Structural Calculations

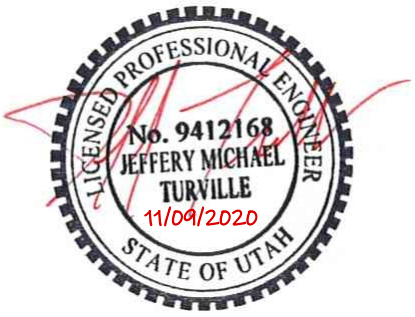
for

Allred Residence

1877 East Quail Crest Lane
Sandy, UT

SUBMITTED TO:
Arcflo

Solutions you can build on for over 70 years



contact:
Jeff Turville
jturville@reeve-assoc.com
5160 South 1500 West
Riverdale, Utah 84405
801.621.3100

Notice

Reeve & Associate's, Inc., has authorized this copy only if the seal is in **black** ink and the signature is in red or blue ink. We assume responsibility only for the items addressed herein and do not assume responsibility for the remainder of the structure. No site observations are scheduled to verify the understanding of the contractor or the proper installation of the items addressed herein.

Oct-20
Ref: 4899-A77

Solutions you can build on

Project Information

Project Name: Allred Residence
Project Location: 1877 East Quail Crest Lane Sandy, UT

Design Criteria

Governing Building Code:	2018 IBC	
Construction Type:	Wood Bearing Wall	
Wind Zone and Exposure:	103mph	Exp C
Seismic Design Category:	D	
Soil Site Class:	D	
Spectral Accelerations:	Ss = 1.433g	Sds = 1.146g
	S1 = 0.527g	Sd1 = 0.623g
Design Loads:	Roof Dead Load = 15 psf	
	Ground Snow Load = 38 psf	
	Floor Dead Load = 15 psf	
	Floor Live Load = 40 psf	

Construction Materials:

Concrete 28-Day Compressive Strength

Foundations:	f'c = 4500 psi	(2500 psi design)
Exterior Slabs on Grade	f'c = 4500 psi	
Reinforcing Grade:	ASTM A615 Grade 60	

Structural Steel: ASTM A992 (f_y = 50 ksi)

Wood

Sawn Lumber:			
DF#2 or better	Fb=875 psi	Fv=95 psi	E=1.6x10^6
Laminated Veneer Lumber			
Microlam®	Fb=2600 psi	Fv=285 psi	E=2.0x10^6
Parallel Strand Lumber			
Parallam®	Fb=2900 psi	Fv=290 psi	E=2.0x10^6
Glu-Laminated Beams:			
24F-V4 DF/DF	Fb=2400 psi	Fv=195 psi	E=1.8x10^6

Roof Sheathing	7/16" OSB
Floor Sheathing	3/4" OSB
Wall Sheathing	7/16" OSB

Soil Criteria

Geotechnical Consultant:	n/a
Report Number:	n/a
Bearing Pressure:	1500 psf
Min. Bearing Depth:	30" to bottom of footing

(Contractor/Owner to verify proper bearing conditions are provided)

Reeve & Associates, Inc.	PROJECT Allred Residence	PROJ NO. Ref: 4899-A77
	SUBJECT **Dead Loads**	BY DATE 10/05/20
		CHK DATE
		SHEET OF REV

Typical Roof Dead Loads:

R-38 Attic Insulation	1.25 psf
15/32" Roof Sheathing	1.5 psf
Pre-Engineered Trusses	3 psf
Elec/Mech	2 psf
Asphalt Shingles	2 psf
1/2" Gyp Board Ceiling	2.2 psf
Collateral	**3.05** psf
Total Dead Load =	15 psf

Typical Floor Dead Loads:

Carpet - lightweight finishes	2 psf
3/4" OSB plywood	2.3 psf
Pre-Engineered Truss or joist	3 psf
Insulation (12" at 0.14 psf/in)	1.5 psf
Mech/Elec/Plumbing	1.5 psf
1/2" gypboard ceiling	2.2 psf
Collateral	2.5 psf
Total Dead Load =	15 psf

Typical Wall Dead Loads:

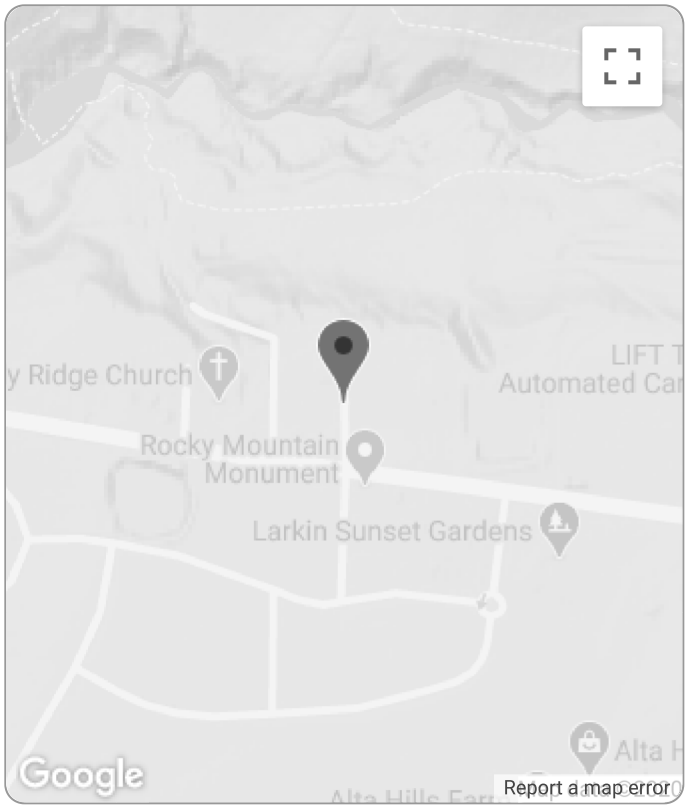
Fiber-Cement Siding	3 psf
House Wrap	0.5 psf
7/16" OSB Sheathing	1.5 psf
2x6 Studs @ 16"o.c.	1.7 psf
Insulation (6" batt @ 0.1psf/in)	0.6 psf
Elec/Mech	1.5 psf
1/2" Gyp Board	2.2 psf
Collateral	**1** psf
Total Dead Load =	12 psf

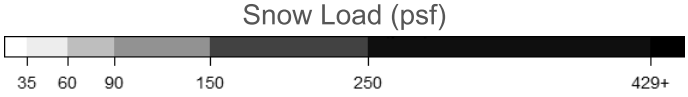
2018 Utah Ground Snow Load Map

Allred Residence

Latitude: 40.557
Longitude: -111.838
Elevation: 4,797 ft

Ground Snow Load:
38 psf / 1.83 kPa





*This document is not legally binding. The user is urged to verify ground snow load values with the local authority having jurisdiction.

These ground snow load values represent 50-year ground snow load estimated value at a 2% probability of exceedance for the location given. The grid used in the map is 3350ft by 3350ft. Elevations for these grid cells were estimated by aggregating data from 100ft by 100ft USGS digital elevation models and may not coincide with the actual site elevation. These predictions are calculated using the process outlined in The Utah Snow Load Study.1

Final predictions given are bounded at a lower limit for a minimum ground snow load of 21 psf to meet ASCE 7. Estimated values for snow loads at elevations significantly higher than all nearby stations lead to unreasonably high snow load estimates, therefore, the predictions in the map are not allowed to extend beyond the highest 50-year station ground snow load of 429 psf. Elevations over 9,000 ft are also considered less accurate due to the limited number of stations at these elevations. The results shown in this report have included a warning if the results have reached or exceeded the upper limit.

While great efforts have been made to ensure these predictions are as accurate as possible, designers must use expert judgement to ensure that such predictions are appropriate for their particular project. The SEAU and the authors cannot accept responsibility for prediction errors or any consequences resulting therefrom.

1 Bean, Brennan; Maguire, Marc; and Sun, Yan, "The Utah Snow Load Study" (2018). Civil and Environmental Engineering Faculty Publications. Paper 3589.

madeNicely.com.

Ground & Sloped Roof Snow Loads
ASCE 7-16 Chp. 7.2-7.4

GENERAL INPUT AND OUTPUT:

Roof Slope:	12:12	*45.00 °*
Location:	SALT LAKE	
Elevation at Site	4797 ft	
p_g (Ground Snow)	47 psf	38 psf *<---Manual Entry*
C_e (Exposure Factor):	1.0	
C_t (Thermal Factor):	1.0	
I_s (Importance Factor):	1.0	
P_f (Roof Snow):	**26.0 psf**	
C_s (Roof Slope Factor):	0.6	
P_s (Sloped Roof Snow):	**16.3 psf**	

Snow Drift Load

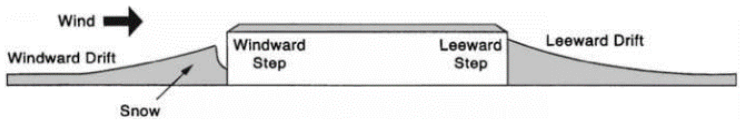


FIGURE 7.7-1 Drifts Formed at Windward and Leeward Steps

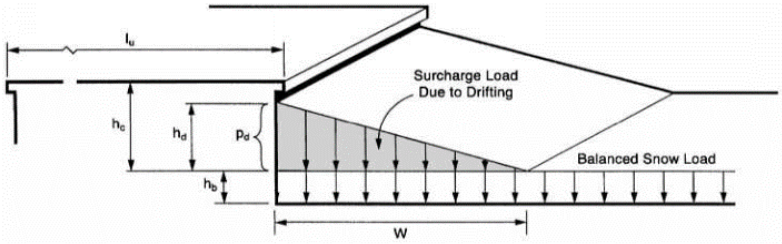


FIGURE 7.7-2 Configuration of Snowdrifts on Lower Roofs

Snow Drifts at Lower Roofs

Description Drift 1	P_f	P_g	L_u Upper	L_u Lower	Ht. Step	Is	Snow Load Density	h_b
	26 psf	38 psf	0.00 ft	0.00 ft	0.00 ft	1.0	18.94 pcf	1.37 ft
	hc	h_c/h_b	h_d Leeward	h_d Wndwrd	Max Drift	W	x	Drift at x
Drift Not Required	0.00 ft	0.00 psf	-1.50 ft	-1.13 ft	**0.00 psf**	**0.00 ft**	0	0.00 psf
Description Drift 2	P_f	P_g	L_u Upper	L_u Lower	Ht. Step	Is	Snow Load Density	h_b
	26 psf	38 psf	0.00 ft	0.00 ft	0.00 ft	1.0	18.94 pcf	1.37 ft
	hc	h_c/h_b	h_d Leeward	h_d Wndwrd	Max Drift	W	x	Drift at x
Drift Not Required	0.00 ft	0.00 psf	-1.50 ft	-1.13 ft	**0.00 psf**	**0.00 ft**	0	0.00 psf
Description Drift 3	P_f	P_g	L_u Upper	L_u Lower	Ht. Step	Is	Snow Load Density	h_b
	26 psf	38 psf	0.00 ft	0.00 ft	0.00 ft	1.0	18.94 pcf	1.37 ft
	hc	h_c/h_b	h_d Leeward	h_d Wndwrd	Max Drift	W	x	Drift at x
Drift Not Required	0.00 ft	0.00 psf	-1.50 ft	-1.13 ft	**0.00 psf**	**0.00 ft**	0	0.00 psf
Description Drift 4	P_f	P_g	L_u Upper	L_u Lower	Ht. Step	Is	Snow Load Density	h_b
	26 psf	38 psf	0.00 ft	0.00 ft	0.00 ft	1.0	18.94 pcf	1.37 ft
	hc	h_c/h_b	h_d Leeward	h_d Wndwrd	Max Drift	W	x	Drift at x
Drift Not Required	0.00 ft	0.00 psf	-1.50 ft	-1.13 ft	**0.00 psf**	**0.00 ft**	0	0.00 psf

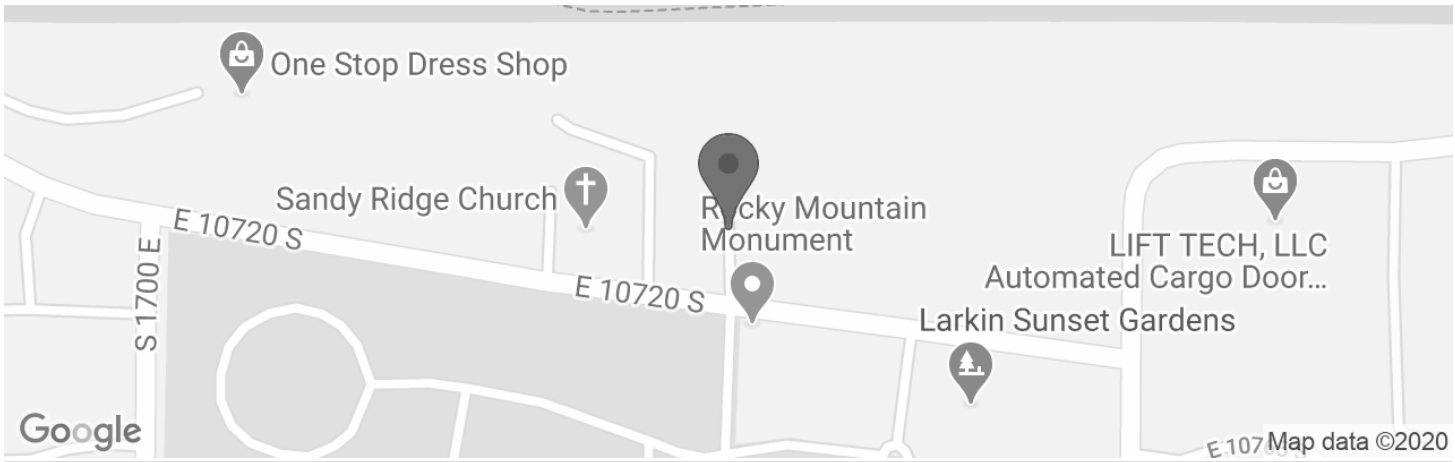
Snow Drifts at Roof Projections

Description Drift A	P_f	P_g	L_u	Ht. Step	Is	Snow Load Density	h_b
	26 psf	38 psf	0.00 ft	0.00 ft	1.0	18.94 pcf	1.37 ft
	hc	h_c/h_b	h_d	Max Drift	W	x	Drift at x
Drift Not Required	0.00 ft	0.00 psf	1.18 ft	**0.00 psf**	**0.00 ft**	0	0.00 psf
Description Drift B	P_f	P_g	L_u	Ht. Step	Is	Snow Load Density	h_b
	26 psf	38 psf	0.00 ft	0.00 ft	1.0	18.94 pcf	1.37 ft
	hc	h_c/h_b	h_d	Max Drift	W	x	Drift at x
Drift Not Required	0.00 ft	0.00 psf	1.18 ft	**0.00 psf**	**0.00 ft**	0	0.00 psf
Description Drift C	P_f	P_g	L_u	Ht. Step	Is	Snow Load Density	h_b
	26 psf	38 psf	0.00 ft	0.00 ft	1.0	18.94 pcf	1.37 ft
	hc	h_c/h_b	h_d	Max Drift	W	x	Drift at x
Drift Not Required	0.00 ft	0.00 psf	1.18 ft	**0.00 psf**	**0.00 ft**	0	0.00 psf

Allred Residence

Quail Crest Ln, Sandy, UT 84092, USA

Latitude, Longitude: 40.5572508, -111.8383725



Date	8/11/2020, 4:22:26 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Default (See Section 11.4.3)

Type	Value	Description
S_S	1.433	MCE_R ground motion. (for 0.2 second period)
S_1	0.527	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.719	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1.146	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1.2	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.651	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	0.781	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	1.433	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.671	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	2.867	Factored deterministic acceleration value. (0.2 second)
S1RT	0.527	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.611	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	1.193	Factored deterministic acceleration value. (1.0 second)
PGAd	1.169	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.857	Mapped value of the risk coefficient at short periods

Seismic Design for Building Structures

ASCE 7-16 Chp. 12

Earthquake Loads-Site Ground Motion

I=	1		h_n=	24.00 ft	(Building Height)
R=	6.5	Wood Brg Wall	Structure Type =	Other	
S_s=	1.433		C_t=	0.02	
S_1=	0.527		x=	0.75	
Site Class=	D	Default			
			Check Height for LFRS =	24.0ft	> NP (per exception 12.2.5.6 where
			DL =	6.5 psf (Estimated)	DL <20psf allowed up to 65ft)
F_a=	1.20				
S_{MS}=	1.720		S_{MS}=	F_a*S_S	
S_{DS}=	1.146		S_{DS}=	2*S_{MS}/3	
F_v=	1.77				
S_{M1}=	0.934		S_{M1}=	F_v*S_1	
S_{D1}=	0.623		S_{D1}=	2*S_{M1}/3	

Earthquake Loads-Minimum Design Lateral Force

			TL=	8 s	
C_s=	0.1764	(12.8-2)	T=	0.217 s	Cs OK per 11.4.8
C_s=	0.4419	max (12.8-3)	Ts=	0.543 s	1.5xTs= 0.815 s
C_s=	0.0504	min (12.8-5)			Load Combinations that control lateral:
			ASD Load Factor =	0.7	D+0.75L+0.75S+0.75(0.7*E)
USE			Rho =	1.3	0.6D+0.7E
C_s= 0.1764					
V=C_s*W			**V = ASD Load Factor*Rho*Cs*W =**	**0.16 *W**	

Dead Load Effect **$V_{unfactored}$ = Rho*Cs*W = 0.23 *W**

0.2*S_{DS}= 0.229

(+/-) 0.2*S_{DS}*D

Seismic Design Category

SDS => D

SD1 => D

Wind Loads on Building Structures

ASCE 7-16 Chp. 27, Part 1

Reeve & Associates, Inc.

