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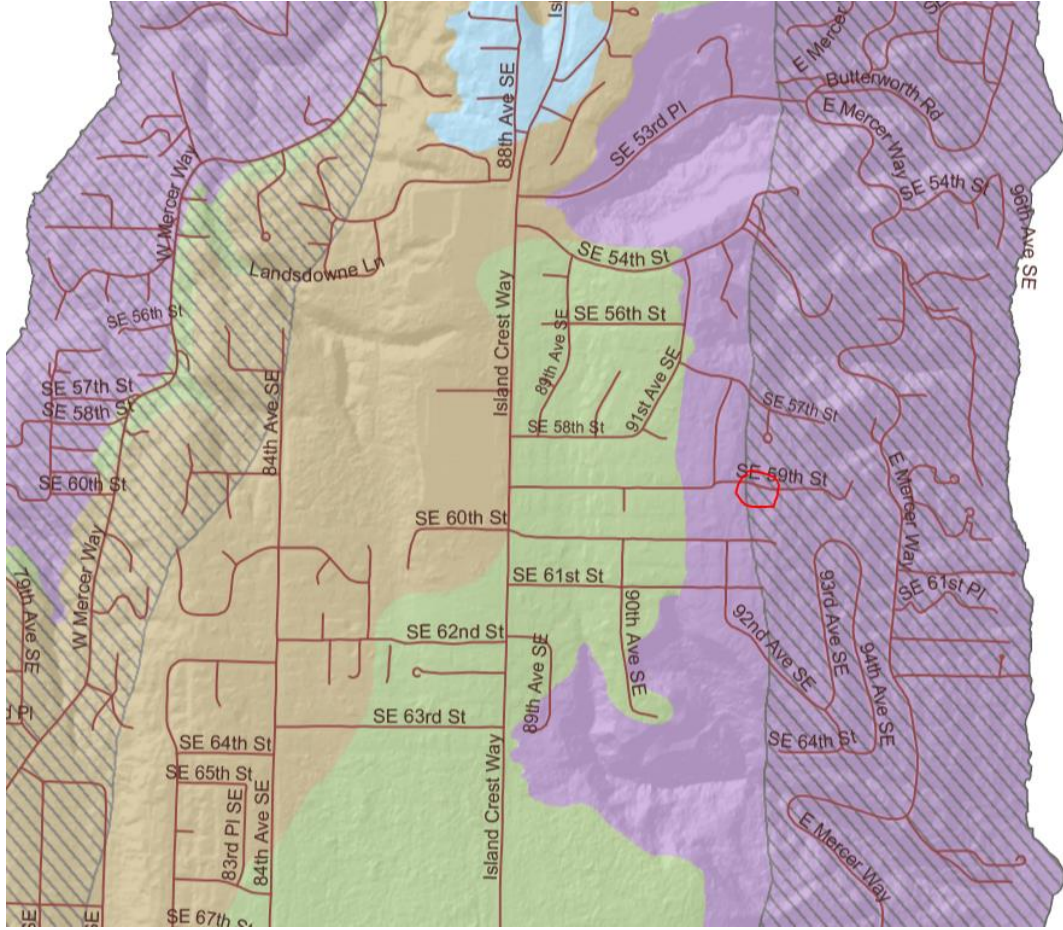
STRUCTURAL CALCULATIONS

Lateral & Gravity Design
20-014



3/13/2020

Holt Residence
9224 SE 60th St
Mercer Island, WA 98040
March 13, 2020



Search Information

Address: 9224 SE 60th St, Mercer Island, WA 98040, USA
Coordinates: 47.5494176, -122.2156336
Elevation: 307 ft
Timestamp: 2020-03-06T20:28:23.060Z
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.

While the information presented on this website is believed to be correct, ATC and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in the report should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other

Search Information

Address: 9224 SE 60th St, Mercer Island, WA 98040, USA

Coordinates: 47.5494176, -122.2156336

Elevation: 307 ft

Timestamp: 2020-03-06T20:35:48.723Z

Hazard Type: Seismic

Reference Document: ASCE7-16

Risk Category: I

Site Class: D



Basic Parameters

Name	Value	Description
S _S	1.453	MCE _R ground motion (period=0.2s)
S ₁	0.504	MCE _R ground motion (period=1.0s)
S _{MS}	1.453	Site-modified spectral acceleration value
S _{M1}	* null	Site-modified spectral acceleration value
S _{DS}	0.968	Numeric seismic design value at 0.2s SA
S _{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

▼Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F _a	1	Site amplification factor at 0.2s
F _v	* null	Site amplification factor at 1.0s
CR _S	0.902	Coefficient of risk (0.2s)
CR ₁	0.899	Coefficient of risk (1.0s)
PGA	0.622	MCF _{0.2} peak ground acceleration

S1D	1.645	Factored deterministic acceleration value (1.0s)
PGAd	1.423	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:	9224 SE 60th 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.	2.2
TOTAL DEAD LOAD:		15.0 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

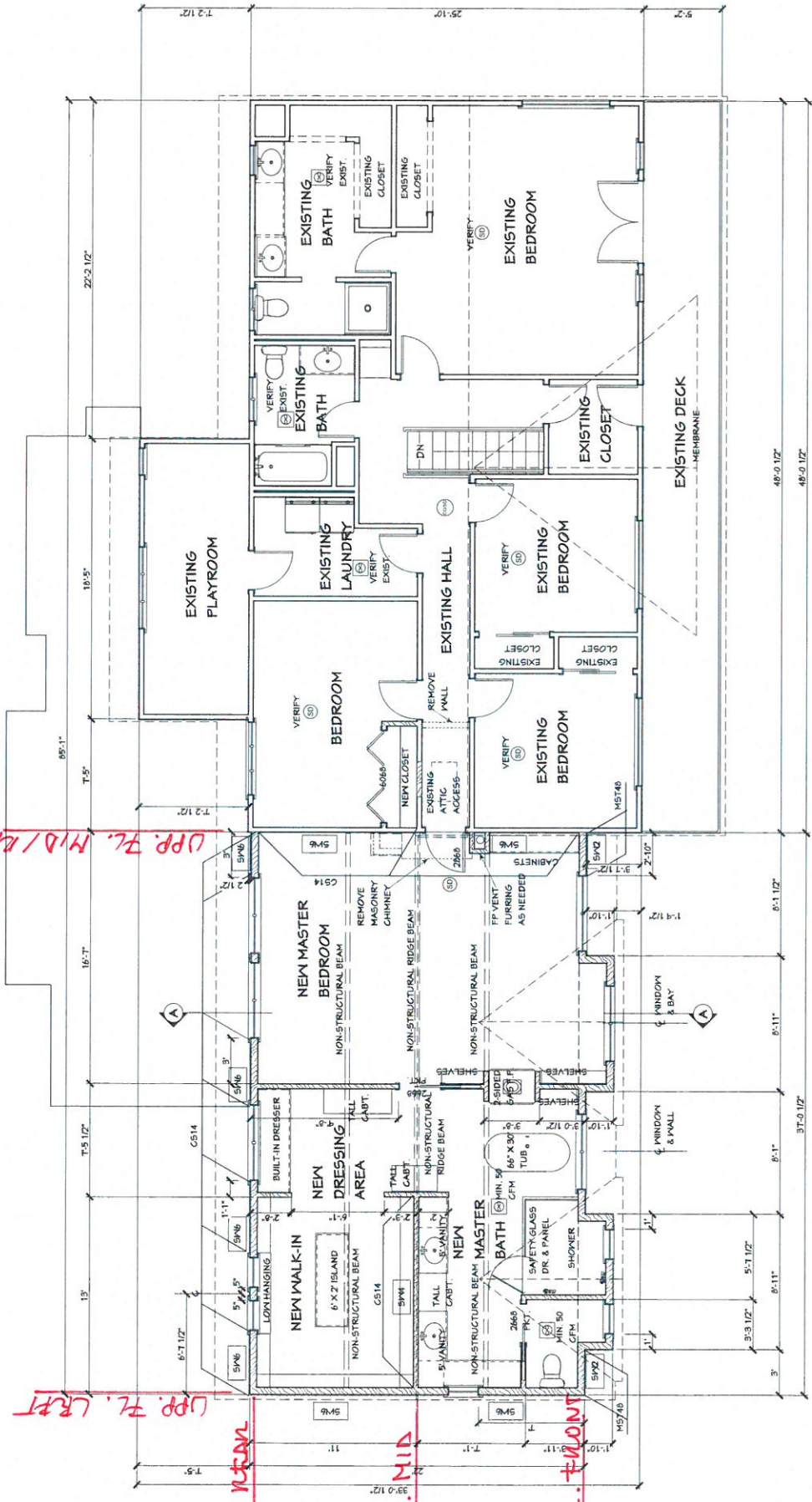
UPP. FL. MID / R. CH. T

UPP. FL. LEFT

UPP. FL. REAR

UPP. FL. MID

UPP. FL. FRONT



EXISTING

 REMOVED

 NEW

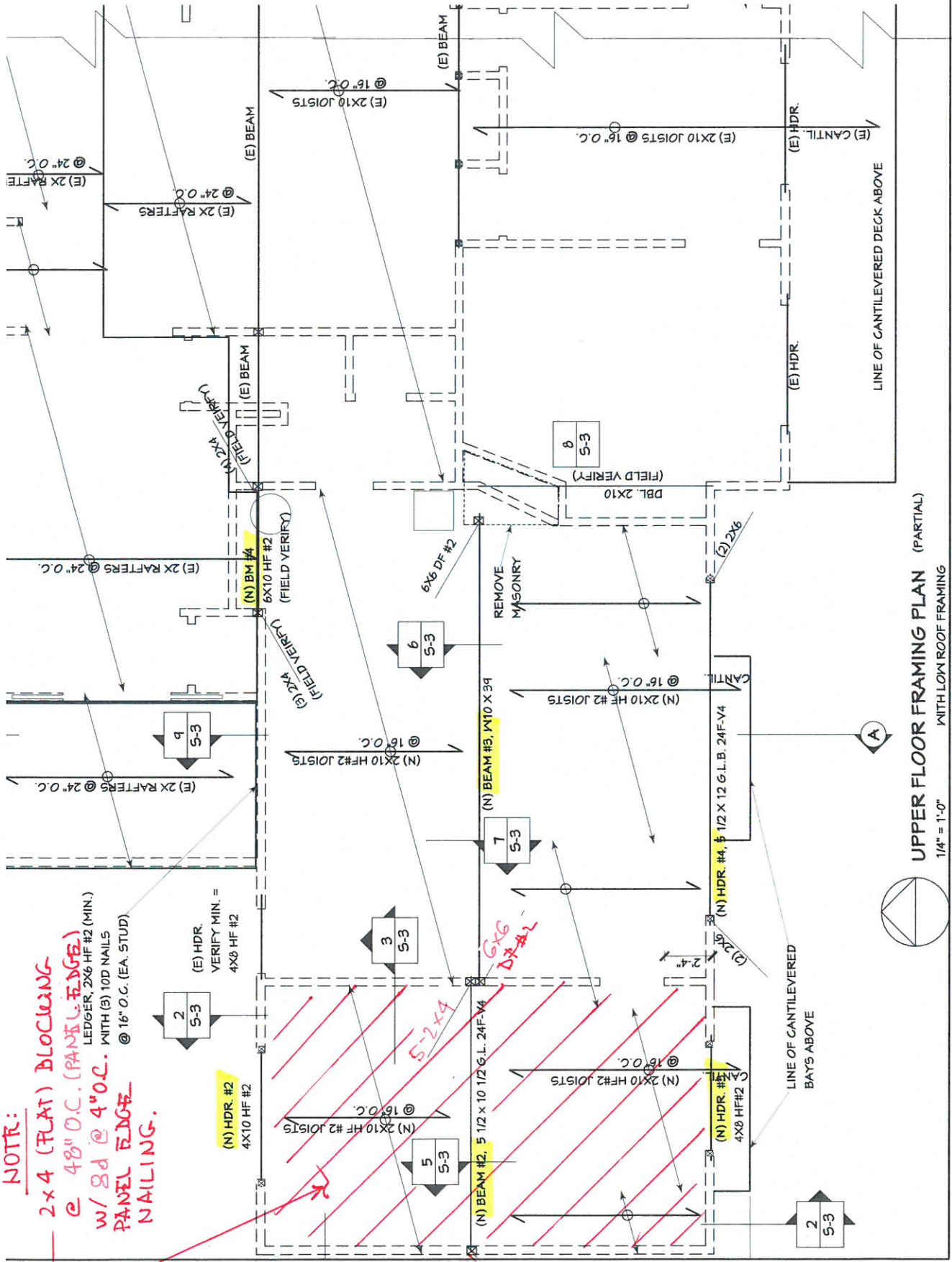
REVISED UPPER LEVEL

 1/4" = 1'-0"

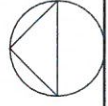
NOTE:

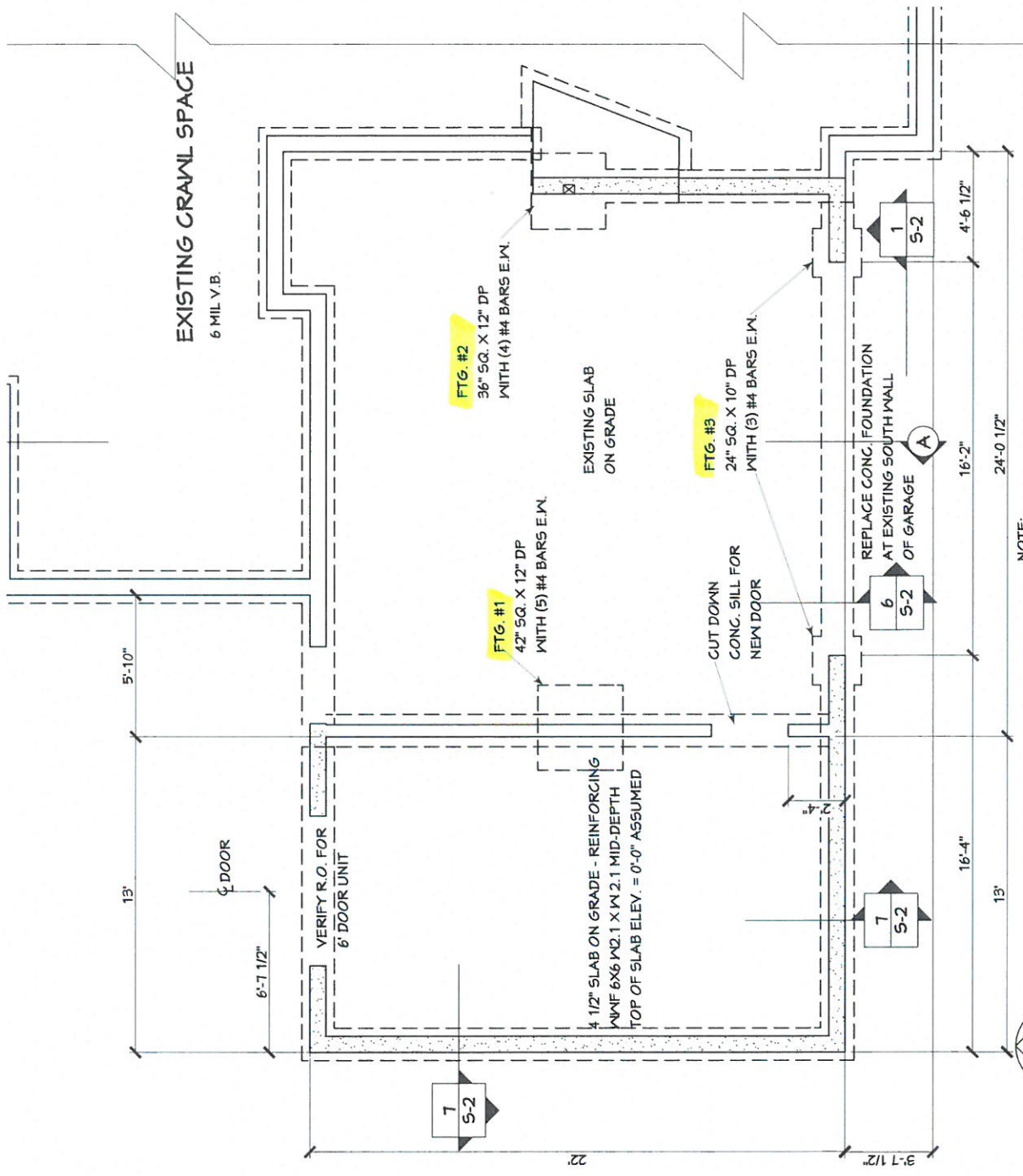
2x4 (FLAT) BLOCKING @ 48" O.C. (PANEL EDGE) w/ 8d @ 4" O.C. PANEL EDGE NAILING.

