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FILE NO. 170716

TITLE MERCER ISLAND RESIDENCE
5236 W. Mercer Way
New Construction

PREPARED BY Tom Wolfe, PE



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Introduction

The following pages provide lateral and gravity load calculations, and details, for a new single family residence and detached garage.

The referenced soldier pile retaining wall was previously installed under a separate permit and is not in the scope of this engineering report

Revision 4: June 11 2024

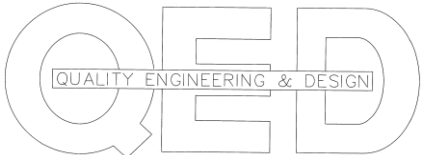
Previously submitted engineering is revised to exclude the roof penthouse, reconfigure some walls and detach the garage.

The following Codes and references are used to develop loads and allowables:

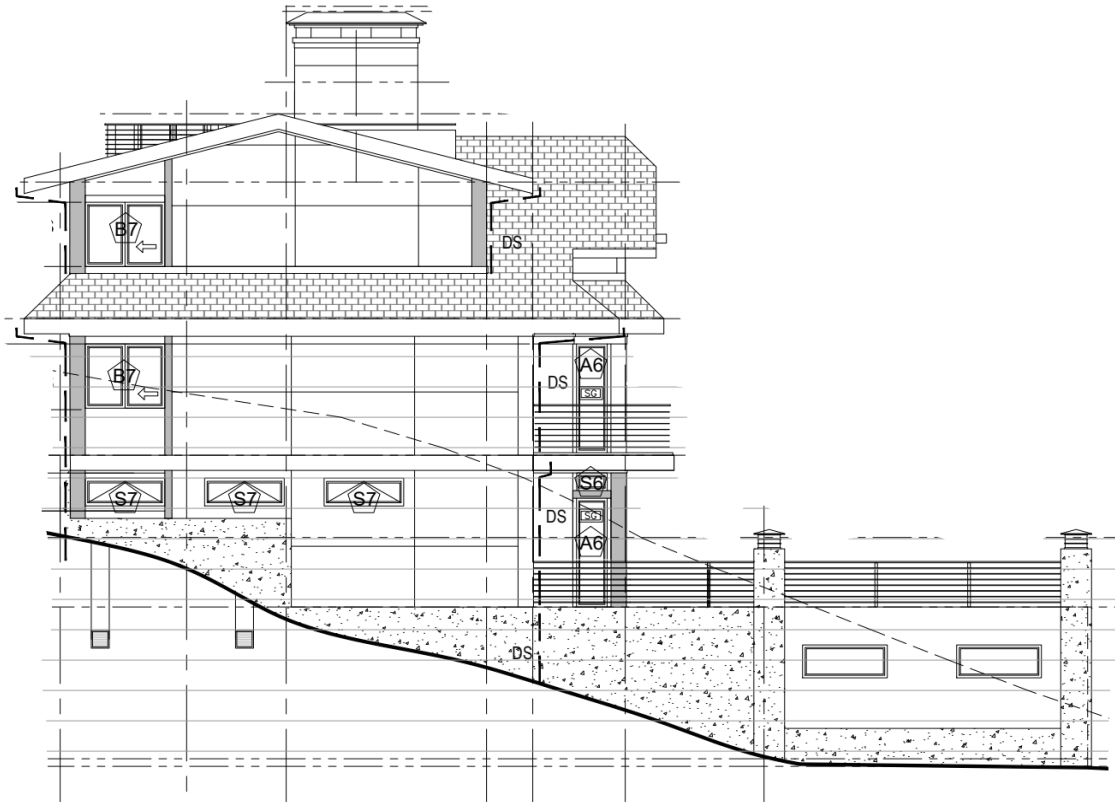
- [1] "International Building Code (IBC)", 2021 Edition, International Code Council
- [2] ASCE 7-16, "Minimum Design Loads for Buildings and Other Structures", American Society of Civil Engineers
- [3] National Design Specification (NDS), "Design Allowables for Wood Construction", American Forest & Paper Association, American Wood Council
- [4] American Wood Council; Special Design Provisions for Wind and Seismic
- [5] Simpson Strong-Tie, Catalog C-2024, "Wood Construction Connectors"
- [6] Frederick Merritt; Standard Handbook for Civil Engineers

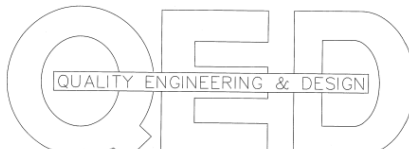
The following computer programs were utilized in the completion of this report:

PROFIS Anchor, Version 2.6.2, produced by Hilti Corporation
FORTE, Online Version, produced by Weyerhaeuser Corporation

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Introduction



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Seismic Loads

Ref.: Default Values

Site Classification, Ref. ASCE 7, Chapter 20

Site Class:

D

Site	Description		
A	Hard rock	D	Stiff soil
B	Rock	E	Soft clay soil
C	Very dense soil and soft rock	F	Soils requiring site response analysis

Latitude and Longitude of Site

Site: 5236 West Mercer Way, Seattle WA

Latitude: 47.55540 °

Longitude: -122.22518 °

Site-Specific Seismic Parameters:

Ref.: [ATC Hazards by Location \(atcouncil.org\)](http://atcouncil.org)

Code: ASCE 7-1016

ATC Hazards by Location

Search by Address Search by Coordinate

5236 W Mercer Way, Mercer Island, WA 98040, USA Search

Coordinates: 47.555402, -122.225179

Wind
 Snow
 Tornado
 Seismic

Reference Document: ASCE7-16

Risk Category: II

Site Class: D - Default

Basic Parameters

Name	Value	Description
S _S	1.45	MCE _R ground motion (period=0.2s)
S ₁	0.503	MCE _R ground motion (period=1.0s)
S _{MS}	1.74	Site-modified spectral acceleration value
S _{M1}	* null	Site-modified spectral acceleration value
S _{DS}	1.16	Numeric seismic design value at 0.2s SA
S _{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F _a	1.2	Site amplification factor at 0.2s
F _v	* null	Site amplification factor at 1.0s
CR _S	0.902	Coefficient of risk (0.2s)
CR ₁	0.898	Coefficient of risk (1.0s)
PGA	0.621	MCE _G peak ground acceleration
F _{PGA}	1.2	Site amplification factor at PGA
PGA _M	0.745	Site modified peak ground acceleration
T _L	6	Long-period transition period (s)

Spectral Response Acceleration Parameters:

short period: S_s = 1.450 g

1 sec period: S₁ = 0.503 g

Transition period: T_L = 6 sec

< Long Period transition period, Ref. ASCE 7, Fig. 22-12

Seismic Loads

Seismic Parameters:

Select Risk Category:	Non substantial risk to human life		II	Ref. ASCE 7 Table 1.5-1
$I_e =$	Seismic Importance Factor for Risk Category II	$I_{e,Risk} =$	1.00	Ref. ASCE 7 Table 1.5-2
Site Class			D	Ref. previous page
$S_s =$	Spectral Response Accel Param, short period	$S_s =$	1.45 g	Ref. previous page
$S_1 =$	Spectral Response Accel Param, 1 sec period	$S_1 =$	0.503 g	Ref. previous page
$F_a =$	Site Coefficient (based on S_s and Site Class)	$F_a =$	1	Ref. ASCE 7 Table 11.4-1
$F_v =$	Site Coefficient (based on S_1 and Site Class)	$F_v =$	1.5	Ref. ASCE 7 Table 11.4-2
$S_{MS} =$	MCE_R Spectral Response, short period	$S_{MS} = F_a S_s =$	1.45	Ref. ASCE 7 Eqn. 11.4-1
$S_{M1} =$	MCE_R Spectral Response, 1 sec period	$S_{M1} = F_v S_1 =$	0.7545	Ref. ASCE 7 Eqn. 11.4-2
$S_{DS} =$	Design Spectral Response, short period	$S_{DS} = 2/3 * S_{MS} =$	0.967	Ref. ASCE 7 Eqn. 11.4-3
$S_{D1} =$	Design Spectral Response, 1 sec period	$S_{D1} = 2/3 * S_{M1} =$	0.503	Ref. ASCE 7 Eqn. 11.4-4
Seismic Design Category	based on S_{DS} : D	} (use worst case)	D	Ref. ASCE 7 Table 11.6-1,2
(A = low, F = High)	based on S_{D1} : D			

Seismic Coefficients:

Ref. ASCE 7, Table 12.2-1

Structure Type	Building Structure	Can be different in X & Z directions.
Description:	Light Framed Wood Shear Walls	Light Framed Wood Shear Walls
R = Response Modification Factor:	X: $R_x = 7.00$	Z: $R_z = 7.00$
$\Omega_0 =$ Overstrength Factor:	$\Omega_{0,x} = 2.50$	$\Omega_{0,z} = 2.50$
$C_d =$ Deflection Amplification Factor:	$C_{d,x} = 4.00$	$C_{d,z} = 4.00$
N = Number of Stories =	N = 3	

Seismic Loads

Calculate Fundamental Period of Structure:

h_n = Highest point on structure	33	Ft.
C_u =	1.4	Ref ASCE 7 Table 12.8-1
C_t = for "all other structural systems"	0.02	Ref ASCE 7 Table 12.8-2
x = for "all other structural systems"	0.75	Ref ASCE 7 Table 12.8-2
T_a = Approx Period = $(C_t) (h_n)^x$ =	0.28	Ref ASCE 7 Eq 12.8-7
T_{max} = Maximum Period = $(C_u) (T_a)$ =	0.39	Ref ASCE 7 Sec 12.8.2
T = Period = greater of T_{max} and T_a	0.39	
T_o = $(0.2) (S_{D1} / S_{DS})$ =	0.10	Ref ASCE 7 Sec 11.4.5
T_s = (S_{D1} / S_{DS}) =	0.52	
T_L = Long Transition Period	6	Ref. ASCE 7, Fig. 22-12

Design Spectral Response Acceleration:

S_a = Design Spectral Response Acceleration = 0.97 Ref ASCE 7 Sec 11.4.5

Seismic Design Procedure:

Seismic Design Category = D	
Risk Category = II	
Structure Type is Light Framed Wood Shear Walls	Based on these conditions, from Table 12.6-1:
Number of Stories = 3	Equivalent Lateral Force Procedure is Acceptable

Determine C_s :

$$C_s = \frac{SDS}{R / I_{seismic}} = 0.138$$

C_{sMax} = 0.186 Ref ASCE 7 Eq 12.8-3 and 12.8-4

C_{sMin} = 0.043 Ref ASCE 7 Eq 12.8-5 and 12.8-6

Governing Value for C_s = 0.138

Seismic Base Shear = $V = C_s \times W$

For Allowable Stress Procedure (ASD), $F_s = 0.7 \times C_s = 0.097$

Seismic Base Shear = $0.7C_s \times W$

Seismic Loads

Shear wall loads

S/W Designation	Allowable Load Lb. / Ft.
P1-6	242
P1-4	353
P1-3	456
P1-2	595
P2-6	484
P2-4	707
P2-3	911
P2-2	1190

Calculated Shear Wall values from SDPWS:

- a) use lower values for Seismic
- b) Use values for 15/32" structural panels per Footnote 2
- c) Assume Hem-fir #2 framing with G = 0.43 per Footnote 3

Wall Type	Tabulated Value (Table 4.3A)	Tabulated Value x 0.5 x 0.93	
P1-6	520	242	
P1-4	760	353	
P1-3	980	456	
P1-2	1280	595	
P2-6	1040	484	See Section 4.3.3.3
P2-4	1520	707	See Section 4.3.3.3
P2-3	1960	911	See Section 4.3.3.3
P2-2	2560	1190	See Section 4.3.3.3

Seismic Vertical Load Dist

Determine Seismic Weight:

Level	Area Ft ²	Roof Lb.	Floor Lb.	Ext Wall Lb.	Int Wall Lb.	Total Lb.	
Roof Level	0	0	0	0	0	0	Penthouse removed
3rd Floor	1404	5200	16400	14220	6408	42228	
2nd Floor	1404	5100	7680	7900	2960	23640	
1st Floor	1710	0	7680	20000	4960	32640	
Total Seismic weight						98508	

Seismic Base Shear = 0.7(Cs)(W) = 0.7(0.138)(W) = 9522.4

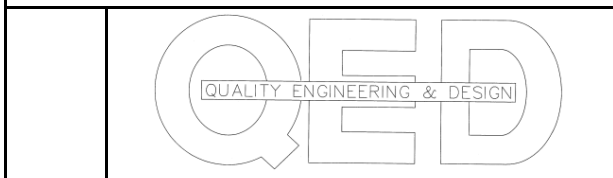
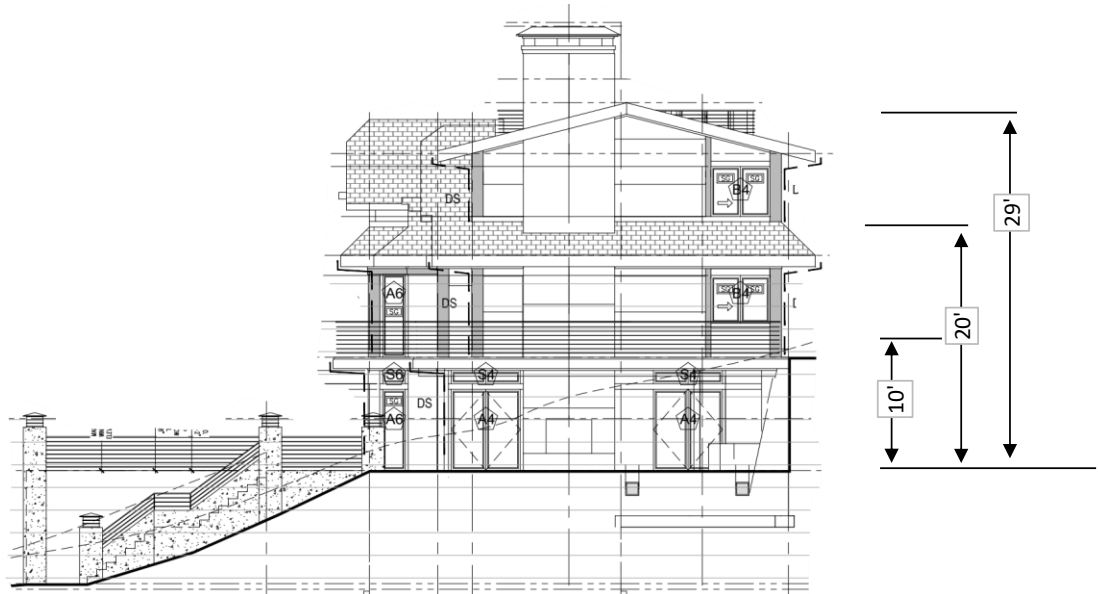
VERTICAL DISTRIBUTION OF SEISMIC FORCE

Level	w _x	h _x	w _x h _x ^k	C _{vx}	F _x
Roof Level	0	37.3	0	0.000	0.0
3rd Floor	42228	29	1224612	0.605	5762.0
2nd Floor	23640	20	472800	0.234	2224.6
1st Floor	32640	10	326400	0.161	1535.8
SUM =	98508		2023812		9522.4

k = 1 for T < 0.5

$$C_{vx} = \frac{w_x h_x^k}{\sum_{i=1}^n w_i h_i^k}$$

$$F_x = C_{vx} V$$



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Wind Parameters

Use Directional Procedure per ASCE 7 Chapter 27

Per Section 27.4.6, for buildings meeting the requirements of Appendix D, paragraph D1.1, only Case 1 and 3 of Figure 27.4-8 need to be considered. Additionally, for flexible diaphragm structure, Case 1 will govern for shear wall design. Therefore, only Case 1 is considered.

Basic Wind Parameters:

Risk Category:	Non substantial risk to human life	II	ASCE 7 Table 1.5-1
$I_w =$ Wind Importance Factor	for Risk Category II	1.00	ASCE 7 Table 1.5-2
Exposure		C	
$V =$ Basic Wind Speed		110	ASCE 7 Figure 26.5-1
$K_{zt} =$ Spectral Response Accel Param, short period		1.60	ASCE 7 Section 26.8
$K_d =$		0.85	ASCE 7 Table 26.2-1
$G =$ Gust Factor		0.85	ASCE 7 Sec 26.9.1 & 26.9.2
$G_{cpi} =$ Site Coefficient (positive & Negative)		0.18	ASCE 7 Table 26.11-1

Story Heights:	10	Ft., Lower Floor	0	Ft., Roof Height
	10	Ft., Main Floor	29	Ft. Mean Roof Height
	9	Ft., Upper Floor		
	9	Roof Level Enclosure		

Wind Pressure at Upper Floor:

$$z = \frac{\text{Upper Floor} + \text{Main} + \text{Lower}}{2} = 24.5 \text{ Ft.} = \text{Mean wall height at upper floor}$$

$$z_g = 900 \text{ from Table 26.9-1} \quad K_z = 2.01 \times (z / z_g)^{(2/\alpha)} = 0.941$$

$$\alpha = 9.5 \text{ from Table 26.9-1} \quad K_h = 2.01 \times (h / z_g)^{(2/\alpha)} = 0.975$$

$$q_z = 0.00256(K_z)(K_{zt})(K_d)(V^2) = 39.65$$

$$q_h = 0.00256(K_h)(K_{zt})(K_d)(V^2) = 41.09$$

Wind Pressure at Main Floor:

$$z = \frac{\text{Main Floor} + \text{Lower}}{2} = 15 \text{ Ft.} = \text{Mean wall height at Main floor}$$

$$q_z = 0.00256(K_z)(K_{zt})(K_d)(V^2) = 35.76 \quad K_z = 2.01 \times (z / z_g)^{(2/\alpha)} = 0.849$$

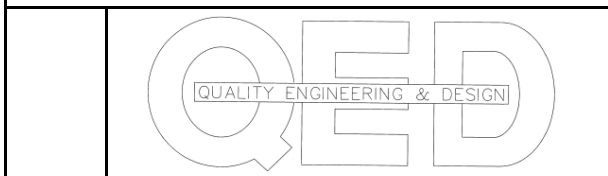
$$q_h = 0.00256(K_h)(K_{zt})(K_d)(V^2) = 41.09 \quad K_h = 2.01 \times (h / z_g)^{(2/\alpha)} = 0.975$$

Wind Pressure at Lower Floor:

$$z = \frac{\text{Lower Floor}}{2} = 5 \text{ Ft.} = \text{Mean wall height at Main floor}$$

$$q_z = 0.00256(K_z)(K_{zt})(K_d)(V^2) = 28.38 \quad K_z = 2.01 \times (z / z_g)^{(2/\alpha)} = 0.674$$

$$q_h = 0.00256(K_h)(K_{zt})(K_d)(V^2) = 41.09 \quad K_h = 2.01 \times (h / z_g)^{(2/\alpha)} = 0.975$$



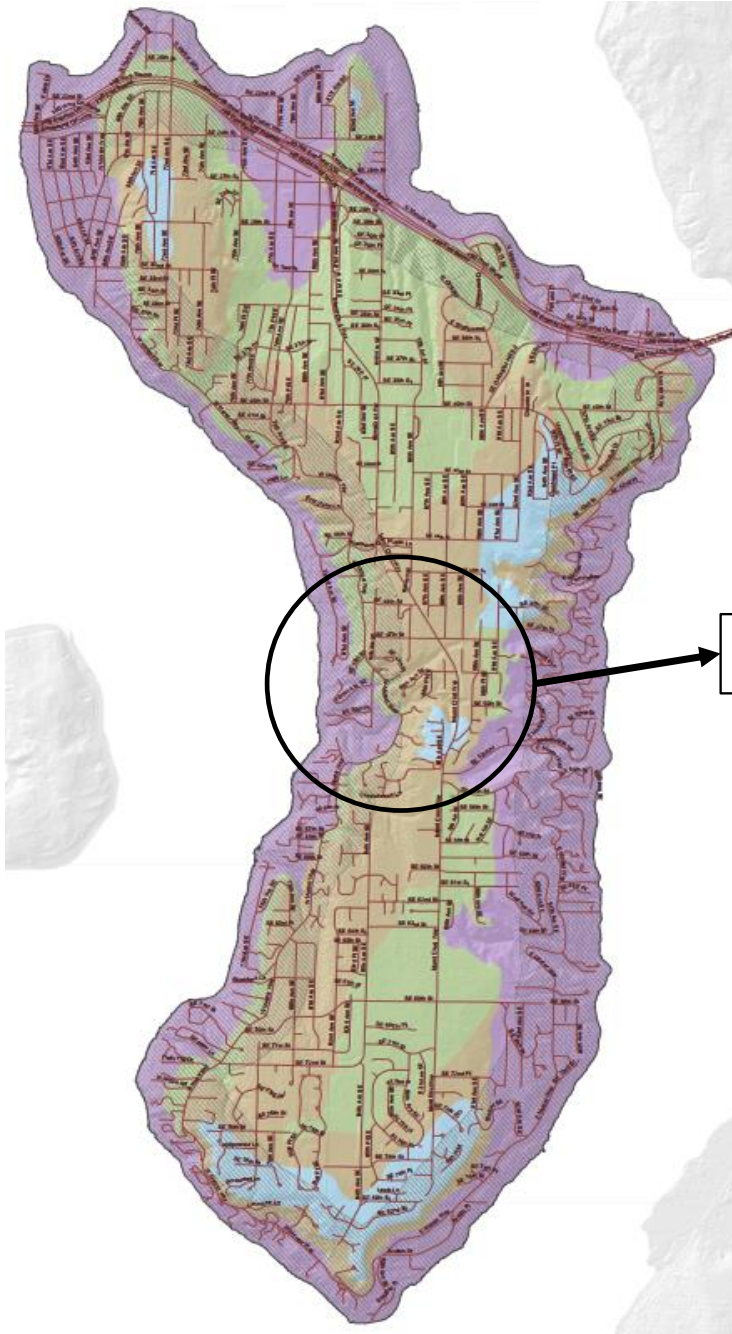
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Wind Loads-Kzt

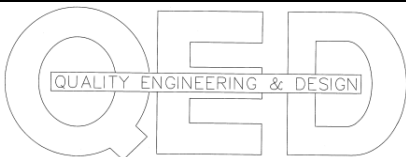
Calculate Kzt: Y
Kzt = 1.60 From Mercer Island Wind Map

**Mercer Island Wind Exposure
and Wind Speed-Up (Topographic Effect)**

by Development Services Group (DSG), City of Mercer Island
April 2009



See enlarged view on following page



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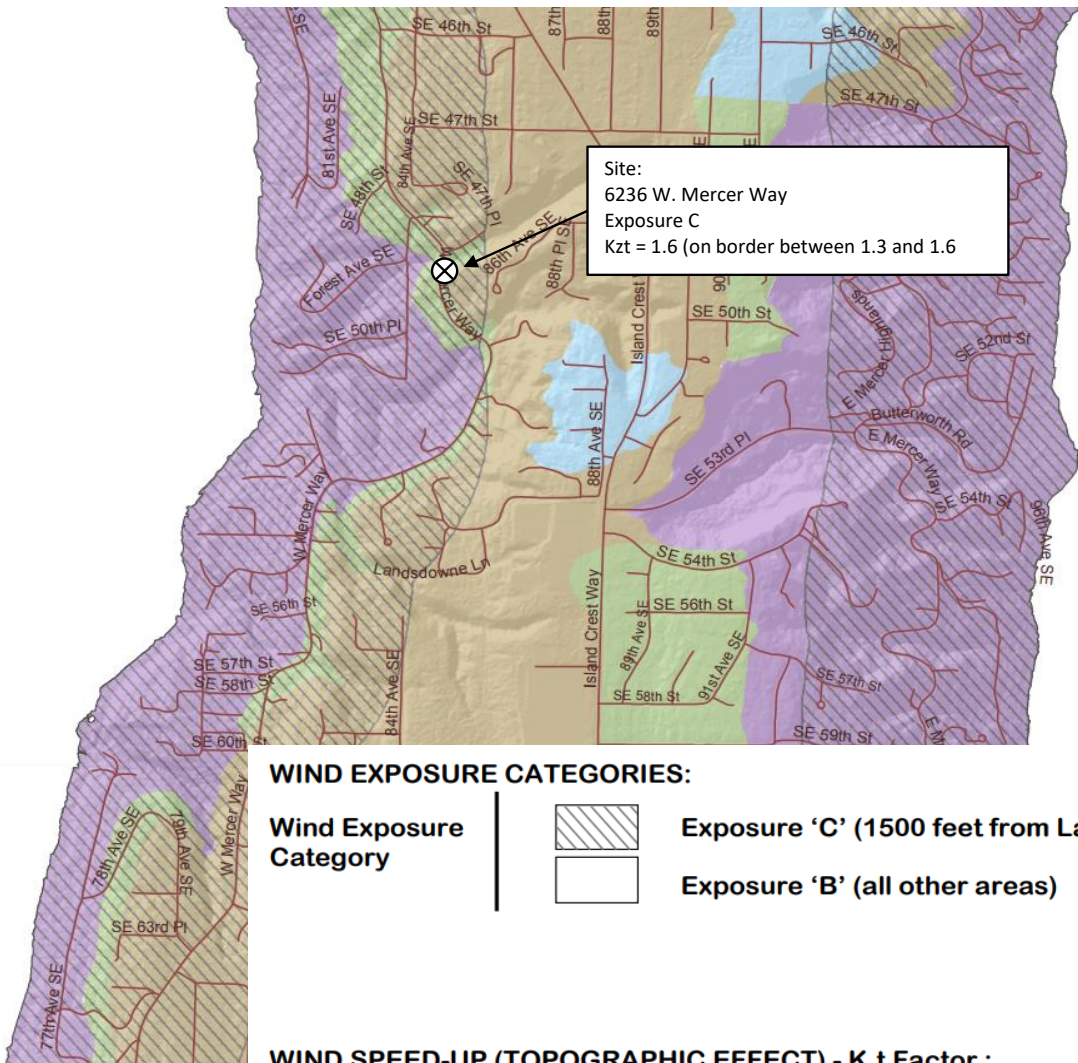
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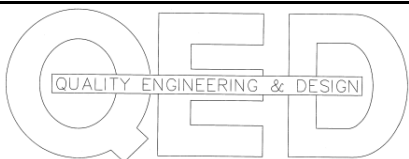
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Wind Loads-Kzt



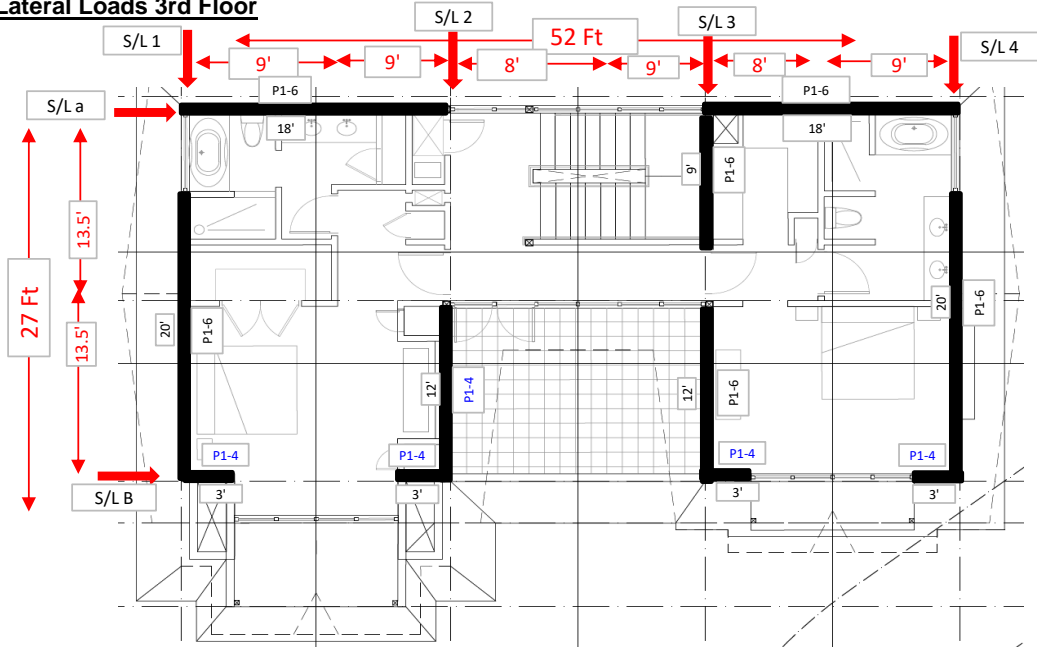
Site:
6236 W. Mercer Way
Exposure C
Kzt = 1.6 (on border between 1.3 and 1.6)



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Lateral Loads 3rd Floor



Upper Floor Plan
showing shear lines and tributary widths

Determine seismic weights per Shear Line (S/L):

Longitudinal Overall Length = 52 Ft
Transverse Overall Width = 27 Ft

Dead Load for Floor area with Concrete Pavers = 10+15 = 25 psf
Dead Load for Floor & Roof weight calculations = 10 psf
Dead Load for Exterior Wall weight calculations = 10 psf
Dead Load for Interior Wall weight calculations = 8 psf

Tributary Widths		
S/L a	13.5	Ft
S/L b	13.5	Ft
S/L c	0	Ft
S/L 1	9	Ft
S/L 2	17	Ft
S/L 3	17	Ft
S/L 4	9	Ft

SEISMIC WEIGHTS AND FORCE UPPER FLOOR				
S/L	Roof Area x 10	Floor (above) Area x 10	Exterior Walls = Length x Story Ht x 10	Interior Walls
a	2600	8200	7110	3960
b	2600	8200	7110	2448
c	0	0	0	0
d	0	0	0	0
TOTAL	5200	16400	14220	6408

Seismic Load Upper Floor = 5762.04

$$\text{Force per S/L} = \rho F_{\text{upper}} \times \frac{\text{Trib L}}{\text{Total L}}$$

SEISMIC LOAD PER S/L			
	Longitudinal	Transverse	
a	3745.33	1	1296.46
b	3745.33	2	2448.87
c	0	3	2448.87
d	0	4	1296.46

Rho = 1.3 for Upper Floor Longitudinal (see calculation in following section)

Rho = 1.3 for Upper Floor Transverse (see calculation in following section)

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Lateral Loads 3rd Floor

WIND LOAD Cp FACTOR

LONGITUDINAL DIRECTION									
Parallel to Ridge									
WALLS					ROOF				
L / B	Cp			h / L	Pitch	Angle	Cp		
	Windward	Leeward			inch/Ft	Deg	Windward	Leeward	
52/27= 1.9	0.8	-0.3		29/52= 0.6	0	0.00	-0.7	-0.18	
TRANSVERSE DIRECTION									
Normal to Ridge									
27/52= 0.5	0.8	-0.5		29/27= 1.1	0	0.00	0.2	-0.6	

CALCULATED WIND PRESSURE

LONGITUDINAL DIRECTION					
Parallel to Ridge					
Windward Wall	Leeward Wall	Total Wall	Windward Roof	Leeward Roof	Total Roof
(qzGCp) - (qhGcpi)	(qhGCp) - (qhGcpi)	Windward - Leeward	(qhGCp) - (qhGcpi)	(qhGCp) - (qhGcpi)	Horiz Comp
		37.44	(qhGCp) - (qhGcpi)	(qhGCp) - (qhGcpi)	-31.84

TRANSVERSE DIRECTION					
Normal to Ridge					
(qzGCp) - (qhGcpi)	(qhGCp) - (qhGcpi)	44.43	(qhGCp) - (qhGcpi)	(qhGCp) - (qhGcpi)	-0.41

GOVERNING WIND LOAD - COMPARE CALCULATED PRESSURE W/ MINIMUM ALLOWED

LONGITUDINAL	Wall	37.4	TRANSVERSE	Wall	44.4
	Roof	8.0		Roof	8.0
		Min per 27.4-1			Min per 27.4-1

WIND LOADS PER SHEAR LINE

S/L	TRIBUTARY WIDTH	STORY HEIGHT	WALL WIND LOAD =W x Hw x Pw	ROOF WIND LOAD =W x Hr x Pr	TOTAL = (0.6)W
a	13.5	9	4549.0	0	2,729.4
b	13.5	9	4549.0	0	2,729.4
c	0	9	0.0	0	0.0
d					
Total Longitudinal Wind Load =					5,458.8

1	9	9	3598.4	0.0	2,159.1
2	17	9	6797.0	0.0	4,078.2
3	17	9	6797.0	0.0	4,078.2
4	9	9	3598.4	0.0	2,159.1
Total Transverse Wind Load =					12,474.5

COMPARING SEISMIC AND WIND LOADS:

Longitudinal Direction: WIND GOVERNS
 Transverse Direction: WIND GOVERNS

* Per Load Case 6 in ASCE
 7 Max wind load
 considered = 0.6W

Governing loads per shear line:

S/L	LOAD	S/L	LOAD
a	2,729	1	2,159
b	2,729	2	4,078
c	0	3	4,078
d	0	4	2,159

Wall Aspect Ratio

Min Allowed Wall Length = 9/3.5 = 2.6 Ft
 For walls < 9/2 = 4.5 Ft, Strength reduction =:
 (2b)/h per SDPWS 4.3.4.3
 For L = 3.5 → 0.78
 For L = 3 → 0.67

Lateral Loads 3rd Floor

UNIT LATERAL LOADS PER S/L				
S/L	S/W LENGTHS (ft)	TOTAL (ft.)	UNIT LOAD (plf)	S/W TYPE
a	18' + 17"	35	77.98	P1-6
b	(3'+3'+3'+3')(0.67)	8	341.18	P1-4
c				
d				
1	20'	20	107.95	P1-6
2	12'	12	339.85	P1-4
3	9'+12'	21	194.20	P1-6
4	20'	20	107.95	P1-6

CALCULATE SHEAR WALL UPLIFT & HOLD-DOWNS					
For resisting weight use 10 psf x 60% = 6 psf (60% of dead load resists overturning)					

S/L	WALL LENGTH	WALL WEIGHT*	WALL HEIGHT	UPLIFT (Unit Load x L)(H) - (Weight)(L / 2)	HOLD-DOWN TYPE
a	18	1800	9	-198.2	No Hold-Down Required
	17	1700	9	-148.2	No Hold-Down Required

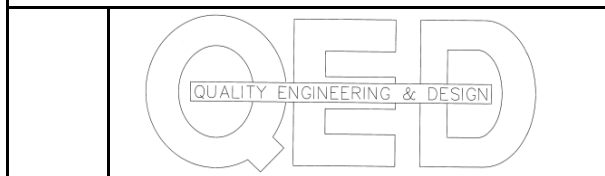
b	3	300	9	2920.6	MST37 (3815#)
	3	300	9	2920.6	MST37 (3815#)
	3	300	9	2920.6	MST37 (3815#)
	3	300	9	2920.6	MST37 (3815#)

1	20	1200	9	371.6	MST37 (3815#)

2	12	720	9	2698.7	MST37 (3815#)

3	9	540	9	1477.8	MST37 (3815#)
	12	720	9	1387.8	MST37 (3815#)

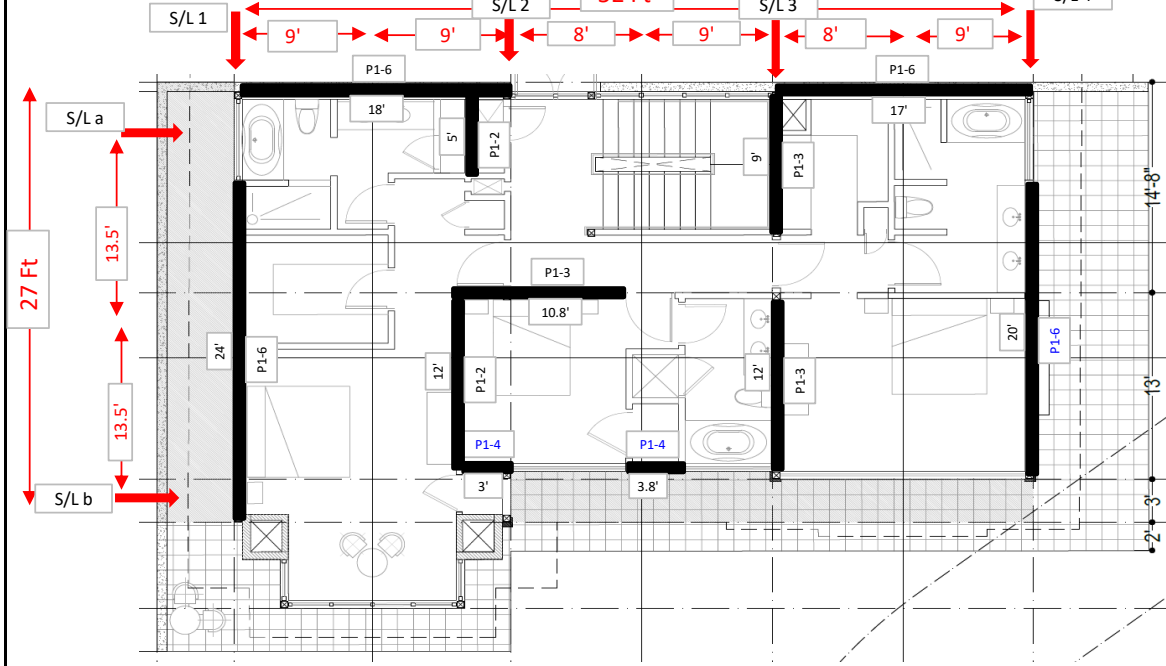
4	20	1200	9	371.6	MST37 (3815#)



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Lateral Loads 2nd Floor



Main Floor Plan
showing shear lines and tributary widths

Determine seismic weights per Shear Line (S/L):

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Tributary Widths		
S/L a	13.5	Ft
S/L b	13.5	Ft
S/L c	0	Ft
S/L 1	9	Ft
S/L 2	17	Ft
S/L 3	17	Ft
S/L 4	9	Ft

SEISMIC WEIGHTS & FORCE FOR MAIN FLOOR				
S/L	Deck	Floor (above)	Exterior Walls	Interior Walls
	Above	Area x 10	= L x H x 10	
a	2550	3840	1350	2960
b	2550	3840	6550	0
c	0	0	0	0
d	0	0	0	0
TOTAL	5100	7680	7900	2960

Seismic Load Upper Floor = 2224.62

$$\text{Force per S/L} = \rho F_{\text{upper}} \times \frac{\text{Trib L}}{\text{Total L}}$$

SEISMIC LOAD PER S/L				
	Longitudinal		Transverse	
a	1183.09		1	500.539
b	1183.09		2	945.463
c	0		3	945.463
d	0		4	500.539

Rho = 1.3 for Main Floor Longitudinal (see calculation in following section)
Rho = 1.3 for Main Floor Transverse (see calculation in following section)

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Lateral Loads 2nd Floor

WIND LOAD Cp FACTOR

LONGITUDINAL DIRECTION									
Parallel to Ridge									
WALLS					ROOF				
L / B	Cp			h / L	Pitch	Angle	Cp		
	Windward	Leeward			inch/Ft	Deg	Windward	Leeward	
52/33= 1.6	0.8	-0.3		29/52= 0.6	0	0.00	-0.7	-0.18	
TRANSVERSE DIRECTION									
Normal to Ridge									
33/52= 0.6	0.8	-0.5		29/33= 0.9	0	0.00	0.2	-0.6	

CALCULATED WIND PRESSURE

LONGITUDINAL DIRECTION									
Parallel to Ridge									
Windward Wall	Leeward Wall	Total Wall		Windward Roof	Leeward Roof	Total Roof			
(qzGCp) - (qhGcpi)	(qhGCp) - (qhGcpi)	Windward - Leeward		(qhGCp) - (qhGcpi)	(qhGCp) - (qhGcpi)	Horiz Comp			
		33.44				-31.84			

TRANSVERSE DIRECTION									
Normal to Ridge									
(qzGCp) - (qhGcpi)	(qhGCp) - (qhGcpi)	41.78		(qhGCp) - (qhGcpi)	(qhGCp) - (qhGcpi)	-0.41			

GOVERNING WIND LOAD - COMPARE CALCULATED PRESSURE W/ MINIMUM ALLOWED

LONGITUDINAL	Wall	33.4	Min per 27.4-1	TRANSVERSE	Wall	41.8	Min per 27.4-1
	Roof	8.0			Roof	8.0	

WIND LOADS PER SHEAR LINE

S/L	TRIBUTARY WIDTH	STORY HEIGHT	WALL WIND LOAD =W x Hw x Pw	ROOF WIND LOAD =W x Hr x Pr	TOTAL (= 0.6W)	COMBINED TOTAL add upper floor
a	13.5	10	4,514.0	0.0	2,708.4	5,437.8
b	13.5	10	4,514.0	0.0	2,708.4	5,437.8
c	0	10	0.0	0.0	0.0	0.0
d	0	10	0.0	0.0	0.0	0.0
Total Longitudinal Wind Load =					5,416.8	10,875.6

1	9	10	3,760.1	0.0	2,256.1	4,415.1
2	17	10	7,102.4	0.0	4,261.5	8,339.7
3	17	10	7,102.4	0.0	4,261.5	8,339.7
4	9	10	3,760.1	0.0	2,256.1	4,415.1
Total Transverse Wind Load =					13,035.0	25,509.6

COMPARING SEISMIC AND WIND LOADS:

Longitudinal Direction: WIND GOVERNS
 Transverse Direction: WIND GOVERNS

* Per Load Case 6 in ASCE 7
 Max wind load considered = 0.6W

Governing loads per shear line:

S/L	LOAD	S/L	LOAD
a	5437.79	1	4415.12
b	5437.79	2	8339.67
c	0	3	8339.67
d	0	4	4415.12

Wall Aspect Ratio

Min Allowed Wall Length = 10/3.5 = 2.9 Ft
 For walls < 10/2 = 5 Ft, Strength reduction =:
 (2b)/h per SDPWS 4.3.4.3
 For L = 3 → 0.67
 For L = 3.75 → 0.83

Lateral Loads 2nd Floor

UNIT LATERAL LOADS PER S/L				
S/L	S/W LENGTHS (ft)	TOTAL (Ft.)	UNIT LOAD (plf)	S/W TYPE
a	18'+17'	35	155.37	P1-6
b	(3)(0.67)+(3.75)(0.83)+10.8	15.9	341.46	P1-4
c				
d				
1	24'	24	183.96	P1-6
2	12'+5'	17	490.57	P1-2
3	9'+12'	21	397.13	P1-3
4	20'	20	220.76	P1-6

CALCULATE SHEAR WALL UPLIFT & HOLD-DOWNS					
For resisting weight use 10 psf x 60% = 6 psf (60% of dead load resists overturning)					
S/L	WALL LENGTH	WALL WEIGHT	C.G. HEIGHT	UPLIFT (Unit Load x L)(H) - (Weight)(L / 2)	HOLD-DOWN TYPE
a	18	4000	9.5	-524	No Hold-Down Required
	17	3775	9.5	-412	No Hold-Down Required
b	3	1330	9.5	2,579	MST37 (3815#)
	3.75	1660	9.5	2,414	MST37 (3815#)
	10.8	2400	9.5	2,044	MST37 (3815#)

↑
Load is applied at average height of upper and main floor walls for purposes of determining overturning

$$= \frac{[H_{main} \times (H_{main} / 2)] + [H_{upper} \times ((H_{upper} / 2) + H_{main})]}{H_{main} + H_{upper}}$$

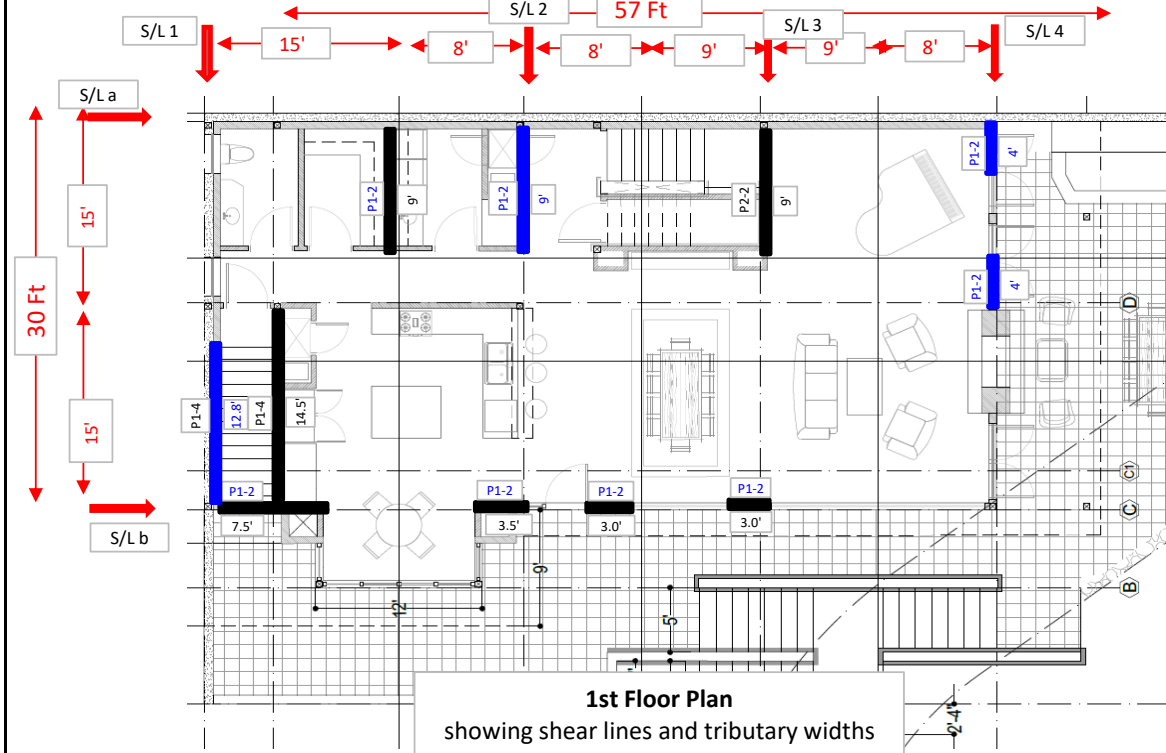
Lateral Loads 2nd Floor

CALCULATE SHEAR WALL UPLIFT & HOLD-DOWNS					
For resisting weight use 10 psf x 60% = 6 psf (60% of dead load resists overturning)					
S/L	WALL LENGTH	WALL WEIGHT	C.G. HEIGHT	UPLIFT (Unit Load x L)(H) - (Weight)(L / 2)	HOLD-DOWN TYPE
1	24	3000	9.5	248	MST37 (3815#)
2	12	1500	9.5	3,910	MST48 (4460#)
	5	650	9.5	4,335	MST60 (5800#)
3	9	1200	9.5	3,173	MST37 (3815#)
	12	1500	9.5	3,023	MST37 (3815#)
4	20	2525	9.5	835	MST37 (3815#)

↑
Load is applied at average height of upper and main floor walls for purposes of determining overturning

$$= \frac{[H_{main} \times (H_{main} / 2)] + [H_{upper} \times ((H_{upper} / 2) + H_{main})]}{H_{main} + H_{upper}}$$

Lateral Loads 1st Floor



1st Floor Plan
showing shear lines and tributary widths

Determine seismic weights per Shear 6235 Lake Washington Blvd

Longitudinal Overall Length = 70 Ft
Transverse Overall Width = 49 Ft

Dead Load for Floor & Roof weight calculations = 10 psf
Dead Load for Exterior Wall weight calculations = 10 psf
Dead Load for Interior Wall weight calculations = 8 psf

Tributary Widths		
S/L a	15	Ft
S/L b	15	Ft
S/L c	0	Ft
S/L 1	15	Ft
S/L 2	16	Ft
S/L 3	18	Ft
S/L 4	8	Ft

SEISMIC WEIGHTS & FORCE FOR LOWER FLOOR

S/L	Roof A x 10	Floor (above) Area x 10	Exterior Walls = L x H x 10	Interior Walls
a	0	3840	10000	3760
b	0	3840	10000	1200
c	0	0		0
d				
TOTAL	0	7680	20000	4960

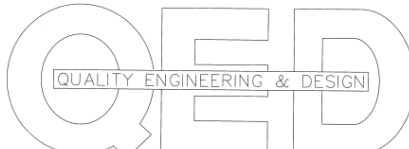
Seismic Load Upper Floor = 1535.78

$$\text{Force per S/L} = \rho F_{\text{upper}} \times \frac{\text{Trib L}}{\text{Total L}}$$

SEISMIC LOAD PER S/L				
	Longitudinal		Transverse	
a	611.177		1	427.824
b	611.177		2	456.345
c	0		3	513.388
d	0		4	228.173

Rho = 1.3 for Main Floor Longitudinal (see calculation in following section)
Rho = 1.3 for Main Floor Transverse (see calculation in following section)

