PACIFIC NORTHWEST STRUCTURAL GROUP, INC.

6193 NE MALBON CT.
KINGSTON, WA 98346
(360) 903-2803
David@PNWStructure.com

Revised Structural Calculations

21-028 Smith-Cutright Residence Addition & Remodel
7655 SE 40th Street
Mercer Island, WA 98040

ALL COMPUTATIONS AND ENGINEERING FOR THIS PROJECT HAVE BEEN PERFORMED BY MYSELF OR UNDER MY SUPERVISION.

09-MAR-22

DIGITAL SIGNATURE

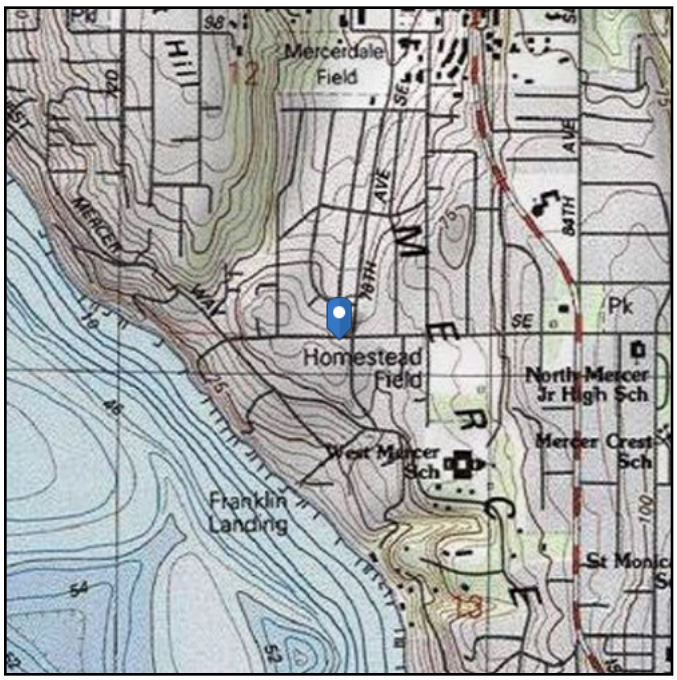
Digitally signed by David L. Starkel
Date: 2022.03.09 13:59:53 -08'00'

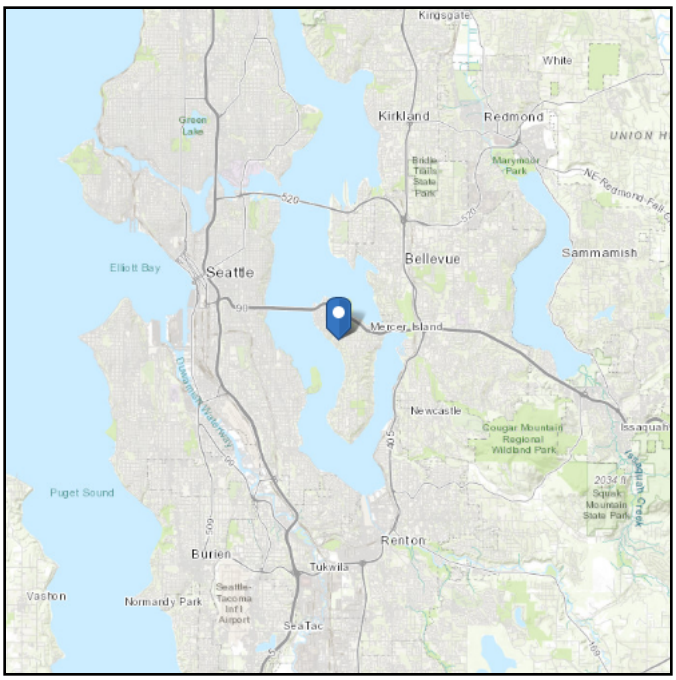
ASCE 7 Hazards Report

Address:
7655 SE 40th St
Mercer Island, Washington
98040

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see Section 11.4.3)

Elevation: 198.09 ft (NAVD 88)
Latitude: 47.57438
Longitude: -122.235437





Wind

Results:

Wind Speed:	98 Vmph
10-year MRI	67 Vmph
25-year MRI	74 Vmph
50-year MRI	78 Vmph
100-year MRI	83 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Sun Oct 17 2021

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

Seismic

Site Soil Class: D - Default (see Section 11.4.3)

Results:

S_S :	1.418	S_{D1} :	N/A
S_1 :	0.493	T_L :	6
F_a :	1.2	PGA :	0.607
F_v :	N/A	PGA_M :	0.728
S_{MS} :	1.702	F_{PGA} :	1.2
S_{M1} :	N/A	I_e :	1
S_{DS} :	1.135	C_v :	1.384

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Sun Oct 17 2021

Date Source: USGS Seismic Design Maps

Snow

Results:

Elevation:

Data Source:

Date Accessed: Sun Oct 17 2021

In "Case Study" areas, site-specific case studies are required to establish ground snow loads. Extreme local variations in ground snow loads in these areas preclude mapping at this scale.

Ground snow load determination for such sites shall be based on an extreme value statistical analysis of data available in the vicinity of the site using a value with a 2 percent annual probability of being exceeded (50-year mean recurrence interval).

Site is outside ASCE/SEI 7-16, Table 7.2-5 boundaries. For ground snow loads in this area, see SEAW Snow Load Analysis for Washington, 2nd Ed. (1995). Structural Engineers Association of Washington, Seattle, WA.

Statutory requirements of the Authority Having Jurisdiction are not included.

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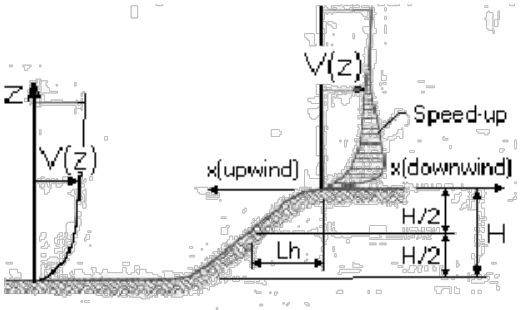
Wind Loads : ASCE 7- 16

Ultimate Wind Speed	110 mph
Nominal Wind Speed	85.2 mph
Risk Category	II
Exposure Category	C
Enclosure Classif.	Enclosed Building
Internal pressure	+/-0.18
Directionality (Kd)	0.85
Kh case 1	0.958
Kh case 2	0.958
Type of roof	Sawtooth

Topographic Factor (Kzt)

Topography		2D Ridge
Hill Height	(H)	200.0 ft
Half Hill Length (Lh)		0.0 ft
Actual H/Lh	=	0.00
Use H/Lh	=	0.00
Modified Lh	=	0.0 ft
From top of crest: x =		0.0 ft
Bldg up/down wind?		downwind

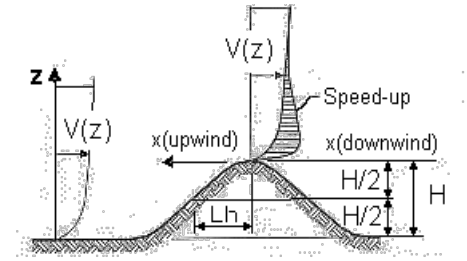
H/Lh<0.2
∴ Kzt=1.0



ESCARPMENT

H/Lh=	0.00	K_1 =	0.000
x/Lh =	0.00	K_2 =	0.000
z/Lh =	0.00	K_3 =	1.000

At Mean Roof Ht:
$Kzt = (1+K_1K_2K_3)^2$ = 1.00 use 1.60



2D RIDGE or 3D AXISYMMETRICAL HILL

Gust Effect Factor

h =	26.6 ft
B =	49.5 ft
/z (0.6h) =	16.0 ft

Flexible structure if natural frequency < 1 Hz (T > 1 second).
If building h/B>4 then may be flexible and should be investigated.
h/B = 0.54 Rigid structure (low rise bldg)

G = 0.85 Using rigid structure default

Rigid Structure

ē =	0.20	
ℓ =	500 ft	
z_{min} =	15 ft	
c =	0.20	
g_Q, g_v =	3.4	
L_z =	432.5 ft	
Q =	0.91	
I_z =	0.23	
G =	0.88	use G = 0.85

Flexible or Dynamically Sensitive Structure

34 ıcy (η_1) =	0.0 Hz			
Damping ratio (β) =	0			
/b =	0.65			
/α =	0.15			
Vz =	93.8			
N_1 =	0.00			
R_n =	0.000			
R_h =	28.282	η =	0.000	h = 26.6 ft
R_B =	28.282	η =	0.000	
R_L =	28.282	η =	0.000	
g_R =	0.000			
R =	0.000			
Gf =	0.000			

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Enclosure Classification

Test for Enclosed Building: Ao < 0.01Ag or 4 sf, whichever is smaller

Test for Open Building: All walls are at least 80% open.
Ao ≥ 0.8Ag

Test for Partially Enclosed Building: Predominately open on one side only

	Input			Test	
Ao	100.0	sf	Ao ≥ 1.1Aoi	NO	
Ag	100.0	sf	Ao > 4' or 0.01Ag	YES	
Aoi	100.0	sf	Aoi / Agi ≤ 0.20	NO	Building is NOT
Agi	100.0	sf			Partially Enclosed

Conditions to qualify as Partially Enclosed Building. Must satisfy all of the following:
Ao ≥ 1.1Aoi
Ao > smaller of 4' or 0.01 Ag
Aoi / Agi ≤ 0.20
Where:
Ao = the total area of openings in a wall that receives positive external pressure.
Ag = the gross area of that wall in which Ao is identified.
Aoi = the sum of the areas of openings in the building envelope (walls and roof) not including Ao.
Agi = the sum of the gross surface areas of the building envelope (walls and roof) not including Ag.

Test for Partially Open Building: A building that does not qualify as open, enclosed or partially enclosed.
(This type building will have same wind pressures as an enclosed building.

Reduction Factor for large volume partially enclosed buildings (Ri) :

If the partially enclosed building contains a single room that is unpartitioned , the internal pressure coefficient may be multiplied by the reduction factor Ri.

Total area of all wall & roof openings (Aog): 0 sf
Unpartitioned internal volume (Vi) : 0 cf
Ri = 1.00

Ground Elevation Factor (Ke)

Grd level above sea level = 0.0 ft Ke = 1.0000
Constant = 0.00256 Adj Constant = 0.00256

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Wind Loads - MWFRS h≤60' (Low-rise Buildings) except for open buildings

Kz = Kh (case 1) = 0.96
Base pressure (qh) = **40.4 psf**
GCpi = +/-0.18

Edge Strip (a) = 4.6 ft
End Zone (2a) = 9.1 ft
Zone 2 length = 22.8 ft

Wind Pressure Coefficients

	CASE A				CASE B		
		θ = 9.5 deg					
Surface	GCpf	w/-GCpi	w/+GCpi		GCpf	w/-GCpi	w/+GCpi
1	0.44	0.62	0.26		-0.45	-0.27	-0.63
2	-0.69	-0.51	-0.87		-0.69	-0.51	-0.87
3	-0.40	-0.22	-0.58		-0.37	-0.19	-0.55
4	-0.33	-0.15	-0.51		-0.45	-0.27	-0.63
5					0.40	0.58	0.22
6					-0.29	-0.11	-0.47
1E	0.67	0.85	0.49		-0.48	-0.30	-0.66
2E	-1.07	-0.89	-1.25		-1.07	-0.89	-1.25
3E	-0.58	-0.40	-0.76		-0.53	-0.35	-0.71
4E	-0.49	-0.31	-0.67		-0.48	-0.30	-0.66
5E					0.61	0.79	0.43
6E					-0.43	-0.25	-0.61

Ultimate Wind Surface Pressures (psf)

1		25.0	10.4		-10.9	-25.4
2		-20.6	-35.1		-20.6	-35.1
3		-9.0	-23.5		-7.7	-22.2
4		-6.1	-20.6		-10.9	-25.4
5					23.4	8.9
6					-4.4	-19.0
1E		34.2	19.6		-12.1	-26.6
2E		-35.9	-50.4		-35.9	-50.4
3E		-16.0	-30.6		-14.1	-28.7
4E		-12.6	-27.1		-12.1	-26.6
5E					31.9	17.4
6E					-10.1	-24.6

Parapet

Windward parapet = 0.0 psf (GCpn = +1.5)
Leeward parapet = 0.0 psf (GCpn = -1.0)

Windward roof overhangs = 28.3 psf (upward) add to windward roof pressure

Horizontal MWFRS Simple Diaphragm Pressures (psf)

Transverse direction (normal to L)

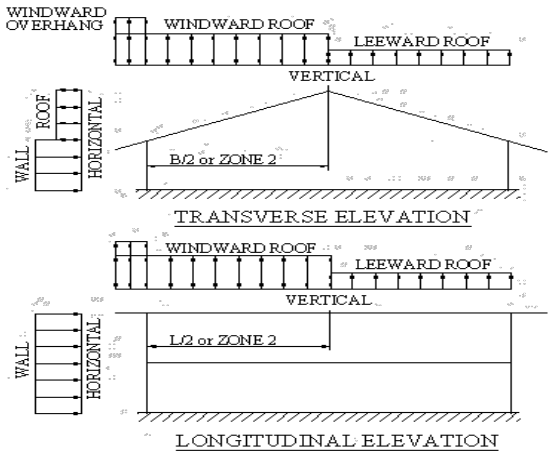
Interior Zone: Wall 31.1 psf
Roof -11.6 psf **
End Zone: Wall 46.8 psf
Roof -19.9 psf **

Longitudinal direction (parallel to L)

Interior Zone: Wall 27.8 psf
End Zone: Wall 42.0 psf

** NOTE: Total horiz force shall not be less than that determined by neglecting roof forces (except for MWFRS moment frames).

The code requires the MWFRS be designed for a min ultimate force of 16 psf multiplied by the wall area plus an 8 psf force applied to the vertical projection of the roof.



Wind Loads - h≤60' Longitudinal Direction MWFRS On Open or Partially

Enclosed Buildings with Transverse Frames and Pitched Roofs

Base pressure (qh) = **40.4 psf** **ASCE 7-16 procedure**

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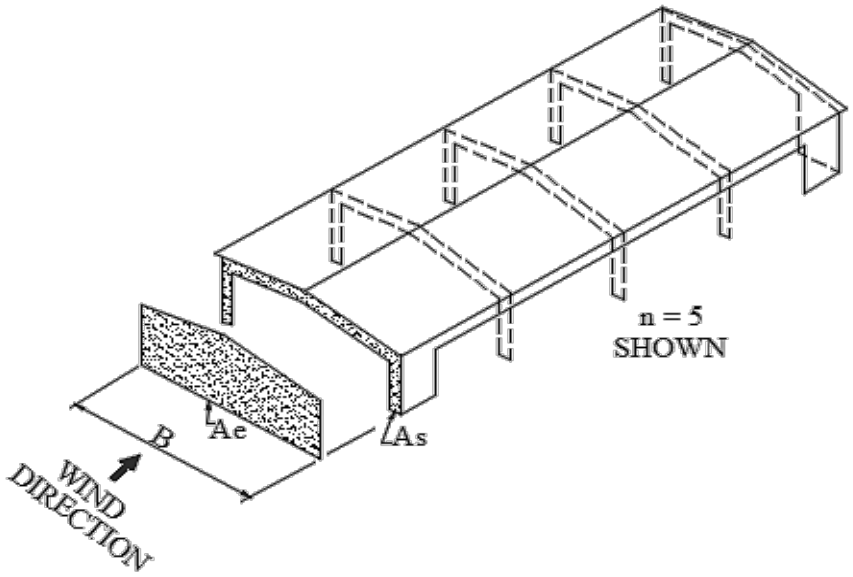
GCpi = +/-0.18 Enclosed bldg, procdure doesn't apply
Roof Angle (θ) = 9.5 deg



B=	49.5	ft
# of frames (n) =	0	
Solid are of end wall including fascia (As) =	0.0	sf
Roof ridge height =	30.8	ft
Roof eave height =	26.6	ft
Total end wall area if soild (Ae) =	1,420.8	sf

Longidinal Directional Force (F) = pAe
p= qh [(GCpf)windward -(GCpf)leeward] K_B K_S

Solidarity ratio (Φ) =	0.000	
n =	3	use n = 3 minimum
KB =	0.8	
KS =	0.600	
Zones 5 & 6 area =	1,295	sf
5E & 6E area =	126	sf
(GCpf) windward - (GCpf) leeward] =	0.721	
p =	14.0	psf

Total force to be resisted by MWFRS (F) = **19.8** **kips** applied at the centroid of the end wall area Ae

Note: The longidudinal force acts in combination with roof loads calculated elsewhere for an open or partially enclosed building.

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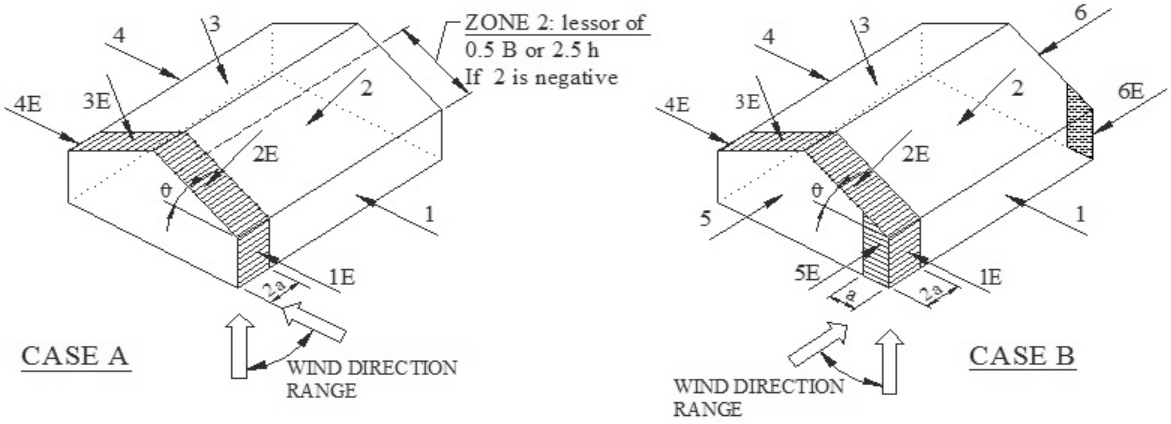
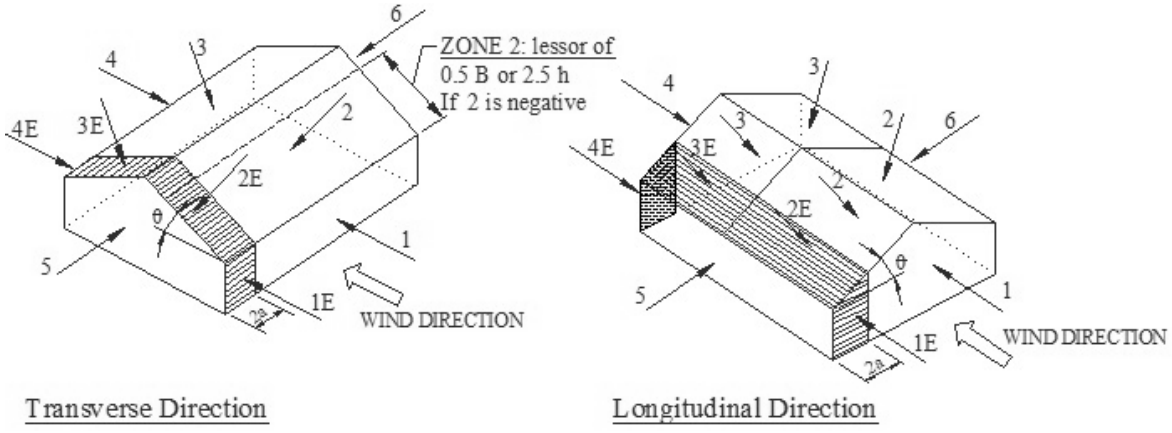


NOTE: Torsional loads are 25% of zones 1 - 6. See code for loading diagram.
Exception: One story buildings h<30' and 1 to 2 storybuildings framed with light-frame construction or with flexible diaphragms need not be designed for the torsional load case.

ASCE 7-98 & ASCE 7-10 (& later) - MWFRS wind pressure zones



NOTE: Torsional loads are 25% of zones 1 - 4. See code for loading diagram.
Exception: One story buildings h<30' and 1 to 2 storybuildings framed with light-frame construction or with flexible diaphragms need not be designed for the torsional load case.

ASCE 7-02 and ASCE 7-05 - MWFRS wind pressure zones

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Ultimate Wind Pressures

Wind Loads - Components & Cladding : h ≤ 60'

Kh (case 1) =	0.96	h =	26.6 ft
Base pressure (qh) =	**40.4 psf**	a =	4.6 ft
Minimum parapet ht =	0.0 ft	GCpi =	+/-0.18
Roof Angle (θ) =	9.5 deg	qi = qh =	40.4 psf
Type of roof =	Sawtooth		

Roof

	Surface Pressure (psf)								User input	
Area	10 sf	20 sf	50 sf	100 sf	200 sf	350 sf	500 sf	1000 sf	75 sf	300 sf
Negative Zone 1	-75.9	-70.9	-64.3	-59.2	-54.2	-50.2	-47.6	-47.6	-61.3	-51.3
Negative Zone 2	-43.6	-43.6	-43.6	-43.6	-37.5	-32.6	-29.5	-23.4	-43.6	-34.0
Span A Negative Zone 3	-100.1	-93.7	-85.1	-78.7	-72.3	-67.1	-63.8	-63.8	-81.4	-68.5
Span B,C&D Neg. Zone 3	-136.4	-123.5	-106.5	-93.7	-80.8	-70.4	-63.8	-63.8	-99.0	-73.2
Positive Zone 1	19.4	18.2	16.6	16	16.0	16.0	16.0	16.0	16.0	16.0
Positive Zone 2	#VALUE!	#VALUE!	#VALUE!	#VALUE!						
'Positive Zone 3	-68.6	-67.4	-65.8	-64.6	-54.1	-45.7	-40.4	-40.4	-65.1	-48.0
					-55.7	-48.8	-44.4	-44.4	-67.9	-50.7
					-64.2	-52.1	-44.4	-44.4	-85.5	-55.5

Overhang pressures in the table above assume an internal pressure coefficient (Gcpi) of 0.0
Overhang soffit pressure equals adj wall pressure (which includes internal pressure of 7.3 psf)

Parapet

qp = 0.0 psf

		Surface Pressure (psf)						User input
Solid Parapet Pressure		10 sf	20 sf	50 sf	100 sf	200 sf	500 sf	40 sf
CASE A:	Zone 2 :	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Zone 3 :	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASE B :	Interior zone :	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Corner zone :	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Walls

	GCp +/- GCpi				Surface Pressure at h				User input	
Area	10 sf	100 sf	200 sf	500 sf	10 sf	100 sf	200 sf	500 sf	10 sf	200 sf
Negative Zone 4	-1.17	-1.01	-0.96	-0.90	-47.2	-40.8	-38.9	-36.3	-47.2	-38.9
Negative Zone 5	-1.44	-1.12	-1.03	-0.90	-58.1	-45.3	-41.4	-36.3	-58.1	-41.4
Positive Zone 4 & 5	1.08	0.92	0.87	0.81	43.6	37.2	35.2	32.7	43.6	35.2

Note: GCp reduced by 10% due to roof angle <= 10 deg.

Location of C&C Wind Pressure Zones - ASCE 7-10 & earlier

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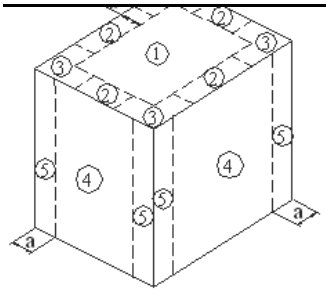
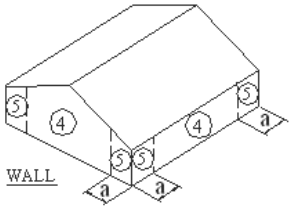
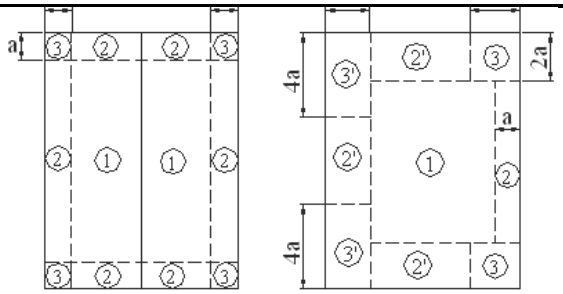


Roofs w/ θ ≤ 10°
and all walls
h > 60'

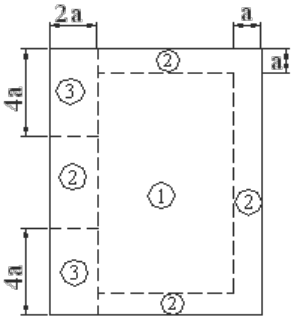


Walls h ≤ 60'
& alt design h<90'

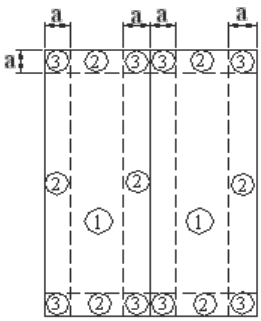


Gable, Sawtooth and
Multispan Gable θ ≤ 7 degrees &
Monoslope ≤ 3 degrees
h ≤ 60' & alt design h<90'

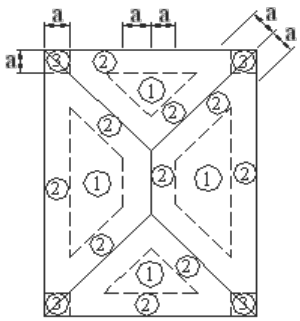
Monoslope roofs
3° < θ ≤ 10°
h ≤ 60' & alt design h<90'



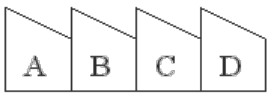
Monoslope roofs
10° < θ ≤ 30°
h ≤ 60' & alt design h<90'

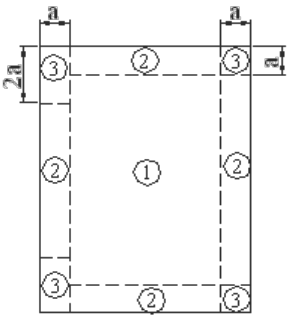


Multispan Gable &
Gable 7° < θ ≤ 45°

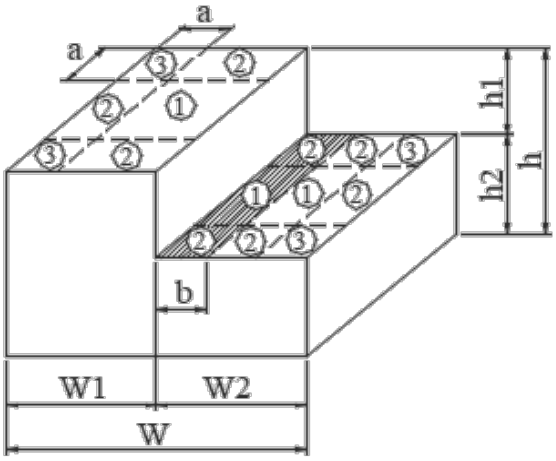


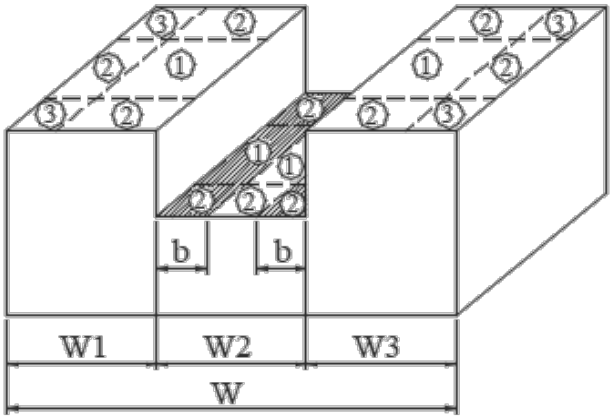
Hip 7° < θ ≤27°





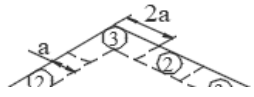
Sawtooth 10° < θ ≤ 45°
h ≤ 60' & alt design h<90'

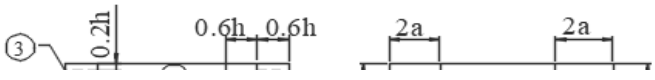




Stepped roofs θ ≤ 3°
h ≤ 60' & alt design h<90'

Location of C&C Wind Pressure Zones - ASCE 7-16

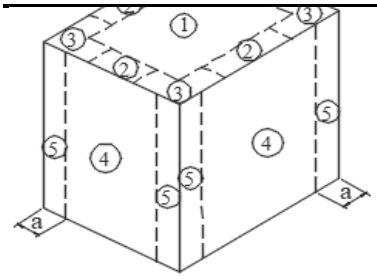




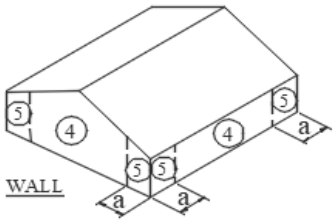
Pacific Northwest Structural Group
6193 NE Malbon Ct.
Kingston, WA 98346
(360) 903.2803

JOB TITLE Smith-Cutright Residence Addition & Remodel

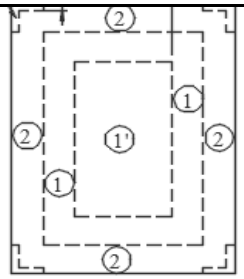
JOB NO. 21-028 **SHEET NO.**
CALCULATED BY DLS **DATE**
CHECKED BY DLS **DATE**



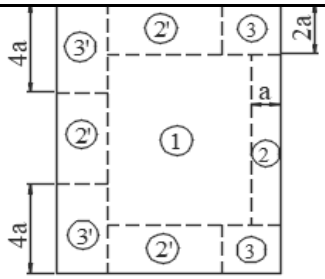
Roofs w/ θ ≤ 10°
and all walls
h > 60'



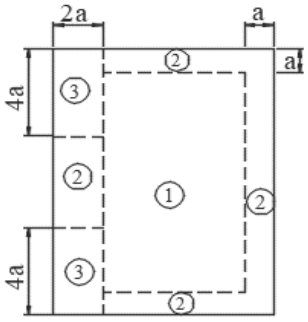
Walls h ≤ 60'
& alt design h<90'



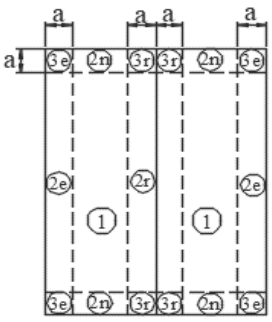
Gable, Sawtooth and
Multispan Gable θ ≤ 7 degrees &
Monoslope ≤ 3 degrees
h ≤ 60' & alt design h<90'



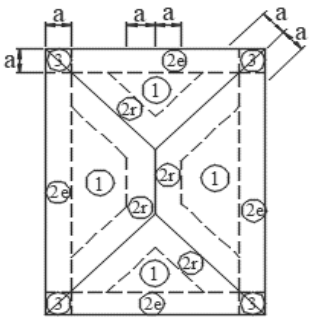
Monoslope roofs
3° < θ ≤ 10°
h ≤ 60' & alt design h<90'



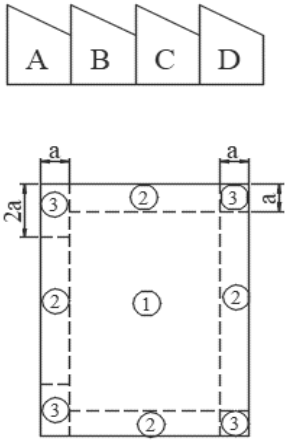
Monoslope roofs
10° < θ ≤ 30°
h ≤ 60' & alt design h<90'



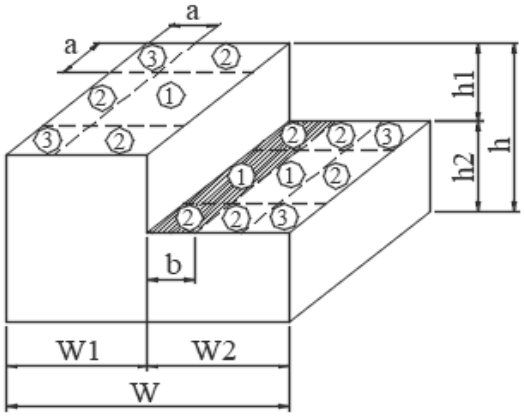
Multispan Gable &
Gable 7° < θ ≤ 45°

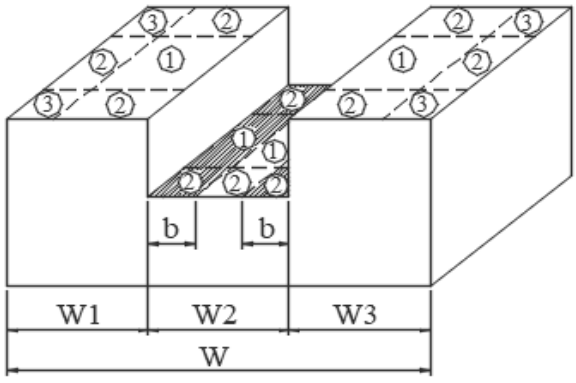


Hip 7° < θ ≤ 27°



Sawtooth 10° < θ ≤ 45°
h ≤ 60' & alt design h<90'





Stepped roofs θ ≤ 3°
h ≤ 60' & alt design h<90'

Pacific Northwest Structural Group, Inc.				
	Project	Smith-Cutright Residence Addition & Remodel	Designer	DLS
	Location	7655 SE 40th Street, Mercer Island, WA 98040	Project No.	21-028
	Client	Laura Smith & David Cutright	*Revised*	*4-Dec-20*
	Design Live and Dead Loads, Soil Data			

DESIGN LIVE AND DEAD LOADS

ROOF LOAD :		
Asphalt Shingles	1.5	PSF
Re-Roof	1.5	PSF
Roof Shtg	1.5	PSF
Rafter @ 24" oc	3.3	PSF
Insulation	1.6	PSF
Gypsum Shtg	2.2	PSF
		PSF
		PSF
SUB-TOTAL	11.6	PSF
SLOPE CORRECTION "X:12" 2.00	1.0	
MISCELLANEOUS	3.2	PSF
ROOF DEAD LOAD	15.0	PSF
ROOF SNOW LOAD	25.0	PSF
REDUCED SNOW LOAD	N/A	PSF
ROOF LIVE LOAD	20.0	PSF

EXTERIOR WALL LOAD		
Siding	4.0	PSF
Wall Shtg	1.5	PSF
2x6 @ 16" oc	1.7	PSF
Bottom & Top Plates	0.8	PSF
Insulation	0.5	PSF
Gypsum Shtg	2.2	PSF
Mech., Elec., & Misc.	0.3	PSF
EXTER. WALL DEAD LOAD	11.0	PSF

INTERIOR WALL LOAD		
Gypsum Shtg	4.4	PSF
2X4 @ 16" oc	1.1	PSF
Insulation	0.5	PSF
Bottom & Top Plates	0.8	PSF
Mech., Elec., & Misc.	1.2	PSF
INTERIOR WALL DEAD LOAD	8.0	PSF

FLOOR LOAD		
Floor Covering	1.0	PSF
Floor Shtg	2.3	PSF
Floor Joist	3.3	PSF
Insulation	1.3	PSF
Gypsum Sheathing	5.6	PSF
Mech., Elec., & Misc.	1.5	PSF
		PSF
FLOOR DEAD LOAD	15.0	PSF
FLOOR LIVE LOAD	40.0	PSF

DECK OR BALCONY DEAD LOAD		
2x Decking	4.5	PSF
Deck Joist	3.3	PSF
Mech., Elec., & Misc.	4.2	PSF
		PSF
DECK DEAD LOAD	12.0	PSF
DECK LIVE LOAD	60.0	PSF

		PSF
		PSF
		PSF
		PSF
		PSF
		PSF
		PSF
FLOOR DEAD LOAD	-	PSF
FLOOR LIVE LOAD		PSF

SOILS DATA

SOILS REPORT	N/A		
GEOTECHNICAL ENGINEER	N/A	DATE OF REPORT	N/A

BASIC BEARING PRESSURE		
PADS & CONT. FND	1,500	PSF
INCREASE FOR WIDTH	N/A	%
INCREASE FOR DEPTH	N/A	%
MAX. SOIL PRESSURE	1,500	PSF
ISOLATED FOUNDATIONS	N/A	PSF

ACTIVE SOIL PRESSURE		
PASSIVE PRESSURE	N/A	PCF
SOIL FRICTION	N/A	
E.F.P. (Cantilever)	N/A	PCF
E.F.P. (Restrained)	N/A	PCF

Pacific Northwest Structural Group, Inc.				
	Project	Smith-Cutright Residence Addition & Remodel	Designer	DLS
	Location	7655 SE 40th Street, Mercer Island, WA 98040	Project No.	21-028
	Client	Laura Smith & David Cutright	*Revised*	*4-Dec-20*
	ASCE 10-16, 2018 IBC & 2019 OSSC Section 1609 Wind Loads			

BUILDING DATA:		
Roof Pitch	2.00	:12
θ=	9.46	
Building Length	45.50	ft
Building Width	49.50	ft
1st Level Plate Height	8.08	ft
2nd Level Plate Height	16.50	ft
3rd Level Plate Height	-	ft
Gable Height	28.71	ft
Roof Height	4.13	ft
Mean Roof Height h =	26.64	ft

Horizontal MWFRS Simple Diaphragm Pressures (psf)		
Transverse Direction (Normal to Length)	Basic Wind	Allowable Wind
Interior Zone Wall	31.10	18.66
Interior Zone Roof	8.00	4.80
End Zone Wall	46.80	28.08
End Zone Roof	8.00	4.80
Average Wall	37.38	22.43
Average Roof	8.00	4.80
Longitudinal Direction (Parallel to Length)	Basic Wind	Allowable Wind
Interior Zone Wall	27.80	16.68
End Zone Wall	42.00	25.20
Average Wall	33.48	20.09

Allowable Design Uniform Wind Load				
Level	Transverse		Longitudinal	
1st Level Plate	275.6	plf	246.9	plf
2nd Level Plate	204.8	plf	207.2	plf
3rd Level Plate	-	plf	-	plf

Pacific Northwest Structural Group, Inc.	Project	Smith-Cutright Residence Addition & Remod	Designer	DLS
	Location	7655 SE 40th Street, Mercer Island, WA 980	Project No.	21-028
	Client	Laura Smith & David Cutright	*Revised*	*14-Jan-21*
	ASCE 7-16, 2018 IBC Section 1613, & 2019 OSSC 1613			

