8430 SE 45TH STREET,
MERCER ISLAND, WA 98040

STRUCTURAL CALCULATIONS
FOR
EXISTING RESIDENCE ADDITION

Date Signed: 08-21-2024

2021 International Residential Code
2021 International Building Code

PROJECT NAME							
ADDRESS	8430 SE 45TH STREET, MERCER ISLAND						
PROJECT #							
DATE	8/16/2024						
BUILDING CODE	2021 International Residential Code						
	2021 International Building Code						
WIND DESIGN	Vult =	110	MPH				
	Vasd =	85	MPH				
	Exposure =	B					
	K_{ZT} =	1.60					
	Importance Factor =	1.0					
SEISMIC DESIGN	Ss(g) =	1.43		S_{MS}(g) =	1.716	S_{DS}(g) =	1.144
	S_1(g) =	0.497					
	Seismic Design Category =	D					
	Site Class =	D					
	Importance Factor =	1.0					
DESIGN LOADING	Roof Snow Load =	25	PSF				
	Floor Live Load =	40	PSF				
	Bedroom Live Load =	30	PSF				
	Deck & Balcony Live Load =	60	PSF				
	Roof Dead Load =	15	PSF				
	Floor Dead Load =	15	PSF	(For framing gravity design)			
	Exterior Wall Dead Load =	10	PSF				
	Partition Wall Seismic Weight =	10	PSF				
	Floor Seismic Weight =	10	PSF				
	Allowable Soil Pressure =	1500	PSF				
	Lateral Earth (Restrained) Pressure =	50	PCF				
	Passive Pressure =	300	PCF				
	Coefficient of Friction =	0.4					
SCOPE OF WORK	Existing residence building addition design						

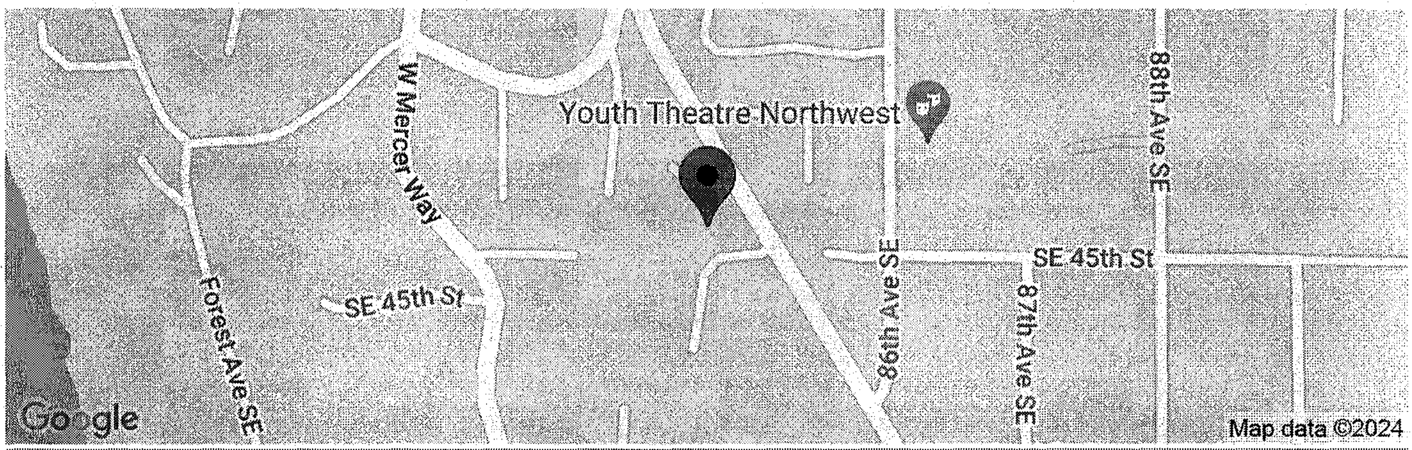
USGS web services were down for some period of time and as a result this tool wasn't operational, resulting in *timeout* error.
USGS web services are now operational so this tool should work as expected.

SEA STRUCTURAL ENGINEERS ASSOCIATION CALIFORNIA

OSHPD

8430 SE 45th St, Mercer Island, WA 98040, USA

Latitude, Longitude: 47.5657244, -122.2260443



Date	8/21/2024, 11:17:24 AM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Default (See Section 11.4.3)

Type	Value	Description
S_S	1.43	MCE_R ground motion. (for 0.2 second period)
S_1	0.497	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.716	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1.144	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	0.612	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	0.735	Site modified peak ground acceleration
T_L	6	Long-period transition period in seconds
SsRT	1.43	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.585	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	3.826	Factored deterministic acceleration value. (0.2 second)
S1RT	0.497	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.553	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	1.511	Factored deterministic acceleration value. (1.0 second)

Type	Value	Description
PGAd	1.294	Factored deterministic acceleration value. (Peak Ground Acceleration)
PGA_{UH}	0.612	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C_{RS}	0.902	Mapped value of the risk coefficient at short periods
C_{R1}	0.898	Mapped value of the risk coefficient at a period of 1 s
C_V	1.386	Vertical coefficient