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Lateral Loads 1st Floor									
WIND LOAD Cp FACTOR									
LONGITUDINAL DIRECTION					Parallel to Ridge				
WALLS					ROOF				
L / B	Cp			h / L	Pitch	Angle	Cp		
	Windward	Leeward			inch/Ft	Deg	Windward	Leeward	
70/49= 1.4	0.8	-0.3		29/70= 0.4	0	0.00	-0.3	-0.18	
TRANSVERSE DIRECTION					Normal to Ridge				
49/70= 0.7	0.8	-0.5		29/49= 0.6	0	0.00	-0.4	-0.6	
CALCULATED WIND PRESSURE									
LONGITUDINAL DIRECTION					Parallel to Ridge				
Windward Wall	Leeward Wall	Total Wall		Windward Roof	Leeward Roof	Total Roof			
(qzGCp) - (qhGcpi)	(qhGCp) - (qhGcpi)	Windward - Leeward		(qhGCp) - (qhGcpi)	(qhGCp) - (qhGcpi)	Horiz Comp			
		29.77				-17.87			
TRANSVERSE DIRECTION					Normal to Ridge				
(qzGCp) - (qhGcpi)	(qhGCp) - (qhGcpi)	36.76		(qhGCp) - (qhGcpi)	(qhGCp) - (qhGcpi)	-21.36			
GOVERNING WIND LOAD - COMPARE CALCULATED PRESSURE W/ MINIMUM ALLOWED									
LONGITUDINAL	Wall	29.8			TRANSVERSE	Wall	36.8		
	Roof	8.0	Min per 27.4-1			Roof	8.0	Min per 27.4-1	
WIND LOADS PER SHEAR LINE									
S/L	TRIBUTARY WIDTH	STORY HEIGHT	WALL WIND LOAD =W x Hw x Pw	ROOF WIND LOAD =W x Hr x Pr	TOTAL (= 0.6 W)	COMBINED TOTAL add upper floor walls			
a	15	10	4,466.0	0.0	2,679.6	8,117.4			
b	15	10	4,466.0	0.0	2,679.6	8,117.4			
c	0	10	0.0	0.0	0.0	0.0			
d									
Total Longitudinal Wind Load =					5,359.2	16,234.7			
1	15	10	5,513.6	0.0	3,308.2	7,723.3			
2	16	0	0.0	0.0	0.0	8,339.7			
3	18	0	0.0	0.0	0.0	8,339.7			
4	8	0	0.0	0.0	0.0	4,415.1			
Total Transverse Wind Load =					3,308.2	28,817.8			
COMPARING SEISMIC AND WIND LOADS:									
Longitudinal Direction: WIND GOVERNS									
Transverse Direction: WIND GOVERNS									
Governing loads per shear line:					Wall Aspect Ratio				
S/L	LOAD		S/L	LOAD	Min Allowed Wall Length = 10/3.5 = 2.9 Ft				
a	8117.37		1	7723.31	For walls < 10/2 = 5 Ft, Strength reduction =:				
b	8117.37		2	8339.67	(2b)/h per SDPWS 4.3.4.3				
c	0		3	8339.67	For L = 3 ➡ 0.67				
d			4	4415.12	For L = 3.5 ➡ 0.78				
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Lateral Loads 1st Floor

UNIT LATERAL LOADS PER S/L				
S/L	S/W LENGTHS (ft)	TOTAL (Ft.)	UNIT LOAD (plf)	S/W TYPE
a	N/A. Resolved to foundation at level above			
b	7.5+(3.5)(0.78)+(3+3)(0.67)	14.2	570.75	P1-2
1	12.8'+14.5'	26.5	291.45	P1-4
2	9'+9'	18	463.31	P1-2
3	9'	9	926.63	P2-2
4	4' + 4'	8	551.89	P1-2

CALCULATE SHEAR WALL UPLIFT & HOLD-DOWNS
 For resisting weight use 10 psf x 60% = 6 psf (60% of dead load resists overturning)

S/L	WALL LENGTH	WALL WEIGHT*	C.G. HEIGHT	UPLIFT (Unit Load x L)(H) - (Weight)(L / 2)	HOLD-DOWN TYPE
a	N/A. Resolved to foundation at level above				

b	7.5	2500	14.5	7,026	HDU11- 6x Stud (9535#)
	3.5	1175	14.5	7,688	HDU11- 6x Stud (9535#)
	3	1000	14.5	7,776	HDU11- 6x Stud (9535#)

1	12.8	1760	14.5	3,346	STHD14 (5785#)
	14.5	2000	14.5	3,226	MST37 (3815#)

2	9	1200	14.5	6,118	HDU8 (6970#)
	9	1200	14.5	6,118	HDU8 (6970#)

3	9	2550	14.5	12,161	HDU14- 8x Stud (14390#)

4	4	733	14.5	7,636	HDU11- 6x Stud (9535#)
	4	733	14.5	7,636	HDU11- 6x Stud (9535#)

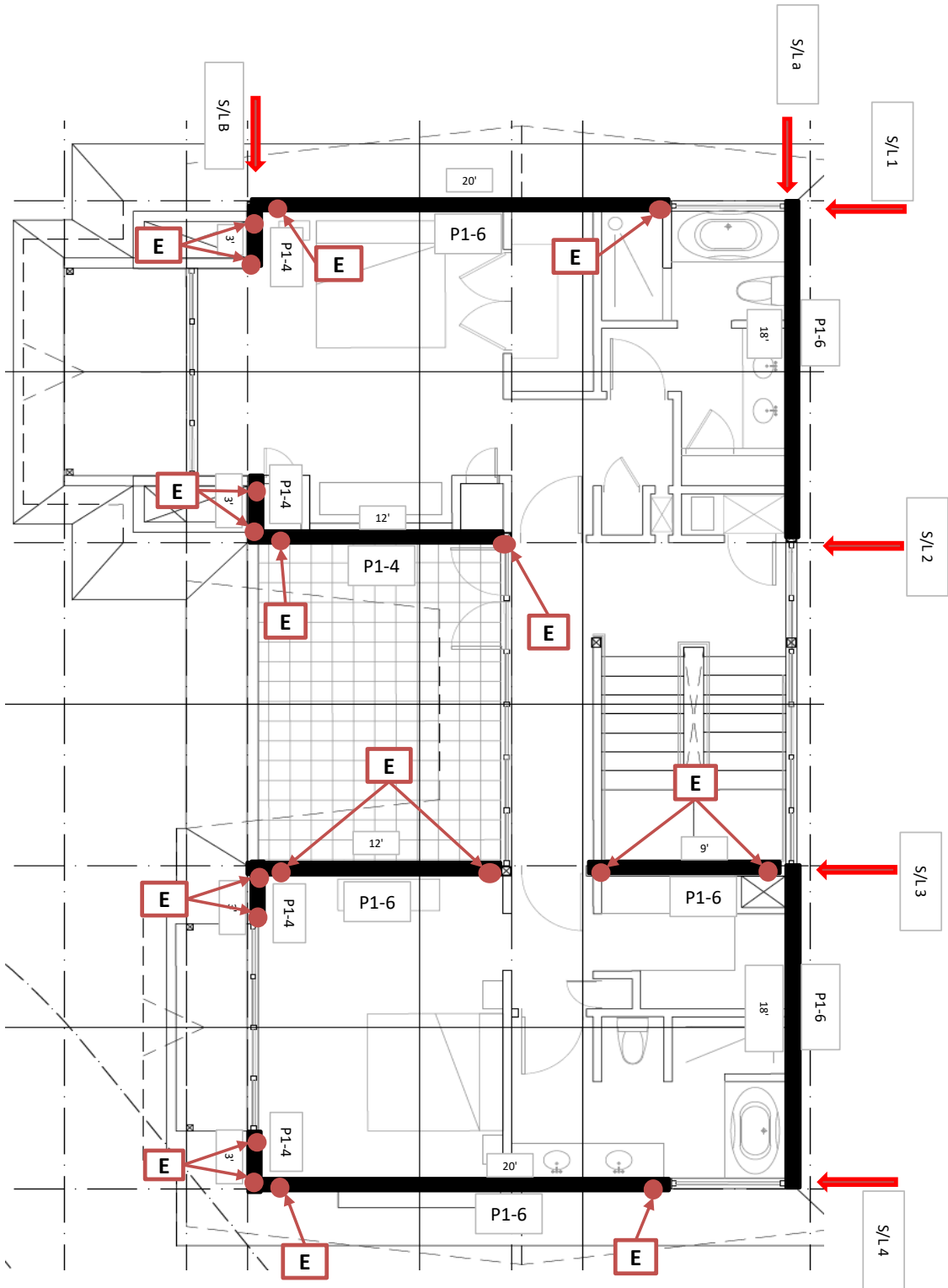
↑
 Load is applied at center of gravity of wall stack up for purposes of determining overturning

$$= [H_{lower} \times (H_{lower}/2)] + [H_{main} \times ((H_{main} / 2) + H_{lower})] + [H_{upper} \times ((H_{upper}/2) + H_{main} + H_{lower})]$$

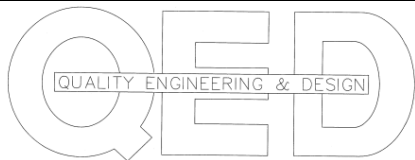
$$H_{lower} + H_{main} + H_{upper}$$

- * Install STHD14 into new concrete of MST48 into existing.
- ** Install MST48 Strap. Bolt to face of existing foundation wall and nail to shear wall (see Detail)

Lateral Engineering Sketches



3rd Floor Shear Plan



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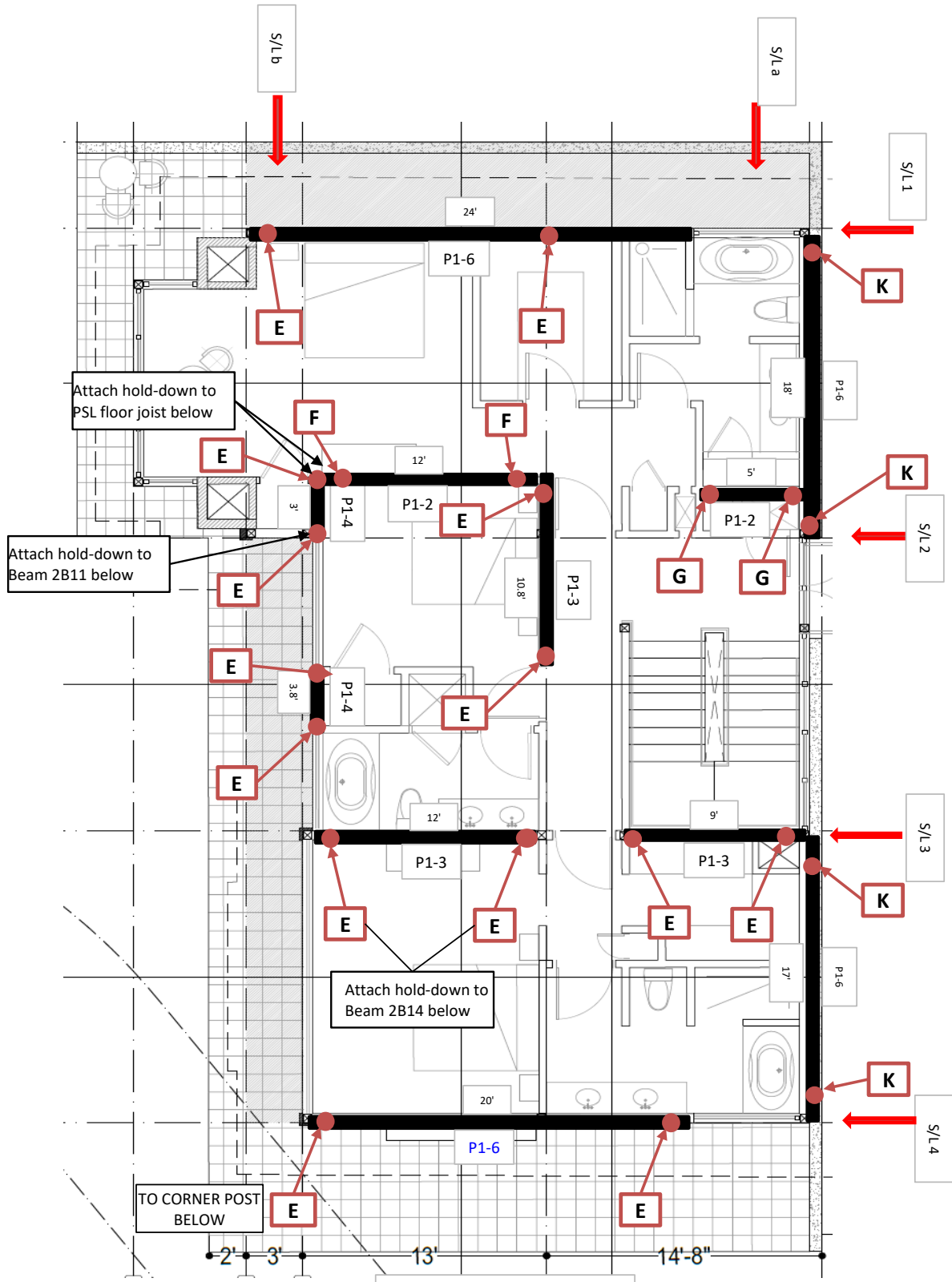
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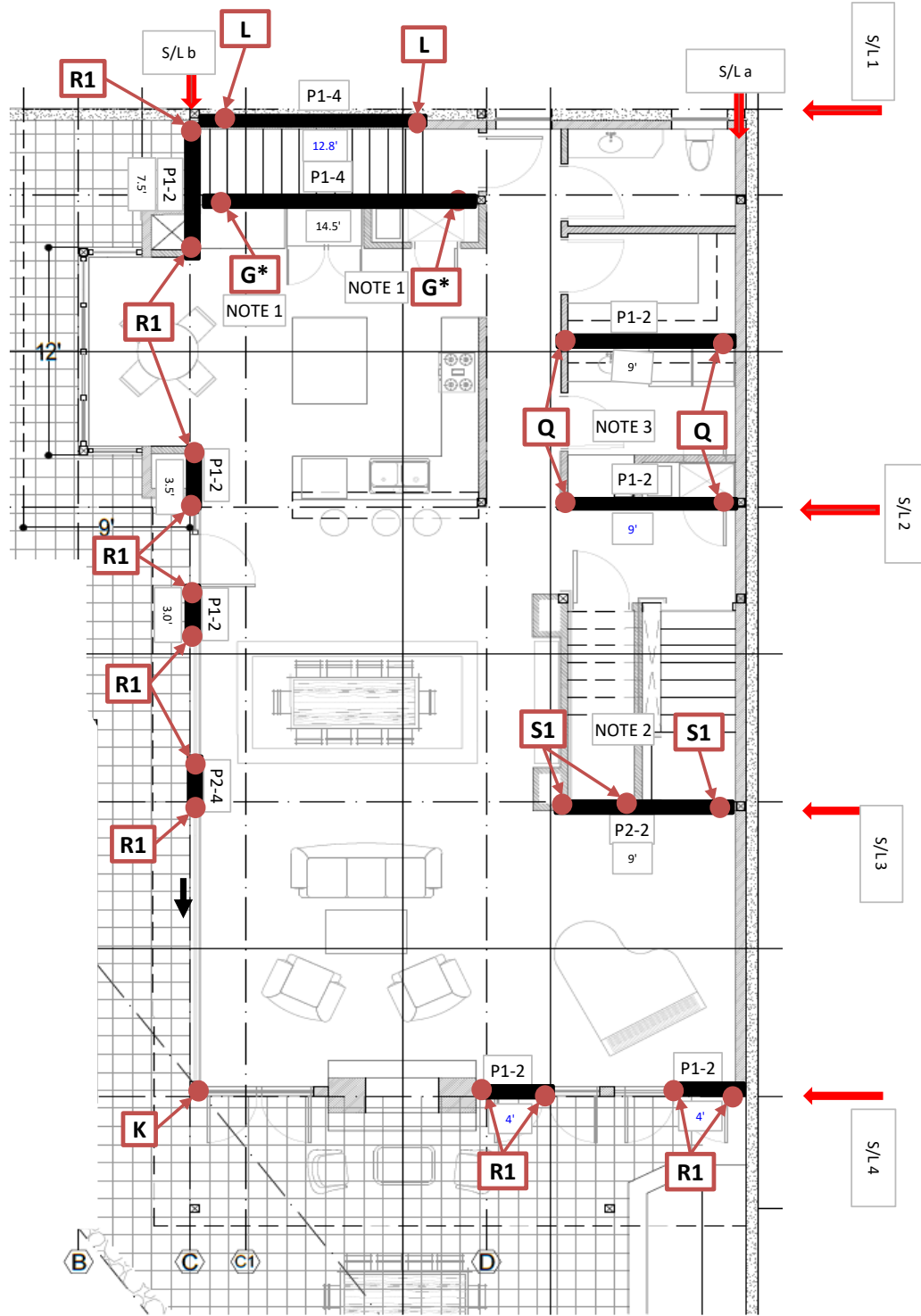
Lateral Engineering Sketches



2nd Floor Shear Plan

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Lateral Engineering Sketches

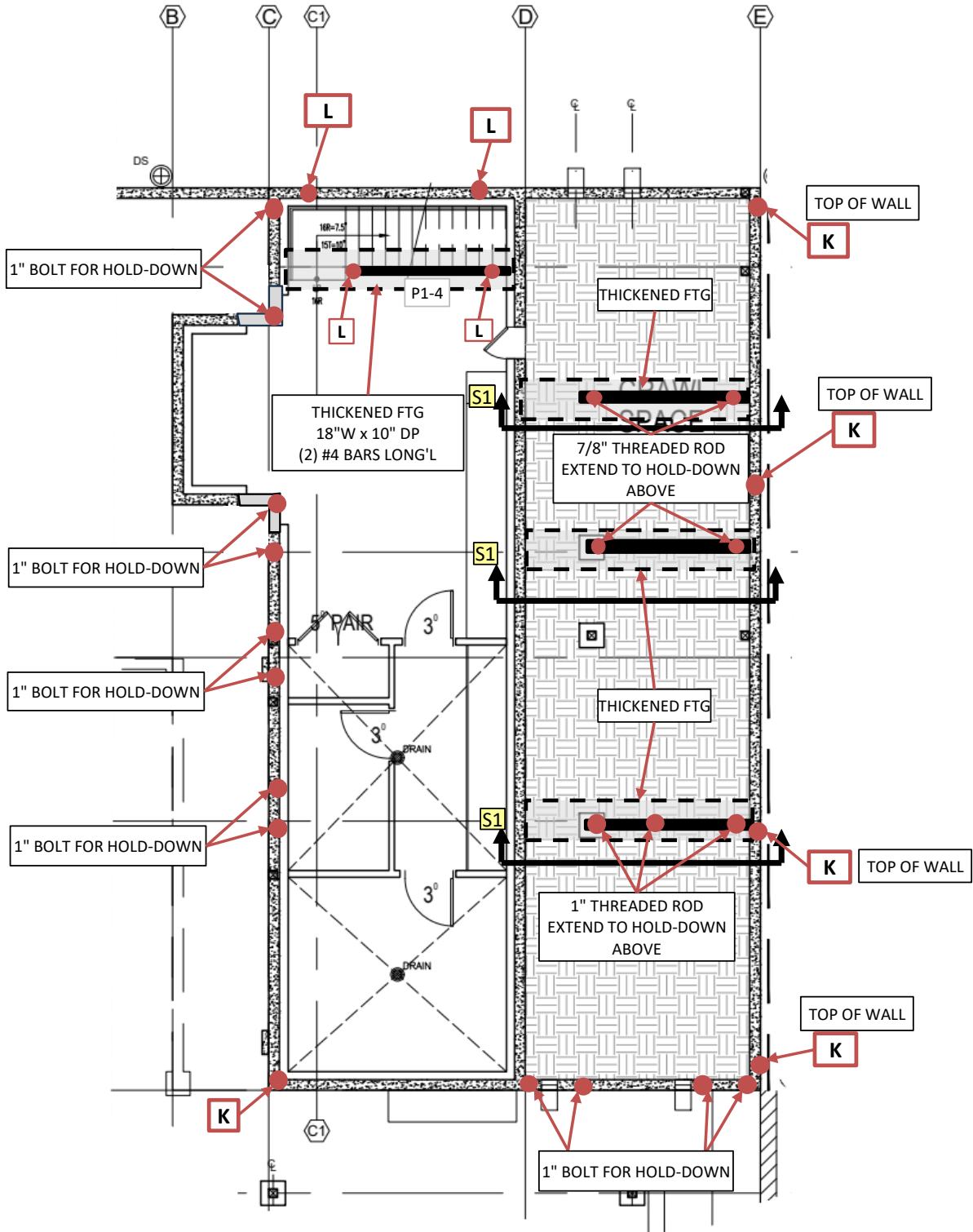


NOTE 1: Install MST48 at Main Floor with SHD14 to Footing (see Detail)
 NOTE 2: Install HDU14-SDS2.5 to 6x6 stud. Extend 1" threaded rod to footing below
 NOTE 3: Install HDU8-SDS2.5 to Dbl stud. Extend 7/8" threaded rod to footing below

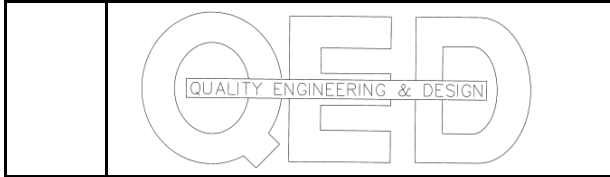
1st Floor Shear Plan

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Lateral Engineering Sketches



FOUNDATION PLAN SHOWING SHEAR WALLS/HOLD-DOWNS



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Lateral Engineering Sketches


SHEAR WALL SCHEDULE

DESIGNATION	NAIL SIZE	NAIL SPACING		BLOCKING Y / N	BOTTOM PLATE ANCHORAGE	DESIGN LOAD (PLF)
		EDGE	FIELD			
P1-6	8d	6"	12"	YES	(2) 16d AT 6" O.C. OR 5/8" BOLTS AT 32" O.C.	242
P1-4	8d	4"	12"	YES	(2) 16d AT 6" O.C. OR 5/8" BOLTS AT 24" O.C.	353
P1-3	8d	3"	12"	YES	(3) 16d AT 5" O.C. OR 5/8" BOLTS AT 24" O.C.	456
P1-2	8d	2"	12"	YES	(3) 16d AT 5" O.C. OR 3/4" BOLTS AT 24" O.C.	595
P2-6	8d	6"	12"	YES	(2) 16d AT 5" O.C. OR 5/8" BOLTS AT 24" O.C.	484
P2-4	8d	4"	12"	YES	(3) 16d AT 5" O.C. OR 3/4" BOLTS AT 24" O.C.	707
P2-3	8d	3"	12"	YES	(4) 16d AT 5" O.C. OR 3/4" BOLTS AT 20" O.C.	911
P2-2	8d	2"	12"	YES	(4) 16d AT 4" O.C. OR 3/4" BOLTS AT 16" O.C.	1190

SHEAR WALL SCHEDULE NOTES


- P1 SHEAR WALL TO HAVE 7/16" A.P.A. RATED PLYWOOD OR ORIENTED STRAND BOARD (O.S.B.) ON ONE SIDE
P2 SHEAR WALL TO HAVE 7/16" A.P.A. RATED PLYWOOD OR ORIENTED STRAND BOARD (O.S.B.) ON BOTH SIDES
- FOR P1-3 THROUGH P2-4 WALLS, 3X STUDS ARE REQUIRED AT ALL PANEL EDGES
- NAILS ARE COMMON IN THE SIZE INDICATED
- FOR DOUBLE SIDED SHEAR WALLS (P2-X), SEAMS SHALL BE STAGGERED ON EACH SIDE (NO TWO SEAMS ON SAME STUD).
- PANEL EDGES TO BE BLOCKED WITH FULL WIDTH 2X NOMINAL FRAMING FOR P1-6 AND P1-4 WALLS. PANEL EDGES FOR P1-3 THROUGH P2-4 WALLS SHALL BE BLOCKED WITH 3X NOMINAL FRAMING. PANELS MAY BE INSTALLED EITHER VERTICALLY OR HORIZONTALLY.
- ANCHOR BOLTS SHALL BE EMBEDDED IN CONCRETE A MINIMUM OF 7", AND SHALL BE INSTALLED WITH 3" SQUARE X 0.229" WASHERS.

KEY TO LATERAL ENGINEERING SKETCHES

 Designates Hold-Down Location
See schedule on following page for hold-down type

 Shear Wall

 Shear Wall Designation. See Schedule for details

 Thickened footing below shear wall
18" wide x 10" deep w/ (2) #4 bars long'l

Lateral Engineering Sketches

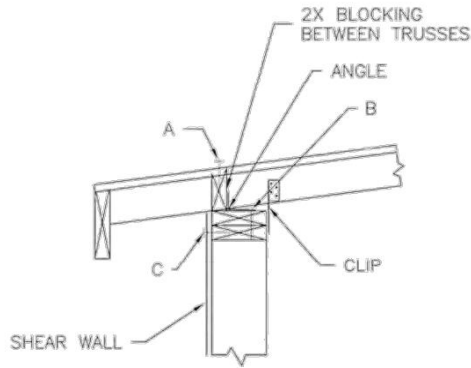
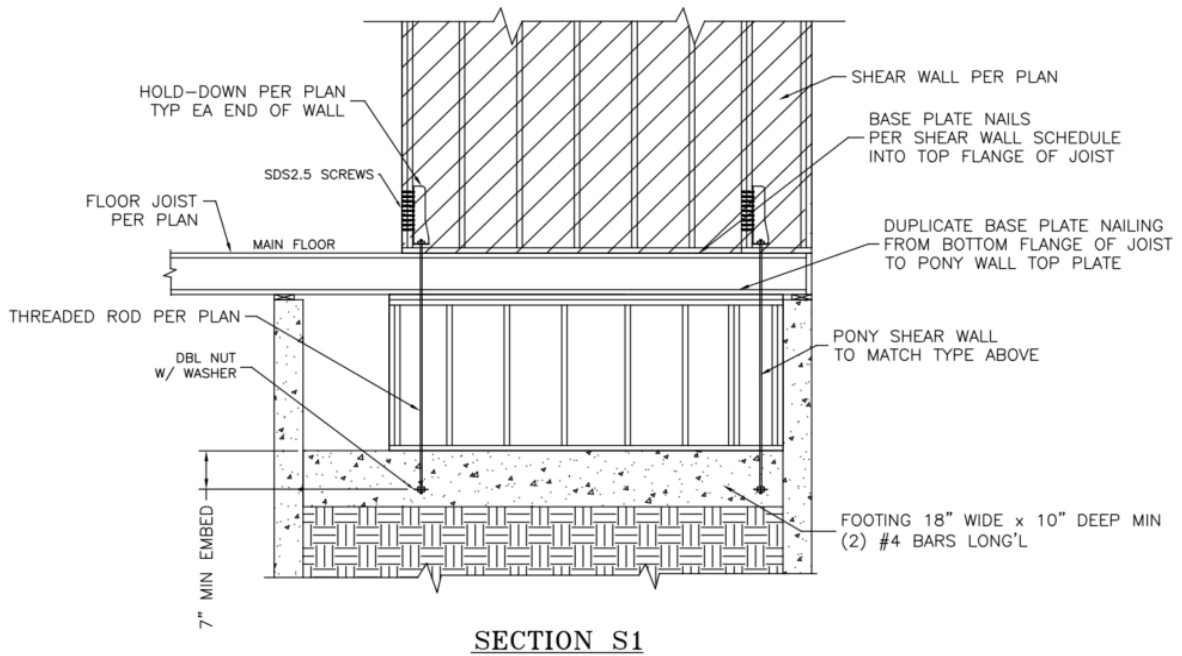
HOLDDOWN SCHEDULE

DESIGNATION	DESCRIPTION	ALLOWABLE DESIGN LOAD (lb)		
A	CMST12	9,215 (End length = 44" w/ (49) 10d each end)		
B	CMST14	6,490 (End Length = 34" w/ (38) 10d each end)		
C	CS16	1,700 (End Length = 12" w/ (11) 10d each end)		
D	CS14	2,490 (End Length = 16" w/ (15) 10d each end)		WOOD TO WOOD CONNECTION
E	MST37	3,815		
F	MST48	4,460		
G	MST60	5,800		
		<u>6" Wall</u>	<u>8" Wall</u>	
H	LSTHD8	1,695	1,695	
J	STHD8	2,345	3,195	
K	STHD10	3,185	3,725	
L	STHD14	4,805	5,785	
M	HDU2-SDS2.5	3,075		BOLTED TO CONCRETE NAILED TO STUDS
O	HDU4-SDS2.5	4,565 (5/8" bolt)		
P	HDU5-SDS2.5	5,645 (5/8" bolt)		
Q	HDU8-SDS2.5	6970 (w/ 3 1/2" thick end studs**)		BOLTED TO CONCRETE SCREWED TO STUDS
R1	HDU11-SDS2.5	9535 (w/ 5 1/2" thick end studs**)		
R2	HDU11-SDS2.5	11175 (w/ 7 1/4" thick end studs**)		
S1	HDU14-SDS2.5	14390 (w/ 7 1/4" thick end studs**)		
S2	HDU14-SDS2.5	14925 (w/ 5 1/2 x 5 1/2 thick end studs)		

** Dimension shown is in direction parallel to SDS screws. Dimension perpendicular to screws (wall thickness) is 3 1/2" minimum except for Type S2 which requires a 6x6 post

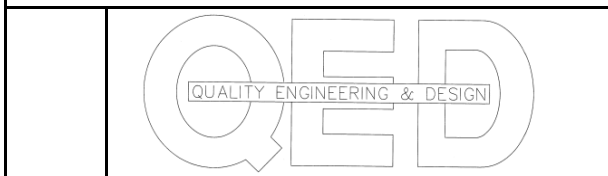
HOLD-DOWNS LISTED ABOVE ARE SIMPSON STRONG-TIE

Lateral Engineering Sketches



ROOF DIAPHRAGM TO EXTERIOR SHEAR WALL

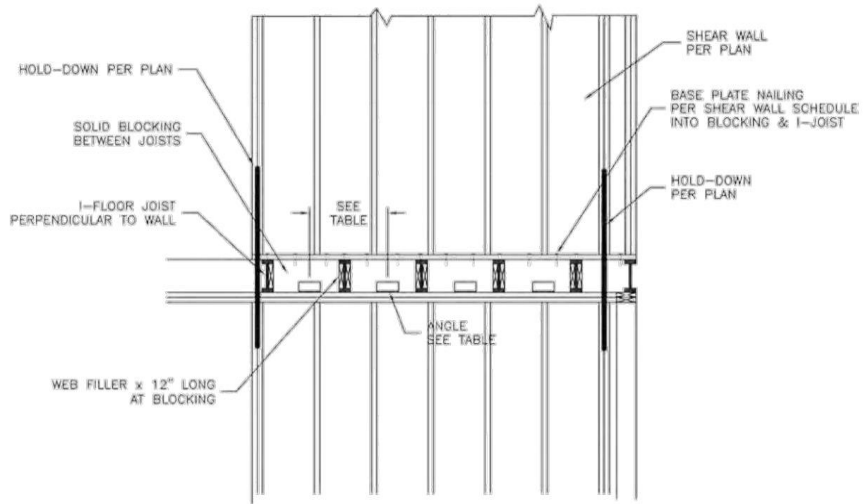
SHEAR WALL	ANGLE		NAIL						CLIP
			A		B		C		
TYPE	TYPE	SPACING	SIZE	SPACING	SIZE	SPACING	SIZE	SPACING	TYPE
P1-6	A34	18"	10d	6"	10d	6"	10d	6"	H1
P1-4	A34	12"	10d	4"	10d	4"	10d	4"	H1
P1-3	A23	12"	10d	3"	10d	3"	10d	3"	H1
P1-2	A23	9"	10d	2"	10d	2"	10d	2"	H1



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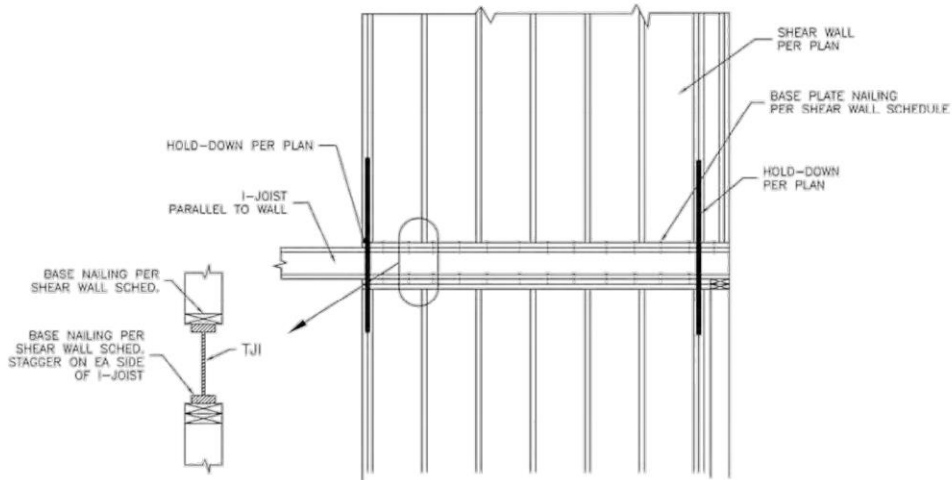
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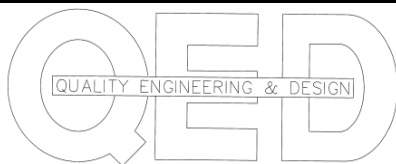
SHEAR WALL CONNECTION
JOISTS PERPENDICULAR TO SHEAR WALL

SHEAR WALL TYPE	ANGLE	
	TYPE	SPACING
P1-6	A23	24"
P1-4	A23	18"
P1-3	A23	12"
P1-2	A23	9"



SHEAR WALL CONNECTION
JOISTS PARALLEL TO SHEAR WALL

SHEAR WALL TYPE	ANGLE	
	TYPE	SPACING
P1-6	A23	24"
P1-4	A23	18"
P1-3	A23	12"
P1-2	A23	9"



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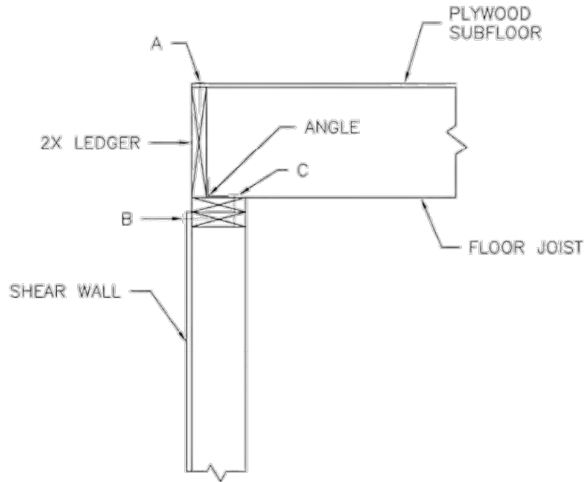
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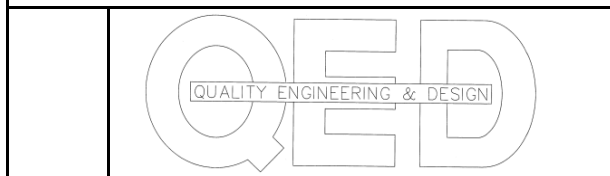
Lateral Engineering Sketches



FLOOR DIAPHRAGM TO SHEAR WALL BELOW

FLOOR JOISTS PERPENDICULAR

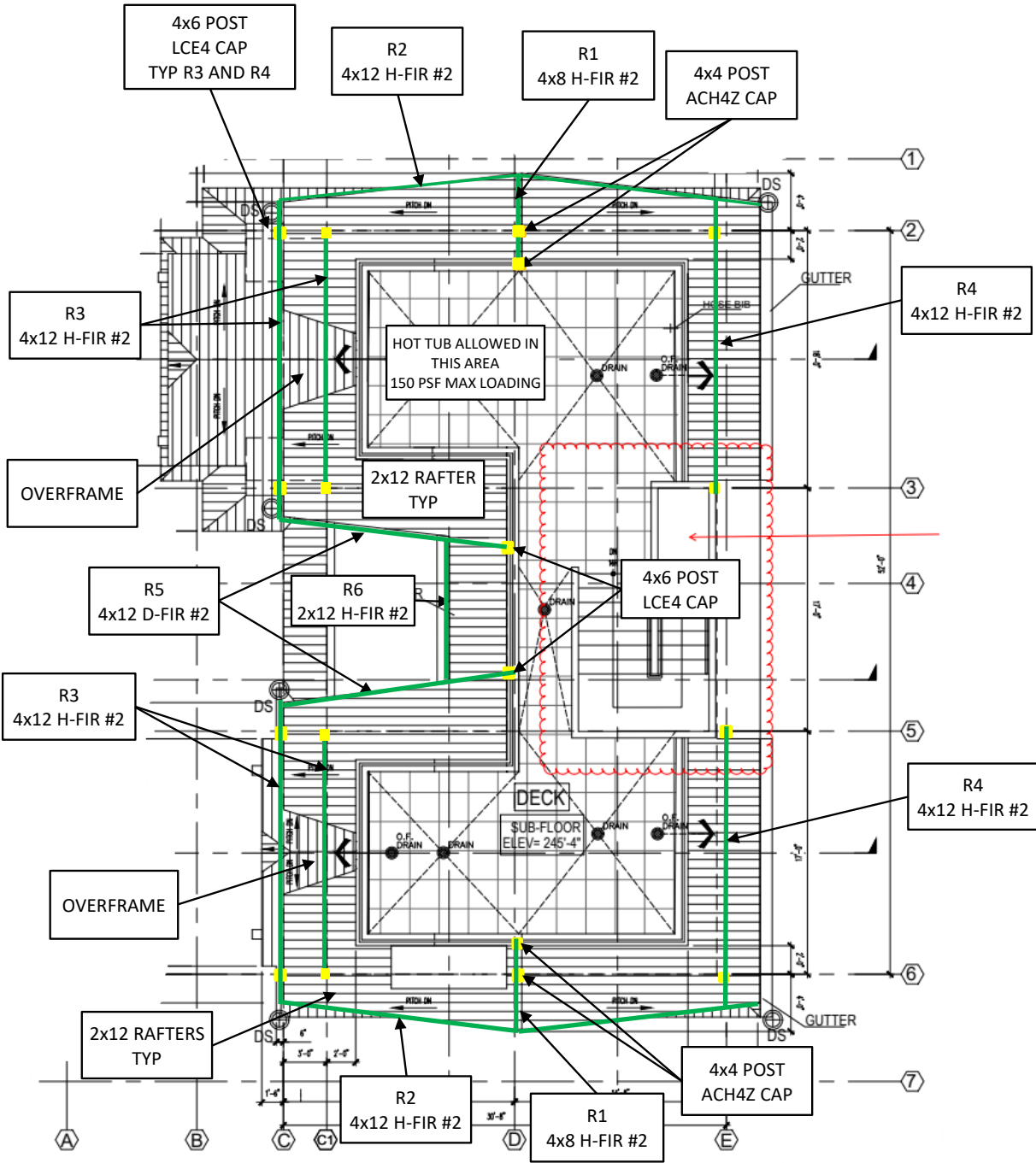
SHEAR WALL	ANGLE		NAIL					
			A		B		C	
TYPE	TYPE	SPACING	SIZE	SPACING	SIZE	SPACING	SIZE	SPACING
P1-6	A23	24"	10d	6"	10d	6"	10d	6"
P1-4	A23	18"	10d	4"	10d	4"	10d	4"
P1-3	A23	12"	10d	3"	10d	3"	10d	3"
P1-2	A23	9"	10d	2"	10d	2"	10d	2"



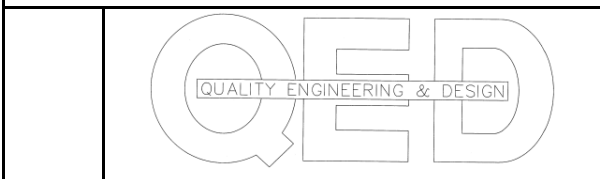
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Upper Roof Framing-New



UPPER ROOF FRAMING



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Upper Roof Framing-New

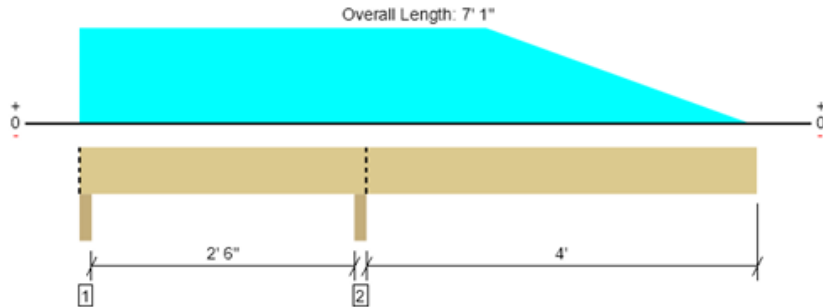
Beam R1 - North Upper Ridge Beam (cantilevered)



MEMBER REPORT

PASSED

UPPER ROOF, Roof: Flush Beam-type changed
1 piece(s) 4 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1812 @ 2' 11 1/4"	4961 (3.50")	Passed (37%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	681 @ 2' 2 1/4"	2918	Passed (23%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-1312 @ 2' 11 1/4"	3247	Passed (40%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.064 @ 7' 1"	0.415	Passed (2L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.105 @ 7' 1"	0.553	Passed (2L/948)	--	1.0 D + 1.0 S (All Spans)

Member Length : 7' 1"
 System : Roof
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD
 Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/180).
- Right cantilever length exceeds 1/3 member length or 1/2 back span length. Additional bracing should be considered.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Factored	
1 - Column - SPF	3.50"	3.50"	1.50"	6	135/-103	169/-128	175/-122	Blocking
2 - Column - SPF	3.50"	3.50"	1.50"	714	878	1098	1812	Blocking

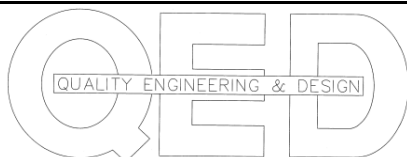
• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	7' 1" o/c	
Bottom Edge (Lu)	7' 1" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Roof Live (1.25)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 7' 1"	N/A	6.4	--	--	
1 - Uniform (PSF)	0 to 4' 3" (Front)	8'	15.0	20.0	25.0	Roof Load
2 - Tapered (PSF)	4' 3" to 7' (Front)	8' to 0	15.0	20.0	25.0	Roof Load

• Side loads are assumed to not induce cross-grain tension.



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Upper Roof Framing-New

Beam R2 - Rake Beam at Prow

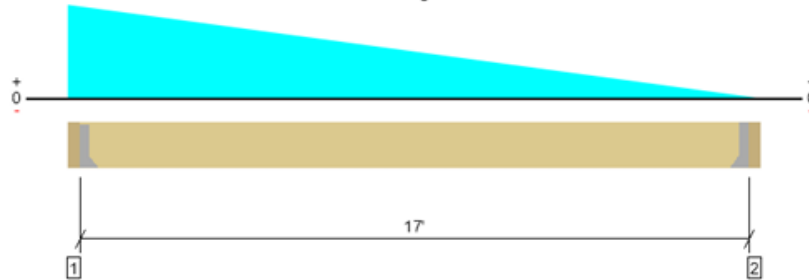


MEMBER REPORT

PASSED

UPPER ROOF, R3-Rake Beam at North Prow Roof-type changed
1 piece(s) 4 x 12 HF No.2

Overall Length: 17' 7"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1883 @ 3 1/2"	2126 (1.50")	Passed (89%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1587 @ 1' 2 3/4"	4528	Passed (35%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	6276 @ 7' 7"	6615	Passed (95%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.349 @ 8' 5 3/4"	0.567	Passed (L/585)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.593 @ 8' 5 15/16"	0.850	Passed (L/344)	--	1.0 D + 1.0 S (All Spans)

Member Length : 17'
 System : Roof
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD
 Member Pitch : 0/12

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

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Factored	
1 - Hanger on 11 1/4" SPF beam	3.50"	Hanger ¹	1.50"	794	946	1183	1977	See note ¹
2 - Hanger on 11 1/4" SPF beam	3.50"	Hanger ¹	1.50"	431	462	578	1009	See note ¹

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	14' 2" o/c	
Bottom Edge (Lu)	17' o/c	

• Maximum allowable bracing intervals based on applied load.

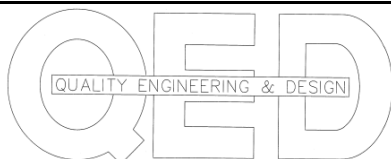
Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	LUS414	2.00"	N/A	10-16d	6-16d	
2 - Face Mount Hanger	LUS48	2.00"	N/A	6-10d	4-10d	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Roof Live (1.25)	Snow (1.15)	Comments
0 - Self Weight (PLF)	3 1/2" to 17' 3 1/2"	N/A	10.0	--	--	
1 - Tapered (PSF)	0 to 17' 7" (Front)	8' to 0	15.0	20.0	25.0	Roof Load at Prow

- Side loads are assumed to not induce cross-grain tension.



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Upper Roof Framing-New

Beam R3 - Roof Beam West of Roof Deck

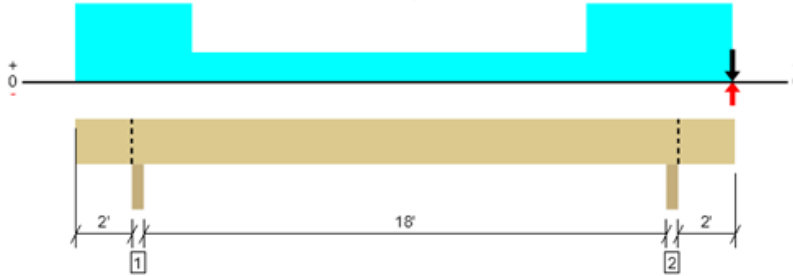


MEMBER REPORT

PASSED

UPPER ROOF, R3-Eve Beam West and East of Roof Deck
1 piece(s) 4 x 12 HF No.2

Overall Length: 22' 7"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	2634 @ 20' 5 1/4"	4961 (3.50")	Passed (53%)	--	1.0 D + 1.0 S (Adj Spans) [1]
Shear (lbs)	1420 @ 19' 4 1/4"	4528	Passed (31%)	1.15	1.0 D + 1.0 S (Adj Spans) [1]
Moment (Ft-lbs)	5594 @ 11' 6 15/16"	6615	Passed (85%)	1.15	1.0 D + 1.0 S (Alt Spans) [8]
Live Load Defl. (in)	0.379 @ 11' 4 11/16"	0.915	Passed (L/579)	--	1.0 D + 1.0 S (Alt Spans) [8]
Total Load Defl. (in)	0.626 @ 11' 4 9/16"	1.219	Passed (L/351)	--	1.0 D + 1.0 S (Alt Spans) [8]

Member Length : 22' 7"
System : Roof
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Factored	
1 - Column - SPF	3.50'	3.50'	1.63"	932	1108	1385	2317	Blocking
2 - Column - SPF	3.50'	3.50'	1.86"	987	1317	1647	2634	Blocking

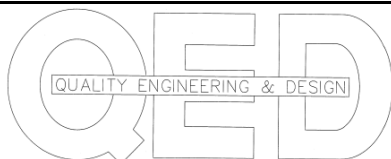
• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	22' 7" o/c	
Bottom Edge (Lu)	22' 7" o/c	

• Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Roof Live (1.25)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 22' 7"	N/A	10.0	--	--	
1 - Uniform (PSF)	0 to 4' (Front)	8'	15.0	20.0	25.0	Roof Load South of Deck
2 - Uniform (PSF)	4' to 17' 6" (Front)	3'	15.0	20.0	25.0	Roof Load along width of Deck
3 - Uniform (PSF)	17' 6" to 22' 6" (Front)	8'	15.0	20.0	25.0	Roof Load along width of Deck
4 - Point (lb)	22' 6" (Front)	N/A	6	135/-103	169/-128	Linked from: R1-North Ridge, Support 1

• Side loads are assumed to not induce cross-grain tension.



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Upper Roof Framing-New

Beam R4 - Roof Beam West of Roof Deck



MEMBER REPORT

PASSED

UPPER ROOF, R4-Eve Beam East of Roof Deck
1 piece(s) 4 x 12 HF No.2

Overall Length: 20' 7"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	2365 @ 18' 5 1/4"	4961 (3.50")	Passed (48%)	--	1.0 D + 1.0 S (All Spans) [1]
Shear (lbs)	1508 @ 1' 2 3/4"	4528	Passed (33%)	1.15	1.0 D + 1.0 S (Alt Spans) [8]
Moment (Ft-lbs)	6052 @ 8' 6 3/4"	6615	Passed (91%)	1.15	1.0 D + 1.0 S (Alt Spans) [8]
Live Load Defl. (in)	0.406 @ 9' 1 7/16"	0.914	Passed (L/540)	--	1.0 D + 1.0 S (Alt Spans) [8]
Total Load Defl. (in)	0.680 @ 9' 1 3/16"	1.218	Passed (L/322)	--	1.0 D + 1.0 S (Alt Spans) [8]

Member Length : 20' 7"
System : Roof
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Factored	
1 - Column - SPF	3.50'	3.50'	1.50'	767	917	1146	1913	Blocking
2 - Column - SPF	3.50'	3.50'	1.67'	892	1179	1473	2365	Blocking

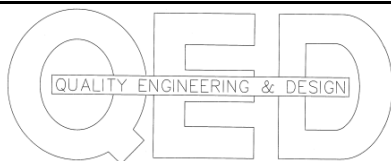
• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	18' 5" o/c	
Bottom Edge (Lu)	20' 7" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Roof Live (1.25)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 20' 7"	N/A	10.0	--	--	
1 - Uniform (PSF)	0 to 4' (Front)	8'	15.0	20.0	25.0	Roof Load South of Deck
2 - Uniform (PSF)	4' to 17' 6" (Front)	3'	15.0	20.0	25.0	Roof Load along width of Deck
3 - Uniform (PSF)	17' 6" to 20' 6" (Front)	8'	15.0	20.0	25.0	Roof Load along width of Deck
4 - Point (lb)	20' 6" (Front)	N/A	6	135/-103	169/-128	Linked from: R1-North Ridge, Support 1

• Side loads are assumed to not induce cross-grain tension.



