

City of Puyallup
Building
ACCEPTED

JMontgomery
05/05/2023
8:07:11 AM

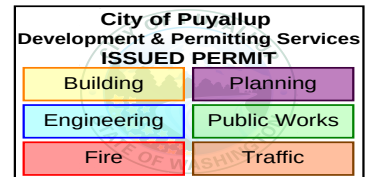


STRUCTURAL CALCULATIONS

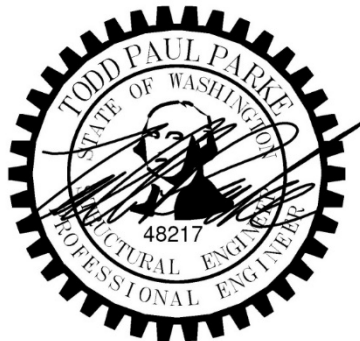
FOR

THE APPROVED CONSTRUCTION PLANS AND ALL ENGINEERING DOCUMENTS MUST BE POSTED ON THE JOB AT ALL INSPECTIONS IN A VISIBLE AND READILY ACCESSIBLE LOCATION.

CHC PUYALLUP - CANNERY
201 WEST MAIN
PUYALLUP, WA 98371



PREPARED BY
PCS STRUCTURAL SOLUTIONS

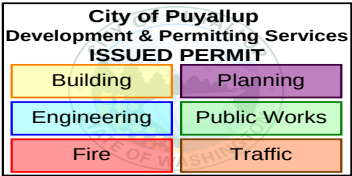


OCTOBER 21, 2022
22-537

PRCTI20221698

PRCTI20221698

DESIGN CRITERIA





Project: CHC Puyallup Job Number: 22-537
 Sheet: _____ of _____ Name: LMC
 Originating Office: Tacoma Date: 9/27/2021

DESIGN CRITERIA CHECKLIST

CODE: IBC 2018, ASCE 7-16 LOCATION: Puyallup, WA
 RISK CATEGORY: II (Per ASCE 7-16 Table 1.5-1 & IBC Table 1604.5)

VERTICAL DESIGN CRITERIA

	DEAD	LIVE	PARTITION	CONCENTRATED
ROOF:	<u>25 PSF</u>	<u>25 PSF</u>		
ROOF MECH:	<u>VARIES</u>			
OFFICE:	<u>20 PSF</u>	<u>50 PSF</u>	<u>15 PSF</u>	
CORRIDORS 2ND FLR	<u>20 PSF</u>	<u>80 PSF</u>		<u>1000#/300#</u>
STAIRS:		<u>100 PSF</u>		

WIND DESIGN CRITERIA

BASIC WIND SPEED (V) = 98 MPH (Per ASCE 7-16 Sec. 26.5.1, Fig. 26.5-1A; 1B; 1C & 1D, or as required by Bld'g Dept.)
 EXPOSURE CATEGORY: B (Per ASCE 7-16 Section 26.7.3)
 DIRECTIONALITY FACTOR (K_d): 0.85 (Per ASCE 7-16 Table 26.6-1)
 GUST EFFECT FACTOR (G): 0.85 (Per ASCE 7-16 Section 26.11)
 TOPOGRAPHIC FEATURE: None (See ASCE 7-16 Figure 26.8-1)
 HILL HEIGHT (H): 0 FT (See ASCE 7-16 Figure 26.8-1)
 UPWIND DISTANCE TO HALF HILL (L_h): 0 FT (See ASCE 7-16 Figure 26.8-1)
 DISTANCE FROM CREST TO SITE (x): 0 FT UPWIND (See ASCE 7-16 Figure 26.8-1)
 MEAN ROOF HEIGHT: 30 FT (See ASCE 7-16 Section 26.2 - Definitions)
 ELEVATION: 0 FT (See ASCE 7-16 Section 26.9)
 ENCLOSURE CLASSIFICATION: Enclosed (See ASCE 7-16 Section 26.2 & Table 26.13-1)
 ROOF TYPE: Gable (See ASCE 7-16 Figure 27.3-1)
 ROOF SLOPE ($\frac{\text{rise}}{\text{run}}$): 1.82:12 (Enter vertical rise in 12 horizontal units) θ (degrees): 8.62

SEISMIC DESIGN CRITERIA

The existing demand/capacity ratio of the existing lateral system is not being increased by more than 10%.

DEFLECTION CRITERIA

FLOOR (LIVE):	L/ 480	▼	ROOF (LIVE):	L/ 360	▼
FLOOR (TOTAL):	L/ 360	▼	ROOF (TOTAL):	L/ 240	▼
WALLS:	L/ 360	▼	SPECIAL:	L/	▼

SOIL DESIGN CRITERIA

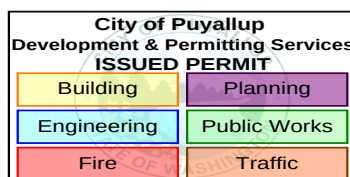
REPORT: NO

BEARING: 1500 PSF
 ACTIVE: 45 PCF
 PASSIVE: 200 PCF
 COEFFICIENT OF FRICTION: 0.35

PILE TYPE: _____
 VERTICAL CAPACITY: _____
 UPLIFT CAPACITY: _____

MINIMUM FOOTING DIMENSIONS:
 CONTINUOUS: 1'-4"
 SPREAD: 1'-6"
 FROST DEPTH: 1'-6"

LATERAL CAPACITY: _____
 SIZE: _____





Project: CHC Puyallup Job Number: 22-537
 Sheet: of Name: LMC
 Originating Office: Tacoma Date: 09/27/21

MATERIALS

CONCRETE

Footings:	3000 PSI	
Slabs/Walls:	4000 PSI	

REINFORCING

Steel Grade = 60 $f_y =$ 60 KSI

STRUCTURAL STEEL

W-Flange Beams	ASTM A992	$f_y =$ <u>50 KSI</u>
Shapes & Plates	ASTM A36	$f_y =$ <u>36 KSI</u>
Pipes	ASTM A53, Grade B	$f_y =$ <u>35 KSI</u>
HSS Rect.	ASTM A500, Grade C	$f_y =$ <u>50 KSI</u>
HSS Round	ASTM A500, Grade C	$f_y =$ <u>46 KSI</u>

MASONRY

ASTM C90 $f'_m =$ 1900 PSI SOLID GROUTED

GLULAM BEAMS

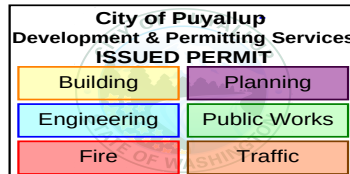
Simple Spans		Cantilevers
24F-V4	Grade =	24F-V8
1.80E+06 PSI	E =	1.80E+06 PSI
2400 PSI	$F_{b(BOTTOM)} =$	2400 PSI
1850 PSI	$F_{b(TOP)} =$	2400 PSI
240 PSI	$F_v =$	240 PSI

SCL PRODUCTS

	2x SCL	1½" SCL	3½, 5¼ SCL
E =	1.30E+06 PSI	1.80E+06 PSI	2.00E+06 PSI
$F_b =$	1700 PSI	2600 PSI	2900 PSI
$F_v =$	285 PSI	285 PSI	285 PSI
$F_c =$	1400 PSI	2400 PSI	2600 PSI

FRAMING LUMBER

Joists & Studs	2x DF #2	2x HF #1	-
E =	1.60E+06 PSI	1.50E+06 PSI	-
$F_b =$	900 PSI	975 PSI	-
$F_v =$	180 PSI	150 PSI	-
$F_c =$	1350 PSI	1350 PSI	-
Beams & Headers	4x DF #2	4x HF #1	6x DF #1
E =	1.60E+06 PSI	1.50E+06 PSI	1.60E+06 PSI
$F_b =$	900 PSI	975 PSI	1350 PSI
$F_v =$	180 PSI	150 PSI	170 PSI
Posts & Timbers	6x DF #1	-	-
E =	1.60E+06 PSI	-	-
$F_c =$	1000 PSI	-	-



DESIGN CRITERIA - WIND

BASIC WIND SPEED (V): 98 MPH
 RISK CATEGORY: II
 EXPOSURE CATEGORY: B
 DIRECTIONALITY FACTOR (K_d): 0.85
 GUST EFFECT FACTOR (G): 0.85

MEAN ROOF HEIGHT: 30 FT
 GROUND ELEVATION FACTOR (K_e): 1.00
 ENCLOSURE CLASSIFICATION: Enclosed
 ROOF TYPE: Gable
 ROOF SLOPE (θ :12): 1.8:12
 θ (degrees): 8.62

ROOF PRESSURES (Figure 27.3-1)					
		External Pressures ($q_h^*(GC_p)$):			Internal Pressures ($\pm q_i^*(GC_{pi})$)
Wind Direction:	h/L:	Windward (Positive)	Windward (Negative)	Leeward	All Roofs
Normal to Ridge for $\theta \geq 10^\circ$	≤ 0.25	N/A	N/A	N/A	2.6
	0.50	N/A	N/A	N/A	
	≥ 1.0	N/A	N/A	N/A	
Normal to Ridge for $\theta < 10^\circ$ and Parallel to Ridge for All θ	h/L:	Horizontal Distance from Windward Edge	External Pressures ($q^*(GC_p)$):		Internal Pressures ($\pm q_i^*(GC_{pi})$)
			Positive Pressure	Negative Pressure	All Roofs
	≤ 0.5	0 to h	-2.2	-11.2	2.6
		h to 2h		-6.2	
		$> 2h$		-3.7	
	≥ 1.0	0 to h/2	-2.2	-16.2	
		$> h/2$		-8.7	

ASCE 7-16 CHAPTER 27: WIND LOADS ON BUILDINGS: MWFRS (DIRECTIONAL PROCEDURE)						
PART 1: ENCLOSED AND PARTIALLY ENCLOSED BUILDINGS OF ALL HEIGHTS						
HORIZONTAL WALL PRESSURES (Figure 27.3-1)						
Windward External Pressures ($q_z^*(GC_p)$):			Leeward & Sidewall External Pressures ($q_h^*(GC_p)$):			Internal Pressures ($\pm q_i^*(GC_{pi})$)
Height Above Ground Level, z	K_{zt}	Windward wall	L/B:	Leeward wall	Sidewall	All walls
15	1.00	8.1	0-1	-6.2	-8.7	2.6
20	1.00	8.8	2	-3.7		
25	1.00	9.4	≥ 4	-2.5		
30	1.00	9.9				
40	1.00	10.8				
50	1.00	11.5				
60	1.00	12.1				
70	1.00	12.6				
80	1.00	13.2				
90	1.00	13.6				
100	1.00	14.1				
120	1.00	14.8				
140	1.00	15.5				
160	1.00	16.1				
180	1.00	16.6				
200	1.00	17.1				
250	1.00	18.2				
300	1.00	19.2				
350	1.00	20.0				
400	1.00	20.9				
450	1.00	21.6				
500	1.00	22.2				

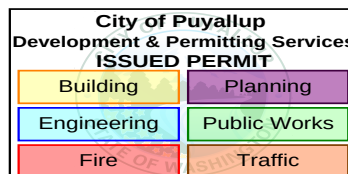
NOTES:

- Minimum Design Wind Loads (Per ASCE 7-16 27.1.5): The wind load used for design of the MWFRS shall not be less than 16 PSF multiplied by the wall area of the building, and 8 PSF multiplied by the roof area of the building projected on a vertical plane normal to the assumed wind direction. Wall and roof loads shall be applied simultaneously.

- q_i has conservatively been taken equal to q_h

$$K_{ht} = 1.00$$

$$q_h = 14.6 \text{ PSF}$$





Project: CHC Puyallup

Job Number: 22-537

Sheet: _____ of _____

Name: LMC

Originating Office: Tacoma

Date: 09/27/21

DESIGN CRITERIA - WIND

BASIC WIND SPEED (V):	98 MPH	MEAN ROOF HEIGHT:	30 FT
RISK CATEGORY:	II	GROUND ELEVATION FACTOR (K _e):	1.00
EXPOSURE CATEGORY:	B	ENCLOSURE CLASSIFICATION:	Enclosed
DIRECTIONALITY FACTOR (K _d):	0.85	ROOF TYPE:	Gable
GUST EFFECT FACTOR (G):	0.85	ROOF SLOPE (γ :12):	1.8:12
		θ (degrees):	8.62

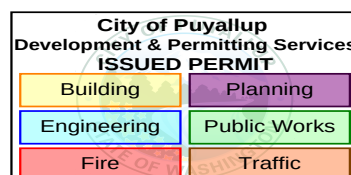
ASCE 7-16 CHAPTER 30: WIND LOADS: COMPONENTS AND CLADDING										
PART 1: LOW-RISE BUILDINGS (h≤60 ft)										
ROOF SURFACES										
Effective Wind Area	POSITIVE PRESSURES				NEGATIVE PRESSURES					
	ZONE									
	ALL ZONES				1	2e	2n	2r	3e	3r
10 SF	16.0				-31.9	-31.9	-46.5	-46.5	-46.5	-55.3
20 SF	16.0				-31.9	-31.9	-40.2	-40.2	-40.2	-47.4
50 SF	16.0				-19.4	-19.4	-31.9	-31.9	-31.9	-36.9
100 SF	16.0				-16.0	-16.0	-25.6	-25.6	-25.6	-29.0
WALL SURFACES & ROOF OVERHANGS										
Effective Wind Area	WALL ZONES				ROOF OVERHANG ZONES					
	POSITIVE PRESSURES		NEGATIVE PRESSURES		NEGATIVE PRESSURES					
	4	5	4	5	1	2e	2n	2r	3e	3r
10 SF	17.3	17.3	-18.7	-23.1	-36.6	-36.6	-51.2	-51.2	-60.0	-68.8
20 SF	16.5	16.5	-17.9	-21.6	-36.6	-36.6	-46.5	-46.5	-51.8	-58.2
50 SF	16.0	16.0	-16.9	-19.5	-28.2	-28.2	-40.2	-40.2	-41.0	-44.2
100 SF	16.0	16.0	-16.1	-17.9	-21.9	-21.9	-35.5	-35.5	-32.8	-33.6
500 SF	16.0	16.0	-16.0	-16.0	-21.9	-21.9	-29.3	-29.3	-21.9	-33.6

NOTES:

- ASCE 7-16 30.2.2: Minimum Design Wind Loads: The design wind pressure for C&C of buildings shall not be less than a net pressure of 16 PSF acting in either direction normal to the surface.
- q_i has conservatively been taken equal to q_h

$$K_{ht} = 1.00$$

$$q_h = 14.6 \text{ PSF}$$



DESIGN CRITERIA - WIND

FIGURE 27.3-8: Main Wind Force Resisting System, Part 1 (All Heights): Design Wind Load Cases per ASCE 7-16

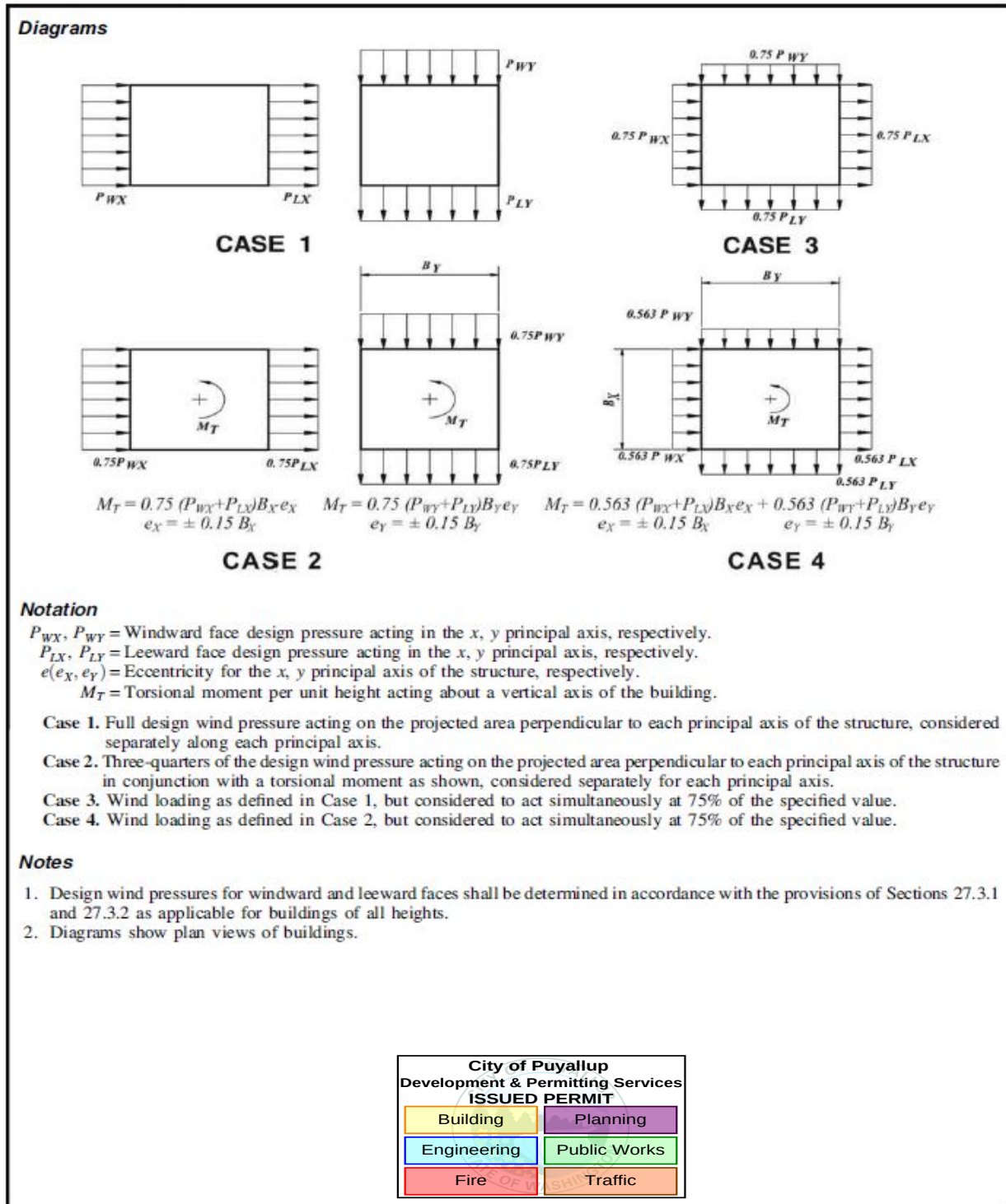


FIGURE 27.3-8 Main Wind Force Resisting System, Part 1 (All Heights): Design Wind Load Cases

DESIGN CRITERIA - WIND

FIGURE 27.3-1 Main Wind Force Resisting System, Part 1 (All Heights): External Pressure Coefficients, C_p , for Enclosed and Partially Enclosed Buildings - Walls and Roofs per ASCE 7-16

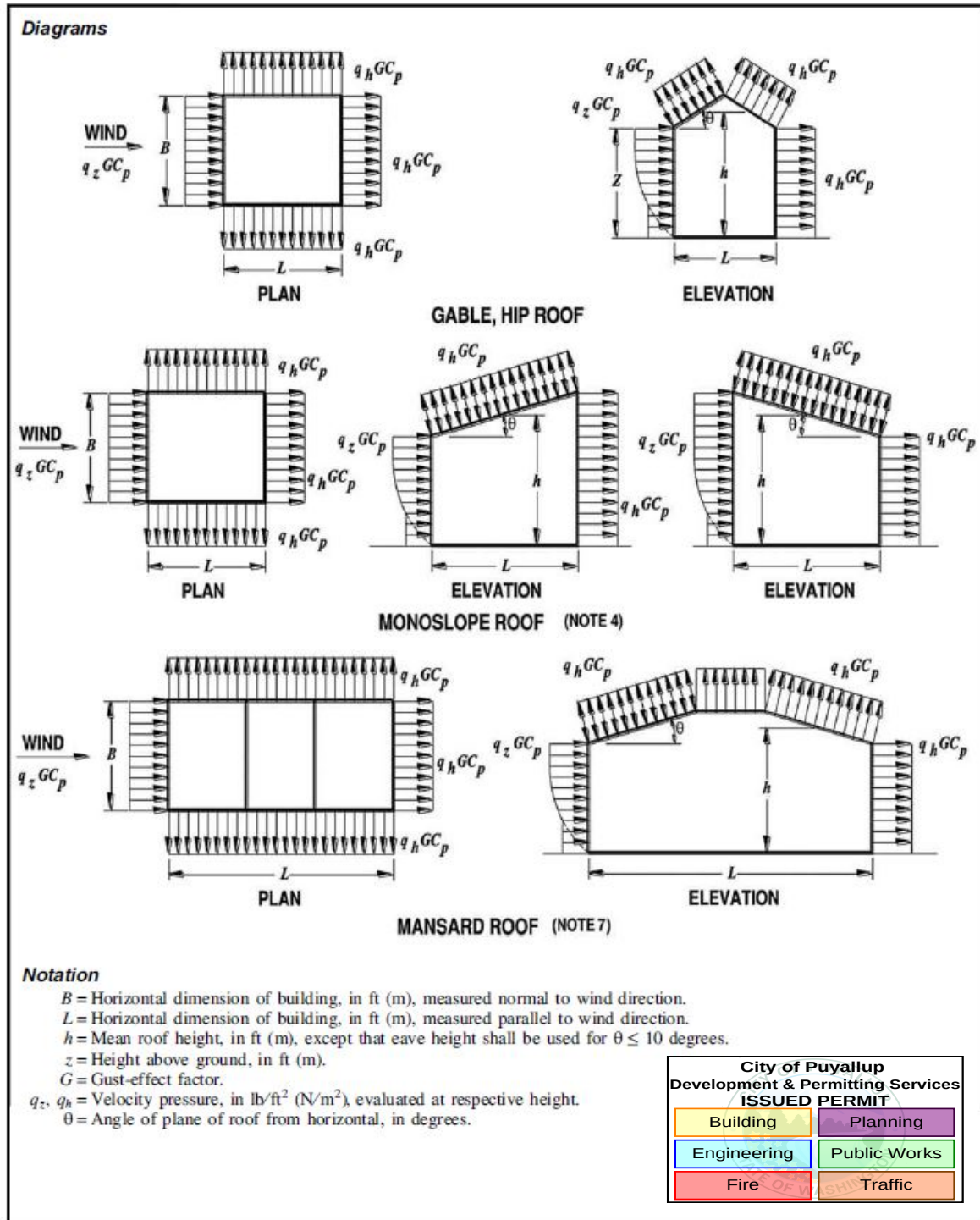
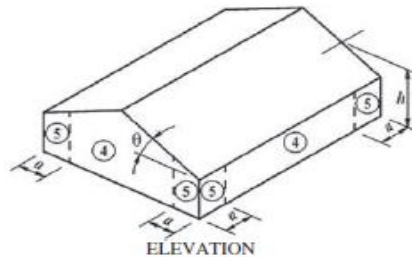


FIGURE 27.3-1 Main Wind Force Resisting System, Part 1 (All Heights): External Pressure Coefficients, C_p , for Enclosed and Partially Enclosed Buildings—Walls and Roofs

DESIGN CRITERIA - WIND

FIGURE 30.3-1: Components and Cladding [$h \leq 60$ ft]: External Pressure Coefficients, (GC_p), for Enclosed and Partially Enclosed Buildings - Walls

Diagram



Notation

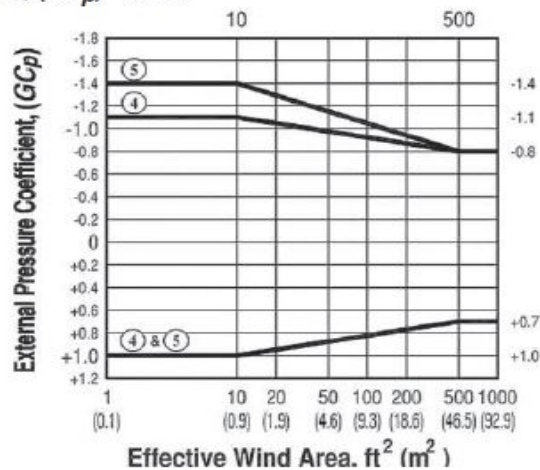
a = 10% of least horizontal dimension or $0.4h$, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 m).

Exception: For buildings with $\theta = 0^\circ$ to 7° and a least horizontal dimension greater than 300 ft (90 m), dimension a shall be limited to a maximum of $0.8h$.

h = Mean roof height, in ft (m), except that eave height shall be used for $\theta \leq 10^\circ$.

θ = Angle of plane of roof from horizontal, in degrees.

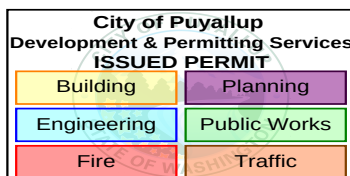
External Pressure Coefficient, (GC_p) - Walls



Notes

1. Vertical scale denotes (GC_p) to be used with qh .
2. Horizontal scale denotes effective wind area, in ft^2 (m^2).
3. Plus and minus signs signify pressures acting toward and away from the surfaces, respectively.
4. Each component shall be designed for maximum positive and negative pressures.
5. Values of (GC_p) for walls shall be reduced by 10% when $\theta \leq 10^\circ$.