SEISMIC DESIGN CHECK

ROOF WT: 1664 ft² · (15 PSF + 10 PSF/2) = 33.3 kip

UPPER FLOOR WT: 444 FT² · (15 PSF + 10 PSF/2)

\+ 1420 FT² · (10 PSF + 10 PSF) = 38.3 kip

ROOF HT: 9' (18')

UPPER FLOOR HT: 9'

ASCE 7-16 Seismic Base Shear

Project File: 8430 45TH ST SE ADDITION.ec6

DESCRIPTION: Seismic Base Shear Analysis

Specific Description:

Risk Category

Calculations per ASCE 7-16

Risk Category of Building or Other Structure : "II" : All Buildings and other structures except those listed as Category I, III, and IV — *SCE 7-16, Page 4, Table 1.5-1*

Seismic Importance Factor = 1 — *ASCE 7-16, Page 5, Table 1.5-2*

USER DEFINED Ground Motion

ASCE 7-16 11.4.2

Max. Ground Motions, 5% Damping

S_S = 1.430 g, 0.2 sec response

S_1 = 0.4970 g, 1.0 sec response

For the closest datapoint grid location . . .

Latitude = 0.000 deg North

Longitude = 0.000 deg West

Conforms to ASCE 7 Section 12.8.1.3: Regular structure with period of 0.5 s or less, SDS limited to max of 0.7*SDS or 1.0 for calculatior

Site Class, Site Coeff. and Design Category

Classification: "D" : Shear Wave Velocity 600 to 1,200 ft/sec		=	**D** (By Default per 11.4.3)	*ASCE 7-16 Table 20.3-1*
Site Coefficients Fa & Fv	Fa	=	1.20	*ASCE 7-16 Table 11.4-1 & 11.4-2*
(using straight-line interpolation from table va	Fv	=	1.80	
Maximum Considered Earthquake Accelerat	S_{MS} = Fa * Ss	=	1.716	*ASCE 7-16 Eq. 11.4-1*
	S_{M1} = Fv * S1	=	0.896	*ASCE 7-16 Eq. 11.4-2*
Design Spectral Acceleration	$S_{DS} = S_{MS}$ * 2/3	=	1.144	*ASCE 7-16 Eq. 11.4-3*
	$S_{D1} = S_{M1}$ * 2/3	=	0.597	*ASCE 7-16 Eq. 11.4-4*
Seismic Design Category		=	**D**	*\SCE 7-16 Table 11.6-1 & -2*

Resisting System

ASCE 7-16 Table 12.2-1

Basic Seismic Force Resisting System . . . . **Bearing Wall Systems**

15.Light-frame (wood) walls sheathed w/wood structural panels rated for shear resistance.

Response Modification Coefficient " I = 6.50

System Overstrength Factor " Wo " = 2.50

Deflection Amplification Factor " Cd ' = 4.00

NOTE! See ASCE 7-16 for all applicable footn

Building height Limits :

Category "A & B" Limit:	No Limit
Category "C" Limit:	No Limit
Category "D" Limit:	Limit = 65
Category "E" Limit:	Limit = 65
Category "F" Limit:	Limit = 65

Lateral Force Procedure

ASCE 7-16 Section 12.8.2

Equivalent Lateral Force Procedure

The "Equivalent Lateral Force Procedure" is being used according to the provisions of ASCE 7-16 12.8

Determine Building Period

Use ASCE 12.8-7

Structure Type for Building Period CalculaAll Other Structural Systems

" Ct " value = 0.020 " hn " : Height from base to highest leve 18.0 ft

" x " value = 0.75

" Ta " Approximate fundemental period using Eq. 12.8-7 : Ta = Ct * (hn ^ x) = 0.175 sec

"TL" : Long-period transition period per ASCE 7-16 Maps 22-14 -> 22-17 6.000 sec

Building Period " Ta " Calculated from Approximate Method sel= 0.175

ASCE 7-16 Seismic Base Shear

Project File: 8430 45TH ST SE ADDITION.ec6

DESCRIPTION: Seismic Base Shear Analysis

" Cs " Response Coefficient

ASCE 7-16 Section 12.8.1.1

S_{DS} : Short Period Design Spectral Response	=	1.144	From Eq. 12.8-2, Preliminary Cs	=	0.154
" R " : Response Modification Factor	=	6.50	From Eq. 12.8-3 & 12.8-4 , Cs need not excee	=	0.526
" I " : Seismic Importance Factor	=	1	From Eq. 12.8-5 & 12.8-6, Cs not be less than	=	0.044

User has selected ASCE 12.8.1.3 : Regular structure, Less than 5 Stories and with T <<= 0.5 sec, SO Ss <= 1.5 for Cs calcul

Cs : Seismic Response Coefficient = = 0.1538

Seismic Base Shear

ASCE 7-16 Section 12.8.1

Cs = 0.1538 from 12.8.1.1

W (see Sum Wi below) = 71.60 k

Seismic Base Shear V = Cs * W = 11.02 k

Vertical Distribution of Seismic Forces

ASCE 7-16 Section 12.8.3

" k " : hx exponent based on Ta = 1.00

Table of building Weights by Floor Level...

