISMIC			WIND			GRAVITY LOADING (plf)					Uplift	Comp	Anchorage		
			# in Wall	PLF	Chord F (#)	# in Wall	PLF	Chord F (#)	Wall W (#)	Snow	Dead	Live						
W 677	24.7%	13.33	9,464			4,369									10	ft		
	22.5%	3.00	2,129	710	7,098	983	328	3,276	360	0	0	0	7,013	7,323	44	OK	(2)MSTC52	OK
	22.5%	3.00	2,129	710	7,098	983	328	3,276	360	0	0	0	7,013	7,323	44	OK	(2)MSTC52	OK
	25.8%	3.44	2,440	710	7,098	1,126	328	3,276	413	0	0	0	7,001	7,356	44	OK	(2)MSTC52	OK
M1 1164	42.4%	20.42	5,378			3,731									10	ft		
	79.9%	16.31	4,297	263	2,634	3,490	214	2,140	1,958	0	0	0	2,175	3,861	4	OK	MSTC40	OK
E 903	32.9%	8.63	10,508	1,218		5,093	590								10	ft		
	100.0%	8.63	10,508	1,218	12,183	5,093	590	5,905	1,035	0	0	0	11,941	12,832	22	OK	HDU14	OK
Lower -to- Main																		
	%	Length (ft)	SEISMIC			WIND			GRAVITY LOADING (plf)					Uplift	Comp	Anchorage		
			# in Wall	PLF	Chord F (#)	# in Wall	PLF	Chord F (#)	Wall W (#)	Snow	Dead	Live						
W 441	15.7%	38.67	10,617			5,611									10	ft		
	62.1%	24.00	6,590	275	2,746	3,483	145	1,451	2,880	0	0	0	2,071	4,551	6	OK	HDU2	OK
	61.1%	14.67	6,488	442	4,424	3,429	234	2,338	1,760	0	0	0	4,011	5,527	4	OK	HDU5	OK
M1 1229	43.8%	11.96	8,591			7,192									10	ft		
	100.0%	11.96	8,591	718	7,184	7,192	601	6,015	1,435	0	0	0	6,848	8,083	2	OK	HDU8	OK
E 1137	40.5%	17.33	13,480			8,296									10	ft		
	61.1%	10.58	8,231	778	7,777	5,065	479	4,786	1,270	0	0	0	7,479	8,573	44	OK	HDU8	OK
	38.9%	6.75	5,249	778	7,777	3,230	479	4,786	810	0	0	0	7,587	8,285	44	OK	HDU8	OK



⚠ This is a beta release of the new ATC Hazards by Location website. Please [contact us](#) with feedback.

ℹ The ATC Hazards by Location website will not be updated to support ASCE 7-22. [Find out why.](#)

ATC Hazards by Location

Search Information

Address: 3632 90th Ave SE
Coordinates: 47.5772184, -122.2181489
Elevation: 263 ft
Timestamp: 2023-04-25T19:12:20.879Z
Hazard Type: Seismic
Reference Document: ASCE7-16
Risk Category: II
Site Class: D



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}	1.403	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	0.935	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

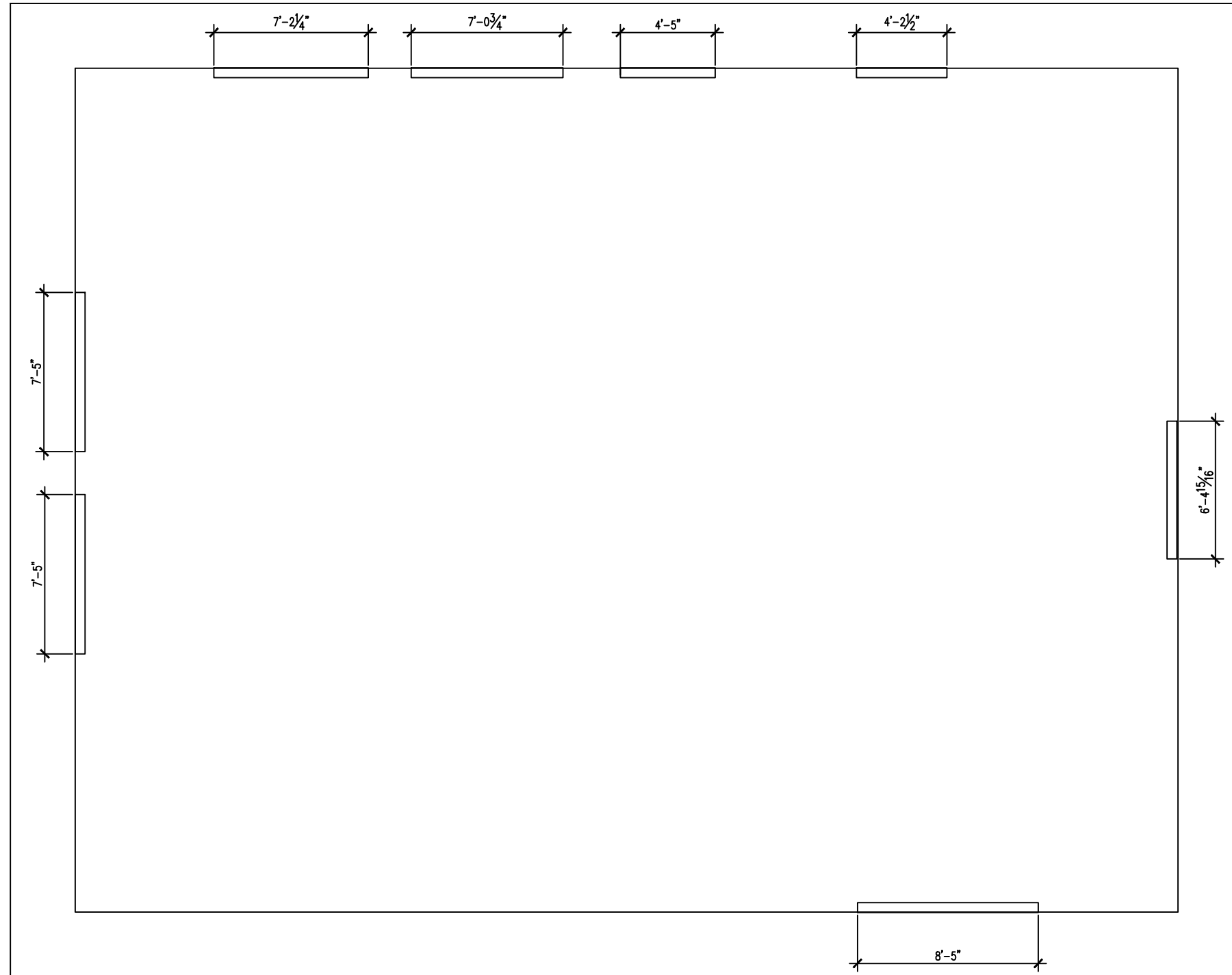
Name	Value	Description
SDC	* null	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.903	Coefficient of risk (0.2s)
CR_1	0.897	Coefficient of risk (1.0s)
PGA	0.6	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.66	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)
PGA_d	1.208	Factored deterministic acceleration value (PGA)

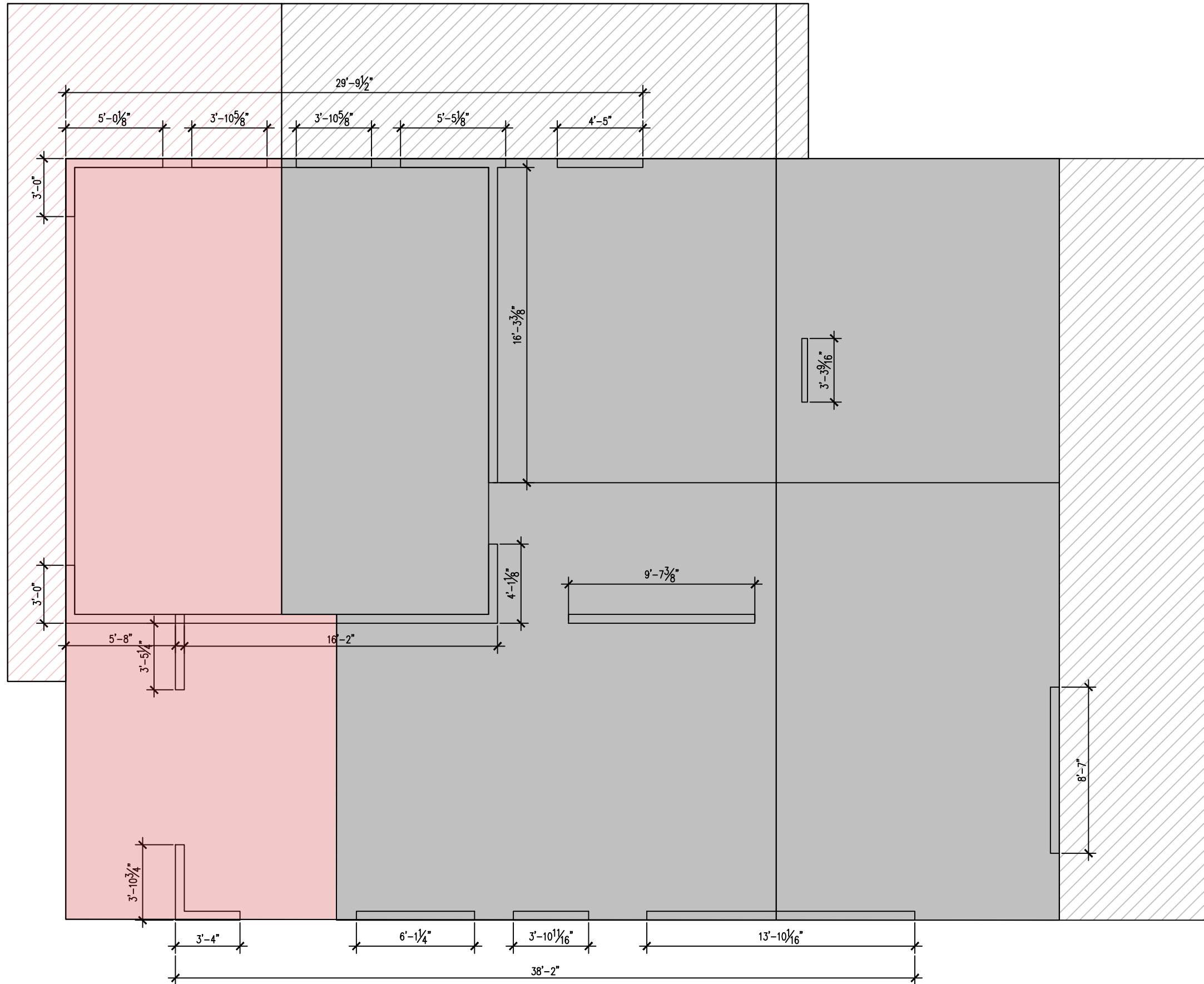
* See Section 11.4.8

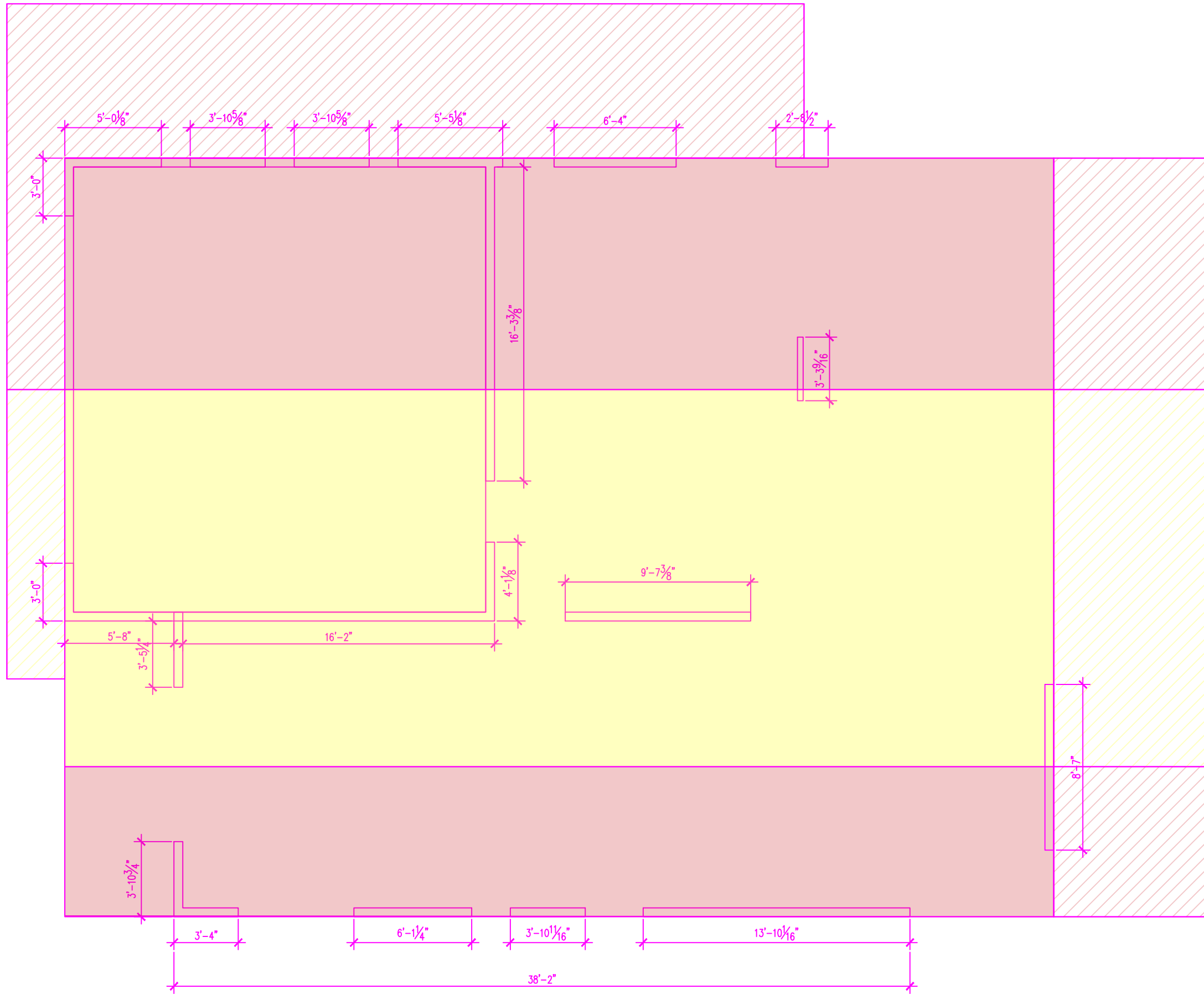
The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

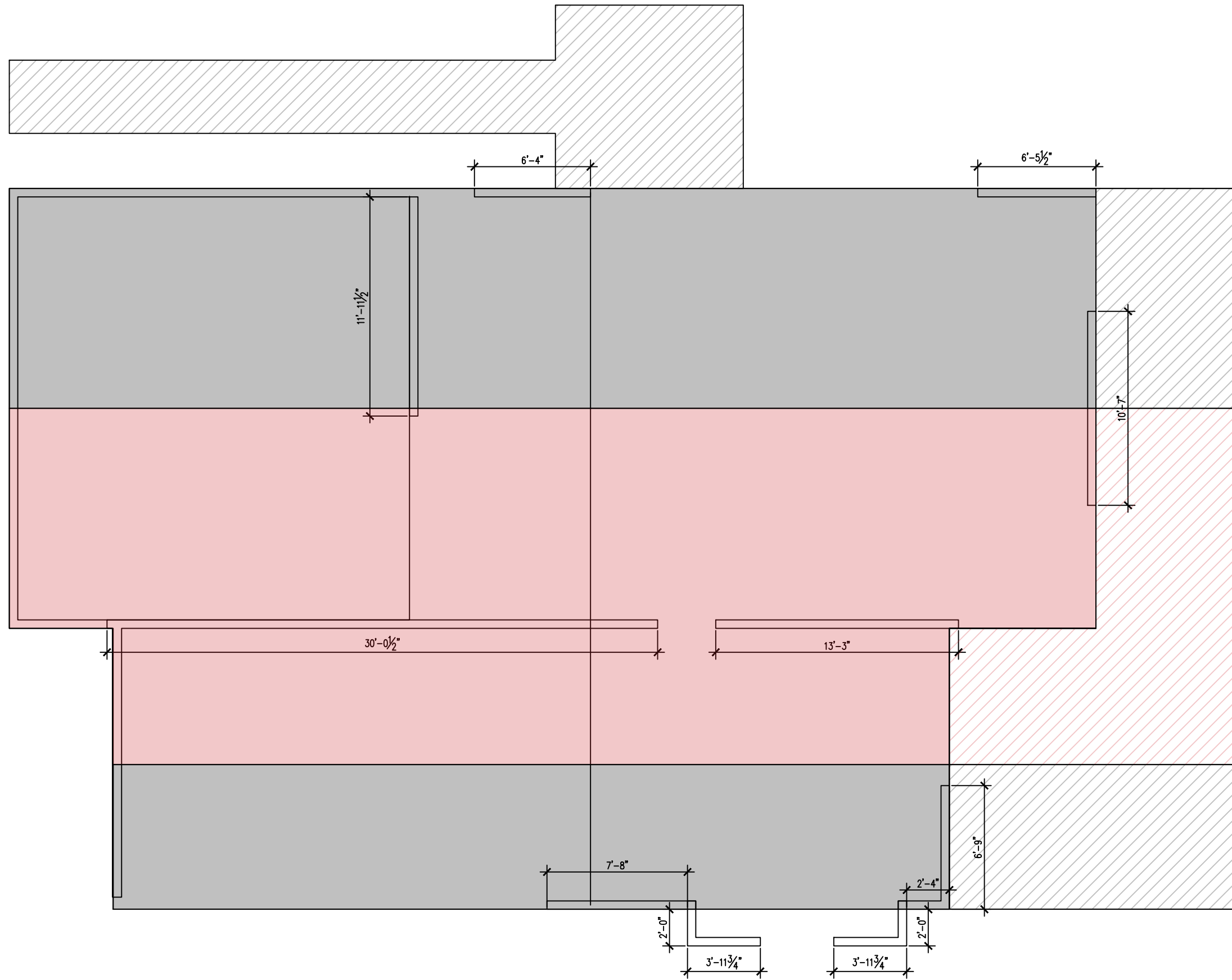
Please note that the ATC Hazards by Location website will not be updated to support ASCE 7-22. [Find out why.](#)

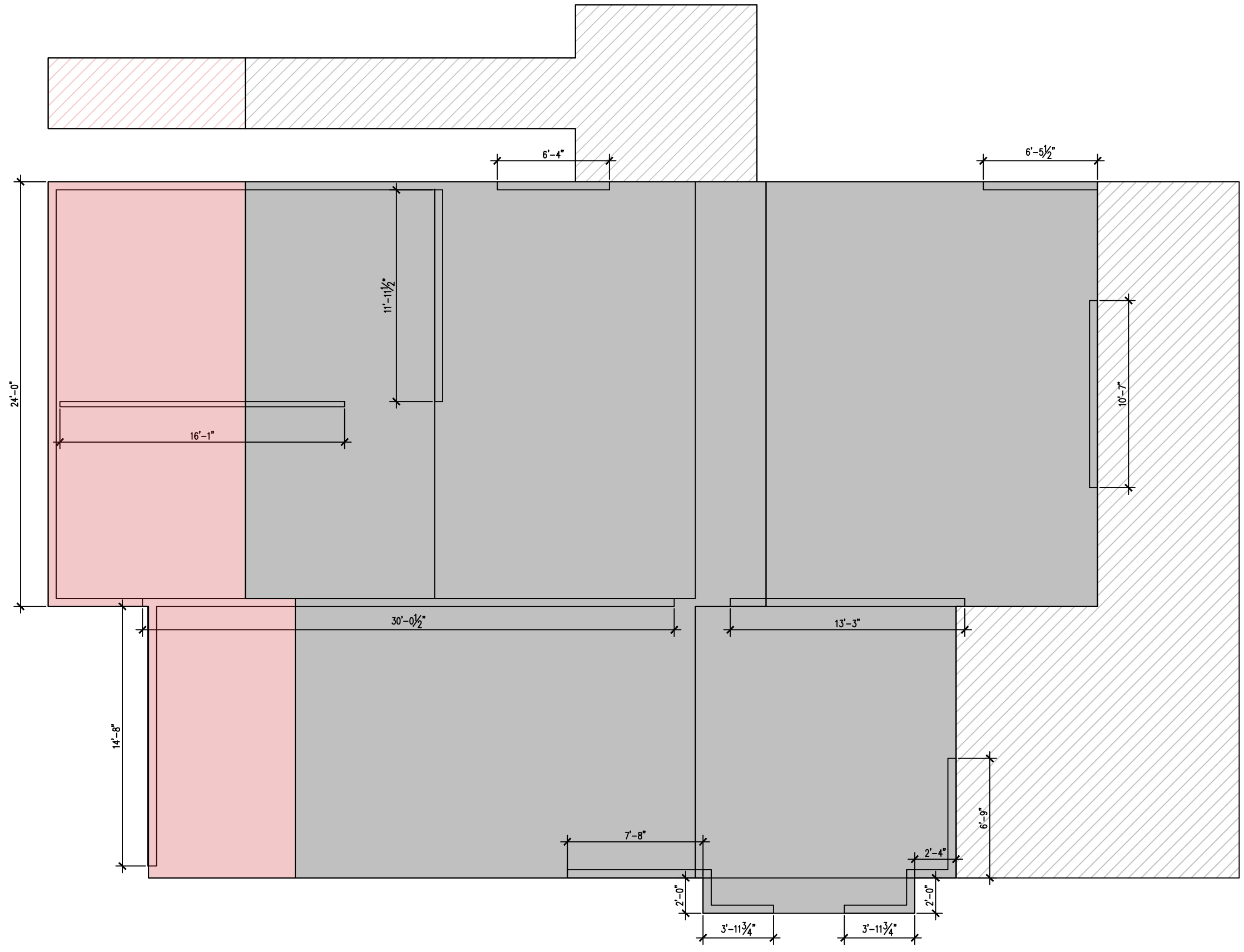
Disclaimer

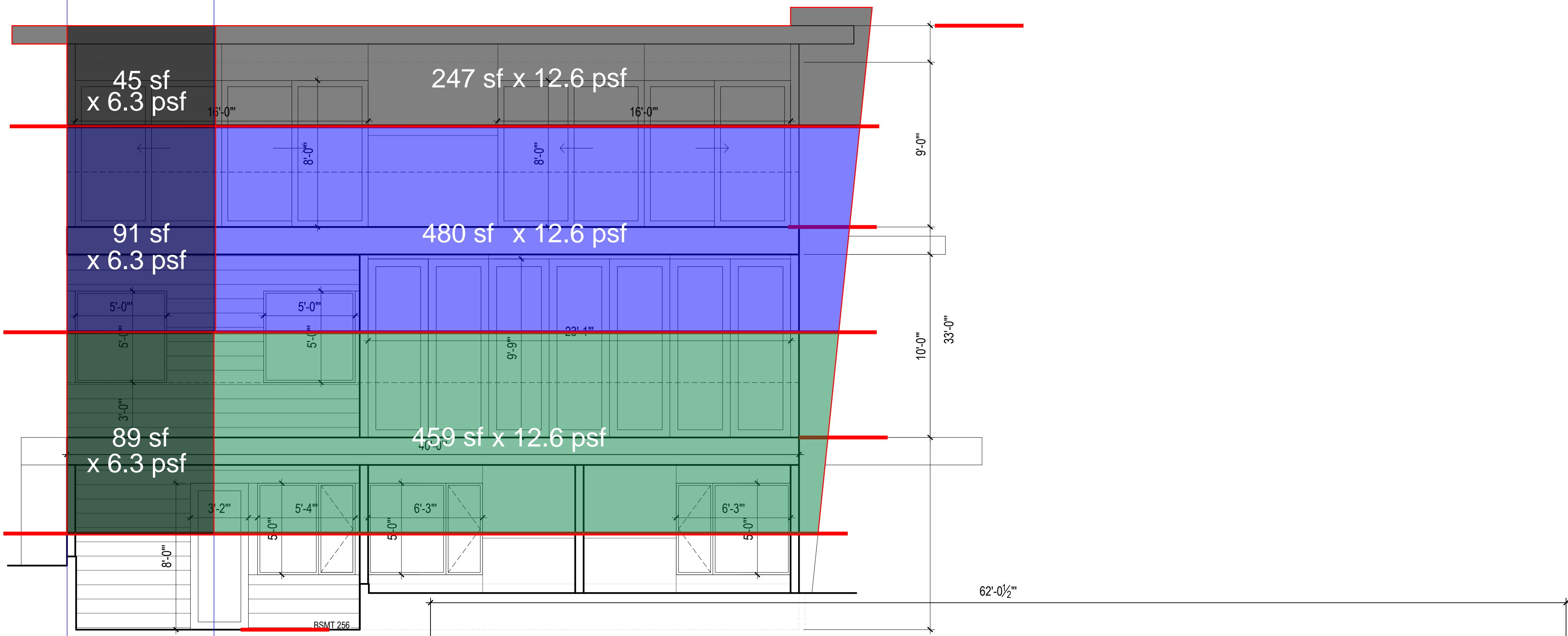




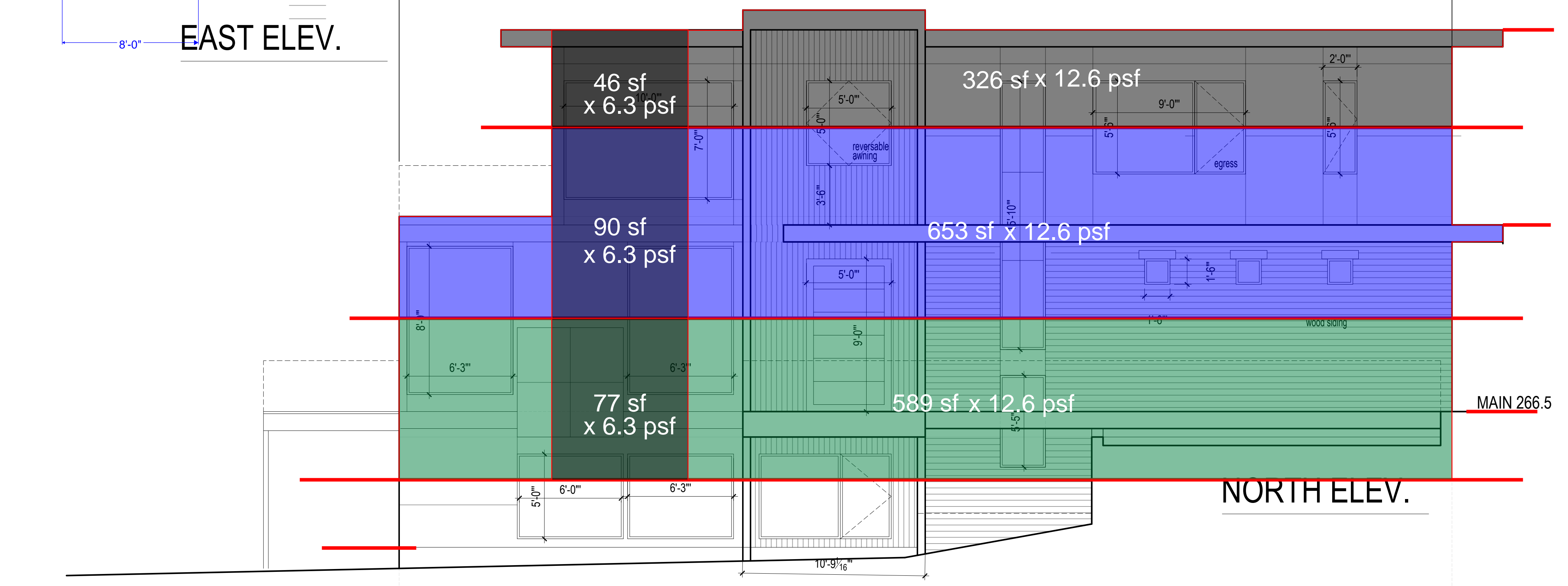








EAST ELEV.



NORTH ELEV.

Atlas Consulting SE, Inc.

