Structural Calculations for:

Dillon-Naftolin Residence

4524 90th Ave SE
Mercer Island, WA 98040

9/30/2022

Prepared for:	Herschel L. D. Parnes, Architect
Job #:	00059-2022-01
Date:	9/30/2022

Criteria Sheet

Codes

Structural	IBC 2018
Loading	ASCE 7-16
Wood:	NDS 2018
Concrete:	ACI 318-14

Project Location

Street & Number	4524 90th Ave SE
City:	Mercer Island
State:	WA
ZIP:	98040
Latitude:	47.5645 N
Longitude:	-122.2187 W
Ground Elevation	361 ft

Occupancy Category

Risk Category: II ASCE 7 Table 1.5-1

Seismic Load Summary:

Analysis Procedure:	Equivalent Lateral Force Procedure		
Lateral System:	Light-frame (wood) Walls Sheathed with Wood Structural Panels Rated for Shear Resistance		
R:	6.50	C_d=	4
Base Shear V =	2 kips	Ω_o=	2.5
S_S=	1.427	S_1=	0.496
S_{DS}=	1.14	S_{D1}=	0.60
C_s=	0.176	I_E=	1.0

Story Information

# Stories Above Grade	1

Horizontal and Vertical Irregularities:

Is the building a "Regular Structure"? (No horizontal or vertical irregularities) Yes

Wind Load Summary:

V=	100	K_{ZT}=	1.48
Exposure =	B		

Dead Loads:

Roof		Floor	
Roofing	2.5 psf	Flooring	2 psf
Sheathing	2 psf	Sheathing	2.5 psf
Rafters	2 psf	Framing	3 psf
Misc	5 psf	Misc	4 psf
Ceiling	3 psf	Ceilng	3 psf
	15 psf		15 psf
Use	15 psf	Use	15 psf

Snow Loads:

Snow, pf 25 psf

Soils:

Soils Report Provided? No To be approved by the authority having jurisdiction, per 11.8.2 exception.

Allowable Bearing 1500 psf

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Seismic Design

ASCE 7-16 Seismic Analysis — Equivalent Lateral Force Procedure

Seismic Force Resisting System Per Table 12.2-1		
	System	Bearing Wall Systems
	Type:	Light-frame (wood) Walls Sheathed with Wood Structural Panels Rated for Shear Resistance

Seismic Design Cat.	D	
Risk Category	II	I, II, or III, or IV per Table 1.5-1
Site Class	D (Default)	Assumed default soil properties, per 11.4.3.
Diaphragm Flexibility	Flexible	

Section 12.8.1.3 Exceptions

Regular Structure	Yes
≤ 5 Stories above grade	Yes
T ≤ 0.5s	Yes
ρ = 1.0	No
Not Site Class E or F	Yes
Risk Category I or II	Yes

If all exceptions are met, S_{DS} may be taken as 1, but not less than 0.7*(Calculated S_{DS})

S_S	1.427 g	2% in 50 yr, Latitude & Longitude lookup
S_1	0.496 g	2% in 50 yr, Latitude & Longitude lookup
R	6.50	
C_d	4.0	
Ω_o	2.5	
I_e	1.00	Table 1.5-2
h_n	9.0 ft	
Ct	0.02	Table 12.8-2
x	0.75	Table 12.8-2
T_a	0.10 sec	
T	0.10 sec	Eq. 12.8-7
T_0	0.10 sec	
T_S	0.52 sec	
T_L	6.00 sec	
F_a	1.20	Table 11.4-1
F_v	1.80	Table 11.4-2
S_{MS}	1.71 g	Eq. 11.4-1
S_{M1}	0.89 g	Eq. 11.4-2
S_{DS}	1.142 g	Eq. 11.4-3
S_{D1}	0.597 g	Eq. 11.4-4
C_s	***0.176 Controls***	Eq. 12.8-2
	0.883	Eq. 12.8-3 need not exceed, T < T_L
	0.010	Eq. 12.8-5 or 12.8-6 minimum
C_s, design	0.176	Section 11.4.8 Exception 2 Applied
Bldg. Weight	12.2 k	
V = C_SW	2.1 k	Eq. 12.8-1, Strength Level Base Shear
V = C_{Sasd}W	1.5 k	Eq. 12.8-1 ASD Base Shear