Risk Category =	II		
Basic Wind Speed V =	103	mph	
Exposure Category =	C		3
Wind Directionality Factor, Kd =	0.85		
Topographic Factor, K_{zt} =	1.0		Site Elevation
Ground Elevation Factor, Ke =	0.9		4000 ft
Gust Effect Factor, G =	0.85		
Total Stories =	1	(5 max)	
Internal Pressure Coefficient, Gcpi =	0.18		
	-0.18		

Enclosure Classification - Section 26.12

	Length	Height	Ag	Ao	% open	Open	Partial E check #1
Wall 1 =	20	10	200	0	0.0	N	N
Wall 2 =	20	10	200	0	0.0	N	N
Wall 3 =	25	10	250	0	0.0	N	N
Wall 4 =	25	10	250	0	0.0	N	N

Open:	NO
Partially Enclosed:	NO
Enclosed:	YES
Partially Open:	NO

Wall Pressure

	Front to Back	Side to Side
Windward Wall, Cp =	0.8	0.8
Windward Wall Width, B =	92 ft	56 ft
Side Wall Width, L =	56 ft	92 ft
L/B =	0.608696	1.642857
Leeward Wall, Cp =	-0.5	-0.3
Side Wall, Cp =	-0.7	-0.7

Roof Pressure

Roof Type =	Hip 2		Mono 3	
Roof Pitch =	12/12	45.0 °	12/12	45.0 °
Ridge Height =	35 ft		35 ft	
Eave Height =	14 ft		14 ft	
Mean Roof Height, h =	24.3 ft		24.3 ft	
h/L =	0.43		0.26	
h/2 =	12 ft		12 ft	
Kz =	0.94		0.94	
Velocity Pressure, qz =	18.8 psf		18.8 psf	

Parapet Wall Pressure

Parapet Wall Height =	0 ft
Building Height to top of parapet=	0 ft
Kz =	0.85
qp =	19.6 psf
WW GCpn =	1.50
LW GCpn+	-1.00
Pp =	49.0 psf
Adj. Pp =	29.4 psf
Parapet Load per foot =	0.0 plf

Roof Pressure Coefficient Cp

Figure 27.3-1

		WW Area: 2144 ft² LW Area: 2144 ft² Front to Back Distance from Windward Edge, ft					WW Area: 602 ft² LW Area: 602 ft² Side to Side Distance from Windward Edge, ft			
	Max/Min	0 ft	12 ft	24 ft	49 ft	Max/Min	0 ft	12 ft	24 ft	49 ft
Windward Normal to Ridge =	Max	0.40	0.40	0.40	0.40	Max	0.40	0.40	0.40	0.40
	Min	0.11	0.11	0.11	0.11	Min	0.38	0.38	0.38	0.38
Leeward Normal to Ridge =	Max	-0.60	-0.60	-0.60	-0.60	Max	-0.60	-0.60	-0.60	-0.60
	Min	-0.60	-0.60	-0.60	-0.60	Min	-0.60	-0.60	-0.60	-0.60
Parallel to Ridge =	Max	-0.18	-0.18	-0.18	-0.18	Max	-0.18	-0.18	-0.18	-0.18
(or less than 10° slope)	Min	-0.90	-0.90	-0.50	-0.30	Min	-0.90	-0.90	-0.50	-0.30

ASD Factor: 0.6

Load Description	Overall Height	Wall Trib	Kh	gh	Front to Back WW	LW	SW	Int +/-	Total WW+LW	Shear Force, lbs	Adj. Shear Force, lbs	Adj. Wall Force
				max-->	6.4 psf	-9.6 psf	varies	3.4 psf	15.9 psf	24169 lbs	14502 lbs	
Roof	35.0 ft	-	-	min-->	1.7 psf	-9.6 psf	varies	-3.4 psf	11.3 psf	17091 lbs	10255 lbs	
Wall 1	10 ft	5	0.85		17.0 psf	11.5 psf	-8.0 psf	-11.2 psf	3.4 psf	19.5 psf	8971 lbs	5383 lbs
			0.85		17.0 psf	11.5 psf	-8.0 psf	-11.2 psf	3.4 psf	19.5 psf	0 lbs	0 lbs
			0.85		17.0 psf	11.5 psf	-8.0 psf	-11.2 psf	3.4 psf	19.5 psf	0 lbs	0 lbs
			0.85		17.0 psf	11.5 psf	-8.0 psf	-11.2 psf	3.4 psf	19.5 psf	0 lbs	0 lbs
			0.85		17.0 psf	11.5 psf	-8.0 psf	-11.2 psf	3.4 psf	19.5 psf	0 lbs	0 lbs
Other												
									Front to Back Total Shear:		33140 lbs	19884 lbs

		Side to Side WW	LW	SW	Int +/-	Total WW + LW	Shear Force, lbs	Adj. Shear Force, lbs	Adj. Wall Force
	max-->	11.5 psf	-4.8 psf	varies	3.4 psf	16.3 psf	9820 lbs	5892 lbs	
Roof	min-->	6.0 psf	-9.6 psf	varies	-3.4 psf	15.6 psf	6640 lbs	3984 lbs	
Wall 1		11.5 psf	-4.8 psf	-11.2 psf	3.4 psf	16.3 psf	4568 lbs	2741 lbs	
		11.5 psf	-4.8 psf	-11.2 psf	3.4 psf	16.3 psf	0 lbs	0 lbs	
		11.5 psf	-4.8 psf	-11.2 psf	3.4 psf	16.3 psf	0 lbs	0 lbs	
		11.5 psf	-4.8 psf	-11.2 psf	3.4 psf	16.3 psf	0 lbs	0 lbs	
		11.5 psf	-4.8 psf	-11.2 psf	3.4 psf	16.3 psf	0 lbs	0 lbs	
Other									
						Side to Side Total Shear:	14388 lbs	8633 lbs	

Vertical Distribution of Seismic Forces

ASCE 7-16 Chp. 12.8.3

Side-to-Side Dim:	92 ft		Roof Area = 3900 ft²
Front-to-Back Dim:	56 ft	Height	Floor Area = 1817 ft²
Roof Trib:	6 ft	14 ft	Floor Area = 2625 ft²
Floor Trib:	5 ft	14 ft	Floor Area =
Floor Trib:	4.5 ft	9 ft	
Floor Trib:			
Roof DL:	15 psf		
Roof Seis. DL+Snow:	15 psf		Snow (psf) = 26 psf
Floor Seismic DL:	15 psf		*Floor to Floor Tie Span = 24 in
Wall Seismic DL:	15 psf		

Seismic: V = 0.16 *W

F-front-to-back:	V		W	WxHx	Cvx	Fx
Roof	12046 lbs	lb	75055	1050774	0.43	14291 lbs
Floor	6589 lbs	lb	41055	574770	0.23	7817 lbs
Floor	14632 lbs	lb	91170	820530	0.34	11160 lbs
Floor	0 lbs	lb	0	0	0.00	0 lbs
	33268 lbs		207280	2446074		33268 lbs
F-side-to-side:						
Roof	11006 lbs	lb	68575.31	960054	0.43	13130 lbs
Floor	5722 lbs	lb	35655	499170	0.22	6827 lbs
Floor	13852 lbs	lb	86310	776790	0.35	10624 lbs
Floor	0 lbs	lb	0	0	0.00	0 lbs
	30581 lbs		190540	2236014		30581 lbs

Summation of Lateral Forces

Wind:

F-front-to-back:	
Roof	19884 lbs
Floor	0 lbs
Floor	0 lbs
Floor	0 lbs

F-side-to-side:	
Roof	8633 lbs
Floor	0 lbs
Floor	0 lbs
Floor	0 lbs

Use for Design Comparison:

F-front-to-back:			SW Multiplier	Wind/Seismic Governing Ratio
Roof	19884 lbs	**Wind Governs**	1.4	1.391373
Floor	7817 lbs	**Seismic Governs**	1	
Floor	11160 lbs	**Seismic Governs**	1	
Floor	0 lbs		1	
F-side-to-side:				
Roof	13130 lbs	**Seismic Governs**	1	0.657477
Floor	6827 lbs	**Seismic Governs**	1	
Floor	10624 lbs	**Seismic Governs**	1	
Floor	0 lbs		1	

Wood Shear Wall Capacities (plf):

	seismic	wind
SW-1	260	365
SW-2	380	532
SW-3	490	685
SW-4	640	896
SW-5	760	1065
SW-6	980	1370
SW-7	1280	1790

Hold Down Capacities (lbs):

0	NONE	
500	LSTHD8	1610
1610	STHD10	2175
2175	STHD14	3500
3500	HDU4	4565
4565	HDU5	5645
5645	HDU8	7870
7870	HDU11	9535
9535	HDU14	14445
14445	HD12	15510
15510	HD19	19070
19070	NG	

See Floor to Floor Tie Span Above*

0	NONE	
500	MST37	1725
1725	MST48	3215
3215	MST60	5240
5240	MST72	6730
6730	CMST12*	9215
9215	(2) MST60	10480
10480	(2) MST72	13460
13460	NG	

Wood Shear Wall Design

NG

Reeve & Associates, Inc.

2nd Floor

Front-to-Back SW:	**Bonus Rm Lt**	**Gar/Kitch**	**Hall/Stg Rt**	**Bed 1 Rt**						
SW Height (ft):	9	10	10	9						
SW Trib (ft) W:	0	0	0	0						
SW Area (sf) S:	423	908.5	242	243.5						
SW Wind Forces:	0	0	0	0	0	0	0	0	0	0
SW Seismic Forces:	848	1821	485	488	0	0	0	0	0	0
Total SW Length (ft):	19.5	20	14	10.5	0	0	0	0	0	0
Uplift (lb):	391	911	347	418	0	0	0	0	0	0
SW Length (ft):	19.5	20	14	10.5						
Sum Perf Sgmts (ft):	19.5	20	14	10.5						
Area Openings (sf):	0	0	0	0						
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio Reduc.:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):	0.00	0.00	0.00	0.00						
Seismic V (lb/ft):	43.48	91.06	34.65	46.49						
SW Designation:	**SW-1**	**SW-1**	**SW-1**	**SW-1**						
Floor Trib DL (ft):	2	2	2	3						
Resist. 0.6DL (lb):	965.25	1080	756	567	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:	**NONE**	**NONE**	**NONE**	**NONE**	**NONE**					
SW Length (ft):										
Sum Perf Sgmts (ft):										
Area Openings (sf):										
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):										
Seismic V (lb/ft):										
SW Designation:										
Trib DL (ft):				6						
Resist. 0.6DL (lb):	0	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:			**NONE**							
SW Length (ft):										
Sum Perf Sgmts (ft):										
Area Openings (sf):										
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):										
Seismic V (lb/ft):										
SW Designation:										
Trib DL (ft):										
Resist. 0.6DL (lb):	0	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:										
SW Length (ft):										
Sum Perf Sgmts (ft):										
Area Openings (sf):										
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):										
Seismic V (lb/ft):										
SW Designation:										
Trib DL (ft):										
Resist. 0.6DL (lb):	0	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:										
SW Length (ft):										
Sum Perf Sgmts (ft):										
Area Openings (sf):										
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):										
Seismic V (lb/ft):										
SW Designation:										
Trib DL (ft):										
Resist. 0.6DL (lb):	0	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:										

2nd Floor

Side-to-Side SW:	Bonus Frnt	Bonus Bk		Bed 1 Frnt	Gar/Stairs					
SW Height (ft):	9	9		9	9	0.01				
SW Trib (ft) W:	0	0		0	0					
SW Area (sf) S:	423	665		243.5	487					
SW Wind Forces:	0	0	0	0	0	0	0	0	0	0
SW Seismic Forces:	741	1164	0	426	853	0	0	0	0	0
Total SW Length (ft):	10	0	0	11	20	0	0	0	0	0
Uplift (lb):	666	0	0	349	384	0	0	0	0	0
		FTW								
SW Length (ft):	5			13.5	20					
Sum Perf Sgmts (ft):	5			11	20					
Area Openings (sf):	0			12.5	0					
Co:	1.00	1.00	1.00	0.89	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio Reduc.:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):	0.00			0.00	0.00					
Seismic V (lb/ft):	74.05			38.75	42.63					
SW Designation:	**SW-1**	**SEE CALC**		**SW-1**	**SW-1**					
Floor Trib DL (ft):	4	6		2	4					
Resist. 0.6DL (lb):	292.5	0	0	668.25	1170	0	0	0	0	0
Net Uplift (lb):	374	0	0	0	0	0	0	0	0	0
Hold Down:	**NONE**		**NONE**	**NONE**	**NONE**	**NONE**	**NONE**			
SW Length (ft):	5									
Sum Perf Sgmts (ft):	5									
Area Openings (sf):	0									
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):	0.00									
Seismic V (lb/ft):	74.05									
SW Designation:	**SW-1**									
Trib DL (ft):	4									
Resist. 0.6DL (lb):	292.5	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	374	0	0	0	0	0	0	0	0	0
Hold Down:	**NONE**				**NONE**					
SW Length (ft):										
Sum Perf Sgmts (ft):										
Area Openings (sf):										
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):										
Seismic V (lb/ft):										
SW Designation:										
Trib DL (ft):										
Resist. 0.6DL (lb):	0	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:										
SW Length (ft):										
Sum Perf Sgmts (ft):										
Area Openings (sf):										
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):										
Seismic V (lb/ft):										
SW Designation:										
Trib DL (ft):										
Resist. 0.6DL (lb):	0	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:										
SW Length (ft):										
Sum Perf Sgmts (ft):										
Area Openings (sf):										
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	#DIV/0!	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):										
Seismic V (lb/ft):										
SW Designation:										
Trib DL (ft):										
Resist. 0.6DL (lb):	0	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:										

Roof Front-to-Back SW:	Bonus Rm Lt	Gar/Kitch	Master Rt	Bed 1 Rt	Mstr Clst Lt	0	0	0	0	0
SW Height (ft):	13	13	10	10	10					
SW Trib (ft) W:	14.5	45.5	31	12	7					
SW Area (sf) S:	431.5	1708	1394.5	243.5	134					
SW Wind Forces:	3134	9834	6700	2594	1513					
SW Seismic Forces:	4242	15497	11211	2403	1054					
Total SW Length (ft):	12	28	26.8333	10	9.8333	0	0	0	0	0
Uplift (lb):	5231	7846	4359	2843	1539	0	0	0	0	0
SW Length (ft):	12	28	15.333	10	9.8333					
Sum Perf Sgmts (ft):	12	28	15.3333	10	9.8333					
Area Openings (sf):	0	0	0	0	0					
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):	186.54	250.87	178.35	185.26	109.90					
Seismic V (lb/ft):	353.48	553.48	417.78	240.33	107.18					
SW Designation:	**SW-2**	**SW-4**	**SW-3**	**SW-1**	**SW-1**					
Roof Trib DL (ft):	6	2	8	4	8					
Resist. 0.6DL (lb):	1991.25	2970	1997.973	1197	796.4973	0	0	0	0	0
Net Uplift (lb):	3240	4876	2361	1646	742	0	0	0	0	0
Hold Down:	**STHD14**	**HDU5**	**STHD14**	**STHD10**	**LSTHD8**					
SW Length (ft):			11.5							
Sum Perf Sgmts (ft):			11.5							
Area Openings (sf):			0							
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):			178.35							
Seismic V (lb/ft):			417.78							
SW Designation:			**SW-3**							
Trib DL (ft):		2	8							
Resist. 0.6DL (lb):	0	0	931.5	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	3427	0	0	0	0	0	0	0
Hold Down:			**STHD14**							
SW Length (ft):										
Sum Perf Sgmts (ft):										
Area Openings (sf):										
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):										
Seismic V (lb/ft):										
SW Designation:										
Trib DL (ft):										
Resist. 0.6DL (lb):	0	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:										
SW Length (ft):										
Sum Perf Sgmts (ft):										
Area Openings (sf):										
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):										
Seismic V (lb/ft):										
SW Designation:										
Trib DL (ft):										
Resist. 0.6DL (lb):	0	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:										
SW Length (ft):										
Sum Perf Sgmts (ft):										
Area Openings (sf):										
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):										
Seismic V (lb/ft):										
SW Designation:										
Trib DL (ft):										
Resist. 0.6DL (lb):	0	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:										

Roof

Side-to-Side SW:	Bonus Frnt	Bonus Bk	2 Car Deep	Bed 1 Frnt	Gar/Stairs	Mstr Clst	Master	Dining	0	0
SW Height (ft):	13	8	10	13	13	10	10	14	0	
SW Trib (ft) W:	16.75	16.75	16.75	15	15	15	15	4	0	
SW Area (sf) S:	422.5	757.5	281	453.5	1276.5	358	466.5	120	0	
SW Wind Forces:	2582	2582	2582	2312	2312	2312	2312	617	0	
SW Seismic Forces:	3794	6056	2031	3703	10077	2587	3371	1449	0	
Total SW Length (ft):	10.5	0	6	16	20.75	10	6	0	0	0
Uplift (lb):	5332	0	4304	3249	6683	2587	5618	0	0	0
		FTW						FTW		
SW Length (ft):	5.25		15	23.5	7.75	14	6			
Sum Perf Sgmts (ft):	5.25		6	16	7.75	10	6			
Area Openings (sf):	0		20.997	45	0	20	0			
Co:	1.00	1.00	1.22	0.89	1.00	0.88	1.00	1.00	1.00	1.00
Aspect Ratio:	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):	175.66		307.40	103.23	79.60	165.17	275.28			
Seismic V (lb/ft):	384.17		338.43	231.46	485.64	258.70	561.85			
SW Designation:	**SW-3**	**SEE CALC**	**SW-2**	**SW-1**	**SW-3**	**SW-2**	**SW-4**	**SEE CALC**		
Roof Trib DL (ft):	6		4	2	12	2	12			
Resist. 0.6DL (lb):	741.375	0	945	2254.5	2041.875	756	594	0	0	0
Net Uplift (lb):	4590	0	2584	1393	4641	2201	5024	0	0	0
Hold Down:	**HDU5**		**STHD14**	**LSTHD8**	**HDU5**	**STHD14**	**MST60**	**NONE**	**NONE**	
SW Length (ft):	5.25				13					
Sum Perf Sgmts (ft):	5.25				13					
Area Openings (sf):	0				0					
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):	175.66				79.60					
Seismic V (lb/ft):	384.17				485.64					
SW Designation:	**SW-3**				**SW-3**					
Trib DL (ft):	6			2	12					
Resist. 0.6DL (lb):	741.375	0	0	0	1462.5	0	0	0	0	0
Net Uplift (lb):	4590	0	0	0	5221	0	0	0	0	0
Hold Down:	**HDU5**				**HDU5**					
SW Length (ft):										
Sum Perf Sgmts (ft):										
Area Openings (sf):										
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):										
Seismic V (lb/ft):										
SW Designation:										
Trib DL (ft):										
Resist. 0.6DL (lb):	0	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:										
SW Length (ft):										
Sum Perf Sgmts (ft):										
Area Openings (sf):										
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):										
Seismic V (lb/ft):										
SW Designation:										
Trib DL (ft):										
Resist. 0.6DL (lb):	0	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:										
SW Length (ft):										
Sum Perf Sgmts (ft):										
Area Openings (sf):										
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):										
Seismic V (lb/ft):										
SW Designation:										
Trib DL (ft):										
Resist. 0.6DL (lb):	0	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:										