FIGURE 30.3-1 Components and Cladding [$h \leq 60$ ft ($h \leq 18.3$ m)]: External Pressure Coefficients, (GC_p), for Enclosed and Partially Enclosed Buildings—Walls

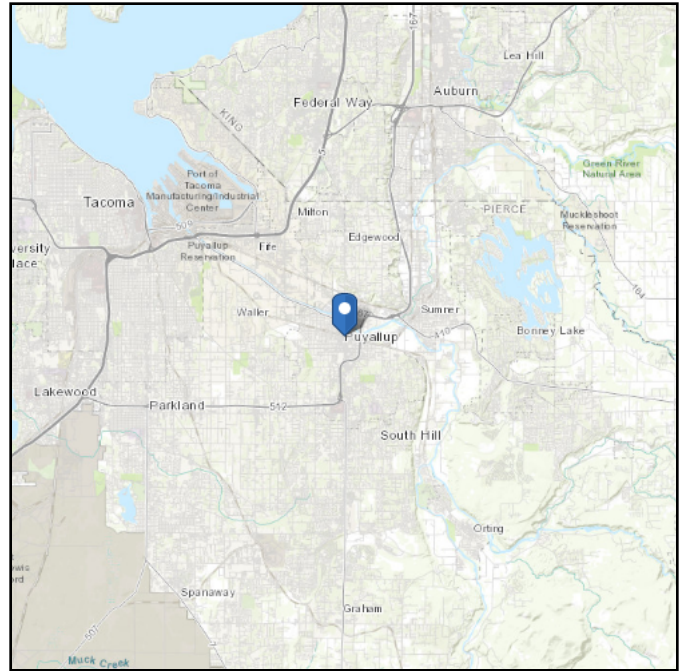
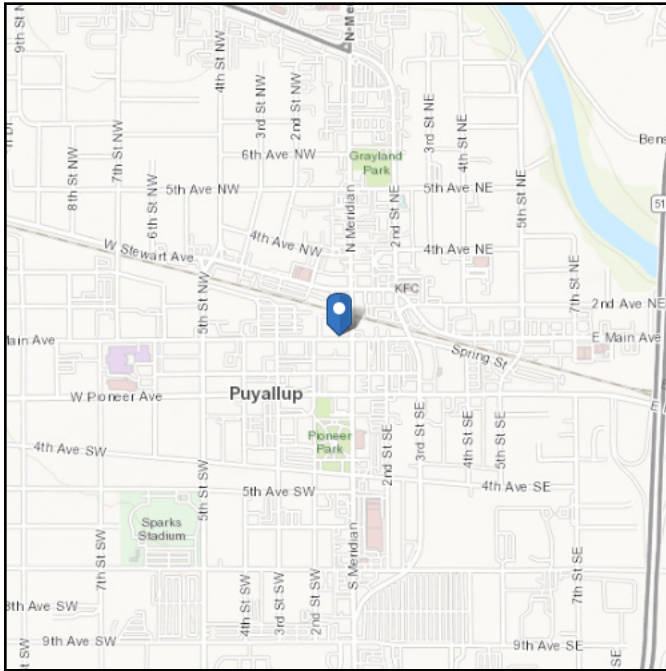


ASCE 7 Hazards Report

Address:
133 W Main Ave
Puyallup, Washington
98371

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

Elevation: 48.07 ft (NAVD 88)
Latitude: 47.191847
Longitude: -122.294181



Wind

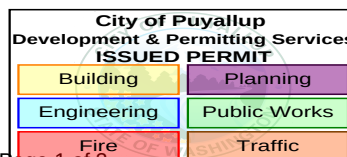
Results:

Wind Speed	98 Vmph
10-year MRI	67 Vmph
25-year MRI	73 Vmph
50-year MRI	78 Vmph
100-year MRI	83 Vmph

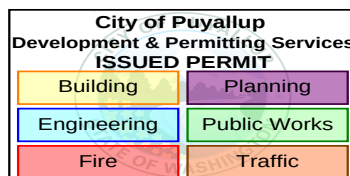
Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Mon Aug 29 2022

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.



GRAVITY



PRCTI20221698

2ND FLOOR LOAD SUMMARY

East of Grid (D) DL summary

Bigger Joists

FLOORING	= 1 PSF
15/32" STHG	= 1.5 PSF
1 1/2" Deck	= 3.5 PSF
3x12 @ 8'	= 11 PSF (5.5)
Mech	= 5 PSF
ceiling items	= 3 PSF
	<u>25 PSF - 20 PSF</u>

West of Grid (D) DL summary

FLOORING	= 1 PSF
15/32" STHG	= 1.5
3/4" Deck	= 1.8
2x10 @ 8'	= 7 - (3.5)
Mech (12)	= 5
ceiling	= 3
	<u>19.3 PSF - 16 PSF</u>
	<u>19.3 PSF - Use 20 PSF</u>

crawlspace DL summary

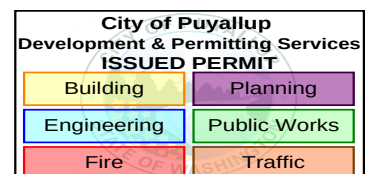
Flooring	= 1.5 PSF
3/4" STHG	= 2.3 PSF
1 7/8" TJI's	= 1.7 PSF (3.3/2)
Insul	= 1.5 PSF
Misc plumb	= 2
Mech	<u>9 PSF - Use 10 PSF</u>

LOADING LISTED ON (E) DWG

Roof SNOW = 25 PSF
Roof Dead = Actual
OFFICE LL = 50 PSF
OFFICE DL = Actual + 20 PSF part
CORR & EXITS = 100 PSF LL
= Actual DL
% (E) framing was designed
for loads matching new
loading. Check new egress
corridor framing locations

New LL

Roof = 25 PSF
Floor = 50 PSF + 15 PSF partition
Corridor = 80 PSF (2nd Floor)
Stair = 100 PSF
Corridor = 100 PSF (a ground)

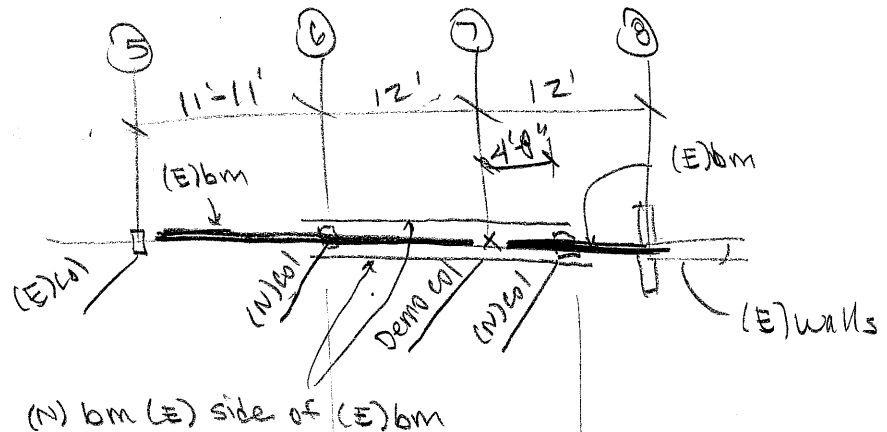


Demo col @ (D) 1/7

Roof framing

70 PSF meek
25 PSF SNOW
25 PSF DL

New bm's EA side of
(E) Bm.



New bm at roof

(Actual = 0)

$$WDL = (70 + 25) \times 15.6' = 1482 \text{ #/ft}$$

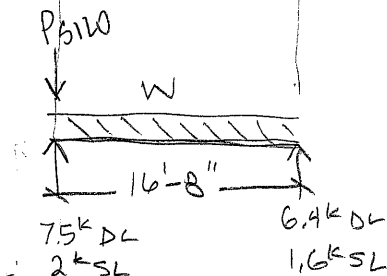
$$WSL = (25) \times 15.6' = 390 \text{ #/ft}$$

$$1872 \text{ #/ft}$$

(actual = 390 #/ft)

$$P_{SILLO} = \frac{12.5'}{2} \times \frac{15.6'}{2} \times (20 \text{ PSF DL} + 25 \text{ PSF DL} + 25 \text{ PSF SL})$$

$$= 2.2 \text{ k DL} + 1.2 \text{ k SL}$$



-see enercalc

Provide (2) 5×14 PSL's - one EA side of (E) bm. good for 33k

Col

H = 28.5' assumed - ht close to tallest ridge

$$FND: 25 \text{ k} / (4.5')^2 = 1235 \text{ PSF}$$

USE $5 \times 5'$ FND

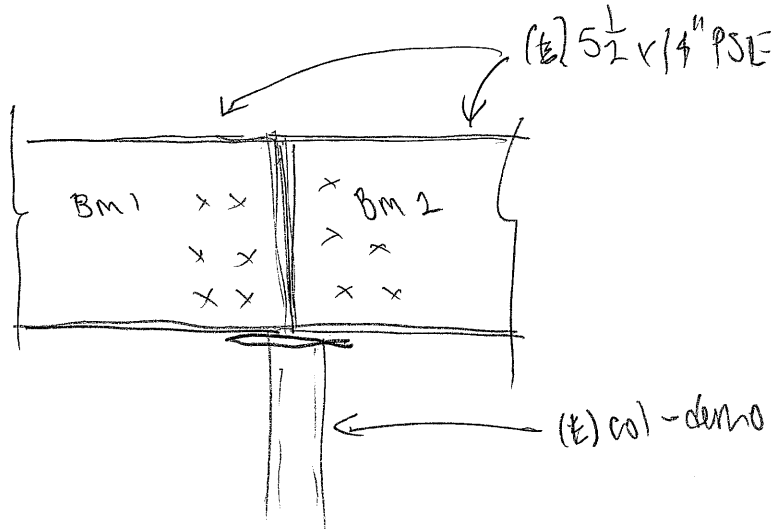
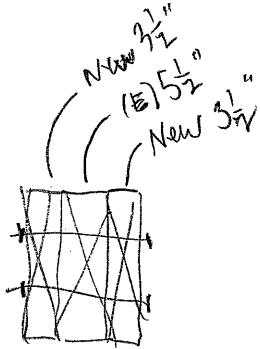
see enercalc

$$H \text{ of } 5 \times 5 \times \frac{1}{2}$$

$$P_{max} = (95 \text{ PSF}) \times 7.8' \times \frac{(11.9' + 16.7')}{2} + 95 \times 7.8' \times \frac{16.7'}{2} + 2.2 \text{ k} = 19 \text{ k}$$

$$+ (25 \text{ PSF}) \times \text{ " } (\text{ " }) + 25 \times \text{ " } \text{ " } + 1.2 \text{ k} = 5.6 \text{ k}$$

$$\left. \begin{array}{l} 19 \text{ k} \\ 5.6 \text{ k} \end{array} \right\} 24.6 \text{ k}$$



Need to transfer (E) bm reaction to new bms via bolts

(E) Bm Reactions:

Bm 1

$$L = 24' \quad W_{DL} = 25 \text{ PSF} \times 31' / 2 = 388 \# / \text{ft}$$

$$W_L = 25 \text{ PSF} \times 31' / 2 = 388 \# / \text{ft}$$

$$\underline{776 \# / \text{ft}}$$

$$R = 776 \# / \text{ft} \times 12' = 9,3^k$$

Bm 2

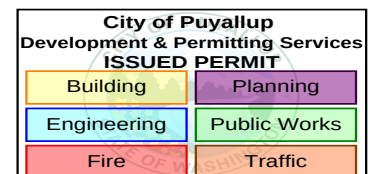
$$L = 12' \quad W_{DL} = 388 \# / \text{ft}$$

$$W_L = 388 \# / \text{ft}$$

$$\underline{776 \# / \text{ft}}$$

$$R = 776 \# / \text{ft} \times 6' = 4.7^k$$

NDS Table 11F 3/4" Ø
 $V_{bolt} = 1750^{\#}$
 $\frac{9305^{\#}}{1750^{\#}} = \text{Need } (6) \text{ bolts @ EA bm end}$



Project Title: **CHC Puyallup**
 Engineer: **LMC**
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: New Roof Bm grid D -half load to bm EA side - updated mech

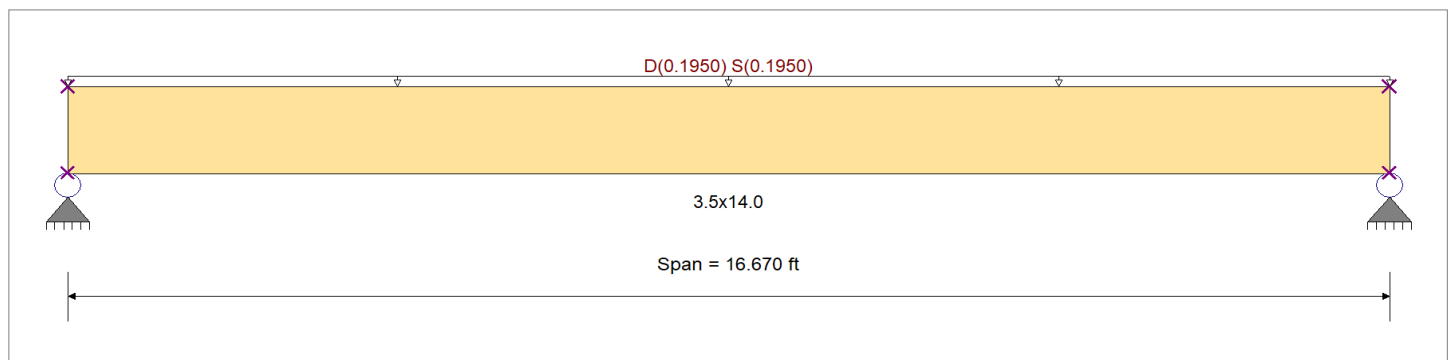
CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design	Fb +	2,900.0 psi	E : Modulus of Elasticity	
Load Combination : IBC 2018	Fb -	2,900.0 psi	Ebend- xx	2,000.0ksi
	Fc - Prll	2,900.0 psi	Eminbend - xx	1,016.54ksi
Wood Species : iLevel Truss Joist	Fc - Perp	750.0 psi		
Wood Grade : Parallam PSL 2.0E	Fv	290.0 psi		
	Ft	2,025.0 psi	Density	45.070pcf
Beam Bracing : Completely Unbraced				



Applied Loads

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

Beam self weight calculated and added to loading

Loads on all spans...

Partial Length Uniform Load : D = 0.0250, S = 0.0250 ksf, Extent = 0.0 --> 16.670 ft, Tributary Width = 7.80 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.588	1	Maximum Shear Stress Ratio	=	0.267	1
Section used for this span		3.5x14.0		Section used for this span		3.5x14.0	
fb: Actual	=	1,477.76psi		fv: Actual	=	89.08 psi	
Fb: Allowable	=	2,514.58psi		Fv: Allowable	=	333.50 psi	
Load Combination		+D+S+H		Load Combination		+D+S+H	
Location of maximum on span	=	8.335ft		Location of maximum on span	=	15.514 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection	0.213 in	Ratio =	939 >=360	Span: 1 : S Only			
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a			
Max Downward Total Deflection	0.443 in	Ratio =	452 >=240	Span: 1 : +D+S+H			
Max Upward Total Deflection	0 in	Ratio =	0 <240	n/a			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L		M	fb	F'b	V	fv	F'v
+D+H														0.00			
Length = 16.670 ft	1	0.343	0.177	0.90	1.000	1.00	1.00	1.00	1.00	0.86		7.31	766.84	2234.68	1.51	46.22	261.00
+D+L+H														0.00			
Length = 16.670 ft	1	0.324	0.159	1.00	1.000	1.00	1.00	1.00	1.00	0.82		7.31	766.84	2370.02	1.51	46.22	290.00
+D+Lr+H														0.00			
Length = 16.670 ft	1	0.297	0.128	1.25	1.000	1.00	1.00	1.00	1.00	0.71		7.31	766.84	2580.94	1.51	46.22	362.50
+D+S+H														0.00			
Length = 16.670 ft	1	0.588	0.267	1.15	1.000	1.00	1.00	1.00	1.00	0.75		14.08	1,477.76	2514.58	2.91	89.08	333.50
+D+0.750Lr+0.750L+H														0.00			
Length = 16.670 ft	1	0.297	0.128	1.25	1.000	1.00	1.00	1.00	1.00	0.71		7.31	766.84	2580.94	1.51	46.22	362.50
+D+0.750L+0.750S+H														0.00			
Length = 16.670 ft	1	0.517	0.235	1.15	1.000	1.00	1.00	1.00	1.00	0.75		12.39	1,300.03	2514.58	2.56	78.37	333.50

PRCTI20221698

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: New Roof Bm grid D -half load to bm EA side - updated mech

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios		C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	Moment Values			Shear Values		
			M	V								M	fb	F'b	V	fv	F'v
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00	0.75			0.00	0.00	0.00	0.00
Length = 16.670 ft	1		0.283	0.100	1.60	1.000	1.00	1.00	1.00	1.00	0.58	7.31	766.84	2709.74	1.51	46.22	464.00
+D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00	0.58			0.00	0.00	0.00	0.00
Length = 16.670 ft	1		0.283	0.100	1.60	1.000	1.00	1.00	1.00	1.00	0.58	7.31	766.84	2709.74	1.51	46.22	464.00
+D+0.750Lr+0.750L+0.450W-					1.000	1.00	1.00	1.00	1.00	1.00	0.58			0.00	0.00	0.00	0.00
Length = 16.670 ft	1		0.283	0.100	1.60	1.000	1.00	1.00	1.00	1.00	0.58	7.31	766.84	2709.74	1.51	46.22	464.00
+D+0.750L+0.750S+0.450W+					1.000	1.00	1.00	1.00	1.00	1.00	0.58			0.00	0.00	0.00	0.00
Length = 16.670 ft	1		0.480	0.169	1.60	1.000	1.00	1.00	1.00	1.00	0.58	12.39	1,300.03	2709.74	2.56	78.37	464.00
+D+0.750L+0.750S+0.5250E-					1.000	1.00	1.00	1.00	1.00	1.00	0.58			0.00	0.00	0.00	0.00
Length = 16.670 ft	1		0.480	0.169	1.60	1.000	1.00	1.00	1.00	1.00	0.58	12.39	1,300.03	2709.74	2.56	78.37	464.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00	0.58			0.00	0.00	0.00	0.00
Length = 16.670 ft	1		0.170	0.060	1.60	1.000	1.00	1.00	1.00	1.00	0.58	4.38	460.10	2709.74	0.91	27.73	464.00
+0.60D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00	0.58			0.00	0.00	0.00	0.00
Length = 16.670 ft	1		0.170	0.060	1.60	1.000	1.00	1.00	1.00	1.00	0.58	4.38	460.10	2709.74	0.91	27.73	464.00

Overall Maximum Deflections

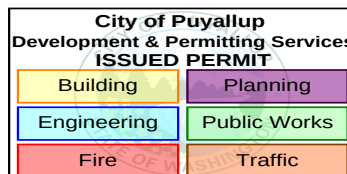
Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.4426	8.396		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

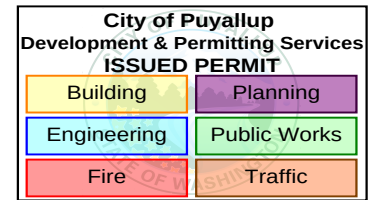
Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.378	3.378
Overall MINimum	1.625	1.625
+D+H	1.753	1.753
+D+L+H	1.753	1.753
+D+Lr+H	1.753	1.753
+D+S+H	3.378	3.378
+D+0.750Lr+0.750L+H	1.753	1.753
+D+0.750L+0.750S+H	2.972	2.972
+D+0.60W+H	1.753	1.753
+D+0.70E+H	1.753	1.753
+D+0.750Lr+0.750L+0.450W+H	1.753	1.753
+D+0.750L+0.750S+0.450W+H	2.972	2.972
+D+0.750L+0.750S+0.5250E+H	2.972	2.972
+0.60D+0.60W+0.60H	1.052	1.052
+0.60D+0.70E+0.60H	1.052	1.052
D Only	1.753	1.753
S Only	1.625	1.625
H Only		



PRCTI20221698

Project Title: **CHC Puyallup**
 Engineer: **LMC**
 Project ID:
 Project Descr:



Steel Column

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: New steel col grid D/6

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
 Load Combinations Used : IBC 2018

General Information

Steel Section Name : **HSS5x5x1/2**

Analysis Method : Allowable Strength

Steel Stress Grade

Fy : Steel Yield 46.0 ksi

E : Elastic Bending Modulus 29,000.0 ksi

Overall Column Height 29.0 ft

Top & Bottom Fixity Top & Bottom Pinned

Brace condition for deflection (buckling) along columns :

X-X (width) axis :

Unbraced Length for buckling ABOUT Y-Y Axis = 29.0 ft, K = 1.0

Y-Y (depth) axis :

Unbraced Length for buckling ABOUT X-X Axis = 29.0 ft, K = 1.0

Applied Loads

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

Column self weight included : 824.47 lbs * Dead Load Factor

AXIAL LOADS . . .

Axial Load at 29.0 ft, Xecc = 4.50 in, Yecc = -1.50 in, D = 7.50, S = 3.0 k

Axial Load at 29.0 ft, Xecc = -4.50 in, Yecc = -1.50 in, D = 7.50, S = 3.0 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =

0.7513 : 1

Load Combination

+D+S

Location of max.above base

29.0 ft

At maximum location values are . . .

Pa : Axial

21.824 k

Pn / Omega : Allowable

32.396 k

Ma-x : Applied

2.625 k-ft

Mn-x / Omega : Allowable

30.070 k-ft

Ma-y : Applied

0.0 k-ft

Mn-y / Omega : Allowable

30.070 k-ft

Maximum Load Reactions . .

Top along X-X

0.0 k

Bottom along X-X

0.0 k

Top along Y-Y

0.09052 k

Bottom along Y-Y

0.09052 k

Maximum Load Deflections . . .

Along Y-Y 0.3274 in at 16.933ft above base
 for load combination : +D+S

Along X-X 0.0 in at 0.0ft above base
 for load combination :

PASS Maximum Shear Stress Ratio

0.001634 : 1

Load Combination

+D+S

Location of max.above base

0.0 ft

At maximum location values are . . .

Va : Applied

0.09052 k

Vn / Omega : Allowable

55.409 k

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios								Maximum Shear Ratios			
	Stress Ratio	Status	Location	Cbx	Cby	KxLx/Ry	KyLy/Rx		Stress Ratio	Status	Location	
D Only	0.544	PASS	29.00 ft	1.66	1.00	191.21	191.21		0.001	PASS	0.00 ft	
+D+S	0.751	PASS	29.00 ft	1.66	1.00	191.21	191.21		0.002	PASS	0.00 ft	
+D+0.750S	0.699	PASS	29.00 ft	1.66	1.00	191.21	191.21		0.002	PASS	0.00 ft	
+0.60D	0.326	PASS	29.00 ft	1.66	1.00	191.21	191.21		0.001	PASS	0.00 ft	

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction		X-X Axis Reaction		k	Y-Y Axis Reaction		Mx - End Moments		k-ft	My - End Moments	
	@ Base		@ Base	@ Top		@ Base	@ Top	@ Base	@ Top		@ Base	@ Top
D Only	15.824					0.065	-0.065					
+D+S	21.824					0.091	-0.091					
+D+0.750S	20.324					0.084	-0.084					
+0.60D	9.495					0.039	-0.039					
S Only	6.000					0.026	-0.026					

Extreme Reactions

Item	Extreme Value	Axial Reaction		X-X Axis Reaction		k	Y-Y Axis Reaction		Mx - End Moments		k-ft	My - End Moments	
		@ Base		@ Base	@ Top		@ Base	@ Top	@ Base	@ Top		@ Base	@ Top
Axial @ Base	Maximum	21.824					0.091	-0.091			2.625		

PRCTI20221698

Steel Column

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

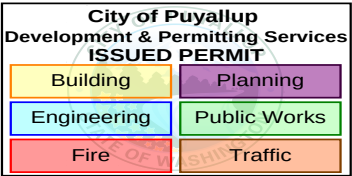
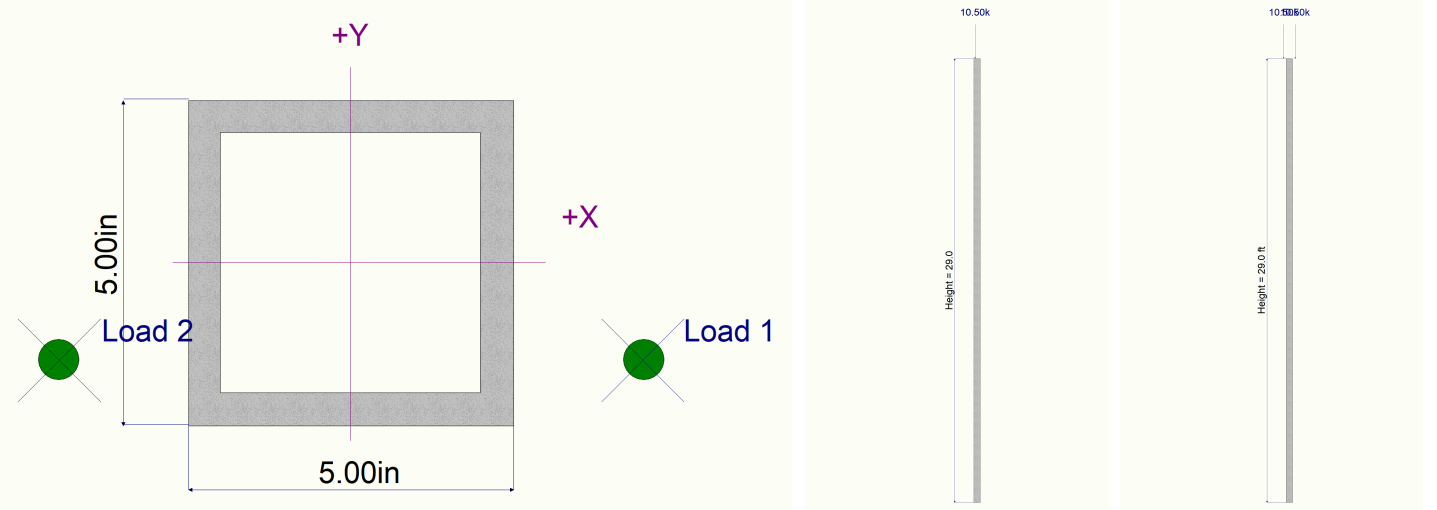
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DESCRIPTION: New steel col grid D/6