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Upper Roof Framing-New

Roof Beam R5

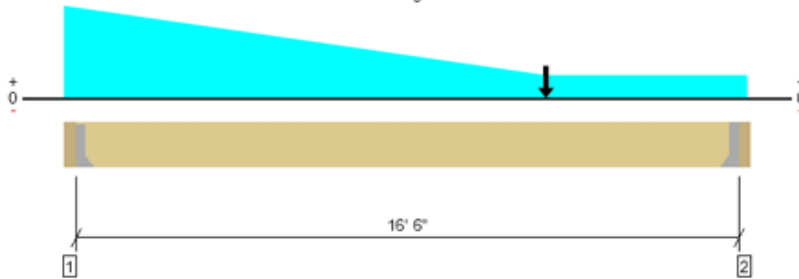


MEMBER REPORT

PASSED

UPPER ROOF, R5-Edge Beam at Upper Floor West Deck-type changed
1 piece(s) 4 x 12 DF No.2

Overall Length: 17' 1"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1918 @ 3 1/2"	3281 (1.50")	Passed (58%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1623 @ 1' 2 3/4"	5434	Passed (30%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	6683 @ 8' 1"	7004	Passed (95%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.294 @ 8' 5 1/4"	0.550	Passed (L/674)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.499 @ 8' 5 7/16"	0.825	Passed (L/397)	--	1.0 D + 1.0 S (All Spans)

Member Length : 16' 6"
 System : Roof
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD
 Member Pitch : 0/12

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

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Factored	
1 - Hanger on 11 1/4" SPF beam	3.50"	Hanger ¹	1.50"	810	962	1202	2012	See note ¹
2 - Hanger on 11 1/4" SPF beam	3.50"	Hanger ¹	1.50"	585	651	814	1399	See note ¹

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	15' 6" o/c	
Bottom Edge (Lu)	16' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

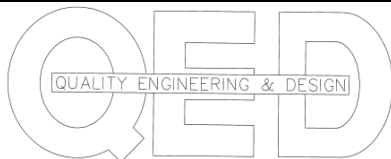
Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	LUS414	2.00"	N/A	10-16d	6-16d	
2 - Face Mount Hanger	LUS410	2.00"	N/A	8-10d	6-10d	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Roof Live (1.25)	Snow (1.15)	Comments
0 - Self Weight (PLF)	3 1/2" to 16' 9 1/2"	N/A	10.0	--	--	
1 - Tapered (PSF)	0 to 12' (Front)	8' to 2'	15.0	20.0	25.0	Roof Load
2 - Uniform (PSF)	12' to 17' (Front)	2'	15.0	20.0	25.0	Roof Load
3 - Point (lb)	12' (Back)	N/A	180	212	265	Linked from: R6-Upper Beam at Upper Floor west Deck-type changed, Support 1

• Side loads are assumed to not induce cross-grain tension.



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Upper Roof Framing-New

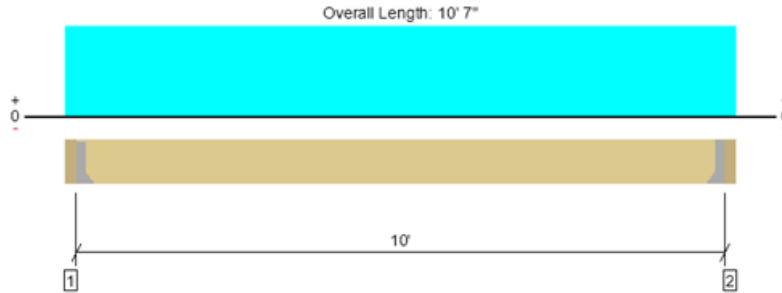
Roof Beam R6



MEMBER REPORT

PASSED

UPPER ROOF, R6-Upper Beam at Upper Floor west Deck-type changed
1 piece(s) 2 x 12 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDf	Load: Combination (Pattern)
Member Reaction (lbs)	421 @ 3 1/2"	911 (1.50")	Passed (46%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	342 @ 1' 2 3/4"	1941	Passed (18%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1053 @ 5' 3 1/2"	2577	Passed (41%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.049 @ 5' 3 1/2"	0.333	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.082 @ 5' 3 1/2"	0.500	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 10'
 System : Roof
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD
 Member Pitch : 0/12

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

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Factored	
1 - Hanger on 11 1/4" SPF beam	3.50"	Hanger ¹	1.50"	180	212	265	445	See note ¹
2 - Hanger on 11 1/4" SPF beam	3.50"	Hanger ¹	1.50"	180	212	265	445	See note ¹

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	10' o/c	
Bottom Edge (Lu)	10' o/c	

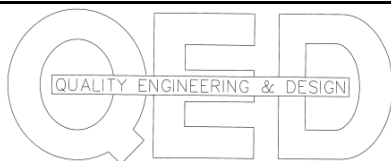
•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	LUS28	1.75"	N/A	6-10dx1.5	3-10d	
2 - Face Mount Hanger	LUS28	1.75"	N/A	6-10dx1.5	3-10d	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Roof Live (1.25)	Snow (1.15)	Comments
0 - Self Weight (PLF)	3 1/2" to 10' 3 1/2"	N/A	4.3	--	--	
1 - Uniform (PSF)	0 to 10' 7" (Back)	2'	15.0	20.0	25.0	Roof Load

- Side loads are assumed to not induce cross-grain tension.



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Upper Roof Framing-New

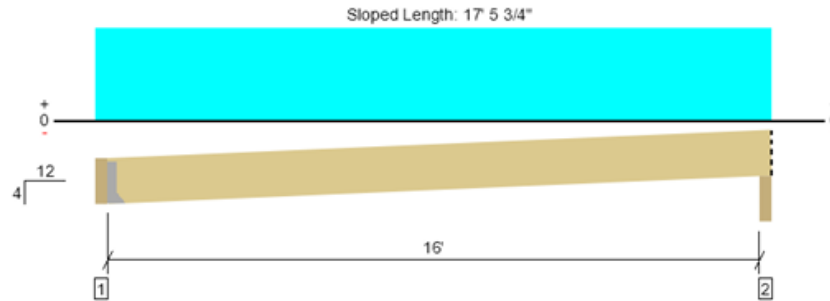
Upper Roof Rafters



MEMBER REPORT

PASSED

UPPER ROOF, Upper Roof Joists
1 piece(s) 2 x 12 HF No.2 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDf	Load: Combination (Pattern)
Member Reaction (lbs)	438 @ 3 1/2"	911 (1.50")	Passed (48%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	389 @ 1' 2 3/16"	1941	Passed (20%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1759 @ 8' 4"	2964	Passed (59%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.241 @ 8' 4"	0.848	Passed (L/844)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.393 @ 8' 4"	1.130	Passed (L/517)	--	1.0 D + 1.0 S (All Spans)

Member Length : 17' 5 13/16"
 System : Roof
 Member Type : Joist
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD
 Member Pitch : 4/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Factored	
1 - Hanger on 11 1/4" SPF beam	3.50"	Hanger ¹	1.50"	175	222	278	453	See note ¹
2 - Beveled Plate - SPF	3.50"	3.50"	1.50"	174	220	275	449	Blocking

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

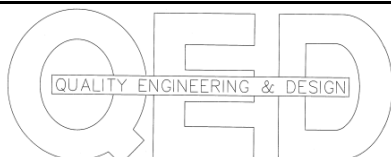
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 4" o/c	
Bottom Edge (Lu)	17' 2" o/c	

- Maximum allowable bracing intervals based on applied load.
- Dimensions for lateral bracing intervals are measured along the length of the member for sloped conditions.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	LRU28Z	1.94"	N/A	6-10dx1.5	5-10d	

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

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (1.25)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 16' 7"	16"	15.0	20.0	25.0	Roof Load



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Upper Roof Framing-New

Post PR3 - Similar for Beam R3 and R4



MEMBER REPORT

PASSED

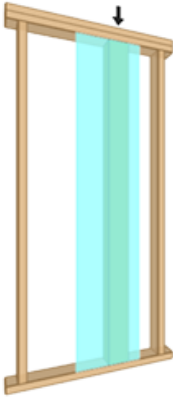
UPPER ROOF, PR3-Post for Beam R3

1 piece(s) 4 x 6 HF No.2 (Plank)

Wall Height: 9'

Member Height: 8' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	30	50	Passed (59%)	--	--
Compression (lbs)	4329	7969	Passed (54%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	4329	8181	Passed (53%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	65	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	60	3080	Passed (2%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	140 @ mid-span	1737	Passed (8%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.10 @ mid-span	0.86	Passed (L/1075)	--	1.0 D + 0.45 W + 0.75 L + 0.75 S
Bending/Compression	0.68	1	Passed (68%)	1.15	1.0 D + 1.0 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- Member has been designed in flat (plank) orientation with lateral (wind) loads applied to wide strand face.

Supports	Type	Material
Top	Dbl 2X	Spruce-Pine-Fir
Base	2X	Spruce-Pine-Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
8'	

Lateral Connections

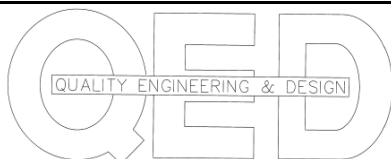
Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Loads	Tributary Width	Dead (0.90)	Roof Live (1.25)	Snow (1.15)	Comments
1 - Point (lb)	N/A	932	1108	1385	Linked from: R3-Eve Beam West of Roof Deck, Support 1
2 - Point (lb)	N/A	810	962	1202	Linked from: R5-Edge Beam at Upper Floor West Deck-type changed, Support 1

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	25.1	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.



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Upper Roof Framing-New

Post at Inner end of Beam R4



MEMBER REPORT

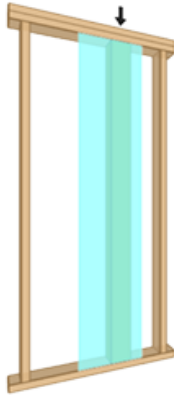
PASSED

UPPER ROOF, PR4-Post Inner End of Beam R4
1 piece(s) 4 x 4 HF No.2

Wall Height: 9'

Member Height: 8' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	30	50	Passed (59%)	--	--
Compression (lbs)	2365	5088	Passed (46%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	2365	5206	Passed (45%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	65	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	60	1960	Passed (3%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	140 @ mid-span	1215	Passed (12%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.11 @ mid-span	0.86	Passed (L/943)	--	1.0 D + 0.45 W + 0.75 L + 0.75 S
Bending/Compression	0.47	1	Passed (47%)	1.15	1.0 D + 1.0 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Type	Material
Top	DbI 2X	Spruce-Pine-Fir
Base	2X	Spruce-Pine-Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
8'	

Lateral Connections

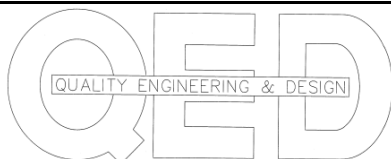
Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Tributary Width	Dead (0.90)	Roof Live (1.25)	Snow (1.15)	Comments
1 - Point (lb)	N/A	892	1179	1473	Linked from: R4-Eve Beam East of Roof Deck, Support 2

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	25.1	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.



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Upper Roof Framing-New

Post PR3 - Post for Beam R3



MEMBER REPORT

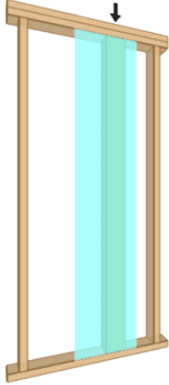
PASSED

UPPER ROOF, PR3-Post for Beam R3
1 piece(s) 4 x 6 HF No.2 (Plank)

Wall Height: 9'

Member Height: 8' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	30	50	Passed (59%)	--	--
Compression (lbs)	4329	7969	Passed (54%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	4329	8181	Passed (53%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	65	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	60	3080	Passed (2%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	140 @ mid-span	1737	Passed (8%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.10 @ mid-span	0.86	Passed (L/1075)	--	1.0 D + 0.45 W + 0.75 L + 0.75 S
Bending/Compression	0.68	1	Passed (68%)	1.15	1.0 D + 1.0 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- Member has been designed in flat (plank) orientation with lateral (wind) loads applied to wide strand face.

Supports	Type	Material
Top	Dbl 2X	Spruce-Pine-Fir
Base	2X	Spruce-Pine-Fir

System : Wall
 Member Type : Column
 Building Code : IBC 2021
 Design Methodology : ASD

Max Unbraced Length	Comments
8'	

Lateral Connections

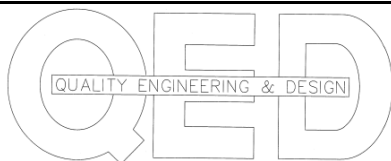
Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Loads	Tributary Width	Dead (0.90)	Roof Live (1.25)	Snow (1.15)	Comments
1 - Point (lb)	N/A	932	1108	1385	Linked from: R3-Eve Beam West of Roof Deck, Support 1
2 - Point (lb)	N/A	810	962	1202	Linked from: R5-Edge Beam at Upper Floor West Deck-type changed, Support 1

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	25.1	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Wind Zone (4), Gcpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.



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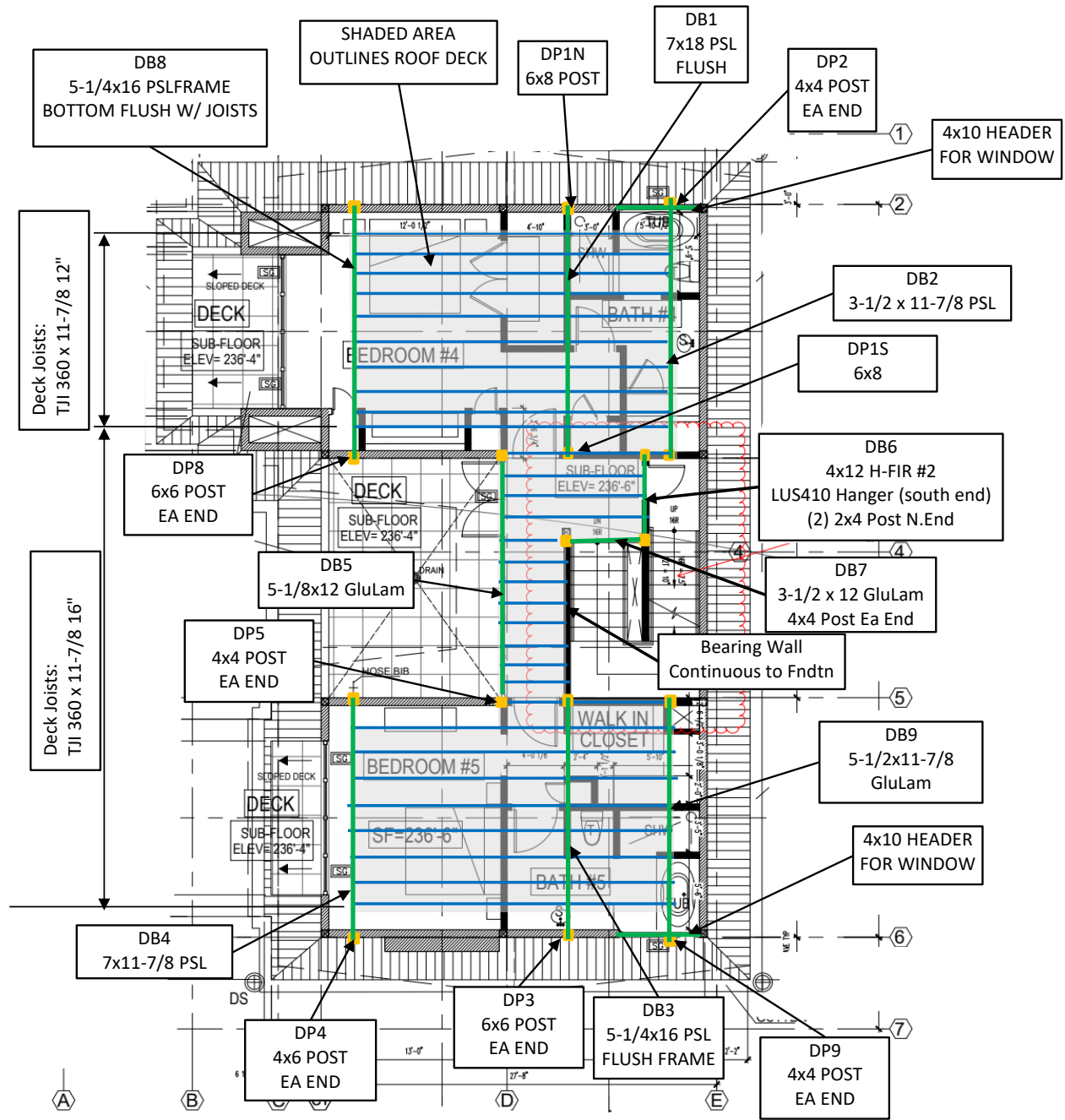
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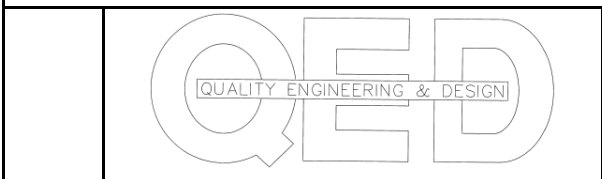
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Roof Deck Framing-New



ROOF DECK FRAMING



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Roof Deck Framing-New

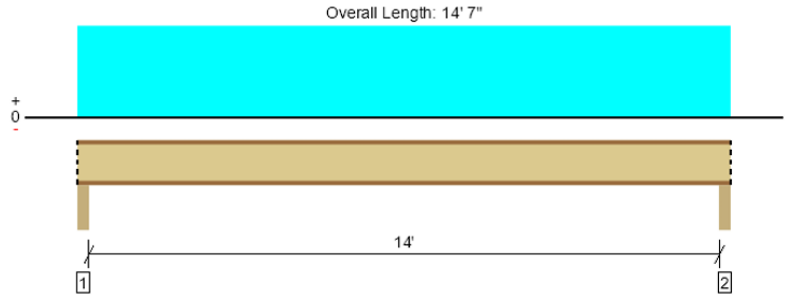
Flat Roof Deck Joists at Hot Tub



MEMBER REPORT

PASSED

ROOF DECK, Deck Joists at Hot Tub
1 piece(s) 11 7/8" TJI@ 360 @ 12" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1349 @ 2 1/2"	1505 (3.50")	Passed (90%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1295 @ 3 1/2"	1705	Passed (76%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	4641 @ 7' 3 1/2"	6180	Passed (75%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.350 @ 7' 3 1/2"	0.354	Passed (L/486)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.431 @ 7' 3 1/2"	0.708	Passed (L/394)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	56	40	Passed	--	--

Member Length : 14' 7"
System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

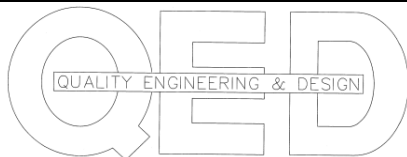
Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Beam - GLB	3.50"	3.50"	2.86"	255	1094	182	1349	Blocking
2 - Beam - GLB	3.50"	3.50"	2.86"	255	1094	182	1349	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 2" o/c	
Bottom Edge (Lu)	14' 7" o/c	

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

Vertical Load	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 14' 7"	12"	35.0	150.0	25.0	Deck and Hot Tub 35 psf for pavers 150 psf Live load including hot tub



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Roof Deck Framing-New

DB1- Deck Beam



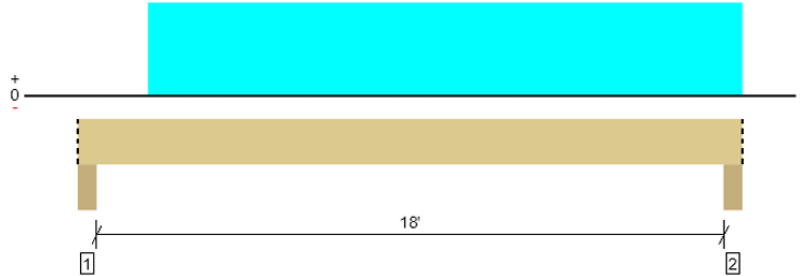
MEMBER REPORT

PASSED

ROOF DECK, Beam DB1

1 piece(s) 7" x 18" 2.2E Parallam® PSL

Overall Length: 18' 11"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	16076 @ 18' 7"	24063 (5.50")	Passed (67%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	12906 @ 1' 11 1/2"	24360	Passed (53%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	70165 @ 9' 6 3/8"	87330	Passed (80%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.468 @ 9' 5 13/16"	0.608	Passed (L/468)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.619 @ 9' 5 13/16"	0.913	Passed (L/354)	--	1.0 D + 1.0 L (All Spans)

Member Length : 18' 11"
System : Floor
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Member should be side-loaded from both sides of the member or braced to prevent rotation.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Column - SPF	5.50"	5.50"	2.97"	3207	9776	2025	12983	Blocking
2 - Column - SPF	5.50"	5.50"	3.67"	3902	12173	2521	16076	Blocking

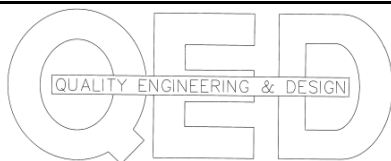
• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	18' 11" o/c	
Bottom Edge (Lu)	18' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 18' 11"	N/A	39.4	--	--	
1 - Uniform (PSF)	2' to 18' 11" (Front)	7' 3"	35.0	150.0	25.0	West side of beam: Roof Deck Load including pavers and Hot Tub
2 - Uniform (PSF)	2' to 18' 11" (Front)	3' 6"	35.0	60.0	25.0	East side of beam: Roof Deck Load including pavers

• Side loads are assumed to not induce cross-grain tension.



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Roof Deck Framing-New

DB2 - Roof deck beams at west and east side of north deck



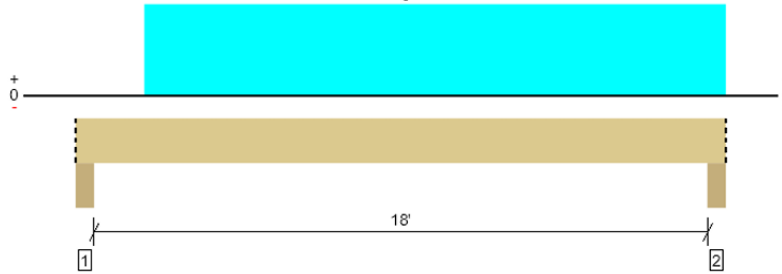
MEMBER REPORT

PASSED

ROOF DECK, Beam DB2

1 piece(s) 3 1/2" x 11 7/8" 2.2E Parallam® PSL

Overall Length: 18' 11"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3465 @ 18' 7"	12031 (5.50")	Passed (29%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	2931 @ 17' 5 5/8"	8035	Passed (36%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	15126 @ 9' 6 3/8"	19902	Passed (76%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.535 @ 9' 5 13/16"	0.608	Passed (L/409)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.879 @ 9' 5 13/16"	0.913	Passed (L/249)	--	1.0 D + 1.0 L (All Spans)

Member Length : 18' 11"
System : Floor
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Column - SPF	5.50"	5.50"	1.50"	1112	1695	2807	Blocking
2 - Column - SPF	5.50"	5.50"	1.58"	1354	2111	3465	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	18' 11" o/c	
Bottom Edge (Lu)	18' 11" o/c	

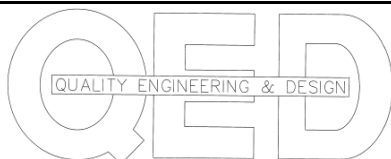
- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 18' 11"	N/A	13.0	--	
1 - Uniform (PSF)	2' to 18' 11" (Front)	3' 9"	35.0	60.0	Deck Load with Pavers

- Side loads are assumed to not induce cross-grain tension.

Member Notes

East side of North Roof Deck



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Roof Deck Framing-New

DB3- Roof deck beam in center of south deck



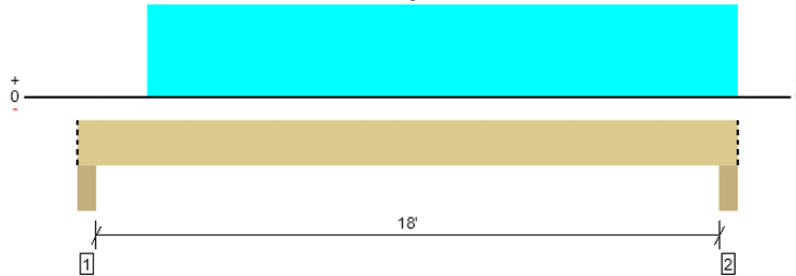
MEMBER REPORT

PASSED

ROOF DECK, Beam DB3

1 piece(s) 5 1/4" x 16" 2.2E Parallam® PSL

Overall Length: 18' 11"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	10440 @ 18' 7"	18047 (5.50")	Passed (58%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	8133 @ 17' 1 1/2"	16240	Passed (50%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	43876 @ 9' 6 3/8"	52432	Passed (84%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.471 @ 9' 5 13/16"	0.608	Passed (L/465)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.747 @ 9' 5 13/16"	0.913	Passed (L/293)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

Member Length : 18' 11"
System : Floor
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Column - SPF	5.50"	5.50"	2.57"	3149	4973	2072	8433	Blocking
2 - Column - SPF	5.50"	5.50"	3.18"	3860	6192	2580	10440	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	18' 11" o/c	
Bottom Edge (Lu)	18' 11" o/c	

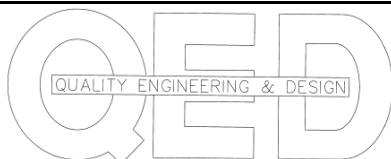
- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 18' 11"	N/A	26.3	--	--	
1 - Uniform (PSF)	2' to 18' 11" (Front)	7' 6"	35.0	60.0	25.0	West side of beam: Roof Deck Load including pavers
2 - Uniform (PSF)	2' to 18' 11" (Front)	3' 6"	35.0	60.0	25.0	East side of beam: Roof Deck Load including pavers

- Side loads are assumed to not induce cross-grain tension.

Member Notes

Center of South Roof Deck



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Roof Deck Framing-New

DB4 - Roof deck Beam East and West side of South Deck

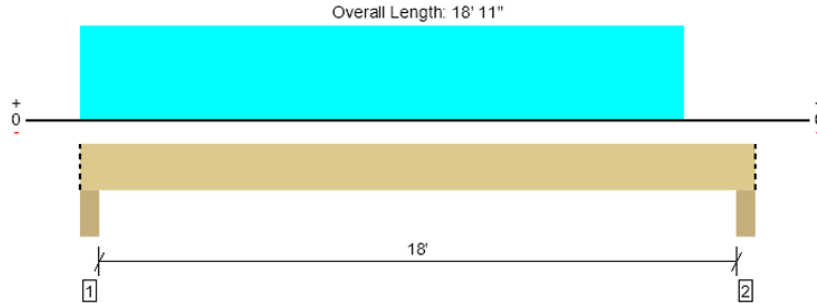


MEMBER REPORT

PASSED

ROOF DECK, Beam DB4

1 piece(s) 7" x 11 7/8" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	7194 @ 4"	24063 (5.50")	Passed (30%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	5861 @ 1' 5 3/8"	16071	Passed (36%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	30252 @ 9' 4 5/8"	39805	Passed (76%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.569 @ 9' 5 3/16"	0.608	Passed (L/385)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.913 @ 9' 5 3/16"	0.913	Passed (L/240)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

Member Length : 18' 11"
 System : Floor
 Member Type : Drop Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Member should be side-loaded from both sides of the member or braced to prevent rotation.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Column - SPF	5.50"	5.50"	1.64"	2709	4222	1759	7194	Blocking
2 - Column - SPF	5.50"	5.50"	1.50"	2223	3390	1413	5826	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	18' 11" o/c	
Bottom Edge (Lu)	18' 11" o/c	

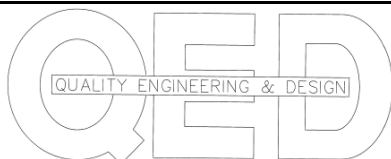
- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 18' 11"	N/A	26.0	--	--	
1 - Uniform (PSF)	0 to 16' 11" (Front)	7' 6"	35.0	60.0	25.0	Deck Load + Pavers

- Side loads are assumed to not induce cross-grain tension.

Member Notes

West side of South Roof Deck



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Roof Deck Framing-New

Roof Deck Beam DB5 Adjacent to stairs



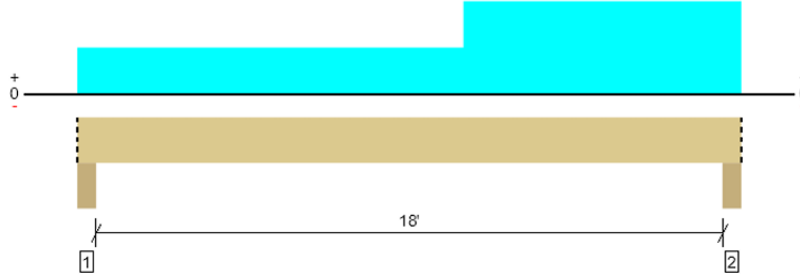
MEMBER REPORT

PASSED

ROOF DECK, Beam DB5

1 piece(s) 5 1/8" x 12" 24F-V4 DF Glulam

Overall Length: 18' 11"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4042 @ 18' 7"	18322 (5.50")	Passed (22%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	3179 @ 17' 5 1/2"	10865	Passed (29%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	14202 @ 10' 11 5/16"	24600	Passed (58%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.410 @ 9' 8 1/2"	0.608	Passed (L/535)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.663 @ 9' 8 3/8"	0.913	Passed (L/331)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

Member Length : 18' 11"
System : Floor
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 18' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Column - SPF	5.50"	5.50"	1.50"	1107	1655	690	2865	Blocking
2 - Column - SPF	5.50"	5.50"	1.50"	1524	2370	987	4042	Blocking

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

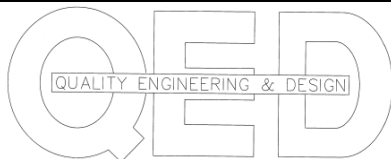
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	18' 11" o/c	
Bottom Edge (Lu)	18' 11" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 18' 11"	N/A	14.9	--	--	
1 - Uniform (PSF)	0 to 11' (Front)	2' 6"	35.0	60.0	25.0	Deck Load + Pavers
2 - Uniform (PSF)	11' to 18' 11" (Front)	5'	35.0	60.0	25.0	Deck Load + Pavers

- Side loads are assumed to not induce cross-grain tension.

Member Notes
Adjacent to stair well



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Roof Deck Framing-New

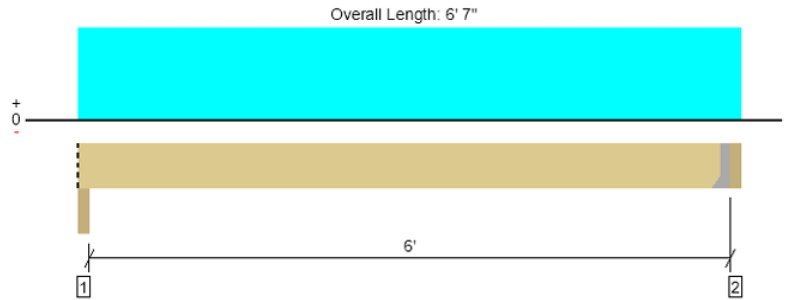
Roof deck Beam DB6 supporting roof deck joists at top of stairs



MEMBER REPORT

PASSED

ROOF DECK, Beam DB6
1 piece(s) 4 x 12 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1543 @ 6' 3 1/2"	2126 (1.50")	Passed (73%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	1031 @ 5' 4 1/4"	3938	Passed (26%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2274 @ 3' 2 3/4"	5752	Passed (40%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.019 @ 3' 2 3/4"	0.204	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.030 @ 3' 2 3/4"	0.306	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

Member Length : 6' 3 1/2"
System : Floor
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Column - SPF	3.50"	3.50"	1.50"	597	969	404	1627	Blocking
2 - Hanger on 11 1/4" SPF beam	3.50"	Hanger ¹	1.50"	618	1006	419	1687	See note ¹

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 4" o/c	
Bottom Edge (Lu)	6' 4" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	LUS410	2.00"	N/A	8-16d	6-16d	

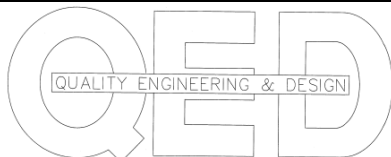
- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 3 1/2"	N/A	10.0	--	--	
1 - Uniform (PSF)	0 to 6' 7" (Front)	5'	35.0	60.0	25.0	Deck Load + Pavers

- Side loads are assumed to not induce cross-grain tension.

Member Notes

Supports roof deck joists at top of stairs



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Roof Deck Framing-New

Roof deck Beam DB7 supporting Stair stringers and Beam DB6

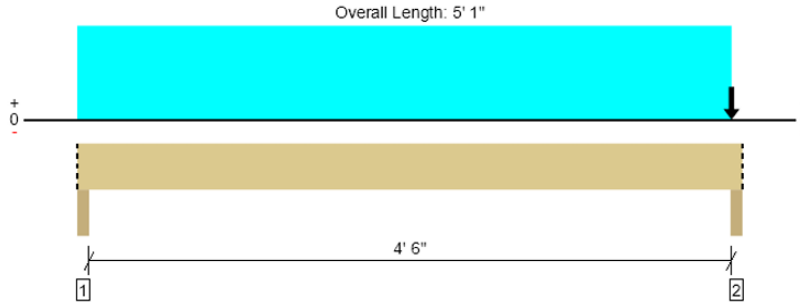


MEMBER REPORT

PASSED

ROOF DECK, Beam DB7

1 piece(s) 3 1/2" x 12" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2814 @ 4' 11"	7963 (3.50")	Passed (35%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	575 @ 1' 3 1/2"	7420	Passed (8%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	1298 @ 2' 6 1/2"	16800	Passed (8%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.005 @ 2' 6 1/2"	0.158	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.006 @ 2' 6 1/2"	0.237	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

Member Length : 5' 1"
System : Floor
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 4' 9".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Column - SPF	3.50"	3.50"	1.50"	255	915	381	1227	Blocking
2 - Column - SPF	3.50"	3.50"	1.50"	844	1854	773	2814	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 1" o/c	
Bottom Edge (Lu)	5' 1" o/c	

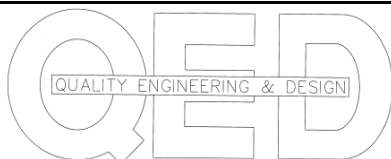
•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 1"	N/A	10.2	--	--	
1 - Uniform (PSF)	0 to 5' (Front)	6'	15.0	60.0	25.0	Deck Load + Pavers
2 - Point (lb)	5' (Front)	N/A	597	969	404	Linked from: Beam DB6, Support 1

• Side loads are assumed to not induce cross-grain tension.

Member Notes

Supports Stair stringers and Beam DB6



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Roof Deck Framing-New

Roof Deck Beam DB8

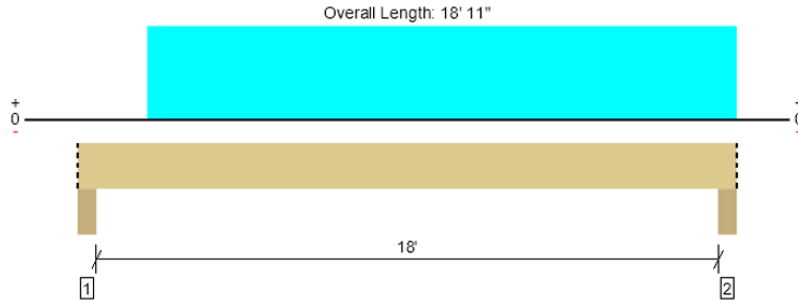


MEMBER REPORT

PASSED

ROOF DECK, Beam DB8

1 piece(s) 7" x 16" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	12915 @ 18' 7"	24063 (5.50")	Passed (54%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	10449 @ 17' 1 1/2"	21653	Passed (48%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	56370 @ 9' 5 3/8"	69909	Passed (81%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.548 @ 9' 5 13/16"	0.608	Passed (L/400)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.694 @ 9' 5 13/16"	0.913	Passed (L/316)	--	1.0 D + 1.0 L (All Spans)

Member Length : 18' 11"
 System : Floor
 Member Type : Drop Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Member should be side-loaded from both sides of the member or braced to prevent rotation.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Column - SPF	5.50"	5.50"	2.39"	2243	8194	10437	Blocking
2 - Column - SPF	5.50"	5.50"	2.95"	2712	10203	12915	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	18' 11" o/c	
Bottom Edge (Lu)	18' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 18' 11"	N/A	35.0	--	
1 - Uniform (PSF)	2' to 18' 11" (Back)	7' 3"	35.0	150.0	Hot Tub Load

• Side loads are assumed to not induce cross-grain tension.

Member Notes
west Side of North deck

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Roof Deck Framing-New

Deck Beam DB9



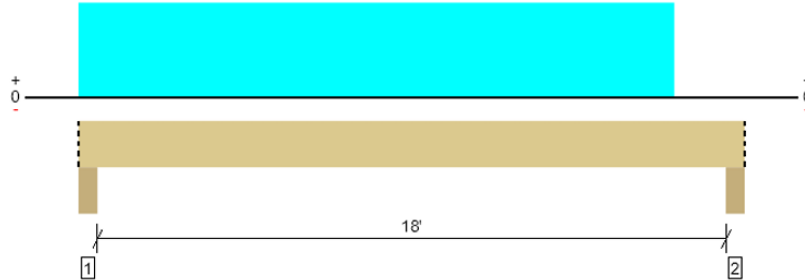
MEMBER REPORT

PASSED

ROOF DECK, Beam DB9

1 piece(s) 5 1/2" x 11 7/8" 24F-V4 DF Glulam

Overall Length: 18' 11"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3393 @ 4"	19663 (5.50")	Passed (17%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	2765 @ 1' 5 3/8"	11539	Passed (24%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	14274 @ 9' 4 5/8"	25853	Passed (55%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.395 @ 9' 5 3/16"	0.608	Passed (L/554)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.641 @ 9' 5 3/16"	0.913	Passed (L/342)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

Member Length : 18' 11"
System : Floor
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 18' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Column - SPF	5.50"	5.50"	1.50"	1299	1970	821	3393	Blocking
2 - Column - SPF	5.50"	5.50"	1.50"	1073	1582	659	2754	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	18' 11" o/c	
Bottom Edge (Lu)	18' 11" o/c	

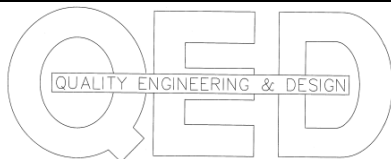
- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 18' 11"	N/A	15.9	--	--	
1 - Uniform (PSF)	0 to 16' 11" (Front)	3' 6"	35.0	60.0	25.0	Deck Load + Pavers

- Side loads are assumed to not induce cross-grain tension.

Member Notes

East side of South Roof Deck



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Roof Deck Framing-New

Post DP1N Supports north end of Beam DB1



MEMBER REPORT

PASSED

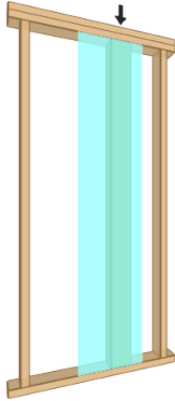
ROOF DECK, Post DP1N

1 piece(s) 6 x 8 HF No.2 (Plank)

Wall Height: 8'

Member Height: 7' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	17	50	Passed (33%)	--	--
Compression (lbs)	16075	20694	Passed (78%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	16075	17531	Passed (92%)	--	1.0 D + 1.0 L
Lateral Reaction (lbs)	58	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	51	6160	Passed (1%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	111 @ mid-span	2899	Passed (4%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.01 @ mid-span	0.76	Passed (L/12865)	--	1.0 D + 0.6 W
Bending/Compression	0.30	1	Passed (30%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- Bearing shall be on a metal plate or strap, or on other equivalently durable, rigid, homogeneous material with sufficient stiffness to distribute applied load.
- Member has been designed in flat (plank) orientation with lateral (wind) loads applied to wide strand face.

Supports	Type	Material
Top	Dbl 2X	Spruce-Pine-Fir
Base	2X	Spruce-Pine-Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
7' 7 1/2"	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

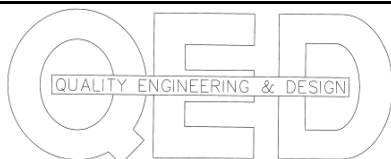
Vertical Load	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Point (lb)	N/A	3902	12173	2521	Linked from: Beam DB1, Support 2

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	25.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Wind Zone (4), GCpI (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes

Supports North end of Beam DB1



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Roof Deck Framing-New

Post DP1S - Supports South end of Beam DB1



MEMBER REPORT

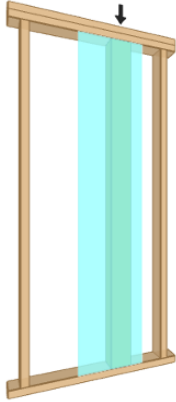
PASSED

ROOF DECK, Post DP1S
1 piece(s) 6 x 8 HF No.2 (Plank)

Wall Height: 8'

Member Height: 7' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	17	50	Passed (33%)	--	--
Compression (lbs)	16075	20694	Passed (78%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	16075	17531	Passed (92%)	--	1.0 D + 1.0 L
Lateral Reaction (lbs)	58	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	51	6160	Passed (1%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	111 @ mid-span	2899	Passed (4%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.01 @ mid-span	0.76	Passed (L/12865)	--	1.0 D + 0.6 W
Bending/Compression	0.30	1	Passed (30%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- Bearing shall be on a metal plate or strap, or on other equivalently durable, rigid, homogeneous material with sufficient stiffness to distribute applied load.
- Member has been designed in flat (plank) orientation with lateral (wind) loads applied to wide strand face.

Supports	Type	Material
Top	Dbl 2X	Spruce-Pine-Fir
Base	2X	Spruce-Pine-Fir

System : Wall
 Member Type : Column
 Building Code : IBC 2021
 Design Methodology : ASD

Max Unbraced Length	Comments
7' 7 1/2"	

Lateral Connections				
Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

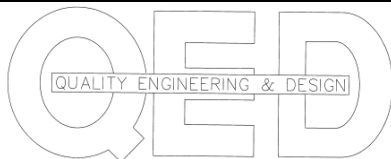
- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Point (lb)	N/A	3902	12173	2521	Linked from: Beam DB1, Support 2

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	25.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes
Supports South end of Beam DB1



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Roof Deck Framing-New

Post DP2 - Supports Beam DB2



MEMBER REPORT

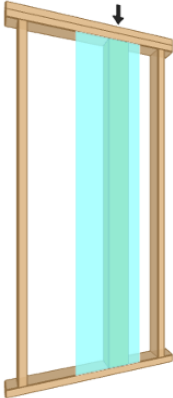
PASSED

ROOF DECK, Post DP2
1 piece(s) 4 x 4 HF No.2

Wall Height: 8'

Member Height: 7' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	26	50	Passed (52%)	--	--
Compression (lbs)	2807	6271	Passed (45%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	2807	5206	Passed (54%)	--	1.0 D + 1.0 L
Lateral Reaction (lbs)	58	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	54	1960	Passed (3%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	111 @ mid-span	1215	Passed (9%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.05 @ mid-span	0.76	Passed (L/1828)	--	1.0 D + 0.6 W
Bending/Compression	0.24	1	Passed (24%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Type	Material
Top	Dbl 2X	Spruce-Pine-Fir
Base	2X	Spruce-Pine-Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
7' 7 1/2"	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

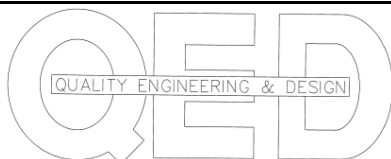
Vertical Load	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
1 - Point (lb)	N/A	1112	1695	Linked from: Beam DB2, Support 1

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	25.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes

Supports each end of Beam DB2



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Roof Deck Framing-New

Post DP3 - Supports Beam DB3



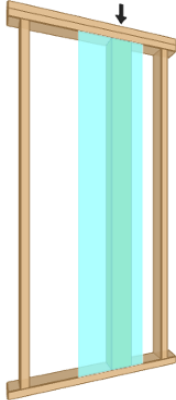
MEMBER REPORT
 ROOF DECK, Post DP3
1 piece(s) 6 x 6 HF No.2

PASSED

Wall Height: 8'

Member Height: 7' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	17	50	Passed (33%)	--	--
Compression (lbs)	10052	15175	Passed (66%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	10439	12856	Passed (81%)	--	1.0 D + 0.75 L + 0.75 S
Lateral Reaction (lbs)	58	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	51	4517	Passed (1%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	111 @ mid-span	2126	Passed (5%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.01 @ mid-span	0.76	Passed (L/9434)	--	1.0 D + 0.6 W
Bending/Compression	0.29	1	Passed (29%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- Bearing shall be on a metal plate or strap, or on other equivalently durable, rigid, homogeneous material with sufficient stiffness to distribute applied load.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Type	Material
Top	Dbl 2X	Spruce-Pine-Fir
Base	2X	Spruce-Pine-Fir

System : Wall
 Member Type : Column
 Building Code : IBC 2021
 Design Methodology : ASD

Max Unbraced Length	Comments
7' 7 1/2"	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

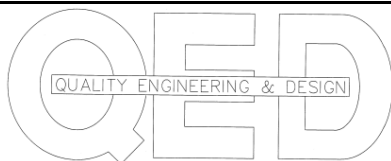
Vertical Load	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Point (lb)	N/A	3860	6192	2580	Linked from: Beam DB3, Support 2

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	25.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes

Supports each end of Beam DB3



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Roof Deck Framing-New

Post DP4 - Supports each end of Beam DB4



MEMBER REPORT

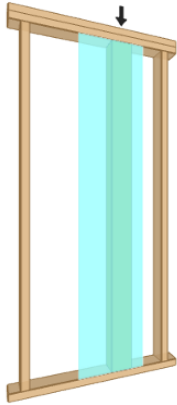
PASSED

ROOF DECK, Post DP4
1 piece(s) 4 x 6 HF No.2

Wall Height: 8'

Member Height: 7' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	26	50	Passed (52%)	--	--
Compression (lbs)	7195	9966	Passed (72%)	1.15	1.0 D + 0.75 L + 0.75 S
Plate Bearing (lbs)	7195	8181	Passed (88%)	--	1.0 D + 0.75 L + 0.75 S
Lateral Reaction (lbs)	58	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	51	3080	Passed (2%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	111 @ mid-span	2561	Passed (4%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.01 @ mid-span	0.76	Passed (L/7095)	--	1.0 D + 0.6 W
Bending/Compression	0.54	1	Passed (54%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- Bearing shall be on a metal plate or strap, or on other equivalently durable, rigid, homogeneous material with sufficient stiffness to distribute applied load.

Supports	Type	Material
Top	Dbl 2X	Spruce-Pine-Fir
Base	2X	Spruce-Pine-Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
7' 7 1/2"	

Lateral Connections				
Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

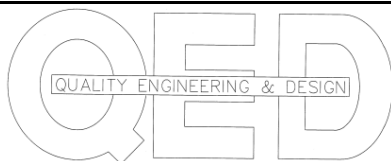
- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Point (lb)	N/A	2709	4222	1759	Linked from: Beam DB4, Support 1

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	25.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes
Supports each end of DB4



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Roof Deck Framing-New

Post DP5 - Supports each end of Beam DB5



MEMBER REPORT

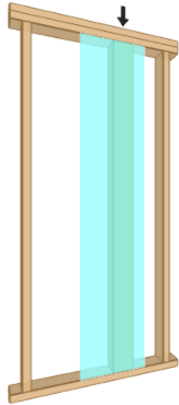
PASSED

ROOF DECK, Post DP5
1 piece(s) 4 x 4 HF No.2

Wall Height: 8'

Member Height: 7' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	26	50	Passed (52%)	--	--
Compression (lbs)	2866	6372	Passed (45%)	1.15	1.0 D + 0.75 L + 0.75 S
Plate Bearing (lbs)	2866	5206	Passed (55%)	--	1.0 D + 0.75 L + 0.75 S
Lateral Reaction (lbs)	58	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	54	1960	Passed (3%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	111 @ mid-span	1215	Passed (9%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.05 @ mid-span	0.76	Passed (L/1828)	--	1.0 D + 0.6 W
Bending/Compression	0.31	1	Passed (31%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Type	Material
Top	Dbl 2X	Spruce-Pine-Fir
Base	2X	Spruce-Pine-Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
7' 7 1/2"	

Lateral Connections				
Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

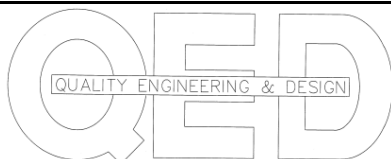
- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Point (lb)	N/A	1107	1655	690	Linked from: Beam DB5, Support 1

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	25.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes
Supports each end of DB5



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Roof Deck Framing-New

Post DP6 - Supports each end of Beam DB6



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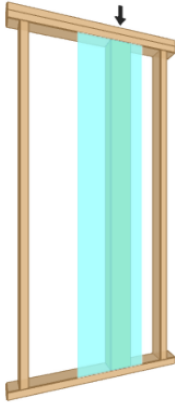
PASSED

ROOF DECK, Post DP6
2 piece(s) 2 x 4 HF No.2

Wall Height: 8'

Member Height: 7' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	31	50	Passed (61%)	--	--
Compression (lbs)	1627	2470	Passed (66%)	1.15	1.0 D + 0.75 L + 0.75 S
Plate Bearing (lbs)	1627	4463	Passed (36%)	--	1.0 D + 0.75 L + 0.75 S
Lateral Reaction (lbs)	58	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	54	1680	Passed (3%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	111 @ mid-span	1026	Passed (11%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.06 @ mid-span	0.76	Passed (L/1567)	--	1.0 D + 0.6 W
Bending/Compression	0.53	1	Passed (53%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- The column stability factor ($K_f = 0.6$) applied to this design assumes nailed built-up columns per NDS section 15.3.3. For Weyerhaeuser ELP products refer to the U.S. Wall Guide for multiple-member connection requirements.