6810 NE 149th St
 Kenmore, WA
 206-427-7233

JOB TITLE 3632 90th Ave SE (Mithalia)

JOB NO.	210-2022	SHEET NO.	
CALCULATED BY	JDA	DATE	7/16/22
CHECKED BY		DATE	

www.struware.com

Code Search

Code: ASCE 7 - 10

Occupancy:

Occupancy Group = R Residential

Risk Category & Importance Factors:

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

Type of Construction:

Fire Rating:
 Roof = 0.0 hr
 Floor = 0.0 hr

Building Geometry:

Roof angle (θ) 0.00 / 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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JOB NO. 210-2022 SHEET NO. _____
CALCULATED BY JDA DATE 7/16/22
CHECKED BY _____ DATE _____

Wind Loads : ASCE 7- 10

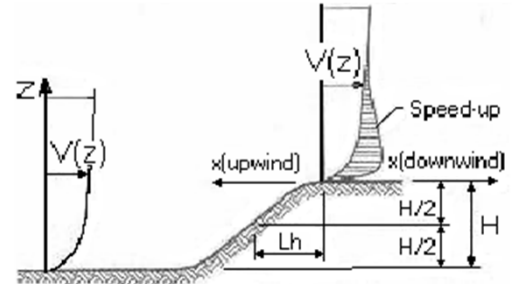
Ultimate Wind Speed 110 mph
Nominal Wind Speed 85.2 mph
Risk Category II
Exposure Category B
Enclosure Classif. Enclosed Building
Internal pressure +/-0.18
Directionality (Kd) 0.85
Kh case 1 0.720
Kh case 2 0.720
Type of roof Gable

Topographic Factor (Kzt)

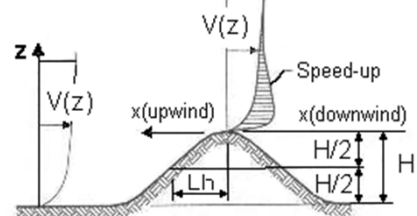
Topography 2D Escarpment
Hill Height (H) 0.0 ft
Half Hill Length (Lh) 39.4 ft
Actual H/Lh = 0.00
Use H/Lh = 0.00
Modified Lh = 39.4 ft
From top of crest: x = 0.0 ft
Bldg up/down wind? upwind

H/Lh= 0.00 K₁ = 0.000
x/Lh = 0.00 K₂ = 1.000
z/Lh = 0.84 K₃ = 0.123
At Mean Roof Ht:
Kzt = (1+K₁K₂K₃)² = 1.00 use 1.60

H < 60ft; exp B
∴ Kzt=1.0



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 (η₁) = 0.0 Hz
Damping ratio (β) = 0
/b = 0.45
/α = 0.25
V_z = 70.9
N₁ = 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

Atlas Consulting SE, Inc.6810 NE 149th St
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JOB NO.	210-2022	SHEET NO.	
CALCULATED BY	JDA	DATE	7/16/22
CHECKED BY		DATE	

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.
 $A_o \geq 0.8A_g$ **Test for Partially Enclosed Building:**

Input		Test	
Ao	0.0 sf	$A_o \geq 1.1A_{oi}$	YES
Ag	0.0 sf	$A_o > 4'$ or $0.01A_g$	NO
Aoi	0.0 sf	$A_{oi} / A_{gi} \leq 0.20$	NO
Agi	0.0 sf		

Building is NOT Partially Enclosed

Conditions to qualify as Partially Enclosed Building. Must satisfy all of the following:

- $A_o \geq 1.1A_{oi}$
- $A_o >$ smaller of 4' or $0.01 A_g$
- $A_{oi} / A_{gi} \leq 0.20$

Where:

- A_o = the total area of openings in a wall that receives positive external pressure.
- A_g = the gross area of that wall in which A_o is identified.
- A_{oi} = the sum of the areas of openings in the building envelope (walls and roof) not including A_o .
- A_{gi} = the sum of the gross surface areas of the building envelope (walls and roof) not including A_g .

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

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

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

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

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

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

$K_z = K_h$ (case 1) = 0.72
 Base pressure (qh) = **18.2 psf**
 $G_{Cpi} = +/-0.18$

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

Wind Pressure Coefficients

Surface	CASE A			CASE B		
	G_{Cpf}	$\theta = 0 \text{ deg}$ w/- G_{Cpi}	w/+ G_{Cpi}	G_{Cpf}	w/- G_{Cpi}	w/+ G_{Cpi}
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 ($G_{Cpn} = +1.5$)
 Leeward parapet = 0.0 psf ($G_{Cpn} = -1.0$)

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

Horizontal MWFRS Simple Diaphragm Pressures (psf)

Transverse direction (normal to L)

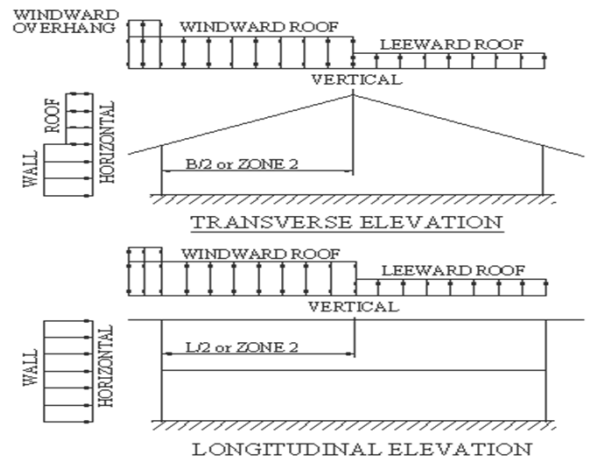
Interior Zone: Wall 12.6 psf
 Roof -5.8 psf **
 End Zone: Wall 18.9 psf
 Roof -9.8 psf **

Longitudinal direction (parallel to L)

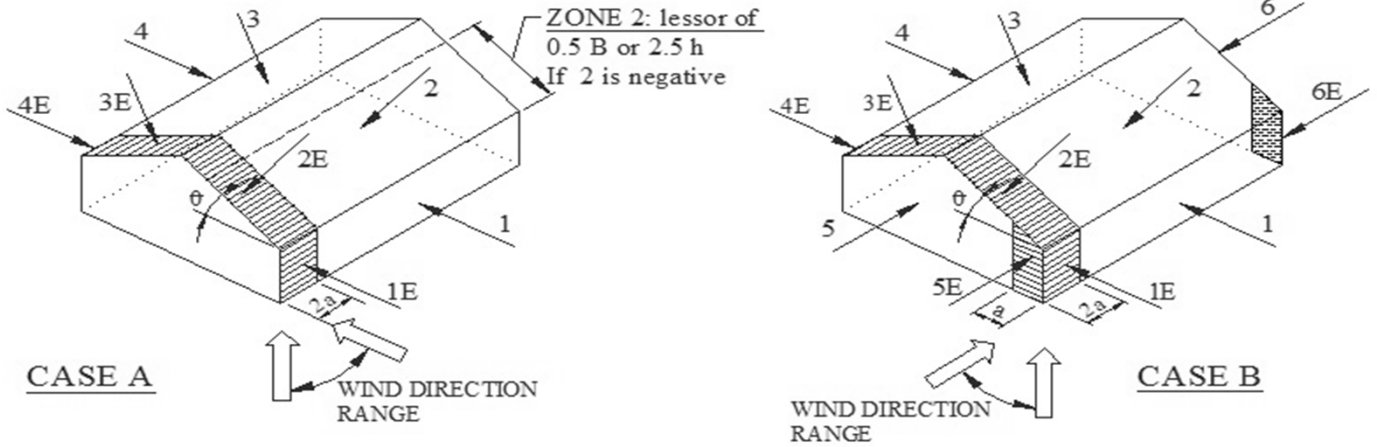
Interior Zone: Wall 12.6 psf
 End Zone: Wall 18.9 psf

** 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



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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JOB TITLE 3632 90th Ave SE (Mithalia)

JOB NO. 210-2022 SHEET NO. _____
 CALCULATED BY JDA DATE 7/16/22
 CHECKED BY _____ DATE _____

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 Area	GCp +/- GCpi			Surface Pressure (psf)			User input	
	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)

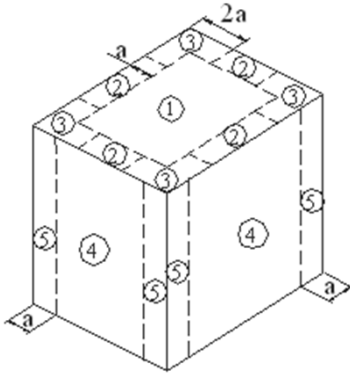
Solid Parapet Pressure	Surface Pressure (psf)			User input
	10 sf	100 sf	500 sf	40 sf
CASE A : Interior zone:	0.0	0.0	0.0	0.0
Corner zone:	0.0	0.0	0.0	0.0
CASE B : Interior zone:	0.0	0.0	0.0	0.0
Corner zone:	0.0	0.0	0.0	0.0

Walls

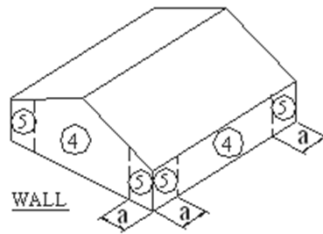
Walls Area	GCp +/- GCpi			Surface Pressure (psf)			User input	
	10 sf	100 sf	500 sf	10 sf	100 sf	500 sf	10 sf	91 sf
Negative Zone 4	-1.17	-1.01	-0.90	-21.3	-18.4	-16.4	-21.3	-18.5
Negative Zone 5	-1.44	-1.12	-0.90	-26.2	-20.4	-16.4	-26.2	-20.7
Positive Zone 4 & 5	1.08	0.92	0.81	19.7	16.8	14.7	19.7	16.9

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

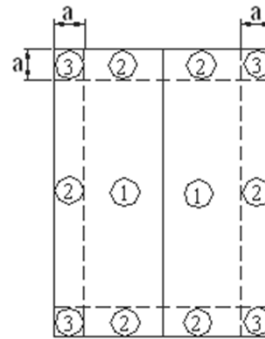
Location of C&C Wind Pressure Zones



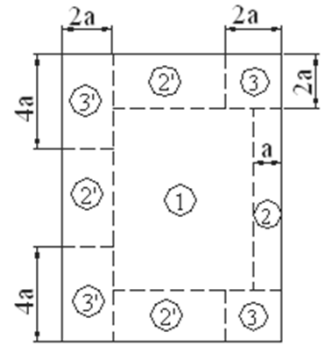
Roofs w/ $\theta \leq 10^\circ$
and all walls
 $h > 60'$



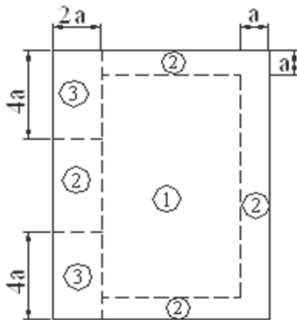
Walls $h \leq 60'$
& alt design $h < 90'$



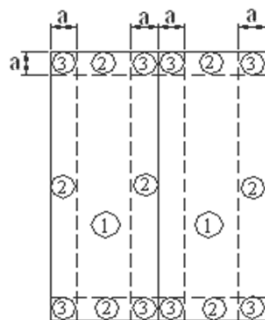
Gable, Sawtooth and
Multispan Gable $\theta \leq 7$ degrees &
Monoslope ≤ 3 degrees
 $h \leq 60'$ & alt design $h < 90'$



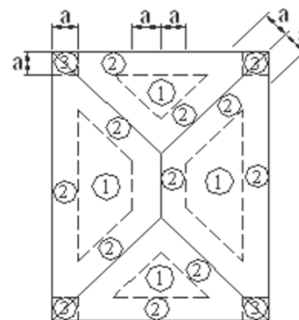
Monoslope roofs
 $3^\circ < \theta \leq 10^\circ$
 $h \leq 60'$ & alt design $h < 90'$



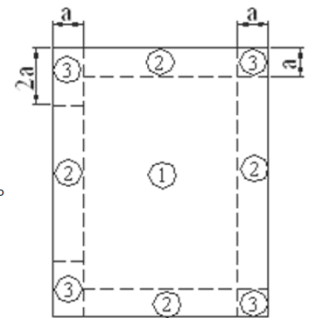
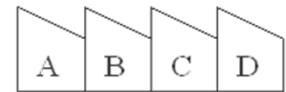
Monoslope roofs
 $10^\circ < \theta \leq 30^\circ$
 $h \leq 60'$ & alt design $h < 90'$



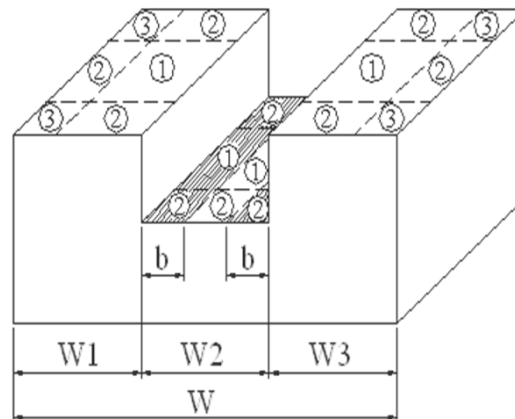
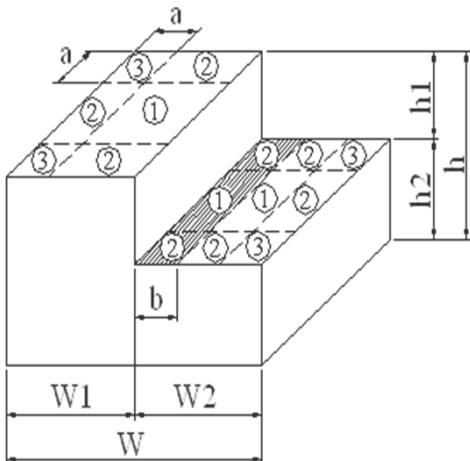
Multispan Gable &
Gable $7^\circ < \theta \leq 45^\circ$



Hip $7^\circ < \theta \leq 27^\circ$



Sawtooth $10^\circ < \theta \leq 45^\circ$
 $h \leq 60'$ & alt design $h < 90'$



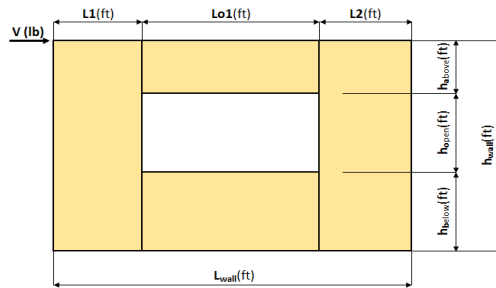
Stepped roofs $\theta \leq 3^\circ$
 $h \leq 60'$ & alt design $h < 90'$



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Project Information

Code:	2018 IBC	Date:	4/25/2023
Designer:	JDA		
Client:	CenterLine		
Project:	Mithalia		
Wall Line:	N - Upper to Roof		



Shear Wall Calculation Variables

V	4218 lbf	Opening 1	Adj. Factor Method =	2bs/h
L1	7.19 ft	ha	Wall Pier Aspect Ratio	Adj. Factor
L2	7.00 ft	ho	P1=ho/L1=	0.83
hwall	10.00 ft	hb	P2=ho/L2=	0.86
Lwall	16.19 ft	Lo1		N/A

1. Hold-down forces: $H = Vh_{wall}/L_{wall}$ = 2605 lbf

2. Unit shear above + below opening
First opening: $va1 = vb1 = H/(h_a+h_b) = 651$ plf

3. Total boundary force above + below openings
First opening: $O1 = va1 \times (L_{o1}) = 1303$ lbf

4. Corner forces
 $F1 = O1(L1)/(L1+L2) = 660$ lbf
 $F2 = O1(L2)/(L1+L2) = 643$ lbf

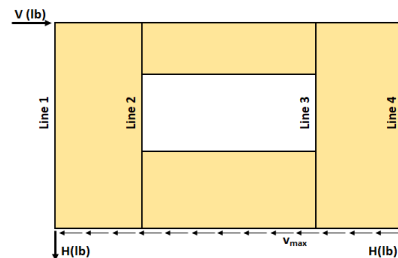
5. Tributary length of openings
 $T1 = (L1 \times Lo1)/(L1+L2) = 1.01$ ft
 $T2 = (L2 \times Lo1)/(L1+L2) = 0.99$ ft

6. Unit shear beside opening
 $v1 = (V/L)(L1+T1)/L1 = 297$ plf
 $v2 = (V/L)(T2+L2)/L2 = 297$ plf
Check $v1 \times L1 + v2 \times L2 = V?$ = 4218 lbf **OK**

7. Resistance to corner forces
 $R1 = v1 \times L1 = 2137$ lbf
 $R2 = v2 \times L2 = 2081$ lbf

8. Difference corner force + resistance
 $R1 - F1 = 1477$ lbf
 $R2 - F2 = 1438$ lbf

9. Unit shear in corner zones
 $vc1 = (R1 - F1)/L1 = 205$ plf
 $vc2 = (R2 - F2)/L2 = 205$ plf



Check Summary of Shear Values for One Opening

Line 1: $vc1(h_a+h_b)+v1(h_o)=H?$		822	1784	2605 lbf
Line 2: $va1(h_a+h_b)-vc1(h_a+h_b)-v1(h_o)=0?$	2605	822	1784	0
Line 3: $va1(h_a+h_b)-vc2(h_a+h_b)-v1(h_o)=0?$	2605	822	1784	0
Line 4: $vc2(h_a+h_b)+v2(h_o)=H?$		822	1784	2605 lbf

Design Summary*

Req. Sheathing Capacity	651 plf	4-Term Deflection	0.453 in.	3-Term Deflection	0.498 in.
Req. Strap Force	660 lbf	4-Term Story Drift %	0.015 %	3-Term Story Drift %	0.017 %
Req. HD Force (H)	2605 lbf				
Req. Shear Wall Anchorage Force (v_{max})	261 plf				

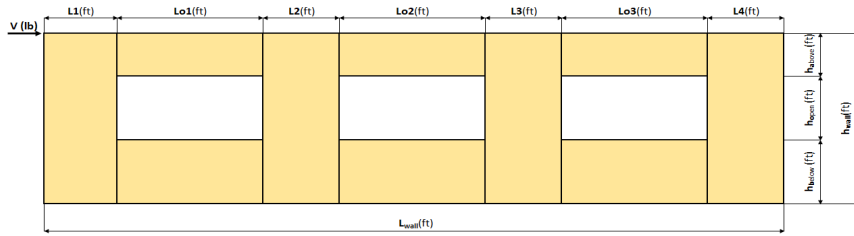
*The Design Summary assumes that the shear wall is designed as blocked.



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Project Information

Code:	2018 WBC	Date:	4/25/2023
Designer:	JDA		
Client:	Centerline		
Project:	Mithalia		
Wall Line:	N - Main to Upper		



Shear Wall Calculation Variables										
V	9096 lbf	Opening 1		Opening 2		Opening 3		Adj. Factor Method =	2bs/h	
L1	5.00 ft	h _{a1}	1.17 ft	h _{a2}	1.17 ft	h _{a3}	1.17 ft	Wall Pier Aspect Ratio	Adj. Factor	
L2	3.83 ft	h _{b1}	1.50 ft	h _{b2}	1.50 ft	h _{b3}	1.50 ft	P1=h _a /L1=	0.30	N/A
L3	3.83 ft	h _{c1}	7.25 ft	h _{c2}	7.25 ft	h _{c3}	7.25 ft	P2=h _b /L2=	0.39	N/A
L4	5.42 ft	Lo1	1.50 ft	Lo2	1.50 ft	Lo3	1.50 ft	P3=h _c /L3=	0.39	N/A
h _{wall}	9.92 ft							P4=h _d /L4=	0.28	N/A
L _{wall}	22.58 ft									

1. Hold-down forces: H = Vh_{wall}/L_{wall} = 3995 lbf

2. Unit shear above + below opening
 First opening: va1 = vb1 = H/(h_{a1}+h_{b1}) = 475 plf
 Second opening: va2 = vb2 = H/(h_{a2}+h_{b2}) = 475 plf
 Third opening: va3 = vb3 = H/(h_{a3}+h_{b3}) = 475 plf

3. Total boundary force above + below openings
 First opening: O1 = va1 x (Lo1) = 712 lbf
 Second opening: O2 = va2 x (Lo2) = 712 lbf
 Third opening: O3 = va3 x (Lo3) = 712 lbf

4. Corner forces
 F1 = O1(L1)/(L1+L2) = 403 lbf
 F2 = O1(L2)/(L1+L2) = 309 lbf
 F3 = O2(L2)/(L2+L3) = 356 lbf
 F4 = O2(L3)/(L2+L3) = 356 lbf
 F5 = O3(L3)/(L3+L4) = 295 lbf
 F6 = O3(L4)/(L3+L4) = 417 lbf

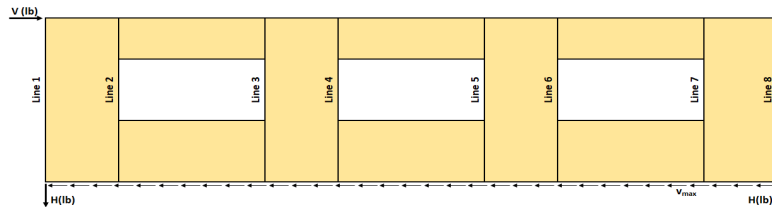
5. Tributary length of openings
 T1 = (L1*Lo1)/(L1+L2) = 0.85 ft
 T2 = (L2*Lo1)/(L1+L2) = 0.65 ft
 T3 = (L2*Lo2)/(L2+L3) = 0.75 ft
 T4 = (L3*Lo2)/(L2+L3) = 0.75 ft
 T5 = (L3*Lo3)/(L3+L4) = 0.62 ft
 T6 = (L4*Lo3)/(L3+L4) = 0.88 ft

6. Unit shear beside opening
 v1 = (V/L)/(L1+T1)/L1 = 471 plf
 v2 = (V/L)/(T2+L2+T3)/L2 = 550 plf
 v3 = (V/L)/(T4+L3+T5)/L3 = 547 plf
 v4 = (V/L)/(T6+L4)/L4 = 468 plf
 Check v1*L1+v2*L2+v3*L3+v4*L4=V? 9096 lbf OK

7. Resistance to corner forces
 R1 = v1*L1 = 2356 lbf
 R2 = v2*L2 = 2107 lbf
 R3 = v3*L3 = 2095 lbf
 R4 = v4*L4 = 2537 lbf

8. Difference corner force + resistance
 R1-F1 = 1953 lbf
 R2-F2-F3 = 1442 lbf
 R3-F4-F5 = 1444 lbf
 R4-F6 = 2120 lbf

9. Unit shear in corner zones
 vc1 = (R1-F1)/L1 = 391 plf
 vc2 = (R2-F2-F3)/L2 = 377 plf
 vc3 = (R3-F4-F5)/L3 = 377 plf
 vc4 = (R4-F6)/L4 = 391 plf



Check Summary of Shear Values for Three Openings			
Line 1: vc1(h _{a1} +h _{b1})+v1(h _{a1})=H?	3288	707	3995 lbf
Line 2: va1(h _{a1} +h _{b1})-vc1(h _{a1} +h _{b1})-v1(h _{a1})=0?	3995	3288	707
Line 3: vc2(h _{a2} +h _{b2})+v2(h _{a2})-va1(h _{a1} +h _{b1})=0?	3170	825	3995
Line 4: va2(h _{a2} +h _{b2})-vc2(h _{a2} +h _{b2})-v2(h _{a2})=0?	3995	825	3170
Line 5: va2(h _{a2} +h _{b2})-vc3(h _{a2} +h _{b2})-v3(h _{a2})=0?	3995	3174	821
Line 6: va3(h _{a3} +h _{b3})-vc3(h _{a3} +h _{b3})-v3(h _{a3})=0?	3995	821	3174
Line 7: va3(h _{a3} +h _{b3})-vc4(h _{a3} +h _{b3})-v4(h _{a3})=0?	3995	3293	702
Line 8: vc4(h _{a3} +h _{b3})+v4(h _{a3})=H?	3293	702	3995 lbf

Design Summary*

Req. Sheathing Capacity	550 plf	4-Term Deflection	0.184 in.	3-Term Deflection	0.199 in.
Req. Strap Force	417 lbf	4-Term Story Drift %	0.006 %	3-Term Story Drift %	0.007 %
Req. HD Force (H)	3995 lbf				
Req. Shear Wall Anchorage Force (V _{max})	403 plf				

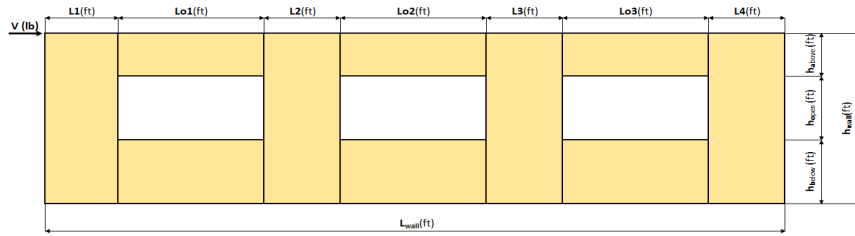
*The Design Summary assumes that the shear wall is designed as blocked.



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Project Information

Code:	2018 WBC	Date:	4/25/2023
Designer:	JDA		
Client:	Centerline		
Project:	Mithalia		
Wall Line:	S - Main to Upper		



Shear Wall Calculation Variables

V	8469 lbf				Adj. Factor Method = 2bs/h	
L1	3.33 ft	Opening 1	Opening 2	Opening 3	Wall Pier Aspect Ratio	Adj. Factor
L2	6.08 ft	h _{a1} = 2.00 ft	h _{a2} = 2.00 ft	h _{a3} = 2.00 ft	P1=h _a /L1=	N/A
L3	3.83 ft	h _{b1} = 5.00 ft	h _{b2} = 5.00 ft	h _{b3} = 5.00 ft	P2=h _b /L2=	N/A
L4	13.83 ft	h _{c1} = 3.00 ft	h _{c2} = 3.00 ft	h _{c3} = 3.00 ft	P3=h _c /L3=	N/A
h _{wall}	10.00 ft	Lo1 = 6.00 ft	Lo2 = 2.00 ft	Lo3 = 3.00 ft	P4=h _c /L4=	N/A
L _{wall}	38.07 ft					

1. Hold-down forces: $H = Vh_{wall}/L_{wall}$ = 2225 lbf

2. Unit shear above + below opening
 First opening: $va1 = vb1 = H/(h_{a1}+h_{b1}) = 445$ plf
 Second opening: $va2 = vb2 = H/(h_{a2}+h_{b2}) = 445$ plf
 Third opening: $va3 = vb3 = H/(h_{a3}+h_{b3}) = 445$ plf

3. Total boundary force above + below openings
 First opening: $O1 = va1 \times (Lo1) = 2670$ lbf
 Second opening: $O2 = va2 \times (Lo2) = 890$ lbf
 Third opening: $O3 = va3 \times (Lo3) = 1335$ lbf

4. Corner forces
 $F1 = O1(L1)/(L1+L2) = 945$ lbf
 $F2 = O1(L2)/(L1+L2) = 1725$ lbf
 $F3 = O2(L2)/(L2+L3) = 546$ lbf
 $F4 = O2(L3)/(L2+L3) = 344$ lbf
 $F5 = O3(L3)/(L3+L4) = 289$ lbf
 $F6 = O3(L4)/(L3+L4) = 1045$ lbf

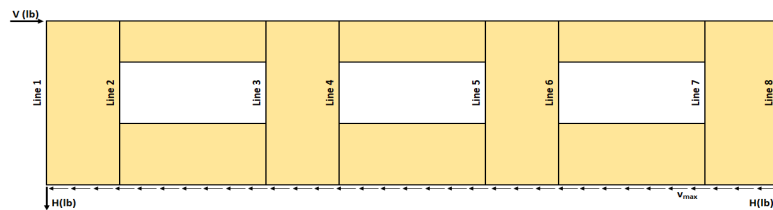
5. Tributary length of openings
 $T1 = (L1*Lo1)/(L1+L2) = 2.12$ ft
 $T2 = (L2*Lo1)/(L1+L2) = 3.88$ ft
 $T3 = (L2*Lo2)/(L2+L3) = 1.23$ ft
 $T4 = (L3*Lo2)/(L2+L3) = 0.77$ ft
 $T5 = (L3*Lo3)/(L3+L4) = 0.65$ ft
 $T6 = (L4*Lo3)/(L3+L4) = 2.35$ ft

6. Unit shear beside opening
 $v1 = (V/L)(L1+T1)/L1 = 364$ plf
 $v2 = (V/L)(T2+L2+T3)/L2 = 409$ plf
 $v3 = (V/L)(T4+L3+T5)/L3 = 305$ plf
 $v4 = (V/L)(T6+L4)/L4 = 260$ plf
 Check $v1*L1+v2*L2+v3*L3+v4*L4=V?$ = 8469 lbf OK

7. Resistance to corner forces
 $R1 = v1*L1 = 1213$ lbf
 $R2 = v2*L2 = 2488$ lbf
 $R3 = v3*L3 = 1169$ lbf
 $R4 = v4*L4 = 3599$ lbf

8. Difference corner force + resistance
 $R1-F1 = 268$ lbf
 $R2-F2-F3 = 217$ lbf
 $R3-F4-F5 = 535$ lbf
 $R4-F6 = 2554$ lbf

9. Unit shear in corner zones
 $vc1 = (R1-F1)/L1 = 81$ plf
 $vc2 = (R2-F2-F3)/L2 = 36$ plf
 $vc3 = (R3-F4-F5)/L3 = 140$ plf
 $vc4 = (R4-F6)/L4 = 185$ plf



Check Summary of Shear Values for Three Openings

Line 1: $vc1(h_{a1}+h_{b1})+v1(h_{c1})=H?$	403	1822	2225 lbf
Line 2: $va1(h_{a1}+h_{b1})+vc1(h_{a1}+h_{b1})-v1(h_{c1})=0?$	2225	403	1822
Line 3: $vc2(h_{a2}+h_{b2})+v2(h_{c2})-vc1(h_{a1}+h_{b1})=0?$	179	2046	2225
Line 4: $va2(h_{a2}+h_{b2})+vc2(h_{a2}+h_{b2})-vc2(h_{a2}+h_{b2})=0?$	2225	2046	179
Line 5: $va2(h_{a2}+h_{b2})+vc3(h_{a2}+h_{b2})-v3(h_{c3})=0?$	2225	699	1526
Line 6: $va3(h_{a3}+h_{b3})+vc3(h_{a3}+h_{b3})-vc3(h_{a3}+h_{b3})=0?$	2225	1526	699
Line 7: $va3(h_{a3}+h_{b3})+vc4(h_{a3}+h_{b3})-v4(h_{c4})=0?$	2225	923	1301
Line 8: $vc4(h_{a3}+h_{b3})+v4(h_{c4})=H?$	923	1301	2225 lbf

Design Summary*

Req. Sheathing Capacity	445 plf	4-Term Deflection	0.371 in.	3-Term Deflection	0.406 in.
Req. Strap Force	1725 lbf	4-Term Story Drift %	0.012 %	3-Term Story Drift %	0.014 %
Req. HD Force (H)	2225 lbf				
Req. Shear Wall Anchorage Force (V _{max})	222 plf				

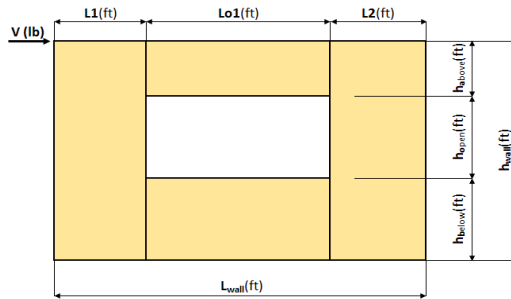
*The Design Summary assumes that the shear wall is designed as blocked.