Extreme Reactions

Item	Extreme Value	Axial Reaction	X-X Axis Reaction		k	Y-Y Axis Reaction		Mx - End Moments		k-ft	My - End Moments	
		@ Base	@ Base	@ Top		@ Base	@ Top	@ Base	@ Top		@ Base	@ Top
"	Minimum	6.000				0.026	-0.026			0.750		
Reaction, X-X Axis Base	Maximum	15.824				0.065	-0.065			1.875		
"	Minimum	15.824				0.065	-0.065			1.875		
Reaction, Y-Y Axis Base	Maximum	21.824				0.091	-0.091			2.625		
"	Minimum	6.000				0.026	-0.026			0.750		
Reaction, X-X Axis Top	Maximum	15.824				0.065	-0.065			1.875		
"	Minimum	15.824				0.065	-0.065			1.875		
Reaction, Y-Y Axis Top	Maximum	6.000				0.026	-0.026			0.750		
"	Minimum	15.824				0.065	-0.065			1.875		
Moment, X-X Axis Base	Maximum	15.824				0.065	-0.065			1.875		
"	Minimum	15.824				0.065	-0.065			1.875		
Moment, Y-Y Axis Base	Maximum	15.824				0.065	-0.065					1.875
"	Minimum	15.824				0.065	-0.065					1.875
Moment, X-X Axis Top	Maximum	21.824				0.091	-0.091			2.625		
"	Minimum	6.000				0.026	-0.026			0.750		
Moment, Y-Y Axis Top	Maximum	15.824				0.065	-0.065			1.875		
"	Minimum	15.824				0.065	-0.065			1.875		

Sketches



PRCTI20221698

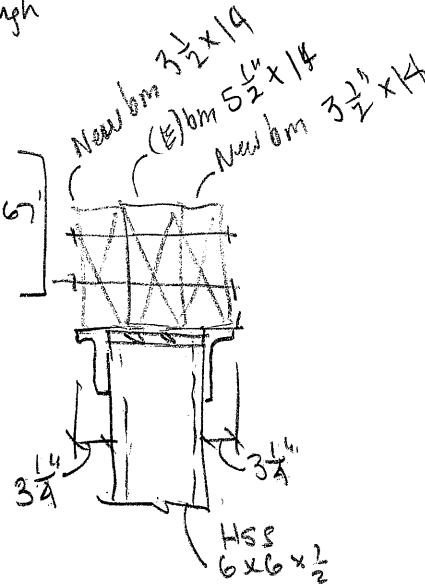
@ ① ⑦

Conn new bms to col

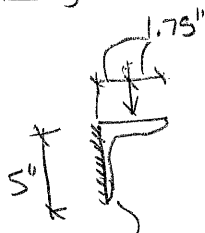
Brg on (e) bms to col. Not through angles

$$V = \frac{1}{2} \times \left[\begin{array}{l} \text{mech} \\ \text{rf} \\ (25 + 25 \text{ PSF DL}) \times \left(\frac{11.9'}{2} + \frac{12' \times 2}{3} + 12' \right) \times 15.6' \\ + 15.3' \times 3 \times 16' \\ \text{Lbms} \\ + \text{P silo } 3,400' \end{array} \right]$$

$$V = 14 \text{ k Tot}$$



Angle



le) bms brg directly on col

$$V_{\text{angles}} = 14 \text{ k} - \frac{2.7 \text{ k}}{2} - \frac{2.4 \text{ k}}{2} - 3.4 \text{ k} = 8 \text{ k} + \text{transfers through angles to col}$$

$$M = \frac{8 \text{ k}}{2 \text{ angles}} \times (1.75' - k) = 2.25 \text{ k'}$$

$$f_b = \frac{M}{Z} \quad \frac{M}{Z} = f_b Z = \frac{36}{1.67} \times Z \geq 2.25 \text{ k'}$$

bolts: NDS Table 11F
 $V_{\text{bolt}} = 1750' - \text{need } (5)$
bolts $3/4" \times 8$

$$5' \times 3 \frac{1}{2}' \times \frac{3}{4}' \times 4' \text{ long} \quad Z_{\text{req'd}} = .10 \text{ in}^3 = \frac{b h^2}{4} = \frac{4' \times h^2}{4} \quad h_{\text{min}} = .32' < 3/4', \text{ OK}$$

$k = 13/16"$

Weld

$1.75' = e = a$ AISC Table 8-4

$P = 18 \text{ k} / 2 = 4 \text{ k}$

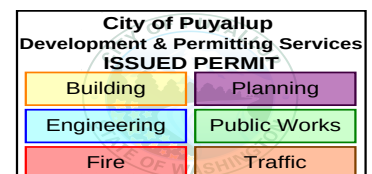
$a = \frac{1.75}{5} = .35 \quad k = \frac{4}{5} = .8 \quad C = 2.97$

$D_{\text{min}} = \frac{2.00 \times 4 \text{ k}}{2.97 \times 1 \times 5"} = .54"$

W/ $L6 \times 4 \times 3/4$

$a = \frac{1.75}{6} = .3 \quad k = \frac{4}{6} = .7 \quad C = 3.11$

$D_{\text{min}} = \frac{2 \times 4 \text{ k}}{3.11 \times 1 \times 6"} = .43" - \frac{7}{16}" \text{ weld}$





Structural Solutions

Project: C HC Puyallup

Job No: 22537

Subject: _____ Sheet: _____

Name: LMC

City of Puyallup Office: _____
Development & Permitting Services
ISSUED PERMIT

Building	Planning
Engineering	Public Works
Fire	Traffic

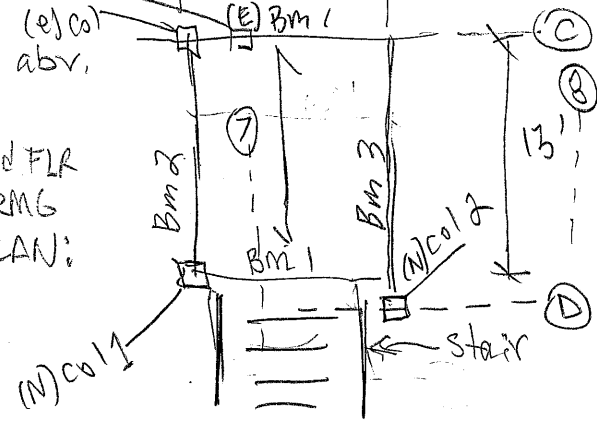
Seattle ☒ Tacoma ☐ Portland ☐

(E) Col
abr.

Date: 6.8.1

New col @ new interior stair

2nd FLR
FRMG
PLAN:



col 1 @ (6.7) & (C.7)
col 2 @ (7.3) & (D)
1 story

Approx loads :

Stair DL = 135 PSF (concr treads & landing + steel + glass + rail)
Stair LL = 100 PSF
50 PSF, 50 PSF, 10 PSF, 20 PSF
(48.5 #/ for 48" tall) x 70'

Stair area = $\frac{208 \text{ SF}}{2} = 104 \text{ SF}$ trib to 2nd Floor landing
(1/2 to ground)

$$P_{\text{col 1}} = \frac{104 \text{ SF} \times 235 \text{ PSF}}{2 \text{ cols}} + \text{Floor} \left[\frac{(20 \text{ PSF DL} + 50 \text{ PSF LL}) \times 13' \times 6.8'}{2 \times 2} \right]$$

100 PSF gathering @ stair/elevator

12.2k

= 15.0k

15k - see enercalc. [HSS 4x4x5/16] col 1

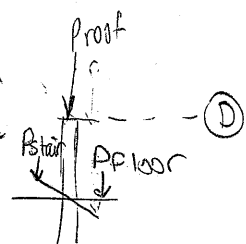
HT = 13'-8"

$$FND = \frac{115^k}{(3.5')^2} = 1774 \text{ PSF} - \text{Use } 4' \times 4' - \text{fnd @ col 1}$$

Actual = less, OK

Proof DL = 95 PSF x 15.6' x 24'/2 = 17.8k
LL = 25 PSF x 15.6' x 24'/2 = 5k
P stair = Bm 1 Reaction = 7.4k DL + 7.3k LL

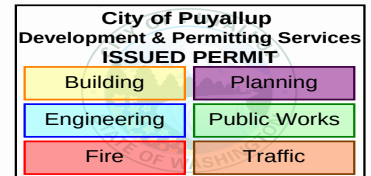
P floor DL = (20 PSF) x 26'/2 x 7'/2 = 0.9k
LL = (65 PSF) x 26'/2 x 7'/2 = 3.0k



PROT20221698

HSS 6x6x1/2

FND = 41k/6'x6' = 1139



Bm 1

100PSF (landy and wait for elevator)

$$W_{Floor} = (20 \text{ PSF DL} + 50 \text{ PSF LL}) \times \frac{13'}{2}$$

$$W = 130\#/\text{DL}$$

$$325\#/\text{LL}$$

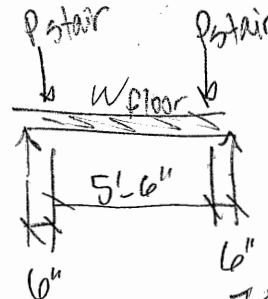
$$650\#/\text{DL}$$

$$P_{stair} = 12.8^k \quad (5.2^k \text{ LL}, 7^k \text{ DL})$$

- see enercalc

$$8 \times 10 \text{ DF} \#1 \text{ OK}$$

$$5\frac{1}{4} \times 9\frac{1}{4} \text{ PSL } (2.0^k) \text{ OK}$$



$$7.4^k \text{ DL}$$

$$7.3^k \text{ LL}$$

$$(R=6^k)$$

Hanger
HGLT 5.37 H=9.25

revise: stair will have intermediate cols.

$$\therefore \text{stair load to stinger}$$

$$P_{stair} = \frac{7'}{2} \times \frac{5.83'}{2} \times (100 \text{ PSF LL})$$

$$= 1.0^k \text{ LL} + 1.4^k \text{ DL}$$

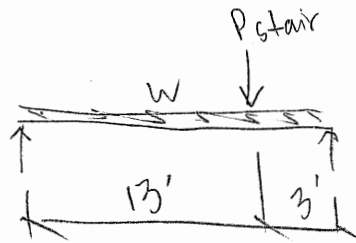
Bm 3

$$L=16'$$

$$W_{floor} = 25 \text{ PSF DL} \times 1' = 25\#/\text{DL}$$

$$+ 100 \text{ PSF LL} \times 1' = 100\#/\text{LL}$$

$$125\#/\text{DL}$$



Loads assumed before stair framing was finalized.
Assumed floating stair and therefore much high reaction to bm 3. Actual reaction to bm 3 is 3kips.
All bms and conn OK.

$$P_{stair} = \text{Bm 1 reaction} = 7.4^k \text{ DL} + 7.3^k \text{ LL}$$

wood bm doesn't work

$$W10 \times 19$$
 - see enercalc

$$W8 \times 24$$
 - to allow ~~wood~~ ~~stair~~ to fit on top of (el) bm gwl(2)

New Joists @ stair landing

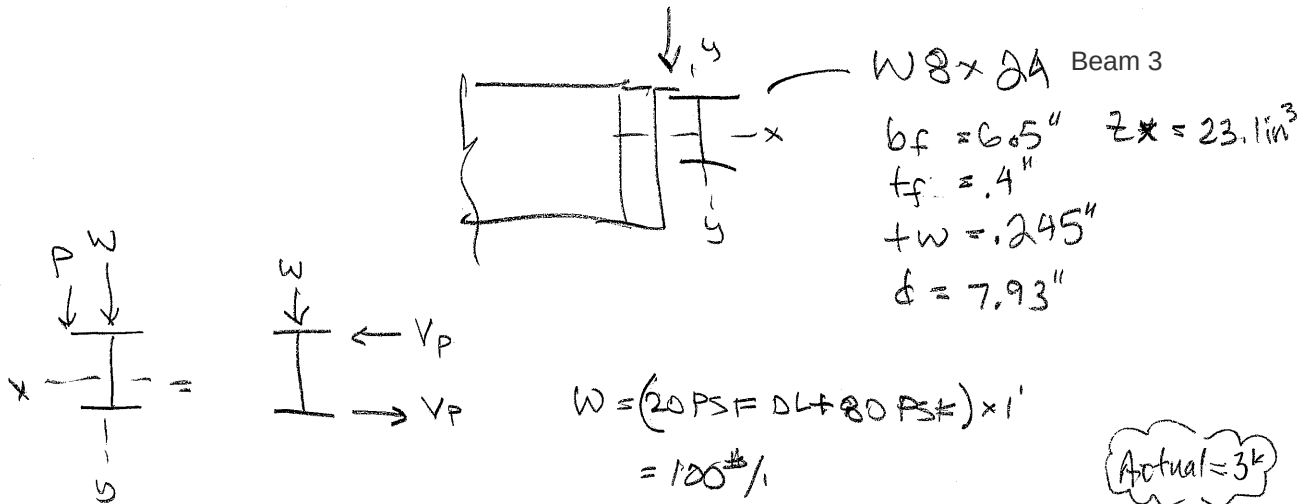
$$L=16' \quad W_{floor} = 25\#/\text{DL} + 100\#/\text{LL} \quad R_{DL+LL} = 800\# + 260\# = 1060\# \quad \text{AUC410}$$

$$Val = 1795\#$$

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Check Torsion @ Top of Landing beam

Beam 3



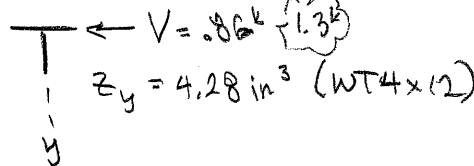
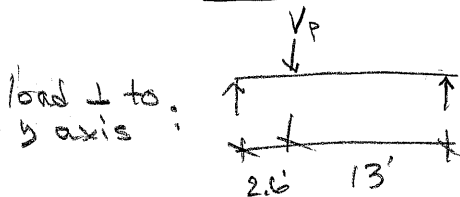
$$W = (20 \text{ PSF DL} + 80 \text{ PSF LL}) \times 1' = 100 \text{ #/ft}$$

$$P = (60 \text{ PSF} \times \frac{7'}{2} \times \frac{6'}{2}) + (100 \text{ PSF} \times \frac{6'}{2}) = 1.7 \text{ k} - \text{say } 2 \text{ k}$$

Actual = 3k

$$V_p = P \times \frac{6.5''}{2} / (7.93'' - .4'') = .86 \text{ k} = 1.3 \text{ k}$$

Check top of beam



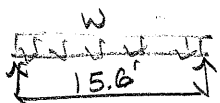
$$M_y = \frac{V_p \times (2.6') \times (13')}{15.6'} = 1.86 \text{ k}' - 2.3 \text{ k}'$$

$$\frac{M_y}{S_y} = \frac{50 \text{ ksi} \times Z_y}{1.67 \times 12} = 10.7 \text{ k}' > M_y \checkmark$$

$\therefore$ Torsion on beam ok

add ϕ @ end conn to HSS @ + & B Flange to take out the rotation

load $\parallel$ to y axis



$$M = wL^2/8 = 3 \text{ k}'$$

$$\frac{M_x}{S_x} = \frac{50 \text{ ksi} \times 23.1}{1.67 \times 12} = 57.6 \text{ k}' > M_x \checkmark$$

Combined:

$$\frac{M_x}{S_x} + \frac{M_y}{S_y} \leq 1$$

$$\frac{3}{57.6} + \frac{1.86}{10.7} = .23 \leq 1 \checkmark$$

Project Title: **CHC Puyallup**
 Engineer: **LMC**
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Wood Beam

File: CHC Puyallup calcs.ec6
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 PCS STRUCTURAL SOLUTIONS

Lic. # : KW-06002327

DESCRIPTION: **Beam 1 - at new stair landing - revised lower P stringer load due to added stair cols at intermediate landing**

CODE REFERENCES

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

Load Combination Set : IBC 2018

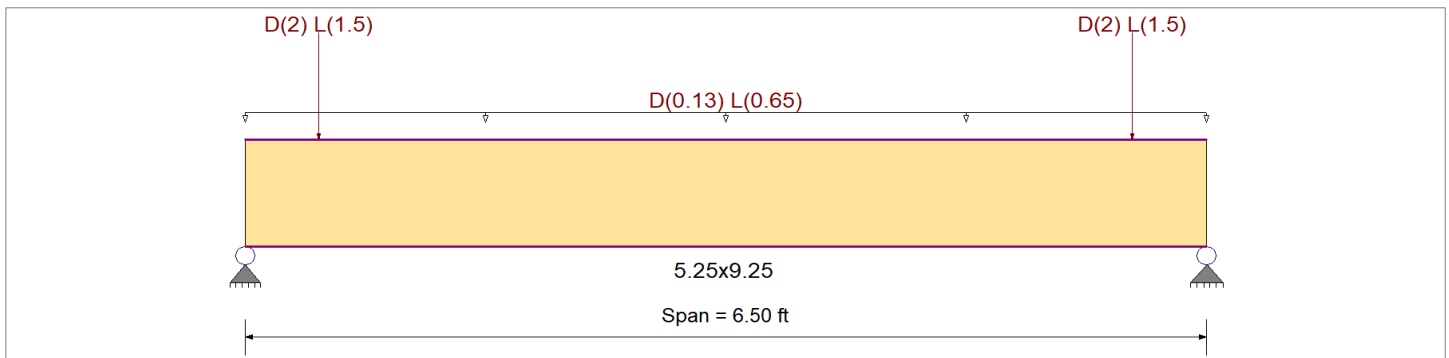
Material Properties

Analysis Method : **Allowable Stress Design**
 Load Combination **IBC 2018**

Wood Species : **iLevel Truss Joist**
 Wood Grade : **Parallam PSL 2.0E**

Beam Bracing : **Beam is Fully Braced against lateral-torsional buckling**

Fb + 2,900.0 psi E : Modulus of Elasticity
 Fb - 2,900.0 psi Ebend- xx 2,000.0 ksi
 Fc - Prll 2,900.0 psi Eminbend - xx 1,016.54 ksi
 Fc - Perp 750.0 psi
 Fv 290.0 psi
 Ft 2,025.0 psi Density 45.070 pcf



Applied Loads

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

Uniform Load : D = 0.130, L = 0.650 , Tributary Width = 1.0 ft, (floor load)

Point Load : D = 2.0, L = 1.50 k @ 0.50 ft, (Stair stringer)

Point Load : D = 2.0, L = 1.50 k @ 6.0 ft, (Stair stringer)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.324 1	Maximum Shear Stress Ratio	=	0.207 : 1
Section used for this span	=	5.25x9.25	Section used for this span	=	5.25x9.25
fb: Actual	=	940.77 psi	fv: Actual	=	60.01 psi
Fb: Allowable	=	2,900.00 psi	Fv: Allowable	=	290.00 psi
Load Combination	=	+D+L	Load Combination	=	+D+L
Location of maximum on span	=	3.250ft	Location of maximum on span	=	5.741 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection		0.048 in	Ratio =		1632 >=360
Max Upward Transient Deflection		0.000 in	Ratio =		0 <360
Max Downward Total Deflection		0.069 in	Ratio =		1138 >=240
Max Upward Total Deflection		0.000 in	Ratio =		0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios		C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	Moment Values			Shear Values		
			M	V								M	fb	F'b	V	fv	F'v
D Only	Length = 6.50 ft	1	0.104	0.038	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.69	270.33	0.00	0.00	0.00	0.00
+D+L	Length = 6.50 ft	1	0.324	0.207	1.00	1.000	1.00	1.00	1.00	1.00	1.00	5.87	940.77	2900.00	1.94	60.01	290.00
+D+0.750L	Length = 6.50 ft	1	0.213	0.131	1.25	1.000	1.00	1.00	1.00	1.00	1.00	4.82	773.16	3625.00	1.54	47.51	362.50
+0.60D	Length = 6.50 ft	1	0.035	0.013	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.01	162.20	4640.00	0.19	6.00	464.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0685	3.274		0.0000	0.000

PRCTI20221698

Wood Beam

File: CHC Puyallup calcs.ec6
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PCS STRUCTURAL SOLUTIONS

Lic. # : KW-06002327

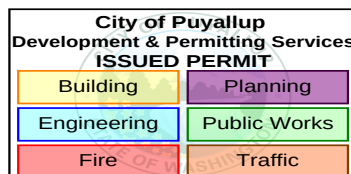
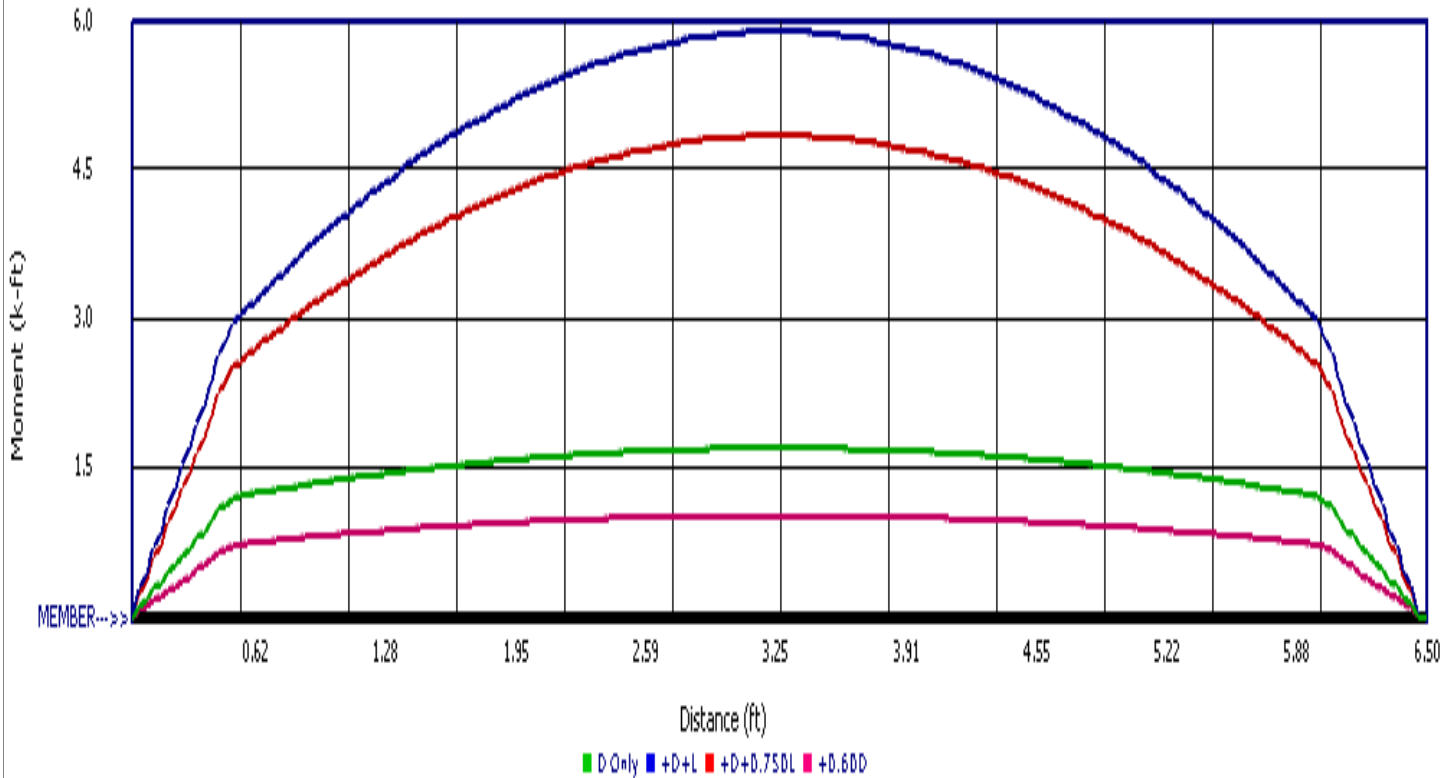
DESCRIPTION: **Beam 1 - at new stair landing - revised lower P stringer load due to added stair cols at intermediate landing**

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	6.035	6.035
Overall MINimum	3.613	3.613
D Only	2.423	2.423
+D+L	6.035	6.035
+D+0.750L	5.132	5.132
+0.60D	1.454	1.454
L Only	3.613	3.613



PRCTI20221698

Project Title: **CHC Puyallup**
 Engineer: **LMC**
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Steel Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Beam 3 - at new stair landing

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : IBC 2018

Material Properties

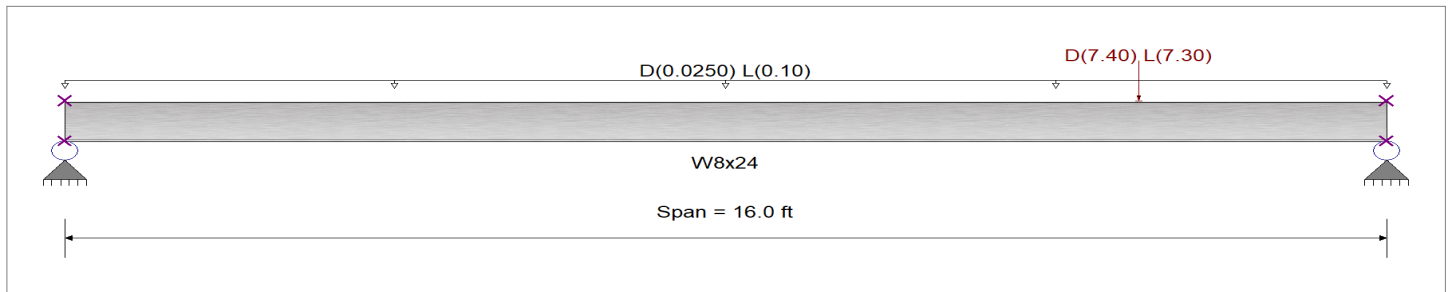
Analysis Method : Allowable Strength Design

Beam Bracing : Completely Unbraced

Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi

E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight calculated and added to loading

Uniform Load : D = 0.0250, L = 0.10 k/ft, Tributary Width = 1.0 ft, (floor load)

Point Load : D = 7.40, L = 7.30 k @ 13.0 ft, (Beam 1)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.693 : 1	Maximum Shear Stress Ratio =	0.338 : 1
Section used for this span	W8x24	Section used for this span	W8x24
Ma : Applied	38.702 k-ft	Va : Applied	13.136 k
Mn / Omega : Allowable	55.832 k-ft	Vn/Omega : Allowable	38.857 k
Load Combination	+D+L	Load Combination	+D+L
Location of maximum on span	16.000 ft	Location of maximum on span	16.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.307 in	Ratio =	624 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.587 in	Ratio =	327 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values							Summary of Shear Values	
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx/Vnx/Omega
D Only													
Dsgn. L = 16.00 ft		1	0.333	0.165	18.97		18.97	95.17	56.99	1.38	1.00	6.40	58.29
+D+L													
Dsgn. L = 16.00 ft		1	0.693	0.338	38.70		38.70	93.24	55.83	1.35	1.00	13.14	58.29
+D+0.750L													
Dsgn. L = 16.00 ft		1	0.603	0.295	33.77		33.77	93.51	56.00	1.36	1.00	11.45	58.29
+0.60D													
Dsgn. L = 16.00 ft		1	0.200	0.099	11.38		11.38	95.17	56.99	1.38	1.00	3.84	58.29

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.5868	8.914		0.0000	0.000

Vertical Reactions

Load Combination	Support 1	Support 2
Overall MAXimum	3.948	13.136
Overall MINimum	1.068	3.843
D Only	1.780	6.405
+D+L	3.948	13.136
+D+0.750L	3.406	11.453

PRCTI20221698

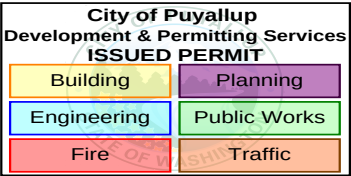
Steel Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25 PCS STRUCTURAL SOLUTIONS (c) ENERCALC INC 1983-2022

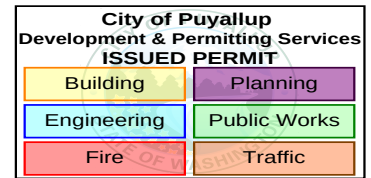
DESCRIPTION: Beam 3 - at new stair landing

Vertical Reactions			Support notation : Far left is #1	Values in KIPS
Load Combination	Support 1	Support 2		
+0.60D	1.068	3.843		
L Only	2.169	6.731		



PRCTI20221698

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: New floor landing joist - at top of new central stair

CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design

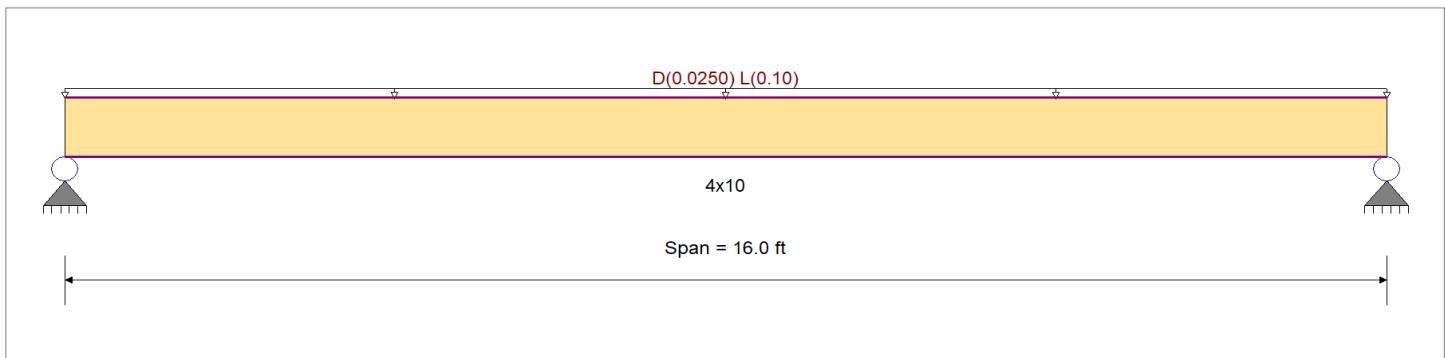
Load Combination : IBC 2018

Wood Species : Douglas Fir-Larch

Wood Grade : No.2

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb + 900 psi
 Fb - 900 psi
 Fc - Prll 1350 psi
 Fc - Perp 625 psi
 Fv 180 psi
 Ft 575 psi
 E : Modulus of Elasticity
 Ebend- xx 1600ksi
 Eminbend - xx 580ksi
 Density 31.21pcf



Applied Loads

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

Beam self weight calculated and added to loading

Loads on all spans...