Level #	Wi : Weight	Hi : Height	(Wi * Hi^k)	Cvx	Fx=Cvx * V	Sum Story Shear	Sum Story Moment
2	33.30	18.00	599.40	0.6349	6.99	6.99	0.00
1	38.30	9.00	344.70	0.3651	4.02	11.02	62.94
Sum Wi =	71.60 k	Sum Wi * Hi =	944.10 k-ft		Total Base Shear =	11.02 k	
						Base Moment =	162.1 k-ft

Diaphragm Forces : Seismic Design Category "B" to "F"

ASCE 7-16 12.10.1.1

Level #	Wi	Fi	Sum Fi	Sum Wi	Fpx : Calcd	Fpx : Min	Fpx : Max	Fpx	Dsgn. Force
2	33.30	6.99	6.99	33.30	6.99	7.62	15.24	7.62	7.62
1	38.30	4.02	11.02	71.60	5.89	8.76	17.53	8.76	8.76

Wpx	Weight at level of diaphragm and other structure elements attached to it.
Fi	Design Lateral Force applied at the level.
Sum Fi	Sum of "Lat. Force" of current level plus all levels above
MIN Req'd Force @ Level . . .	0.20 * S_{DS} * I * Wpx
MAX Req'd Force @ Level . .	0.40 * S_{DS} * I * Wpx
Fpx : Design Force @ Level .	Wpx * SUM(x->n) Fi / SUM(x->n) wi, x = Current level, n = Top Level

SHEET________OF________

ASCE 7
Wind Loads per ASCE 7 Chapter 28 MWFRS (Envelope Procedure)- Low-Rise Buildings

Input Cells =
Project Number:
Project Name: 8430 45TH STREET SE ADDITION
Location:
Design By:
Program Limitations: 1. Mean roof height h less than or equal to 60 ft.
2. Mean roof height h does not exceed least horizontal dimension.

BUILDING AND SITE INFORMATION

	INPUT	
Building width, B =	23	ft (perpendicular to ridge)
Building length, L =	55	ft (parallel to ridge)
Building eave height, h_e =	18	ft
Building ridge height, h_r =	22	ft
Height of parapet, h_p =	18	ft
Roof slope, s =	5.00 in./ft.	= 22.62 degrees
Is roof a gable or hip =	Gable	
Risk Category =	II	
Wind velocity, V =	110	mi/hr = 85 mi/hr (ASD)
Exposure =	B	
Topographic factor, K_{zt} =	1.6	
Wind directionality factor, K_d =	0.85	
Bldg internal pressure condition =	Enclosed	

	OUTPUT	
Mean roof height, h =	20	ft
2a =	6	ft
h/L =	0.36	
h/B =	0.87	
Internal Pressure Coeff's, GC_{pi} =	0.18	
	-0.18	
Pressure exposure coeff, K_h =	0.7	
Velocity pressure, q_h =	29.49	psf

Design Wind Pressure (LRFD)
28.1 PSF

Bldg. Info.	Height(ft)	Roof	First	
		9	9	
	E-W Width	23	ft	
	N-S Width	55	ft	
E-W Vw	Roof	3	Sum	3
(kip)	First	5.9	(kip)	8.9
N-S Vw	Roof	7	Sum	7
(kip)	First	14	(kip)	21

MAIN WIND-FORCE RESISTING SYSTEM (MWFRS)
Wind Pressures for Low-Rise Buildings

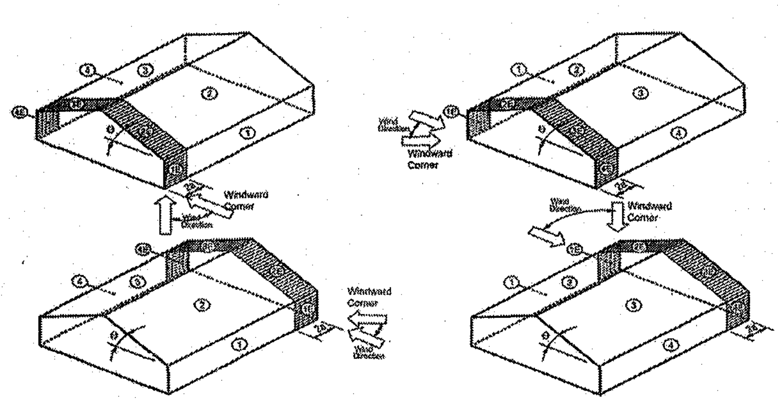
$$p = q_h[(GC_{pf}) - (GC_{pi})] \ \ (lb/ft^2)$$

Load Case A: Winds Perpendicular to Ridge

Internal pressure = +/- 5.3 psf (LRFD)
+/- 3.2 psf (ASD)

Bldg Surface	GC_{pf}	Wind Pressure (lb/ft^2) LRFD	ASD
1	0.54	16	9.6
2	-0.45	-13.3	-8
3	-0.47	-13.9	-8.3
4	-0.41	-12.1	-7.3
1E	0.77	22.8	13.7
2E	-0.72	-21.3	-12.8
3E	-0.65	-19.2	-11.5
4E	-0.6	-17.7	-10.6

Note: 1. Sign Convention
positive numbers denote forces toward the surface
negative numbers denote forces away from the surface
2. Minimum wind design loads shall not be less than 16 psf (LRFD) multiplied by wall area of building and 8 psf (LRFD) multiplied by the roof area of the building projected onto a vertical plane normal to the assumed wind direction (see Sect. C27.4.7 & Figure C27.4-1)
3. Internal pressure cancels when Zones 1 & 4 and 1E & 4E are combined, but adds or subtracts at Zones 2 & 3 and 2E & 3E that do not have directly opposing loads.