Supports	Type	Material
Top	Dbl 2X	Spruce-Pine-Fir
Base	2X	Spruce-Pine-Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
7' 7 1/2"	

Lateral Connections				
Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

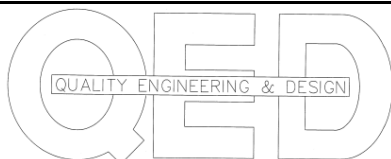
- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Point (lb)	N/A	597	969	404	Linked from: Beam DB6, Support 1

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	25.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes
Supports North end of DB6



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Roof Deck Framing-New

Post DP7 - Supports each end of Beam DB7



MEMBER REPORT

PASSED

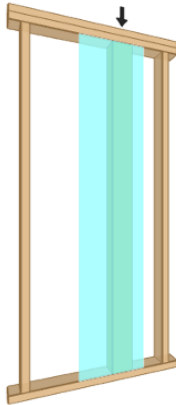
ROOF DECK, Post DP7

1 piece(s) 4 x 4 HF No.2

Wall Height: 8'

Member Height: 7' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	26	50	Passed (52%)	--	--
Compression (lbs)	1227	6372	Passed (19%)	1.15	1.0 D + 0.75 L + 0.75 S
Plate Bearing (lbs)	1227	5206	Passed (24%)	--	1.0 D + 0.75 L + 0.75 S
Lateral Reaction (lbs)	58	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	54	1960	Passed (3%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	111 @ mid-span	1215	Passed (9%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.05 @ mid-span	0.76	Passed (L/1828)	--	1.0 D + 0.6 W
Bending/Compression	0.12	1	Passed (12%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Type	Material
Top	Dbf 2X	Spruce-Pine-Fir
Base	2X	Spruce-Pine-Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
7' 7 1/2"	

Lateral Connections				
Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

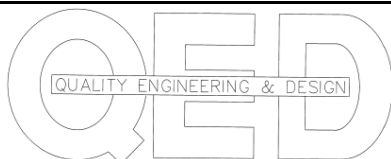
- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Point (lb)	N/A	255	915	381	Linked from: Beam DB7, Support 1

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	25.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes
Supports each end of DB7



MERCER ISLAND RESIDENCE

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Roof Deck Framing-New

Post DP8 - Supports each end of Beam DB8



MEMBER REPORT

PASSED

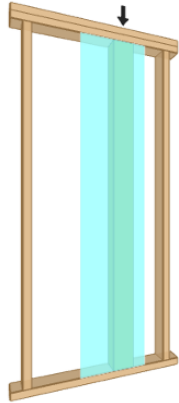
ROOF DECK, Post DP8

1 piece(s) 6 x 6 HF No.2

Wall Height: 8'

Member Height: 7' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	17	50	Passed (33%)	--	--
Compression (lbs)	12915	15175	Passed (85%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	12915	12856	Passed (100%)	--	1.0 D + 1.0 L
Lateral Reaction (lbs)	58	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	51	4517	Passed (1%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	111 @ mid-span	2126	Passed (5%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.01 @ mid-span	0.76	Passed (L/9434)	--	1.0 D + 0.6 W
Bending/Compression	0.29	1	Passed (29%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- Bearing shall be on a metal plate or strap, or on other equivalently durable, rigid, homogeneous material with sufficient stiffness to distribute applied load.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Type	Material
Top	Dbl 2X	Spruce-Pine-Fir
Base	2X	Spruce-Pine-Fir

System : Wall
 Member Type : Column
 Building Code : IBC 2021
 Design Methodology : ASD

Max Unbraced Length	Comments
7' 7 1/2"	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

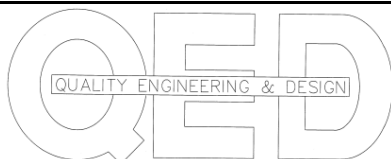
Vertical Load	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
1 - Point (lb)	N/A	2712	10203	Linked from: Beam DB8, Support 2

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	25.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Wind Zone (4), GCpl (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes

Supports each end of DB8



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Roof Deck Framing-New

Post DP9 - Supports each end of Beam DB9



MEMBER REPORT

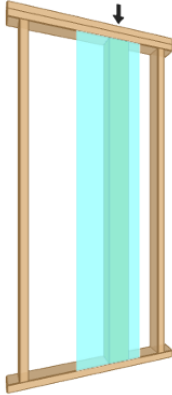
PASSED

ROOF DECK, Post DP9
1 piece(s) 4 x 4 HF No.2

Wall Height: 8'

Member Height: 7' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	26	50	Passed (52%)	--	--
Compression (lbs)	3392	6372	Passed (53%)	1.15	1.0 D + 0.75 L + 0.75 S
Plate Bearing (lbs)	3392	5206	Passed (65%)	--	1.0 D + 0.75 L + 0.75 S
Lateral Reaction (lbs)	58	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	54	1960	Passed (3%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	111 @ mid-span	1215	Passed (9%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.05 @ mid-span	0.76	Passed (L/1828)	--	1.0 D + 0.6 W
Bending/Compression	0.40	1	Passed (40%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Type	Material
Top	DbI 2X	Spruce-Pine-Fir
Base	2X	Spruce-Pine-Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
7' 7 1/2"	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

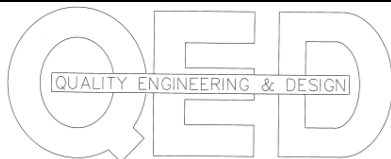
Vertical Load	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Point (lb)	N/A	1299	1970	821	Linked from: Beam DB9, Support 1

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	25.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes

Supports each end of DB9



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Roof Deck Framing-New

Header supporting DP2

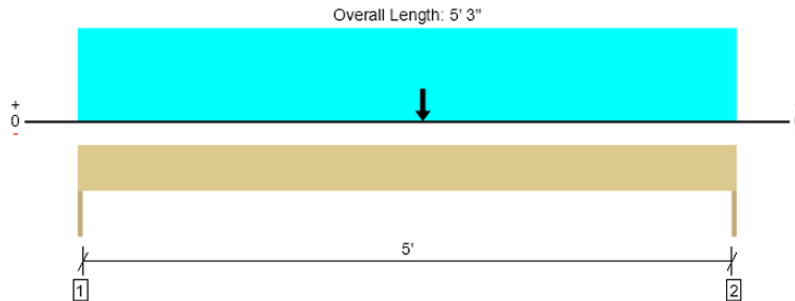


MEMBER REPORT

PASSED

ROOF DECK, Header for DP2

1 piece(s) 4 x 10 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1641 @ 5' 3"	2126 (1.50")	Passed (77%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1587 @ 4' 4 1/4"	3238	Passed (49%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	3914 @ 2' 9"	4242	Passed (92%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.032 @ 2' 7 5/8"	0.175	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.052 @ 2' 7 5/8"	0.262	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

Member Length : 5' 3"
 System : Wall
 Member Type : Header
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Trimmer - SPF	1.50"	1.50"	1.50"	594	912	1506	None
2 - Trimmer - SPF	1.50"	1.50"	1.50"	648	993	1641	None

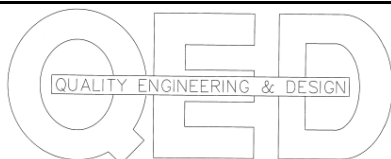
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 3" o/c	
Bottom Edge (Lu)	5' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 5' 3"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 5' 3"	1'	12.0	40.0	Default Load
2 - Point (lb)	2' 9"	N/A	1136	1695	Linked from: Post DP2, Support 1

Member Notes

Header for Post DP2 NE corner



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Roof Deck Framing-New

Header supporting Post DP9

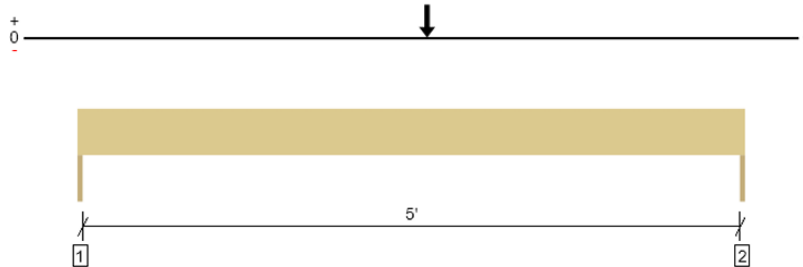


MEMBER REPORT

PASSED

ROOF DECK, Header for DP9
1 piece(s) 4 x 10 HF No.2

Overall Length: 5' 3"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1811 @ 5' 3"	2126 (1.50")	Passed (85%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	1739 @ 4' 4 1/4"	3238	Passed (54%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (FT-lbs)	4340 @ 2' 9"	4242	Passed (102%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.036 @ 2' 7 11/16"	0.175	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.060 @ 2' 7 11/16"	0.262	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

Member Length : 5' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Trimmer - SPF	1.50"	1.50"	1.50"	651	938	391	1648	None
2 - Trimmer - SPF	1.50"	1.50"	1.50"	714	1032	430	1811	None

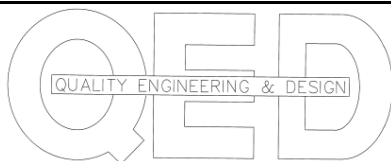
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6" o/c	
Bottom Edge (Lu)	5' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 3"	N/A	8.2	--	--	
1 - Point (lb)	2' 9"	N/A	1323	1970	821	Linked from: Post DP9, Support 1

Member Notes

Header for Post DP2 NE corner



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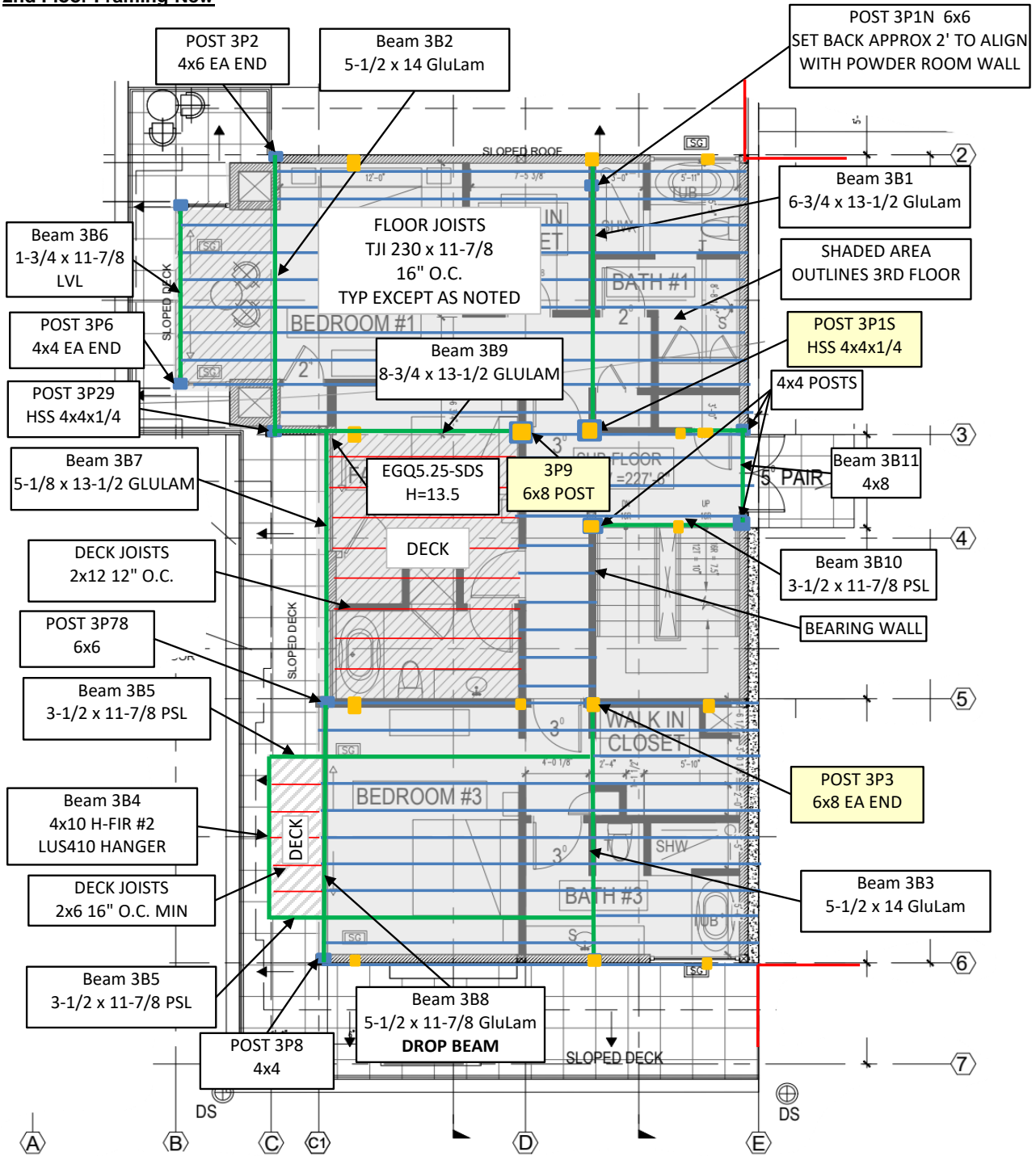
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2nd Floor Framing-New



- Post Down to Second Floor
- Post From Roof Deck Framing

SECOND FLOOR FRAMING

Note that beams are labeled as "3rd Floor" but designation was changed to "2nd Floor" at revision 4 to match architectural drawing change

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2nd Floor Framing-New

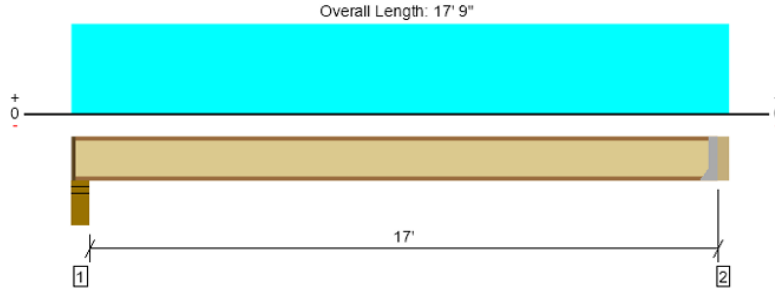
2nd Floor Joists



MEMBER REPORT

PASSED

3RD FLOOR, Floor Joists 3rd Floor
1 piece(s) 11 7/8" TJI@ 230 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	592 @ 17' 5 1/2"	1060 (1.75")	Passed (56%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	592 @ 17' 5 1/2"	1655	Passed (36%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2529 @ 8' 11"	4215	Passed (60%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.278 @ 8' 11"	0.427	Passed (L/738)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.361 @ 8' 11"	0.854	Passed (L/568)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	41	35	Passed	--	--

Member Length : 17' 4 1/4"
 System : Floor
 Member Type : Joist
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - SPF	5.50"	4.25"	1.75"	143	476	618	1 1/4" Rim Board
2 - Hanger on 11 7/8" SPF beam	3.50"	Hanger ¹	1.75" / - ²	141	471	612	See note ¹

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

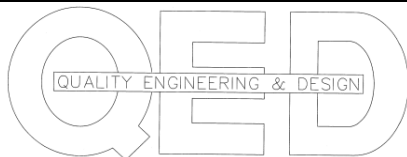
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 4" o/c	
Bottom Edge (Lu)	17' 4" o/c	

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

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	IUS2.37/11.88	2.00"	N/A	10-10dx1.5	2-Strong-Grip	

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

Vertical Load	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 17' 9"	16"	12.0	40.0	Floor Load



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2nd Floor Framing-New

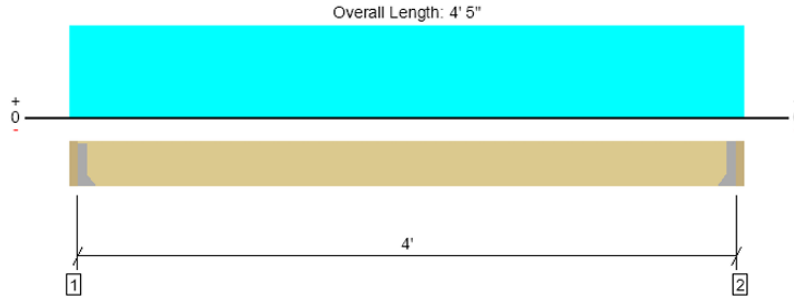
Southwest Deck Joists



MEMBER REPORT

PASSED

3RD FLOOR, Deck Joists-SW Deck
1 piece(s) 2 x 6 HF No.2 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDf	Load: Combination (Pattern)
Member Reaction (lbs)	253 @ 2 1/2"	911 (1.50")	Passed (28%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	195 @ 8"	825	Passed (24%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	253 @ 2' 2 1/2"	801	Passed (32%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.017 @ 2' 2 1/2"	0.100	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.027 @ 2' 2 1/2"	0.200	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

Member Length : 4'
 System : Floor
 Member Type : Joist
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Hanger on 5 1/2" SPF beam	2.50"	Hanger ¹	1.50"	103	177	280	See note ¹
2 - Hanger on 5 1/2" SPF beam	2.50"	Hanger ¹	1.50"	103	177	280	See note ¹

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

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

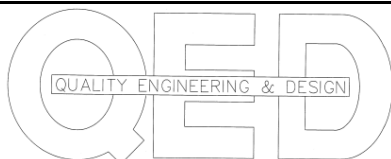
•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	LU26	1.50"	N/A	6-10dx1.5	4-10dx1.5	
2 - Face Mount Hanger	LU26	1.50"	N/A	6-10dx1.5	4-10dx1.5	

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

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 4' 5"	16"	35.0	60.0	Deck Joists



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2nd Floor Framing-New

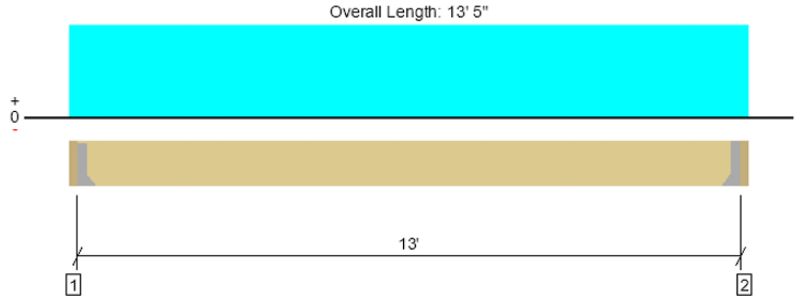
Deck Joists at Center Deck



MEMBER REPORT

PASSED

3RD FLOOR, Deck Joists-Middle Deck
1 piece(s) 2 x 12 HF No.2 @ 12" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	618 @ 2 1/2"	911 (1.50")	Passed (68%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	528 @ 1' 1 3/4"	1688	Passed (31%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2007 @ 6' 8 1/2"	2577	Passed (78%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.167 @ 6' 8 1/2"	0.325	Passed (L/936)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.264 @ 6' 8 1/2"	0.650	Passed (L/591)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

Member Length : 13'
 System : Floor
 Member Type : Joist
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Hanger on 11 1/4" SPF beam	2.50"	Hanger ¹	1.50"	235	403	637	See note ¹
2 - Hanger on 11 1/4" SPF beam	2.50"	Hanger ¹	1.50"	235	403	637	See note ¹

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 1" o/c	
Bottom Edge (Lu)	13' o/c	

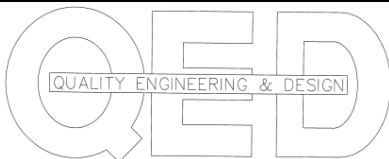
• Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	LUS28	1.75"	N/A	6-10dx1.5	3-10d	
2 - Face Mount Hanger	LUS28	1.75"	N/A	6-10dx1.5	3-10d	

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

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 13' 5"	12"	35.0	60.0	Deck Joists



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2nd Floor Framing-New

Beam 3B1



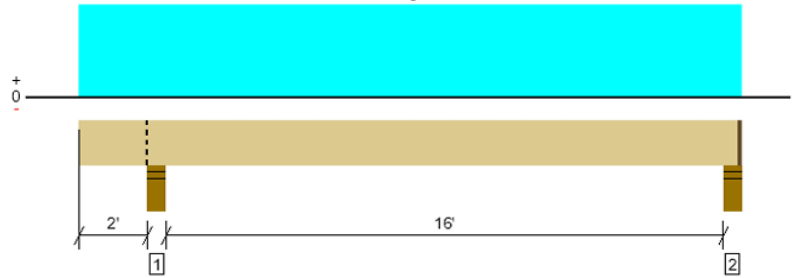
MEMBER REPORT

PASSED

3RD FLOOR, Beam 3B1

1 piece(s) 6 3/4" x 13 1/2" 24F-V4 DF Glulam

Overall Length: 18' 11"



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

Design Results	Actual @ Location	Allowed	Result	LDf	Load: Combination (Pattern)
Member Reaction (lbs)	6712 @ 18' 7"	12192 (4.25")	Passed (55%)	--	1.0 D + 1.0 L (Alt Spans)
Shear (lbs)	5595 @ 3' 7"	16099	Passed (35%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	26567 @ 10' 5 5/16"	40442	Passed (66%)	1.00	1.0 D + 1.0 L (Alt Spans)
Neg Moment (Ft-lbs)	-1993 @ 2' 2 3/4"	31609	Passed (6%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.388 @ 10' 4 7/8"	0.409	Passed (L/506)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.512 @ 10' 5"	0.818	Passed (L/383)	--	1.0 D + 1.0 L (Alt Spans)

Member Length : 18' 9 3/4"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Overhang deflection criteria: LL (2L/480) and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 0.99 that was calculated using length L = 16' 3 5/16".
- Critical negative moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 2' 6 3/8".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - SPF	5.50"	5.50"	2.95"	2134	6335	8469	Blocking
2 - Stud wall - SPF	5.50"	4.25"	2.34"	1687	5106/-29	6794	1 1/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	18' 10" o/c	
Bottom Edge (Lu)	18' 10" o/c	

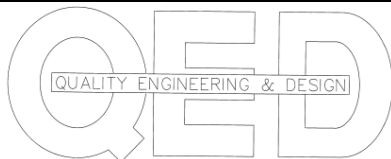
- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 18' 9 3/4"	N/A	22.1	--	
1 - Uniform (PSF)	0 to 18' 11" (Front)	8'	12.0	40.0	Floor Joists on West side of beam
2 - Uniform (PSF)	0 to 18' 11" (Front)	7'	12.0	40.0	Floor Joists on East side of beam

- Side loads are assumed to not induce cross-grain tension.

Member Notes

Inner Floor Beam at North end



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2nd Floor Framing-New

Beam 3B2



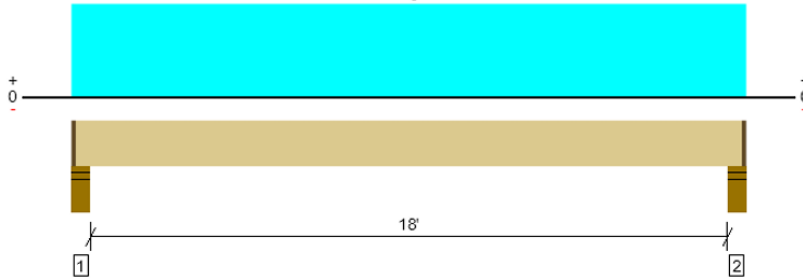
MEMBER REPORT

PASSED

3RD FLOOR, Beam 3B2

1 piece(s) 5 1/2" x 14" 24F-V4 DF Glulam

Overall Length: 18' 11"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	6424 @ 4"	9934 (4.25")	Passed (65%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	5379 @ 1' 7 1/2"	13603	Passed (40%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	28590 @ 9' 5 1/2"	35631	Passed (80%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.584 @ 9' 5 1/2"	0.608	Passed (L/375)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.757 @ 9' 5 1/2"	0.913	Passed (L/289)	--	1.0 D + 1.0 L (All Spans)

Member Length : 18' 8 1/2"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 0.99 that was calculated using length L = 18' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - SPF	5.50"	4.25"	2.75"	1480	5013	6493	1 1/4" Rim Board
2 - Stud wall - SPF	5.50"	4.25"	2.75"	1480	5013	6493	1 1/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	18' 9" o/c	
Bottom Edge (Lu)	18' 9" o/c	

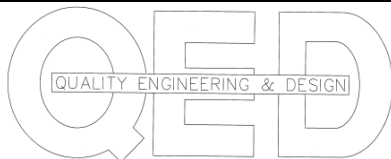
- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 1/4" to 18' 9 3/4"	N/A	18.7	--	
1 - Uniform (PSF)	0 to 18' 11" (Front)	3' 6"	12.0	60.0	Deck Joists
2 - Uniform (PSF)	0 to 18' 11" (Front)	8'	12.0	40.0	Floor Joists

- Side loads are assumed to not induce cross-grain tension.

Member Notes

West Floor Beam at North end



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2nd Floor Framing-New

Beam DB3

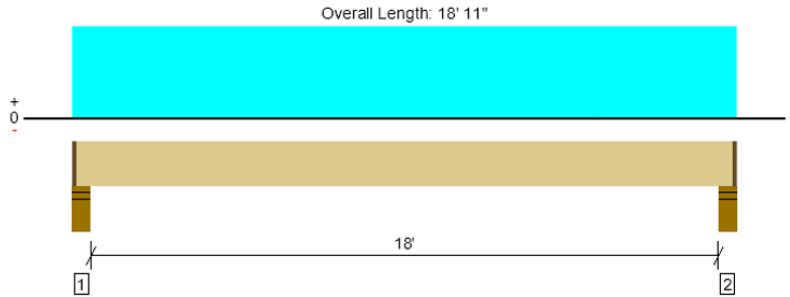


MEMBER REPORT

PASSED

3RD FLOOR, Beam 3B3

1 piece(s) 5 1/2" x 14" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	6985 @ 4"	9934 (4.25")	Passed (70%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	5849 @ 1' 7 1/2"	13603	Passed (43%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	31088 @ 9' 5 1/2"	35631	Passed (87%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.617 @ 9' 5 1/2"	0.608	Passed (L/355)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.823 @ 9' 5 1/2"	0.913	Passed (L/266)	--	1.0 D + 1.0 L (All Spans)

Member Length : 18' 8 1/2"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 0.99 that was calculated using length L = 18' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - SPF	5.50"	4.25"	2.99"	1764	5297	7061	1 1/4" Rim Board
2 - Stud wall - SPF	5.50"	4.25"	2.99"	1764	5297	7061	1 1/4" Rim Board

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

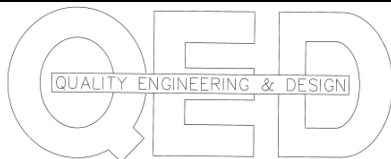
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	18' 9" o/c	
Bottom Edge (Lu)	18' 9" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 1/4" to 18' 9 3/4"	N/A	18.7	--	
1 - Uniform (PSF)	0 to 18' 11" (Front)	7"	12.0	40.0	Floor Joists
2 - Uniform (PSF)	0 to 18' 11" (Front)	7"	12.0	40.0	Floor Joists

- Side loads are assumed to not induce cross-grain tension.

Member Notes
Inner Floor Beam at South end



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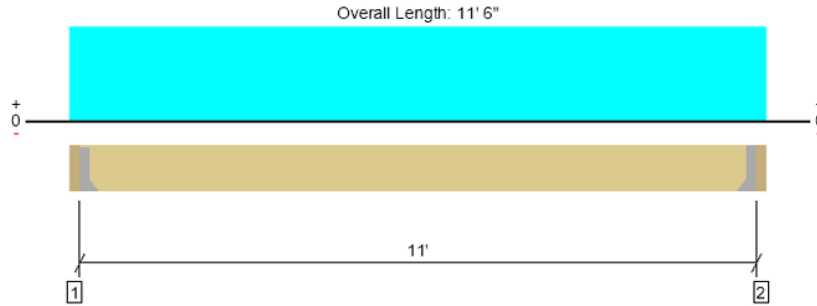
2nd Floor Framing-New

Beam 3B4



MEMBER REPORT
 3RD FLOOR, Beam 3B4
 1 piece(s) 4 x 10 HF No.2

PASSED



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1090 @ 3"	2126 (1.50")	Passed (51%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	937 @ 1' 1/4"	3238	Passed (29%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2998 @ 5' 9"	4242	Passed (71%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.132 @ 5' 9"	0.367	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.218 @ 5' 9"	0.550	Passed (L/607)	--	1.0 D + 1.0 L (All Spans)

Member Length : 11'
 System : Floor
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Hanger on 9 1/4" SPF beam	3.00"	Hanger ¹	1.50"	448	690	1138	See note ¹
2 - Hanger on 9 1/4" SPF beam	3.00"	Hanger ¹	1.50"	448	690	1138	See note ¹

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	11' o/c	
Bottom Edge (Lu)	11' o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	LUS410	2.00"	N/A	8-10dx1.5	6-10d	
2 - Face Mount Hanger	LUS410	2.00"	N/A	8-10dx1.5	6-10d	

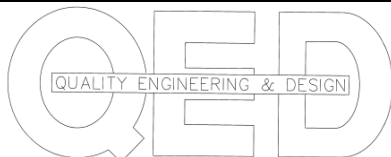
- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	3" to 11' 3"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 11' 6" (Front)	2'	35.0	60.0	Deck Joists

- Side loads are assumed to not induce cross-grain tension.

Member Notes

Deck Beam SW Corner



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2nd Floor Framing-New

Beam 3B5



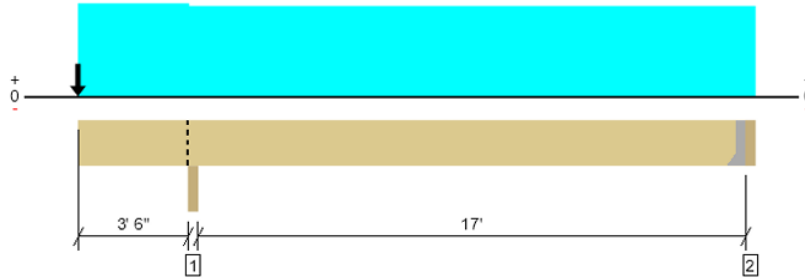
MEMBER REPORT

PASSED

3RD FLOOR, Beam 3B5

1 piece(s) 3 1/2" x 11 7/8" 2.2E Parallam® PSL

Overall Length: 21'



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2421 @ 3' 7 1/2"	4463 (3.00")	Passed (54%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1349 @ 2' 6 1/8"	8035	Passed (17%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	-4679 @ 3' 7 1/2"	19902	Passed (24%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.119 @ 0	0.242	Passed (2L/730)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.164 @ 0	0.363	Passed (2L/530)	--	1.0 D + 1.0 L (Alt Spans)

Member Length : 20' 9"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Beam - SPF	3.00"	3.00"	1.63"	947	1474	2421	Blocking
2 - Hanger on 11 7/8" SPF beam	3.00"	Hanger ¹	1.50"	142	470/-150	612/-8	See note ¹

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	20' 9" o/c	
Bottom Edge (Lu)	20' 9" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	LUS410	2.00"	N/A	8-10dx1.5	6-10d	

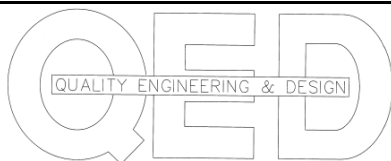
- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 20' 9"	N/A	13.0	--	
1 - Uniform (PSF)	0 to 3' 6" (Top)	9"	35.0	60.0	Deck Joists
2 - Uniform (PSF)	3' 6" to 21' (Top)	1' 4"	12.0	40.0	Floor Load
3 - Point (lb)	0 (Front)	N/A	448	690	Linked from: Beam 3B4, Support 1

- Side loads are assumed to not induce cross-grain tension.

Member Notes

Cantilevered beams supporting Beam 3B4



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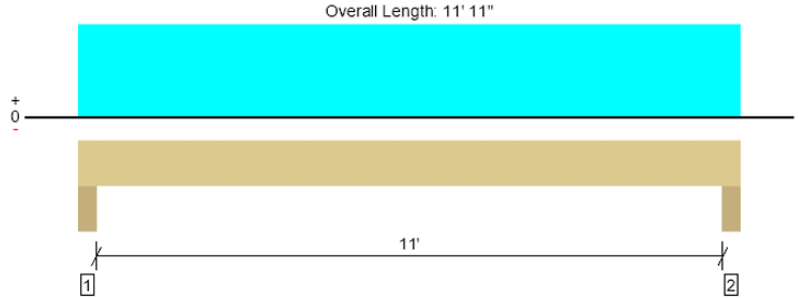
2nd Floor Framing-New

Beam 3B6



MEMBER REPORT
 3RD FLOOR, Beam 3B6
1 piece(s) 4 x 10 HF No.1

PASSED



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1550 @ 4"	7796 (5.50")	Passed (20%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1231 @ 1' 2 3/4"	3238	Passed (38%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	4116 @ 5' 11 1/2"	4866	Passed (85%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.219 @ 5' 11 1/2"	0.375	Passed (L/618)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.271 @ 5' 11 1/2"	0.563	Passed (L/498)	--	1.0 D + 1.0 L (All Spans)

Member Length : 11' 11"
 System : Floor
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Column - SPF	5.50"	5.50"	1.50"	299	1251	1550	None
2 - Column - SPF	5.50"	5.50"	1.50"	299	1251	1550	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 11' 11"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 11' 11" (Front)	3' 6"	12.0	60.0	Deck Joists

• Side loads are assumed to not induce cross-grain tension.

Member Notes
Deck Beam NW Corner

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2nd Floor Framing-New

Beam 3B7



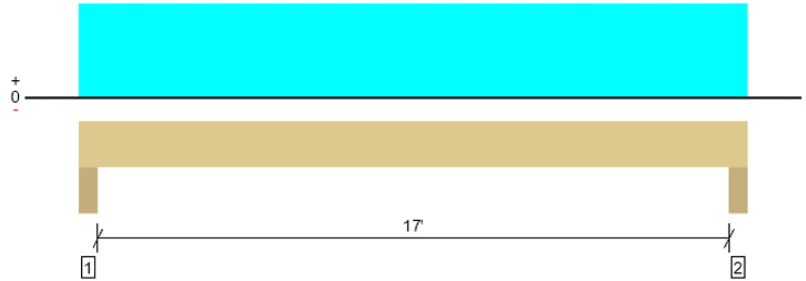
MEMBER REPORT

PASSED

3RD FLOOR, Beam 3B7

1 piece(s) 5 1/8" x 13 1/2" 24F-V4 DF Glulam

Overall Length: 17' 11"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5682 @ 4"	18322 (5.50")	Passed (31%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	4678 @ 1' 7"	12223	Passed (38%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	23594 @ 8' 11 1/2"	31134	Passed (76%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.411 @ 8' 11 1/2"	0.575	Passed (L/504)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.668 @ 8' 11 1/2"	0.863	Passed (L/310)	--	1.0 D + 1.0 L (All Spans)

Member Length : 17' 11"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 17' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Column - SPF	5.50"	5.50"	1.71"	2189	3494	5682	None
2 - Column - SPF	5.50"	5.50"	1.71"	2189	3494	5682	None

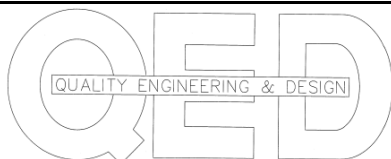
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	17' 11" o/c	
Bottom Edge (Lu)	17' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 17' 11"	N/A	16.8	--	
1 - Uniform (PSF)	0 to 17' 11" (Front)	6' 6"	35.0	60.0	Deck Joists

• Side loads are assumed to not induce cross-grain tension.

Member Notes
Center West deck beam



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2nd Floor Framing-New

Beam 3B8

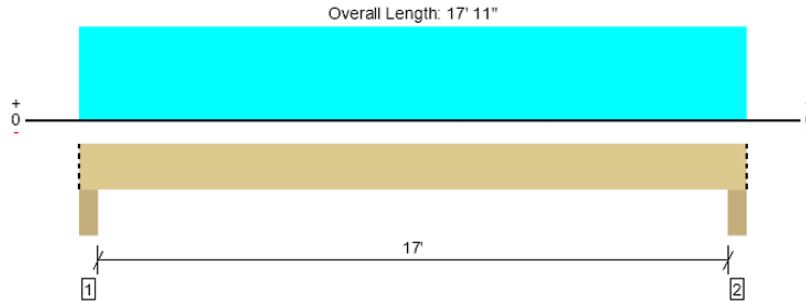


MEMBER REPORT

PASSED

3RD FLOOR, Beam 3B8

1 piece(s) 5 1/2" x 11 7/8" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5105 @ 4"	19663 (5.50")	Passed (26%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	4280 @ 1' 5 3/8"	11539	Passed (37%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	21197 @ 8' 11 1/2"	25853	Passed (82%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.577 @ 8' 11 1/2"	0.575	Passed (L/359)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.822 @ 8' 11 1/2"	0.863	Passed (L/252)	--	1.0 D + 1.0 L (All Spans)

Member Length : 17' 11"
System : Floor
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 17' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Column - SPF	5.50"	5.50"	1.50"	1522	3583	5105	Blocking
2 - Column - SPF	5.50"	5.50"	1.50"	1522	3583	5105	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	17' 11" o/c	
Bottom Edge (Lu)	17' 11" o/c	

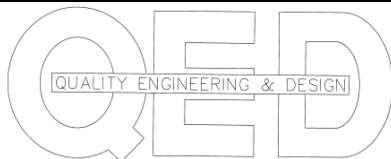
- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 17' 11"	N/A	15.9	--	
1 - Uniform (PSF)	0 to 17' 11" (Front)	2'	35.0	60.0	Deck Joists
2 - Uniform (PSF)	0 to 17' 11" (Front)	7'	12.0	40.0	Floor Joists

- Side loads are assumed to not induce cross-grain tension.

Member Notes

Floor Beam SW corner



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5236 W. Mercer Way
New Construction

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2nd Floor Framing-New

Beam 3B9



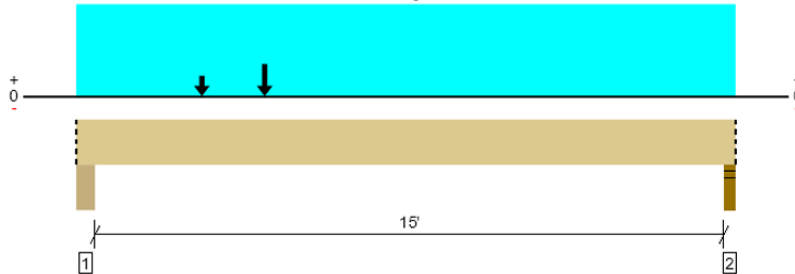
MEMBER REPORT

PASSED

3RD FLOOR, Beam 3B9

1 piece(s) 8 3/4" x 13 1/2" 24F-V4 DF Glulam

Overall Length: 15' 9"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	14856 @ 4"	31281 (5.50")	Passed (47%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	14700 @ 1' 7"	20869	Passed (70%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	52387 @ 4' 6"	51417	Passed (102%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.393 @ 7' 1 13/16"	0.508	Passed (L/466)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.534 @ 7' 1 15/16"	0.762	Passed (L/343)	--	1.0 D + 1.0 L (All Spans)

Member Length : 15' 9"
 System : Floor
 Member Type : Drop Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 0.97 that was calculated using length L = 15' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Column - SPF	5.50"	5.50"	2.61"	4133	10723	14856	Blocking
2 - Stud wall - SPF	3.50"	3.50"	1.50"	1472	3814	5286	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6" o/c	
Bottom Edge (Lu)	15' 9" o/c	

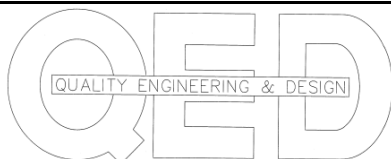
- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 15' 9"	N/A	28.7	--	
1 - Uniform (PSF)	0 to 15' 9" (Top)	1' 4"	12.0	40.0	Floor Load
2 - Point (lb)	3' (Front)	N/A	2189	3494	Linked from: Beam 3B7, Support 1
3 - Point (lb)	4' 6" (Front)	N/A	2712	10203	Linked from: Beam DB8, Support 2

- Side loads are assumed to not induce cross-grain tension.

Member Notes

Supports Beam 3B7 and Post DP8 + Floor Load



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2nd Floor Framing-New

Beam 3B10

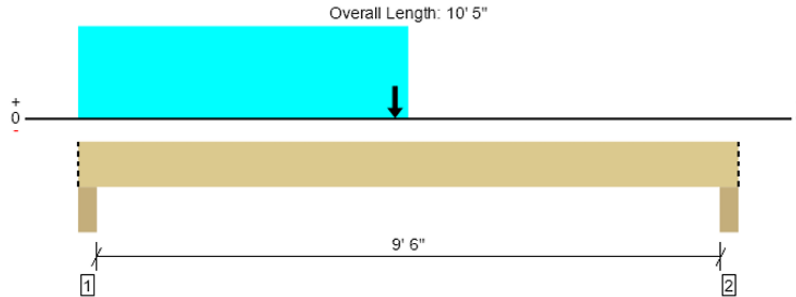


MEMBER REPORT

PASSED

3RD FLOOR, Beam 3B10

1 piece(s) 3 1/2" x 11 7/8" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2304 @ 4"	12031 (5.50")	Passed (19%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1984 @ 1' 5 3/8"	8035	Passed (25%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	8003 @ 5'	19902	Passed (40%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.086 @ 5'	0.325	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.126 @ 5'	0.488	Passed (L/929)	--	1.0 D + 1.0 L (All Spans)

Member Length : 10' 5"
 System : Floor
 Member Type : Drop Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Column - SPF	5.50"	5.50"	1.50"	699	1605	403	2304	Blocking
2 - Column - SPF	5.50"	5.50"	1.50"	530	1082	370	1619	Blocking

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

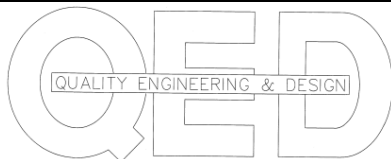
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	10' 5" o/c	
Bottom Edge (Lu)	10' 5" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 10' 5"	N/A	13.0	--	--	
1 - Uniform (PSF)	0 to 5' 2 1/2" (Front)	4'	12.0	40.0	-	Stair Load
2 - Point (lb)	5' (Front)	N/A	844	1854	773	Linked from: Beam DB7, Support 2

- Side loads are assumed to not induce cross-grain tension.

Member Notes
Top of Stairs



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2nd Floor Framing-New

Post 3P1N - Supports North end of Beam 3B1



MEMBER REPORT

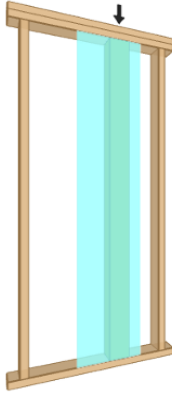
PASSED

3RD FLOOR, Post 3P1N
1 piece(s) 6 x 6 HF No.2

Wall Height: 8'

Member Height: 7' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	17	50	Passed (33%)	--	--
Compression (lbs)	8469	15175	Passed (56%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	8469	12856	Passed (66%)	--	1.0 D + 1.0 L
Lateral Reaction (lbs)	58	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	51	4517	Passed (1%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	111 @ mid-span	2126	Passed (5%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.01 @ mid-span	0.76	Passed (L/9434)	--	1.0 D + 0.6 W
Bending/Compression	0.15	1	Passed (15%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Type	Material
Top	Dbl 2X	Spruce-Pine-Fir
Base	2X	Spruce-Pine-Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
7' 7 1/2"	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

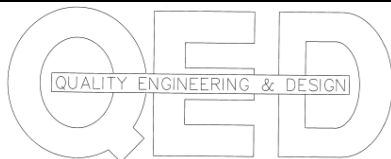
Vertical Load	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
1 - Point (lb)	N/A	2134	6335	Linked from: Beam 3B1, Support 1

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	25.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes

Supports North end of Beam 3B1



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2nd Floor Framing-New

Post 3P1S - Supports South end of Beam 3B1

Vertical Loads	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Point (lb)	N/A	1687	5106/-29	-	Linked from: Beam 3B1, Support 2
2 - Point (lb)	N/A	3902	12173	2521	Linked from: Beam DB1, Support 2

$$\text{Total Load} = (1687+3902) + (5106+12173) = 22868 \text{ Lb.}$$

From AISC 360 for Steel Columns:

$$P_n = F_{cr} A_g = (30.81)(3.59) = 110.61 \text{ kip}$$

For HSS 4x4x1/4: $A_g = 3.59 \text{ in}^2$

$$r = 1.51 \text{ in}$$

$$E = 29000 \text{ ksi}$$

$$F_y = 48 \text{ ksi}$$

$$L = 120 \text{ in.}$$

$$L/r = 79.47$$

$$4.71 \sqrt{\frac{E}{F_y}} = 115.8$$

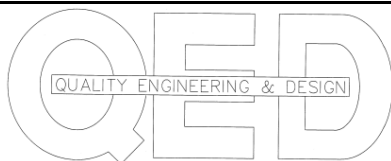
$$\text{When } \frac{L_c}{r} \leq 4.71 \sqrt{\frac{E}{F_y}} \Rightarrow F_{cr} = \left(0.658 \frac{F_y}{F_e}\right) F_y = 30.81 \text{ ksi}$$

$$F_e = \frac{\pi^2 E}{\left(\frac{L_c}{r}\right)^2} = 45.32 \text{ ksi}$$

$$\text{Allowable Compressive Load} = P_n / \Omega = 110.61 / 1.67 = 66.24 \text{ Kip} = 66236 \text{ Lb.}$$

OK Exceeds Required Strength

$$\Omega = 1.67$$



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2nd Floor Framing-New

Post 3P2 - Supports Beam 3B2



MEMBER REPORT

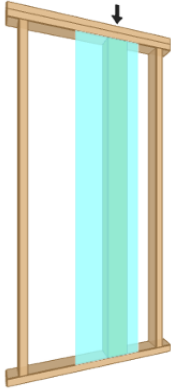
PASSED

3RD FLOOR, Post 3P2
1 piece(s) 4 x 6 HF No.2

Wall Height: 8'

Member Height: 7' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	26	50	Passed (52%)	--	--
Compression (lbs)	6493	9799	Passed (66%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	6493	8181	Passed (79%)	--	1.0 D + 1.0 L
Lateral Reaction (lbs)	58	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	51	3080	Passed (2%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	111 @ mid-span	2561	Passed (4%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.01 @ mid-span	0.76	Passed (L/7095)	--	1.0 D + 0.6 W
Bending/Compression	0.30	1	Passed (30%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- Bearing shall be on a metal plate or strap, or on other equivalently durable, rigid, homogeneous material with sufficient stiffness to distribute applied load.

Supports	Type	Material
Top	Dbl 2X	Spruce-Pine-Fir
Base	2X	Spruce-Pine-Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
7' 7 1/2"	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

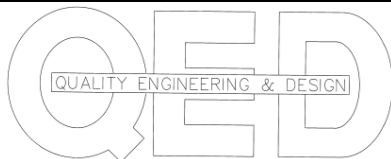
Vertical Load	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
1 - Point (lb)	N/A	1480	5013	Linked from: Beam 3B2, Support 1

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	25.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes

Supports Beam 3B2



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2nd Floor Framing-New

Post 3P3 - Supports Beam 3B3



MEMBER REPORT

PASSED

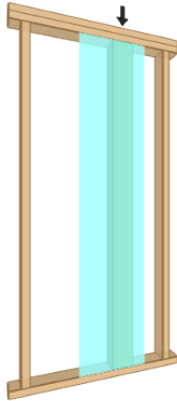
3RD FLOOR, Post 3P3

1 piece(s) 6 x 8 HF No.2

Wall Height: 8'

Member Height: 7' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	17	50	Passed (33%)	--	--
Compression (lbs)	17113	20694	Passed (83%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	17113	17531	Passed (98%)	--	1.0 D + 1.0 L
Lateral Reaction (lbs)	58	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	49	6160	Passed (1%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	111 @ mid-span	3936	Passed (3%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.00 @ mid-span	0.76	Passed (L/23922)	--	1.0 D + 0.6 W
Bending/Compression	0.33	1	Passed (33%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- Bearing shall be on a metal plate or strap, or on other equivalently durable, rigid, homogeneous material with sufficient stiffness to distribute applied load.