ASCE 7-16, IBC 2018 & 2019 OSSC Section 1613, EARTHQUAKE LOADS

Soil Site Class	D			ASCE 7-16 11.4.3 (Default=D)
Response Spectral Acc. (0.2 sec) S_s	1.42			ASCE 7-16 Figure(s) 22-1 through 22-18
Response Spectral Acc.(1.0 sec) S_1	0.49			
Site Coefficient F_a	1.00			ASCE 7-16 Table 11.4-1
Site Coefficient F_v	1.85			ASCE 7-16 Table 11.4-2
Max Considered Earthquake Acc. S_{MS}	1.418	$F_a.S_s$		ASCE 7-16 (11.4-1)
Max Considered Earthquake Acc. S_{M1}	0.912	$F_v.S_1$		ASCE 7-16 (11.4-2)
@ 5% Damped Design S_{DS}	0.945	$2/3.S_{MS}$		ASCE 7-16 (11.4-3)
S_{D1}	0.608	$2/3.S_{M1}$		ASCE 7-16 (11.4-4)
Risk Category			II	ASCE 7-16 Table 1.5-1
Design Category Consideration:				
In each of the two orthogonal directions, the approximate fundamental period of the structure, Ta, determined in accordance with Section 12.8.2.1 is less than 0.8Ts, where Ts is determined in accordance with Section 11.4.5.			Yes	ASCE 7-16 11.6
In each of two orthogonal directions, the fundamental period of the structure used to calculate the story drift is less than Ts.			Yes	
Diaphragms are rigid as defined in Section 12.3.1 or for diaphragms that are flexible, the distance between vertical elements of the seismic force-resisting system does not exceed 40 ft.			Yes	
Seismic Design Category (SDC)	-			ASCE 7-10 11.6
Seismic Design Category for 0.1 sec	D			ASCE 7-16 Table 11.6-1
Seismic Design Category for 1.0 sec	D			ASCE 7-16 Table 11.6-2
S1 < .75g	-			ASCE 7-16 11.6
Seismic Design Category (SDC)	D			ASCE 7-16 11.6
Seismic Force-Resisting System	**A. BEARING WALL SYSTEMS**			
	15. Light-frame (wood) walls sheathed with wood structural panels rated for shear resistance or steel sheets			
Footnotes	-	-		
	-	-		
	-	-		
ASCE 7 Section Where Detailing Requirements Are Specified	14.1 and 14.5			
Building ht. h_n	26.64	ft	Limited Building Height (ft) = 65	
C_t	0.020	x	0.75	ASCE 7-16 Table 12.8-2
C_u	1.400	for SD1 of 0.608g		ASCE 7-16 Table 12.8-1
Approximate Fundamental Period, T_a	0.235	sec	$C_t.(h_n)^x$	ASCE 7-16 (12.8-7)
T_s	0.643	sec	S_{D1}/S_{DS}	ASCE 7-16 11.4.6
T_L	6.00	sec		ASCE 7-16 11.4.6
Period for Computing Drift	0.328	sec	$C_u.T_a$	
Fundamental Period, T	0.235	sec		
$0.8T_s$	0.515	sec	$0.8(S_{D1}/S_{DS})$	ASCE 7-16 11.6
Response Modification Coef. R	6.50			ASCE 7-16 Table 12.2-1

Pacific Northwest Structural Group, Inc.	Project	Smith-Cutright Residence Addition & Remod	Designer	DLS
	Location	7655 SE 40th Street, Mercer Island, WA 980	Project No.	21-028
	Client	Laura Smith & David Cutright	*Revised*	*14-Jan-21*
	ASCE 7-16, 2018 IBC Section 1613, & 2019 OSSC 1613			

Over Strength Factor Ω_o	3.00		ASCE 7-16 Table 12.2-1
Deflection Amplification Factor, C_{db}	4.00		ASCE 7-16 Table 12.2-1
Importance factor I_E	1.00		ASCE 7-16 Table 1.5-2
C_s	0.145	$S_{DS}/R/I_E$	ASCE 7-16 (12.8-2)
T<=TL therefore Cs need not to exceed	0.399	$S_{D1}/(T(R/I_E))$	ASCE 7-16 (12.8-3)
T<TL therefore (12.8-4) N/A	N/A	$S_{D1}.T_L/T^2(R/I_E)$	ASCE 7-16 (12.8-4)
C_s	0.042	$0.044S_{DS}.I_E \geq 0.01$	ASCE 7-16 (12.8-5)
S1 < 0.6g (12.8-6) N/A	N/A	$0.5S_1/(R/I_E)$	ASCE 7-16 (12.8-6)
Use C_s	0.145		
Design Base Shear V	0.145 W	Control	ASCE 7-16 (12.8-1)
Design Service Level Base Shear V	0.102 W	Control	

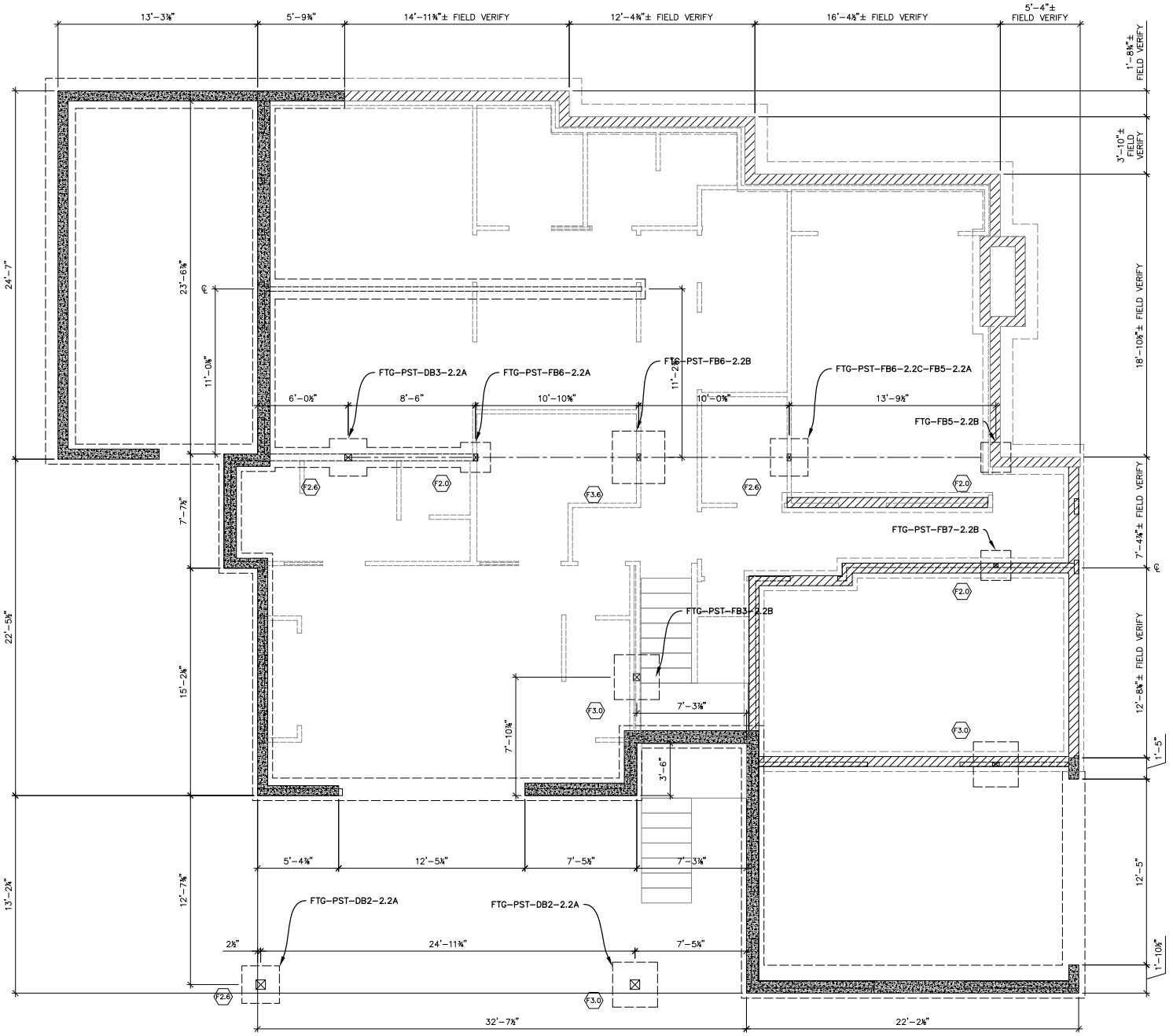
Seismic Load					
Level	W_x (lbs)	h_x (ft)	$W_x.h_x$	C_{vx}	F_x (lbs)
1st Level Plate	42,379	8.8	374,207	0.395	3,092
2nd Level Plate	34,703	16.5	572,600	0.605	4,732
3rd Level Plate	-	-	-	-	-
	77,082	$\Sigma W_x.h_x$	946,806		

Design Service Level Base Shear V	7,824	lbs		
	Transverse		Longitudinal	
Diaphragm Width	49.50	ft	45.50	ft
1st Level Plate	62.5	plf	68.0	plf
2nd Level Plate	95.6	plf	104.0	plf
3rd Level Plate	-	plf	-	plf

Pacific Northwest Structural Group, Inc.				
	Project	Smith-Cutright Residence Addition & Remod	Designer	DLS
	Location	7655 SE 40th Street, Mercer Island, WA 980	Project No.	21-028
	Client	Laura Smith & David Cutright	*Revised*	*4-Dec-20*
	ASCE 7-16 Snow Loads , 2018 IBC 1608, 2019 OSSC 1608			

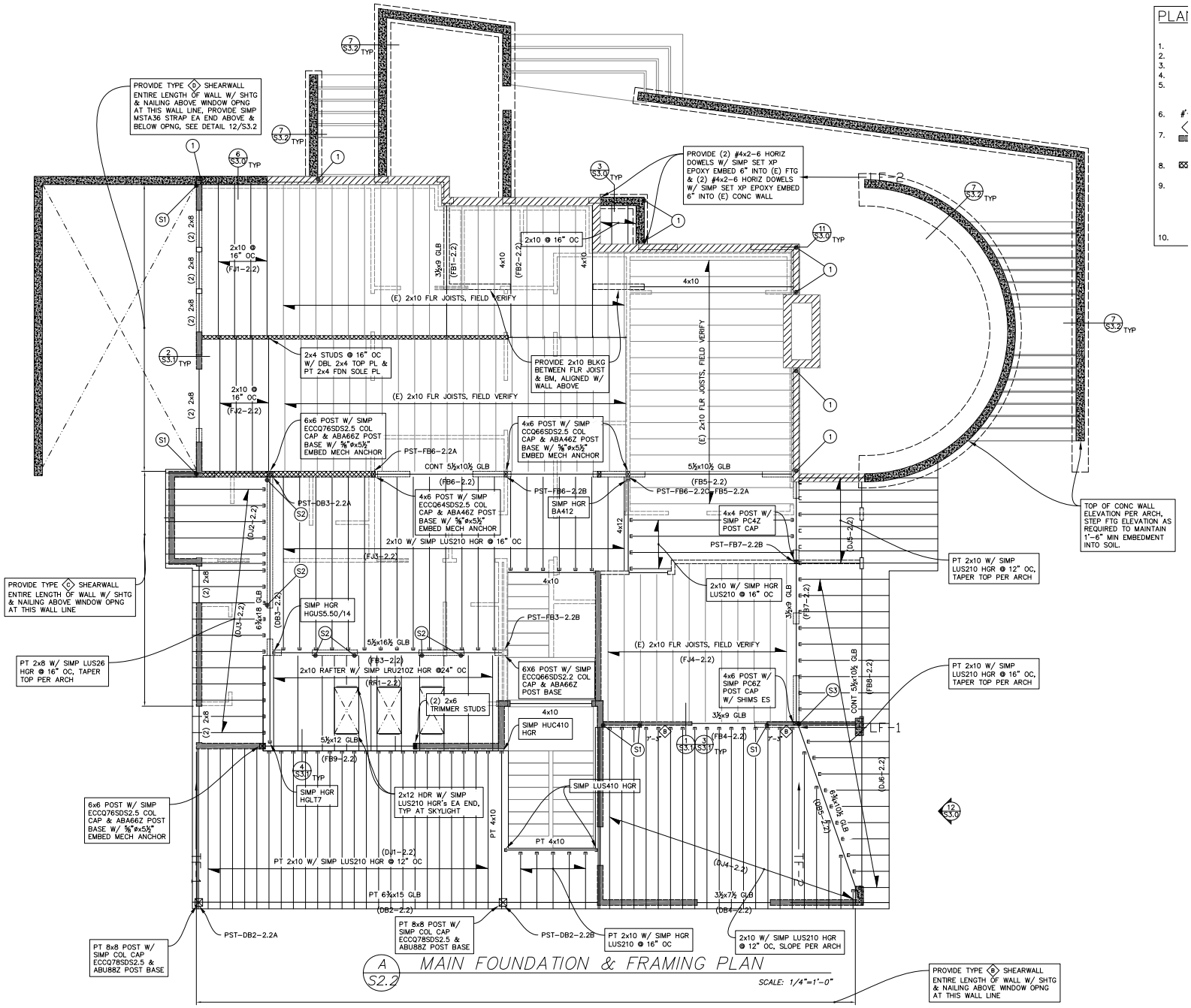
ASCE 7-10 7.3 FLAT ROOF SNOW LOAD			
Ground Snow Load, p_g	30.0	PSF	ASCE 7-16 7.2, 2019 OSSC 1608.2.1
Exposure Category	B		ASCE 7-16 26.7.2, 2019 OSSC 1609.4.2
Exposure of Roof	Partially Exposed		ASCE 7-16 Table 7-3.1
Thermal Condition	Structures kept just above freezing and others with cold, ventilated roofs in which the thermal resistance (R-value) 1.1 between the ventilated space and the heated space exceeds 25°F x h x ft2/Btu		
Risk Category	II		ASCE 7-16 Table 1.5-1
Snow load importance factor, I_s	1.0		ASCE 7-16 Table 1.5-2
Snow exposure factor, C_e	1.00		ASCE 7-16 Table 7-1.3 Exposure Factor
Thermal factor, C_t	1.10		ASCE 7-16 Table 7.3-2 Thermal Factor
Flat-roof snow load, p_f	23.1	PSF	ASCE 7-16 (7.3-1) $0.7C_eC_tI_sp_g$
Min. Design Flat Roof Snow Load, p_m	25.0	PSF	ASCE 7-16 7.3.4 $p_g \le 20$ PSF I_sp_g, $p_g > 20$ PSF $20I_s$
Rain-on-Roof Surcharge Load	5.0	PSF	ASCE 7-16 7.10, 2019 OSSC 1608.2.5
Design Flat Roof Snow Load, p_f	25.0	PSF	

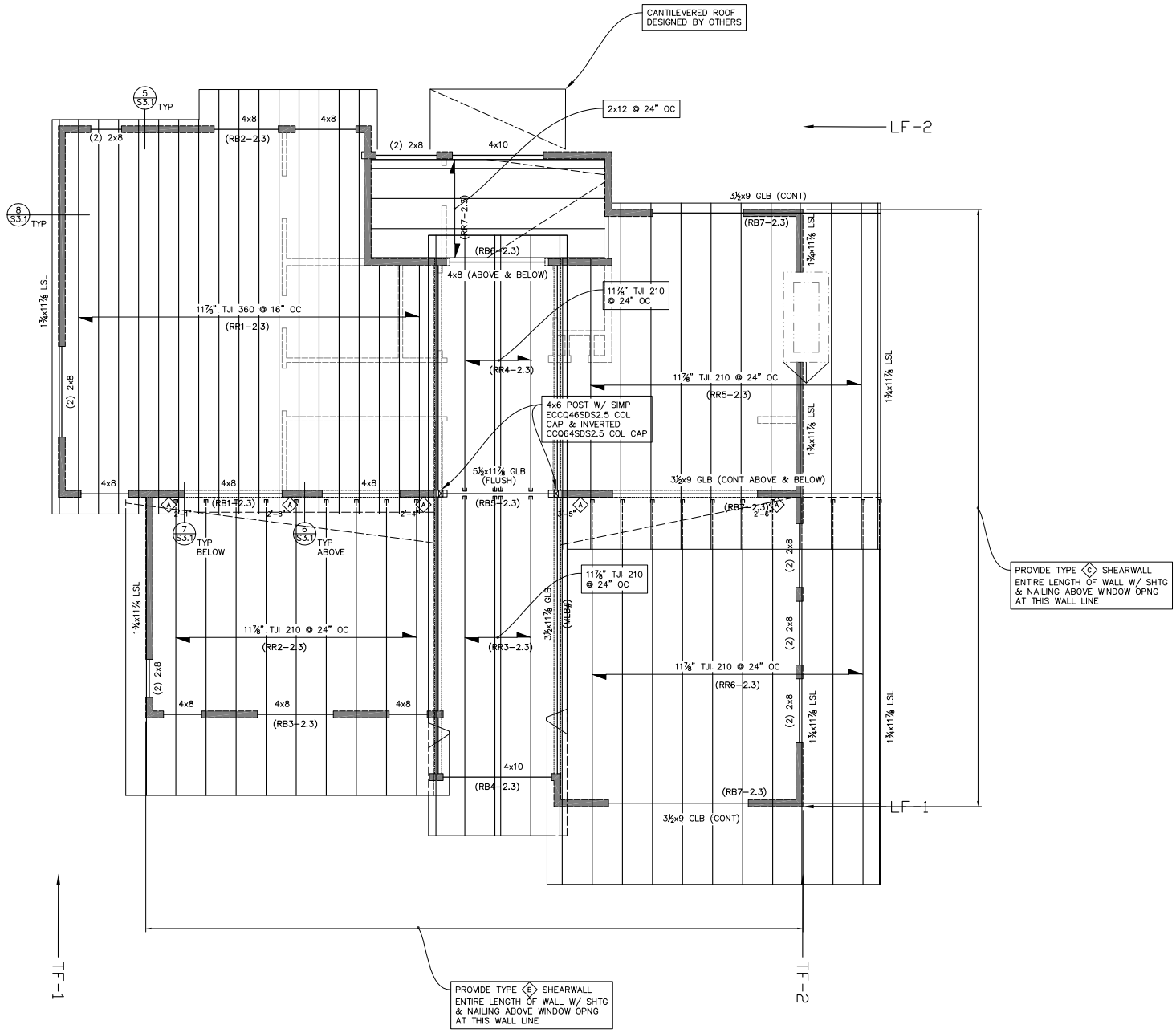
ASCE 7-10 7.4 SLOPE ROOF SNOW LOAD			
Roof Pitch	2	:12	
Roof Slope, Θ	9.46	°	
Roof Surface	All Other Surfaces		
Warm Roof Slope Factor, C_s	1.00		ASCE 7-16 Section 7.4.1, 7.4.2, 7.4.3 Figure(s)
Slope Roof Design Snow Load, p_s	25.0	PSF	ASCE-7-16 (7-.4-1) C_s*p_f



A S2.1 FOUNDATION/FIRST FLOOR FRAMING PLAN

SCALE: 1/4"=1'-0"


PROVIDE TYPE D SHEARWALL ENTIRE LENGTH OF WALL W/ SHTG & NAILING ABOVE WINDOW OPNG AT THIS WALL LINE, PROVIDE SIMP MSTA36 STRAP EA END ABOVE & BELOW OPNG, SEE DETAIL 12/S3.2
PROVIDE (2) #4x2-6 HORIZ DOWELS W/ SIMP SET XP EPOXY EMBED 6" INTO (E) FTG & (2) #4x2-6 HORIZ DOWELS W/ SIMP SET XP EPOXY EMBED 6" INTO (E) CONC WALL
LF-2
LF-1
2x10 @ 16" OC (FJ1-2.2)
2x10 @ 16" OC (FJ2-2.2)
2x10 @ 16" OC
(E) 2x10 FLR JOISTS, FIELD VERIFY
2x4 STUDS @ 16" OC W/ DBL 2x4 TOP PL & PT 2x4 FDN SOLE PL
PROVIDE 2x10 BLKG BETWEEN FLR JOIST & BM, ALIGNED W/ WALL ABOVE
6x6 POST W/ SIMP ECCQ76SDS2.5 COL CAP & ABA66Z POST BASE W/ 5/8"ø x5½" EMBED MECH ANCHOR
4x6 POST W/ SIMP CCQ66SDS2.5 COL CAP & ABA46Z POST BASE W/ 5/8"ø x5½" EMBED MECH ANCHOR
PST-FB6-2.2A
CONT 5½x10½ GLB (FB6-2.2)
5½x10½ GLB (FB5-2.2)
PST-FB6-2.2B
PST-FB6-2.2C
PST-FB5-2.2A
PST-DB3-2.2A
4x6 POST W/ SIMP ECCQ64SDS2.5 COL CAP & ABA46Z POST BASE W/ 5/8"ø x5½" EMBED MECH ANCHOR
SIMP HGR BA412
4x4 POST W/ SIMP PC4Z POST CAP
TOP OF CONC WALL ELEVATION PER ARCH, STEP FTG ELEVATION AS REQUIRED TO MAINTAIN 1'-6" MIN EMBEDMENT INTO SOIL.
2x10 W/ SIMP LUS210 HGR @ 16" OC
(FJ3-2.2)
PST-FB7-2.2B
PT 2x10 W/ SIMP LUS210 HGR @ 12" OC, TAPER TOP PER ARCH
PROVIDE TYPE C SHEARWALL ENTIRE LENGTH OF WALL W/ SHTG & NAILING ABOVE WINDOW OPNG AT THIS WALL LINE
2x10 W/ SIMP HGR LUS210 @ 16" OC
SIMP HGR HGUS5.50/14
PST-FB3-2.2B
5½x16½ GLB (FB3-2.2)
PT 2x8 W/ SIMP LUS26 HGR @ 16" OC, TAPER TOP PER ARCH
2x10 RAFTER W/ SIMP LRU210Z HGR @24" OC (RR1-2.2)
6X6 POST W/ SIMP ECCQ66SDS2.2 COL CAP & ABA66Z POST BASE
4x6 POST W/ SIMP PC6Z POST CAP W/ SHIMS ES
(2) 2x6 TRIMMER STUDS
SIMP HUC410 HGR
5½x12 GLB (FB9-2.2)
SIMP HGR HGLT7
2x12 HDR W/ SIMP LUS210 HGR's EA END, TYP AT SKYLIGHT
SIMP LUS410 HGR
6x6 POST W/ SIMP ECCQ76SDS2.5 COL CAP & ABA66Z POST BASE W/ 5/8"ø x5½" EMBED MECH ANCHOR
PT 2x10 W/ SIMP LUS210 HGR @ 12" OC
PT 6¾x15 GLB (DB2-2.2)
PT 8x8 POST W/ SIMP COL CAP ECCQ78SDS2.5 & ABU88Z POST BASE
PST-DB2-2.2A
PST-DB2-2.2B
PT 2x10 W/ SIMP HGR LUS210 @ 16" OC
2x10 W/ SIMP LUS210 HGR @ 12" OC, SLOPE PER ARCH
PROVIDE TYPE B SHEARWALL ENTIRE LENGTH OF WALL W/ SHTG & NAILING ABOVE WINDOW OPNG AT THIS WALL LINE
A S2.2
MAIN FOUNDATION & FRAMING PLAN
SCALE: 1/4"=1'-0"



A S2.3 ROOF FRAMING PLAN

SCALE: 1/4"=1'-0"

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	-- --	PROJECT NAME:	21-028 Framing
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	DB1-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR BEAM	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 2	(1) 1.5 X 5.5	DRY		

DB1-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 22.083 Member Slope: 0/12 Actual Length (ft): 22.08

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
8.25	20.8	1.55	1.88	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	900	575	180	1350	625	1600	580
Adjusted Values	1170	748	180	1485	625	1600	580
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1.3	1.3	1	1.1	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	22.08333	0	22.08333	0	1.00	0.59	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (97.7%)	3.8	162.0	0	D	0.9
Bending Stress Y (psi)	PASS (82.7%)	182.0	1053.0	11.04	D	0.9
Deflection (in)	PASS (72.6%)	0.303 (=L/876)	1.104 (=L/240)	11.04	D+L	
Bearing Stress (psi)	PASS (99.4%)	4.0	625.0	0	D	0.9

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	21	0	0	0	0	0	0	0	0	0	0
B	21	0	0	0	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	1.88	1.88	0	22.08333	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	-- --	PROJECT NAME:	21-028 Framing
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	DB2-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR BEAM	NDS:	2018 NDS
MATERIAL:	Glulams		

Stress Class Rated 24F-1.8E	24F-V4 DF/DF	(1) 6.75 X 15	DRY		

DB2-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 33 Member Slope: 0/12 Actual Length (ft): 33

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
101.25	1898.44	384.43	23.09	1	0.5	1

STRENGTH PROPERTIES

	Fbx+ (psi)	Fbx- (psi)	Fby (psi)	Ft (psi)	Fvx (psi)	Fvy (psi)	Fc (psi)	Fc⊥ (psi)	Ex (psi)	Exmin (psi)	Ey (psi)	Eymin (psi)
Base Values	2400	1850	1450	1100	265	230	1650	650	1800000	950000	1600000	850000
Adjusted Values	2400	1850	1450	1100	265	230	1650	650	1800000	950000	1600000	850000
C_M	1	1	1	1	1	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1	1	1	1	1	1

Bending Adjustment Factors C_{vr} = 1

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	25	0	25	0	1.00	0.99	1.00	1.00
2	8	0	8	0	1.00	1.00	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (56.3%)	115.7	265.0	24.75	D+L	1
Bending Stress Y (psi)	PASS (11.1%)	1495.0	1682.2	25.08	D+L	1
Deflection (in)	PASS (30.9%)	0.576 (=L/521)	0.833 (=L/360)	11.22	L	
Bearing Stress (psi)	PASS (25.4%)	536.8	719.6	25	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	1263	4125	0	0	0	0	0	0	0	0	0
B	3046	9636	0	0	0	0	0	0	0	0	0
C	-699	-2540	0	0	0	0	0	0	0	0	0

Reaction Location

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	23.09	23.09	0	33	Dead	Y

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	37.14373	37.14373	25	33	Dead	Y
Uniform (lbf/ft)	127.3681	127.3681	25	33	Live	Y
Uniform (lbf/ft)	102.0234	102.0234	0	25	Dead	Y
Uniform (lbf/ft)	408.0938	408.0938	0	25	Live	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	DB3-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR BEAM	NDS:	2018 NDS
MATERIAL:	Glulams		

Stress Class Rated 24F-1.8E	24F-V4 DF/DF	(1) 6.75 X 18	DRY		

DB3-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 22.333 Member Slope: 0/12 Actual Length (ft): 22.33

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
121.5	3280.5	461.32	27.71	1	0.5	1

STRENGTH PROPERTIES

	Fbx+ (psi)	Fbx- (psi)	Fby (psi)	Ft (psi)	Fvx (psi)	Fvy (psi)	Fc (psi)	Fc⊥ (psi)	Ex (psi)	Exmin (psi)	Ey (psi)	Eymin (psi)
Base Values	2400	1850	1450	1100	265	230	1650	650	1800000	950000	1600000	850000
Adjusted Values	2400	1850	1450	1100	265	230	1650	650	1800000	950000	1600000	850000
C_M	1	1	1	1	1	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1	1	1	1	1	1

Bending Adjustment Factors C_{vr} = 1

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	22.3334	0	22.3334	0	1.00	0.98	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (61.4%)	102.3	265.0	22.33	D+L	1.15
Bending Stress Y (psi)	PASS (15.1%)	2176.0	2562.5	14.52	D+0.75L+0.75S	1
Deflection (in)	PASS (30.4%)	0.777 (=L/345)	1.117 (=L/240)	11.61	D+L	
Compressive Stress (psi)	PASS (100.0%)	0.0	1855.9	7.37	D+Lr	1.25
Tensile Stress (psi)	PASS (100.0%)	0.0	1375.0	7.37	D+Lr	1.25
Bearing Stress (psi)	PASS (57.1%)	279.0	650.0	22.33	D+0.75L+0.75S	1.15
Bending-Compression (Unit)	PASS (15.1%)	0.85	1.00	14.52	D+0.75L+0.75S	1.15
Bending-Tension (Unit)	PASS (30.9%)	0.69	1.00	14.52	D+0.75L+0.75Lr	1.25

REACTIONS

Units for V: lbf Units for M: lbf-ft

Z axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	0	0	3 / -2	1	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0
Y axis											
A	3769	3259	1449	1811	0	0	0	0	0	0	0
B	4514	3773	2211	2763	0	0	0	0	0	0	0

Reaction Location

A B

CONNECTORS

(All connectors are Simpson Strong-Tie connectors)*

Support B	Model	Type	Adequacy (%)	Header Fastening (in)	Joist Nails (in)	Nailer Thickness (in)
Primary	HGLT7	Hanger	12.16	(18) N54A	(6) N54A	N/A

Hanger at support B has seat sloped 0 degrees, skewed 0 degrees.

WSR = web stiffeners required

*Capacity values are adjusted based on specific gravity when members use grades other than those specified in Simpson Strong-Tie's capacity tables.

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	50	50	0	14.6667	Snow	Y
Uniform (lbf/ft)	123.5	123.5	0	14.6667	Dead	Y
Uniform (lbf/ft)	40	40	0	14.6667	Roof Live	Y
Self Weight (lbf/ft)	27.71	27.71	0	22.3334	Dead	Y

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	4677.405	-	14.6667	-	Dead	Y
Point (lbf)	2786.667	-	14.6667	-	Live	Y
Point (lbf)	3841.006	-	14.6667	-	Snow	Y
Point (lbf)	-1.273669	-	14.6667	-	Snow	Z
Point (lbf)	1.757772	-	14.6667	-	Roof Live	Z
Point (lbf)	3072.984	-	14.6667	-	Roof Live	Y
Point (lbf)	-2.918893	-	14.6667	-	Roof Live	Z
Uniform (lbf/ft)	66.17825	66.17825	0	7.3334	Dead	Y
Uniform (lbf/ft)	239.0621	239.0621	0	7.3334	Live	Y
Uniform (lbf/ft)	45.99631	45.99631	7.3334	22.3334	Dead	Y
Uniform (lbf/ft)	166.1569	166.1569	7.3334	22.3334	Live	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	DB4-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR BEAM	NDS:	2018 NDS
MATERIAL:	Glulams		

Stress Class Rated 24F-1.8E	24F-V4 DF/DF	(1) 3.5 X 7.5	DRY		

DB4-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 6.333 Member Slope: 0/12 Actual Length (ft): 6.33

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
26.25	123.05	26.8	5.99	1	0.5	1

STRENGTH PROPERTIES

	Fbx+ (psi)	Fbx- (psi)	Fby (psi)	Ft (psi)	Fvx (psi)	Fvy (psi)	Fc (psi)	Fc⊥ (psi)	Ex (psi)	Exmin (psi)	Ey (psi)	Eymin (psi)
Base Values	2400	1850	1450	1100	265	230	1650	650	1800000	950000	1600000	850000
Adjusted Values	2400	1850	1528	1100	265	230	1650	650	1800000	950000	1600000	850000
C_M	1	1	1	1	1	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1	1	1	1	1	1

Bending Adjustment Factors C_{vr} = 1

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	6.3334	0	6.3334	0	1.00	0.99	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (62.5%)	99.5	265.0	0	D+L	1
Bending Stress Y (psi)	PASS (58.0%)	1008.1	2400.0	3.17	D+L	1
Deflection (in)	PASS (66.3%)	0.071 (=L/1069)	0.211 (=L/360)	3.17	L	
Bearing Stress (psi)	PASS (78.1%)	142.1	650.0	0	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	363	1378	0	0	0	0	0	0	0	0	0
B	363	1378	0	0	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	5.99	5.99	0	6.3334	Dead	Y

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	108.75	108.75	0	6.3334	Dead	Y
Uniform (lbf/ft)	435	435	0	6.3334	Live	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	DB5-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR BEAM	NDS:	2018 NDS
MATERIAL:	Glulams		

Stress Class Rated 24F-1.8E	24F-V4 DF/DF	(1) 6.75 X 10.5	DRY		

DB5-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 15.5 Member Slope: 0/12 Actual Length (ft): 15.5

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
70.88	651.16	269.1	16.16	1	0.5	1

STRENGTH PROPERTIES

	Fbx+ (psi)	Fbx- (psi)	Fby (psi)	Ft (psi)	Fvx (psi)	Fvy (psi)	Fc (psi)	Fc⊥ (psi)	Ex (psi)	Exmin (psi)	Ey (psi)	Eymin (psi)
Base Values	2400	1850	1450	1100	265	230	1650	650	1800000	950000	1600000	850000
Adjusted Values	2400	1850	1472	1100	265	230	1650	650	1800000	950000	1600000	850000
C_M	1	1	1	1	1	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1	1	1	1	1	1

Bending Adjustment Factors C_{vr} = 1

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	15.5	0	15.5	0	1.00	0.99	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (68.9%)	82.5	265.0	0	D+L	1
Bending Stress Y (psi)	PASS (50.6%)	1184.6	2400.0	6.82	D+L	1
Deflection (in)	PASS (17.3%)	0.427 (=L/435)	0.517 (=L/360)	7.44	L	
Bearing Stress (psi)	PASS (74.6%)	165.1	650.0	0	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft Unbalanced loads checked for Live and Live Roof loads, reactions are an ''envelope'' of combos

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	125	3775	0	0	0	0	0	0	0	0	0
B	125	2197	0	0	0	0	0	0	0	0	0

Reaction Location

A B

UNBALANCED LIVE LOAD - WORST CASE

Load Combination: L, Maximum Stress Ratios from: Deflection

-Live Load Applied

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Trapezoidal (lbf/ft)	552.6	40	0	15.5	Live	Y
Trapezoidal (lbf/ft)	138	40	0	15.5	Live	Y
Self Weight (lbf/ft)	16.16	16.16	0	15.5	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	DJ1-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR JOIST	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Hem-Fir	No. 2	(1) 1.5 X 9.25	12(in) O.C.	DRY	INCISED

DJ1-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 13.083 Member Slope: 0/12 Actual Length (ft): 13.08 O.C. Spacing(in): 12

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
13.88	98.93	2.6	2.74	1	0.43	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	850	525	150	1300	405	1300	470
Adjusted Values	860	462	120	1040	405	1235	446
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	0.8	0.8	0.8	0.8	1	0.95	0.95
C_F	1.1	1.1	1	1	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1.15

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	12.58333	0	12.58333	0	1.00	0.58	1.00	1.00
2	0.5	0	0.5	0	1.00	1.00	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (57.6%)	50.9	120.0	0	D+L	1
Bending Stress Y (psi)	PASS (3.5%)	830.1	860.2	6.28	D+L	1
Deflection (in)	PASS (34.2%)	0.276 (=L/547)	0.419 (=L/360)	6.28	L	
Bearing Stress (psi)	PASS (77.8%)	89.7	405.0	0	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	94	377	0	0	0	0	0	0	0	0	0
B	102	408	0	0	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0

Reaction Location

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft^2)	60	60	0	13.08333	Live	Y
Uniform (lbf/ft^2)	15	15	0	13.08333	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	DJ2-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR JOIST	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Hem-Fir	No. 2	(1) 1.5 X 7.25	16(in) O.C.	DRY	INCISED

DJ2-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 8.5 Member Slope: 0/12 Actual Length (ft): 8.5 O.C. Spacing(in): 16

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
10.88	47.63	2.04	2.15	1	0.43	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	850	525	150	1300	405	1300	470
Adjusted Values	938	504	120	1092	405	1235	446
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	0.8	0.8	0.8	0.8	1	0.95	0.95
C_F	1.2	1.2	1	1.05	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1.15

BEAM DATA

		Unbraced Length (ft)		Beam End				
Span	Length (ft)	Top	Bottom	Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	8	0	8	0	1.00	0.86	1.00	1.00
2	0.5	0	0.5	0	1.00	1.00	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (53.0%)	56.4	120.0	7.99	D+L	1
Bending Stress Y (psi)	PASS (21.1%)	740.4	938.4	3.99	D+L	1
Deflection (in)	PASS (26.0%)	0.025 (=L/485)	0.033 (=L/360)	8.5	L	
Bearing Stress (psi)	PASS (80.4%)	87.9	448.4	8	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	88	319	0	0	0	0	0	0	0	0	0
B	100	361	0	0	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0

Reaction Location

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft^2)	60	60	0	8.5	Live	Y
Uniform (lbf/ft^2)	15	15	0	8.5	Dead	Y
Self Weight (lbf/ft)	2.15	2.15	0	8.5	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	-- --	PROJECT NAME:	21-028 Framing
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	DJ3-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR JOIST	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Hem-Fir	No. 2	(1) 1.5 X 7.25	16(in) O.C.	DRY	INCISED

DJ3-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 6.083 Member Slope: 0/12 Actual Length (ft): 6.08 O.C. Spacing(in): 16

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
10.88	47.63	2.04	2.15	1	0.43	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	850	525	150	1300	405	1300	470
Adjusted Values	938	504	120	1092	405	1235	446
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	0.8	0.8	0.8	0.8	1	0.95	0.95
C_F	1.2	1.2	1	1.05	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1.15

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	5.58334	0	5.58334	0	1.00	0.94	1.00	1.00
2	0.5	0	0.5	0	1.00	1.00	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (67.5%)	39.0	120.0	0	D+L	1
Bending Stress Y (psi)	PASS (61.9%)	357.6	938.4	2.8	D+L	1
Deflection (in)	PASS (75.3%)	0.008 (=L/1462)	0.033 (=L/360)	6.08	L	
Bearing Stress (psi)	PASS (85.6%)	64.5	448.4	5.58	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	61	222	0	0	0	0	0	0	0	0	0
B	73	265	0	0	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0

Reaction Location

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft^2)	60	60	0	6.08334	Live	Y
Uniform (lbf/ft^2)	15	15	0	6.08334	Dead	Y
Self Weight (lbf/ft)	2.15	2.15	0	6.08334	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	-- --	PROJECT NAME:	21-028 Framing
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	DJ4-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR JOIST	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 1	(1) 1.5 X 9.25	12(in) O.C.	DRY	

DJ4-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 14.5 Member Slope: 0/12 Actual Length (ft): 14.5 O.C. Spacing(in): 12

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
13.88	98.93	2.6	3.16	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	1000	675	180	1500	625	1700	620
Adjusted Values	1265	742	180	1500	625	1700	620
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1.1	1.1	1	1	1	1	1

Bending Adjustment Factors $C_{fu} = 0.74C_r = 1.15$

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	14.5	0	14.5	0	1.00	0.48	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (67.3%)	58.8	180.0	14.5	D+L	1
Bending Stress Y (psi)	PASS (12.6%)	1105.8	1265.0	7.25	D+L	1
Deflection (in)	PASS (26.6%)	0.355 (=L/490)	0.483 (=L/360)	7.25	L	
Bearing Stress (psi)	PASS (83.4%)	103.6	625.0	0	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	109	435	0	0	0	0	0	0	0	0	0
B	109	435	0	0	0	0	0	0	0	0	0

Reaction Location

A B

CONNECTORS (All connectors are Simpson Strong-Tie connectors)*

Support A	Model	Type	Adequacy (%)	Header Fastening (in)	Joist Nails (in)	Nailer Thickness (in)
Primary	LUS210	Hanger	26.12	(8) 0.148 x 3	(4) 0.148 x 3	N/A

Hanger at support A has seat sloped 0 degrees, skewed 0 degrees.