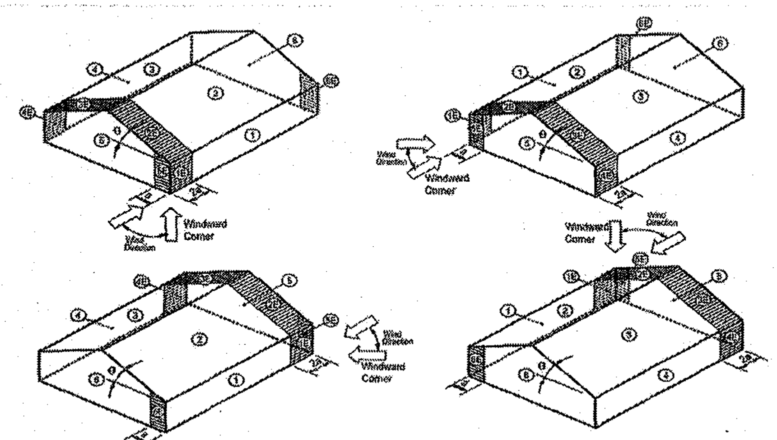
Load Case A

Load Case B: Winds Parallel to Ridge

Bldg Surface	GC_{pf}	Wind Pressure (lb/ft^2)	
		LRFD	ASD
1	-0.45	-13.3	-8
2	-0.69	-20.4	-12.2
3	-0.37	-11	-6.6
4	-0.45	-13.3	-8
5	0.4	11.8	7.1
6	-0.29	-8.6	-5.2
1E	-0.48	-14.2	-8.5
2E	-1.07	-31.6	-19
3E	-0.53	-15.7	-9.4
4E	-0.48	-14.2	-8.5
5E	0.61	18	10.8
6E	-0.43	-12.7	-7.6

Internal pressure = +/- 5.3 psf (LRFD)
+/- 3.2 psf (ASD)

Note: 1. Sign Convention
positive numbers denote forces toward the surface
negative numbers denote forces away from the surface
2. Minimum wind design loads shall not be less than 16 psf (LRFD) multiplied by wall area of building (see Sect. C27.4.7 & Figure C27.4-1).
3. Internal pressure cancels when Zones 1 & 4 and 1E & 4E are combined, but adds or subtracts at Zones 2 & 3 and 2E & 3E that do not have directly opposing loads.



Load Case B

MAIN WIND-FORCE RESISTING SYSTEM (MWFRS)

Wind Pressures for Parapets

Pressure exposure coeff, K_z = 0.7
Velocity pressure, q_p = 29.49 psf (LRFD)

$p_p = q_p(GC_{pn})$ (lb/ft^2)

Windward parapets, p_{p_wind} = 44.2 psf (LRFD)
Leeward parapets, p_{p_lee} = -29.5 psf (LRFD)

positive numbers signify net pressure acting toward the exterior side of the parapet
negative numbers signify net pressure acting away from the exterior side of the parapet

Wind Pressures for Roof Uplift

Roof uplift load up to 6 feet from exterior walls, p = -29.3 psf (LRFD)

Roof uplift load more than 6 feet from exterior walls, p = -19 psf (LRFD)