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Project Information

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

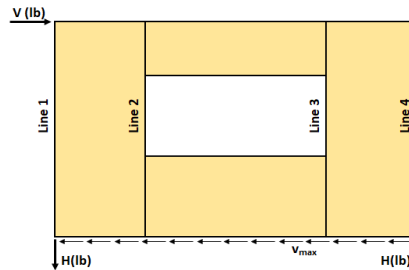


Shear Wall Calculation Variables

V	6336 lbf	Opening 1	Adj. Factor Method =	2bs/h
L1	7.42 ft	ha	Wall Pier Aspect Ratio	Adj. Factor
L2	7.42 ft	ho	P1=ho/L1=	0.74
hwall	10.50 ft	hb	P2=hb/L2=	0.74
Lwall	16.84 ft	Lo1		N/A

- Hold-down forces:** $H = Vh_{wall}/L_{wall} = 3951$ lbf
- Unit shear above + below opening**
First opening: $va1 = vb1 = H/(h_a+h_b) = 790$ plf
- Total boundary force above + below openings**
First opening: $O1 = va1 \times (Lo1) = 1580$ lbf
- Corner forces**
 $F1 = O1(L1)/(L1+L2) = 790$ lbf
 $F2 = O1(L2)/(L1+L2) = 790$ lbf
- Tributary length of openings**
 $T1 = (L1*Lo1)/(L1+L2) = 1.00$ ft
 $T2 = (L2*Lo1)/(L1+L2) = 1.00$ ft

- Unit shear beside opening**
 $v1 = (V/L)(L1+T1)/L1 = 427$ plf
 $v2 = (V/L)(T2+L2)/L2 = 427$ plf
Check $v1*L1+v2*L2=V?$ 6336 lbf **OK**
- Resistance to corner forces**
 $R1 = v1*L1 = 3168$ lbf
 $R2 = v2*L2 = 3168$ lbf
- Difference corner force + resistance**
 $R1-F1 = 2378$ lbf
 $R2-F2 = 2378$ lbf
- Unit shear in corner zones**
 $vc1 = (R1-F1)/L1 = 320$ plf
 $vc2 = (R2-F2)/L2 = 320$ plf



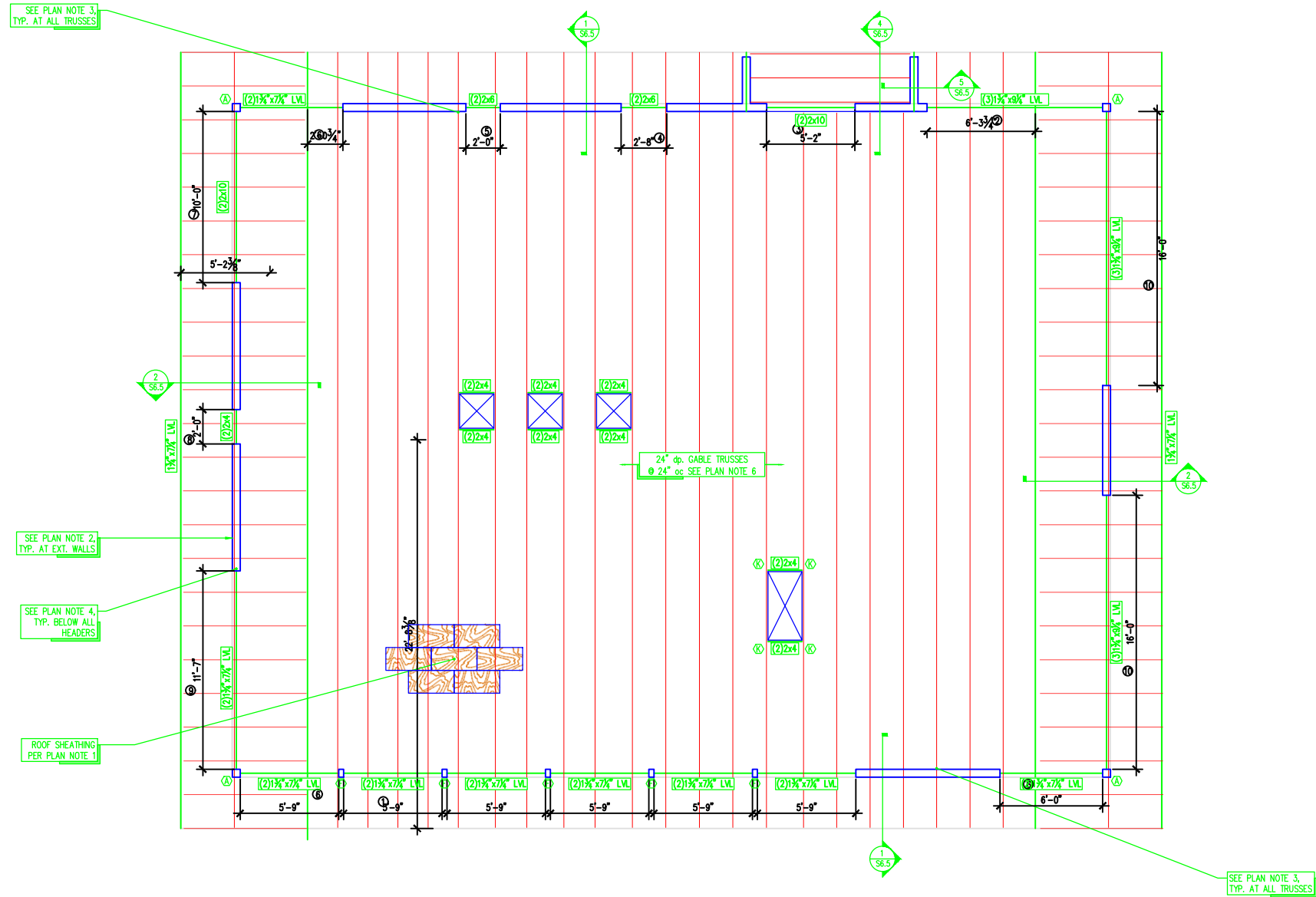
Check Summary of Shear Values for One Opening

Line 1: $vc1(h_a+h_b)+v1(h_o)=H?$		1602	2348	3951 lbf
Line 2: $va1(h_a+h_b)-vc1(h_a+h_b)-v1(h_o)=0?$	3951	1602	2348	0
Line 3: $va1(h_a+h_b)-vc2(h_a+h_b)-v1(h_o)=0?$	3951	1602	2348	0
Line 4: $vc2(h_a+h_b)+v2(h_o)=H?$		1602	2348	3951 lbf

Design Summary*

Req. Sheathing Capacity	790 plf	4-Term Deflection	0.299 in.	3-Term Deflection	0.341 in.
Req. Strap Force	790 lbf	4-Term Story Drift %	0.009 %	3-Term Story Drift %	0.011 %
Req. HD Force (H)	3951 lbf				
Req. Shear Wall Anchorage Force (v_{max})	376 plf				

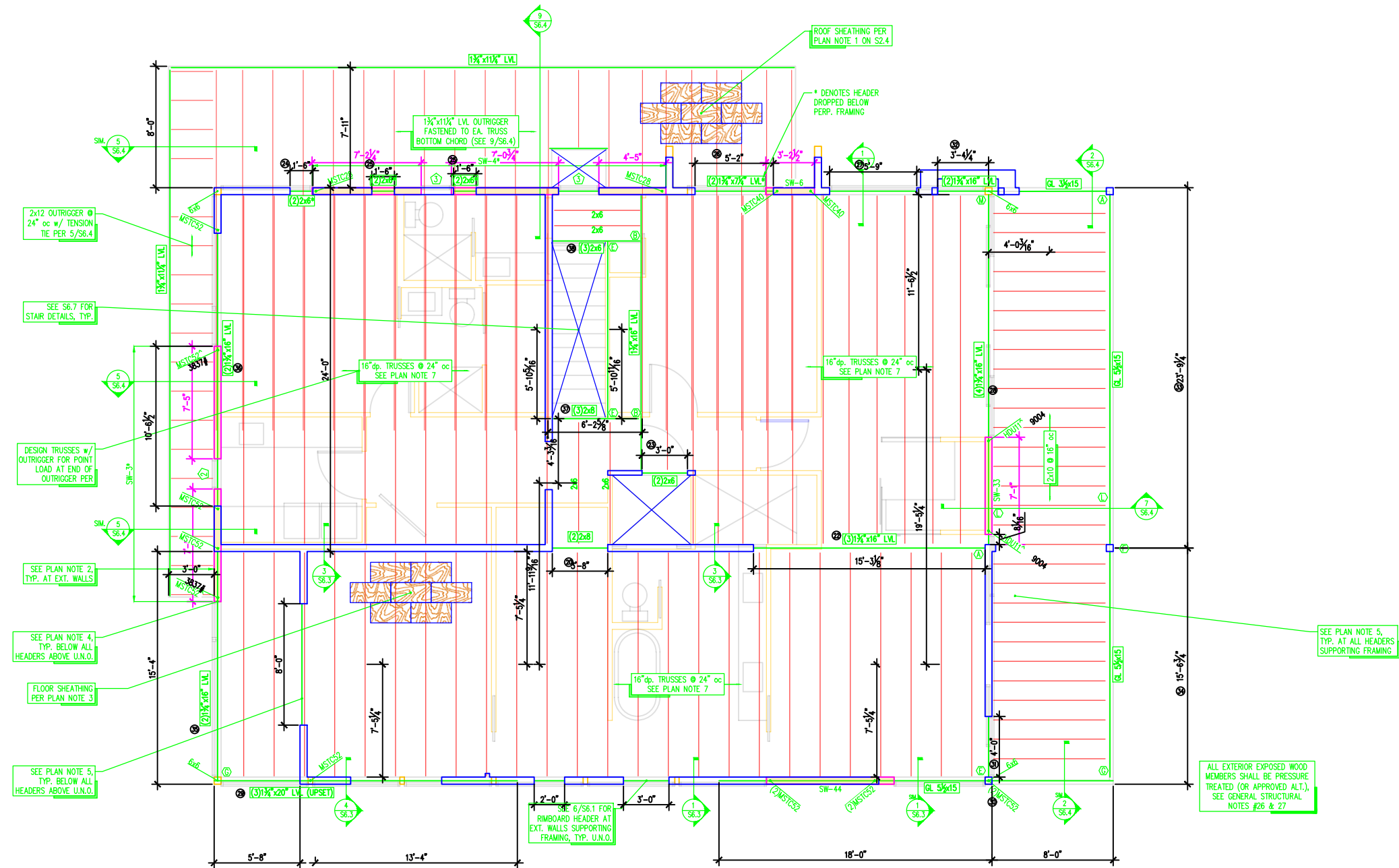
*The Design Summary assumes that the shear wall is designed as blocked.



- ROOF PLAN NOTES**
1. ROOF SHEATHING SHALL CONSIST OF 5/8" SHEATHING (PANEL SPAN RATING 32/16) NAILED AT ALL FRAMED PANEL EDGES, DIAPHRAGM BOUNDARIES, BLOCKING, AND SHEAR WALLS w/ 10d @ 6" oc; AND AT ALL INTERMEDIATE SUPPORTS w/ 10d @ 12" oc (SEE 3/S6.2).
 2. DASHED WALLS AND SHEARWALLS SHOWN IN PLAN ARE BELOW ROOF FRAMING ELEVATION (i.e. FROM THIRD FLOOR TO UNDERSIDE OF ROOF).
 3. PROVIDE H2.5A HURRICANE TIES AT END OF ALL EXISTING RAFTERS.
 4. ALL HEADERS SHALL HAVE A MINIMUM NUMBER OF POSTS PER 4/S6.1 AT NON-LOAD BEARING EXTERIOR WALLS, AND PER 6/S6.1 AT LOAD BEARING EXTERIOR WALLS.
 5. HEADERS IN EXTERIOR WALLS NOT SUPPORTING RAFTERS, JOISTS, OR BEAMS SHALL BE PER DETAIL 4/S6.1 U.N.O. IN PLAN.
 6. SEE GENERAL STRUCTURAL NOTE #23 FOR ROOF TRUSS REQUIREMENTS.

1 ROOF FRAMING PLAN
S2.4 1/4" = 1'-0"

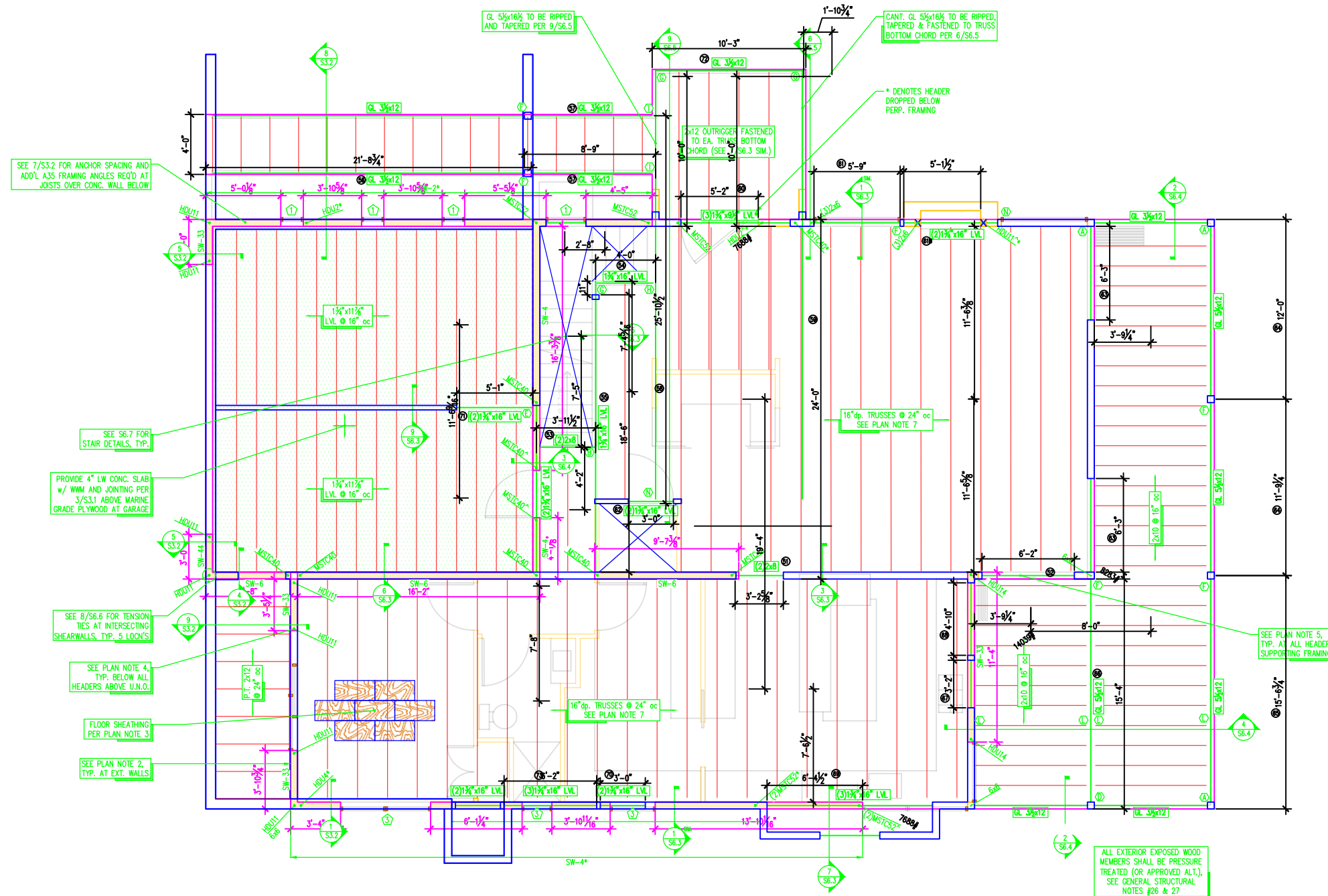




- UPPER FLOOR PLAN NOTES**
- SOLID WALLS AND SHEARWALLS SHOWN IN PLAN ARE ABOVE FRAMING LEVEL. DASHED WALLS SHOWN IN PLAN ARE BELOW FRAMING LEVEL.
 - EXTERIOR STUDWALLS SHALL BE 2x6 STUDS @ 16" oc (MAX). SEE ARCHITECTURAL FOR INTERIOR STUDWALLS. SEE 6/6.1, 5/S6.2, AND 2/S6.2 FOR ALLOWABLE HOLES & NOTCHES IN STUDWALL STUDS AND TOP & BOTTOM PLATES.
 - FLOOR SHEATHING SHALL CONSIST OF 3/4" T&G SHEATHING (PANEL SPAN RATING 48/24). NAIL SHEATHING AT ALL FRAMED PANEL EDGES, DIAPHRAGM BOUNDARIES, BLOCKING, AND SHEAR WALLS w/ 10d @ 6" oc; AND AT ALL INTERMEDIATE SUPPORTS w/ 10d @ 12" oc (SEE 3/S6.2). GLUE SHEATHING AT ALL SUPPORTS w/ ADHESIVE CONFORMING TO ASTM SPECIFICATION D3498.
 - ALL HEADERS ABOVE (SEE 1/S2.4) SHALL HAVE A MINIMUM NUMBER OF POSTS PER 4/S6.1 AT NON-LOAD BEARING EXTERIOR WALLS, AND PER 6/S6.1 AT LOAD BEARING EXTERIOR WALLS
 - HEADERS IN EXTERIOR WALLS NOT SUPPORTING RAFTERS, JOISTS, OR BEAMS SHALL BE PER DETAIL 4/S6.1 U.N.O. IN PLAN.
 - AT AREA(S) INDICATED AS BLOCKED DIAPHRAGM, INSTALL 2x FLAT BLOCKING AT ALL UNFRAMED PANEL EDGES. NAIL SHEATHING PER PLAN NOTE 3.
 - SEE GENERAL STRUCTURAL NOTE #23 FOR FLOOR TRUSS REQUIREMENTS.

1 UPPER FLOOR FRAMING PLAN
 S2.3 1/4" = 1'-0"





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/ W/M AND JOINTING PER 3/S3.1 ABOVE MARINE GRADE PLYWOOD AT GARAGE

SEE 8/S6.6 FOR TENSION TIES AT INTERSECTING SHEARWALLS, TYP. 5 LOON'S

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

CANT. GL 5/8"x16" TO BE RIPPED, TAPERED & FASTENED TO TRUSS BOTTOM CHORD PER 6/S6.5

* DENOTES HEADER DROPPED BELOW PERP. FRAMING

2x12 OUTRIGGER FASTENED TO EA. TRUSS BOTTOM CHORD (SEE 7/S6.3 SIM.)

16" dp. TRUSSES @ 24" oc SEE PLAN NOTE 7

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

- MAIN FLOOR PLAN NOTES**
- SOLID WALLS AND SHEARWALLS SHOWN IN PLAN ARE ABOVE FRAMING LEVEL. DASHED WALLS SHOWN IN PLAN ARE BELOW FRAMING LEVEL.
 - EXTERIOR STUDWALLS SHALL BE 2x6 STUDS @ 16" oc (MAX). SEE ARCHITECTURAL FOR INTERIOR STUDWALLS. SEE 6/6.1, 5/S6.2, AND 2/S6.2 FOR ALLOWABLE HOLES & NOTCHES IN STUDWALL STUDS AND TOP & BOTTOM PLATES.
 - FLOOR SHEATHING SHALL CONSIST OF 3/4" T&G SHEATHING (PANEL SPAN RATING 48/24). NAIL SHEATHING AT ALL FRAMED PANEL EDGES, DIAPHRAGM BOUNDARIES, BLOCKING, AND SHEAR WALLS w/ 10d @ 6" oc; AND AT ALL INTERMEDIATE SUPPORTS w/ 10d @ 12" oc (SEE 3/S6.2). GLUE SHEATHING AT ALL SUPPORTS w/ ADHESIVE CONFORMING TO ASTM SPECIFICATION D3498.
 - ALL HEADERS ABOVE (SEE 1/S2.3) SHALL HAVE A MINIMUM NUMBER OF POSTS PER 4/S6.1 AT NON-LOAD BEARING EXTERIOR WALLS, AND PER 6/S6.1 AT LOAD BEARING EXTERIOR WALLS
 - HEADERS IN EXTERIOR WALLS SHALL BE PER DETAIL 6/S6.1 U.N.O. IN PLAN.
 - AT AREA(S) INDICATED AS BLOCKED DIAPHRAGM, INSTALL 2x FLAT BLOCKING AT ALL UNFRAMED PANEL EDGES. NAIL SHEATHING PER PLAN NOTE 3.
 - SEE GENERAL STRUCTURAL NOTE #23 FOR FLOOR TRUSS REQUIREMENTS.

1 MAIN FLOOR FRAMING PLAN
S2.2 1/4" = 1'-0"



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	
6	Passed	2 piece(s) 1 3/4" x 7 1/4" 2.0E Microllam® LVL	
7	Passed	2 piece(s) 2 x 10 DF No.1	
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	3 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL	
Upper			
Member Name	Results	Current Solution	Comments
20	Passed	2 piece(s) 2 x 8 DF No.1	
22	Passed	3 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
23	Passed	2 piece(s) 2 x 6 DF No.1	
24	Passed	2 piece(s) 2 x 4 DF No.1	
25	Passed	2 piece(s) 2 x 6 DF No.1	
26	Passed	2 piece(s) 1 3/4" x 7 1/4" 1.55E TimberStrand® LSL	
27	Passed	1 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
28	Passed	4 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	Passed	3 piece(s) 1 3/4" x 20" 2.0E Microllam® LVL	
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	Passed	2 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
37	Passed	3 piece(s) 2 x 8 DF No.1	
38	Passed	3 piece(s) 2 x 6 DF No.1	

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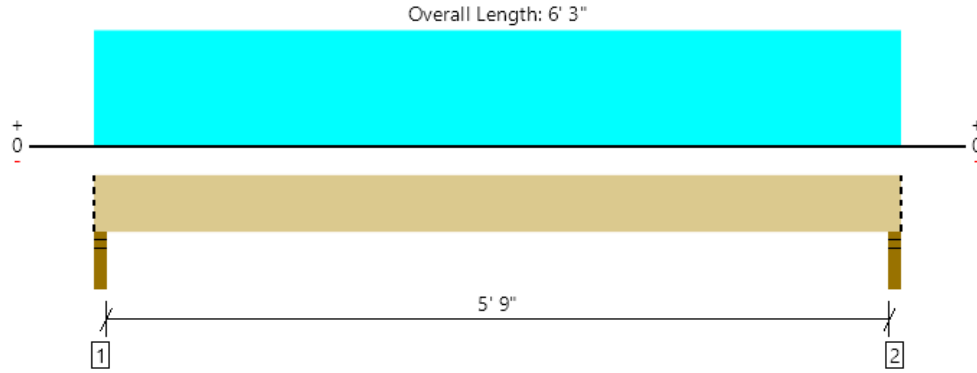


Main			
Member Name	Results	Current Solution	Comments
Garage Joists	Passed	1 piece(s) 1 3/4" x 11 1/4" 2.0E Microllam® LVL @ 16" OC	
51	Passed	2 piece(s) 2 x 8 DF No.1	
52	Passed	1 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
53	Passed	2 piece(s) 2 x 8 DF No.1	
54	Passed	1 piece(s) 1 3/4" x 16" 2.0E Microllam® 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	1 piece(s) 5 1/2" x 16" 24F-V8 DF Glulam	Right cantilever exceeds the maximum braced cantilever length of 7'.
59	Failed	1 piece(s) 5 1/2" x 16" 24F-V4 DF Glulam	Right cantilever exceeds the maximum braced cantilever length of 7'.
60	Failed	3 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL	An excessive uplift of -1620 lbs at support located at 7' 6 1/2" failed this product.
60 (w_overstrength)	Failed	3 piece(s) 1 3/4" x 9 1/4" 2.0E Microllam® LVL	Multiple Failures/Errors
61A	Passed	1 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
61B	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	
64A	Passed	1 piece(s) 3 1/2" x 12" 24F-V4 DF Glulam	
64B	Passed	1 piece(s) 3 1/2" x 12" 24F-V4 DF Glulam	
65	Passed	1 piece(s) 3 1/2" x 12" 24F-V4 DF Glulam	
66	Passed	1 piece(s) 5 1/2" x 12" 24F-V4 DF Glulam	
67	Passed	1 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
68	Passed	1 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
69	Passed	3 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
69 (w_overstrength)	Failed	3 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	Multiple Failures/Errors
70	Passed	2 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
71	Passed	2 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL	
72	Passed	1 piece(s) 3 1/2" x 12" 24F-V4 DF Glulam	
73	Passed	3 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	

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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)	3924 @ 1 1/2"	6563 (3.00")	Passed (60%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2852 @ 10 1/4"	5544	Passed (51%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	5651 @ 3' 1 1/2"	8182	Passed (69%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.103 @ 3' 1 1/2"	0.300	Passed (L/697)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.190 @ 3' 1 1/2"	0.400	Passed (L/378)	--	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"	1.79"	1796	2128	3924	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.79"	1796	2128	3924	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' 3" o/c	
Bottom Edge (Lu)	6' 3" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 3"	N/A	7.4	--	
1 - Uniform (PSF)	0 to 6' 3" (Top)	22' 8 3/8"	25.0	30.0	Default Load

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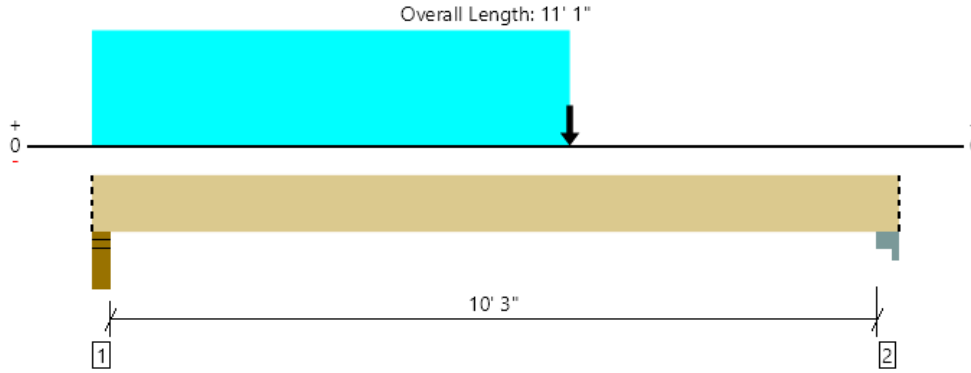
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
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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)	7011 @ 3"	10041 (4.50")	Passed (70%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	5564 @ 1' 1 3/4"	10611	Passed (52%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	17751 @ 5' 6 5/8"	19327	Passed (92%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.286 @ 5' 5 1/16"	0.525	Passed (L/441)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.530 @ 5' 5 1/16"	0.700	Passed (L/238)	--	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 - SPF	4.50"	4.50"	3.14"	3229	3782	7011	Blocking
2 - Column Cap - steel	5.50"	5.50"	1.50"	1916	2204	4120	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' 3" o/c	
Bottom Edge (Lu)	11' 1" o/c	

•Maximum allowable bracing intervals based on applied load.