Building Period Per Alternate Analysis

T (sec)	

Per Geotech Report

F_a	
F_v	

$$T_a = C_t h_n^x \quad \text{Eq. 12.8.7}$$

$$S_{MS} = F_a S_S \quad \text{Eq. 11.4-1}$$
$$S_{M1} = F_v S_1 \quad \text{Eq. 11.4-2}$$
$$S_{DS} = {}^2/_3\, S_{MS} \quad \text{Eq. 11.4-3}$$
$$S_{D1} = {}^2/_3\, S_{M1} \quad \text{Eq. 11.4-4}$$

$$C_S = \frac{S_{DS}}{(R/I_e)} \quad \text{Eq. 12.8-2}$$
$$C_S = \frac{S_{D1}}{T(R/I_e)} \quad \text{Eq. 12.8-3}$$
$$C_S = \frac{S_{D1} T_L}{T^2(R/I_e)} \quad \text{Eq. 12.8-4}$$
$$C_S \geq 0.044 S_{DS} I_e \quad \text{Eq. 12.8-5}$$
$$C_S \geq 0.01 \quad \text{Eq. 12.8-5}$$
$$C_S \geq 0.5 \frac{S_1}{(R/I_e)} \quad \text{Eq. 12.8-6}$$

$$C_{VX} = w_x h_x^k / \textstyle\sum_{i=1}^{n} w_x h_i^k \quad \text{Eq. 12.8-12}$$

$$F_{px} = {}^{\sum_{i=x}^{n} F_i}/_{\sum_{i=x}^{n} w_i}\, w_{px} \quad \text{Eq. 12.10-1}$$
$$F_{px} \geq 0.2 S_{DS} I_e w_{px} \quad \text{Eq. 12.10-2}$$
$$F_{px} \leq 0.4 S_{DS} I_e w_{px} \quad \text{Eq. 12.10-3}$$

Vertical Distribution Strength ρ= 1.3 k= 1.000

Level	h_x (ft)	W_x (k)	h_x^k (ft)	$W_x h_x^k$	Story Shear Strength			Diaphragm Force (ρ not included)				
					C_{vx} (%)	F_x (k)	SV (k)	$F_{px,calc}$	$F_{px,min}$	$F_{px,max}$	$F_{px,design}$	γ=F_{px}/F_x
Roof	9.0	12.2	9.0	110	1.000	2.8	**2.8**	2.1	2.8	5.6	**2.8**	1.00
Σ		12.2		110		**2.8**						

Wind Design - MWFRS

ASCE 7 Chapter 27 - Directional Procedure

Design Method	Strength

Wind Coefficients

Exposure	B	
V=	100	mph
K_d=	0.85	Table 26.6-1
K_h=	0.57	Table 26.10-1
K_e=	0.99	Table 26.9-1
G=	0.85	26.9.4

Location and Building Dimensions

Calculate Kzt?	Yes	
Kzt	1.48	
Roof Type	Gable	
Roof Angle - Transverse Dir	18	degrees
Roof Angle - Long Dir	0	degrees
Ground to top of roof	11	ft
Bot of roof to top of roof	5	ft
Mean Roof Height, h	8.5	ft
Short Plan Dimension	18	ft
Long Plan Dimension	31	ft
Parapet ?	No	
Ground to top of parapet		ft
Average Parapet Height		ft
Ht of 2nd Level Above Grade	0	ft

Velocity Pressure at Mean Roof Height, q_h =	18.3	psf

Transverse Wind Pressures

L/B = 0.58 h/L = 0.47

Pressure Coefficients from Figure 27.3-1:

Bldg Face	C_p
Windward Wall	0.8
Leeward Wall	-0.50
Windward Roof	-0.5 / -0.05
Leeward Roof	-0.56

Wall Pressures (Unfactored): Strength

Ht	K_z	q_z	$P_{ww\ walls}$	$P_{lwwalls}$	**P_{walls} (psf)**
0-15	0.57	18.17	12.35	7.79	**20.1**
15-20	0.62	19.76	13.44	7.79	**21.2**
20-25	0.66	21.04	14.31	7.79	**22.1**
25-30	0.7	22.31	15.17	7.79	**23.0**
30-40	0.76	24.22	16.47	7.79	**24.3**
41-50	0.81	25.82	17.56	7.79	**25.3**
51-60	0.85	27.09	18.42	7.79	**26.2**
61-70	0.89	28.37	19.29	7.79	**27.1**
71-80	0.93	29.64	20.16	7.79	**27.9**
81-90	0.95	30.28	20.59	7.79	**28.4**
91-100	0.99	31.56	21.46	7.79	**29.2**

Roof Pressures (Unfactored) Strength

Windward		Leeward	**Horiz Proj (psf)**
Max	Min		
-0.8	-7.9	-8.7	**8.00**

Longitudinal Wind Pressures

L/B = 1.72 h/L = 0.27

Pressure Coefficients from Figure 27.4-1:

Bldg Face	C_p
Windward Wall	0.8
Leeward Wall	-0.36
Windward Roof	-0.9 / -0.18
Leeward Roof	-0.48

Wall Pressures (Unfactored): Strength

Ht	K_z	q_z	$P_{ww\ walls}$	$P_{lwwalls}$	**P_{walls} (psf)**
0-15	0.57	18.17	12.35	5.54	**17.89**
15-20	0.62	19.76	13.44	5.54	**18.97**
20-25	0.66	21.04	14.31	5.54	**19.84**
25-30	0.7	22.31	15.17	5.54	**20.71**
30-40	0.76	24.22	16.47	5.54	**22.01**
41-50	0.81	25.82	17.56	5.54	**23.09**
51-60	0.85	27.09	18.42	5.54	**23.96**
61-70	0.89	28.37	19.29	5.54	**24.83**
71-80	0.93	29.64	20.16	5.54	**25.69**
81-90	0.96	30.60	20.81	5.54	**26.34**
91-100	0.99	31.56	21.46	5.54	**26.99**