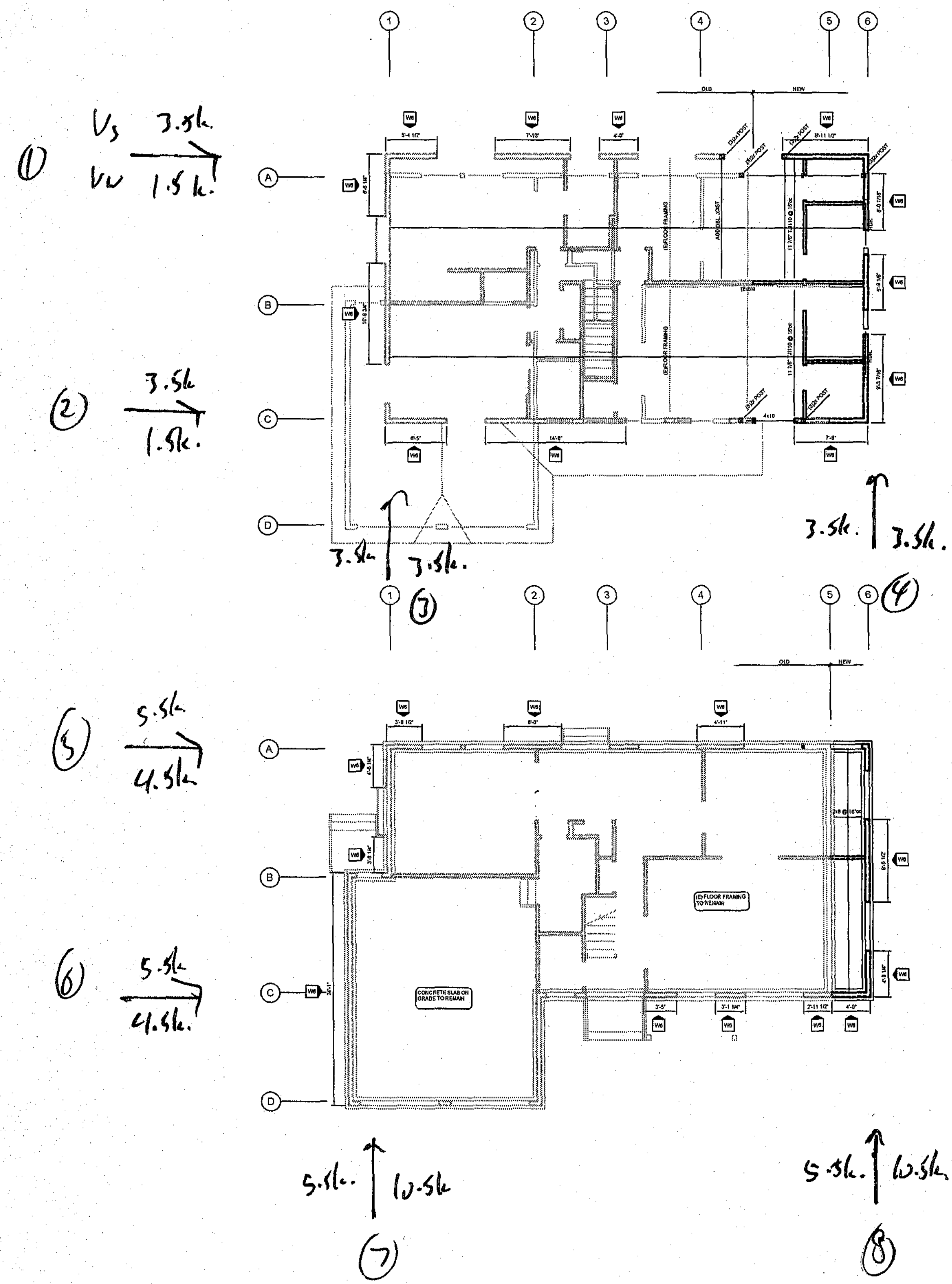
Wood Shear Wall Design

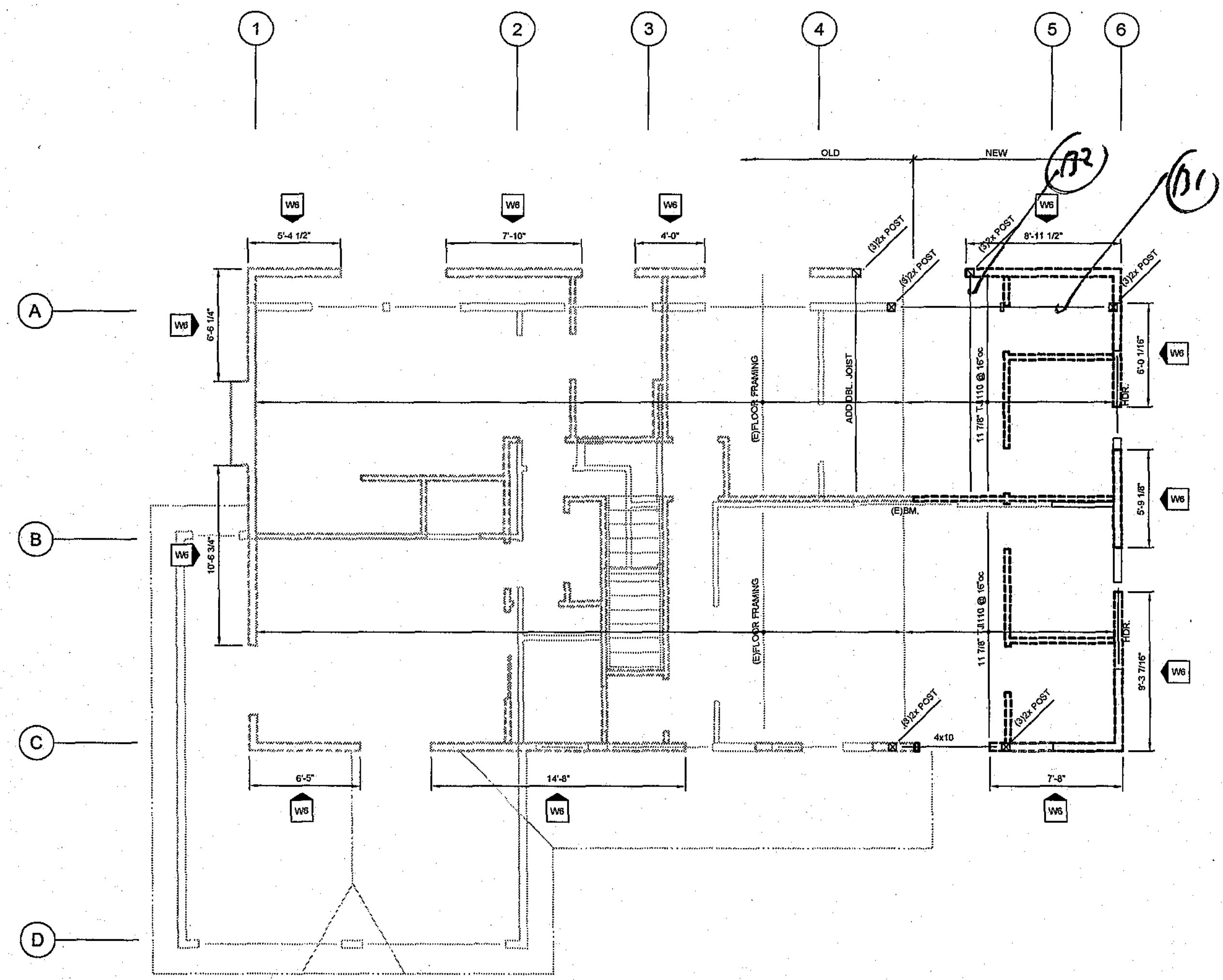
	SW#	Length b(ft)	Height h(ft)	Vseismic (LRFD)(kips)	Vwind (LRFD)(kips)	Aspect Ratio h/b	h/b>2?	Total Design V (ASD)		SW Design	SW Uplift (ASD)	Wall Holdown	Foundation Holdown
Seisc.	SW1	25.18'	9.0'	3.50 k	1.50 k	0.36	N	2.45 k	0.10 klf	**W6**	.20 k	**Not Reqd'**	
		WALL											
Seisc.	SW2	28.75'	9.0'	3.50 k	1.50 k	0.31	N	2.45 k	0.09 klf	**W6**	-.01 k		
		WALL											
Seisc.	SW3	17.0'	9.0'	3.50 k	3.50 k	0.53	N	2.45 k	0.14 klf	**W6**	.84 k	**Not Reqd'**	
		WALL											
Seisc.	SW4	21.0'	9.0'	3.50 k	3.50 k	0.43	N	2.45 k	0.12 klf	**W6**	.48 k	**Not Reqd'**	
		WALL											
Seisc.	SW5	13.76'	9.0'	5.50 k	4.50 k	0.65	N	3.85 k	0.28 klf	**W4**	2.15 k		**HDU4(9")**
Seisc.	SW6	12.59'	9.0'	5.50 k	4.50 k	0.71	N	3.85 k	0.31 klf	**W4**	2.41 k		**HDU4(9")**