WSR = web stiffeners required

*Capacity values are adjusted based on specific gravity when members use grades other than those specified in Simpson Strong-Tie's capacity tables.

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft^2)	60	60	0	14.5	Live	Y
Uniform (lbf/ft^2)	15	15	0	14.5	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	DJ5-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR JOIST	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Hem-Fir	No. 2	(1) 1.5 X 9.25	12(in) O.C.	DRY	INCISED

DJ5-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 11.333 Member Slope: 0/12 Actual Length (ft): 11.33 O.C. Spacing(in): 12

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
13.88	98.93	2.6	2.74	1	0.43	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	850	525	150	1300	405	1300	470
Adjusted Values	860	462	120	1040	405	1235	446
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	0.8	0.8	0.8	0.8	1	0.95	0.95
C_F	1.1	1.1	1	1	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1.15

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	5.3334	0	5.3334	0	1.00	0.97	1.00	1.00
2	6	0	6	0	1.00	0.97	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (57.7%)	50.7	120.0	5.33	D+L	1
Bending Stress Y (psi)	PASS (6.4%)	783.2	837.1	5.33	D+L	1
Deflection (in)	PASS (89.1%)	0.019 (=L/3316)	0.178 (=L/360)	3.29	L	
Bearing Stress (psi)	PASS (60.2%)	178.3	448.4	5.33	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	-13	-42	0	0	0	0	0	0	0	0	0
B	214	722	0	0	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0

Reaction Location

CONNECTORS (All connectors are Simpson Strong-Tie connectors)*

Support A	Model	Type	Adequacy (%)	Header Fastening (in)	Joist Nails (in)	Nailer Thickness (in)
Primary	LUS210	Hanger	86.24	(8) 0.148 x 3	(4) 0.148 x 3	N/A

Hanger at support A has seat sloped 0 degrees, skewed 0 degrees.

WSR = web stiffeners required

*Capacity values are adjusted based on specific gravity when members use grades other than those specified in Simpson Strong-Tie's capacity tables.

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft^2)	60	60	0	11.3334	Live	Y
Uniform (lbf/ft^2)	15	15	0	11.3334	Dead	Y
Self Weight (lbf/ft)	2.74	2.74	0	11.3334	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	DJ6-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR JOIST	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Hem-Fir	No. 2	(1) 1.5 X 9.25	16(in) O.C.	DRY	INCISED

DJ6-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 7.25 Member Slope: 0/12 Actual Length (ft): 7.25 O.C. Spacing(in): 16

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
13.88	98.93	2.6	2.74	1	0.43	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	850	525	150	1300	405	1300	470
Adjusted Values	860	462	120	1040	405	1235	446
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	0.8	0.8	0.8	0.8	1	0.95	0.95
C_F	1.1	1.1	1	1	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1.15

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	5	0	5	0	1.00	0.96	1.00	1.00
2	2.25	0	2.25	0	1.00	0.99	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (72.8%)	32.6	120.0	4.93	D+L	1
Bending Stress Y (psi)	PASS (82.9%)	145.6	853.2	5	D+L	1
Deflection (in)	PASS (97.1%)	0.005 (=L/12503)	0.167 (=L/360)	2.25	L	
Bearing Stress (psi)	PASS (77.1%)	102.9	448.4	5	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	45	160	0	0	0	0	0	0	0	0	0
B	120	421	0	0	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0

Reaction Location

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft^2)	60	60	0	7.25	Live	Y
Uniform (lbf/ft^2)	15	15	0	7.25	Dead	Y
Self Weight (lbf/ft)	2.74	2.74	0	7.25	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	DJ7-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR JOIST	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Hem-Fir	No. 2	(1) 1.5 X 11.25	16(in) O.C.	DRY	INCISED

DJ7-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 3.667 Member Slope: 0/12 Actual Length (ft): 3.67 O.C. Spacing(in): 16

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
16.88	177.98	3.16	3.33	1	0.43	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	850	525	150	1300	405	1300	470
Adjusted Values	782	420	120	1040	405	1235	446
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	0.8	0.8	0.8	0.8	1	0.95	0.95
C_F	1	1	1	1	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1.15

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	3.16667	0	3.16667	0	1.00	0.96	1.00	1.00
2	0.5	0	0.5	0	1.00	1.00	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (87.7%)	14.8	120.0	3.15	D+L	1
Bending Stress Y (psi)	PASS (94.0%)	46.7	782.0	1.54	D+L	1
Deflection (in)	PASS (98.9%)	0.000 (=L/29970)	0.033 (=L/360)	3.67	L	
Bearing Stress (psi)	PASS (90.7%)	41.8	448.4	3.17	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	36	124	0	0	0	0	0	0	0	0	0
B	50	170	0	0	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0

Reaction Location

CONNECTORS (All connectors are Simpson Strong-Tie connectors)*

Support A	Model	Type	Adequacy (%)	Header Fastening (in)	Joist Nails (in)	Nailer Thickness (in)
Primary	LUS210	Hanger	86.13	(8) 0.148 x 3	(4) 0.148 x 3	N/A

Hanger at support A has seat sloped 0 degrees, skewed 0 degrees.

WSR = web stiffeners required

*Capacity values are adjusted based on specific gravity when members use grades other than those specified in Simpson Strong-Tie's capacity tables.

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft^2)	60	60	0	3.66667	Live	Y
Uniform (lbf/ft^2)	15	15	0	3.66667	Dead	Y
Self Weight (lbf/ft)	3.33	3.33	0	3.66667	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	FB1-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR BEAM	NDS:	2018 NDS
MATERIAL:	Glulams		

Stress Class Rated 24F-1.8E	24F-V4 DF/DF	(1) 3.5 X 9	DRY		

FB1-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 11 Member Slope: 0/12 Actual Length (ft): 11

Area	Ix	Iy	BSW	Lams	G	Kcr
(in^2)	(in^4)	(in^4)	(lbf/ft)			Creep Factor
31.5	212.62	32.16	7.18	1	0.5	1

STRENGTH PROPERTIES

	Fbx+	Fbx-	Fby	Ft	Fvx	Fvy	Fc	Fc⊥	Ex	Exmin	Ey	Eymin
	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)
Base Values	2400	1850	1450	1100	265	230	1650	650	1800000	950000	1600000	850000
Adjusted Values	2400	1850	1497	1100	265	230	1650	650	1800000	950000	1600000	850000
C_M	1	1	1	1	1	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1	1	1	1	1	1

Bending Adjustment Factors C_{vr} = 1

BEAM DATA

		Unbraced Length (ft)		Beam End				
Span	Length (ft)	Top	Bottom	Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	11	0	11	0	1.00	0.98	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (66.1%)	103.3	304.8	0	D+S	1.15
Bending Stress Y (psi)	PASS (52.4%)	1312.7	2760.0	4.84	D+0.75L+0.75S	1.15
Deflection (in)	PASS (54.0%)	0.253 (=L/522)	0.550 (=L/240)	5.28	D+Lr	
Bearing Stress (psi)	PASS (72.8%)	177.0	650.0	0	D+S	1.15

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	1175	293	795	993	0	0	0	0	0	0	0
B	612	293	358	447	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	53.33	53.33	0	11	Live	Y
Uniform (lbf/ft)	20	20	0	11	Dead	Y
Uniform (lbf/ft)	75	75	0	6.8334	Dead	Y
Self Weight (lbf/ft)	7.18	7.18	0	11	Dead	Y

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	142.7186	142.7186	0	6.8334	Dead	Y
Uniform (lbf/ft)	210.8185	210.8185	0	6.8334	Snow	Y
Uniform (lbf/ft)	168.6548	168.6548	0	6.8334	Roof Live	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	-- --	PROJECT NAME:	21-028 Framing
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	FB2-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR BEAM	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 2	(1) 3.5 X 9.25	DRY		

FB2-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 11 Member Slope: 0/12 Actual Length (ft): 11

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
32.38	230.84	33.05	7.38	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	900	575	180	1350	625	1600	580
Adjusted Values	1080	632	180	1350	625	1600	580
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1.2	1.1	1	1	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	11	0	11	0	1.00	0.98	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (76.3%)	49.0	207.0	11	D+0.75L+0.75S	1.15
Bending Stress Y (psi)	PASS (26.2%)	917.1	1242.0	6.82	D+0.75L+0.75S	1.15
Deflection (in)	PASS (70.6%)	0.162 (=L/817)	0.550 (=L/240)	5.83	D+Lr	
Bearing Stress (psi)	PASS (86.2%)	86.3	625.0	11	D+0.75L+0.75S	1.15

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	341	293	244	305	0	0	0	0	0	0	0
B	462	293	399	500	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	53.33	53.33	0	11	Live	Y
Uniform (lbf/ft)	20	20	0	11	Dead	Y
Self Weight (lbf/ft)	7.38	7.38	0	11	Dead	Y

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	501.7554	-	6.8334	-	Dead	Y
Point (lbf)	804.0684	-	6.8334	-	Snow	Y
Point (lbf)	643.0063	-	6.8334	-	Roof Live	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	FJ3-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR JOIST	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 1	(1) 1.5 X 9.25	16(in) O.C.	DRY	

FJ3-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 14.667 Member Slope: 0/12 Actual Length (ft): 14.67 O.C. Spacing(in): 16

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
13.88	98.93	2.6	3.16	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	1000	675	180	1500	625	1700	620
Adjusted Values	1265	742	180	1500	625	1700	620
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1.1	1.1	1	1	1	1	1

Bending Adjustment Factors $C_{fu} = 0.74C_r = 1.15$

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	14.6667	0	14.6667	0	1.00	0.48	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (66.3%)	60.6	180.0	14.67	D+L	1
Bending Stress Y (psi)	PASS (8.8%)	1153.9	1265.0	7.33	D+L	1
Deflection (in)	PASS (32.5%)	0.330 (=L/533)	0.489 (=L/360)	7.33	L	
Bearing Stress (psi)	PASS (82.9%)	106.9	625.0	0	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	170	391	0	0	0	0	0	0	0	0	0
B	170	391	0	0	0	0	0	0	0	0	0

Reaction Location

A B

CONNECTORS (All connectors are Simpson Strong-Tie connectors)*

Support A	Model	Type	Adequacy (%)	Header Fastening (in)	Joist Nails (in)	Nailer Thickness (in)
Primary	LUS210	Hanger	57.98	(8) 0.148 x 3	(4) 0.148 x 3	N/A

Hanger at support A has seat sloped 0 degrees, skewed 0 degrees.

WSR = web stiffeners required

*Capacity values are adjusted based on specific gravity when members use grades other than those specified in Simpson Strong-Tie's capacity tables.

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft^2)	40	40	0	14.6667	Live	Y
Uniform (lbf/ft^2)	15	15	0	14.6667	Dead	Y
Self Weight (lbf/ft)	3.16	3.16	0	14.6667	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	FB4-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR BEAM	NDS:	2018 NDS
MATERIAL:	Glulams		

Stress Class Rated 24F-1.8E	24F-V4 DF/DF	(1) 3.5 X 9	DRY		

FB4-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 6.5 Member Slope: 0/12 Actual Length (ft): 6.5

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
31.5	212.62	32.16	7.18	1	0.5	1

STRENGTH PROPERTIES

	Fbx+ (psi)	Fbx- (psi)	Fby (psi)	Ft (psi)	Fvx (psi)	Fvy (psi)	Fc (psi)	Fc⊥ (psi)	Ex (psi)	Exmin (psi)	Ey (psi)	Eymin (psi)
Base Values	2400	1850	1450	1100	265	230	1650	650	1800000	950000	1600000	850000
Adjusted Values	2400	1850	1497	1100	265	230	1650	650	1800000	950000	1600000	850000
C_M	1	1	1	1	1	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1	1	1	1	1	1

Bending Adjustment Factors C_{vr} = 1

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	6.5	0	6.5	0	1.00	0.99	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (25.0%)	198.8	265.0	0	D+L	1
Bending Stress Y (psi)	PASS (28.2%)	1722.5	2400.0	3.25	D+L	1.25
Shear Stress X (psi)	PASS (100.0%)	0.1	287.5	0	D+Lr	1
Bending Stress X (psi)	PASS (99.9%)	1.2	1870.6	3.25	D+Lr	1.25
Deflection (in)	PASS (58.5%)	0.135 (=L/579)	0.325 (=L/240)	3.25	D+L	
Bearing Stress (psi)	PASS (44.5%)	360.7	650.0	0	D+0.75L+0.75Lr	1.25

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	1893	2280	1087	679	0	0	0	0	0	0	0
B	1893	2280	1087	679	0	0	0	0	0	0	0
X axis											
A	0	0	1	0	0	0	0	0	0	0	0
B	0	0	1	0	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	100	100	0	6.5	Dead	Y
Self Weight (lbf/ft)	7.18	7.18	0	6.5	Dead	Y

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	-0.1481476	-0.1481476	0	6.5	Dead	X
Uniform (lbf/ft)	250.8287	250.8287	0	6.5	Dead	Y
Uniform (lbf/ft)	208.9823	208.9823	0	6.5	Snow	Y
Uniform (lbf/ft)	-0.1975431	-0.1975431	0	6.5	Roof Live	X
Uniform (lbf/ft)	334.3967	334.3967	0	6.5	Roof Live	Y
Uniform (lbf/ft)	108.75	108.75	0	6.5	Dead	Y
Uniform (lbf/ft)	435	435	0	6.5	Live	Y
Uniform (lbf/ft)	115.8231	115.8231	0	6.5	Dead	Y
Uniform (lbf/ft)	266.6683	266.6683	0	6.5	Live	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	FB5-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR BEAM	NDS:	2018 NDS
MATERIAL:	Glulams		

Stress Class Rated 24F-1.8E	24F-V4 DF/DF	(1) 5.5 X 10.5	DRY		

FB5-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 13.833 Member Slope: 0/12 Actual Length (ft): 13.83

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
57.75	530.58	145.58	13.17	1	0.5	1

STRENGTH PROPERTIES

	Fbx+ (psi)	Fbx- (psi)	Fby (psi)	Ft (psi)	Fvx (psi)	Fvy (psi)	Fc (psi)	Fc⊥ (psi)	Ex (psi)	Exmin (psi)	Ey (psi)	Eymin (psi)
Base Values	2400	1850	1450	1100	265	230	1650	650	1800000	950000	1600000	850000
Adjusted Values	2400	1850	1472	1100	265	230	1650	650	1800000	950000	1600000	850000
C_M	1	1	1	1	1	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1	1	1	1	1	1

Bending Adjustment Factors C_{vr} = 1

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	13.83334	0	13.83334	0	1.00	0.99	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (60.2%)	131.9	331.3	13.83	D+Lr	1.25
Bending Stress Y (psi)	PASS (56.7%)	1300.1	3000.0	10.93	D+Lr	1.25
Shear Stress X (psi)	PASS (100.0%)	0.1	287.5	13.83	D+Lr	1.25
Bending Stress X (psi)	PASS (99.9%)	0.9	1837.8	11.21	D+Lr	1.25
Deflection (in)	PASS (53.2%)	0.324 (=L/513)	0.692 (=L/240)	7.61	D+Lr	
Bearing Stress (psi)	PASS (59.4%)	263.8	650.0	13.83	D+Lr	1.25

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	1222	369	1296	810	0	0	0	0	0	0	0
B	2342	369	2736	1710	0	0	0	0	0	0	0
X axis											
A	0	0	1 / 0	0	0	0	0	0	0	0	0
B	1	0	2 / -1	0	0	0	0	0	0	0	0

Reaction Location

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	53.3	53.3	0	13.83334	Live	Y
Uniform (lbf/ft)	20	20	0	13.83334	Dead	Y
Self Weight (lbf/ft)	13.17	13.17	0	13.83334	Dead	Y

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	0.3275461	0.3275461	0	1.41667	Dead	X
Uniform (lbf/ft)	0.3275461	0.3275461	11	13.83334	Dead	X
Uniform (lbf/ft)	203.1002	203.1002	0	1.41667	Dead	Y
Uniform (lbf/ft)	203.1002	203.1002	11	13.83334	Dead	Y
Uniform (lbf/ft)	0.6063387	0.6063387	0	1.41667	Snow	X
Uniform (lbf/ft)	0.6063387	0.6063387	11	13.83334	Snow	X
Uniform (lbf/ft)	169.3124	169.3124	0	1.41667	Snow	Y
Uniform (lbf/ft)	169.3124	169.3124	11	13.83334	Snow	Y
Uniform (lbf/ft)	0.2700491	0.2700491	0	1.41667	Roof Live	X
Uniform (lbf/ft)	0.2700491	0.2700491	11	13.83334	Roof Live	X
Uniform (lbf/ft)	270.8003	270.8003	0	1.41667	Roof Live	Y
Uniform (lbf/ft)	270.8003	270.8003	11	13.83334	Roof Live	Y
Uniform (lbf/ft)	-0.6244926	-0.6244926	0	1.416667	Dead	X
Uniform (lbf/ft)	-0.6244926	-0.6244926	11	13.83334	Dead	X
Uniform (lbf/ft)	144.517	144.517	0	1.416667	Dead	Y
Uniform (lbf/ft)	144.517	144.517	11	13.83334	Dead	Y
Uniform (lbf/ft)	-0.4851565	-0.4851565	0	1.416667	Snow	X
Uniform (lbf/ft)	-0.4851565	-0.4851565	11	13.83334	Snow	X
Uniform (lbf/ft)	120.4367	120.4367	0	1.416667	Snow	Y
Uniform (lbf/ft)	120.4367	120.4367	11	13.83334	Snow	Y
Uniform (lbf/ft)	-0.9031782	-0.9031782	0	1.416667	Roof Live	X
Uniform (lbf/ft)	-0.9031782	-0.9031782	11	13.83334	Roof Live	X
Uniform (lbf/ft)	192.6777	192.6777	0	1.416667	Roof Live	Y
Uniform (lbf/ft)	192.6777	192.6777	11	13.83334	Roof Live	Y
Point (lbf)	132.0047	-	1.416667	-	Dead	Y
Point (lbf)	1496.188	-	11	-	Dead	Y
Point (lbf)	104.5029	-	1.416667	-	Snow	Y
Point (lbf)	1184.473	-	11	-	Snow	Y
Point (lbf)	167.1921	-	1.416667	-	Roof Live	Y
Point (lbf)	1895.015	-	11	-	Roof Live	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	FB7-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR BEAM	NDS:	2018 NDS
MATERIAL:	Glulams		

Stress Class Rated 24F-1.8E	24F-V4 DF/DF	(1) 3.5 X 9	DRY		

FB7-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 20.083 Member Slope: 0/12 Actual Length (ft): 20.08

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
31.5	212.62	32.16	7.18	1	0.5	1

STRENGTH PROPERTIES

	Fbx+ (psi)	Fbx- (psi)	Fby (psi)	Ft (psi)	Fvx (psi)	Fvy (psi)	Fc (psi)	Fc⊥ (psi)	Ex (psi)	Exmin (psi)	Ey (psi)	Eymin (psi)
Base Values	2400	1850	1450	1100	265	230	1650	650	1800000	950000	1600000	850000
Adjusted Values	2400	1850	1497	1100	265	230	1650	650	1800000	950000	1600000	850000
C_M	1	1	1	1	1	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1	1	1	1	1	1

Bending Adjustment Factors C_{vr} = 1

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	13.3334	0	13.3334	0	1.00	0.98	1.00	1.00
2	6.750001	0	6.75	0	1.00	1.00	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (56.6%)	114.9	265.0	13.46	D+L	1
Bending Stress Y (psi)	PASS (29.2%)	1287.5	1819.6	13.26	D+L	1
Deflection (in)	PASS (57.7%)	0.282 (=L/568)	0.667 (=L/240)	6.03	D+L	
Bearing Stress (psi)	PASS (45.5%)	392.4	719.6	13.33	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	919	626 / -33	0	271	0	0	0	0	0	0	0
B	2570	2237	0	688	0	0	0	0	0	0	0
C	330	719	0	45	0	0	0	0	0	0	0

Reaction Location

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	50	50	0	20.0834	Snow	Y
Uniform (lbf/ft)	130	130	0	20.0834	Dead	Y
Uniform (lbf/ft)	275	275	13.3334	20.0834	Live	Y
Uniform (lbf/ft)	103	103	13.3334	20.0834	Dead	Y
Self Weight (lbf/ft)	7.18	7.18	0	20.0834	Dead	Y

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	-12.5627	-12.5627	13.3334	20.0834	Dead	Y
Uniform (lbf/ft)	-42.49428	-42.49428	13.3334	20.0834	Live	Y
Uniform (lbf/ft)	34.00035	34.00035	0	13.3334	Dead	Y
Uniform (lbf/ft)	119.625	119.625	0	13.3334	Live	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	FB8-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR BEAM	NDS:	2018 NDS
MATERIAL:	Glulams		

Stress Class Rated 24F-1.8E	24F-V4 DF/DF	(1) 5.5 X 9	DRY		

FB8-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 12.667 Member Slope: 0/12 Actual Length (ft): 12.67

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
49.5	334.12	124.78	11.29	1	0.5	1

STRENGTH PROPERTIES

	Fbx+ (psi)	Fbx- (psi)	Fby (psi)	Ft (psi)	Fvx (psi)	Fvy (psi)	Fc (psi)	Fc⊥ (psi)	Ex (psi)	Exmin (psi)	Ey (psi)	Eymin (psi)
Base Values	2400	1850	1450	1100	265	230	1650	650	1800000	950000	1600000	850000
Adjusted Values	2400	1850	1497	1100	265	230	1650	650	1800000	950000	1600000	850000
C_M	1	1	1	1	1	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1	1	1	1	1	1

Bending Adjustment Factors C_{vr} = 1

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	12.6667	0	12.6667	0	1.00	0.99	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (69.9%)	79.9	265.0	12.67	D+L	1
Bending Stress Y (psi)	PASS (43.8%)	1349.4	2400.0	6.33	D+L	1
Deflection (in)	PASS (28.1%)	0.304 (=L/500)	0.422 (=L/360)	6.33	L	
Bearing Stress (psi)	PASS (78.9%)	137.0	650.0	12.67	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	639	1997	0	0	0	0	0	0	0	0	0
B	639	1997	0	0	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	11.29	11.29	0	12.6667	Dead	Y

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	89.63728	89.63728	0	12.6667	Dead	Y
Uniform (lbf/ft)	315.375	315.375	0	12.6667	Live	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	FB9-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR BEAM	NDS:	2018 NDS
MATERIAL:	Glulams		

Stress Class Rated 24F-1.8E	24F-V4 DF/DF	(1) 5.5 X 12	DRY		

FB9-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 12.5 Member Slope: 0/12 Actual Length (ft): 12.5

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
66	792	166.38	15.05	1	0.5	1

STRENGTH PROPERTIES

	Fbx+ (psi)	Fbx- (psi)	Fby (psi)	Ft (psi)	Fvx (psi)	Fvy (psi)	Fc (psi)	Fc⊥ (psi)	Ex (psi)	Exmin (psi)	Ey (psi)	Eymin (psi)
Base Values	2400	1850	1450	1100	265	230	1650	650	1800000	950000	1600000	850000
Adjusted Values	2400	1850	1450	1100	265	230	1650	650	1800000	950000	1600000	850000
C_M	1	1	1	1	1	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1	1	1	1	1	1

Bending Adjustment Factors C_{vr} = 1

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	12.5	0	12.5	0	1.00	0.99	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (2.8%)	257.6	265.0	0	D+L	1
Bending Stress Y (psi)	PASS (47.0%)	1271.8	2400.0	5.5	D+L	1
Deflection (in)	PASS (54.6%)	0.284 (=L/529)	0.625 (=L/240)	6	D+L	
Bearing Stress (psi)	PASS (1.8%)	638.2	650.0	0	D+0.75L+0.75S	1.15

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	5406	5928	2596	3245	0	0	0	0	0	0	0
B	1424	2557	678	847	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	15.05	15.05	0	12.5	Dead	Y

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	80.34286	80.34286	0.6667	12.5	Dead	Y
Uniform (lbf/ft)	112.2963	112.2963	0.6667	12.5	Snow	Y
Uniform (lbf/ft)	89.83692	89.83692	0.6667	12.5	Roof Live	Y
Uniform (lbf/ft)	94.22628	94.22628	0	12.5	Dead	Y
Uniform (lbf/ft)	376.9051	376.9051	0	12.5	Live	Y
Point (lbf)	4513.849	-	0.6667	-	Dead	Y
Point (lbf)	3773.249	-	0.6667	-	Live	Y
Point (lbf)	2763.24	-	0.6667	-	Snow	Y
Point (lbf)	2210.709	-	0.6667	-	Roof Live	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	FJ1-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR JOIST	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 2	(1) 1.5 X 9.25	16(in) O.C.	DRY	

FJ1-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 12.75 Member Slope: 0/12 Actual Length (ft): 12.75 O.C. Spacing(in): 16

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
13.88	98.93	2.6	3.16	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	900	575	180	1350	625	1600	580
Adjusted Values	1138	632	180	1350	625	1600	580
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1.1	1.1	1	1	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1.15

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	12.75	0	12.75	0	1.00	0.56	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (70.7%)	52.7	180.0	0	D+L	1
Bending Stress Y (psi)	PASS (23.4%)	872.0	1138.5	6.38	D+L	1
Deflection (in)	PASS (52.9%)	0.200 (=L/764)	0.425 (=L/360)	6.38	L	
Bearing Stress (psi)	PASS (85.1%)	92.9	625.0	0	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	148	340	0	0	0	0	0	0	0	0	0
B	148	340	0	0	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft^2)	40	40	0	12.75	Live	Y
Uniform (lbf/ft^2)	15	15	0	12.75	Dead	Y
Self Weight (lbf/ft)	3.16	3.16	0	12.75	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	FJ5-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR JOIST	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 2	(1) 1.5 X 11.25	16(in) O.C.	DRY	

FJ5-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 13.75 Member Slope: 0/12 Actual Length (ft): 13.75 O.C. Spacing(in): 16

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
16.88	177.98	3.16	3.85	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	900	575	180	1350	625	1600	580
Adjusted Values	1035	575	180	1350	625	1600	580
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1	1	1	1	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1.15

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	13.75	0	13.75	0	1.00	0.48	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (75.5%)	44.1	180.0	0	D+L	1
Bending Stress Y (psi)	PASS (37.5%)	647.0	1035.0	6.88	D+L	1
Deflection (in)	PASS (67.1%)	0.151 (=L/1096)	0.458 (=L/360)	6.88	L	
Bearing Stress (psi)	PASS (84.9%)	94.5	625.0	0	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	130	367	0	0	0	0	0	0	0	0	0
B	130	367	0	0	0	0	0	0	0	0	0

Reaction Location

A B

CONNECTORS (All connectors are Simpson Strong-Tie connectors)*

Support A	Model	Type	Adequacy (%)	Header Fastening (in)	Joist Nails (in)	Nailer Thickness (in)
Primary	LUS210	Hanger	62.83	(8) 0.148 x 3	(4) 0.148 x 3	N/A
Support B						
Primary	LUS210	Hanger	41.92	(8) 0.148 x 3	(4) 0.148 x 3	N/A

Hanger at support A has seat sloped 0 degrees, skewed 0 degrees.

Hanger at support B has seat sloped 0 degrees, skewed 0 degrees.

WSR = web stiffeners required

*Capacity values are adjusted based on specific gravity when members use grades other than those specified in Simpson Strong-Tie's capacity tables.

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft^2)	40	40	0	13.75	Live	Y
Uniform (lbf/ft)	15	15	0	13.75	Dead	Y
Self Weight (lbf/ft)	3.85	3.85	0	13.75	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	FJ2-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR JOIST	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 2	(1) 1.5 X 9.25	16(in) O.C.	DRY	

FJ2-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 11.25 Member Slope: 0/12 Actual Length (ft): 11.25 O.C. Spacing(in): 16

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
13.88	98.93	2.6	3.16	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	900	575	180	1350	625	1600	580
Adjusted Values	1138	632	180	1350	625	1600	580
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1.1	1.1	1	1	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1.15

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	11.25	0	11.25	0	1.00	0.63	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (74.2%)	46.5	180.0	0	D+L	1
Bending Stress Y (psi)	PASS (40.4%)	678.9	1138.5	5.62	D+L	1
Deflection (in)	PASS (67.6%)	0.121 (=L/1112)	0.375 (=L/360)	5.62	L	
Bearing Stress (psi)	PASS (86.9%)	82.0	625.0	0	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	130	300	0	0	0	0	0	0	0	0	0
B	130	300	0	0	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft^2)	40	40	0	11.25	Live	Y
Uniform (lbf/ft^2)	15	15	0	11.25	Dead	Y
Self Weight (lbf/ft)	3.16	3.16	0	11.25	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	FJ3-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR JOIST	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 1	(1) 1.5 X 9.25	16(in) O.C.	DRY	

FJ3-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 14.667 Member Slope: 0/12 Actual Length (ft): 14.67 O.C. Spacing(in): 16

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
13.88	98.93	2.6	3.16	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	1000	675	180	1500	625	1700	620
Adjusted Values	1265	742	180	1500	625	1700	620
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1.1	1.1	1	1	1	1	1

Bending Adjustment Factors $C_{fu} = 0.74C_r = 1.15$

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	14.6667	0	14.6667	0	1.00	0.48	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (66.3%)	60.6	180.0	14.67	D+L	1
Bending Stress Y (psi)	PASS (8.8%)	1153.9	1265.0	7.33	D+L	1
Deflection (in)	PASS (32.5%)	0.330 (=L/533)	0.489 (=L/360)	7.33	L	
Bearing Stress (psi)	PASS (82.9%)	106.9	625.0	0	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	170	391	0	0	0	0	0	0	0	0	0
B	170	391	0	0	0	0	0	0	0	0	0

Reaction Location

A B

CONNECTORS (All connectors are Simpson Strong-Tie connectors)*

Support A	Model	Type	Adequacy (%)	Header Fastening (in)	Joist Nails (in)	Nailer Thickness (in)
Primary	LUS210	Hanger	57.98	(8) 0.148 x 3	(4) 0.148 x 3	N/A

Hanger at support A has seat sloped 0 degrees, skewed 0 degrees.

WSR = web stiffeners required

*Capacity values are adjusted based on specific gravity when members use grades other than those specified in Simpson Strong-Tie's capacity tables.

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft^2)	40	40	0	14.6667	Live	Y
Uniform (lbf/ft^2)	15	15	0	14.6667	Dead	Y
Self Weight (lbf/ft)	3.16	3.16	0	14.6667	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	FJ4-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	FLOOR JOIST	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 2	(1) 1.5 X 9.25	16(in) O.C.	DRY	

FJ4-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 13.333 Member Slope: 0/12 Actual Length (ft): 13.33 O.C. Spacing(in): 16

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
13.88	98.93	2.6	3.16	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	900	575	180	1350	625	1600	580
Adjusted Values	1138	632	180	1350	625	1600	580
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1.1	1.1	1	1	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1.15

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	13.3334	0	13.3334	0	1.00	0.54	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (69.4%)	55.1	180.0	0	D+L	1
Bending Stress Y (psi)	PASS (16.2%)	953.7	1138.5	6.67	D+L	1
Deflection (in)	PASS (46.1%)	0.240 (=L/668)	0.444 (=L/360)	6.67	L	
Bearing Stress (psi)	PASS (84.5%)	97.1	625.0	0	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	154	356	0	0	0	0	0	0	0	0	0
B	154	356	0	0	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

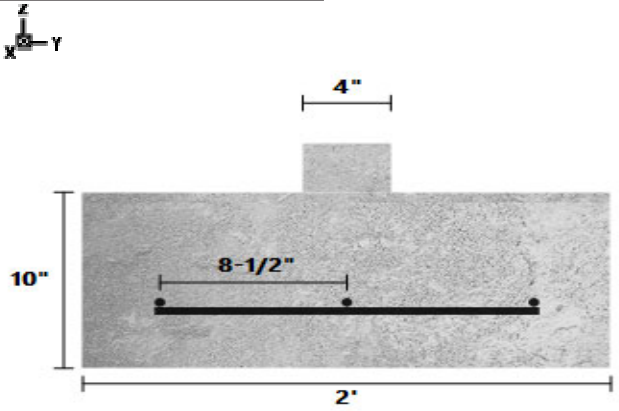
Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft^2)	40	40	0	13.3334	Live	Y
Uniform (lbf/ft^2)	15	15	0	13.3334	Dead	Y
Self Weight (lbf/ft)	3.16	3.16	0	13.3334	Dead	Y

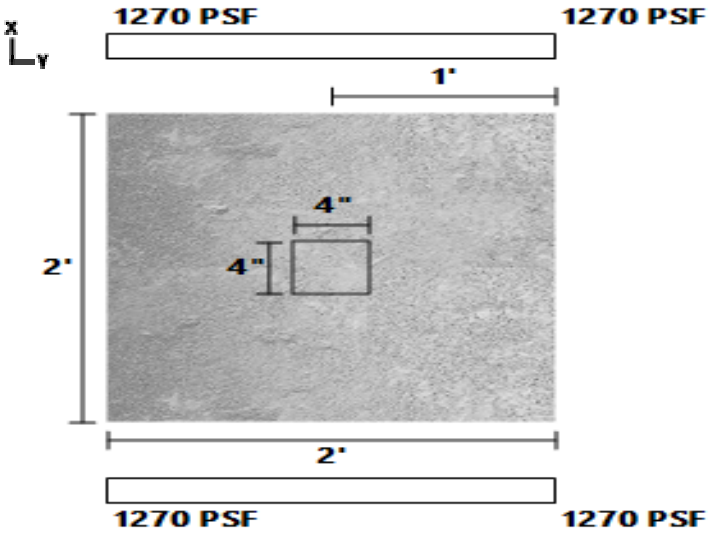
PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.1	LOADING:	
MEMBER NAME:	FTG-FB5-2.2B	CODE:	2018 International Building Code
MEMBER TYPE:	ISOLATED FOOTING	ACI:	ACI 318-14
MATERIAL:	Concrete		

2 (ft) X 2 (ft) X 10 (in)	Soil Depth TOF: 0 (ft)	(3) #4 Long, (3) #4 Short

FTG-FB5-2.2B DIAGRAMS





MATERIAL PROPERTIES

FOOTING

fc' (psi)	Ec (psi)	Density (lbf/ft³)	Width (ft)	Length (ft)	Depth (in)	Volume (ft³)
2500	2880952	145	2	2	10	3.33

CALCULATION VARIABLES

Bo (in)	Φ-X	Φ-Y
42	0	0

COLUMN

Width (in)	Length (in)	Material	Offset (in)
4	4	Concrete	0

SOIL

Bearing Strength (lbf/ft²)	Density (lbf/ft³)	Cohesion	Friction Angle	Depth (ft)	Rankine Coefficient (Kp)
1500	140	0	30	0	3

REBAR

Bar Size #	# Bars Long	# Bars Short	fy (psi)	Es (psi)
4	3	3	60000	2.9E+07

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOAD COMBO
Soil Bearing Pressure (lbf/ft²)	PASS (15.4%)	1269.6	1500.0	D+Lr
Two-Way Shear (Punching) (lbf)	PASS (81.5%)	7557.1	40950.0	1.2D+1.6Lr+L
One-Way Shear X (lbf)	PASS (90.6%)	1102.1	11700.0	1.2D+1.6Lr+L
Moment X (lbf-ft)	PASS (59.0%)	1312.0	3200.0	1.2D+1.6Lr+L
One-Way Shear Y (lbf)	PASS (90.6%)	1102.1	11700.0	1.2D+1.6Lr+L
Moment Y (lbf-ft)	PASS (59.0%)	1312.0	3200.0	1.2D+1.6Lr+L
Crushing (psi)	PASS (65.8%)	472.3	1381.3	1.2D+1.6Lr+L

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction

LINKED LOAD LIST

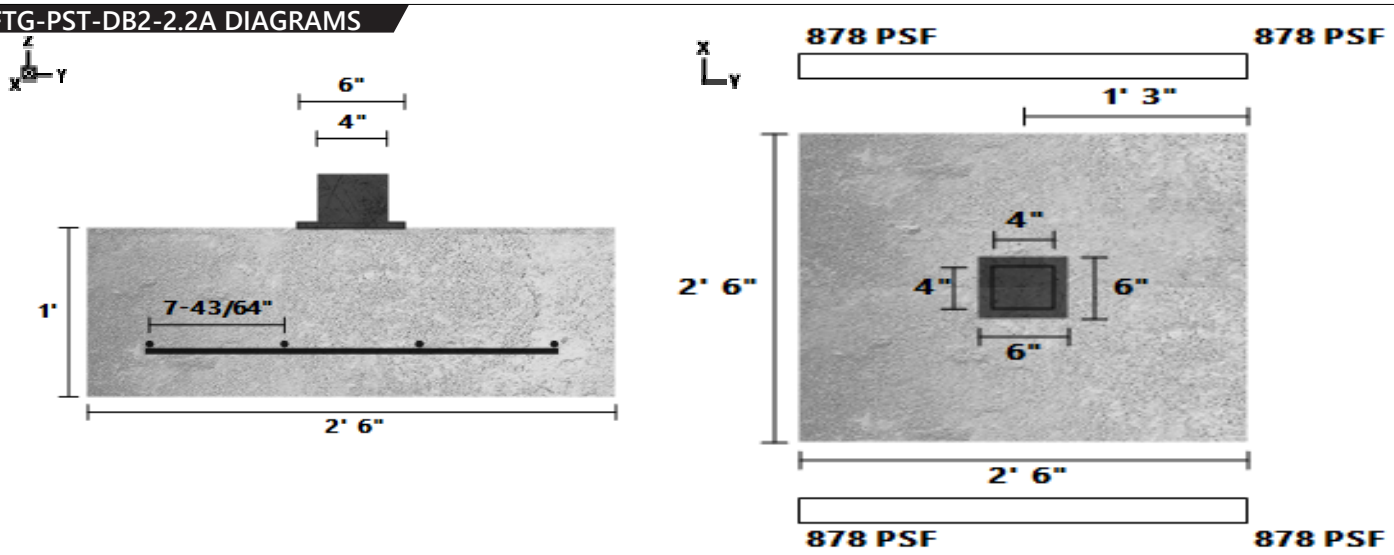
Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	2341.958	-	0	-	Dead	Z
Point (lbf)	368.6582	-	0	-	Live	Z
Point (lbf)	1710.472	-	0	-	Snow	Z
Point (lbf)	2736.328	-	0	-	Roof Live	Z

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.1	LOADING:	
MEMBER NAME:	FTG-PST-DB2-2.2A	CODE:	2018 International Building Code
MEMBER TYPE:	ISOLATED FOOTING	ACI:	ACI 318-14
MATERIAL:	Concrete		

2.5 (ft) X 2.5 (ft) X 12 (in)	Soil Depth TOF: 0 (ft)	(4) #4 Long, (4) #4 Short

FTG-PST-DB2-2.2A DIAGRAMS



MATERIAL PROPERTIES

FOOTING

fc' (psi)	Ec (psi)	Density (lbf/ft³)	Width (ft)	Length (ft)	Depth (in)	Volume (ft³)
2500	2880952	145	2.5	2.5	12	6.25