Uniform Load on ALL spans : D = 0.0250, L = 0.10 k/ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio				Maximum Shear Stress Ratio			
Section used for this span	=	0.940	1	Section used for this span	=	0.246	1
fb: Actual	=	1,015.69psi		fv: Actual	=	44.29 psi	
Fb: Allowable	=	1,080.00psi		Fv: Allowable	=	180.00 psi	
Load Combination		+D+L		Load Combination		+D+L	
Location of maximum on span	=	8.000ft		Location of maximum on span	=	15.241 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection	0.402 in	Ratio =	478 >=360	Span: 1 : L Only			
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a			
Max Downward Total Deflection	0.530 in	Ratio =	362 >=240	Span: 1 : +D+L			
Max Upward Total Deflection	0 in	Ratio =	0 <240	n/a			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v
D Only													0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.253	0.066	0.90	1.200	1.00	1.00	1.00	1.00	1.00	1.02	246.33	972.00	0.23	10.74	162.00
+D+L					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.940	0.246	1.00	1.200	1.00	1.00	1.00	1.00	1.00	4.22	1,015.69	1080.00	0.96	44.29	180.00
+D+0.750L					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.610	0.160	1.25	1.200	1.00	1.00	1.00	1.00	1.00	3.42	823.35	1350.00	0.77	35.90	225.00
+0.60D					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.086	0.022	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.61	147.80	1728.00	0.14	6.44	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.5301	8.058		0.0000	0.000

PRCTI20221698

Wood Beam

Project File: CHC Puyallup calcs.ec6

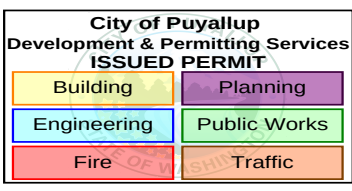
LIC# : KW-06014122, Build:20.22.7.25 PCS STRUCTURAL SOLUTIONS (c) ENERCALC INC 1983-2022

DESCRIPTION: New floor landing joist - at top of new central stair

Vertical Reactions

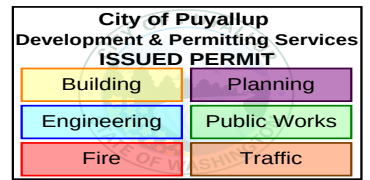
Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.056	1.056
Overall MINimum	0.800	0.800
D Only	0.256	0.256
+D+L	1.056	1.056
+D+0.750L	0.856	0.856
+0.60D	0.154	0.154
L Only	0.800	0.800



PRCTI20221698

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:



Steel Column

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: New steel col grid D/7.3

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
 Load Combinations Used : IBC 2018

General Information

Steel Section Name : HSS6x6x1/2	Overall Column Height	29.0 ft
Analysis Method : Allowable Strength	Top & Bottom Fixity	Top & Bottom Pinned
Steel Stress Grade	Brace condition for deflection (buckling) along columns :	
Fy : Steel Yield	X-X (width) axis :	
E : Elastic Bending Modulus	Unbraced Length for buckling ABOUT Y-Y Axis = 29.0 ft, K = 1.0	
	Y-Y (depth) axis :	
	Unbraced Length for buckling ABOUT X-X Axis = 29.0 ft, K = 1.0	

Applied Loads

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

Column self weight included : 1,021.96 lbs * Dead Load Factor

AXIAL LOADS . . .

P roof: Axial Load at 29.0 ft, D = 18.0, S = 5.0 k
 P stair: Axial Load at 13.670 ft, Yecc = 4.0 in, D = 8.0, L = 8.0 k
 P Floor: Axial Load at 29.0 ft, Xecc = 4.0 in, D = 1.0, L = 3.0 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =	0.7186 : 1	Maximum Load Reactions . .	
Load Combination	+D+0.750L+0.750S	Top along X-X	0.04598 k
Location of max.above base	13.624 ft	Bottom along X-X	0.04598 k
At maximum location values are . . .		Top along Y-Y	0.1839 k
Pa : Axial	40.022 k	Bottom along Y-Y	0.1839 k
Pn / Omega : Allowable	60.116 k	Maximum Load Deflections . . .	
Ma-x : Applied	-2.192 k-ft	Along Y-Y	0.06976 in at 19.658 ft above base
Mn-x / Omega : Allowable	45.449 k-ft	for load combination : +D+L	
Ma-y : Applied	-0.5089 k-ft	Along X-X	-0.08951 in at 16.933 ft above base
Mn-y / Omega : Allowable	45.449 k-ft	for load combination : +D+L	
PASS Maximum Shear Stress Ratio	0.002598 : 1		
Load Combination	+D+L		
Location of max.above base	0.0 ft		
At maximum location values are . . .			
Va : Applied	0.1839 k		
Vn / Omega : Allowable	70.779 k		

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios								Maximum Shear Ratios		
	Stress Ratio	Status	Location	Cbx	Cby	KxLx/Ry	KyLy/Rx		Stress Ratio	Status	Location
D Only	0.494	PASS	13.62 ft	1.37	1.66	156.05	156.05		0.001	PASS	0.00 ft
+D+L	0.710	PASS	13.62 ft	1.37	1.66	156.05	156.05		0.003	PASS	0.00 ft
+D+S	0.577	PASS	13.62 ft	1.37	1.66	156.05	156.05		0.001	PASS	0.00 ft
+D+0.750L	0.656	PASS	13.62 ft	1.37	1.66	156.05	156.05		0.002	PASS	0.00 ft
+D+0.750L+0.750S	0.719	PASS	13.62 ft	1.37	1.66	156.05	156.05		0.002	PASS	0.00 ft
+0.60D	0.296	PASS	13.62 ft	1.37	1.66	156.05	156.05		0.001	PASS	0.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction	X-X Axis Reaction		k	Y-Y Axis Reaction		Mx - End Moments		k-ft	My - End Moments	
	@ Base	@ Base	@ Top		@ Base	@ Top	@ Base	@ Top		@ Base	@ Top
D Only	28.022	0.011	0.011		-0.092	0.092					
+D+L	39.022	0.046	0.046		-0.184	0.184					
+D+S	33.022	0.011	0.011		-0.092	0.092					
+D+0.750L	36.272	0.037	0.037		-0.161	0.161					
+D+0.750L+0.750S	40.022	0.037	0.037		-0.161	0.161					
+0.60D	16.813	0.007	0.007		-0.055	0.055					
L Only	11.000	0.034	0.034		-0.092	0.092					

PRCTI20221698

Steel Column

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: New steel col grid D/7.3

Maximum Reactions

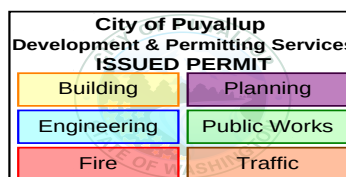
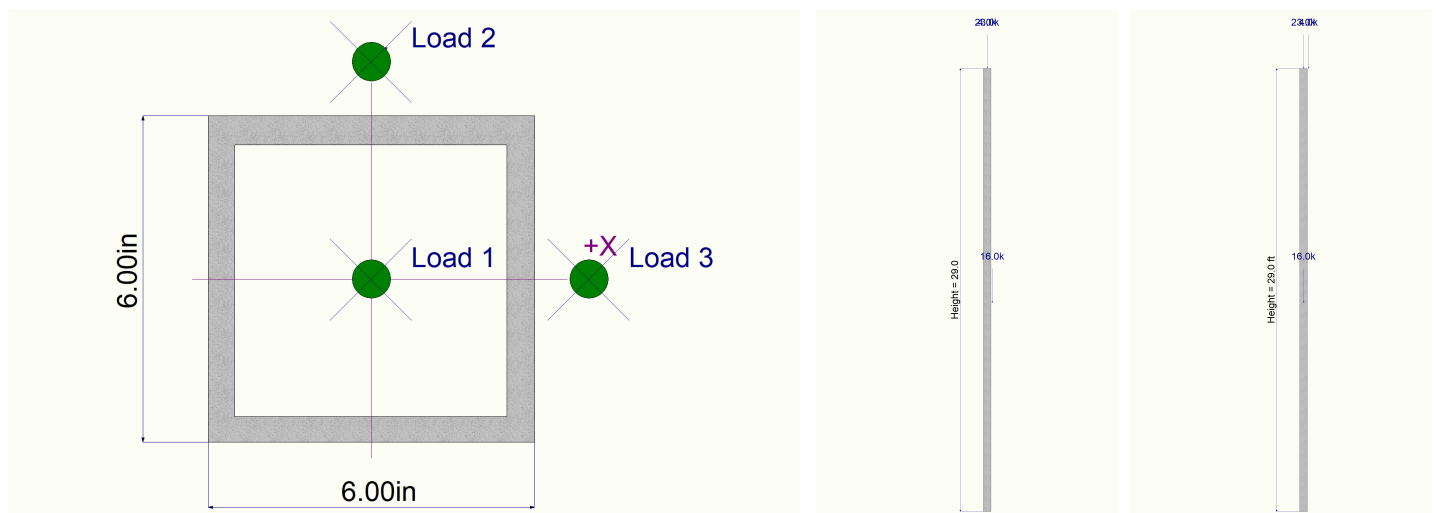
Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction @ Base @ Top	k	Y-Y Axis Reaction @ Base @ Top	Mx - End Moments @ Base @ Top	k-ft	My - End Moments @ Base @ Top
S Only	5.000						

Extreme Reactions

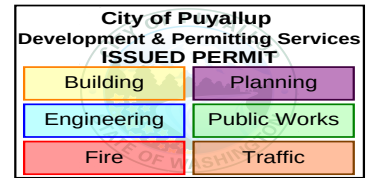
Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction @ Base @ Top	k	Y-Y Axis Reaction @ Base @ Top	Mx - End Moments @ Base @ Top	k-ft	My - End Moments @ Base @ Top
Axial @ Base	Maximum	40.022	0.037 0.037		-0.161 0.161			-1.083
"	Minimum	5.000						
Reaction, X-X Axis Base	Maximum	39.022	0.046 0.046		-0.184 0.184			-1.333
"	Minimum	5.000						
Reaction, Y-Y Axis Base	Maximum	5.000						
"	Minimum	39.022	0.046 0.046		-0.184 0.184			-1.333
Reaction, X-X Axis Top	Maximum	39.022	0.046 0.046		-0.184 0.184			-1.333
"	Minimum	5.000						
Reaction, Y-Y Axis Top	Maximum	28.022	0.011 0.011		-0.092 0.092			-0.333
"	Minimum	5.000						
Moment, X-X Axis Base	Maximum	28.022		0.011	-0.092 0.092			-0.333
"	Minimum	28.022		0.011	-0.092 0.092			-0.333
Moment, Y-Y Axis Base	Maximum	28.022	0.011 0.011		-0.092 0.092		-0.333	
"	Minimum	28.022	0.011 0.011		-0.092 0.092		-0.333	
Moment, X-X Axis Top	Maximum	28.022	0.011 0.011		-0.092 0.092			-0.333
"	Minimum	28.022	0.011 0.011		-0.092 0.092			-0.333
Moment, Y-Y Axis Top	Maximum	5.000						
"	Minimum	39.022	0.046 0.046		-0.184 0.184			-1.333

Sketches



PRCTI20221698

Project Title: **CHC Puyallup**
 Engineer: **LMC**
 Project ID:
 Project Descr:



Steel Column

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: New col (steel) at grids 6.7/C.7

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
 Load Combinations Used : IBC 2018

General Information

Steel Section Name : HSS4x4x5/16	Overall Column Height	13.670 ft
Analysis Method : Allowable Strength	Top & Bottom Fixity	Top & Bottom Pinned
Steel Stress Grade	Brace condition for deflection (buckling) along columns :	
Fy : Steel Yield 46.0 ksi	X-X (width) axis :	
E : Elastic Bending Modulus 29,000.0 ksi	Unbraced Length for buckling ABOUT Y-Y Axis = 13.670 ft, K = 1.0	
	Y-Y (depth) axis :	
	Unbraced Length for buckling ABOUT X-X Axis = 13.670 ft, K = 1.0	

Applied Loads

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

Column self weight included : 202.726 lbs * Dead Load Factor

AXIAL LOADS . . .

Stair landing and stair: Axial Load at 13.670 ft, Xecc = 2.0 in, D = 7.50, L = 7.40 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =	0.4743 : 1	Maximum Load Reactions . .	
Load Combination	+D+L	Top along X-X	0.1817 k
Location of max.above base	13.670 ft	Bottom along X-X	0.1817 k
At maximum location values are . . .		Top along Y-Y	0.0 k
Pa : Axial	15.103 k	Bottom along Y-Y	0.0 k
Pn / Omega : Allowable	49.972 k	Maximum Load Deflections . . .	
Ma-x : Applied	0.0 k-ft	Along Y-Y	0.0 in at 0.0ft above base
Mn-x / Omega : Allowable	12.831 k-ft	for load combination :	
Ma-y : Applied	-2.483 k-ft	Along X-X	-0.1958 in at 7.982ft above base
Mn-y / Omega : Allowable	12.831 k-ft	for load combination : +D+L	
PASS Maximum Shear Stress Ratio	0.006040 : 1		
Load Combination	+D+L		
Location of max.above base	0.0 ft		
At maximum location values are . . .			
Va : Applied	0.1817 k		
Vn / Omega : Allowable	30.078 k		

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios				Maximum Shear Ratios					
	Stress Ratio	Status	Location	Cbx	Cby	KxLx/Ry	KyLy/Rx	Stress Ratio	Status	Location
D Only	0.174	PASS	13.67 ft	1.00	1.66	110.09	110.09	0.003	PASS	0.00 ft
+D+L	0.474	PASS	13.67 ft	1.00	1.66	110.09	110.09	0.006	PASS	0.00 ft
+D+0.750L	0.416	PASS	13.67 ft	1.00	1.66	110.09	110.09	0.005	PASS	0.00 ft
+0.60D	0.105	PASS	13.67 ft	1.00	1.66	110.09	110.09	0.002	PASS	0.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction		X-X Axis Reaction		k	Y-Y Axis Reaction		Mx - End Moments		My - End Moments	
	@ Base		@ Base	@ Top		@ Base	@ Top	@ Base	@ Top	@ Base	@ Top
D Only	7.703		0.091	0.091							
+D+L	15.103		0.182	0.182							
+D+0.750L	13.253		0.159	0.159							
+0.60D	4.622		0.055	0.055							
L Only	7.400		0.090	0.090							

Extreme Reactions

Item	Extreme Value	Axial Reaction		X-X Axis Reaction		k	Y-Y Axis Reaction		Mx - End Moments		My - End Moments	
		@ Base		@ Base	@ Top		@ Base	@ Top	@ Base	@ Top	@ Base	@ Top
Axial @ Base	Maximum	15.103		0.182	0.182							-2.483
"	Minimum	4.622		0.055	0.055							-0.750

PRCTI20221698

Steel Column

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

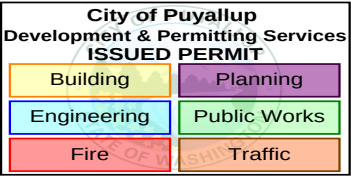
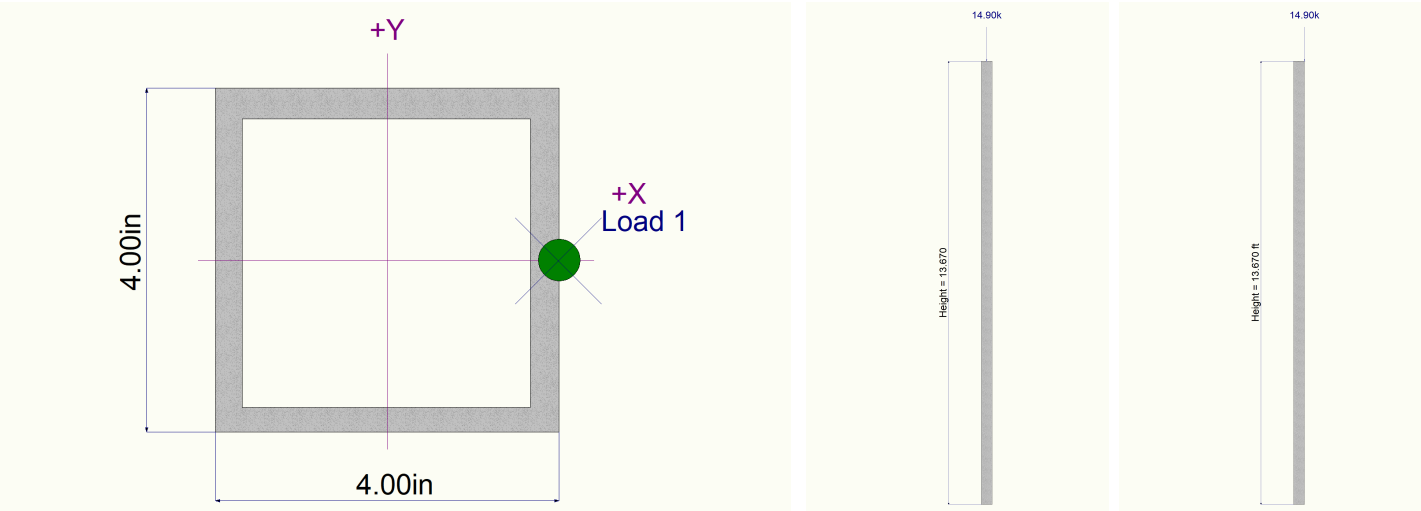
(c) ENERCALC INC 1983-2022

DESCRIPTION: New col (steel) at grids 6.7/C.7

Extreme Reactions

Item	Extreme Value	Axial Reaction	X-X Axis Reaction		k	Y-Y Axis Reaction		Mx - End Moments		k-ft	My - End Moments	
		@ Base	@ Base	@ Top		@ Base	@ Top	@ Base	@ Top		@ Base	@ Top
Reaction, X-X Axis Base	Maximum	15.103	0.182	0.182								-2.483
"	Minimum	4.622	0.055	0.055								-0.750
Reaction, Y-Y Axis Base	Maximum	7.703	0.091	0.091								-1.250
"	Minimum	7.703	0.091	0.091								-1.250
Reaction, X-X Axis Top	Maximum	15.103	0.182	0.182								-2.483
"	Minimum	4.622	0.055	0.055								-0.750
Reaction, Y-Y Axis Top	Maximum	7.400	0.090	0.090								-1.233
"	Minimum	7.703	0.091	0.091								-1.250
Moment, X-X Axis Base	Maximum	7.703		0.091								-1.250
"	Minimum	7.703		0.091								-1.250
Moment, Y-Y Axis Base	Maximum	7.703	0.091	0.091				-1.250				
"	Minimum	7.703	0.091	0.091				-1.250				
Moment, X-X Axis Top	Maximum	7.703	0.091	0.091								-1.250
"	Minimum	7.703	0.091	0.091								-1.250
Moment, Y-Y Axis Top	Maximum	4.622	0.055	0.055								-0.750
"	Minimum	15.103	0.182	0.182								-2.483

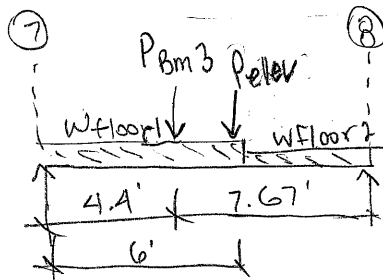
Sketches



PRCTI20221698

(E) bm 1

- With Bm 3 pt load added
- @ grid (C)



$$W_{floor 1} = \frac{31.67'}{2} \times (.025 \text{ KSF DL})$$

$$+ \frac{16.25'}{2} \times (.065 \text{ KSF LL}) - (\text{lobby})$$

$$+ \frac{15.5'}{2} \times (.1 \text{ KSF LL}) - (\text{elevator})$$

$$= .396 \text{ K/1 DL} + 1.6 \text{ K/1 LL}$$

$$P_{bm 3} = 2 \text{ K DL} + 2.2 \text{ K LL}$$

$$P_{elevator} = 0.09 \text{ K DL} + .5 \text{ K LL (bm @ elevator North edge)}$$

$$W_{floor 2} = \frac{16.25'}{2} \times (.025 \text{ KSF DL} + .065 \text{ KSF LL})$$

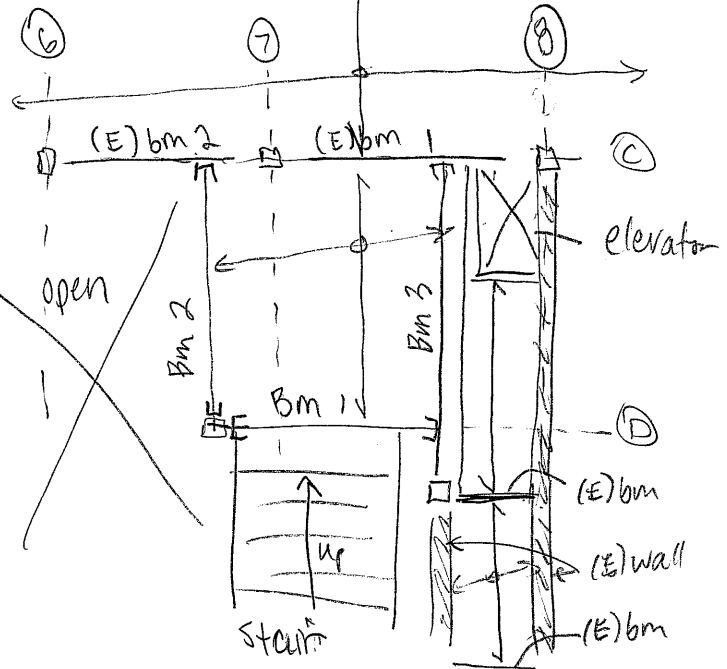
$$+ .015 \times 12' \text{ wall}$$

$$= .38 \text{ K/1 DL} + .53 \text{ K/1 LL}$$

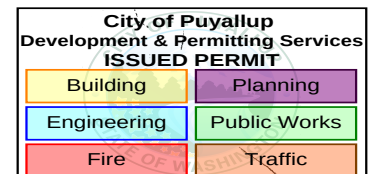
(E) (5) 2" x 9 1/2" bm 2x overstressed in bending

∴ i.e. Add new col. @ North elevator corner

2nd Floor Framing Plan:



PLAN ← North



Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Existing bm grid C with new stair landing WF bm load

CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : IBC 2018

Wood Species : Douglas Fir-Larch

Wood Grade : No.2

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb + 900.0 psi

Fb - 900.0 psi

Fc - Prll 1,350.0 psi

Fc - Perp 625.0 psi

Fv 180.0 psi

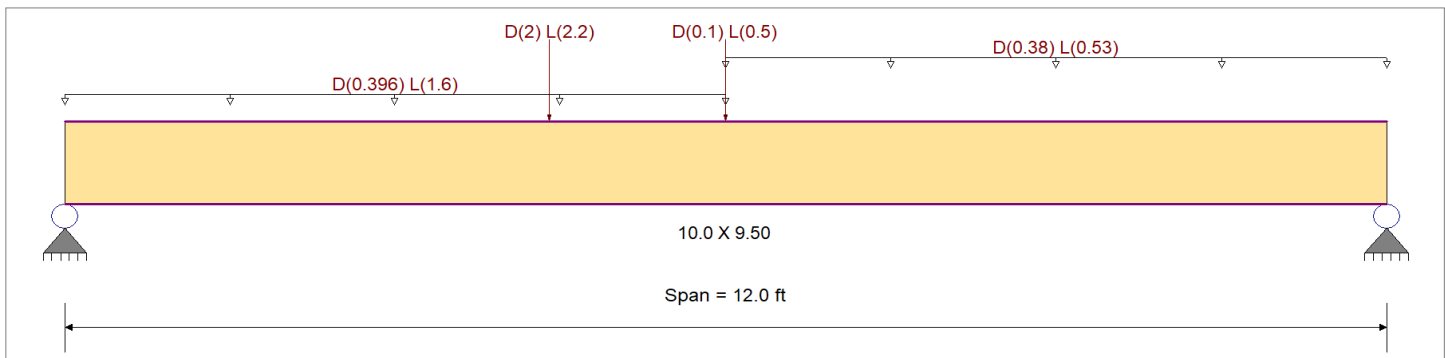
Ft 575.0 psi

E : Modulus of Elasticity

Ebend- xx 1,600.0ksi

Eminbend - xx 580.0ksi

Density 31.210pcf



Applied Loads

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

Beam self weight calculated and added to loading

Load for Span Number 1

Uniform Load : D = 0.3960, L = 1.60 k/ft, Extent = 0.0 --> 6.0 ft, Tributary Width = 1.0 ft, (Wfloor)

Uniform Load : D = 0.380, L = 0.530 k/ft, Extent = 6.0 --> 12.0 ft, Tributary Width = 1.0 ft, (Wfloor2)

Point Load : D = 0.10, L = 0.50 k @ 6.0 ft, (Pelevator)

Point Load : D = 2.0, L = 2.20 k @ 4.40 ft, (Pbm3)

(E) bm overstressed, therefore
add new col below

DESIGN SUMMARY

Maximum Bending Stress Ratio			=	3.511	1	Maximum Shear Stress Ratio			=	1.039	1
Section used for this span				10.0 X 9.50		Section used for this span				10.0 X 9.50	
fb: Actual			=	3,159.63psi		fv: Actual			=	186.96 psi	
Fb: Allowable			=	900.00psi		Fv: Allowable			=	180.00 psi	
Load Combination				+D+L		Load Combination				+D+L	
Location of maximum on span			=	4.599ft		Location of maximum on span			=	0.000 ft	
Span # where maximum occurs			=	Span # 1		Span # where maximum occurs			=	Span # 1	
Maximum Deflection											
Max Downward Transient Deflection				0.575 in	Ratio =	250	<360	Span: 1 : L Only			
Max Upward Transient Deflection				0 in	Ratio =	0	<360	n/a			
Max Downward Total Deflection				0.847 in	Ratio =	169	<240	Span: 1 : +D+L			
Max Upward Total Deflection				0 in	Ratio =	0	<240	n/a			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v
D Only													0.00	0.00	0.00	0.00
Length = 12.0 ft	1	1.246	0.338	0.90	1.000	1.00	1.00	1.00	1.00	1.00	12.65	1,009.36	810.00	3.46	54.69	162.00
+D+L					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	3.511	1.039	1.00	1.000	1.00	1.00	1.00	1.00	1.00	39.61	3,159.63	900.00	11.84	186.96	180.00
+D+0.750L					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	2.331	0.684	1.25	1.000	1.00	1.00	1.00	1.00	1.00	32.86	2,621.85	1125.00	9.75	153.89	225.00
+0.60D					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1	0.421	0.114	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.59	605.62	1440.00	2.08	32.81	288.00

PRCTI20221698

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25 PCS STRUCTURAL SOLUTIONS (c) ENERCALC INC 1983-2022

DESCRIPTION: Existing bm grid C with new stair landing WF bm load

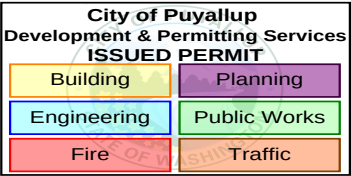
Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.8472	5.781		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

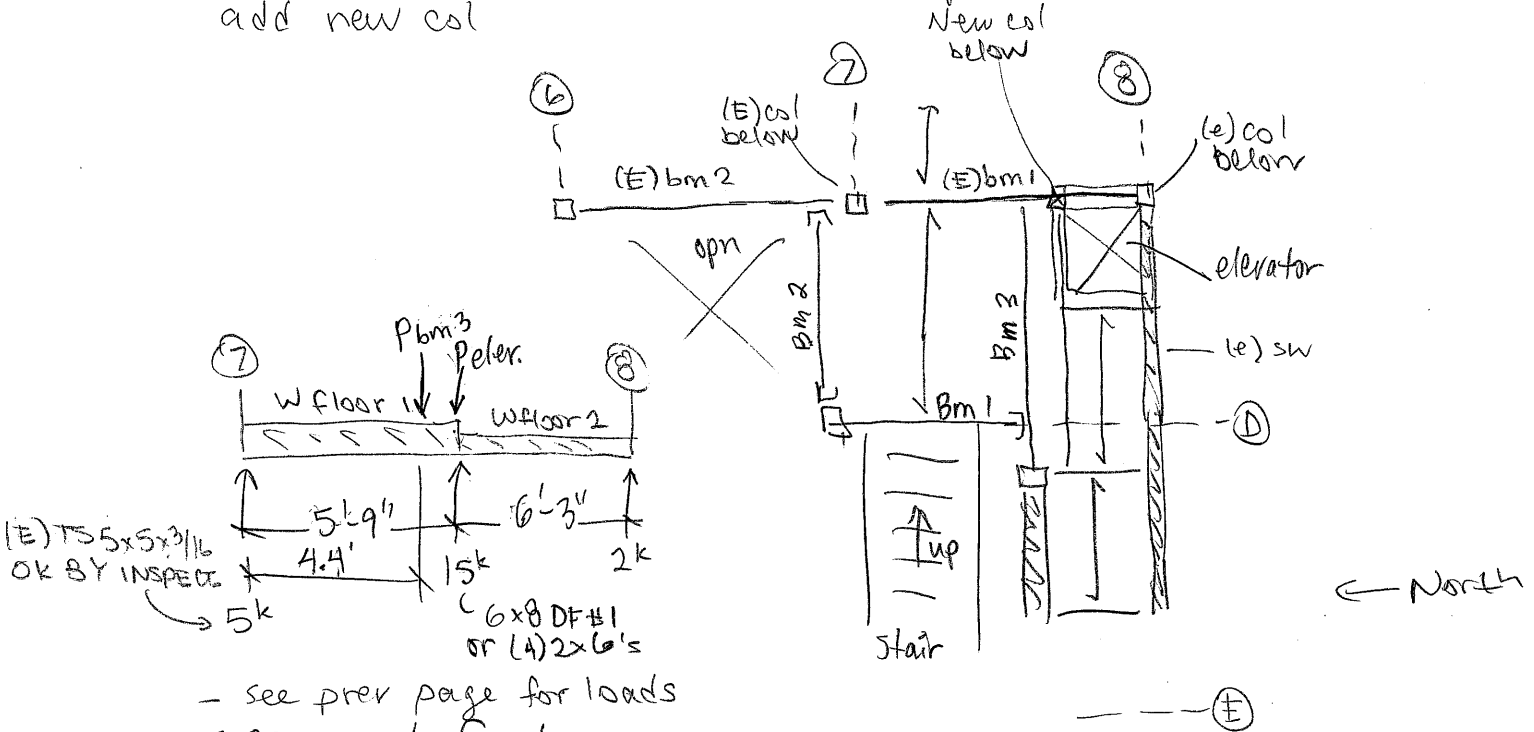
Load Combination	Support 1	Support 2
Overall MAXimum	13.431	9.053
Overall MINimum	9.638	5.842
D Only	3.792	3.211
+D+L	13.431	9.053
+D+0.750L	11.021	7.592
+0.60D	2.275	1.927
L Only	9.638	5.842



(e)bm 1 continued

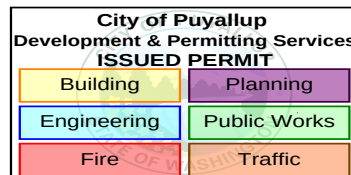
add new col

2nd Floor Framing Plan:



- see prev page for loads
- see excel for bm
- Scale'd as if $(1\frac{1}{2}) \times 5 = \text{width}$
- though appears to be $(2) \times 5$ width
- Bm ok

∴ (E)bm w/ new post add @ elev North corner - ok



Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Existing bm grid C with new stair landing WF bm load - new col added

CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : IBC 2018

Wood Species : Douglas Fir-Larch

Wood Grade : No.2

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

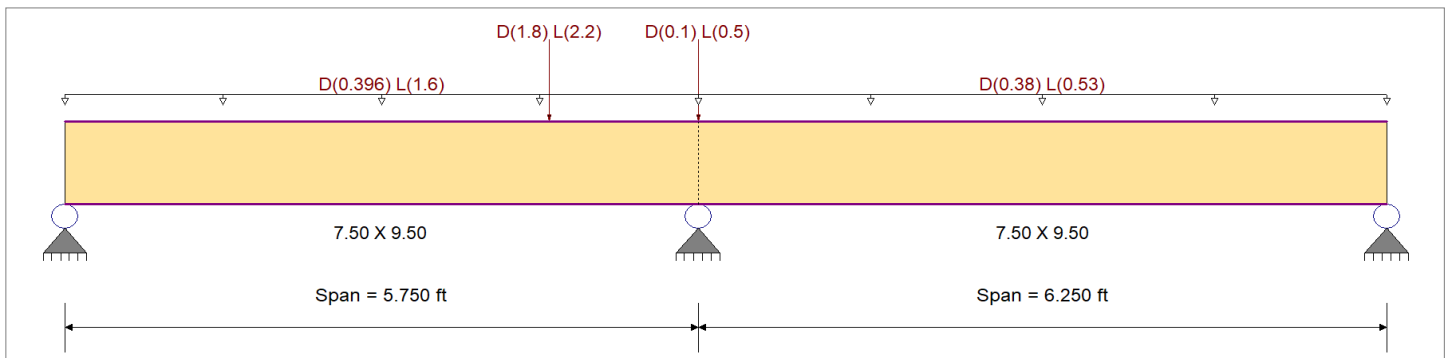
Fb + 900.0 psi
 Fb - 900.0 psi
 Fc - Prll 1,350.0 psi
 Fc - Perp 625.0 psi
 Fv 180.0 psi
 Ft 575.0 psi

E : Modulus of Elasticity

Ebend- xx 1,600.0ksi

Eminbend - xx 580.0ksi

Density 31.210pcf



Applied Loads

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

Beam self weight calculated and added to loading

Load for Span Number 1

Uniform Load : D = 0.3960, L = 1.60 , Tributary Width = 1.0 ft, (Wfloor1)

Point Load : D = 0.10, L = 0.50 k @ 5.750 ft, (Pelevator)

Point Load : D = 1.80, L = 2.20 k @ 4.40 ft, (Pbm3)

Load for Span Number 2

Uniform Load : D = 0.380, L = 0.530 , Tributary Width = 1.0 ft, (wfloor2)

DESIGN SUMMARY

Design N.G.

Maximum Bending Stress Ratio	=	0.955	1	Maximum Shear Stress Ratio	=	1.017	: 1
Section used for this span		7.50 X 9.50		Section used for this span		7.50 X 9.50	
fb: Actual	=	859.94psi		fv: Actual	=	183.14 psi	
Fb: Allowable	=	900.00psi		Fv: Allowable	=	180.00 psi	
Load Combination		+D+L		Load Combination		+D+L	
Location of maximum on span	=	5.750ft		Location of maximum on span	=	4.979 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection	0.035 in	Ratio =	1972	>=360	Span: 1 : L Only		
Max Upward Transient Deflection	-0.009 in	Ratio =	8623	>=360	Span: 2 : L Only		
Max Downward Total Deflection	0.045 in	Ratio =	1519	>=240	Span: 2 : D Only		
Max Upward Total Deflection	-0.009 in	Ratio =	8495	>=240	Span: 2 : +D+L		

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L		M	fb	F'b	V	fv	F'v
+D+L																	
Length = 5.750 ft	1	0.955	1.017	1.00	1.000	1.00	1.00	1.00	1.00	1.00		8.08	859.94	900.00	8.70	183.14	180.00
Length = 6.250 ft	2	0.955	1.017	1.00	1.000	1.00	1.00	1.00	1.00	1.00		8.08	859.94	900.00	3.47	183.14	180.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0454	2.763		0.0000	0.000
D Only	2	0.0036	4.050	+D+L	-0.0088	1.362

PRCTI20221698

Wood Beam

Project File: CHC Puyallup calcs.ec6

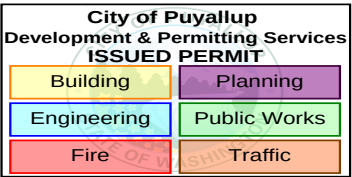
LIC# : KW-06014122, Build:20.22.7.25 PCS STRUCTURAL SOLUTIONS (c) ENERCALC INC 1983-2022

DESCRIPTION: Existing bm grid C with new stair landing WF bm load - new col added

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	5.316	15.035	1.599
Overall MINimum	4.164	10.269	0.780
+D+L	5.316	15.035	1.599
D Only	1.152	4.767	0.819
L Only	4.164	10.269	0.780



PRCTI20221698

FND

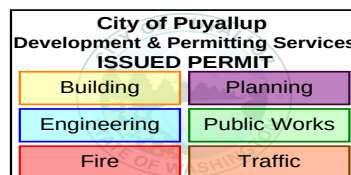
Bott New central stair

stair load:

Total stair area = 208 SF

$$\begin{aligned} \text{Half stair load to ground} &= \frac{208}{2} = 104 \text{ SF} \times \left(\overset{\text{PSF}}{135 \text{ DL}} + \overset{\text{PSF}}{100 \text{ LL}} \right) \\ &= \frac{24.4^k}{2 \text{ stringers}} = 12.2^k \text{ EA} \end{aligned}$$

$$q = \frac{12.2}{3 \times 3} = 1358 \text{ PSF} < 1500 \text{ PSF} \checkmark$$



HSS base PL's

@ HSS 6x6

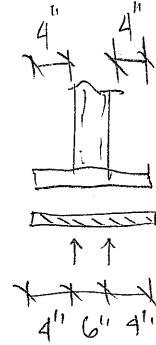
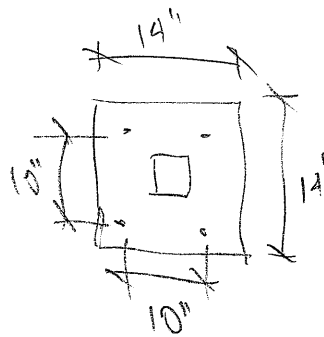
max End capacity = 47 k

$$W = \frac{47k}{(14'')^2} = .24 \text{ ksi}$$

cantil. $M = .24 \text{ ksi} \times (4'')^2 / 2 = 1.92 \text{ k''/''}$

cont. $M = .24 \text{ ksi} \times (6'')^2 / 10 = .86 \text{ k''/''}$

$$t = \sqrt{\frac{6M}{27}} = \sqrt{\frac{1.92 \times 6}{27}} = .65'' \leftarrow \boxed{3/4'' \text{ PL}}$$



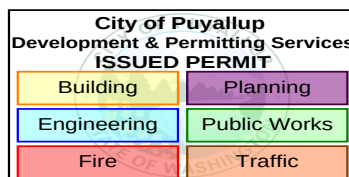
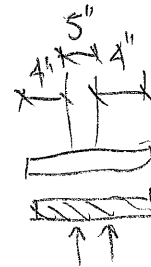
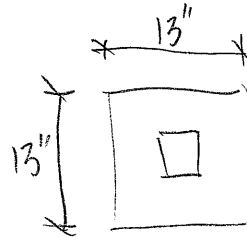
@ HSS 5x5

max End capacity = 33 k

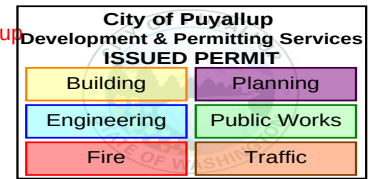
$$W = \frac{33}{(13'')^2} = .195 \text{ ksi}$$

$$M = W \times (4'')^2 / 2 = 1.56 \text{ k''/''}$$

$$t = \sqrt{\frac{6 \times 1.56}{27}} = .59'' \leftarrow \boxed{5/8'' \text{ PL}}$$



Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:



File: CHC Puyallup calcs.ec6
 Software copyright ENERCALC, INC. 1983-2020, Build:12.20.8.24
 PCS STRUCTURAL SOLUTIONS

General Footing

Lic. #: KW-06002327

DESCRIPTION: F4.0 foundation

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16

Load Combinations Used : IBC 2018

General Information

Material Properties

f'_c : Concrete 28 day strength	=	3.0	ksi
f_y : Rebar Yield	=	60.0	ksi
E_c : Concrete Elastic Modulus	=	3,155.92	ksi
Concrete Density	=	145.0	pcf
ϕ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

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

Soil Design Values

Allowable Soil Bearing	=	1.50	ksf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	250.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=	0.920	ft
Allow press. increase per foot of depth when footing base is below	=		ksf

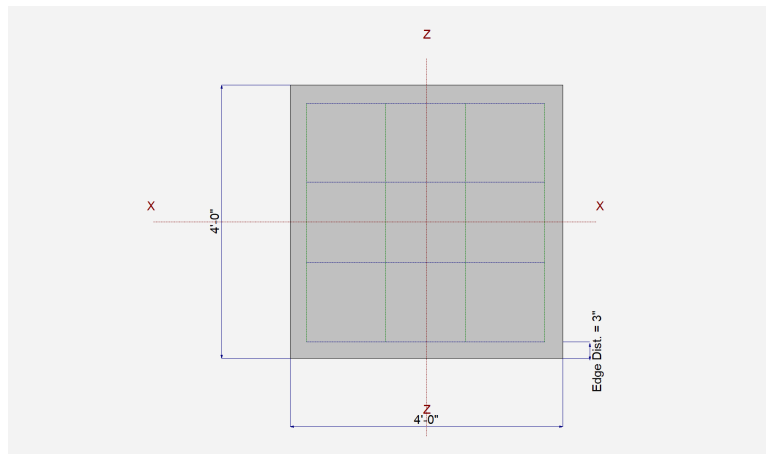
Increases based on footing plan dimension

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

Dimensions

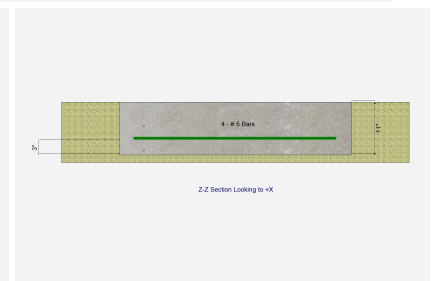
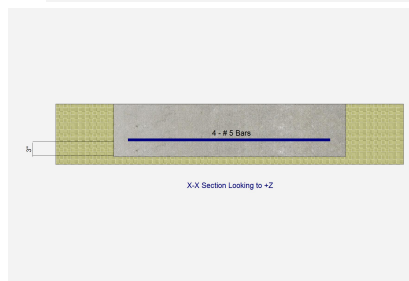
Width parallel to X-X Axis	=	4.0	ft
Length parallel to Z-Z Axis	=	4.0	ft
Footing Thickness	=	11.0	in

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



Reinforcing

Bars parallel to X-X Axis	=		
Number of Bars	=	4.0	
Reinforcing Bar Size	=	# 5	
Bars parallel to Z-Z Axis	=		
Number of Bars	=	4.0	
Reinforcing Bar Size	=	# 5	
Bandwidth Distribution Check (ACI 15.4.4.2)			
Direction Requiring Closer Separation			n/a
# Bars required within zone			n/a
# Bars required on each side of zone			n/a

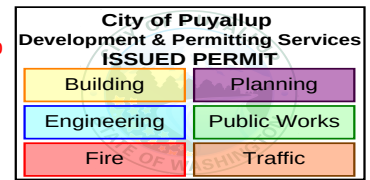


Applied Loads

	D	Lr	L	S	W	E	H
P : Column Load	=	21.0					k
OB : Overburden	=						ksf
M-xx	=						k-ft
M-zz	=						k-ft
V-x	=						k
V-z	=						k

PRCTI20221698

Project Title: **CHC Puyallup**
 Engineer: **LMC**
 Project ID:
 Project Descr:



General Footing

File: CHC Puyallup calcs.ec6
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PCS STRUCTURAL SOLUTIONS

Lic. # : KW-06002327

DESCRIPTION: **F4.0 foundation**

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9640	Soil Bearing	1.446 ksf	1.50 ksf	D Only about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.3423	Z Flexure (+X)	3.675 k-ft/ft	10.736 k-ft/ft	+1.40D
PASS	0.3423	Z Flexure (-X)	3.675 k-ft/ft	10.736 k-ft/ft	+1.40D
PASS	0.3423	X Flexure (+Z)	3.675 k-ft/ft	10.736 k-ft/ft	+1.40D
PASS	0.3423	X Flexure (-Z)	3.675 k-ft/ft	10.736 k-ft/ft	+1.40D
PASS	0.3075	1-way Shear (+X)	25.266 psi	82.158 psi	+1.40D
PASS	0.3075	1-way Shear (-X)	25.266 psi	82.158 psi	+1.40D
PASS	0.3075	1-way Shear (+Z)	25.266 psi	82.158 psi	+1.40D
PASS	0.3075	1-way Shear (-Z)	25.266 psi	82.158 psi	+1.40D
PASS	0.6810	2-way Punching	111.904 psi	164.317 psi	+1.40D

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc		Zecc		Actual Soil Bearing Stress @ Location				Actual / Allow Ratio
			(in)			Bottom, -Z	Top, +Z	Left, -X	Right, +X	
X-X, D Only	1.50	n/a	0.0	1.446	1.446	n/a	n/a	n/a	n/a	0.964
X-X, +0.60D	1.50	n/a	0.0	0.8675	0.8675	n/a	n/a	n/a	n/a	0.578
Z-Z, D Only	1.50	0.0	n/a	n/a	n/a	1.446	1.446	0.8675	0.8675	0.964
Z-Z, +0.60D	1.50	0.0	n/a	n/a	n/a	0.8675	0.8675	0.8675	0.8675	0.578

Overturning Stability

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

Sliding Stability

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

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	3.675	+Z	Bottom	0.2376	Min Temp %	0.310	10.736	OK
X-X, +1.40D	3.675	-Z	Bottom	0.2376	Min Temp %	0.310	10.736	OK
X-X, +1.20D	3.150	+Z	Bottom	0.2376	Min Temp %	0.310	10.736	OK
X-X, +1.20D	3.150	-Z	Bottom	0.2376	Min Temp %	0.310	10.736	OK
X-X, +0.90D	2.363	+Z	Bottom	0.2376	Min Temp %	0.310	10.736	OK
X-X, +0.90D	2.363	-Z	Bottom	0.2376	Min Temp %	0.310	10.736	OK
Z-Z, +1.40D	3.675	-X	Bottom	0.2376	Min Temp %	0.310	10.736	OK
Z-Z, +1.40D	3.675	+X	Bottom	0.2376	Min Temp %	0.310	10.736	OK
Z-Z, +1.20D	3.150	-X	Bottom	0.2376	Min Temp %	0.310	10.736	OK
Z-Z, +1.20D	3.150	+X	Bottom	0.2376	Min Temp %	0.310	10.736	OK
Z-Z, +0.90D	2.363	-X	Bottom	0.2376	Min Temp %	0.310	10.736	OK
Z-Z, +0.90D	2.363	+X	Bottom	0.2376	Min Temp %	0.310	10.736	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	25.27 psi	25.27 psi	25.27 psi	25.27 psi	25.27 psi	82.16 psi	0.31	OK
+1.20D	21.66 psi	21.66 psi	21.66 psi	21.66 psi	21.66 psi	82.16 psi	0.26	OK
+0.90D	16.24 psi	16.24 psi	16.24 psi	16.24 psi	16.24 psi	82.16 psi	0.20	OK

PRCTI20221698

Project Title: CHC Puyallup
Engineer: LMC
Project ID:
Project Descr:

General Footing

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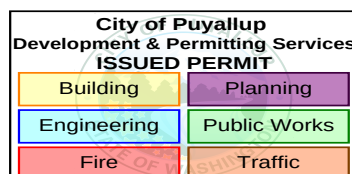
Lic. # : KW-06002327

DESCRIPTION: F4.0 foundation

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	111.90 psi	164.32psi	0.681	OK
+1.20D	95.92 psi	164.32psi	0.5837	OK
+0.90D	71.94 psi	164.32psi	0.4378	OK



PRCTI20221698

Project Title: **CHC Puyallup**
 Engineer: **LMC**
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services	
ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

General Footing

Lic. #: KW-06002327

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DESCRIPTION: **F5.0 foundation**

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16

Load Combinations Used : IBC 2018

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,155.92	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Soil Design Values

Allowable Soil Bearing	=	1.50	ksf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	250.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Analysis Settings

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

Increases based on footing Depth

Footing base depth below soil surface	=	1.0	ft
Allow press. increase per foot of depth when footing base is below	=		ksf