Wind	SW7	32.25'	9.0'	5.50 k	10.50 k	0.28	N	6.30 k	0.20 klf	**W6**	.89 k		**Not Reqd'**
Wind	SW8	13.17'	9.0'	5.50 k	10.50 k	0.68	N	6.30 k	0.48 klf	**W4**	3.95 k		**HDU4**
	SW9												
	SW10												
	SW11												
	SW12												

SW #	Vs,all (ASD) (kip/ft)	Vw,all (ASD) (kip/ft)	Wall HD	Tall (ASD)(kips)	FTG HD	Tall (ASD) (kips)
W6	0.26	0.37	MSTC28	1.54	STHD10	3.40
W4	0.38	0.53	MSTC40	3.08	STHD14	3.82
W3	0.49	0.69	MSTC52	4.62	HDU4	4.57
2W6	0.52	0.73	MSTC66	5.86	HDU5	5.65
2W4	0.76	1.07	MST72	6.73	HDU8	6.97
2W3	0.98	1.37	CMST12x84"	9.215	HDU11	9.34
2W2	1.28	1.79	2xMSTC66	11.72	HDU14	10.77
			2xMST72	13.46	HD12	12.67
			2xCMST12x84"	18.43	HDU14(SPC.)	14.44
			HD19(SPC.)	19.07	HD12(SPC.)	15.51
					HD19	16.77
					HD19(SPC.)	19.07

*Holdown not required for uplift less than 1 Kips(ASD)

SHEAR WALL PLAN.





B1, L= 12'4, TL= 8' FLOOR, 14' ROOF. 3 1/2x 11 7/8 LVL.

B2, L= 11'4, 2'3 CANT. PL @ END DL : 630#. 4x10.
SL : 1050#.