Roof Pressures (Unfactored) Strength

Windward		Leeward	**Horiz Proj (psf)**
Max	Min		
-2.8	-14.0	-7.5	**8.00**

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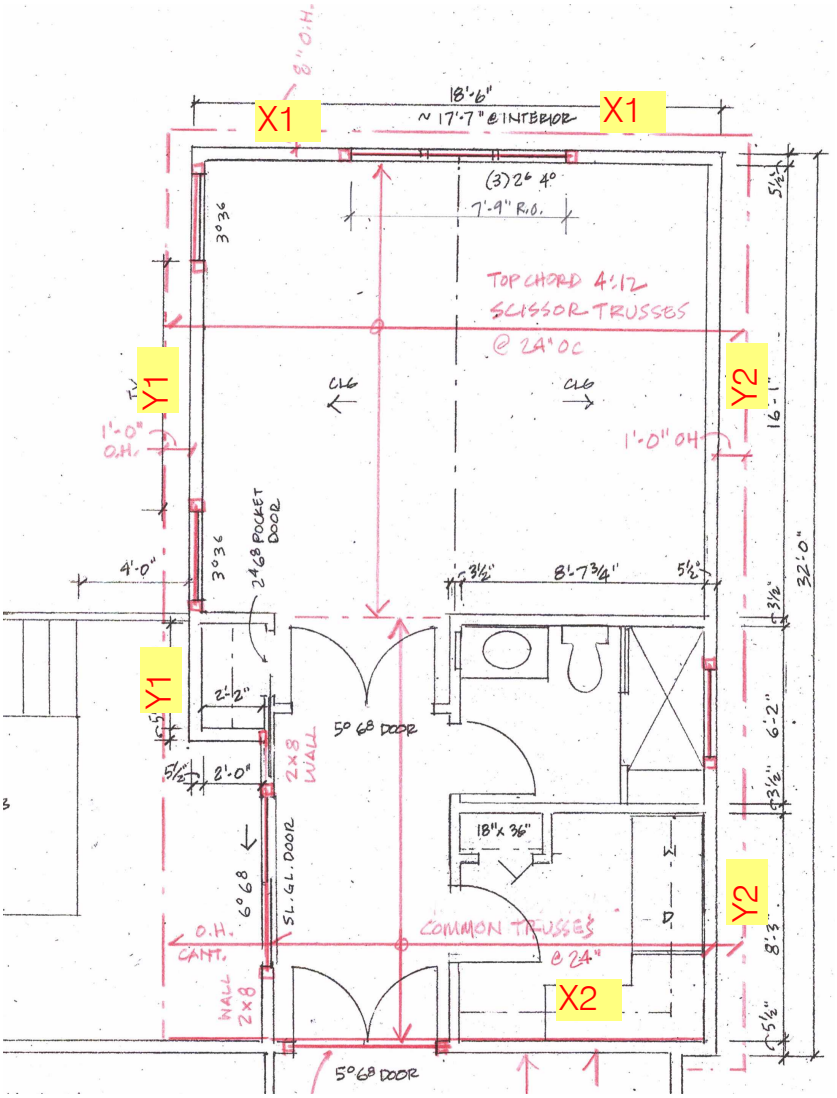

Shear wall key plan

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STRUCTURAL ENGINEERING

Dillon-Naftolin Residence
PROJECT

6/30/2022
DATE

PROJ. #
EBG
DESIGN

SHEET

Shear Wall Force Distribution

Governing Ultimate Story Shears:

Level	N-S Direction (k)	N-S Direction Loading	E-W Direction (k)	E-W Direction Loading
Roof	5.7	Wind	5.3	Wind

ASD Story Shears:

	N-S (k)	E-W (k)
Roof	3.4	3.2

Plywood Shear Wall Capacities:

Edge Nailing	Capacity (lbs/ft)	
	Seismic	Wind
8d @ 6	260	365
8d @ 4	380	532
8d @ 3	490	685
8d @ 2	640	895

X-Direction Wall Shear Distribution (See Shear Wall Key Plan)

	Wall Line	Trib Length (ft)	Shear (k)	Wall Length (ft)	Unit Shear (lbs/ft)	Wall Type
Low Roof	x1	9	1.6	11	145	W6
	x2	9	1.6	9	177	W6

Y-Direction Wall Shear Distribution (See Shear Wall Key Plan)

	Wall Line	Trib Length (ft)	Shear (k)	Wall Length (ft)	Unit Shear (lbs/ft)	Wall Type
Low Roof	y1	18	1.7	13.5	127	W6
	y2	18	1.7	28	61	W6