Lower Floor

Front-to-Back SW:	**Bonus Rm L**	**Gar/Kitch**	**Master Rt**	**Bed 1 Rt**	**Mstr Clst Lt**	**0**	**0**	**0**	**0**	**0**
SW Height (ft):	n/a	n/a	n/a	n/a	n/a					
SW Trib (ft) W:										
SW Area (sf) S:										
SW Wind Forces:										
SW Seismic Forces:										
Total SW Length (ft):	0	0	0	0	0	0	0	0	0	0
Uplift (lb):	0	0	0	0	0	0	0	0	0	0
SW Length (ft):										
Sum Perf Sgmts (ft):										
Area Openings (sf):										
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):										
Seismic V (lb/ft):										
SW Designation:										
Floor Trib DL (ft):										
Resist. 0.6DL (lb):	0	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:										
SW Length (ft):										
Sum Perf Sgmts (ft):										
Area Openings (sf):										
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):										
Seismic V (lb/ft):										
SW Designation:										
Trib DL (ft):										
Resist. 0.6DL (lb):	0	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:										
SW Length (ft):										
Sum Perf Sgmts (ft):										
Area Openings (sf):										
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):										
Seismic V (lb/ft):										
SW Designation:										
Trib DL (ft):										
Resist. 0.6DL (lb):	0	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:										
SW Length (ft):										
Sum Perf Sgmts (ft):										
Area Openings (sf):										
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):										
Seismic V (lb/ft):										
SW Designation:										
Trib DL (ft):										
Resist. 0.6DL (lb):	0	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:										

FLOOR										
Side-to-Side SW:	**Bonus Frnt**	**Bonus Bk**	**2 Car Deep**	**Bed 1 Frnt**	**Gar/Stairs**	**Mstr Clst**	**Master**	**Dining**	**Undr Deck**	**0**
SW Height (ft):	n/a	n/a	n/a	n/a	n/a	n/a	9	9	9	
SW Trib (ft) W:							0	0	0	
SW Area (sf) S:							750	219	339	
SW Wind Forces:							2312	617	0	
SW Seismic Forces:							6406	2336	1372	
Total SW Length (ft):	0	0	0	0	0	0	11	7	5.5	0
Uplift (lb):	0	0	0	0	0	0	8306	5901	2245	0
SW Length (ft):							17	13	14.5	
Sum Perf Sgmts (ft):							11	7	5.5	
Area Openings (sf):							24	24	56.997	
Co:	1.00	1.00	1.00	1.00	1.00	1.00	0.89	1.00	0.59	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):							150.15	62.92	0.00	
Seismic V (lb/ft):							582.40	333.65	249.45	
SW Designation:							**SW-5**	**SW-2**	**SW-3**	
Floor Trib DL (ft):							9	4	7	
Resist. 0.6DL (lb):	0	0	0	0	0	0	1971	760.5	1044	0
Net Uplift (lb):	0	0	0	0	0	0	7312	5141	2749	0
Hold Down:							**HDU8**	**HDU5**	**STHD14**	
SW Length (ft):										
Sum Perf Sgmts (ft):										
Area Openings (sf):										
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):										
Seismic V (lb/ft):										
SW Designation:										
Trib DL (ft):										
Resist. 0.6DL (lb):	0	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:										
SW Length (ft):										
Sum Perf Sgmts (ft):										
Area Openings (sf):										
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):										
Seismic V (lb/ft):										
SW Designation:										
Trib DL (ft):										
Resist. 0.6DL (lb):	0	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:										
SW Length (ft):										
Sum Perf Sgmts (ft):										
Area Openings (sf):										
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):										
Seismic V (lb/ft):										
SW Designation:										
Trib DL (ft):										
Resist. 0.6DL (lb):	0	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:										
SW Length (ft):										
Sum Perf Sgmts (ft):										
Area Openings (sf):										
Co:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Aspect Ratio:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Wind V (lb/ft):										
Seismic V (lb/ft):										
SW Designation:										
Trib DL (ft):										
Resist. 0.6DL (lb):	0	0	0	0	0	0	0	0	0	0
Net Uplift (lb):	0	0	0	0	0	0	0	0	0	0
Hold Down:										

Force Transfer Around Openings - Diekmann Technique

Shear Line: BONUS RM BK (2nd STORY)

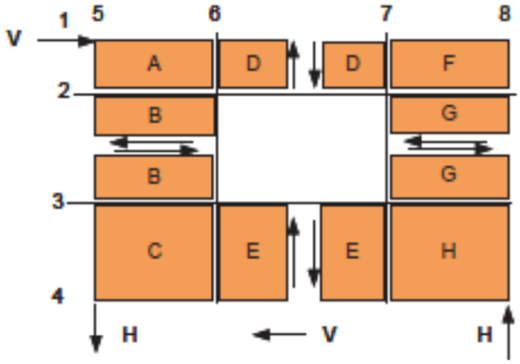
Reeve & Associates, Inc.

ASD Horizontal Shear, V = 1164 lbs
Controlling Lateral Force = Seismic
Number of Openings = 1

#	Pier Left	Pier Right	Opening W	Opening H	Top Dist.	Bot Dist.	Min. H/W	Aspect Red.	D-E Sum	B-G Sum	Max Strap	Boundary Force
1	2.333	2.5	9	6.333	1.333	1.667	2.7	0.91	3	4.83	1219	2357
												0
												0

*Aspect Reduction = 1.25-0.125h/b (AWC SPDWS 4.3.4)

Total Wall Length = 13.833 ft
Wall Height = 9.3327 ft
Total Pier Length = 4.8 ft
Holdown Force, H = 785 lbs
D,E Shear = 262 lb/ft
B,G Shear = 241 lb/ft
Total Tension, F = 2357 lbs
Min Strap = 1138 lbs
Max Strap = 1219 lbs
Check 1 488 lb/ft
Check 2 488 lb/ft
A,C,F,H Shear = -247 lb/ft



Dead Load = 150 plf
Net Uplift = 163 lbs

Holdown:	LSTHD8

Results Summary

Pier	Ht	Adj.	V_{Req}	SW	Strap
-	ft	%	lb/ft	-	-
1	9.333	0.91	265	SW-2	CS16
2					
3					

Shear Wall Capacities

		Seismic		Wind	
SW-1	-	260	plf	365	plf
SW-2	-	380	plf	532	plf
SW-3	-	490	plf	685	plf
SW-4	-	640	plf	896	plf
SW-5	-	760	plf	1065	plf
SW-6	-	980	plf	1370	plf
SW-7	-	1280	plf	1790	plf

Model No.	Total L	Ga.	DF/SP Fasteners (in.)	DF/SP End Length	SPF/HF Fasteners (in.)	SPF/HF End Length	Allowable Tension Loads (160)
CMST12	40'	12	(74) 0.162 x 2½	33"	(84) 0.162 x 2½	38"	9,215
			(86) 0.148 x 2½	39"	(98) 0.148 x 2½	44"	9,215
CMST14	52½'	14	(56) 0.162 x 2½	26"	(66) 0.162 x 2½	30"	6,475
			(66) 0.148 x 2½	30"	(76) 0.148 x 2½	34"	6,475
CMSTC16	54'	16	(50) 0.148 x 3¼	20"	(58) 0.148 x 3¼	25"	4,690
CS14	100'	14	(26) 0.148 x 2½	15"	(30) 0.148 x 2½	16"	2,490
			(30) 0.131 x 2½	16"	(36) 0.131 x 2½	19"	2,490
SS CS16	150'	16	(20) 0.148 x 2½	11"	(22) 0.148 x 2½	13"	1,705
			(22) 0.131 x 2½	13"	(26) 0.131 x 2½	14"	1,705
CS20	250'	20	(12) 0.148 x 2½	6"	(14) 0.148 x 2½	9"	1,030
			(14) 0.131 x 2½	9"	(16) 0.131 x 2½	9"	1,030

Force Transfer Around Openings - Diekmann Technique

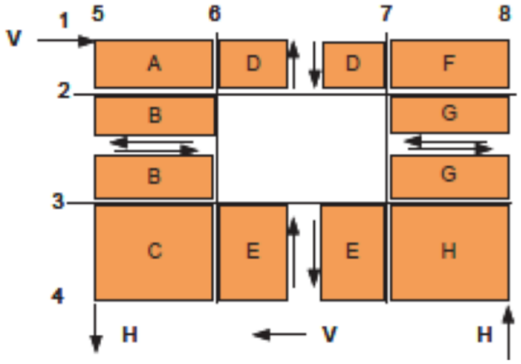
Shear Line: BONUS RM BK (1st STORY)

ASD Horizontal Shear, V =	6056	lbs
Controlling Lateral Force =	Seismic	
Number of Openings =	1	

#	Pier Left	Pier Right	Opening W	Opening H	Top Dist.	Bot Dist.	Min. H/W	Aspect Red.	D-E Sum	B-G Sum	Max Strap	Boundary Force
1	3	2.33	9	4	1	5	1.7	1.00	6	5.33	3565	6338
												0
												0

*Aspect Reduction = 1.25-0.125h/b (AWC SPDWS 4.3.4)

Total Wall Length =	14.333	ft
Wall Height =	10	ft
Total Pier Length =	5.3	ft
Holdown Force, H =	4225	lbs
D,E Shear =	704	lb/ft
B,G Shear =	1136	lb/ft
Total Tension, F =	6338	lbs
Min Strap =	2773	lbs
Max Strap =	3565	lbs
Check 1	1188	lb/ft
Check 2	1188	lb/ft
A,C,F,H Shear =	-53	lb/ft



Dead Load =	360	plf
Net Uplift =	2677	lbs
Holdown:	STHD14	

Results Summary

Pier	Ht	Adj.	V_{Req}	SW	Strap
-	ft	%	lb/ft	-	-
1	10	1.00	1136	SW-7	CMSTC16
2					
3					

Shear Wall Capacities

		Seismic		Wind	
SW-1	-	260	plf	365	plf
SW-2	-	380	plf	532	plf
SW-3	-	490	plf	685	plf
SW-4	-	640	plf	896	plf
SW-5	-	760	plf	1065	plf
SW-6	-	980	plf	1370	plf
SW-7	-	1280	plf	1790	plf

Model No.	Total L	Ga.	DF/SP Fasteners (in.)	DF/SP End Length	SPF/HF Fasteners (in.)	SPF/HF End Length	Allowable Tension Loads (160)
CMST12	40'	12	(74) 0.162 x 2½	33"	(84) 0.162 x 2½	38"	9,215
			(86) 0.148 x 2½	39"	(98) 0.148 x 2½	44"	9,215
CMST14	52½'	14	(56) 0.162 x 2½	26"	(66) 0.162 x 2½	30"	6,475
			(66) 0.148 x 2½	30"	(76) 0.148 x 2½	34"	6,475
CMSTC16	54'	16	(50) 0.148 x 3¼	20"	(58) 0.148 x 3¼	25"	4,690
CS14	100'	14	(26) 0.148 x 2½	15"	(30) 0.148 x 2½	16"	2,490
			(30) 0.131 x 2½	16"	(36) 0.131 x 2½	19"	2,490
SS CS16	150'	16	(20) 0.148 x 2½	11"	(22) 0.148 x 2½	13"	1,705
			(22) 0.131 x 2½	13"	(26) 0.131 x 2½	14"	1,705
CS20	250'	20	(12) 0.148 x 2½	6"	(14) 0.148 x 2½	9"	1,030
			(14) 0.131 x 2½	9"	(16) 0.131 x 2½	9"	1,030

Force Transfer Around Openings - Diekmann Technique

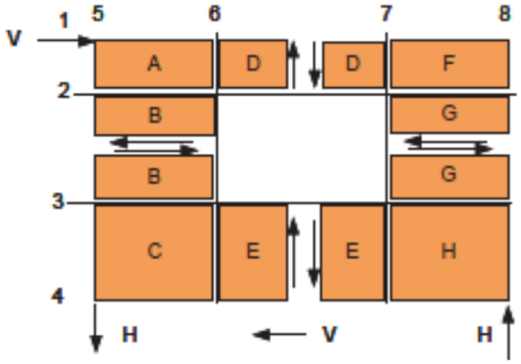
Shear Line: Dining

ASD Horizontal Shear, V = 1449 lbs
Controlling Lateral Force = Seismic
Number of Openings = 1

#	Pier Left	Pier Right	Opening W	Opening H	Top Dist.	Bot Dist.	Min. H/W	Aspect Red.	D-E Sum	B-G Sum	Max Strap	Boundary Force
1	2.333	2	9	7	1.583	2.167	3.5	0.81	3.75	4.33	1510	2804
												0
												0

*Aspect Reduction = 1.25-0.125h/b (AWC SPDWS 4.3.4)

Total Wall Length = 13.333 ft
Wall Height = 10.75 ft
Total Pier Length = 4.3 ft
Holdown Force, H = 1169 lbs
D,E Shear = 312 lb/ft
B,G Shear = 334 lb/ft
Total Tension, F = 2804 lbs
Min Strap = 1294 lbs
Max Strap = 1510 lbs
Check 1 647 lb/ft
Check 2 647 lb/ft
A,C,F,H Shear = -313 lb/ft



Dead Load = 360 plf
Net Uplift = -271 lbs

Holdown:	NONE

Results Summary

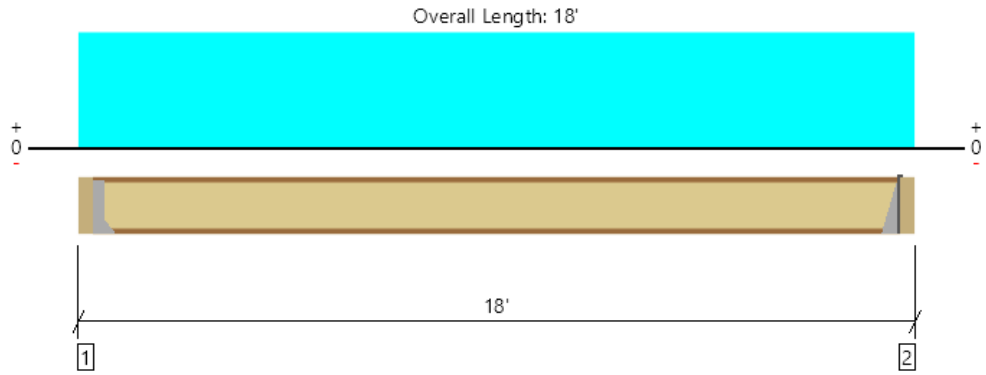
Pier	Ht	Adj.	V_{Req}	SW	Strap
-	ft	%	lb/ft	-	-
1	10.75	0.81	412	SW-3	CS16
2					
3					

Shear Wall Capacities

		Seismic		Wind	
SW-1	-	260	plf	365	plf
SW-2	-	380	plf	532	plf
SW-3	-	490	plf	685	plf
SW-4	-	640	plf	896	plf
SW-5	-	760	plf	1065	plf
SW-6	-	980	plf	1370	plf
SW-7	-	1280	plf	1790	plf

Model No.	Total L	Ga.	DF/SP Fasteners (in.)	DF/SP End Length	SPF/HF Fasteners (in.)	SPF/HF End Length	Allowable Tension Loads (160)
CMST12	40'	12	(74) 0.162 x 2½	33"	(84) 0.162 x 2½	38"	9,215
			(86) 0.148 x 2½	39"	(98) 0.148 x 2½	44"	9,215
CMST14	52½'	14	(56) 0.162 x 2½	26"	(66) 0.162 x 2½	30"	6,475
			(66) 0.148 x 2½	30"	(76) 0.148 x 2½	34"	6,475
CMSTC16	54'	16	(50) 0.148 x 3¼	20"	(58) 0.148 x 3¼	25"	4,690
CS14	100'	14	(26) 0.148 x 2½	15"	(30) 0.148 x 2½	16"	2,490
			(30) 0.131 x 2½	16"	(36) 0.131 x 2½	19"	2,490
SS CS16	150'	16	(20) 0.148 x 2½	11"	(22) 0.148 x 2½	13"	1,705
			(22) 0.131 x 2½	13"	(26) 0.131 x 2½	14"	1,705
CS20	250'	20	(12) 0.148 x 2½	6"	(14) 0.148 x 2½	9"	1,030
			(14) 0.131 x 2½	9"	(16) 0.131 x 2½	9"	1,030

2nd Floor, Floor Joist (OVER GARAGE))
1 piece(s) 11 7/8" TJI® 360 @ 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)	639 @ 3 1/2"	1080 (1.75")	Passed (59%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	639 @ 3 1/2"	1705	Passed (37%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2781 @ 9'	6180	Passed (45%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.259 @ 9'	0.435	Passed (L/808)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.356 @ 9'	0.871	Passed (L/588)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	43	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 structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Hanger on 11 7/8" GLB beam	3.50"	Hanger[1]	1.75" / - [2]	180	480	660	See note [1]
2 - Hanger on 11 7/8" LVL beam	3.50"	Hanger[1]	1.75" / - [2]	180	480	660	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.
- [2] Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 8" o/c	
Bottom Edge (Lu)	17' 5" o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- 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	IUS2.37/11.88	2.00"	N/A	10-10dx1.5	2-Strong-Grip	
2 - Top Mount Hanger	ITS2.37/11.88	2.00"	4-10dx1.5	2-10dx1.5	2-Strong-Grip	

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

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 18'	16"	15.0	40.0	Default Load

Weyerhaeuser Notes

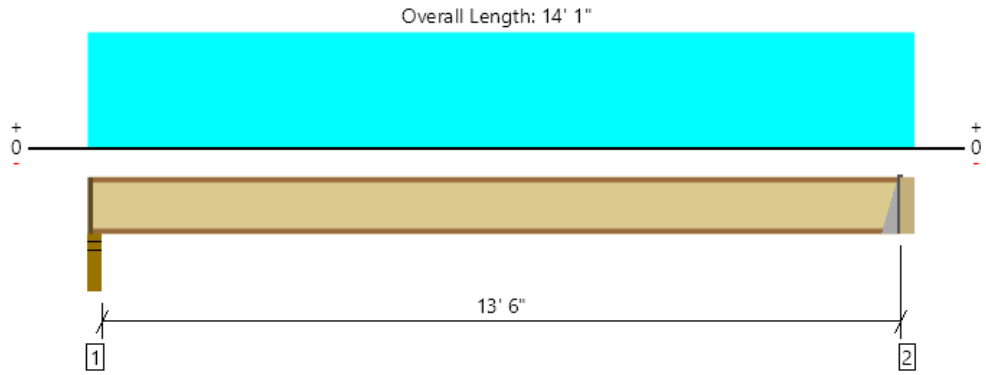
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Drew Willard Reeve and Associates (801) 663-4456 awillard@reeve-assoc.com	