Wood Beam

Project File: 8430 45TH ST SE ADDITION.ec6

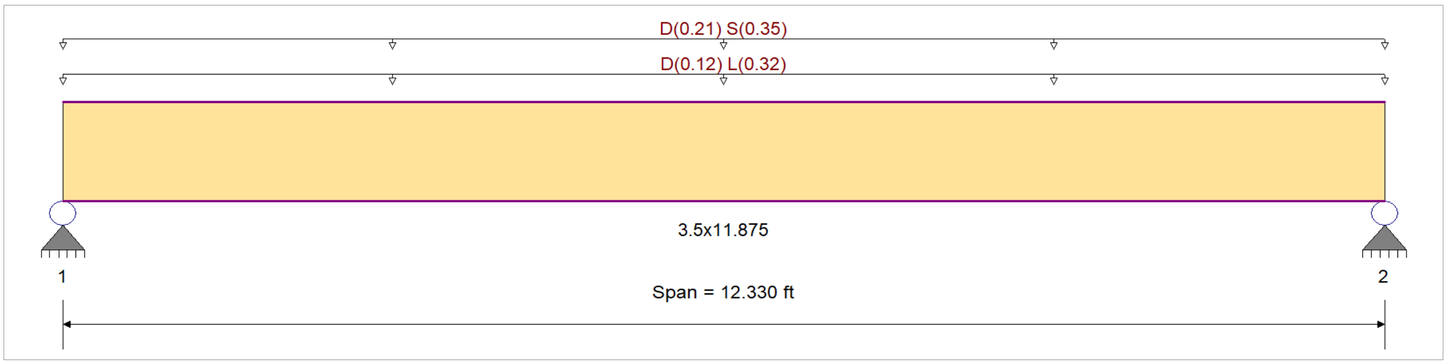
DESCRIPTION: B1

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	2400 psi	*E : Modulus of Elasticity*	
Load Combination	IBC 2021	Fb -	1850 psi	Ebend- xx	1800 ksi
		Fc - Prll	1650 psi	Eminbend - xx	950 ksi
Wood Species :	DF/DF	Fc - Perp	650 psi	Ebend- yy	1600 ksi
Wood Grade :	24F-V4	Fv	265 psi	Eminbend - yy	850 ksi
		Ft	1100 psi	Density	31.21 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 loading
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 8.0 ft
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 14.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.845** : 1	Maximum Shear Stress Ratio	=	**0.520** : 1
Section used for this span		**3.5x11.875**	Section used for this span		**3.5x11.875**
fb: Actual	=	2,332.88 psi	fv: Actual	=	158.53 psi
F'b	=	2,760.00 psi	F'v	=	304.75 psi
Load Combination		+D+0.750L+0.750S	Load Combination		+D+0.750L+0.750S
Location of maximum on span	=	6.165 ft	Location of maximum on span	=	11.385 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.208 in	Ratio =	0	>=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	710	<360	n/a
Max Downward Total Deflection	0.501 in	Ratio =	295	>=180	Span: 1 : +D+0.750L+0.750S
Max Upward Total Deflection	0 in	Ratio =	0	<180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 12.330 ft	1	0.435	0.268	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.44	939.8	2,160.0	1.77	63.9	238.5
+D+L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 12.330 ft	1	0.761	0.468	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	12.52	1,826.9	2,400.0	3.44	124.2	265.0
+D+S					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 12.330 ft	1	0.692	0.426	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	13.09	1,910.1	2,760.0	3.60	129.8	304.8
+D+0.750L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 12.330 ft	1	0.535	0.329	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	11.00	1,605.2	3,000.0	3.02	109.1	331.3
+D+0.750L+0.750S					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0

Wood Beam

Project File: 8430 45TH ST SE ADDITION.ec6

DESCRIPTION: B1

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
Length = 12.330 ft	**1**	0.845	0.520	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	15.99	2,332.9	2,760.0	4.39	158.5	304.8
+0.60D					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 12.330 ft	**1**	0.147	0.090	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.87	563.9	3,840.0	1.06	38.3	424.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S	1	0.5007	6.210		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	5.188	5.188
Max Upward from Load Combinations	5.188	5.188
Max Upward from Load Cases	2.158	2.158
D Only	2.090	2.090
+D+L	4.063	4.063
+D+S	4.248	4.248
+D+0.750L	3.570	3.570
+D+0.750L+0.750S	5.188	5.188
+0.60D	1.254	1.254
L Only	1.973	1.973
S Only	2.158	2.158

