

CK Engineering LLC.

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Lake Forest Park, WA 98155

Phone: (206) 417-0670

STRUCTURAL CALCULATIONS

Lateral & Gravity Design
21-057

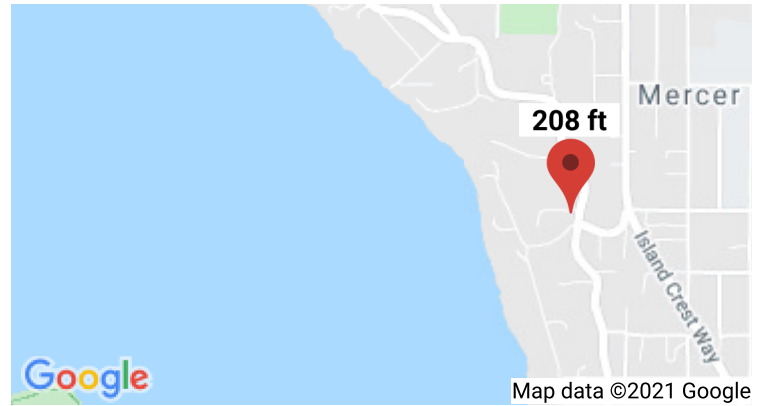


10/28/2021

BRETSCHNEDER RESIDENCE
8141 SE 44th St
Mercer Island, WA 98040
October 28, 2021

Search Information

Address: 8141 SE 44th St, Mercer Island, WA 98040, USA
Coordinates: 47.5670854, -122.2293466
Elevation: 208 ft
Timestamp: 2021-10-21T19:02:49.985Z
Hazard Type: Wind



ASCE 7-16

MRI 10-Year 67 mph
 MRI 25-Year 73 mph
 MRI 50-Year 78 mph
 MRI 100-Year 83 mph
 Risk Category I 92 mph
 Risk Category II 97 mph
 Risk Category III 104 mph
 Risk Category IV 108 mph

ASCE 7-10

MRI 10-Year 72 mph
 MRI 25-Year 79 mph
 MRI 50-Year 85 mph
 MRI 100-Year 91 mph
 Risk Category I 100 mph
 Risk Category II 110 mph
 Risk Category III-IV 115 mph

ASCE 7-05

ASCE 7-05 Wind Speed 85 mph

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

Disclaimer

Hazard loads are interpolated from data provided in ASCE 7 and rounded up to the nearest whole integer. Per ASCE 7, islands and coastal areas outside the last contour should use the last wind speed contour of the coastal area – in some cases, this website will extrapolate past the last wind speed contour and therefore, provide a wind speed that is slightly higher. NOTE: For queries near wind-borne debris region boundaries, the resulting determination is sensitive to rounding which may affect whether or not it is considered to be within a wind-borne debris region.

Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

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and website does not imply approval by the governing building code board responsible for building code approval and interpretation for the building site described by latitude/longitude location in the report.



Search Information

Address: 8141 SE 44th St, Mercer Island, WA 98040, USA

Coordinates: 47.5670854, -122.2293466

Elevation: 208 ft

Timestamp: 2021-10-21T19:03:56.973Z

Hazard Type: Seismic

Reference Document: ASCE7-16

Risk Category: I

Site Class: D-default



Basic Parameters

Name	Value	Description
S_S	1.429	MCE_R ground motion (period=0.2s)
S_1	0.497	MCE_R ground motion (period=1.0s)
S_{MS}	1.715	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	1.143	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

▼Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1.2	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.902	Coefficient of risk (0.2s)
CR_1	0.897	Coefficient of risk (1.0s)
PGA	0.612	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	0.734	Site modified peak ground acceleration

T _L	6	Long-period transition period (s)
SsRT	1.429	Probabilistic risk-targeted ground motion (0.2s)
SsUH	1.584	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	3.783	Factored deterministic acceleration value (0.2s)
S1RT	0.497	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.553	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.497	Factored deterministic acceleration value (1.0s)
PGAd	1.282	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

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Disclaimer

Hazard loads are provided by the U.S. Geological Survey [Seismic Design Web Services](#).

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Design Criteria

Scope of Work:	Lateral & Gravity Design		
Site Address:	8141 SE 44th St Mercer Island, WA 98040		
Number of Stories:	2	Engineer:	PK

Roof Loading

Roofing	Composition	3.0
Sheathing	5/8" Plywood	1.8
Insulation	Roll/Batt	3.0
Ceiling	5/8" GWB	2.8
Framing	Trusses	2.2
Miscellaneous	fixtures, mechanical, electrical, etc.	7.2
TOTAL DEAD LOAD:		20.0 psf
ROOF SNOW LOAD:		25.0 psf

Upper Floor Loading

Floor Covering	Carpet/Hardwood/Tile	3.0
Sheathing	3/4" T&G	2.3
Ceiling	1/2" GWB	2.2
Joists	Solid Sawn @ 16" o/c	3.3
Beams		2.8
Miscellaneous	fixtures, mechanical, electrical, etc.	1.4
TOTAL DEAD LOAD:		15.0 psf
FLOOR LIVE LOAD:		40.0 psf

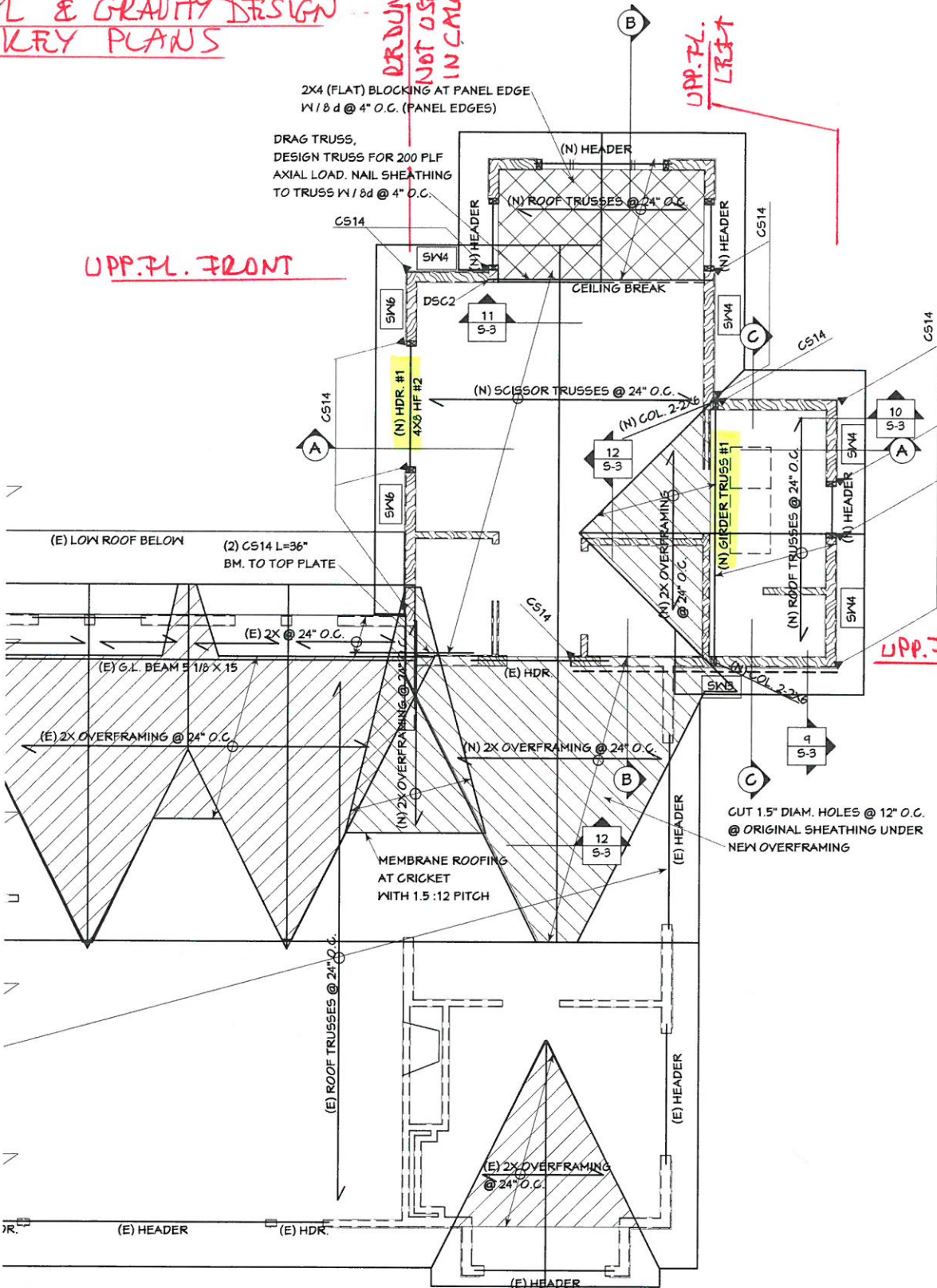
Main Floor Loading

Floor Covering	Carpet/Hardwood/Tile	3.0
Sheathing	3/4" T&G	2.3
Ceiling	5/8" GWB	2.8
Joists	I-Joists	2.1
Beams		4.2
Miscellaneous	fixtures, mechanical, electrical, etc.	0.6
TOTAL DEAD LOAD:		15.0 psf
FLOOR LIVE LOAD:		40.0 psf