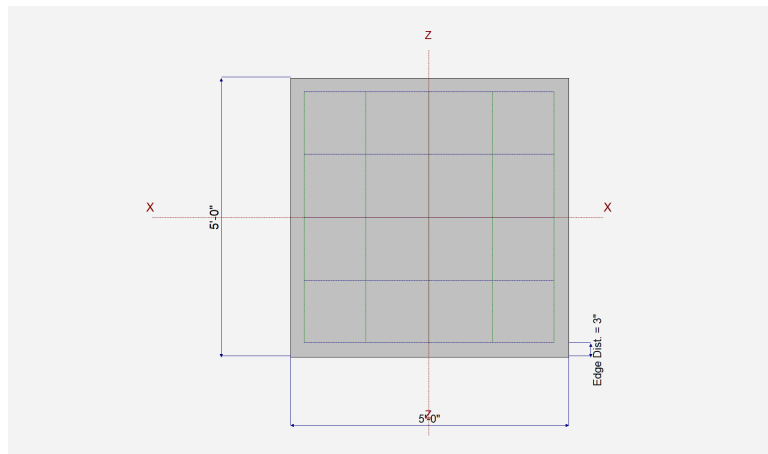
Increases based on footing plan dimension

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

Dimensions

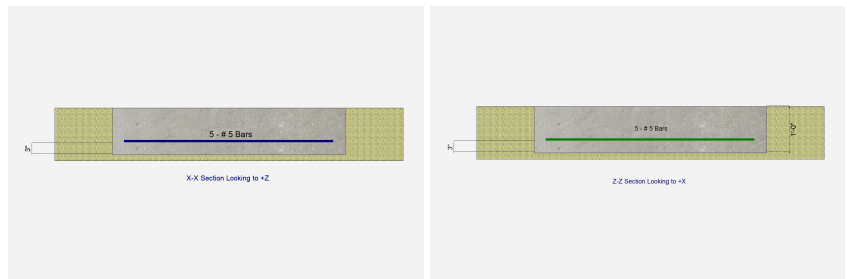
Width parallel to X-X Axis	=	5	ft
Length parallel to Z-Z Axis	=	5.0	ft
Footing Thickness	=	12.0	in

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



Reinforcing

Bars parallel to X-X Axis	=		
Number of Bars	=	5	
Reinforcing Bar Size	=	#	5
Bars parallel to Z-Z Axis	=		
Number of Bars	=	5	
Reinforcing Bar Size	=	#	5
Bandwidth Distribution Check (ACI 15.4.4.2)			
Direction Requiring Closer Separation			
# Bars required within zone		n/a	
# Bars required on each side of zone		n/a	

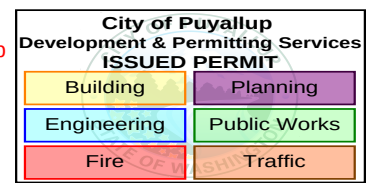


Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	33.0							k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

PRCTI20221698

Project Title: **CHC Puyallup**
 Engineer: **LMC**
 Project ID:
 Project Descr:



General Footing

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Lic. # : KW-06002327

DESCRIPTION: **F5.0 foundation**

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9767	Soil Bearing	1.465 ksf	1.50 ksf	D Only about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.4761	Z Flexure (+X)	5.775 k-ft/ft	12.131 k-ft/ft	+1.40D
PASS	0.4761	Z Flexure (-X)	5.775 k-ft/ft	12.131 k-ft/ft	+1.40D
PASS	0.4761	X Flexure (+Z)	5.775 k-ft/ft	12.131 k-ft/ft	+1.40D
PASS	0.4761	X Flexure (-Z)	5.775 k-ft/ft	12.131 k-ft/ft	+1.40D
PASS	0.3645	1-way Shear (+X)	29.944 psi	82.158 psi	+1.40D
PASS	0.3645	1-way Shear (-X)	29.944 psi	82.158 psi	+1.40D
PASS	0.3645	1-way Shear (+Z)	29.944 psi	82.158 psi	+1.40D
PASS	0.3645	1-way Shear (-Z)	29.944 psi	82.158 psi	+1.40D
PASS	0.8483	2-way Punching	139.384 psi	164.317 psi	+1.40D

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc	Actual Soil Bearing Stress @ Location				Actual / Allow Ratio
			(in)	Bottom, -Z	Top, +Z	Left, -X	Right, +X	
X-X, D Only	1.50	n/a	0.0	1.465	1.465	n/a	n/a	0.977
X-X, +0.60D	1.50	n/a	0.0	0.8790	0.8790	n/a	n/a	0.586
Z-Z, D Only	1.50	0.0	n/a	n/a	n/a	1.465	1.465	0.977
Z-Z, +0.60D	1.50	0.0	n/a	n/a	n/a	0.8790	0.8790	0.586

Overturning Stability

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

Sliding Stability

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

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	5.775	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.40D	5.775	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D	4.950	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +1.20D	4.950	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +0.90D	3.713	+Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
X-X, +0.90D	3.713	-Z	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.40D	5.775	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.40D	5.775	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D	4.950	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +1.20D	4.950	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +0.90D	3.713	-X	Bottom	0.2592	Min Temp %	0.310	12.131	OK
Z-Z, +0.90D	3.713	+X	Bottom	0.2592	Min Temp %	0.310	12.131	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	29.94 psi	29.94 psi	29.94 psi	29.94 psi	29.94 psi	82.16 psi	0.36	OK
+1.20D	25.67 psi	25.67 psi	25.67 psi	25.67 psi	25.67 psi	82.16 psi	0.31	OK
+0.90D	19.25 psi	19.25 psi	19.25 psi	19.25 psi	19.25 psi	82.16 psi	0.23	OK

PRCTI20221698

Project Title: CHC Puyallup
Engineer: LMC
Project ID:
Project Descr:

General Footing

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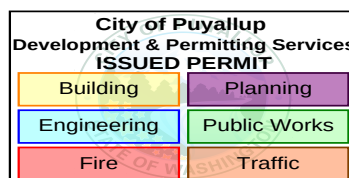
Lic. # : KW-06002327

DESCRIPTION: F5.0 foundation

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	139.38 psi	164.32psi	0.8483	OK
+1.20D	119.47 psi	164.32psi	0.7271	OK
+0.90D	89.60 psi	164.32psi	0.5453	OK



PRCTI20221698

General Footing

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 PCS STRUCTURAL SOLUTIONS

Lic. #: KW-06002327

DESCRIPTION: **F6.0 foundation**

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16

Load Combinations Used : IBC 2018

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,155.92	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Soil Design Values

Allowable Soil Bearing	=	1.50	ksf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	250.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Analysis Settings

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

Increases based on footing Depth

Footing base depth below soil surface	=	1.170	ft
Allow press. increase per foot of depth when footing base is below	=		ksf

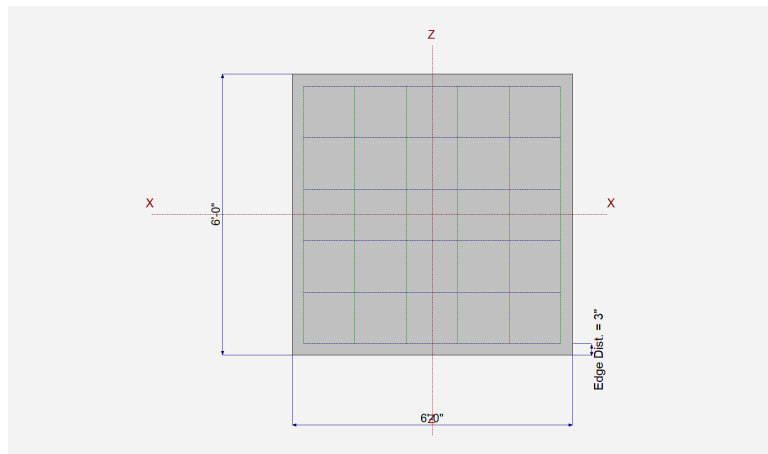
Increases based on footing plan dimension

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

Dimensions

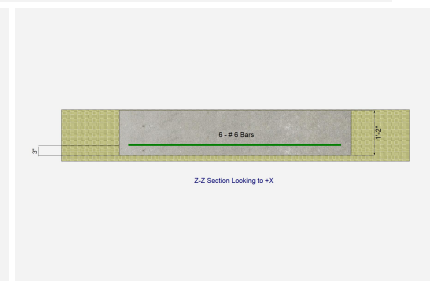
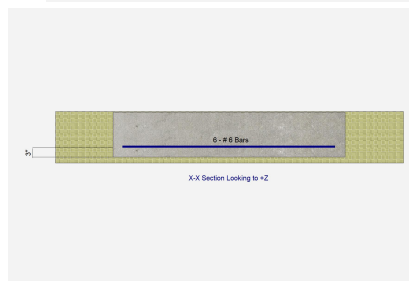
Width parallel to X-X Axis	=	6	ft
Length parallel to Z-Z Axis	=	6.0	ft
Footing Thickness	=	14.0	in

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



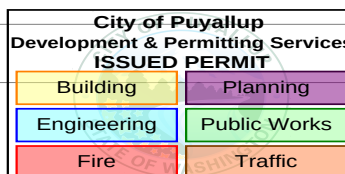
Reinforcing

Bars parallel to X-X Axis	=		
Number of Bars	=	6	
Reinforcing Bar Size	=	#	6
Bars parallel to Z-Z Axis	=		
Number of Bars	=	6	
Reinforcing Bar Size	=	#	6
Bandwidth Distribution Check (ACI 15.4.4.2)			
Direction Requiring Closer Separation			
# Bars required within zone		n/a	
# Bars required on each side of zone		n/a	



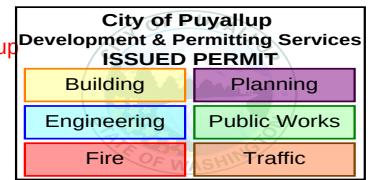
Applied Loads

	D	Lr	L	S	W	E	H
P : Column Load	=	47.0					k
OB : Overburden	=						ksf
M-xx	=						k-ft
M-zz	=						k-ft
V-x	=						k
V-z	=						k



PRCTI20221698

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:



General Footing

File: CHC Puyallup calcs.ec6
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 PCS STRUCTURAL SOLUTIONS

Lic. # : KW-06002327

DESCRIPTION: F6.0 foundation

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9833	Soil Bearing	1.475 ksf	1.50 ksf	D Only about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.3931	Z Flexure (+X)	8.225 k-ft/ft	20.926 k-ft/ft	+1.40D
PASS	0.3931	Z Flexure (-X)	8.225 k-ft/ft	20.926 k-ft/ft	+1.40D
PASS	0.3931	X Flexure (+Z)	8.225 k-ft/ft	20.926 k-ft/ft	+1.40D
PASS	0.3931	X Flexure (-Z)	8.225 k-ft/ft	20.926 k-ft/ft	+1.40D
PASS	0.3539	1-way Shear (+X)	29.078 psi	82.158 psi	+1.40D
PASS	0.3539	1-way Shear (-X)	29.078 psi	82.158 psi	+1.40D
PASS	0.3539	1-way Shear (+Z)	29.078 psi	82.158 psi	+1.40D
PASS	0.3539	1-way Shear (-Z)	29.078 psi	82.158 psi	+1.40D
PASS	0.8062	2-way Punching	132.470 psi	164.317 psi	+1.40D

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc	Actual Soil Bearing Stress @ Location				Actual / Allow Ratio
			(in)	Bottom, -Z	Top, +Z	Left, -X	Right, +X	
X-X, D Only	1.50	n/a	0.0	1.475	1.475	n/a	n/a	0.983
X-X, +0.60D	1.50	n/a	0.0	0.8851	0.8851	n/a	n/a	0.590
Z-Z, D Only	1.50	0.0	n/a	n/a	n/a	1.475	1.475	0.983
Z-Z, +0.60D	1.50	0.0	n/a	n/a	n/a	0.8851	0.8851	0.590

Overturning Stability

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

Sliding Stability

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

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	8.225	+Z	Bottom	0.3024	Min Temp %	0.440	20.926	OK
X-X, +1.40D	8.225	-Z	Bottom	0.3024	Min Temp %	0.440	20.926	OK
X-X, +1.20D	7.050	+Z	Bottom	0.3024	Min Temp %	0.440	20.926	OK
X-X, +1.20D	7.050	-Z	Bottom	0.3024	Min Temp %	0.440	20.926	OK
X-X, +0.90D	5.288	+Z	Bottom	0.3024	Min Temp %	0.440	20.926	OK
X-X, +0.90D	5.288	-Z	Bottom	0.3024	Min Temp %	0.440	20.926	OK
Z-Z, +1.40D	8.225	-X	Bottom	0.3024	Min Temp %	0.440	20.926	OK
Z-Z, +1.40D	8.225	+X	Bottom	0.3024	Min Temp %	0.440	20.926	OK
Z-Z, +1.20D	7.050	-X	Bottom	0.3024	Min Temp %	0.440	20.926	OK
Z-Z, +1.20D	7.050	+X	Bottom	0.3024	Min Temp %	0.440	20.926	OK
Z-Z, +0.90D	5.288	-X	Bottom	0.3024	Min Temp %	0.440	20.926	OK
Z-Z, +0.90D	5.288	+X	Bottom	0.3024	Min Temp %	0.440	20.926	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	29.08 psi	29.08 psi	29.08 psi	29.08 psi	29.08 psi	82.16 psi	0.35	OK
+1.20D	24.92 psi	24.92 psi	24.92 psi	24.92 psi	24.92 psi	82.16 psi	0.30	OK
+0.90D	18.69 psi	18.69 psi	18.69 psi	18.69 psi	18.69 psi	82.16 psi	0.23	OK

PRCTI20221698

Project Title: **CHC Puyallup**
Engineer: **LMC**
Project ID:
Project Descr:

General Footing

File: CHC Puyallup calcs.ec6
Software copyright ENERCALC, INC. 1983-2020, Build:12.20.8.24
PCS STRUCTURAL SOLUTIONS

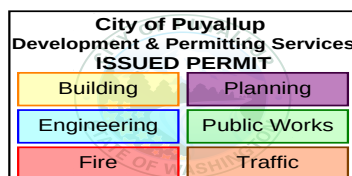
Lic. # : KW-06002327

DESCRIPTION: **F6.0 foundation**

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	132.47 psi	164.32psi	0.8062	OK
+1.20D	113.55 psi	164.32psi	0.691	OK
+0.90D	85.16 psi	164.32psi	0.5183	OK



PRCTI20221698

Demo or move cols

@ (4.7) / (F) & (4.7) / (E) & (8.6) / (E)

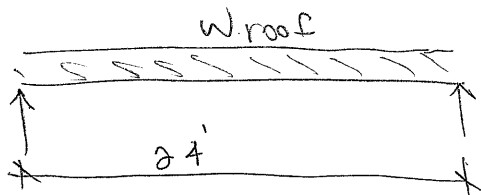
↳ in all (3) cases, distance between cols to remain $\leq 24'$

↳ col to move or demo is on 2nd floor only

(E) bm + (E) $3\frac{1}{2} \times 11\frac{1}{4}$ " Timberstrand EA side of bm

Roof Bm

Check (E) $3\frac{1}{2} \times 11\frac{1}{4}$ " for new span
Roof bm



mech

$$W_{\text{roof DL}} = (70 \text{ PSF} + 25 \text{ PSF}) \times 35\frac{1}{2} = 1663\frac{\#}{\text{ft}}$$

$$SL = (25 \text{ PSF}) \times 35\frac{1}{2} = 438\frac{\#}{\text{ft}}$$

$$\overline{2100\frac{\#}{\text{ft}}}$$

$$M = 2100\frac{\#}{\text{ft}} \times 24^2 / 8 = 151\text{K}$$

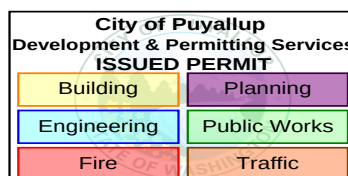
$$V = 2100\frac{\#}{\text{ft}} \times \frac{24}{2} = 25.2\text{K}$$

$$(2) 3\frac{1}{2} \times 11\frac{1}{4}" \text{ Mallow} = 2 \times 10.5\text{K} = \text{N.G.}$$

$$\text{Timberstrand Vallow} = 2 \times 11\text{K} = \text{N.G.}$$

(E) BMS OVERSTRESSED

∴ Check option of moving col. instead of demoing col.



City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Move cols

- Demo (e) col & add (2) new to super roof bms

- 2nd Floor cols only (2nd Floor to roof)

- @ (4.7) / (F)

(4.7) / (E)

(8.6) / (F)

PLAN: ← North

@ (4.7) / (F)

- 2nd Flr cols
- Roof BMS

(E) $3\frac{1}{2}$ " roof bms
are spliced @ cols
as shown

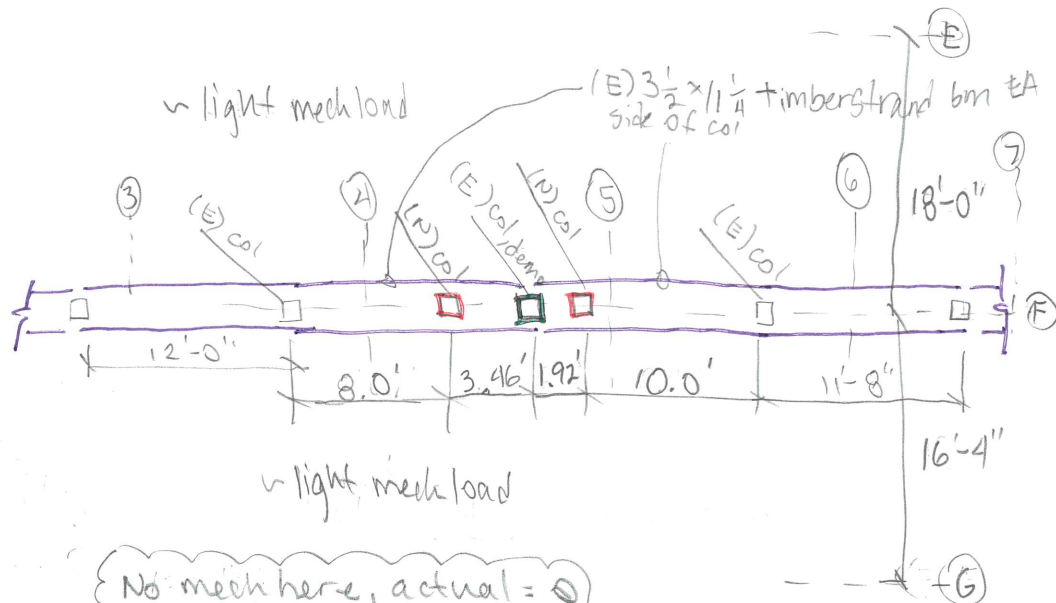
WDL light mech = 15 PSF

WDL mech well = 70 PSF

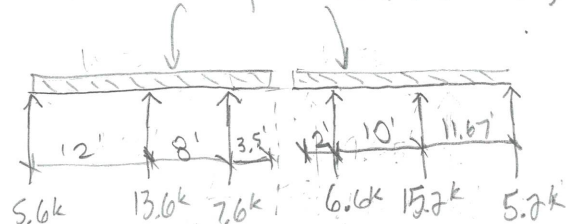
WDL roof = 25 PSF

WSL = 25 PSF

New bm spans w/ demo'd col:
& New Cols added



$$W = WDL + SL + \text{light mech} \times (18' + 16.33')/2$$



- See enercalc, (e) (2) $3\frac{1}{2} \times 11\frac{1}{4}$ Timberstrand ok (1.3E assumed)

updated mech loading

$$W_{mech} = 3000\# / 6' \times \frac{1}{2} = 250\#$$

No mech → WDL + SL → WDL + SL + Wmech

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) Roof Bm with col 4.7/F moved (left) - updated mech

CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : IBC 2018

Wood Species : iLevel Truss Joist

Wood Grade : TimberStrand LSL 1.3E - Beam/Col

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

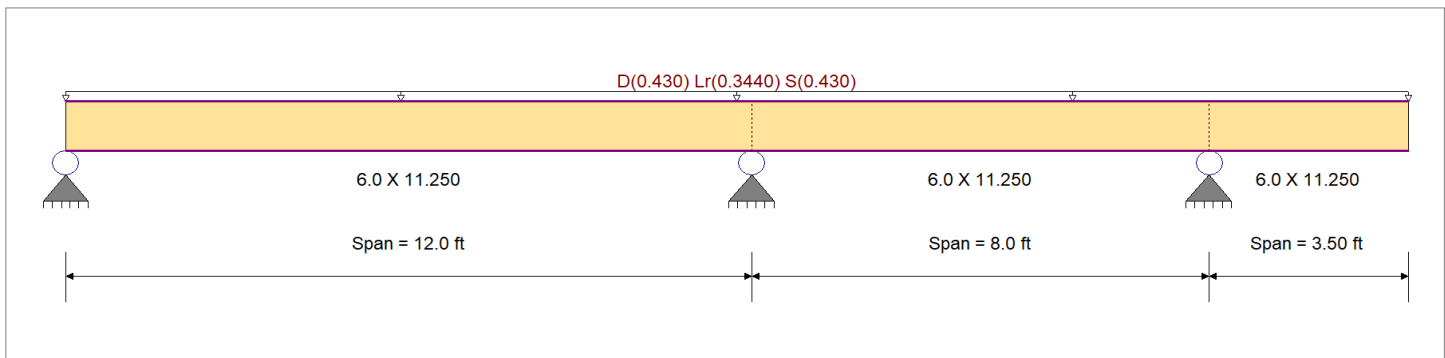
Fb + 1,700.0 psi
 Fb - 1,700.0 psi
 Fc - Prll 1,400.0 psi
 Fc - Perp 680.0 psi
 Fv 400.0 psi
 Ft 1,075.0 psi

E : Modulus of Elasticity

Ebend- xx 1,300.0 ksi

Eminbend - xx 660.75 ksi

Density 45.010 pcf



Applied Loads

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

Beam self weight calculated and added to loading

Loads on all spans...

Uniform Load on ALL spans : D = 0.0250, Lr = 0.020, S = 0.0250 ksf, Tributary Width = 17.20 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio			=	0.546 : 1	Maximum Shear Stress Ratio			=	0.262 : 1
Section used for this span				6.0 X 11.250	Section used for this span				6.0 X 11.250
fb: Actual			=	1,067.24psi	fv: Actual			=	120.55 psi
Fb: Allowable			=	1,955.00psi	Fv: Allowable			=	460.00 psi
Load Combination				+D+S+H	Load Combination				+D+S+H
Location of maximum on span			=	12.000ft	Location of maximum on span			=	11.092 ft
Span # where maximum occurs			=	Span # 1	Span # where maximum occurs			=	Span # 1
Maximum Deflection									
Max Downward Transient Deflection			0.077 in	Ratio =	1084 >=360	Span: 3 : Lr Only, LL Comb Run (L*L)			
Max Upward Transient Deflection			-0.038 in	Ratio =	2188 >=360	Span: 3 : Lr Only, LL Comb Run (*L*)			
Max Downward Total Deflection			0.262 in	Ratio =	550 >=240	Span: 3 : +D+Lr+H, LL Comb Run (L*L)			
Max Upward Total Deflection			-0.061 in	Ratio =	1575 >=240	Span: 3 : +D+Lr+H, LL Comb Run (*L*)			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L		M	fb	F'b	V	fv	F'v
+D+H																	
Length = 12.0 ft	1	0.357	0.171	0.90	1.000	1.00	1.00	1.00	1.00	1.00		5.76	546.40	1530.00	2.78	61.72	360.00
Length = 8.0 ft	2	0.357	0.171	0.90	1.000	1.00	1.00	1.00	1.00	1.00		5.76	546.40	1530.00	1.79	61.72	360.00
Length = 3.50 ft	3	0.171	0.171	0.90	1.000	1.00	1.00	1.00	1.00	1.00		2.76	261.97	1530.00	1.17	61.72	360.00
+D+Lr+H, LL Comb Run (**L)																	
Length = 12.0 ft	1	0.253	0.122	1.25	1.000	1.00	1.00	1.00	1.00	1.00		5.67	537.46	2125.00	2.74	60.94	500.00
Length = 8.0 ft	2	0.238	0.122	1.25	1.000	1.00	1.00	1.00	1.00	1.00		5.34	506.44	2125.00	2.06	60.94	500.00
Length = 3.50 ft	3	0.217	0.122	1.25	1.000	1.00	1.00	1.00	1.00	1.00		4.87	461.75	2125.00	2.06	60.94	500.00
+D+Lr+H, LL Comb Run (*L*)																	
Length = 12.0 ft	1	0.306	0.133	1.25	1.000	1.00	1.00	1.00	1.00	1.00		6.86	650.77	2125.00	3.00	66.62	500.00
Length = 8.0 ft	2	0.306	0.133	1.25	1.000	1.00	1.00	1.00	1.00	1.00		6.86	650.77	2125.00	3.00	66.62	500.00
Length = 3.50 ft	3	0.123	0.133	1.25	1.000	1.00	1.00	1.00	1.00	1.00		2.76	261.97	2125.00	1.17	66.62	500.00

PRCTI20221698

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services	
ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) Roof Bm with col 4.7/F moved (left) - updated mech