Shearwall Holdown Design

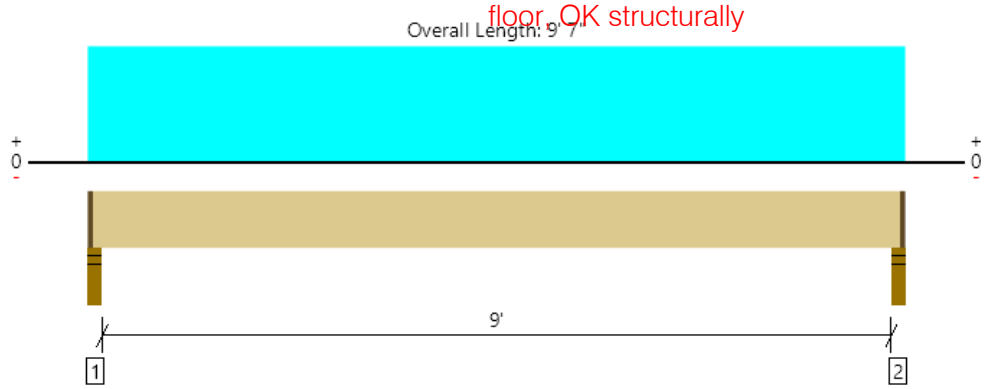
Holdown Capacities	
HDU5	5645 lbs
HDU2	3075 lbs
(2)cs16	3410 lbs
MST72	6730 lbs

Wall ID	Supporting	Direction	Segment lengths			Shear	Hwall	DL	T1	T2	T3	Holdown
			1	2	3	lbs/ft	(ft)	(lbs/ft)	(lbs)	(lbs)	(lbs)	
x1	**Roof**	x	5.5	5.5		145	9	132	1087	1087	0	HDU2
x2	**Roof**	x	9			177	9	132	1237	0	0	HDU2
y1	**Roof**	y	8.5	5		127	9	132	806	945	0	HDU2
y2	**Roof**	y	18	10		61	9	132	0	153	0	HDU2

Crawlspace, Crawlspace Joist

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

increased to 2x10 to match (E) floor, OK structurally



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)	325 @ 2 1/2"	2109 (2.25")	Passed (15%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	270 @ 10 3/4"	1305	Passed (21%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	728 @ 4' 9 1/2"	1511	Passed (48%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.105 @ 4' 9 1/2"	0.229	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.136 @ 4' 9 1/2"	0.458	Passed (L/809)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - DF	3.50"	2.25"	1.50"	77	256	333	1 1/4" Rim Board
2 - Stud wall - DF	3.50"	2.25"	1.50"	77	256	333	1 1/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 5" o/c	
Bottom Edge (Lu)	9' 5" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 9' 7"	16"	12.0	40.0	Default Load

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

ForteWEB Software Operator	Job Notes
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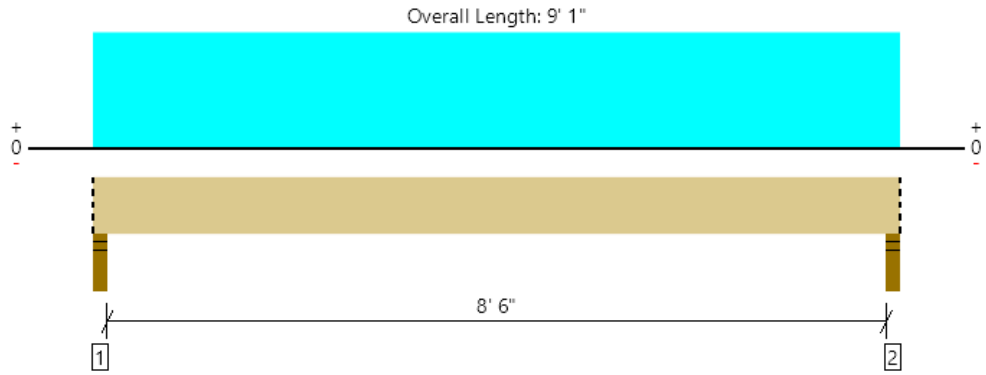
Crawlspace, Crawlspace Drop Beam
1 piece(s) 4 x 10 DF No.1



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2036 @ 2"	7656 (3.50")	Passed (27%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1559 @ 1' 3/4"	3885	Passed (40%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	4289 @ 4' 6 1/2"	4991	Passed (86%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.108 @ 4' 6 1/2"	0.292	Passed (L/976)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.151 @ 4' 6 1/2"	0.438	Passed (L/697)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - DF	3.50"	3.50"	1.50"	582	1453	2035	Blocking
2 - Stud wall - DF	3.50"	3.50"	1.50"	582	1453	2035	Blocking