CALCULATION VARIABLES

Bo (in)	Φ-X	Φ-Y
54	0	0

COLUMN

Width (in)	length (in)	Plate Width (in)	Plate Length (in)	Plate Thickness (in)	Material	Offset (in)
4	4	6	6	0	Steel	0

SOIL

Bearing Strength (lbf/ft²)	Density (lbf/ft³)	Cohesion	Friction Angle	Depth (ft)	Rankine Coefficient (Kp)
1500	140	0	30	0	3

REBAR

Bar Size #	# Bars Long	# Bars Short	fy (psi)	Es (psi)
4	4	4	60000	2.9E+07

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOAD COMBO
Soil Bearing Pressure (lbf/ft²)	PASS (41.5%)	878.2	1500.0	D+L
Two-Way Shear (Punching) (lbf)	PASS (88.0%)	8236.3	68850.0	1.2D+1.6L+0.5Lr
One-Way Shear X (lbf)	PASS (94.3%)	1098.2	19125.0	1.2D+1.6L+0.5Lr
Moment X (lbf-ft)	PASS (71.4%)	1787.4	6250.0	1.2D+1.6L+0.5Lr
One-Way Shear Y (lbf)	PASS (94.3%)	1098.2	19125.0	1.2D+1.6L+0.5Lr
Moment Y (lbf-ft)	PASS (71.4%)	1787.4	6250.0	1.2D+1.6L+0.5Lr
Crushing (psi)	PASS (83.4%)	228.8	1381.3	1.2D+1.6L+0.5Lr

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction

LINKED LOAD LIST

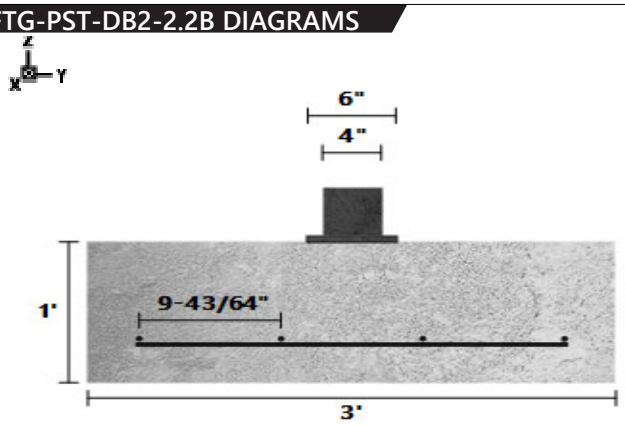
Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	1363.043	-	0	-	Dead	Z
Point (lbf)	4125.404	-	0	-	Live	Z

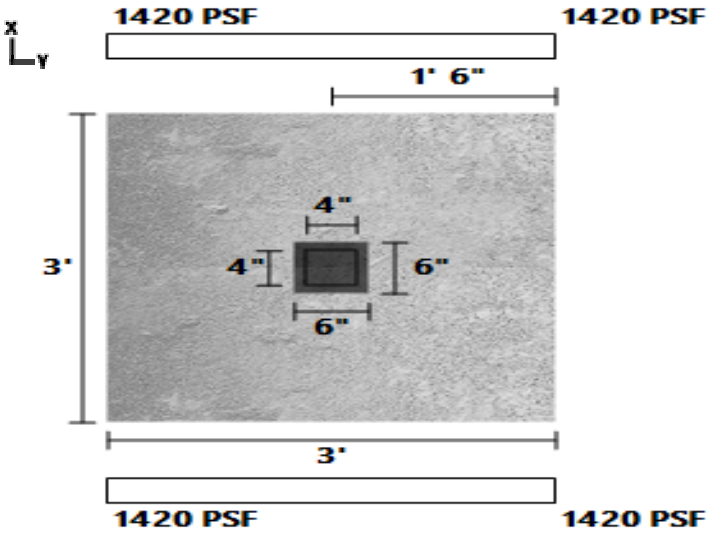
PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	-- --	PROJECT NAME:	21-028 Framing
LEVEL:	S2.1	LOADING:	
MEMBER NAME:	FTG-PST-DB2-2.2B	CODE:	2018 International Building Code
MEMBER TYPE:	ISOLATED FOOTING	ACI:	ACI 318-14
MATERIAL:	Concrete		

3 (ft) X 3 (ft) X 12 (in)	Soil Depth TOF: 0 (ft)	(4) #4 Long, (4) #4 Short

FTG-PST-DB2-2.2B DIAGRAMS





MATERIAL PROPERTIES

FOOTING

fc' (psi)	Ec (psi)	Density (lbf/ft³)	Width (ft)	Length (ft)	Depth (in)	Volume (ft³)
2500	2880952	145	3	3	12	9

CALCULATION VARIABLES

Bo (in)	Φ-X	Φ-Y
54	0	0

COLUMN

Width (in)	length (in)	Plate Width (in)	Plate Length (in)	Plate Thickness (in)	Material	Offset (in)
4	4	6	6	0	Steel	0

SOIL

Bearing Strength (lbf/ft²)	Density (lbf/ft³)	Cohesion	Friction Angle	Depth (ft)	Rankine Coefficient (Kp)
1500	140	0	30	0	3

REBAR

Bar Size #	# Bars Long	# Bars Short	fy (psi)	Es (psi)
4	4	4	60000	2.9E+07

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOAD COMBO
Soil Bearing Pressure (lbf/ft²)	PASS (5.3%)	1420.1	1500.0	D+L
Two-Way Shear (Punching) (lbf)	PASS (72.1%)	19191.8	68850.0	1.2D+1.6L+0.5Lr
One-Way Shear X (lbf)	PASS (83.7%)	3731.7	22950.0	1.2D+1.6L+0.5Lr
Moment X (lbf-ft)	PASS (28.8%)	5336.6	7500.0	1.2D+1.6L+0.5Lr
One-Way Shear Y (lbf)	PASS (83.7%)	3731.7	22950.0	1.2D+1.6L+0.5Lr
Moment Y (lbf-ft)	PASS (28.8%)	5336.6	7500.0	1.2D+1.6L+0.5Lr
Crushing (psi)	PASS (61.4%)	533.1	1381.3	1.2D+1.6L+0.5Lr

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction

LINKED LOAD LIST

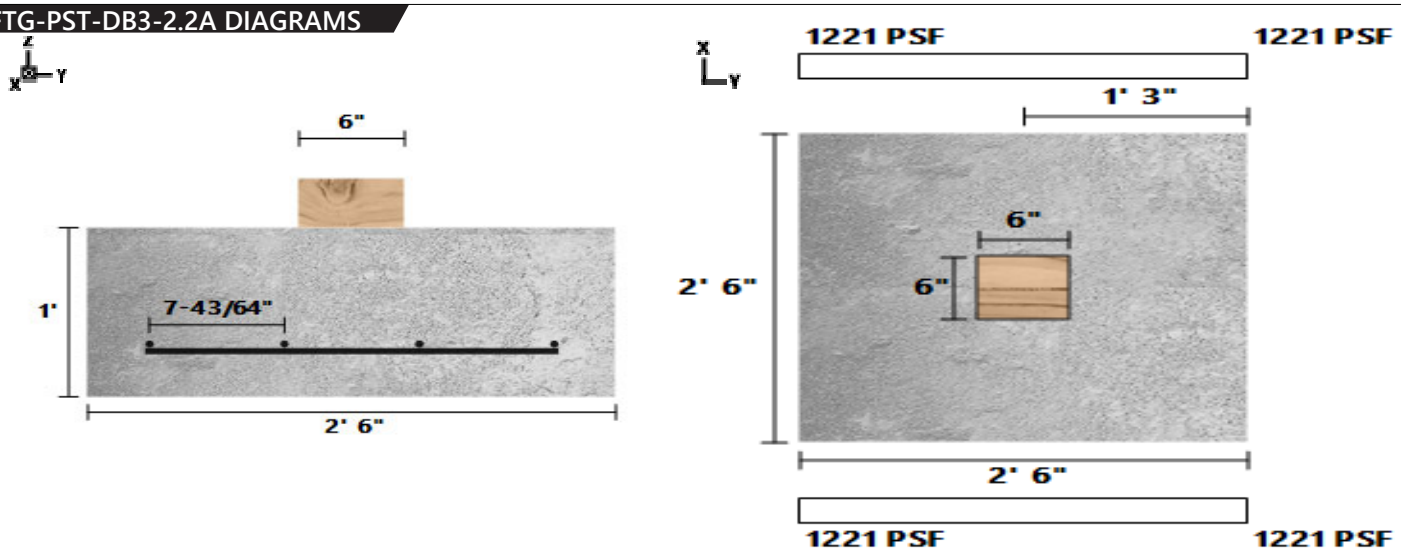
Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	3145.583	-	0	-	Dead	Z
Point (lbf)	9635.687	-	0	-	Live	Z

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.1	LOADING:	
MEMBER NAME:	FTG-PST-DB3-2.2A	CODE:	2018 International Building Code
MEMBER TYPE:	ISOLATED FOOTING	ACI:	ACI 318-14
MATERIAL:	Concrete		

2.5 (ft) X 2.5 (ft) X 12 (in)	Soil Depth TOF: 0 (ft)	(4) #4 Long, (4) #4 Short

FTG-PST-DB3-2.2A DIAGRAMS



MATERIAL PROPERTIES

FOOTING

fc' (psi)	Ec (psi)	Density (lbf/ft³)	Width (ft)	Length (ft)	Depth (in)	Volume (ft³)
2500	2880952	145	2.5	2.5	12	6.25

CALCULATION VARIABLES

Bo (in)	Φ-X	Φ-Y
58	0	0

COLUMN

Width (in)	Length (in)	Material	Offset (in)
6	6	Wood	0

SOIL

Bearing Strength (lbf/ft²)	Density (lbf/ft³)	Cohesion	Friction Angle	Depth (ft)	Rankine Coefficient (Kp)
1500	140	0	30	0	3

REBAR

Bar Size #	# Bars Long	# Bars Short	fy (psi)	Es (psi)
4	4	4	60000	2.9E+07

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOAD COMBO
Soil Bearing Pressure (lbf/ft²)	PASS (18.6%)	1220.8	1500.0	D+0.75L+0.75S
Two-Way Shear (Punching) (lbf)	PASS (85.5%)	10749.9	73950.0	1.2D+1.6S+L
One-Way Shear X (lbf)	PASS (93.4%)	1254.2	19125.0	1.2D+1.6S+L
Moment X (lbf-ft)	PASS (65.6%)	2150.0	6250.0	1.2D+1.6S+L
One-Way Shear Y (lbf)	PASS (93.4%)	1254.2	19125.0	1.2D+1.6S+L
Moment Y (lbf-ft)	PASS (65.6%)	2150.0	6250.0	1.2D+1.6S+L
Crushing (psi)	PASS (78.4%)	298.6	1381.3	1.2D+1.6S+L

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction

LINKED LOAD LIST

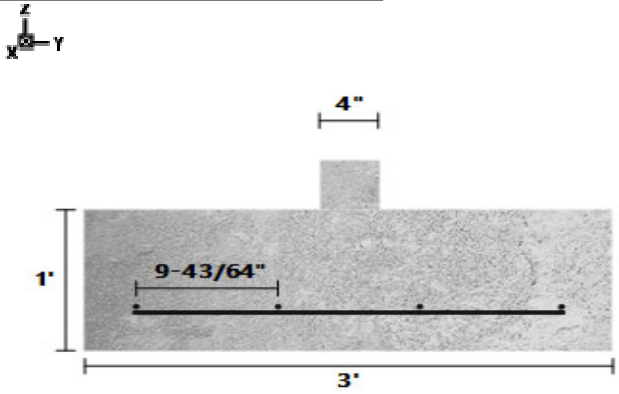
Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	3827.668	-	0	-	Dead	Z
Point (lbf)	3258.915	-	0	-	Live	Z
Point (lbf)	1811.1	-	0	-	Snow	Z
Point (lbf)	1448.941	-	0	-	Roof Live	Z

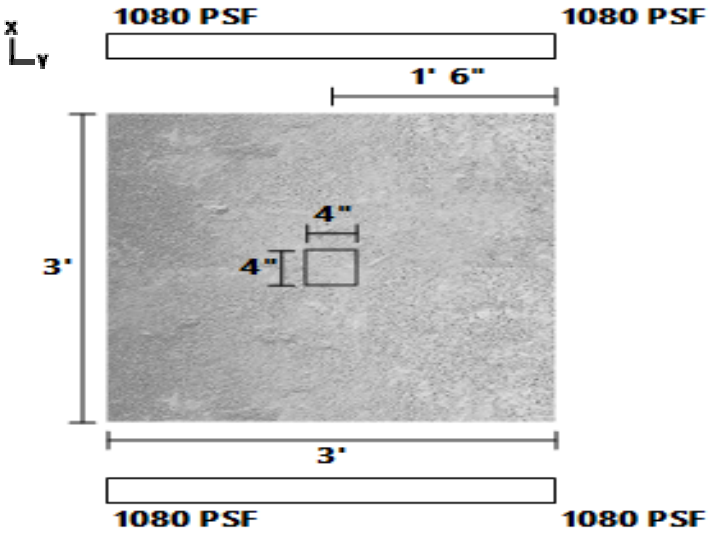
PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.1	LOADING:	
MEMBER NAME:	FTG-PST-FB3-2.2B	CODE:	2018 International Building Code
MEMBER TYPE:	ISOLATED FOOTING	ACI:	ACI 318-14
MATERIAL:	Concrete		

3 (ft) X 3 (ft) X 12 (in)	Soil Depth TOF: 0 (ft)	(4) #4 Long, (4) #4 Short

FTG-PST-FB3-2.2B DIAGRAMS





MATERIAL PROPERTIES

FOOTING

fc' (psi)	Ec (psi)	Density (lbf/ft³)	Width (ft)	Length (ft)	Depth (in)	Volume (ft³)
2500	2880952	145	3	3	12	9

CALCULATION VARIABLES

Bo (in)	Φ-X	Φ-Y
50	0	0

COLUMN

Width (in)	Length (in)	Material	Offset (in)
4	4	Concrete	0

SOIL

Bearing Strength (lbf/ft²)	Density (lbf/ft³)	Cohesion	Friction Angle	Depth (ft)	Rankine Coefficient (Kp)
1500	140	0	30	0	3

REBAR

Bar Size #	# Bars Long	# Bars Short	fy (psi)	Es (psi)
4	4	4	60000	2.9E+07

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOAD COMBO
Soil Bearing Pressure (lbf/ft²)	PASS (28.0%)	1079.7	1500.0	D+0.75L+0.75S
Two-Way Shear (Punching) (lbf)	PASS (77.1%)	14628.0	63750.0	1.2D+1.6S+L
One-Way Shear X (lbf)	PASS (86.7%)	3047.5	22950.0	1.2D+1.6S+L
Moment X (lbf-ft)	PASS (42.2%)	4334.2	7500.0	1.2D+1.6S+L
One-Way Shear Y (lbf)	PASS (86.7%)	3047.5	22950.0	1.2D+1.6S+L
Moment Y (lbf-ft)	PASS (42.2%)	4334.2	7500.0	1.2D+1.6S+L
Crushing (psi)	PASS (33.8%)	914.2	1381.3	1.2D+1.6S+L

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction

LINKED LOAD LIST

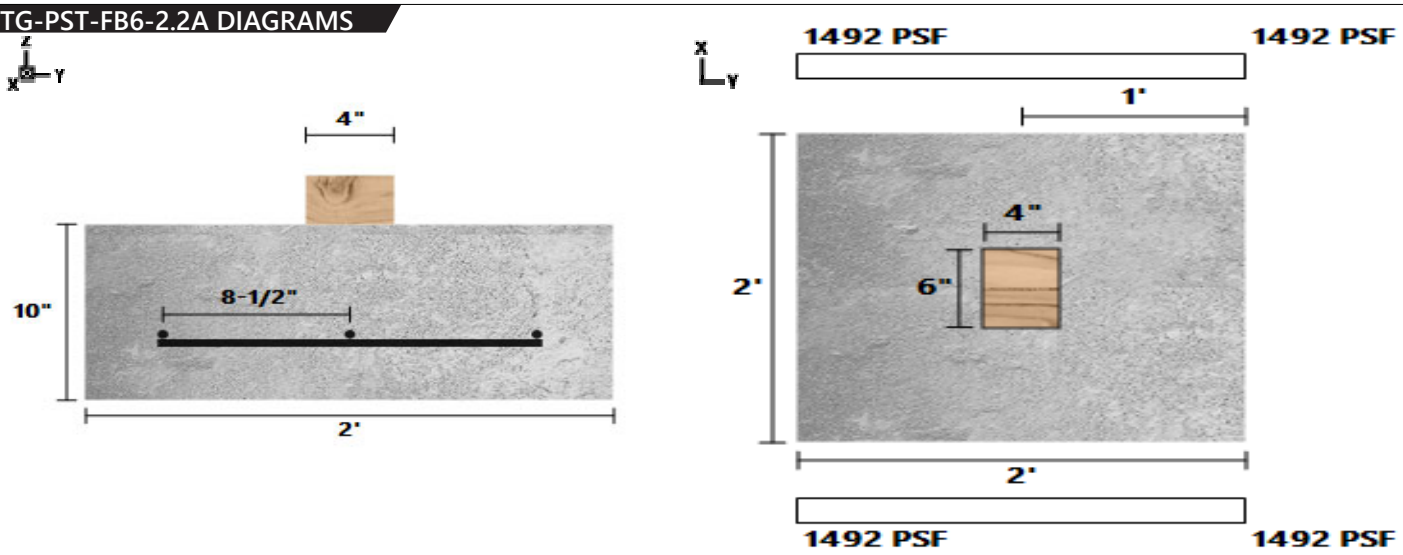
Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	4746.396	-	0	-	Dead	Z
Point (lbf)	2786.667	-	0	-	Live	Z
Point (lbf)	3841.006	-	0	-	Snow	Z
Point (lbf)	3072.984	-	0	-	Roof Live	Z

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	-- --	PROJECT NAME:	21-028 Framing
LEVEL:	S2.1	LOADING:	
MEMBER NAME:	FTG-PST-FB6-2.2A	CODE:	2018 International Building Code
MEMBER TYPE:	ISOLATED FOOTING	ACI:	ACI 318-14
MATERIAL:	Concrete		

2 (ft) X 2 (ft) X 10 (in)	Soil Depth TOF: 0 (ft)	(3) #4 Long, (3) #4 Short

FTG-PST-FB6-2.2A DIAGRAMS



MATERIAL PROPERTIES

FOOTING

fc' (psi)	Ec (psi)	Density (lbf/ft³)	Width (ft)	Length (ft)	Depth (in)	Volume (ft³)
2500	2880952	145	2	2	10	3.33

CALCULATION VARIABLES

Bo (in)	Φ-X	Φ-Y
46	0	0

COLUMN

Width (in)	Length (in)	Material	Offset (in)
4	6	Wood	0

SOIL

Bearing Strength (lbf/ft²)	Density (lbf/ft³)	Cohesion	Friction Angle	Depth (ft)	Rankine Coefficient (Kp)
1500	140	0	30	0	3

REBAR

Bar Size #	# Bars Long	# Bars Short	fy (psi)	Es (psi)
4	3	3	60000	2.9E+07

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOAD COMBO
Soil Bearing Pressure (lbf/ft²)	PASS (0.5%)	1492.2	1500.0	D+0.75L+0.75S
Two-Way Shear (Punching) (lbf)	PASS (79.9%)	9028.1	44850.0	1.2D+1.6S+L
One-Way Shear X (lbf)	PASS (92.0%)	940.4	11700.0	1.2D+1.6S+L
Moment X (lbf-ft)	PASS (60.3%)	1269.6	3200.0	1.2D+1.6S+L
One-Way Shear Y (lbf)	PASS (88.7%)	1316.6	11700.0	1.2D+1.6S+L
Moment Y (lbf-ft)	PASS (51.0%)	1567.4	3200.0	1.2D+1.6S+L
Crushing (psi)	PASS (72.8%)	376.2	1381.3	1.2D+1.6S+L

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction

LINKED LOAD LIST

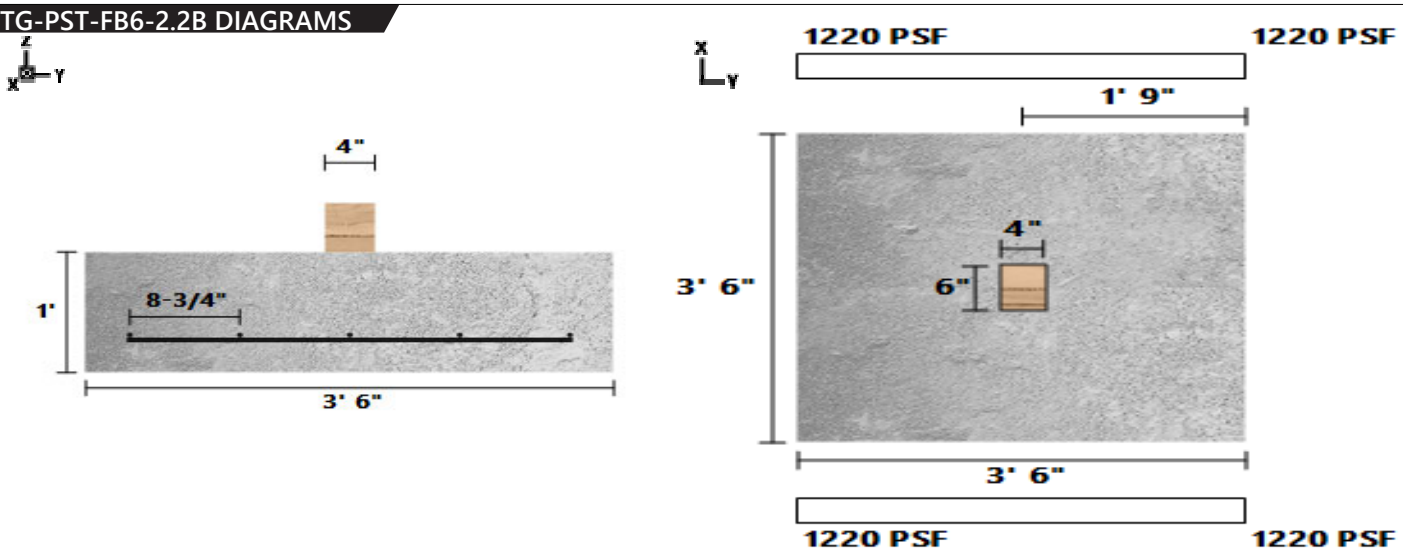
Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	2398.703	-	0	-	Dead	Z
Point (lbf)	2315.983	-	0	-	Snow	Z
Point (lbf)	-217.7031	-	0	-	Live	Z
Point (lbf)	-107.4312	-	0	-	Roof Live	Z
Point (lbf)	2444.114	-	0	-	Live	Z
Point (lbf)	1967.185	-	0	-	Roof Live	Z

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	-- --	PROJECT NAME:	21-028 Framing
LEVEL:	S2.1	LOADING:	
MEMBER NAME:	FTG-PST-FB6-2.2B	CODE:	2018 International Building Code
MEMBER TYPE:	ISOLATED FOOTING	ACI:	ACI 318-14
MATERIAL:	Concrete		

3.5 (ft) X 3.5 (ft) X 12 (in)	Soil Depth TOF: 0 (ft)	(5) #4 Long, (5) #4 Short

FTG-PST-FB6-2.2B DIAGRAMS



MATERIAL PROPERTIES

FOOTING

fc' (psi)	Ec (psi)	Density (lbf/ft³)	Width (ft)	Length (ft)	Depth (in)	Volume (ft³)
2500	2880952	145	3.5	3.5	12	12.25

CALCULATION VARIABLES

Bo (in)	Φ-X	Φ-Y
54	0	0

COLUMN

Width (in)	Length (in)	Material	Offset (in)
4	6	Wood	0

SOIL

Bearing Strength (lbf/ft²)	Density (lbf/ft³)	Cohesion	Friction Angle	Depth (ft)	Rankine Coefficient (Kp)
1500	140	0	30	0	3

REBAR

Bar Size #	# Bars Long	# Bars Short	fy (psi)	Es (psi)
4	5	5	60000	2.9E+07

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOAD COMBO
Soil Bearing Pressure (lbf/ft²)	PASS (18.7%)	1219.4	1500.0	D+0.75L+0.75S
Two-Way Shear (Punching) (lbf)	PASS (67.3%)	22527.4	68850.0	1.2D+1.6S+L
One-Way Shear X (lbf)	PASS (81.0%)	5095.5	26775.0	1.2D+1.6S+L
Moment X (lbf-ft)	PASS (80.3%)	7240.9	36737.4	1.2D+1.6S+L
One-Way Shear Y (lbf)	PASS (79.0%)	5631.8	26775.0	1.2D+1.6S+L
Moment Y (lbf-ft)	PASS (78.0%)	8067.8	36737.4	1.2D+1.6S+L
Crushing (psi)	PASS (32.0%)	938.6	1381.3	1.2D+1.6S+L

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction

LINKED LOAD LIST

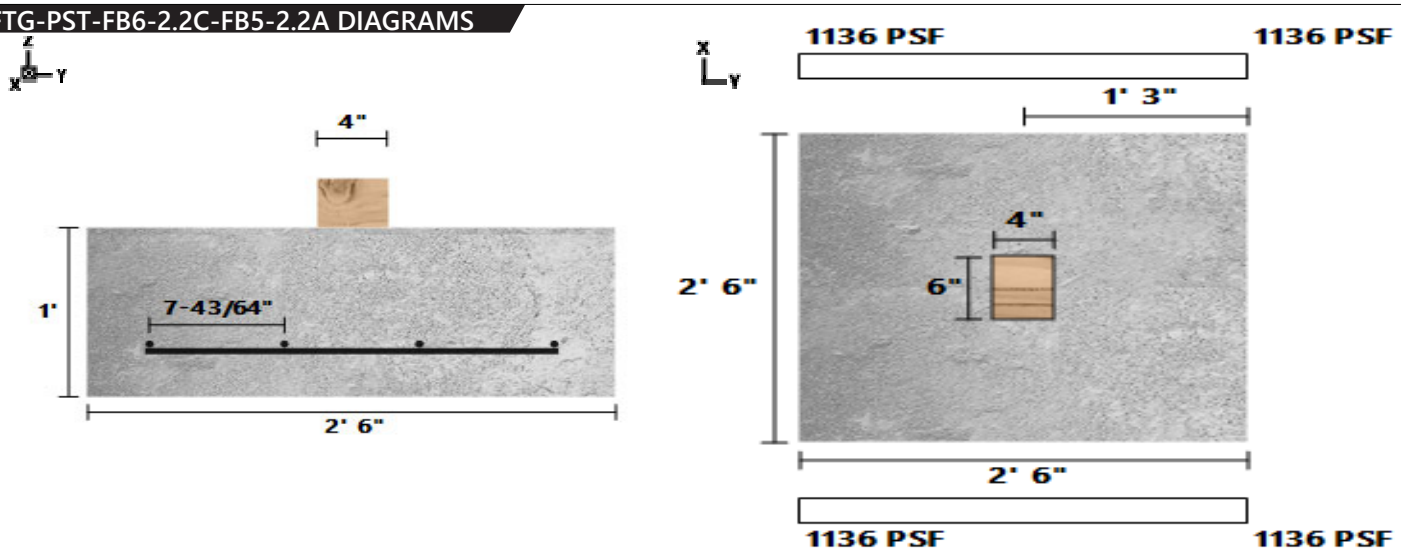
Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	6179.9	-	0	-	Dead	Z
Point (lbf)	5954.472	-	0	-	Live	Z
Point (lbf)	5723.145	-	0	-	Snow	Z
Point (lbf)	-92.39405	-	0	-	Roof Live	Z
Point (lbf)	4818.333	-	0	-	Roof Live	Z

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.1	LOADING:	
MEMBER NAME:	FTG-PST-FB6-2.2C-FB5-2.2A	CODE:	2018 International Building Code
MEMBER TYPE:	ISOLATED FOOTING	ACI:	ACI 318-14
MATERIAL:	Concrete		

2.5 (ft) X 2.5 (ft) X 12 (in)	Soil Depth TOF: 0 (ft)	(4) #4 Long, (4) #4 Short

FTG-PST-FB6-2.2C-FB5-2.2A DIAGRAMS



MATERIAL PROPERTIES

FOOTING

fc' (psi)	Ec (psi)	Density (lbf/ft³)	Width (ft)	Length (ft)	Depth (in)	Volume (ft³)
2500	2880952	145	2.5	2.5	12	6.25

CALCULATION VARIABLES

Bo (in)	Φ-X	Φ-Y
54	0	0

COLUMN

Width (in)	Length (in)	Material	Offset (in)
4	6	Wood	0

SOIL

Bearing Strength (lbf/ft²)	Density (lbf/ft³)	Cohesion	Friction Angle	Depth (ft)	Rankine Coefficient (Kp)
1500	140	0	30	0	3

REBAR

Bar Size #	# Bars Long	# Bars Short	fy (psi)	Es (psi)
4	4	4	60000	2.9E+07

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOAD COMBO
Soil Bearing Pressure (lbf/ft²)	PASS (24.2%)	1136.4	1500.0	D+0.75L+0.75Lr
Two-Way Shear (Punching) (lbf)	PASS (84.0%)	11033.1	68850.0	1.2D+1.6Lr+L
One-Way Shear X (lbf)	PASS (93.3%)	1287.2	19125.0	1.2D+1.6Lr+L
Moment X (lbf-ft)	PASS (64.7%)	2206.6	6250.0	1.2D+1.6Lr+L
One-Way Shear Y (lbf)	PASS (91.3%)	1655.0	19125.0	1.2D+1.6Lr+L
Moment Y (lbf-ft)	PASS (58.6%)	2589.7	6250.0	1.2D+1.6Lr+L
Crushing (psi)	PASS (66.7%)	459.7	1381.3	1.2D+1.6Lr+L

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction

LINKED LOAD LIST

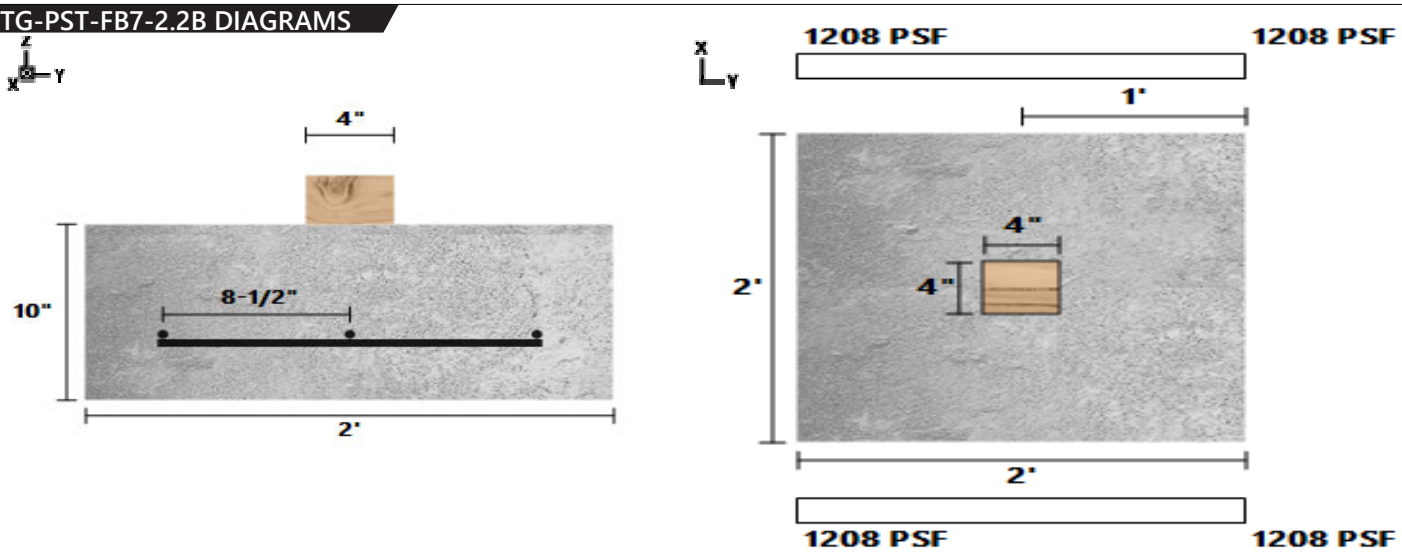
Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	3078.514	-	0	-	Dead	Z
Point (lbf)	2212.221	-	0	-	Snow	Z
Point (lbf)	-390.5283	-	0	-	Live	Z
Point (lbf)	-283.1348	-	0	-	Roof Live	Z
Point (lbf)	2075.743	-	0	-	Live	Z
Point (lbf)	3289.445	-	0	-	Roof Live	Z

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.1	LOADING:	
MEMBER NAME:	FTG-PST-FB7-2.2B	CODE:	2018 International Building Code
MEMBER TYPE:	ISOLATED FOOTING	ACI:	ACI 318-14
MATERIAL:	Concrete		

2 (ft) X 2 (ft) X 10 (in)	Soil Depth TOF: 0 (ft)	(3) #4 Long, (3) #4 Short

FTG-PST-FB7-2.2B DIAGRAMS



MATERIAL PROPERTIES

FOOTING

fc' (psi)	Ec (psi)	Density (lbf/ft³)	Width (ft)	Length (ft)	Depth (in)	Volume (ft³)
2500	2880952	145	2	2	10	3.33

CALCULATION VARIABLES

Bo (in)	Φ-X	Φ-Y
42	0	0

COLUMN

Width (in)	Length (in)	Material	Offset (in)
4	4	Wood	0

SOIL

Bearing Strength (lbf/ft²)	Density (lbf/ft³)	Cohesion	Friction Angle	Depth (ft)	Rankine Coefficient (Kp)
1500	140	0	30	0	3

REBAR

Bar Size #	# Bars Long	# Bars Short	fy (psi)	Es (psi)
4	3	3	60000	2.9E+07

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOAD COMBO
Soil Bearing Pressure (lbf/ft²)	PASS (19.5%)	1208.0	1500.0	D+L
Two-Way Shear (Punching) (lbf)	PASS (82.8%)	7037.2	40950.0	1.2D+1.6L+0.5S
One-Way Shear X (lbf)	PASS (91.2%)	1026.3	11700.0	1.2D+1.6L+0.5S
Moment X (lbf-ft)	PASS (61.8%)	1221.7	3200.0	1.2D+1.6L+0.5S
One-Way Shear Y (lbf)	PASS (91.2%)	1026.3	11700.0	1.2D+1.6L+0.5S
Moment Y (lbf-ft)	PASS (61.8%)	1221.7	3200.0	1.2D+1.6L+0.5S
Crushing (psi)	PASS (68.2%)	439.8	1381.3	1.2D+1.6L+0.5S

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction

LINKED LOAD LIST

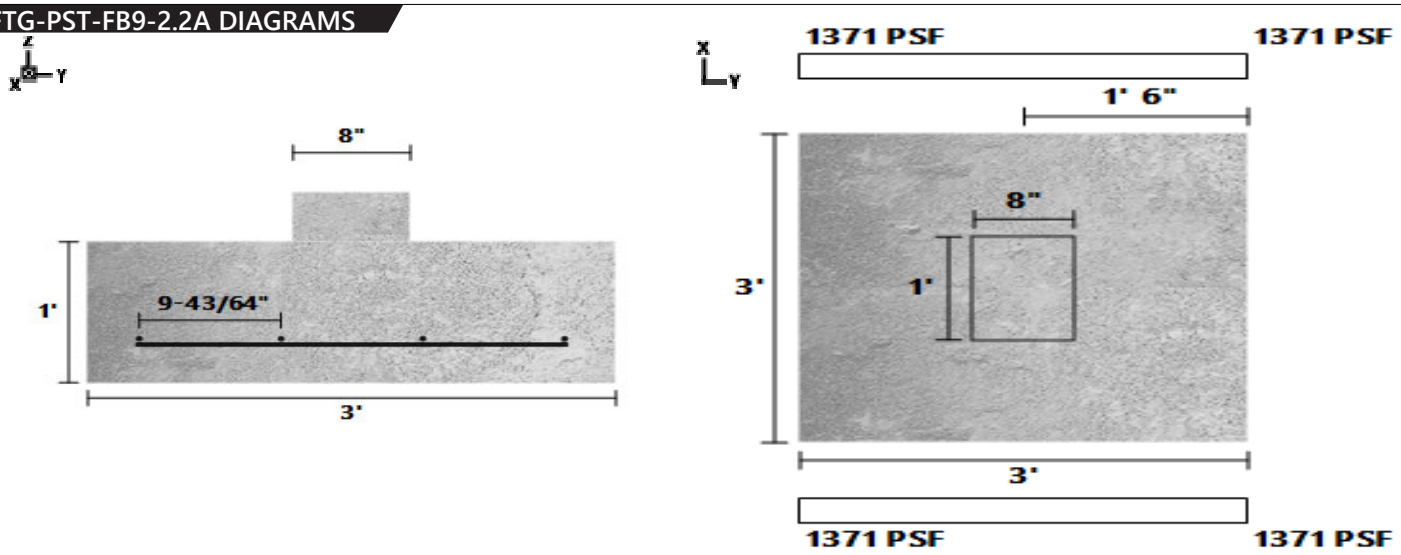
Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	2595.245	-	0	-	Dead	Z
Point (lbf)	2236.799	-	0	-	Live	Z
Point (lbf)	688.0073	-	0	-	Snow	Z

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.1	LOADING:	
MEMBER NAME:	FTG-PST-FB9-2.2A	CODE:	2018 International Building Code
MEMBER TYPE:	ISOLATED FOOTING	ACI:	ACI 318-14
MATERIAL:	Concrete		

3 (ft) X 3 (ft) X 12 (in)	Soil Depth TOF: 0 (ft)	(4) #4 Long, (4) #4 Short

FTG-PST-FB9-2.2A DIAGRAMS



MATERIAL PROPERTIES

FOOTING

fc' (psi)	Ec (psi)	Density (lbf/ft³)	Width (ft)	Length (ft)	Depth (in)	Volume (ft³)
2500	2880952	145	3	3	12	9

CALCULATION VARIABLES

Bo (in)	Φ-X	Φ-Y
74	0	0

COLUMN

Width (in)	Length (in)	Material	Offset (in)
8	12	Concrete	0

SOIL

Bearing Strength (lbf/ft²)	Density (lbf/ft³)	Cohesion	Friction Angle	Depth (ft)	Rankine Coefficient (Kp)
1500	140	0	30	0	3

REBAR

Bar Size #	# Bars Long	# Bars Short	fy (psi)	Es (psi)
4	4	4	60000	2.9E+07

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOAD COMBO
Soil Bearing Pressure (lbf/ft²)	PASS (8.6%)	1371.3	1500.0	D+0.75L+0.75S
Two-Way Shear (Punching) (lbf)	PASS (81.3%)	17673.7	94350.0	1.2D+1.6S+L
One-Way Shear X (lbf)	PASS (92.5%)	1718.3	22950.0	1.2D+1.6S+L
Moment X (lbf-ft)	PASS (60.7%)	2945.6	7500.0	1.2D+1.6S+L
One-Way Shear Y (lbf)	PASS (88.2%)	2700.1	22950.0	1.2D+1.6S+L
Moment Y (lbf-ft)	PASS (46.5%)	4009.3	7500.0	1.2D+1.6S+L
Crushing (psi)	PASS (86.7%)	184.1	1381.3	1.2D+1.6S+L