Supports	Type	Material
Top	Dbl 2X	Spruce-Pine-Fir
Base	2X	Spruce-Pine-Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
7' 7 1/2"	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

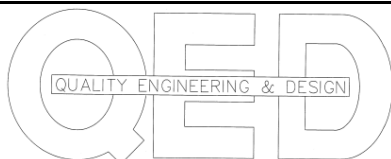
Vertical Loads	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Point (lb)	N/A	1764	5297	-	Linked from: Beam 3B3, Support 1
2 - Point (lb)	N/A	3860	6192	2580	Linked from: Beam DB3, Support 2

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	25.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Wind Zone (4), GCPI (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes

Supports Beam 3B3 + Post DP3



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2nd Floor Framing-New

Post 3P6 - Supports Beam 3B6



MEMBER REPORT

PASSED

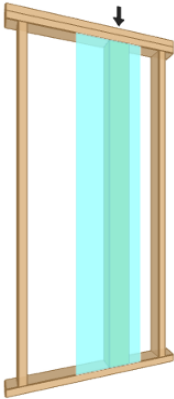
3RD FLOOR, Post 3P6

1 piece(s) 4 x 4 HF No.2

Wall Height: 8'

Member Height: 7' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	26	50	Passed (52%)	--	--
Compression (lbs)	1550	6271	Passed (25%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	1550	5206	Passed (30%)	--	1.0 D + 1.0 L
Lateral Reaction (lbs)	58	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	54	1960	Passed (3%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	111 @ mid-span	1215	Passed (9%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.05 @ mid-span	0.76	Passed (L/1828)	--	1.0 D + 0.6 W
Bending/Compression	0.12	1	Passed (12%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Type	Material
Top	Dbl 2X	Spruce-Pine-Fir
Base	2X	Spruce-Pine-Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
7' 7 1/2"	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

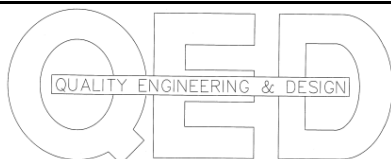
Vertical Load	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
1 - Point (lb)	N/A	299	1251	Linked from: Beam 3B6, Support 1

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	25.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Wind Zone (4), GCpI (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes

Supports Beam 3B6



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2nd Floor Framing-New

Post 3P78 - Supports Beam 3B7 South end and 3B8 North end



MEMBER REPORT

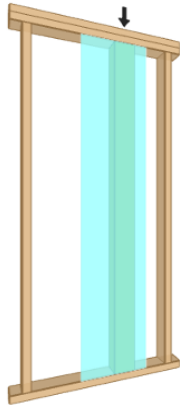
PASSED

3RD FLOOR, Post 3P78
1 piece(s) 6 x 6 HF No.2

Wall Height: 8'

Member Height: 7' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	17	50	Passed (33%)	--	--
Compression (lbs)	10788	15175	Passed (71%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	10788	12856	Passed (84%)	--	1.0 D + 1.0 L
Lateral Reaction (lbs)	58	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	51	4517	Passed (1%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	111 @ mid-span	2126	Passed (5%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.01 @ mid-span	0.76	Passed (L/9434)	--	1.0 D + 0.6 W
Bending/Compression	0.23	1	Passed (23%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- Bearing shall be on a metal plate or strap, or on other equivalently durable, rigid, homogeneous material with sufficient stiffness to distribute applied load.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Type	Material
Top	Db1 2X	Spruce-Pine-Fir
Base	2X	Spruce-Pine-Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
7' 7 1/2"	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

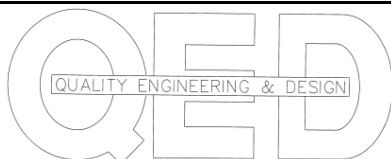
Vertical Loads	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
1 - Point (lb)	N/A	2189	3494	Linked from: Beam 3B7, Support 1
2 - Point (lb)	N/A	1522	3583	Linked from: Beam 3B8, Support 1

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	25.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes

Supports Beam 3B7 South End and 3B8 North end



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2nd Floor Framing-New

Post 3P8 - Supports Beam 3B8 South end



MEMBER REPORT

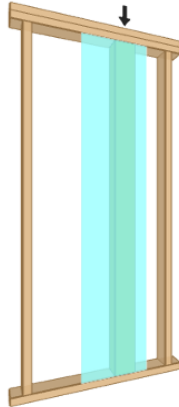
PASSED

3RD FLOOR, Post 3P8
1 piece(s) 4 x 4 HF No.2

Wall Height: 8'

Member Height: 7' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	26	50	Passed (52%)	--	--
Compression (lbs)	5105	6271	Passed (81%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	5105	5206	Passed (98%)	--	1.0 D + 1.0 L
Lateral Reaction (lbs)	58	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	54	1960	Passed (3%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	111 @ mid-span	1215	Passed (9%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.05 @ mid-span	0.76	Passed (L/1828)	--	1.0 D + 0.6 W
Bending/Compression	0.59	1	Passed (59%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- Bearing shall be on a metal plate or strap, or on other equivalently durable, rigid, homogeneous material with sufficient stiffness to distribute applied load.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Type	Material
Top	Dbl 2X	Spruce-Pine-Fir
Base	2X	Spruce-Pine-Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
7' 7 1/2"	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

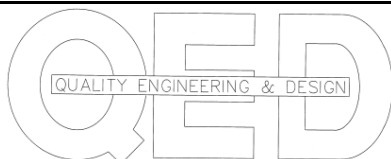
Vertical Load	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
1 - Point (lb)	N/A	1522	3583	Linked from: Beam 3B8, Support 1

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	25.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes

Supports Beam 3B8



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2nd Floor Framing-New

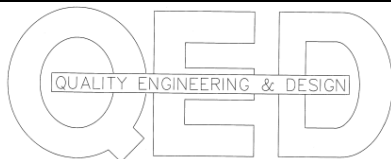
Post 3P29 HSS 4x4x1/4

Vertical Loads	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
1 - Point (lb)	N/A	1480	5013	Linked from: Beam 3B2, Support 1
2 - Point (lb)	N/A	4133	10723	Linked from: Beam 3B9, Support 1

Total Load = (1480 + 4133) + (5013 + 10723) = 21349 Lb.

From previous pages, Allowable load for HSS 4x4x1/4 = 66236 Lb

HSS 4x4x1/4 Post is OK



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2nd Floor Framing-New

Post 3P10 Supports Beam 3B10



MEMBER REPORT

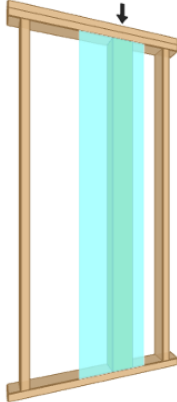
PASSED

3RD FLOOR, Post 3P10
1 piece(s) 4 x 4 HF No.2

Wall Height: 8'

Member Height: 7' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	26	50	Passed (52%)	--	--
Compression (lbs)	2304	6271	Passed (37%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	2304	5206	Passed (44%)	--	1.0 D + 1.0 L
Lateral Reaction (lbs)	58	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	54	1960	Passed (3%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	111 @ mid-span	1215	Passed (9%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.05 @ mid-span	0.76	Passed (L/1828)	--	1.0 D + 0.6 W
Bending/Compression	0.21	1	Passed (21%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Type	Material
Top	Dbl 2X	Spruce-Pine-Fir
Base	2X	Spruce-Pine-Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
7' 7 1/2"	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

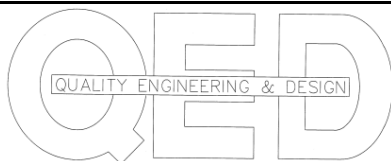
Vertical Load	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Point (lb)	N/A	699	1605	403	Linked from: Beam 3B10, Support 1

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	25.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes

3B10



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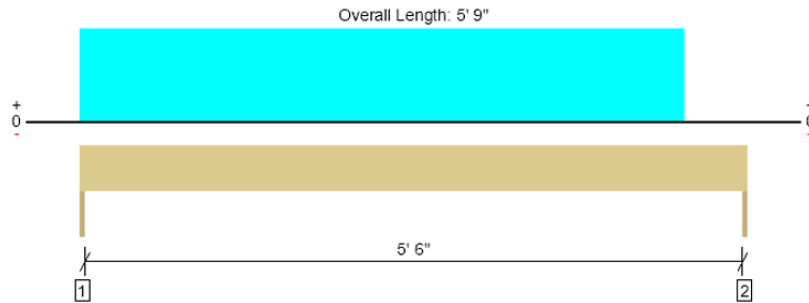
Beam 3B11



MEMBER REPORT

PASSED

3RD FLOOR, Beam 3B11
1 piece(s) 4 x 6 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	755 @ 0	2126 (1.50")	Passed (36%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	614 @ 5' 2"	1925	Passed (32%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1076 @ 2' 10 3/16"	1625	Passed (66%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.076 @ 2' 10 1/2"	0.192	Passed (L/904)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.101 @ 2' 10 1/2"	0.287	Passed (L/682)	--	1.0 D + 1.0 L (All Spans)

Member Length : 5' 9"
System : Floor
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Column - SPF	1.50"	1.50"	1.50"	185	570	755	None
2 - Column - SPF	1.50"	1.50"	1.50"	156	472	627	None

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

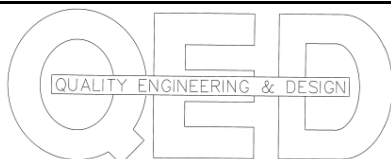
•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 5' 9"	N/A	4.9	--	
1 - Uniform (PSF)	0 to 5' 2 1/2" (Front)	5'	12.0	40.0	Floor Load

• Side loads are assumed to not induce cross-grain tension.

Member Notes

5' Door East side



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2nd Floor Framing-New

Post 3P9 - Supports Beam 3B9



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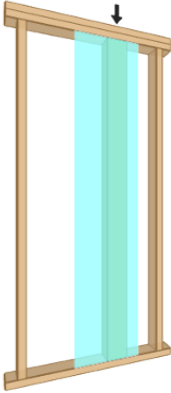
PASSED

3RD FLOOR, Post 3P9
1 piece(s) 6 x 8 HF No.2

Wall Height: 8'

Member Height: 7' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	17	50	Passed (33%)	--	--
Compression (lbs)	17618	20694	Passed (85%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	17618	17531	Passed (100%)	--	1.0 D + 1.0 L
Lateral Reaction (lbs)	58	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	49	6160	Passed (1%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	111 @ mid-span	3936	Passed (3%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.00 @ mid-span	0.76	Passed (L/23922)	--	1.0 D + 0.6 W
Bending/Compression	0.29	1	Passed (29%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- Bearing shall be on a metal plate or strap, or on other equivalently durable, rigid, homogeneous material with sufficient stiffness to distribute applied load.

Supports	Type	Material
Top	Dbl 2X	Spruce-Pine-Fir
Base	2X	Spruce-Pine-Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
7' 7 1/2"	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

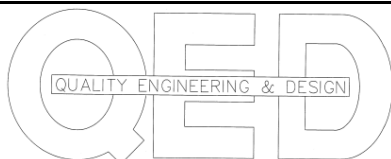
Vertical Loads	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Point (lb)	N/A	4133	10723	-	Linked from: Beam 3B9, Support 1
2 - Point (lb)	N/A	1107	1655	690	DP5

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	1'	25.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Member Notes

3B9



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2nd Floor Framing-New

Header at Entry closet on East side Gris Line 3. Supports Post DP2 at South end of Beam DB2

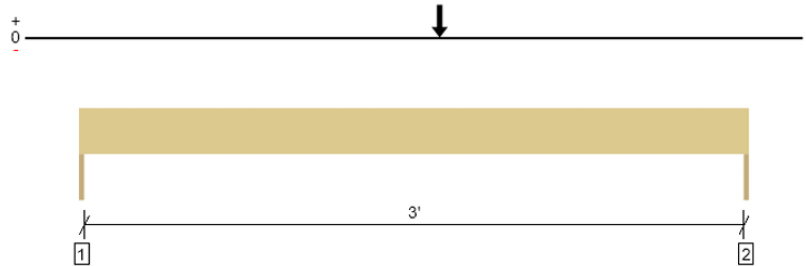


MEMBER REPORT

PASSED

3RD FLOOR, Header at Entry
1 piece(s) 4 x 8 HF No.2

Overall Length: 3' 3"



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

Design Results	Actual @ Location	Allowed	Result	LDf	Load: Combination (Pattern)
Member Reaction (lbs)	1535 @ 3' 3"	2126 (1.50")	Passed (72%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1530 @ 2' 6 1/4"	2538	Passed (60%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2295 @ 1' 9"	2823	Passed (81%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.014 @ 1' 7 11/16"	0.108	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.024 @ 1' 7 11/16"	0.162	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

Member Length : 3' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Trimmer - SPF	1.50"	1.50"	1.50"	535	782	1317	None
2 - Trimmer - SPF	1.50"	1.50"	1.50"	622	913	1535	None

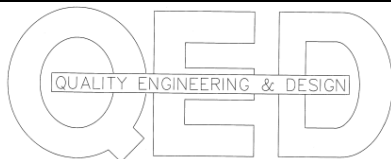
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 3" o/c	
Bottom Edge (Lu)	3' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 3' 3"	N/A	6.4	--	
1 - Point (lb)	1' 9"	N/A	1136	1695	Linked from: Post DP2, Support 1

Member Notes

Header at entry closet on east side Grid Line 3. Supports Post DP2 at south end of Beam DB2



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Revision

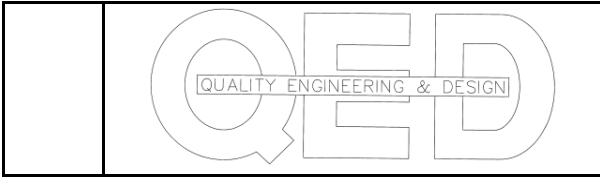
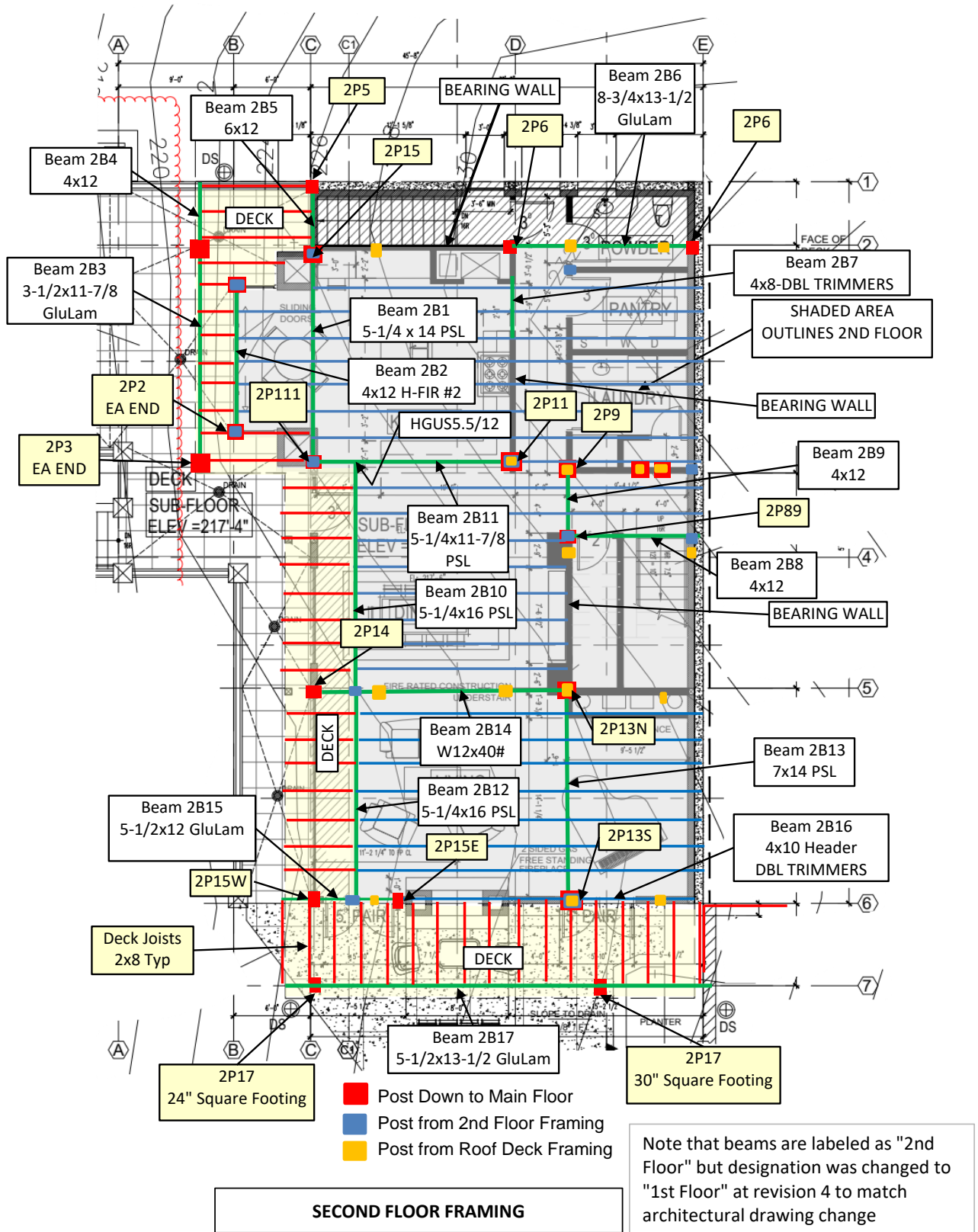
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1st Floor Framing



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1st Floor Framing

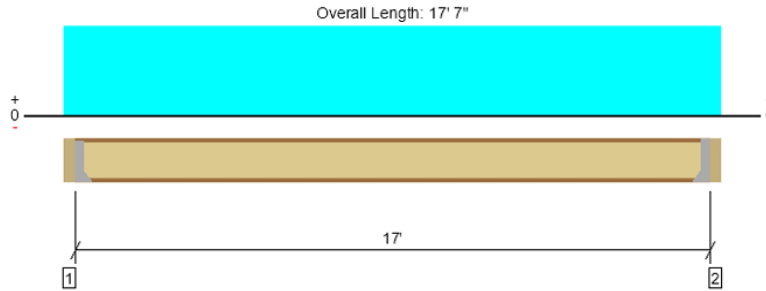
1st Floor Joists at South end



MEMBER REPORT

PASSED

2ND FLOOR, 2nd Floor Joists-South end
1 piece(s) 11 7/8" TJI@ 230 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	589 @ 3 1/2"	1060 (1.75")	Passed (56%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	589 @ 3 1/2"	1655	Passed (36%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2505 @ 8' 9 1/2"	4215	Passed (59%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.273 @ 8' 9 1/2"	0.425	Passed (L/748)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.354 @ 8' 9 1/2"	0.850	Passed (L/576)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	41	40	Passed	--	--

Member Length : 17'
 System : Floor
 Member Type : Joist
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Hanger on 11 7/8" SPF beam	3.50"	Hanger ¹	1.75" / - ²	141	469	610	See note ¹
2 - Hanger on 11 7/8" SPF beam	3.50"	Hanger ¹	1.75" / - ²	141	469	610	See note ¹

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.
- ² Required Bearing Length / Required Bearing Length with Web Stiffeners

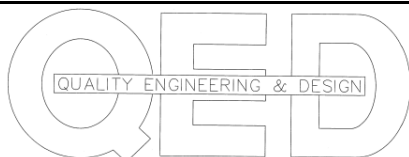
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 4" o/c	
Bottom Edge (Lu)	17' o/c	

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

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	IUS2.37/11.88	2.00"	N/A	10-10dx1.5	2-Strong-Grip	
2 - Face Mount Hanger	IUS2.37/11.88	2.00"	N/A	10-10dx1.5	2-Strong-Grip	

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

Vertical Load	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 17' 7"	16"	12.0	40.0	Floor Load



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1st Floor Framing

Beam 2B1

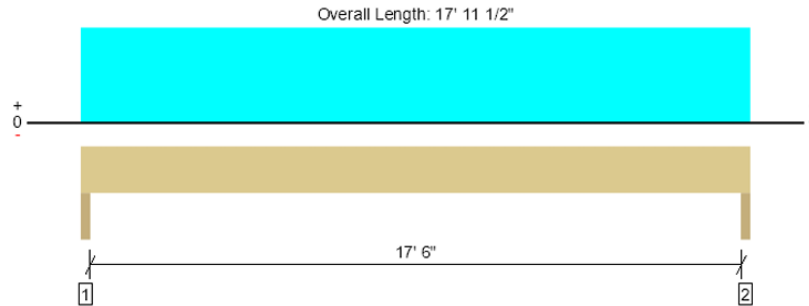


MEMBER REPORT

PASSED

2ND FLOOR, Beam 2B1

1 piece(s) 5 1/4" x 14" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5109 @ 1 1/4"	9023 (2.75")	Passed (57%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	4315 @ 1' 4 3/4"	14210	Passed (30%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	22408 @ 8' 11 3/4"	40743	Passed (55%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.379 @ 8' 11 3/4"	0.444	Passed (L/562)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.513 @ 8' 11 3/4"	0.887	Passed (L/415)	--	1.0 D + 1.0 L (All Spans)

Member Length : 17' 11 1/2"
 System : Floor
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Column - SPF	2.75"	2.75"	1.56"	1338	3771	5109	None
2 - Column - SPF	2.75"	2.75"	1.56"	1338	3771	5109	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	18' o/c	
Bottom Edge (Lu)	18' o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 17' 11 1/2"	N/A	23.0	--	
1 - Uniform (PSF)	0 to 17' 11 1/2" (Front)	3'	12.0	40.0	Floor Load
2 - Uniform (PSF)	0 to 17' 11 1/2" (Back)	7' 6"	12.0	40.0	Floor Load

• Side loads are assumed to not induce cross-grain tension.

Member Notes
west Side of Kitchen

1st Floor Framing

Beam 2B2



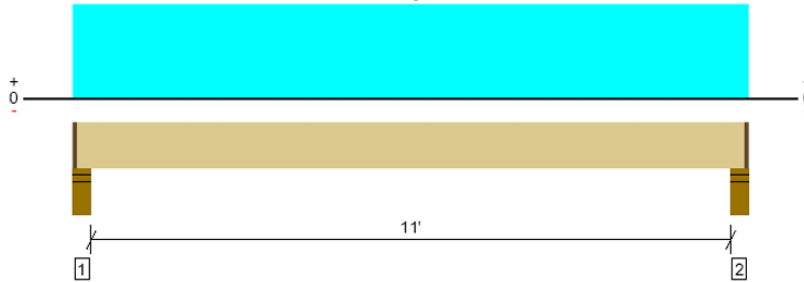
MEMBER REPORT

PASSED

2ND FLOOR, Beam 2B2

1 piece(s) 4 x 12 HF No.2

Overall Length: 11' 11"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1806 @ 4"	6024 (4.25")	Passed (30%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1407 @ 1' 4 3/4"	3938	Passed (36%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	4880 @ 5' 11 1/2"	5752	Passed (85%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.140 @ 5' 11 1/2"	0.281	Passed (L/963)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.206 @ 5' 11 1/2"	0.563	Passed (L/656)	--	1.0 D + 1.0 L (All Spans)

Member Length : 11' 8 1/2"
 System : Floor
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - SPF	5.50"	4.25"	1.50"	586	1251	1837	1 1/4" Rim Board
2 - Stud wall - SPF	5.50"	4.25"	1.50"	586	1251	1837	1 1/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	11' 9" o/c	
Bottom Edge (Lu)	11' 9" o/c	

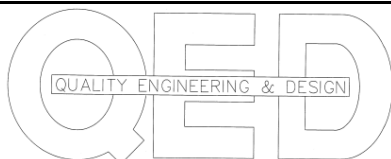
•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 1/4" to 11' 9 3/4"	N/A	10.0	--	
1 - Uniform (PSF)	0 to 11' 11" (Front)	1' 6"	35.0	60.0	Deck + Pavers
2 - Uniform (PSF)	0 to 11' 11" (Back)	3'	12.0	40.0	Floor Load

• Side loads are assumed to not induce cross-grain tension.

Member Notes

West side of Nook



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1st Floor Framing

Beam 2B3



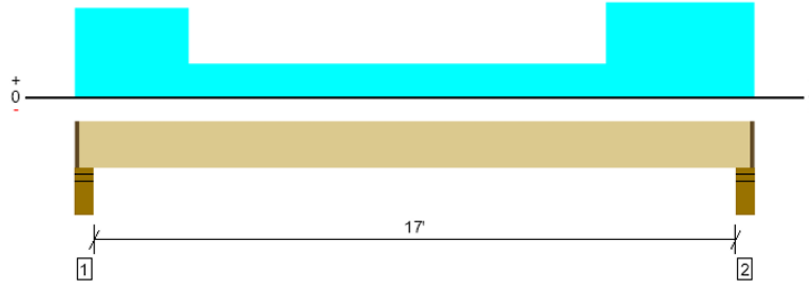
MEMBER REPORT

PASSED

2ND FLOOR, Beam 2B3

1 piece(s) 3 1/2" x 11 7/8" 24F-V4 DF Glulam

Overall Length: 17' 11"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2299 @ 17' 7"	6322 (4.25")	Passed (36%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1743 @ 16' 5 5/8"	7343	Passed (24%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	6945 @ 9' 3 5/16"	16452	Passed (42%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.261 @ 9' 7/16"	0.431	Passed (L/794)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.436 @ 9' 7/16"	0.863	Passed (L/475)	--	1.0 D + 1.0 L (All Spans)

Member Length : 17' 8 1/2"
 System : Floor
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 17' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - SPF	5.50"	4.25"	1.50"	840	1287	2127	1 1/4" Rim Board
2 - Stud wall - SPF	5.50"	4.25"	1.55"	919	1422	2341	1 1/4" Rim Board

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

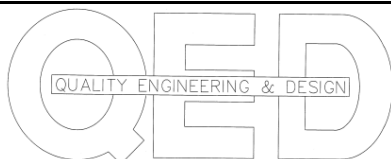
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	17' 9" o/c	
Bottom Edge (Lu)	17' 9" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 1/4" to 17' 9 3/4"	N/A	10.1	--	
1 - Uniform (PSF)	0 to 3' (Front)	4'	35.0	60.0	Deck + Pavers
2 - Uniform (PSF)	3' to 14' (Front)	1' 6"	35.0	60.0	Deck + Pavers
3 - Uniform (PSF)	14' to 17' 11" (Front)	4' 3"	35.0	60.0	Deck + Pavers

• Side loads are assumed to not induce cross-grain tension.

Member Notes
Northwest deck beam



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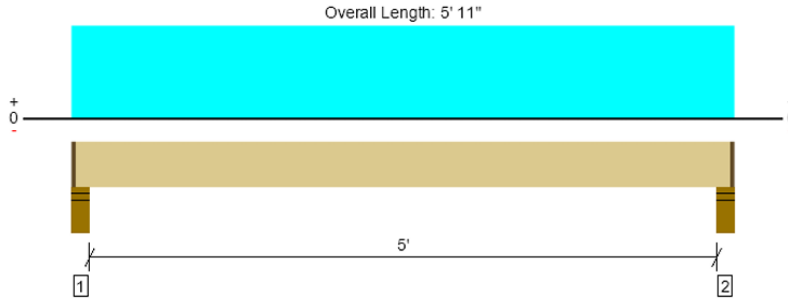
1st Floor Framing

Beam 2B4



MEMBER REPORT
 2ND FLOOR, Beam 2B4
1 piece(s) 4 x 12 HF No.2

PASSED



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1113 @ 4"	6024 (4.25")	Passed (18%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	609 @ 1' 4 3/4"	3938	Passed (15%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1344 @ 2' 11 1/2"	5752	Passed (23%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.008 @ 2' 11 1/2"	0.131	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.012 @ 2' 11 1/2"	0.262	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

Member Length : 5' 8 1/2"
 System : Floor
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - SPF	5.50"	4.25"	1.50"	443	710	1153	1 1/4" Rim Board
2 - Stud wall - SPF	5.50"	4.25"	1.50"	443	710	1153	1 1/4" Rim Board

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

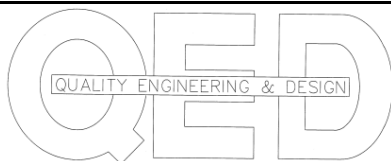
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 9" o/c	
Bottom Edge (Lu)	5' 9" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 1/4" to 5' 9 3/4"	N/A	10.0	--	
1 - Uniform (PSF)	0 to 5' 11" (Front)	4'	35.0	60.0	Deck + Pavers

• Side loads are assumed to not induce cross-grain tension.

Member Notes
Northwest deck beam



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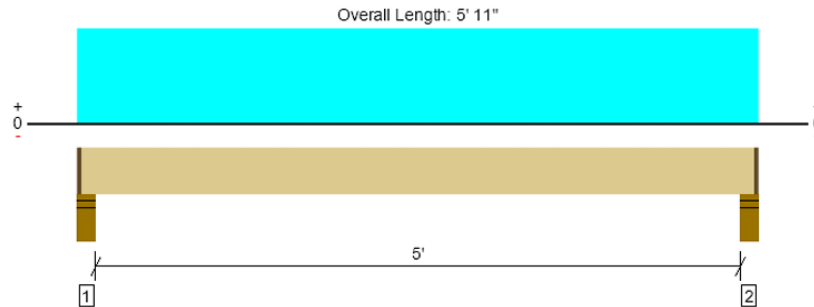
1st Floor Framing

Beam 2B5



MEMBER REPORT
 2ND FLOOR, Beam 2B5
1 piece(s) 6 x 12 HF No.2

PASSED



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1947 @ 4"	9467 (4.25")	Passed (21%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1051 @ 1' 5"	5903	Passed (18%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2350 @ 2' 11 1/2"	6819	Passed (34%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.010 @ 2' 11 1/2"	0.131	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.015 @ 2' 11 1/2"	0.262	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

Member Length : 5' 8 1/2"
 System : Floor
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Lumber grading provisions must be extended over the length of the member per NDS 4.2.5.5.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - SPF	5.50"	4.25"	1.50"	655	1361	2016	1 1/4" Rim Board
2 - Stud wall - SPF	5.50"	4.25"	1.50"	655	1361	2016	1 1/4" Rim Board

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 1/4" to 5' 9 3/4"	N/A	16.0	--	
1 - Uniform (PSF)	0 to 5' 11" (Front)	4'	35.0	60.0	Deck + Pavers
2 - Uniform (PSF)	0 to 5' 11" (Front)	5' 6"	12.0	40.0	Stairs

• Side loads are assumed to not induce cross-grain tension.

Member Notes
Northwest deck at stairs

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1st Floor Framing

Beam 2B6



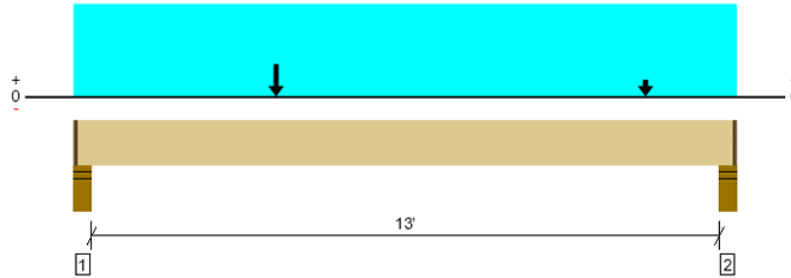
MEMBER REPORT

PASSED

2ND FLOOR, Beam 2B6

1 piece(s) 8 3/4" x 13 1/2" 24F-V4 DF Glulam

Overall Length: 13' 11"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	13148 @ 4"	15805 (4.25")	Passed (83%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	12839 @ 1' 7"	20869	Passed (62%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	49709 @ 4' 3"	52144	Passed (95%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.265 @ 6' 4 3/4"	0.331	Passed (L/599)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.402 @ 6' 5 11/16"	0.663	Passed (L/396)	--	1.0 D + 1.0 L (All Spans)

Member Length : 13' 8 1/2"
 System : Floor
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 0.98 that was calculated using length L = 13' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Stud wall - SPF	5.50"	4.25"	3.54"	4390	8777	1776	13167	1 1/4" Rim Board
2 - Stud wall - SPF	5.50"	4.25"	2.34"	3626	5091	745	8717	1 1/4" Rim Board

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

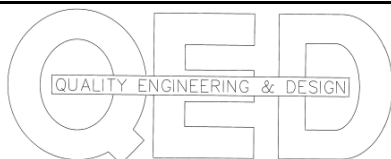
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	13' 9" o/c	
Bottom Edge (Lu)	13' 9" o/c	

• Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	1 1/4" to 13' 9 3/4"	N/A	28.7	--	--	
1 - Uniform (PLF)	0 to 13' 11" (Front)	N/A	180.0	-	-	Wall weight above (2 stories)
2 - Point (lb)	4' 3" (Top)	N/A	3982	12173	2521	Linked from: Post DP1N, Support 1
3 - Point (lb)	12' (Top)	N/A	1136	1695	-	Linked from: Post DP2, Support 1

• Side loads are assumed to not induce cross-grain tension.

Member Notes
Northwest corner. Supports posts from roof deck



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1st Floor Framing

Beam 2B7

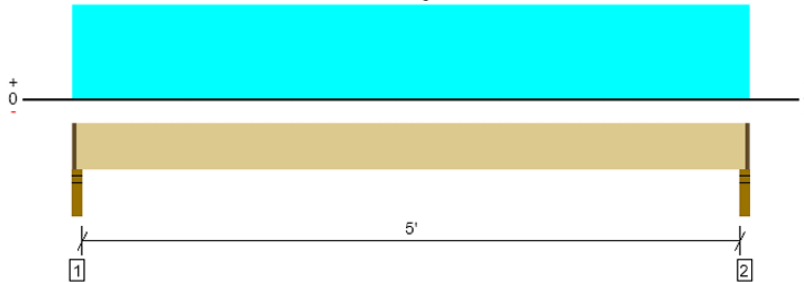


MEMBER REPORT

PASSED

2ND FLOOR, Beam 2B7
1 piece(s) 4 x 8 HF No.2

Overall Length: 5' 6"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2046 @ 1 1/2"	2481 (1.75")	Passed (82%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1466 @ 10 1/4"	2538	Passed (58%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2665 @ 2' 9"	2823	Passed (94%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.070 @ 2' 9"	0.131	Passed (L/903)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.091 @ 2' 9"	0.262	Passed (L/689)	--	1.0 D + 1.0 L (All Spans)

Member Length : 5' 3 1/2"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - SPF	3.00"	1.75"	1.50"	504	1623	2126	1 1/4" Rim Board
2 - Stud wall - SPF	3.00"	1.75"	1.50"	504	1623	2126	1 1/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 4" o/c	
Bottom Edge (Lu)	5' 4" o/c	

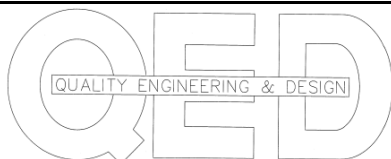
•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 1/4" to 5' 4 3/4"	N/A	6.4	--	
1 - Uniform (PSF)	0 to 5' 6" (Front)	7' 6"	12.0	40.0	Floor Load
2 - Uniform (PSF)	0 to 5' 6" (Back)	7' 3"	12.0	40.0	Floor Load

• Side loads are assumed to not induce cross-grain tension.

Member Notes

Header at Kitchen



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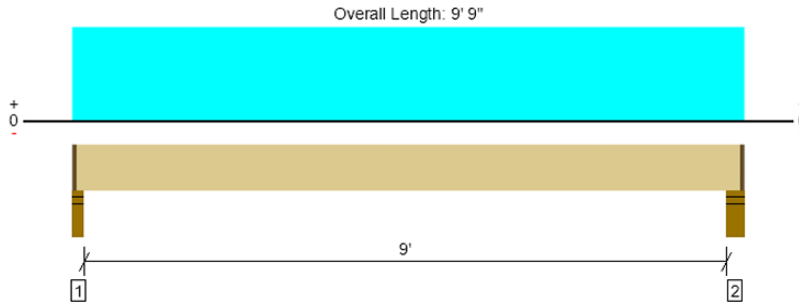
1st Floor Framing

Beam 2B8



MEMBER REPORT
 2ND FLOOR, Beam 2B8
 1 piece(s) 4 x 12 HF No.2

PASSED



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1022 @ 2"	3189 (2.25")	Passed (32%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	777 @ 1' 2 3/4"	3938	Passed (20%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2331 @ 4' 9 1/2"	5752	Passed (41%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.049 @ 4' 9 1/2"	0.231	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.067 @ 4' 9 1/2"	0.463	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

Member Length : 9' 6 1/2"
 System : Floor
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - SPF	3.50"	2.25"	1.50"	277	767	1043	1 1/4" Rim Board
2 - Stud wall - SPF	5.50"	4.25"	1.50"	286	793	1080	1 1/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 7" o/c	
Bottom Edge (Lu)	9' 7" o/c	

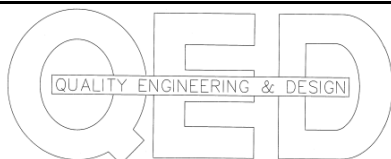
•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 1/4" to 9' 7 3/4"	N/A	10.0	--	
1 - Uniform (PSF)	0 to 9' 9" (Front)	4'	12.0	40.0	Stair Load

• Side loads are assumed to not induce cross-grain tension.

Member Notes

Top of Stairs



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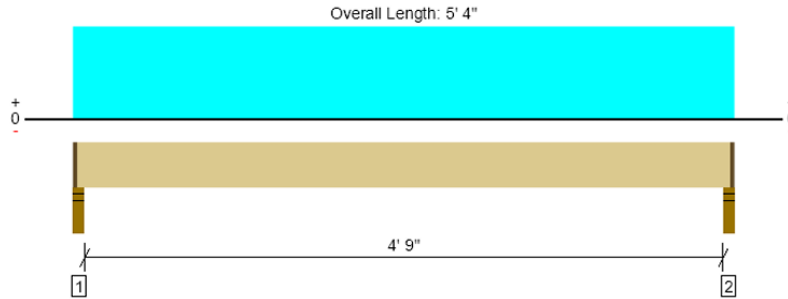
1st Floor Framing

Beam 2B9



MEMBER REPORT
 2ND FLOOR, Beam 2B9
1 piece(s) 4 x 12 HF No.2

PASSED



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2024 @ 2"	3189 (2.25")	Passed (63%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1136 @ 1' 2 3/4"	3938	Passed (29%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2469 @ 2' 8"	5752	Passed (43%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.016 @ 2' 8"	0.125	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.021 @ 2' 8"	0.250	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

Member Length : 5' 1 1/2"
 System : Floor
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - SPF	3.50"	2.25"	1.50"	506	1600	2106	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	2.25"	1.50"	506	1600	2106	1 1/4" Rim Board

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

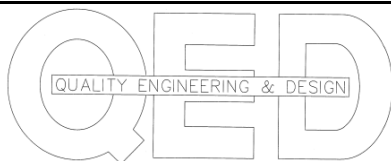
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 2" o/c	
Bottom Edge (Lu)	5' 2" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 1/4" to 5' 2 3/4"	N/A	10.0	--	
1 - Uniform (PSF)	0 to 5' 4" (Front)	10'	12.0	40.0	Floor Load
2 - Uniform (PSF)	0 to 5' 4" (Back)	5'	12.0	40.0	Floor Load

• Side loads are assumed to not induce cross-grain tension.

Member Notes
Adjacent to Stairs



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1st Floor Framing

Beam 2B10



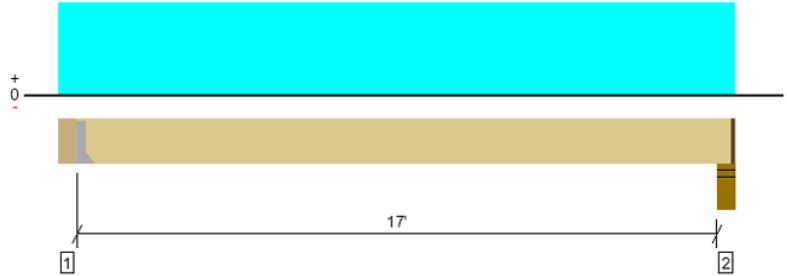
MEMBER REPORT

PASSED

2ND FLOOR, Beam 2B10

1 piece(s) 5 1/4" x 16" 2.2E Parallam® PSL

Overall Length: 17' 11"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	7118 @ 5 1/2"	7118 (2.17")	Passed (100%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	6009 @ 1' 9 1/2"	16240	Passed (37%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	30472 @ 9' 1/4"	52432	Passed (58%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.311 @ 9' 1/4"	0.428	Passed (L/660)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.446 @ 9' 1/4"	0.856	Passed (L/461)	--	1.0 D + 1.0 L (All Spans)

Member Length : 17' 4 1/4"
 System : Floor
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Hanger on 16" SPF beam	5.50"	Hanger ¹	2.17"	2254	5232	7487	See note ¹
2 - Stud wall - SPF	5.50"	4.25"	3.28"	2232	5160	7392	1 1/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	17' 4" o/c	
Bottom Edge (Lu)	17' 4" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	HGUS5.50/12	4.00"	N/A	56-10d	20-10d	

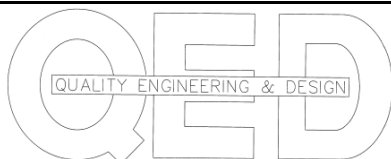
- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	5 1/2" to 17' 9 3/4"	N/A	26.3	--	
1 - Uniform (PSF)	0 to 17' 11" (Front)	10'	12.0	40.0	Floor Load
2 - Uniform (PSF)	0 to 17' 11" (Back)	3'	35.0	60.0	Deck + pavers

- Side loads are assumed to not induce cross-grain tension.

Member Notes

West wall at deck



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1st Floor Framing

Beam 2B11



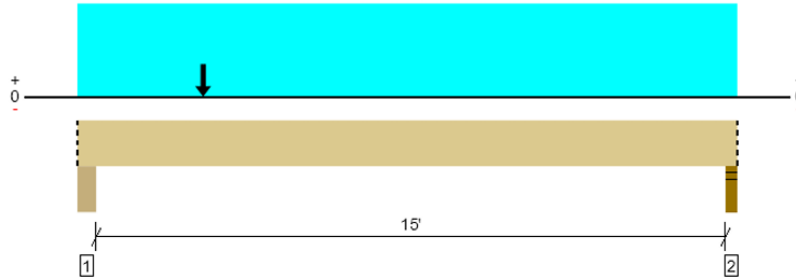
MEMBER REPORT

PASSED

2ND FLOOR, Beam 2B11

1 piece(s) 5 1/4" x 11 7/8" 2.2E Parallam® PSL

Overall Length: 15' 9"



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

Design Results	Actual @ Location	Allowed	Result	LDf	Load: Combination (Pattern)
Member Reaction (lbs)	6882 @ 4"	18047 (5.50")	Passed (38%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	6754 @ 1' 5 3/8"	12053	Passed (56%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	17959 @ 3'	29854	Passed (60%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.268 @ 7' 1 7/16"	0.381	Passed (L/683)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.393 @ 7' 1 11/16"	0.762	Passed (L/465)	--	1.0 D + 1.0 L (All Spans)

Member Length : 15' 9"
 System : Floor
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Column - SPF	5.50"	5.50"	2.10"	2142	4740	6882	Blocking
2 - Stud wall - SPF	3.50"	3.50"	1.50"	670	1329	2000	Blocking

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

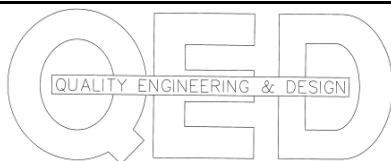
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	15' 9" o/c	
Bottom Edge (Lu)	15' 9" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 15' 9"	N/A	19.5	--	
1 - Uniform (PSF)	0 to 15' 9" (Top)	1' 3 15/16"	12.0	40.0	Floor Load
2 - Point (lb)	3' (Front)	N/A	2254	5232	Linked from: Beam 2B10, Support 1

• Side loads are assumed to not induce cross-grain tension.

Member Notes
Supports Beam 2B10



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1st Floor Framing

Beam 2B12



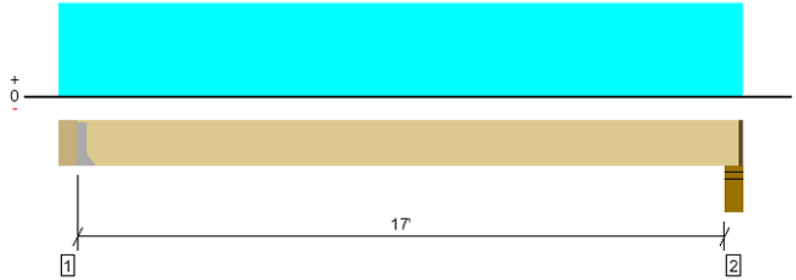
MEMBER REPORT

PASSED

2ND FLOOR, Beam 2B12

1 piece(s) 5 1/4" x 16" 2.2E Parallam® PSL

Overall Length: 17' 11"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	7118 @ 5 1/2"	7118 (2.17")	Passed (100%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	6009 @ 1' 9 1/2"	16240	Passed (37%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	30472 @ 9' 1/4"	52432	Passed (58%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.311 @ 9' 1/4"	0.428	Passed (L/660)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.446 @ 9' 1/4"	0.856	Passed (L/461)	--	1.0 D + 1.0 L (All Spans)

Member Length : 17' 4 1/4"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Hanger on 16" SPF beam	5.50"	Hanger ¹	2.17"	2254	5232	7487	See note ¹
2 - Stud wall - SPF	5.50"	4.25"	3.28"	2232	5160	7392	1 1/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	17' 4" o/c	
Bottom Edge (Lu)	17' 4" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	HGUS5.50/12	4.00"	N/A	56-10d	20-10d	

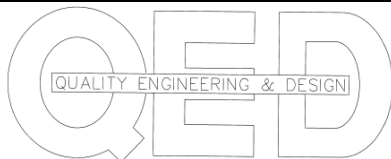
- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	5 1/2" to 17' 9 3/4"	N/A	26.3	--	
1 - Uniform (PSF)	0 to 17' 11" (Front)	10'	12.0	40.0	Floor Load
2 - Uniform (PSF)	0 to 17' 11" (Back)	3'	35.0	60.0	Deck + pavers

- Side loads are assumed to not induce cross-grain tension.

Member Notes

West wall at deck



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1st Floor Framing

Beam 2B13



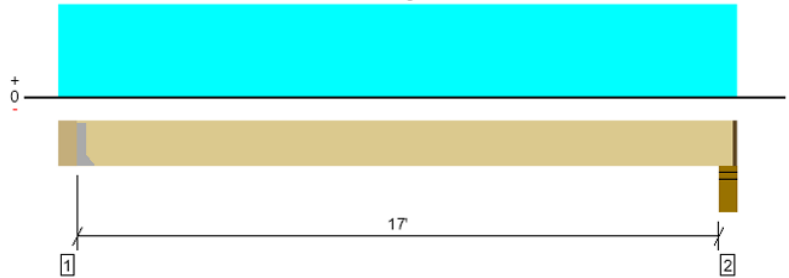
MEMBER REPORT

PASSED

2ND FLOOR, Beam 2B13

1 piece(s) 7" x 14" 2.2E Parallam® PSL

Overall Length: 17' 11"



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

Design Results	Actual @ Location	Allowed	Result	LDf	Load: Combination (Pattern)
Member Reaction (lbs)	6941 @ 5 1/2"	6941 (1.59")	Passed (100%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	5995 @ 1' 7 1/2"	18947	Passed (32%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	29716 @ 9' 1/4"	54324	Passed (55%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.353 @ 9' 1/4"	0.428	Passed (L/582)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.477 @ 9' 1/4"	0.856	Passed (L/431)	--	1.0 D + 1.0 L (All Spans)

Member Length : 17' 4 1/4"
 System : Floor
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Member should be side-loaded from both sides of the member or braced to prevent rotation.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Hanger on 14" SPF beam	5.50"	Hanger ¹	1.59"	1886	5413	7298	See note ¹
2 - Stud wall - SPF	5.50"	4.25"	2.40"	1870	5338	7208	1 1/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	17' 4" o/c	
Bottom Edge (Lu)	17' 4" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	HGUS7.25/10	4.00"	N/A	46-16d	16-16d	

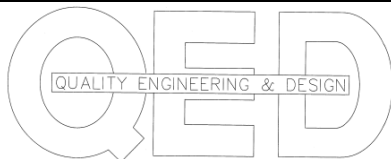
- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	5 1/2" to 17' 9 3/4"	N/A	30.6	--	
1 - Uniform (PSF)	0 to 17' 11" (Front)	10'	12.0	40.0	Floor Load
2 - Uniform (PSF)	0 to 17' 11" (Back)	5'	12.0	40.0	Floor Load

- Side loads are assumed to not induce cross-grain tension.

Member Notes

SE Corner



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1st Floor Framing

Beam 2B14



MEMBER REPORT

PASSED

2ND FLOOR, Beam 2B14

1 piece(s) W12X40 (A992) ASTM Steel

Overall Length: 18' 1"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	29151 @ 5"	30488 (5.25")	Passed (96%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	29096 @ 6 1/2"	70210	Passed (41%)	--	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	67726 @ 5'	104136	Passed (65%)	--	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.220 @ 8' 1 1/8"	0.431	Passed (L/940)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.345 @ 8' 1 1/2"	0.863	Passed (L/600)	--	1.0 D + 1.0 L (All Spans)

Member Length : 17' 10 1/2"
 System : Floor
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Bearing reinforcement may be required for support located at 3 3/4".
- Bearing reinforcement may be required for point load located at 2' 4 3/4".
- Applicable calculations are based on ANSI/AISC 360-16.
- A lateral-torsional buckling factor (C_b) of 1.0 has been assumed.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Column - SPF	6.50"	5.25"	5.25"	9938	19213	1378	29151	1 1/4" Rim Board
2 - Column - SPF	6.50"	5.25"	5.25"	3220	5170	1071	8390	1 1/4" Rim Board

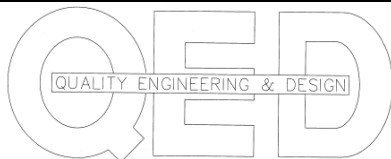
• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	1 1/4" to 17' 11 3/4"	N/A	40.0	--	--	
1 - Uniform (PSF)	0 to 18' 1" (Top)	1' 4"	12.0	40.0	-	Floor Load
2 - Point (lb)	2' 6" (Back)	N/A	2254	5232	-	Linked from: Beam 2B10, Support 1
3 - Point (lb)	2' 6" (Top)	N/A	3769	7077	-	Linked from: Post 3P78, Support 1
4 - Point (lb)	5' (Front)	N/A	2746	4222	1759	Linked from: Post DP4, Support 1
5 - Point (lb)	15' 6" (Top)	N/A	1131	1655	690	Linked from: Post DP5, Support 1
6 - Point (lb)	2' 6" (Front)	N/A	2254	5232	-	Linked from: Beam 2B12, Support 1

• Side loads are assumed to not induce cross-grain tension.