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 9' 1"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 9' 1" (Front)	8'	15.0	40.0	Default Load

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

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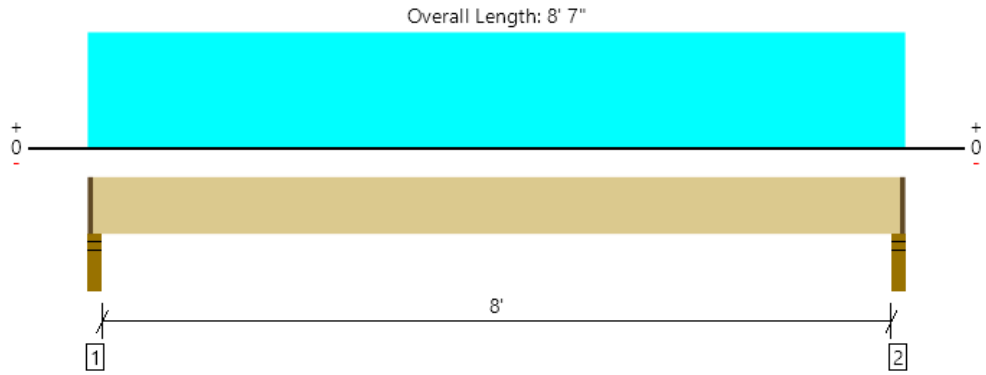
Deck Joist

1 piece(s) 2 x 8 HF No.2 @ 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)	402 @ 2 1/2"	1367 (2.25")	Passed (29%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	326 @ 10 3/4"	1088	Passed (30%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	800 @ 4' 3 1/2"	1284	Passed (62%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.129 @ 4' 3 1/2"	0.204	Passed (L/758)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.155 @ 4' 3 1/2"	0.408	Passed (L/632)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - DF	3.50"	2.25"	1.50"	69	343	412	1 1/4" Rim Board
2 - Stud wall - DF	3.50"	2.25"	1.50"	69	343	412	1 1/4" Rim Board

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 8' 7"	16"	12.0	60.0	Default Load

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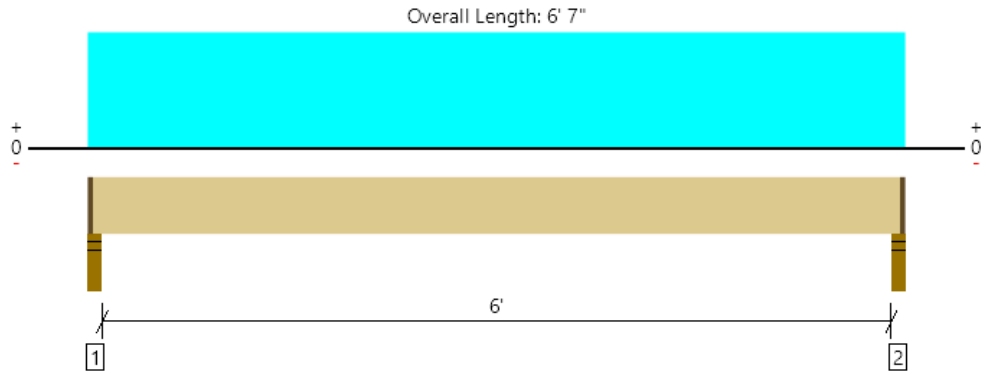
Crawlspace, Deck Beam
1 piece(s) 4 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	938 @ 2"	3189 (2.25")	Passed (29%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	705 @ 10 3/4"	2538	Passed (28%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1438 @ 3' 3 1/2"	2823	Passed (51%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.057 @ 3' 3 1/2"	0.156	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.070 @ 3' 3 1/2"	0.313	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - DF	3.50"	2.25"	1.50"	178	790	968	1 1/4" Rim Board
2 - Stud wall - DF	3.50"	2.25"	1.50"	178	790	968	1 1/4" Rim Board