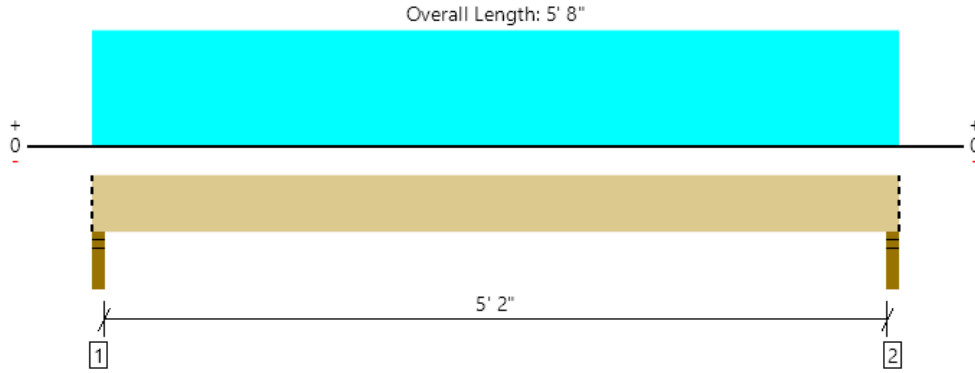
Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 11' 1"	N/A	14.2	--	
1 - Uniform (PSF)	0 to 6' 6 3/4" (Top)	22' 8 3/8"	25.0	30.0	Default Load
2 - Point (lb)	6' 6 3/4" (Top)	N/A	1264	1517	50.6 sf tributary

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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)	3557 @ 1' 1/2"	5625 (3.00")	Passed (63%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2275 @ 1' 1/4"	3830	Passed (59%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	4604 @ 2' 10"	4510	Passed (102%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.039 @ 2' 10"	0.271	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.072 @ 2' 10"	0.361	Passed (L/899)	--	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"	1.90"	1628	1929	3557	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.90"	1628	1929	3557	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)	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)	22' 8 3/8"	25.0	30.0	Default Load

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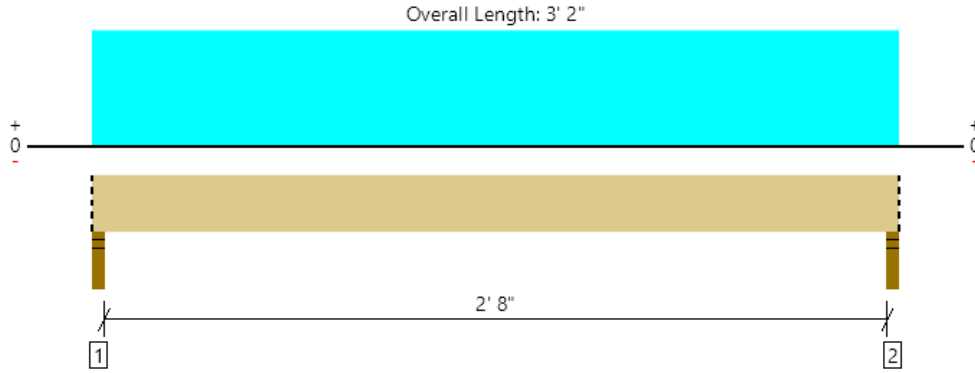
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Roof, 4
2 piece(s) 2 x 6 DF No.1



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)	1983 @ 1' 1/2"	5625 (3.00")	Passed (35%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1096 @ 8' 1/2"	2277	Passed (48%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1332 @ 1' 7"	1884	Passed (71%)	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"	905	1078	1983	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	905	1078	1983	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)	22' 8 3/8"	25.0	30.0	Default Load

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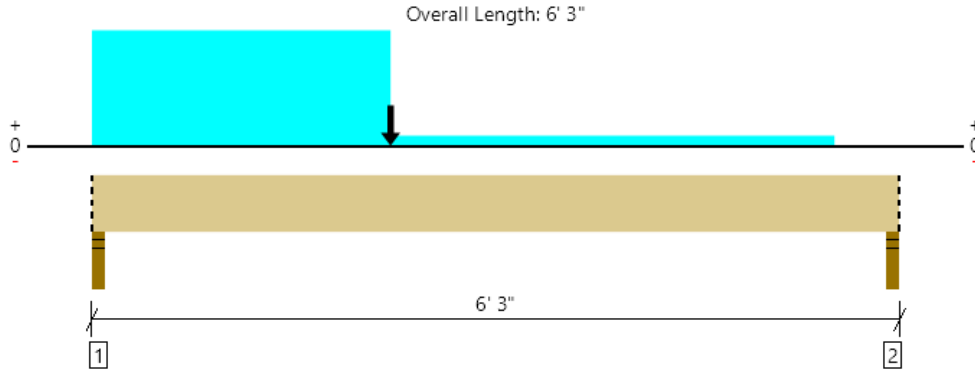
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Roof, 6
2 piece(s) 1 3/4" x 7 1/4" 2.0E Microllam® LVL



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)	4311 @ 1 1/2"	6563 (3.00")	Passed (66%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3239 @ 10 1/4"	5544	Passed (58%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	6083 @ 2' 3 3/4"	8182	Passed (74%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.093 @ 2' 11 3/16"	0.300	Passed (L/777)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.171 @ 2' 11 3/16"	0.400	Passed (L/421)	--	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"	1.97"	1972	2339	4311	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	822	959	1781	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' 3" o/c	
Bottom Edge (Lu)	6' 3" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 3"	N/A	7.4	--	
1 - Uniform (PSF)	0 to 2' 3 3/4" (Top)	22' 8 3/8"	25.0	30.0	Default Load
2 - Point (lb)	2' 3 3/4" (Top)	N/A	1264	1517	50.6 sf tributary
3 - Uniform (PSF)	2' 3 3/4" to 5' 9" (Top)	2'	25.0	30.0	Default Load

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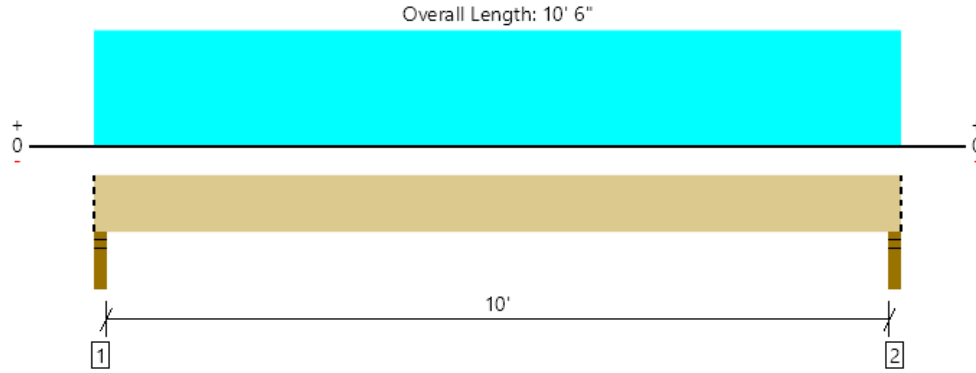
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



Roof, 7
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)	1538 @ 1' 1/2"	5625 (3.00")	Passed (27%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1239 @ 1' 1/4"	3830	Passed (32%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3847 @ 5' 3"	4510	Passed (85%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.115 @ 5' 3"	0.512	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.216 @ 5' 3"	0.683	Passed (L/569)	--	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"	719	819	1538	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	719	819	1538	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)	10' 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 10' 6"	N/A	7.0	--	
1 - Uniform (PSF)	0 to 10' 6" (Top)	5' 2 3/8"	25.0	30.0	Default Load

Weyerhaeuser Notes

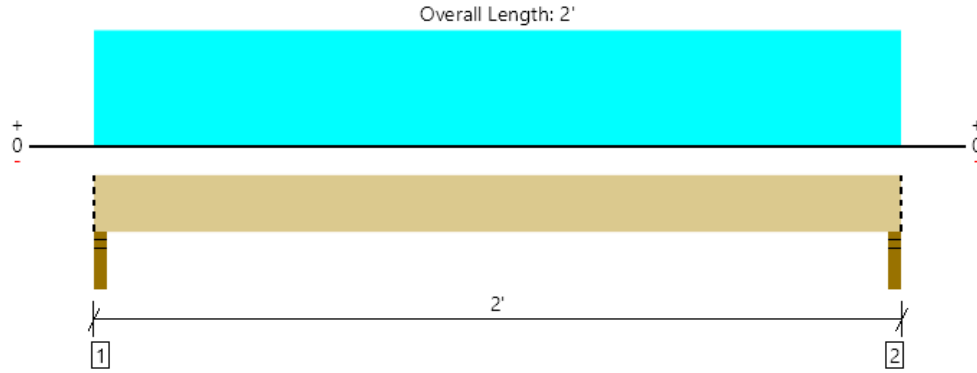
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



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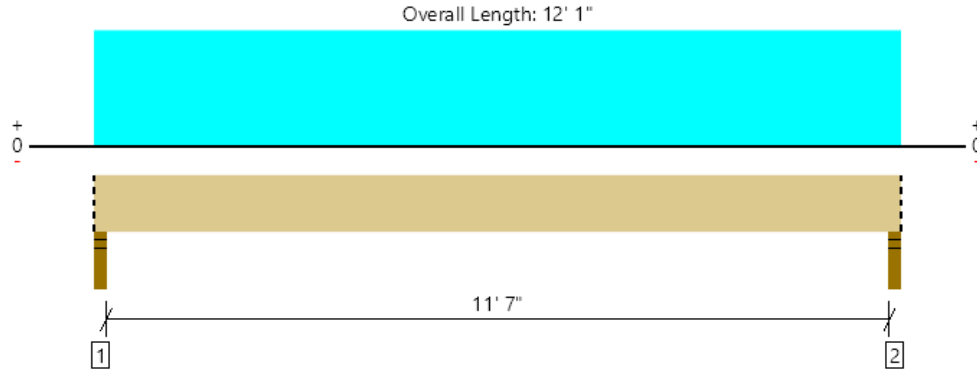
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



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)	1772 @ 1' 1/2"	6563 (3.00")	Passed (27%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1521 @ 10' 1/4"	5544	Passed (27%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	5134 @ 6' 1/2"	8182	Passed (63%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.322 @ 6' 1/2"	0.592	Passed (L/441)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.605 @ 6' 1/2"	0.789	Passed (L/235)	--	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"	830	942	1772	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	830	942	1772	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)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 12' 1"	N/A	7.4	--	
1 - Uniform (PSF)	0 to 12' 1" (Top)	5' 2 3/8"	25.0	30.0	Default Load

Weyerhaeuser Notes

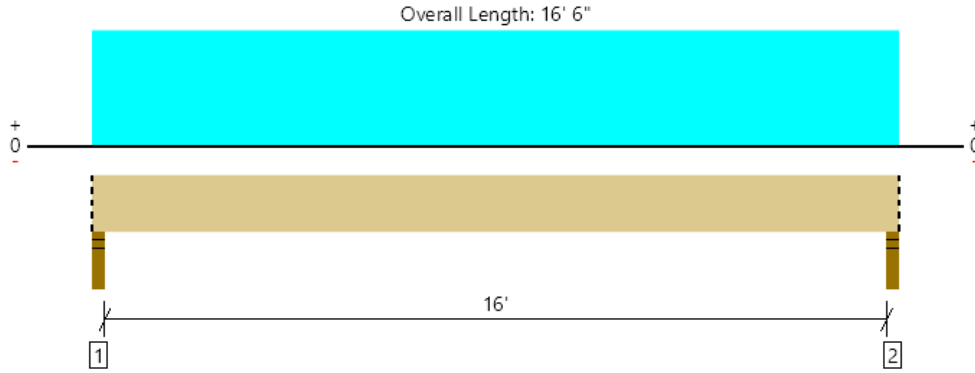
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



Roof, 10
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)	2475 @ 1' 1/2"	9844 (3.00")	Passed (25%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2169 @ 1' 1/4"	10611	Passed (20%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	9904 @ 8' 3"	19327	Passed (51%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.365 @ 8' 3"	0.813	Passed (L/534)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.703 @ 8' 3"	1.083	Passed (L/277)	--	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"	1189	1286	2475	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.50"	1189	1286	2475	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)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 16' 6"	N/A	14.2	--	
1 - Uniform (PSF)	0 to 16' 6" (Top)	5' 2 3/8"	25.0	30.0	Default Load

Weyerhaeuser Notes

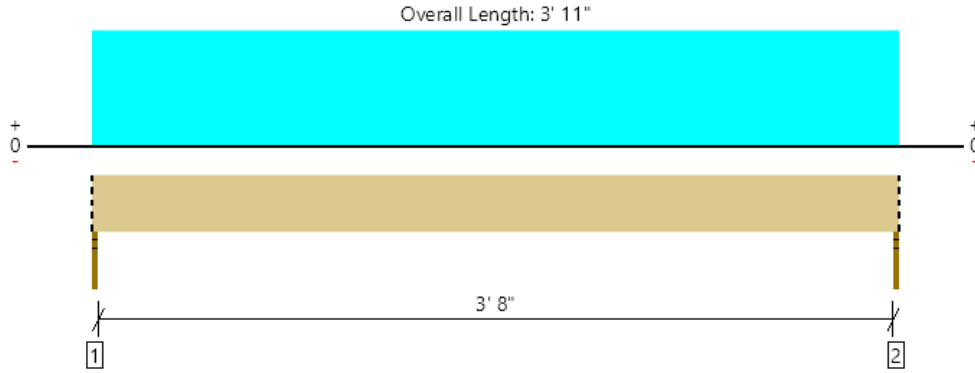
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



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)	1891 @ 0	2813 (1.50")	Passed (67%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1187 @ 8 3/4"	2610	Passed (45%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1851 @ 1' 11 1/2"	2628	Passed (70%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.016 @ 1' 11 1/2"	0.098	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.032 @ 1' 11 1/2"	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	1.50"	1.50"	1.50"	951	940	1891	Blocking
2 - Stud wall - DF	1.50"	1.50"	1.50"	951	940	1891	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' 11" o/c	
Bottom Edge (Lu)	3' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 3' 11"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 3' 11" (Top)	12'	40.0	40.0	Default Load

Weyerhaeuser Notes

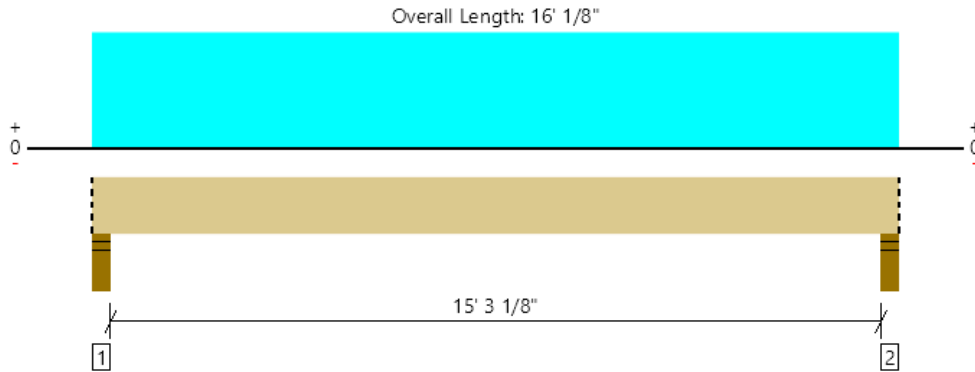
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



Upper, 22
3 piece(s) 1 3/4" x 16" 2.OE 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)	12644 @ 3"	14766 (4.50")	Passed (86%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	9946 @ 1' 8 1/2"	15960	Passed (62%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	47498 @ 8' 1/16"	46671	Passed (102%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.315 @ 8' 1/16"	0.388	Passed (L/592)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.639 @ 8' 1/16"	0.776	Passed (L/291)	--	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	4.50"	4.50"	3.85"	6420	6224	12644	Blocking
2 - Stud wall - DF	4.50"	4.50"	3.85"	6420	6224	12644	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)	16' 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' 1/8"	N/A	24.5	--	
1 - Uniform (PSF)	0 to 16' 1/8" (Top)	19' 5 1/4"	40.0	40.0	Default Load

Weyerhaeuser Notes

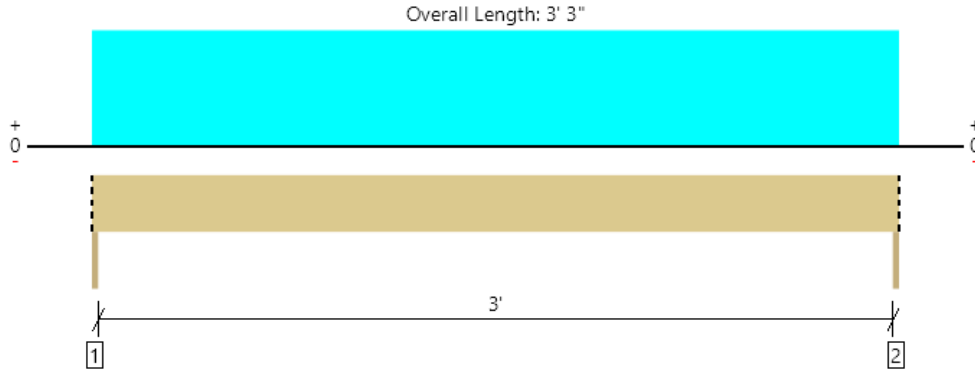
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



Upper, 23
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)	1531 @ 0	2813 (1.50")	Passed (54%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	981 @ 7"	1980	Passed (50%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1244 @ 1' 7 1/2"	1639	Passed (76%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.017 @ 1' 7 1/2"	0.081	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.033 @ 1' 7 1/2"	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/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 - Beam - DF	1.50"	1.50"	1.50"	752	779	-68	1531	Blocking
2 - Beam - DF	1.50"	1.50"	1.50"	752	779	-68	1531	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' 3" o/c	
Bottom Edge (Lu)	3' 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 3' 3"	N/A	4.2	--	--	
1 - Uniform (PLF)	0 to 3' 3" (Front)	N/A	458.5	479.5	-42.0	Linked from: Floor: Joist w/ Cant, Support 1

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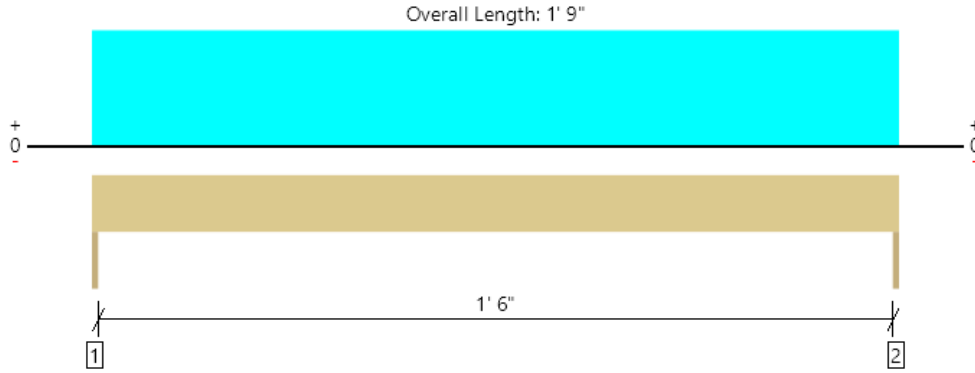
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



Upper, 24
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)	1044 @ 0	2813 (1.50")	Passed (37%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	506 @ 5"	1260	Passed (40%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	422 @ 10 1/2"	766	Passed (55%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.007 @ 10 1/2"	0.058	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.014 @ 10 1/2"	0.087	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	1.50"	1.50"	1.50"	545	420	245	1044	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	545	420	245	1044	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	620.5	480.5	279.5	Linked from: Floor: Joist w/ Cant, Support 2

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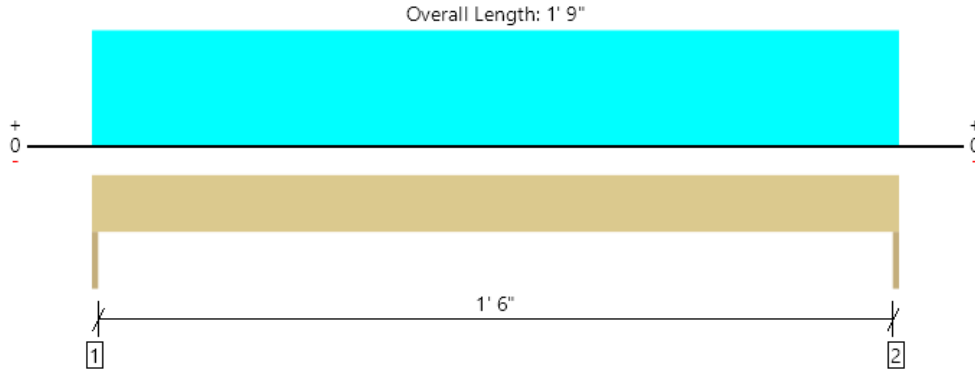
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



Upper, 25
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)	2083 @ 0	2813 (1.50")	Passed (74%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	694 @ 7"	2277	Passed (30%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	911 @ 10 1/2"	1884	Passed (48%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.003 @ 10 1/2"	0.058	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.007 @ 10 1/2"	0.087	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	1.50"	1.50"	1.50"	1138	420	840	2083	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	1138	420	840	2083	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	4.2	--	--	
1 - Uniform (PSF)	0 to 1' 9"	22' 8 3/8"	25.0	-	30.0	
2 - Uniform (PSF)	0 to 1' 9"	9'	12.0	-	-	
3 - Uniform (PLF)	0 to 1' 9"	N/A	620.5	480.5	279.5	Linked from: Floor: Joist w/ Cant, Support 2

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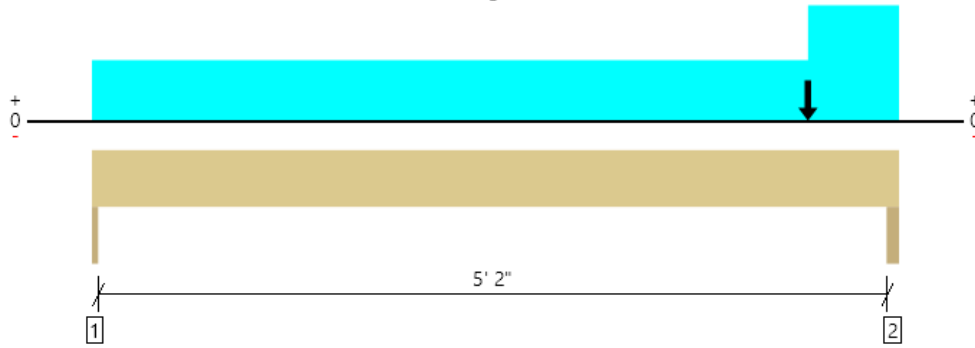
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



Upper, 26
2 piece(s) 1 3/4" x 7 1/4" 1.55E TimberStrand® LSL

Overall Length: 5' 6 1/2"



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)	3554 @ 0	4069 (1.50")	Passed (87%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	3972 @ 4' 8 1/4"	6031	Passed (66%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	5271 @ 2' 11 9/16"	7156	Passed (74%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.093 @ 2' 9"	0.181	Passed (L/699)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.196 @ 2' 9"	0.271	Passed (L/332)	--	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.

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"	1865	1301	951	3554	None
2 - Trimmer - DF	3.00"	3.00"	2.52"	3600	1361	2953	6835	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 7" o/c	
Bottom Edge (Lu)	5' 7" 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' 6 1/2"	N/A	7.9	--	--	
1 - Uniform (PSF)	4' 11" to 5' 6 1/2"	22' 8 3/8"	25.0	-	30.0	
2 - Point (lb)	4' 11"	N/A	1628	-	1929	Linked from: 3, Support 1
3 - Uniform (PLF)	0 to 5' 6 1/2"	N/A	620.5	480.5	279.5	Linked from: Floor: Joist w/ Cant, Support 2

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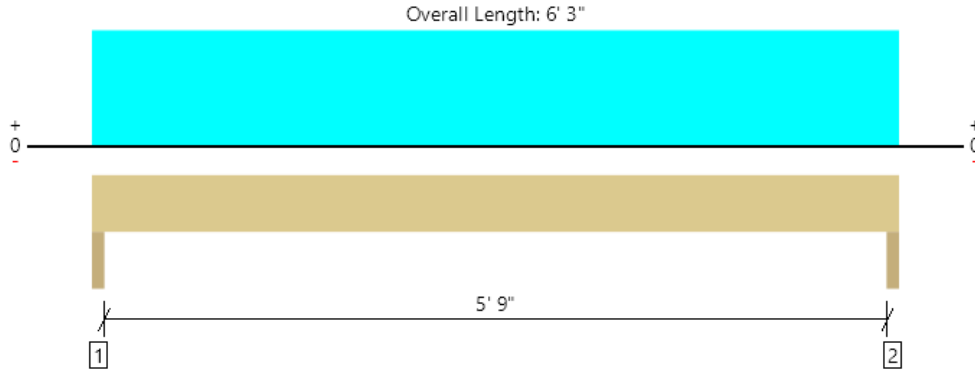
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



Upper, 27
1 piece(s) 1 3/4" x 16" 2.OE 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)	2911 @ 1' 1/2"	3938 (3.00")	Passed (74%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1436 @ 1' 7"	5320	Passed (27%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	4192 @ 3' 1 1/2"	15557	Passed (27%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.020 @ 3' 1 1/2"	0.200	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.040 @ 3' 1 1/2"	0.300	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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Trimmer - DF	3.00"	3.00"	2.22"	1468	1443	2911	None
2 - Trimmer - DF	3.00"	3.00"	2.22"	1468	1443	2911	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 3" o/c	
Bottom Edge (Lu)	6' 3" 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' 3"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 6' 3"	11' 6 1/2"	40.0	40.0	

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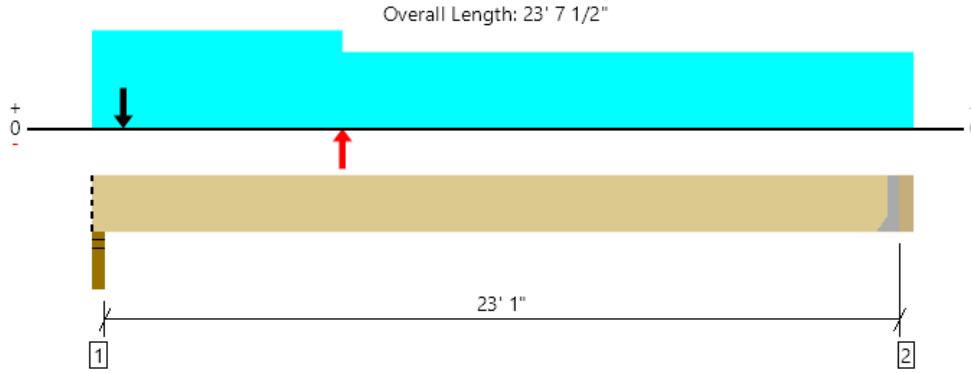
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



Upper, 28
4 piece(s) 1 3/4" x 16" 2.OE 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)	5950 @ 23' 4"	7875 (1.50")	Passed (76%)	--	1.0 D - 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	5220 @ 1' 7"	21280	Passed (25%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	32533 @ 11' 5 1/4"	62228	Passed (52%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.641 @ 11' 2 3/16"	0.774	Passed (L/435)	--	1.0 D - 0.525 E + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.928 @ 11' 3 9/16"	1.160	Passed (L/300)	--	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.
- -420 lbs uplift at support located at 23' 4". Strapping or other restraint may be required.
- 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	3.00"	3.00"	1.51"	2795	3343	2489/-2489	6609/-65	Blocking
2 - Hanger on 16" LVL beam	3.50"	Hanger ¹	1.50"	2204	3390	2489/-2489	6053/-420	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)	12' 9" o/c	
Bottom Edge (Lu)	23' 4" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	HGUS7.25/12	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' 4"	N/A	32.7	--	--	
1 - Uniform (PSF)	0 to 23' 7 1/2" (Top)	4' 1"	25.0	60.0	-	Default Load
2 - Uniform (PSF)	0 to 23' 7 1/2" (Top)	1'	40.0	40.0	-	Default Load
3 - Uniform (PSF)	0 to 7' 4" (Top)	10'	12.0	-	-	Default Load
4 - Point (lb)	11" (Front)	N/A	-	-	9004	
5 - Point (lb)	7' 4" (Front)	N/A	-	-	-9004	

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



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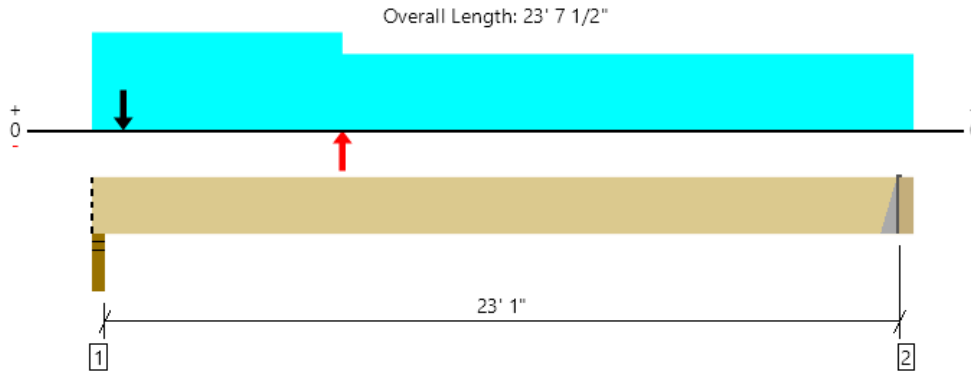
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