Member Notes
Supports Beams 2B10 and 2B12 + Posts DP4, DP5 and 3P78



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Beam 2B15

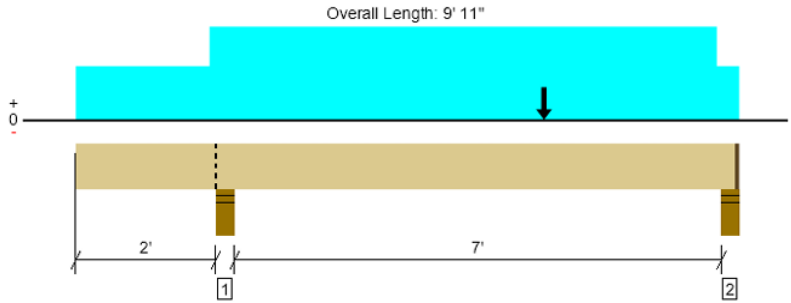


MEMBER REPORT

PASSED

2ND FLOOR, Beam 2B15

1 piece(s) 5 1/2" x 12" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	6185 @ 9' 7"	9934 (4.25")	Passed (62%)	--	1.0 D + 1.0 L (Alt Spans)
Shear (lbs)	5630 @ 8' 5 1/2"	11660	Passed (48%)	1.00	1.0 D + 1.0 L (Alt Spans)
Pos Moment (Ft-lbs)	14356 @ 7'	26400	Passed (54%)	1.00	1.0 D + 1.0 L (Alt Spans)
Neg Moment (Ft-lbs)	-650 @ 2' 2 3/4"	20350	Passed (3%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.048 @ 6' 1"	0.184	Passed (L/999+)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.082 @ 6' 15/16"	0.368	Passed (L/999+)	--	1.0 D + 1.0 L (Alt Spans)

Member Length : 9' 9 3/4"
System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Overhang deflection criteria: LL (2L/480) and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 7' 4".
- Critical negative moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 2' 4 5/8".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Stud wall - SPF	5.50"	5.50"	2.04"	1886	2888	618	4774	Blocking
2 - Stud wall - SPF	5.50"	4.25"	2.65"	2569	3641/-53	1141	6210	1 1/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

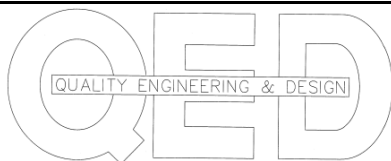
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 10" o/c	
Bottom Edge (Lu)	9' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 9' 9 3/4"	N/A	16.0	--	--	
1 - Uniform (PSF)	0 to 9' 11" (Front)	3' 9"	5.0	60.0	-	Deck Load + Pavers
2 - Point (lb)	7" (Front)	N/A	2746	4222	1759	Linked from: Post DP4, Support 1
3 - Uniform (PLF)	2' to 9' 7" (Front)	N/A	180.0	-	-	

• Side loads are assumed to not induce cross-grain tension.

Member Notes
SW corner supporting deck + Post DP4



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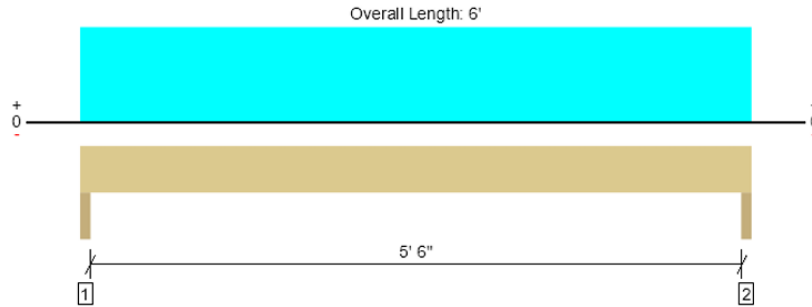
1st Floor Framing

Beam 2B16



MEMBER REPORT
 2ND FLOOR, Beam2B16
 1 piece(s) 4 x 10 HF No.2

PASSED



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1633 @ 1 1/2"	4253 (3.00")	Passed (38%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1078 @ 1' 1/4"	3238	Passed (33%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2250 @ 3'	4242	Passed (53%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.018 @ 3'	0.192	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.045 @ 3'	0.287	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

Member Length : 6'
 System : Wall
 Member Type : Header
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Trimmer - SPF	3.00"	3.00"	1.50"	958	675	1633	None
2 - Trimmer - SPF	3.00"	3.00"	1.50"	958	675	1633	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 6'	N/A	8.2	--	
1 - Uniform (PSF)	0 to 6'	3' 9"	35.0	60.0	Deck Load + Pavers
2 - Uniform (PLF)	0 to 6'	N/A	180.0	-	Wall weight above (2 stories)

Member Notes
 Header at SE corner 5' Door

1st Floor Framing

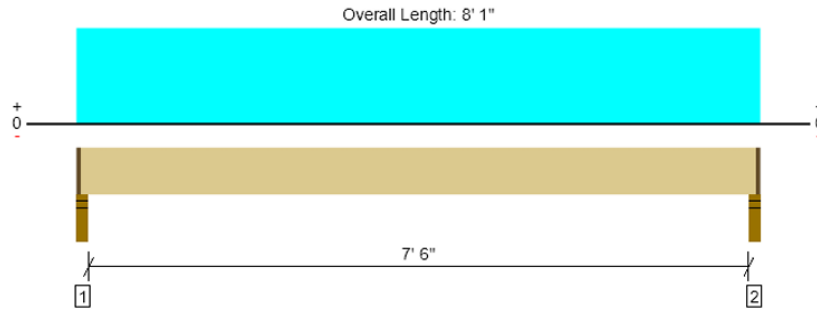
Deck Joists at South Deck



MEMBER REPORT

PASSED

2ND FLOOR, Deck Joists-South Deck
1 piece(s) 2 x 8 HF No.2 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	499 @ 2 1/2"	1367 (2.25")	Passed (36%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	398 @ 10 3/4"	1088	Passed (37%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	931 @ 4' 1/2"	1284	Passed (72%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.100 @ 4' 1/2"	0.192	Passed (L/916)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.159 @ 4' 1/2"	0.383	Passed (L/579)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

Member Length : 7' 10 1/2"
 System : Floor
 Member Type : Joist
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

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

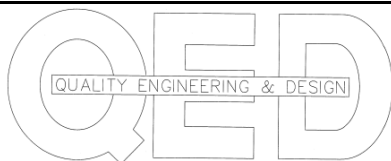
Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - SPF	3.50"	2.25"	1.50"	189	323	512	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	2.25"	1.50"	189	323	512	1 1/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	7' 11" o/c	
Bottom Edge (Lu)	7' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 8' 1"	16"	35.0	60.0	Deck Load + pavers



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1st Floor Framing

Post 2P15- Supports Beam 2B15



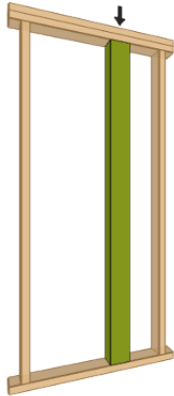
MEMBER REPORT
 2ND FLOOR, Post 2P15
 1 piece(s) 6 x 6 HF No.2

PASSED

Wall Height: 9'

Member Height: 8' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	19	50	Passed (38%)	--	--
Compression (lbs)	13618	14378	Passed (95%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	13618	18906	Passed (72%)	--	1.0 D + 1.0 L
Lateral Reaction (lbs)	0	--	--	--	N/A
Lateral Shear (lbs)	0	N/A	Passed (N/A)	--	N/A
Lateral Moment (ft-lbs)	0 @ mid-span	N/A	Passed (N/A)	--	N/A
Total Deflection (in)	0.00 @ mid-span	N/A	Passed (N/A)	--	N/A
Bending/Compression	N/A	1	Passed (N/A)	--	N/A

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Type	Material
Top	Dbf 2X	Douglas Fir-Larch
Base	2X	Douglas Fir-Larch

System : Wall
 Member Type : Column
 Building Code : IBC 2021
 Design Methodology : ASD

Max Unbraced Length	Comments
8'	

Vertical Loads	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
1 - Point (lb)	N/A	1480	5013	Linked from: Beam 3B2, Support 1
2 - Point (lb)	N/A	1338	3771	Linked from: Beam 2B1, Support 1
3 - Point (lb)	N/A	655	1361	Linked from: Beam 2B5, Support 1

Member Notes

North end Beam 1
 South end Beam 5

1st Floor Framing

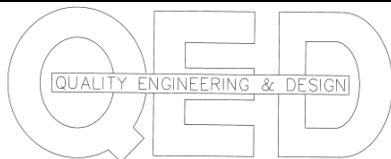
Post 2P111- Supports Beam 2B1 and 2B11 HSS 4x4x1/4

Vertical Loads	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
1 - Point (lb)	N/A	2142	4740	Linked from: Beam 2B11, Support 1
2 - Point (lb)	N/A	-	21349	Post 3P29
3 - Point (lb)	N/A	1338	3771	Linked from: Beam 2B1, Support 1

Total Load = (2142+1338) + (4740+21349+3771) = 33340 Lb.

From previous pages, Allowable load for HSS 4x4x1/4 = 66236 Lb

HSS 4x4x1/4 Post is OK



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1st Floor Framing

Post 2P2- Supports Beam 2B2



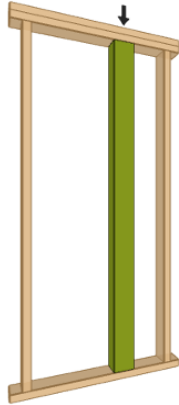
MEMBER REPORT
 2ND FLOOR, Post 2P2
1 piece(s) 4 x 4 HF No.2

PASSED

Wall Height: 9'

Member Height: 8' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	30	50	Passed (59%)	--	--
Compression (lbs)	3387	5031	Passed (67%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	3387	7656	Passed (44%)	--	1.0 D + 1.0 L
Lateral Reaction (lbs)	0	--	--	--	N/A
Lateral Shear (lbs)	0	N/A	Passed (N/A)	--	N/A
Lateral Moment (ft-lbs)	0 @ mid-span	N/A	Passed (N/A)	--	N/A
Total Deflection (in)	0.00 @ mid-span	N/A	Passed (N/A)	--	N/A
Bending/Compression	N/A	1	Passed (N/A)	--	N/A

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Type	Material
Top	Dbl 2X	Douglas Fir-Larch
Base	2X	Douglas Fir-Larch

System : Wall
 Member Type : Column
 Building Code : IBC 2021
 Design Methodology : ASD

Max Unbraced Length	Comments
8'	

Vertical Loads	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
1 - Point (lb)	N/A	586	1251	Linked from: Beam 2B2, Support 1
2 - Point (lb)	N/A	299	1251	Linked from: Beam 3B6, Support 1

Member Notes
 2B2+3P6

1st Floor Framing

Post 2P3- Supports Beam 2B3



MEMBER REPORT

PASSED

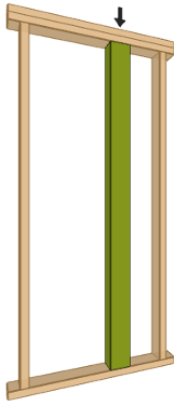
2ND FLOOR, Post 2P3

1 piece(s) 4 x 4 HF No.2

Wall Height: 9'

Member Height: 8' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	30	50	Passed (59%)	--	--
Compression (lbs)	2341	5031	Passed (47%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	2341	7656	Passed (31%)	--	1.0 D + 1.0 L
Lateral Reaction (lbs)	0	--	--	--	N/A
Lateral Shear (lbs)	0	N/A	Passed (N/A)	--	N/A
Lateral Moment (ft-lbs)	0 @ mid-span	N/A	Passed (N/A)	--	N/A
Total Deflection (in)	0.00 @ mid-span	N/A	Passed (N/A)	--	N/A
Bending/Compression	N/A	1	Passed (N/A)	--	N/A

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Type	Material
Top	Dbl 2X	Douglas Fir-Larch
Base	2X	Douglas Fir-Larch

System : Wall
 Member Type : Column
 Building Code : IBC 2021
 Design Methodology : ASD

Max Unbraced Length	Comments
8'	

Vertical Load	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
1 - Point (lb)	N/A	919	1422	Linked from: Beam 2B3, Support 2

Member Notes
2B3

1st Floor Framing

Post 2P4- Supports Beam 2B4



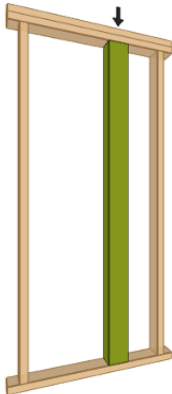
MEMBER REPORT
 2ND FLOOR, Post 2P4
 1 piece(s) 4 x 4 HF No.2

PASSED

Wall Height: 9'

Member Height: 8' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	30	50	Passed (59%)	--	--
Compression (lbs)	3494	5031	Passed (69%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	3494	7656	Passed (46%)	--	1.0 D + 1.0 L
Lateral Reaction (lbs)	0	--	--	--	N/A
Lateral Shear (lbs)	0	N/A	Passed (N/A)	--	N/A
Lateral Moment (ft-lbs)	0 @ mid-span	N/A	Passed (N/A)	--	N/A
Total Deflection (in)	0.00 @ mid-span	N/A	Passed (N/A)	--	N/A
Bending/Compression	N/A	1	Passed (N/A)	--	N/A

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Type	Material
Top	Dbl 2X	Douglas Fir-Larch
Base	2X	Douglas Fir-Larch

System : Wall
 Member Type : Column
 Building Code : IBC 2021
 Design Methodology : ASD

Max Unbraced Length	Comments
8'	

Vertical Loads	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
1 - Point (lb)	N/A	919	1422	Linked from: Beam 2B3, Support 2
2 - Point (lb)	N/A	443	710	Linked from: Beam 2B4, Support 1

Member Notes
2B3+2B4

1st Floor Framing

Post 2P6- Supports Beam 2B6



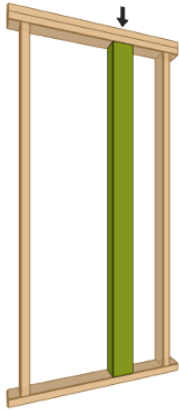
MEMBER REPORT
 2ND FLOOR, Post 2P6
 1 piece(s) 6 x 6 HF No.2

PASSED

Wall Height: 9'

Member Height: 8' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	19	50	Passed (38%)	--	--
Compression (lbs)	13167	14378	Passed (92%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	13167	18906	Passed (70%)	--	1.0 D + 1.0 L
Lateral Reaction (lbs)	0	--	--	--	N/A
Lateral Shear (lbs)	0	N/A	Passed (N/A)	--	N/A
Lateral Moment (ft-lbs)	0 @ mid-span	N/A	Passed (N/A)	--	N/A
Total Deflection (in)	0.00 @ mid-span	N/A	Passed (N/A)	--	N/A
Bending/Compression	N/A	1	Passed (N/A)	--	N/A

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

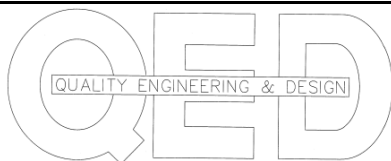
Supports	Type	Material
Top	Dbl 2X	Douglas Fir-Larch
Base	2X	Douglas Fir-Larch

System : Wall
 Member Type : Column
 Building Code : IBC 2021
 Design Methodology : ASD

Max Unbraced Length	Comments
8'	

Vertical Load	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Point (lb)	N/A	4390	8777	1776	Linked from: Beam 2B6, Support 1

Member Notes
2B6



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1st Floor Framing

Post 2P89- Supports Beam 2B8 and 2B9



MEMBER REPORT

PASSED

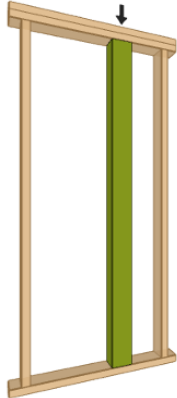
2ND FLOOR, Post 2P89

1 piece(s) 6 x 6 HF No.2

Wall Height: 9'

Member Height: 8' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	19	50	Passed (38%)	--	--
Compression (lbs)	6621	14378	Passed (46%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	6621	18906	Passed (35%)	--	1.0 D + 1.0 L
Lateral Reaction (lbs)	0	--	--	--	N/A
Lateral Shear (lbs)	0	N/A	Passed (N/A)	--	N/A
Lateral Moment (ft-lbs)	0 @ mid-span	N/A	Passed (N/A)	--	N/A
Total Deflection (in)	0.00 @ mid-span	N/A	Passed (N/A)	--	N/A
Bending/Compression	N/A	1	Passed (N/A)	--	N/A

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

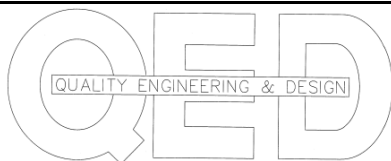
Supports	Type	Material
Top	Dbl 2X	Douglas Fir-Larch
Base	2X	Douglas Fir-Larch

System : Wall
 Member Type : Column
 Building Code : IBC 2021
 Design Methodology : ASD

Max Unbraced Length	Comments
8'	

Vertical Loads	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Point (lb)	N/A	277	767	-	Linked from: Beam 2B8, Support 1
2 - Point (lb)	N/A	506	1600	-	Linked from: Beam 2B9, Support 1
3 - Point (lb)	N/A	717	1902	793	DP7
4 - Point (lb)	N/A	214	638	-	3P10

Member Notes
2B8+2B9+DP7+3p10



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1st Floor Framing

Post 2P9- Supports Beam 2B9



MEMBER REPORT

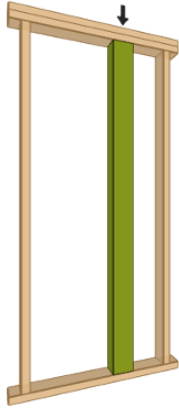
PASSED

2ND FLOOR, Post 2P9
1 piece(s) 4 x 4 HF No.2

Wall Height: 9'

Member Height: 8' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	30	50	Passed (59%)	--	--
Compression (lbs)	4725	5031	Passed (94%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	4725	7656	Passed (62%)	--	1.0 D + 1.0 L
Lateral Reaction (lbs)	0	--	--	--	N/A
Lateral Shear (lbs)	0	N/A	Passed (N/A)	--	N/A
Lateral Moment (ft-lbs)	0 @ mid-span	N/A	Passed (N/A)	--	N/A
Total Deflection (in)	0.00 @ mid-span	N/A	Passed (N/A)	--	N/A
Bending/Compression	N/A	1	Passed (N/A)	--	N/A

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Type	Material
Top	Dbl 2X	Douglas Fir-Larch
Base	2X	Douglas Fir-Larch

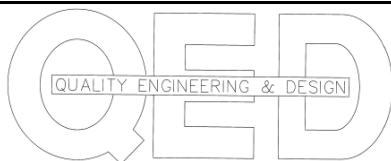
System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
8'	

Vertical Loads	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Point (lb)	N/A	506	1600	-	Linked from: Beam 2B9, Support 1
2 - Point (lb)	N/A	717	1902	793	DP7

Member Notes

2B9+DP7



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1st Floor Framing

Post 2P11- Supports Beam 2B11



MEMBER REPORT

PASSED

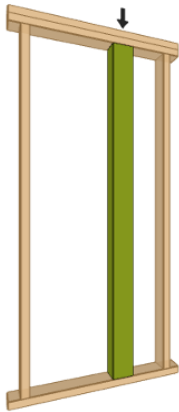
2ND FLOOR, Post 2P11

1 piece(s) 6 x 12 HF No.2

Wall Height: 9'

Member Height: 8' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	17	50	Passed (35%)	--	--
Compression (lbs)	24500	27804	Passed (88%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	24500	39531	Passed (62%)	--	1.0 D + 1.0 L
Lateral Reaction (lbs)	0	--	--	--	N/A
Lateral Shear (lbs)	0	N/A	Passed (N/A)	--	N/A
Lateral Moment (ft-lbs)	0 @ mid-span	N/A	Passed (N/A)	--	N/A
Total Deflection (in)	0.00 @ mid-span	N/A	Passed (N/A)	--	N/A
Bending/Compression	N/A	1	Passed (N/A)	--	N/A

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- Special detailing and installation procedures are necessary for large wall construction.
- Lumber grading provisions must be extended over the length of the member per NDS 4.2.5.5.

Supports	Type	Material
Top	Dbl 2X	Douglas Fir-Larch
Base	2X	Douglas Fir-Larch

System : Wall
 Member Type : Column
 Building Code : IBC 2021
 Design Methodology : ASD

Max Unbraced Length	Comments
8'	

Vertical Loads	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Point (lb)	N/A	2142	4740	-	Linked from: Beam 2B11, Support 1
2 - Point (lb)	N/A	5240	12378	690	3P9

Member Notes
 2B11+3P9

1st Floor Framing

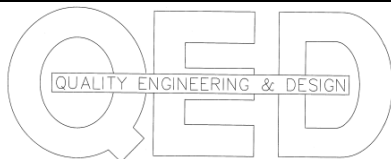
Post 2P13- Supports each end of Beam 2B13 - HSS 4x4x1/4

Vertical Loads	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Point (lb)	N/A	1886	5413	-	Linked from: Beam 2B13, Support 1
2 - Point (lb)	N/A	9938	19213	1378	Linked from: Beam 2B14, Support 1
3 - Point (lb)	N/A	3860	6192	2580	POST DP3

Total Load = (1886+9938+3860) + (5413+19213+6192) = 46502 Lb.

From previous pages, Allowable load for HSS 4x4x1/4 = 66236 Lb

HSS 4x4x1/4 Post is OK



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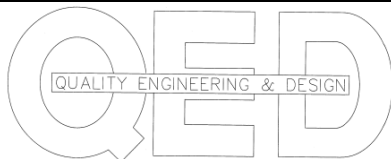
Post 2P14- Supports Beam 2B14 - HSS 4x4x1/4

Vertical Load	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Point (lb)	N/A	9938	19213	1378	Linked from: Beam 2B14, Support 1

Total Load = 9938+19213 = 29151 Lb.

From previous pages, Allowable load for HSS 4x4x1/4 = 66236 Lb

HSS 4x4x1/4 Post is OK



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Post 2P15W- Supports West end of Beam 2B15



MEMBER REPORT

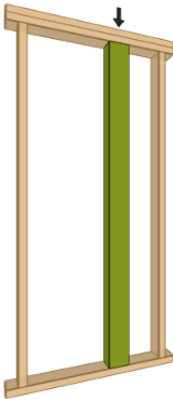
PASSED

2ND FLOOR, Post 2P15W
1 piece(s) 4 x 4 HF No.2

Wall Height: 9'

Member Height: 8' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	30	50	Passed (59%)	--	--
Compression (lbs)	4774	5031	Passed (95%)	1.00	1.0 D + 1.0 L
Plate Bearing (lbs)	4774	7656	Passed (62%)	--	1.0 D + 1.0 L
Lateral Reaction (lbs)	0	--	--	--	N/A
Lateral Shear (lbs)	0	N/A	Passed (N/A)	--	N/A
Lateral Moment (ft-lbs)	0 @ mid-span	N/A	Passed (N/A)	--	N/A
Total Deflection (in)	0.00 @ mid-span	N/A	Passed (N/A)	--	N/A
Bending/Compression	N/A	1	Passed (N/A)	--	N/A

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

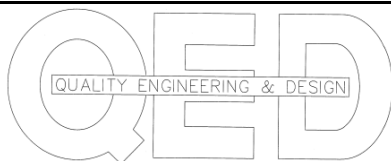
Supports	Type	Material
Top	Dbl 2X	Douglas Fir-Larch
Base	2X	Douglas Fir-Larch

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
8'	

Vertical Load	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Point (lb)	N/A	1886	2888	618	Linked from: Beam 2B15, Support 1

Member Notes
2B15



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Post 2P15E- Supports East end of Beam 2B15



MEMBER REPORT

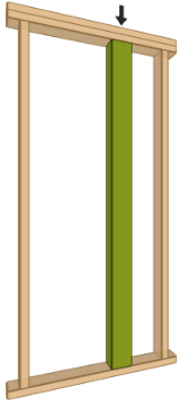
PASSED

2ND FLOOR, Post 2P15E
1 piece(s) 6 x 6 HF No.2

Wall Height: 9'

Member Height: 8' 7 1/2"

Tributary Width: 1'



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination [Load Group]
Slenderness	19	50	Passed (38%)	--	--
Compression (lbs)	6210	14378	Passed (43%)	1.00	1.0 D + 1.0 L [1]
Plate Bearing (lbs)	6210	18906	Passed (33%)	--	1.0 D + 1.0 L [1]
Lateral Reaction (lbs)	0	--	--	--	N/A
Lateral Shear (lbs)	0	N/A	Passed (N/A)	--	N/A
Lateral Moment (ft-lbs)	0 @ mid-span	N/A	Passed (N/A)	--	N/A
Total Deflection (in)	0.00 @ mid-span	N/A	Passed (N/A)	--	N/A
Bending/Compression	N/A	1	Passed (N/A)	--	N/A

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- This product has a square cross section. The analysis engine has checked both edge and plank orientations to allow for either installation.

Supports	Type	Material
Top	Dbl 2X	Douglas Fir-Larch
Base	2X	Douglas Fir-Larch

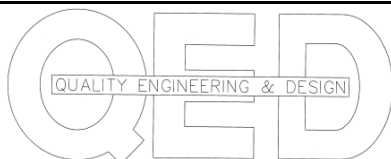
System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
8'	

Vertical Load	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Point (lb)	N/A	2569	3641/-53	1141	Linked from: Beam 2B15, Support 2

Member Notes

2B15



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Beam 2B17



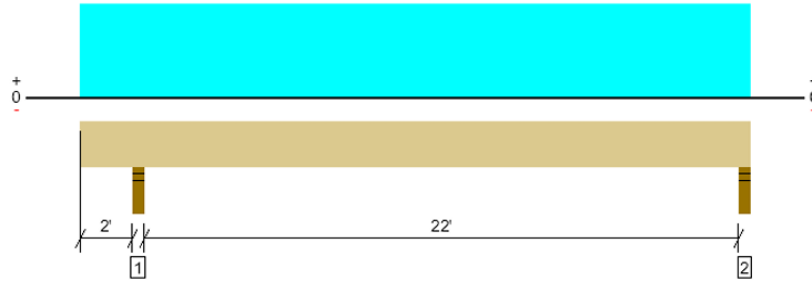
MEMBER REPORT

PASSED

2ND FLOOR, Beam 2B17

1 piece(s) 5 1/2" x 13 1/2" 24F-V4 DF Glulam

Overall Length: 24' 7"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5328 @ 2' 1 3/4"	8181 (3.50")	Passed (65%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	3968 @ 3' 5"	13118	Passed (30%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	24497 @ 13' 3 7/8"	32609	Passed (75%)	1.00	1.0 D + 1.0 L (Alt Spans)
Neg Moment (Ft-lbs)	-916 @ 2' 1 3/4"	25755	Passed (4%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.654 @ 13' 3 3/8"	0.742	Passed (L/408)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	1.076 @ 13' 3 9/16"	1.114	Passed (L/248)	--	1.0 D + 1.0 L (Alt Spans)

Member Length : 24' 7"
 System : Floor
 Member Type : Drop Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Upward deflection on left cantilever exceeds overhang deflection criteria.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 0.98 that was calculated using length L = 22' 2 1/4".
- Critical negative moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 2' 4 1/4".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - SPF	3.50"	3.50"	2.28"	2115	3212	5328	None
2 - Stud wall - SPF	3.50"	3.50"	1.92"	1770	2713/-25	4482	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	24' 7" o/c	
Bottom Edge (Lu)	24' 7" o/c	

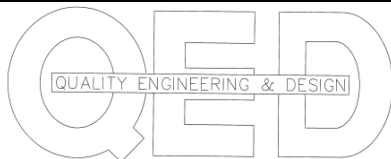
•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 24' 7"	N/A	18.0	--	
1 - Uniform (PSF)	0 to 24' 7" (Front)	4'	35.0	60.0	Deck Load + Pavers

• Side loads are assumed to not induce cross-grain tension.

Member Notes

South deck



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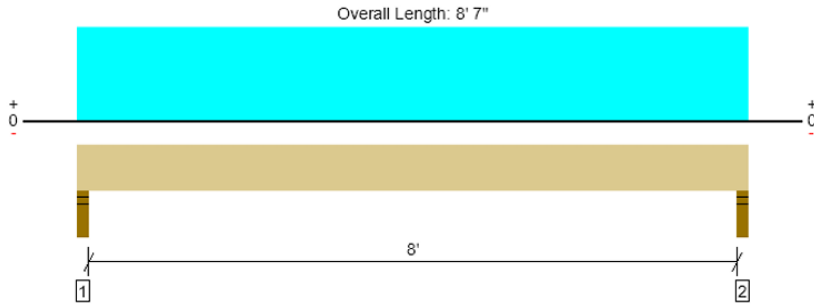
Beam 2B17 - Short span at south deck



MEMBER REPORT

PASSED

2ND FLOOR, Beam 2B17-Short Span
1 piece(s) 5 1/2" x 13 1/2" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1708 @ 2"	8181 (3.50")	Passed (21%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1144 @ 1' 5"	13118	Passed (9%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	3387 @ 4' 3 1/2"	33413	Passed (10%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.012 @ 4' 3 1/2"	0.275	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.020 @ 4' 3 1/2"	0.412	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

Member Length : 8' 7"
 System : Floor
 Member Type : Drop Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 8' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - SPF	3.50"	3.50"	1.50"	678	1030	1708	None
2 - Stud wall - SPF	3.50"	3.50"	1.50"	678	1030	1708	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' 7" o/c	
Bottom Edge (Lu)	8' 7" o/c	

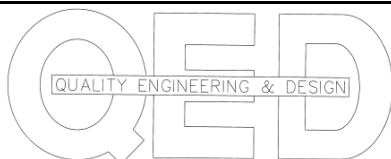
•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 8' 7"	N/A	18.0	--	
1 - Uniform (PSF)	0 to 8' 7" (Front)	4'	35.0	60.0	Deck Load + Pavers

• Side loads are assumed to not induce cross-grain tension.

Member Notes

South deck



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Post 2P17 - Supports Beam 2B17



MEMBER REPORT

PASSED

2ND FLOOR, Post 2P17
 1 piece(s) 6 x 6 HF No.2

Post Height: 9'



Design Results	Actual	Allowed	Result	LDF	Load: Combination [Load Group]
Slenderness	20	50	Passed (39%)	--	--
Compression (lbs)	6191	14040	Passed (44%)	1.00	1.0 D + 1.0 L [1]
Base Bearing (lbs)	6191	898425	Passed (1%)	--	1.0 D + 1.0 L [1]
Bending/Compression	N/A	1	Passed (N/A)	--	N/A

- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.

Supports	Type	Material
Base	Beam	Steel

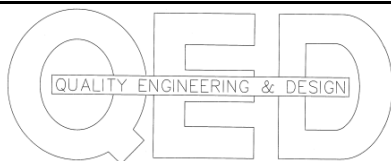
Member Type : Free Standing Post
 Building Code : IBC 2021
 Design Methodology : ASD

Max Unbraced Length	Comments
Full Member Length	No bracing assumed.

Drawing is Conceptual

Vertical Loads	Dead (0.90)	Floor Live (1.00)	Comments
1 - Point (lb)	1770	2713/-25	Linked from: Beam 2B17, Support 2
2 - Point (lb)	678	1030	Linked from: Beam 2B17-Short Span, Support 1

Member Notes
South Deck Post



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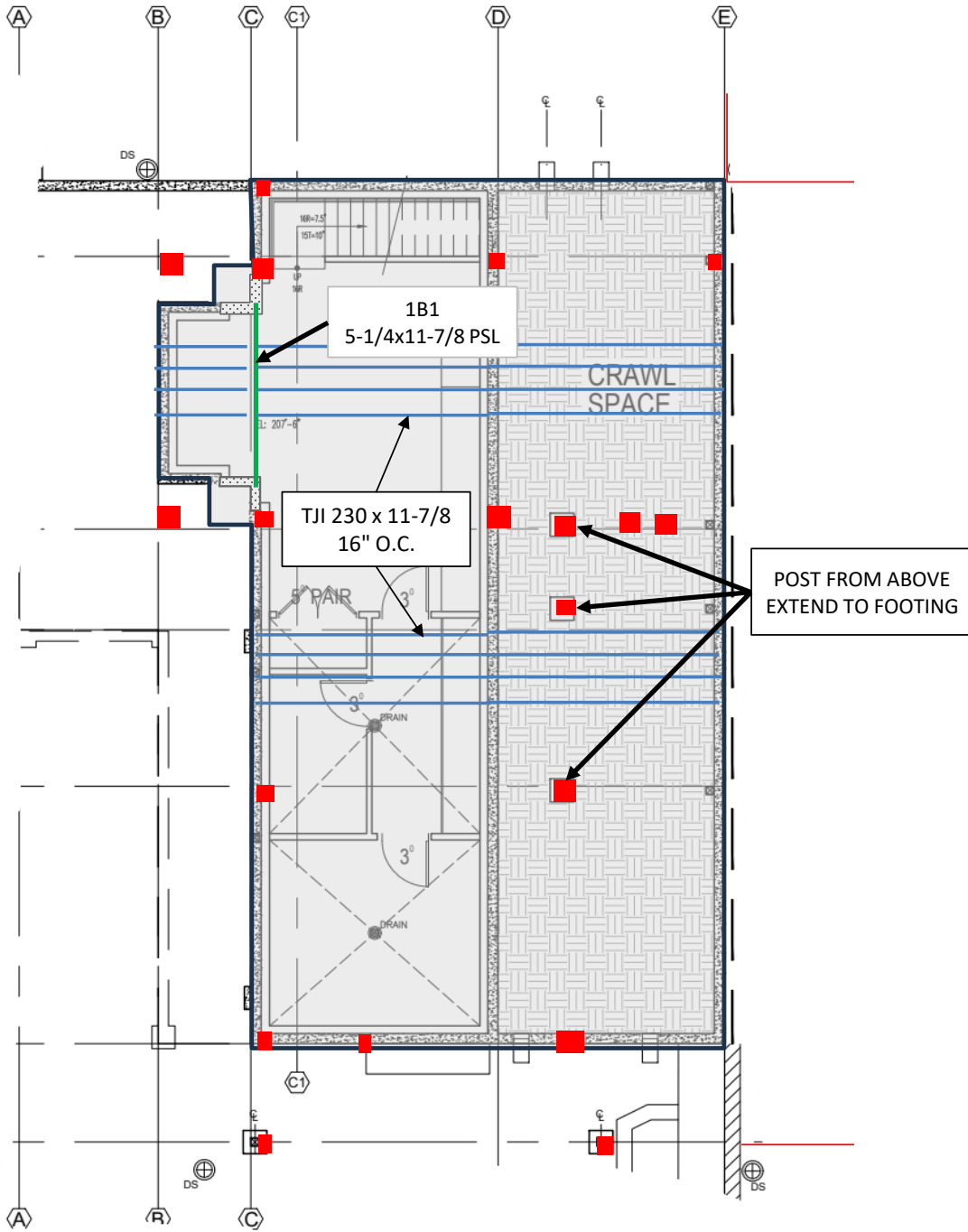
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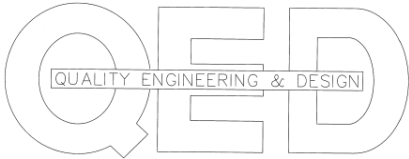
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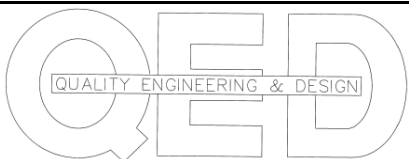
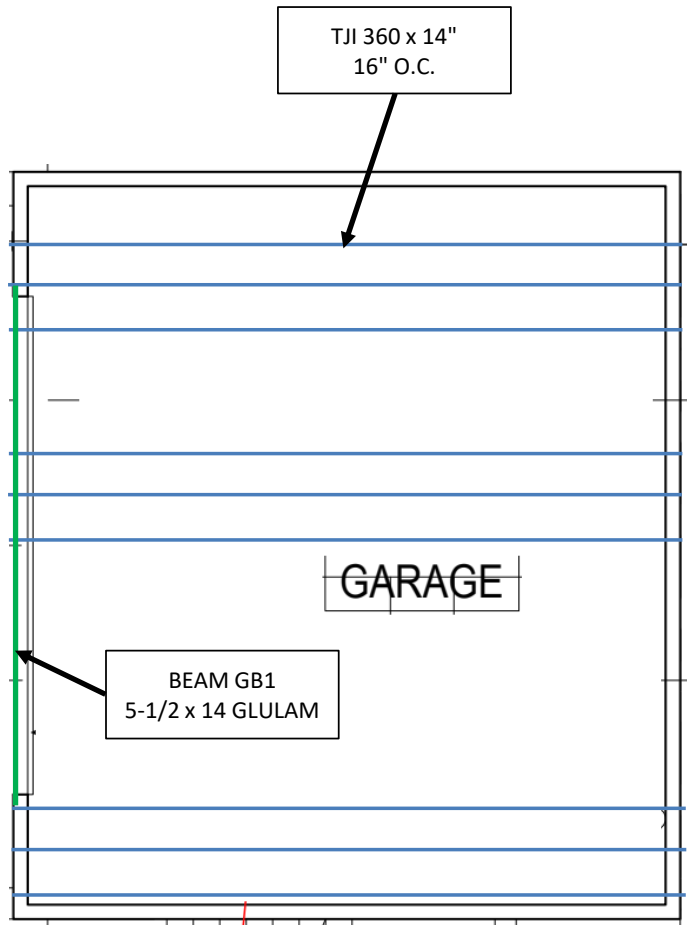
Main Floor Framing



■ Posts from Second Floor Framing

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Main Floor Framing



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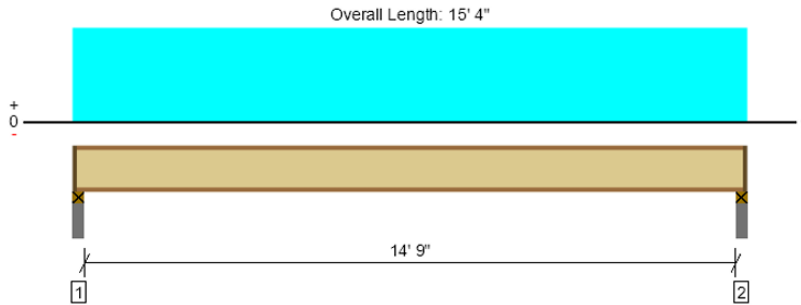
First Floor Joists



MEMBER REPORT

PASSED

FIRST FLOOR, First Floor Joists
1 piece(s) 11 7/8" TJI@ 230 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	524 @ 2 1/2"	1183 (2.25")	Passed (44%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	511 @ 3 1/2"	1655	Passed (31%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1928 @ 7' 8"	4215	Passed (46%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.168 @ 7' 8"	0.373	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.218 @ 7' 8"	0.746	Passed (L/821)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	50	40	Passed	--	--

Member Length : 15' 1 1/2"
 System : Floor
 Member Type : Joist
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

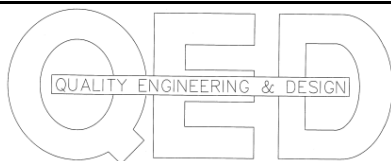
Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Plate on concrete - SPF	3.50"	2.25"	1.75"	123	409	532	1 1/4" Rim Board
2 - Plate on concrete - SPF	3.50"	2.25"	1.75"	123	409	532	1 1/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 2" o/c	
Bottom Edge (Lu)	15' 2" o/c	

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

Vertical Load	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 15' 4"	16"	12.0	40.0	Floor Load



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Main Floor Framing

Beam 1B1

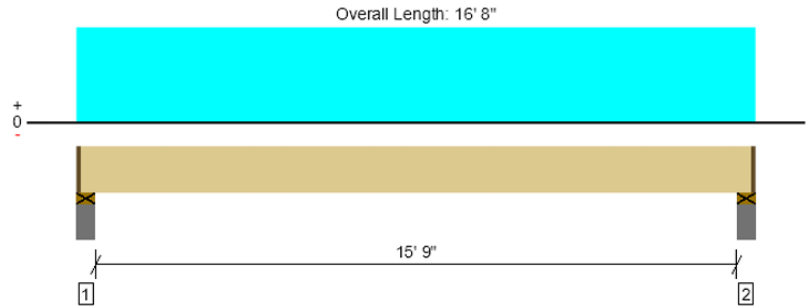


MEMBER REPORT

PASSED

FIRST FLOOR, Beam 1B1

1 piece(s) 5 1/4" x 11 7/8" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4546 @ 4"	9483 (4.25")	Passed (48%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	3804 @ 1' 5 3/8"	12053	Passed (32%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	17679 @ 8' 4"	29854	Passed (59%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.397 @ 8' 4"	0.400	Passed (L/483)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.535 @ 8' 4"	0.800	Passed (L/359)	--	1.0 D + 1.0 L (All Spans)

Member Length : 16' 5 1/2"
 System : Floor
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Plate on concrete - SPF	5.50"	4.25"	2.04"	1185	3417	4602	1 1/4" Rim Board
2 - Plate on concrete - SPF	5.50"	4.25"	2.04"	1185	3417	4602	1 1/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	16' 6" o/c	
Bottom Edge (Lu)	16' 6" o/c	

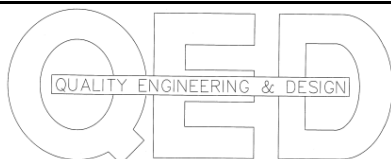
- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 1/4" to 16' 6 3/4"	N/A	19.5	--	
1 - Uniform (PSF)	0 to 16' 8" (Front)	3'	12.0	40.0	Floor Load
2 - Uniform (PSF)	0 to 16' 8" (Back)	7' 3"	12.0	40.0	Floor Load

- Side loads are assumed to not induce cross-grain tension.

Member Notes

Floor support beam at nook in NW corner



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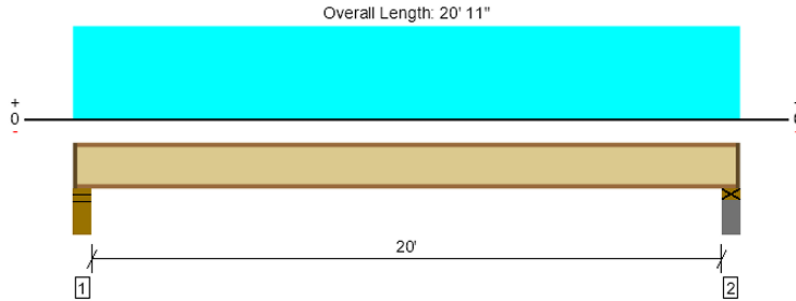
Garage Roof Joists (with deck loads)



MEMBER REPORT

PASSED

GARAGE, Garage Roof Joists
1 piece(s) 14" TJI® 360 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1312 @ 4 1/2"	1505 (3.50")	Passed (87%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1267 @ 5 1/2"	1955	Passed (65%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	6439 @ 10' 5 1/2"	7335	Passed (88%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.476 @ 10' 5 1/2"	0.504	Passed (L/508)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.754 @ 10' 5 1/2"	1.008	Passed (L/321)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	43	40	Passed	--	--

Member Length : 20' 8 1/2"
 System : Floor
 Member Type : Joist
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - SPF	5.50"	4.25"	2.70"	488	837	1325	1 1/4" Rim Board
2 - Plate on concrete - SPF	5.50"	4.25"	2.70"	488	837	1325	1 1/4" Rim Board

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

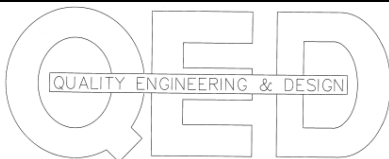
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 10" o/c	
Bottom Edge (Lu)	2' 9" o/c	

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

Vertical Load	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 20' 11"	16"	35.0	60.0	Deck Load + pavers

Member Notes

Garage roof deck with pavers



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Main Floor Framing

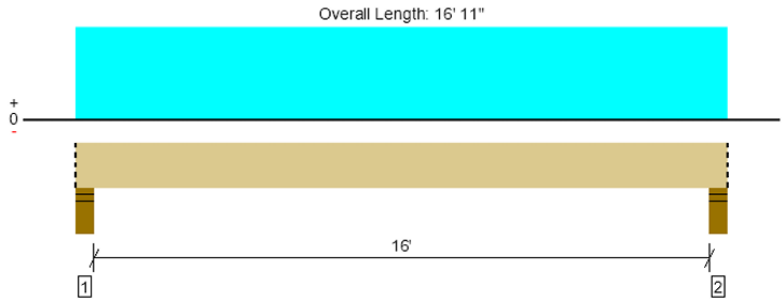
Garage Door Header



MEMBER REPORT

PASSED

GARAGE, Garage Door Header
1 piece(s) 5 1/2" x 14" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDf	Load: Combination (Pattern)
Member Reaction (lbs)	8997 @ 4"	12856 (5.50")	Passed (70%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	7269 @ 1' 7 1/2"	13603	Passed (53%)	1.00	1.0 D + 1.0 L (All Spans)
Pos Moment (Ft-lbs)	35111 @ 8' 5 1/2"	35933	Passed (98%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.457 @ 8' 5 1/2"	0.542	Passed (L/426)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.737 @ 8' 5 1/2"	0.813	Passed (L/265)	--	1.0 D + 1.0 L (All Spans)

Member Length : 16' 11"
 System : Floor
 Member Type : Drop Beam
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 16' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - SPF	5.50"	5.50"	3.85"	3415	5583	8997	Blocking
2 - Stud wall - SPF	5.50"	5.50"	3.85"	3415	5583	8997	Blocking

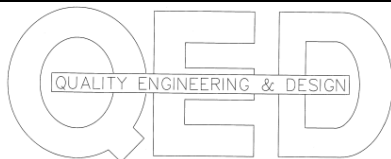
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	13' 2" o/c	
Bottom Edge (Lu)	16' 11" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 16' 11"	N/A	18.7	--	
1 - Uniform (PSF)	0 to 16' 11" (Top)	11'	35.0	60.0	Deck Load + Pavers

- Side loads are assumed to not induce cross-grain tension.