Soil Bearing Capacity:	1500 psf
Frost Depth:	18 in

LATERAL & GRAVITY DESIGN KEY PLANS

DR. BOUNDS
NOT O.S.D.
IN CALCS



UPP. PL. FRONT

UPP. PL. LEFT

UPP. PL. RIGHT



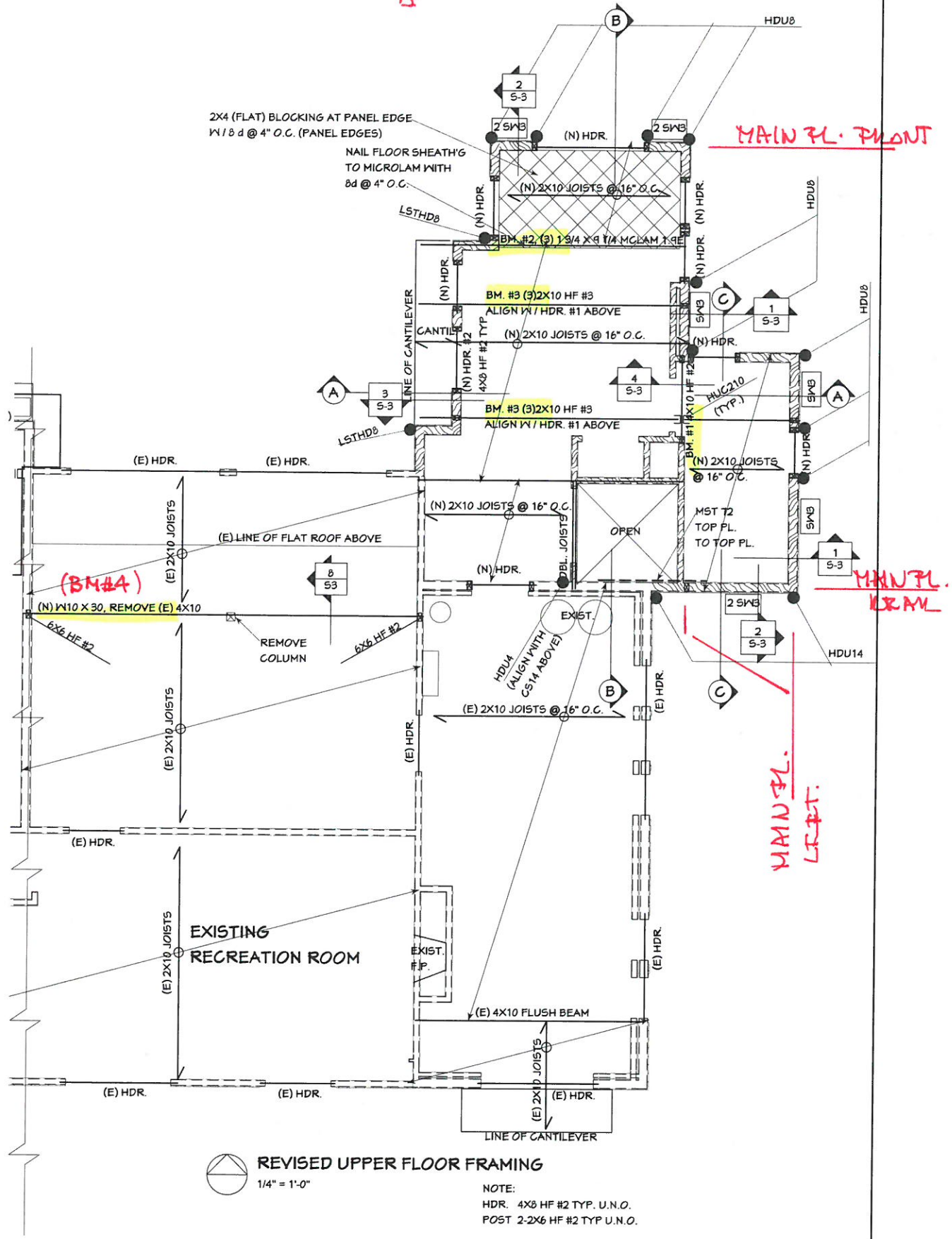
REVISED ROOF FRAMING

1/4" = 1'-0"

NOTE:
HDR. 4X8 HF #2 TYP. U.N.O.
POST 2-2X6 HF #2 TYP. U.N.O.

ROOF VENTING:

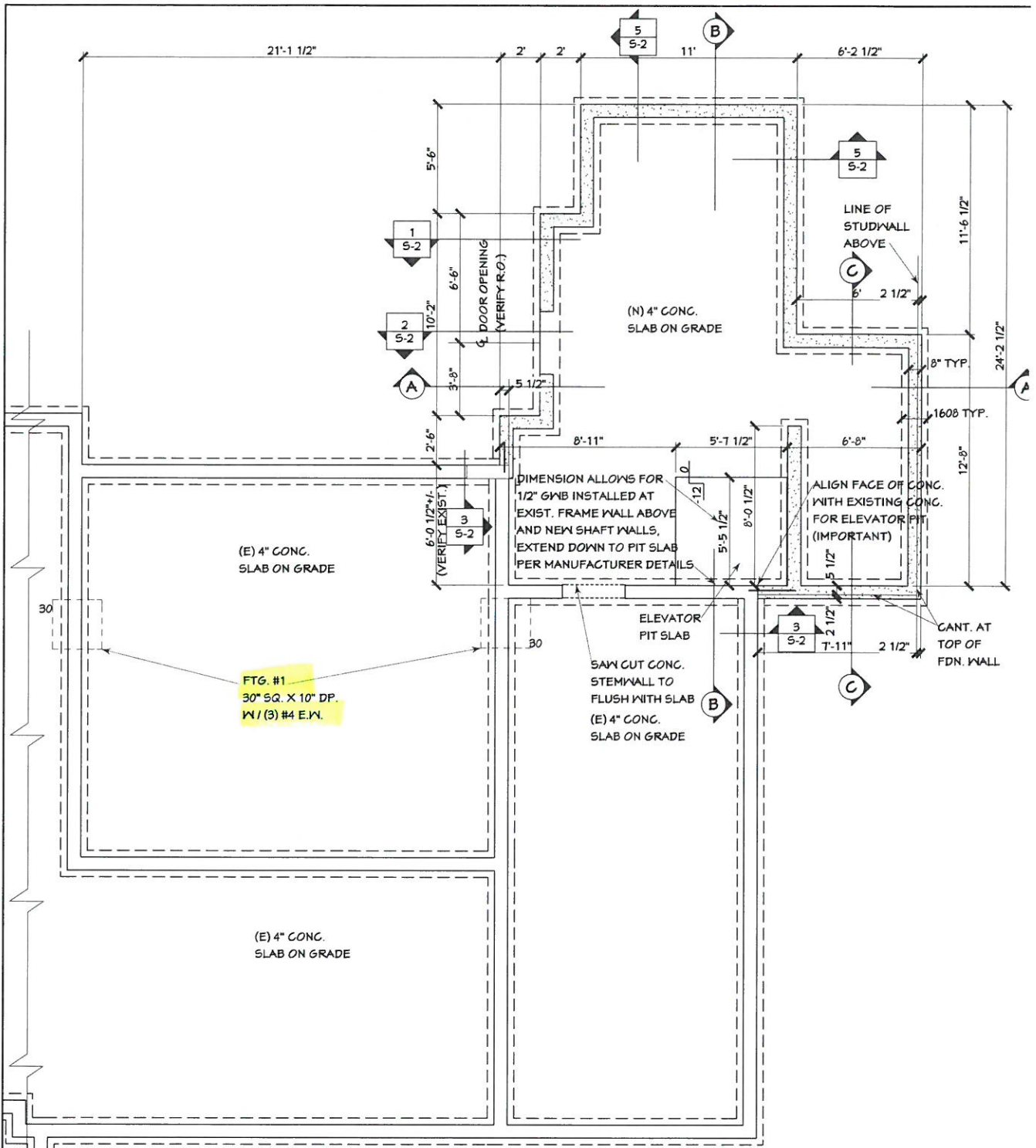
VENTING REQUIRED
417 S.F. / 150 = 2.78 S.F. = 400.8 SQ. IN.
VENTING PROVIDED = 587.4 SQ. IN.
SOLID VENT BLOCK
47.75' X 4.71 SQ. IN. / FT. = 224.9 SQ. IN.
CONTINUOUS RIDGE VENT
30.21' X 12 SQ. IN. / FT. = 362.5 SQ. IN.



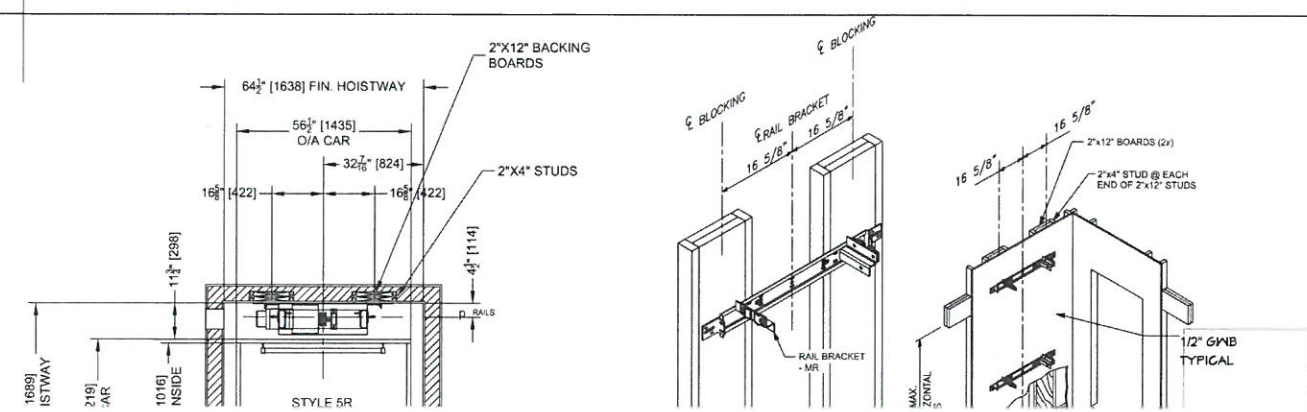
REVISED UPPER FLOOR FRAMING

1/4" = 1'-0"

NOTE:
 HDR. 4X8 HF #2 TYP. U.N.O.
 POST 2-2X6 HF #2 TYP U.N.O.



REVISED FOUNDATION PLAN
 1/4" = 1'-0"
 [Symbol] EXISTING
 [Symbol] REMOVED
 [Symbol] NEW



Type of construction: **NEW**
 Applicable Building Codes: **IBC 2018, ASCE 7/SEI 7-16**

Location: **8141 SE 44th St
 Mercer Island, WA 98040**

Work performed :

Lateral & Gravity Design

WIND DESIGN:

$$P_s = \lambda_w P_{s30} K_{zt}$$

Exposure : **C** Wind Exposure Category as set forth in Section 26.7 of ASCE 7-16
 Wind Speed = **85 MPH** Basic Wind Speed (LRFD) as used in Figure 28.5 of ASCE 7-16 and converted to (ASD)
 $P_{s30} =$ Simplified design wind pressure for Exposure B, at $h = 30$ feet and for $I = 1.0$, from Figure 28.5-1
 $I_w =$ **1** Importance factor as defined in Table 1.5-2 of ASCE 7-16
 $\lambda =$ **1.29** Adjustment factor for building height and exposure from Figure 28.5-1 of ASCE 7-16
 $K_{zt} =$ **1.30** Adjustment factor for increased wind speed due to a hill or escarpment from Section 26.8 of ASCE 7-16

Roof slope :

Front/Rear $\tan^{-1} \left(\frac{\text{rise}}{\text{run}} \right) = \tan^{-1} \left(\frac{6}{12} \right) = 26.6 \text{ degrees}$
 Left/Right $\tan^{-1} \left(\frac{8}{12} \right) = 33.7 \text{ degrees}$
 Mean Elevation **20 ft**

Number of floors: **2**

Average uplift (F/R) = **-7.3 psf** Based on wind zones 'G' and 'H'
 Average uplift (R/L) = **-2.0 psf** Based on wind zones 'G' and 'H'

	End zone of wall		End zone of roof	
	Front/Rear	Left/Right	Front/Rear	Left/Right
$P_{s30} =$	A = 13.9 psf	12.9 psf	B = 4.3 psf	8.8 psf
$P_s =$	23.3 psf	21.6 psf	7.3 psf	14.7 psf

	Interior zone of wall		Interior zone of roof	
	Front/Rear	Left/Right	Front/Rear	Left/Right
$P_{s30} =$	C = 10.3 psf	10.2 psf	D = 3.8 psf	7.0 psf
$P_s =$	17.3 psf	17.1 psf	6.4 psf	11.7 psf