LEDGER, 2x6 HF #2 (MIN.) WITH (3) 10D NAILS @ 16" O.C. (EA. STUD)



UPPER FLOOR FRAMING PLAN (PARTIAL)
WITH LOW ROOF FRAMING
1/4" = 1'-0"



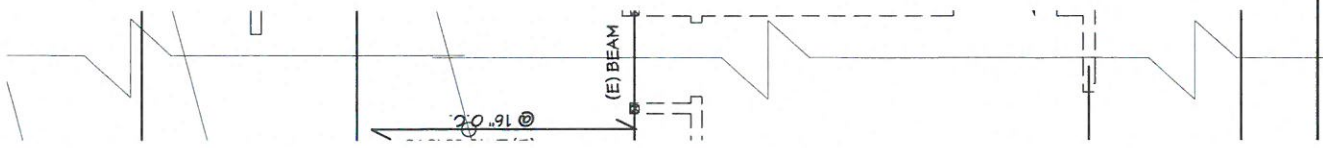
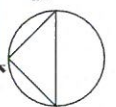


NOTE:

- 16" W. X 8" DP CONTINUOUS CONC. FOUNDATION WITH (2) #4 BARS, CONTINUOUS AT MID-DEPTH (TYP.)
- 8" W. X CONTINUOUS CONC. STEM WALL WITH #4 BARS @ 16" O.C. HORIZONTAL & VERTICAL (TYP.)

REVISD FOUNDATION PLAN (PARTIAL)
 1/4" = 1'-0"

EXISTING
 NEW



Type of construction:	Remodel/Addition
Applicable Building Codes:	IBC 2015, ASCE 7/SEI 7-10

Location:	9224 SE 60th St Mercer Island, WA 98040
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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 7-10
Wind Speed =	85 MPH	Basic Wind Speed (LRFD) as used in Figure 28.6 of ASCE 7-10 and converted to (ASD)
P_{s30} =		Simplified design wind pressure for Exposure B, at $h = 30$ feet and for $I = 1.0$, from Figure 28.6-1
I_w =	1	Importance factor as defined in Table 1.5-2 of ASCE 7-10
λ =	1.29	Adjustment factor for building height and exposure from Figure 28.6-1 of ASCE 7-10
K_{zt} =	1.00	Adjustment factor for increased wind speed due to a hill or escarpment from Section 26.8 of ASCE 7-10

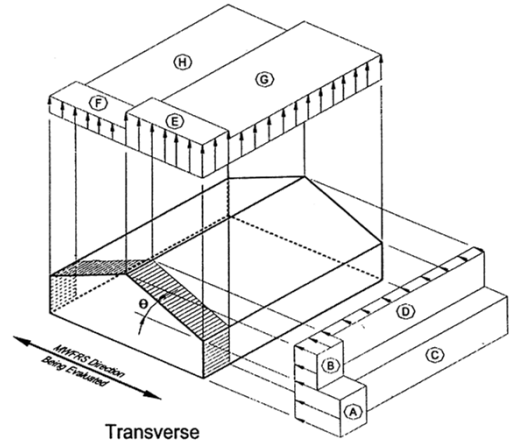
Roof slope :	rise	/	run	
Front/Rear	5	/	12) = 22.6 degrees
Left/Right	5	/	12) = 22.6 degrees
	20 ft		Mean Elevation	

Number of floors: 2

Average uplift (F/R) =	-9.1 psf	Based on wind zones 'G' and 'H'
Average uplift (R/L) =	-9.1 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 = 15.1 psf	15.1 psf	B = -0.8 psf	-0.8 psf
P_s =	19.5 psf	19.5 psf	-1.0 psf	-1.0 psf

	Interior zone of wall		Interior zone of roof	
	Front/Rear	Left/Right	Front/Rear	Left/Right
P_{s30} =	C = 10.5 psf	10.5 psf	D = 0.2 psf	0.2 psf
P_s =	13.5 psf	13.5 psf	0.2 psf	0.2 psf



WIND LOAD CALCULATIONS
FRONT → REAR

ΣV 2ND FLOOR =

WIND ZONE	B	D	A	C								
AVE. HEIGHT	6	6	4	4								
AVE. WIDTH	14	73	14	71								
P_s	0.00	0.21	19.46	13.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL	0	92	1090	3838	0	0	0	0	0	0	0	0
TOTAL	8,620 lbs		Minimum net pressure controls. The calc. pressure is less than the min. net pressure, equal to 16psf(A-C), and 8psf(B-D) applied over the entire area. (ASCE 7-10 28.6.4)									

ΣV 1ST FLOOR =

WIND ZONE	A	C										
AVE. HEIGHT	9	9										
AVE. WIDTH	14	71										
P_s	19.46	13.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL	2452	8635	0	0	0	0	0	0	0	0	0	0
TOTAL	11,087 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	A	C	D	A	C							
AVE. HEIGHT	6.5	6.5	5.5	4	4							
AVE. WIDTH	10	7	7.5	6	27							
Ps	19.46	13.51	0.21	19.46	13.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL	1265	615	9	467	1459	0	0	0	0	0	0	0
TOTAL	3,815 lbs											

ΣV 1ST FLOOR =

WIND ZONE	A	C	A									
AVE. HEIGHT	9	9	4.5									
AVE. WIDTH	6	27	8									
Ps	19.46	13.51	19.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUBTOTAL	1051	3284	701	0	0	0	0	0	0	0	0	0
TOTAL	5,035 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:	17.00 ft
Total length of Shearwall in Shortest Line:	5.83 ft
Length of Shortest Segment within Shear Line:	2.83 ft
Length of Longest Segment in Shear Line:	3.00 ft

Tributary Area:	1.0
Total Area:	2.0

$\rho = 1.00$
ASCE 7-10 12.3.4.2 a

MAIN FLOOR CALCULATIONS:

Plate Height:	8.00 ft
Total length of Shearwall in Shortest Line:	12.00 ft
Length of Shortest Shearwall within Shear Line:	4.00 ft
Length of Longest Wall in Shear Line:	4.00 ft

Tributary Area:	1.0
Total Area:	2.0

$\rho = 1.00$
ASCE 7-10 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

$\rho = NA$

All loads in pounds per square foot

SEISMIC DESIGN:

$E = E_h + E_v$

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

$Q_E = V = C_s W$

WALL DEAD LOAD =	10 psf
FLAT ROOF SNOW LOAD =	25 psf
RED. S.L. (20%*S.L.) =	0

ROOF DEAD LOAD =	15.0 psf
UPPER FLOOR D.L. =	15.0 psf
LOWER FLOOR D.L. =	15.0 psf
FLOOR LIVE LOAD =	40.0 psf

$\rho =$	1.00
Site Class =	D
$I_E =$	1
R =	6.5
$h_n =$	23

When the Site Class is not specified by Geotech, D will be assumed
Importance factor as defined in Table 11.5-1

Total height of structure

$V = 0.7S_{DS}I_E W / R$ $S_{DS} = 2/3 S_{MS}$
 $V_{max} = S_{D1}I_E W / T_g R$ $S_{MS} = (F_a)(S_s)$
 $T_g = 0.02h_n^{0.75}$ $S_{D1} = 2/3 S_{M1}$
 $T_g = 0.21 s$ $S_{M1} = (F_v)(S_1)$

$S_s =$	145.3%	$S_{MS} =$	145.3%
$F_a =$	1.00	$S_{DS} =$	96.9%
$S_1 =$	50.4%	$S_{M1} =$	75.6%
$F_v =$	1.50	$S_{D1} =$	50.4%

V =	0.104	W
E =	0.104	W
Cs =	0.104	

2ND FLOOR DIAPHRAGM LOADING:

W (ROOF) =

LENGTH	WIDTH	LOAD	TOTAL
50	33	15.0	24750
37	28	15.0	15540
		15.0	0
		15.0	0
		15.0	0

Area = 2686 Sub-Total= 40290

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
170	4	10.0	6800
75	4	10.0	3000
		10.0	0
		10.0	0
		10.0	0

Area = 980 Sub-Total= 9800

TOTAL = 50090 lb

1ST FLOOR DIAPHRAGM LOADING:

W (ROOF) =

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 (FLOOR) =

LENGTH	WIDTH	LOAD	TOTAL
85	25	15.0	31875
		15.0	0
		15.0	0
		15.0	0
		15.0	0

Area = 2125 Sub-Total= 31875

W (WALL) =

LENGTH	TRIB. HT.	LOAD	TOTAL
170	8	10.0	13600
75	4	10.0	3000
		10.0	0
		10.0	0
		10.0	0

Area = 1660 Sub-Total= 16600

TOTAL = 48475 lb

NOT APPLICABLE

W (ROOF) =

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 (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) = .104 x 50090 lb = 5225 lbs
 V (1ST FLOOR) = .104 x 48475 lb = 5057 lbs
 V () = .104 x lb = lbs

REDISTRIBUTE:

$\Sigma V \times \rho$	height	$\Sigma V \times \text{height}$
5225 lb	17	88830
5057 lb	8	40455
lb		0

TOTAL = 10282 lb TOTAL = 129284

E (2ND) = $\frac{\Sigma V \times \text{height} \times \Sigma V \text{ TOTAL}}{\Sigma V \times \text{height TOTAL}}$ = 7065 lbs

E (1ST) = $\frac{\Sigma V \times \text{height} \times \Sigma V \text{ TOTAL}}{\Sigma V \times \text{height TOTAL}}$ = 3217 lbs

E () = NOT USED = 0 lbs

SUMMARY:

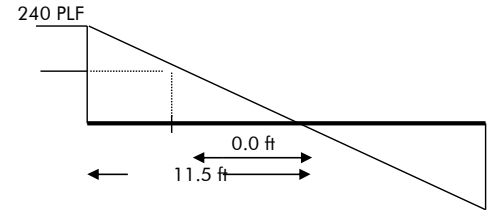
	WIND (front-rear)	WIND (left-right)	SEISMIC
ΣV (2ND) =	8620 lbs	3815 lbs	7065 lbs
ΣV (MAIN) =	11087 lbs	5035 lbs	3217 lbs
NOT APPLICABLE	0 lbs	0 lbs	0 lbs
TOTAL =	19707 lbs	8850 lbs	10282 lbs

DIAPHRAGM SHEAR:

Total diaphragm length = 85.0 ft Sub-diaphragm length = 37.0 ft
 Diaphragm width = 23.0 ft ΣV (MAIN) = 11,087 lbs

$$v = \frac{\Sigma V(2nd)}{(2)(width)} = \frac{4826 \text{ lb}}{46 \text{ ft}} = 105 \text{ PLF}$$

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 = 37.0 ft Total-diaphragm length = 85.0 ft
 Sub-diaphragm width = 23.0 ft

$$T = \frac{M}{B} = \frac{\Sigma V \times (\text{diaphragm length})}{8 \times (\text{diaphragm width})} = \frac{4826 \times 37 \text{ ft}}{8 \times 23 \text{ ft}} = 971 \text{ lbs}$$

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

Area = 8.25 in² $F_t = 525 \text{ psi}$
 Load duration (C_D) = 1.33 $T_{\text{allowable}} = \text{Area} \times C_D \times F_t = 5,761 \text{ lbs}$

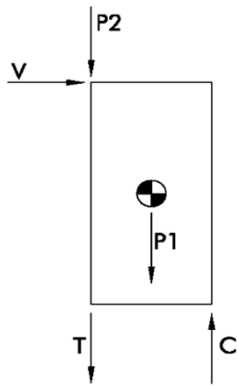
Since T allowable is greater than T applied, OK.

SHEAR CAPACITY OF 10d COMMON NAIL = 102 lbs $102 \times C_d \times p = 136 \text{ lbs}$ 2015 NDS

OF NAILS PER 4 FT SPLICE = $\frac{971 \text{ lbs}}{136 \text{ lbs}} = 7$

USE 2x6 HF #2 TOP PLATE W/ (8) 10d COMMON NAILS PER SPLICE.

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 7-10 2.4.1

Tension Equations (Uplift)

7. $0.6D + W$

8. $(0.6 - 0.14S_{Ds})D + E$ \longrightarrow $0.46 D + E$

*8. $(0.6 - 0.14S_{Ds})D + 2.5 E$ \longrightarrow $0.46 D + 2.5 E$

Compression Equations

5. $D + W$

5. $(1 + 0.14S_{Ds})D + E$ \longrightarrow $1.14 D + E$

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

6. $(1.0 + 0.105S_{Ds})D + 0.75E + 0.75L + 0.75S$ \longrightarrow $1.10 D + 0.75 E + 0.75 L + 0.75 S$

*5. $(1 + 0.14S_{Ds})D + 2.5E$ \longrightarrow $1.14 D + 2.5 E$

*6. $(1.0 + 0.105S_{Ds})D + 1.875E + 0.75L + 0.75S$ \longrightarrow $1.10 D + 1.875 E + 0.75 L + 0.75 S$

* 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 FLOOR REAR

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)

15.50 ft Total Length of Shearwalls

V(from upper)= 3815 lb 7065 lb
 V(from main)= 0 lb 0 lb
 V(from lower)= 0 lb 0 lb
 Σ (Wind) = 3,815 lb Σ (Smc) = 7,065 lb
 v = 59 PLF v = 109 PLF

Tributary Width (Upper Floor)
5.5 tributary width
23.0 total width
 Tributary Width (Main Floor)
1.0 tributary width
2.0 total width
 Not Used
1.0 tributary width
2.0 total width

Tributary Area (Upper Floor)
5.5 tributary area
23.0 total area
 Tributary Area (Main Floor)
1.0 tributary area
2.0 total area
 Not Used
1.0 tributary area
2.0 total area

Height of Shearwall = **8.0 ft**
 Length of Shearwall = **3.0 ft**

Weight of Shearwall = **10.0 lbs**
 Tributary width for dead load = **11.0 ft**
 Length of adjoining wall = **1.5 ft**

Aspect Ratio OK

Use alternate R factor for seismic? **No**

SDPWS, Table 4.3A → (2w/h) x 0.93 x 260 = 181 PLF

USE **SW6**

Seismic controls shearwall design

C_{TOTAL} = (floor above) + (this floor) = **610 lbs**
 T_{TOTAL} = (floor above) + (this floor) = **531 lbs**

Seismic controls
 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 = 872 lbs**

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

UPPER FLOOR MID

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)

12.00 ft Total Length of Shearwalls

V(from upper)= 3815 lb 7065 lb
 V(from main)= 0 lb 0 lb
 V(from lower)= 0 lb 0 lb
 Σ (Wind) = 3,815 lb Σ (Smc) = 7,065 lb
 v = 159 PLF v = 294 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

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

Height of Shearwall = **8.0 ft**
 Length of Shearwall = **12.0 ft**

Weight of Shearwall = **10.0 lbs**
 Tributary width for dead load = **0.0 ft**
 Length of adjoining wall = **1.0 ft**

Aspect Ratio OK

Use alternate R factor for seismic? **No**

SDPWS, Table 4.3A → 0.93 x 380 = 353 PLF

USE **SW4**

Seismic controls shearwall design

C_{TOTAL} = (floor above) + (this floor) = **1648 lbs**
 T_{TOTAL} = (floor above) + (this floor) = **2095 lbs**

Seismic controls
 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 = 2355 lbs**

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

UPPER FLOOR FRONT

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)

5.38 ft Total Length of Shearwalls

V(from upper)= 3815 lb 7065 lb
 V(from main)= 0 lb 0 lb
 V(from lower)= 0 lb 0 lb
 Σ (Wind) = 3,815 lb Σ (Smc) = 7,065 lb
 v = 200 PLF v = 371 PLF

Tributary Width (Upper Floor)
6.5 tributary width
23.0 total width
 Tributary Width (Main Floor)
1.0 tributary width
2.0 total width
 Not Used
1.0 tributary width
2.0 total width