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios		C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	Moment Values			Shear Values		
			M	V								M	fb	F'b	V	fv	F'v
+D+Lr+H, LL Comb Run (*LL)					1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1		0.287	0.126	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.44	610.81	2125.00	2.83	62.98	500.00
Length = 8.0 ft	2		0.287	0.126	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.44	610.81	2125.00	2.68	62.98	500.00
Length = 3.50 ft	3		0.217	0.126	1.25	1.000	1.00	1.00	1.00	1.00	1.00	4.87	461.75	2125.00	2.06	62.98	500.00
+D+Lr+H, LL Comb Run (L**)					1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1		0.445	0.215	1.25	1.000	1.00	1.00	1.00	1.00	1.00	9.96	944.79	2125.00	4.84	107.53	500.00
Length = 8.0 ft	2		0.423	0.215	1.25	1.000	1.00	1.00	1.00	1.00	1.00	9.48	898.65	2125.00	2.25	107.53	500.00
Length = 3.50 ft	3		0.123	0.215	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.76	261.97	2125.00	1.17	107.53	500.00
+D+Lr+H, LL Comb Run (L*L)					1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1		0.453	0.213	1.25	1.000	1.00	1.00	1.00	1.00	1.00	10.14	961.58	2125.00	4.80	106.75	500.00
Length = 8.0 ft	2		0.404	0.213	1.25	1.000	1.00	1.00	1.00	1.00	1.00	9.06	858.70	2125.00	2.06	106.75	500.00
Length = 3.50 ft	3		0.217	0.213	1.25	1.000	1.00	1.00	1.00	1.00	1.00	4.87	461.75	2125.00	2.06	106.75	500.00
+D+Lr+H, LL Comb Run (LL*)					1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1		0.472	0.219	1.25	1.000	1.00	1.00	1.00	1.00	1.00	10.58	1,003.03	2125.00	4.93	109.57	500.00
Length = 8.0 ft	2		0.472	0.219	1.25	1.000	1.00	1.00	1.00	1.00	1.00	10.58	1,003.03	2125.00	3.46	109.57	500.00
Length = 3.50 ft	3		0.123	0.219	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.76	261.97	2125.00	1.17	109.57	500.00
+D+Lr+H, LL Comb Run (LLL)					1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1		0.453	0.218	1.25	1.000	1.00	1.00	1.00	1.00	1.00	10.16	963.07	2125.00	4.90	108.79	500.00
Length = 8.0 ft	2		0.453	0.218	1.25	1.000	1.00	1.00	1.00	1.00	1.00	10.16	963.07	2125.00	3.15	108.79	500.00
Length = 3.50 ft	3		0.217	0.218	1.25	1.000	1.00	1.00	1.00	1.00	1.00	4.87	461.75	2125.00	2.06	108.79	500.00
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1		0.546	0.262	1.15	1.000	1.00	1.00	1.00	1.00	1.00	11.26	1,067.24	1955.00	5.42	120.55	460.00
Length = 8.0 ft	2		0.546	0.262	1.15	1.000	1.00	1.00	1.00	1.00	1.00	11.26	1,067.24	1955.00	3.49	120.55	460.00
Length = 3.50 ft	3		0.262	0.262	1.15	1.000	1.00	1.00	1.00	1.00	1.00	5.40	511.69	1955.00	2.28	120.55	460.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.2618	5.546		0.0000	0.000
	2	0.0000	5.546	+D+Lr+H, LL Comb Run (L*L)	-0.0609	3.630
+D+Lr+H, LL Comb Run (L*L)	3	0.1286	3.500		0.0000	3.630

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	4.349	10.481	5.876	
Overall MINimum	2.122	5.115	2.868	
+D+Lr+H, LL Comb Run (**L)	2.261	5.015	4.528	
+D+Lr+H, LL Comb Run (*L*)	2.135	6.972	4.247	
+D+Lr+H, LL Comb Run (*LL)	2.170	6.620	5.767	
+D+Lr+H, LL Comb Run (L**)	3.981	8.204	2.544	
+D+Lr+H, LL Comb Run (L*L)	4.016	7.853	4.064	
+D+Lr+H, LL Comb Run (LL*)	3.889	9.810	3.782	
+D+Lr+H, LL Comb Run (LLL)	3.924	9.458	5.302	
+D+S+H	4.349	10.481	5.876	
D Only	2.226	5.366	3.008	
Lr Only, LL Comb Run (**L)	0.035	-0.351	1.520	
Lr Only, LL Comb Run (*L*)	-0.092	1.605	1.238	
Lr Only, LL Comb Run (*LL)	-0.057	1.254	2.758	
Lr Only, LL Comb Run (L**)	1.754	2.838	-0.464	
Lr Only, LL Comb Run (L*L)	1.790	2.487	1.056	
Lr Only, LL Comb Run (LL*)	1.663	4.443	0.774	
Lr Only, LL Comb Run (LLL)	1.698	4.092	2.294	
S Only	2.122	5.115	2.868	

PRCTI20221698

Project Title: CHC Puyallup
Engineer: LMC
Project ID:
Project Descr:

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) Roof Bm with col 4.7/F moved (right) - updated mech

CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : IBC 2018

Wood Species : iLevel Truss Joist

Wood Grade : TimberStrand LSL 1.3E - Beam/Col

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

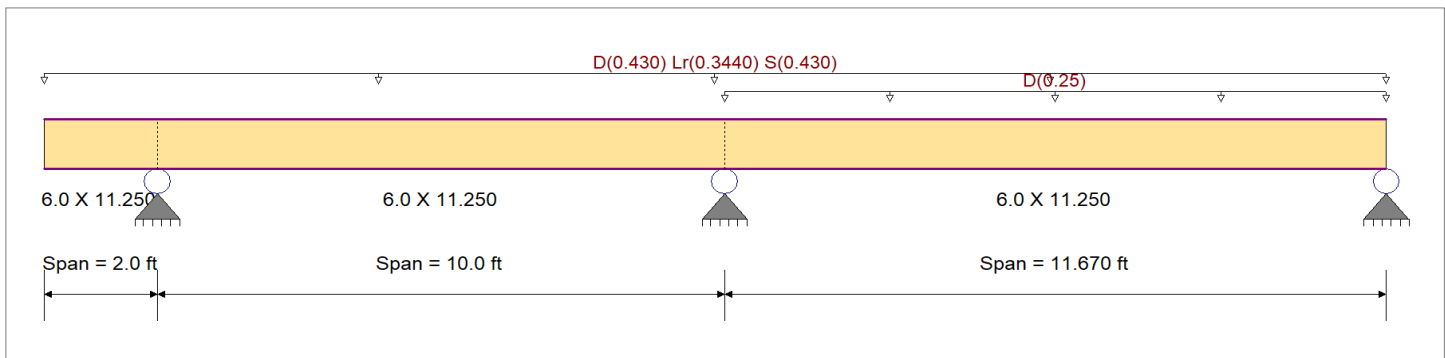
Fb + 1,700.0 psi
Fb - 1,700.0 psi
Fc - Prll 1,400.0 psi
Fc - Perp 680.0 psi
Fv 400.0 psi
Ft 1,075.0 psi

E : Modulus of Elasticity

Ebend- xx 1,300.0 ksi

Eminbend - xx 660.75 ksi

Density 45.010 pcf



Applied Loads

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

Beam self weight calculated and added to loading

Loads on all spans...

Uniform Load on ALL spans : D = 0.0250, Lr = 0.020, S = 0.0250 ksf, Tributary Width = 17.20 ft

Load for Span Number 3

Uniform Load : D = 0.250, Tributary Width = 1.0 ft, (mech)

DESIGN SUMMARY

Design OK

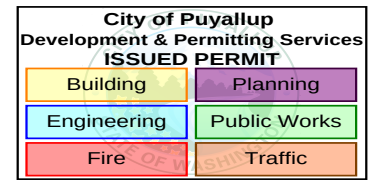
Maximum Bending Stress Ratio	=	0.730 : 1	Maximum Shear Stress Ratio	=	0.333 : 1
Section used for this span		6.0 X 11.250	Section used for this span		6.0 X 11.250
fb: Actual	=	1,426.54 psi	fv: Actual	=	153.13 psi
Fb: Allowable	=	1,955.00 psi	Fv: Allowable	=	460.00 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	10.000 ft	Location of maximum on span	=	10.000 ft
Span # where maximum occurs	=	Span # 2	Span # where maximum occurs	=	Span # 2
Maximum Deflection					
Max Downward Transient Deflection	0.109 in	Ratio = 1284 >= 360	Span: 3 : Lr Only, LL Comb Run (L*L)		
Max Upward Transient Deflection	-0.041 in	Ratio = 1164 >= 360	Span: 3 : Lr Only, LL Comb Run (*L*)		
Max Downward Total Deflection	0.288 in	Ratio = 485 >= 240	Span: 3 : +D+Lr+H, LL Comb Run (L*L)		
Max Upward Total Deflection	-0.044 in	Ratio = 1102 >= 240	Span: 2 : +D+Lr+H, LL Comb Run (L*L)		

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	Cd	C _{F/V}	C _i	C _r	C _m	C _t	C _L		M	fb	F'b	V	fv	F'v
+D+H																	
Length = 2.0 ft	1	0.056	0.065	0.90	1.000	1.00	1.00	1.00	1.00	1.00		0.90	85.54	1530.00	1.05	23.26	360.00
Length = 10.0 ft	2	0.547	0.261	0.90	1.000	1.00	1.00	1.00	1.00	1.00		8.82	836.40	1530.00	4.23	93.96	360.00
Length = 11.670 ft	3	0.547	0.261	0.90	1.000	1.00	1.00	1.00	1.00	1.00		8.82	836.40	1530.00	4.23	93.96	360.00
+D+Lr+H, LL Comb Run (**L)																	
Length = 2.0 ft	1	0.040	0.032	1.25	1.000	1.00	1.00	1.00	1.00	1.00		0.90	85.54	2125.00	0.73	16.25	500.00
Length = 10.0 ft	2	0.534	0.276	1.25	1.000	1.00	1.00	1.00	1.00	1.00		11.98	1,135.42	2125.00	6.20	137.82	500.00
Length = 11.670 ft	3	0.549	0.276	1.25	1.000	1.00	1.00	1.00	1.00	1.00		12.31	1,166.82	2125.00	6.20	137.82	500.00
+D+Lr+H, LL Comb Run (*L*)																	
Length = 2.0 ft	1	0.040	0.100	1.25	1.000	1.00	1.00	1.00	1.00	1.00		0.90	85.54	2125.00	2.25	50.00	500.00

PRCTI20221698

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) Roof Bm with col 4.7/F moved (right) - updated mech

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment	Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	f _b	F'b	V	f _v	F'v
	Length = 10.0 ft	2	0.482	0.195	1.25	1.000	1.00	1.00	1.00	1.00	1.00	10.81	1,024.54	2125.00	4.40	97.73	500.00
	Length = 11.670 ft	3	0.482	0.195	1.25	1.000	1.00	1.00	1.00	1.00	1.00	10.81	1,024.54	2125.00	4.40	97.73	500.00
+D+Lr+H, LL Comb Run (*LL)					1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
	Length = 2.0 ft	1	0.040	0.086	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.90	85.54	2125.00	1.93	43.00	500.00
	Length = 10.0 ft	2	0.623	0.283	1.25	1.000	1.00	1.00	1.00	1.00	1.00	13.96	1,323.56	2125.00	6.37	141.60	500.00
	Length = 11.670 ft	3	0.623	0.283	1.25	1.000	1.00	1.00	1.00	1.00	1.00	13.96	1,323.56	2125.00	6.37	141.60	500.00
+D+Lr+H, LL Comb Run (L**)					1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
	Length = 2.0 ft	1	0.071	0.050	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.59	150.77	2125.00	1.13	25.14	500.00
	Length = 10.0 ft	2	0.387	0.187	1.25	1.000	1.00	1.00	1.00	1.00	1.00	8.66	821.35	2125.00	4.21	93.65	500.00
	Length = 11.670 ft	3	0.387	0.187	1.25	1.000	1.00	1.00	1.00	1.00	1.00	8.66	821.35	2125.00	4.21	93.65	500.00
+D+Lr+H, LL Comb Run (L*L)					1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
	Length = 2.0 ft	1	0.071	0.038	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.59	150.77	2125.00	0.86	19.01	500.00
	Length = 10.0 ft	2	0.527	0.275	1.25	1.000	1.00	1.00	1.00	1.00	1.00	11.82	1,120.37	2125.00	6.19	137.52	500.00
	Length = 11.670 ft	3	0.552	0.275	1.25	1.000	1.00	1.00	1.00	1.00	1.00	12.37	1,173.14	2125.00	6.19	137.52	500.00
+D+Lr+H, LL Comb Run (LL*)					1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
	Length = 2.0 ft	1	0.071	0.104	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.59	150.77	2125.00	2.33	51.89	500.00
	Length = 10.0 ft	2	0.475	0.195	1.25	1.000	1.00	1.00	1.00	1.00	1.00	10.65	1,009.49	2125.00	4.38	97.43	500.00
	Length = 11.670 ft	3	0.475	0.195	1.25	1.000	1.00	1.00	1.00	1.00	1.00	10.65	1,009.49	2125.00	4.38	97.43	500.00
+D+Lr+H, LL Comb Run (LLL)					1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
	Length = 2.0 ft	1	0.071	0.090	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.59	150.77	2125.00	2.02	44.88	500.00
	Length = 10.0 ft	2	0.616	0.283	1.25	1.000	1.00	1.00	1.00	1.00	1.00	13.80	1,308.51	2125.00	6.36	141.30	500.00
	Length = 11.670 ft	3	0.616	0.283	1.25	1.000	1.00	1.00	1.00	1.00	1.00	13.80	1,308.51	2125.00	6.36	141.30	500.00
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
	Length = 2.0 ft	1	0.085	0.109	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.76	167.08	1955.00	2.26	50.28	460.00
	Length = 10.0 ft	2	0.730	0.333	1.15	1.000	1.00	1.00	1.00	1.00	1.00	15.05	1,426.54	1955.00	6.89	153.13	460.00
	Length = 11.670 ft	3	0.730	0.333	1.15	1.000	1.00	1.00	1.00	1.00	1.00	15.05	1,426.54	1955.00	6.89	153.13	460.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+Lr+H, LL Comb Run (*L*)	-0.0435	0.000
Lr Only, LL Comb Run (*L*)	2	0.0615	4.790	+D+Lr+H, LL Comb Run (L*L)	-0.0561	6.891
+D+Lr+H, LL Comb Run (L*L)	3	0.2882	6.374		0.0000	6.891

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum		4.839	13.623	5.311
Overall MINimum		2.474	5.729	1.976
+D+Lr+H, LL Comb Run (**L)		2.050	10.487	5.072
+D+Lr+H, LL Comb Run (*L*)		3.887	9.983	3.165
+D+Lr+H, LL Comb Run (*LL)		3.572	12.576	4.902
+D+Lr+H, LL Comb Run (L**)		3.138	7.796	3.349
+D+Lr+H, LL Comb Run (L*L)		2.823	10.389	5.086
+D+Lr+H, LL Comb Run (LL*)		4.660	9.884	3.179
+D+Lr+H, LL Comb Run (LLL)		4.345	12.477	4.916
+D+S+H		4.839	13.623	5.311
D Only		2.366	7.894	3.335
Lr Only, LL Comb Run (**L)		-0.315	2.593	1.737
Lr Only, LL Comb Run (*L*)		1.522	2.088	-0.170
Lr Only, LL Comb Run (*LL)		1.206	4.681	1.567
Lr Only, LL Comb Run (L**)		0.773	-0.098	0.014
Lr Only, LL Comb Run (L*L)		0.457	2.495	1.751
Lr Only, LL Comb Run (LL*)		2.294	1.990	-0.156
Lr Only, LL Comb Run (LLL)		1.979	4.583	1.581
S Only		2.474	5.729	1.976

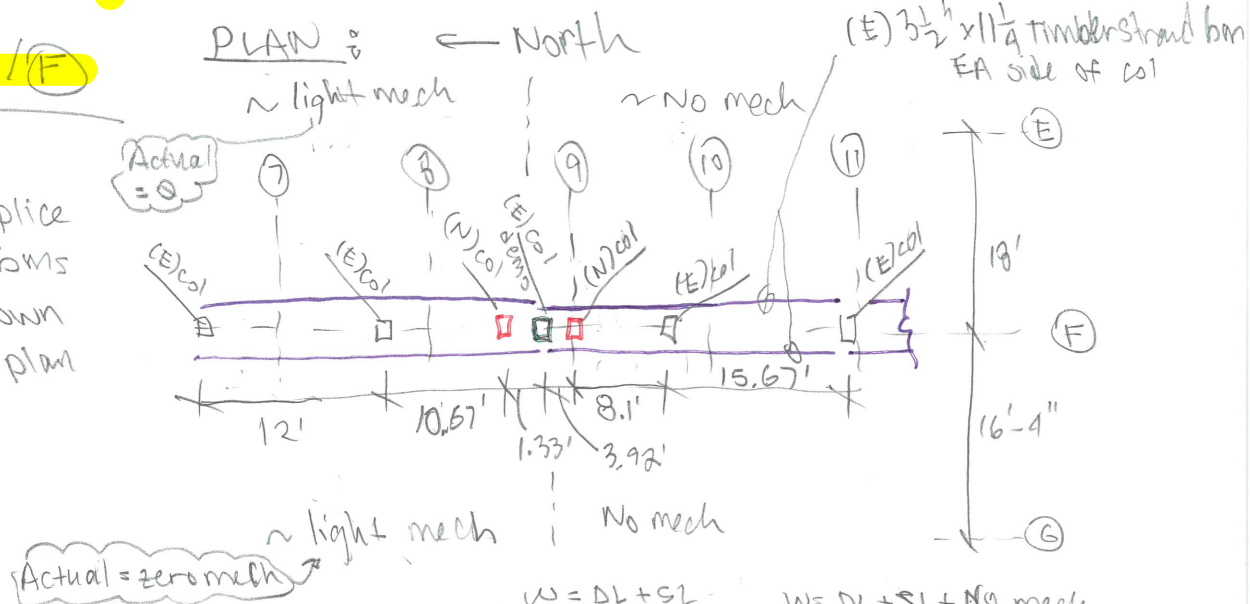
PRCTI20221698

Move Cols - continued

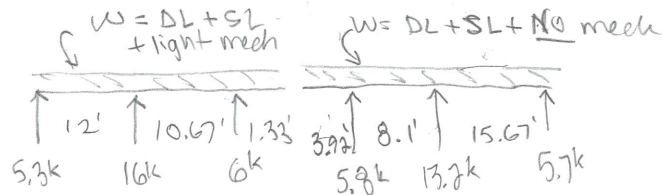
-2nd Floor Cols / Roof Bms

(8.6) / (F)

(E) bm splice
in $3\frac{1}{2}$ " bms
are as shown
on this plan



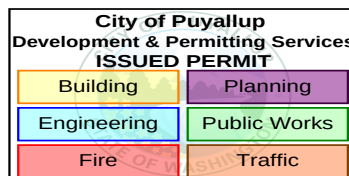
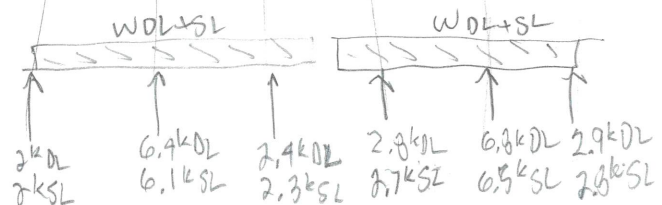
New beam spans @ (E) bms :



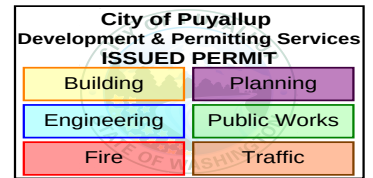
-see enercalc, (e)(2) $3\frac{1}{2}$ " x $11\frac{1}{4}$ " Timberstrand bms, OK (1.3E assumed)

updated bm w/ mech loading

No mech road



Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) Roof Bm with col 8.6/F moved (left) - updated mech

CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : IBC 2018

Wood Species : iLevel Truss Joist

Wood Grade : TimberStrand LSL 1.3E - Beam/Col

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

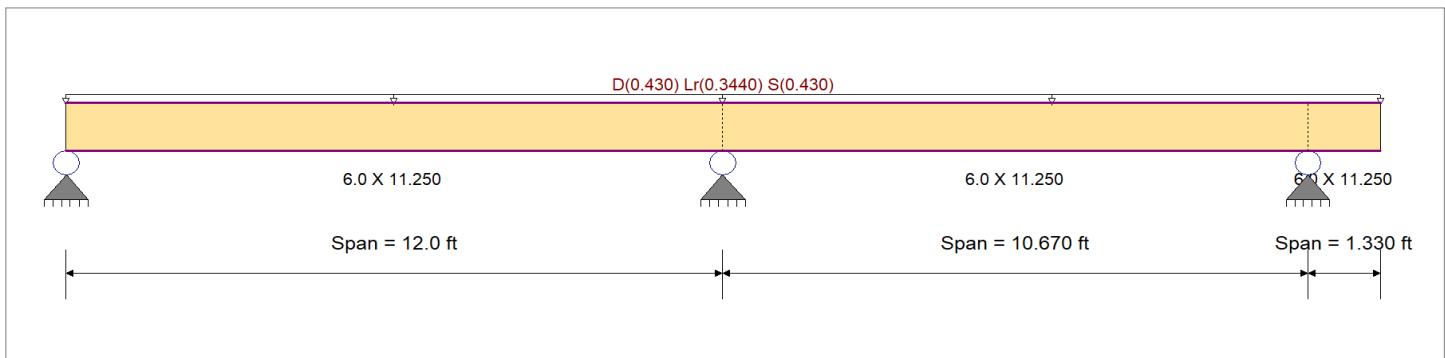
Fb + 1,700.0 psi
 Fb - 1,700.0 psi
 Fc - Prll 1,400.0 psi
 Fc - Perp 680.0 psi
 Fv 400.0 psi
 Ft 1,075.0 psi

E : Modulus of Elasticity

Ebend- xx 1,300.0ksi

Eminbend - xx 660.75ksi

Density 45.010pcf



Applied Loads

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

Beam self weight calculated and added to loading

Loads on all spans...

Uniform Load on ALL spans : D = 0.0250, Lr = 0.020, S = 0.0250 ksf, Tributary Width = 17.20 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.684 1	Maximum Shear Stress Ratio	=	0.274 : 1
Section used for this span		6.0 X 11.250	Section used for this span		6.0 X 11.250
fb: Actual	=	1,338.16psi	fv: Actual	=	125.85 psi
Fb: Allowable	=	1,955.00psi	Fv: Allowable	=	460.00 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	12.000ft	Location of maximum on span	=	11.092 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

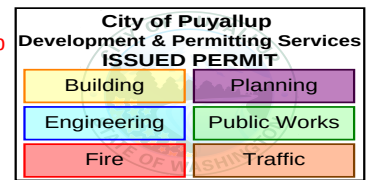
Max Downward Transient Deflection	0.122 in	Ratio =	1182 >=360	Span: 3 : Lr Only, LL Comb Run (L*L)
Max Upward Transient Deflection	-0.033 in	Ratio =	964 >=360	Span: 3 : Lr Only, LL Comb Run (*L*)
Max Downward Total Deflection	0.232 in	Ratio =	621 >=240	Span: 2 : +D+Lr+H, LL Comb Run (*L*)
Max Upward Total Deflection	-0.054 in	Ratio =	590 >=240	Span: 3 : +D+Lr+H, LL Comb Run (*L*)

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L		M	fb	F'b	V	fv	F'v
+D+H																	
Length = 12.0 ft	1	0.448	0.179	0.90	1.000	1.00	1.00	1.00	1.00	1.00		7.23	685.10	1530.00	0.00	0.00	0.00
Length = 10.670 ft	2	0.448	0.179	0.90	1.000	1.00	1.00	1.00	1.00	1.00		7.23	685.10	1530.00	2.90	64.43	360.00
Length = 1.330 ft	3	0.025	0.179	0.90	1.000	1.00	1.00	1.00	1.00	1.00		0.40	37.83	1530.00	2.64	64.43	360.00
+D+Lr+H, LL Comb Run (*L*)																	
Length = 12.0 ft	1	0.319	0.129	1.25	1.000	1.00	1.00	1.00	1.00	1.00		7.15	678.31	2125.00	0.00	0.00	0.00
Length = 10.670 ft	2	0.319	0.129	1.25	1.000	1.00	1.00	1.00	1.00	1.00		7.15	678.31	2125.00	2.89	64.30	500.00
Length = 1.330 ft	3	0.031	0.129	1.25	1.000	1.00	1.00	1.00	1.00	1.00		0.70	66.68	2125.00	2.61	64.30	500.00
+D+Lr+H, LL Comb Run (*L*)																	
Length = 12.0 ft	1	0.425	0.195	1.25	1.000	1.00	1.00	1.00	1.00	1.00		9.53	903.57	2125.00	0.00	0.00	0.00
Length = 10.670 ft	2	0.425	0.195	1.25	1.000	1.00	1.00	1.00	1.00	1.00		9.53	903.57	2125.00	4.38	97.44	500.00
Length = 1.330 ft	3	0.018	0.195	1.25	1.000	1.00	1.00	1.00	1.00	1.00		0.40	37.83	2125.00	4.38	97.44	500.00

PRCTI20221698

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) Roof Bm with col 8.6/F moved (left) - updated mech