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 1/4" to 6' 5 3/4"	N/A	6.4	--	
1 - Uniform (PSF)	0 to 6' 7" (Front)	4'	12.0	60.0	Default Load

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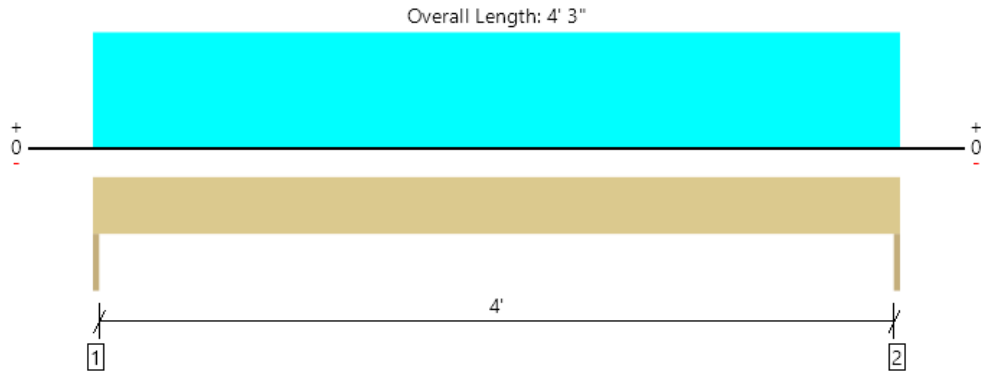
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, Typ Header
2 piece(s) 2 x 8 DF No.1



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	862 @ 0	2813 (1.50")	Passed (31%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	566 @ 8 3/4"	3002	Passed (19%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	916 @ 2' 1 1/2"	3022	Passed (30%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.011 @ 2' 1 1/2"	0.142	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.018 @ 2' 1 1/2"	0.213	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Trimmer - DF	1.50"	1.50"	1.50"	330	531	861	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	330	531	861	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 3" o/c	
Bottom Edge (Lu)	4' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 4' 3"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 4' 3"	10'	15.0	25.0	Default Load

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

ForteWEB Software Operator	Job Notes
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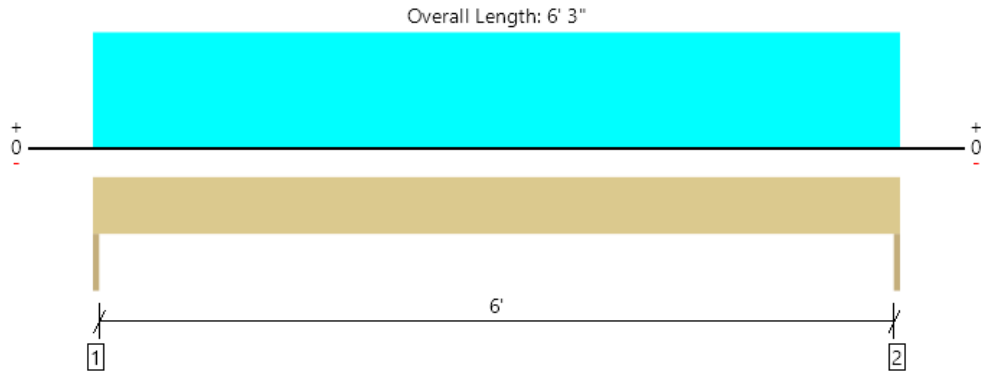
Weyerhaeuser