Tributary Area (Upper Floor)
6.5 tributary area
23.0 total area
 Tributary Area (Main Floor)
1.0 tributary area
2.0 total area
 Not Used
1.0 tributary area
2.0 total area

Height of Shearwall = **8.0 ft**
 Length of Shearwall = **2.8 ft**

Weight of Shearwall = **10.0 lbs**
 Tributary width for dead load = **11.0 ft**
 Length of adjoining wall = **1.5 ft**

Aspect Ratio OK

Use alternate R factor for seismic? **No**

SDPWS, Table 4.3A → (2w/h) x 0.93 x 595 = 391 PLF

USE **SW2**

Seismic controls shearwall design

C_{TOTAL} = (floor above) + (this floor) = **2078 lbs**
 T_{TOTAL} = (floor above) + (this floor) = **2637 lbs**

Seismic controls
 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 = 2969 lbs**

USE SIMPSON DESIGNED HOLDOWN: **MST48**
 OR AT FOUNDATION / INTERIOR WALLS USE: **STHD10/RJ**

HDU4

UPPER FLOOR LEFT

SHEARWALL

WIND

SEISMIC

Floor Info
Upper Floor Level, e.g. Upper, Main, Lower
Fl-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)
19.50 ft Total Length of Shearwalls
 $V(\text{from upper}) = 8620 \text{ lb}$ 7065 lb
 $V(\text{from main}) = 0 \text{ lb}$ 0 lb
 $V(\text{from lower}) = 0 \text{ lb}$ 0 lb
 $\Sigma (\text{Wind}) = 8,620 \text{ lb}$ $\Sigma (\text{Smc}) = 7,065 \text{ lb}$
 $v = 99 \text{ PLF}$ $v = 81 \text{ PLF}$

Tributary Width (Upper Floor)
19.0 tributary width
85.0 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 = **6.5 ft**
 Aspect Ratio OK
 Use alternate R factor for seismic? **No**

Tributary Area (Upper Floor)
19.0 tributary area
85.0 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 = **1.3 ft**
 Length of adjoining wall = **3.0 ft**

SDPWS, Table 4.3A → 0.93 x 260 = 242 PLF

USE **SW6**

$C_{TOTAL} =$ (floor above) + (this floor) = **790 lbs** = 790 lbs Wind controls
 $T_{TOTAL} =$ (floor above) + (this floor) = **461 lbs** = 461 lbs Load case 8 controls - Wind

Seismic controls holddown design

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: **E = 648 lbs**

NO HOLDOWNS REQUIRED **OK**

UPPER FLOOR MID/RIGHT

SHEARWALL

WIND

SEISMIC

Floor Info
Upper Floor Level, e.g. Upper, Main, Lower
Fl-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)
18.00 ft Total Length of Shearwalls
 $V(\text{from upper}) = 8620 \text{ lb}$ 7065 lb
 $V(\text{from main}) = 0 \text{ lb}$ 0 lb
 $V(\text{from lower}) = 0 \text{ lb}$ 0 lb
 $\Sigma (\text{Wind}) = 8,620 \text{ lb}$ $\Sigma (\text{Smc}) = 7,065 \text{ lb}$
 $v = 239 \text{ PLF}$ $v = 196 \text{ PLF}$

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 = **7.5 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 = **2.0 ft**
 Length of adjoining wall = **1.0 ft**

SDPWS, Table 4.3A → 0.93 x 260 = 242 PLF

USE **SW6**

$C_{TOTAL} =$ (floor above) + (this floor) = **1916 lbs** = 1916 lbs Wind controls
 $T_{TOTAL} =$ (floor above) + (this floor) = **1602 lbs** = 1602 lbs Load case 8 controls - Wind

Wind controls holddown design

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: **E = 1570 lbs**

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

MAIN FLOOR REAR

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)
21.00 ft Total Length of Shearwalls
 $V(\text{from upper}) = 3815 \text{ lb}$ 7065 lb
 $V(\text{from main}) = 5035 \text{ lb}$ 3217 lb
 $V(\text{from lower}) = 0 \text{ lb}$ 0 lb
 $\Sigma (\text{Wind}) = 8,850 \text{ lb}$ $\Sigma (\text{Smc}) = 10,282 \text{ lb}$
 $v = 163 \text{ PLF}$ $v = 157 \text{ PLF}$

Tributary Width (Upper Floor)
5.5 tributary width
23.0 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 = **3.5 ft**
 Aspect Ratio OK
 Use alternate R factor for seismic? **No**

Tributary Area (Upper Floor)
5.5 tributary area
23.0 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 = **5.0 ft**
 Length of adjoining wall = **1.5 ft**

SDPWS, Table 4.3A → (2w/h) x 0.93 x 260 = 212 PLF

USE **SW6**

$C_{TOTAL} =$ (floor above) + (this floor) = **610** + 1307 lbs = 1917 lbs Wind controls
 $T_{TOTAL} =$ (floor above) + (this floor) = **531** + 1022 lbs = 1553 lbs Load case 8 controls - Seismic

Seismic controls holddown design

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: **E = 1256 lbs**

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

MAIN FLOOR FRONT

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)
14.50 ft	Total Length of Shearwalls
V(from upper)= 3815 lb	7065 lb
V(from main)= 5035 lb	3217 lb
V(from lower)= 0 lb	0 lb
Σ (Wind) = 8,850 lb	Σ (Smc) = 10,282 lb
v = 248 PLF	v = 249 PLF

Tributary Width (Upper Floor)	
6.5	tributary width
23.0	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 = 3.0 ft	
Aspect Ratio OK	
Use alternate R factor for seismic? No	

Tributary Area (Upper Floor)	
6.5	tributary area
23.0	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 = 5.5 ft	
Length of adjoining wall = 2.0 ft	

SDPWS, Table 4.3A → (2w/h) x 0.93 x 380 = 265 PLF

USE **SW4**

Seismic controls shearwall design

C _{TOTAL} =	(floor above) + (this floor) =	2078	+	1984 lbs	=	4062 lbs	Wind controls
T _{TOTAL} =	(floor above) + (this floor) =	2637	+	1725 lbs	=	4362 lbs	Load case 8 controls - Seismic

Wind controls holdown design

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: E = 1989 lbs

USE SIMPSON DESIGNED HOLDOWN: **MST60**
OR AT FOUNDATION / INTERIOR WALLS USE: **HDU8-SDS2.5**

MAIN FLOOR LEFT

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)
22.00 ft	Total Length of Shearwalls
V(from upper)= 8620 lb	7065 lb
V(from main)= 11087 lb	3217 lb
V(from lower)= 0 lb	0 lb
Σ (Wind) = 19,707 lb	Σ (Smc) = 10,282 lb
v = 200 PLF	v = 104 PLF

Tributary Width (Upper Floor)	
19.0	tributary width
85.0	total width
Tributary Width (Main Floor)	
19.0	tributary width
85.0	total width
Not Used	
1.0	tributary width
2.0	total width
Height of Shearwall = 8.0 ft	
Length of Shearwall = 22.0 ft	
Aspect Ratio OK	
Use alternate R factor for seismic? No	

Tributary Area (Upper Floor)	
19.0	tributary area
85.0	total area
Tributary Area (Main Floor)	
19.0	tributary area
85.0	total area
Not Used	
1.0	tributary area
2.0	total area
Weight of Shearwall = 10.0 lbs	
Tributary width for dead load = 0.0 ft	
Length of adjoining wall = 2.0 ft	

SDPWS, Table 4.3A → 1.4 x 0.93 x 260 = 339 PLF

USE **SW6**

Wind controls shearwall design

C _{TOTAL} =	(floor above) + (this floor) =	790	+	1602 lbs	=	2392 lbs	Wind controls
T _{TOTAL} =	(floor above) + (this floor) =	461	+	978 lbs	=	1439 lbs	Load case 8 controls - Wind

Wind controls holdown design

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: E = 836 lbs

USE SIMPSON DESIGNED HOLDOWN: **CS14**
OR AT FOUNDATION / INTERIOR WALLS USE: **LSTD8/RJ**

MAIN FLOOR MID AT GARAGE

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)
16.00 ft	Total Length of Shearwalls
V(from upper)= 8620 lb	7065 lb
V(from main)= 11087 lb	3217 lb
V(from lower)= 0 lb	0 lb
Σ (Wind) = 19,707 lb	Σ (Smc) = 10,282 lb
v = 163 PLF	v = 47 PLF

Tributary Width (Upper Floor)	
0.0	tributary width
2.0	total width
Tributary Width (Main Floor)	
20.0	tributary width
85.0	total width
Not Used	
1.0	tributary width
2.0	total width
Height of Shearwall = 8.0 ft	
Length of Shearwall = 16.0 ft	
Aspect Ratio OK	
Use alternate R factor for seismic? No	

Tributary Area (Upper Floor)	
0.0	tributary area
2.0	total area
Tributary Area (Main Floor)	
20.0	tributary area
85.0	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 → 1.4 x 0.93 x 260 = 339 PLF

USE **SW6**

Wind controls shearwall design

C _{TOTAL} =	(floor above) + (this floor) =		+	1304 lbs	=	1304 lbs	Wind controls
T _{TOTAL} =	(floor above) + (this floor) =		+	791 lbs	=	791 lbs	Load case 8 controls - Wind

Wind controls holdown design

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: E = 379 lbs

USE SIMPSON DESIGNED HOLDOWN: **CS14**
OR AT FOUNDATION / INTERIOR WALLS USE: **LSTD8/RJ**

MAIN FLOOR MID/RIGHT AT HOUSE

SHEARWALL

WIND

SEISMIC

Floor Info

Main	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)
12.00 ft	Total Length of Shearwalls

V(from upper)=	8620 lb	7065 lb
V(from main)=	11087 lb	3217 lb
V(from lower)=	0 lb	0 lb
Σ (Wind) =	19,707 lb	Σ (Smc) = 10,282 lb
v =	750 PLF	v = 408 PLF

3x framing required per IBC

SDPWS, Table 4.3A → 1.4 x 0.93 x 595 = 775 PLF

C _{TOTAL} =	(floor above) + (this floor) =		+	6004 lbs	=	6004 lbs
T _{TOTAL} =	(floor above) + (this floor) =		+	5496 lbs	=	5496 lbs

Tributary Width (Upper Floor)	
1.0	tributary width
2.0	total width
Tributary Width (Main Floor)	
36.0	tributary width
85.0	total width
Not Used	
1.0	tributary width
2.0	total width

Height of Shearwall =	8.0 ft
Length of Shearwall =	12.0 ft

Use alternate R factor for seismic? **No**

Tributary Area (Upper Floor)	
1.0	tributary area
2.0	total area
Tributary Area (Main Floor)	
36.0	tributary area
85.0	total area
Not Used	
1.0	tributary area
2.0	total area

Weight of Shearwall =	10.0 lbs
Tributary width for dead load =	1.3 ft
Length of adjoining wall =	2.5 ft

USE **SW2**

Wind controls shearwall design

Seismic controls holdown design

USE SIMPSON DESIGNED HOLDOWN:

OR AT FOUNDATION / INTERIOR WALLS USE:

MST72

HDU8-SDS2.5

Where overstrength factor is applicable, use this value for E in equations 5, 6, and 8: E = 3263 lbs

Wood Beam

Lic. # : KW-06009431

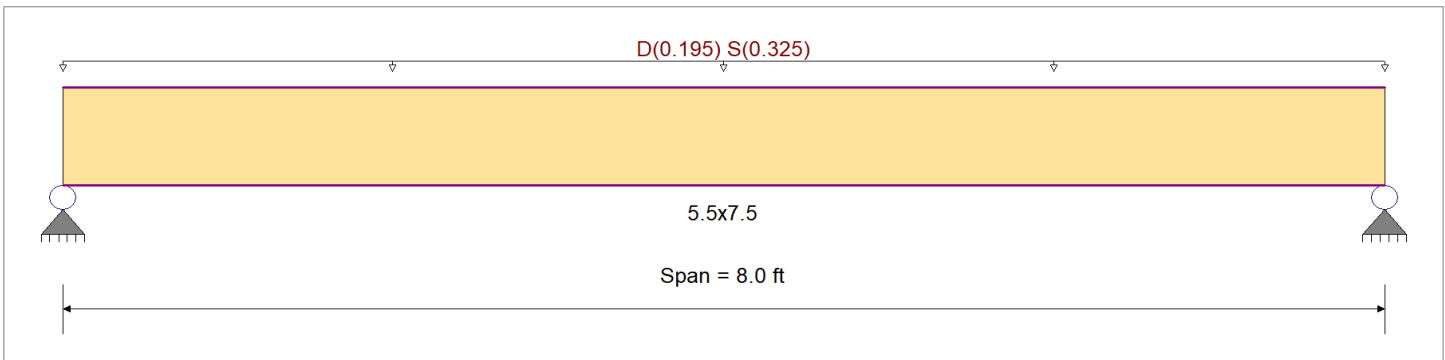
DESCRIPTIO BM#1

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 +	2,400.0 psi	E : Modulus of Elasti	
Load Combination	ASCE 7-16	Fb -	1,850.0 psi	Ebend- xx	1,800.0ksi
Wood Species	DF/DF	Fc - Prll	1,650.0 psi	Eminbend - x	950.0ksi
Wood Grade	24F - V4	Fc - Perp	650.0 psi	Ebend- yy	1,600.0ksi
		Fv	265.0 psi	Eminbend - y	850.0ksi
		Ft	1,100.0 psi	Density	31.210pcf
Beam Bracing	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 13.0 ft, (ROOF)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.351 : 1	Maximum Shear Stress Ratio	=	0.210 : 1
Section used for this span	=	5.5x7.5	Section used for this span	=	5.5x7.5
	=	968.15psi		=	64.04 psi
	=	2,760.00psi		=	304.75 psi
Load Combination	=	+D+S+H	Load Combination	=	+D+S+H
Location of maximum on span	=	4.000ft	Location of maximum on span	=	7.387 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection		0.087 in	Ratio =	1109	>=360
Max Upward Transient Deflection		0.000 in	Ratio =	0	<360
Max Downward Total Deflection		0.138 in	Ratio =	693	>=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+H	Length = 8.0 ft	1	0.168	0.101	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.56	363.05	2160.00	0.00	0.00	0.00	0.00	0.00
+D+L+H	Length = 8.0 ft	1	0.151	0.091	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.56	363.05	2400.00	0.00	0.00	0.00	0.00	0.00
+D+Lr+H	Length = 8.0 ft	1	0.121	0.073	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.56	363.05	3000.00	0.00	0.00	0.00	0.00	0.00
+D+S+H	Length = 8.0 ft	1	0.351	0.210	1.15	1.000	1.00	1.00	1.00	1.00	1.00	4.16	968.15	2760.00	1.76	64.04	304.75	0.00	0.00
+D+0.750Lr+0.750L+H	Length = 8.0 ft	1	0.121	0.073	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.56	363.05	3000.00	0.00	0.00	0.00	0.00	0.00
+D+0.750L+0.750S+H	Length = 8.0 ft	1	0.296	0.177	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.51	816.87	2760.00	1.49	54.04	304.75	0.00	0.00
+D+0.60W+H	Length = 8.0 ft	1	0.095	0.057	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.56	363.05	3840.00	0.00	0.00	0.00	0.00	0.00

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Printed: 13 MAR 2020, 5:09PM

Wood Beam

File = C:\Users\pasko\Desktop\Holt Residence Gravity.ec6 .
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CK Engineering LLC

DESCRIPTIO BM#1

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+0.750Lr+0.750L+0.450W-	Length = 8.0 ft	1	0.095	0.057	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.56	363.05	3840.00	0.00	0.00	0.00	0.66	24.02	424.00
+D+0.750L+0.750S+0.450W+	Length = 8.0 ft	1	0.213	0.127	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3.51	816.87	3840.00	0.00	0.00	0.00	1.49	54.04	424.00
+0.60D+0.60W+0.60H	Length = 8.0 ft	1	0.057	0.034	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	217.83	3840.00	0.00	0.00	0.00	0.40	14.41	424.00
+D+0.70E+0.60H	Length = 8.0 ft	1	0.095	0.057	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.56	363.05	3840.00	0.00	0.00	0.00	0.66	24.02	424.00
+D+0.750L+0.750S+0.5250E-	Length = 8.0 ft	1	0.213	0.127	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3.51	816.87	3840.00	0.00	0.00	0.00	1.49	54.04	424.00
+0.60D+0.70E+H	Length = 8.0 ft	1	0.057	0.034	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	217.83	3840.00	0.00	0.00	0.00	0.40	14.41	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.1385	4.029		0.0000	0.000