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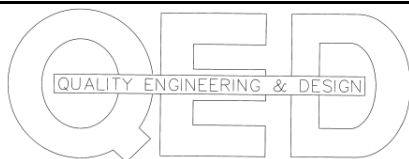
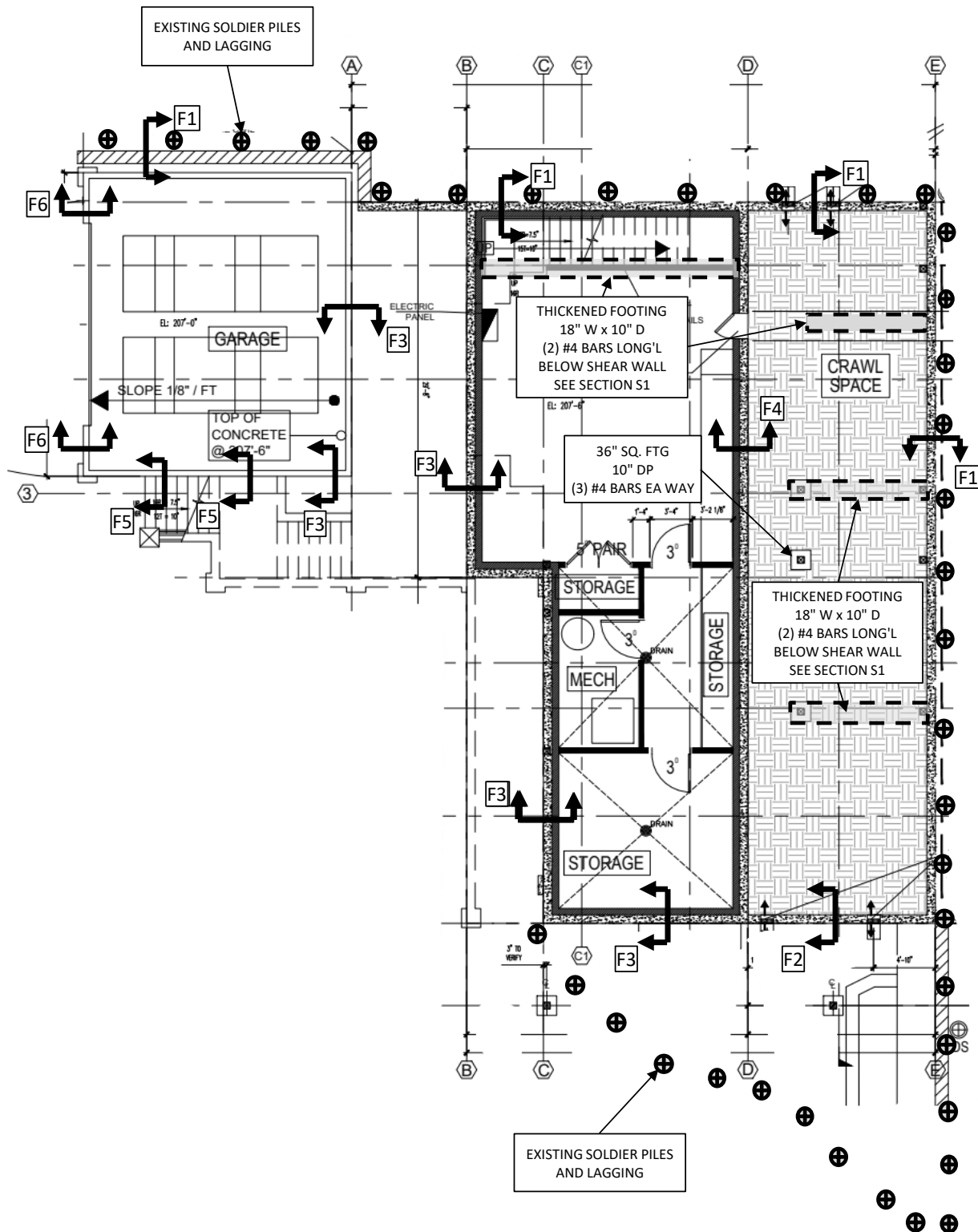
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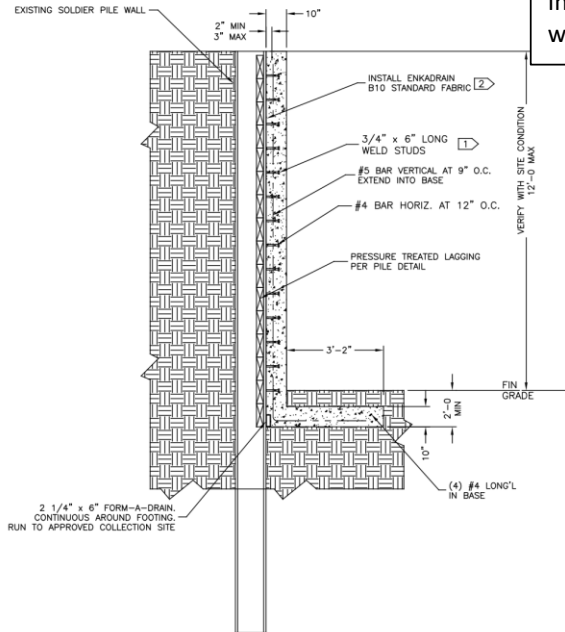
Foundation Plan



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Foundation Wall F1



NOTE:

In this area all lateral soil pressure is resisted by soldier pile wall. Concrete wall only supports lateral seismic force = 7H

$$\text{Retained Soil Height, } H_{\text{soil}} = 0 \text{ Ft.}$$

$$\text{Stem Wall Height, } H_{\text{wall}} = 12.5 \text{ Ft.}$$

$$\text{Stem Wall Width, } w_{\text{stem}} = 10 \text{ in.}$$

$$W_{\text{stem}} = 0.83 \text{ Ft.}$$

$$\text{Width of Base, } W_{\text{base}} = 4 \text{ Ft.}$$

$$\text{Base thickness, } t_{\text{base}} = 10 \text{ in.}$$

$$T_{\text{base}} = 0.83333 \text{ Ft.}$$

$$\text{Dist Toe to Face, } x_{\text{toe}} = 38 \text{ in.}$$

$$X_{\text{toe}} = 3.16667 \text{ Ft.}$$

$$\text{Heel width, } X_{\text{heel}} = 0.00 \text{ Ft.}$$

$$\text{Unit Weight of Soil, } D_{\text{soil}} = 90 \text{ Lb./Ft}^3$$

$$\text{Unit Weight of Concrete, } D_{\text{conc}} = 150 \text{ Lb./Ft}^3$$

$$\text{Wall Embed, } H_{\text{embed}} = 0.83 \text{ Ft}$$

Weight / C.G.

$$\text{Concrete Wall Weight} = [(W_{\text{stem}} \times (H_{\text{wall}} + H_{\text{embed}})) + (W_{\text{base}} \times T_{\text{base}})] \times D_{\text{conc}} = 2166.67 \text{ Lb. per Lineal Foot}$$

$$\text{Weight of Soil over Heel} = (X_{\text{heel}} \times [H_{\text{soil}} + H_{\text{embed}}]) \times D_{\text{soil}} = 0 \text{ Lb. per Lineal Foot}$$

$$\text{C.G. of Concrete, } X_{\text{barConc}} = \frac{(W_{\text{stem}} \times H_{\text{conc}})(W_{\text{stem}}/2 + X_{\text{toe}}) + (W_{\text{base}} \times T_{\text{base}})(W_{\text{base}}/2)}{(W_{\text{stem}} \times H_{\text{conc}}) + (W_{\text{base}} \times T_{\text{base}})} = 3.20 \text{ Ft}$$

$$\text{C.G. of Soil, } X_{\text{barSoil}} = (X_{\text{heel}}/2) + W_{\text{stem}} + X_{\text{toe}} = 4.00 \text{ Ft.}$$

Lateral Pressure:

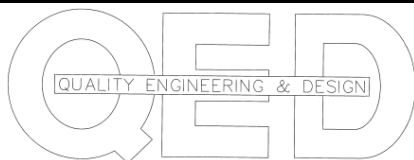
$$\text{For equivalent fluid pressure, } D_{\text{fluid}}, \text{ of } 0 \text{ Lb. per cubic foot (pcf)}$$

$$\text{Surcharge Pressure, } P_{\text{surch}} = 84 \text{ 7H lb. per Sq.Ft. (seismic surcharge, uniform)}$$

$$E_a = \frac{D_{\text{fluid}} \times H_{\text{soil}}^2}{2} + P_{\text{surch}} \times H = 1008 \text{ Soil Force, Lb per Lin Ft}$$

Considering pressure as fluid pressure:

$$E_h = E_a = 1008 \text{ Horizontal component of pressure}$$



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Foundation Wall F1

Overturning Moment:

$$\text{Moment in Stem Wall, } M_{ot} = E_h \times (H_{wall} / 2) = 6048 \text{ Ft. Lb.}$$

$$\text{Resisting Moment, } M_{resist} = (W_{wall})(X_{barConc}) + (W_{soil})(X_{barSoil}) = 6932.24 \text{ Ft. Lb.}$$

$$\frac{M_{resist}}{M_{OT}} = 1.15 > 1.1 ; \text{OK per IBC 1807.2.3}$$

Vertical Reinforcing Steel:

$$f'_c = 2500 \text{ psi, compressive strength}$$

$$E_c = 57000\sqrt{f'_c} = 2850000 \text{ psi, Elastic Modulus for concrete}$$

$$F_{ySteel} = 60,000 \text{ psi, yield strength for steel (A615 Gr. 60)}$$

$$F_{aSteel} = 20,000 \text{ psi, allowable stress for steel}$$

$$d = w_{stem} - 3 = 7 \text{ in.}$$

$$b = 12 \text{ in., Unit length of wall}$$

Ultimate Strength Design for Cantilever Wall:

$$\text{Design Moment} = 1.6 \times M_{ot} = 1.6 \times 6048 = 9676.8 \text{ Ft.Lb.}$$

$$\beta_1 = 0.85 \text{ for } f'_c < 4000$$

$$\rho_b = \frac{0.85 \beta_1 f'_c}{f_{ySteel}} \times \frac{87000}{87000 + f_{ySteel}} = 0.01782$$

$$\text{Min Value for } \rho_b = 200 / F_{ySteel} = 0.00333$$

$$\text{Max Value for } \rho_b = 0.75\rho_b = 0.013$$

$$\text{Max Reinforcing Steel, } A_{sMax} = (0.75)(\rho_b)(b)(d) = 1.122 \text{ in}^2$$

$$\text{Rebar Size} = \#5 \quad \text{Cross Section} = 0.31 \text{ in}^2$$

$$\text{Rebar Spacing} = 9 \text{ in.}$$

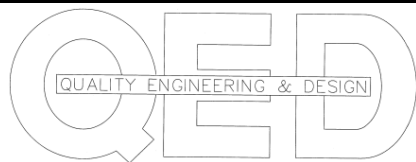
$$\text{Rebar Area per Foot} = 0.41333 \text{ in}^2 \text{ per Foot}$$

$$a = \frac{(A_s)(f_{ySteel})}{(0.85)(f'_c)(b)} = 0.973$$

Moment capability for Stem Wall:

$$M_u = 0.9[(A_s)(f_{ySteel})(d - a/2)] = 145,386 \text{ in.Lb.} \quad (= 12115.5 \text{ Ft.Lb.})$$

OK. Larger than Required Moment



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Foundation Wall F1

Reinforcing Steel in Base:

$$d = w_{\text{stem}} - 3 = 7 \text{ in.}$$
$$b = 12 \text{ in., Unit length of base}$$

Ultimate Strength Design for Base:

$$\beta_1 = 0.85 \text{ for } f'_c < 4000$$
$$\rho_b = \frac{0.85 \beta_1 f'_c}{f_{y\text{Steel}}} \times \frac{87000}{87000 + f_{y\text{Steel}}} = 0.01782$$

$$\text{Min Value for } \rho_b = 200 / F_{y\text{Steel}} = 0.00333$$

$$\text{Max Value for } \rho_b = 0.75\rho_b = 0.013$$

$$\text{Max Reinforcing Steel, } A_{s\text{Max}} = (0.75)(\rho_b)(b)(d) = 1.122 \text{ in}^2$$

$$\text{Rebar Size} = \#5 \quad \text{Cross Section} = 0.31 \text{ in}^2$$
$$\text{Rebar Spacing} = 9 \text{ in.}$$

$$\text{Rebar Area per Foot} = 0.41333 \text{ in}^2 \text{ per Foot}$$

$$a = \frac{(A_s)(f_{y\text{Steel}})}{(0.85)(f'_c)(b)} = 0.973$$

Moment capability for Base:

$$M_u = 0.9[(A_s)(f_{y\text{Steel}})(d - a/2)] = 145,386 \text{ in.lb.} \quad (= 12115.5 \text{ Ft.Lb.})$$

OK. Larger than Required Moment

Shear Capability at footing/wall shear plane per ACI 318 Section 11.6:

$$\text{Unit Shear Force} = 1.6 \times V_u = 1612.8 \text{ Lb. per Ft.} \quad (= 1.6 \times E_n \text{ from previous pages})$$

$$\text{For vertical bars: } V_n = (A_{vf})(f_y)(\mu) = 14880 \text{ lb. per Ft.}$$

Where:

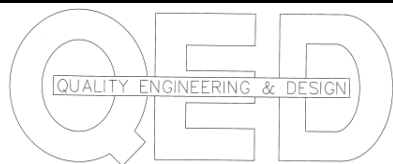
$$A_{vf} = 0.41333 \text{ in}^2 \text{ per Foot}$$
$$f_y = 60,000$$
$$\mu = 0.6 \times \lambda = 0.6$$
$$\lambda = 1 \text{ for normal weight concrete}$$

$$\text{Max } V_n \text{ shall not exceed: } 0.2f'_c A_c = 60000 \quad \text{OR} \quad 800 A_c = 96000$$

$$\Phi V_n = (0.75)(14880) = 11160 \quad \text{OK, Larger than Required Shear Force, } V_u$$

Where:

$$\Phi = 0.75 \quad (\text{Section 9.3.2.3})$$
$$V_n = 14880 \quad \text{Min of } (A_{vf})(f_y)(\mu) \text{ OR } (0.2f'_c A_c) \text{ OR } (800 A_c)$$



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Foundation Wall F1

Sliding Resistance:

$R_{\text{passive}} = 300$ Passive Soil Resistance is equivalent to a fluid of density 300 pcf

$\mu_f = 0.35$ Friction Factor against soil

Per Geotech report, these values include Safety Factor of 1.5

$E_h = 1008$ Lb. per Ft. Horizontal Load (see previous pages)

$W_{\text{wall}} = 2166.67$ Lb. per Ft. Wall Weight (see previous pages)

Friction Force, $F_f = \mu_f \times W_{\text{wall}} = 758.333$ Lb. per Foot of wall

Net force to be resisted by wall embedment = $E_{h\text{Net}} = E_h - F_f = 249.667$ Lb. per Lineal Foot

Passive Resistance:

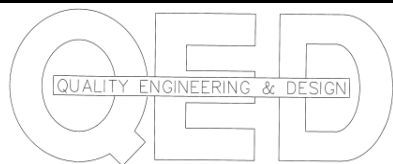
Resisting pressure at bottom of footing embed = $R_{\text{passive}} \times D$ (where D = embed depth)

Average pressure from top to bottom of embed = $(R_{\text{passive}} \times D) / 2$

Resistive force per foot of wall length = $[(R_{\text{passive}} \times D) / 2] \times D$

Solving for "D" required to equal the applied force:

$$D = \text{SQRT} \left[\frac{(2)(E_{h\text{Net}})}{R_{\text{passive}}} \right] = 1.3 \text{ Ft., Minimum embed depth to resist sliding}$$



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Foundation Wall F1

Overturning Soil Pressure:

O.T. Moment = 6048 Ft. Lb. per Lineal Foot
Resisting Moment = -6932.2 Ft. Lb. per Lineal Foot
Net Moment, M_{net} = -884.24 Ft. Lb. per Lineal Foot

$$P_{vert} = W_{conc} + W_{soil} + (P_{surch} \times W_{heel}) = 2166.67 \text{ Lb. per Lineal Foot}$$

Ref [6], Page 8-78

$$L_{net} = \frac{|M_{net}|}{P_{vert}} = 0.41 \text{ Ft.}$$

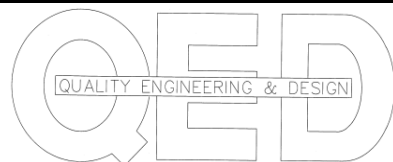
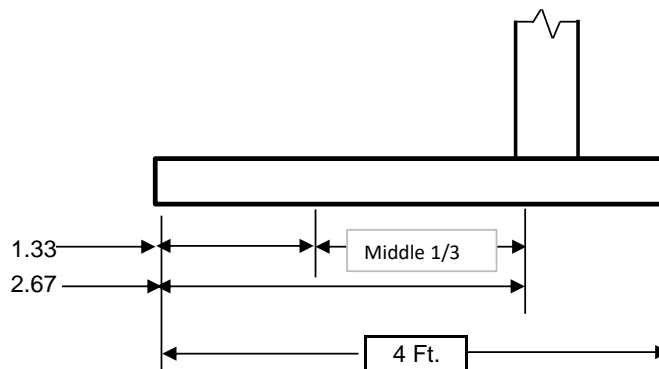
$$\text{Bearing Pressure} = \frac{P_{vert}}{A} \left(1 \pm 6e/L \right) = 1835.08 \text{ psf}$$

$$P_{vert} = 2166.67 \text{ Lb.}$$

$$A = 4 \text{ Ft}^2 \text{ (Area of Base at 1' Wide)}$$

$$L = 4 \text{ Ft. Length of Base}$$

$$e = 1.59 \text{ Ft.}$$



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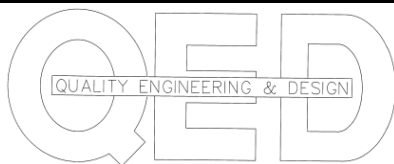
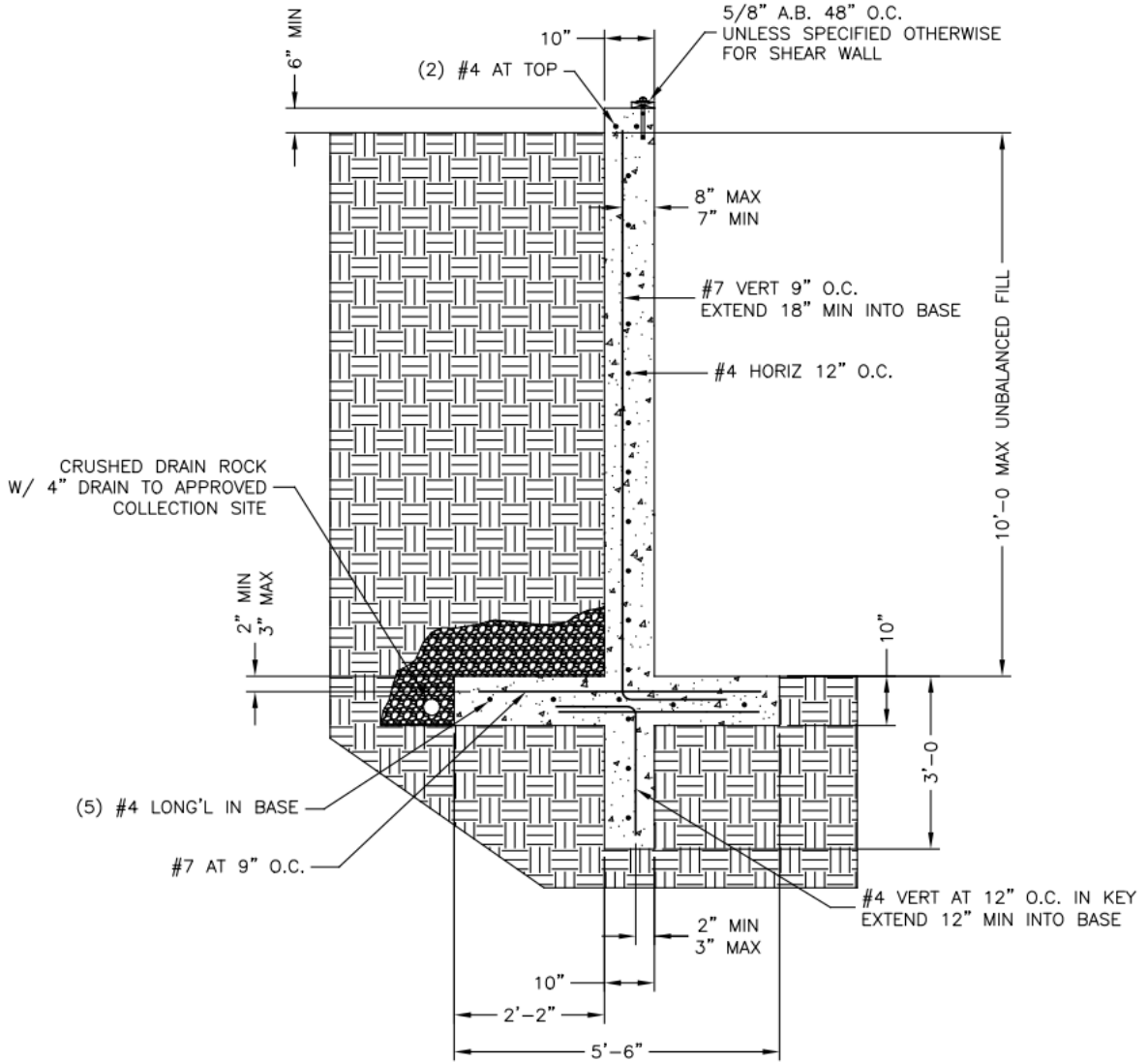
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Foundation Wall F2



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Foundation Wall F2

Retained Soil Height, $H_{soil} = 10$ Ft.

Stem Wall Height, $H_{wall} = 10.5$ Ft.

Stem Wall Width, $w_{stem} = 10$ in.

$W_{stem} = 0.83$ Ft.

Width of Base, $W_{base} = 5.5$ Ft.

Base thickness, $t_{base} = 10$ in.

$T_{base} = 0.83$ Ft.

Dist Toe to Face, $x_{toe} = 30$ in.

$X_{toe} = 2.50$ Ft.

Heel width, $X_{heel} = 2.17$ Ft. 26 in.

Unit Weight of Soil, $D_{soil} = 90$ Lb./Ft³

Unit Weight of Concrete, $D_{conc} = 150$ Lb./Ft³

Wall Embed, $H_{embed} = 1.17$ Ft (not including key)

Weight / C.G.

Concrete Wall Weight = $[(W_{stem} \times (H_{wall} + H_{embed})) + (W_{base} \times T_{base})] \times D_{conc} = 2145.83$ Lb. per Lineal Foot

Weight of Soil over Heel = $(X_{heel} \times [H_{soil} + H_{embed}]) \times D_{soil} = 2177.5$ Lb. per Lineal Foot

C.G. of Concrete, $X_{barConc} = \frac{(W_{stem} \times H_{conc})(W_{stem}/2 + X_{toe}) + (W_{base} \times T_{base})(W_{base}/2)}{(W_{stem} \times H_{conc}) + (W_{base} \times T_{base})} = 2.86$ Ft

C.G. of Soil, $X_{barSoil} = (X_{heel}/2) + W_{stem} + X_{toe} = 4.42$ Ft.

Lateral Pressure:

For equivalent fluid pressure, D_{fluid} , of 40 Lb. per cubic foot (pcf)

Surcharge Pressure, $P_{surch} = 0$ lb. per Sq.Ft.

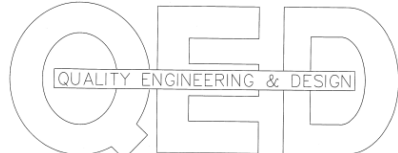
Surcharge Pressure, $P_{seis} = 70$ 7H lb. per Sq.Ft. (seismic surcharge, uniform)

Triangular Load due to Soil Pressure: $E_a = \frac{D_{fluid} \times H_{soil}^2}{2} + P_{surch} = 2000$ Soil Force, Lb per Lin Ft

Uniform pressure due to seismic : $E_s = 0.7 \times P_{seis} \times H = 490$ Lb. per Lin Ft, uniform pressure

Considering pressure as fluid pressure:

$E_h = E_a = 2000$ Horizontal component of pressure

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Foundation Wall F2

Overturning Moment:

$$\begin{aligned} \text{Moment in Stem Wall, } M_{ot} &= E_h \times [(H_{soil} / 3) + H_{embed}] + E_{seis} \times H_{soil} / 2 && 11450 \text{ Ft. Lb. (incl Seismic)} \\ \text{Moment in Stem Wall, } M_{ot} &= E_h \times [(H_{soil} / 3) + H_{embed}] && 9000 \text{ Ft. Lb. (excl Seismic)} \\ \text{Resisting Moment, } M_{resist} &= (W_{wall})(X_{barConc}) + (W_{soil})(X_{barSoil}) = && 15753 \text{ Ft. Lb.} \end{aligned}$$

$$\begin{aligned} \frac{M_{resist}}{M_{OT}} &= 1.38 > 1.1 ; \text{OK} && \text{Min Safety factor including seismic} \\ &= 1.75 > 1.5 ; \text{OK} && \text{Min safety factor without seismic} \end{aligned}$$

Vertical Reinforcing Steel:

$$\begin{aligned} f'_c &= 2500 \text{ psi, compressive strength} \\ E_c &= 57000vf'_c = 2.9E+06 \text{ psi, Elastic Modulus for concrete} \end{aligned}$$

$$\begin{aligned} F_{ySteel} &= 60,000 \text{ psi, yield strength for steel (A615 Gr. 60)} \\ F_{aSteel} &= 20,000 \text{ psi, allowable stress for steel} \end{aligned}$$

$$\begin{aligned} d &= w_{stem} - 3 = 7 \text{ in.} \\ b &= 12 \text{ in., Unit length of wall} \end{aligned}$$

Ultimate Strength Design for Cantilever Wall:

$$\text{Design Moment} = 1.6 \times M_{ot} = 1.6 \times 0 = 18320 \text{ Ft.Lb.}$$

$$\begin{aligned} \beta_1 &= 0.85 \text{ for } f'_c < 4000 \\ \rho_b &= \frac{0.85 \beta_1 f'_c}{f_{ySteel}} \times \frac{87000}{87000 + f_{ySteel}} = 0.01782 \end{aligned}$$

$$\begin{aligned} \text{Min Value for } \rho_b &= 200 / F_{ySteel} = 0.00333 \\ \text{Max Value for } \rho_b &= 0.75\rho_b = 0.013 \end{aligned}$$

$$\text{Max Reinforcing Steel, } A_{sMax} = (0.75)(\rho_b)(b)(d) = 1.122 \text{ in}^2$$

$$\begin{aligned} \text{Rebar Size} &= \#7 \text{ Cross Section} = 0.6 \text{ in}^2 \\ \text{Rebar Spacing} &= 9 \text{ in.} \end{aligned}$$

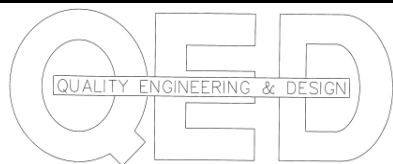
$$\text{Rebar Area per Foot} = 0.8 \text{ in}^2 \text{ per Foot}$$

$$a = \frac{(A_s)(f_{ySteel})}{(0.85)(f'_c)(b)} = 1.882$$

Moment capability for Stem Wall:

$$M_u = 0.9[(A_s)(f_{ySteel})(d - a/2)] = 261,741 \text{ in.lb. } (= 21811.8 \text{ Ft.Lb.})$$

OK. Larger than Required Moment



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Foundation Wall F2

Reinforcing Steel in Base:

$$d = w_{\text{stem}} - 3 = 7 \text{ in.}$$
$$b = 12 \text{ in., Unit length of base}$$

Ultimate Strength Design for Base:

$$\beta_1 = 0.85 \text{ for } f'_c < 4000$$
$$\rho_b = \frac{0.85 \beta_1 f'_c}{f_{y\text{Steel}}} \times \frac{87000}{87000 + f_{y\text{Steel}}} = 0.01782$$

$$\text{Min Value for } \rho_b = 200 / F_{y\text{Steel}} = 0.00333$$
$$\text{Max Value for } \rho_b = 0.75\rho_b = 0.013$$

$$\text{Max Reinforcing Steel, } A_{s\text{Max}} = (0.75)(\rho_b)(b)(d) = 1.122 \text{ in}^2$$

$$\text{Rebar Size} = \#7 \quad \text{Cross Section} = 0.6 \text{ in}^2$$
$$\text{Rebar Spacing} = 9 \text{ in.}$$

$$\text{Rebar Area per Foot} = 0.8 \text{ in}^2 \text{ per Foot}$$

$$a = \frac{(A_s)(f_{y\text{Steel}})}{(0.85)(f'_c)(b)} = 1.882$$

Moment capability for Base:

$$M_u = 0.9[(A_s)(f_{y\text{Steel}})(d - a/2)] = 261,741 \text{ in.lb.} \quad (= 21811.8 \text{ Ft.Lb.})$$

OK. Larger than Required Moment

Shear Capability at footing/wall shear plane per ACI 318 Section 11.6:

$$\text{Unit Shear Force} = 1.6 \times V_u = 0 \text{ Lb. per Ft.} \quad (= 1.6 \times E_n \text{ from previous pages})$$

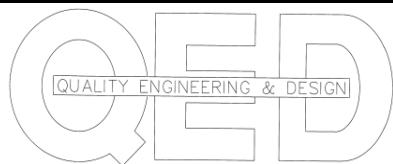
$$\text{For vertical bars: } V_n = (A_{vf})(f_y)(\mu) = 28800 \text{ lb. per Ft.}$$

$$\text{Where: } A_{vf} = 0.8 \text{ in}^2 \text{ per Foot}$$
$$f_y = 60,000$$
$$\mu = 0.6 \times \lambda = 0.6$$
$$\lambda = 1 \text{ for normal weight concrete}$$

$$\text{Max } V_n \text{ shall not exceed: } 0.2f'_c A_c = 60000 \quad \text{OR} \quad 800 A_c = 96000$$

$$\Phi V_n = (0.75)(28800) = 21600 \quad \text{OK, Larger than Required Shear Force, } V_u$$

$$\text{Where: } \Phi = 0.75 \text{ (Section 9.3.2.3)}$$
$$V_n = 28800 \text{ Min of } (A_{vf})(f_y)(\mu) \text{ OR } (0.2f'_c A_c) \text{ OR } (800 A_c)$$



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Foundation Wall F2

Bending in Footing Key

$$\begin{aligned} \text{Force at Base} &= Eh = 2000 \text{ Lb. per lineal ft.} \\ \text{Moment in Key} &= 2000 \times (3 / 2) = 3000 \text{ Ft.Lb.} \end{aligned}$$

$$\begin{aligned} \text{Key Thickness, } t &= 10 \text{ in.} \\ d = t - 3 &= 7 \text{ in.} \\ b &= 12 \text{ in.} \\ &\text{unit length} \end{aligned}$$

$$\text{Design Moment} = 1.6 \times 3000 = 4800 \text{ Ft.Lb. (LRFD equivalent)}$$

$$\beta_1 = 0.85 \text{ for } f'_c < 4000$$

$$\rho_b = \frac{0.85 \beta_1 f'_c}{f_{y\text{Steel}}} \times \frac{87000}{87000 + f_{y\text{Steel}}} = 0.01782$$

$$\text{Min Value for } \rho_b = 200 / F_{y\text{Steel}} = 0.00333$$

$$\text{Max Value for } \rho_b = 0.75\rho_b = 0.013$$

$$\text{Max Reinforcing Steel, } A_{s\text{Max}} = (0.75)(\rho_b)(b)(d) = 1.122 \text{ in}^2$$

$$\begin{aligned} \text{Rebar Size} &= \#4 \quad \text{Cross Section} = 0.2 \text{ in}^2 \\ \text{Rebar Spacing} &= 12 \text{ in.} \end{aligned}$$

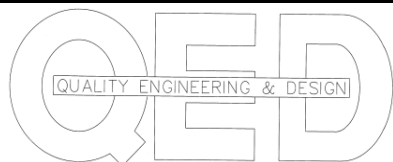
$$\text{Rebar Area per Foot} = 0.2 \text{ in}^2 \text{ per Foot}$$

$$a = \frac{(A_s)(f_{y\text{Steel}})}{(0.85)(f'_c)(b)} = 0.471$$

Moment capability for Stem Wall:

$$M_u = 0.9[(A_s)(f_{y\text{Steel}})(d - a/2)] = 73,059 \text{ in.lb. } (= 6088.2 \text{ Ft.Lb.})$$

OK. Larger than Required Moment



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Sliding Resistance:

$R_{\text{passive}} = 300$ Passive Soil Resistance is equivalent to a fluid of density 300 pcf

$\mu_f = 0.35$ Friction Factor against soil

Per Geotech report, these values include Safety Factor of 1.5

$E_h = 2000$ Lb. per Ft. Horizontal Load (see previous pages)

$W_{\text{wall}} = 2145.83$ Lb. per Ft. Wall Weight (see previous pages)

Friction Force, $F_f = \mu_f \times W_{\text{wall}} = 751.042$ Lb. per Foot of wall

Net force to be resisted by wall embedment = $E_{h\text{Net}} = (E_h) - F_f = 1248.96$ Lb. per Lineal Foot

Passive Resistance:

Resisting pressure at bottom of footing embed = $R_{\text{passive}} \times D$ (where D = embed depth)

Average pressure from top to bottom of embed = $(R_{\text{passive}} \times D) / 2$

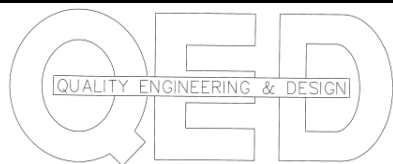
Resistive force per foot of wall length = $[(R_{\text{passive}} \times D) / 2] \times D$

Solving for "D" required to equal the applied force:

$$D = \text{SQRT} \left[\frac{(2)(E_{h\text{Net}})}{R_{\text{passive}}} \right] = 2.9 \text{ Ft., Minimum embed depth to resist sliding}$$
$$= 34.6 \text{ in., Minimum}$$

Actual Embed = 3 Ft.

= 36.0 in.



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Overturning Soil Pressure:

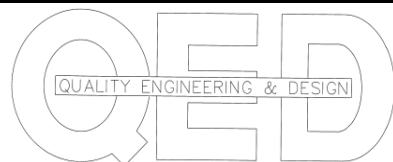
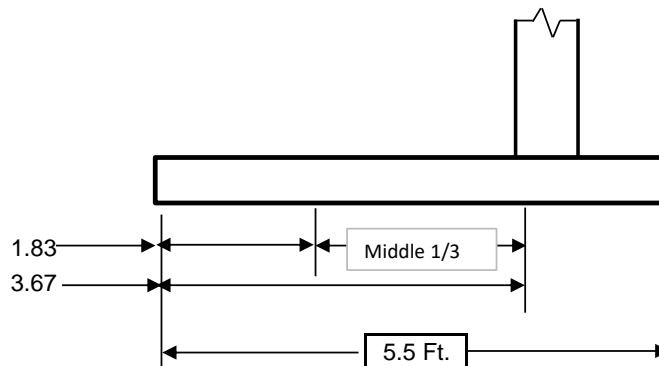
O.T. Moment = 0 Ft. Lb. per Lineal Foot
Resisting Moment = -15753 Ft. Lb. per Lineal Foot
Net Moment, M_{net} = -15753 Ft. Lb. per Lineal Foot

$$P_{vert} = W_{conc} + W_{soil} + (P_{surch} \times W_{heel}) = 4475 \text{ Lb. per Lineal Foot} \quad \text{Ref [6], Page 8-78}$$

$$L_{net} = \frac{|M_{net}|}{P_{vert}} = 4.00 \text{ Ft.}$$

$$\text{Bearing Pressure} = \frac{P_{vert}}{A} \left(1 \pm \frac{6e}{L} \right) = 1923.14 \text{ psf}$$

$P_{vert} = 4475 \text{ Lb.}$
 $A = 5.5 \text{ Ft}^2 \text{ (Area of Base at 1' Wide)}$
 $L = 5.5 \text{ Ft. Length of Base}$
 $e = -1.25 \text{ Ft.}$



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Foundation Wall F2

Check Overturning and sliding with additional seismic load = 7H uniform
Per IBC Section 1807.2.3, safety factor can be reduced to 1.1 for seismic loading

Lateral Pressure including Seismic:

Lateral Soil Pressure = 0 psf, triangular load distribution (see previous pages)

Earthquake Lateral pressure = $7 \times H = 7 \times 10 = 70$ psf, uniform load distribution

Force on Unit width = $P \times 1 \times H = (70)(10) = 700$ Lb.

Overturning:

Moment due to Seismic = $F_{\text{seismic}} \times H/2 = (700)(10/2) = 3500$ Ft.Lb.

Total Overturning Moment = $M_{\text{soil}} + M_{\text{EQ}} = 0 + 3500 = 3500$ Ft.Lb.

Resisting moment = 15753 Ft.Lb. (see previous pages)

Safety Factor on Overturning = $\frac{\text{Resisting Moment}}{\text{Overturning Mom}} = 4.50$ **OK. Greater than 1.1**

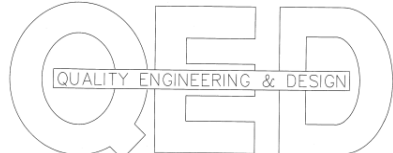
Sliding

Total Sliding Force = $2000 + 700 = 2700$ lb.

Total Resisting Force = Friction + Embed = $\mu_f \times W_{\text{wall}} + [(R_{\text{passive}} \times D) / 2] \times D \times 1.5 = 3151.56$ lb.

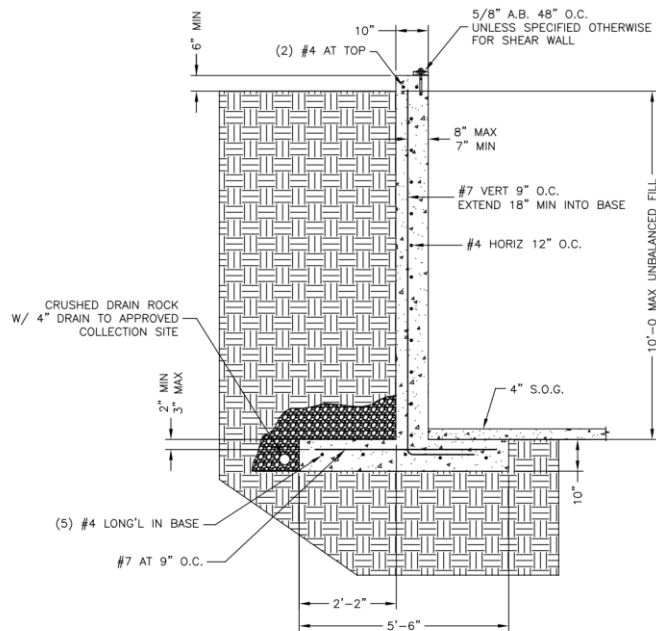
multiplied resisting force by 1.5 since values on previous page include SF = 1.5

Safety Factor on Sliding = $\frac{F_{\text{resist}}}{F_{\text{sliding}}} = 1.17$ **OK. Greater than 1.1**

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Foundation Wall F3

10' Cantilevered Retaining Wall (Detail F3):



$$\text{Retained Soil Height, } H_{\text{soil}} = 10 \text{ Ft.}$$

$$\text{Stem Wall Height, } H_{\text{wall}} = 10.5 \text{ Ft.}$$

$$\text{Stem Wall Width, } w_{\text{stem}} = 10 \text{ in.}$$

$$W_{\text{stem}} = 0.83 \text{ Ft.}$$

$$\text{Width of Base, } W_{\text{base}} = 5 \text{ Ft.}$$

$$\text{Base thickness, } t_{\text{base}} = 10 \text{ in.}$$

$$T_{\text{base}} = 0.83333 \text{ Ft.}$$

$$\text{Dist Toe to Face, } x_{\text{toe}} = 26 \text{ in.}$$

$$X_{\text{toe}} = 2.16667 \text{ Ft.}$$

$$\text{Heel width, } X_{\text{heel}} = 2.00 \text{ Ft.}$$

$$\text{Unit Weight of Soil, } D_{\text{soil}} = 90 \text{ Lb./Ft}^3$$

$$\text{Weight of Concrete, } D_{\text{conc}} = 150 \text{ Lb./Ft}^3$$

$$\text{Wall Embed, } H_{\text{embed}} = 0.83 \text{ Ft}$$

Weight / C.G.

$$\text{Concrete Wall Weight} = [(W_{\text{stem}} \times (H_{\text{wall}} + H_{\text{embed}})) + (W_{\text{base}} \times T_{\text{base}})] \times D_{\text{conc}} = 2041.67 \text{ Lb. per Lineal Foot}$$

$$\text{Weight of Soil over Heel} = (X_{\text{heel}} \times [H_{\text{soil}} + H_{\text{embed}}]) \times D_{\text{soil}} = 1950 \text{ Lb. per Lineal Foot}$$

$$\text{C.G. of Concrete, } X_{\text{barConc}} = \frac{(W_{\text{stem}} \times H_{\text{conc}})(W_{\text{stem}}/2 + X_{\text{toe}}) + (W_{\text{base}} \times T_{\text{base}})(W_{\text{base}}/2)}{(W_{\text{stem}} \times H_{\text{conc}}) + (W_{\text{base}} \times T_{\text{base}})} = 2.56 \text{ Ft}$$

$$\text{C.G. of Soil, } X_{\text{barSoil}} = (X_{\text{heel}}/2) + W_{\text{stem}} + X_{\text{toe}} = 4.00 \text{ Ft.}$$

Lateral Pressure

$$\text{For equivalent fluid pressure, } D_{\text{fluid}}, \text{ of } 40 \text{ Lb. per cubic foot (pcf)}$$

$$\text{Surcharge Pressure, } P_{\text{surch}} = 0 \text{ lb. per Sq.Ft.}$$

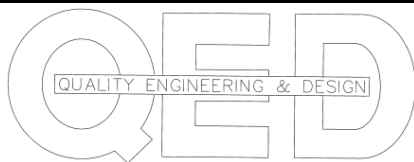
$$\text{Surcharge Pressure, } P_{\text{seis}} = 70 \text{ 7H lb. per Sq.Ft. (seismic surcharge, uniform)}$$

$$\text{Triangular Load due to Soil Pressure: } E_a = \frac{D_{\text{fluid}} \times H_{\text{soil}}^2}{2} + P_{\text{surch}} = 2000 \text{ Soil Force, Lb per Lin Ft}$$

$$\text{Uniform pressure due to seismic: } E_s = 0.7 \times P_{\text{seis}} \times H = 490 \text{ Lb. per Lin Ft, uniform pressure}$$

Considering pressure as fluid pressure:

$$E_h = E_a = 2000 \text{ Horizontal component of pressure}$$



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Overturning Moment:

$$\begin{aligned} \text{Moment in Stem Wall, } M_{ot} &= E_h \times [(H_{soil} / 3) + H_{embed}] + E_{seis} \times H_{soil} / 2 && 10783.3 \text{ Ft. Lb. (incl Seismic)} \\ \text{Moment in Stem Wall, } M_{ot} &= E_h \times [(H_{soil} / 3) + H_{embed}] && 8333.33 \text{ Ft. Lb. (excl Seismic)} \\ \text{Resisting Moment, } M_{resist} &= (W_{wall})(X_{barConc}) + (W_{soil})(X_{barSoil}) = && 13019.4 \text{ Ft. Lb.} \end{aligned}$$

$$\begin{aligned} \frac{M_{resist}}{M_{OT}} &= 1.21 > 1.1 ; \text{OK} && \text{Min Safety factor including seismic} \\ &= 1.56 > 1.5 ; \text{OK} && \text{Min safety factor without seismic} \end{aligned}$$

Vertical Reinforcing Steel:

$$\begin{aligned} f'_c &= 2500 \text{ psi, compressive strength} \\ E_c &= 57000\sqrt{f'_c} = 2850000 \text{ psi, Elastic Modulus for concrete} \end{aligned}$$

$$\begin{aligned} F_{ySteel} &= 60,000 \text{ psi, yield strength for steel (A615 Gr. 60)} \\ F_{aSteel} &= 20,000 \text{ psi, allowable stress for steel} \end{aligned}$$

$$\begin{aligned} d &= w_{stem} - 3 = 7 \text{ in.} \\ b &= 12 \text{ in., Unit length of wall} \end{aligned}$$

Ultimate Strength Design for Cantilever Wall:

$$\text{Design Moment} = 1.6 \times M_{ot} = 1.6 \times 10783.3 = 17253.3 \text{ Ft.Lb.}$$

$$\begin{aligned} \beta_1 &= 0.85 \text{ for } f'_c < 4000 \\ \rho_b &= \frac{0.85 \beta_1 f'_c}{f_{ySteel}} \times \frac{87000}{87000 + f_{ySteel}} = 0.01782 \end{aligned}$$

$$\begin{aligned} \text{Min Value for } \rho_b &= 200 / F_{ySteel} = 0.00333 \\ \text{Max Value for } \rho_b &= 0.75\rho_b = 0.013 \end{aligned}$$

$$\text{Max Reinforcing Steel, } A_{sMax} = (0.75)(\rho_b)(b)(d) = 1.122 \text{ in}^2$$

$$\begin{aligned} \text{Rebar Size} &= \#7 && \text{Cross Section} = 0.6 \text{ in}^2 \\ \text{Rebar Spacing} &= 9 \text{ in.} \end{aligned}$$

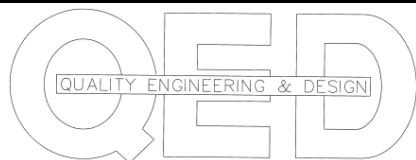
$$\text{Rebar Area per Foot} = 0.8 \text{ in}^2 \text{ per Foot}$$

$$a = \frac{(A_s)(f_{ySteel})}{(0.85)(f'_c)(b)} = 1.882$$

Moment capability for Stem Wall:

$$M_u = 0.9[(A_s)(f_{ySteel})(d - a/2)] = 261,741 \text{ in.lb. } (= 21811.8 \text{ Ft.Lb.})$$

OK. Larger than Required Moment



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Foundation Wall F3

Reinforcing Steel in Base:

$$d = w_{\text{stem}} - 3 = 7 \text{ in.}$$
$$b = 12 \text{ in., Unit length of base}$$

Ultimate Strength Design for Base:

$$\beta_1 = 0.85 \text{ for } f'_c < 4000$$
$$\rho_b = \frac{0.85 \beta_1 f'_c}{f_{y\text{Steel}}} \times \frac{87000}{87000 + f_{y\text{Steel}}} = 0.01782$$

$$\text{Min Value for } \rho_b = 200 / F_{y\text{Steel}} = 0.00333$$
$$\text{Max Value for } \rho_b = 0.75\rho_b = 0.013$$

$$\text{Max Reinforcing Steel, } A_{s\text{Max}} = (0.75)(\rho_b)(b)(d) = 1.122 \text{ in}^2$$

$$\text{Rebar Size} = \#7 \quad \text{Cross Section} = 0.6 \text{ in}^2$$
$$\text{Rebar Spacing} = 9 \text{ in.}$$

$$\text{Rebar Area per Foot} = 0.8 \text{ in}^2 \text{ per Foot}$$

$$a = \frac{(A_s)(f_{y\text{Steel}})}{(0.85)(f'_c)(b)} = 1.882$$

Moment capability for Base:

$$M_u = 0.9[(A_s)(f_{y\text{Steel}})(d - a/2)] = 261,741 \text{ in.lb.} \quad (= 21811.8 \text{ Ft.Lb.})$$

OK. Larger than Required Moment

Shear Capability at footing/wall shear plane per ACI 318 Section 11.6:

$$\text{Unit Shear Force} = 1.6 \times V_u = 3200 \text{ Lb. per Ft.} \quad (= 1.6 \times E_n \text{ from previous pages})$$

$$\text{For vertical bars: } V_n = (A_{vf})(f_y)(\mu) = 28800 \text{ lb. per Ft.}$$

Where:

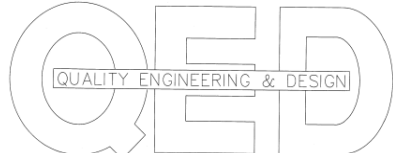
$$A_{vf} = 0.8 \text{ in}^2 \text{ per Foot}$$
$$f_y = 60,000$$
$$\mu = 0.6 \times \lambda = 0.6$$
$$\lambda = 1 \text{ for normal weight concrete}$$

$$\text{Max } V_n \text{ shall not exceed: } 0.2f'_c A_c = 60000 \quad \text{OR} \quad 800 A_c = 96000$$

$$\Phi V_n = (0.75)(28800) = 21600 \quad \text{OK, Larger than Required Shear Force, } V_u$$

Where:

$$\Phi = 0.75 \quad (\text{Section 9.3.2.3})$$
$$V_n = 28800 \quad \text{Min of } (A_{vf})(f_y)(\mu) \text{ OR } (0.2f'_c A_c) \text{ OR } (800 A_c)$$

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Foundation Wall F3

Sliding Resistance:

Sliding resistance at base is provided by slab on grade

Overturning Soil Pressure:

O.T. Moment = 8333.33 Ft. Lb. per Lineal Foot
Resisting Moment = -13019 Ft. Lb. per Lineal Foot
Net Moment, M_{net} = -4686.1 Ft. Lb. per Lineal Foot

$$P_{vert} = W_{conc} + W_{soil} + (P_{surch} \times W_{heel}) = 3991.67 \text{ Lb. per Lineal Foot}$$

Ref [6], Page 8-78

$$L_{net} = \frac{|M_{net}|}{P_{vert}} = 1.17 \text{ Ft.}$$

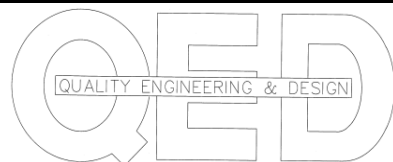
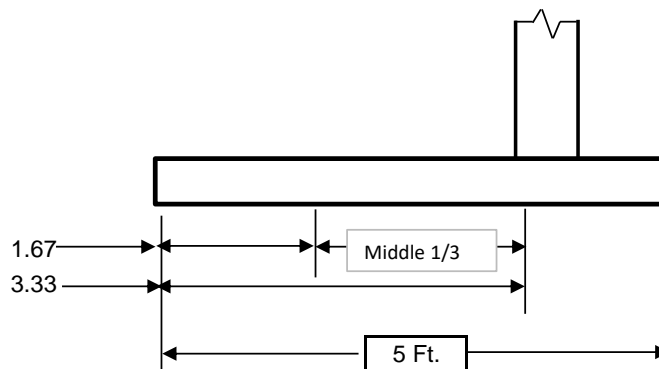
$$\text{Bearing Pressure} = \frac{P_{vert}}{A} \left(1 \pm 6e/L \right) = 2068.67 \text{ psf}$$

$$P_{vert} = 3991.67 \text{ Lb.}$$

$$A = 5 \text{ Ft}^2 \text{ (Area of Base at 1' Wide)}$$

$$L = 5 \text{ Ft. Length of Base}$$

$$e = 1.33 \text{ Ft.}$$



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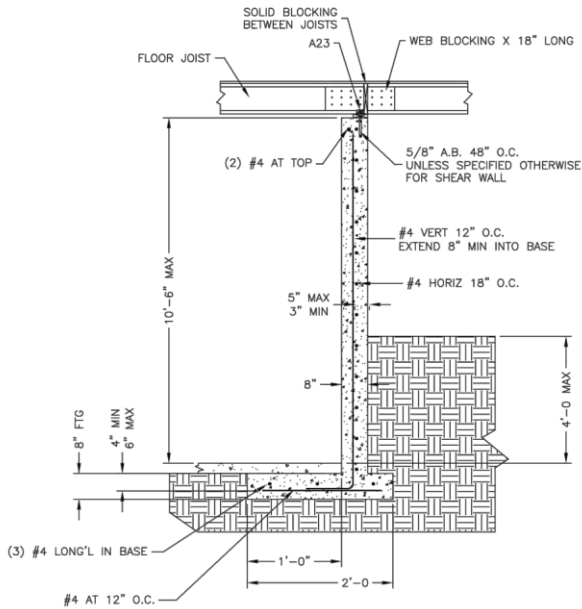
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Foundation Wall F4



$$\text{Retained Soil Height, } H_{\text{soil}} = 4 \text{ Ft.}$$

$$\text{Stem Wall Height, } H_{\text{wall}} = 10 \text{ Ft.}$$

$$\text{Stem Wall Width, } w_{\text{stem}} = 8 \text{ in.}$$

$$W_{\text{stem}} = 0.67 \text{ Ft.}$$

$$\text{Width of Base, } W_{\text{base}} = 2 \text{ Ft.}$$

$$\text{Base thickness, } t_{\text{base}} = 8 \text{ in.}$$

$$T_{\text{base}} = 0.66667 \text{ Ft.}$$

$$\text{Dist Toe to Face, } x_{\text{toe}} = 4 \text{ in.}$$

$$X_{\text{toe}} = 0.333 \text{ Ft.}$$

$$\text{Heel width, } X_{\text{heel}} = 1.00 \text{ Ft.}$$

$$\text{Unit Weight of Soil, } D_{\text{soil}} = 90 \text{ Lb./Ft}^3$$

$$\text{Unit Weight of Concrete, } D_{\text{conc}} = 150 \text{ Lb./Ft}^3$$

$$\text{Wall Embed, } H_{\text{embed}} = 0.67 \text{ Ft}$$

Weight / C.G.