Weyerhaeuser

2nd Floor, floor Joist (OVER KITCHEN)
1 piece(s) 11 7/8" TJI® 210 @ 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)	498 @ 13' 9 1/2"	1005 (1.75")	Passed (50%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	498 @ 13' 9 1/2"	1655	Passed (30%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1691 @ 7'	3795	Passed (45%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.128 @ 7'	0.340	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.175 @ 7'	0.679	Passed (L/929)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	49	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 structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - DF	3.50"	2.25"	1.75"	140	373	513	1 1/4" Rim Board
2 - Hanger on 11 7/8" LVL beam	3.50"	Hanger[1]	1.75" / - [2]	142	378	520	See note [1]

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 8" o/c	
Bottom Edge (Lu)	13' 8" o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- 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	ITS2.06/11.88	2.00"	4-10dx1.5	2-10dx1.5	2-Strong-Grip	

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

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 14' 1"	16"	15.0	40.0	Default Load

Weyerhaeuser Notes

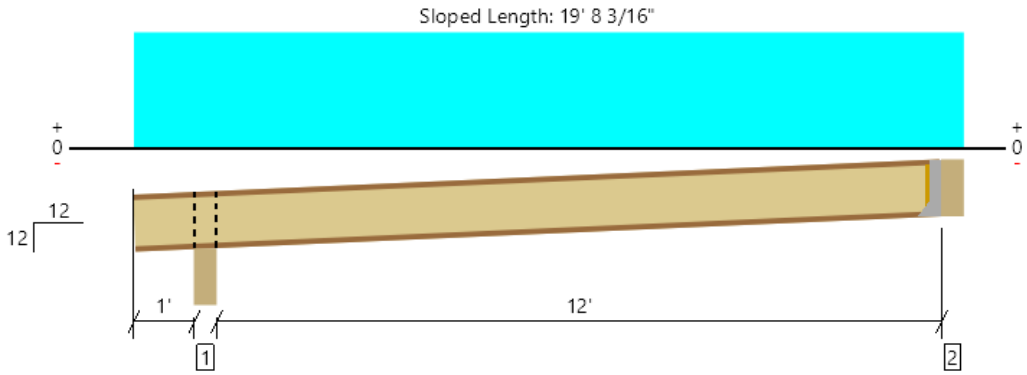
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Drew Willard Reeve and Associates (801) 663-4456 awillard@reeve-assoc.com	

Weyerhaeuser

Roof, Roof Joist: Simple Span
1 piece(s) 11 7/8" TJI® 110 @ 24" OC



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

Member Length : 20' 1/4"

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	573 @ 13' 5 1/2"	1409 (1.75")	Passed (41%)	1.15	1.0 D + 1.0 S (Alt Spans)
Shear (lbs)	573 @ 13' 5 1/2"	1794	Passed (32%)	1.15	1.0 D + 1.0 S (Alt Spans)
Moment (Ft-lbs)	1739 @ 7' 4 11/16"	3634	Passed (48%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.211 @ 7' 4 1/4"	0.865	Passed (L/983)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.381 @ 7' 4 5/16"	1.153	Passed (L/544)	--	1.0 D + 1.0 S (Alt Spans)

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/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	Roof Live	Snow	Total	
1 - Beveled Plate - SPF	5.50"	5.50"	3.50"	314	296	385	995	Blocking
2 - Hanger on 11 7/8" GLB beam	5.50"	Hanger[1]	- / 1.75" [2]	271	262	340	873	Web Stiffeners, 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.
- [2] Required Bearing Length / Required Bearing Length with Web Stiffeners

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

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- 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	LSSR1.81Z	1.88"	N/A	14-10dx2.5	12-10dx1.5	Web Stiffeners

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

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (non-snow: 1.25)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 13' 11"	24"	15.0	20.0	26.0	Default Load

Weyerhaeuser Notes

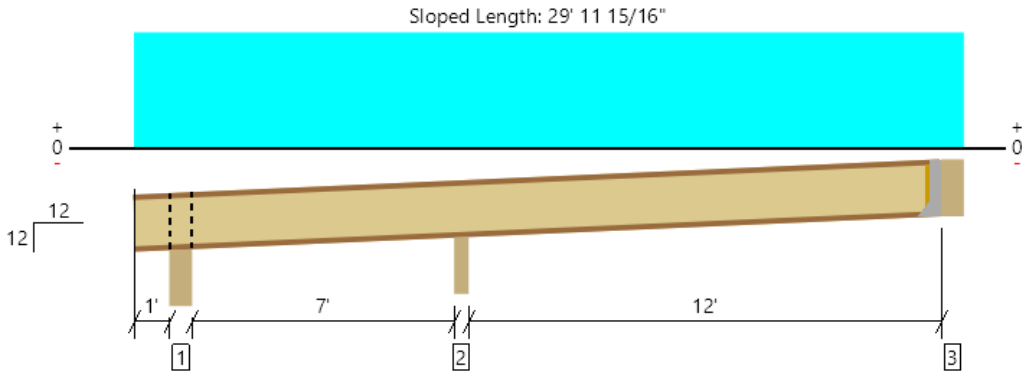
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Drew Willard Reeve and Associates (801) 663-4456 awillard@reeve-assoc.com	

Weyerhaeuser

Roof, Roof Joist: Continuous
1 piece(s) 11 7/8" TJI® 110 @ 24" OC



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

Member Length : 30' 4"

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1201 @ 8' 7 1/4"	3147 (3.50")	Passed (38%)	1.15	1.0 D + 1.0 S (Adj Spans)
Shear (lbs)	642 @ 8' 9"	1794	Passed (36%)	1.15	1.0 D + 1.0 S (Adj Spans)
Moment (Ft-lbs)	-1316 @ 8' 7 1/4"	3634	Passed (36%)	1.15	1.0 D + 1.0 S (Adj Spans)
Live Load Defl. (in)	0.131 @ 15' 2 1/4"	0.859	Passed (L/999+)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.231 @ 15' 2 11/16"	1.145	Passed (L/892)	--	1.0 D + 1.0 S (Alt Spans)

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/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	Roof Live	Snow	Total	
1 - Beveled Plate - SPF	5.50"	5.50"	3.50"	133	156	203	492	Blocking
2 - Beveled Plate - DF	3.50"	3.50"	3.50"	538	510	663	1711	None
3 - Hanger on 11 7/8" GLB beam	5.50"	Hanger[1]	- / 1.75" [2]	223	220	286	729	Web Stiffeners, 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.
- [2] Required Bearing Length / Required Bearing Length with Web Stiffeners

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

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

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
3 - Face Mount Hanger	LSSR1.81Z	1.88"	N/A	14-10dx2.5	12-10dx1.5	Web Stiffeners

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

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (non-snow: 1.25)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 21' 2 1/2"	24"	15.0	20.0	26.0	Default Load

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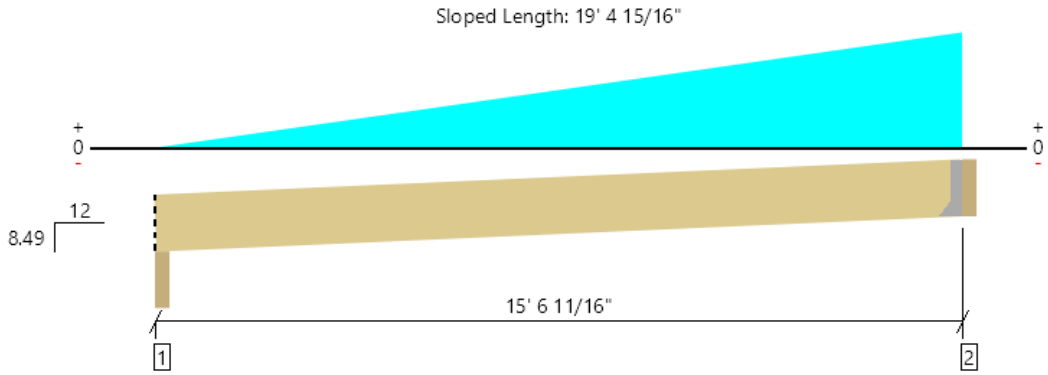
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Drew Willard Reeve and Associates (801) 663-4456 awillard@reeve-assoc.com	

Weyerhaeuser

Roof, Roof: Hip Beam

1 piece(s) 1 3/4" x 11 7/8" 2.0E Microllam® LVL



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

Member Length : 19' 9 1/16"

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD
Member Pitch : 8.49/12

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1711 @ 15' 6 11/16"	1969 (1.50")	Passed (87%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	1452 @ 14' 9"	4936	Passed (29%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	5133 @ 8' 11 13/16"	11155	Passed (46%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.318 @ 8' 1 13/16"	0.943	Passed (L/710)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.686 @ 8' 1 5/8"	1.257	Passed (L/330)	--	1.0 D + 1.0 Lr (All Spans)

- 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	Roof Live	Total	
1 - Beveled Plate - SPF	3.50"	3.50"	1.50"	491	408	899	Blocking
2 - Hanger on 11 7/8" SPF beam	3.50"	Hanger[1]	1.50"	908	802	1710	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)	19' 1" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	U14X SLD35.3	2.00"	N/A	14-10d	6-10dx1.5	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Roof Live (non-snow: 1.25)	Comments
0 - Self Weight (PLF)	0 to 15' 6 11/16"	N/A	6.1	--	
1 - Tapered (PLF)	0 to 15' 6 11/16"	N/A	0.0 to 134.7	0.0 to 155.6	Generated from Roof Geometry

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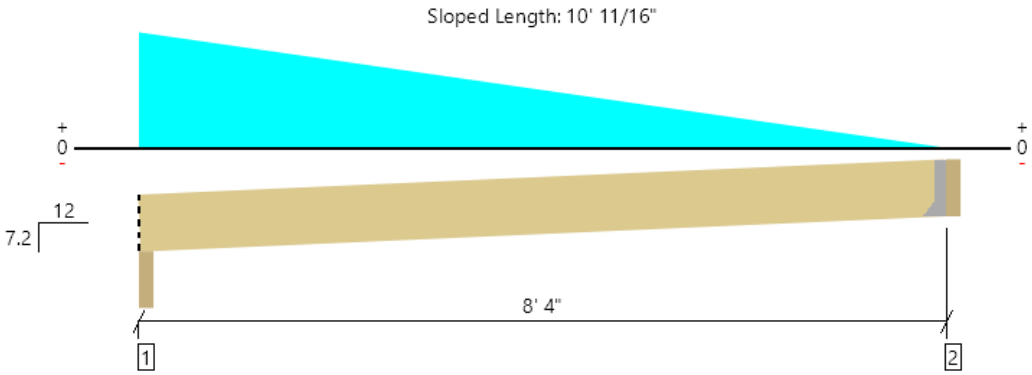
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Drew Willard Reeve and Associates (801) 663-4456 awillard@reeve-assoc.com	

Weyerhaeuser

Roof, Roof: Valley Beam

1 piece(s) 1 3/4" x 11 7/8" 2.0E Microllam® LVL



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

Member Length : 10' 3 3/4"

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD
Member Pitch : 7.2/12

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	483 @ 2"	2603 (3.50")	Passed (19%)	--	1.0 D + 1.0 Lr (All Spans)
Shear (lbs)	305 @ 1' 1 11/16"	4936	Passed (6%)	1.25	1.0 D + 1.0 Lr (All Spans)
Moment (Ft-lbs)	728 @ 3' 8"	11155	Passed (7%)	1.25	1.0 D + 1.0 Lr (All Spans)
Live Load Defl. (in)	0.013 @ 4' 1 1/8"	0.476	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)
Total Load Defl. (in)	0.028 @ 4' 1 1/4"	0.635	Passed (L/999+)	--	1.0 D + 1.0 Lr (All Spans)

- 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	Roof Live	Total	
1 - Beveled Plate - SPF	3.50"	3.50"	1.50"	256	227	483	Blocking
2 - Hanger on 11 7/8" SPF beam	3.50"	Hanger[1]	1.50"	135	107	242	See note [1]

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

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

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	LSSR1.81Z	1.88"	N/A	14-10dx2.5	12-10dx1.5	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Roof Live (non-snow: 1.25)	Comments
0 - Self Weight (PLF)	0 to 8' 4"	N/A	6.1	--	
1 - Tapered (PLF)	0 to 8' 4"	N/A	68.5 to 0.0	80.0 to 0.0	Generated from Roof Geometry

Weyerhaeuser Notes

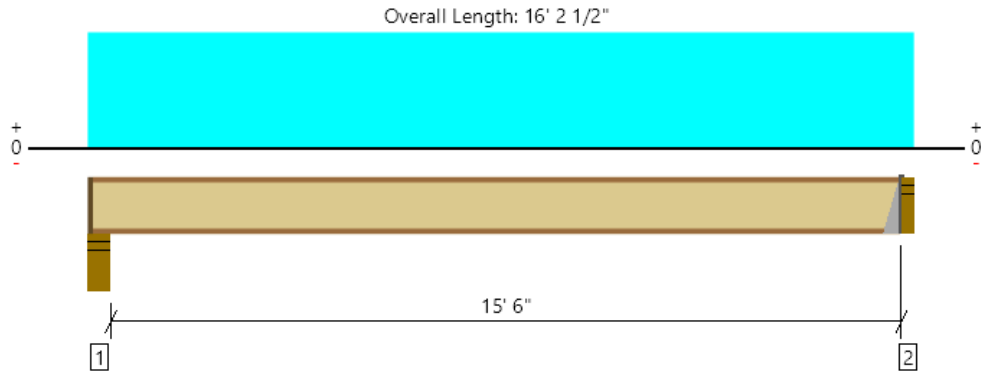
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ForteWEB Software Operator	Job Notes
Drew Willard Reeve and Associates (801) 663-4456 awillard@reeve-assoc.com	

Weyerhaeuser

1st Floor, Floor: Deck Tile Tech
1 piece(s) 11 7/8" TJI® 210 @ 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)	779 @ 15' 11 1/2"	1005 (1.75")	Passed (78%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	779 @ 15' 11 1/2"	1655	Passed (47%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	3036 @ 8' 2"	3795	Passed (80%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.262 @ 8' 2"	0.390	Passed (L/713)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.448 @ 8' 2"	0.779	Passed (L/418)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
TJ-Pro™ Rating	47	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 structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Total	
1 - Stud wall - DF	5.50"	4.25"	1.75"	381	436	283	1100	1 1/4" Rim Board
2 - Hanger on DF studWall	3.00"	Hanger[1]	1.75" / - [2]	375	429	279	1083	See note [1]

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 11" o/c	
Bottom Edge (Lu)	15' 10" o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- 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	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 Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 16' 2 1/2"	16"	35.0	40.0	26.0	Default Load

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ForteWEB Software Operator	Job Notes
Drew Willard Reeve and Associates (801) 663-4456 awillard@reeve-assoc.com	

Weyerhaeuser

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 16 SEP 2020, 8:29AM

Wood Beam

File: Allred Residence.ec6

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Lic. # : KW-06010158

REEVE & ASSOCIATES

DESCRIPTION: RB-1

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2018

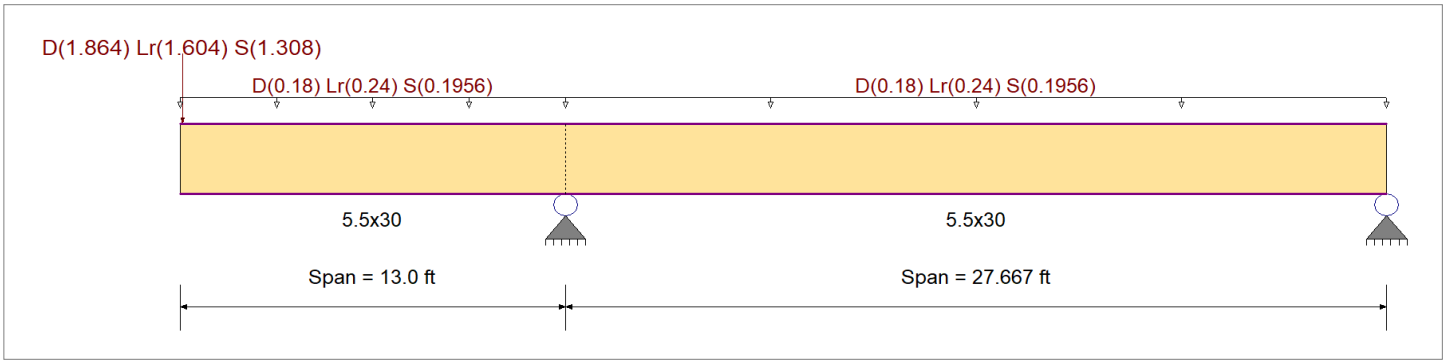
Wood Species : DF/DF
Wood Grade : 24F-V4

Fb +	2,400.0 psi
Fb -	1,850.0 psi
Fc - Prll	1,650.0 psi
Fc - Perp	650.0 psi
Fv	265.0 psi
Ft	1,100.0 psi

E : Modulus of Elasticity

Ebend- xx	1,800.0 ksi
Eminbend - xx	950.0 ksi
Ebend- yy	1,600.0 ksi
Eminbend - yy	850.0 ksi
Density	31.210 pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads
Load for Span Number 1
Point Load : D = 1.864, Lr = 1.604, S = 1.308 k @ 0.10 ft, (HIP BEAM)
Uniform Load : D = 0.0150, Lr = 0.020, S = 0.01630 ksf, Tributary Width = 12.0 ft, (ROOF)
Load for Span Number 2
Uniform Load : D = 0.0150, Lr = 0.020, S = 0.01630 ksf, Tributary Width = 12.0 ft, (ROOF)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.594 : 1	Maximum Shear Stress Ratio	=	0.227 : 1
Section used for this span		5.5x30	Section used for this span		5.5x30
	=	1,210.90 psi		=	75.16 psi
	=	2,038.20 psi		=	331.25 psi
Load Combination		+D+Lr+H, LL Comb Run (L*)	Load Combination		+D+Lr+H, LL Comb Run (LL)
Location of maximum on span	=	0.000 ft	Location of maximum on span	=	10.531 ft
Span # where maximum occurs	=	Span # 2	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.538 in	Ratio =	578 >=360
Max Upward Transient Deflection	-0.214 in	Ratio =	1460 >=360
Max Downward Total Deflection	0.905 in	Ratio =	344 >=180
Max Upward Total Deflection	-0.199 in	Ratio =	1667 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.389	0.158	0.90	0.951	1.00	1.00	1.00	1.00	1.00	42.28	614.94	1582.64	4.14	37.60	238.50
Length = 27.667 ft	2	0.419	0.158	0.90	0.881	1.00	1.00	1.00	1.00	1.00	42.28	614.94	1467.50	3.98	37.60	238.50
+D+L+H, LL Comb Run (*L)					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.350	0.142	1.00	0.951	1.00	1.00	1.00	1.00	1.00	42.28	614.94	1758.48	4.14	37.60	265.00
Length = 27.667 ft	2	0.377	0.142	1.00	0.881	1.00	1.00	1.00	1.00	1.00	42.28	614.94	1630.56	3.98	37.60	265.00
+D+L+H, LL Comb Run (L*)					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.350	0.142	1.00	0.951	1.00	1.00	1.00	1.00	1.00	42.28	614.94	1758.48	4.14	37.60	265.00
Length = 27.667 ft	2	0.377	0.142	1.00	0.881	1.00	1.00	1.00	1.00	1.00	42.28	614.94	1630.56	3.98	37.60	265.00