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	5461.85	-	0	-	Dead	Z
Point (lbf)	5927.698	-	0	-	Live	Z
Point (lbf)	3244.844	-	0	-	Snow	Z
Point (lbf)	2595.984	-	0	-	Roof Live	Z

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	PST-DB2-2.2A	CODE:	2018 International Building Code
MEMBER TYPE:	COLUMN	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Hem-Fir	No. 2	(1) 7.5 X 7.5	DRY		

PST-DB2-2.2A DIAGRAM

COLUMN PROPERTIES

Start(ft) 0 End(ft): 9

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
56.25	263.67	263.67	11.1	1	0.43	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	575	375	140	575	405	1100	400
Adjusted Values	575	375	140	575	405	1100	400
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1	1	1	1	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1

COLUMN DATA

		Unbraced Length (ft)		Column End					
Span	Length (ft)	X	Y	Offset	CP	Ke(X Axis)	Ke(Y Axis)	KeL/d (X Axis)	KeL/d (Y Axis)
1	9	9	9	0	0.91	1.00	1.00	14.4	14.4

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Deflection (in)	PASS (97.6%)	0.007 (=L/15000)	0.300 (=L/360)	9	L	
Compressive Stress (psi)	PASS (81.4%)	97.6	523.4	0	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft

Z axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	1363	4125	0	0	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	11.1	11.1	0	9	Dead	Z

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	-1263.145	-	9	-	Dead	Z
Point (lbf)	-4125.404	-	9	-	Live	Z

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	PST-DB2-2.2B	CODE:	2018 International Building Code
MEMBER TYPE:	COLUMN	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Hem-Fir	No. 2	(1) 7.5 X 7.5	DRY	INCISED	

PST-DB2-2.2B DIAGRAM

COLUMN PROPERTIES

Start(ft) 0 End(ft): 9

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
56.25	263.67	263.67	11.1	1	0.43	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	575	375	140	575	405	1100	400
Adjusted Values	460	300	112	460	405	1045	380
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	0.8	0.8	0.8	0.8	1	0.95	0.95
C_F	1	1	1	1	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1

COLUMN DATA

Span	Length (ft)	Unbraced Length (ft) X	Unbraced Length (ft) Y	Column End Offset	CP	Ke(X Axis)	Ke(Y Axis)	KeL/d (X Axis)	KeL/d (Y Axis)
1	9	9	9	0	0.93	1.00	1.00	14.4	14.4

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Deflection (in)	PASS (94.1%)	0.018 (=L/6102)	0.300 (=L/360)	9	L	
Compressive Stress (psi)	PASS (46.7%)	227.2	426.3	0	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft

Z axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	3146	9636	0	0	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0

Reaction Location

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	11.1	11.1	0	9	Dead	Z

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	-3045.685	-	9	-	Dead	Z
Point (lbf)	-9635.687	-	9	-	Live	Z

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	PST-DB3-2.2A	CODE:	2018 International Building Code
MEMBER TYPE:	COLUMN	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 2	(1) 5.5 X 5.5	DRY		

PST-DB3-2.2A DIAGRAM

COLUMN PROPERTIES

Start(ft) 0 End(ft): 8.5

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
30.25	76.26	76.26	6.9	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	750	475	170	700	625	1300	470
Adjusted Values	750	475	170	700	625	1300	470
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1	1	1	1	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1

COLUMN DATA

		Unbraced Length (ft)		Column End					
Span	Length (ft)	X	Y	Offset	CP	Ke(X Axis)	Ke(Y Axis)	KeL/d (X Axis)	KeL/d (Y Axis)
1	8.5	8.5	8.5	0	0.83	1.00	1.00	18.55	18.55

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Deflection (in)	PASS (95.2%)	0.014 (=L/7499)	0.283 (=L/360)	8.5	D+Lr	
Compressive Stress (psi)	PASS (59.4%)	234.3	577.7	0	D+L	1
Bearing Stress (psi)	PASS (100.0%)	0.2	875.0	8.5	D+Lr	1.25

REACTIONS

Units for V: lbf Units for M: lbf-ft

Z axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	3828	3259	1449	1811	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0
Y axis											
A	0	0	0	0	0	0	0	0	0	0	0
B	0	0	3 / -2	1	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	6.9	6.9	0	8.5	Dead	Z

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	-3769.025	-	8.5	-	Dead	Z
Point (lbf)	-3258.915	-	8.5	-	Live	Z
Point (lbf)	1.273669	-	8.5	-	Snow	Y
Point (lbf)	-1811.1	-	8.5	-	Snow	Z
Point (lbf)	-1448.941	-	8.5	-	Roof Live	Z
Point (lbf)	2.918893	-	8.5	-	Roof Live	Y
Point (lbf)	-1.757772	-	8.5	-	Roof Live	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	PST-FB3-2.2B	CODE:	2018 International Building Code
MEMBER TYPE:	COLUMN	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 2	(1) 5.5 X 5.5	DRY		

PST-FB3-2.2B DIAGRAM

COLUMN PROPERTIES

Start(ft) 0 End(ft): 10

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
30.25	76.26	76.26	6.9	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	750	475	170	700	625	1300	470
Adjusted Values	750	475	170	700	625	1300	470
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1	1	1	1	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1

COLUMN DATA

		Unbraced Length (ft)		Column End					
Span	Length (ft)	X	Y	Offset	CP	Ke(X Axis)	Ke(Y Axis)	KeL/d (X Axis)	KeL/d (Y Axis)
1	10	10	10	0	0.69	1.00	1.00	21.82	21.82

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Deflection (in)	PASS (92.9%)	0.024 (=L/5042)	0.333 (=L/360)	10	D+Lr	
Compressive Stress (psi)	PASS (42.5%)	321.2	558.5	0	D+0.75L+0.75S	1.15

REACTIONS

Units for V: lbf Units for M: lbf-ft

Z axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	4746	2787	3073	3841	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0
X axis											
A	0	0	0	0	0	0	0	0	0	0	0
B	0	0	3 / -2	1	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	6.9	6.9	0	10	Dead	Z

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	-4677.405	-	10	-	Dead	Z
Point (lbf)	-2786.667	-	10	-	Live	Z
Point (lbf)	-3841.006	-	10	-	Snow	Z
Point (lbf)	-1.273669	-	10	-	Snow	X
Point (lbf)	1.757772	-	10	-	Roof Live	X
Point (lbf)	-3072.984	-	10	-	Roof Live	Z
Point (lbf)	-2.918893	-	10	-	Roof Live	X

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	PST-FB6-2.2A	CODE:	2018 International Building Code
MEMBER TYPE:	COLUMN	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 2	(1) 3.5 X 5.5	DRY		

PST-FB6-2.2A DIAGRAM

COLUMN PROPERTIES

Start(ft) 0 End(ft): 9

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
19.25	48.53	19.65	4.39	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	900	575	180	1350	625	1600	580
Adjusted Values	1170	748	180	1485	625	1600	580
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1.3	1.3	1	1.1	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1

COLUMN DATA

		Unbraced Length (ft)		Column End					
Span	Length (ft)	X	Y	Offset	CP	Ke(X Axis)	Ke(Y Axis)	KeL/d (X Axis)	KeL/d (Y Axis)
1	9	9	9	0	0.27	1.00	1.00	19.64	30.86

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Deflection (in)	PASS (94.9%)	0.015 (=L/7105)	0.300 (=L/360)	9	D+Lr	
Compressive Stress (psi)	PASS (33.4%)	310.1	465.8	0	D+0.75L+0.75S	1.15
Bearing Stress (psi)	PASS (100.0%)	0.5	1707.8	9	D+S	1.15

REACTIONS

Units for V: lbf Units for M: lbf-ft

Z axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	2399	2444 / -218	1967 / -107	2316	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0
Y axis											
A	0	0	0	0	0	0	0	0	0	0	0
B	-2	0	1 / -3	-4	0	0	0	0	0	0	0
X axis											
A	0	0	0	0	0	0	0	0	0	0	0
B	-3	0	0 / -6	0	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	4.39	4.39	0	9	Dead	Z

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	-2.069101	-	9	-	Dead	Y
Point (lbf)	-2359.19	-	9	-	Dead	Z
Point (lbf)	2.571273	-	9	-	Dead	X
Point (lbf)	-3.89418	-	9	-	Snow	Y
Point (lbf)	-2315.983	-	9	-	Snow	Z
Point (lbf)	-0.2858821	-	9	-	Snow	X
Point (lbf)	-2444.114	-	9	-	Live	Z
Point (lbf)	1.029599	-	9	-	Roof Live	Y
Point (lbf)	107.4312	-	9	-	Roof Live	Z
Point (lbf)	6.441796	-	9	-	Roof Live	X
Point (lbf)	-3.133266	-	9	-	Roof Live	Y
Point (lbf)	217.7031	-	9	-	Live	Z
Point (lbf)	-1967.186	-	9	-	Roof Live	Z
Point (lbf)	-0.4226311	-	9	-	Roof Live	X

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	PST-FB6-2.2B	CODE:	2018 International Building Code
MEMBER TYPE:	COLUMN	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 2	(1) 3.5 X 5.5	DRY		

PST-FB6-2.2B DIAGRAM

COLUMN PROPERTIES

Start(ft) 0 End(ft): 9

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
19.25	48.53	19.65	4.39	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	900	575	180	1350	625	1600	580
Adjusted Values	1170	748	180	1485	625	1600	580
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1.3	1.3	1	1.1	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1

COLUMN DATA

		Unbraced Length (ft)		Column End					
Span	Length (ft)	X	Y	Offset	CP	Ke(X Axis)	Ke(Y Axis)	KeL/d (X Axis)	KeL/d (Y Axis)
1	9	9	1	0	0.57	1.00	1.00	19.64	3.43

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Deflection (in)	PASS (87.2%)	0.039 (=L/2805)	0.300 (=L/360)	9	D+Lr	
Compressive Stress (psi)	PASS (20.5%)	776.0	976.1	0	D+0.75L+0.75S	1.15

REACTIONS

Units for V: lbf Units for M: lbf-ft

Z axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	6180	5954	4818 / -92	5723	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0
X axis											
A	0	0	0	0	0	0	0	0	0	0	0
B	-4	0	1 / -10	1	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	4.39	4.39	0	9	Dead	Z

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	-6140.387	-	9	-	Dead	Z
Point (lbf)	3.94452	-	9	-	Dead	X
Point (lbf)	-5954.472	-	9	-	Live	Z
Point (lbf)	-5723.145	-	9	-	Snow	Z
Point (lbf)	-0.5075927	-	9	-	Snow	X
Point (lbf)	92.39405	-	9	-	Roof Live	Z
Point (lbf)	9.868913	-	9	-	Roof Live	X
Point (lbf)	-4818.333	-	9	-	Roof Live	Z
Point (lbf)	-0.7833914	-	9	-	Roof Live	X

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	PST-FB6-2.2C-FB5-2.2A	CODE:	2018 International Building Code
MEMBER TYPE:	COLUMN	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 2	(1) 3.5 X 5.5	DRY		

PST-FB6-2.2C-FB5-2.2A DIAGRAM

COLUMN PROPERTIES

Start(ft) 0 End(ft): 9

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
19.25	48.53	19.65	4.39	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	900	575	180	1350	625	1600	580
Adjusted Values	1170	748	180	1485	625	1600	580
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1.3	1.3	1	1.1	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1

COLUMN DATA

		Unbraced Length (ft)		Column End					
Span	Length (ft)	X	Y	Offset	CP	Ke(X Axis)	Ke(Y Axis)	KeL/d (X Axis)	KeL/d (Y Axis)
1	9	9	1	0	0.54	1.00	1.00	19.64	3.43

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Deflection (in)	PASS (92.6%)	0.022 (=L/4843)	0.300 (=L/360)	9	D+Lr	
Compressive Stress (psi)	PASS (63.2%)	369.0	1001.7	0	D+0.75L+0.75Lr	1.25

REACTIONS

Units for V: lbf Units for M: lbf-ft

Z axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	3079	2076 / -391	3289 / -283	2212	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0
X axis											
A	0	0	0	0	0	0	0	0	0	0	0
B	-1	0	1 / -4	0	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	4.39	4.39	0	9	Dead	Z

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	-1222.475	-	9	-	Dead	Z
Point (lbf)	0.4852938	-	9	-	Dead	X
Point (lbf)	-368.6545	-	9	-	Live	Z
Point (lbf)	-809.9343	-	9	-	Snow	Z
Point (lbf)	1.476055	-	9	-	Roof Live	X
Point (lbf)	-1295.656	-	9	-	Roof Live	Z
Point (lbf)	-0.4413353	-	9	-	Roof Live	X
Point (lbf)	-1816.526	-	9	-	Dead	Z
Point (lbf)	0.4763518	-	9	-	Dead	X
Point (lbf)	-1402.287	-	9	-	Snow	Z
Point (lbf)	-0.2682381	-	9	-	Snow	X
Point (lbf)	-1707.088	-	9	-	Live	Z
Point (lbf)	283.1348	-	9	-	Roof Live	Z
Point (lbf)	2.225126	-	9	-	Roof Live	X
Point (lbf)	390.5283	-	9	-	Live	Z
Point (lbf)	-1993.789	-	9	-	Roof Live	Z
Point (lbf)	-0.6626288	-	9	-	Roof Live	X

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	PST-FB7-2.2B	CODE:	2018 International Building Code
MEMBER TYPE:	COLUMN	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 2	(1) 3.5 X 3.5	DRY		

PST-FB7-2.2B DIAGRAM

COLUMN PROPERTIES

Start(ft) 0 End(ft): 9

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
12.25	12.51	12.51	2.79	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	900	575	180	1350	625	1600	580
Adjusted Values	1350	862	180	1552	625	1600	580
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1.5	1.5	1	1.15	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1

COLUMN DATA

		Unbraced Length (ft)		Column End					
Span	Length (ft)	X	Y	Offset	CP	Ke(X Axis)	Ke(Y Axis)	KeL/d (X Axis)	KeL/d (Y Axis)
1	9	9	9	0	0.30	1.00	1.00	30.86	30.86

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Deflection (in)	PASS (95.9%)	0.012 (=L/8780)	0.300 (=L/360)	9	L	
Compressive Stress (psi)	PASS (14.6%)	394.5	461.6	0	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft

Z axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	2595	2237	0	688	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	2.79	2.79	0	9	Dead	Z

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	-2570.1	-	9	-	Dead	Z
Point (lbf)	-2236.799	-	9	-	Live	Z
Point (lbf)	-688.0073	-	9	-	Snow	Z

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	PST-FB9-2.2A	CODE:	2018 International Building Code
MEMBER TYPE:	COLUMN	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 2	(1) 5.5 X 5.5	DRY		

PST-FB9-2.2A DIAGRAM

COLUMN PROPERTIES

Start(ft) 0 End(ft): 8.08333

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
30.25	76.26	76.26	6.9	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	750	475	170	700	625	1300	470
Adjusted Values	750	475	170	700	625	1300	470
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1	1	1	1	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1

COLUMN DATA

Span	Length (ft)	Unbraced Length (ft) X	Unbraced Length (ft) Y	Column End Offset	CP	Ke(X Axis)	Ke(Y Axis)	KeL/d (X Axis)	KeL/d (Y Axis)
1	8.08333	8.08333	8.08333	0	0.85	1.00	1.00	17.64	17.64

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Compressive Stress (psi)	PASS (36.4%)	376.5	592.1	0	D+L	1

REACTIONS

Units for V: lbf Units for M: lbf-ft

Z axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	5462	5928	2596	3245	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	6.9	6.9	0	8.08333	Dead	Z

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Point (lbf)	-5406.083	-	8.08333	-	Dead	Z
Point (lbf)	-5927.698	-	8.08333	-	Live	Z
Point (lbf)	-3244.844	-	8.08333	-	Snow	Z
Point (lbf)	-2595.984	-	8.08333	-	Roof Live	Z

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.3	LOADING:	ASD
MEMBER NAME:	RB1-2.3	CODE:	2018 International Building Code
MEMBER TYPE:	ROOF BEAM	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 2	(1) 3.5 X 7.25	DRY		

RB1-2.3 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 6.833 Member Slope: 0/12 Actual Length (ft): 6.83 Roof Pitch: 0/12

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
25.38	111.15	25.9	5.79	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	900	575	180	1350	625	1600	580
Adjusted Values	1170	690	180	1417	625	1600	580
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1.3	1.2	1	1.05	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	6.8334	0	6.8334	0	1.00	0.99	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (46.7%)	110.4	207.0	0	D+S	1.15
Bending Stress Y (psi)	PASS (7.2%)	1248.8	1345.5	3.42	D+S	1.15
Shear Stress X (psi)	PASS (99.9%)	0.2	207.0	0	D+S	1.15
Bending Stress X (psi)	PASS (99.6%)	5.0	1344.3	3.42	D+S	1.15
Deflection (in)	PASS (71.0%)	0.132 (=L/621)	0.456 (=L/180)	3.42	D+Lr	
Bearing Stress (psi)	PASS (75.6%)	152.5	625.0	0	D+S	1.15

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	712	0	924	1155	0	0	0	0	0	0	0
B	712	0	924	1155	0	0	0	0	0	0	0
X axis											
A	1	0	2	3	0	0	0	0	0	0	0
B	1	0	2	3	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	5.79	5.79	0	6.8334	Dead	Y

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	-0.3027921	-0.3027921	0	6.8334	Dead	X
Uniform (lbf/ft)	202.6862	202.6862	0	6.8334	Dead	Y
Uniform (lbf/ft)	-0.758234	-0.758234	0	6.8334	Snow	X
Uniform (lbf/ft)	338.1744	338.1744	0	6.8334	Snow	Y
Uniform (lbf/ft)	-0.4585218	-0.4585218	0	6.8334	Roof Live	X
Uniform (lbf/ft)	270.4559	270.4559	0	6.8334	Roof Live	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	-- --	PROJECT NAME:	21-028 Framing
LEVEL:	S2.3	LOADING:	ASD
MEMBER NAME:	RB2-2.3	CODE:	2018 International Building Code
MEMBER TYPE:	ROOF BEAM	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 2	(1) 3.5 X 7.25	DRY		

RB2-2.3 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 4.667 Member Slope: 0/12 Actual Length (ft): 4.667 Roof Pitch: 0/12

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
25.38	111.15	25.9	5.79	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	900	575	180	1350	625	1600	580
Adjusted Values	1170	690	180	1417	625	1600	580
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1.3	1.2	1	1.05	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	4.667	0	4.667	0	1.00	0.99	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (59.3%)	84.2	207.0	0	D+S	1.15
Bending Stress Y (psi)	PASS (51.7%)	650.2	1345.5	2.33	D+S	1.25
Shear Stress X (psi)	PASS (99.8%)	0.4	225.0	0	D+Lr	1.15
Bending Stress X (psi)	PASS (99.5%)	6.6	1461.6	2.33	D+Lr	1.25
Deflection (in)	PASS (89.7%)	0.032 (=L/1744)	0.311 (=L/180)	2.33	D+Lr	
Bearing Stress (psi)	PASS (81.4%)	116.2	625.0	0	D+S	1.15

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	542	0	705	882	0	0	0	0	0	0	0
B	542	0	705	882	0	0	0	0	0	0	0
X axis											
A	2	0	5	-1	0	0	0	0	0	0	0
B	2	0	5	-1	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	5.79	5.79	0	4.667	Dead	Y

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	-0.858579	-0.858579	0	4.667	Dead	X
Uniform (lbf/ft)	226.5237	226.5237	0	4.667	Dead	Y
Uniform (lbf/ft)	0.3180531	0.3180531	0	4.667	Snow	X
Uniform (lbf/ft)	377.8576	377.8576	0	4.667	Snow	Y
Uniform (lbf/ft)	-2.145077	-2.145077	0	4.667	Roof Live	X
Uniform (lbf/ft)	301.9083	301.9083	0	4.667	Roof Live	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.3	LOADING:	ASD
MEMBER NAME:	RB3-2.3	CODE:	2018 International Building Code
MEMBER TYPE:	ROOF BEAM	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 2	(1) 3.5 X 7.25	DRY		

RB3-2.3 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 5.333 Member Slope: 0/12 Actual Length (ft): 5.33 Roof Pitch: 0/12

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
25.38	111.15	25.9	5.79	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	900	575	180	1350	625	1600	580
Adjusted Values	1170	690	180	1417	625	1600	580
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1.3	1.2	1	1.05	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	5.3334	0	5.3334	0	1.00	0.99	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (62.6%)	77.5	207.0	0	D+S	1.15
Bending Stress Y (psi)	PASS (49.2%)	684.1	1345.5	2.67	D+S	1.25
Shear Stress X (psi)	PASS (100.0%)	0.0	225.0	0	D+Lr	1.15
Bending Stress X (psi)	PASS (99.9%)	0.9	1461.4	2.67	D+Lr	1.25
Deflection (in)	PASS (87.6%)	0.044 (=L/1451)	0.356 (=L/180)	2.67	D+Lr	
Bearing Stress (psi)	PASS (82.9%)	107.0	625.0	0	D+S	1.15

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	501	0	648	810	0	0	0	0	0	0	0
B	501	0	648	810	0	0	0	0	0	0	0
X axis											
A	0	0	0 / -1	0	0	0	0	0	0	0	0
B	0	0	0 / -1	0	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	5.79	5.79	0	5.3334	Dead	Y

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	182.1962	182.1962	0	5.3334	Dead	Y
Uniform (lbf/ft)	0.1340704	0.1340704	0	5.3334	Snow	X
Uniform (lbf/ft)	303.5977	303.5977	0	5.3334	Snow	Y
Uniform (lbf/ft)	242.897	242.897	0	5.3334	Roof Live	Y
Uniform (lbf/ft)	0.3072519	0.3072519	0	5.3334	Roof Live	X
Uniform (lbf/ft)	-0.1850286	-0.1850286	0	5.3334	Roof Live	X

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	-- --	PROJECT NAME:	21-028 Framing
LEVEL:	S2.3	LOADING:	ASD
MEMBER NAME:	RB4-2.3	CODE:	2018 International Building Code
MEMBER TYPE:	ROOF BEAM	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 2	(1) 3.5 X 9.25	DRY		

RB4-2.3 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 7.5 Member Slope: 0/12 Actual Length (ft): 7.5 Roof Pitch: 0/12

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
32.38	230.84	33.05	7.38	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	900	575	180	1350	625	1600	580
Adjusted Values	1080	632	180	1350	625	1600	580
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1.2	1.1	1	1	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	7.5	0	7.5	0	1.00	0.99	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (53.0%)	97.4	207.0	7.5	D+S	1.15
Bending Stress Y (psi)	PASS (23.7%)	947.5	1242.0	3.75	D+S	0.9
Shear Stress X (psi)	PASS (100.0%)	0.0	162.0	0	D	1.15
Bending Stress X (psi)	PASS (99.9%)	0.6	971.6	3.75	D	0.9
Deflection (in)	PASS (81.1%)	0.095 (=L/950)	0.500 (=L/180)	3.75	D+Lr	
Bearing Stress (psi)	PASS (72.5%)	171.6	625.0	7.5	D+S	1.15

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	805	0	1037	1296	0	0	0	0	0	0	0
B	805	0	1037	1296	0	0	0	0	0	0	0
X axis											
A	0	0	-1	0	0	0	0	0	0	0	0
B	0	0	-1	0	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	7.38	7.38	0	7.5	Dead	Y

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	-0.1328855	-0.1328855	0	7.5	Dead	X
Uniform (lbf/ft)	207.3935	207.3935	0	7.5	Dead	Y
Uniform (lbf/ft)	345.697	345.697	0	7.5	Snow	Y
Uniform (lbf/ft)	276.4824	276.4824	0	7.5	Roof Live	Y
Uniform (lbf/ft)	0.182497	0.182497	0	7.5	Roof Live	X

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.3	LOADING:	ASD
MEMBER NAME:	RB5-2.3	CODE:	2018 International Building Code
MEMBER TYPE:	ROOF BEAM	NDS:	2018 NDS
MATERIAL:	Glulams		

Stress Class Rated 24F-1.8E	24F-V4 DF/DF	(1) 3.5 X 12	DRY		

RB5-2.3 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 7 Member Slope: 0/12 Actual Length (ft): 7 Roof Pitch: 0/12

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
42	504	42.88	9.58	1	0.5	1

STRENGTH PROPERTIES

	Fbx+ (psi)	Fbx- (psi)	Fby (psi)	Ft (psi)	Fvx (psi)	Fvy (psi)	Fc (psi)	Fc⊥ (psi)	Ex (psi)	Exmin (psi)	Ey (psi)	Eymin (psi)
Base Values	2400	1850	1450	1100	265	230	1650	650	1800000	950000	1600000	850000
Adjusted Values	2400	1850	1450	1100	265	230	1650	650	1800000	950000	1600000	850000
C_M	1	1	1	1	1	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1	1	1	1	1	1

Bending Adjustment Factors C_{vr} = 1

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	7	0	7	0	1.00	0.98	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (72.0%)	85.3	304.8	0	D+S	1.15
Bending Stress Y (psi)	PASS (78.4%)	597.2	2760.0	3.5	D+S	1.15
Shear Stress X (psi)	PASS (100.0%)	0.0	264.5	0	D+S	1.15
Bending Stress X (psi)	PASS (100.0%)	0.6	1667.1	3.5	D+S	1.15
Deflection (in)	PASS (92.2%)	0.036 (=L/2321)	0.467 (=L/180)	3.5	D+Lr	
Bearing Stress (psi)	PASS (70.0%)	195.0	650.0	0	D+S	1.15

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	917	0	1212 / -35	1472	0	0	0	0	0	0	0
B	917	0	1212 / -35	1472	0	0	0	0	0	0	0
X axis											
A	0	0	-1	-1	0	0	0	0	0	0	0
B	0	0	-1	-1	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	9.58	9.58	0	7	Dead	Y

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	137.2861	137.2861	0	7	Dead	Y
Uniform (lbf/ft)	0.1838779	0.1838779	0	7	Snow	X
Uniform (lbf/ft)	228.8101	228.8101	0	7	Snow	Y
Uniform (lbf/ft)	190.9396	190.9396	0	7	Roof Live	Y
Uniform (lbf/ft)	0.1470861	0.1470861	0	7	Roof Live	X
Uniform (lbf/ft)	-7.912623	-7.912623	0	7	Roof Live	Y
Uniform (lbf/ft)	115.0754	115.0754	0	7	Dead	Y
Uniform (lbf/ft)	191.7908	191.7908	0	7	Snow	Y
Uniform (lbf/ft)	155.4517	155.4517	0	7	Roof Live	Y
Uniform (lbf/ft)	-2.025301	-2.025301	0	7	Roof Live	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.3	LOADING:	ASD
MEMBER NAME:	RB6-2.3	CODE:	2018 International Building Code
MEMBER TYPE:	ROOF BEAM	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 2	(1) 3.5 X 7.25	DRY		

RB6-2.3 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 6.667 Member Slope: 0/12 Actual Length (ft): 6.67 Roof Pitch: 0/12

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
25.38	111.15	25.9	5.79	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	900	575	180	1350	625	1600	580
Adjusted Values	1170	690	180	1417	625	1600	580
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1.3	1.2	1	1.05	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	6.667	0	6.667	0	1.00	0.99	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (62.7%)	77.2	207.0	6.67	D+S	1.15
Bending Stress Y (psi)	PASS (36.7%)	851.8	1345.5	3.33	D+S	1.15
Deflection (in)	PASS (80.7%)	0.086 (=L/933)	0.445 (=L/180)	3.33	D+Lr	
Bearing Stress (psi)	PASS (82.9%)	106.6	625.0	0	D+S	1.15

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	502	0	643	804	0	0	0	0	0	0	0
B	502	0	643	804	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	5.79	5.79	0	6.667	Dead	Y

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	144.7318	144.7318	0	6.667	Dead	Y
Uniform (lbf/ft)	241.2085	241.2085	0	6.667	Snow	Y
Uniform (lbf/ft)	192.8923	192.8923	0	6.667	Roof Live	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.3	LOADING:	ASD
MEMBER NAME:	RB7-2.3	CODE:	2018 International Building Code
MEMBER TYPE:	ROOF BEAM	NDS:	2018 NDS
MATERIAL:	Glulams		

Stress Class Rated 24F-1.8E	24F-V4 DF/DF	(1) 3.5 X 9	DRY		

RB7-2.3 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 11.333 Member Slope: 0/12 Actual Length (ft): 11.33 Roof Pitch: 0/12

Area	Ix	Iy	BSW	Lams	G	Kcr
(in^2)	(in^4)	(in^4)	(lbf/ft)			Creep Factor
31.5	212.62	32.16	7.18	1	0.5	1

STRENGTH PROPERTIES

	Fbx+ (psi)	Fbx- (psi)	Fby (psi)	Ft (psi)	Fvx (psi)	Fvy (psi)	Fc (psi)	Fc⊥ (psi)	Ex (psi)	Exmin (psi)	Ey (psi)	Eymin (psi)
Base Values	2400	1850	1450	1100	265	230	1650	650	1800000	950000	1600000	850000
Adjusted Values	2400	1850	1497	1100	265	230	1650	650	1800000	950000	1600000	850000
C_M	1	1	1	1	1	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1	1	1	1	1	1

Bending Adjustment Factors C_{vr} = 1

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	6.1667	0	6.1667	0	1.00	1.00	1.00	1.00
2	5.1667	0	5.1667	0	1.00	1.00	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (75.7%)	80.6	331.3	6.12	D+Lr	1.25
Bending Stress Y (psi)	PASS (52.9%)	1083.7	2302.2	6.12	D+Lr	1.25
Deflection (in)	PASS (94.6%)	0.022 (=L/3364)	0.411 (=L/180)	4.19	D+Lr	
Bearing Stress (psi)	PASS (74.6%)	176.2	694.3	6.17	D+Lr	1.25

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	132	0	167	105	0	0	0	0	0	0	0
B	1496	0	1895	1184	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0

Reaction Location

A B C

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	7.18	7.18	0	11.3334	Dead	Y

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	136.4788	136.4788	0	11.3334	Dead	Y
Uniform (lbf/ft)	113.7323	113.7323	0	11.3334	Snow	Y
Uniform (lbf/ft)	181.9581	181.9581	0	11.3334	Roof Live	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.3	LOADING:	ASD
MEMBER NAME:	RB8-2.3	CODE:	2018 International Building Code
MEMBER TYPE:	ROOF BEAM	NDS:	2018 NDS
MATERIAL:	Glulams		

Stress Class Rated 24F-1.8E	24F-V4 DF/DF	(1) 3.5 X 9	DRY		

RB8-2.3 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 15.167 Member Slope: 0/12 Actual Length (ft): 15.17 Roof Pitch: 0/12

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
31.5	212.62	32.16	7.18	1	0.5	1

STRENGTH PROPERTIES

	Fbx+ (psi)	Fbx- (psi)	Fby (psi)	Ft (psi)	Fvx (psi)	Fvy (psi)	Fc (psi)	Fc⊥ (psi)	Ex (psi)	Exmin (psi)	Ey (psi)	Eymin (psi)
Base Values	2400	1850	1450	1100	265	230	1650	650	1800000	950000	1600000	850000
Adjusted Values	2400	1850	1497	1100	265	230	1650	650	1800000	950000	1600000	850000
C_M	1	1	1	1	1	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1	1	1	1	1	1

Bending Adjustment Factors C_{vr} = 1

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	10	0	10	0	1.00	0.99	1.00	1.00
2	5.1667	0	5.1667	0	1.00	1.00	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (57.2%)	141.9	331.3	9.86	D+Lr	1.25
Bending Stress Y (psi)	PASS (29.4%)	1624.4	2302.2	10.01	D+Lr	1.15
Shear Stress X (psi)	PASS (99.9%)	0.3	264.5	9.86	D+S	1.25
Bending Stress X (psi)	PASS (99.5%)	8.1	1720.9	10.01	D+S	1.15
Deflection (in)	PASS (67.3%)	0.225 (=L/550)	0.689 (=L/180)	15.17	D+Lr	
Bearing Stress (psi)	PASS (37.2%)	451.7	719.6	10	D+Lr	1.25

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	771	0	993	621	0	0	0	0	0	0	0
B	2419	0	3115	1947	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0
X axis											
A	-1	0	-1	-2	0	0	0	0	0	0	0
B	-4	0	-3	-7	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0

Reaction Location

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	7.18	7.18	0	15.1667	Dead	Y

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	0.3275461	0.3275461	0	15.1667	Dead	X
Uniform (lbf/ft)	203.1002	203.1002	0	15.1667	Dead	Y
Uniform (lbf/ft)	0.6063387	0.6063387	0	15.1667	Snow	X
Uniform (lbf/ft)	169.3124	169.3124	0	15.1667	Snow	Y
Uniform (lbf/ft)	0.2700491	0.2700491	0	15.1667	Roof Live	X
Uniform (lbf/ft)	270.8003	270.8003	0	15.1667	Roof Live	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.3	LOADING:	ASD
MEMBER NAME:	RB9-2.3	CODE:	2018 International Building Code
MEMBER TYPE:	ROOF BEAM	NDS:	2018 NDS
MATERIAL:	Glulams		

Stress Class Rated 24F-1.8E	24F-V4 DF/DF	(1) 3.5 X 9	DRY		

RB9-2.3 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 14.834 Member Slope: 0/12 Actual Length (ft): 14.83 Roof Pitch: 0/12

Area	Ix	Iy	BSW	Lams	G	Kcr
(in^2)	(in^4)	(in^4)	(lbf/ft)			Creep Factor
31.5	212.62	32.16	7.18	1	0.5	1

STRENGTH PROPERTIES

	Fbx+ (psi)	Fbx- (psi)	Fby (psi)	Ft (psi)	Fvx (psi)	Fvy (psi)	Fc (psi)	Fc⊥ (psi)	Ex (psi)	Exmin (psi)	Ey (psi)	Eymin (psi)
Base Values	2400	1850	1450	1100	265	230	1650	650	1800000	950000	1600000	850000
Adjusted Values	2400	1850	1497	1100	265	230	1650	650	1800000	950000	1600000	850000
C_M	1	1	1	1	1	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1	1	1	1	1	1

Bending Adjustment Factors C_{vr} = 1

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	9.667	0	9.667	0	1.00	0.99	1.00	1.00
2	5.1667	0	5.1667	0	1.00	1.00	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (47.3%)	174.6	331.3	9.64	D+Lr	1.25
Bending Stress Y (psi)	PASS (13.4%)	1984.7	2291.1	9.64	D+Lr	1.25
Shear Stress X (psi)	PASS (100.0%)	0.1	287.5	9.64	D+Lr	1.25
Bending Stress X (psi)	PASS (99.8%)	3.0	1870.4	9.64	D+Lr	1.25
Deflection (in)	PASS (54.6%)	0.313 (=L/397)	0.689 (=L/180)	14.83	D+Lr	
Bearing Stress (psi)	PASS (23.5%)	550.4	719.6	9.67	D+Lr	1.25

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	891	0	1155	722	0	0	0	0	0	0	0
B	2936	0	3806	2378	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0
X axis											
A	1	0	1	0	0	0	0	0	0	0	0
B	2	0	2	0	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0

Reaction Location

A B C

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Self Weight (lbf/ft)	7.18	7.18	0	14.8337	Dead	Y

LINKED LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	-0.1481476	-0.1481476	0	14.8337	Dead	X
Uniform (lbf/ft)	250.8287	250.8287	0	14.8337	Dead	Y
Uniform (lbf/ft)	208.9823	208.9823	0	14.8337	Snow	Y
Uniform (lbf/ft)	-0.1975431	-0.1975431	0	14.8337	Roof Live	X
Uniform (lbf/ft)	334.3967	334.3967	0	14.8337	Roof Live	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	-- --	PROJECT NAME:	21-028 Framing
LEVEL:	S2.3	LOADING:	ASD
MEMBER NAME:	RB11-2.3	CODE:	2018 International Building Code
MEMBER TYPE:	ROOF BEAM	NDS:	2018 NDS
MATERIAL:	Glulams		

Stress Class Rated 24F-1.8E	24F-V4 DF/DF	(1) 3.5 X 11.875	DRY		

RB11-2.3 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 18.5 Member Slope: 0/12 Actual Length (ft): 18.5 Roof Pitch: 0/12

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
41.56	488.41	42.43	9.48	1	0.5	1

STRENGTH PROPERTIES

	Fbx+ (psi)	Fbx- (psi)	Fby (psi)	Ft (psi)	Fvx (psi)	Fvy (psi)	Fc (psi)	Fc⊥ (psi)	Ex (psi)	Exmin (psi)	Ey (psi)	Eymin (psi)
Base Values	2400	1850	1450	1100	265	230	1650	650	1800000	950000	1600000	850000
Adjusted Values	2400	1850	1452	1100	265	230	1650	650	1800000	950000	1600000	850000
C_M	1	1	1	1	1	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1	1	1	1	1	1

Bending Adjustment Factors C_{vr} = 1

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	18.5	0	18.5	0	1.00	0.91	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (76.1%)	72.7	304.8	18.5	D+S	1.15
Bending Stress Y (psi)	PASS (53.2%)	1292.6	2760.0	9.44	D+S	1.15
Deflection (in)	PASS (53.3%)	0.576 (=L/386)	1.233 (=L/180)	9.25	D+Lr	
Bearing Stress (psi)	PASS (74.7%)	164.5	650.0	18.5	D+S	1.15

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	1121	0	555	694	0	0	0	0	0	0	0
B	1321	0	555	694	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft)	60	60	0	18.5	Roof Live	Y
Uniform (lbf/ft)	75	75	0	18.5	Snow	Y
Trapezoidal (lbf/ft)	90	155	0	18.5	Dead	Y
Self Weight (lbf/ft)	9.48	9.48	0	18.5	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	-- --	PROJECT NAME:	21-028 Framing
LEVEL:	S2.3	LOADING:	ASD
MEMBER NAME:	RR1-2.3	CODE:	2018 International Building Code
MEMBER TYPE:	ROOF RAFTER	NDS:	2018 NDS
MATERIAL:	I-Joists		

Weyerhaeuser	TJI 360	(1) 11.875	16(in) O.C.	DRY	

RR1-2.3 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 28.251 Member Slope: 2/12 Actual Length (ft): 28.64 Roof Pitch: 2/12 O.C. Spacing(in): 16

						End Rcap	End Rcap	End Rcap	End Rcap	Int Rcap	Int Rcap	Int Rcap	Int Rcap
EI x10^6	BSW	Lams	K x10^6	Mcap	Vcap	1.75 NS	3.5 NS	1.75 WS	3.5 WS	3.5 NS	5.25 NS	3.5 WS	5.25 WS
(lbf-in^2)	(lbf/ft)		(lbf)	(lbf-ft)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)
419	0	1	4.5	6180	1705	1080	1505	1440	1705	2460	3000	2815	3360