Roof, Header @ Sliding Glass Door
1 piece(s) 4 x 8 DF No.1



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1270 @ 0	3281 (1.50")	Passed (39%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	974 @ 8 3/4"	3502	Passed (28%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1985 @ 3' 1 1/2"	3820	Passed (52%)	1.15	1.0 D + 1.0 S (All Spans)
Vert Live Load Defl. (in)	0.045 @ 3' 1 1/2"	0.208	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Vert Total Load Defl. (in)	0.074 @ 3' 1 1/2"	0.313	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Lat Member Reaction (lbs)	142 @ 6' 3"	N/A	Passed (N/A)	1.60	1.0 D + 0.6 W
Lat Shear (lbs)	123 @ 5"	4872	Passed (3%)	1.60	1.0 D + 0.6 W
Lat Moment (Ft-lbs)	222 @ mid-span	2694	Passed (8%)	1.60	1.0 D + 0.6 W
Lat Deflection (in)	0.025 @ mid-span	0.625	Passed (L/999+)	--	1.0 D + 0.6 W
Bi-Axial Bending	0.38	1.00	Passed (38%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Lateral deflection criteria: Wind (L/120)
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Trimmer - DF	1.50"	1.50"	1.50"	489	781	1270	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	489	781	1270	None

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

•Maximum allowable bracing intervals based on applied load.

Lateral Connections						
Supports	Plate Size	Plate Material	Connector	Type/Model	Quantity	Nailing
Left	2X	Douglas Fir-Larch	Nails	8d x 2.5" Box (Toe)	2	
Right	2X	Douglas Fir-Larch	Nails	8d x 2.5" Box (Toe)	2	

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 3"	N/A	6.4	--	
1 - Uniform (PSF)	0 to 6' 3"	10'	15.0	25.0	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	4'	19.0	

• ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (100), Risk Category(II), Effective Wind Area determined using full member span and trib. width.
• IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

ForteWEB Software Operator	Job Notes
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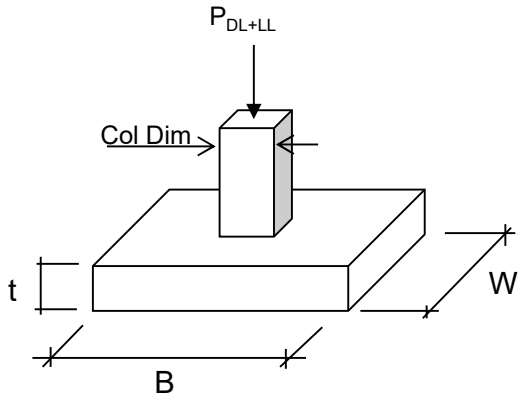
Weyerhaeuser

Footing Design

Based on ACI 318-14, IBC 2018, ASCE 7-16

Footing Type= A Crawlspace Footing

Allowable Soil Pressure= 1500 PSF
f'c= 2500 psi



Footing Criteria

B (ft)	W (ft)	t (in)	P_{DL} (k)	P_{LL} (k)	Col Dim (in)	Reinforcement (in^2 EA WAY)
2.5	2.5	12	1.2	3	3.5	0.8

Soil Pressure Check

Pressure = 0.67 KSF <= Allowable, OK

One-Way Shear Check

qs (PSF)	Trib Area (SF)	d (in)	Vu (k)	ΦVn (k)	
1.00	1.25	9	1.25	20.25	ΦVn > Vu, OK

Two-Way Shear Check

Trib Area (SF)	Vu (k)	bo (in)	B	bo/d	as	Vc/(f'cbod)	ΦVc (k)	
5.16	5.16	50	0.291667	5.56	40	4	67.5	ΦVn > Vu, OK

Reinforcement Check

Mu (k-ft)	Rn (psi)	p	pgross	pmin	Ast reqd (in^2)	Use Ast (in^2)	
1.52	8.35	0.00014	0.0001	0.0018	0.65	0.8	Ast>Ast Req'd, OK

Concrete Strain

a	c	Et	
0.753	0.886	0.027	>.004, OK

SSF STRUCTURAL ENGINEERING

Design Summary

Soil Pressure --	OK
One-Way Shear --	OK
Two-Way Shear --	OK
Reinforcement --	OK
Concrete Strain --	OK