$$\text{Concrete Wall Weight} = [(W_{\text{stem}} \times (H_{\text{wall}} + H_{\text{embed}})) + (W_{\text{base}} \times T_{\text{base}})] \times D_{\text{conc}} = 1266.67 \text{ Lb. per Lineal Foot}$$

$$\text{Weight of Soil over Heel} = (X_{\text{heel}} \times [H_{\text{soil}} + H_{\text{embed}}]) \times D_{\text{soil}} = 420 \text{ Lb. per Lineal Foot}$$

$$\text{C.G. of Concrete, } X_{\text{barConc}} = \frac{(W_{\text{stem}} \times H_{\text{conc}})(W_{\text{stem}}/2 + X_{\text{toe}}) + (W_{\text{base}} \times T_{\text{base}})(W_{\text{base}}/2)}{(W_{\text{stem}} \times H_{\text{conc}}) + (W_{\text{base}} \times T_{\text{base}})} = 0.72 \text{ Ft}$$

$$\text{C.G. of Soil, } X_{\text{barSoil}} = (X_{\text{heel}}/2) + W_{\text{stem}} + X_{\text{toe}} = 1.50 \text{ Ft.}$$

Lateral Pressure

$$\text{For equivalent fluid pressure, } D_{\text{fluid}} \text{ of } 40 \text{ Lb. per cubic foot (pcf)}$$

$$\text{Surcharge Pressure, } P_{\text{surch}} = 0 \text{ lb. per Sq.Ft.}$$

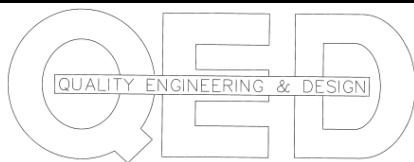
$$\text{Surcharge Pressure, } P_{\text{seis}} = 66.5 \text{ 7H lb. per Sq.Ft. (seismic surcharge, uniform)}$$

$$\text{Triangular Load due to Soil Pressure: } E_a = \frac{D_{\text{fluid}} \times H_{\text{soil}}^2}{2} + P_{\text{surch}} = 320 \text{ Soil Force, Lb per Lin Ft}$$

$$\text{Uniform pressure due to seismic: } E_s = 0.7 \times P_{\text{seis}} \times H = 186.2 \text{ Lb. per Lin Ft, uniform pressure}$$

Considering pressure as fluid pressure:

$$E_h = E_a = 320 \text{ Horizontal component of pressure}$$



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Overturning Moment:

$$\begin{aligned} \text{Moment in Stem Wall, } M_{ot} &= E_h \times [(H_{soil} / 3) + H_{embed}] + E_{seis} \times H_{soil} / 2 && 1012.4 \text{ Ft. Lb. (incl Seismic)} \\ \text{Moment in Stem Wall, } M_{ot} &= E_h \times [(H_{soil} / 3) + H_{embed}] && 640 \text{ Ft. Lb. (excl Seismic)} \\ \text{Resisting Moment, } M_{resist} &= (W_{wall})(X_{barConc}) + (W_{soil})(X_{barSoil}) = && 1544.81 \text{ Ft. Lb.} \end{aligned}$$

$$\begin{aligned} \frac{M_{resist}}{M_{OT}} &= 1.53 > 1.1 ; \text{OK} && \text{Min Safety factor including seismic} \\ &= 2.41 > 1.5 ; \text{OK} && \text{Min safety factor without seismic} \end{aligned}$$

Vertical Reinforcing Steel:

$$\begin{aligned} f'_c &= 2500 \text{ psi, compressive strength} \\ E_c &= 57000\sqrt{f'_c} = 2850000 \text{ psi, Elastic Modulus for concrete} \end{aligned}$$

$$\begin{aligned} F_{ySteel} &= 60,000 \text{ psi, yield strength for steel (A615 Gr. 60)} \\ F_{aSteel} &= 20,000 \text{ psi, allowable stress for steel} \end{aligned}$$

$$\begin{aligned} d &= w_{stem} - 3 = 5 \text{ in.} \\ b &= 12 \text{ in., Unit length of wall} \end{aligned}$$

Ultimate Strength Design for Cantilever Wall:

$$\text{Design Moment} = 1.6 \times M_{ot} = 1.6 \times 1012.4 = 1619.84 \text{ Ft.Lb.}$$

$$\begin{aligned} \beta_1 &= 0.85 \text{ for } f'_c < 4000 \\ \rho_b &= \frac{0.85 \beta_1 f'_c}{f_{ySteel}} \times \frac{87000}{87000 + f_{ySteel}} = 0.01782 \end{aligned}$$

$$\begin{aligned} \text{Min Value for } \rho_b &= 200 / F_{ySteel} = 0.00333 \\ \text{Max Value for } \rho_b &= 0.75\rho_b = 0.013 \end{aligned}$$

$$\text{Max Reinforcing Steel, } A_{sMax} = (0.75)(\rho_b)(b)(d) = 0.802 \text{ in}^2$$

$$\begin{aligned} \text{Rebar Size} &= \#4 && \text{Cross Section} = 0.2 \text{ in}^2 \\ \text{Rebar Spacing} &= 12 \text{ in.} \end{aligned}$$

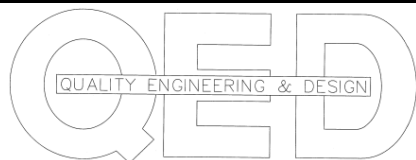
$$\text{Rebar Area per Foot} = 0.2 \text{ in}^2 \text{ per Foot}$$

$$a = \frac{(A_s)(f_{ySteel})}{(0.85)(f'_c)(b)} = 0.471$$

Moment capability for Stem Wall:

$$M_u = 0.9[(A_s)(f_{ySteel})(d - a/2)] = 51,459 \text{ in.lb. } (= 4288.2 \text{ Ft.Lb.})$$

OK. Larger than Required Moment



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Foundation Wall F4

Reinforcing Steel in Base:

$$d = w_{\text{stem}} - 3 = 5 \text{ in.}$$
$$b = 12 \text{ in., Unit length of base}$$

Ultimate Strength Design for Base:

$$\beta_1 = 0.85 \text{ for } f'_c < 4000$$
$$\rho_b = \frac{0.85 \beta_1 f'_c}{f_{y\text{Steel}}} \times \frac{87000}{87000 + f_{y\text{Steel}}} = 0.01782$$

$$\text{Min Value for } \rho_b = 200 / F_{y\text{Steel}} = 0.00333$$
$$\text{Max Value for } \rho_b = 0.75\rho_b = 0.013$$

$$\text{Max Reinforcing Steel, } A_{s\text{Max}} = (0.75)(\rho_b)(b)(d) = 0.802 \text{ in}^2$$

$$\text{Rebar Size} = \#4 \quad \text{Cross Section} = 0.2 \text{ in}^2$$
$$\text{Rebar Spacing} = 12 \text{ in.}$$

$$\text{Rebar Area per Foot} = 0.2 \text{ in}^2 \text{ per Foot}$$

$$a = \frac{(A_s)(f_{y\text{Steel}})}{(0.85)(f'_c)(b)} = 0.471$$

Moment capability for Base:

$$M_u = 0.9[(A_s)(f_{y\text{Steel}})(d - a/2)] = 51,459 \text{ in.lb. } (= 4288.2 \text{ Ft.Lb.})$$

OK. Larger than Required Moment

Shear Capability at footing/wall shear plane per ACI 318 Section 11.6:

$$\text{Unit Shear Force} = 1.6 \times V_u = 512 \text{ Lb. per Ft. } (= 1.6 \times E_n \text{ from previous pages})$$

$$\text{For vertical bars: } V_n = (A_{vf})(f_y)(\mu) = 7200 \text{ lb. per Ft.}$$

Where:

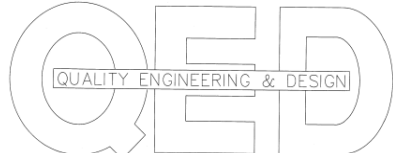
$$A_{vf} = 0.2 \text{ in}^2 \text{ per Foot}$$
$$f_y = 60,000$$
$$\mu = 0.6 \times \lambda = 0.6$$
$$\lambda = 1 \text{ for normal weight concrete}$$

$$\text{Max } V_n \text{ shall not exceed: } 0.2f'_c A_c = 48000 \quad \text{OR} \quad 800 A_c = 76800$$

$$\Phi V_n = (0.75)(7200) = 5400 \quad \text{OK, Larger than Required Shear Force, } V_u$$

Where:

$$\Phi = 0.75 \text{ (Section 9.3.2.3)}$$
$$V_n = 7200 \text{ Min of } (A_{vf})(f_y)(\mu) \text{ OR } (0.2f'_c A_c) \text{ OR } (800 A_c)$$

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Foundation Wall F4

Sliding Resistance:

Sliding resistance at base is provided by slab on grade

Overturning Soil Pressure:

O.T. Moment = 640 Ft. Lb. per Lineal Foot
Resisting Moment = -1544.8 Ft. Lb. per Lineal Foot
Net Moment, M_{net} = -904.81 Ft. Lb. per Lineal Foot

$$P_{vert} = W_{conc} + W_{soil} + (P_{surch} \times W_{heel}) = 1686.67 \text{ Lb. per Lineal Foot}$$

Ref [6], Page 8-78

$$L_{net} = \frac{|M_{net}|}{P_{vert}} = 0.54 \text{ Ft.}$$

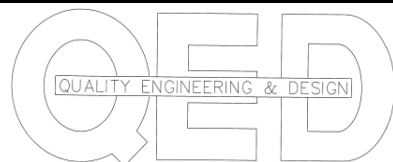
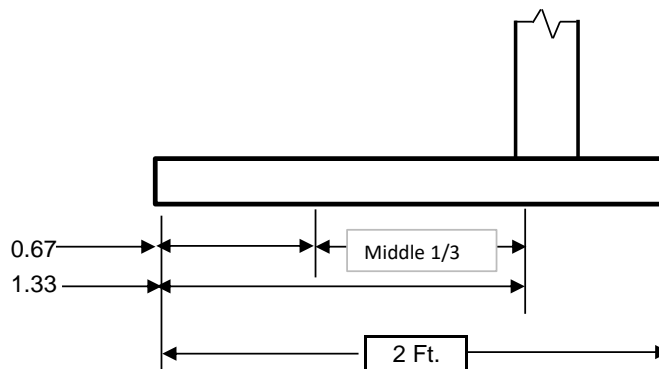
$$\text{Bearing Pressure} = \frac{P_{vert}}{A} \left(1 \pm 6e/L \right) = 2016.11 \text{ psf}$$

$$P_{vert} = 1686.67 \text{ Lb.}$$

$$A = 2 \text{ Ft}^2 \text{ (Area of Base at 1' Wide)}$$

$$L = 2 \text{ Ft. Length of Base}$$

$$e = 0.46 \text{ Ft.}$$



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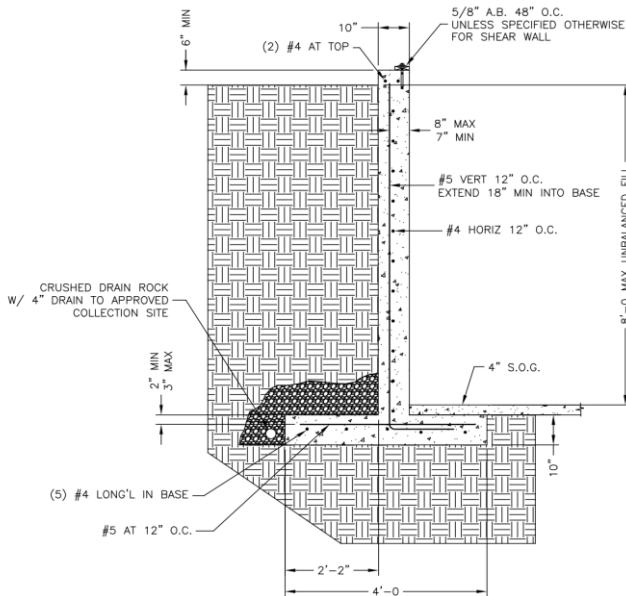
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Foundation Wall F5

8' Cantilevered Retaining Wall (Detail F5):



$$\text{Retained Soil Height, } H_{\text{soil}} = 8 \text{ Ft.}$$

$$\text{Stem Wall Height, } H_{\text{wall}} = 8.5 \text{ Ft.}$$

$$\text{Stem Wall Width, } w_{\text{stem}} = 10 \text{ in.}$$

$$W_{\text{stem}} = 0.83 \text{ Ft.}$$

$$\text{Width of Base, } W_{\text{base}} = 4 \text{ Ft.}$$

$$\text{Base thickness, } t_{\text{base}} = 10 \text{ in.}$$

$$T_{\text{base}} = 0.83333 \text{ Ft.}$$

$$\text{Dist Toe to Face, } x_{\text{toe}} = 12 \text{ in.}$$

$$X_{\text{toe}} = 1 \text{ Ft.}$$

$$\text{Heel width, } X_{\text{heel}} = 2.17 \text{ Ft.}$$

$$\text{Unit Weight of Soil, } D_{\text{soil}} = 90 \text{ Lb./Ft}^3$$

$$\text{Unit Weight of Concrete, } D_{\text{conc}} = 150 \text{ Lb./Ft}^3$$

$$\text{Wall Embed, } H_{\text{embed}} = 0.83 \text{ Ft}$$

Weight / C.G.

$$\text{Concrete Wall Weight} = [(W_{\text{stem}} \times (H_{\text{wall}} + H_{\text{embed}})) + (W_{\text{base}} \times T_{\text{base}})] \times D_{\text{conc}} = 1666.67 \text{ Lb. per Lineal Foot}$$

$$\text{Weight of Soil over Heel} = (X_{\text{heel}} \times [H_{\text{soil}} + H_{\text{embed}}]) \times D_{\text{soil}} = 1722.5 \text{ Lb. per Lineal Foot}$$

$$\text{C.G. of Concrete, } X_{\text{barConc}} = \frac{(W_{\text{stem}} \times H_{\text{conc}})(W_{\text{stem}}/2 + X_{\text{toe}}) + (W_{\text{base}} \times T_{\text{base}})(W_{\text{base}}/2)}{(W_{\text{stem}} \times H_{\text{conc}}) + (W_{\text{base}} \times T_{\text{base}})} = 1.60 \text{ Ft}$$

$$\text{C.G. of Soil, } X_{\text{barSoil}} = (X_{\text{heel}}/2) + W_{\text{stem}} + X_{\text{toe}} = 2.92 \text{ Ft.}$$

Lateral Pressure

$$\text{For equivalent fluid pressure, } D_{\text{fluid}}, \text{ of } 40 \text{ Lb. per cubic foot (pcf)}$$

$$\text{Surcharge Pressure, } P_{\text{surch}} = 0 \text{ lb. per Sq.Ft.}$$

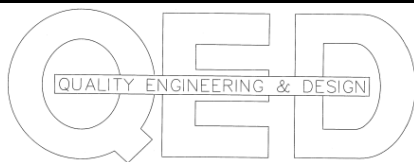
$$\text{Surcharge Pressure, } P_{\text{seis}} = 56 \text{ 7H lb. per Sq.Ft. (seismic surcharge, uniform)}$$

$$\text{Triangular Load due to Soil Pressure: } E_a = \frac{D_{\text{fluid}} \times H_{\text{soil}}^2}{2} + P_{\text{surch}} = 1280 \text{ Soil Force, Lb per Lin Ft}$$

$$\text{Uniform pressure due to seismic: } E_s = 0.7 \times P_{\text{seis}} \times H = 313.6 \text{ Lb. per Lin Ft, uniform pressure}$$

Considering pressure as fluid pressure:

$$E_h = E_a = 1280 \text{ Horizontal component of pressure}$$



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Foundation Wall F5

Overturning Moment:

$$\begin{aligned} \text{Moment in Stem Wall, } M_{ot} &= E_h \times [(H_{soil} / 3) + H_{embed}] + E_{seis} \times H_{soil} / 2 && 5734.4 \text{ Ft. Lb. (incl Seismic)} \\ \text{Moment in Stem Wall, } M_{ot} &= E_h \times [(H_{soil} / 3) + H_{embed}] && 4480 \text{ Ft. Lb. (excl Seismic)} \\ \text{Resisting Moment, } M_{resist} &= (W_{wall})(X_{barConc}) + (W_{soil})(X_{barSoil}) = && 7696.18 \text{ Ft. Lb.} \end{aligned}$$

$$\begin{aligned} \frac{M_{resist}}{M_{OT}} &= 1.34 > 1.1 ; \text{OK} && \text{Min Safety factor including seismic} \\ &= 1.72 > 1.5 ; \text{OK} && \text{Min safety factor without seismic} \end{aligned}$$

Vertical Reinforcing Steel:

$$\begin{aligned} f'_c &= 2500 \text{ psi, compressive strength} \\ E_c &= 57000\sqrt{f'_c} = 2850000 \text{ psi, Elastic Modulus for concrete} \end{aligned}$$

$$\begin{aligned} F_{ySteel} &= 60,000 \text{ psi, yield strength for steel (A615 Gr. 60)} \\ F_{aSteel} &= 20,000 \text{ psi, allowable stress for steel} \end{aligned}$$

$$\begin{aligned} d &= w_{stem} - 3 = 7 \text{ in.} \\ b &= 12 \text{ in., Unit length of wall} \end{aligned}$$

Ultimate Strength Design for Cantilever Wall:

$$\text{Design Moment} = 1.6 \times M_{ot} = 1.6 \times 5734.4 = 9175.04 \text{ Ft.Lb.}$$

$$\begin{aligned} \beta_1 &= 0.85 \text{ for } f'_c < 4000 \\ \rho_b &= \frac{0.85 \beta_1 f'_c}{f_{ySteel}} \times \frac{87000}{87000 + f_{ySteel}} = 0.01782 \end{aligned}$$

$$\begin{aligned} \text{Min Value for } \rho_b &= 200 / F_{ySteel} = 0.00333 \\ \text{Max Value for } \rho_b &= 0.75\rho_b = 0.013 \end{aligned}$$

$$\text{Max Reinforcing Steel, } A_{sMax} = (0.75)(\rho_b)(b)(d) = 1.122 \text{ in}^2$$

$$\begin{aligned} \text{Rebar Size} &= \#5 \quad \text{Cross Section} = 0.31 \text{ in}^2 \\ \text{Rebar Spacing} &= 12 \text{ in.} \end{aligned}$$

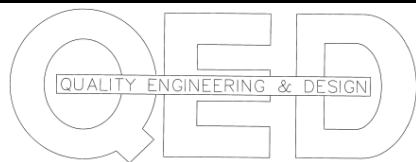
$$\text{Rebar Area per Foot} = 0.31 \text{ in}^2 \text{ per Foot}$$

$$a = \frac{(A_s)(f_{ySteel})}{(0.85)(f'_c)(b)} = 0.729$$

Moment capability for Stem Wall:

$$M_u = 0.9[(A_s)(f_{ySteel})(d - a/2)] = 111,075 \text{ in.lb.} \quad (= 9256.2 \text{ Ft.Lb.})$$

OK. Larger than Required Moment



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Foundation Wall F5

Reinforcing Steel in Base:

$$d = w_{\text{stem}} - 3 = 7 \text{ in.}$$
$$b = 12 \text{ in., Unit length of base}$$

Ultimate Strength Design for Base:

$$\beta_1 = 0.85 \text{ for } f'_c < 4000$$
$$\rho_b = \frac{0.85 \beta_1 f'_c}{f_{y\text{Steel}}} \times \frac{87000}{87000 + f_{y\text{Steel}}} = 0.01782$$

$$\text{Min Value for } \rho_b = 200 / F_{y\text{Steel}} = 0.00333$$

$$\text{Max Value for } \rho_b = 0.75\rho_b = 0.013$$

$$\text{Max Reinforcing Steel, } A_{s\text{Max}} = (0.75)(\rho_b)(b)(d) = 1.122 \text{ in}^2$$

$$\text{Rebar Size} = \#5 \quad \text{Cross Section} = 0.31 \text{ in}^2$$
$$\text{Rebar Spacing} = 12 \text{ in.}$$

$$\text{Rebar Area per Foot} = 0.31 \text{ in}^2 \text{ per Foot}$$

$$a = \frac{(A_s)(f_{y\text{Steel}})}{(0.85)(f'_c)(b)} = 0.729$$

Moment capability for Base:

$$M_u = 0.9[(A_s)(f_{y\text{Steel}})(d - a/2)] = 111,075 \text{ in.lb. } (= 9256.2 \text{ Ft.Lb.})$$

OK. Larger than Required Moment

Shear Capability at footing/wall shear plane per ACI 318 Section 11.6:

$$\text{Unit Shear Force} = 1.6 \times V_u = 2048 \text{ Lb. per Ft. } (= 1.6 \times E_n \text{ from previous pages})$$

$$\text{For vertical bars: } V_n = (A_{vf})(f_y)(\mu) = 11160 \text{ lb. per Ft.}$$

Where:

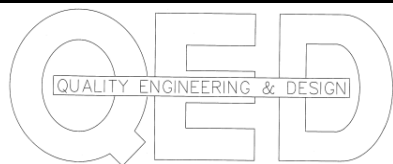
$$A_{vf} = 0.31 \text{ in}^2 \text{ per Foot}$$
$$f_y = 60,000$$
$$\mu = 0.6 \times \lambda = 0.6$$
$$\lambda = 1 \text{ for normal weight concrete}$$

$$\text{Max } V_n \text{ shall not exceed: } 0.2f'_c A_c = 60000 \quad \text{OR} \quad 800 A_c = 96000$$

$$\Phi V_n = (0.75)(11160) = 8370 \quad \text{OK, Larger than Required Shear Force, } V_u$$

Where: $\Phi = 0.75$ (Section 9.3.2.3)

$$V_n = 11160 \text{ Min of } (A_{vf})(f_y)(\mu) \text{ OR } (0.2f'_c A_c) \text{ OR } (800 A_c)$$



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Foundation Wall F5

Sliding Resistance:

Sliding resistance at base is provided by slab on grade

Overturning Soil Pressure:

O.T. Moment = 4480 Ft. Lb. per Lineal Foot
Resisting Moment = -7696.2 Ft. Lb. per Lineal Foot
Net Moment, M_{net} = -3216.2 Ft. Lb. per Lineal Foot

$$P_{vert} = W_{conc} + W_{soil} + (P_{surch} \times W_{heel}) = 3389.17 \text{ Lb. per Lineal Foot}$$

Ref [6], Page 8-78

$$L_{net} = \frac{|M_{net}|}{P_{vert}} = 0.95 \text{ Ft.}$$

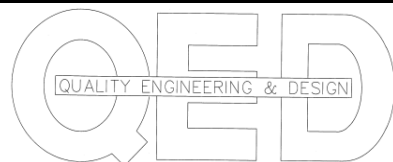
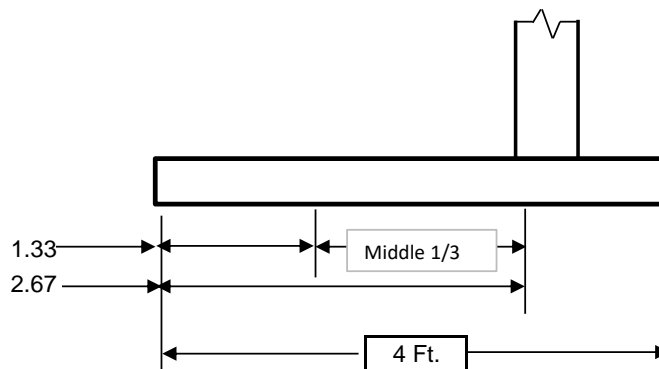
$$\text{Bearing Pressure} = \frac{P_{vert}}{A} \left(1 \pm 6e/L \right) = 2183.1 \text{ psf}$$

$$P_{vert} = 3389.17 \text{ Lb.}$$

$$A = 4 \text{ Ft}^2 \text{ (Area of Base at 1' Wide)}$$

$$L = 4 \text{ Ft. Length of Base}$$

$$e = 1.05 \text{ Ft.}$$



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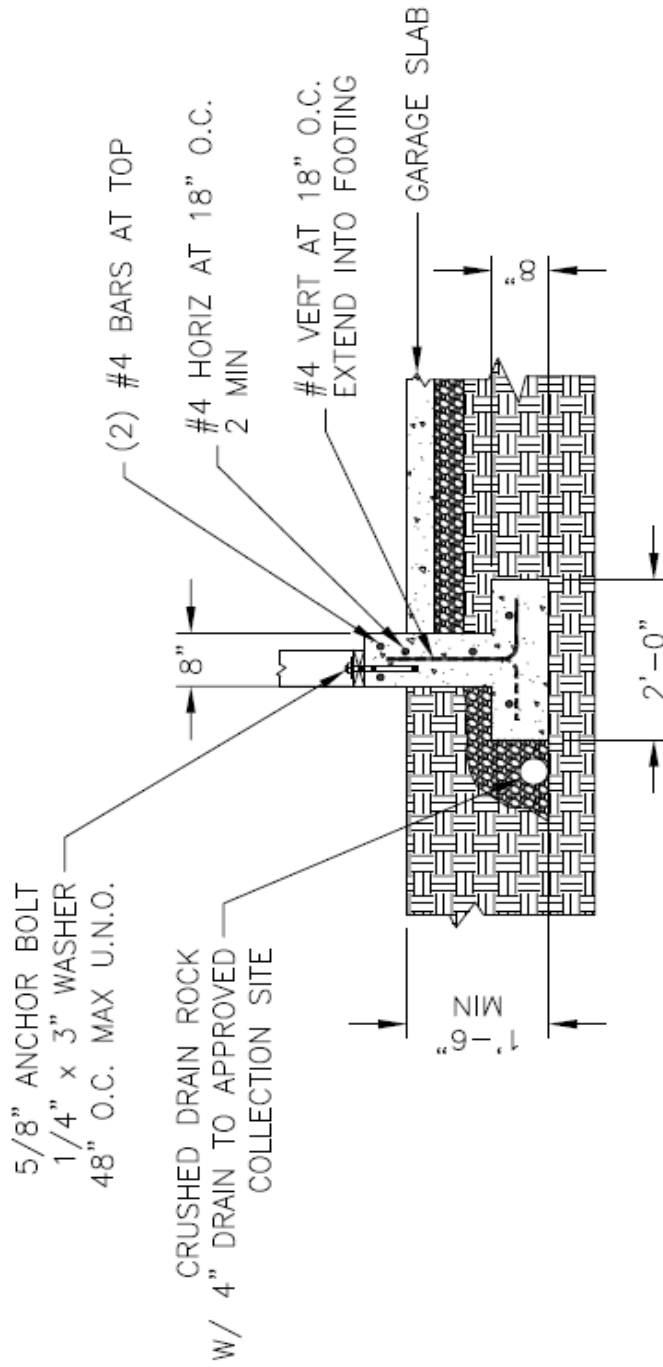
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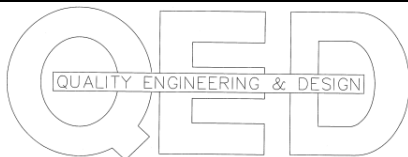
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Foundation Wall F6



SECTION **F6**
SCALE: NONE



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Appendix 1

City of
Mercer Island *washington*

HOME CITY COUNCIL DEPARTMENTS BOARDS & COMMISSIONS CONTACT US

Find it Quickly

Back to Development Services - Building & Planning

Land Use / Planning
Building and Permitting
City Code
Parking, Traffic, Pedestrians, Bicycles
Small Works and Consultant Roster
Weekly Bulletin
Demographics
Design Commission
Planning Commission
PEAK Agreements
Target Times
Ombudsman

Agendas & Minutes

Calendar Events

FAQs

City of Mercer Island / Development Services - Building & Planning / Building and Permitting / Building Permits / Codes, Design Criteria, & Research / **Climatic and Geographic Design Criteria**

Climatic and Geographic Design Criteria

IRC TABLE R301.2 (1) Climatic and Geographic Design Criteria

Roof Snow Load ^a	Wind Design ^b		Seismic Design Category ^c	Subject to Damage From:			Outside Design Temp-- Heat/Cool	Ice Barrier Under-lyment Required	Flood Hazards ^e	Air Freezing Index	Mean Annual Temp
	Speed	Topographic Effects		Weathering ^d	Frost Line Depth	Termite Decay					
25 psf	110 mph	See footnote ^b	D2	Moderate	12"	Slight to Moderate	24°F/83°F	No	NA	113	53°F

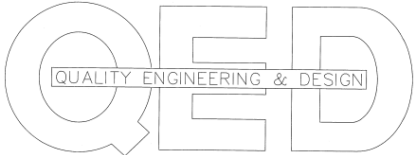
^a When using this roof snow load it will be left to the engineer's judgment whether to consider drift or sliding snow. However, rain on snow surcharge of 5 psf must be considered for roof slopes less than 5 degrees.

^b Wind exposure category and Topographic effects (Wind Speed-up Kzt factor) shall be determined on a site-specific basis by the Engineer of Record (components and cladding need not consider topographic effects unless otherwise determined by the engineer of record).

^c From IRC Table 301.2(1).

^d Weathering may require a higher strength concrete or grade of masonry than necessary to satisfy the structural requirements of this code. The grade of masonry units shall be determined from ASTM C 34, C 55, C 62, C 73, C 90, C 129, C 145, C 216 or C 652.

^e The City of Mercer Island participates in the National Flood Insurance Program (NFIP); Regular Program (No Special Flood Hazard Area). Further NFIP participation information: CID 530083, Initial FHBM Identified 06/28/74, Initial FIRM Identified 05/16/95, Current Effective Map Date (NSFHA), Reg-Emer Date 06/30/97.

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Studs

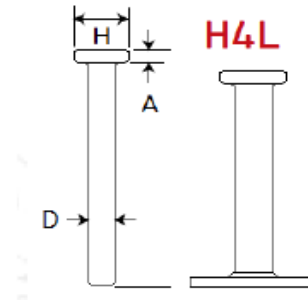
Concrete Anchors

NELSON STUD WELDING SPECIFICATION

H4L Headed Concrete Anchors

Nelson headed concrete anchors deliver code specified embedded tension and shear strength values between steel and concrete. These anchors meet requirements of the following codes:

- AWS D1.1 Structural Welding Code – Steel, Type B
- AWS D1.6 Structural Welding Code – Stainless Steel, Type A
- AASHTO/AWS D1.5 Bridge Welding Code
- ISO-13918 Welding – Studs for Arc Stud Welding
- Canadian Standards Association, W59 – Welded Steel Construction, Type B
- International Building Code Section 19



See also: ICC-ES Evaluation Report ESR-2856 Nelson Shear Connectors

Headed anchors are widely used in precast, cast-in-place or composite steel construction for miscellaneous embedded plates, frames, curbing, attachments and connections.

For similar function studs, see Nelson [S3L Shear Connectors](#) and [D2L Deformed Bar Anchors](#).

When ordering, specify: Type, Diameter, Before Weld Length, Material, Quantity, and Part Number

Example: H4L 1/2 x 4-1/8"; Mild Steel; 5000 pieces; #101053003

Stud Diameter D	Burn Off	A	H	Ferrule to Flat	Required Standard Accessories		
					Chuck	Foot*	Grip for Flat
1/4 / 6 mm	0.125 3 mm	0.187	0.500	100101067	500001014	502002001	501003007
3/8 / 10 mm	0.125 3 mm	0.281	0.750	100101099	500001018	502002001	501003009
1/2 / 13 mm	0.125 3 mm	0.312	1.000	100101114	500001085	502002002	501003010
5/8 / 16 mm	0.187 4 mm	0.312	1.250	100101187	500001088	502002002	501003014

*Feet 502002001 and 502002002 are used with Nelson's heavy duty gun. Feet 502002045 and 502002046 are used with Nelson's standard duty gun.

MATERIALS: Studs are available in Low Carbon Mild Steel and 316L Stainless Steel. For specific grade information and physical and chemical properties, and conforming standards, please see [General Material Specifications](#). Certified Material Test Reports (CMTR) and Certificates of Compliance (COC) are available and must be requested at time of order.

For ferrules and grips used in welding at an angle to plate, welding to angles, and welding to a vertical base plate, see the [Special Applications](#) section of the [Ferrule Specifications](#).

ALLOWABLE LOADS FOR PSL COLUMNS

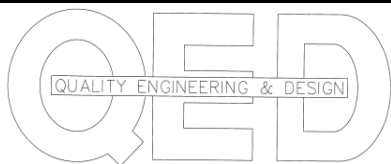
Allowable Axial Loads (lbs) for 1.3E TimberStrand® LSL

Column Bearing Type	Effective Column Length	Column Size															
		3 1/2" x 3 1/2"			3 1/2" x 4 3/4"			3 1/2" x 5 1/2"			3 1/2" x 7 1/4"			3 1/2" x 8 5/8"			
		100%	115%	125%	100%	115%	125%	100%	115%	125%	100%	115%	125%	100%	115%	125%	
On Column Base	3'	12,165	13,665	14,625	15,210	17,085	18,280	19,120	21,475	22,980	25,205	28,310	30,290	29,985	33,680	36,035	
	4'	10,745	11,830	12,490	13,435	14,790	15,610	16,885	18,590	19,625	22,260	24,505	25,870	26,480	29,155	30,780	
	5'	9,120	9,810	10,215	11,400	12,265	12,765	14,335	15,420	16,050	18,895	20,325	21,155	22,480	24,180	25,170	
	6'	7,550	7,985	8,235	9,440	9,980	10,295	11,865	12,550	12,945	15,640	16,540	17,060	18,610	19,680	20,300	
	7'	6,235	6,525	6,695	7,795	8,160	8,370	9,800	10,255	10,520	12,915	13,520	13,870	15,365	16,085	16,500	
	8'	5,195	5,400	5,515	6,490	6,750	6,895	8,160	8,485	8,670	10,755	11,185	11,430	12,795	13,305	13,595	
	9'	4,375	4,525	4,610	5,465	5,655	5,765	6,870	7,110	7,245	9,060	9,370	9,550	10,775	11,150	11,360	
	10'	3,725	3,840	3,905	4,655	4,795	4,880	5,850	6,030	6,135	7,715	7,950	8,085	9,175	9,460	9,620	
	12'	2,785	2,855	2,895	3,480	3,565	3,615	4,375	4,485	4,545	5,770	5,910	5,995	6,860	7,030	7,130	
	14'	2,155	2,200	2,225	2,695	2,750	2,780	3,385	3,455	3,495	4,465	4,555	4,610	5,310	5,420	5,485	
	On Wood Plate ⁽¹⁾⁽²⁾	3'-7"	5,765	5,765	5,765	7,065	7,065	7,065	8,740	8,740	8,740	10,785	10,785	10,785	12,830	12,830	12,830
		8'	5,195	5,400	5,515	6,490	6,750	6,895	8,160	8,485	8,670	10,755	10,785	10,785	12,795	12,830	12,830
		9'	4,375	4,525	4,610	5,465	5,655	5,765	6,870	7,110	7,245	9,060	9,370	9,550	10,775	11,150	11,360
		10'	3,725	3,840	3,905	4,655	4,795	4,880	5,850	6,030	6,135	7,715	7,950	8,085	9,175	9,460	9,620
12'		2,785	2,855	2,895	3,480	3,565	3,615	4,375	4,485	4,545	5,770	5,910	5,995	6,860	7,030	7,130	
14'		2,155	2,200	2,225	2,695	2,750	2,780	3,385	3,455	3,495	4,465	4,555	4,610	5,310	5,420	5,485	

(1) Wood plate bearing is based on compression perpendicular-to-grain stress of 425 psi adjusted per the NDS®, 3.10.4.
 (2) See connection details below.

Allowable Axial Loads (lbs) for 1.8E Parallam® PSL

Column Bearing Type	Effective Column Length	Column Size																										
		3 1/2" x 3 1/2"			3 1/2" x 5 1/4"			3 1/2" x 7"			5 1/4" x 5 1/4"			5 1/4" x 7"			7" x 7"											
		100%	115%	125%	100%	115%	125%	100%	115%	125%	100%	115%	125%	100%	115%	125%	100%	115%	125%									
On Column Base	6'	10,595	11,200	11,545	15,890	16,800	17,320	21,190	22,395	23,095	33,295	36,675	38,735	40,000	40,000	40,000	40,000	40,000	40,000	40,000								
	7'	8,735	9,140	9,370	13,105	13,710	14,060	17,475	18,280	18,745	30,010	32,545	34,030	40,000	40,000	40,000	40,000	40,000	40,000	40,000								
	8'	7,265	7,550	7,715	10,900	11,325	11,570	14,535	15,100	15,425	26,650	28,490	29,555	35,530	37,985	39,410	40,000	40,000	40,000	40,000								
	9'	6,115	6,320	6,440	9,170	9,480	9,660	12,225	12,640	12,880	23,475	24,835	25,620	31,300	33,115	34,165	40,000	40,000	40,000	40,000								
	10'	5,200	5,355	5,445	7,800	8,035	8,170	10,400	10,715	10,895	20,660	21,695	22,290	27,545	28,925	29,725	40,000	40,000	40,000	40,000								
	12'	3,885	3,980	4,030	5,825	5,965	6,050	7,765	7,955	8,065	16,160	16,805	17,175	21,545	22,405	22,900	40,000	40,000	40,000	40,000								
14'	3,000	3,065	3,100	4,500	4,595	4,645	6,005	6,125	6,195	12,890	13,315	13,560	17,185	17,755	18,080	34,155	35,785	36,720	30,300									
16'	Slenderness ratio exceeds 50																											
18'																				8,670	8,885	9,010	11,560	11,850	12,010	24,020	24,860	25,345
20'																				7,285	7,445	7,535	9,710	9,925	10,050	20,475	21,110	21,475
22'																				17,630	18,125	18,405	15,325	15,715	15,935			
24'																				15,325	15,715	15,935						



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Appendix 1

ALLOWABLE LOADS FOR 4x4 COLUMNS

Allowable Column Compression = **4090** lb.

Column Type: sawn lumber

Material: Hem-Fir

Modulus of Elasticity: 1400000

Basic allowable compression $F_c = 1300$

Actual Length, $L = 120$ in.

$K = 1$ From NDS, Appendix G for pin/pin connection

Effective Column Length, $KL = 120$ in.

Column width, $w = 3.5$ in.

Column depth, $d = 3.5$ in.

Slenderness Ratio, $R_c/d = 34.2857$ max ratio of KL/w or KL/d OK < 50

Adjusted Compressive Stress = **333.897** psi

$K_{ce} = 0.3$ for visually graded

$F_{ce} = 357.292$

$c = 0.8$

$F^*_c = 1287$

$c_t = 1$

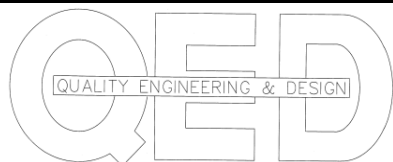
$c_D = 0.9$

$c_M = 1$ Wet service, See Table 4A

$c_F = 1.1$

$c_i = 1$ incising factor (= 0.8 if incised)

$C_p = 0.25944$



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Appendix 1

ALLOWABLE LOADS FOR 4x6 COLUMNS

Allowable Column Compression = **6428** lb.

Column Type: sawn lumber

Material: Hem-Fir

Modulus of Elasticity: 1400000

Basic allowable compression $F_c = 1300$

Actual Length, $L = 120$ in.

$K = 1$ From NDS, Appendix G for pin/pin connection

Effective Column Length, $KL = 120$ in.

Column width, $w = 3.5$ in.

Column depth, $d = 5.5$ in.

Slenderness Ratio, $R_c/d = 34.2857$ max ratio of KL/w or KL/d OK < 50

Adjusted Compressive Stress = **333.897** psi

$K_{ce} = 0.3$ for visually graded

$F_{ce} = 357.292$

$c = 0.8$

$F^*_c = 1287$

$c_t = 1$

$c_D = 0.9$

$c_M = 1$ Wet service, See Table 4A

$c_F = 1.1$

$c_i = 1$ incising factor (= 0.8 if incised)

$C_p = 0.25944$

Appendix 1

ALLOWABLE LOADS FOR 6x6 COLUMNS

Allowable Column Compression = **21436** lb.

Column Type: sawn lumber

Material: Hem-Fir

Modulus of Elasticity: 1400000

Basic allowable compression $F_c = 1300$

Actual Length, $L = 120$ in.

$K = 1$ From NDS, Appendix G for pin/pin connection

Effective Column Length, $KL = 120$ in.

Column width, $w = 5.5$ in.

Column depth, $d = 5.5$ in.

Slenderness Ratio, $R_c/d = 21.8182$ max ratio of KL/w or KL/d OK < 50

Adjusted Compressive Stress = **708.639** psi

$K_{ce} = 0.3$ for visually graded

$F_{ce} = 882.292$

$c = 0.8$

$F^*c = 1287$

$c_t = 1$

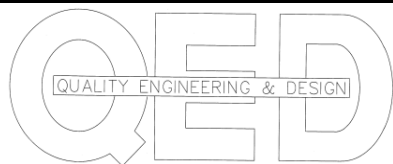
$c_D = 0.9$

$c_M = 1$ Wet service, See Table 4A

$c_F = 1.1$

$c_i = 1$ incising factor (= 0.8 if incised)

$C_p = 0.55061$



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Appendix 2-Hold-Down Embed

ANCHOR EMBED FOR HDU14 HOLD-DOWN



Profis Anchor 2.7.3

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Company: Quality Engineering & Design
 Specifier: T. Wolfe
 Address:
 Phone | Fax: |
 E-Mail:

Page: 1
 Project: Mercer Island Res
 Sub-Project | Pos. No.:
 Date: 10/18/2017

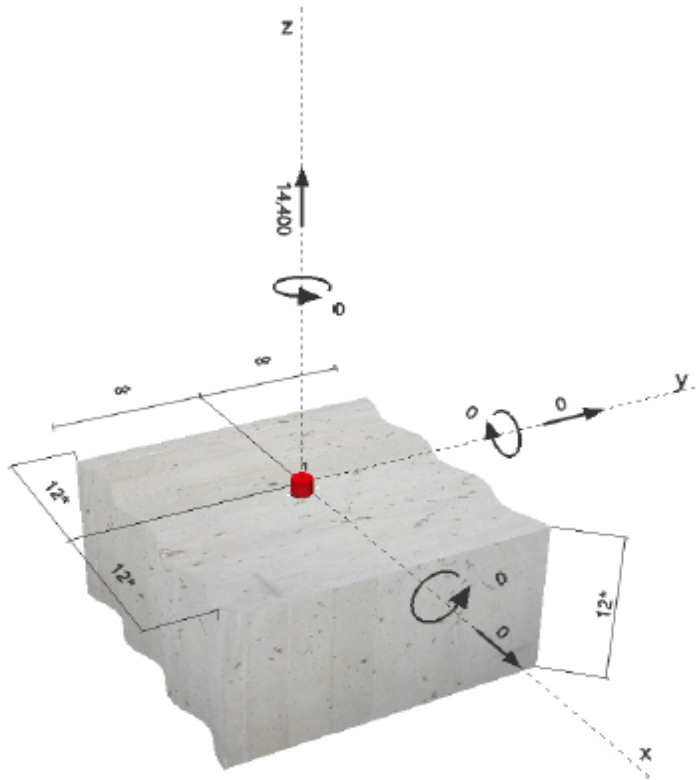
Specifier's comments: Anchor embed for HDU14 Hold-Down

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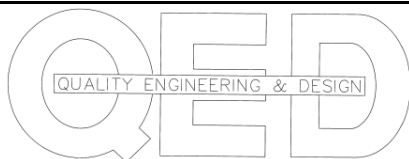
Anchor type and diameter: Heavy Square Head ASTM F 1554 GR. 36 1
Effective embedment depth: $h_{ef} = 10.000$ in.
Material: ASTM F 1554
Proof: Design method ACI 318-14 / CIP
Stand-off Installation: - (Recommended plate thickness: not calculated)
Profile: no profile
Base material: cracked concrete, 2500, $f'_c = 2500$ psi; $h = 12.000$ in.
Reinforcement: tension: condition B, shear: condition B;
 edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F) Tension load: yes (17.2.3.4.3 (b))
 Shear load: yes (17.2.3.5.3 (a))



Geometry [in.] & Loading [lb, in.lb]



Input data and results must be checked for agreement with the existing conditions and for plausibility!
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Profis Anchor 2.7.3

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Company:	Quality Engineering & Design	Page:	2
Specifier:	T. Wolfe	Project:	Mercer Island Res
Address:		Sub-Project / Pos. No.:	
Phone / Fax:		Date:	10/18/2017
E-Mail:			

2 Proof / Utilization (Governing Cases)

Loading	Proof	Design values [lb]		Utilization	Status
		Load	Capacity	β_N / β_V [%]	
Tension	Concrete Breakout Strength	14400	14982	97 / -	OK
Shear	-	-	-	- / -	-

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	-	-	-	-	-

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

4 Remarks; Your Cooperation Duties

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Appendix 2-Hold-Down Embed

ANCHOR EMBED FOR HDU11 HOLD-DOWN



Profis Anchor 2.7.3

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Company: Quality Engineering & Design
 Specifier: T. Wolfe
 Address:
 Phone | Fax: |
 E-Mail:

Page: 1
 Project: Mercer Island Res
 Sub-Project | Pos. No.:
 Date: 10/18/2017

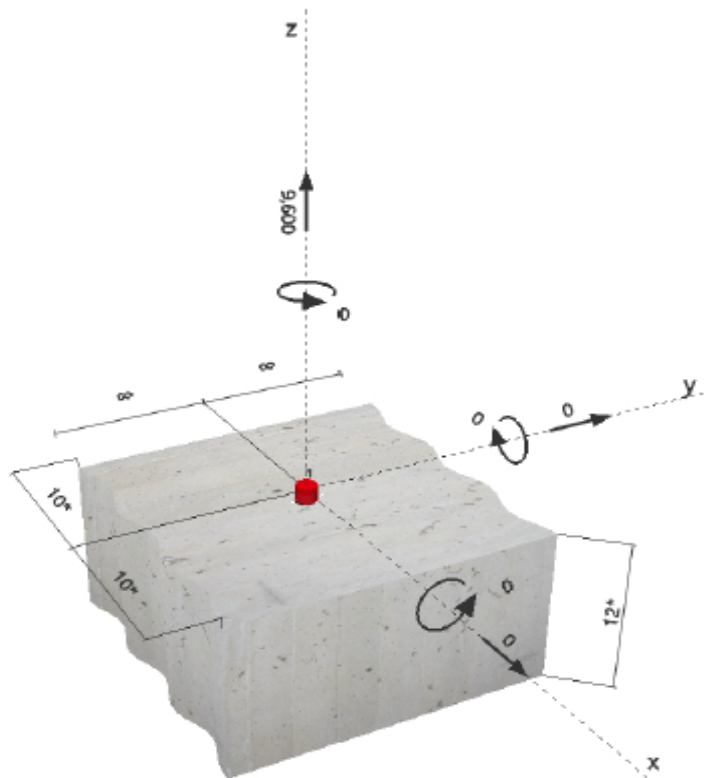
Specifier's comments: Anchor embed for HDU11 Hold-Down

1 Input data

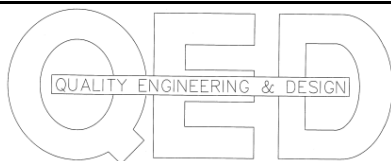
Anchor type and diameter: Heavy Square Head ASTM F 1554 GR. 36 1
Effective embedment depth: $h_{ef} = 10.000$ in.
Material: ASTM F 1554
Proof: Design method ACI 318-14 / CIP
Stand-off Installation: - (Recommended plate thickness: not calculated)
Profile: no profile
Base material: cracked concrete, 2500, $f'_c = 2500$ psi; $h = 12.000$ in.
Reinforcement: tension: condition B, shear: condition B;
 edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)
 Tension load: yes (17.2.3.4.3 (b))
 Shear load: yes (17.2.3.5.3 (a))



Geometry [in.] & Loading [lb, in.lb]



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Profis Anchor 2.7.3

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Company:	Quality Engineering & Design	Page:	2
Specifier:	T. Wolfe	Project:	Mercer Island Res
Address:		Sub-Project / Pos. No.:	
Phone / Fax:		Date:	10/18/2017
E-Mail:			

2 Proof / Utilization (Governing Cases)

Loading	Proof	Design values [lb]		Utilization β_N / β_V [%]	Status
		Load	Capacity		
Tension	Concrete Breakout Strength	9600	11953	81 / -	OK
Shear	-	-	-	- / -	-

Loading	β_N	β_V	ζ	Utilization β_{NV} [%]	Status
Combined tension and shear loads	-	-	-	-	-

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

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