Upper, 28 (w_Overstrength)
4 piece(s) 1 3/4" x 16" 2.OE Microllam® LVL

An excessive uplift of -2679 lbs at support located at 1 1/2" failed this product.
An excessive uplift of -3034 lbs at support located at 23' 4" 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)	7910 @ 23' 4"	7910 (1.51")	Passed (100%)	--	1.0 D - 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	5220 @ 1' 7"	21280	Passed (25%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	81931 @ 7' 4"	99565	Passed (82%)	1.60	1.0 D - 0.7 E (All Spans)
Live Load Defl. (in)	1.144 @ 10' 11 1/2"	0.774	Failed (L/243)	--	1.0 D - 0.525 E + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	1.431 @ 11' 15/16"	1.160	Failed (L/195)	--	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.
- 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	3.00"	3.00"	1.96"	2795	3343	6224/-6224	8570/-2679	Blocking
2 - Hanger on 16" LVL beam	3.50"	Hanger ¹	1.51"	2204	3390	6224/-6224	8014/-3034	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)	5' 8" o/c	
Bottom Edge (Lu)	8' 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	
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' 4"	N/A	32.7	--	--	
1 - Uniform (PSF)	0 to 23' 7 1/2" (Top)	4' 1"	25.0	60.0	-	Default Load
2 - Uniform (PSF)	0 to 23' 7 1/2" (Top)	1'	40.0	40.0	-	Default Load
3 - Uniform (PSF)	0 to 7' 4" (Top)	10'	12.0	-	-	Default Load
4 - Point (lb)	11" (Front)	N/A	-	-	22510	
5 - Point (lb)	7' 4" (Front)	N/A	-	-	-22510	

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



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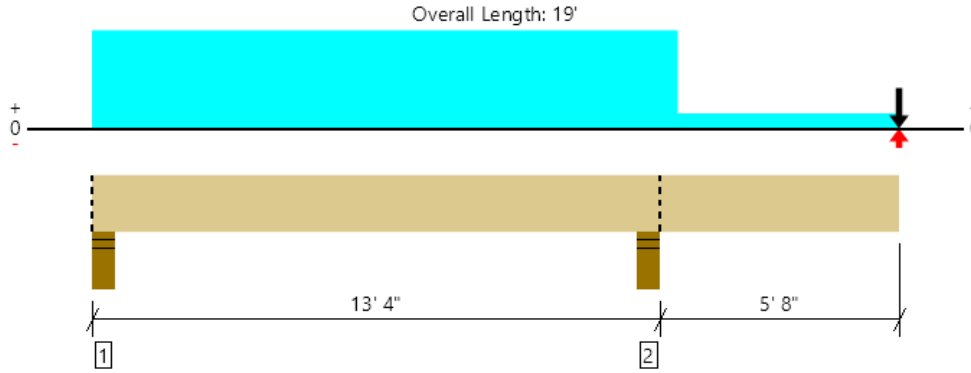
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



Upper, 29
3 piece(s) 1 3/4" x 20" 2.OE 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)	16709 @ 13' 1 1/4"	18047 (5.50")	Passed (93%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Shear (lbs)	8011 @ 15'	22943	Passed (35%)	1.15	1.0 D + 1.0 S (All Spans) [1]
Moment (Ft-lbs)	-46439 @ 13' 1 1/4"	81355	Passed (57%)	1.15	1.0 D + 1.0 S (All Spans) [1]
Live Load Defl. (in)	0.196 @ 19'	0.393	Passed (2L/720)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (Alt Spans) [1]
Total Load Defl. (in)	0.424 @ 19'	0.590	Passed (2L/334)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (Alt 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).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- -706 lbs uplift at support located at 4". 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	5.50"	5.50"	1.50"	733	1999/-299	-1439	403/-403	2732/-782	Blocking
2 - Stud wall - DF	5.50"	5.50"	5.09"	10342	3039	4557	1276/-1276	16709	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	19' o/c	
Bottom Edge (Lu)	8' 8" 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'	N/A	30.6	--	--	--	
1 - Uniform (PSF)	0 to 13' 9 1/2" (Top)	7' 5 1/4"	40.0	40.0	-	-	Default Load
2 - Uniform (PSF)	0 to 19' (Top)	9'	12.0	-	-	-	Default Load
3 - Point (lb)	19' (Top)	N/A	822	-	959	-	Linked from: 6, Support 2
4 - Point (lb)	19' (Front)	N/A	830	-	942	-	Linked from: 9, Support 1
5 - Point (lb)	19' (Front)	N/A	2686	636	1217	873/-873	Linked from: 35, Support 2

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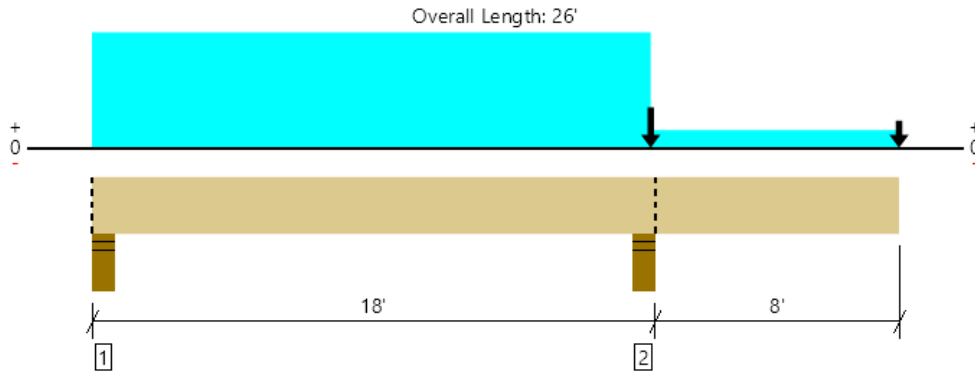
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



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)	15397 @ 17' 9 1/4"	18906 (5.50")	Passed (81%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	6832 @ 16' 3 1/2"	14575	Passed (47%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	21752 @ 8' 1 1/16"	41250	Passed (53%)	1.00	1.0 D + 1.0 L (Alt Spans)
Neg Moment (Ft-lbs)	-27854 @ 17' 9 1/4"	30921	Passed (90%)	1.00	1.0 D + 1.0 L (Alt Spans)
Live Load Defl. (in)	0.687 @ 26'	0.549	Failed (2L/288)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.722 @ 26'	0.823	Passed (2L/274)	--	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.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 15' 6 3/16".
- Critical negative moment adjusted by a volume factor of 1.00 that was calculated using length L = 15' 8 13/16".
- 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	Factored	
1 - Stud wall - DF	5.50"	5.50"	1.70"	3157	2693/-902	-	5850	Blocking
2 - Stud wall - DF	5.50"	5.50"	4.48"	9114	6133	2245	15397	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)	26' o/c	
Bottom Edge (Lu)	26' 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 26'	N/A	20.0	--	--	
1 - Uniform (PSF)	0 to 18' (Top)	7' 5 1/4"	40.0	40.0	-	Default Load
2 - Uniform (PSF)	0 to 26' (Top)	9'	12.0	-	-	Default Load
3 - Point (lb)	18' (Top)	N/A	822	-	959	Linked from: 6, Support 2
4 - Point (lb)	18' (Front)	N/A	1189	-	1286	Linked from: 10, Support 1
5 - Point (lb)	26' (Front)	N/A	946	1910	-	Linked from: 34, Support 1
6 - Point (lb)	18' (Front)	N/A	629	659	-	Linked from: 31, Support 1

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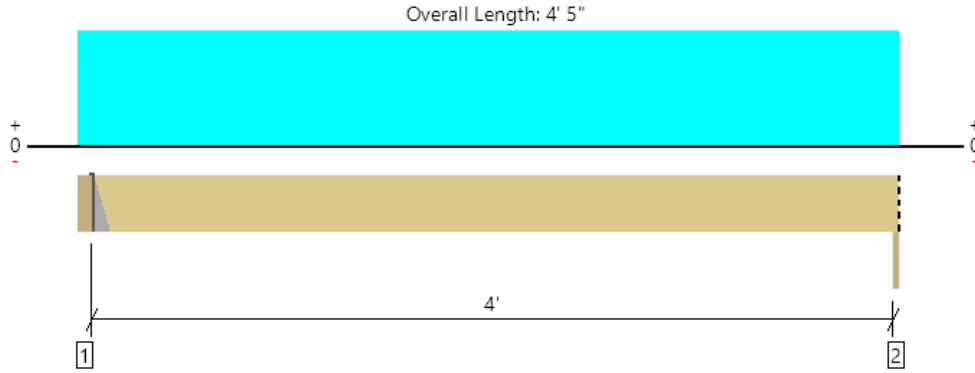
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



Upper, 31
1 piece(s) 1 3/4" x 16" 2.OE 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)	1131 @ 4' 5"	1641 (1.50")	Passed (69%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	400 @ 1' 7 1/2"	5320	Passed (8%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1166 @ 2' 4 1/4"	15557	Passed (7%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.004 @ 2' 4 1/4"	0.138	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.008 @ 2' 4 1/4"	0.206	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"	629	659	1288	See note ¹
2 - Beam - DF	1.50"	1.50"	1.50"	553	578	1131	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)	4' 2" o/c	
Bottom Edge (Lu)	4' 2" 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	

- 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' 5"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 4' 5" (Top)	4'	25.0	60.0	Default Load
2 - Uniform (PSF)	0 to 4' 5" (Top)	1'	40.0	40.0	Default Load
3 - Uniform (PSF)	0 to 4' 5" (Top)	10'	12.0	-	Default Load

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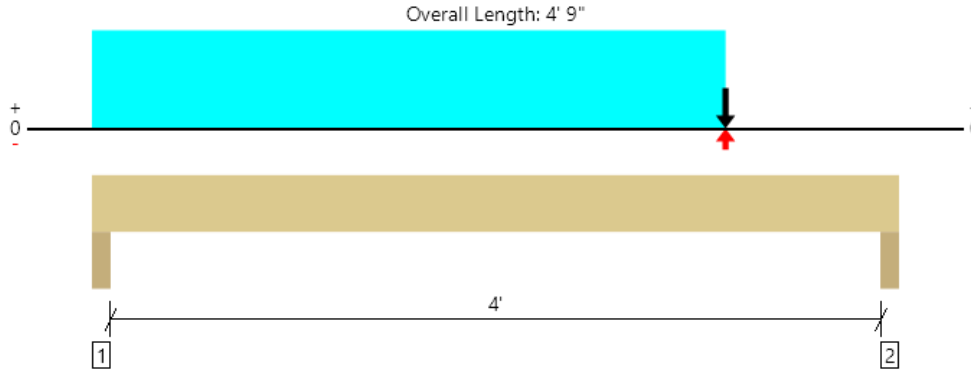
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



Upper, 32
2 piece(s) 1 3/4" x 16" 2.OE 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)	10829 @ 4' 6"	11813 (4.50")	Passed (92%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Shear (lbs)	3327 @ 3' 1/2"	10640	Passed (31%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Moment (Ft-lbs)	7515 @ 3' 8 3/4"	35781	Passed (21%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Live Load Defl. (in)	0.012 @ 3' 8 3/4"	0.142	Passed (L/999+)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Total Load Defl. (in)	0.023 @ 2' 7"	0.213	Passed (L/999+)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]

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	Seismic	Factored	
1 - Trimmer - DF	4.50"	4.50"	1.54"	2066	1679	633	451/-451	4037	None
2 - Trimmer - DF	4.50"	4.50"	4.13"	5042	3433	2857	2038/-2038	10829	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 9" o/c	
Bottom Edge (Lu)	4' 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)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 4' 9"	N/A	16.3	--	--	--	
1 - Uniform (PSF)	0 to 3' 8 3/4"	11' 6 1/2"	40.0	40.0	-	-	
2 - Point (lb)	3' 8 3/4"	N/A	1916	-	2204	-	Linked from: 2, Support 2
3 - Point (lb)	3' 8 3/4"	N/A	1189	-	1286	-	Linked from: 10, Support 1
4 - Point (lb)	3' 8 3/4"	N/A	2204	3390	-	2489/-2489	Linked from: 28, Support 2

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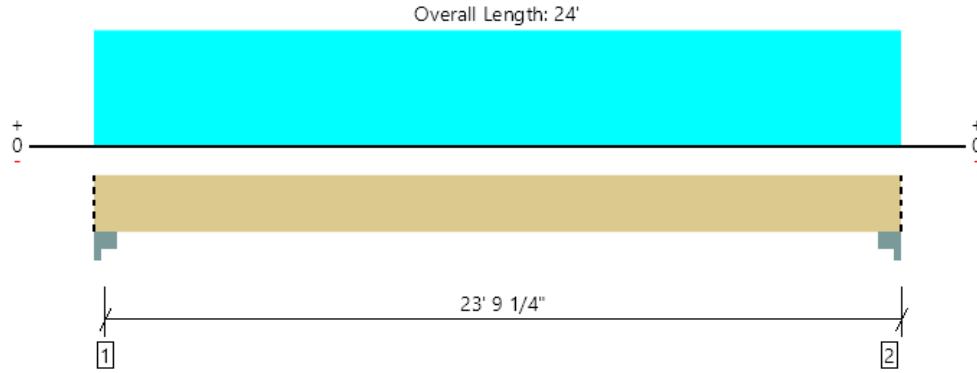
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



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)	4321 @ 4"	19663 (5.50")	Passed (22%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	3706 @ 1' 8 1/2"	14575	Passed (25%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	24504 @ 12'	39636	Passed (62%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.575 @ 12'	0.778	Passed (L/487)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.862 @ 12'	1.167	Passed (L/325)	--	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	5.50"	5.50"	1.50"	1441	2880	4321	Blocking
2 - Column Cap - steel	5.50"	5.50"	1.50"	1441	2880	4321	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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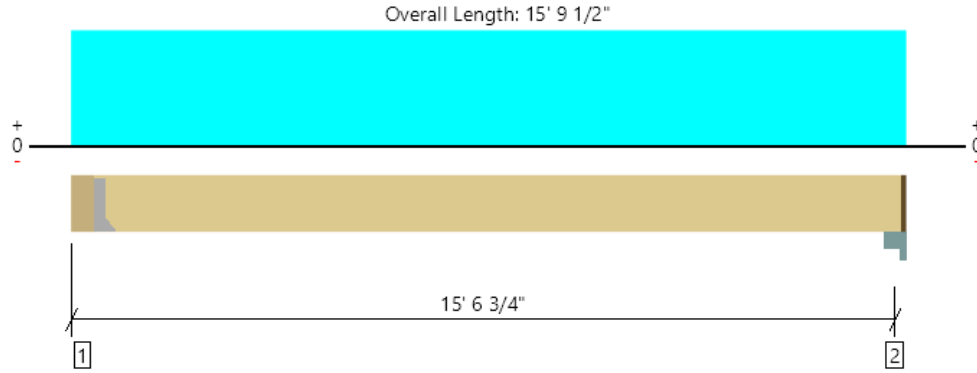
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



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)	2700 @ 5 1/2"	5363 (1.50")	Passed (50%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	2250 @ 1' 8 1/2"	14575	Passed (15%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	10126 @ 7' 11 1/2"	41250	Passed (25%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.098 @ 7' 11 1/2"	0.500	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.147 @ 7' 11 1/2"	0.750	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'.
- 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 - Hanger on 15" GLB beam	5.50"	Hanger ¹	1.50"	946	1910	2856	See note ¹
2 - Column Cap - steel	5.50"	4.25"	1.50"	938	1880	2818	1 1/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	15' 3" o/c	
Bottom Edge (Lu)	15' 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 - Face Mount Hanger	HUC612	2.50"	N/A	22-10d	8-10d	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	5 1/2" to 15' 8 1/4"	N/A	20.0	--	
1 - Uniform (PSF)	0 to 15' 9 1/2" (Top)	4'	25.0	60.0	Default Load

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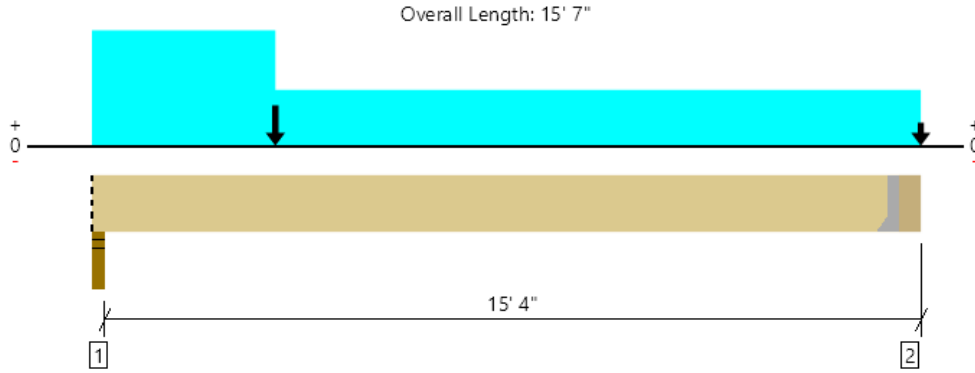
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



Upper, 35
2 piece(s) 1 3/4" x 16" 2.OE 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)	5540 @ 1' 1/2"	6563 (3.00")	Passed (84%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	4731 @ 1' 7"	17024	Passed (28%)	1.60	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	9917 @ 6' 9 1/2"	31114	Passed (32%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.140 @ 6' 11"	0.501	Passed (L/999+)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.287 @ 7' 2 1/8"	0.751	Passed (L/627)	--	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.
- -508 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"	2.53"	2611	611	1219	2964/-2964	5540/-508	Blocking
2 - Hanger on 16" LVL beam	5.25"	Hanger ¹	1.50"	2686	636	1217	873/-873	4534	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' 7" o/c	
Bottom Edge (Lu)	15' 2" 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	HUC412	2.50"	N/A	16-16d	6-10d	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 15' 1 3/4"	N/A	16.3	--	--	--	
1 - Uniform (PSF)	0 to 15' 7" (Top)	2'	40.0	40.0	-	-	Default Load
2 - Uniform (PSF)	0 to 15' 7" (Top)	9'	12.0	-	-	-	Default Load
3 - Point (lb)	3' 6 1/2" (Front)	N/A	-	-	-	3837	
4 - Point (lb)	15' 7" (Top)	N/A	830	-	942	-	Linked from: 9, Support 1
5 - Point (lb)	3' 6 1/2" (Top)	N/A	830	-	942	-	Linked from: 9, Support 2
6 - Uniform (PSF)	0 to 3' 6 1/2" (Top)	5' 2 3/8"	25.0	-	30.0	-	Default Load

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



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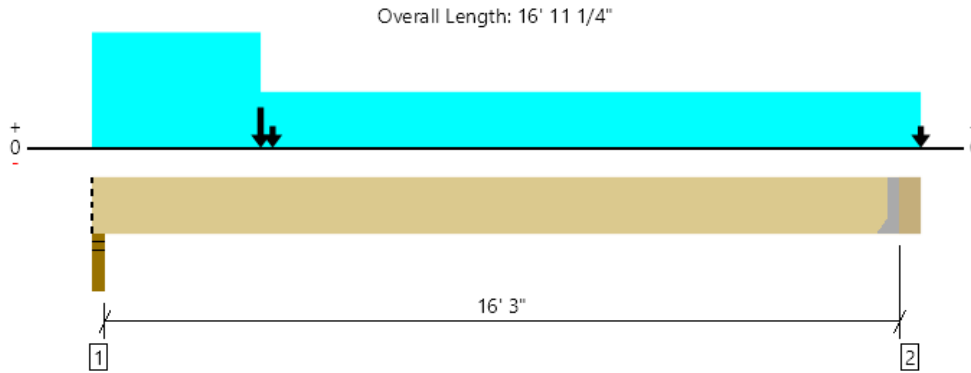
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



Upper, 35 (w_Overstrength)
 2 piece(s) 1 3/4" x 16" 2.OE Microllam® LVL

Support 1 failed reaction check due to insufficient bearing capacity.
 An excessive uplift of -3710 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)	8199 @ 1 1/2"	6563 (3.00")	Failed (125%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	7591 @ 1' 7"	17024	Passed (45%)	1.60	1.0 D + 0.7 E (All Spans)
Moment (Ft-lbs)	25684 @ 3' 9 1/2"	49783	Passed (52%)	1.60	1.0 D + 0.7 E (All Spans)
Live Load Defl. (in)	0.308 @ 7' 4 15/16"	0.546	Passed (L/639)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.506 @ 7' 8 1/4"	0.819	Passed (L/388)	--	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	Snow	Seismic	Factored	
1 - Stud wall - DF	3.00"	3.00"	3.75"	2757	665	1228	7663/-7663	8199/-3710	Blocking
2 - Hanger on 16" LVL beam	5.25"	Hanger ¹	1.50"	2817	690	1209	2020/-2020	5302	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' 8" o/c	
Bottom Edge (Lu)	13' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	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'	40.0	40.0	-	-	Default Load
2 - Uniform (PSF)	0 to 16' 11 1/4" (Top)	9'	12.0	-	-	-	Default Load
3 - Point (lb)	3' 6 1/2" (Front)	N/A	-	-	-	9683	
4 - Point (lb)	16' 11 1/4" (Top)	N/A	830	-	942	-	Linked from: 9, Support 1
5 - Point (lb)	3' 9 1/2" (Top)	N/A	830	-	942	-	Linked from: 9, Support 2
6 - Uniform (PSF)	0 to 3' 6 1/2" (Top)	5' 2 3/8"	25.0	-	30.0	-	Default Load

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



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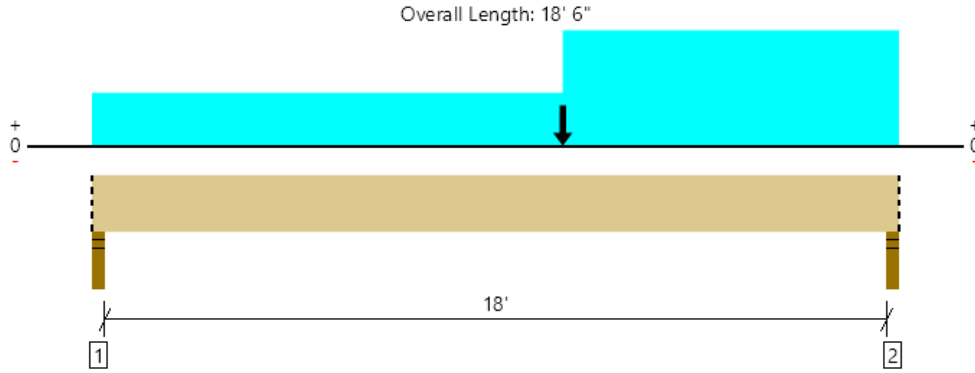
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



Upper, 36
2 piece(s) 1 3/4" x 16" 2.OE 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)	4714 @ 18' 4 1/2"	6563 (3.00")	Passed (72%)	--	1.0 D + 0.45 W + 0.75 L + 0.75 Lr (All Spans)
Shear (lbs)	3289 @ 16' 11"	13300	Passed (25%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	21381 @ 10' 9 1/2"	49783	Passed (43%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 Lr (All Spans)
Live Load Defl. (in)	0.291 @ 9' 7 3/4"	0.608	Passed (L/752)	--	1.0 D + 0.45 W + 0.75 L + 0.75 Lr (All Spans)
Total Load Defl. (in)	0.536 @ 9' 6 3/4"	0.913	Passed (L/408)	--	1.0 D + 0.45 W + 0.75 L + 0.75 Lr (All Spans)

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

- Deflection criteria: LL (L/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	Roof Live	Wind	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.51"	1771	1078	1594	3297	Blocking
2 - Stud wall - DF	3.00"	3.00"	2.16"	2363	1789	2243	4714	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' 1" o/c	
Bottom Edge (Lu)	18' 6" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Roof Live (non-snow: 1.25)	Wind (1.60)	Comments
0 - Self Weight (PLF)	0 to 18' 6"	N/A	16.3	--	--	
1 - Uniform (PSF)	0 to 18' 6" (Top)	3'	15.0	30.0	-	Default Load
2 - Uniform (PSF)	0 to 18' 6" (Top)	9'	12.0	-	-	Default Load
3 - Point (lb)	10' 9 1/2" (Front)	N/A	-	-	3837	
4 - Uniform (PSF)	10' 9 1/2" to 18' 6" (Top)	5' 2 3/8"	25.0	30.0	-	Default Load

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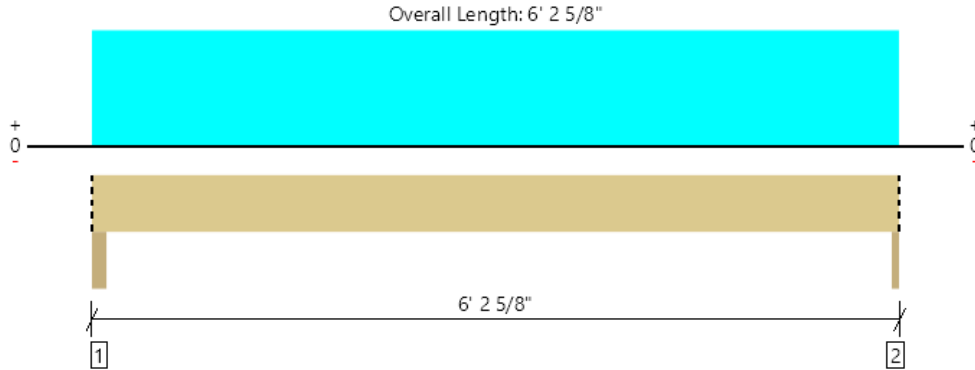
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



Upper, 37
3 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)	2226 @ 6' 2 3/8"	4922 (1.75")	Passed (45%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1676 @ 10 3/4"	3915	Passed (43%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	3334 @ 3' 2 3/16"	3942	Passed (85%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.050 @ 3' 2 3/16"	0.151	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.090 @ 3' 2 3/16"	0.302	Passed (L/806)	--	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 - Beam - DF	3.50"	3.50"	1.50"	1039	1294	2333	Blocking
2 - Beam - DF	1.75"	1.75"	1.50"	991	1235	2226	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' 3" o/c	
Bottom Edge (Lu)	6' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 6' 2 5/8"	N/A	8.3	--	
1 - Uniform (PSF)	0 to 6' 2 5/8" (Front)	4' 3 1/4"	40.0	40.0	
2 - Uniform (PSF)	3' 9 1/4" to 6' 2 5/8" (Front)	5' 10 3/4"	25.0	40.0	
3 - Uniform (PSF)	0 to 3' 9 1/4" (Front)	5' 10 3/4"	25.0	40.0	

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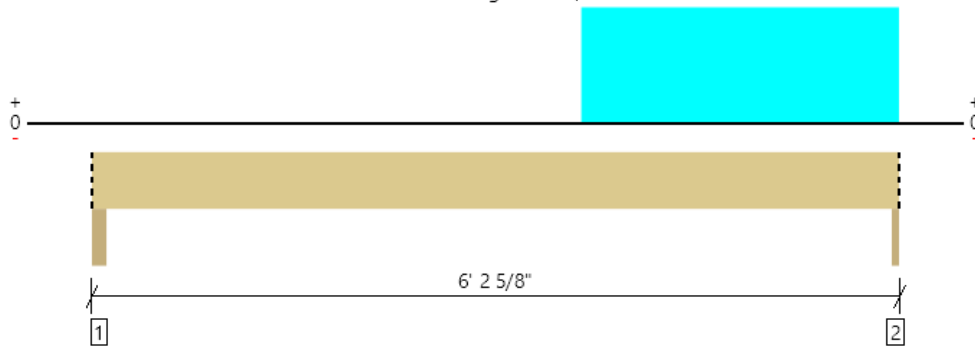
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



Upper, 38
3 piece(s) 2 x 6 DF No.1

Overall Length: 6' 2 5/8"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	943 @ 6' 2 3/8"	4922 (1.75")	Passed (19%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	655 @ 5' 7 3/8"	2970	Passed (22%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	911 @ 4' 2 15/16"	2458	Passed (37%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.023 @ 3' 5 9/16"	0.151	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.048 @ 3' 5 7/16"	0.302	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 - Beam - DF	3.50"	3.50"	1.50"	135	115	250	Blocking
2 - Beam - DF	1.75"	1.75"	1.50"	481	462	943	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' 3" o/c	
Bottom Edge (Lu)	6' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 6' 2 5/8"	N/A	6.3	--	
1 - Uniform (PSF)	3' 9 1/4" to 6' 2 5/8" (Front)	5' 10 3/4"	40.0	40.0	

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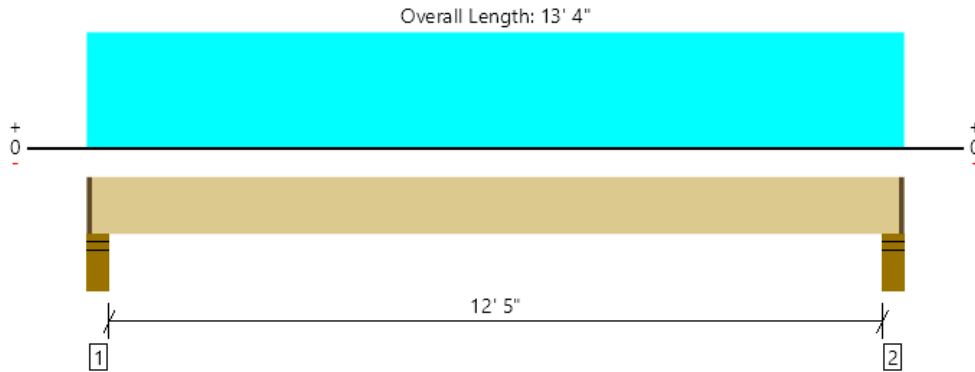
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