Vertical Reactions

Load Combination	Support notation : Far left is #'		Values in KIPS	
	Support 1	Support 2		
Overall MAXimum	2.080	2.080		
Overall MINimum	1.300	1.300		
+D+H	0.780	0.780		
+D+L+H	0.780	0.780		
+D+Lr+H	0.780	0.780		
+D+S+H	2.080	2.080		
+D+0.750Lr+0.750L+H	0.780	0.780		
+D+0.750L+0.750S+H	1.755	1.755		
+D+0.60W+H	0.780	0.780		
+D+0.750Lr+0.750L+0.450W+H	0.780	0.780		
+D+0.750L+0.750S+0.450W+H	1.755	1.755		
+0.60D+0.60W+0.60H	0.468	0.468		
+D+0.70E+0.60H	0.780	0.780		
+D+0.750L+0.750S+0.5250E+H	1.755	1.755		
+0.60D+0.70E+H	0.468	0.468		
D Only	0.780	0.780		
Lr Only				
L Only				
S Only	1.300	1.300		
W Only				
E Only				
H Only				

Wood Beam

Lic. # : KW-06009431

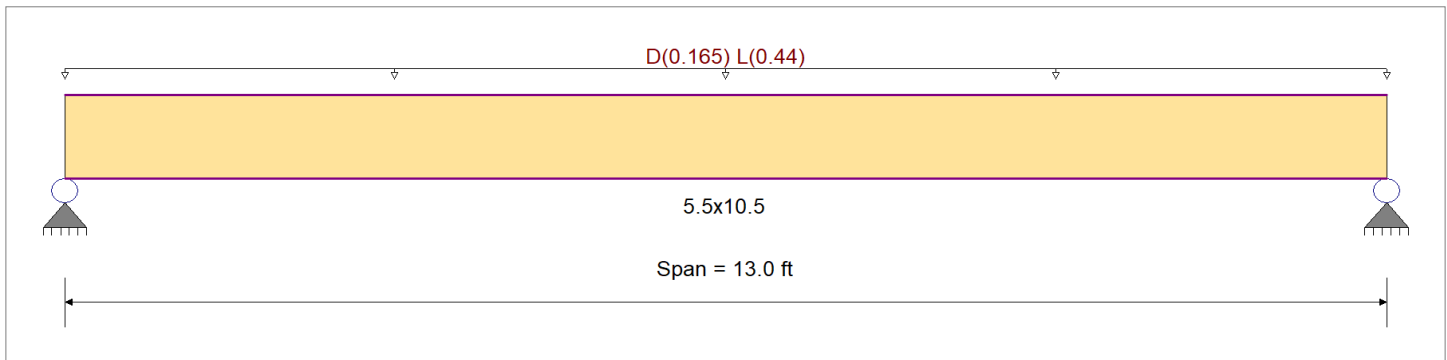
DESCRIPTIO BM#2

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 +	2,400.0 psi	E : Modulus of Elasti	
Load Combination	ASCE 7-16	Fb -	1,850.0 psi	Ebend- xx	1,800.0ksi
Wood Species	DF/DF	Fc - Prll	1,650.0 psi	Eminbend - x	950.0ksi
Wood Grade	24F - V4	Fc - Perp	650.0 psi	Ebend- yy	1,600.0ksi
		Fv	265.0 psi	Eminbend - y	850.0ksi
		Ft	1,100.0 psi	Density	31.210pcf
Beam Bracing	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 11.0 ft, (FLOOR)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.632 1	Maximum Shear Stress Ratio	=	0.335 : 1
Section used for this span	=	5.5x10.5	Section used for this span	=	5.5x10.5
	=	1,517.55psi		=	88.72 psi
	=	2,400.00psi		=	265.00 psi
Load Combination	=	+D+L+H	Load Combination	=	+D+L+H
Location of maximum on span	=	6.500ft	Location of maximum on span	=	12.146 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection		0.298 in	Ratio =	523 >=360	
Max Upward Transient Deflection		0.000 in	Ratio =	0 <360	
Max Downward Total Deflection		0.409 in	Ratio =	380 >=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+H	Length = 13.0 ft	1	0.192	0.101	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3.49	413.88	2160.00	0.00	0.00	0.00	0.00
+D+L+H	Length = 13.0 ft	1	0.632	0.335	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12.78	1,517.55	2400.00	0.00	0.00	0.00	0.00
+D+Lr+H	Length = 13.0 ft	1	0.138	0.073	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3.49	413.88	3000.00	0.00	0.00	0.00	0.00
+D+S+H	Length = 13.0 ft	1	0.150	0.079	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3.49	413.88	2760.00	0.00	0.00	0.00	0.00
+D+0.750Lr+0.750L+H	Length = 13.0 ft	1	0.414	0.219	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	10.46	1,241.63	3000.00	0.00	0.00	0.00	0.00
+D+0.750L+0.750S+H	Length = 13.0 ft	1	0.450	0.238	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	10.46	1,241.63	2760.00	0.00	0.00	0.00	0.00
+D+0.60W+H	Length = 13.0 ft	1	0.108	0.057	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3.49	413.88	3840.00	0.00	0.00	0.00	0.00

Project Title:
 Engineer:
 Project ID:
 Project Descr:

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Wood Beam

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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						
+D+0.750Lr+0.750L+0.450W-	Length = 13.0 ft	1	0.323	0.171	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	10.46	1,241.63	3840.00	0.00	0.00	0.00	2.79	72.59	424.00
+D+0.750L+0.750S+0.450W+	Length = 13.0 ft	1	0.323	0.171	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	10.46	1,241.63	3840.00	0.00	0.00	0.00	2.79	72.59	424.00	
+0.60D+0.60W+0.60H	Length = 13.0 ft	1	0.065	0.034	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.09	248.33	3840.00	0.00	0.00	0.00	0.56	14.52	424.00	
+D+0.70E+0.60H	Length = 13.0 ft	1	0.108	0.057	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3.49	413.88	3840.00	0.00	0.00	0.00	0.93	24.20	424.00	
+D+0.750L+0.750S+0.5250E-	Length = 13.0 ft	1	0.323	0.171	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	10.46	1,241.63	3840.00	0.00	0.00	0.00	2.79	72.59	424.00	
+0.60D+0.70E+H	Length = 13.0 ft	1	0.065	0.034	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.09	248.33	3840.00	0.00	0.00	0.00	0.56	14.52	424.00	

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.4095	6.547		0.0000	0.000

Vertical Reactions

Load Combination	Support notation : Far left is #'		Values in KIPS	
	Support 1	Support 2		
Overall MAXimum	3.933	3.933		
Overall MINimum	2.860	2.860		
+D+H	1.073	1.073		
+D+L+H	3.933	3.933		
+D+Lr+H	1.073	1.073		
+D+S+H	1.073	1.073		
+D+0.750Lr+0.750L+H	3.218	3.218		
+D+0.750L+0.750S+H	3.218	3.218		
+D+0.60W+H	1.073	1.073		
+D+0.750Lr+0.750L+0.450W+H	3.218	3.218		
+D+0.750L+0.750S+0.450W+H	3.218	3.218		
+0.60D+0.60W+0.60H	0.644	0.644		
+D+0.70E+0.60H	1.073	1.073		
+D+0.750L+0.750S+0.5250E+H	3.218	3.218		
+0.60D+0.70E+H	0.644	0.644		
D Only	1.073	1.073		
Lr Only				
L Only	2.860	2.860		
S Only				
W Only				
E Only				
H Only				

Steel Beam

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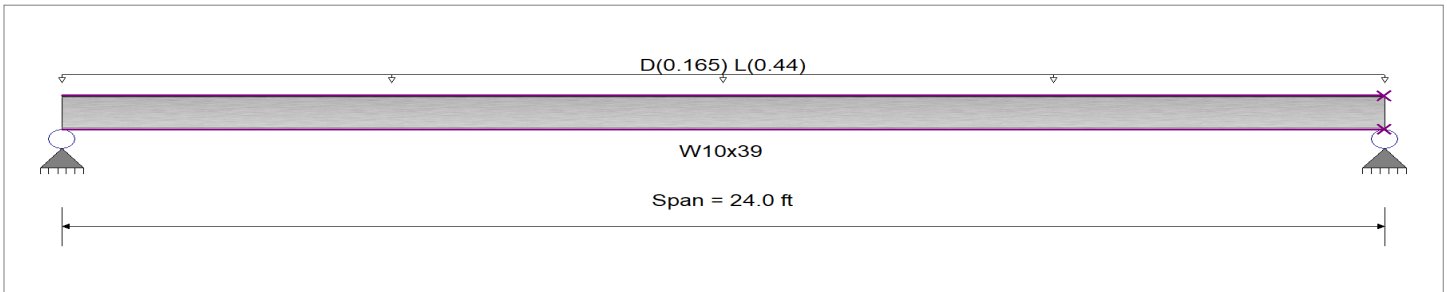
DESCRIPTIO BM#3

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 NOT internally calculated and added
 Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 11.0 ft, (FLOOR)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.373 : 1	Maximum Shear Stress Ratio =	0.116 : 1
Section used for this span	W10x39	Section used for this span	W10x39
Ma : Applied	43.560 k-ft	Va : Applied	7.260 k
Mn / Omega : Allowable	116.766 k-ft	Vn/Omega : Allowable	62.496 k
Load Combination	+D+L+H	Load Combination	+D+L+H
Location of maximum on span	12.000ft	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	0.544 in	Ratio =	529 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.749 in	Ratio =	385 >=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+H	Dsgn. L = 24.00 ft	1	0.102	0.032	11.88		11.88	195.00	116.77	1.00	1.00	1.98	93.74	62.50
+D+L+H	Dsgn. L = 24.00 ft	1	0.373	0.116	43.56		43.56	195.00	116.77	1.00	1.00	7.26	93.74	62.50
+D+Lr+H	Dsgn. L = 24.00 ft	1	0.102	0.032	11.88		11.88	195.00	116.77	1.00	1.00	1.98	93.74	62.50
+D+S+H	Dsgn. L = 24.00 ft	1	0.102	0.032	11.88		11.88	195.00	116.77	1.00	1.00	1.98	93.74	62.50
+D+0.750Lr+0.750L+H	Dsgn. L = 24.00 ft	1	0.305	0.095	35.64		35.64	195.00	116.77	1.00	1.00	5.94	93.74	62.50
+D+0.750L+0.750S+H	Dsgn. L = 24.00 ft	1	0.305	0.095	35.64		35.64	195.00	116.77	1.00	1.00	5.94	93.74	62.50
+D+0.60W+H	Dsgn. L = 24.00 ft	1	0.102	0.032	11.88		11.88	195.00	116.77	1.00	1.00	1.98	93.74	62.50
+D+0.750Lr+0.750L+0.450W+H	Dsgn. L = 24.00 ft	1	0.305	0.095	35.64		35.64	195.00	116.77	1.00	1.00	5.94	93.74	62.50
+D+0.750L+0.750S+0.450W+H	Dsgn. L = 24.00 ft	1	0.305	0.095	35.64		35.64	195.00	116.77	1.00	1.00	5.94	93.74	62.50
+0.60D+0.60W+0.60H	Dsgn. L = 24.00 ft	1	0.061	0.019	7.13		7.13	195.00	116.77	1.00	1.00	1.19	93.74	62.50
+D+0.70E+0.60H	Dsgn. L = 24.00 ft	1	0.102	0.032	11.88		11.88	195.00	116.77	1.00	1.00	1.98	93.74	62.50
+D+0.750L+0.750S+0.5250E+H	Dsgn. L = 24.00 ft	1	0.305	0.095	35.64		35.64	195.00	116.77	1.00	1.00	5.94	93.74	62.50

Project Title:
 Engineer:
 Project ID:
 Project Descr:

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Steel Beam

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DESCRIPTIO BM#3

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		
+0.60D+0.70E+H														
Dsgn. L = 24.00 ft		1	0.061	0.019	7.13		7.13	195.00	116.77	1.00	1.00	1.19	93.74	62.50

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.7485	12.069		0.0000	0.000

Vertical Reactions

Load Combination	Support 1	Support 2
Overall MAXimum	7.260	7.260
Overall MINimum	1.188	1.188
+D+H	1.980	1.980
+D+L+H	7.260	7.260
+D+Lr+H	1.980	1.980
+D+S+H	1.980	1.980
+D+0.750Lr+0.750L+H	5.940	5.940
+D+0.750L+0.750S+H	5.940	5.940
+D+0.60W+H	1.980	1.980
+D+0.750Lr+0.750L+0.450W+H	5.940	5.940
+D+0.750L+0.750S+0.450W+H	5.940	5.940
+0.60D+0.60W+0.60H	1.188	1.188
+D+0.70E+0.60H	1.980	1.980
+D+0.750L+0.750S+0.5250E+H	5.940	5.940
+0.60D+0.70E+H	1.188	1.188
D Only	1.980	1.980
Lr Only		
L Only	5.280	5.280
S Only		
W Only		
E Only		
H Only		

Wood Beam

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DESCRIPTION BM#4

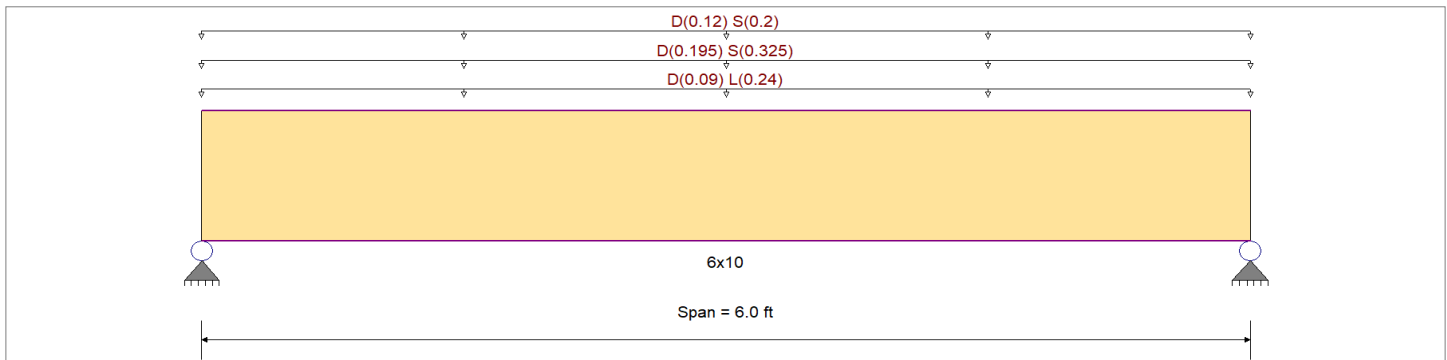
CODE REFERENCES

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 Elasticity	
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.

- Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 6.0 ft, (FLOOR)
- Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 13.0 ft, (UPPER ROOF)
- Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 8.0 ft, (LOWER ROOF)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.654 : 1	Maximum Shear Stress Ratio	=	0.360 : 1
Section used for this span	=	6x10	Section used for this span	=	6x10
	=	638.86psi		=	62.14 psi
	=	977.50psi		=	172.50 psi
Load Combination	=	+D+0.750L+0.750S+H	Load Combination	=	+D+0.750L+0.750S+H
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		0.030 in	Ratio =	2388	>=360
Max Upward Transient Deflection		0.000 in	Ratio =	0	<360
Max Downward Total Deflection		0.056 in	Ratio =	1281	>=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+H	Length = 6.0 ft	1	0.346	0.190	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.82	264.36	765.00	0.00	0.00	0.00	0.90	25.71	135.00
+D+L+H	Length = 6.0 ft	1	0.495	0.273	1.00	1.000	1.00	1.00	1.00	1.00	1.00	2.90	421.01	850.00	0.00	0.00	0.00	0.00	0.00	0.00
+D+Lr+H	Length = 6.0 ft	1	0.249	0.137	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.82	264.36	1062.50	0.00	0.00	0.00	0.90	25.71	187.50
+D+S+H	Length = 6.0 ft	1	0.621	0.342	1.15	1.000	1.00	1.00	1.00	1.00	1.00	4.19	607.04	977.50	0.00	0.00	0.00	2.06	59.05	172.50
+D+0.750Lr+0.750L+H	Length = 6.0 ft	1	0.359	0.198	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.63	381.85	1062.50	0.00	0.00	0.00	0.00	0.00	0.00
+D+0.750L+0.750S+H	Length = 6.0 ft	1	0.654	0.360	1.15	1.000	1.00	1.00	1.00	1.00	1.00	4.40	638.86	977.50	0.00	0.00	0.00	2.16	62.14	172.50

Project Title:
 Engineer:
 Project ID:
 Project Descr:

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DESCRIPTIO BM#4

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+0.60W+H	Length = 6.0 ft	1	0.194	0.107	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.82	264.36	1360.00	0.00	0.00	0.00
+D+0.750Lr+0.750L+0.450W-	Length = 6.0 ft	1	0.281	0.155	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.63	381.85	1360.00	0.00	0.00	0.00
+D+0.750L+0.750S+0.450W+	Length = 6.0 ft	1	0.470	0.259	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4.40	638.86	1360.00	0.00	0.00	0.00
+0.60D+0.60W+0.60H	Length = 6.0 ft	1	0.117	0.064	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.09	158.61	1360.00	0.00	0.00	0.00	
+D+0.70E+0.60H	Length = 6.0 ft	1	0.194	0.107	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.82	264.36	1360.00	0.00	0.00	0.00	
+D+0.750L+0.750S+0.5250E-	Length = 6.0 ft	1	0.470	0.259	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4.40	638.86	1360.00	0.00	0.00	0.00	
+0.60D+0.70E+H	Length = 6.0 ft	1	0.117	0.064	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.09	158.61	1360.00	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+0.750L+0.750S+0.5250E+H	1	0.0562	3.022		0.0000	0.000

Vertical Reactions

Support notation : Far left is #'

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.936	2.936
Overall MINimum	1.575	1.575
+D+H	1.215	1.215
+D+L+H	1.935	1.935
+D+Lr+H	1.215	1.215
+D+S+H	2.790	2.790
+D+0.750Lr+0.750L+H	1.755	1.755
+D+0.750L+0.750S+H	2.936	2.936
+D+0.60W+H	1.215	1.215
+D+0.750Lr+0.750L+0.450W+H	1.755	1.755
+D+0.750L+0.750S+0.450W+H	2.936	2.936
+0.60D+0.60W+0.60H	0.729	0.729
+D+0.70E+0.60H	1.215	1.215
+D+0.750L+0.750S+0.5250E+H	2.936	2.936
+0.60D+0.70E+H	0.729	0.729
D Only	1.215	1.215
Lr Only		
L Only	0.720	0.720
S Only	1.575	1.575
W Only		
E Only		
H Only		

Wood Beam

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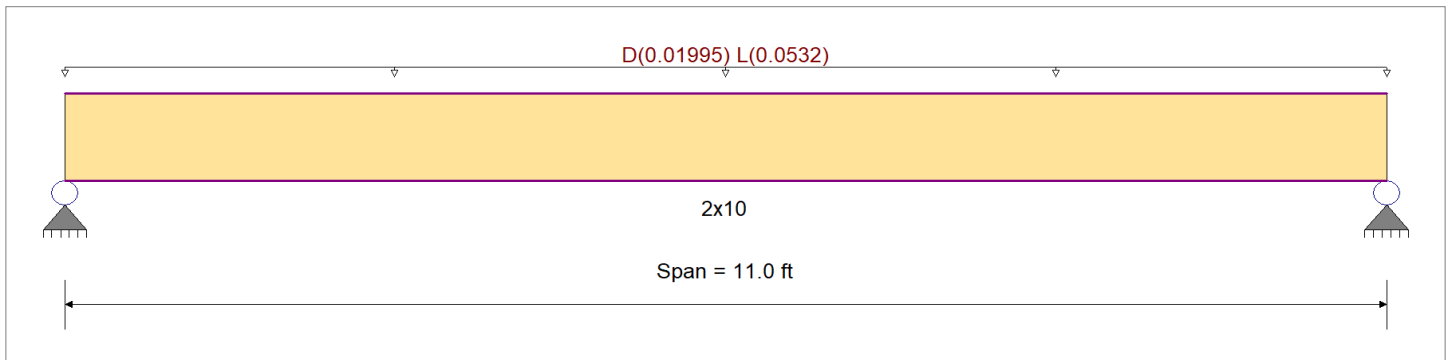
DESCRIPTIO FLOOR JOIST

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		
		Ft	525.0 psi	Density	26.840pcf
Beam Bracing	Beam is Fully Braced against lateral-torsional buckling			Repetitive Member Stress Increa	



Applied Loads

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

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

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.577 : 1	Maximum Shear Stress Ratio	=	0.250 : 1
Section used for this span	=	2x10	Section used for this span	=	2x10
	=	620.68psi		=	37.46 psi
	=	1,075.25psi		=	150.00 psi
Load Combination	=	+D+L+H	Load Combination	=	+D+L+H
Location of maximum on span	=	5.500ft	Location of maximum on span	=	10.237 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection		0.137 in Ratio =	963 >=360		
Max Upward Transient Deflection		0.000 in Ratio =	0 <360		
Max Downward Total Deflection		0.188 in Ratio =	700 >=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+H	Length = 11.0 ft	1	0.175	0.076	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.30	169.28	967.73	0.00	0.09	10.22	135.00
+D+L+H	Length = 11.0 ft	1	0.577	0.250	1.00	1.100	1.00	1.15	1.00	1.00	1.00	1.11	620.68	1075.25	0.00	0.00	0.00	0.00
+D+Lr+H	Length = 11.0 ft	1	0.126	0.054	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.30	169.28	1344.06	0.00	0.09	10.22	187.50
+D+S+H	Length = 11.0 ft	1	0.137	0.059	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.30	169.28	1236.54	0.00	0.09	10.22	172.50
+D+0.750Lr+0.750L+H	Length = 11.0 ft	1	0.378	0.163	1.25	1.100	1.00	1.15	1.00	1.00	1.00	0.91	507.83	1344.06	0.00	0.00	0.00	0.00
+D+0.750L+0.750S+H	Length = 11.0 ft	1	0.411	0.178	1.15	1.100	1.00	1.15	1.00	1.00	1.00	0.91	507.83	1236.54	0.00	0.00	0.00	0.00
+D+0.60W+H	Length = 11.0 ft	1	0.098	0.043	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.30	169.28	1720.40	0.00	0.09	10.22	240.00

Project Title:
 Engineer:
 Project ID:
 Project Descr:

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Wood Beam

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DESCRIPTIO FLOOR JOIST

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+0.750Lr+0.750L+0.450W-	Length = 11.0 ft	1	0.295	0.128	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.91	507.83	1720.40	0.00	0.00	0.00	0.28	30.65	240.00
+D+0.750L+0.750S+0.450W+	Length = 11.0 ft	1	0.295	0.128	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.91	507.83	1720.40	0.00	0.00	0.00	0.00	0.00	0.00
+0.60D+0.60W+0.60H	Length = 11.0 ft	1	0.059	0.026	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.18	101.57	1720.40	0.00	0.00	0.00	0.06	6.13	240.00
+D+0.70E+0.60H	Length = 11.0 ft	1	0.098	0.043	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.30	169.28	1720.40	0.00	0.00	0.00	0.09	10.22	240.00
+D+0.750L+0.750S+0.5250E-	Length = 11.0 ft	1	0.295	0.128	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.91	507.83	1720.40	0.00	0.00	0.00	0.00	0.00	0.00
+0.60D+0.70E+H	Length = 11.0 ft	1	0.059	0.026	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.18	101.57	1720.40	0.00	0.00	0.00	0.06	6.13	240.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.1885	5.540		0.0000	0.000

Vertical Reactions

Load Combination	Support notation : Far left is #'		Values in KIPS	
	Support 1	Support 2		
Overall MAXimum	0.402	0.402		
Overall MINimum	0.293	0.293		
+D+H	0.110	0.110		
+D+L+H	0.402	0.402		
+D+Lr+H	0.110	0.110		
+D+S+H	0.110	0.110		
+D+0.750Lr+0.750L+H	0.329	0.329		
+D+0.750L+0.750S+H	0.329	0.329		
+D+0.60W+H	0.110	0.110		
+D+0.750Lr+0.750L+0.450W+H	0.329	0.329		
+D+0.750L+0.750S+0.450W+H	0.329	0.329		
+0.60D+0.60W+0.60H	0.066	0.066		
+D+0.70E+0.60H	0.110	0.110		
+D+0.750L+0.750S+0.5250E+H	0.329	0.329		
+0.60D+0.70E+H	0.066	0.066		
D Only	0.110	0.110		
Lr Only				
L Only	0.293	0.293		
S Only				
W Only				
E Only				
H Only				

Wood Beam

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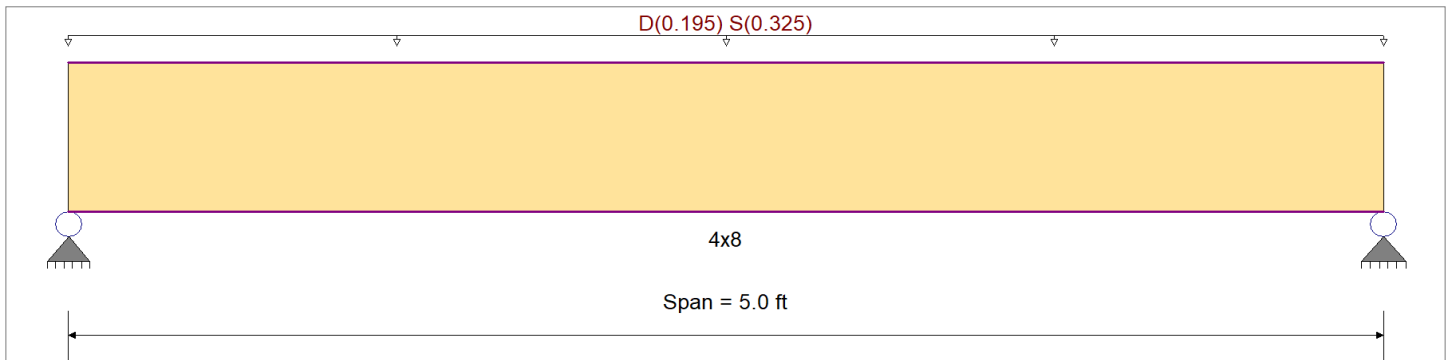
DESCRIPTIO HDR#1

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 Elasticity	
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.

Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 13.0 ft, (ROOF)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.500 : 1	Maximum Shear Stress Ratio	=	0.338 : 1
Section used for this span	=	4x8	Section used for this span	=	4x8
	=	635.98psi		=	58.34 psi
	=	1,270.75psi		=	172.50 psi
Load Combination	=	+D+S+H	Load Combination	=	+D+S+H
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		0.032 in Ratio =	1885	>=	360
Max Upward Transient Deflection		0.000 in Ratio =	0	<	360
Max Downward Total Deflection		0.051 in Ratio =	1178	>=	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+H	Length = 5.0 ft	1	0.240	0.162	0.90	1.300	1.00	1.00	1.00	1.00	1.00	1.00	0.61	238.49	994.50	0.00	0.00	0.00	0.00
+D+L+H	Length = 5.0 ft	1	0.216	0.146	1.00	1.300	1.00	1.00	1.00	1.00	1.00	1.00	0.61	238.49	1105.00	0.00	0.00	0.00	0.00
+D+Lr+H	Length = 5.0 ft	1	0.173	0.117	1.25	1.300	1.00	1.00	1.00	1.00	1.00	1.00	0.61	238.49	1381.25	0.00	0.00	0.00	0.00
+D+S+H	Length = 5.0 ft	1	0.500	0.338	1.15	1.300	1.00	1.00	1.00	1.00	1.00	1.00	1.63	635.98	1270.75	0.00	0.00	0.00	0.00
+D+0.750Lr+0.750L+H	Length = 5.0 ft	1	0.173	0.117	1.25	1.300	1.00	1.00	1.00	1.00	1.00	1.00	0.61	238.49	1381.25	0.00	0.00	0.00	0.00
+D+0.750L+0.750S+H	Length = 5.0 ft	1	0.422	0.285	1.15	1.300	1.00	1.00	1.00	1.00	1.00	1.00	1.37	536.61	1270.75	0.00	0.00	0.00	0.00
+D+0.60W+H	Length = 5.0 ft	1	0.135	0.091	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.00	0.61	238.49	1768.00	0.00	0.00	0.00	0.00

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DESCRIPTIO HDR#1

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	f _v	F'v		
+D+0.750Lr+0.750L+0.450W-	Length = 5.0 ft	1	0.135	0.091	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
+D+0.750L+0.750S+0.450W+	Length = 5.0 ft	1	0.304	0.205	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
+0.60D+0.60W+0.60H	Length = 5.0 ft	1	0.081	0.055	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
+D+0.70E+0.60H	Length = 5.0 ft	1	0.135	0.091	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
+D+0.750L+0.750S+0.5250E-	Length = 5.0 ft	1	0.304	0.205	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
+0.60D+0.70E+H	Length = 5.0 ft	1	0.081	0.055	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.00	1.00	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+H	1	0.0509	2.518		0.0000	0.000

Vertical Reactions

Load Combination	Support notation : Far left is #'		Values in KIPS	
	Support 1	Support 2		
Overall MAXimum	1.300	1.300		
Overall MINimum	0.813	0.813		
+D+H	0.488	0.488		
+D+L+H	0.488	0.488		
+D+Lr+H	0.488	0.488		
+D+S+H	1.300	1.300		
+D+0.750Lr+0.750L+H	0.488	0.488		
+D+0.750L+0.750S+H	1.097	1.097		
+D+0.60W+H	0.488	0.488		
+D+0.750Lr+0.750L+0.450W+H	0.488	0.488		
+D+0.750L+0.750S+0.450W+H	1.097	1.097		
+0.60D+0.60W+0.60H	0.293	0.293		
+D+0.70E+0.60H	0.488	0.488		
+D+0.750L+0.750S+0.5250E+H	1.097	1.097		
+0.60D+0.70E+H	0.293	0.293		
D Only	0.488	0.488		
Lr Only				
L Only				
S Only	0.813	0.813		
W Only				
E Only				
H Only				

Wood Beam

Lic. # : KW-06009431

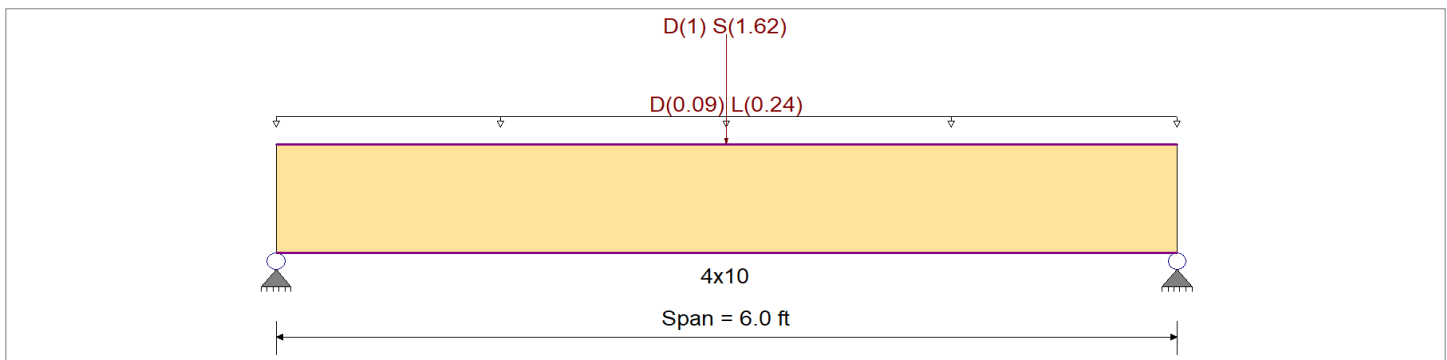
DESCRIPTIO HDR#2

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 +	850.0 psi	E : Modulus of Elasti	
Load Combinati	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.

Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 6.0 ft, (FLOOR)
 Point Load : D = 1.0, S = 1.620 k @ 3.0 ft, (HDR#1)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.930	1	Maximum Shear Stress Ratio	=	0.459	: 1
Section used for this span	=	4x10		Section used for this span	=	4x10	
	=	1,090.93psi			=	79.25 psi	
	=	1,173.00psi			=	172.50 psi	
Load Combination	=	+D+0.750L+0.750S+H		Load Combination	=	+D+0.750L+0.750S+H	
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		0.042	in	Ratio =	1705	>=	360
Max Upward Transient Deflection		0.000	in	Ratio =	0	<	360
Max Downward Total Deflection		0.084	in	Ratio =	856	>=	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+H	Length = 6.0 ft	1	0.499	0.241	0.90	1.200	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.91	458.01	918.00	0.00	0.00	0.00	0.00	0.00	0.00	
+D+L+H	Length = 6.0 ft	1	0.704	0.382	1.00	1.200	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.99	717.67	1020.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
+D+Lr+H	Length = 6.0 ft	1	0.359	0.173	1.25	1.200	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.91	458.01	1275.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
+D+S+H	Length = 6.0 ft	1	0.889	0.406	1.15	1.200	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4.34	1,042.25	1173.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
+D+0.750Lr+0.750L+H	Length = 6.0 ft	1	0.512	0.273	1.25	1.200	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.72	652.76	1275.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
+D+0.750L+0.750S+H	Length = 6.0 ft	1	0.930	0.459	1.15	1.200	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4.54	1,090.93	1173.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
+D+0.60W+H						1.200	1.00	1.00	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Printed: 13 MAR 2020, 5:09PM

Wood Beam

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DESCRIPTIO HDR#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	f _v	F'v
Length = 6.0 ft	1	0.281	0.135	1.60	1.200	1.00	1.00	1.00	1.00	1.00	1.91	458.01	1632.00	0.70	32.48	240.00	
+D+0.750Lr+0.750L+0.450W-					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 6.0 ft	1	0.400	0.213	1.60	1.200	1.00	1.00	1.00	1.00	1.00	2.72	652.76	1632.00	1.10	51.11	240.00	
+D+0.750L+0.750S+0.450W+					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 6.0 ft	1	0.668	0.330	1.60	1.200	1.00	1.00	1.00	1.00	1.00	4.54	1,090.93	1632.00	1.71	79.25	240.00	
+0.60D+0.60W+0.60H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 6.0 ft	1	0.168	0.081	1.60	1.200	1.00	1.00	1.00	1.00	1.00	1.14	274.81	1632.00	0.42	19.49	240.00	
+D+0.70E+0.60H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 6.0 ft	1	0.281	0.135	1.60	1.200	1.00	1.00	1.00	1.00	1.00	1.91	458.01	1632.00	0.70	32.48	240.00	
+D+0.750L+0.750S+0.5250E-					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 6.0 ft	1	0.668	0.330	1.60	1.200	1.00	1.00	1.00	1.00	1.00	4.54	1,090.93	1632.00	1.71	79.25	240.00	
+0.60D+0.70E+H					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 6.0 ft	1	0.168	0.081	1.60	1.200	1.00	1.00	1.00	1.00	1.00	1.14	274.81	1632.00	0.42	19.49	240.00	

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.5250E+H	1	0.0841	3.022		0.0000	0.000

Vertical Reactions

Support notation : Far left is #'

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.918	1.918
Overall MINimum	0.810	0.810
+D+H	0.770	0.770
+D+L+H	1.490	1.490
+D+Lr+H	0.770	0.770
+D+S+H	1.580	1.580
+D+0.750Lr+0.750L+H	1.310	1.310
+D+0.750L+0.750S+H	1.918	1.918
+D+0.60W+H	0.770	0.770
+D+0.750Lr+0.750L+0.450W+H	1.310	1.310
+D+0.750L+0.750S+0.450W+H	1.918	1.918
+0.60D+0.60W+0.60H	0.462	0.462
+D+0.70E+0.60H	0.770	0.770
+D+0.750L+0.750S+0.5250E+H	1.918	1.918
+0.60D+0.70E+H	0.462	0.462
D Only	0.770	0.770
Lr Only		
L Only	0.720	0.720
S Only	0.810	0.810
W Only		
E Only		
H Only		

Project Title:
 Engineer:
 Project ID:
 Project Descr:

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Wood Beam

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DESCRIPTIO HDR#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	f _v	F'v					
+D+0.750Lr+0.750L+0.450W-	Length = 5.0 ft	1	0.249	0.168	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.13	440.29	1768.00	0.00	0.00	0.00	0.68	40.39	240.00
+D+0.750L+0.750S+0.450W+	Length = 5.0 ft	1	0.249	0.168	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.13	440.29	1768.00	0.00	0.00	0.00	0.00	0.00	0.00
+0.60D+0.60W+0.60H	Length = 5.0 ft	1	0.050	0.034	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.23	88.06	1768.00	0.00	0.00	0.00	0.14	8.08	240.00
+D+0.70E+0.60H	Length = 5.0 ft	1	0.083	0.056	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.38	146.76	1768.00	0.00	0.00	0.00	0.23	13.46	240.00
+D+0.750L+0.750S+0.5250E-	Length = 5.0 ft	1	0.249	0.168	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.13	440.29	1768.00	0.00	0.00	0.00	0.68	40.39	240.00
+0.60D+0.70E+H	Length = 5.0 ft	1	0.050	0.034	1.60	1.300	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.23	88.06	1768.00	0.00	0.00	0.00	0.14	8.08	240.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.0431	2.518		0.0000	0.000

Vertical Reactions

Support notation : Far left is #'

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.100	1.100
Overall MINimum	0.800	0.800
+D+H	0.300	0.300
+D+L+H	1.100	1.100
+D+Lr+H	0.300	0.300
+D+S+H	0.300	0.300
+D+0.750Lr+0.750L+H	0.900	0.900
+D+0.750L+0.750S+H	0.900	0.900
+D+0.60W+H	0.300	0.300
+D+0.750Lr+0.750L+0.450W+H	0.900	0.900
+D+0.750L+0.750S+0.450W+H	0.900	0.900
+0.60D+0.60W+0.60H	0.180	0.180
+D+0.70E+0.60H	0.300	0.300
+D+0.750L+0.750S+0.5250E+H	0.900	0.900
+0.60D+0.70E+H	0.180	0.180
D Only	0.300	0.300
Lr Only		
L Only	0.800	0.800
S Only		
W Only		
E Only		
H Only		

Wood Beam

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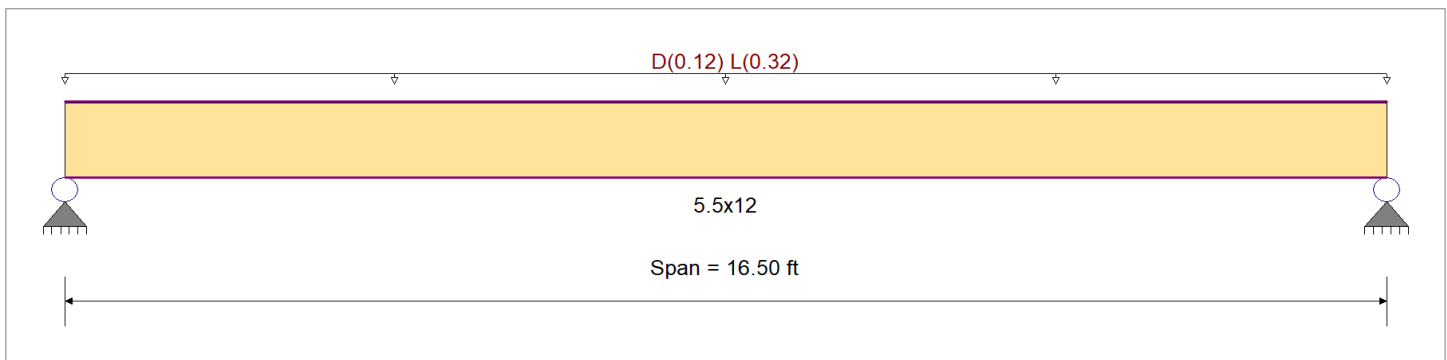
DESCRIPTIO HDR#4

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
Wood Species	DF/DF	Fc - Prll	1650 psi	Eminbend - x	950ksi
Wood Grade	24F - V4	Fc - Perp	650 psi	Ebend- yy	1600ksi
		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.

Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 8.0 ft, (FLOOR)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.567 : 1	Maximum Shear Stress Ratio	=	0.275 : 1
Section used for this span	=	5.5x12	Section used for this span	=	5.5x12
	=	1,361.25psi		=	72.86 psi
	=	2,400.00psi		=	265.00 psi
Load Combination	=	+D+L+H	Load Combination	=	+D+L+H
Location of maximum on span	=	8.250ft	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		0.377 in	Ratio =		525 >=360
Max Upward Transient Deflection		0.000 in	Ratio =		0 <360
Max Downward Total Deflection		0.518 in	Ratio =		382 >=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+H	Length = 16.50 ft	1	0.172	0.083	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4.08	371.25	2160.00	0.00	0.00	0.00	0.00
+D+L+H	Length = 16.50 ft	1	0.567	0.275	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	14.97	1,361.25	2400.00	0.00	0.00	0.00	0.00
+D+Lr+H	Length = 16.50 ft	1	0.124	0.060	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4.08	371.25	3000.00	0.00	0.00	0.00	0.00
+D+S+H	Length = 16.50 ft	1	0.135	0.065	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4.08	371.25	2760.00	0.00	0.00	0.00	0.00
+D+0.750Lr+0.750L+H	Length = 16.50 ft	1	0.371	0.180	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12.25	1,113.75	3000.00	0.00	0.00	0.00	0.00
+D+0.750L+0.750S+H	Length = 16.50 ft	1	0.404	0.196	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12.25	1,113.75	2760.00	0.00	0.00	0.00	0.00
+D+0.60W+H	Length = 16.50 ft	1	0.097	0.047	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4.08	371.25	3840.00	0.00	0.00	0.00	0.00

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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+0.750Lr+0.750L+0.450W-	Length = 16.50 ft	1	0.290	0.141	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12.25	1,113.75	3840.00	0.00	0.00	0.00	2.62	59.62	424.00
+D+0.750L+0.750S+0.450W+	Length = 16.50 ft	1	0.290	0.141	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12.25	1,113.75	3840.00	0.00	0.00	0.00	2.62	59.62	424.00
+0.60D+0.60W+0.60H	Length = 16.50 ft	1	0.058	0.028	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.45	222.75	3840.00	0.00	0.00	0.00	0.52	11.92	424.00	
+D+0.70E+0.60H	Length = 16.50 ft	1	0.097	0.047	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4.08	371.25	3840.00	0.00	0.00	0.00	0.87	19.87	424.00	
+D+0.750L+0.750S+0.5250E-	Length = 16.50 ft	1	0.290	0.141	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	12.25	1,113.75	3840.00	0.00	0.00	0.00	2.62	59.62	424.00	
+0.60D+0.70E+H	Length = 16.50 ft	1	0.058	0.028	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.45	222.75	3840.00	0.00	0.00	0.00	0.52	11.92	424.00	

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.5177	8.310		0.0000	0.000

Vertical Reactions

Support notation : Far left is #'

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.630	3.630
Overall MINimum	2.640	2.640
+D+H	0.990	0.990
+D+L+H	3.630	3.630
+D+Lr+H	0.990	0.990
+D+S+H	0.990	0.990
+D+0.750Lr+0.750L+H	2.970	2.970
+D+0.750L+0.750S+H	2.970	2.970
+D+0.60W+H	0.990	0.990
+D+0.750Lr+0.750L+0.450W+H	2.970	2.970
+D+0.750L+0.750S+0.450W+H	2.970	2.970
+0.60D+0.60W+0.60H	0.594	0.594
+D+0.70E+0.60H	0.990	0.990
+D+0.750L+0.750S+0.5250E+H	2.970	2.970
+0.60D+0.70E+H	0.594	0.594
D Only	0.990	0.990
Lr Only		
L Only	2.640	2.640
S Only		
W Only		
E Only		
H Only		

General Footing

Lic. # : KW-06009431

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

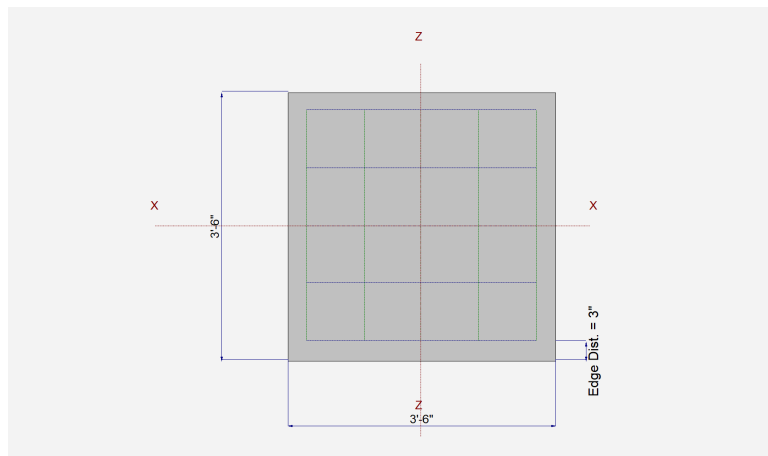
Allowable pressure increase per foot of depth when max. length or width is greater than	=	ksf
	=	ft

Dimensions

Width parallel to X-X Axis	=	3.50 ft
Length parallel to Z-Z Axis	=	3.50 ft
Footing Thickness	=	12.0 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



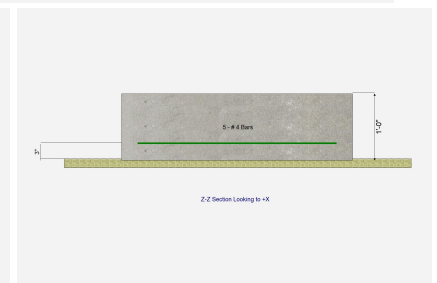
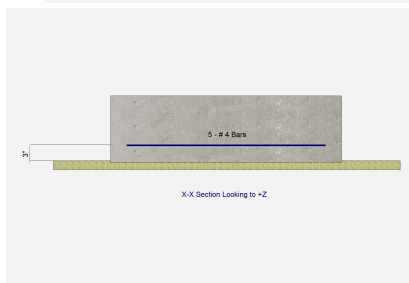
Reinforcing

Bars parallel to X-X Axis	=	5.0
Number of Bars	=	# 4
Reinforcing Bar Size	=	# 4

Bars parallel to Z-Z Axis	=	5.0
Number of Bars	=	# 4
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	=	3.050		8.380				k
OB : Overburden	=							ksf
M-xx	=							k-ft
M-zz	=							k-ft
V-x	=							k
V-z	=							k

General Footing

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CK Engineering LLC

DESCRIPTIO FTNG#1

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.7187	Soil Bearing	1.078 ksf	1.50 ksf	+D+L+H about Z-Z axis
PASS	n/a	Overturing - X-X	0.0 k-ft	0.0 k-ft	No Overturing
PASS	n/a	Overturing - Z-Z	0.0 k-ft	0.0 k-ft	No Overturing
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	0.2836	Z Flexure (+X)	2.134 k-ft/ft	7.522 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.2836	Z Flexure (-X)	2.134 k-ft/ft	7.522 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.2836	X Flexure (+Z)	2.134 k-ft/ft	7.522 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.2836	X Flexure (-Z)	2.134 k-ft/ft	7.522 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1746	1-way Shear (+X)	13.095 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1746	1-way Shear (-X)	13.095 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1746	1-way Shear (+Z)	13.095 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1746	1-way Shear (-Z)	13.095 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.3342	2-way Punching	50.129 psi	150.0 psi	+1.20D+0.50Lr+1.60L+1.60H