BEAM DATA

		Unbraced Length (ft)		Beam End
Span	Length (ft)	Top	Bottom	Elev. Diff (ft)
1	1.334	0	1.334	0.2223333
2	24.25	0	24.25	4.041667
3	2.667	0	2.667	0.4445

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Force (lbf)	PASS (67.1%)	644.3	1960.8	25.43	D+S	1.15
Bending Moment (lbf-ft)	PASS (45.8%)	3854.0	7107.0	13.28	D+S	1.15
Deflection (in)	PASS (15.3%)	0.153 (=L/213)	0.180 (=L/180)	0	D+Lr	
Bearing Load (lbf)	PASS (71.5%)	805.1	2829.0	25.58	D+S	1.15

REACTIONS

Units for V: lbf Units for M: lbf-ft

Z axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	0	0	1	1	0	0	0	0	0	0	0
B	0	0	-1	-1	0	0	0	0	0	0	0
C	-1	0	-3	0	0	0	0	0	0	0	0
D	1	0	3	0	0	0	0	0	0	0	0
Y axis											
A	0	0	0	0	0	0	0	0	0	0	0
B	270	0	361	451	0	0	0	0	0	0	0
C	302	0	403	504	0	0	0	0	0	0	0
D	0	0	0	0	0	0	0	0	0	0	0

Reaction Location WS-Web Stiffener Required NSR-No Stiffener Required

A	B	C	D
NSR	NSR	NSR	NSR

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft^2)	20	20	0	28.251	Roof Live	Y
Uniform (lbf/ft^2)	25	25	0	28.251	Snow	Y
Uniform (lbf/ft^2)	15	15	0	28.251	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.2	LOADING:	ASD
MEMBER NAME:	RR1-2.2	CODE:	2018 International Building Code
MEMBER TYPE:	ROOF RAFTER	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 2	(1) 1.5 X 11.25	16(in) O.C.	DRY	

RR1-2.2 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 8.083 Member Slope: 4/12 Actual Length (ft): 8.52 Roof Pitch: 4/12 O.C. Spacing(in): 16

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
16.88	177.98	3.16	3.85	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	900	575	180	1350	625	1600	580
Adjusted Values	1035	575	180	1350	625	1600	580
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1	1	1	1	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1.15

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	7.6667	0	7.6667	2.555567	1.00	0.70	1.00	1.00
2	0.4166713	0	0.416671	0.1388904	1.00	1.00	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (90.6%)	19.4	207.0	0	D+S	1.15
Bending Stress Y (psi)	PASS (86.0%)	167.0	1190.2	3.8	D+S	1.15
Deflection (in)	PASS (95.3%)	0.003 (=L/3767)	0.059 (=L/180)	8.08	D+Lr	
Compressive Stress (psi)	PASS (99.7%)	4.3	1505.4	0	D+S	1.15
Tensile Stress (psi)	PASS (99.4%)	4.3	661.3	7.6	D+S	1.15
Bearing Stress (psi)	PASS (93.6%)	44.0	692.0	7.67	D+S	1.15
Bending-Compression (Unit)	PASS (86.0%)	0.14	1.00	3.8	D+S	1.15
Bending-Tension (Unit)	PASS (86.0%)	0.14	1.00	3.88	D+S	1.15

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	96	0	107	134	0	0	0	0	0	0	0
B	107	0	120	150	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0

Reaction Location

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft^2)	25	25	0	8.083371	Snow	Y
Uniform (lbf/ft^2)	15	15	0	8.083371	Dead	Y
Uniform (lbf/ft^2)	20	20	0	8.083371	Roof Live	Y
Self Weight (lbf/ft)	3.85	3.85	0	8.083371	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	-- --	PROJECT NAME:	21-028 Framing
LEVEL:	S2.3	LOADING:	ASD
MEMBER NAME:	RR2-2.3	CODE:	2018 International Building Code
MEMBER TYPE:	ROOF RAFTER	NDS:	2018 NDS
MATERIAL:	I-Joists		

Weyerhaeuser	TJI 210	(1) 11.875	24(in) O.C.	DRY	

RR2-2.3 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 18.583 Member Slope: 2/12 Actual Length (ft): 18.84 Roof Pitch: 2/12 O.C. Spacing(in): 24

						End Rcap	End Rcap	End Rcap	End Rcap	Int Rcap	Int Rcap	Int Rcap	Int Rcap
EI x10^6	BSW	Lams	K x10^6	Mcap	Vcap	1.75 NS	3.5 NS	1.75 WS	3.5 WS	3.5 NS	5.25 NS	3.5 WS	5.25 WS
(lbf-in^2)	(lbf/ft)		(lbf)	(lbf-ft)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)
315	0	1	4.5	3795	1655	1005	1460	1365	1655	2145	2565	2505	2925

BEAM DATA

		Unbraced Length (ft)		Beam End
Span	Length (ft)	Top	Bottom	Elev. Diff (ft)
1	14.41667	0	14.41667	2.402778
2	4.1667	0	4.1667	0.6944501

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Force (lbf)	PASS (67.6%)	616.2	1903.3	14.31	D+S	1.15
Bending Moment (lbf-ft)	PASS (59.5%)	1769.6	4364.3	6.69	D+S	1.15
Deflection (in)	PASS (69.5%)	0.172 (=L/590)	0.563 (=L/180)	18.58	D+Lr	
Bearing Load (lbf)	PASS (67.1%)	971.6	2949.8	14.42	D+S	1.15

REACTIONS

Units for V: lbf Units for M: lbf-ft Unbalanced loads checked for Live and Live Roof loads, reactions are an "envelope" of combos

Z axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	0	0	0 / -1	0	0	0	0	0	0	0	0
B	0	0	1 / 0	0	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0
Y axis											
A	201	0	292 / -24	335	0	0	0	0	0	0	0
B	364	0	486	607	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0

Reaction Location WS-Web Stiffener Required NSR-No Stiffener Required

UNBALANCED LIVE LOAD - WORST CASE

(Critical Condition Does Not Include Live Loads)

-Live Load Applied

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft^2)	20	20	0	18.58337	Roof Live	Y
Uniform (lbf/ft^2)	25	25	0	18.58337	Snow	Y
Uniform (lbf/ft^2)	15	15	0	18.58337	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	-- --	PROJECT NAME:	21-028 Framing
LEVEL:	S2.3	LOADING:	ASD
MEMBER NAME:	RR3-2.3	CODE:	2018 International Building Code
MEMBER TYPE:	ROOF RAFTER	NDS:	2018 NDS
MATERIAL:	I-Joists		

Weyerhaeuser	TJI 210	(1) 11.875	24(in) O.C.	DRY	

RR3-2.3 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 22.667 Member Slope: 2/12 Actual Length (ft): 22.98 Roof Pitch: 2/12 O.C. Spacing(in): 24

						End Rcap	End Rcap	End Rcap	End Rcap	Int Rcap	Int Rcap	Int Rcap	Int Rcap
EI x10^6	BSW	Lams	K x10^6	Mcap	Vcap	1.75 NS	3.5 NS	1.75 WS	3.5 WS	3.5 NS	5.25 NS	3.5 WS	5.25 WS
(lbf-in^2)	(lbf/ft)		(lbf)	(lbf-ft)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)
315	0	1	4.5	3795	1655	1005	1460	1365	1655	2145	2565	2505	2925

BEAM DATA

		Unbraced Length (ft)		Beam End
Span	Length (ft)	Top	Bottom	Elev. Diff (ft)
1	18.8334	0	18.8334	3.138901
2	3.833399	0	3.8334	0.6388999

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Force (lbf)	PASS (58.9%)	782.9	1903.3	18.81	D+S	1.15
Bending Moment (lbf-ft)	PASS (24.3%)	3304.1	4364.3	9.07	D+S	1.15
Deflection (in)	PASS (50.7%)	0.628 (=L/365)	1.273 (=L/180)	9.29	D+Lr	
Bearing Load (lbf)	PASS (56.4%)	732.2	1679.0	0	D+S	1.15

REACTIONS

Units for V: lbf Units for M: lbf-ft Unbalanced loads checked for Live and Live Roof loads, reactions are an "envelope" of combos

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	275	0	382 / -16	458	0	0	0	0	0	0	0
B	415	0	553	691	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0

Reaction Location WS-Web Stiffener Required NSR-No Stiffener Required

UNBALANCED LIVE LOAD - WORST CASE

(Critical Condition Does Not Include Live Loads)

-Live Load Applied

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft^2)	20	20	0	22.6668	Roof Live	Y
Uniform (lbf/ft^2)	25	25	0	22.6668	Snow	Y
Uniform (lbf/ft^2)	15	15	0	22.6668	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	-- --	PROJECT NAME:	21-028 Framing
LEVEL:	S2.3	LOADING:	ASD
MEMBER NAME:	RR4-2.3	CODE:	2018 International Building Code
MEMBER TYPE:	ROOF RAFTER	NDS:	2018 NDS
MATERIAL:	I-Joists		

Weyerhaeuser	TJI 210	(1) 11.875	24(in) O.C.	DRY	

RR4-2.3 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 17.083 Member Slope: 2/12 Actual Length (ft): 17.32 Roof Pitch: 2/12 O.C. Spacing(in): 24

						End Rcap	End Rcap	End Rcap	End Rcap	Int Rcap	Int Rcap	Int Rcap	Int Rcap
EI x10^6	BSW	Lams	K x10^6	Mcap	Vcap	1.75 NS	3.5 NS	1.75 WS	3.5 WS	3.5 NS	5.25 NS	3.5 WS	5.25 WS
(lbf-in^2)	(lbf/ft)		(lbf)	(lbf-ft)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)
315	0	1	4.5	3795	1655	1005	1460	1365	1655	2145	2565	2505	2925

BEAM DATA

		Unbraced Length (ft)		Beam End
Span	Length (ft)	Top	Bottom	Elev. Diff (ft)
1	15.3334	0	15.3334	2.555567
2	1.750001	0	1.75	0.2916668

PASS-FAIL

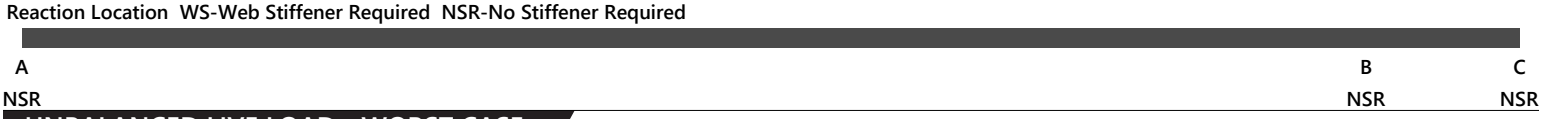
	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Force (lbf)	PASS (67.9%)	611.0	1903.3	15.2	D+S	1.15
Bending Moment (lbf-ft)	PASS (46.8%)	2322.1	4364.3	7.52	D+S	1.15
Deflection (in)	PASS (72.6%)	0.284 (=L/656)	1.036 (=L/180)	7.69	D+Lr	
Bearing Load (lbf)	PASS (63.4%)	613.7	1679.0	0	D+S	1.15

REACTIONS

Units for V: lbf Units for M: lbf-ft Unbalanced loads checked for Live and Live Roof loads, reactions are an "envelope" of combos

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	230	0	311 / -4	384	0	0	0	0	0	0	0
B	289	0	386	482	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0

Reaction Location WS-Web Stiffener Required NSR-No Stiffener Required



UNBALANCED LIVE LOAD - WORST CASE

(Critical Condition Does Not Include Live Loads)

-Live Load Applied

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft^2)	20	20	0	17.0834	Roof Live	Y
Uniform (lbf/ft^2)	25	25	0	17.0834	Snow	Y
Uniform (lbf/ft^2)	15	15	0	17.0834	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	--	PROJECT NAME:	21-028 Framing
	--		
LEVEL:	S2.3	LOADING:	ASD
MEMBER NAME:	RR5-2.3	CODE:	2018 International Building Code
MEMBER TYPE:	ROOF RAFTER	NDS:	2018 NDS
MATERIAL:	I-Joists		

Weyerhaeuser	TJI 210	(1) 11.875	24(in) O.C.	DRY	

RR5-2.3 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 22.334 Member Slope: 2/12 Actual Length (ft): 22.64 Roof Pitch: 2/12 O.C. Spacing(in): 24

						End Rcap	End Rcap	End Rcap	End Rcap	Int Rcap	Int Rcap	Int Rcap	Int Rcap
EI x10^6	BSW	Lams	K x10^6	Mcap	Vcap	1.75 NS	3.5 NS	1.75 WS	3.5 WS	3.5 NS	5.25 NS	3.5 WS	5.25 WS
(lbf-in^2)	(lbf/ft)		(lbf)	(lbf-ft)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)
315	0	1	4.5	3795	1655	1005	1460	1365	1655	2145	2565	2505	2925

BEAM DATA

		Unbraced Length (ft)		Beam End
Span	Length (ft)	Top	Bottom	Elev. Diff (ft)
1	18.667	0	18.667	3.111167
2	3.667	0	3.667	0.6111667

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Force (lbf)	PASS (67.6%)	669.4	2068.8	18.54	D+Lr	1.25
Bending Moment (lbf-ft)	PASS (39.7%)	2858.1	4743.8	8.93	D+Lr	1.25
Deflection (in)	PASS (33.9%)	0.328 (=L/272)	0.496 (=L/180)	22.33	D+Lr	
Bearing Load (lbf)	PASS (64.6%)	948.1	2681.3	18.67	D+Lr	1.25

REACTIONS

Units for V: lbf Units for M: lbf-ft

Z axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	0	0	0	0	0	0	0	0	0	0	0
B	1	0	1	1	0	0	0	0	0	0	0
C	-1	0	-1	-1	0	0	0	0	0	0	0
Y axis											
A	273	0	364	227	0	0	0	0	0	0	0
B	406	0	542	339	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0

Reaction Location WS-Web Stiffener Required NSR-No Stiffener Required

A	B	C
NSR	NSR	NSR

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft^2)	20	20	0	22.334	Roof Live	Y
Uniform (lbf/ft)	25	25	0	22.334	Snow	Y
Uniform (lbf/ft^2)	15	15	0	22.334	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	-- --	PROJECT NAME:	21-028 Framing
LEVEL:	S2.3	LOADING:	ASD
MEMBER NAME:	RR6-2.3	CODE:	2018 International Building Code
MEMBER TYPE:	ROOF RAFTER	NDS:	2018 NDS
MATERIAL:	I-Joists		

Weyerhaeuser	TJI 210	(1) 11.875	24(in) O.C.	DRY	

RR6-2.3 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 26 Member Slope: 2/12 Actual Length (ft): 26.36 Roof Pitch: 2/12 O.C. Spacing(in): 24

						End Rcap	End Rcap	End Rcap	End Rcap	Int Rcap	Int Rcap	Int Rcap	Int Rcap
EI x10^6	BSW	Lams	K x10^6	Mcap	Vcap	1.75 NS	3.5 NS	1.75 WS	3.5 WS	3.5 NS	5.25 NS	3.5 WS	5.25 WS
(lbf-in^2)	(lbf/ft)		(lbf)	(lbf-ft)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)	(lbf)
315	0	1	4.5	3795	1655	1005	1460	1365	1655	2145	2565	2505	2925

BEAM DATA

		Unbraced Length (ft)		Beam End
Span	Length (ft)	Top	Bottom	Elev. Diff (ft)
1	20.5	0	20.5	3.416667
2	5.5	0	5.5	0.9166667

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Force (lbf)	PASS (63.6%)	753.9	2068.8	20.28	D+Lr	1.25
Bending Moment (lbf-ft)	PASS (32.4%)	3208.8	4743.8	9.62	D+Lr	1.25
Deflection (in)	PASS (30.6%)	0.516 (=L/259)	0.743 (=L/180)	26	D+Lr	
Bearing Load (lbf)	PASS (56.3%)	1170.5	2681.3	20.5	D+Lr	1.25

REACTIONS

Units for V: lbf Units for M: lbf-ft

Z axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	-1	0	-2	-1	0	0	0	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0
C	1	0	2	1	0	0	0	0	0	0	0
Y axis											
A	289	0	385	241	0	0	0	0	0	0	0
B	502	0	669	418	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0

Reaction Location WS-Web Stiffener Required NSR-No Stiffener Required

A	B	C
NSR	NSR	NSR

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft^2)	20	20	0	26	Roof Live	Y
Uniform (lbf/ft)	25	25	0	26	Snow	Y
Uniform (lbf/ft^2)	15	15	0	26	Dead	Y

PASS

DATE:	10/18/2021	COMPANY:	Pacific Northwest Structural Group, Inc
VITRUVIUS BUILD:	Base	DESIGNED BY:	David Starkel
CUSTOMER:		REVIEWED BY:	David Starkel
PROJ. ADDRESS:	-- --	PROJECT NAME:	21-028 Framing
LEVEL:	S2.3	LOADING:	ASD
MEMBER NAME:	RR7-2.3	CODE:	2018 International Building Code
MEMBER TYPE:	ROOF RAFTER	NDS:	2018 NDS
MATERIAL:	Solid Sawn		

Douglas Fir-Larch	No. 2	(1) 1.5 X 11.25	24(in) O.C.	DRY	

RR7-2.3 DIAGRAM

BEAM PROPERTIES

Start (ft): 0 End (ft): 16 Member Slope: 4/12 Actual Length (ft): 16.87 Roof Pitch: 4/12 O.C. Spacing(in): 24

Area (in^2)	Ix (in^4)	Iy (in^4)	BSW (lbf/ft)	Lams	G	Kcr Creep Factor
16.88	177.98	3.16	3.85	1	0.5	1

STRENGTH PROPERTIES

	Fb (psi)	Ft (psi)	Fv (psi)	Fc (psi)	Fc⊥ (psi)	E (psi) x10^3	Emin (psi) x10^3
Base Values	900	575	180	1350	625	1600	580
Adjusted Values	1035	575	180	1350	625	1600	580
C_M	1	1	1	1	1	1	1
C_T	1	1	1	1	1	1	1
C_i	1	1	1	1	1	1	1
C_F	1	1	1	1	1	1	1

Bending Adjustment Factors C_{fu} = 1 C_r = 1.15

BEAM DATA

Span	Length (ft)	Unbraced Length (ft) Top	Unbraced Length (ft) Bottom	Beam End Elev. Diff (ft)	CL(Top)	CL(Bottom)	CL(Left)	CL(Right)
1	16	0	16	5.333333	1.00	0.36	1.00	1.00

PASS-FAIL

	PASS/FAIL	MAGNITUDE	STRENGTH	LOCATION (ft)	LOAD COMBO	DURATION FACTOR CD
Shear Stress Y (psi)	PASS (71.2%)	59.6	207.0	0	D+S	1.15
Bending Stress Y (psi)	PASS (9.9%)	1072.7	1190.2	8	D+S	1.15
Deflection (in)	PASS (60.2%)	0.448 (=L/452)	1.124 (=L/180)	8	D+Lr	
Compressive Stress (psi)	PASS (98.8%)	13.3	1100.6	0	D+S	1.15
Tensile Stress (psi)	PASS (98.0%)	13.3	661.3	16	D+S	1.15
Bearing Stress (psi)	PASS (80.6%)	121.2	625.0	0	D+S	1.15
Bending-Compression (Unit)	PASS (9.9%)	0.90	1.00	8	D+S	1.15
Bending-Tension (Unit)	PASS (9.9%)	0.90	1.00	8.16	D+S	1.15

REACTIONS

Units for V: lbf Units for M: lbf-ft

Y axis	DEAD	LIVE	LIVE ROOF	SNOW	WIND +	WIND -	SEISMIC +	SEISMIC -	ICE	RAIN	EARTH
A	285	0	337	422	0	0	0	0	0	0	0
B	285	0	337	422	0	0	0	0	0	0	0

Reaction Location

A B

LOAD LIST

Type	Left Magnitude	Right Magnitude	Load Start (ft)	Load End (ft)	Load Type	Direction
Uniform (lbf/ft^2)	20	20	0	16	Roof Live	Y
Uniform (lbf/ft^2)	25	25	0	16	Snow	Y
Uniform (lbf/ft^2)	15	15	0	16	Dead	Y
Self Weight (lbf/ft)	3.85	3.85	0	16	Dead	Y

Pacific Northwest Structural Group, Inc.	Project:	Smith-Cutright Residence Addition & Remodel	By:	DLS
	Location:	7655 SE 40th Street, Mercer Island, WA 98040	Project No.:	21-028
	Client:	Laura Smith & David Cutright	*Last Update:*	
	AWC SDPWS-2015 - Wood Shear Wall Design Aid ALLOWABLE STRESS DESIGN		24-Apr-20	

Mark	Sheating Type, Nail Size, Panel Edges Fastener Spacing, & Capacity	Capacity (plf)
A	7/16" Sheathing W/ 8d @ 6" oc	335
B	7/16" Sheathing W/ 8d @ 4" oc	490
C	7/16" Sheathing W/ 8d @ 3" oc	630
	None	#N/A
	None	#N/A
	None	#N/A

Mark	Simpson Strong-Tie Holdowns	Capacity (lb)	Holdown Deflection at Highest Load (in)
1	HDU2-SDS2.5 W/ 3" Post	3,075	0.088
2	HDU4-SDS2.5 W/ 3" Post	4,565	0.114
	None	N/A	N/A
	None	N/A	N/A
	None	N/A	N/A
	None	N/A	N/A
	None	N/A	N/A
	None	N/A	N/A
	None	N/A	N/A
	None	N/A	N/A
	None	N/A	N/A
	None	N/A	N/A

○ SEISMIC
◉ WIND

Shear Wall Deflection		
G	90,000	psi
E	1,200,000	psi
A	8.25	in^2

2rd Level

Lateral Trib. Width	ft	24.8
V from above	k	-
Uniform v this level	plf	204.8
Total Wall Length	ft	29.42
V this level	k	5.1
V accum.	k	5.1
Unit Wall Shear	plf	172
Shear Wall Capcity	plf	335
Demand vs. Capcity Ratio		0.51
Apparent Stiffness, Ga	K/in	11.00

Shearwall Type: A

Overturning Moment

		Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Wall 6
M_{OT} from above	k-ft	-	-	-	-	-	-
Story Ht	ft	8.08	8.08	8.08	-	-	-
Length	ft	10.75	4.00	14.67	-	-	-
Diaphragm Ratio		0.75	2.02	0.55	-	-	-
Modified Capacity		335	332	335	-	-	-
M_{OT}	k-ft	15.0	5.6	20.4	-	-	-
M_{OT} accum	k-ft	15.0	5.6	20.4	-	-	-

Shear Wall Defection

Δ_B	in	0.082	0.220	0.060	-	-	-
Δ_V	in	0.226	0.226	0.226	-	-	-
Δ_{HD}	in	0.066	0.178	0.048	-	-	-
Δ_{SW}	in	0.374	0.624	0.334	-	-	-

Resisting Moment

M_R from above		k-ft	-	-	-	-	-	-
Distr. Wts.	Wall Wt	psf	10.0	10.0	10.0	-	-	-
	Trib above	ft	6.0	6.0	6.0	-	-	-
	Wt above	psf	12.0	12.0	12.0	-	-	-
End Wts.	Hdr. Trib	ft	-	-	-	-	-	-
	trib to hdr	ft	-	-	-	-	-	-
	Wt to hdr	psf	-	-	-	-	-	-
Perp. Wall Wts.	Dist to wall	ft	-	-	-	-	-	-
	Wt of wall	lb	-	-	-	-	-	-
	Dist to wall	ft	-	-	-	-	-	-
	Wt of wall	lb	-	-	-	-	-	-
M_R this level		k-ft	8.83	1.22	16.44	-	-	-
M_R accum		k-ft	8.83	1.22	16.44	-	-	-

SEE PERFORATED SHEAR CALCULATIONS FOR WALLS 2-3

Hold Down Forces

Wt. Reduction		0.60	0.60	0.60	0.60	0.60	0.60
T_R accum	k	0.82	0.31	1.12	-	-	-
HD Offset	ft	-	-	-	-	-	-
HD Force	k	0.90	1.21	0.72	-	-	-
HD Capacity	k	3.08	3.08	3.08	-	-	-
Hold Down Type		1	1	1	-	-	-

1st Level

Lateral Trib. Width	ft	24.8
V from above	k	5.1
Uniform v this level	plf	275.6
Total Wall Length	ft	23.76
V this level	k	6.8
V accum.	k	11.9
Unit Wall Shear	plf	501
Shear Wall Capcity	plf	630
Demand vs. Capcity Ratio		0.79
Apparent Stiffness, Ga	K/in	17.00

Shearwall Type: C

Overturning Moment

		Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Wall 6
M_{OT} from above	k-ft	14.97	5.57	20.42	-	-	-
Story Ht	ft	-	8.08	8.08	8.08	8.08	8.08
Length	ft	-	2.42	2.17	3.00	7.67	8.50
Diaphragm Ratio		-	3.34	3.72	2.69	1.05	0.95
Modified Capacity		-	525	N/A	575	630	630
M_{OT}	k-ft	-	9.8	8.8	12.1	31.0	34.4
M_{OT} accum	k-ft	15.0	15.4	29.2	12.1	31.0	34.4

Shear Wall Defection

Δ_B	in	-	1.058	1.180	0.854	0.334	0.301
Δ_V	in	-	0.424	0.424	0.424	0.424	0.424
Δ_{HD}	in	-	#N/A	#N/A	0.307	0.120	0.108
Δ_{SW}	in	-	-	-	1.585	0.878	0.834

Resisting Moment

M_R from above		k-ft	8.8	1.2	16.4	-	-	-
Distr. Wts.	Wall Wt	psf	10.0	10.0	10.0	10.0	10.0	10.0
	Trib above	ft	6.0	6.0	6.0	6.0	6.0	6.0
	Wt above	psf	12.0	12.0	12.0	12.0	12.0	12.0
End Wts.	Hdr. Trib	ft	-	-	-	#######	-	-
	trib to hdr	ft	-	-	-	-	-	-
	Wt to hdr	psf	-	-	-	-	-	-
Perp. Wall Wts.	Dist to wall	ft	-	-	-	-	-	-
	Wt of wall	lb	-	-	-	-	-	-
	Dist to wall	ft	-	-	-	-	-	-
	Wt of wall	lb	-	-	-	-	-	-
M_R this level		k-ft	-	0.45	0.36	0.69	4.49	5.52
M_R accum		k-ft	8.83	1.67	16.80	0.69	4.49	5.52

SEE FORCE TRANFER AROUND OPENINGS (FTAO) CALCULATIONS FOR WALLS

Hold Down Forces

Wt. Reduction		0.60	0.60	0.60	0.60	0.60	0.60
T_R accum	k	-	0.69	7.74	0.23	0.59	0.65
HD Offset	ft	-	-	-	-	-	-
HD Force	k	-	5.93	8.81	3.91	3.69	3.66
HD Capacity	k	-	#N/A	#N/A	4.57	4.57	4.57
Hold Down Type		-	#N/A	#N/A	2	2	2

Project:	Smith-Cutright Residence Addition & Remodel	By:	DLS
Location:	TF-1	Job No.:	21-028
Client:	Laura Smith & David Cutright	Last Update:	24-Apr-20

Wood Shear Wall Design Aid

Comments: See Perforated Shear

1st Level
Shear Wall Design Aid

Lateral Trib. Width	ft	24.8
V from above	k	-
Uniform v this level	plf	207.2
Total Wall Length	ft	22.7
V this level	k	5.1
V accum.	k	5.1
Unit Wall Shear	plf	226
Unit Shear Wall Capcity	plf	335
Demand vs. Capcity Ratio		0.68
Apparent Stiffness, Ga	K/in	11.00

Shearwall Type: A

Overturning Moment

Wall			Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Wall 6	Wall 7	Wall 8	Wall 9	Wall 10	Wall 11	Wall 12
M_{OT} from above		k-ft	-	-	-	-	-	-	-	-	-	-	-	-
Story Ht		ft	8.08	8.08	8.08	8.08	-	-	-	-	-	-	-	-
Length		ft	4.17	10.50	4.17	3.83	-	-	-	-	-	-	-	-
Diaphragm Ratio			1.94	0.77	1.94	2.11	-	-	-	-	-	-	-	-
Modified Capacity			335	335	335	330	-	-	-	-	-	-	-	-
M_{OT}		k-ft	7.6	19.2	7.6	7.0	-	-	-	-	-	-	-	-
M_{OT} accum		k-ft	7.6	19.2	7.6	7.0	-	-	-	-	-	-	-	-

Shear Wall Defection

Δ_B		in	0.277	0.110	0.277	0.302	-	-	-	-	-	-	-	-
Δ_V		in	0.226	0.226	0.226	0.226	-	-	-	-	-	-	-	-
Δ_{HD}		in	0.171	0.068	0.171	0.186	-	-	-	-	-	-	-	-
Δ_{SW}		in	0.674	0.403	0.674	0.713	-	-	-	-	-	-	-	-

Resisting Moment

M_R from above			k-ft	-	-	-	-	-	-	-	-	-	-	-	-
Distr. Wts.	Wall Wt		psf	10.0	10.0	10.0	10.0	-	-	-	-	-	-	-	-
	Trib above		ft	6.0	6.0	6.0	6.0	-	-	-	-	-	-	-	-
	Wt above		psf	12.0	12.0	12.0	12.0	-	-	-	-	-	-	-	-
End Wts.	Hdr. Trib		ft	-	-	-	-	-	-	-	-	-	-	-	-
	trib to hdr		ft	-	-	-	-	-	-	-	-	-	-	-	-
	Wt to hdr		psf	-	-	-	-	-	-	-	-	-	-	-	-
Perp. Wall Wts.	Dist to wall		ft	4.17	10.50	4.17	3.83	-	-	-	-	-	-	-	-
	Wt of wall		lb	-	-	-	-	-	-	-	-	-	-	-	-
	Dist to wall		ft	-	-	-	-	-	-	-	-	-	-	-	-
	Wt of wall		lb	-	-	-	-	-	-	-	-	-	-	-	-
M_R this level			k-ft	1.33	8.42	1.33	1.12	-	-	-	-	-	-	-	-
M_R accum			k-ft	1.33	8.42	1.33	1.12	-	-	-	-	-	-	-	-

SEE PERFORATED SHEAR CALCULATIONS

Hold Down Forces

Wt. Reduction		0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
T_R accum	k	0.32	0.80	0.32	0.29	-	-	-	-	-	-	-	-
HD Offset	ft	-	-	-	-	-	-	-	-	-	-	-	-
HD Force	k	1.64	1.35	1.64	1.65	-	-	-	-	-	-	-	-
HD Capacity	k	3.08	3.08	3.08	3.08	-	-	-	-	-	-	-	-
Hold Down Type		(1)	(1)	(1)	(1)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)

Project:	Smith-Cutright Residence Addition & Remodel	By:	DLS
Location:	TF-2 2nd	Job No.:	21-028
Client:	Laura Smith & David Cutright	Last Update:	24-Apr-20

Wood Shear Wall Design Aid

Comments: See Perforated Shear Calculations

2rd Level

Lateral Trib. Width	ft	22.6
V from above	k	-
Uniform v this level	plf	207.2
Total Wall Length	ft	17.84
V this level	k	4.7
V accum.	k	4.7
Unit Wall Shear	plf	263
Shear Wall Capcity	plf	490
Demand vs. Capcity Ratio		0.54
Apparent Stiffness, Ga	K/in	14.00

Shearwall Type: B

Overturning Moment

		Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Wall 6
M_{OT} from above	k-ft	-	-	-	-	-	-
Story Ht	ft	10.50	10.50	11.50	11.50	-	-
Length	ft	6.75	3.75	3.67	3.67	-	-
Diaphragm Ratio		1.56	2.80	3.13	3.13	-	-
Modified Capacity		490	350	313	313	-	-
M_{OT}	k-ft	18.6	10.3	11.1	11.1	-	-
M_{OT} accum	k-ft	18.6	10.3	11.1	11.1	-	-

Shear Wall Defection

Δ_B	in	0.437	0.787	1.056	1.056	-	-
Δ_V	in	0.429	0.429	0.470	0.470	-	-
Δ_{HD}	in	0.137	0.246	0.276	0.276	-	-
Δ_{SW}	in	1.003	1.462	1.801	1.801	-	-

Resisting Moment

M_R from above		k-ft	-	-	-	-	-	-
Distr. Wts.	Wall Wt	psf	10.0	10.0	10.0	10.0	-	-
	Trib above	ft	12.7	12.7	15.8	15.8	-	-
	Wt above	psf	12.0	12.0	12.0	12.0	-	-
End Wts.	Hdr. Trib	ft	-	-	-	-	-	-
	trib to hdr	ft	-	-	-	-	-	-
	Wt to hdr	psf	-	-	-	-	-	-
Perp. Wall Wts.	Dist to wall	ft	-	-	-	-	-	-
	Wt of wall	lb	-	-	-	-	-	-
	Dist to wall	ft	-	-	-	-	-	-
	Wt of wall	lb	-	-	-	-	-	-
M_R this level		k-ft	5.86	1.81	2.05	2.05	-	-
M_R accum		k-ft	5.86	1.81	2.05	2.05	-	-

Hold Down Forces

Wt. Reduction		0.60	0.60	0.60	0.60	0.60	0.60
T_R accum	k	0.87	0.48	0.56	0.56	-	-
HD Offset	ft	-	-	-	-	-	-
HD Force	k	2.24	2.47	2.69	2.69	-	-
HD Capacity	k	3.08	3.08	3.08	3.08	-	-
Hold Down Type		1	1	1	1	-	-

1st Level

Lateral Trib. Width	ft	22.6
V from above	k	4.7
Uniform v this level	plf	247.0
Total Wall Length	ft	42.67
V this level	k	5.6
V accum.	k	10.3
Unit Wall Shear	plf	241
Shear Wall Capcity	plf	490
Demand vs. Capcity Ratio		0.49
Apparent Stiffness, Ga	K/in	14.00

Shearwall Type: B

Overturning Moment

		Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Wall 6
M_{OT} from above	k-ft	18.62	10.35	11.09	11.09	-	-
Story Ht	ft	8.08	8.08	8.08	8.08	8.08	8.08
Length	ft	5.58	7.42	7.25	7.25	8.17	7.00
Diaphragm Ratio		1.45	1.09	1.11	1.11	0.99	1.15
Modified Capacity		490	490	490	490	490	490
M_{OT}	k-ft	10.9	14.4	14.1	14.1	15.9	13.6
M_{OT} accum	k-ft	29.5	24.8	25.2	25.2	15.9	13.6

Shear Wall Defection

Δ_B	in	0.221	0.166	0.170	0.170	0.151	0.176
Δ_V	in	0.330	0.330	0.330	0.330	0.330	0.330
Δ_{HD}	in	0.165	0.096	0.098	0.098	0.087	0.102
Δ_{SW}	in	0.716	0.592	0.598	0.598	0.568	0.607

Resisting Moment

M_R from above		k-ft	5.9	1.8	2.0	2.0	-	-
Distr. Wts.	Wall Wt	psf	10.0	10.0	10.0	10.0	10.0	10.0
	Trib above	ft	6.0	6.0	6.0	6.0	6.0	6.0
	Wt above	psf	12.0	12.0	12.0	12.0	12.0	12.0
End Wts.	Hdr. Trib	ft	-	#######	-	#######	-	#######
	trib to hdr	ft	-	-	-	-	-	-
	Wt to hdr	psf	-	-	-	-	-	-
Perp. Wall Wts.	Dist to wall	ft	-	-	-	-	-	-
	Wt of wall	lb	-	-	-	-	-	-
	Dist to wall	ft	-	-	-	-	-	-
	Wt of wall	lb	-	-	-	-	-	-
M_R this level		k-ft	2.38	4.21	4.02	4.02	5.10	3.74
M_R accum		k-ft	8.23	6.01	6.06	6.06	5.10	3.74

Hold Down Forces

Wt. Reduction		0.60	0.60	0.60	0.60	0.60	0.60
T_R accum	k	1.48	0.81	0.84	0.84	0.62	0.53
HD Offset	ft	-	-	-	-	-	-
HD Force	k	4.40	2.85	2.97	2.97	1.57	1.62
HD Capacity	k	4.57	3.08	3.08	3.08	3.08	3.08
Hold Down Type		2	1	1	1	1	1

Project:	Smith-Cutright Residence Addition & Remodel	By:	DLS
Location:	LF-1	Job No.:	21-028
Client:	Laura Smith & David Cutright	Last Update:	24-Apr-20

Wood Shear Wall Design Aid

Comments:

1st Level
Shear Wall Design Aid

Lateral Trib. Width	ft	24.8
V from above	k	-
Uniform v this level	plf	207.2
Total Wall Length	ft	22.7
V this level	k	5.1
V accum.	k	5.1
Unit Wall Shear	plf	226
Unit Shear Wall Capcity	plf	335
Demand vs. Capcity Ratio		0.68
Apparent Stiffness, Ga	K/in	11.00

Shearwall Type: A

Overturning Moment

Wall		Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Wall 6	Wall 7	Wall 8	Wall 9	Wall 10	Wall 11	Wall 12
M_{OT} from above	k-ft	-	-	-	-	-	-	-	-	-	-	-	-
Story Ht	ft	8.08	8.08	8.08	8.08	-	-	-	-	-	-	-	-
Length	ft	4.17	10.50	4.17	3.83	-	-	-	-	-	-	-	-
Diaphragm Ratio		1.94	0.77	1.94	2.11	-	-	-	-	-	-	-	-
Modified Capacity		335	335	335	330	-	-	-	-	-	-	-	-
M_{OT}	k-ft	7.6	19.2	7.6	7.0	-	-	-	-	-	-	-	-
M_{OT} accum	k-ft	7.6	19.2	7.6	7.0	-	-	-	-	-	-	-	-

Shear Wall Defection

Δ_B	in	0.277	0.110	0.277	0.302	-	-	-	-	-	-	-	-
Δ_V	in	0.226	0.226	0.226	0.226	-	-	-	-	-	-	-	-
Δ_{HD}	in	0.171	0.068	0.171	0.186	-	-	-	-	-	-	-	-
Δ_{SW}	in	0.674	0.403	0.674	0.713	-	-	-	-	-	-	-	-

Resisting Moment

M_R from above		k-ft	-	-	-	-	-	-	-	-	-	-	-	-
Distr. Wts.	Wall Wt	psf	10.0	10.0	10.0	10.0	-	-	-	-	-	-	-	-
	Trib above	ft	6.0	6.0	6.0	6.0	-	-	-	-	-	-	-	-
	Wt above	psf	12.0	12.0	12.0	12.0	-	-	-	-	-	-	-	-
End Wts.	Hdr. Trib	ft	-	-	-	-	-	-	-	-	-	-	-	-
	trib to hdr	ft	-	-	-	-	-	-	-	-	-	-	-	-
	Wt to hdr	psf	-	-	-	-	-	-	-	-	-	-	-	-
Perp. Wall Wts.	Dist to wall	ft	4.17	10.50	4.17	3.83	-	-	-	-	-	-	-	-
	Wt of wall	lb	-	-	-	-	-	-	-	-	-	-	-	-
	Dist to wall	ft	-	-	-	-	-	-	-	-	-	-	-	-
	Wt of wall	lb	-	-	-	-	-	-	-	-	-	-	-	-
M_R this level		k-ft	1.33	8.42	1.33	1.12	-	-	-	-	-	-	-	-
M_R accum		k-ft	1.33	8.42	1.33	1.12	-	-	-	-	-	-	-	-

Hold Down Forces

Wt. Reduction		0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
T_R accum	k	0.32	0.80	0.32	0.29	-	-	-	-	-	-	-	-
HD Offset	ft	-	-	-	-	-	-	-	-	-	-	-	-
HD Force	k	1.64	1.35	1.64	1.65	-	-	-	-	-	-	-	-
HD Capacity	k	3.08	3.08	3.08	3.08	-	-	-	-	-	-	-	-
Hold Down Type		1	1	1	1	-	-	-	-	-	-	-	-

Project:	Smith-Cutright Residence Addition & Remodel	By:	DLS
Location:	LF-2 2nd	Job No.:	21-028
Client:	Laura Smith & David Cutright	Last Update:	24-Apr-20

Wood Shear Wall Design Aid

Comments: See Perforated Shear Calculations

	Project:	Smith-Cutright Residence Addition & Remodel	By:	DLS
	Location:	7655 SE 40th Street, Mercer Island, WA 98040	Project No.:	21-028
	Client:	Laura Smith & David Cutright	Last Update:	27-Apr-19
	PERFORATED SHEAR WALL EFFECTIVE SHEAR CAPACITY RATIO			

Wall Line	Force to Wall [P] (K)	Total Length of Wall [L] (ft)	Length of Full Height Shearwall [A1+A3+A5] (ft)	Unit Shear in Wall (plf)	Percent Full Height Sheathing	Plate Height [H] (ft)	Maximum Unrestrained Opening Height (B2+B3) (ft)	Maximum Unrestrained Opening Height (B2+B3) (%)	Effective Shear Capacity Ratio	Required Capacity (plf)	Shearwall Capacity (plf)	Ratio	Revised Shearwall Type	Combined Resisting Force (K)	Required Uplift Capacity (K)	Revised Holdown Type
TF-1 2nd Wall 2-3	3.22	24.75	18.67	172	75%	8	5	62%	0.799	216	335	0.6439	A	-	1.74	1
TF-2 2nd	5.13	39.75	14.67	350	37%	8	5	62%	0.659	531	630	0.8424	C	0.80	3.49	2
LF-1 1st Wall 1-2	3.13	25.25	13.00	241	51%	8	5	62%	0.713	338	490	0.6894	B	-	2.73	1
LF-1 1st Wall 3-4	3.49	21.17	14.50	241	68%	8	5	62%	0.791	305	335	0.9093	A	-	2.46	1
LF-1 1st Wall 5-6	3.65	21.17	15.17	241	72%	8	5	62%	0.799	301	335	0.9	A	-	2.44	1
	-	-	-			-	-							-	-	-
	-	-	-			-	-							-	-	-
	-	-	-			-	-							-	-	-
	-	-	-			-	-							-	-	-
	-	-	-			-	-							-	-	-
	-	-	-			-	-							-	-	-
	-	-	-			-	-							-	-	-
	-	-	-			-	-							-	-	-
	-	-	-			-	-							-	-	-
	-	-	-			-	-							-	-	-
	-	-	-			-	-							-	-	-
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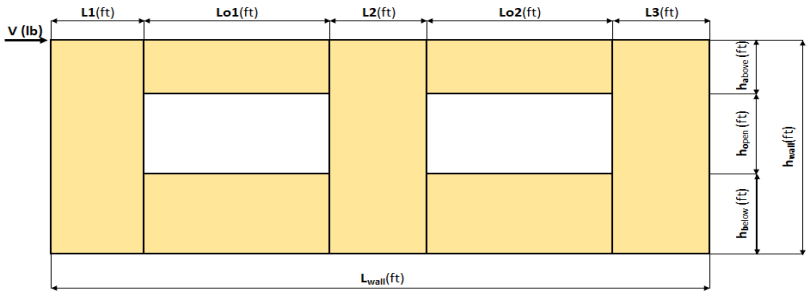
	-	-	-			-	-							-	-	-
	-	-	-			-	-							-	-	-
	-	-	-			-	-							-	-	-

This version of the Force Transfer Around Openings calculator has expired.
Please go to **www.apawood.org** to download the latest version.