Main, Garage Joists

1 piece(s) 1 3/4" x 11 1/4" 2.OE MicroIam® 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

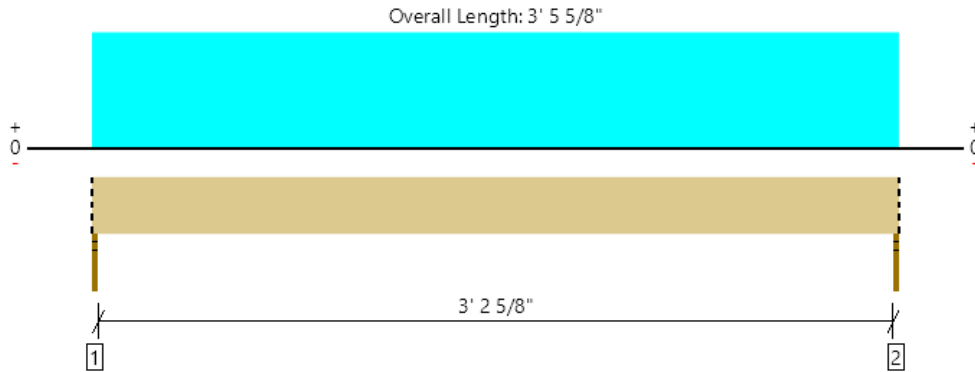
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



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)	2692 @ 0	2813 (1.50")	Passed (96%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1560 @ 8 3/4"	2610	Passed (60%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2335 @ 1' 8 13/16"	2628	Passed (89%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.016 @ 1' 8 13/16"	0.087	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.031 @ 1' 8 13/16"	0.173	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"	1351	1341	2692	Blocking
2 - Stud wall - DF	1.50"	1.50"	1.50"	1351	1341	2692	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' 5 5/8"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 3' 5 5/8" (Top)	19' 4"	40.0	40.0	Default Load

Weyerhaeuser Notes

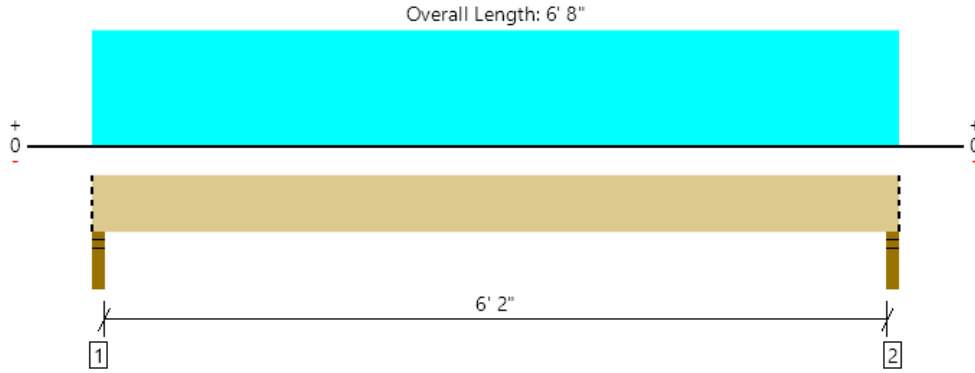
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



Main, 52
1 piece(s) 1 3/4" x 16" 2.OE 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)	3116 @ 1' 1/2"	3281 (3.00")	Passed (95%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1636 @ 1' 7"	5320	Passed (31%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	4811 @ 3' 4"	15557	Passed (31%)	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)	0.050 @ 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"	2.85"	1572	1544	3116	Blocking
2 - Stud wall - DF	3.00"	3.00"	2.85"	1572	1544	3116	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' 7"	40.0	40.0	Default Load

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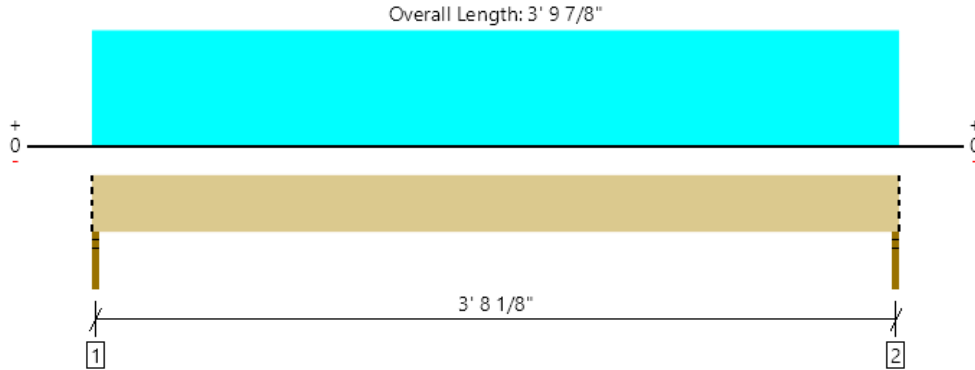
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



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)	1569 @ 1/4"	3281 (1.75")	Passed (48%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	953 @ 9"	2610	Passed (37%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1467 @ 1' 10 15/16"	2628	Passed (56%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.013 @ 1' 10 15/16"	0.095	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.023 @ 1' 10 15/16"	0.189	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	1.75"	1.75"	1.50"	684	886	1569	Blocking
2 - Stud wall - DF	1.75"	1.75"	1.50"	684	886	1569	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' 10" o/c	
Bottom Edge (Lu)	3' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 3' 9 7/8"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 3' 9 7/8" (Top)	4' 2"	40.0	40.0	Default Load
2 - Uniform (PSF)	0 to 3' 9 7/8" (Top)	7' 5"	25.0	40.0	Default Load

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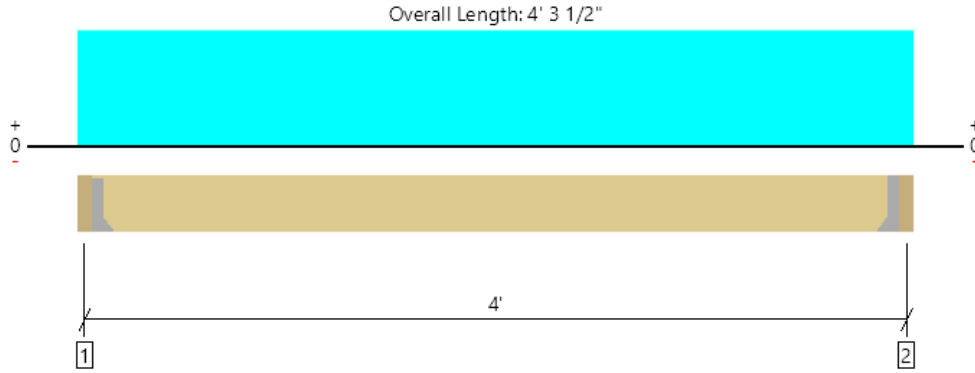
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



Main, 54

1 piece(s) 1 3/4" x 16" 2.OE 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)	1115 @ 3 1/2"	1969 (1.50")	Passed (57%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	313 @ 1' 7 1/2"	5320	Passed (6%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1034 @ 2' 1 3/4"	15557	Passed (7%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.003 @ 2' 1 3/4"	0.093	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.006 @ 2' 1 3/4"	0.185	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"	652	637	1288	See note ¹
2 - Hanger on 16" DF beam	3.50"	Hanger ¹	1.50"	652	637	1288	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' 9" o/c	
Bottom Edge (Lu)	3' 9" o/c	

- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	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'	N/A	8.2	--	
1 - Uniform (PSF)	0 to 4' 3 1/2" (Top)	7' 5"	40.0	40.0	Default Load

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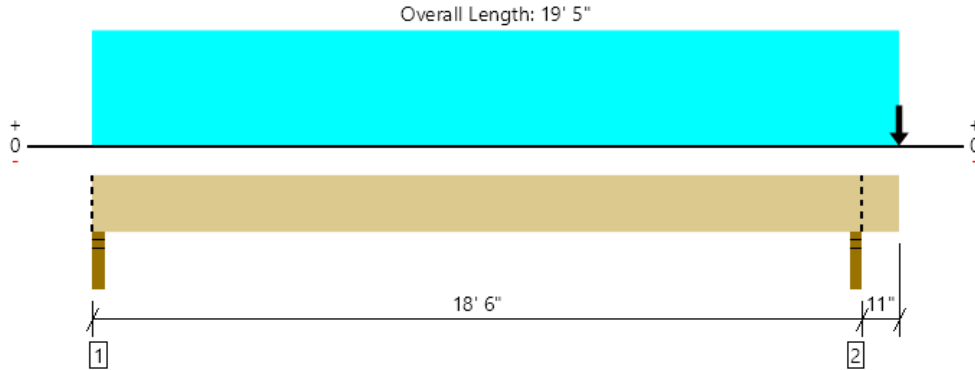
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



Main, 55
1 piece(s) 1 3/4" x 16" 2.OE 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)	2771 @ 18' 4 1/2"	3281 (3.00")	Passed (84%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1137 @ 16' 11"	5320	Passed (21%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	5402 @ 8' 11 5/8"	15557	Passed (35%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.181 @ 9' 3"	0.456	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.291 @ 9' 1 13/16"	0.913	Passed (L/753)	--	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).
- Overhang deflection criteria: LL (2L/480) and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.50"	499	740/-39	1239	Blocking
2 - Stud wall - DF	3.00"	3.00"	2.53"	1282	1489	2771	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' 5" o/c	
Bottom Edge (Lu)	19' 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 19' 5"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 19' 5" (Top)	2'	25.0	40.0	Default Load
2 - Point (lb)	19' 5" (Front)	N/A	652	637	Linked from: 54, Support 1

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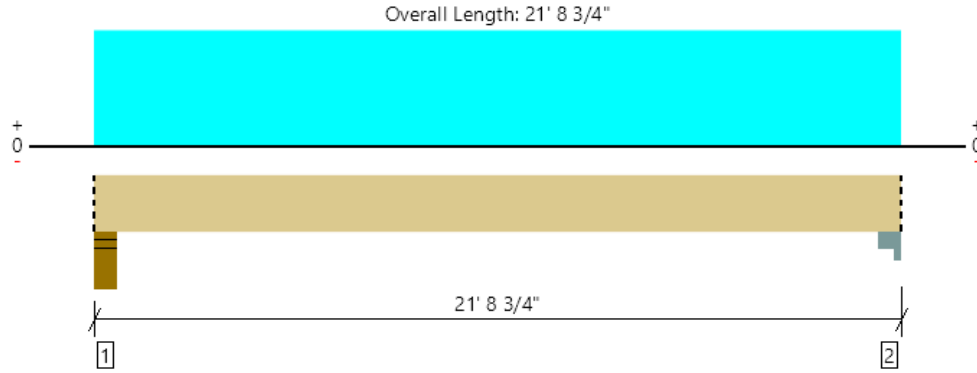
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



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)	1958 @ 4"	12031 (5.50")	Passed (16%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1695 @ 1' 5 1/2"	7420	Passed (23%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	9993 @ 10' 10 3/8"	16800	Passed (59%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.586 @ 10' 10 3/8"	0.702	Passed (L/432)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.880 @ 10' 10 3/8"	1.053	Passed (L/287)	--	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 = 21' 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 - Stud wall - DF	5.50"	5.50"	1.50"	654	1304	1958	Blocking
2 - Column Cap - steel	5.50"	5.50"	1.50"	654	1304	1958	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' 9" o/c	
Bottom Edge (Lu)	21' 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 21' 8 3/4"	N/A	10.2	--	
1 - Uniform (PSF)	0 to 21' 8 3/4" (Top)	2'	25.0	60.0	Default Load

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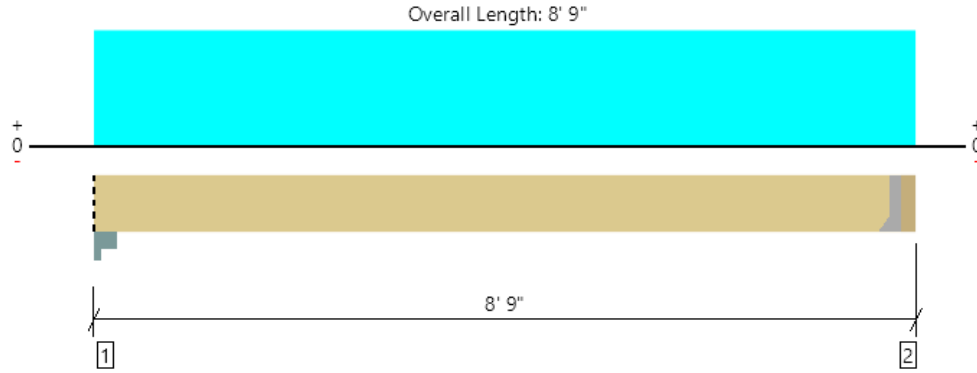
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



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)	732 @ 8' 5 1/2"	3413 (1.50")	Passed (21%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	552 @ 7' 5 1/2"	7420	Passed (7%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	1487 @ 4' 4 3/4"	16800	Passed (9%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.013 @ 4' 4 3/4"	0.203	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.019 @ 4' 4 3/4"	0.406	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 = 8' 1 1/2".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Column Cap - steel	5.50"	5.50"	1.50"	265	528	792	Blocking
2 - Hanger on 12" LVL beam	3.50"	Hanger ¹	1.50"	259	523	782	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)	8' 6" o/c	
Bottom Edge (Lu)	8' 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	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 8' 5 1/2"	N/A	10.2	--	
1 - Uniform (PSF)	0 to 8' 9" (Top)	2'	25.0	60.0	Default Load

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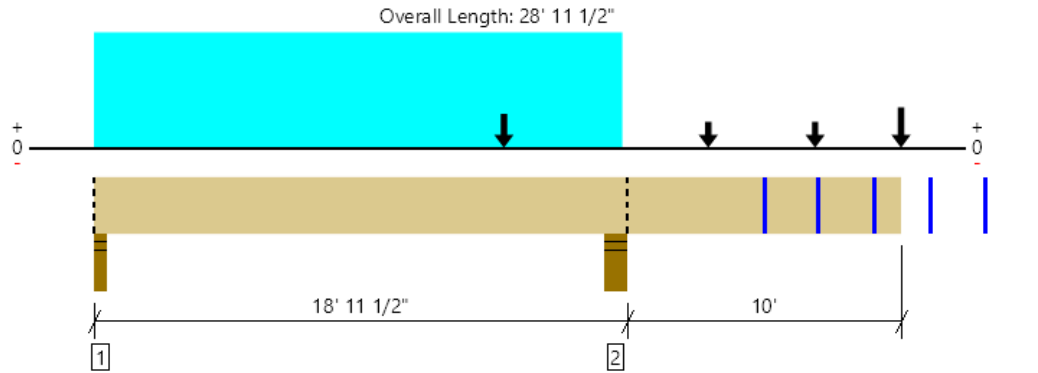
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



Main, 58
1 piece(s) 5 1/2" x 16" 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)	7672 @ 18' 8 3/4"	18906 (5.50")	Passed (41%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	3856 @ 17' 2"	15547	Passed (25%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	5263 @ 7' 8 15/16"	46857	Passed (11%)	1.00	1.0 D + 1.0 L (Alt Spans)
Neg Moment (Ft-lbs)	-26824 @ 18' 8 3/4"	32901	Passed (82%)	1.00	1.0 D + 1.0 L (Alt Spans)
Live Load Defl. (in)	0.772 @ 28' 11 1/2"	0.682	Failed (2L/318)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	1.096 @ 28' 11 1/2"	1.023	Failed (2L/224)	--	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).
- Right cantilever length exceeds 1/3 member length or 1/2 back span length. Additional bracing should be considered.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Moment capacity over cantilever support 2 has been reduced by 25% to lessen the effects of buckling.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 14' 11".
- Critical negative moment adjusted by a volume factor of 0.93 that was calculated using length L = 28' 10".
- -345 lbs uplift at support located at 1 1/2". 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	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.50"	513	892/-858	1404/-345	Blocking
2 - Stud wall - DF	5.50"	5.50"	2.23"	3481	4191	7672	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)	29' o/c	
Bottom Edge (Lu)	29' 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 28' 11 1/2"	N/A	21.4	--	
1 - Uniform (PSF)	0 to 18' 11 1/2" (Top)	2'	40.0	40.0	Default Load
2 - Point (lb)	14' 8 1/2" (Front)	N/A	652	637	Linked from: 54, Support 1
3 - Point (lb)	22' 1/2" (Front)	N/A	259	523	Linked from: 57, Support 2
4 - Point (lb)	25' 10 1/2" (Front)	N/A	259	523	Linked from: 57, Support 2
5 - Point (lb)	28' 11 1/2" (Front)	N/A	688	1025	Linked from: 72, Support 1

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Location Analysis	Shear (lbs)			Moment (Ft-lbs)			Deflection (in)		Comments
	Actual	Allowed	LDF	Actual	Allowed	LDF	Live Load	Total	
1 - 24' 1"	2599	15547	1.00	-10006	44861	1.00	0.361	0.502	
2 - 26'	1776	15547	1.00	-5161	44861	1.00	0.518	0.728	
3 - 28'	1733	15547	1.00	-1651	44861	1.00	0.689	0.976	
4 - 30'	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
5 - 32'	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
6 - 34'	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

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

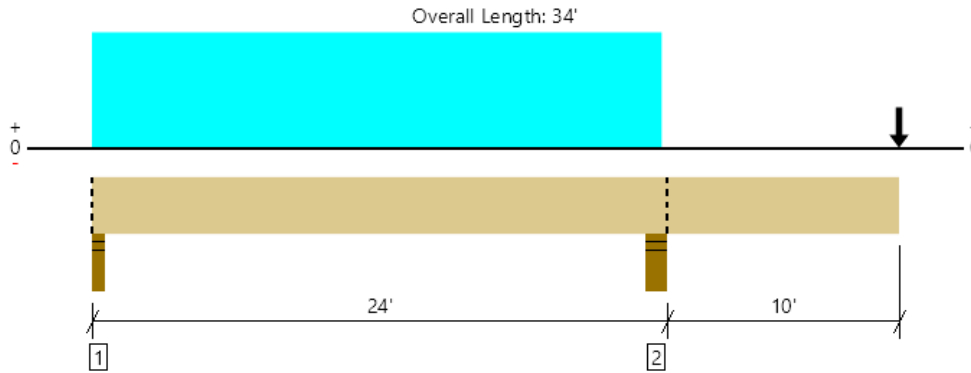
ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



Main, 59

1 piece(s) 5 1/2" x 16" 24F-V4 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)	4540 @ 23' 9 1/4"	18906 (5.50")	Passed (24%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	2342 @ 22' 2 1/2"	15547	Passed (15%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	6895 @ 9' 8"	45716	Passed (15%)	1.00	1.0 D + 1.0 L (All Spans)
Neg Moment (Ft-lbs)	-18645 @ 23' 9 1/4"	25074	Passed (74%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.619 @ 34'	0.682	Passed (2L/396)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.891 @ 34'	1.023	Passed (2L/276)	--	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).
- 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.
- Critical positive moment adjusted by a volume factor of 0.97 that was calculated using length L = 19' 1 1/16".
- Critical negative moment adjusted by a volume factor of 0.92 that was calculated using length L = 32' 3 13/16".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - DF	3.00"	3.00"	1.50"	508	956/-444	1464	Blocking
2 - Stud wall - DF	5.50"	5.50"	1.50"	2107	2433	4540	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)	34' o/c	
Bottom Edge (Lu)	34' 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	21.4	--	
1 - Uniform (PSF)	0 to 24' (Top)	2'	25.0	40.0	Default Load
2 - Point (lb)	34' (Front)	N/A	688	1025	Linked from: 72, Support 1

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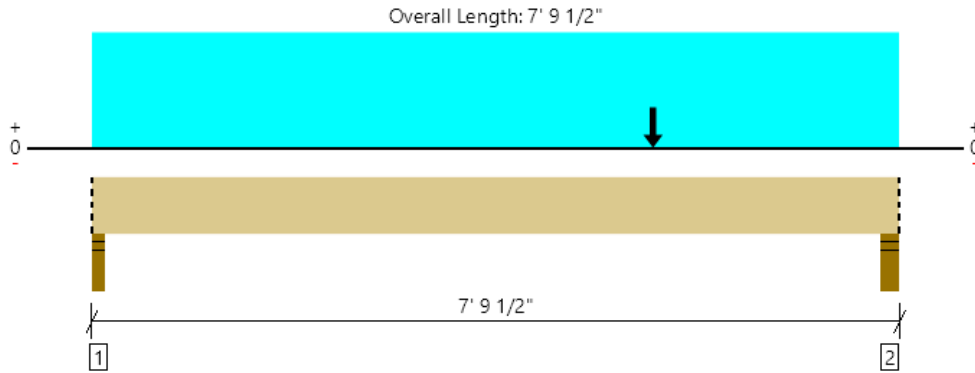
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



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

An excessive uplift of -1620 lbs at support located at 7' 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)	8304 @ 1' 1/2"	9844 (3.00")	Passed (84%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	5330 @ 1' 1/4"	9227	Passed (58%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	13031 @ 3' 10"	16806	Passed (78%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.183 @ 3' 11 7/8"	0.247	Passed (L/486)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.290 @ 3' 11 1/8"	0.371	Passed (L/307)	--	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	Snow	Seismic	Factored	
1 - Stud wall - DF	3.00"	3.00"	2.53"	3583	3682	1071	2203/-2203	8304	Blocking
2 - Stud wall - DF	4.50"	4.50"	3.13"	3700	3802	1106	5485/-5485	10261/-1620	Blocking

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

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

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 7' 9 1/2"	N/A	14.2	--	--	--	
1 - Uniform (PSF)	0 to 7' 9 1/2" (Top)	12'	25.0	40.0	-	-	Default Load
2 - Point (lb)	5' 5" (Front)	N/A	-	-	-	7688	
3 - Uniform (PLF)	0 to 7' 9 1/2" (Front)	N/A	620.5	480.5	279.5	-	Linked from: Floor: Joist w/ Cant, Support 2

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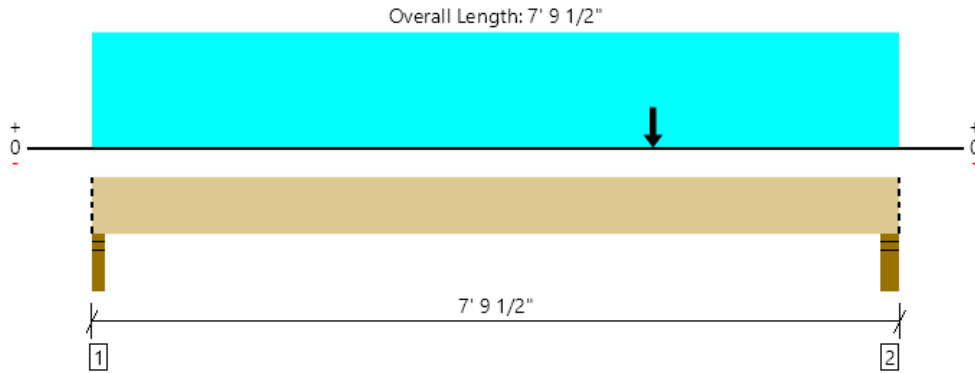
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



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

An excessive uplift of -1705 lbs at support located at 1 1/2" failed this product.
 An excessive uplift of -7379 lbs at support located at 7' 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)	10039 @ 1 1/2"	9844 (3.00")	Passed (102%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	12444 @ 6' 7 3/4"	14763	Passed (84%)	1.60	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	25784 @ 5' 4 5/8"	26889	Passed (96%)	1.60	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.299 @ 4' 1 1/16"	0.247	Failed (L/298)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.405 @ 4' 3/16"	0.371	Failed (L/220)	--	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	Snow	Seismic	Factored	
1 - Stud wall - DF	3.00"	3.00"	3.06"	3583	3682	1071	5507/-5507	10039/-1705	Blocking
2 - Stud wall - DF	4.50"	4.50"	4.44"	3700	3802	1106	13713/-13713	14580/-7379	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' 10" o/c	
Bottom Edge (Lu)	7' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 7' 9 1/2"	N/A	14.2	--	--	--	
1 - Uniform (PSF)	0 to 7' 9 1/2" (Top)	12'	25.0	40.0	-	-	Default Load
2 - Point (lb)	5' 5" (Front)	N/A	-	-	-	19220	
3 - Uniform (PLF)	0 to 7' 9 1/2" (Front)	N/A	620.5	480.5	279.5	-	Linked from: Floor: Joist w/ Cant, Support 2

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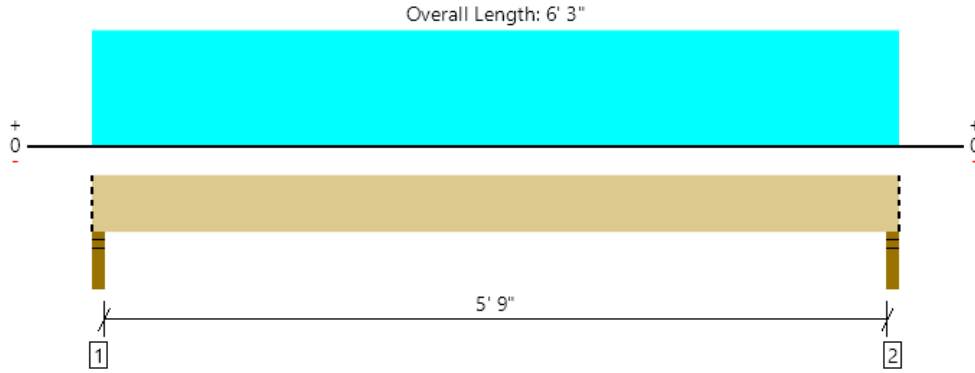
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



Main, 61A
1 piece(s) 1 3/4" x 16" 2.OE 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)	2368 @ 1' 1/2"	3281 (3.00")	Passed (72%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1168 @ 1' 7"	5320	Passed (22%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	3410 @ 3' 1 1/2"	15557	Passed (22%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.020 @ 3' 1 1/2"	0.200	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.033 @ 3' 1 1/2"	0.300	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"	2.16"	926	1441	2368	Blocking
2 - Stud wall - DF	3.00"	3.00"	2.16"	926	1441	2368	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' 3" o/c	
Bottom Edge (Lu)	6' 3" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 6' 3"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 6' 3" (Top)	11' 6 3/8"	25.0	40.0	Default Load

Weyerhaeuser Notes

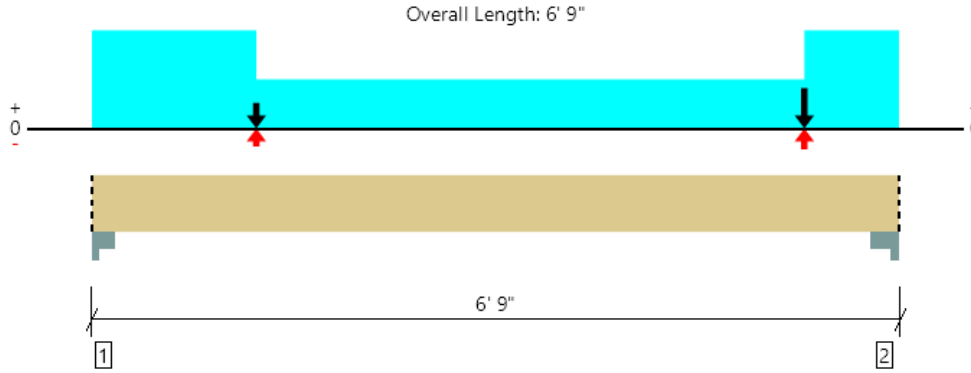
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



Main, 61B
2 piece(s) 1 3/4" x 16" 2.OE 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)	13720 @ 6' 3 1/2"	18375 (7.00")	Passed (75%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Shear (lbs)	3498 @ 1' 9 1/2"	10640	Passed (33%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Moment (Ft-lbs)	7024 @ 2' 11 15/16"	31114	Passed (23%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Live Load Defl. (in)	0.018 @ 3' 3 13/16"	0.199	Passed (L/999+)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Total Load Defl. (in)	0.035 @ 3' 3 11/16"	0.298	Passed (L/999+)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (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	Snow	Seismic	Factored	
1 - Column Cap - steel	5.50"	5.50"	2.69"	3369	3702	682	486/-486	7071	Blocking
2 - Column Cap - steel	7.00"	7.00"	5.23"	6420	5523	2808	2003/-2003	13720	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)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 6' 9"	N/A	16.3	--	--	--	
1 - Uniform (PSF)	0 to 6' 9" (Top)	11' 6 3/8"	25.0	40.0	-	-	Default Load
2 - Point (lb)	1' 4 1/2" (Front)	N/A	2066	1679	633	451/-451	Linked from: 32, Support 1
3 - Point (lb)	5' 11 1/2" (Front)	N/A	5042	3433	2857	2038/-2038	Linked from: 32, Support 2
4 - Uniform (PSF)	0 to 1' 4 1/2" (Top)	11' 6 3/8"	25.0	40.0	-	-	Default Load
5 - Uniform (PSF)	5' 11 1/2" to 6' 9" (Top)	11' 6 3/8"	25.0	40.0	-	-	Default Load