WIND LOAD CALCULATIONS FRONT → REAR

ΣV 2ND FLOOR =

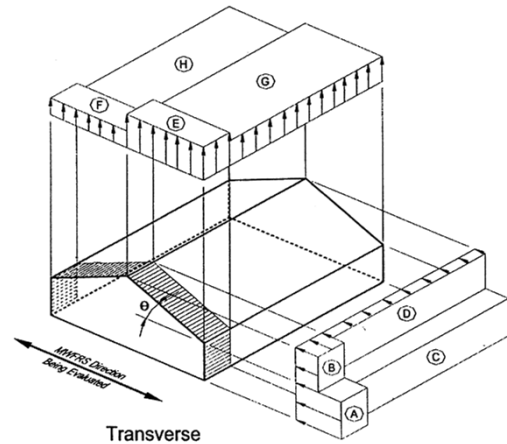
WIND ZONE	B	D	A	C								
AVE. HEIGHT	5.5	5.5	4	4								
AVE. WIDTH	11	57	11	56								
P_s	7.26	6.43	23.32	17.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL	439	2015	1026	3876	0	0	0	0	0	0	0	0
TOTAL	7,356 lbs											

ΣV 1ST FLOOR =

WIND ZONE	A	C										
AVE. HEIGHT	9	9										
AVE. WIDTH	11	56										
P_s	23.32	17.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL	2309	8721	0	0	0	0	0	0	0	0	0	0
TOTAL	11,030 lbs											

NOT USED

WIND ZONE												
AVE. HEIGHT												
AVE. WIDTH												
P_s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0 lbs											



WIND LOAD CALCULATIONS

LEFT → RIGHT

ΣV 2ND FLOOR =

WIND ZONE	D	B	C	A	C							
AVE. HEIGHT	2	4	4	4	4							
AVE. WIDTH	39	9	48	9	48							
Ps	11.72	14.73	17.07	21.59	17.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL	914	530	3278	777	3278	0	0	0	0	0	0	0
TOTAL	8,778 lbs											

ΣV 1ST FLOOR =

WIND ZONE	A	C										
AVE. HEIGHT	10	10										
AVE. WIDTH	9	48										
Ps	21.59	17.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL	1943	8195	0	0	0	0	0	0	0	0	0	0
TOTAL	10,139 lbs											

NOT USED

WIND ZONE												
AVE. HEIGHT												
AVE. WIDTH												
Ps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0 lbs											

ρ CALCS:**2ND FLOOR CALCULATIONS:**

Plate Height:	8.00 ft
Total length of Shearwall in Shortest Line:	6.00 ft
Length of Shortest Segment within Shear Line:	3.00 ft
Length of Longest Segment in Shear Line:	3.00 ft

Tributary Area:	1.0
Total Area:	2.0

$$\rho = 1.00$$

ASCE 7-16 12.3.4.2 a

MAIN FLOOR CALCULATIONS:

Plate Height:	8.00 ft
Total length of Shearwall in Shortest Line:	8.75 ft
Length of Shortest Shearwall within Shear Line:	3.00 ft
Length of Longest Wall in Shear Line:	3.50 ft

Tributary Area:	1.0
Total Area:	2.0

$$\rho = 1.00$$

ASCE 7-16 12.3.4.2 b

NOT USED:

Plate Height:	8.00 ft
Total length of Shearwall in Shortest Line:	8.00 ft
Length of Shortest Shearwall within Shear Line:	8.00 ft
Length of Longest Wall in Shear Line:	8.00 ft

Tributary Area:	1.0
Total Area:	2.0

$$\rho = \text{NA}$$

SEISMIC DESIGN:

$$E = E_h + E_v$$

$$E = \rho Q_E + .2S_{DS}D$$

$$Q_E = V = C_s W$$

$\rho =$	1.00
Site Class =	D
$I_E =$	1
R =	6.5
$h_n =$	22

Geotech Report Yes

Importance factor as defined in Table 11.5-1

Total height of structure

$$V = 0.7S_{DS}I_E W / R$$

$$S_{DS} = 2/3 S_{MS}$$

$$S_s = 149.0\%$$

$$S_{MS} = 178.8\%$$

$$V = 0.128 W$$

$$V_{max} = S_{D1}I_E W / T_g R$$

$$S_{MS} = (F_a)(S_s)$$

$$F_a = 1.20$$

$$S_{DS} = 119.2\%$$

$$E = 0.128 W$$

$$T_g = 0.02h_n^{0.75}$$

$$S_{D1} = 2/3 S_{M1}$$

$$S_1 = 49.7\%$$

$$S_{M1} = 74.6\%$$

$$C_s = 0.128$$

$$T_g = 0.20 \text{ s}$$

$$S_{M1} = (F_v)(S_1)$$

$$F_v = 1.50$$

$$S_{D1} = 49.7\%$$

$$C_s = 0.128$$

All loads in pounds per square foot

WALL DEAD LOAD = 10 psf

ROOF DEAD LOAD = 20.0 psf

FLAT ROOF SNOW LOAD = 25 psf

UPPER FLOOR D.L. = 15.0 psf

RED. S.L. (20%*S.L.) = 0

LOWER FLOOR D.L. = 15.0 psf

FLOOR LIVE LOAD = 40.0 psf

2ND FLOOR DIAPHRAGM LOADING:

W (ROOF) =	LENGTH	WIDTH	LOAD	TOTAL
	46	32	20.0	29440
	50	14	20.0	14000
	16	8	20.0	2560
			20.0	0
			20.0	0
Area = 2300		Sub-Total=		46000

W (FLOOR) =	LENGTH	WIDTH	LOAD	TOTAL
			15.0	0
			15.0	0
			15.0	0
			15.0	0
			15.0	0
Area = 0		Sub-Total=		0

W (WALL) =	LENGTH	TRIB. HT.	LOAD	TOTAL
	140	4	10.0	5600
	120	4	10.0	4800
			10.0	0
			10.0	0
			10.0	0
Area = 1040		Sub-Total=		10400
TOTAL =				56400 lb

1ST FLOOR DIAPHRAGM LOADING:

W (ROOF) =	LENGTH	WIDTH	LOAD	TOTAL
			20.0	0
			20.0	0
			20.0	0
			20.0	0
			20.0	0
Area = 0		Sub-Total=		0

W (FLOOR) =	LENGTH	WIDTH	LOAD	TOTAL
	45	30	15.0	20250
	52	13	15.0	10140
	12	8	15.0	1440
			15.0	0
			15.0	0
Area = 2122		Sub-Total=		31830

W (WALL) =	LENGTH	TRIB. HT.	LOAD	TOTAL
	140	8	10.0	11200
	120	8	10.0	9600
			10.0	0
			10.0	0
			10.0	0
Area = 2080		Sub-Total=		20800
TOTAL =				52630 lb

NOT APPLICABLE

W (ROOF) =	LENGTH	WIDTH	LOAD	TOTAL
			20.0	0
			20.0	0
			20.0	0
			20.0	0
			20.0	0
Area = 0		Sub-Total=		0

W (FLOOR) =	LENGTH	WIDTH	LOAD	TOTAL
			15.0	0
			15.0	0
			15.0	0
			15.0	0
			15.0	0
Area = 0		Sub-Total=		0

W (WALL) =	LENGTH	TRIB. HT.	LOAD	TOTAL
			10.0	0
			10.0	0
			10.0	0
			10.0	0
			10.0	0
Area = 0		Sub-Total=		0
TOTAL =				lb

$$V (2ND FLOOR) = .128 \times 56400 \text{ lb} = 7240 \text{ lbs}$$

$$V (1ST FLOOR) = .128 \times 52630 \text{ lb} = 6756 \text{ lbs}$$

$$V () = .128 \times \text{lb} = \text{lbs}$$

REDISTRIBUTE:

$\Sigma V \times \rho$	height	$\Sigma V \times \text{height}$
7240 lb	17	123080
6756 lb	8	54049
lb		0

TOTAL = 13996 lb

TOTAL = 177129

$$E (2ND) = \frac{\Sigma V \times \text{height} \times \Sigma V \text{ TOTAL}}{\Sigma V \times \text{height TOTAL}} = 9725 \text{ lbs}$$

$$E (1ST) = \frac{\Sigma V \times \text{height} \times \Sigma V \text{ TOTAL}}{\Sigma V \times \text{height TOTAL}} = 4271 \text{ lbs}$$

$$E () = \text{NOT USED} = 0 \text{ lbs}$$

SUMMARY:

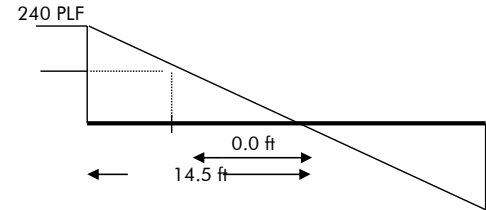
	WIND (front-rear)	WIND (left-right)	SEISMIC
ΣV (2ND) =	7356 lbs	8778 lbs	9725 lbs
ΣV (MAIN) =	11030 lbs	10139 lbs	4271 lbs
NOT APPLICABLE	0 lbs	0 lbs	0 lbs
TOTAL =	18386 lbs	18917 lbs	13996 lbs

DIAPHRAGM SHEAR:

Total diaphragm length =	67.0 ft	Sub-diaphragm length =	44.0 ft
Diaphragm width =	29.0 ft	ΣV (MAIN) =	11,030 lbs

$$v = \frac{\Sigma V(2nd)}{(2)(width)} = \frac{7243 \text{ lb}}{58 \text{ ft}} = 125 \text{ PLF}$$

IBC Table 2306.3.1 \longrightarrow 240 PLF



USE 15/32 CDX ROOF SHEATHING OR 3/4 T&G CDX SUBFLOORING w/8d AT 6 in o/c(PANEL EDGE), END 8d AT 12in o/c(PANEL FIELD)

CHORD:

Sub-diaphragm length =	44.0 ft	Total-diaphragm length =	67.0 ft
Sub-diaphragm width =	29.0 ft		

$$T = \frac{M}{B} = \frac{\Sigma V \times (\text{diaphragm length})}{8 \times (\text{diaphragm width})} = \frac{7243 \times 44 \text{ ft}}{8 \times 29 \text{ ft}} = 1374 \text{ lbs}$$

Top Plate Size: 2x6 Species/Grade: HF #2

Area = 8.25 in² $F_t = 525 \text{ psi}$

Load duration (C_D) = 1.33 $T_{\text{allowable}} = \text{Area} \times C_D \times F_t = 5,761 \text{ lbs}$

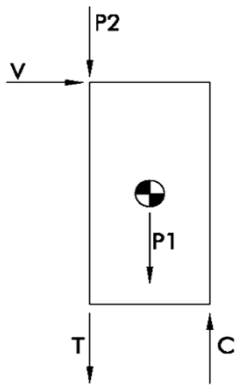
Since T allowable is greater than T applied, OK.

SHEAR CAPACITY OF 10d COMMON NAIL = 102 lbs $102 \times C_d \times p = 136 \text{ lbs}$ 2018 NDS

OF NAILS PER 4 FT SPLICE = $\frac{1374 \text{ lbs}}{136 \text{ lbs}} = 10$

USE 2x6 HF #2 TOP PLATE W/ (2) 10d NAILS @ 9 in O/C.