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 16 SEP 2020, 8:29AM

Wood Beam

File: Allred Residence.ec6

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Lic. # : KW-06010158

REEVE & ASSOCIATES

DESCRIPTION: RB-1

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+L+H, LL Comb Run (LL)					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.350	0.142	1.00	0.951	1.00	1.00	1.00	1.00	1.00	42.28	614.94	1758.48	4.14	37.60	265.00
Length = 27.667 ft	2	0.377	0.142	1.00	0.881	1.00	1.00	1.00	1.00	1.00	42.28	614.94	1630.56	3.98	37.60	265.00
+D+Lr+H, LL Comb Run (*L)					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.280	0.184	1.25	0.951	1.00	1.00	1.00	1.00	1.00	42.28	614.94	2198.11	6.71	60.96	331.25
Length = 27.667 ft	2	0.302	0.184	1.25	0.881	1.00	1.00	1.00	1.00	1.00	42.28	614.94	2038.20	6.71	60.96	331.25
+D+Lr+H, LL Comb Run (L*)					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.551	0.227	1.25	0.951	1.00	1.00	1.00	1.00	1.00	83.25	1,210.90	2198.11	8.27	75.16	331.25
Length = 27.667 ft	2	0.594	0.227	1.25	0.881	1.00	1.00	1.00	1.00	1.00	83.25	1,210.90	2038.20	5.46	75.16	331.25
+D+Lr+H, LL Comb Run (LL)					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.551	0.227	1.25	0.951	1.00	1.00	1.00	1.00	1.00	83.25	1,210.90	2198.11	8.27	75.16	331.25
Length = 27.667 ft	2	0.594	0.227	1.25	0.881	1.00	1.00	1.00	1.00	1.00	83.25	1,210.90	2038.20	8.19	75.16	331.25
+D+S+H					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.544	0.224	1.15	0.951	1.00	1.00	1.00	1.00	1.00	75.68	1,100.78	2022.26	7.50	68.22	304.75
Length = 27.667 ft	2	0.587	0.224	1.15	0.881	1.00	1.00	1.00	1.00	1.00	75.68	1,100.78	1875.14	7.41	68.22	304.75
+D+0.750Lr+0.750L+H, LL Comb R					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.280	0.165	1.25	0.951	1.00	1.00	1.00	1.00	1.00	42.28	614.94	2198.11	6.02	54.76	331.25
Length = 27.667 ft	2	0.302	0.165	1.25	0.881	1.00	1.00	1.00	1.00	1.00	42.28	614.94	2038.20	6.02	54.76	331.25
+D+0.750Lr+0.750L+H, LL Comb R					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.483	0.199	1.25	0.951	1.00	1.00	1.00	1.00	1.00	73.01	1,061.91	2198.11	7.23	65.77	331.25
Length = 27.667 ft	2	0.521	0.199	1.25	0.881	1.00	1.00	1.00	1.00	1.00	73.01	1,061.91	2038.20	5.09	65.77	331.25
+D+0.750Lr+0.750L+H, LL Comb R					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.483	0.199	1.25	0.951	1.00	1.00	1.00	1.00	1.00	73.01	1,061.91	2198.11	7.23	65.77	331.25
Length = 27.667 ft	2	0.521	0.199	1.25	0.881	1.00	1.00	1.00	1.00	1.00	73.01	1,061.91	2038.20	7.13	65.77	331.25
+D+0.750L+0.750S+H, LL Comb Ru					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.484	0.199	1.15	0.951	1.00	1.00	1.00	1.00	1.00	67.33	979.32	2022.26	6.66	60.56	304.75
Length = 27.667 ft	2	0.522	0.199	1.15	0.881	1.00	1.00	1.00	1.00	1.00	67.33	979.32	1875.14	6.55	60.56	304.75
+D+0.750L+0.750S+H, LL Comb Ru					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.484	0.199	1.15	0.951	1.00	1.00	1.00	1.00	1.00	67.33	979.32	2022.26	6.66	60.56	304.75
Length = 27.667 ft	2	0.522	0.199	1.15	0.881	1.00	1.00	1.00	1.00	1.00	67.33	979.32	1875.14	6.55	60.56	304.75
+D+0.750L+0.750S+H, LL Comb Ru					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.484	0.199	1.15	0.951	1.00	1.00	1.00	1.00	1.00	67.33	979.32	2022.26	6.66	60.56	304.75
Length = 27.667 ft	2	0.522	0.199	1.15	0.881	1.00	1.00	1.00	1.00	1.00	67.33	979.32	1875.14	6.55	60.56	304.75
+D+0.60W+H					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.219	0.089	1.60	0.951	1.00	1.00	1.00	1.00	1.00	42.28	614.94	2813.57	4.14	37.60	424.00
Length = 27.667 ft	2	0.236	0.089	1.60	0.881	1.00	1.00	1.00	1.00	1.00	42.28	614.94	2608.89	3.98	37.60	424.00
+D+0.70E+H					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.219	0.089	1.60	0.951	1.00	1.00	1.00	1.00	1.00	42.28	614.94	2813.57	4.14	37.60	424.00
Length = 27.667 ft	2	0.236	0.089	1.60	0.881	1.00	1.00	1.00	1.00	1.00	42.28	614.94	2608.89	3.98	37.60	424.00
+D+0.750Lr+0.750L+0.450W+H, LL					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.219	0.129	1.60	0.951	1.00	1.00	1.00	1.00	1.00	42.28	614.94	2813.57	6.02	54.76	424.00
Length = 27.667 ft	2	0.236	0.129	1.60	0.881	1.00	1.00	1.00	1.00	1.00	42.28	614.94	2608.89	6.02	54.76	424.00
+D+0.750Lr+0.750L+0.450W+H, LL					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.377	0.155	1.60	0.951	1.00	1.00	1.00	1.00	1.00	73.01	1,061.91	2813.57	7.23	65.77	424.00
Length = 27.667 ft	2	0.407	0.155	1.60	0.881	1.00	1.00	1.00	1.00	1.00	73.01	1,061.91	2608.89	5.09	65.77	424.00
+D+0.750Lr+0.750L+0.450W+H, LL					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.377	0.155	1.60	0.951	1.00	1.00	1.00	1.00	1.00	73.01	1,061.91	2813.57	7.23	65.77	424.00
Length = 27.667 ft	2	0.407	0.155	1.60	0.881	1.00	1.00	1.00	1.00	1.00	73.01	1,061.91	2608.89	7.13	65.77	424.00
+D+0.750L+0.750S+0.450W+H, LL					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.348	0.143	1.60	0.951	1.00	1.00	1.00	1.00	1.00	67.33	979.32	2813.57	6.66	60.56	424.00
Length = 27.667 ft	2	0.375	0.143	1.60	0.881	1.00	1.00	1.00	1.00	1.00	67.33	979.32	2608.89	6.55	60.56	424.00
+D+0.750L+0.750S+0.450W+H, LL					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.348	0.143	1.60	0.951	1.00	1.00	1.00	1.00	1.00	67.33	979.32	2813.57	6.66	60.56	424.00
Length = 27.667 ft	2	0.375	0.143	1.60	0.881	1.00	1.00	1.00	1.00	1.00	67.33	979.32	2608.89	6.55	60.56	424.00
+D+0.750L+0.750S+0.450W+H, LL					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.348	0.143	1.60	0.951	1.00	1.00	1.00	1.00	1.00	67.33	979.32	2813.57	6.66	60.56	424.00
Length = 27.667 ft	2	0.375	0.143	1.60	0.881	1.00	1.00	1.00	1.00	1.00	67.33	979.32	2608.89	6.55	60.56	424.00
+D+0.750L+0.750S+0.5250E+H, LL					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.348	0.143	1.60	0.951	1.00	1.00	1.00	1.00	1.00	67.33	979.32	2813.57	6.66	60.56	424.00
Length = 27.667 ft	2	0.375	0.143	1.60	0.881	1.00	1.00	1.00	1.00	1.00	67.33	979.32	2608.89	6.55	60.56	424.00

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 16 SEP 2020, 8:29AM

Wood Beam

File: Allred Residence.ec6

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Lic. # : KW-06010158

REEVE & ASSOCIATES

DESCRIPTION: RB-1

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
+D+0.750L+0.750S+0.5250E+H, LL					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.348	0.143	1.60	0.951	1.00	1.00	1.00	1.00	1.00	67.33	979.32	2813.57	6.66	60.56	424.00
Length = 27.667 ft	2	0.375	0.143	1.60	0.881	1.00	1.00	1.00	1.00	1.00	67.33	979.32	2608.89	6.55	60.56	424.00
+D+0.750L+0.750S+0.5250E+H, LL					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.348	0.143	1.60	0.951	1.00	1.00	1.00	1.00	1.00	67.33	979.32	2813.57	6.66	60.56	424.00
Length = 27.667 ft	2	0.375	0.143	1.60	0.881	1.00	1.00	1.00	1.00	1.00	67.33	979.32	2608.89	6.55	60.56	424.00
+0.60D+0.60W+0.60H					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.131	0.053	1.60	0.951	1.00	1.00	1.00	1.00	1.00	25.37	368.97	2813.57	2.48	22.56	424.00
Length = 27.667 ft	2	0.141	0.053	1.60	0.881	1.00	1.00	1.00	1.00	1.00	25.37	368.97	2608.89	2.39	22.56	424.00
+0.60D+0.70E+0.60H					0.881	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 13.0 ft	1	0.131	0.053	1.60	0.951	1.00	1.00	1.00	1.00	1.00	25.37	368.97	2813.57	2.48	22.56	424.00
Length = 27.667 ft	2	0.141	0.053	1.60	0.881	1.00	1.00	1.00	1.00	1.00	25.37	368.97	2608.89	2.39	22.56	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr+H, LL Comb Run (L*)	1	0.9045	0.000		0.0000	0.000
Lr Only, LL Comb Run (*L)	2	0.0830	22.412	+D+Lr+H, LL Comb Run (L*)	-0.1991	10.356

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		18.707	4.777
Overall MINimum		7.764	1.499
+D+H		9.182	1.457
+D+L+H, LL Comb Run (*L)		9.182	1.457
+D+L+H, LL Comb Run (L*)		9.182	1.457
+D+L+H, LL Comb Run (LL)		9.182	1.457
+D+Lr+H, LL Comb Run (*L)		12.502	4.777
+D+Lr+H, LL Comb Run (L*)		15.387	-0.024
+D+Lr+H, LL Comb Run (LL)		18.707	3.296
+D+S+H		16.946	2.955
+D+0.750Lr+0.750L+H, LL Comb Run (*		11.672	3.947
+D+0.750Lr+0.750L+H, LL Comb Run (L		13.835	0.346
+D+0.750Lr+0.750L+H, LL Comb Run (L		16.325	2.836
+D+0.750L+0.750S+H, LL Comb Run (*L		15.005	2.581
+D+0.750L+0.750S+H, LL Comb Run (L*		15.005	2.581
+D+0.750L+0.750S+H, LL Comb Run (LL		15.005	2.581
+D+0.60W+H		9.182	1.457
+D+0.70E+H		9.182	1.457
+D+0.750Lr+0.750L+0.450W+H, LL Comb		11.672	3.947
+D+0.750Lr+0.750L+0.450W+H, LL Comb		13.835	0.346
+D+0.750Lr+0.750L+0.450W+H, LL Comb		16.325	2.836
+D+0.750L+0.750S+0.450W+H, LL Comb		15.005	2.581
+D+0.750L+0.750S+0.450W+H, LL Comb		15.005	2.581
+D+0.750L+0.750S+0.450W+H, LL Comb		15.005	2.581
+D+0.750L+0.750S+0.5250E+H, LL Comb		15.005	2.581
+D+0.750L+0.750S+0.5250E+H, LL Comb		15.005	2.581
+D+0.750L+0.750S+0.5250E+H, LL Comb		15.005	2.581
+0.60D+0.60W+0.60H		5.509	0.874
+0.60D+0.70E+0.60H		5.509	0.874
D Only		9.182	1.457
Lr Only, LL Comb Run (*L)		3.320	3.320
Lr Only, LL Comb Run (L*)		6.205	-1.481
Lr Only, LL Comb Run (LL)		9.525	1.839
S Only		7.764	1.499
H Only			

Simple Span Beam Calculation

Reeve & Associates, Inc.

Roof Dead	15	psf	Include Self Wt? Yes
Roof Live	20	psf	
Snow	16.25	psf	
Floor Dead	15	psf	
Floor Live	40	psf	

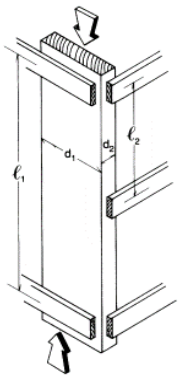
		Uniform Loads			Point Loads					Partial Uniform Loads																
member ID	span ft	roof trib ft	floor trib ft	wall load plf	dead, lbs	roof live, lbs	snow, lbs	floor live, lbs	dist from left, ft	DL, psf	roof live, psf	snow, psf	trib, ft	Floor DL, psf	Floor LL, psf	trib, ft	start dist from left, ft	end dist from left, ft	applied moment lb-ft	% Str	applied shear lbs	% Str	Selected Member	Total Def, in	Total Δ limit, L/	Δ act, L/	Live Def, in	Live Δ limit, L/	Live Δ act, L/	Max Defl Location, ft
RB-2	16.67	7																	8754	72.2	2101	45.1	1-3/4"x14" LVL	0.5469	L/240	L/366	0.3037	360	L/659	8.3
RB-3	13	5.5			1447	1620.7	1318		6.5										14291	80.1	2864	36.3	(2) 1-3/4"x11-7/8" LVL	0.383	L/240	L/407	0.2036	360	L/766	6.5
RB-4	20	12																	21715	89.5	4343	46.6	(2) 1-3/4"x14" LVL	0.9767	L/240	L/246	0.5398	360	L/445	10.0
RB-5	10	8																	3626	68.5	1451	29.0	(3) 2x10	0.1375	L/240	L/873	0.0758	360	L/1583	5.0
RB-6	7	6																	1323	14.8	756	19.2	1-3/4"x11-7/8" LVL	0.0239	L/240	L/3515	0.0133	360	L/6329	3.5
RB-7	10	5	5																4839	27.1	1936	24.5	(2) 1-3/4"x11-7/8" LVL	0.0892	L/240	L/1346	0.0461	360	L/2605	5.0
RB-8	3	6			3003	1617	1318	3638	1.5										5425	76.2	3761	61.9	(3) 2x12	0.0083	L/240	L/4331	0.0044	480	L/8191	1.5
RB-9	18	6																	8996	50.4	1999	25.3	(2) 1-3/4"x11-7/8" LVL	0.5371	L/240	L/402	0.2902	360	L/744	9.0
RB-10	3	2			1943	2400	1950		1.5										3344	94.7	2287	68.7	(2) 2x10	0.0138	L/240	L/2613	0.0076	360	L/4737	1.5
RB-11	11	2	2	120	935	1166.7	948		5.5										9253	78.6	2443	38.7	(2) 1-3/4"x9-1/2" LVL	0.3609	L/240	L/366	0.1645	360	L/803	5.5
RB-12	6	10																	1599	67.6	1066	40.8	(2) 2x8	0.068	L/240	L/1059	0.0383	360	L/1882	3.0
RB-13	10	10																	4496	38.2	1798	28.5	(2) 1-3/4"x9-1/2" LVL	0.1618	L/240	L/742	0.09	360	L/1334	5.0
RB-14	6	5		135															1419	60.0	946	36.2	(2) 2x8	0.0603	L/240	L/1194	0.0191	360	L/3764	3.0
RB-15	11	5																	2768	24.1	1006	17.4	3-1/8"x10-1/2" GLB	0.1111	L/240	L/1188	0.0607	360	L/2174	5.5
RB-16	8	2	2	135	1943	2400	1950		4										10663	59.7	3160	40.0	(2) 1-3/4"x11-7/8" LVL	0.1053	L/240	L/912	0.0528	360	L/1817	4.0
RB-17	9	2			900	1200	975		4.5	15	20	16.25	13				4.5	9	7835	66.5	2944	46.6	(2) 1-3/4"x9-1/2" LVL	0.2079	L/240	L/520	0.1171	360	L/922	4.8
RB-18	12	13																	8365	71.0	2788	44.1	(2) 1-3/4"x9-1/2" LVL	0.4335	L/240	L/332	0.2425	360	L/594	6.0
RB-19	13	10.5																	7932	69.1	2441	42.1	3-1/8"x10-1/2" GLB	0.4447	L/240	L/351	0.2487	360	L/627	6.5
RB-20	17.5	12																	16625	68.5	3800	40.8	(2) 1-3/4"x14" LVL	0.5726	L/240	L/367	0.3164	360	L/664	8.8
RB-21	16	2			1338	1525.3	1240		8										14083	78.9	2089	26.5	(2) 1-3/4"x11-7/8" LVL	0.5562	L/240	L/345	0.2906	360	L/661	8.0
RB-22	6	10.5																	1678	70.9	1118	42.8	(2) 2x8	0.0713	L/240	L/1010	0.0402	360	L/1792	3.0
RB-23	5	17.5																	1935	54.8	1548	46.5	(2) 2x10	0.0275	L/240	L/2181	0.0155	360	L/3859	2.5
RB-24	9	2			935	1166.7	948												794	12.5	353	6.4	(3) 1-3/4"x5-1/2" LVL	0.0795	L/240	L/1358	0.0406	360	L/2663	4.5
RB-25																									L/240			360		
RB-26																									L/240			360		
RB-27																									L/240			360		
RB-28																									L/240			360		

Beam Trimmer Stud Calculation

Adjustment Factors - ASD

Cd:	0.90
Cm:	1.00
Ct:	1.00
Ci:	1.00
Cf:	-

Framing	2x6
Default Species	DF



Reeve & Associates, Inc.