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+H	1.50	n/a	0.0	0.3940	0.3940	n/a	n/a	0.263
X-X, +D+L+H	1.50	n/a	0.0	1.078	1.078	n/a	n/a	0.719
X-X, +D+Lr+H	1.50	n/a	0.0	0.3940	0.3940	n/a	n/a	0.263
X-X, +D+S+H	1.50	n/a	0.0	0.3940	0.3940	n/a	n/a	0.263
X-X, +D+0.750Lr+0.750L+H	1.50	n/a	0.0	0.9070	0.9070	n/a	n/a	0.605
X-X, +D+0.750L+0.750S+H	1.50	n/a	0.0	0.9070	0.9070	n/a	n/a	0.605
X-X, +D+0.60W+H	1.50	n/a	0.0	0.3940	0.3940	n/a	n/a	0.263
X-X, +D+0.750Lr+0.750L+0.450W	1.50	n/a	0.0	0.9070	0.9070	n/a	n/a	0.605
X-X, +D+0.750L+0.750S+0.450W	1.50	n/a	0.0	0.9070	0.9070	n/a	n/a	0.605
X-X, +0.60D+0.60W+0.60H	1.50	n/a	0.0	0.2364	0.2364	n/a	n/a	0.158
X-X, +D+0.70E+0.60H	1.50	n/a	0.0	0.3940	0.3940	n/a	n/a	0.263
X-X, +D+0.750L+0.750S+0.5250E	1.50	n/a	0.0	0.9070	0.9070	n/a	n/a	0.605
X-X, +0.60D+0.70E+H	1.50	n/a	0.0	0.2364	0.2364	n/a	n/a	0.158
Z-Z, +D+H	1.50	0.0	n/a	n/a	n/a	0.3940	0.3940	0.263
Z-Z, +D+L+H	1.50	0.0	n/a	n/a	n/a	1.078	1.078	0.719
Z-Z, +D+Lr+H	1.50	0.0	n/a	n/a	n/a	0.3940	0.3940	0.263
Z-Z, +D+S+H	1.50	0.0	n/a	n/a	n/a	0.3940	0.3940	0.263
Z-Z, +D+0.750Lr+0.750L+H	1.50	0.0	n/a	n/a	n/a	0.9070	0.9070	0.605
Z-Z, +D+0.750L+0.750S+H	1.50	0.0	n/a	n/a	n/a	0.9070	0.9070	0.605
Z-Z, +D+0.60W+H	1.50	0.0	n/a	n/a	n/a	0.3940	0.3940	0.263
Z-Z, +D+0.750Lr+0.750L+0.450W	1.50	0.0	n/a	n/a	n/a	0.9070	0.9070	0.605
Z-Z, +D+0.750L+0.750S+0.450W	1.50	0.0	n/a	n/a	n/a	0.9070	0.9070	0.605
Z-Z, +0.60D+0.60W+0.60H	1.50	0.0	n/a	n/a	n/a	0.2364	0.2364	0.158
Z-Z, +D+0.70E+0.60H	1.50	0.0	n/a	n/a	n/a	0.3940	0.3940	0.263
Z-Z, +D+0.750L+0.750S+0.5250E	1.50	0.0	n/a	n/a	n/a	0.9070	0.9070	0.605
Z-Z, +0.60D+0.70E+H	1.50	0.0	n/a	n/a	n/a	0.2364	0.2364	0.158

Overturing Stability

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

Sliding Stability

All units k

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

General Footing

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DESCRIPTIO FTNG#1

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+1.60H	0.5338	+Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +1.40D+1.60H	0.5338	-Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	2.134	+Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	2.134	-Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +1.20D+1.60L+0.50S+1.60H	2.134	+Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +1.20D+1.60L+0.50S+1.60H	2.134	-Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +1.20D+1.60Lr+L+1.60H	1.505	+Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +1.20D+1.60Lr+L+1.60H	1.505	-Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +1.20D+1.60Lr+0.50W+1.60	0.4575	+Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +1.20D+1.60Lr+0.50W+1.60	0.4575	-Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +1.20D+L+1.60S+1.60H	1.505	+Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +1.20D+L+1.60S+1.60H	1.505	-Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +1.20D+1.60S+0.50W+1.60	0.4575	+Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +1.20D+1.60S+0.50W+1.60	0.4575	-Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	1.505	+Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	1.505	-Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +1.20D+L+0.50S+W+1.60H	1.505	+Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +1.20D+L+0.50S+W+1.60H	1.505	-Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +0.90D+W+1.60H	0.3431	+Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +0.90D+W+1.60H	0.3431	-Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +1.20D+L+0.20S+E+1.60H	1.505	+Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +1.20D+L+0.20S+E+1.60H	1.505	-Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +0.90D+E+0.90H	0.3431	+Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
X-X, +0.90D+E+0.90H	0.3431	-Z	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +1.40D+1.60H	0.5338	-X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +1.40D+1.60H	0.5338	+X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	2.134	-X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	2.134	+X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	2.134	-X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	2.134	+X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	1.505	-X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	1.505	+X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60	0.4575	-X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60	0.4575	+X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +1.20D+L+1.60S+1.60H	1.505	-X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +1.20D+L+1.60S+1.60H	1.505	+X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +1.20D+1.60S+0.50W+1.60	0.4575	-X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +1.20D+1.60S+0.50W+1.60	0.4575	+X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	1.505	-X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	1.505	+X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	1.505	-X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	1.505	+X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +0.90D+W+1.60H	0.3431	-X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +0.90D+W+1.60H	0.3431	+X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +1.20D+L+0.20S+E+1.60H	1.505	-X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +1.20D+L+0.20S+E+1.60H	1.505	+X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +0.90D+E+0.90H	0.3431	-X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK
Z-Z, +0.90D+E+0.90H	0.3431	+X	Bottom	0.2592	Min Temp %	0.2857	7.522	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	3.28 psi	3.28 psi	3.28 psi	3.28 psi	3.28 psi	75.00 psi	0.04	OK
+1.20D+0.50Lr+1.60L+1.60H	13.10 psi	13.10 psi	13.10 psi	13.10 psi	13.10 psi	75.00 psi	0.17	OK
+1.20D+1.60L+0.50S+1.60H	13.10 psi	13.10 psi	13.10 psi	13.10 psi	13.10 psi	75.00 psi	0.17	OK
+1.20D+1.60Lr+L+1.60H	9.24 psi	9.24 psi	9.24 psi	9.24 psi	9.24 psi	75.00 psi	0.12	OK
+1.20D+1.60Lr+0.50W+1.60H	2.81 psi	2.81 psi	2.81 psi	2.81 psi	2.81 psi	75.00 psi	0.04	OK
+1.20D+L+1.60S+1.60H	9.24 psi	9.24 psi	9.24 psi	9.24 psi	9.24 psi	75.00 psi	0.12	OK
+1.20D+1.60S+0.50W+1.60H	2.81 psi	2.81 psi	2.81 psi	2.81 psi	2.81 psi	75.00 psi	0.04	OK
+1.20D+0.50Lr+L+W+1.60H	9.24 psi	9.24 psi	9.24 psi	9.24 psi	9.24 psi	75.00 psi	0.12	OK
+1.20D+L+0.50S+W+1.60H	9.24 psi	9.24 psi	9.24 psi	9.24 psi	9.24 psi	75.00 psi	0.12	OK
+0.90D+W+1.60H	2.11 psi	2.11 psi	2.11 psi	2.11 psi	2.11 psi	75.00 psi	0.03	OK
+1.20D+L+0.20S+E+1.60H	9.24 psi	9.24 psi	9.24 psi	9.24 psi	9.24 psi	75.00 psi	0.12	OK

Project Title:
 Engineer:
 Project ID:
 Project Descr:

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General Footing

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DESCRIPTIO FTNG#1

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+0.90D+E+0.90H	2.11 psi	2.11 psi	2.11 psi	2.11 psi	2.11 psi	75.00 psi	0.03	OK
Two-Way "Punching" Shear								All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	12.54 psi	150.00psi	0.08361	OK
+1.20D+0.50Lr+1.60L+1.60H	50.13 psi	150.00psi	0.3342	OK
+1.20D+1.60L+0.50S+1.60H	50.13 psi	150.00psi	0.3342	OK
+1.20D+1.60Lr+L+1.60H	35.36 psi	150.00psi	0.2357	OK
+1.20D+1.60Lr+0.50W+1.60H	10.75 psi	150.00psi	0.07166	OK
+1.20D+L+1.60S+1.60H	35.36 psi	150.00psi	0.2357	OK
+1.20D+1.60S+0.50W+1.60H	10.75 psi	150.00psi	0.07166	OK
+1.20D+0.50Lr+L+W+1.60H	35.36 psi	150.00psi	0.2357	OK
+1.20D+L+0.50S+W+1.60H	35.36 psi	150.00psi	0.2357	OK
+0.90D+W+1.60H	8.06 psi	150.00psi	0.05375	OK
+1.20D+L+0.20S+E+1.60H	35.36 psi	150.00psi	0.2357	OK
+0.90D+E+0.90H	8.06 psi	150.00psi	0.05375	OK

General Footing

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DESCRIPTIO FTNG#2

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

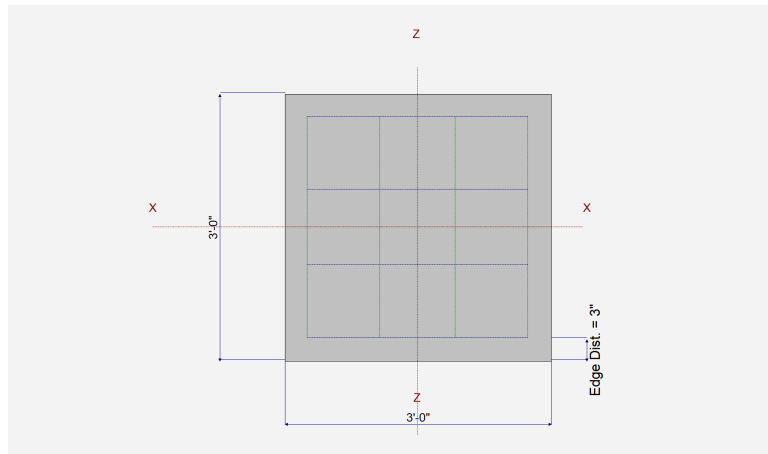
Allowable pressure increase per foot of depth when max. length or width is greater than	=	ksf
	=	ft

Dimensions

Width parallel to X-X Axis	=	3.0 ft
Length parallel to Z-Z Axis	=	3.0 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



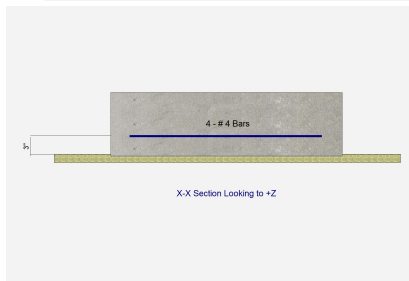
Reinforcing

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

Bars parallel to Z-Z Axis	=	
Number of Bars	=	4
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	2.640				k
OB : Overburden	=						ksf
M-xx	=						k-ft
M-zz	=						k-ft
V-x	=						k
V-z	=						k

General Footing

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DESCRIPTIO FTNG#2

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.4243	Soil Bearing	0.6364 ksf	1.50 ksf	+D+L+H about Z-Z axis
PASS	n/a	Overturing - X-X	0.0 k-ft	0.0 k-ft	No Overturing
PASS	n/a	Overturing - Z-Z	0.0 k-ft	0.0 k-ft	No Overturing
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	0.1524	Z Flexure (+X)	0.8280 k-ft/ft	5.433 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1524	Z Flexure (-X)	0.8280 k-ft/ft	5.433 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1524	X Flexure (+Z)	0.8280 k-ft/ft	5.433 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1524	X Flexure (-Z)	0.8280 k-ft/ft	5.433 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1086	1-way Shear (+X)	8.149 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1086	1-way Shear (-X)	8.149 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1086	1-way Shear (+Z)	8.149 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1086	1-way Shear (-Z)	8.149 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.2163	2-way Punching	32.444 psi	150.0 psi	+1.20D+0.50Lr+1.60L+1.60H

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+H	1.50	n/a	0.0	0.3431	0.3431	n/a	n/a	0.229
X-X, +D+L+H	1.50	n/a	0.0	0.6364	0.6364	n/a	n/a	0.424
X-X, +D+Lr+H	1.50	n/a	0.0	0.3431	0.3431	n/a	n/a	0.229
X-X, +D+S+H	1.50	n/a	0.0	0.3431	0.3431	n/a	n/a	0.229
X-X, +D+0.750Lr+0.750L+H	1.50	n/a	0.0	0.5631	0.5631	n/a	n/a	0.375
X-X, +D+0.750L+0.750S+H	1.50	n/a	0.0	0.5631	0.5631	n/a	n/a	0.375
X-X, +D+0.60W+H	1.50	n/a	0.0	0.3431	0.3431	n/a	n/a	0.229
X-X, +D+0.750Lr+0.750L+0.450W	1.50	n/a	0.0	0.5631	0.5631	n/a	n/a	0.375
X-X, +D+0.750L+0.750S+0.450W	1.50	n/a	0.0	0.5631	0.5631	n/a	n/a	0.375
X-X, +0.60D+0.60W+0.60H	1.50	n/a	0.0	0.2058	0.2058	n/a	n/a	0.137
X-X, +D+0.70E+0.60H	1.50	n/a	0.0	0.3431	0.3431	n/a	n/a	0.229
X-X, +D+0.750L+0.750S+0.5250E	1.50	n/a	0.0	0.5631	0.5631	n/a	n/a	0.375
X-X, +0.60D+0.70E+H	1.50	n/a	0.0	0.2058	0.2058	n/a	n/a	0.137
Z-Z, +D+H	1.50	0.0	n/a	n/a	n/a	0.3431	0.3431	0.229
Z-Z, +D+L+H	1.50	0.0	n/a	n/a	n/a	0.6364	0.6364	0.424
Z-Z, +D+Lr+H	1.50	0.0	n/a	n/a	n/a	0.3431	0.3431	0.229
Z-Z, +D+S+H	1.50	0.0	n/a	n/a	n/a	0.3431	0.3431	0.229
Z-Z, +D+0.750Lr+0.750L+H	1.50	0.0	n/a	n/a	n/a	0.5631	0.5631	0.375
Z-Z, +D+0.750L+0.750S+H	1.50	0.0	n/a	n/a	n/a	0.5631	0.5631	0.375
Z-Z, +D+0.60W+H	1.50	0.0	n/a	n/a	n/a	0.3431	0.3431	0.229
Z-Z, +D+0.750Lr+0.750L+0.450W	1.50	0.0	n/a	n/a	n/a	0.5631	0.5631	0.375
Z-Z, +D+0.750L+0.750S+0.450W	1.50	0.0	n/a	n/a	n/a	0.5631	0.5631	0.375
Z-Z, +0.60D+0.60W+0.60H	1.50	0.0	n/a	n/a	n/a	0.2058	0.2058	0.137
Z-Z, +D+0.70E+0.60H	1.50	0.0	n/a	n/a	n/a	0.3431	0.3431	0.229
Z-Z, +D+0.750L+0.750S+0.5250E	1.50	0.0	n/a	n/a	n/a	0.5631	0.5631	0.375
Z-Z, +0.60D+0.70E+H	1.50	0.0	n/a	n/a	n/a	0.2058	0.2058	0.137

Overturing Stability

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

Sliding Stability

All units k

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

Project Title:
 Engineer:
 Project ID:
 Project Descr:

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General Footing

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DESCRIPTIO FTNG#2

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+1.60H	0.350	+Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +1.40D+1.60H	0.350	-Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.8280	+Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.8280	-Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +1.20D+1.60L+0.50S+1.60H	0.8280	+Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +1.20D+1.60L+0.50S+1.60H	0.8280	-Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +1.20D+1.60Lr+L+1.60H	0.630	+Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +1.20D+1.60Lr+L+1.60H	0.630	-Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +1.20D+1.60Lr+0.50W+1.60	0.30	+Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +1.20D+1.60Lr+0.50W+1.60	0.30	-Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +1.20D+L+1.60S+1.60H	0.630	+Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +1.20D+L+1.60S+1.60H	0.630	-Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +1.20D+1.60S+0.50W+1.60H	0.30	+Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +1.20D+1.60S+0.50W+1.60H	0.30	-Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	0.630	+Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	0.630	-Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +1.20D+L+0.50S+W+1.60H	0.630	+Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +1.20D+L+0.50S+W+1.60H	0.630	-Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +0.90D+W+1.60H	0.2250	+Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +0.90D+W+1.60H	0.2250	-Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +1.20D+L+0.20S+E+1.60H	0.630	+Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +1.20D+L+0.20S+E+1.60H	0.630	-Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +0.90D+E+0.90H	0.2250	+Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
X-X, +0.90D+E+0.90H	0.2250	-Z	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +1.40D+1.60H	0.350	-X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +1.40D+1.60H	0.350	+X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.8280	-X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.8280	+X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	0.8280	-X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	0.8280	+X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	0.630	-X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	0.630	+X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60	0.30	-X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60	0.30	+X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +1.20D+L+1.60S+1.60H	0.630	-X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +1.20D+L+1.60S+1.60H	0.630	+X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	0.30	-X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	0.30	+X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	0.630	-X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	0.630	+X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	0.630	-X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	0.630	+X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +0.90D+W+1.60H	0.2250	-X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +0.90D+W+1.60H	0.2250	+X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +1.20D+L+0.20S+E+1.60H	0.630	-X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +1.20D+L+0.20S+E+1.60H	0.630	+X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +0.90D+E+0.90H	0.2250	-X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK
Z-Z, +0.90D+E+0.90H	0.2250	+X	Bottom	0.2160	Min Temp %	0.2667	5.433	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	3.44 psi	3.44 psi	3.44 psi	3.44 psi	3.44 psi	75.00 psi	0.05	OK
+1.20D+0.50Lr+1.60L+1.60H	8.15 psi	8.15 psi	8.15 psi	8.15 psi	8.15 psi	75.00 psi	0.11	OK
+1.20D+1.60L+0.50S+1.60H	8.15 psi	8.15 psi	8.15 psi	8.15 psi	8.15 psi	75.00 psi	0.11	OK
+1.20D+1.60Lr+L+1.60H	6.20 psi	6.20 psi	6.20 psi	6.20 psi	6.20 psi	75.00 psi	0.08	OK
+1.20D+1.60Lr+0.50W+1.60H	2.95 psi	2.95 psi	2.95 psi	2.95 psi	2.95 psi	75.00 psi	0.04	OK
+1.20D+L+1.60S+1.60H	6.20 psi	6.20 psi	6.20 psi	6.20 psi	6.20 psi	75.00 psi	0.08	OK
+1.20D+1.60S+0.50W+1.60H	2.95 psi	2.95 psi	2.95 psi	2.95 psi	2.95 psi	75.00 psi	0.04	OK
+1.20D+0.50Lr+L+W+1.60H	6.20 psi	6.20 psi	6.20 psi	6.20 psi	6.20 psi	75.00 psi	0.08	OK
+1.20D+L+0.50S+W+1.60H	6.20 psi	6.20 psi	6.20 psi	6.20 psi	6.20 psi	75.00 psi	0.08	OK
+0.90D+W+1.60H	2.21 psi	2.21 psi	2.21 psi	2.21 psi	2.21 psi	75.00 psi	0.03	OK
+1.20D+L+0.20S+E+1.60H	6.20 psi	6.20 psi	6.20 psi	6.20 psi	6.20 psi	75.00 psi	0.08	OK

Project Title:
 Engineer:
 Project ID:
 Project Descr:

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General Footing

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DESCRIPTIO FTNG#2

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+0.90D+E+0.90H	2.21 psi	2.21 psi	2.21 psi	2.21 psi	2.21 psi	75.00 psi	0.03	OK
Two-Way "Punching" Shear								All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	13.71 psi	150.00psi	0.09143	OK
+1.20D+0.50Lr+1.60L+1.60H	32.44 psi	150.00psi	0.2163	OK
+1.20D+1.60L+0.50S+1.60H	32.44 psi	150.00psi	0.2163	OK
+1.20D+1.60Lr+L+1.60H	24.69 psi	150.00psi	0.1646	OK
+1.20D+1.60Lr+0.50W+1.60H	11.76 psi	150.00psi	0.07837	OK
+1.20D+L+1.60S+1.60H	24.69 psi	150.00psi	0.1646	OK
+1.20D+1.60S+0.50W+1.60H	11.76 psi	150.00psi	0.07837	OK
+1.20D+0.50Lr+L+W+1.60H	24.69 psi	150.00psi	0.1646	OK
+1.20D+L+0.50S+W+1.60H	24.69 psi	150.00psi	0.1646	OK
+0.90D+W+1.60H	8.82 psi	150.00psi	0.05878	OK
+1.20D+L+0.20S+E+1.60H	24.69 psi	150.00psi	0.1646	OK
+0.90D+E+0.90H	8.82 psi	150.00psi	0.05878	OK

General Footing

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DESCRIPTIO FTNG#3

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

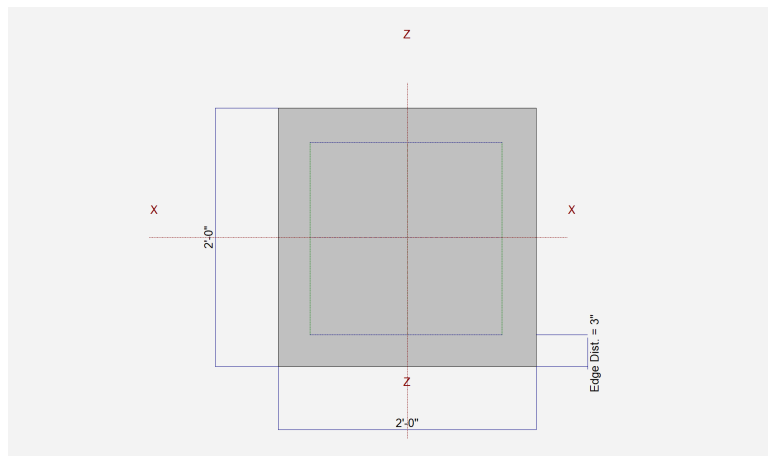
Allowable pressure increase per foot of depth when max. length or width is greater than	=	ksf
	=	ft

Dimensions

Width parallel to X-X Axis	=	2.0 ft
Length parallel to Z-Z Axis	=	2.0 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



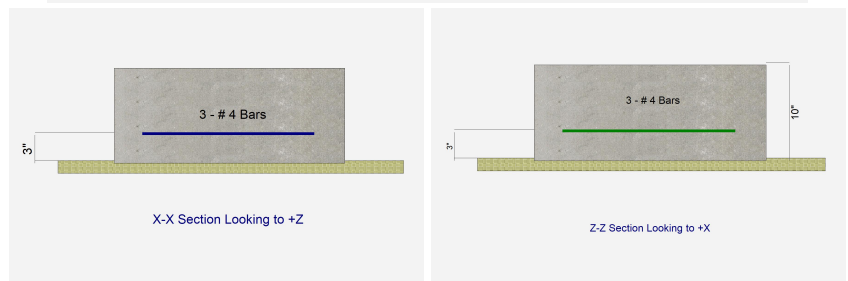
Reinforcing

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	=	1.0	2.640					k
OB : Overburden	=							ksf
M-xx	=							k-ft
M-zz	=							k-ft
V-x	=							k
V-z	=							k

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DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.6873	Soil Bearing	1.031 ksf	1.50 ksf	+D+L+H about Z-Z axis
PASS	n/a	Overturing - X-X	0.0 k-ft	0.0 k-ft	No Overturing
PASS	n/a	Overturing - Z-Z	0.0 k-ft	0.0 k-ft	No Overturing
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	0.1114	Z Flexure (+X)	0.6780 k-ft/ft	6.088 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1114	Z Flexure (-X)	0.6780 k-ft/ft	6.088 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1114	X Flexure (+Z)	0.6780 k-ft/ft	6.088 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1114	X Flexure (-Z)	0.6780 k-ft/ft	6.088 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.09040	1-way Shear (+X)	6.780 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.09040	1-way Shear (-X)	6.780 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.09040	1-way Shear (+Z)	6.780 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.09040	1-way Shear (-Z)	6.780 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1679	2-way Punching	25.183 psi	150.0 psi	+1.20D+0.50Lr+1.60L+1.60H

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+H	1.50	n/a	0.0	0.3708	0.3708	n/a	n/a	0.247
X-X, +D+L+H	1.50	n/a	0.0	1.031	1.031	n/a	n/a	0.687
X-X, +D+Lr+H	1.50	n/a	0.0	0.3708	0.3708	n/a	n/a	0.247
X-X, +D+S+H	1.50	n/a	0.0	0.3708	0.3708	n/a	n/a	0.247
X-X, +D+0.750Lr+0.750L+H	1.50	n/a	0.0	0.8658	0.8658	n/a	n/a	0.577
X-X, +D+0.750L+0.750S+H	1.50	n/a	0.0	0.8658	0.8658	n/a	n/a	0.577
X-X, +D+0.60W+H	1.50	n/a	0.0	0.3708	0.3708	n/a	n/a	0.247
X-X, +D+0.750Lr+0.750L+0.450W	1.50	n/a	0.0	0.8658	0.8658	n/a	n/a	0.577
X-X, +D+0.750L+0.750S+0.450W	1.50	n/a	0.0	0.8658	0.8658	n/a	n/a	0.577
X-X, +0.60D+0.60W+0.60H	1.50	n/a	0.0	0.2225	0.2225	n/a	n/a	0.148
X-X, +D+0.70E+0.60H	1.50	n/a	0.0	0.3708	0.3708	n/a	n/a	0.247
X-X, +D+0.750L+0.750S+0.5250E	1.50	n/a	0.0	0.8658	0.8658	n/a	n/a	0.577
X-X, +0.60D+0.70E+H	1.50	n/a	0.0	0.2225	0.2225	n/a	n/a	0.148
Z-Z, +D+H	1.50	0.0	n/a	n/a	n/a	0.3708	0.3708	0.247
Z-Z, +D+L+H	1.50	0.0	n/a	n/a	n/a	1.031	1.031	0.687
Z-Z, +D+Lr+H	1.50	0.0	n/a	n/a	n/a	0.3708	0.3708	0.247
Z-Z, +D+S+H	1.50	0.0	n/a	n/a	n/a	0.3708	0.3708	0.247
Z-Z, +D+0.750Lr+0.750L+H	1.50	0.0	n/a	n/a	n/a	0.8658	0.8658	0.577
Z-Z, +D+0.750L+0.750S+H	1.50	0.0	n/a	n/a	n/a	0.8658	0.8658	0.577
Z-Z, +D+0.60W+H	1.50	0.0	n/a	n/a	n/a	0.3708	0.3708	0.247
Z-Z, +D+0.750Lr+0.750L+0.450W	1.50	0.0	n/a	n/a	n/a	0.8658	0.8658	0.577
Z-Z, +D+0.750L+0.750S+0.450W	1.50	0.0	n/a	n/a	n/a	0.8658	0.8658	0.577
Z-Z, +0.60D+0.60W+0.60H	1.50	0.0	n/a	n/a	n/a	0.2225	0.2225	0.148
Z-Z, +D+0.70E+0.60H	1.50	0.0	n/a	n/a	n/a	0.3708	0.3708	0.247
Z-Z, +D+0.750L+0.750S+0.5250E	1.50	0.0	n/a	n/a	n/a	0.8658	0.8658	0.577
Z-Z, +0.60D+0.70E+H	1.50	0.0	n/a	n/a	n/a	0.2225	0.2225	0.148

Overturing Stability

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

Sliding Stability

All units k

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

General Footing

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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
X-X, +1.40D+1.60H	0.1750	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.40D+1.60H	0.1750	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.6780	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.6780	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+1.60L+0.50S+1.60H	0.6780	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+1.60L+0.50S+1.60H	0.6780	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+1.60Lr+L+1.60H	0.480	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+1.60Lr+L+1.60H	0.480	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+1.60Lr+0.50W+1.60	0.150	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+1.60Lr+0.50W+1.60	0.150	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+L+1.60S+1.60H	0.480	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+L+1.60S+1.60H	0.480	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+1.60S+0.50W+1.60H	0.150	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+1.60S+0.50W+1.60H	0.150	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	0.480	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	0.480	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+L+0.50S+W+1.60H	0.480	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+L+0.50S+W+1.60H	0.480	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +0.90D+W+1.60H	0.1125	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +0.90D+W+1.60H	0.1125	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+L+0.20S+E+1.60H	0.480	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +1.20D+L+0.20S+E+1.60H	0.480	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +0.90D+E+0.90H	0.1125	+Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
X-X, +0.90D+E+0.90H	0.1125	-Z	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.40D+1.60H	0.1750	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.40D+1.60H	0.1750	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.6780	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.6780	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	0.6780	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	0.6780	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	0.480	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	0.480	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60	0.150	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60	0.150	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+L+1.60S+1.60H	0.480	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+L+1.60S+1.60H	0.480	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	0.150	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	0.150	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	0.480	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	0.480	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	0.480	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	0.480	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +0.90D+W+1.60H	0.1125	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +0.90D+W+1.60H	0.1125	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+L+0.20S+E+1.60H	0.480	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +1.20D+L+0.20S+E+1.60H	0.480	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +0.90D+E+0.90H	0.1125	-X	Bottom	0.2160	Min Temp %	0.30	6.088	OK
Z-Z, +0.90D+E+0.90H	0.1125	+X	Bottom	0.2160	Min Temp %	0.30	6.088	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	1.75 psi	1.75 psi	1.75 psi	1.75 psi	1.75 psi	75.00 psi	0.02	OK
+1.20D+0.50Lr+1.60L+1.60H	6.78 psi	6.78 psi	6.78 psi	6.78 psi	6.78 psi	75.00 psi	0.09	OK
+1.20D+1.60L+0.50S+1.60H	6.78 psi	6.78 psi	6.78 psi	6.78 psi	6.78 psi	75.00 psi	0.09	OK
+1.20D+1.60Lr+L+1.60H	4.80 psi	4.80 psi	4.80 psi	4.80 psi	4.80 psi	75.00 psi	0.06	OK
+1.20D+1.60Lr+0.50W+1.60H	1.50 psi	1.50 psi	1.50 psi	1.50 psi	1.50 psi	75.00 psi	0.02	OK
+1.20D+L+1.60S+1.60H	4.80 psi	4.80 psi	4.80 psi	4.80 psi	4.80 psi	75.00 psi	0.06	OK
+1.20D+1.60S+0.50W+1.60H	1.50 psi	1.50 psi	1.50 psi	1.50 psi	1.50 psi	75.00 psi	0.02	OK
+1.20D+0.50Lr+L+W+1.60H	4.80 psi	4.80 psi	4.80 psi	4.80 psi	4.80 psi	75.00 psi	0.06	OK
+1.20D+L+0.50S+W+1.60H	4.80 psi	4.80 psi	4.80 psi	4.80 psi	4.80 psi	75.00 psi	0.06	OK
+0.90D+W+1.60H	1.13 psi	1.13 psi	1.13 psi	1.13 psi	1.13 psi	75.00 psi	0.02	OK
+1.20D+L+0.20S+E+1.60H	4.80 psi	4.80 psi	4.80 psi	4.80 psi	4.80 psi	75.00 psi	0.06	OK

Project Title:
 Engineer:
 Project ID:
 Project Descr:

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General Footing

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DESCRIPTIO FTNG#3

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+0.90D+E+0.90H	1.13 psi	1.13 psi	1.13 psi	1.13 psi	1.13 psi	75.00 psi	0.02	OK
Two-Way "Punching" Shear								All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	6.50 psi	150.00psi	0.04333	OK
+1.20D+0.50Lr+1.60L+1.60H	25.18 psi	150.00psi	0.1679	OK
+1.20D+1.60L+0.50S+1.60H	25.18 psi	150.00psi	0.1679	OK
+1.20D+1.60Lr+L+1.60H	17.83 psi	150.00psi	0.1189	OK
+1.20D+1.60Lr+0.50W+1.60H	5.57 psi	150.00psi	0.03714	OK
+1.20D+L+1.60S+1.60H	17.83 psi	150.00psi	0.1189	OK
+1.20D+1.60S+0.50W+1.60H	5.57 psi	150.00psi	0.03714	OK
+1.20D+0.50Lr+L+W+1.60H	17.83 psi	150.00psi	0.1189	OK
+1.20D+L+0.50S+W+1.60H	17.83 psi	150.00psi	0.1189	OK
+0.90D+W+1.60H	4.18 psi	150.00psi	0.02786	OK
+1.20D+L+0.20S+E+1.60H	17.83 psi	150.00psi	0.1189	OK
+0.90D+E+0.90H	4.18 psi	150.00psi	0.02786	OK