Lateral Calculation Key



V = Shear, plf
 H = Height of shearwall
 L = Length of shearwall
 P1 = Weight of shearwall and connected framing
 P2 = Weight of adjacent wall

$T = V \times H - 0.5P1 - P2$ = Tension reaction to be resisted by holdown
 $C = V \times H + 0.5P1$ = Compression reaction

ASD Basic Load Combinations

For calculation of tension and compression forces in compliance with ASCE 7-16 2.4.1

Tension Equations (Uplift)

7. $0.6D + W$

8. $(0.6 - 0.14S_{Ds})D + E$ \longrightarrow $0.43 D + E$

*8. $(0.6 - 0.14S_{Ds})D + 2.5 E$ \longrightarrow $0.43 D + 2.5 E$

Compression Equations

5. $D + W$

5. $(1 + 0.14S_{Ds})D + E$ \longrightarrow $1.17 D + E$

6. $D + 0.75W + 0.75L + 0.75S$

6. $(1.0 + 0.105S_{Ds})D + 0.75E + 0.75L + 0.75S$ \longrightarrow $1.13 D + 0.75 E + 0.75 L + 0.75 S$

*5. $(1 + 0.14S_{Ds})D + 2.5E$ \longrightarrow $1.17 D + 2.5 E$

*6. $(1.0 + 0.105S_{Ds})D + 1.875E + 0.75L + 0.75S$ \longrightarrow $1.13 D + 1.875 E + 0.75 L + 0.75 S$

* Equations include overstrength factor.

Note: The 0.7 factor for Earthquake loading has already been incorporated into the calculation of the lateral design force E_h , but not E_v . Therefore this factor has been omitted from equations 5, 6 and 8 where appropriate.

UPPER FL. REAR (SHOWER)

SHEARWALL

WIND

SEISMIC

Floor Info
Upper Floor Level, e.g. Upper, Main, Lower
Lt-Rt Load Direction, e.g. Left-Right, Front-Rear
 (For Left Wall, Use Front-Rear Load Direction)
CDX Sheathing type
 Values in accordance with AF&PA SDPWS-2015
Roof Resisting Dead Load
 (e.g. Roof, Upper Floor, Main Floor)
13.00 ft Total Length of Shearwalls
 $V(\text{from upper}) = 8778 \text{ lb}$ 9725 lb
 $V(\text{from main}) = 0 \text{ lb}$ 0 lb
 $V(\text{from lower}) = 0 \text{ lb}$ 0 lb
 $\Sigma (\text{Wind}) = 8,778 \text{ lb}$ $\Sigma (\text{Smc}) = 9,725 \text{ lb}$
 $v = 338 \text{ PLF}$ $v = 374 \text{ PLF}$

Tributary Width (Upper Floor)
1.0 tributary width
2.0 total width
 Tributary Width (Main Floor)
1.0 tributary width
2.0 total width
 Not Used
1.0 tributary width
2.0 total width
 Height of Shearwall = **8.0 ft**
 Length of Shearwall = **13.0 ft**
 Aspect Ratio OK
 Use alternate R factor for seismic? **No**

Tributary Area (Upper Floor)
1.0 tributary area
2.0 total area
 Tributary Area (Main Floor)
1.0 tributary area
2.0 total area
 Not Used
1.0 tributary area
2.0 total area
 Weight of Shearwall = **10.0 lbs**
 Tributary width for dead load = **6.0 ft**
 Length of adjoining wall = **1.0 ft**

SDPWS, Table 4.3A → 0.93 x 456 = 424 PLF

USE **SW3**

Seismic controls shearwall design

$C_{TOTAL} =$ (floor above) + (this floor) = **2701 lbs** = 2701 lbs Wind controls
 $T_{TOTAL} =$ (floor above) + (this floor) = **2343 lbs** = 2343 lbs Load case 8 controls - Seismic

Seismic controls holdown design

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: **E = 2992 lbs**

USE SIMPSON DESIGNED HOLDOWN: **CS14**
 OR AT FOUNDATION / INTERIOR WALLS USE: **STHD10/RJ**

UPPER FL. FRONT (OFFICE/GUEST BDRM/BATH)

SHEARWALL

WIND

SEISMIC

Floor Info
Upper Floor Level, e.g. Upper, Main, Lower
Lt-Rt Load Direction, e.g. Left-Right, Front-Rear
 (For Left Wall, Use Front-Rear Load Direction)
CDX Sheathing type
 Values in accordance with AF&PA SDPWS-2015
Roof Resisting Dead Load
 (e.g. Roof, Upper Floor, Main Floor)
10.00 ft Total Length of Shearwalls
 $V(\text{from upper}) = 8778 \text{ lb}$ 9725 lb
 $V(\text{from main}) = 0 \text{ lb}$ 0 lb
 $V(\text{from lower}) = 0 \text{ lb}$ 0 lb
 $\Sigma (\text{Wind}) = 8,778 \text{ lb}$ $\Sigma (\text{Smc}) = 9,725 \text{ lb}$
 $v = 227 \text{ PLF}$ $v = 252 \text{ PLF}$

Tributary Width (Upper Floor)
15.0 tributary width
58.0 total width
 Tributary Width (Main Floor)
1.0 tributary width
2.0 total width
 Not Used
1.0 tributary width
2.0 total width
 Height of Shearwall = **8.0 ft**
 Length of Shearwall = **4.0 ft**
 Aspect Ratio OK
 Use alternate R factor for seismic? **No**

Tributary Area (Upper Floor)
15.0 tributary area
58.0 total area
 Tributary Area (Main Floor)
1.0 tributary area
2.0 total area
 Not Used
1.0 tributary area
2.0 total area
 Weight of Shearwall = **10.0 lbs**
 Tributary width for dead load = **1.0 ft**
 Length of adjoining wall = **1.0 ft**

SDPWS, Table 4.3A → 0.93 x 353 = 328 PLF

USE **SW4**

Seismic controls shearwall design

$C_{TOTAL} =$ (floor above) + (this floor) = **1816 lbs** = 1816 lbs Wind controls
 $T_{TOTAL} =$ (floor above) + (this floor) = **1882 lbs** = 1882 lbs Load case 8 controls - Seismic

Seismic controls holdown design

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: **E = 2012 lbs**

USE SIMPSON DESIGNED HOLDOWN: **CS14**
 OR AT FOUNDATION / INTERIOR WALLS USE: **LSTHD8/RJ**

UPPER FL. LEFT (OFFICE/BATH)

SHEARWALL

WIND

SEISMIC

Floor Info
Upper Floor Level, e.g. Upper, Main, Lower
Fi-Rr Load Direction, e.g. Left-Right, Front-Rear
 (For Left Wall, Use Front-Rear Load Direction)
CDX Sheathing type
 Values in accordance with AF&PA SDPWS-2015
Roof Resisting Dead Load
 (e.g. Roof, Upper Floor, Main Floor)
16.00 ft Total Length of Shearwalls
 $V(\text{from upper}) = 7356 \text{ lb}$ 9725 lb
 $V(\text{from main}) = 0 \text{ lb}$ 0 lb
 $V(\text{from lower}) = 0 \text{ lb}$ 0 lb
 $\Sigma (\text{Wind}) = 7,356 \text{ lb}$ $\Sigma (\text{Smc}) = 9,725 \text{ lb}$
 $v = 230 \text{ PLF}$ $v = 304 \text{ PLF}$

Tributary Width (Upper Floor)
1.0 tributary width
2.0 total width
 Tributary Width (Main Floor)
1.0 tributary width
2.0 total width
 Not Used
1.0 tributary width
2.0 total width
 Height of Shearwall = **8.0 ft**
 Length of Shearwall = **4.0 ft**
 Aspect Ratio OK
 Use alternate R factor for seismic? **No**

Tributary Area (Upper Floor)
1.0 tributary area
2.0 total area
 Tributary Area (Main Floor)
1.0 tributary area
2.0 total area
 Not Used
1.0 tributary area
2.0 total area
 Weight of Shearwall = **10.0 lbs**
 Tributary width for dead load = **1.0 ft**
 Length of adjoining wall = **1.0 ft**

SDPWS, Table 4.3A → 0.93 x 353 = 328 PLF

USE **SW4**

Seismic controls shearwall design

$C_{TOTAL} =$ (floor above) + (this floor) = **1839 lbs** = 1839 lbs Wind controls
 $T_{TOTAL} =$ (floor above) + (this floor) = **2301 lbs** = 2301 lbs Load case 8 controls - Seismic

Seismic controls holdown design

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: **E = 2431 lbs**

USE SIMPSON DESIGNED HOLDOWN: **CS14**
 OR AT FOUNDATION / INTERIOR WALLS USE: **STHD10/RJ**

MAIN FL. REAR (SHOWER/SHOP)

SHEARWALL

WIND

SEISMIC

Floor Info

Main Floor Level, e.g. Upper, Main, Lower
 Lt-Rt Load Direction, e.g. Left-Right, Front-Rear
 (For Left Wall, Use Front-Rear Load Direction)

CDX Sheathing type
 Values in accordance with AF&PA SDPWS-2015

U/FL Resisting Dead Load
 (e.g. Roof, Upper Floor, Main Floor)

7.90 ft Total Length of Shearwalls

$$\begin{aligned} V(\text{from upper}) &= 8778 \text{ lb} & 9725 \text{ lb} \\ V(\text{from main}) &= 10139 \text{ lb} & 4271 \text{ lb} \\ V(\text{from lower}) &= 0 \text{ lb} & 0 \text{ lb} \\ \Sigma (\text{Wind}) &= 18,917 \text{ lb} & \Sigma (\text{Smc}) = 13,996 \text{ lb} \\ v &= 1197 \text{ PLF} & v = 886 \text{ PLF} \end{aligned}$$

3x framing required per IBC

SDPWS, Table 4.3A \rightarrow $0.93 \times 1190 = 1107 \text{ PLF}$

$$\begin{aligned} C_{\text{TOTAL}} &= (\text{floor above}) + (\text{this floor}) = 2701 \\ T_{\text{TOTAL}} &= (\text{floor above}) + (\text{this floor}) = 2343 \end{aligned}$$

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: $E = 7087 \text{ lbs}$

Tributary Width (Upper Floor)

1.0 tributary width
 2.0 total width

Tributary Width (Main Floor)

1.0 tributary width
 2.0 total width

Not Used

1.0 tributary width
 2.0 total width

Height of Shearwall = 8.0 ft

Length of Shearwall = 7.9 ft

Aspect Ratio OK

Use alternate R factor for seismic? No

Tributary Area (Upper Floor)

1.0 tributary area
 2.0 total area

Tributary Area (Main Floor)

1.0 tributary area
 2.0 total area

Not Used

1.0 tributary area
 2.0 total area

Weight of Shearwall = 10.0 lbs

Tributary width for dead load = 1.0 ft

Length of adjoining wall = 1.0 ft

USE (2)SW2

Seismic controls shearwall design

Wind controls
 Load case 8 controls - Wind

Seismic controls holdown design

USE SIMPSON DESIGNED HOLDOWN: (2)CMST14

OR AT FOUNDATION / INTERIOR WALLS USE: HHDQ14-SDS2.5

MAIN FL. FRONT (STORAGE/BDRM)

SHEARWALL

WIND

SEISMIC

Floor Info

Main Floor Level, e.g. Upper, Main, Lower
 Lt-Rt Load Direction, e.g. Left-Right, Front-Rear
 (For Left Wall, Use Front-Rear Load Direction)