Member ID	Factored Left Reaction	Factored Right Reaction	Typ. Trimmer	L_1	L_2	Check	Manual Trimmer Entry	Check
RB-2	2101	2059	-	8 ft	4 ft		(1) 2x6	OK
RB-3	2864	2864	-	12 ft	4 ft		(1) 2x6	OK
RB-4	4343	4343	-	12 ft	4 ft		(2) 2x6	OK
RB-5	1451	1451	(3) 2x6	12 ft	4 ft	OK		
RB-6	756	756	(2) 2x6	12 ft	4 ft	OK		
RB-7	1936	1936	(3) 2x6	12 ft	4 ft	OK		
RB-8	3761	3761	-	12 ft	4 ft		(2) 2x6	OK
RB-9	1999	1999	Manual Calc	12 ft	4 ft			
RB-10	2287	2287	(1) 2x6	12 ft	4 ft	OK		
RB-11	2443	2443	(3) 2x6	15 ft	4 ft	OK		
RB-12	1066	1066	(2) 2x6	12 ft	4 ft	OK		
RB-13	1798	1798	(3) 2x6	12 ft	4 ft	OK		
RB-14	946	946	(2) 2x6	12 ft	4 ft	OK		
RB-15	1006	1006	(3) 2x6	12 ft	4 ft	OK		
RB-16	3160	3160	(2) 2x6	12 ft	4 ft	OK		
RB-17	1921	2944	(3) 2x6	12 ft	4 ft	OK		
RB-18	2788	2788	(3) 2x6	15 ft	4 ft	OK		
RB-19	2441	2441	-	12 ft	4 ft		(1) 6x6	OK
RB-20	3800	3800	-	12 ft	4 ft		(2) 2x6	OK
RB-21	2089	2089	-	12 ft	4 ft		(1) 2x6	OK
RB-22	1118	1118	(2) 2x6	12 ft	4 ft	OK		
RB-23	1548	1548	(2) 2x6	12 ft	4 ft	OK		
RB-24	353	353	(3) 2x6	12 ft	4 ft	OK		
RB-25								
RB-26								
RB-1	18707	4777	-	12 ft	4 ft		(4) 2x6	OK
RB-28								

King Stud Calcs

Stud Height	Opening	Spacing	Typ. King	ASD Wind	Δ Limit	Check	Manual King Entry	Check
9 ft	4 ft	16 in. o.c.	(1) 2x6	22.1 psf	240	OK		
9 ft	8 ft	16 in. o.c.	(2) 2x6	21.2 psf	240	OK		
9 ft	12 ft	16 in. o.c.	(3) 2x6	20.6 psf	240	OK		
10 ft	4 ft	16 in. o.c.	(1) 2x6	22.0 psf	240	OK		
10 ft	8 ft	16 in. o.c.	(2) 2x6	21.0 psf	240	OK		
10 ft	12 ft	16 in. o.c.	(3) 2x6	20.4 psf	240	OK		
12 ft	4 ft	16 in. o.c.	(1) 2x6	21.7 psf	240	OK		
12 ft	8 ft	16 in. o.c.	(2) 2x6	20.7 psf	240	OK		
15 ft	12 ft	16 in. o.c.	-	19.8 psf	240		(1) 6x6	OK

Simple Span Beam Calculation

Reeve & Associates, Inc.

Roof Dead	15	psf	Include Self Wt? Yes
Roof Live	20	psf	
Snow	16.25	psf	
Floor Dead	15	psf	
Floor Live	40	psf	

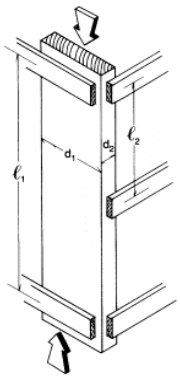
		Uniform Loads			Point Loads					Partial Uniform Loads																		
member ID	span ft	roof trib ft	floor trib ft	wall load plf	dead, lbs	roof live, lbs	snow, lbs	floor live, lbs	dist from left, ft	DL, psf	roof live, psf	snow, psf	trib, ft	Floor DL, psf	Floor LL, psf	trib, ft	start dist from left, ft	end dist from left, ft	applied moment lb-ft	% Str	applied shear lbs	% Str	Selected Member	Total Def, in	Total Δ limit, L/	Δ act, L/	Live Def, in	Live Δ limit, L/	Live Δ act, L/	Max Defl Location, ft
FB-1	28.5									15	20	16.25	8	15	40	9	4.5	28.5	65294	71.1	9388	43.2	5-1/8"x24" GLB	1.216	L/240	L/281	0.6555	360	L/522	15.0
FB-2	14	7			2610	1644.7	1339		4.5					15	40	9.833	4.5	14	23459	87.6	5631	47.5	(3) 1-3/4"x11-7/8" LVL	0.5942	L/240	L/283	0.3921	360	L/428	7.0
FB-3	19		1.333		6209	5569	2578	3983	5.5	100							0	5.5	55594	60.6	10355	47.7	5-1/8"x24" GLB	0.2673	L/240	L/853	0.1157	360	L/1971	8.5
FB-4	14.75		6.75	100	491	408			4	15	20	16.25	4				4	14.75	15706	88.0	4158	52.7	(2) 1-3/4"x11-7/8" LVL	0.6597	L/240	L/268	0.4213	360	L/420	7.5
FB-5	14.75	10.5	6.75	100															20035	74.8	5435	45.9	(3) 1-3/4"x11-7/8" LVL	0.5355	L/240	L/331	0.1962	360	L/902	7.3
FB-6	4		7	100	5270	4917	1832	4296	2										13034	73.0	6944	87.9	(2) 1-3/4"x11-7/8" LVL	0.0312	L/240	L/1536	0.0132	360	L/3623	2.0
FB-7	4		10		384			960	1										1881	79.5	2119	81.2	(2) 2x8	0.035	L/240	L/1373	0.0251	480	L/1913	2.0
FB-8	8		6																2688	30.1	1344	34.0	1-3/4"x11-7/8" LVL	0.0634	L/240	L/1514	0.0453	360	L/2120	4.0
FB-9	19.83		6.75	100										15	40	3	4	12	29034	77.2	5646	41.6	5-1/8"x15" GLB	0.7929	L/240	L/300	0.4609	360	L/516	9.8
FB-10	18.83		1.333	120	4558	5097.4	2702		9.417										52259	98.3	6357	39.0	5-1/8"x18" GLB	0.6204	L/240	L/364	0.3071	360	L/736	9.5
FB-11	17.67	7	1.333	100															14906	83.5	3375	42.7	(2) 1-3/4"x11-7/8" LVL	0.8573	L/240	L/247	0.3141	360	L/675	8.8
																									L/240			360		
																									L/240			360		
																									L/240			360		
																									L/240			360		
																									L/240			360		
																									L/240			360		
																									L/240			360		
																									L/240			360		
																									L/240			360		
																									L/240			360		
																									L/240			360		
																									L/240			360		
TRUSS-R	13.5	10	2	216															14271	30.3	4228	31.8	3-1/2"x20" LVL	0.1003	L/240	L/1615	0.032	360	L/5058	6.8
TRUSS-L	13.5	2	2	216															8803	18.7	2608	19.6	3-1/2"x20" LVL	0.0619	L/240	L/2618	0.0128	360	L/12645	6.8

Beam Trimmer Stud Calculation

Adjustment Factors - ASD

Cd:	0.90
Cm:	1.00
Ct:	1.00
Ci:	1.00
Cf:	-

Framing	2x6
Default Species	DF



Reeve & Associates, Inc.

Member ID	Factored Left Reaction	Factored Right Reaction	Typ. Trimmer	L_1	L_2	Check	Manual Trimmer Entry	Check
FB-1	6944	9388	-	10 ft	4 ft		(3) 2x6	OK
FB-2	5631	5610	-	10 ft	4 ft		(3) 2x6	OK
FB-3	10355	4725	-	10 ft	4 ft		(3) 2x6	OK
FB-4	4158	4108	-	10 ft	4 ft		(3) 2x6	OK
FB-5	5435	5435	-	10 ft	4 ft		(2) 2x6	OK
FB-6	6944	6944	-	10 ft	4 ft		(2) 2x6	OK
FB-7	2119	1447	(1) 2x6	10 ft	4 ft	OK		
FB-8	1344	1344	(2) 2x6	10 ft	4 ft	OK		
FB-9	5646	5350	-	10 ft	4 ft		(3) 2x6	OK
FB-10	6357	6344	-	10 ft	4 ft		(3) 2x6	OK
FB-11	3375	3312	Manual Calc	N/A	N/A			
0								
0								
0								
0								
0								
0								
0								
0								
0								
0								
0								
0								
0								
TRUSS-R	4228	4228	Manual Calc					
TRUSS-L	2608	2608	Manual Calc					

King Stud Calcs

Stud Height	Opening	Spacing	Typ. King	ASD Wind	Δ Limit	Check	Manual King Entry	Check
9 ft	4 ft	16 in. o.c.	(1) 2x6	22.1 psf	240	OK		
9 ft	8 ft	16 in. o.c.	(2) 2x6	21.2 psf	240	OK		
9 ft	12 ft	16 in. o.c.	(3) 2x6	20.6 psf	240	OK		
10 ft	4 ft	16 in. o.c.	(1) 2x6	22.0 psf	240	OK		
10 ft	8 ft	16 in. o.c.	(2) 2x6	21.0 psf	240	OK		
10 ft	12 ft	16 in. o.c.	(3) 2x6	20.4 psf	240	OK		
				24.0 psf		#N/A		
				24.0 psf		#N/A		
				24.0 psf		#N/A		

Simple Span Beam Calculation

Roof Dead	15	psf	Include Self Wt? Yes
Roof Live	20	psf	
Snow	16.25	psf	
Floor Dead	30	psf	
Floor Live	40	psf	

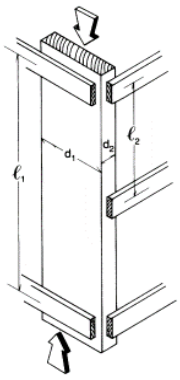
		Uniform Loads			Point Loads					Partial Uniform Loads																	
member ID	span ft	roof trib ft	floor trib ft	wall load plf	dead, lbs	roof live, lbs	snow, lbs	floor live, lbs	dist from left, ft	DL, psf	roof live, psf	snow, psf	trib, ft	Floor DL, psf	Floor LL, psf	trib, ft	start dist from left, ft	end dist from left, ft	applied moment lb-ft	% Str	applied shear lbs	% Str	Selected Member	Total Def, in	Total Δ limit, L/	Δ act, L/	Live Def, in	Live Δ limit, L/	Live Δ act, L/	Max Defl Location, ft
																									L/240			360		
																									L/240			360		
																									L/240			360		
																									L/240			360		
																									L/240			360		
																									L/240			360		
																									L/240			480		
																									L/240			360		
																									L/240			360		
																									L/240			360		
																									L/240			360		
FB-12	9									25	60	16.3	7.5				0	9	6553	55.7	2912	46.1	(2) 1-3/4"x9-1/2" LVL	0.3039	L/240	L/355	0.2125	360	L/508	4.5
FB-13	15.25		11.67	100	3392	2243.3	1223	502	13					30	40	7	0	13	45568	93.9	13292	71.4	(4) 1-3/4"x14" LVL	0.6721	L/240	L/272	0.3565	360	L/513	7.5
FB-14	18		2.5	100	2001	270	219	540	13.67	15	20	16.25		30	40	8	9.167	18	30576	84.0	8330	59.6	(3) 1-3/4"x14" LVL	0.7368	L/240	L/293	0.2994	360	L/721	9.8
FB-15	5.5	19.5	9.75	216															5269	74.1	3832	79.5	(2) 1-3/4"x7-1/4" LVL	0.1291	L/240	L/511	0.0361	360	L/1827	2.8
FB-16	3		15																1187	50.2	1583	60.6	(2) 2x8	0.0126	L/240	L/2853	0.0072	360	L/5018	1.5
FB-17	12		13.5	225								20	4	10	20	4	0	12	23547	88.0	7849	66.3	(3) 1-3/4"x11-7/8" LVL	0.4395	L/240	L/328	0.2127	360	L/677	6.0
FB-18	6		8.5	225															3736	70.6	2490	49.9	(3) 2x10	0.051	L/240	L/1412	0.0209	360	L/3449	3.0
FB-19	15	6	6																15476	81.5	4127	55.4	3-1/8"x13-1/2" GLB	0.5435	L/240	L/331	0.237	360	L/759	7.5
FB-20	3		9		2811	1350	1097	540	1.5										3790	71.6	2939	58.8	(3) 2x10	0.0108	L/240	L/3344	0.0041	360	L/8685	1.5
																									L/240			360		
																									L/240			360		
																									L/240			360		
																									L/240			360		
																									L/240			360		
																									L/240			360		

Beam Trimmer Stud Calculation

Adjustment Factors - ASD

Cd:	0.90
Cm:	1.00
Ct:	1.00
Ci:	1.00
Cf:	-

Framing	2x6
Default Species	DF



Reeve & Associates, Inc.

Member ID	Factored Left Reaction	Factored Right Reaction	Typ. Trimmer	L_1	L_2	Check	Manual Trimmer Entry	Check
0								
0								
0								
0								
0								
0								
0								
0								
0								
0								
0								
FB-12	2912	2912	(3) 2x6	10 ft	4 ft	OK		
FB-13	11437	13292	-	10 ft	4 ft		(3) 2x6	OK
FB-14	4493	8330	-	10 ft	4 ft		(2) 2x6	OK
FB-15	3832	3832	(2) 2x6	10 ft	4 ft	OK		
FB-16	1583	1583	(1) 2x6	10 ft	4 ft	OK		
FB-17	7849	7849	(3) 2x6	10 ft	4 ft	OK		
FB-18	2490	2490	(2) 2x6	10 ft	4 ft	OK		
FB-19	4127	4127	-	12 ft	12 ft		(1) 6x6	OK
FB-20	2939	2939	-	10 ft	4 ft		(1) 2x6	OK
0								
0								
0								
0								
0								
0								
0								

King Stud Calcs

Stud Height	Opening	Spacing	Typ. King	ASD Wind	Δ Limit	Check	Manual King Entry	Check
9 ft	4 ft	16 in. o.c.	(1) 2x6	22.1 psf	240	OK		
9 ft	8 ft	16 in. o.c.	(2) 2x6	21.2 psf	240	OK		
9 ft	12 ft	16 in. o.c.	(3) 2x6	20.6 psf	240	OK		
10 ft	4 ft	16 in. o.c.	(1) 2x6	22.0 psf	240	OK		
10 ft	8 ft	16 in. o.c.	(2) 2x6	21.0 psf	240	OK		
10 ft	12 ft	16 in. o.c.	(3) 2x6	20.4 psf	240	OK		
				24.0 psf		#N/A		
				24.0 psf		#N/A		
				24.0 psf		#N/A		

Typical Wall Studs

	Dead	Snow
Roof	15 psf	16 psf
	Dead	Live
Floor 1	15 psf	40 psf
Floor 2	30 psf	40 psf
	Dead	
Wall 1	15 psf	
Wall 2	0 psf	
Misc.	0 psf	DL

Default Species: DF

Stories: 2

Typical Wall Studs - Level 2

Description	$Roof_{Trib}$	$Floor\ 1_{Trib}$	$Floor\ 2_{Trib}$	$Wall\ 1_{Trib}$	$Wall\ 2_{Trib}$	$Misc_{Trib}$	DL	SL	LL	ASD Factored	ASD Wind	Stud	Height	Spacing	
TYP LEVEL 2	15.0ft	12.0ft	0.0ft	0.0ft	0.0ft	0.0ft	405 plf	244 plf	480 plf	948 plf	18.8 psf	(1) 2x6	12.0 ft	16 in. o.c.	OK
	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0 plf	0 plf	0 plf	0 plf	18.8 psf				
	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0 plf	0 plf	0 plf	0 plf	18.8 psf				
	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0 plf	0 plf	0 plf	0 plf	18.8 psf				
	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0 plf	0 plf	0 plf	0 plf	18.8 psf				

Typical Wall Studs - Level 1

Description	$Roof_{Trib}$	$Floor\ 1_{Trib}$	$Floor\ 2_{Trib}$	$Wall\ 1_{Trib}$	$Wall\ 2_{Trib}$	$Misc_{Trib}$	DL	SL	LL	ASD Factored	ASD Wind	Stud	Height	Spacing	
TYP LEVEL 1	0.0ft	12.0ft	12.0ft	12.0ft	0.0ft	0.0ft	1125 plf	244 plf	1440 plf	2565 plf	18.8 psf	(1) 2x6	10.0 ft	16 in. o.c.	OK
DINING	10.0ft	0.0ft	0.0ft	15.0ft	0.0ft	0.0ft	375 plf	163 plf	0 plf	538 plf	18.8 psf	(1) 2x6	15.0 ft	16 in. o.c.	OK
	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0 plf	0 plf	0 plf	0 plf	18.8 psf				
	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0 plf	0 plf	0 plf	0 plf	18.8 psf				
	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0 plf	0 plf	0 plf	0 plf	18.8 psf				

Description	$Roof_{Trib}$	$Floor\ 1_{Trib}$	$Floor\ 2_{Trib}$	$Wall\ 1_{Trib}$	$Wall\ 2_{Trib}$	$Misc_{Trib}$	DL	SL	LL	ASD Factored	ASD Wind	Stud	Height	Spacing
	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	1125 plf	244 plf	1440 plf	2565 plf	18.8 psf			
	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	375 plf	163 plf	0 plf	538 plf	18.8 psf			
	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0 plf	0 plf	0 plf	0 plf	18.8 psf			
	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0 plf	0 plf	0 plf	0 plf	18.8 psf			
	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0 plf	0 plf	0 plf	0 plf	18.8 psf			

Description	$Roof_{Trib}$	$Floor\ 1_{Trib}$	$Floor\ 2_{Trib}$	$Wall\ 1_{Trib}$	$Wall\ 2_{Trib}$	$Misc_{Trib}$	DL	SL	LL	ASD Factored	ASD Wind	Stud	Height	Spacing
	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	1125 plf	244 plf	1440 plf	2565 plf	18.8 psf			
	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	375 plf	163 plf	0 plf	538 plf	18.8 psf			
	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0 plf	0 plf	0 plf	0 plf	18.8 psf			
	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0 plf	0 plf	0 plf	0 plf	18.8 psf			
	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0 plf	0 plf	0 plf	0 plf	18.8 psf			

Continuous Strip Footings and Isolated Spot Footings

Reeve & Associates, Inc.