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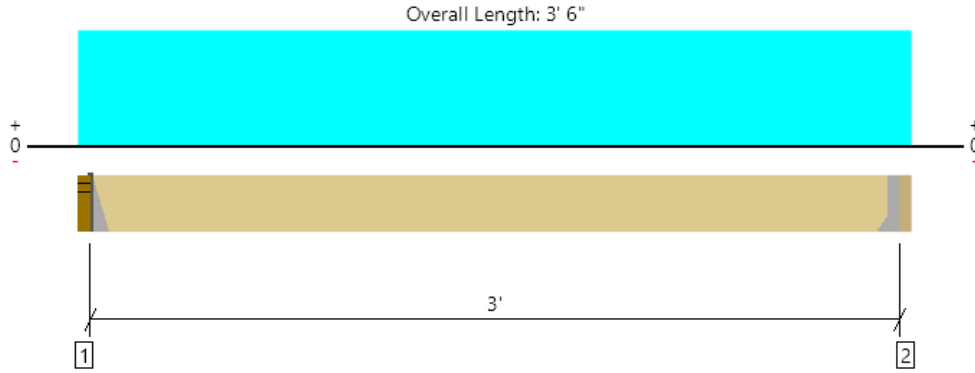
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



Main, 62

1 piece(s) 1 3/4" x 16" 2.OE 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)	1231 @ 3"	1969 (1.50")	Passed (63%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	137 @ 1' 7"	5320	Passed (3%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	923 @ 1' 9"	15557	Passed (6%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.003 @ 1' 9"	0.100	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.005 @ 1' 9"	0.150	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 DF studWall	3.00"	Hanger ¹	1.50"	559	875	1434	See note ¹
2 - Hanger on 16" DF beam	3.00"	Hanger ¹	1.50"	559	875	1434	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' o/c	
Bottom Edge (Lu)	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	Connector not found	N/A	N/A	N/A	N/A	
2 - Face Mount Hanger	IUS1.81/14	2.00"	N/A	14-10dx1.5	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 3' 3"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 3' 6" (Top)	12' 6"	25.0	40.0	Default Load

Weyerhaeuser Notes

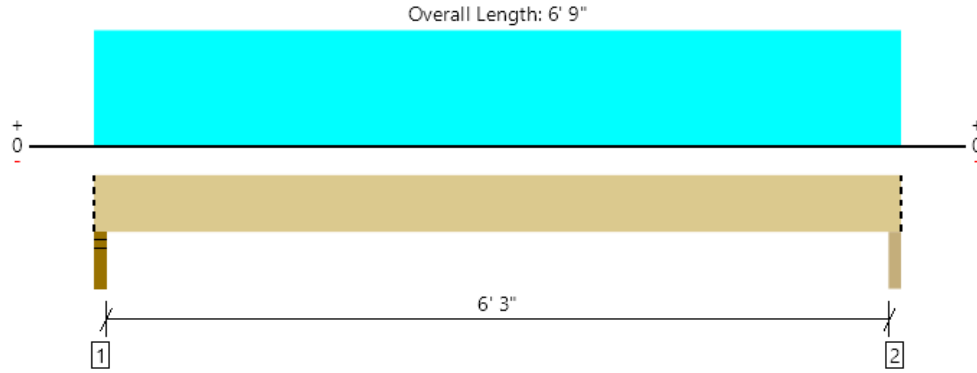
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



Main, 63
1 piece(s) 1 3/4" x 16" 2.OE 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)	1379 @ 1' 1/2"	3281 (3.00")	Passed (42%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	732 @ 1' 7"	5320	Passed (14%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2158 @ 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"	481	899	1379	Blocking
2 - Beam - DF	3.00"	3.00"	1.50"	481	899	1379	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)	3' 9 1/4"	25.0	60.0	Default Load
2 - Uniform (PSF)	0 to 6' 9" (Top)	1'	40.0	40.0	Default Load

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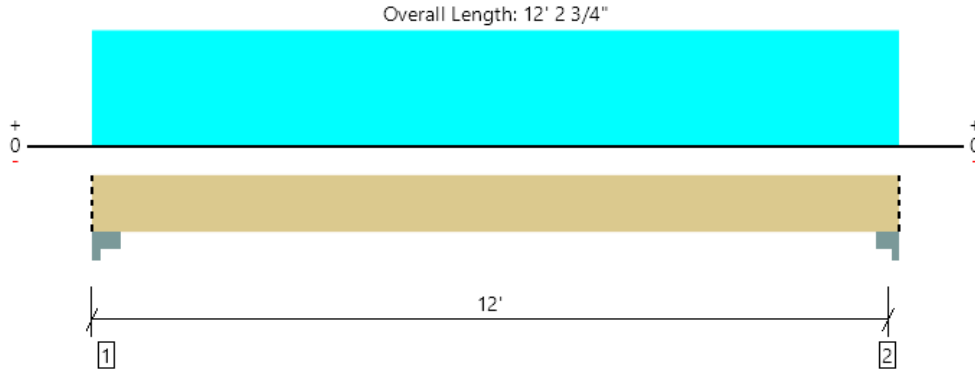
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



Main, 64A

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)	2002 @ 11' 10 3/4"	12513 (5.50")	Passed (16%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1519 @ 1' 7"	7420	Passed (20%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	5408 @ 6' 2 1/8"	16800	Passed (32%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.096 @ 6' 2 1/8"	0.381	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.140 @ 6' 2 1/8"	0.572	Passed (L/978)	--	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 = 11' 5 1/4".
- 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"	7.00"	1.50"	645	1398	2043	Blocking
2 - Column Cap - steel	5.50"	5.50"	1.50"	632	1369	2002	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' 3" o/c	
Bottom Edge (Lu)	12' 3" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 12' 2 3/4"	N/A	10.2	--	
1 - Uniform (PSF)	0 to 12' 2 3/4" (Top)	3' 9 1/4"	25.0	60.0	Default Load

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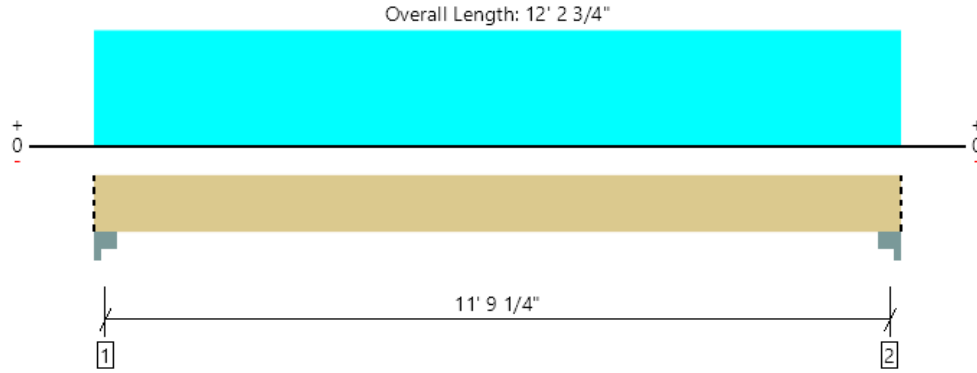
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



Main, 64B

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)	2022 @ 4"	12513 (5.50")	Passed (16%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1540 @ 1' 5 1/2"	7420	Passed (21%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	5527 @ 6' 1 3/8"	16800	Passed (33%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.100 @ 6' 1 3/8"	0.385	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.147 @ 6' 1 3/8"	0.578	Passed (L/946)	--	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 = 11' 6 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"	639	1383	2022	Blocking
2 - Column Cap - steel	5.50"	5.50"	1.50"	639	1383	2022	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' 3" o/c	
Bottom Edge (Lu)	12' 3" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 12' 2 3/4"	N/A	10.2	--	
1 - Uniform (PSF)	0 to 12' 2 3/4" (Top)	3' 9 1/4"	25.0	60.0	Default Load

Weyerhaeuser Notes

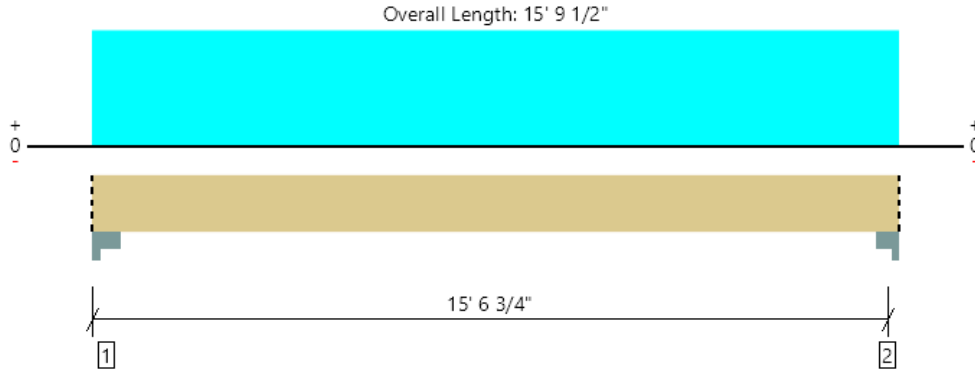
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ForteWEB Software Operator	Job Notes
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Main, 65
1 piece(s) 3 1/2" x 12" 24F-V4 DF Glulam



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)	2591 @ 15' 5 1/2"	12513 (5.50")	Passed (21%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	2108 @ 1' 7"	7420	Passed (28%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	9302 @ 7' 11 1/2"	16800	Passed (55%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.284 @ 7' 11 1/2"	0.500	Passed (L/634)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.415 @ 7' 11 1/2"	0.750	Passed (L/433)	--	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'.
- 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"	831	1801	2632	Blocking
2 - Column Cap - steel	5.50"	5.50"	1.50"	818	1772	2591	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' 10" o/c	
Bottom Edge (Lu)	15' 10" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 15' 9 1/2"	N/A	10.2	--	
1 - Uniform (PSF)	0 to 15' 9 1/2" (Top)	3' 9 1/4"	25.0	60.0	Default Load

Weyerhaeuser Notes

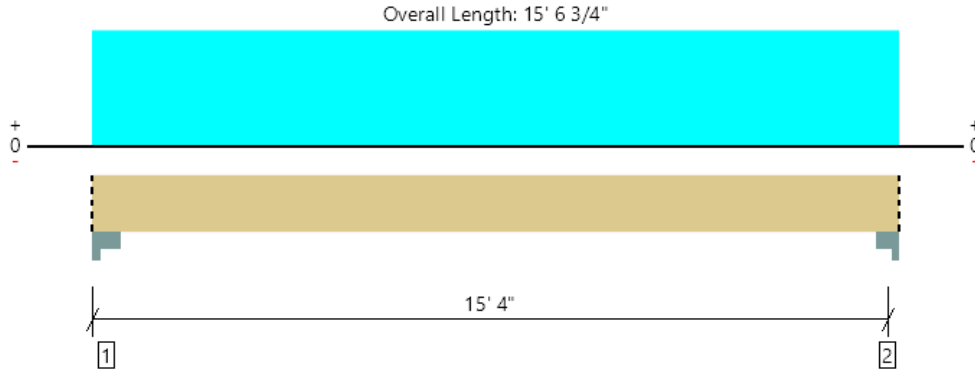
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Main, 66
1 piece(s) 5 1/2" x 12" 24F-V4 DF Glulam



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)	5373 @ 15' 2 3/4"	19663 (5.50")	Passed (27%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	4358 @ 1' 7"	11660	Passed (37%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	18983 @ 7' 10 1/8"	26400	Passed (72%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.361 @ 7' 10 1/8"	0.492	Passed (L/492)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.523 @ 7' 10 1/8"	0.739	Passed (L/339)	--	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 = 14' 9 1/4".
- 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"	7.00"	1.53"	1695	3765	5460	Blocking
2 - Column Cap - steel	5.50"	5.50"	1.50"	1668	3705	5373	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' 7" o/c	
Bottom Edge (Lu)	15' 7" 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 15' 6 3/4"	N/A	16.0	--	
1 - Uniform (PSF)	0 to 15' 6 3/4" (Top)	8'	25.0	60.0	Default Load

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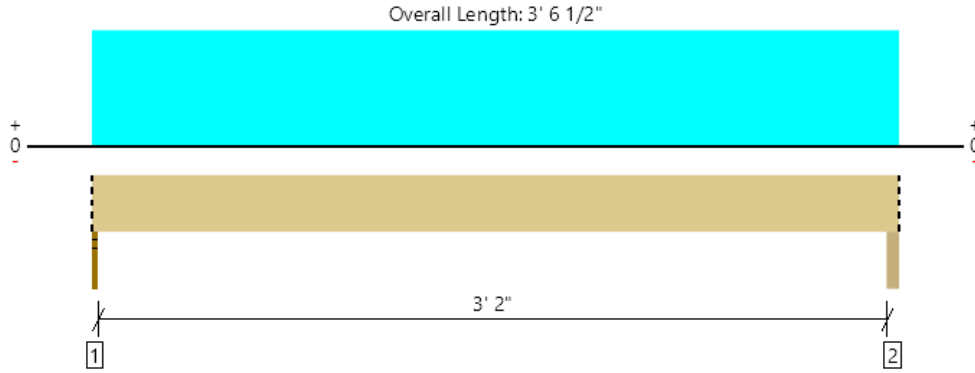
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



Main, 67

1 piece(s) 1 3/4" x 16" 2.OE 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)	883 @ 0	1641 (1.50")	Passed (54%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	129 @ 1' 5 1/2"	5320	Passed (2%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	754 @ 1' 8 1/2"	15557	Passed (5%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.002 @ 1' 8 1/2"	0.114	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.004 @ 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/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	1.50"	1.50"	1.50"	428	455	883	Blocking
2 - Beam - DF	3.00"	3.00"	1.50"	459	488	947	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 7" o/c	
Bottom Edge (Lu)	3' 7" 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 1/2"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 3' 6 1/2" (Top)	3' 9 1/4"	25.0	60.0	Default Load
2 - Uniform (PSF)	0 to 3' 6 1/2" (Top)	1'	40.0	40.0	Default Load
3 - Uniform (PSF)	0 to 3' 6 1/2" (Top)	9'	12.0	-	Default Load

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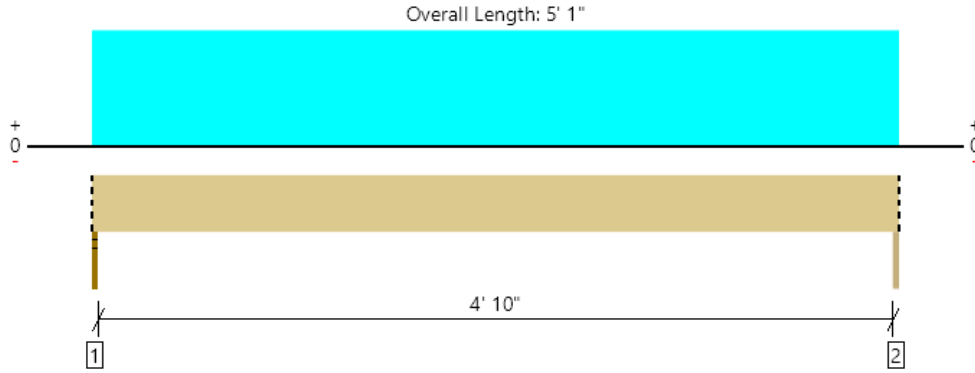
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



Main, 68

1 piece(s) 1 3/4" x 16" 2.OE 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)	1313 @ 0	1641 (1.50")	Passed (80%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	560 @ 1' 5 1/2"	5320	Passed (11%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1669 @ 2' 6 1/2"	15557	Passed (11%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.007 @ 2' 6 1/2"	0.169	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.013 @ 2' 6 1/2"	0.254	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	1.50"	1.50"	1.50"	637	677	1313	Blocking
2 - Beam - DF	1.50"	1.50"	1.50"	637	677	1313	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' 1" o/c	
Bottom Edge (Lu)	5' 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 5' 1"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 5' 1" (Top)	3' 9 1/4"	25.0	60.0	Default Load
2 - Uniform (PSF)	0 to 5' 1" (Top)	1'	40.0	40.0	Default Load
3 - Uniform (PSF)	0 to 5' 1" (Top)	9'	12.0	-	Default Load

Weyerhaeuser Notes

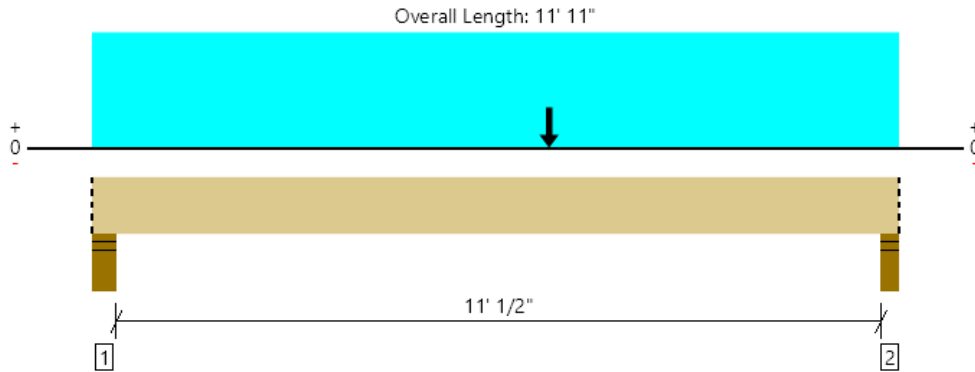
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



Main, 69
3 piece(s) 1 3/4" x 16" 2.OE 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)	12468 @ 11' 8"	14766 (4.50")	Passed (84%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	8184 @ 1' 10"	15960	Passed (51%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	31150 @ 6' 1/4"	46671	Passed (67%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.155 @ 6' 1 1/4"	0.376	Passed (L/875)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.285 @ 6' 13/16"	0.565	Passed (L/476)	--	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	6.00"	6.00"	3.71"	6319	5449	3348/-3348	12163	Blocking
2 - Stud wall - DF	4.50"	4.50"	3.80"	6188	5336	4340/-4340	12468	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' 9" o/c	
Bottom Edge (Lu)	11' 11" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 11' 11"	N/A	24.5	--	--	
1 - Uniform (PSF)	0 to 11' 11" (Top)	7' 6 1/2"	40.0	40.0	-	Default Load
2 - Point (lb)	6' 9" (Front)	N/A	-	-	7688	
3 - Uniform (PSF)	0 to 11' 11" (Top)	7' 6 1/2"	40.0	40.0	-	Default Load
4 - Uniform (PSF)	0 to 11' 11" (Top)	7' 6 1/2"	40.0	40.0	-	Default Load
5 - Uniform (PSF)	0 to 11' 11" (Top)	10'	12.0	-	-	Default Load

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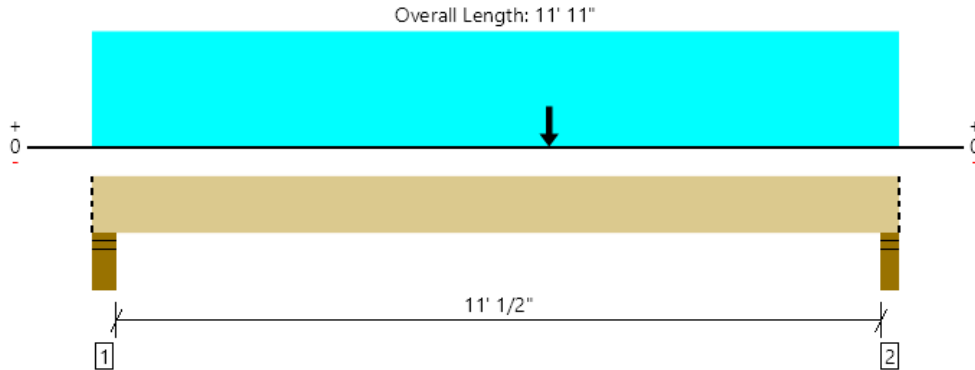
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



Main, 69 (w_overstrength)
 3 piece(s) 1 3/4" x 16" 2.OE Microllam® LVL

- Support 2 failed reaction check due to insufficient bearing capacity.
- An excessive uplift of -2067 lbs at support located at 4 1/2" failed this product.
- An excessive uplift of -3883 lbs at support located at 11' 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)
Member Reaction (lbs)	15886 @ 11' 8"	14766 (4.50")	Failed (108%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	8184 @ 1' 10"	15960	Passed (51%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	55094 @ 6' 9"	74674	Passed (74%)	1.60	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.262 @ 6' 9"	0.376	Passed (L/517)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.391 @ 6' 1 1/4"	0.565	Passed (L/346)	--	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	6.00"	6.00"	4.51"	6319	5449	8369/-8369	14799/-2067	Blocking
2 - Stud wall - DF	4.50"	4.50"	4.84"	6188	5336	10851/-10851	15886/-3883	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' 7" o/c	
Bottom Edge (Lu)	11' 11" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 11' 11"	N/A	24.5	--	--	
1 - Uniform (PSF)	0 to 11' 11" (Top)	7' 6 1/2"	40.0	40.0	-	Default Load
2 - Point (lb)	6' 9" (Front)	N/A	-	-	19220	
3 - Uniform (PSF)	0 to 11' 11" (Top)	7' 6 1/2"	40.0	40.0	-	Default Load
4 - Uniform (PSF)	0 to 11' 11" (Top)	7' 6 1/2"	40.0	40.0	-	Default Load
5 - Uniform (PSF)	0 to 11' 11" (Top)	10'	12.0	-	-	Default Load

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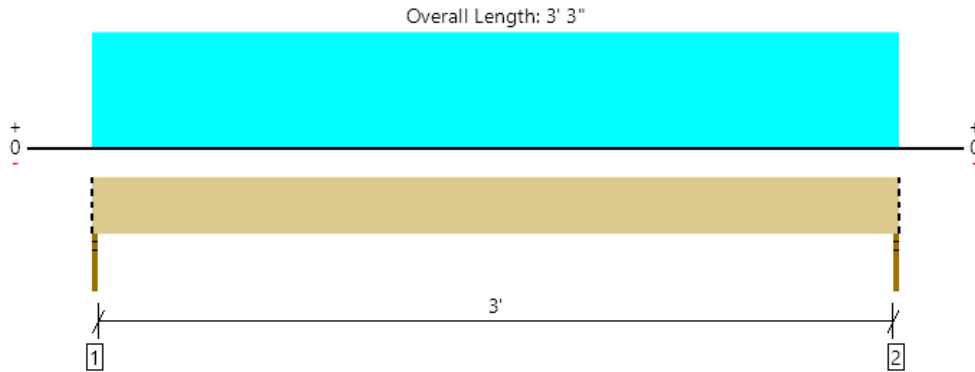
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



Main, 70

2 piece(s) 1 3/4" x 16" 2.OE 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)	2215 @ 0	3281 (1.50")	Passed (68%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	227 @ 1' 5 1/2"	10640	Passed (2%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1800 @ 1' 7 1/2"	31114	Passed (6%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.002 @ 1' 7 1/2"	0.108	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.005 @ 1' 7 1/2"	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	1.50"	1.50"	1.50"	1218	997	2215	Blocking
2 - Stud wall - DF	1.50"	1.50"	1.50"	1218	997	2215	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' 3" o/c	
Bottom Edge (Lu)	3' 3" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 3' 3"	N/A	16.3	--	
1 - Uniform (PSF)	0 to 3' 3" (Top)	7' 8"	40.0	40.0	Default Load
2 - Uniform (PSF)	0 to 3' 3" (Top)	7' 8"	40.0	40.0	Default Load
3 - Uniform (PSF)	0 to 3' 3" (Top)	10'	12.0	-	Default Load

Weyerhaeuser Notes

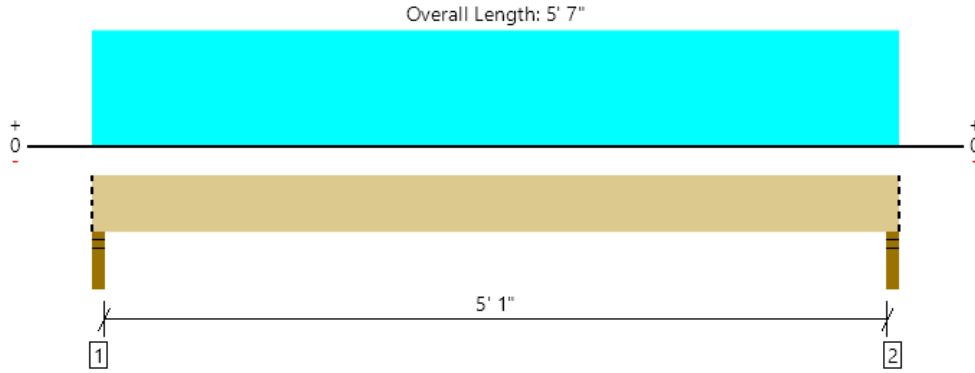
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
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Main, 71
2 piece(s) 1 3/4" x 16" 2.OE 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)	3764 @ 1' 1/2"	6563 (3.00")	Passed (57%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1629 @ 1' 7"	10640	Passed (15%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	4794 @ 2' 9 1/2"	31114	Passed (15%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.007 @ 2' 9 1/2"	0.178	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.020 @ 2' 9 1/2"	0.267	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"	1.72"	2471	1293	3764	Blocking
2 - Stud wall - DF	3.00"	3.00"	1.72"	2471	1293	3764	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' 7" o/c	
Bottom Edge (Lu)	5' 7" 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 5' 7"	N/A	16.3	--	
1 - Uniform (PSF)	0 to 5' 7" (Top)	11' 7"	75.0	40.0	Default Load

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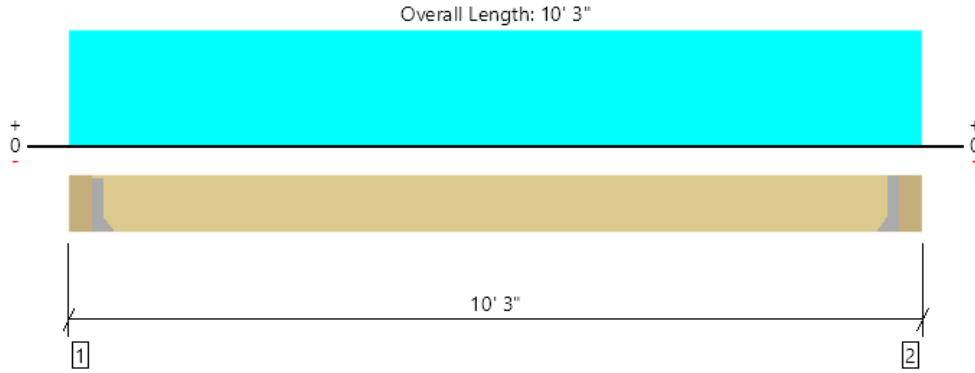
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



Main, 72

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)	1564 @ 5 1/2"	3413 (1.50")	Passed (46%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1229 @ 1' 5 1/2"	7420	Passed (17%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	3650 @ 5' 1 1/2"	16800	Passed (22%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.038 @ 5' 1 1/2"	0.233	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.063 @ 5' 1 1/2"	0.467	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' 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 - Hanger on 12" DF beam	5.50"	Hanger ¹	1.50"	688	1025	1713	See note ¹
2 - Hanger on 12" DF beam	5.50"	Hanger ¹	1.50"	688	1025	1713	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)	9' 4" o/c	
Bottom Edge (Lu)	9' 4" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie							
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories	
1 - Face Mount Hanger	LUS410	2.00"	N/A	8-16d	6-16d		
2 - Face Mount Hanger	LUS410	2.00"	N/A	8-16d	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)	5 1/2" to 9' 9 1/2"	N/A	10.2	--	
1 - Uniform (PSF)	0 to 10' 3" (Top)	5'	25.0	40.0	Default Load

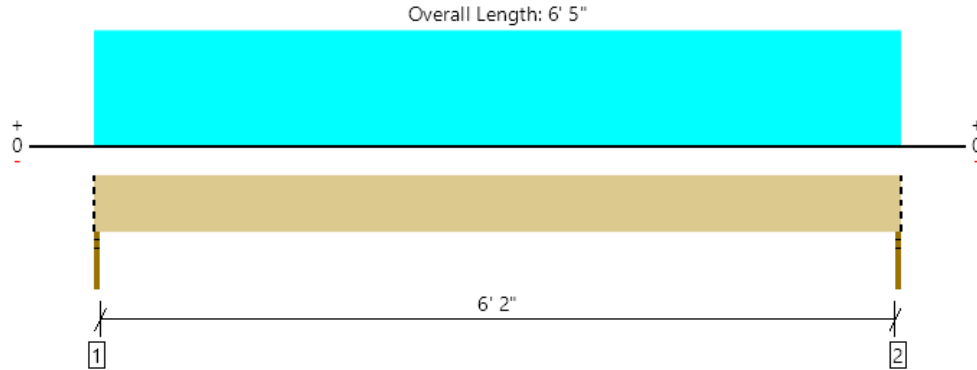
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ForteWEB Software Operator	Job Notes
Javid Abdi Atlas Consulting Engineers (206) 427-7233 javiddabdi@yahoo.com	



Main, 73

3 piece(s) 1 3/4" x 16" 2.OE 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)	4399 @ 0	4922 (1.50")	Passed (89%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	2400 @ 1' 5 1/2"	15960	Passed (15%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	7057 @ 3' 2 1/2"	46671	Passed (15%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.011 @ 3' 2 1/2"	0.214	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.024 @ 3' 2 1/2"	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/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	1.50"	1.50"	1.50"	2431	1968	4399	Blocking
2 - Stud wall - DF	1.50"	1.50"	1.50"	2431	1968	4399	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' 5" o/c	
Bottom Edge (Lu)	6' 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 6' 5"	N/A	24.5	--	
1 - Uniform (PSF)	0 to 6' 5" (Top)	7' 8"	40.0	40.0	Default Load
2 - Uniform (PSF)	0 to 6' 5" (Top)	7' 8"	40.0	40.0	Default Load
3 - Uniform (PSF)	0 to 6' 5" (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	



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

Post Height: 10'



Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	22	50	Passed (44%)	--	--
Compression (lbs)	7177	20918	Passed (34%)	1.00	1.0 D + 1.0 L
Base Bearing (lbs)	7177	898425	Passed (1%)	--	1.0 D + 1.0 L
Bending/Compression	0.39	1	Passed (39%)	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

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

Max Unbraced Length	Comments
Full Member Length	No bracing assumed.