CDX Sheathing type
 Values in accordance with AF&PA SDPWS-2015

U/FL Resisting Dead Load
 (e.g. Roof, Upper Floor, Main Floor)

5.00 ft Total Length of Shearwalls

$$\begin{aligned} V(\text{from upper}) &= 8778 \text{ lb} & 9725 \text{ lb} \\ V(\text{from main}) &= 10139 \text{ lb} & 4271 \text{ lb} \\ V(\text{from lower}) &= 0 \text{ lb} & 0 \text{ lb} \\ \Sigma (\text{Wind}) &= 18,917 \text{ lb} & \Sigma (\text{Smc}) = 13,996 \text{ lb} \\ v &= 874 \text{ PLF} & v = 680 \text{ PLF} \end{aligned}$$

3x framing required per IBC

SDPWS, Table 4.3A \rightarrow $(2w/h) \times 0.93 \times 911 = 706 \text{ PLF}$

$$\begin{aligned} C_{\text{TOTAL}} &= (\text{floor above}) + (\text{this floor}) = \\ T_{\text{TOTAL}} &= (\text{floor above}) + (\text{this floor}) = \end{aligned}$$

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: $E = 4079 \text{ lbs}$

Tributary Width (Upper Floor)

15.0 tributary width
 58.0 total width

Tributary Width (Main Floor)

12.0 tributary width
 58.0 total width

Not Used

1.0 tributary width
 2.0 total width

Height of Shearwall = 6.0 ft

Length of Shearwall = 2.5 ft

Aspect Ratio OK

Use alternate R factor for seismic? No

Tributary Area (Upper Floor)

15.0 tributary area
 58.0 total area

Tributary Area (Main Floor)

12.0 tributary area
 58.0 total area

Not Used

1.0 tributary area
 2.0 total area

Weight of Shearwall = 10.0 lbs

Tributary width for dead load = 1.0 ft

Length of adjoining wall = 1.0 ft

USE (2)SW3

Seismic controls shearwall design

Wind controls
 Load case 8 controls - Wind

Wind controls holdown design

USE SIMPSON DESIGNED HOLDOWN: MST72

OR AT FOUNDATION / INTERIOR WALLS USE: HDU8-SDS2.5

MAIN FL. LEFT (STORAGE/BDRM/BATH)

SHEARWALL

WIND

SEISMIC

Floor Info

Upper Floor Level, e.g. Upper, Main, Lower
 Ft-Rr Load Direction, e.g. Left-Right, Front-Rear
 (For Left Wall, Use Front-Rear Load Direction)

CDX Sheathing type
 Values in accordance with AF&PA SDPWS-2015

U/FL Resisting Dead Load
 (e.g. Roof, Upper Floor, Main Floor)

14.00 ft Total Length of Shearwalls

$$\begin{aligned} V(\text{from upper}) &= 7356 \text{ lb} & 9725 \text{ lb} \\ V(\text{from main}) &= 0 \text{ lb} & 0 \text{ lb} \\ V(\text{from lower}) &= 0 \text{ lb} & 0 \text{ lb} \\ \Sigma (\text{Wind}) &= 7,356 \text{ lb} & \Sigma (\text{Smc}) = 9,725 \text{ lb} \\ v &= 263 \text{ PLF} & v = 347 \text{ PLF} \end{aligned}$$

SDPWS, Table 4.3A \rightarrow $0.93 \times 456 = 424 \text{ PLF}$

$$\begin{aligned} C_{\text{TOTAL}} &= (\text{floor above}) + (\text{this floor}) = 1839 \\ T_{\text{TOTAL}} &= (\text{floor above}) + (\text{this floor}) = 2301 \end{aligned}$$

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: $E = 2779 \text{ lbs}$

Tributary Width (Upper Floor)

1.0 tributary width
 2.0 total width

Tributary Width (Main Floor)

1.0 tributary width
 2.0 total width

Not Used

1.0 tributary width
 2.0 total width

Height of Shearwall = 8.0 ft

Length of Shearwall = 4.0 ft

Aspect Ratio OK

Use alternate R factor for seismic? No

Tributary Area (Upper Floor)

1.0 tributary area
 2.0 total area

Tributary Area (Main Floor)

1.0 tributary area
 2.0 total area

Not Used

1.0 tributary area
 2.0 total area

Weight of Shearwall = 10.0 lbs

Tributary width for dead load = 1.0 ft

Length of adjoining wall = 1.0 ft

USE SW3

Seismic controls shearwall design

Wind controls
 Load case 8 controls - Seismic

Seismic controls holdown design

USE SIMPSON DESIGNED HOLDOWN: MST72

OR AT FOUNDATION / INTERIOR WALLS USE: HDU8-SDS2.5

Wood Beam

File: 12-057.ec6

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CK Engineering LLC

DESCRIPTIO G.T.#1 (REACTIONS ONLY)

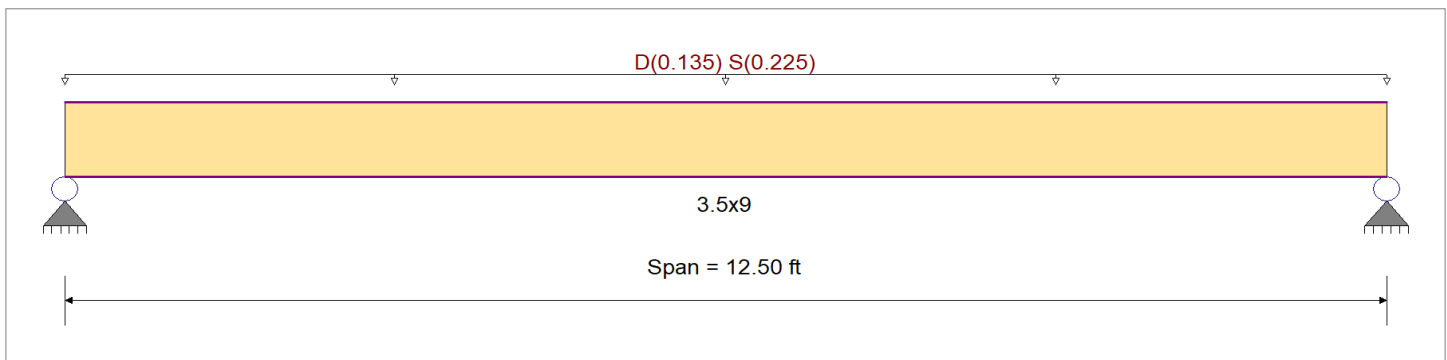
CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : ASCE 7-16

Material Properties

Analysis Method	Allowable Stress Design	Fb +	2400 psi	E : Modulus of Elasti	
Load Combination	ASCE 7-16	Fb -	1850 psi	Ebend- xx	1800ksi
		Fc - Prll	1650 psi	Eminbend - x	950ksi
Wood Species	DF/DF	Fc - Perp	650 psi	Ebend- yy	1600ksi
Wood Grade	24F - V4	Fv	265 psi	Eminbend - y	850ksi
		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 loads

Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 9.0 ft, (ROOF)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.659 < 1	Maximum Shear Stress Ratio	=	0.316 < 1
Section used for this span		3.5x9	Section used for this span		3.5x9
fb: Actual	=	1,819.58psi	fv: Actual	=	96.42 psi
Fb: Allowable	=	2,760.00psi	Fv: Allowable	=	304.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	6.250ft	Location of maximum on span	=	11.770 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection		0.325 in	Ratio =		461 >=360
Max Upward Transient Deflection		0.000 in	Ratio =		0 <360
Max Downward Total Deflection		0.530 in	Ratio =		283 >=240
Max Upward Total Deflection		0.000 in	Ratio =		0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values							
			M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v						
D Only	Length = 12.50 ft	1	0.326	0.156	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.77	703.51	2160.00	0.00	0.00	0.00	0.00	0.00	238.50	
+D+S	Length = 12.50 ft	1	0.659	0.316	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	7.16	1,819.58	2760.00	0.00	0.00	0.00	0.00	0.00	0.00	304.75
+D+0.750S	Length = 12.50 ft	1	0.558	0.268	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	6.07	1,540.56	2760.00	0.00	0.00	0.00	0.00	0.00	0.00	304.75
+0.60D	Length = 12.50 ft	1	0.110	0.053	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.66	422.10	3840.00	0.00	0.00	0.00	0.00	0.00	0.00	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.5296	6.296		0.0000	0.000

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

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DESCRIPTIO G.T.#1 (REACTIONS ONLY)

Vertical Reactions

Support notation : Far left is #'

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.293	2.293
Overall MINimum	1.406	1.406
D Only	0.886	0.886
+D+S	2.293	2.293
+D+0.750S	1.941	1.941
+0.60D	0.532	0.532
S Only	1.406	1.406

Wood Beam

File: 12-057.ec6

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DESCRIPTIO HDR#1

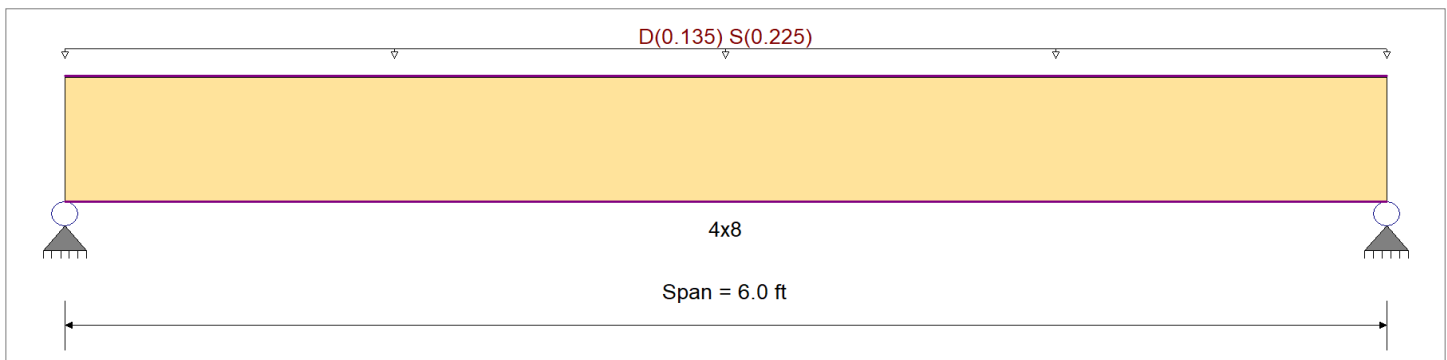
CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : ASCE 7-16

Material Properties

Analysis Method	Allowable Stress Design	Fb +	850 psi	E : Modulus of Elasti	
Load Combination	ASCE 7-16	Fb -	850 psi	Ebend- xx	1300ksi
		Fc - Prll	1300 psi	Eminbend - x	470ksi
Wood Species	Hem Fir	Fc - Perp	405 psi		
Wood Grade	No.2	Fv	150 psi		
		Ft	525 psi	Density	26.84pcf
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

Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 9.0 ft, (ROOF)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.505 : 1	Maximum Shear Stress Ratio	=	0.301 : 1
Section used for this span		4x8	Section used for this span		4x8
fb: Actual	=	642.35psi	fv: Actual	=	51.93 psi
Fb: Allowable	=	1,270.75psi	Fv: Allowable	=	172.50 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	3.000ft	Location of maximum on span	=	0.000ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection		0.046 in	Ratio =		1576 >=360
Max Upward Transient Deflection		0.000 in	Ratio =		0 <360
Max Downward Total Deflection		0.074 in	Ratio =		972 >=240
Max Upward Total Deflection		0.000 in	Ratio =		0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values							
			M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v					
D Only	Length = 6.0 ft	1	0.247	0.147	0.90	1.300	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.63	246.09	994.50	0.00	0.00	0.00	0.34	19.90	135.00
+D+S	Length = 6.0 ft	1	0.505	0.301	1.15	1.300	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.64	642.35	1270.75	0.00	0.00	0.00	0.00	0.00	0.00
+D+0.750S	Length = 6.0 ft	1	0.428	0.255	1.15	1.300	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.39	543.28	1270.75	0.00	0.00	0.00	0.74	43.92	172.50
+0.60D	Length = 6.0 ft	1	0.084	0.050	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.38	147.65	1768.00	0.00	0.00	0.00	0.00	0.00	0.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0740	3.022		0.0000	0.000

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

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CK Engineering LLC

DESCRIPTIO HDR#1

Vertical Reactions

Support notation : Far left is #'

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.094	1.094
Overall MINimum	0.675	0.675
D Only	0.419	0.419
+D+S	1.094	1.094
+D+0.750S	0.925	0.925
+0.60D	0.252	0.252
S Only	0.675	0.675

Project Title:
 Engineer:
 Project ID:
 Project Descr:

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Wood Beam

File: 12-057.ec6

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DESCRIPTIO HDR#2

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S	1	0.0268	2.015		0.0000	0.000

Vertical Reactions

Support notation : Far left is #'

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.337	1.337
Overall MINimum	0.450	0.450
D Only	0.519	0.519
+D+L	1.159	1.159
+D+S	0.969	0.969
+D+0.750L	0.999	0.999
+D+0.750L+0.750S	1.337	1.337
+0.60D	0.312	0.312
L Only	0.640	0.640
S Only	0.450	0.450

Wood Beam

File: 12-057.ec6

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CK Engineering LLC

DESCRIPTIO BM#1

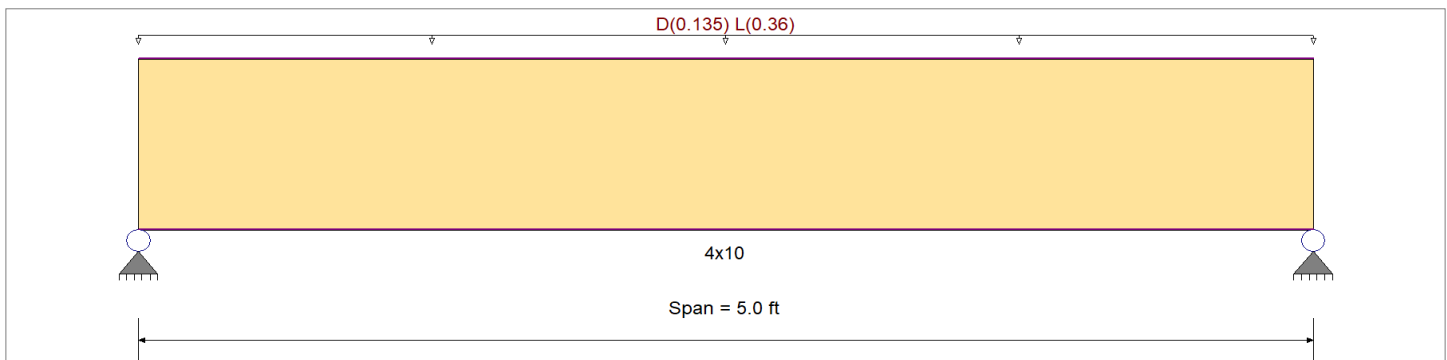
CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : ASCE 7-16

Material Properties

Analysis Method	Allowable Stress Design	Fb +	850.0 psi	E : Modulus of Elasticity	
Load Combination	ASCE 7-16	Fb -	850.0 psi	Ebend- xx	1,300.0ksi
		Fc - Prll	1,300.0 psi	Eminbend - x	470.0ksi
Wood Species	Hem Fir	Fc - Perp	405.0 psi		
Wood Grade	No.2	Fv	150.0 psi		
		Ft	525.0 psi	Density	26.840pcf
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

Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 9.0 ft, (FLOOR)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.369 : 1	Maximum Shear Stress Ratio	=	0.268 : 1
Section used for this span		4x10	Section used for this span		4x10
fb: Actual	=	376.44psi	fv: Actual	=	40.24 psi
Fb: Allowable	=	1,020.00psi	Fv: Allowable	=	150.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	2.500ft	Location of maximum on span	=	0.000ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection		0.017 in	Ratio =		3535 >=360
Max Upward Transient Deflection		0.000 in	Ratio =		0 <360
Max Downward Total Deflection		0.024 in	Ratio =		2540 >=240
Max Upward Total Deflection		0.000 in	Ratio =		0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values							
			M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v					
D Only	Length = 5.0 ft	1	0.115	0.084	0.90	1.200	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.44	105.96	918.00	0.00	0.00	0.00	0.00	0.00	0.00
+D+L	Length = 5.0 ft	1	0.369	0.268	1.00	1.200	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.57	376.44	1020.00	0.00	0.00	0.00	0.00	0.00	0.00
+D+0.750L	Length = 5.0 ft	1	0.242	0.176	1.25	1.200	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.28	308.82	1275.00	0.00	0.00	0.00	0.00	0.00	0.00
+0.60D	Length = 5.0 ft	1	0.039	0.028	1.60	1.200	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.26	63.58	1632.00	0.00	0.00	0.00	0.00	0.00	0.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0236	2.518		0.0000	0.000

Project Title:
Engineer:
Project ID:
Project Descr:

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Wood Beam

File: 12-057.ec6

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CK Engineering LLC

DESCRIPTIO BM#1

Vertical Reactions

Support notation : Far left is #'

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.253	1.253
Overall MINimum	0.900	0.900
D Only	0.353	0.353
+D+L	1.253	1.253
+D+0.750L	1.028	1.028
+0.60D	0.212	0.212
L Only	0.900	0.900

Wood Beam

File: 12-057.ec6

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Lic. #: KW-06009431

CK Engineering LLC

DESCRIPTIO BM#2

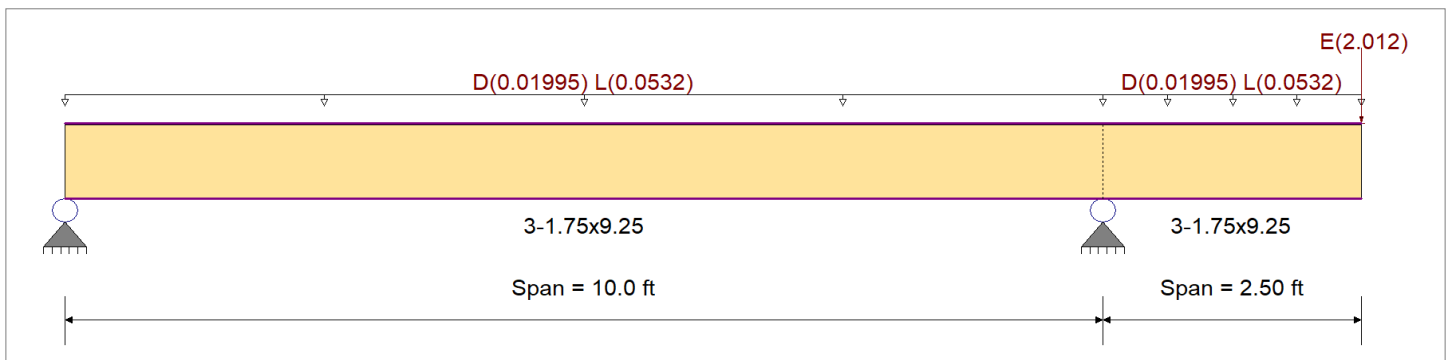
CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : ASCE 7-16

Material Properties

Analysis Method	Allowable Stress Design	Fb +	2600 psi	E : Modulus of Elasticity	
Load Combination	ASCE 7-16	Fb -	2600 psi	Ebend- xx	1900 ksi
Wood Species	Trus Joist	Fc - Prll	2510 psi	Eminbend - x	965.71 ksi
Wood Grade	MicroLam LVL 1.9 E	Fc - Perp	750 psi		
		Fv	285 psi		
		Ft	1555 psi	Density	42.01 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

Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 1.330 ft, (FLOOR)

Load for Span Number 2

Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 1.330 ft, (FLOOR)

Point Load : E = 2.012 k @ 2.50 ft, (SW4)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.887 : 1	Maximum Shear Stress Ratio	=	0.625 : 1
Section used for this span		3-1.75x9.25	Section used for this span		3-1.75x9.25
fb: Actual	=	3,688.99psi	fv: Actual	=	284.97 psi
Fb: Allowable	=	4,160.00psi	Fv: Allowable	=	456.00 psi
Load Combination		+1.209D+4.550E	Load Combination		+1.209D+4.550E
Location of maximum on span	=	10.000ft	Location of maximum on span	=	10.000ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection		0.138 in	Ratio =		436 >=360
Max Upward Transient Deflection		-0.085 in	Ratio =		1405 >=360
Max Downward Total Deflection		0.092 in	Ratio =		648 >=240
Max Upward Total Deflection		-0.054 in	Ratio =		2221 >=240

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values					
			M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v			
D Only																				
	Length = 10.0 ft	1	0.026	0.019	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.37	60.08	2340.00	0.16	4.83	256.50			
	Length = 2.50 ft	2	0.007	0.019	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.11	17.09	2340.00	0.06	4.83	256.50			
+D+L																				
	Length = 10.0 ft	1	0.059	0.043	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.96	153.76	2600.00	0.40	12.37	285.00			
	Length = 2.50 ft	2	0.017	0.043	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.27	43.74	2600.00	0.15	12.37	285.00			
+D+0.750L																				
	Length = 10.0 ft	1	0.040	0.029	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.81	130.34	3250.00	0.34	10.49	356.25			
	Length = 2.50 ft	2	0.011	0.029	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.23	37.07	3250.00	0.13	10.49	356.25			

Project Title:
 Engineer:
 Project ID:
 Project Descr:

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Wood Beam

File: 12-057.ec6

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CK Engineering LLC

DESCRIPTIO BM#2

Load Combination	Segment Length	Span #	Max Stress Ratios								Moment Values			Shear Values			
			M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v
+0.60D						1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.0 ft	1		0.009	0.006	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.22	36.05	4160.00	0.09	2.90	456.00
Length = 2.50 ft	2		0.002	0.006	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.06	10.25	4160.00	0.04	2.90	456.00
+1.209D+4.550E						1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.0 ft	1		0.887	0.625	1.60	1.000	1.00	1.00	1.00	1.00	1.00	23.02	3,688.99	4160.00	9.23	284.97	456.00
Length = 2.50 ft	2		0.887	0.625	1.60	1.000	1.00	1.00	1.00	1.00	1.00	23.02	3,688.99	4160.00	9.23	284.97	456.00
+1.156D+0.750L+3.413E						1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.0 ft	1		0.671	0.474	1.60	1.000	1.00	1.00	1.00	1.00	1.00	17.41	2,791.00	4160.00	7.00	216.32	456.00
Length = 2.50 ft	2		0.671	0.474	1.60	1.000	1.00	1.00	1.00	1.00	1.00	17.41	2,791.00	4160.00	7.00	216.32	456.00
+0.3914D+4.550E						1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 10.0 ft	1		0.883	0.622	1.60	1.000	1.00	1.00	1.00	1.00	1.00	22.93	3,675.02	4160.00	9.18	283.48	456.00
Length = 2.50 ft	2		0.883	0.622	1.60	1.000	1.00	1.00	1.00	1.00	1.00	22.93	3,675.02	4160.00	9.18	283.48	456.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
E Only	1	0.0000	0.000	E Only	-0.0854	5.810
E Only	2	0.1375	2.500		0.0000	5.810

Vertical Reactions

Support notation : Far left is #'

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-0.503	2.515	
Overall MINimum	0.249	2.515	
D Only	0.160	0.267	
+D+L	0.409	0.682	
+D+0.750L	0.347	0.578	
+0.60D	0.096	0.160	
+D+0.70E	-0.192	2.027	
+D+0.750L+0.5250E	0.083	1.899	
+0.60D+0.70E	-0.256	1.920	
L Only	0.249	0.416	
E Only	-0.503	2.515	

Wood Beam

File: 12-057.ec6

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Lic. #: KW-06009431

CK Engineering LLC

DESCRIPTIO BM#3

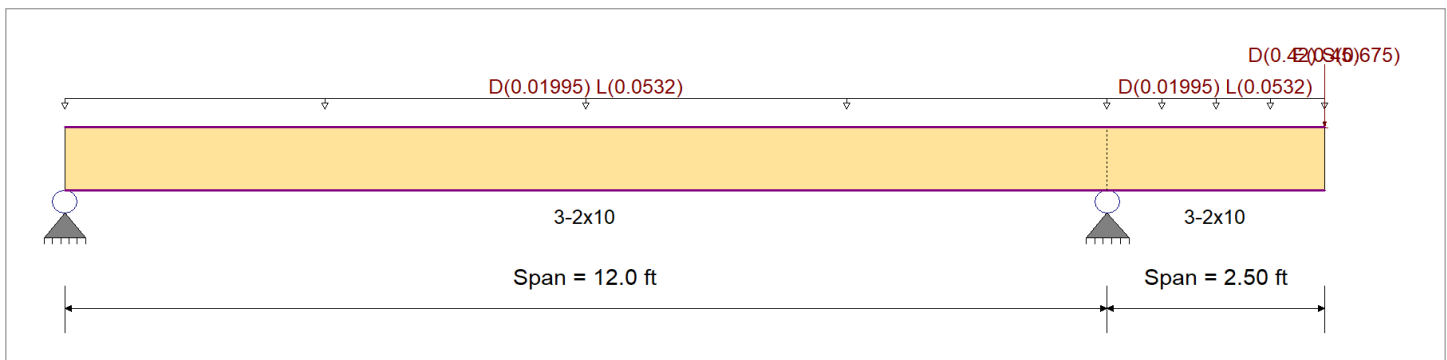
CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : ASCE 7-16

Material Properties

Analysis Method	Allowable Stress Design	Fb +	850.0 psi	E : Modulus of Elasti	
Load Combination	ASCE 7-16	Fb -	850.0 psi	Ebend- xx	1,300.0ksi
Wood Species	Hem Fir	Fc - Prll	1,300.0 psi	Eminbend - x	470.0ksi
Wood Grade	No.2	Fc - Perp	405.0 psi	Fv	150.0 psi
Beam Bracing	Beam is Fully Braced against lateral-torsional buckling	Ft	525.0 psi	Density	26.840pcf



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

Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 1.330 ft, (FLOOR)

Load for Span Number 2

Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 1.330 ft, (FLOOR)

Point Load : E = 0.450 k @ 2.50 ft, (SW4)

Point Load : D = 0.420, S = 0.6750 k @ 2.50 ft, (HDR#1)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.818 : 1	Maximum Shear Stress Ratio	=	0.398 : 1
Section used for this span		3-2x10	Section used for this span		3-2x10
fb: Actual	=	1,223.67 psi	fv: Actual	=	95.57 psi
Fb: Allowable	=	1,496.00 psi	Fv: Allowable	=	240.00 psi
Load Combination		+1.156D+0.750L+0.750S+3.413E	Load Combination		+1.156D+0.750L+0.750S+3.413E
Location of maximum on span	=	12.000ft	Location of maximum on span	=	12.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection		0.091 in Ratio =	656	>=	360
Max Upward Transient Deflection		-0.034 in Ratio =	1750	>=	360
Max Downward Total Deflection		0.130 in Ratio =	460	>=	240
Max Upward Total Deflection		-0.085 in Ratio =	1689	>=	240

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values					
			M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v			
D Only																				
	Length = 12.0 ft	1	0.253	0.125	0.90	1.100	1.00	1.00	1.00	1.00	1.00	1.14	212.54	841.50	0.47	16.86	135.00			
	Length = 2.50 ft	2	0.253	0.125	0.90	1.100	1.00	1.00	1.00	1.00	1.14	212.54	841.50	0.47	16.86	135.00				
+D+L																				
	Length = 12.0 ft	1	0.261	0.135	1.00	1.100	1.00	1.00	1.00	1.00	1.30	243.63	935.00	0.56	20.18	150.00				
	Length = 2.50 ft	2	0.261	0.135	1.00	1.100	1.00	1.00	1.00	1.00	1.30	243.63	935.00	0.56	20.18	150.00				
+D+S																				
	Length = 12.0 ft	1	0.491	0.239	1.15	1.100	1.00	1.00	1.00	1.00	2.82	528.10	1075.25	1.14	41.19	172.50				

Project Title:
 Engineer:
 Project ID:
 Project Descr:

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Wood Beam

File: 12-057.ec6

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CK Engineering LLC

DESCRIPTIO BM#3

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values		
			M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v
	Length = 2.50 ft	2	0.491	0.239	1.15	1.100	1.00	1.00	1.00	1.00	1.00	2.82	528.10	1075.25	1.14	41.19	172.50
+D+0.750L						1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
	Length = 12.0 ft	1	0.202	0.103	1.25	1.100	1.00	1.00	1.00	1.00	1.00	1.26	235.86	1168.75	0.54	19.35	187.50
	Length = 2.50 ft	2	0.202	0.103	1.25	1.100	1.00	1.00	1.00	1.00	1.00	1.26	235.86	1168.75	0.54	19.35	187.50
+D+0.750L+0.750S						1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
	Length = 12.0 ft	1	0.439	0.218	1.15	1.100	1.00	1.00	1.00	1.00	1.00	2.53	472.53	1075.25	1.04	37.60	172.50
	Length = 2.50 ft	2	0.439	0.218	1.15	1.100	1.00	1.00	1.00	1.00	1.00	2.53	472.53	1075.25	1.04	37.60	172.50
+0.60D						1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
	Length = 12.0 ft	1	0.085	0.042	1.60	1.100	1.00	1.00	1.00	1.00	1.00	0.68	127.52	1496.00	0.28	10.12	240.00
	Length = 2.50 ft	2	0.085	0.042	1.60	1.100	1.00	1.00	1.00	1.00	1.00	0.68	127.52	1496.00	0.28	10.12	240.00
+1.209D+4.550E						1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
	Length = 12.0 ft	1	0.812	0.392	1.60	1.100	1.00	1.00	1.00	1.00	1.00	6.49	1,214.07	1496.00	2.61	94.17	240.00
	Length = 2.50 ft	2	0.812	0.392	1.60	1.100	1.00	1.00	1.00	1.00	1.00	6.49	1,214.07	1496.00	2.61	94.17	240.00
+1.156D+0.750L+0.750S+3.4						1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
	Length = 12.0 ft	1	0.818	0.398	1.60	1.100	1.00	1.00	1.00	1.00	1.00	6.54	1,223.67	1496.00	2.65	95.57	240.00
	Length = 2.50 ft	2	0.818	0.398	1.60	1.100	1.00	1.00	1.00	1.00	1.00	6.54	1,223.67	1496.00	2.65	95.57	240.00
+0.3914D+4.550E						1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
	Length = 12.0 ft	1	0.695	0.335	1.60	1.100	1.00	1.00	1.00	1.00	1.00	5.56	1,040.38	1496.00	2.23	80.38	240.00
	Length = 2.50 ft	2	0.695	0.335	1.60	1.100	1.00	1.00	1.00	1.00	1.00	5.56	1,040.38	1496.00	2.23	80.38	240.00

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	-0.0852	7.374
+D+S	2	0.1302	2.500		0.0000	7.374

Vertical Reactions

Load Combination	Support notation : Far left is #'			Values in KIPS
	Support 1	Support 2	Support 3	
Overall MAXimum	0.377	1.997		
Overall MINimum	-0.141	0.544		
D Only	0.072	0.750		
+D+L	0.377	1.216		
+D+S	-0.069	1.566		
+D+0.750L	0.301	1.100		
+D+0.750L+0.750S	0.195	1.711		
+0.60D	0.043	0.450		
+D+0.70E	0.006	1.131		
+D+0.750L+0.750S+0.5250E	0.146	1.997		
+0.60D+0.70E	-0.023	0.831		
L Only	0.305	0.466		
S Only	-0.141	0.816		
E Only	-0.094	0.544		

Steel Beam

Lic. #: KW-06009431

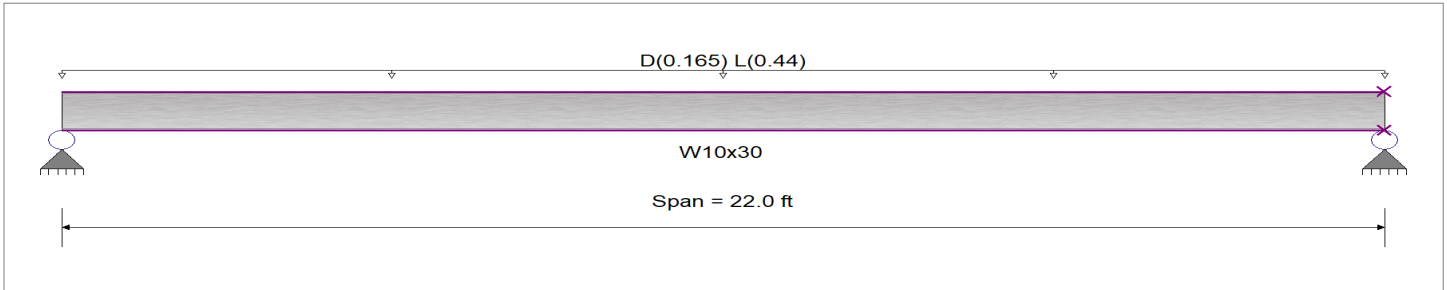
DESCRIPTIO BM#4

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
 Load Combination Set : ASCE 7-16