Geotechnical Consultant: n/a
Report Number: n/a
Bearing Pressure: 1500 psf
Min. Bearing Depth: 30" to bottom of footing
(Contractor/Owner to verify proper bearing conditions are provided)

	Dead	R. Live	Snow
Roof	15 psf	20 psf	16 psf
	Dead	Live	
Floor 1	15 psf	40 psf	
Floor 2	30 psf	40 psf	
	Dead		
Wall 1	10 psf		
Wall 2	0 psf		
Misc.	10 psf		SL

Cont Strip Ftgs									Live			ASD	Required		Specified	
Description	$Roof_{Trib}$	$Floor\ 1_{Trib}$	$Floor\ 2_{Trib}$	$Wall\ 1_{Trib}$	$Wall\ 2_{Trib}$	$Misc_{Trib}$	DL	R. LL	LL	SL	Factored	FTG		FTG	
TYP LEVEL 1	15.0ft	12.0ft	12.0ft	24.0ft	0.0ft	10.0ft	1005 plf	300 plf	960 plf	344 plf	1983 plf	15.9 in	1.3 ft	FC- 1.7	OK
	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0 plf	0 plf	0 plf	0 plf	0 plf	0.0 in	0.0 ft	FC- 0.0	OK
	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0 plf	0 plf	0 plf	0 plf	0 plf	0.0 in	0.0 ft	FC- 0.0	OK
	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0 plf	0 plf	0 plf	0 plf	0 plf	0.0 in	0.0 ft	FC- 0.0	OK
	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0.0ft	0 plf	0 plf	0 plf	0 plf	0 plf	0.0 in	0.0 ft	FC- 0.0	OK

Spot Ftgs		Live					ASD	Required		Specified	
Description	Dead	R. Live	Live	Snow	Wind	Seismic	Factored	FTG		FTG	
FB-1	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	9388 lbs	30.0 in	2.5 ft	FS-3.0	OK
FB-17	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	7849 lbs	27.5 in	2.3 ft	FS-2.5	OK
FB-13 (2)	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	26584 lbs	50.5 in	4.2 ft	FS-5.0	OK
FB-3	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	9276 lbs	29.8 in	2.5 ft	FS-4.0	OK
FB-14	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	0 lbs	8330 lbs	28.3 in	2.4 ft	FS-3.0	OK

TYPICAL FOOTINGS AND REINFORCING

Soil Bearing Pressure = 1500 psf

Footing Parameters

f'c =	2500	psi
fy steel =	60	ksi
pmax =	0.016	

Note: Not all footings were used on this project

Continuous Footings										Trial Reinf				
Callout	Dead	Snow	Live	Typ Eccent	Allowable Load	Ftg Reqd	Nom Ftg	Assumed depth	Asmin/ft	As Reqd/ft	Num Bar	Bar #	As Prov	√ As
FC-1.5	1320 plf	0 plf	900 plf	0.1%	*2.2 klf*	1.48'	*1.5'*	12"	0.18 in^2	0.36 in^2	(2)	4	0.4	OK
FC-2.0	2070 plf	0 plf	900 plf	0.1%	*3.0 klf*	1.98'	*2.0'*	12"	0.24 in^2	0.48 in^2	(3)	4	0.6	OK
FC-2.5	2820 plf	0 plf	900 plf	0.1%	*3.7 klf*	2.48'	*2.5'*	12"	0.30 in^2	0.60 in^2	(3)	5	0.93	OK
FC-3.0	3570 plf	0 plf	900 plf	0.1%	*4.5 klf*	2.98'	*3.0'*	12"	0.36 in^2	0.72 in^2	(3)	5	0.93	OK
FC-3.5	4320 plf	0 plf	900 plf	0.1%	*5.2 klf*	3.48'	*3.5'*	12"	0.42 in^2	0.84 in^2	(3)	5	0.93	OK
FC-4.0	5070 plf	0 plf	900 plf	0.1%	*6.0 klf*	3.98'	*4.0'*	12"	0.48 in^2	0.96 in^2	(4)	5	1.24	OK
FC-4.5	5820 plf	0 plf	900 plf	0.1%	*6.7 klf*	4.48'	*4.5'*	12"	0.54 in^2	1.08 in^2	(4)	5	1.24	OK
FC-5.0	6570 plf	0 plf	900 plf	0.1%	*7.5 klf*	4.98'	*5.0'*	12"	0.60 in^2	1.20 in^2	(5)	5	1.55	OK
FT-1.5	1320 plf	0 plf	900 plf	0.1%	*2.2 klf*	1.48'	*1.5'*	12"	0.18 in^2	0.36 in^2	(2)	4	0.4	OK
FT-2.0	2070 plf	0 plf	900 plf	0.1%	*3.0 klf*	1.98'	*2.0'*	12"	0.24 in^2	0.48 in^2	(3)	4	0.6	OK
FT-2.5	2820 plf	0 plf	900 plf	0.1%	*3.7 klf*	2.48'	*2.5'*	12"	0.30 in^2	0.60 in^2	(3)	5	0.93	OK
FT-3.0	3570 plf	0 plf	900 plf	0.1%	*4.5 klf*	2.98'	*3.0'*	12"	0.36 in^2	0.72 in^2	(3)	5	0.93	OK
FT-3.5	4320 plf	0 plf	900 plf	0.1%	*5.2 klf*	3.48'	*3.5'*	12"	0.42 in^2	0.84 in^2	(3)	5	0.93	OK

Spot Footings													Trial Reinf				
Callout	Dead	Snow	Live	Typ Eccent	Allowable Load	Ftg Reqd	Nom Ftg	Mu	p	√ p	Assumed depth	Asmin	As Reqd	Num Bar	Bar #	As Prov	√ As
FS-2.0	2350 lbs	2350 lbs	2350 lbs	0.1%	*5.9 k*	1.98'	*2.0'*	1.02 k-ft	0.000	OK	12"	0.51 in^2	0.03 in^2	(3)	4	0.6	OK
FS-3.0	5300 lbs	5300 lbs	5300 lbs	0.1%	*13.3 k*	2.98'	*3.0'*	3.92 k-ft	0.000	OK	12"	0.77 in^2	0.13 in^2	(3)	5	0.93	OK
FS-4.0	9500 lbs	9500 lbs	9500 lbs	0.1%	*23.8 k*	3.99'	*4.0'*	10.01 k-ft	0.001	OK	12"	1.03 in^2	0.33 in^2	(4)	5	1.24	OK
FS-5.0	14400 lbs	14400 lbs	14400 lbs	0.1%	*36.0 k*	4.91'	*5.0'*	18.63 k-ft	0.001	OK	12"	1.27 in^2	0.62 in^2	(5)	5	1.55	OK
FS-6.0	21500 lbs	21500 lbs	21200 lbs	0.1%	*53.5 k*	5.99'	*6.0'*	33.88 k-ft	0.001	OK	14"	1.81 in^2	0.88 in^2	(6)	5	1.86	OK
FS-7.0	29000 lbs	29000 lbs	29000 lbs	0.1%	*72.5 k*	6.97'	*7.0'*	53.38 k-ft	0.001	OK	14"	2.11 in^2	1.39 in^2	(7)	5	2.17	OK
FS-8.0	38000 lbs	38000 lbs	38000 lbs	0.1%	*95.0 k*	7.98'	*8.0'*	80.09 k-ft	0.001	OK	16"	2.76 in^2	1.71 in^2	(7)	6	3.08	OK
FS-9.0	48000 lbs	48000 lbs	48000 lbs	0.1%	*120.0 k*	8.97'	*9.0'*	116.00 k-ft	0.001	OK	18"	3.49 in^2	2.09 in^2	(8)	6	3.52	OK
FS-10.0	57000 lbs	57000 lbs	57000 lbs	0.1%	*142.5 k*	9.78'	*10.0'*	152.10 k-ft	0.001	OK	18"	3.80 in^2	2.75 in^2	(9)	6	3.96	OK

PUNCHING SHEAR CHECK

Note: Not all footings were used on this project

Callout	Factored Load	Min Col. Dim	factored qu	Assumed depth	d	bo	Vu	Vc	√ Capacity
FS-2.0	8.5 k	4"	2.12 ksf	12"	9.0"	52"	6.0 k	79.6 k	OK
FS-3.0	19.1 k	4"	2.12 ksf	12"	9.0"	52"	16.6 k	79.6 k	OK
FS-4.0	34.2 k	4"	2.14 ksf	12"	9.0"	52"	31.7 k	79.6 k	OK
FS-5.0	51.8 k	5"	2.07 ksf	12"	9.0"	56"	49.0 k	85.7 k	OK
FS-6.0	77.1 k	6"	2.14 ksf	14"	11.0"	68"	72.8 k	127.2 k	OK
FS-7.0	104.4 k	7"	2.13 ksf	14"	11.0"	72"	99.6 k	134.6 k	OK
FS-8.0	136.8 k	8"	2.14 ksf	16"	13.0"	84"	130.3 k	185.6 k	OK
FS-9.0	172.8 k	8"	2.13 ksf	18"	15.0"	92"	165.0 k	234.6 k	OK
FS-10.0	205.2 k	8"	2.05 ksf	18"	15.0"	92"	197.7 k	234.6 k	OK

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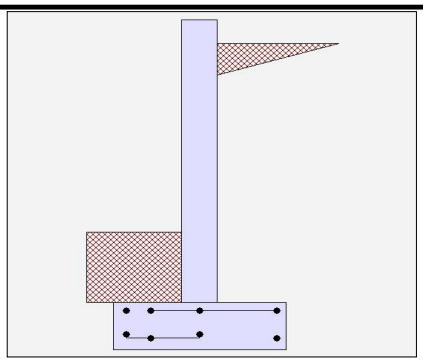
Code: IBC 2018,ACI 318-14,TMS 402-16

Criteria

Retained Height	=	5.50 ft
Wall height above soil	=	0.50 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	18.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,775.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	32.0 psf/ft
	=	
Passive Pressure	=	250.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Service Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Design Summary

Wall Stability Ratios

Overturning	=	2.69	OK
Sliding	=	2.20	OK
Total Bearing Load	=	2,082 lbs	
...resultant ecc.	=	5.23 in	
Soil Pressure @ Toe	=	1,156 psf	OK
Soil Pressure @ Heel	=	125 psf	OK
Allowable	=	1,775 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,619 psf	
ACI Factored @ Heel	=	175 psf	
Footing Shear @ Toe	=	6.0 psi	OK
Footing Shear @ Heel	=	5.0 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	676.0 lbs	
less 100% Passive Force	= -	656.3 lbs	
less 100% Friction Force	= -	832.9 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	IBC 2018,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

	Bottom
	Stem OK
Design Height Above Ftg ft =	0.00
Wall Material Above "Ht" =	Concrete
Design Method =	LRFD
Thickness =	8.00
Rebar Size =	# 5
Rebar Spacing =	12.00
Rebar Placed at =	Center
Design Data	
fb/FB + fa/Fa =	**0.279**
Total Force @ Section	
Service Level lbs =	
Strength Level lbs =	774.4
Moment....Actual	
Service Level ft-# =	
Strength Level ft-# =	1,419.7
Moment.....Allowable =	5,069.7
Shear.....Actual	
Service Level psi =	
Strength Level psi =	16.1
Shear.....Allowable psi =	75.0
Anet (Masonry) in2 =	
Rebar Depth 'd' in =	4.00
Masonry Data	
f'm psi =	
Fs psi =	
Solid Grouting =	
Modular Ratio 'n' =	
Wall Weight psf =	100.0
Short Term Factor =	
Equiv. Solid Thick. =	
Masonry Block Type =	Medium Weight
Masonry Design Method =	ASD
Concrete Data	
f'c psi =	2,500.0
Fy psi =	60,000.0

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Cantilevered Retaining Wall

Code: IBC 2018,ACI 318-14,TMS 402-16

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing
As (based on applied moment) :	0.0857 in2/ft	
(4/3) * As :	0.1143 in2/ft	Min Stem T&S Reinf Area 1.152 in2
200bd/fy : 200(12)(4)/60000 :	0.16 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :
	==========	One layer of : Two layers of :
Required Area :	0.1728 in2/ft	#4@ 12.50 in #4@ 25.00 in
Provided Area :	0.31 in2/ft	#5@ 19.38 in #5@ 38.75 in
Maximum Area :	0.5419 in2/ft	#6@ 27.50 in #6@ 55.00 in

Footing Data

Toe Width	=	1.29 ft
Heel Width	=	1.96
Total Footing Width	=	3.25
Footing Thickness	=	12.00 in
Key Width	=	12.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	1.58 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,619	175 psf
Mu' : Upward	=	14,293	305 ft-#
Mu' : Downward	=	3,784	756 ft-#
Mu: Design	=	433	450 ft-#
Actual 1-Way Shear	=	5.98	5.03 psi
Allow 1-Way Shear	=	75.00	75.00 psi

Toe Reinforcing = # 5 @ 12.00 in
Heel Reinforcing = # 5 @ 12.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 9.25 in, #5@ 14.34 in, #6@ 20.36 in, #7@ 27.77 in, #8@ 36.56 in, #9@ 46
Heel: #4@ 9.25 in, #5@ 14.34 in, #6@ 20.36 in, #7@ 27.77 in, #8@ 36.56 in, #9@ 46
Key: No key defined

Min footing T&S reinf Area 0.84 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

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Cantilevered Retaining Wall

Code: IBC 2018,ACI 318-14,TMS 402-16

Summary of Overturning & Resisting Forces & Moments

Item	.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#	.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)	676.0	2.17	1,464.7			
HL Act Pres (be water tbl)						
Hydrostatic Force						
Buoyant Force =						
Surcharge over Heel =						
Surcharge Over Toe =						
Adjacent Footing Load =						
Added Lateral Load =						
Load @ Stem Above Soil =						
=						
				Soil Over HL (ab. water tbl)	781.5	2.60	2,035.3
				Soil Over HL (bel. water tbl)		2.60	2,035.3
				Watre Table			
				Sloped Soil Over Heel =			
				Surcharge Over Heel =			
				Adjacent Footing Load =			
				Axial Dead Load on Stem =			
				* Axial Live Load on Stem =			
				Soil Over Toe =	213.1	0.65	137.7
				Surcharge Over Toe =			
				Stem Weight(s) =	600.0	1.63	975.1
				Earth @ Stem Transitions =			
				Footing Weight =	487.5	1.63	792.3
				Key Weight =		2.08	
				Vert. Component =			
Total =	676.0	**O.T.M.** =	1,464.7	**Total =**	2,082.2 lbs	**R.M.=**	3,940.3

Resisting/Overturning Ratio = **2.69**
Vertical Loads used for Soil Pressure = 2,082.2 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.059	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

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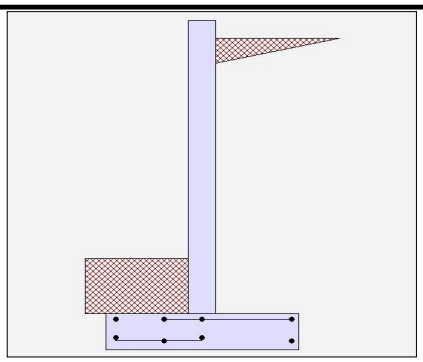
Code: IBC 2018,ACI 318-14,TMS 402-16

Criteria

Retained Height	=	7.50 ft
Wall height above soil	=	0.50 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	18.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,775.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	32.0 psf/ft
	=	
Passive Pressure	=	250.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Service Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Design Summary

Wall Stability Ratios

Overturning	=	3.02	OK
Sliding	=	1.77	OK
Total Bearing Load	=	3,483 lbs	
...resultant ecc.	=	5.21 in	
Soil Pressure @ Toe	=	1,162 psf	OK
Soil Pressure @ Heel	=	329 psf	OK
Allowable	=	1,775 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,627 psf	
ACI Factored @ Heel	=	461 psf	
Footing Shear @ Toe	=	12.9 psi	OK
Footing Shear @ Heel	=	8.1 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	1,156.0 lbs	
less 100% Passive Force	= -	656.3 lbs	
less 100% Friction Force	= -	1,393.3 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	IBC 2018,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

	Bottom
	Stem OK
Design Height Above Ftg ft =	0.00
Wall Material Above "Ht" =	Concrete
Design Method =	LRFD
Thickness =	8.00
Rebar Size =	# 6
Rebar Spacing =	12.00
Rebar Placed at =	Center
Design Data	
fb/FB + fa/Fa =	**0.521**
Total Force @ Section	
Service Level lbs =	
Strength Level lbs =	1,440.0
Moment....Actual	
Service Level ft-# =	
Strength Level ft-# =	3,600.0
Moment.....Allowable =	6,892.0
Shear.....Actual	
Service Level psi =	
Strength Level psi =	30.0
Shear.....Allowable psi =	75.0
Anet (Masonry) in2 =	
Rebar Depth 'd' in =	4.00
Masonry Data	
f'm psi =	
Fs psi =	
Solid Grouting =	
Modular Ratio 'n' =	
Wall Weight psf =	100.0
Short Term Factor =	
Equiv. Solid Thick. =	
Masonry Block Type =	Medium Weight
Masonry Design Method =	ASD
Concrete Data	
f'c psi =	2,500.0
Fy psi =	60,000.0

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Cantilevered Retaining Wall

Code: IBC 2018,ACI 318-14,TMS 402-16

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing
As (based on applied moment) :	0.2173 in2/ft	
(4/3) * As :	0.2898 in2/ft	Min Stem T&S Reinf Area 1.536 in2
200bd/fy : 200(12)(4)/60000 :	0.16 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :
	==========	One layer of : Two layers of :
Required Area :	0.2173 in2/ft	#4@ 12.50 in #4@ 25.00 in
Provided Area :	0.44 in2/ft	#5@ 19.38 in #5@ 38.75 in
Maximum Area :	0.5419 in2/ft	#6@ 27.50 in #6@ 55.00 in

Footing Data

Toe Width	=	2.00 ft
Heel Width	=	2.67
Total Footing Width	=	4.67
Footing Thickness	=	12.00 in
Key Width	=	12.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	1.58 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,627	461	psf
Mu' : Upward	=	35,058	1,260	ft-#
Mu' : Downward	=	9,072	2,348	ft-#
Mu: Design	=	1,332	1,088	ft-#
Actual 1-Way Shear	=	12.94	8.06	psi
Allow 1-Way Shear	=	75.00	75.00	psi

Toe Reinforcing = # 6 @ 12.00 in
Heel Reinforcing = # 6 @ 12.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 9.25 in, #5@ 14.34 in, #6@ 20.36 in, #7@ 27.77 in, #8@ 36.56 in, #9@ 46
Heel: #4@ 9.25 in, #5@ 14.34 in, #6@ 20.36 in, #7@ 27.77 in, #8@ 36.56 in, #9@ 46
Key: No key defined

Min footing T&S reinf Area 1.21 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