Project Information

Code:	2018 IBC
Designer:	DLS
Client:	Laura Smith & David Cutright
Project:	21-028 Smith-Cutright Residence Addition & Remodel
Wall Line:	TF-1 1st Walls 2-4

Date:



Shear Wall Calculation Variables

V	3800 lbf		Opening 1		Opening 2	Adj. Factor Method =		2bs/h
L1	2.33 ft	ha1	1.08 ft	ha2	1.08 ft	Wall Pier Aspect Ratio		Adj. Factor
L2	3.00 ft	ho1	4.00 ft	ho2	4.00 ft	P1=ho1/L1=	1.72	N/A
L3	2.17 ft	hb1	3.00 ft	hb2	3.00 ft	P2=ho2/L2=	1.33	N/A
h_{wall}	8.08 ft	Lo1	6.00 ft	Lo2	10.00 ft	P3=ho3/L3=	1.84	N/A
L_{wall}	23.50 ft							

1. Hold-down forces: H = Vh_{wall}/L_{wall} 1307 lbf

2. Unit shear above + below opening

First opening: va1 = vb1 = H/(ha1+hb1) =	320 plf
Second opening: va2 = vb2 = H/(ha2+hb2) =	320 plf

3. Total boundary force above + below openings

First opening: O1 = va1 x (Lo1) =	1921 lbf
Second opening: O2 = va2 x (Lo2) =	3202 lbf

4. Corner forces

F1 = O1(L1)/(L1+L2) =	840 lbf
F2 = O1(L2)/(L1+L2) =	1081 lbf
F3 = O2(L2)/(L2+L3) =	1858 lbf
F4 = O2(L3)/(L2+L3) =	1344 lbf

5. Tributary length of openings

T1 = (L1*Lo1)/(L1+L2) =	2.62 ft
T2 = (L2*Lo1)/(L1+L2) =	3.38 ft
T3 = (L2*Lo2)/(L2+L3) =	5.80 ft
T4 = (L3*Lo2)/(L2+L3) =	4.20 ft

6. Unit shear beside opening

V1 = (V/L)(L1+T1)/L1 =	344 plf
V2 = (V/L)(T2+L2+T3)/L2 =	657 plf
V3 = (V/L)(T4+L3)/L3 =	474 plf
Check V1*L1+V2*L2+V3*L3=V?	3800 lbf **OK**

7. Resistance to corner forces

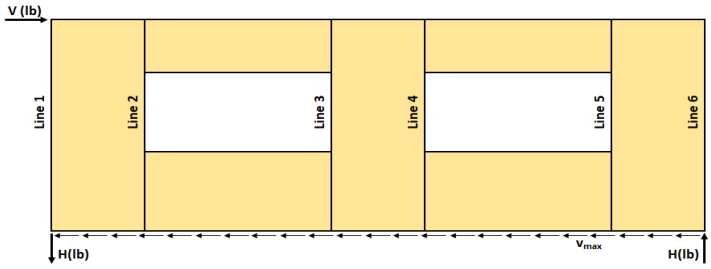
R1 = V1*L1 =	801 lbf
R2 = V2*L2 =	1970 lbf
R3 = V3*L3 =	1030 lbf

8. Difference corner force + resistance

R1-F1 =	-39 lbf
R2-F2-F3 =	-970 lbf
R3-F4 =	-315 lbf

9. Unit shear in corner zones

vc1 = (R1-F1)/L1 =	-17 plf
vc2 = (R2-F2-F3)/L2 =	-323 plf
vc3 = (R3-F4)/L3 =	-145 plf



Check Summary of Shear Values for Two Openings

Line 1: vc1(ha1+hb1)+V1(ho1)=H?		-68	1375	1307 lbf
Line 2: va1(ha1+hb1)-vc1(ha1+hb1)-V1(ho1)=0?	1307	-68	1375	0
Line 3: vc2(ha1+hb1)+V2(ho1)-va1(ha1+hb1)=0?	-1319	2626	1307	0
Line 4: va2(ha2+hb2)-V2(ho2)-vc2(ha2+hb2)=0?	1307	2626	-1319	0
Line 5: va2(ha2+hb2)-vc3(ha2+hb2)-V3(ho2)=0?	1307	-591	1898	0
Line 6: vc3(ha2+hb2)+ V3(ho2) = H?		-591	1898	1307 lbf

Design Summary*

Req. Sheathing Capacity	657 plf
Req. Strap Force	1858 lbf
Req. HD Force	1307 lbf
Req. Shear Wall Anchorage Force	162 plf

4-Term Deflection	0.460 in.
4-Term Story Drift %	0.019 %

See Page 2

3-Term Deflection	0.452 in.
3-Term Story Drift %	0.019 %

See Page 3

*The Design Summary assumes that the shear wall is designed as blocked.

Shear Wall Deflection Calculation Variables

Project Information

Code:	2018 IBC
Designer:	DLS
Client:	Laura Smith & David Cutright
Project:	21-028 Smith-Cutright Residence Addition & Remodel
Wall Line:	TF-1 1st Walls 2-4

Date:

Induced Shear Load $V_{induced}$: 6333 (lbf)

Sheathing:	
OSB	Sheathing Material
7/16	Performance Category
APA Rated Sheathing	Grade
	Gt Override
	Ga Overide

Wood End Post Values:			
Species:	DF-L		
E:	1.20E+06	(psi)	
	Qty	Stud Size	
Dimensions:	2	2x6	
A:	16.5	($in.^2$)	
A Override:		($in.^2$)	

Nail Type: 8d common (penny weight)

	Pier 1	Pier 3	
Nail Spacing:	2	2	(in.)
HD Capacity:	4657	4657	(lbf)
HD Deflection:	0.114	0.114	(in.)

Four-Term Equation Deflection Check

$$\Delta = \frac{8vh^3}{EAb} + \frac{vh}{Gt} + 0.75he_n + d_a\frac{h}{b} \qquad \text{(Equation 23-2)}$$

	Pier 1-L	Pier 1-R	Pier 2-L	Pier 2-R	Pier 3-L	Pier 3-R	
Sheathing:	7/16	7/16	7/16	7/16	7/16	7/16	
Nail:	8d common	8d common	8d common	8d common	8d common	8d common	
$v_{induced}$:	573	573	1094	1094	791	791	(plf)
E:	1.20E+06	1.20E+06	1.20E+06	1.20E+06	1.20E+06	1.20E+06	(psi)
h:	8.08	5.08	5.08	5.08	5.08	8.08	(ft)
A:	16.5	16.5	16.5	16.5	16.5	16.5	($in.^2$)
Gt:	83,500	83,500	83,500	83,500	83,500	83,500	(lbf/in.)
Nail Spacing:	2	2	2	2	2	2	(in.)
Vn:	95	95	182	182	132	132	(plf)
e_n:	0.0043	0.0043	0.0305	0.0305	0.0114	0.0114	(in.)
b:	2.33	2.33	3.00	3.00	2.17	2.17	(ft)
HD Capacity:	4657	4657	4657	4657	4657	4657	(lbf)
HD Defl:	0.114	0.114	0.114	0.114	0.114	0.114	(in.)

Check Total Deflection of Wall System

Pier 1 (left)				Pier 1 (right)			
Term 1 Bending	Term 2 Shear	Term 3 Fastener	Term 4 HD-1	Term 1 Bending	Term 2 Shear	Term 3 Fastener	Term 4 HD-2
0.052	0.055	0.026	0.393	0.013	0.035	0.016	0.155
		Sum	0.527			Sum	0.220
Pier 2 (left)				Pier 2 (right)			
Term 1 Bending	Term 2 Shear	Term 3 Fastener	Term 4 HD-1	Term 1 Bending	Term 2 Shear	Term 3 Fastener	Term 4 HD-2
0.019	0.067	0.116	0.230	0.019	0.067	0.116	0.230
		Sum	0.432			Sum	0.432
Pier 3 (left)				Pier 3 (right)			
Term 1 Bending	Term 2 Shear	Term 3 Fastener	Term 4 HD-1	Term 1 Bending	Term 2 Shear	Term 3 Fastener	Term 4 HD-2
0.019	0.048	0.044	0.230	0.078	0.077	0.069	0.582
		Sum	0.341			Sum	0.806

Total Defl.	
0.460	(in.)
0.0190	%drift

Three-Term Equation Deflection Check

$$\delta_{sw} = \frac{8vh^3}{EAb} + \frac{vh}{1000G_a} + \frac{h\Delta_a}{b} \qquad (4.3\text{-}1)$$

	Pier 1-L	Pier 1-R	Pier 2-L	Pier 2-R	Pier 3-L	Pier 3-R	
Sheathing:	7/16	7/16	7/16	7/16	7/16	7/16	
Nail:	8d common	8d common	8d common	8d common	8d common	8d common	
$v_{induced}$:	573	573	1094	1094	791	791	(plf)
E:	1.20E+06	1.20E+06	1.20E+06	1.20E+06	1.20E+06	1.20E+06	(psi)
h:	8.08	5.08	5.08	5.08	5.08	8.08	(ft)
A:	16.5	16.5	16.5	16.5	16.5	16.5	($in.^2$)
Ga:	42.0	42.0	42.0	42.0	42.0	42.0	(kips/in.)
b:	2.33	2.33	3.00	3.00	2.17	2.17	(ft)
HD Capacity:	4657	4657	4657	4657	4657	4657	(lbf)
HD Defl:	0.114	0.114	0.114	0.114	0.114	0.114	(in.)

Check Total Deflection of Wall System

Pier 1 (left)			Pier 1 (right)		
Term 1 Bending	Term 2 Shear	Term 3 Fastener	Term 1 Bending	Term 2 Shear	Term 3 Fastener
0.052	0.110	0.393	0.013	0.069	0.155
	Sum	0.556		Sum	0.238
Pier 2 (left)			Pier 2 (right)		
Term 1 Bending	Term 2 Shear	Term 3 Fastener	Term 1 Bending	Term 2 Shear	Term 3 Fastener
0.019	0.132	0.230	0.019	0.132	0.230
	Sum	0.382		Sum	0.382
Pier 3 (left)			Pier 3 (right)		
Term 1 Bending	Term 2 Shear	Term 3 Fastener	Term 1 Bending	Term 2 Shear	Term 3 Fastener
0.019	0.096	0.230	0.078	0.152	0.582
	Sum	0.345		Sum	0.812

Total Defl.	
0.452	(in.)
0.0187	%drift

Project Information

Code:	2018 IBC	**Date:**	
Designer:	DLS		
Client:	Laura Smith & David Cutright		
Project:	21-028 Smith-Cutright Residence Addition & Remodel		
Wall Line:	TF-1 1st Walls 2-4		

Comment: The 3-term equation is calibrated to be approximately equal to 4-term equation at 1.4*ASD capacity.

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 8' Cantilevered Wall

Code Reference

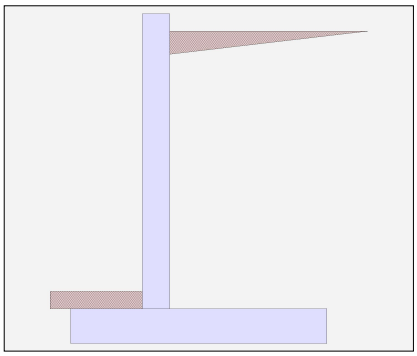
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	8.00 ft
Wall height above soil	=	0.50 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	250.0 psf/ft
Soil Density, Heel	=	120.00 pcf
Soil Density, Toe	=	120.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 8' Cantilevered Wall

Design Summary

Wall Stability Ratios			
Overturning	=	4.88	OK
Sliding	=	1.68	OK
Global Stability	=	2.22	
Total Bearing Load	=	5,573 lbs	
...resultant ecc.	=	2.00 in	
Soil Pressure @ Toe	=	1,034 psf	OK
Soil Pressure @ Heel	=	749 psf	OK
Allowable	=	1,500 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,448 psf	
ACI Factored @ Heel	=	1,049 psf	
Footing Shear @ Toe	=	9.9 psi	OK
Footing Shear @ Heel	=	5.1 psi	OK
Allowable	=	75.0 psi	
Sliding Calcs			
Lateral Sliding Force	=	1,417.5 lbs	
less 100% Passive Force	-	156.3 lbs	
less 100% Friction Force	-	2,229.0 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Bottom		
		Stem OK		
Design Height Above Ftg	ft =	0.00		
Wall Material Above "Ht"	=	Concrete		
Design Method	=	SD	SD	SD
Thickness	=	8.00		
Rebar Size	=	# 4		
Rebar Spacing	=	10.00		
Rebar Placed at	=	Edge		
Design Data				
fb/FB + fa/Fa	=	**0.741**		
Total Force @ Section				
Service Level	lbs =			
Strength Level	lbs =	1,792.0		
Moment....Actual				
Service Level	ft-# =			
Strength Level	ft-# =	4,778.7		
Moment.....Allowable	=	6,444.1		
Shear.....Actual				
Service Level	psi =			
Strength Level	psi =	23.9		
Shear.....Allowable	psi =	75.0		
Anet (Masonry)	in2 =			
Rebar Depth 'd'	in =	6.25		
Masonry Data				
f'm	psi =			
Fs	psi =			
Solid Grouting	=			
Modular Ratio 'n'	=			
Wall Weight	psf =	100.0		
Short Term Factor	=			
Equiv. Solid Thick.	=			
Masonry Block Type	=			
Masonry Design Method	=	ASD		
Concrete Data				
f'c	psi =	2,500.0		
Fy	psi =	60,000.0		

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 8' Cantilevered Wall

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.179 in2/ft		
(4/3) * As :	0.2387 in2/ft	Min Stem T&S Reinf Area 1.632 in2	
200bd/fy : 200(12)(6.25)/60000 :	0.25 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft	
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.2387 in2/ft	#4@ 12.50 in	#4@ 25.00 in
Provided Area :	0.24 in2/ft	#5@ 19.38 in	#5@ 38.75 in
Maximum Area :	0.8467 in2/ft	#6@ 27.50 in	#6@ 55.00 in

Footing Data

Toe Width	=	1.75 ft
Heel Width	=	4.50
Total Footing Width	=	6.25
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,448	1,049	psf
Mu' : Upward	=	2,160	8,305	ft-#
Mu' : Downward	=	386	9,787	ft-#
Mu: Design	=	1,774	1,482	ft-#
phiMin	=	2,500	2,500	ft-#
Actual 1-Way Shear	=	9.88	5.14	psi
Allow 1-Way Shear	=	40.00	40.00	psi

Toe Reinforcing = None Spec'd
Heel Reinforcing = None Spec'd
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe:
Heel:
Key:

Min footing T&S reinf Area 1.62 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 8' Cantilevered Wall

Summary of Overturning & Resisting Forces & Moments

Item	.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#	.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)	1,417.5	3.00	4,252.5			
HL Act Pres (be water tbl)						
Hydrostatic Force						
Buoyant Force =						
Surcharge over Heel =						
Surcharge Over Toe =						
Adjacent Footing Load =						
Added Lateral Load =						
Load @ Stem Above Soil =						
=						
Soil Over HL (ab. water tbl)				3,680.0	4.33	15,946.7
Soil Over HL (bel. water tbl)					4.33	15,946.7
Watre Table						
Sloped Soil Over Heel =						
Surcharge Over Heel =						
Adjacent Footing Load =						
Axial Dead Load on Stem =						
* Axial Live Load on Stem =						
Soil Over Toe =				105.0	0.88	91.9
Surcharge Over Toe =						
Stem Weight(s) =				850.0	2.08	1,770.8
Earth @ Stem Transitions =						
Footing Weight =				937.5	3.13	2,929.7
Key Weight =						
Vert. Component =						
Total =	1,417.5	**O.T.M.** =	4,252.5	**Total =** 5,572.5 lbs	**R.M.=**	20,739.1

Resisting/Overturning Ratio = **4.88**

Vertical Loads used for Soil Pressure = 5,572.5 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.039	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall

DESCRIPTION: 8' Cantilevered Wall

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

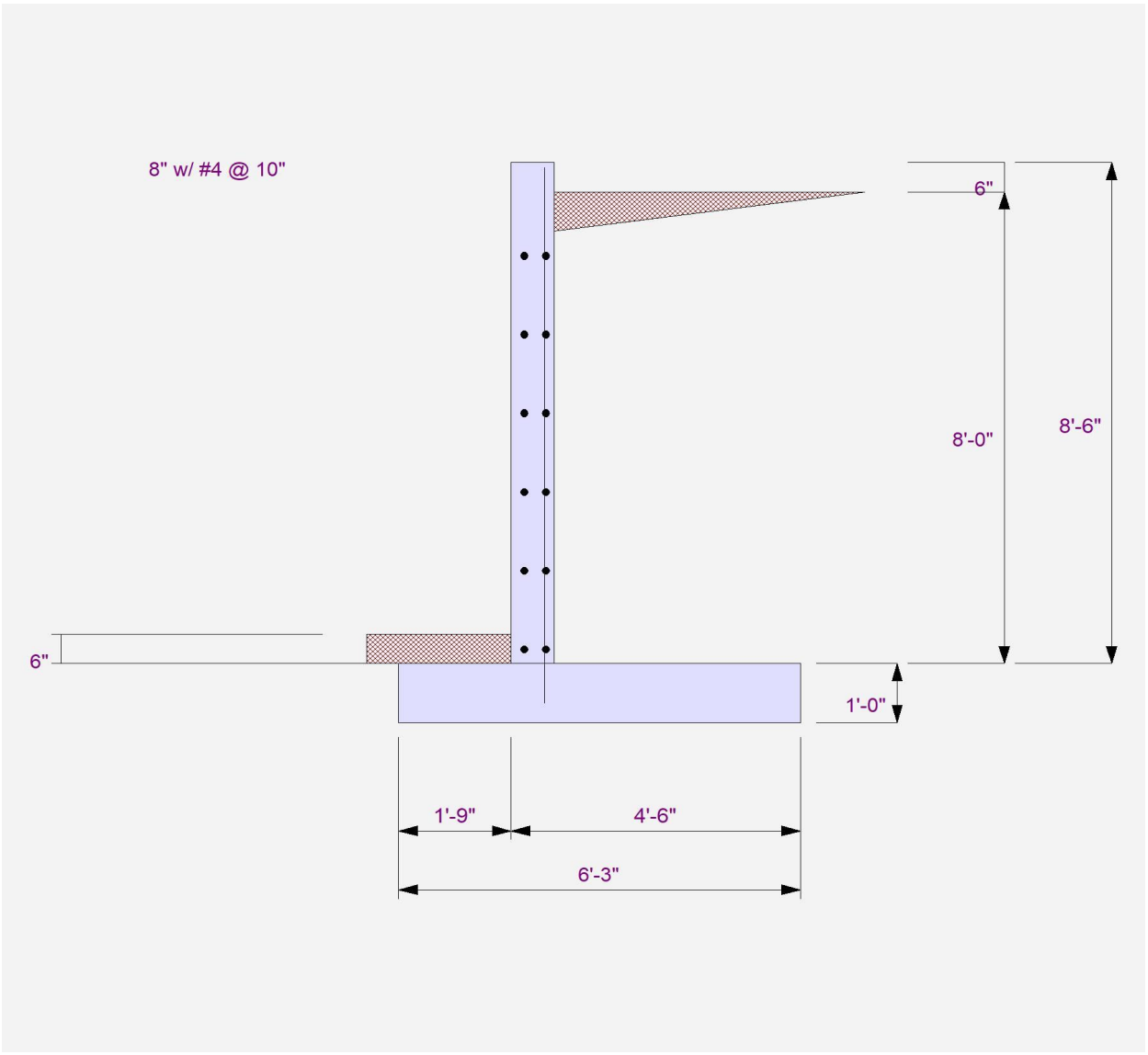
Lap Splice length for #4 bar specified in this stem design segment =	18.72 in
Development length for #4 bar specified in this stem design segment =	14.40 in
Hooked embedment length into footing for #4 bar specified in this stem design segment =	8.36 in
As Provided =	0.2400 in2/ft
As Required =	0.2387 in2/ft

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 8' Cantilevered Wall

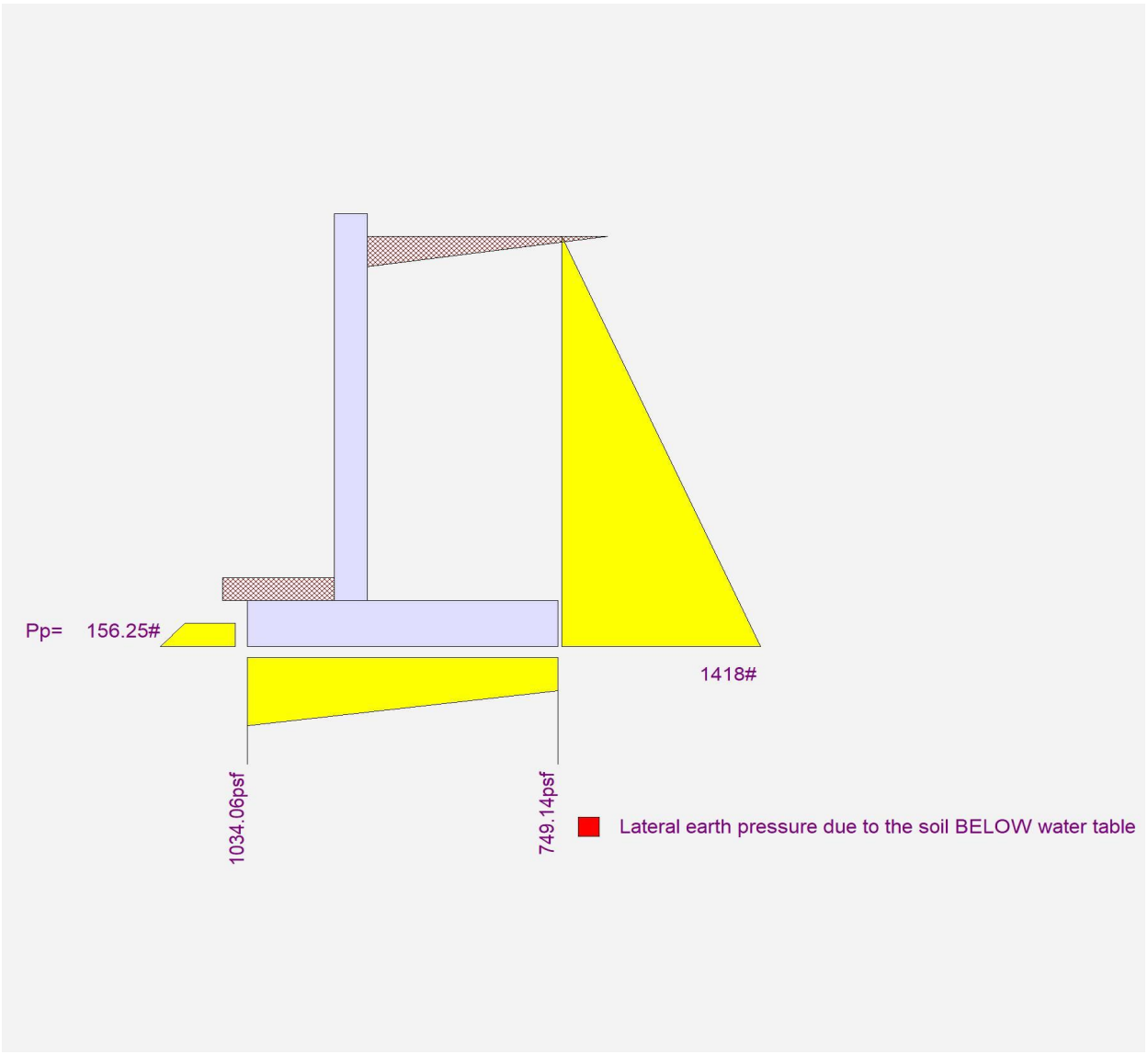


Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 8' Cantilevered Wall



Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 6' Cantilevered Wall

Code Reference

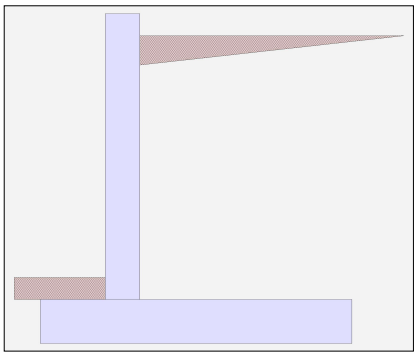
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	6.00 ft
Wall height above soil	=	0.50 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	250.0 psf/ft
Soil Density, Heel	=	120.00 pcf
Soil Density, Toe	=	120.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 6' Cantilevered Wall

Design Summary

Wall Stability Ratios

Overturning	=	7.70	OK
Sliding	=	2.31	OK
Global Stability	=	2.80	
Total Bearing Load	=	4,565 lbs	
...resultant ecc.	=	0.74 in	
Soil Pressure @ Toe	=	808 psf	OK
Soil Pressure @ Heel	=	714 psf	OK
Allowable	=	1,500 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,131 psf	
ACI Factored @ Heel	=	999 psf	
Footing Shear @ Toe	=	3.8 psi	OK
Footing Shear @ Heel	=	0.0 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	857.5 lbs	
less 100% Passive Force	-	156.3 lbs	
less 100% Friction Force	-	1,826.0 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Bottom		
		Stem OK		
Design Height Above Ftg	ft =	0.00		
Wall Material Above "Ht"	=	Concrete		
Design Method	=	SD	SD	SD
Thickness	=	8.00		
Rebar Size	=	# 4		
Rebar Spacing	=	12.00		
Rebar Placed at	=	Edge		
Design Data				
fb/FB + fa/Fa	=	**0.372**		
Total Force @ Section				
Service Level	lbs =			
Strength Level	lbs =	1,008.0		
Moment....Actual				
Service Level	ft-# =			
Strength Level	ft-# =	2,016.0		
Moment.....Allowable	=	5,412.6		
Shear.....Actual				
Service Level	psi =			
Strength Level	psi =	13.4		
Shear.....Allowable	psi =	75.0		
Anet (Masonry)	in2 =			
Rebar Depth 'd'	in =	6.25		
Masonry Data				
f'm	psi =			
Fs	psi =			
Solid Grouting	=			
Modular Ratio 'n'	=			
Wall Weight	psf =	100.0		
Short Term Factor	=			
Equiv. Solid Thick.	=			
Masonry Block Type	=			
Masonry Design Method	=	ASD		
Concrete Data				
f'c	psi =	2,500.0		
Fy	psi =	60,000.0		

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 6' Cantilevered Wall

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.0755 in2/ft		
(4/3) * As :	0.1007 in2/ft	Min Stem T&S Reinf Area 1.248 in2	
200bd/fy : 200(12)(6.25)/60000 :	0.25 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft	
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.1728 in2/ft	#4@ 12.50 in	#4@ 25.00 in
Provided Area :	0.2 in2/ft	#5@ 19.38 in	#5@ 38.75 in
Maximum Area :	0.8467 in2/ft	#6@ 27.50 in	#6@ 55.00 in

Footing Data

Toe Width	=	1.25 ft
Heel Width	=	4.75
Total Footing Width	=	6.00
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,131	999	psf
Mu' : Upward	=	876	8,580	ft-#
Mu' : Downward	=	197	8,704	ft-#
Mu: Design	=	680	124	ft-#
phiMin	=	2,500	2,500	ft-#
Actual 1-Way Shear	=	3.83	0.00	psi
Allow 1-Way Shear	=	40.00	40.00	psi
Toe Reinforcing	=	None Spec'd		
Heel Reinforcing	=	None Spec'd		
Key Reinforcing	=	None Spec'd		
Footing Torsion, Tu	=	0.00		ft-lbs
Footing Allow. Torsion, phi Tu	=	0.00		ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe:
Heel:
Key:

Min footing T&S reinf Area	1.56	in2
Min footing T&S reinf Area per foot	0.26	in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 6' Cantilevered Wall

Summary of Overturning & Resisting Forces & Moments

Item	.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#	.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)	857.5	2.33	2,000.8			
HL Act Pres (be water tbl)						
Hydrostatic Force						
Buoyant Force =						
Surcharge over Heel =						
Surcharge Over Toe =						
Adjacent Footing Load =						
Added Lateral Load =						
Load @ Stem Above Soil =						
=						
Soil Over HL (ab. water tbl)				2,940.0	3.96	11,637.5
Soil Over HL (bel. water tbl)					3.96	11,637.5
Watre Table						
Sloped Soil Over Heel =						
Surcharge Over Heel =						
Adjacent Footing Load =						
Axial Dead Load on Stem =						
* Axial Live Load on Stem =						
Soil Over Toe =				75.0	0.63	46.9
Surcharge Over Toe =						
Stem Weight(s) =				650.0	1.58	1,029.2
Earth @ Stem Transitions =						
Footing Weight =				900.0	3.00	2,700.0
Key Weight =						
Vert. Component =						
Total =	857.5	**O.T.M.** =	2,000.8	**Total =** 4,565.0 lbs	**R.M.=**	15,413.5

Resisting/Overturning Ratio = **7.70**

Vertical Loads used for Soil Pressure = 4,565.0 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.024	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall

DESCRIPTION: 6' Cantilevered Wall

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

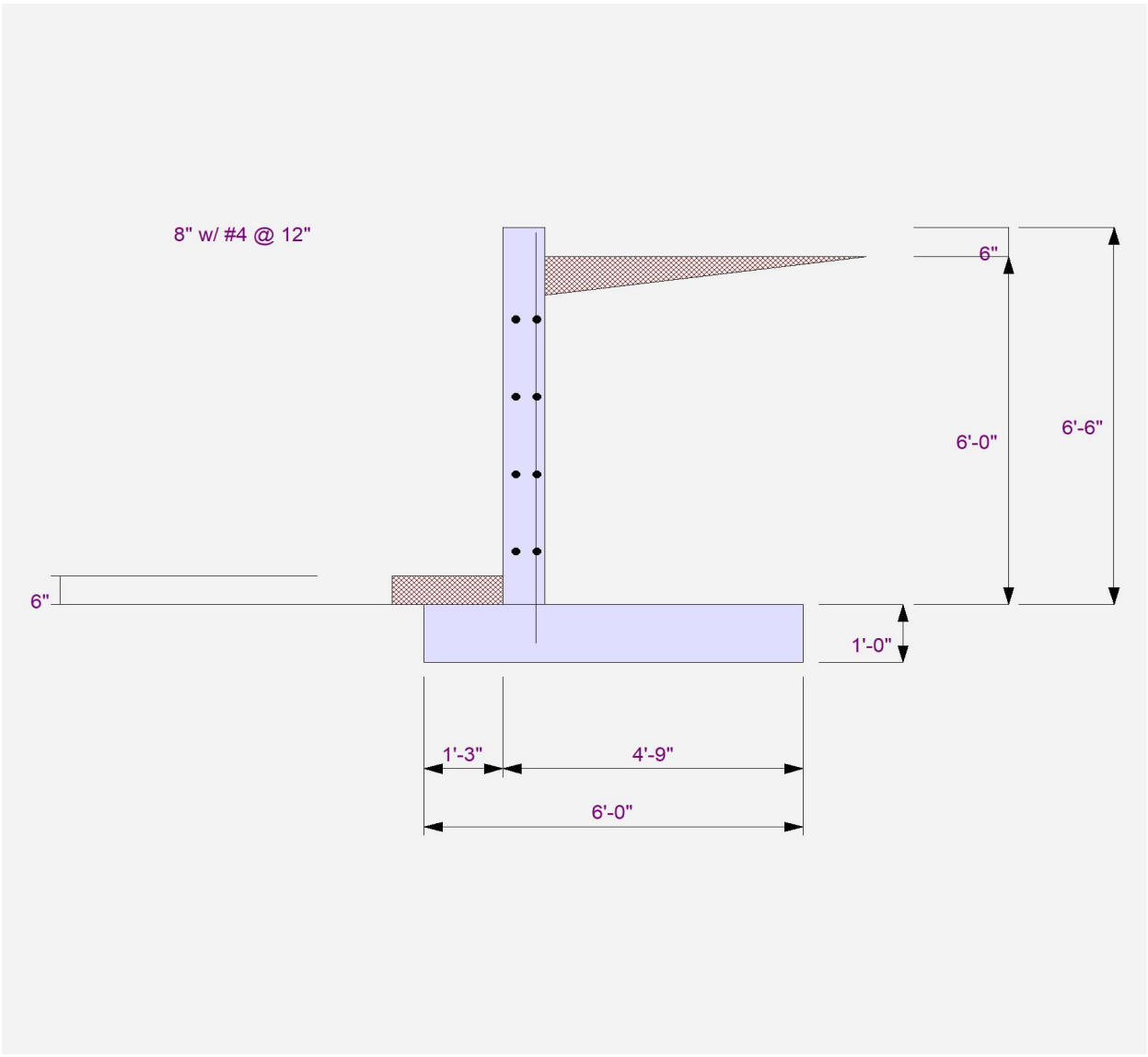
Lap Splice length for #4 bar specified in this stem design segment =	18.72 in
Development length for #4 bar specified in this stem design segment =	14.40 in
Hooked embedment length into footing for #4 bar specified in this stem design segment =	7.26 in
As Provided =	0.2000 in2/ft
As Required =	0.1728 in2/ft