Material Properties

Analysis Method: Allowable Strength Design
 Beam Bracing: Beam is Fully Braced against lateral-torsional buckling
 Bending Axis : Major Axis Bending
 Fy : Steel Yield 50.0 ksi
 E: Modulus : 29,000.0 ksi



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 = 11.0 ft, (FLOOR)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.421 : 1	Maximum Shear Stress Ratio =	0.111 : 1
Section used for this span	W10x30	Section used for this span	W10x30
Ma : Applied	38.418 k-ft	Va : Applied	6.985 k
Mn / Omega : Allowable	91.317 k-ft	Vn/Omega : Allowable	63.0 k
Load Combination	+D+L	Load Combination	+D+L
Location of maximum on span	11.000ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.472 in	Ratio =	558 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.682 in	Ratio =	387 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values					Summary of Shear Values				
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx/Vnx/Omega	
D Only														
Dsgn. L =	22.00 ft	1	0.129	0.034	11.80		11.80	152.50	91.32	1.00	1.00	2.15	94.50	63.00
+D+L														
Dsgn. L =	22.00 ft	1	0.421	0.111	38.42		38.42	152.50	91.32	1.00	1.00	6.99	94.50	63.00
+D+0.750L														
Dsgn. L =	22.00 ft	1	0.348	0.092	31.76		31.76	152.50	91.32	1.00	1.00	5.78	94.50	63.00
+0.60D														
Dsgn. L =	22.00 ft	1	0.078	0.020	7.08		7.08	152.50	91.32	1.00	1.00	1.29	94.50	63.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.6820	11.063		0.0000	0.000

Vertical Reactions

Load Combination	Support notation : Far left is #'		Values in KIPS
	Support 1	Support 2	
Overall MAXimum	6.985	6.985	
Overall MINimum	1.287	1.287	
D Only	2.145	2.145	
+D+L	6.985	6.985	
+D+0.750L	5.775	5.775	
+0.60D	1.287	1.287	
L Only	4.840	4.840	

General Footing

DESCRIPTIO FTNG#1

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
 Load Combinations Used : ASCE 7-16

General Information

Material Properties

f _c : Concrete 28 day strength	=	2.50 ksi
f _y : Rebar Yield	=	40.0 ksi
E _c : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Soil Design Values

Allowable Soil Beari	=	1.50 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	150.0 pcf
Soil/Concrete Friction Coeff.	=	0.250

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Increases based on footing Depth

Footing base depth below soil surface	=	ft
Allow press. increase per foot of depth when footing base is below	=	ksf ft

Increases based on footing plan dimension

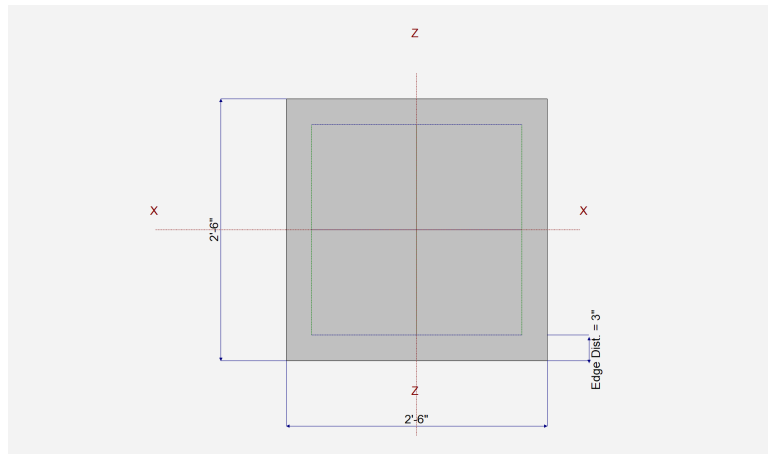
Allowable pressure increase per foot of depth when max. length or width is greater than	=	ksf
	=	ft

Dimensions

Width parallel to X-X Axis	=	2.50 ft
Length parallel to Z-Z Axis	=	2.50 ft
Footing Thickness	=	10.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	in
Rebar Centerline to Edge of Concrete... at Bottom of footing	=	3.0 in



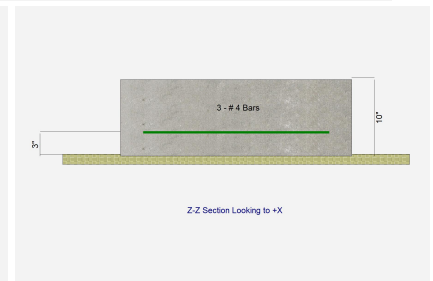
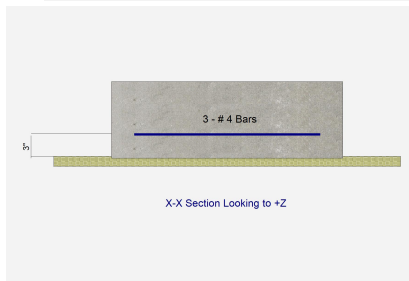
Reinforcing

Bars parallel to X-X Axis	=	
Number of Bars	=	3
Reinforcing Bar Size	=	# 4

Bars parallel to Z-Z Axis	=	
Number of Bars	=	3
Reinforcing Bar Size	=	# 4

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separatio	=	n/a
# Bars required within zone	=	n/a
# Bars required on each side of zone	=	n/a



Applied Loads

	D	L _r	L	S	W	E	H
P : Column Load	=	2.150		4.840			k
OB : Overburden	=						ksf
M-xx	=						k-ft
M-zz	=						k-ft
V-x	=						k
V-z	=						k

General Footing

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DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.8260	Soil Bearing	1.239 ksf	1.50 ksf	+D+L about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.2631	Z Flexure (+X)	1.291 k-ft/ft	4.904 k-ft/ft	+1.20D+1.60L
PASS	0.2631	Z Flexure (-X)	1.291 k-ft/ft	4.904 k-ft/ft	+1.20D+1.60L
PASS	0.2631	X Flexure (+Z)	1.291 k-ft/ft	4.904 k-ft/ft	+1.20D+1.60L
PASS	0.2631	X Flexure (-Z)	1.291 k-ft/ft	4.904 k-ft/ft	+1.20D+1.60L
PASS	0.1770	1-way Shear (+X)	13.274 psi	75.0 psi	+1.20D+1.60L
PASS	0.1770	1-way Shear (-X)	13.274 psi	75.0 psi	+1.20D+1.60L
PASS	0.1770	1-way Shear (+Z)	13.274 psi	75.0 psi	+1.20D+1.60L
PASS	0.1770	1-way Shear (-Z)	13.274 psi	75.0 psi	+1.20D+1.60L
PASS	0.3309	2-way Punching	49.639 psi	150.0 psi	+1.20D+1.60L

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc (in)	Actual Soil Bearing Stress @ Location				Actual / Allow Ratio
				Bottom, -Z	Top, +Z	Left, -X	Right, +X	
X-X, D Only	1.50	n/a	0.0	0.4648	0.4648	n/a	n/a	0.310
X-X, +D+L	1.50	n/a	0.0	1.239	1.239	n/a	n/a	0.826
X-X, +D+0.750L	1.50	n/a	0.0	1.046	1.046	n/a	n/a	0.697
X-X, +0.60D	1.50	n/a	0.0	0.2789	0.2789	n/a	n/a	0.186
Z-Z, D Only	1.50	0.0	n/a	n/a	n/a	0.4648	0.4648	0.310
Z-Z, +D+L	1.50	0.0	n/a	n/a	n/a	1.239	1.239	0.826
Z-Z, +D+0.750L	1.50	0.0	n/a	n/a	n/a	1.046	1.046	0.697
Z-Z, +0.60D	1.50	0.0	n/a	n/a	n/a	0.2789	0.2789	0.186

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

All units k

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	0.3763	+Z	Bottom	0.2160	Min Temp %	0.240	4.904	OK
X-X, +1.40D	0.3763	-Z	Bottom	0.2160	Min Temp %	0.240	4.904	OK
X-X, +1.20D+1.60L	1.291	+Z	Bottom	0.2160	Min Temp %	0.240	4.904	OK
X-X, +1.20D+1.60L	1.291	-Z	Bottom	0.2160	Min Temp %	0.240	4.904	OK
X-X, +1.20D+L	0.9275	+Z	Bottom	0.2160	Min Temp %	0.240	4.904	OK
X-X, +1.20D+L	0.9275	-Z	Bottom	0.2160	Min Temp %	0.240	4.904	OK
X-X, +1.20D	0.3225	+Z	Bottom	0.2160	Min Temp %	0.240	4.904	OK
X-X, +1.20D	0.3225	-Z	Bottom	0.2160	Min Temp %	0.240	4.904	OK
X-X, +0.90D	0.2419	+Z	Bottom	0.2160	Min Temp %	0.240	4.904	OK
X-X, +0.90D	0.2419	-Z	Bottom	0.2160	Min Temp %	0.240	4.904	OK
Z-Z, +1.40D	0.3763	-X	Bottom	0.2160	Min Temp %	0.240	4.904	OK
Z-Z, +1.40D	0.3763	+X	Bottom	0.2160	Min Temp %	0.240	4.904	OK
Z-Z, +1.20D+1.60L	1.291	-X	Bottom	0.2160	Min Temp %	0.240	4.904	OK
Z-Z, +1.20D+1.60L	1.291	+X	Bottom	0.2160	Min Temp %	0.240	4.904	OK
Z-Z, +1.20D+L	0.9275	-X	Bottom	0.2160	Min Temp %	0.240	4.904	OK
Z-Z, +1.20D+L	0.9275	+X	Bottom	0.2160	Min Temp %	0.240	4.904	OK

Project Title:
 Engineer:
 Project ID:
 Project Descr:

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Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in ²	Gvrn. As in ²	Actual As in ²	Phi*Mn k-ft	Status
Z-Z, +1.20D	0.3225	-X	Bottom	0.2160	Min Temp %	0.240	4.904	OK
Z-Z, +1.20D	0.3225	+X	Bottom	0.2160	Min Temp %	0.240	4.904	OK
Z-Z, +0.90D	0.2419	-X	Bottom	0.2160	Min Temp %	0.240	4.904	OK
Z-Z, +0.90D	0.2419	+X	Bottom	0.2160	Min Temp %	0.240	4.904	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	3.87 psi	3.87 psi	3.87 psi	3.87 psi	3.87 psi	75.00 psi	0.05	OK
+1.20D+1.60L	13.27 psi	13.27 psi	13.27 psi	13.27 psi	13.27 psi	75.00 psi	0.18	OK
+1.20D+L	9.54 psi	9.54 psi	9.54 psi	9.54 psi	9.54 psi	75.00 psi	0.13	OK
+1.20D	3.32 psi	3.32 psi	3.32 psi	3.32 psi	3.32 psi	75.00 psi	0.04	OK
+0.90D	2.49 psi	2.49 psi	2.49 psi	2.49 psi	2.49 psi	75.00 psi	0.03	OK

Two-Way "Punching" Shear

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	14.47 psi	150.00psi	0.09648	OK
+1.20D+1.60L	49.64 psi	150.00psi	0.3309	OK
+1.20D+L	35.68 psi	150.00psi	0.2378	OK
+1.20D	12.41 psi	150.00psi	0.0827	OK
+0.90D	9.30 psi	150.00psi	0.06203	OK

All units k