Wood Beam

Project File: 8430 45TH ST SE ADDITION.ec6

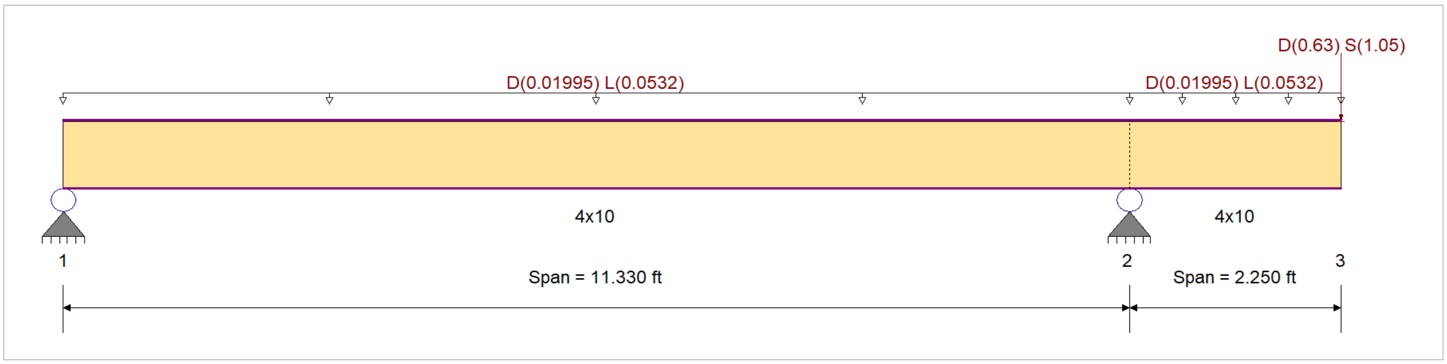
DESCRIPTION: B2

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	875 psi	*E : Modulus of Elasticity*	
Load Combination	IBC 2021	Fb -	875 psi	Ebend- xx	1300 ksi
		Fc - Prll	600 psi	Eminbend - xx	470 ksi
Wood Species :	Douglas Fir-Larch	Fc - Perp	625 psi		
Wood Grade :	No.2	Fv	170 psi		
		Ft	425 psi	Density	31.21 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 loading
Load for Span Number 1
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 1.330 ft
Load for Span Number 2
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 1.330 ft
Point Load : D = 0.630, S = 1.050 k @ 2.250 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.766** : 1	Maximum Shear Stress Ratio	=	**0.408** : 1
Section used for this span		**4x10**	Section used for this span		**4x10**
fb: Actual	=	925.22 psi	fv: Actual	=	79.69 psi
F'b	=	1,207.50 psi	F'v	=	195.50 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	11.330 ft	Location of maximum on span	=	11.330 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.138 in	Ratio =	1204 >=360	Span: 2 : S Only
Max Upward Transient Deflection	-0.113 in	Ratio =	390 >=360	Span: 1 : S Only
Max Downward Total Deflection	0.204 in	Ratio =	264 >=180	Span: 2 : +D+S
Max Upward Total Deflection	-0.151 in	Ratio =	898 >=180	Span: 1 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 11.330 ft	1	0.378	0.203	0.90	1.00	1.00	1.00	1.200	1.00	1.00	1.00	1.49	357.2	945.0	0.67	31.0	153.0
Length = 2.250 ft	2	0.378	0.203	0.90	1.00	1.00	1.00	1.200	1.00	1.00	1.00	1.49	357.2	945.0	0.67	31.0	153.0
+D+L					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.330 ft	1	0.371	0.204	1.00	1.00	1.00	1.00	1.200	1.00	1.00	1.00	1.62	389.6	1,050.0	0.75	34.7	170.0
Length = 2.250 ft	2	0.371	0.204	1.00	1.00	1.00	1.00	1.200	1.00	1.00	1.00	1.62	389.6	1,050.0	0.75	34.7	170.0

Wood Beam

Project File: 8430 45TH ST SE ADDITION.ec6

DESCRIPTION: B2

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
+D+S					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.330 ft	**1**	0.766	0.408	1.15	1.00	1.00	1.00	1.200	1.00	1.00	1.00	3.85	925.2	1,207.5	1.72	79.7	195.5
Length = 2.250 ft	**2**	0.766	0.408	1.15	1.00	1.00	1.00	1.200	1.00	1.00	1.00	3.85	925.2	1,207.5	1.72	79.7	195.5
+D+0.750L					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.330 ft	**1**	0.291	0.159	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	1.59	381.5	1,312.5	0.73	33.8	212.5
Length = 2.250 ft	**2**	0.291	0.159	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	1.59	381.5	1,312.5	0.73	33.8	212.5
+D+0.750L+0.750S					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.330 ft	**1**	0.669	0.359	1.15	1.00	1.00	1.00	1.200	1.00	1.00	1.00	3.36	807.5	1,207.5	1.52	70.3	195.5
Length = 2.250 ft	**2**	0.669	0.359	1.15	1.00	1.00	1.00	1.200	1.00	1.00	1.00	3.36	807.5	1,207.5	1.52	70.3	195.5
+0.60D					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.330 ft	**1**	0.128	0.068	1.60	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.89	214.3	1,680.0	0.40	18.6	272.0
Length = 2.250 ft	**2**	0.128	0.068	1.60	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.89	214.3	1,680.0	0.40	18.6	272.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S	-0.1514	6.773
+D+S	2	0.2042	2.250		0.0000	6.773

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	0.311	2.243	
Max Upward from Load Combinations	0.311	2.243	
Max Upward from Load Cases	0.289	1.259	
Max Downward from all Load Conditio	-0.209		
Max Downward from Load Combinations	-0.187		
Max Downward from Load Cases (Resis	-0.209		
D Only	0.022	0.975	
+D+L	0.311	1.408	
+D+S	-0.187	2.233	
+D+0.750L	0.239	1.299	
+D+0.750L+0.750S	0.082	2.243	
+0.60D	0.013	0.585	
L Only	0.289	0.433	
S Only	-0.209	1.259	