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 6' Cantilevered Wall

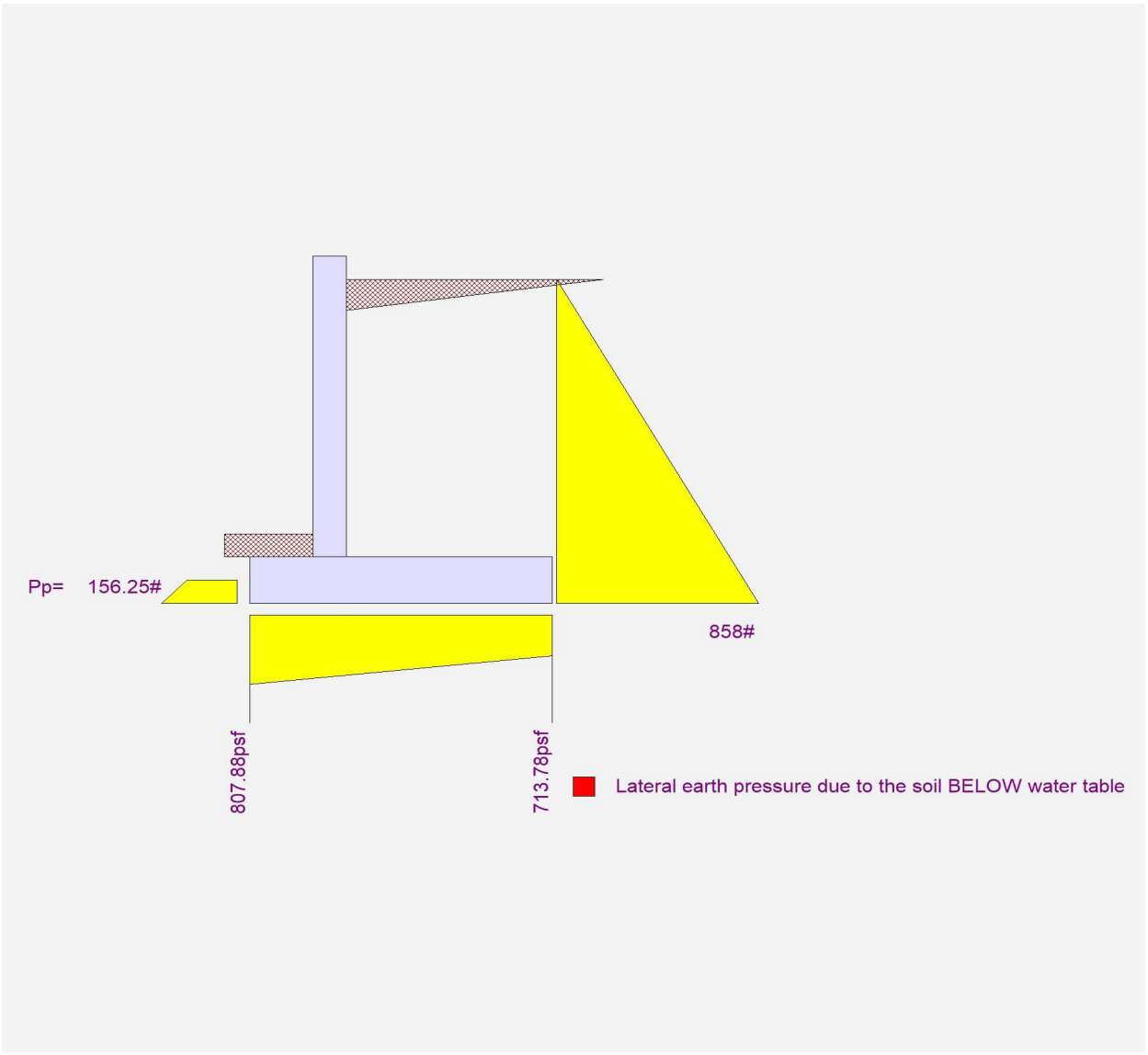


Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 6' Cantilevered Wall



Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 4' Cantilevered Wall

Code Reference

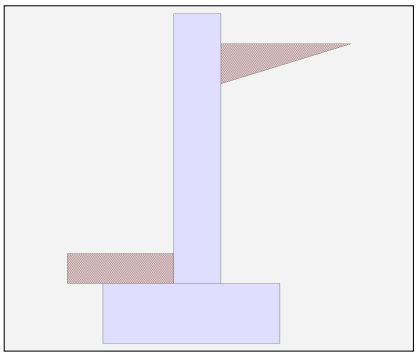
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	4.00 ft
Wall height above soil	=	0.50 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	250.0 psf/ft
Soil Density, Heel	=	120.00 pcf
Soil Density, Toe	=	120.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 4' Cantilevered Wall

Design Summary

Wall Stability Ratios			
Overturning	=	2.65	OK
Sliding	=	1.53	OK
Global Stability	=	2.60	
Total Bearing Load	=	1,285 lbs	
...resultant ecc.	=	3.77 in	
Soil Pressure @ Toe	=	901 psf	OK
Soil Pressure @ Heel	=	127 psf	OK
Allowable	=	1,500 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,262 psf	
ACI Factored @ Heel	=	178 psf	
Footing Shear @ Toe	=	2.2 psi	OK
Footing Shear @ Heel	=	2.8 psi	OK
Allowable	=	75.0 psi	
Sliding Calcs			
Lateral Sliding Force	=	437.5 lbs	
less 100% Passive Force	-	156.3 lbs	
less 100% Friction Force	-	514.0 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Bottom
		Stem OK
Design Height Above Ftg	ft =	0.00
Wall Material Above "Ht"	=	Concrete
Design Method	=	SD SD SD
Thickness	=	8.00
Rebar Size	=	# 4
Rebar Spacing	=	12.00
Rebar Placed at	=	Edge
Design Data		
fb/FB + fa/Fa	=	**0.110**
Total Force @ Section		
Service Level	lbs =	
Strength Level	lbs =	448.0
Moment....Actual		
Service Level	ft-# =	
Strength Level	ft-# =	597.3
Moment.....Allowable	=	5,412.6
Shear.....Actual		
Service Level	psi =	
Strength Level	psi =	6.0
Shear.....Allowable	psi =	75.0
Anet (Masonry)	in2 =	
Rebar Depth 'd'	in =	6.25
Masonry Data		
f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Wall Weight	psf =	100.0
Short Term Factor	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	
Masonry Design Method	=	ASD
Concrete Data		
f'c	psi =	2,500.0
Fy	psi =	60,000.0

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 4' Cantilevered Wall

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.0224 in2/ft		
(4/3) * As :	0.0298 in2/ft	Min Stem T&S Reinf Area 0.864 in2	
200bd/fy : 200(12)(6.25)/60000 :	0.25 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft	
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.1728 in2/ft	#4@ 12.50 in	#4@ 25.00 in
Provided Area :	0.2 in2/ft	#5@ 19.38 in	#5@ 38.75 in
Maximum Area :	0.8467 in2/ft	#6@ 27.50 in	#6@ 55.00 in

Footing Data

Toe Width	=	1.00 ft
Heel Width	=	1.50
Total Footing Width	=	2.50
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,262	178	psf
Mu' : Upward	=	559	103	ft-#
Mu' : Downward	=	126	263	ft-#
Mu: Design	=	433	159	ft-#
phiMin	=	2,500	2,500	ft-#
Actual 1-Way Shear	=	2.24	2.76	psi
Allow 1-Way Shear	=	40.00	40.00	psi
Toe Reinforcing	=	None Spec'd		
Heel Reinforcing	=	None Spec'd		
Key Reinforcing	=	None Spec'd		
Footing Torsion, Tu	=	0.00		ft-lbs
Footing Allow. Torsion, phi Tu	=	0.00		ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe:
Heel:
Key:

Min footing T&S reinf Area	0.65	in2
Min footing T&S reinf Area per foot	0.26	in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 4' Cantilevered Wall

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		437.5	1.67	729.2	Soil Over HL (ab. water tbl)	400.0	2.08	833.3
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		2.08	833.3
Hydrostatic Force					Watre Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	=		
Added Lateral Load	=				* Axial Live Load on Stem	=		
Load @ Stem Above Soil	=				Soil Over Toe	=	60.0	0.50	30.0
	=				Surcharge Over Toe	=		
					Stem Weight(s)	=	450.0	1.33	600.0
					Earth @ Stem Transitions	=		
					Footing Weight	=	375.0	1.25	468.8
					Key Weight	=			
					Vert. Component	=			
Total	=	437.5	**O.T.M.** =	729.2	**Total =**		1,285.0 lbs	**R.M.=**	1,932.1

Resisting/Overturning Ratio = **2.65**

Vertical Loads used for Soil Pressure = 1,285.0 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.045	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

DESCRIPTION: 4' Cantilevered Wall

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

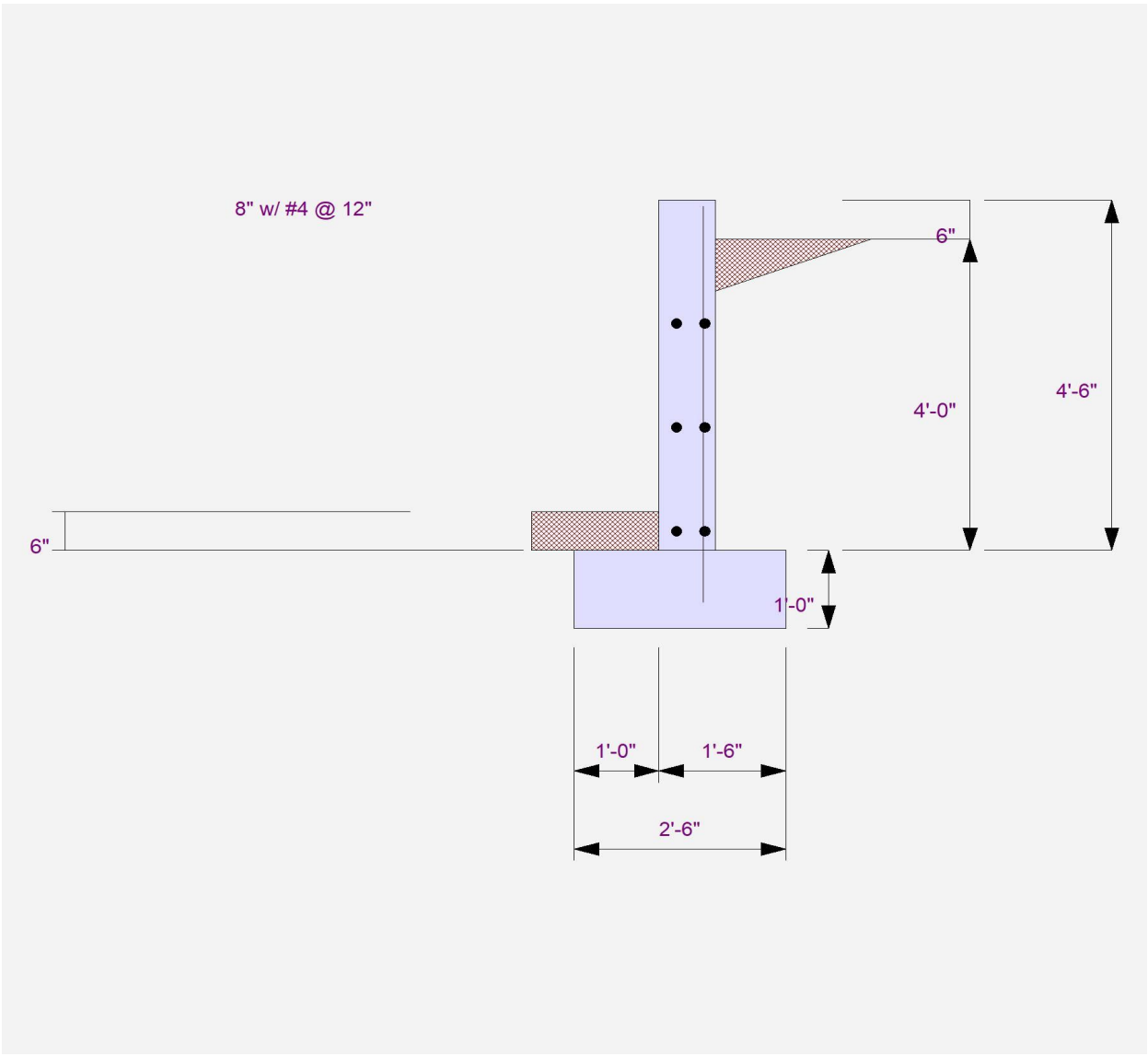
Lap Splice length for #4 bar specified in this stem design segment =	18.72 in
Development length for #4 bar specified in this stem design segment =	14.40 in
Hooked embedment length into footing for #4 bar specified in this stem design segment =	7.26 in
As Provided =	0.2000 in2/ft
As Required =	0.1728 in2/ft

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 4' Cantilevered Wall

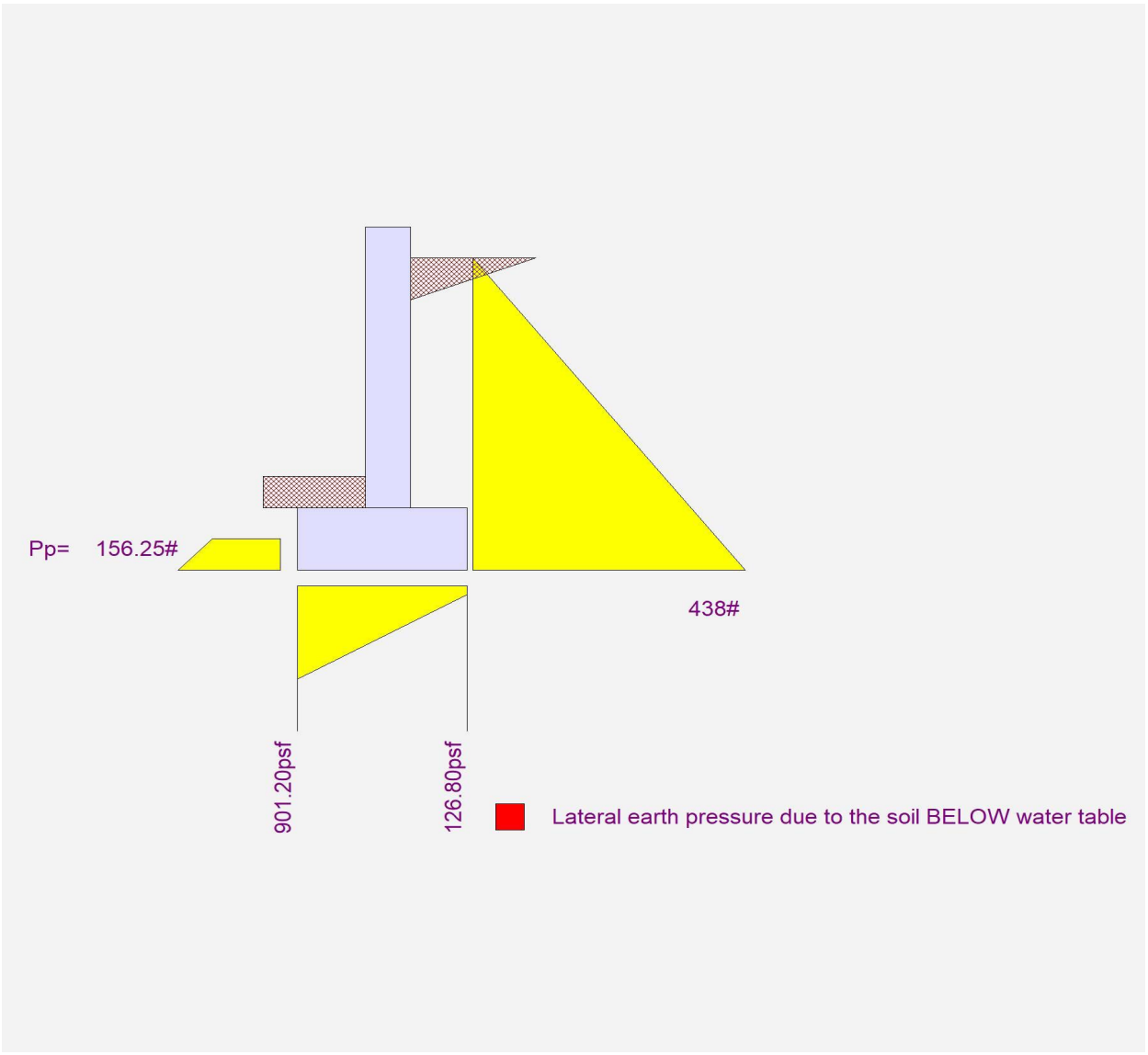


Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 4' Cantilevered Wall



Project Title:
Engineer:
Project ID:
Project Descr:

Restrained Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 8' Basement Wall

Code Reference

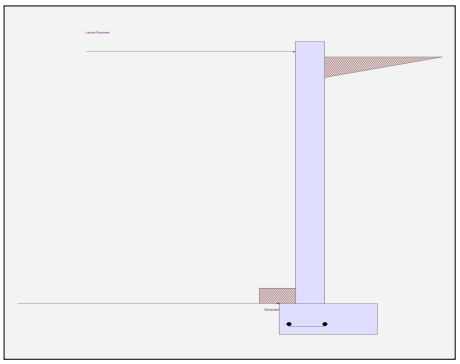
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	8.0 ft
Wall height above soil	=	0.50 ft
Total Wall Height	=	8.50 ft
Top Support Height	=	8.0 ft
Slope Behind Wall	=	0
Height of Soil over Toe	=	6 in

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
At-Rest Heel Pressure	=	55.0 psf/ft
	=	0.0 psf/ft
Passive Pressure	=	250.0 psf/ft
Soil Density	=	120.0 pcf
Footing||Soil Frictior	=	0.4 psf
Soil height to ignore for passive pressure	=	12 in



Surcharge Loads

Surcharge Over Heel = psf
>>>Used To Resist Sliding & Overturning
Surcharge Over Toe = psf
Used for Sliding & Overturning

Axial Load Applied to Stem

Axial Dead Load	=	200.0 lbs
Axial Live Load	=	300.0 lbs
Axial Load Eccentricity	=	in

Uniform Lateral Load Applied to Stem

Lateral Load	=	#/ft
...Height to Top	=	ft
...Height to Bottom	=	ft
Load Type	=	Wind (W) (Strength Level)
Wind on Exposed Stem	=	0.00 psf (Strength Level)

Wind acts left-to-right toward retention side.

Adjacent Footing Load

Adjacent Footing Load	=	lbs
Footing Width	=	ft
Eccentricity	=	in
Wall to Ftg CL Dist	=	ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	ft
Poisson's Ratio	=	0.3

Earth Pressure Seismic Load

K_h Soil Density Multiplier = 0.2 g Added seismic per unit area = 0.0 psf

Design Summary

Total Bearing Load	=	3,035.0 lbs	
...resultant ecc.	=	0.0 in	
Soil Pressure @ Toe	=	1,214.0 psf	OK
Soil Pressure @ Heel	=	1,214.0 psf	OK
Allowable	=	psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,504.80 psf	
ACI Factored @ Heel	=	1,504.80 psf	
Footing Shear @ Toe	=	0.5147 psi	OK
Footing Shear @ Heel	=	2.021 psi	OK
Allowable	=	75.0 psi	
Reaction at Top	=	350.967 lbs	
Reaction at Bottom	=	1,875.51 lbs	

Sliding Calcs
Lateral Sliding Force = 1,875.51 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	0.000
Live Load	0.000
Earth, H	0.000
Wind, W	0.000
Seismic, E	0.000

Concrete Stem Construction

Thickness = 8.00 in
Wall Weight = 100.0 psf
Stem is FIXED to top of footing

		@ Top Support	Mmax Between Top & Base	@ Base of Wall
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	=	8.0 ft	4.466 ft	0.00 ft
Rebar Size	=	# 4	# 4	# 4
Rebar Spacing	=	12.00 in	12.00 in	12.00 in
Rebar Placed at	=	Center	Center	Center
Rebar Depth 'd'	=	4.0 in	4.0 in	4.0 in
Design Data				
fb/FB + fa/Fa	=			
Moment....Actual	=	0.0 ft-#	1,343.30 ft-#	3,003.79 ft-#
Moment.....Allowable	=	3,387.60 ft-#	3,387.60 ft-#	3,387.60 ft-#
Shear Force @ this height	=	563.19 lbs		2,252.81 lbs
Shear.....Actual	=	11.733 psi		46.933 psi
Shear.....Allowable	=	75.0 psi		75.0 psi

Project Title:
Engineer:
Project ID:
Project Descr:

Restrained Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 8' Basement Wall

Footing Strengths & Dimensions

Toe Width	=	0.50 ft
Heel Width	=	2.0
Total Footing Width	=	2.50
Footing Thickness	=	12.0 in
Key Width	=	in
Key Depth	=	in
Key Distance from Toe	=	ft

f'c = 2,500.0 psi Fy = 60000 psi
Footing Concrete Density = 150 pcf
Min. As % = 0.0018
Cover @ Top = 2 in @ Btm.= 3 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,504.80	1,504.80	psf
Mu' : Upward	=	188.10		ft-#
Mu' : Downward	=	31.50		ft-#
Mu: Design	=	157	-154	ft-#
Actual 1-Way Shear	=	0.5147		psi
Allow 1-Way Shear	=	75.0	75.0	psi

Other Acceptable Sizes & Spacings:

Toe: # 7 @ 18.00 in -or- phiMn = phi * 5 * lambda * sqrt(fc) * Sm
Heel: None Spec'd -or- phiMn = phi * 5 * lambda * sqrt(fc) * Sm
Key: # 0 @ 0.00 in -or- No key defined

Min footing T&S reinf Area 0.65 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Summary of Forces on Footing : Slab RESISTS sliding, stem is FIXED at footing

Forces acting on footing for soil pressure

>>> Sliding Forces are restrained by the adjacent slab

Load & Moment Summary For Footing : For Soil Pressure Calcs

Moment @ Top of Footing Applied from Stem			=		-1,877.37 ft-#
Surcharge Over Heel	=	0.0 lbs	0.0 ft		0.0 ft-#
Adjacent Footing Load	=	0.0 lbs	0.0 ft		0.0 ft-#
Axial Dead Load on Stem	=	500.0 lbs	0.8333 ft		416.667 ft-#
Soil Over Toe	=	30.0 lbs	0.250 ft		7.50 ft-#
Surcharge Over Toe	=	0.0 lbs	0.0 ft		0.0 ft-#
Stem Weight	=	850.0 lbs	0.8333 ft		708.33 ft-#
Soil Over Heel	=	1,280.0 lbs	1.833 ft		2,346.67 ft-#
Footing Weight	=	375.0 lbs	1.250 ft		468.750 ft-#
Total Vertical Force	=	3,035.0 lbs	Base Moment	=	2,070.55 ft-#

Stem is specified to be fixed to footing, and top restraint is assumed to react out any tendency for moment at the footing/soil interface, so uniform soil pressure is assumed.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Restrained Retaining Wall

DESCRIPTION: 8' Basement Wall

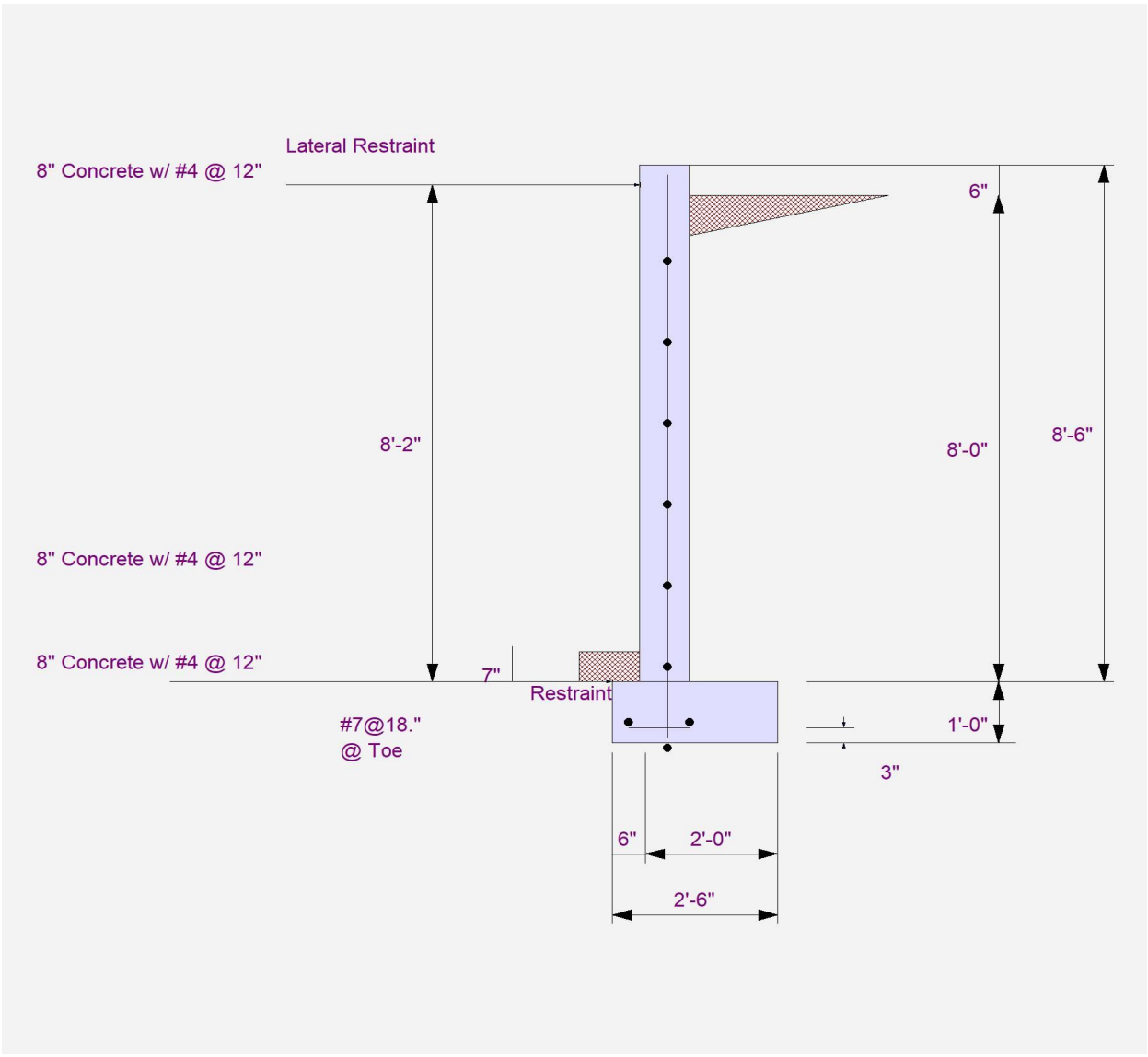
Rebar Lap & Embedment Lengths Information

Project Title:
Engineer:
Project ID:
Project Descr:

Restrained Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 8' Basement Wall

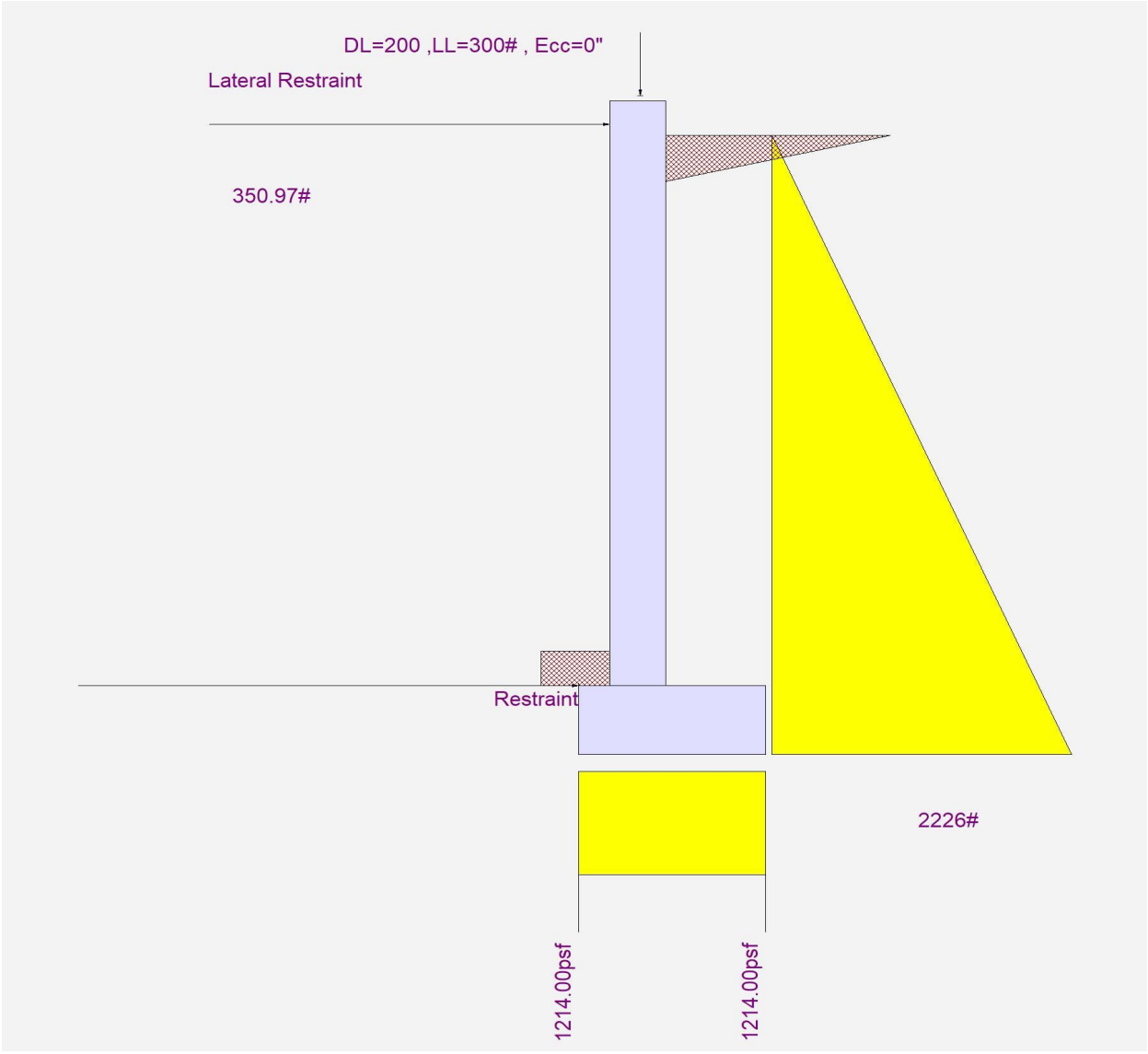


Project Title:
Engineer:
Project ID:
Project Descr:

Restrained Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 8' Basement Wall



Project Title:
Engineer:
Project ID:
Project Descr:

Restrained Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 4' Basement Wall

Code Reference

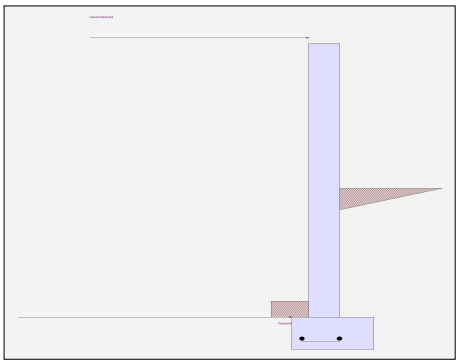
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	4.0 ft
Wall height above soil	=	4.50 ft
Total Wall Height	=	8.50 ft
Top Support Height	=	8.5 ft
Slope Behind Wall	=	0
Height of Soil over Toe	=	6 in

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
At-Rest Heel Pressure	=	55.0 psf/ft
	=	0.0 psf/ft
Passive Pressure	=	250.0 psf/ft
Soil Density	=	120.0 pcf
Footing||Soil Friction	=	0.4 psf
Soil height to ignore for passive pressure	=	12 in



Surcharge Loads

Surcharge Over Heel	=	psf
>>>Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	200.0 lbs
Axial Live Load	=	300.0 lbs
Axial Load Eccentricity	=	in

Uniform Lateral Load Applied to Stem

Lateral Load	=	#/ft
...Height to Top	=	ft
...Height to Bottom	=	ft
Load Type	=	Wind (W) (Strength Level)
Wind on Exposed Stem	=	0.00 psf (Strength Level)

Wind acts left-to-right toward retention side.

Adjacent Footing Load

Adjacent Footing Load	=	lbs
Footing Width	=	ft
Eccentricity	=	in
Wall to Ftg CL Dist	=	ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	ft
Poisson's Ratio	=	0.3

Earth Pressure Seismic Load

K_h Soil Density Multiplier = 0.2 g Added seismic per unit area = 0.0 psf

Design Summary

Total Bearing Load	=	2,080.0 lbs	
...resultant ecc.	=	0.0 in	
Soil Pressure @ Toe	=	1,040.0 psf	OK
Soil Pressure @ Heel	=	1,040.0 psf	OK
Allowable	=	psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,308.0 psf	
ACI Factored @ Heel	=	1,308.0 psf	
Footing Shear @ Toe	=	0.5147 psi	OK
Footing Shear @ Heel	=	4.035 psi	OK
Allowable	=	75.0 psi	
Reaction at Top	=	21.067 lbs	
Reaction at Bottom	=	665.43 lbs	

Sliding Calcs
Lateral Sliding Force = 665.43 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	0.000
Live Load	0.000
Earth, H	0.000
Wind, W	0.000
Seismic, E	0.000

Concrete Stem Construction

Thickness = 8.00 in
Wall Weight = 100.0 psf
Stem is FIXED to top of footing

		@ Top Support	Mmax Between Top & Base	@ Base of Wall
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	=	8.5 ft	3.141 ft	0.00 ft
Rebar Size	=	# 4	# 4	# 4
Rebar Spacing	=	12.00 in	12.00 in	12.00 in
Rebar Placed at	=	Center	Center	Center
Rebar Depth 'd'	=	4.0 in	4.0 in	4.0 in
Design Data				
fb/FB + fa/Fa	=			
Moment....Actual	=	0.0 ft-#	179.990 ft-#	638.56 ft-#
Moment.....Allowable	=	3,387.60 ft-#	3,387.60 ft-#	3,387.60 ft-#
Shear Force @ this height	=	35.306 lbs		668.69 lbs
Shear.....Actual	=	0.7356 psi		13.931 psi
Shear.....Allowable	=	75.0 psi		75.0 psi

Project Title:
Engineer:
Project ID:
Project Descr:

Restrained Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 4' Basement Wall

Footing Strengths & Dimensions

Toe Width	=	0.50 ft
Heel Width	=	1.50
Total Footing Width	=	2.0
Footing Thickness	=	12.0 in
Key Width	=	in
Key Depth	=	in
Key Distance from Toe	=	ft

f'c = 2,500.0 psi Fy = 60000 psi
Footing Concrete Density = 150 pcf
Min. As % = 0.0018
Cover @ Top = 2 in @ Btm.= 3 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,308.0	1,308.0	psf
Mu' : Upward	=	163.50		ft-#
Mu' : Downward	=	31.50		ft-#
Mu: Design	=	132	-192	ft-#
Actual 1-Way Shear	=	0.5147		psi
Allow 1-Way Shear	=	75.0	75.0	psi

Other Acceptable Sizes & Spacings:

Toe: # 7 @ 18.00 in -or- phiMn = phi * 5 * lambda * sqrt(fc) * Sm
Heel: None Spec'd -or- phiMn = phi * 5 * lambda * sqrt(fc) * Sm
Key: # 0 @ 0.00 in -or- No key defined

Min footing T&S reinf Area 0.52 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Summary of Forces on Footing : Slab RESISTS sliding, stem is FIXED at footing

Forces acting on footing for soil pressure

>>> Sliding Forces are restrained by the adjacent slab

Load & Moment Summary For Footing : For Soil Pressure Calcs

Moment @ Top of Footing Applied from Stem			=		-399.101 ft-#
Surcharge Over Heel	=	0.0 lbs	0.0 ft		0.0 ft-#
Adjacent Footing Load	=	0.0 lbs	0.0 ft		0.0 ft-#
Axial Dead Load on Stem	=	500.0 lbs	0.8333 ft		416.667 ft-#
Soil Over Toe	=	30.0 lbs	0.250 ft		7.50 ft-#
Surcharge Over Toe	=	0.0 lbs	0.0 ft		0.0 ft-#
Stem Weight	=	850.0 lbs	0.8333 ft		708.33 ft-#
Soil Over Heel	=	400.0 lbs	1.583 ft		633.33 ft-#
Footing Weight	=	300.0 lbs	1.0 ft		300.0 ft-#
Total Vertical Force	=	2,080.0 lbs	Base Moment	=	1,666.73 ft-#

Stem is specified to be fixed to footing, and top restraint is assumed to react out any tendency for moment at the footing/soil interface, so uniform soil pressure is assumed.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Restrained Retaining Wall

DESCRIPTION: 4' Basement Wall

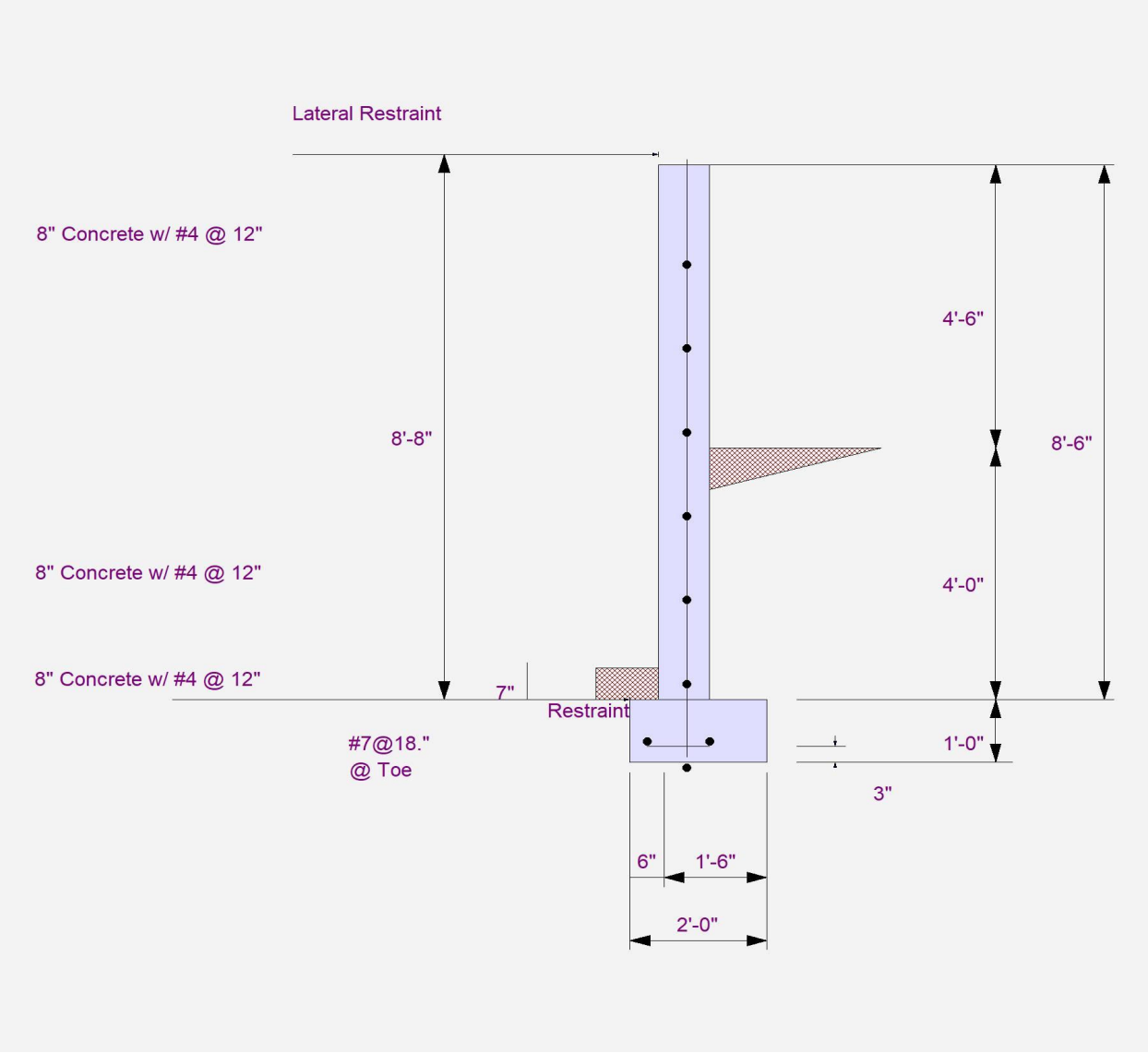
Rebar Lap & Embedment Lengths Information

Project Title:
Engineer:
Project ID:
Project Descr:

Restrained Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 4' Basement Wall



Project Title:
Engineer:
Project ID:
Project Descr:

Restrained Retaining Wall

Project File: 21-028 RetainPro.ec6

DESCRIPTION: 4' Basement Wall