Drawing is Conceptual

Vertical Loads	Dead (0.90)	Floor Live (1.00)	Comments
1 - Point (lb)	1441	2880	Linked from: 33, Support 2
2 - Point (lb)	946	1910	Linked from: 34, Support 1

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



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

Post Height: 10'



Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	22	50	Passed (44%)	--	--
Compression (lbs)	14017	20918	Passed (67%)	1.00	1.0 D + 1.0 L
Base Bearing (lbs)	14017	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

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

Max Unbraced Length	Comments
Full Member Length	No bracing assumed.

Drawing is Conceptual

Vertical Loads	Dead (0.90)	Floor Live (1.00)	Comments
1 - Point (lb)	1441	2880	Linked from: 33, Support 2
2 - Point (lb)	946	1910	Linked from: 34, Support 1
3 - Point (lb)	481	899	Linked from: 63, Support 1
4 - Point (lb)	1695	3765	Linked from: 66, Support 1

Weyerhaeuser Notes

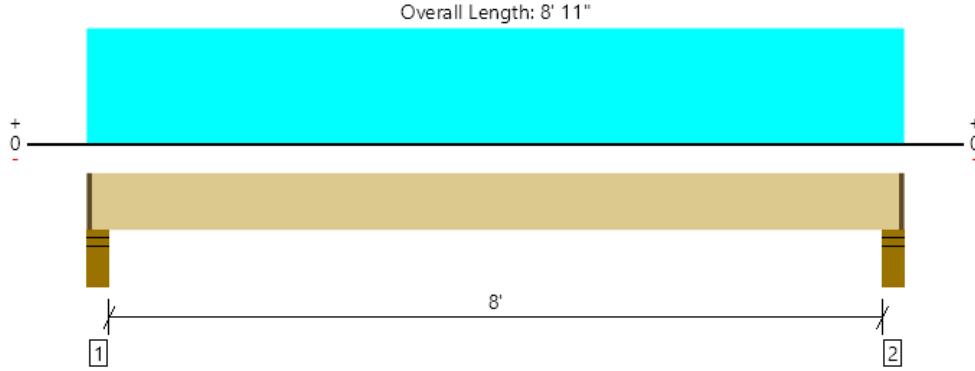
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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



Roof, Deck Joists
1 piece(s) 2 x 10 DF No.1 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	493 @ 4 1/2"	3984 (4.25")	Passed (12%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	366 @ 1' 2 3/4"	1665	Passed (22%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	945 @ 4' 5 1/2"	2255	Passed (42%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.048 @ 4' 5 1/2"	0.204	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.067 @ 4' 5 1/2"	0.408	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

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

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - DF	5.50"	4.25"	1.50"	149	357	505	1 1/4" Rim Board
2 - Stud wall - DF	5.50"	4.25"	1.50"	149	357	505	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)	8' 9" o/c	
Bottom Edge (Lu)	8' 9" 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 8' 11"	16"	25.0	60.0	Default Load

Weyerhaeuser Notes

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

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



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
	0.35		coeff. friction w/Concrete
	0.819		cosine(phi)
	1.000		cosine(del)
Ca	0.375	45 psf	coeff. of active pressure
Cp	2.917	350 psf	coeff. of passive pressure

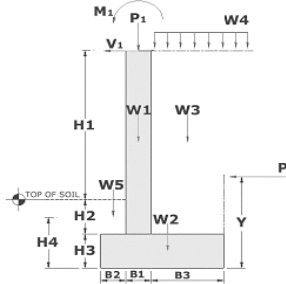
Unit Weight		Int Friction		w. Conc		Soil	
110-120	33-40	0.5-0.6				Sand or gravel, no fines	
120-130	25-35	0.4-0.5				Sand or gravel, w/ fines	
110-120	23-30	0.3-0.4				Silty sand, high clay	
100-120	25-35	0.2-0.4				Medium or stiff clay	
90-110	20-25	0.2-0.3				Soft clay, silt	

WALL GEOMETRY

H1	9.33	(ft)	soil retained
H2	0.5833333	(ft)	soil depth above toe
H3	1	(ft)	footing thickness
H4	1.5833333	(ft)	passive pressure soil depth
B1	0.6666667	(ft)	wall width
B2	4	(ft)	toe width
B3	2	(ft)	heel width
H	10.913333	(ft)	total height
B	6.6666667	(ft)	total base
	150	(pcf)	concrete unit weight

EXTERNAL LOADS

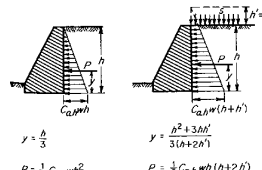
P _{applied}	0	(lb/ft)
V _{applied}	786.19342	(lb/ft)
M _{applied}	4384.0111	(lb-ft / ft)
Surcharge	0	(psf)



LOAD CALCULATIONS

lateral soil force and overturning moment

H _{ptime}	0.00	(ft)	converted surcharge
Y	3.64	(ft)	distance to soil load resultant
P	2680	(lbs)	soil load resultant
	9760	(lb-ft)	M _o , soil + surcharge
	4384.0111	(lb-ft)	M _o , external load
	14,140	(lb-ft)	total overturning Moment

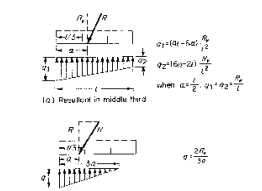


wall restoring forces

component	weight (#)	arm (ft)	moment (ft-lb)
w1 (concrete)	991	4.33	4296
w2 (concrete)	1000	3.33	3333
w3 (heel soil)	2379	5.67	13482
w4 (surcharge)	0	5.67	0
w5 (toe soil)	280	2.00	560
P applied	0	4.33	0
vert. force	4,651		moment 21,671

lateral sliding resistance

	439	(lb)	passive pressure sliding resistance
	1628	(lb)	soil friction force
	2067	(lb)	total sliding resistance

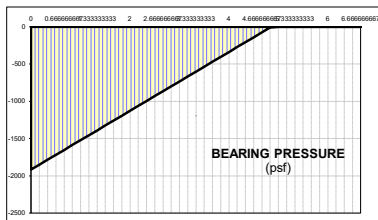


STABILITY FACTOR OF SAFETY CHECKS

	1		F.S. overturning
overturning	0.55		F.S. sliding
sliding	1.53	OK	M _r / M _o
	0.60	OK	(PP+F)/(P+V)

SOIL BEARING

a	1.62	(ft)	distance to resultant
	2.22' to 4.44'		middle third of footing
q1	1914	(psf)	bearing pressure @ toe
q2	N.A.	(psf)	bearing pressure @ heel



FACTORED (1.7) STEM LOAD FORCES

	9.9133333	(ft)	H1 + H2
	3.30	(ft)	line of action (above base)
	2211	(lbs)	P (arm only)
	2211	(lbs)	Ph (arm only)
	19.9	(kip-ft)	Mu (arm moment)

FACTORED (1.7) FOOTING LOADS

	11.7	(kip-ft)	Mu @ Toe (Bot Reinf)
	0.0	(kip-ft)	Mu @ Heel (Bot Reinf)
	7.66	(kip)	Vu @ Toe
	0.01	(kip)	Vu @ Heel

moment is less than 8.56 k-ft at 2.3' above top of foundation

Footing

ØVc	8,100	12" thick
As	0.31	#5 @ 12"
a	0.7294	
ØMn	12.05	k-ft
	1.86	6-#5
	0.0019375	Reinf. Ratio
	0.0021528	Reinf. Ratio

Wall

ØVc	5,400	8" thick	5,400	8" thick
As	0.88	#6 @ 6" oc	0.31	#5 @ 12" oc
a	2.0706		0.7294	
ØMn	21.64	k-ft	8.56	k-ft
	0.009167	Reinf. Ratio	0.003229167	Reinf. Ratio

LRFD soil

	576 psf @ Wall interface
	3254 psf @ Toe
	2303 # in Toe @ 2 ft from Wall
	5356 # in Toe @ 1.33333333 ft from Wall

129 psf @ Wall interface

	0 psf @ 3a
	13 # in Toe @ 0.064444 ft from Wall

Table 24.4.3.2—Minimum ratios of deformed shrinkage and temperature reinforcement area to gross concrete area

Reinforcement type	f _{cr} , psi	Minimum reinforcement ratio
Deformed bars	< 60,000	0.0020
Deformed bars or welded wire reinforcement	≥ 60,000	Greater of: $\frac{0.0018 \times 60,000}{f_c}$
		0.0014

Table 11.6.1—Minimum reinforcement for walls with in-plane V_u ≤ 0.5φV_c

Wall type	Type of nonprestressed reinforcement	Bar/wire size	f _{cr} , psi	Minimum longitudinal ⁽¹⁾ , ρ _l	Minimum transverse, ρ _t
Cast-in-place	Deformed bars	≤ No. 5	≥ 60,000	0.0012	0.0020
		> No. 5	< 60,000	0.0015	0.0025
	Welded-wire reinforcement	≤ W31 or D31	Any	0.0015	0.0025
		> W31 or D31	Any	0.0012	0.0020
Precast ⁽²⁾	Deformed bars or welded-wire reinforcement	Any	Any	0.0010	0.0010

⁽¹⁾ Prestressed walls with an average effective compressive stress of at least 225 psi need not meet the requirement for minimum longitudinal reinforcement ρ_l.
⁽²⁾ For one-way precast, prestressed walls not wider than 12 ft and not mechanically connected to corner restraint in the transverse direction, the minimum reinforcement requirement in the direction normal to the flexural reinforcement need not be satisfied.

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
	0.35		coeff. friction w/Concrete
	0.819		cosine(phi)
	1.000		cosine(del)
Ca	0.375	45 psf	coeff. of active pressure
Cp	2.917	350 psf	coeff. of passive pressure

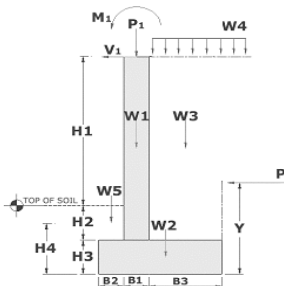
Unit Weight		Int Friction		w. Conc		Soil	
110-120	33-40	0.5-0.6				Sand or gravel, no fines	
120-130	25-35	0.4-0.5				Sand or gravel, w/ fines	
110-120	23-30	0.3-0.4				Silty sand, high clay	
100-120	25-35	0.2-0.4				Medium or stiff clay	
90-110	20-25	0.2-0.3				Soft clay, silt	

WALL GEOMETRY

H1	5.0833333	(ft)	soil retained
H2	0.5833333	(ft)	soil depth above toe
H3	0.8333333	(ft)	footing thickness
H4	1.4166667	(ft)	passive pressure soil depth
B1	0.5	(ft)	wall width
B2	1	(ft)	toe width
B3	2	(ft)	heel width
H	6.5	(ft)	total height
B	3.5	(ft)	total base
	150	(pcf)	concrete unit weight

EXTERNAL LOADS

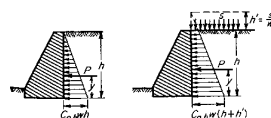
P _{applied}	0	(lb/ft)
V _{applied}	256.88889	(lb/ft)
M _{applied}	818.83333	(lb-ft / ft)
Surcharge	0	(psf)



LOAD CALCULATIONS

lateral soil force and overturning moment

H _{prime}	0.00	(ft)	converted surcharge
Y	2.17	(ft)	distance to soil load resultant
P	951	(lbs)	soil load resultant
	2060	(lb-ft)	M _o , soil + surcharge
	818.83333	(lb-ft)	M _o , external load
	2,880	(lb-ft)	total overturning Moment



wall restoring forces

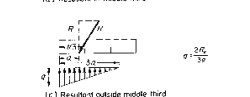
component	weight (#)	arm (ft)	moment (ft-lb)
w1 (concrete)	425	1.25	531
w2 (concrete)	438	1.75	766
w3 (heel soil)	1360	2.50	3400
w4 (surcharge)	0	2.50	0
w5 (toe soil)	70	0.50	35
P applied	0	1.25	0
vert. force	2,293		moment 4,732

$$P = \frac{1}{2} C_{aH} w h^2$$

$$P = \frac{1}{2} C_{aH} w h (h + h')$$

$$M_o = \frac{1}{6} C_{aH} w h^3$$

$$M_o = \frac{1}{6} C_{aH} w h^2 (h + 2h')$$



lateral sliding resistance

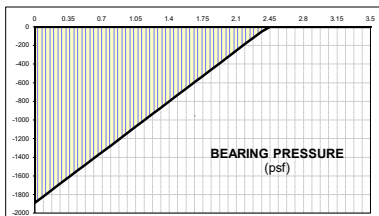
	351	(lb)	passive pressure sliding resistance
	803	(lb)	soil friction force
	1154	(lb)	total sliding resistance

STABILITY FACTOR OF SAFETY CHECKS

overturning	1.64	OK	F.S. overturning
sliding	0.96	OK	F.S. sliding
			M _o / M _r
			(PP+F)/(P _h +V)

SOIL BEARING

a	0.81	(ft)	distance to resultant
	1.17' to 2.33'		middle third of footing
q1	1887	(psf)	bearing pressure @ toe
q2	N.A.	(psf)	bearing pressure @ heel



FACTORED (1.7) STEM LOAD FORCES

	5.6666667	(ft)	H1 + H2
	1.89	(ft)	line of action (above base)
	723	(lbs)	P (arm only)
	723	(lbs)	Ph (arm only)
	3.7	(kip-ft)	Mu (arm moment)

FACTORED (1.7) FOOTING LOADS

	1.2	(kip-ft)	Mu @ Toe (Bot Reinf)
	0.2	(kip-ft)	Mu @ Heel (Bot Reinf)
	2.55	(kip)	Vu @ Toe
	0.57	(kip)	Vu @ Heel

Footing

ØVc	7.969	10" thick
As	0.15	#4 @ 16"
a	0.0002	
ØMn	4.72	k-ft
	1.2	6-#4
	0.0028571	Reinf. Ratio
	0.00125	Reinf. Ratio

Wall

ØVc	4.554	6" thick
As	0.15	#4 @ 16" oc
a	0.0002	
ØMn	4.05	k-ft
	0.001563	Reinf. Ratio

LRFD soil

	1888 psf @ Wall interface
	3208 psf @ Toe
	1888 # in Toe @ 0.5 ft from Wall
	660 # in Toe @ 0.33333333 ft from Wall

1228 psf @ Wall interface
 0 psf @ 3a

571 # in Toe @ 0.31 ft from Wall

Table 24.4.3.2—Minimum ratios of deformed shrinkage and temperature reinforcement area to gross concrete area

Reinforcement type	f _c , psi	Minimum reinforcement ratio
Deformed bars	< 60,000	0.0020
Deformed bars or welded-wire reinforcement	≥ 60,000	Greater of: $\frac{0.0018 \times 60,000}{f_c}$ 0.0014

Table 11.6.1—Minimum reinforcement for walls with in-plane V_u ≤ 0.5ØV_c

Wall type	Type of nonprestressed reinforcement	Bar/wire size	f _c , psi	Minimum longitudinal, ρ _l	Minimum transverse, ρ _t
Cast-in-place	Deformed bars	≤ No. 5	≥ 60,000	0.0012	0.0020
			< 60,000	0.0015	0.0025
		> No. 5	Any	0.0015	0.0025
			Welded-wire reinforcement	≤ W31 or D31	Any
Precast ⁽¹⁾	Deformed bars or welded-wire reinforcement	Any	Any	0.0010	0.0010

⁽¹⁾Prestressed walls with an average effective compressive stress of at least 225 psi need not meet the requirement for minimum longitudinal reinforcement ρ_l.
⁽²⁾In one-way precast, prestressed walls not wider than 12 ft and not mechanically connected to frame moment in the transverse direction, the minimum reinforcement requirement in the direction normal to the flexural reinforcement need not be satisfied.

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
	0.35		coeff. friction w/Concrete
	0.819		cosine(phi)
	1.000		cosine(del)
Ca	0.375	45 psf	coeff. of active pressure
Cp	2.917	350 psf	coeff. of passive pressure

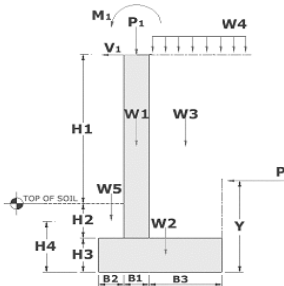
Unit Weight		Int Friction		w. Conc		Soil	
110-120	33-40	0.5-0.6				Sand or gravel, no fines	
120-130	25-35	0.4-0.5				Sand or gravel, w/ fines	
110-120	23-30	0.3-0.4				Silty sand, high clay	
100-120	25-35	0.2-0.4				Medium or stiff clay	
90-110	20-25	0.2-0.3				Soft clay, silt	

WALL GEOMETRY

H1	3.5833333	(ft)	soil retained
H2	0.5833333	(ft)	soil depth above toe
H3	0.8333333	(ft)	footing thickness
H4	1.4166667	(ft)	passive pressure soil depth
B1	0.5	(ft)	wall width
B2	1.5	(ft)	toe width
B3	0.5	(ft)	heel width
H	5	(ft)	total height
B	2.5	(ft)	total base
	150	(pcf)	concrete unit weight

EXTERNAL LOADS

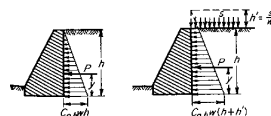
P _{applied}	0	(lb/ft)
V _{applied}	138.88889	(lb/ft)
M _{applied}	325.52083	(lb-ft / ft)
Surcharge	0	(psf)



LOAD CALCULATIONS

lateral soil force and overturning moment

H _{prime}	0.00	(ft)	converted surcharge
Y	1.67	(ft)	distance to soil load resultant
P	563	(lbs)	soil load resultant
	940	(lb-ft)	M _o , soil + surcharge
	325.52083	(lb-ft)	M _o , external load
	1,270	(lb-ft)	total overturning Moment

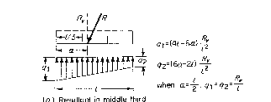


wall restoring forces

component	weight (#)	arm (ft)	moment (ft-lb)
w1 (concrete)	313	1.75	547
w2 (concrete)	313	1.25	391
w3 (heel soil)	250	2.25	563
w4 (surcharge)	0	2.25	0
w5 (toe soil)	105	0.75	79
P applied	0	1.75	0
vert. force	980		moment 1,579

$$P = \frac{1}{2} C_{aH} w h^2$$

$$P = \frac{h^2 + 3.0M'}{3(h+2h')}$$



lateral sliding resistance

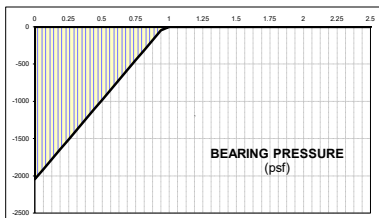
	351	(lb)	passive pressure sliding resistance
	343	(lb)	soil friction force
	694	(lb)	total sliding resistance

STABILITY FACTOR OF SAFETY CHECKS

overturning	1		F.S. overturning
sliding	1.24	OK	F.S. sliding
	0.99	NG	Mu / Mu
			(PP+V)/(Ph+V)

SOIL BEARING

a	0.32	(ft)	distance to resultant
	0.83' to 1.67'		middle third of footing
q1	2042	(psf)	bearing pressure @ toe
q2	N.A.	(psf)	bearing pressure @ heel



FACTORED (1.7) STEM LOAD FORCES

	4.1666667	(ft)	H1 + H2
	1.39	(ft)	line of action (above base)
	391	(lbs)	P (arm only)
	391	(lbs)	Ph (arm only)
	1.5	(kip-ft)	Mu (arm moment)

FACTORED (1.7) FOOTING LOADS

	1.1	(kip-ft)	Mu @ Toe (Bot Reinf)
	0.0	(kip-ft)	Mu @ Heel (Bot Reinf)
	1.67	(kip)	Vu @ Toe
	0.00	(kip)	Vu @ Heel

Footing

ØVc	7.969	10" thick
As	0.075	#4 @ 32"
a	0.0001	
ØMn	2.36	k-ft
	0.8	4-#4
	0.0026667	Reinf. Ratio
	0.000625	Reinf. Ratio

Wall

ØVc	4.554	6" thick
As	0.15	#4 @ 16" oc
a	0.0002	
ØMn	4.05	k-ft
	0.001563	Reinf. Ratio

LRFD soil 0 psf @ Wall interface
 3471.4 psf @ Toe

0 psf @ Wall interface
 0 psf @ Heel

1666.272 # in Toe @ 0.64 ft from Wall
 0 # in Toe @ 0 ft from Wall

0 # in Toe @ 0.166667 ft from Wall
 0 # in Toe @ 0.25 ft from Wall

Table 24.4.3.2—Minimum ratios of deformed shrinkage and temperature reinforcement area to gross concrete area

Reinforcement type	f _c , psi	Minimum reinforcement ratio
Deformed bars	< 60,000	0.0020
Deformed bars or welded wire reinforcement	≥ 60,000	Greater of: $\frac{0.0018 \times 60,000}{f_c}$
		0.0014

Table 11.6.1—Minimum reinforcement for walls with in-plane V_o ≤ 0.5ØV_c

Wall type	Type of nonprestressed reinforcement	Bar/wire size	f _c , psi	Minimum longitudinal, ρ _l	Minimum transverse, ρ _t
Cast-in-place	Deformed bars	≤ No. 5	≥ 60,000	0.0012	0.0020
		> No. 5	< 60,000	0.0015	0.0025
	Welded-wire reinforcement	≤ W31 or D31	Any	0.0015	0.0025
		Any	Any	0.0012	0.0020
Precast ⁽¹⁾	Deformed bars or welded-wire reinforcement	Any	Any	0.0010	0.0010

⁽¹⁾ Prestressed walls with an average effective compressive stress of at least 225 psi need not meet the requirement for minimum longitudinal reinforcement ρ_l.
⁽²⁾ For one-way precast, prestressed walls not wider than 12 ft and not mechanically connected to corner restraint in the transverse direction, the minimum reinforcement requirement in the direction normal to the flexural reinforcement need not be satisfied.

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

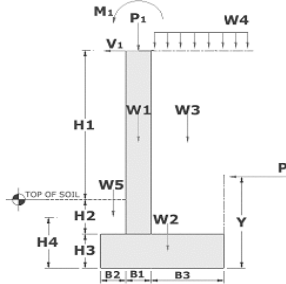
SOIL DATA

w	120	(pcf)	soil unit weight
phi	35	(deg)	soil internal angle of friction
del	0	(deg)	surface angle incline
	0.35		coeff. friction w/Concrete
	0.819		cosine(phi)
	1.000		cosine(del)
Ca	0.375	45 psf	coeff. of active pressure
Cp	2.917	350 psf	coeff. of passive pressure

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	2.0833333	(ft)	soil retained
H2	0.5833333	(ft)	soil depth above toe
H3	0.8333333	(ft)	footing thickness
H4	1.4166667	(ft)	passive pressure soil depth
B1	0.5	(ft)	wall width
B2	0.5	(ft)	toe width
B3	0.5	(ft)	heel width
H	3.5	(ft)	total height
B	1.5	(ft)	total base
	150	(pcf)	concrete unit weight



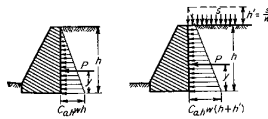
EXTERNAL LOADS

P _{applied}	0	(lb/ft)
V _{applied}	56.888889	(lb/ft)
M _{applied}	85.333333	(lb-ft / ft)
Surcharge	0	(psf)

LOAD CALCULATIONS

lateral soil force and overturning moment

H _{prime}	0.00	(ft)	converted surcharge
Y	1.17	(ft)	distance to soil load resultant
P	276	(lbs)	soil load resultant
	320	(lb-ft)	M _o , soil + surcharge
	85.333333	(lb-ft)	M _o , external load
	410	(lb-ft)	total overturning Moment

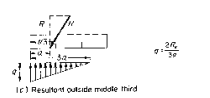
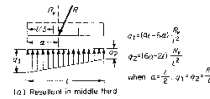


wall restoring forces

component	weight (#)	arm (ft)	moment (ft-lb)	
w1 (concrete)	200	0.75	150	
w2 (concrete)	188	0.75	141	
w3 (heel soil)	160	1.25	200	
w4 (surcharge)	0	1.25	0	
w5 (toe soil)	35	0.25	9	
P applied	0	0.75	0	
vert. force	583		moment	499

$\gamma = \frac{h}{3}$
 $P = \frac{1}{2} C_{a0} w h^2$

$\gamma = \frac{h^2 + 3.0M}{3(h+2a)}$
 $P = \frac{1}{2} C_{a0} w h (h+2a)$



lateral sliding resistance

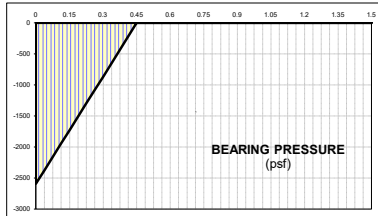
	351	(lb)	passive pressure sliding resistance
	204	(lb)	soil friction force
	555	(lb)	total sliding resistance

STABILITY FACTOR OF SAFETY CHECKS

	1		F.S. overturning
overturning	1.22	OK	F.S. sliding
sliding	1.67	OK	M _r / M _o
			(PP+F)/(P+V)

SOIL BEARING

a	0.15	(ft)	distance to resultant
	0.50' to 1.00'		middle third of footing
q1	2591	(psf)	bearing pressure @ toe
q2	N.A.	(psf)	bearing pressure @ heel



FACTORED (1.7) STEM LOAD FORCES

	2.6666667	(ft)	H1 + H2
	0.89	(ft)	line of action (above base)
	160	(lbs)	P (arm only)
	160	(lbs)	Ph (arm only)
	0.4	(kip-ft)	Mu (arm moment)

FACTORED (1.7) FOOTING LOADS

	0.3	(kip-ft)	Mu @ Toe (Bot Reinf)
	0.0	(kip-ft)	Mu @ Heel (Bot Reinf)
	0.99	(kip)	Vu @ Toe
	0.00	(kip)	Vu @ Heel

Footing

ØVc	7.969	10" thick
As	0.075	#4 @ 32"
a	0.0001	
ØMn	2.36	k-ft
	0.4	2-#4
	0.0022222	Reinf. Ratio
	0.000625	Reinf. Ratio

Wall

ØVc	4.554	6" thick
As	0.15	#4 @ 16" oc
a	0.0002	
ØMn	4.05	k-ft
	0.001563	Reinf. Ratio

LRFD soil

	0 psf @ Wall interface	
	4404.7 'psf @ Toe	
	991.0575 # in Toe @	0.3 ft from Wall
	0 # in Toe @	0 ft from Wall

0 psf @ Wall interface
 0 'psf @ Heel

0 # in Toe @ 0.166667 ft from Wall
 0 # in Toe @ 0.25 ft from Wall

Table 24.4.3.2—Minimum ratios of deformed shrinkage and temperature reinforcement area to gross concrete area

Reinforcement type	f _c , psi	Minimum reinforcement ratio
Deformed bars	< 60,000	0.0020
Deformed bars or welded wire reinforcement	≥ 60,000	Greater of: $\frac{0.0018 \times 60,000}{f_c}$ 0.0014

Table 11.6.1—Minimum reinforcement for walls with in-plane V_u ≤ 0.5ØV_c

Wall type	Type of nonprestressed reinforcement	Bar/wire size	f _c , psi	Minimum longitudinal, ρ _l	Minimum transverse, ρ _t
Cast-in-place	Deformed bars	≤ No. 5	≥ 60,000	0.0012	0.0020
			< 60,000	0.0015	0.0025
		> No. 5	Any	0.0015	0.0025
			Welded-wire reinforcement	≤ W31 or D31	Any
Precast ⁽¹⁾	Deformed bars or welded-wire reinforcement	Any	Any	0.0010	0.0010

⁽¹⁾Prestressed walls with an average effective compressive stress of at least 225 psi need not meet the requirement for minimum longitudinal reinforcement ρ_l.
⁽²⁾In one-way precast, prestressed walls not wider than 12 ft and not mechanically connected to corner restraint in the transverse direction, the minimum reinforcement requirement in the direction normal to the flexural reinforcement need not be satisfied.