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Cantilevered Retaining Wall

Code: IBC 2018,ACI 318-14,TMS 402-16

Summary of Overturning & Resisting Forces & Moments

Item	.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#	.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)	1,156.0	2.83	3,275.3			
HL Act Pres (be water tbl)						
Hydrostatic Force						
Buoyant Force =						
Surcharge over Heel =						
Surcharge Over Toe =						
Adjacent Footing Load =						
Added Lateral Load =						
Load @ Stem Above Soil =						
=						
Soil Over HL (ab. water tbl)				1,652.8	3.67	6,062.8
Soil Over HL (bel. water tbl)					3.67	6,062.8
Watre Table						
Sloped Soil Over Heel =						
Surcharge Over Heel =						
Adjacent Footing Load =						
Axial Dead Load on Stem =						
* Axial Live Load on Stem =						
Soil Over Toe =				330.0	1.00	330.0
Surcharge Over Toe =						
Stem Weight(s) =				800.0	2.33	1,866.7
Earth @ Stem Transitions =						
Footing Weight =				700.5	2.34	1,635.7
Key Weight =					2.08	
Vert. Component =						
Total =	1,156.0	**O.T.M.** =	3,275.3	**Total =** 3,483.3 lbs	**R.M.=**	9,895.2

Resisting/Overturning Ratio = **3.02**
Vertical Loads used for Soil Pressure = 3,483.3 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.055	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

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Cantilevered Retaining Wall

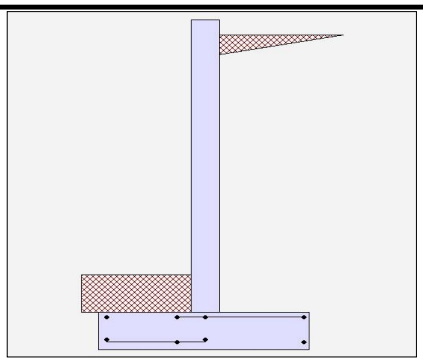
Code: IBC 2018,ACI 318-14,TMS 402-16

Criteria

Retained Height	=	9.25 ft
Wall height above soil	=	0.50 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	15.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,775.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	32.0 psf/ft
	=	
Passive Pressure	=	250.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Service Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Design Summary

Wall Stability Ratios

Overturning	=	3.46	OK
Sliding	=	1.62	OK
Total Bearing Load	=	5,482 lbs	
...resultant ecc.	=	4.21 in	
Soil Pressure @ Toe	=	1,173 psf	OK
Soil Pressure @ Heel	=	582 psf	OK
Allowable	=	1,775 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,642 psf	
ACI Factored @ Heel	=	814 psf	
Footing Shear @ Toe	=	14.0 psi	OK
Footing Shear @ Heel	=	8.1 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	1,764.0 lbs	
less 100% Passive Force	= -	656.3 lbs	
less 100% Friction Force	= -	2,192.8 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	IBC 2018,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

	Bottom
	Stem OK
Design Height Above Ftg ft =	0.00
Wall Material Above "Ht" =	Concrete
Design Method =	LRFD
Thickness =	10.00
Rebar Size =	# 6
Rebar Spacing =	8.00
Rebar Placed at =	Center
Design Data	
fb/FB + fa/Fa =	**0.538**
Total Force @ Section	
Service Level lbs =	
Strength Level lbs =	2,190.4
Moment....Actual	
Service Level ft-# =	
Strength Level ft-# =	6,753.7
Moment.....Allowable =	12,537.0
Shear.....Actual	
Service Level psi =	
Strength Level psi =	36.5
Shear.....Allowable psi =	75.0
Anet (Masonry) in2 =	
Rebar Depth 'd' in =	5.00
Masonry Data	
f'm psi =	
Fs psi =	
Solid Grouting =	
Modular Ratio 'n' =	
Wall Weight psf =	125.0
Short Term Factor =	
Equiv. Solid Thick. =	
Masonry Block Type =	Medium Weight
Masonry Design Method =	ASD
Concrete Data	
f'c psi =	2,500.0
Fy psi =	60,000.0

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Cantilevered Retaining Wall

Code: IBC 2018,ACI 318-14,TMS 402-16

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing
As (based on applied moment) :	0.3206 in2/ft	
(4/3) * As :	0.4275 in2/ft	Min Stem T&S Reinf Area 2.340 in2
200bd/fy : 200(12)(5)/60000 :	0.2 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.240 in2/ft
0.0018bh : 0.0018(12)(10) :	0.216 in2/ft	Horizontal Reinforcing Options :
	==========	One layer of : Two layers of :
Required Area :	0.3206 in2/ft	#4@ 10.00 in #4@ 20.00 in
Provided Area :	0.66 in2/ft	#5@ 15.50 in #5@ 31.00 in
Maximum Area :	0.6773 in2/ft	#6@ 22.00 in #6@ 44.00 in

Footing Data

Toe Width	=	2.75 ft
Heel Width	=	3.50
Total Footing Width	=	6.25
Footing Thickness	=	15.00 in
Key Width	=	12.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	1.58 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,642	814	psf
Mu' : Upward	=	68,983	3,314	ft-#
Mu' : Downward	=	17,696	5,141	ft-#
Mu: Design	=	3,169	1,828	ft-#
Actual 1-Way Shear	=	14.00	8.09	psi
Allow 1-Way Shear	=	75.00	75.00	psi

Toe Reinforcing = # 6 @ 8.00 in
Heel Reinforcing = # 6 @ 12.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 7.40 in, #5@ 11.47 in, #6@ 16.29 in, #7@ 22.21 in, #8@ 29.25 in, #9@ 37
Heel: #4@ 7.40 in, #5@ 11.47 in, #6@ 16.29 in, #7@ 22.21 in, #8@ 29.25 in, #9@ 37
Key: No key defined

Min footing T&S reinf Area 2.03 in2
Min footing T&S reinf Area per foot 0.32 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 7.41 in	#4@ 14.81 in
#5@ 11.48 in	#5@ 22.96 in
#6@ 16.30 in	#6@ 32.59 in

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Cantilevered Retaining Wall

Code: IBC 2018,ACI 318-14,TMS 402-16

Summary of Overturning & Resisting Forces & Moments

Item	.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#	.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)	1,764.0	3.50	6,174.0			
HL Act Pres (be water tbl)						
Hydrostatic Force						
Buoyant Force =						
Surcharge over Heel =						
Surcharge Over Toe =						
Adjacent Footing Load =						
Added Lateral Load =						
Load @ Stem Above Soil =						
=						
Soil Over HL (ab. water tbl)				2,713.3	4.92	13,340.6
Soil Over HL (bel. water tbl)					4.92	13,340.6
Watre Table						
Sloped Soil Over Heel =						
Surcharge Over Heel =						
Adjacent Footing Load =						
Axial Dead Load on Stem =						
* Axial Live Load on Stem =						
Soil Over Toe =				378.1	1.38	519.9
Surcharge Over Toe =						
Stem Weight(s) =				1,218.8	3.17	3,859.4
Earth @ Stem Transitions =						
Footing Weight =				1,171.9	3.13	3,662.1
Key Weight =					2.08	
Vert. Component =						
Total =	1,764.0	**O.T.M.** =	6,174.0	**Total =** 5,482.1 lbs	**R.M.=**	21,382.0

Resisting/Overturning Ratio = **3.46**
Vertical Loads used for Soil Pressure = 5,482.1 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.051	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

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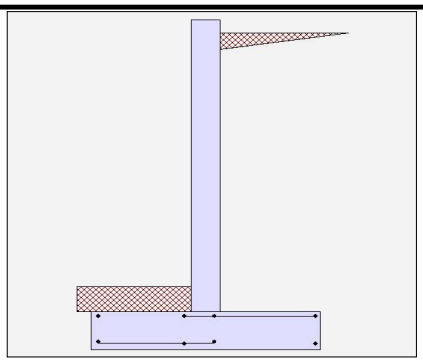
Code: IBC 2018,ACI 318-14,TMS 402-16

Criteria

Retained Height	=	11.00 ft
Wall height above soil	=	0.50 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	12.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,775.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	32.0 psf/ft
	=	
Passive Pressure	=	250.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Service Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Design Summary

Wall Stability Ratios

Overturning	=	3.96	OK
Sliding	=	1.57	OK
Total Bearing Load	=	8,145 lbs	
...resultant ecc.	=	2.58 in	
Soil Pressure @ Toe	=	1,183 psf	OK
Soil Pressure @ Heel	=	854 psf	OK
Allowable	=	1,775 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,656 psf	
ACI Factored @ Heel	=	1,195 psf	
Footing Shear @ Toe	=	15.1 psi	OK
Footing Shear @ Heel	=	8.0 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	2,500.0 lbs	
less 100% Passive Force	= -	656.3 lbs	
less 100% Friction Force	= -	3,258.0 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	IBC 2018,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

	Bottom
	Stem OK
Design Height Above Ftg ft =	0.00
Wall Material Above "Ht" =	Concrete
Design Method =	LRFD
Thickness =	12.00
Rebar Size =	# 6
Rebar Spacing =	10.00
Rebar Placed at =	Edge
Design Data	
fb/FB + fa/Fa =	**0.530**
Total Force @ Section	
Service Level lbs =	
Strength Level lbs =	3,097.6
Moment....Actual	
Service Level ft-# =	
Strength Level ft-# =	11,357.9
Moment.....Allowable =	21,388.7
Shear.....Actual	
Service Level psi =	
Strength Level psi =	26.8
Shear.....Allowable psi =	75.0
Anet (Masonry) in2 =	
Rebar Depth 'd' in =	9.63
Masonry Data	
f'm psi =	
Fs psi =	
Solid Grouting =	
Modular Ratio 'n' =	
Wall Weight psf =	150.0
Short Term Factor =	
Equiv. Solid Thick. =	
Masonry Block Type =	Medium Weight
Masonry Design Method =	ASD
Concrete Data	
f'c psi =	2,500.0
Fy psi =	60,000.0

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Cantilevered Retaining Wall

Code: IBC 2018,ACI 318-14,TMS 402-16

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing
As (based on applied moment) :	0.2712 in2/ft	
(4/3) * As :	0.3616 in2/ft	Min Stem T&S Reinf Area 3.312 in2
200bd/fy : 200(12)(9.625)/60000 :	0.385 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.288 in2/ft
0.0018bh : 0.0018(12)(12) :	0.2592 in2/ft	Horizontal Reinforcing Options :
	==========	One layer of : Two layers of :
Required Area :	0.3616 in2/ft	#4@ 8.33 in #4@ 16.67 in
Provided Area :	0.528 in2/ft	#5@ 12.92 in #5@ 25.83 in
Maximum Area :	1.3039 in2/ft	#6@ 18.33 in #6@ 36.67 in

Footing Data

Toe Width	=	3.50 ft
Heel Width	=	4.50
Total Footing Width	=	8.00
Footing Thickness	=	18.00 in
Key Width	=	12.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	1.58 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,656	1,195	psf
Mu' : Upward	=	116,752	7,732	ft-#
Mu' : Downward	=	29,547	10,547	ft-#
Mu: Design	=	6,268	2,816	ft-#
Actual 1-Way Shear	=	15.06	8.02	psi
Allow 1-Way Shear	=	75.00	75.00	psi

Toe Reinforcing = # 6 @ 10.00 in
Heel Reinforcing = # 6 @ 12.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 6.16 in, #5@ 9.56 in, #6@ 13.57 in, #7@ 18.51 in, #8@ 24.37 in, #9@ 30.
Heel: #4@ 6.16 in, #5@ 9.56 in, #6@ 13.57 in, #7@ 18.51 in, #8@ 24.37 in, #9@ 30.
Key: No key defined

Min footing T&S reinf Area 3.11 in2
Min footing T&S reinf Area per foot 0.39 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 6.17 in	#4@ 12.35 in
#5@ 9.57 in	#5@ 19.14 in
#6@ 13.58 in	#6@ 27.16 in

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Cantilevered Retaining Wall

Code: IBC 2018,ACI 318-14,TMS 402-16

Summary of Overturning & Resisting Forces & Moments

Item	.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#	.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)	2,500.0	4.17	10,416.7			
HL Act Pres (be water tbl)						
Hydrostatic Force						
Buoyant Force =						
Surcharge over Heel =						
Surcharge Over Toe =						
Adjacent Footing Load =						
Added Lateral Load =						
Load @ Stem Above Soil =						
=						
Soil Over HL (ab. water tbl)				4,235.0	6.25	26,468.8
Soil Over HL (bel. water tbl)					6.25	26,468.8
Watre Table						
Sloped Soil Over Heel =						
Surcharge Over Heel =						
Adjacent Footing Load =						
Axial Dead Load on Stem =						
* Axial Live Load on Stem =						
Soil Over Toe =				385.0	1.75	673.8
Surcharge Over Toe =						
Stem Weight(s) =				1,725.0	4.00	6,900.0
Earth @ Stem Transitions =						
Footing Weight =				1,800.0	4.00	7,200.0
Key Weight =					2.08	
Vert. Component =						
Total =	2,500.0	**O.T.M.** =	10,416.7	**Total =** 8,145.0 lbs	**R.M.=**	41,242.5

Resisting/Overturning Ratio = **3.96**
Vertical Loads used for Soil Pressure = 8,145.0 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.047	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

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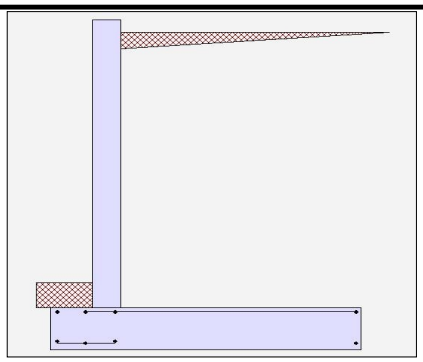
Code: IBC 2018,ACI 318-14,TMS 402-16

Criteria

Retained Height	=	11.00 ft
Wall height above soil	=	0.50 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	12.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,775.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	32.0 psf/ft
	=	
Passive Pressure	=	250.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.300
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Service Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Design Summary

Wall Stability Ratios

Overturning	=	8.13	OK
Sliding	=	1.74	OK
Total Bearing Load	=	14,925 lbs	
...resultant ecc.	=	3.86 in	
Soil Pressure @ Toe	=	1,595 psf	OK
Soil Pressure @ Heel	=	1,119 psf	OK
Allowable	=	1,775 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	2,233 psf	
ACI Factored @ Heel	=	1,566 psf	
Footing Shear @ Toe	=	1.1 psi	OK
Footing Shear @ Heel	=	70.9 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	2,567.1 lbs	
less 0 % Passive Force	= -	0.0 lbs	
less 100% Friction Force	= -	4,477.5 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	IBC 2018,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

	Bottom
	Stem OK
Design Height Above Ftg ft =	0.00
Wall Material Above "Ht" =	Concrete
Design Method =	LRFD
Thickness =	12.00
Rebar Size =	# 6
Rebar Spacing =	10.00
Rebar Placed at =	Edge
Design Data	
fb/FB + fa/Fa =	**0.530**
Total Force @ Section	
Service Level lbs =	
Strength Level lbs =	3,097.6
Moment....Actual	
Service Level ft-# =	
Strength Level ft-# =	11,357.9
Moment.....Allowable =	21,388.7
Shear.....Actual	
Service Level psi =	
Strength Level psi =	26.8
Shear.....Allowable psi =	75.0
Anet (Masonry) in2 =	
Rebar Depth 'd' in =	9.63
Masonry Data	
f'm psi =	
Fs psi =	
Solid Grouting =	
Modular Ratio 'n' =	
Wall Weight psf =	150.0
Short Term Factor =	
Equiv. Solid Thick. =	
Masonry Block Type =	Medium Weight
Masonry Design Method =	ASD
Concrete Data	
f'c psi =	2,500.0
Fy psi =	60,000.0

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Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing
As (based on applied moment) :	0.2712 in2/ft	
(4/3) * As :	0.3616 in2/ft	Min Stem T&S Reinf Area 3.312 in2
200bd/fy : 200(12)(9.625)/60000 :	0.385 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.288 in2/ft
0.0018bh : 0.0018(12)(12) :	0.2592 in2/ft	Horizontal Reinforcing Options :
	==========	One layer of : Two layers of :
Required Area :	0.3616 in2/ft	#4@ 8.33 in #4@ 16.67 in
Provided Area :	0.528 in2/ft	#5@ 12.92 in #5@ 25.83 in
Maximum Area :	1.3039 in2/ft	#6@ 18.33 in #6@ 36.67 in

Footing Data

Toe Width	=	1.50 ft
Heel Width	=	9.50
Total Footing Width	=	11.00
Footing Thickness	=	20.00 in
Key Width	=	12.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	1.58 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	2,233	1,566	psf
Mu' : Upward	=	29,737	0	ft-#
Mu' : Downward	=	5,832	63,291	ft-#
Mu: Design	=	1,651	63,291	ft-#
Actual 1-Way Shear	=	1.11	70.91	psi
Allow 1-Way Shear	=	75.00	75.00	psi

Toe Reinforcing = # 6 @ 10.00 in
Heel Reinforcing = # 6 @ 12.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 5.55 in, #5@ 8.60 in, #6@ 12.21 in, #7@ 16.66 in, #8@ 21.93 in, #9@ 27.
Heel: #4@ 5.55 in, #5@ 8.60 in, #6@ 12.21 in, #7@ 16.66 in, #8@ 21.93 in, #9@ 27.
Key: No key defined

Min footing T&S reinf Area 4.75 in2
Min footing T&S reinf Area per foot 0.43 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 5.56 in	#4@ 11.11 in
#5@ 8.61 in	#5@ 17.22 in
#6@ 12.22 in	#6@ 24.44 in

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Summary of Overturning & Resisting Forces & Moments

Item	.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#	.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)	2,567.1	4.22	10,838.9			
HL Act Pres (be water tbl)						
Hydrostatic Force						
Buoyant Force =						
Surcharge over Heel =						
Surcharge Over Toe =						
Adjacent Footing Load =						
Added Lateral Load =						
Load @ Stem Above Soil =						
=						
Soil Over HL (ab. water tbl)				10,285.0	6.75	69,423.8
Soil Over HL (bel. water tbl)					6.75	69,423.8
Watre Table						
Sloped Soil Over Heel =						
Surcharge Over Heel =						
Adjacent Footing Load =						
Axial Dead Load on Stem =						
* Axial Live Load on Stem =						
Soil Over Toe =				165.0	0.75	123.8
Surcharge Over Toe =						
Stem Weight(s) =				1,725.0	2.00	3,450.0
Earth @ Stem Transitions =						
Footing Weight =				2,750.0	5.50	15,125.0
Key Weight =					2.08	
Vert. Component =						
Total =	2,567.1	**O.T.M.** =	10,838.9	**Total =** 14,925.0 lbs	**R.M.=**	88,122.5

Resisting/Overturning Ratio = **8.13**
Vertical Loads used for Soil Pressure = 14,925.0 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.046	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Solutions you can build on

Reeve & Associates, Inc.

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