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values		
			M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L		M	fb	F'b	V	fv	F'v
+D+Lr+H, LL Comb Run (*LL)					1.000	1.00	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 12.0 ft	1		0.422	0.193	1.25	1.000	1.00	1.00	1.00	1.00	1.00		9.46	896.78	2125.00	4.35	96.65	500.00
Length = 10.670 ft	2		0.422	0.193	1.25	1.000	1.00	1.00	1.00	1.00	1.00		9.46	896.78	2125.00	4.35	96.65	500.00
Length = 1.330 ft	3		0.031	0.193	1.25	1.000	1.00	1.00	1.00	1.00	1.00		0.70	66.68	2125.00	0.32	96.65	500.00
+D+Lr+H, LL Comb Run (L**)					1.000	1.00	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 12.0 ft	1		0.469	0.219	1.25	1.000	1.00	1.00	1.00	1.00	1.00		10.50	995.87	2125.00	4.92	109.43	500.00
Length = 10.670 ft	2		0.469	0.219	1.25	1.000	1.00	1.00	1.00	1.00	1.00		10.50	995.87	2125.00	2.95	109.43	500.00
Length = 1.330 ft	3		0.018	0.219	1.25	1.000	1.00	1.00	1.00	1.00	1.00		0.40	37.83	2125.00	0.18	109.43	500.00
+D+Lr+H, LL Comb Run (L*L)					1.000	1.00	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 12.0 ft	1		0.465	0.219	1.25	1.000	1.00	1.00	1.00	1.00	1.00		10.43	989.08	2125.00	4.92	109.30	500.00
Length = 10.670 ft	2		0.465	0.219	1.25	1.000	1.00	1.00	1.00	1.00	1.00		10.43	989.08	2125.00	2.91	109.30	500.00
Length = 1.330 ft	3		0.031	0.219	1.25	1.000	1.00	1.00	1.00	1.00	1.00		0.70	66.68	2125.00	0.32	109.30	500.00
+D+Lr+H, LL Comb Run (LL*)					1.000	1.00	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 12.0 ft	1		0.571	0.227	1.25	1.000	1.00	1.00	1.00	1.00	1.00		12.81	1,214.34	2125.00	5.12	113.70	500.00
Length = 10.670 ft	2		0.571	0.227	1.25	1.000	1.00	1.00	1.00	1.00	1.00		12.81	1,214.34	2125.00	4.69	113.70	500.00
Length = 1.330 ft	3		0.018	0.227	1.25	1.000	1.00	1.00	1.00	1.00	1.00		0.40	37.83	2125.00	0.18	113.70	500.00
+D+Lr+H, LL Comb Run (LLL)					1.000	1.00	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 12.0 ft	1		0.568	0.227	1.25	1.000	1.00	1.00	1.00	1.00	1.00		12.74	1,207.55	2125.00	5.11	113.56	500.00
Length = 10.670 ft	2		0.568	0.227	1.25	1.000	1.00	1.00	1.00	1.00	1.00		12.74	1,207.55	2125.00	4.66	113.56	500.00
Length = 1.330 ft	3		0.031	0.227	1.25	1.000	1.00	1.00	1.00	1.00	1.00		0.70	66.68	2125.00	0.32	113.56	500.00
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
Length = 12.0 ft	1		0.684	0.274	1.15	1.000	1.00	1.00	1.00	1.00	1.00		14.11	1,338.16	1955.00	5.66	125.85	460.00
Length = 10.670 ft	2		0.684	0.274	1.15	1.000	1.00	1.00	1.00	1.00	1.00		14.11	1,338.16	1955.00	5.16	125.85	460.00
Length = 1.330 ft	3		0.038	0.274	1.15	1.000	1.00	1.00	1.00	1.00	1.00		0.78	73.89	1955.00	0.35	125.85	460.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr+H, LL Comb Run (L*L)	1	0.2317	5.445		0.0000	0.000
+D+Lr+H, LL Comb Run (*L*)	2	0.1215	6.007	+D+Lr+H, LL Comb Run (L*L)	-0.0239	1.255
	3	0.0000	6.007	+D+Lr+H, LL Comb Run (*L*)	-0.0540	1.330

Vertical Reactions

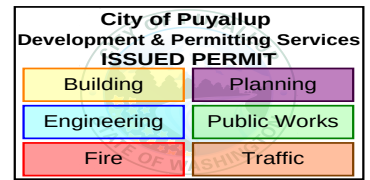
Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	4.110	12.413	4.623	
Overall MINimum	2.006	6.058	2.256	
+D+Lr+H, LL Comb Run (**L)	2.110	6.314	2.860	
+D+Lr+H, LL Comb Run (*L*)	1.912	8.598	3.986	
+D+Lr+H, LL Comb Run (*LL)	1.918	8.557	4.479	
+D+Lr+H, LL Comb Run (L**)	3.895	8.999	2.060	
+D+Lr+H, LL Comb Run (L*L)	3.901	8.958	2.552	
+D+Lr+H, LL Comb Run (LL*)	3.703	11.243	3.679	
+D+Lr+H, LL Comb Run (LLL)	3.709	11.201	4.172	
+D+S+H	4.110	12.413	4.623	
D Only	2.104	6.355	2.367	
Lr Only, LL Comb Run (**L)	0.006	-0.041	0.493	
Lr Only, LL Comb Run (*L*)	-0.192	2.243	1.619	
Lr Only, LL Comb Run (*LL)	-0.186	2.202	2.112	
Lr Only, LL Comb Run (L**)	1.791	2.644	-0.307	
Lr Only, LL Comb Run (L*L)	1.797	2.603	0.186	
Lr Only, LL Comb Run (LL*)	1.599	4.888	1.312	
Lr Only, LL Comb Run (LLL)	1.605	4.846	1.805	
S Only	2.006	6.058	2.256	

PRCTI20221698

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) Roof Bm with col 8.6/F moved (right)

CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : IBC 2018

Wood Species : iLevel Truss Joist

Wood Grade : TimberStrand LSL 1.3E - Beam/Col

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

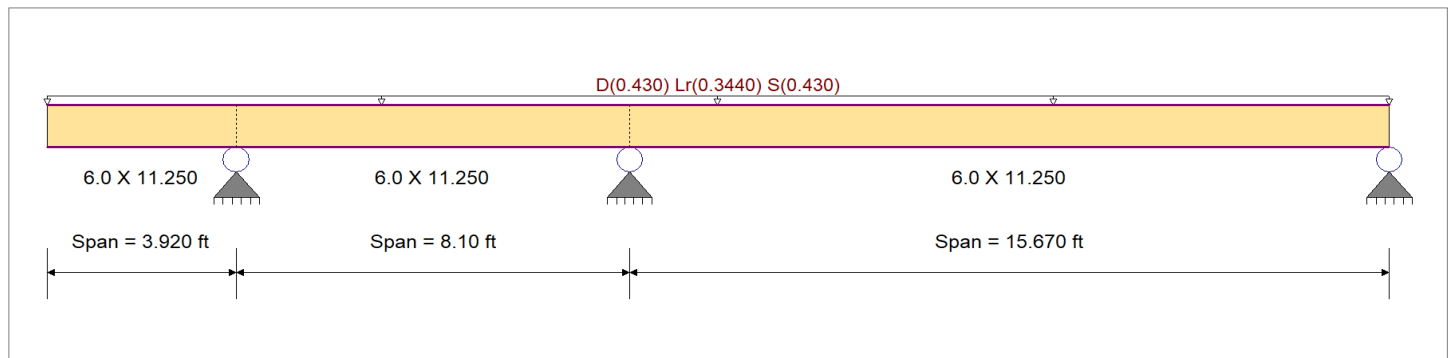
Fb + 1,700.0 psi
 Fb - 1,700.0 psi
 Fc - Prll 1,400.0 psi
 Fc - Perp 680.0 psi
 Fv 400.0 psi
 Ft 1,075.0 psi

E : Modulus of Elasticity

Ebend- xx 1,300.0ksi

Eminbend - xx 660.75ksi

Density 45.010pcf



Applied Loads

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

Beam self weight calculated and added to loading

Loads on all spans...

Uniform Load on ALL spans : D = 0.0250, Lr = 0.020, S = 0.0250 ksf, Tributary Width = 17.20 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio				Maximum Shear Stress Ratio			
Section used for this span	=	6.0 X 11.250		Section used for this span	=	6.0 X 11.250	
fb: Actual	=	1,814.51psi		fv: Actual	=	162.50 psi	
Fb: Allowable	=	1,955.00psi		Fv: Allowable	=	460.00 psi	
Load Combination	=	+D+S+H		Load Combination	=	+D+S+H	
Location of maximum on span	=	8.100ft		Location of maximum on span	=	8.100ft	
Span # where maximum occurs	=	Span # 2		Span # where maximum occurs	=	Span # 2	
Maximum Deflection							
Max Downward Transient Deflection	0.369 in	Ratio =	509 >= 360	Span: 3 : S Only			
Max Upward Transient Deflection	-0.071 in	Ratio =	1360 >= 360	Span: 3 : Lr Only, LL Comb Run (*L*)			
Max Downward Total Deflection	0.757 in	Ratio =	248 >= 240	Span: 3 : +D+S+H			
Max Upward Total Deflection	-0.128 in	Ratio =	761 >= 240	Span: 2 : +D+Lr+H, LL Comb Run (L*L)			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L		M	fb	F'b	V	fv	F'v
+D+H																	
Length = 3.920 ft	1	0.215	0.083	0.90	1.000	1.00	1.00	1.00	1.00	1.00		3.47	328.62	1530.00	1.35	30.05	360.00
Length = 8.10 ft	2	0.607	0.231	0.90	1.000	1.00	1.00	1.00	1.00	1.00		9.80	928.98	1530.00	3.74	83.20	360.00
Length = 15.670 ft	3	0.607	0.231	0.90	1.000	1.00	1.00	1.00	1.00	1.00		9.80	928.98	1530.00	3.74	83.20	360.00
+D+Lr+H, LL Comb Run (*L*)																	
Length = 3.920 ft	1	0.155	0.060	1.25	1.000	1.00	1.00	1.00	1.00	1.00		3.47	328.62	2125.00	1.35	30.05	500.00
Length = 8.10 ft	2	0.748	0.292	1.25	1.000	1.00	1.00	1.00	1.00	1.00		16.76	1,588.95	2125.00	6.57	145.91	500.00
Length = 15.670 ft	3	0.748	0.292	1.25	1.000	1.00	1.00	1.00	1.00	1.00		16.76	1,588.95	2125.00	6.57	145.91	500.00
+D+Lr+H, LL Comb Run (*L*)																	
Length = 3.920 ft	1	0.155	0.072	1.25	1.000	1.00	1.00	1.00	1.00	1.00		3.47	328.62	2125.00	1.62	35.92	500.00
Length = 8.10 ft	2	0.480	0.169	1.25	1.000	1.00	1.00	1.00	1.00	1.00		10.76	1,020.13	2125.00	3.81	84.56	500.00
Length = 15.670 ft	3	0.480	0.169	1.25	1.000	1.00	1.00	1.00	1.00	1.00		10.76	1,020.13	2125.00	3.81	84.56	500.00

PRCTI20221698

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) Roof Bm with col 8.6/F moved (right)

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values		
			M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	f _b	F' _b	V	f _v	F' _v
+D+Lr+H, LL Comb Run (*LL)					1.000		1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.920 ft	1		0.155	0.060	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.47	328.62	2125.00	1.35	30.05	500.00
Length = 8.10 ft	2		0.791	0.295	1.25	1.000	1.00	1.00	1.00	1.00	1.00	17.72	1,680.10	2125.00	6.63	147.28	500.00
Length = 15.670 ft	3		0.791	0.295	1.25	1.000	1.00	1.00	1.00	1.00	1.00	17.72	1,680.10	2125.00	6.63	147.28	500.00
+D+Lr+H, LL Comb Run (L**)					1.000		1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.920 ft	1		0.273	0.106	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.11	579.21	2125.00	2.38	52.96	500.00
Length = 8.10 ft	2		0.417	0.165	1.25	1.000	1.00	1.00	1.00	1.00	1.00	9.35	886.28	2125.00	3.72	82.56	500.00
Length = 15.670 ft	3		0.427	0.165	1.25	1.000	1.00	1.00	1.00	1.00	1.00	9.57	906.97	2125.00	3.72	82.56	500.00
+D+Lr+H, LL Comb Run (L*L)					1.000		1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.920 ft	1		0.273	0.106	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.11	579.21	2125.00	2.38	52.96	500.00
Length = 8.10 ft	2		0.728	0.291	1.25	1.000	1.00	1.00	1.00	1.00	1.00	16.31	1,546.25	2125.00	6.54	145.28	500.00
Length = 15.670 ft	3		0.755	0.291	1.25	1.000	1.00	1.00	1.00	1.00	1.00	16.93	1,605.23	2125.00	6.54	145.28	500.00
+D+Lr+H, LL Comb Run (LL*)					1.000		1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.920 ft	1		0.273	0.106	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.11	579.21	2125.00	2.38	52.96	500.00
Length = 8.10 ft	2		0.460	0.168	1.25	1.000	1.00	1.00	1.00	1.00	1.00	10.31	977.43	2125.00	3.78	83.92	500.00
Length = 15.670 ft	3		0.460	0.168	1.25	1.000	1.00	1.00	1.00	1.00	1.00	10.31	977.43	2125.00	3.78	83.92	500.00
+D+Lr+H, LL Comb Run (LLL)					1.000		1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.920 ft	1		0.273	0.106	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.11	579.21	2125.00	2.38	52.96	500.00
Length = 8.10 ft	2		0.771	0.293	1.25	1.000	1.00	1.00	1.00	1.00	1.00	17.27	1,637.40	2125.00	6.60	146.64	500.00
Length = 15.670 ft	3		0.771	0.293	1.25	1.000	1.00	1.00	1.00	1.00	1.00	17.27	1,637.40	2125.00	6.60	146.64	500.00
+D+S+H					1.000		1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.920 ft	1		0.328	0.128	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.77	641.86	1955.00	2.64	58.69	460.00
Length = 8.10 ft	2		0.928	0.353	1.15	1.000	1.00	1.00	1.00	1.00	1.00	19.14	1,814.51	1955.00	7.31	162.50	460.00
Length = 15.670 ft	3		0.928	0.353	1.15	1.000	1.00	1.00	1.00	1.00	1.00	19.14	1,814.51	1955.00	7.31	162.50	460.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr+H, LL Comb Run (L*L)	1	0.2528	0.000		0.0000	0.000
	2	0.0000	0.000	+D+Lr+H, LL Comb Run (L*L)	-0.1277	4.492
+D+S+H	3	0.7565	8.559		0.0000	4.492

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

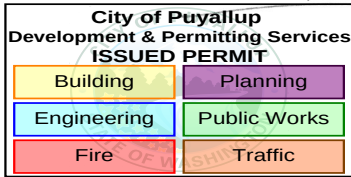
Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum		5.818	13.220	5.682
Overall MINimum		2.682	6.452	2.773
+D+Lr+H, LL Comb Run (**L)		1.954	10.767	5.160
+D+Lr+H, LL Comb Run (*L*)		4.088	8.342	2.848
+D+Lr+H, LL Comb Run (*LL)		3.229	12.340	5.099
+D+Lr+H, LL Comb Run (L**)		4.544	6.358	2.938
+D+Lr+H, LL Comb Run (L*L)		3.685	10.356	5.189
+D+Lr+H, LL Comb Run (LL*)		5.818	7.931	2.876
+D+Lr+H, LL Comb Run (LLL)		4.959	11.930	5.128
+D+S+H		5.495	13.220	5.682
D Only		2.814	6.768	2.909
Lr Only, LL Comb Run (**L)		-0.859	3.999	2.251
Lr Only, LL Comb Run (*L*)		1.275	1.573	-0.061
Lr Only, LL Comb Run (*LL)		0.415	5.572	2.190
Lr Only, LL Comb Run (L**)		1.730	-0.411	0.029
Lr Only, LL Comb Run (L*L)		0.871	3.588	2.280
Lr Only, LL Comb Run (LL*)		3.005	1.163	-0.033
Lr Only, LL Comb Run (LLL)		2.146	5.161	2.218
S Only		2.682	6.452	2.773

PRCTI20221698

Move cols

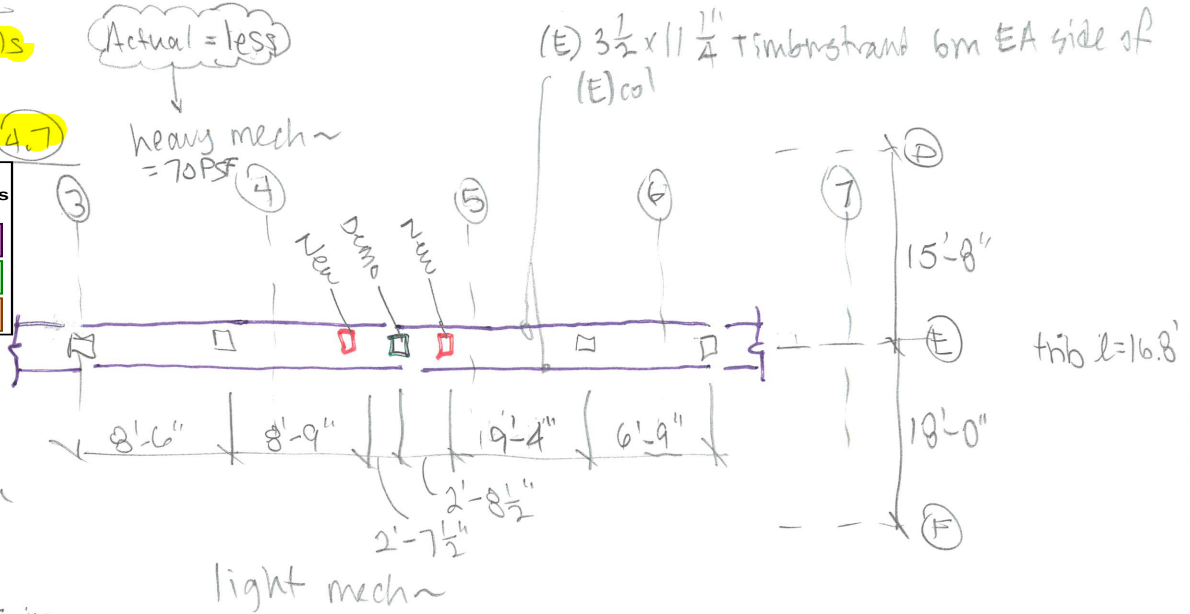
- 2nd Floor cols
- Roof BMS

@ (E) / (4.7)



PLAN:

← North



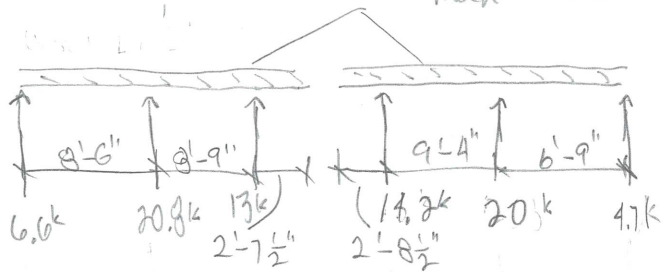
(E) bms splices in
3 1/2" bms are as
shown on this plan

$$W = DL + SL + \frac{1}{2} \text{ heavy mech} + \frac{1}{2} \text{ light mech}$$

New bms spans due to col demo:

- see enercalc

↳ (E) 3 1/2" bms OK



updated bms w/ mech loading

1950# - say 2400#

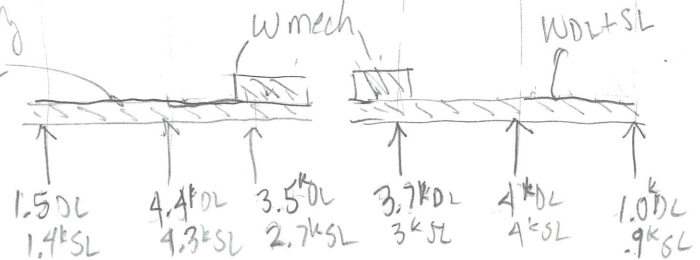
$$W_{mech} = \frac{2400\#}{6 \times 2} = 200\#$$

W_{mech} = 200#

- see enercalc "updated mech" calc.

(E) bms OK

updated calc for more accurate bms reactions to framing below



Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) Roof Bm with col 4.7/E moved (left) - updated mech

CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : IBC 2018

Wood Species : iLevel Truss Joist

Wood Grade : TimberStrand LSL 1.3E - Beam/Col

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

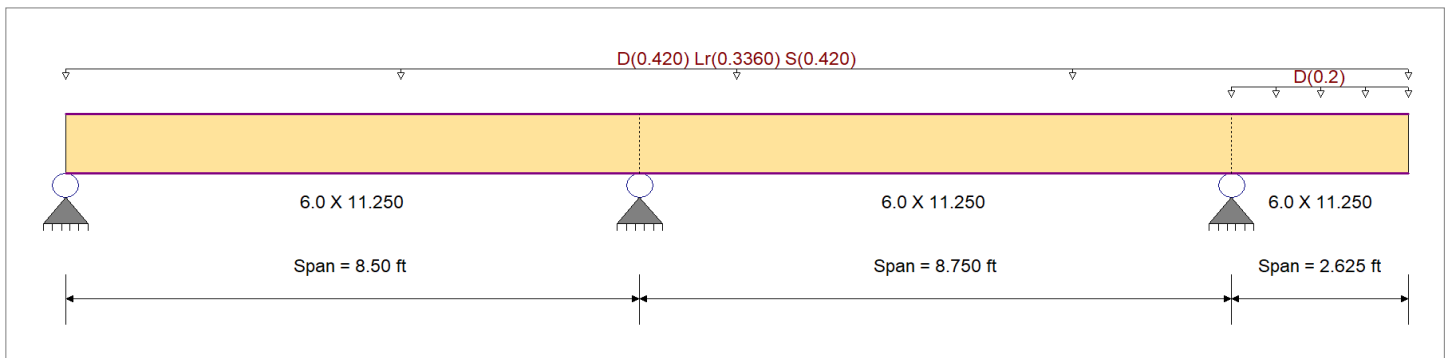
Fb + 1,700.0 psi
 Fb - 1,700.0 psi
 Fc - Prll 1,400.0 psi
 Fc - Perp 680.0 psi
 Fv 400.0 psi
 Ft 1,075.0 psi

E : Modulus of Elasticity

Ebend- xx 1,300.0 ksi

Eminbend - xx 660.75 ksi

Density 45.010 pcf



Applied Loads

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

Beam self weight calculated and added to loading

Loads on all spans...

Uniform Load on ALL spans : D = 0.0250, Lr = 0.020, S = 0.0250 ksf, Tributary Width = 16.80 ft

Load for Span Number 3

Uniform Load : D = 0.20 , Tributary Width = 1.0 ft, (mech)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio			=	0.344 1	Maximum Shear Stress Ratio			=	0.178 : 1
Section used for this span				6.0 X 11.250	Section used for this span				6.0 X 11.250
fb: Actual			=	671.77 psi	fv: Actual			=	82.08 psi
Fb: Allowable			=	1,955.00 psi	Fv: Allowable			=	460.00 psi
Load Combination				+D+S+H	Load Combination				+D+S+H
Location of maximum on span			=	8.500 ft	Location of maximum on span			=	7.571 ft
Span # where maximum occurs			=	Span # 1	Span # where maximum occurs			=	Span # 1
Maximum Deflection									
Max Downward Transient Deflection			0.029 in	Ratio =	2184	Span: 3 : Lr Only, LL Comb Run (L*L)			
Max Upward Transient Deflection			-0.034 in	Ratio =	1836	Span: 3 : Lr Only, LL Comb Run (*L*)			
Max Downward Total Deflection			0.060 in	Ratio =	1698	Span: 3 : +D+Lr+H, LL Comb Run (L*L)			
Max Upward Total Deflection			-0.031 in	Ratio =	2052	Span: 3 : +D+Lr+H, LL Comb Run (*L*)			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L		M	fb	F'b	V	fv	F'v
+D+H																	
Length = 8.50 ft	1	0.220	0.116	0.90	1.000	1.00	1.00	1.00	1.00	1.00		3.54	336.03	1530.00	1.88	41.82	360.00
Length = 8.750 ft	2	0.220	0.116	0.90	1.000	1.00	1.00	1.00	1.00	1.00		3.54	336.03	1530.00	1.69	41.82	360.00
Length = 2.625 ft	3	0.137	0.116	0.90	1.000	1.00	1.00	1.00	1.00	1.00		2.21	209.43	1530.00	1.09	41.82	360.00
+D+Lr+H, LL Comb Run (**L)																	
Length = 8.50 ft	1	0.145	0.082	1.25	1.000	1.00	1.00	1.00	1.00	1.00		3.25	308.19	2125.00	1.85	41.06	500.00
Length = 8.750 ft	2	0.150	0.082	1.25	1.000	1.00	1.00	1.00	1.00	1.00		3.37	319.19	2125.00	1.66	41.06	500.00
Length = 2.625 ft	3	0.150	0.082	1.25	1.000	1.00	1.00	1.00	1.00	1.00		3.37	319.19	2125.00	1.66	41.06	500.00
+D+Lr+H, LL Comb Run (*L*)																	
Length = 8.50 ft	1	0.231	0.136	1.25	1.000	1.00	1.00	1.00	1.00	1.00		5.18	490.69	2125.00	3.05	67.85	500.00

PRCTI20221698

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) Roof Bm with col 4.7/E moved (left) - updated mech

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment	Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v
	Length = 8.750 ft	2	0.231	0.136	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.18	490.69	2125.00	3.05	67.85	500.00
	Length = 2.625 ft	3	0.099	0.136	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.21	209.43	2125.00	1.09	67.85	500.00
	+D+Lr+H, LL Comb Run (*LL)					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
	Length = 8.50 ft	1	0.218	0.128	1.25	1.000	1.00	1.00	1.00	1.00	1.00	4.88	462.85	2125.00	2.89	64.16	500.00
	Length = 8.750 ft	2	0.218	0.128	1.25	1.000	1.00	1.00	1.00	1.00	1.00	4.88	462.85	2125.00	2.89	64.16	500.00
	Length = 2.625 ft	3	0.150	0.128	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.37	319.19	2125.00	1.66	64.16	500.00
+D+Lr+H, LL Comb Run (L**)					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
	Length = 8.50 ft	1	0.225	0.141	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.04	477.80	2125.00	3.17	70.53	500.00
	Length = 8.750 ft	2	0.225	0.141	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.04	477.80	2125.00	1.86	70.53	500.00
	Length = 2.625 ft	3	0.099	0.141	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.21	209.43	2125.00	1.09	70.53	500.00
+D+Lr+H, LL Comb Run (L*L)					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
	Length = 8.50 ft	1	0.216	0.140	1.25	1.000	1.00	1.00	1.00	1.00	1.00	4.85	459.42	2125.00	3.14	69.76	500.00
	Length = 8.750 ft	2	0.212	0.140	1.25	1.000	1.00	1.00	1.00	1.00	1.00	4.75	449.97	2125.00	1.70	69.76	500.00
	Length = 2.625 ft	3	0.150	0.140	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.37	319.19	2125.00	1.66	69.76	500.00
+D+Lr+H, LL Comb Run (LL*)					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
	Length = 8.50 ft	1	0.298	0.150	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.67	632.46	2125.00	3.37	74.80	500.00
	Length = 8.750 ft	2	0.298	0.150	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.67	632.46	2125.00	3.22	74.80	500.00
	Length = 2.625 ft	3	0.099	0.150	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.21	209.43	2125.00	1.09	74.80	500.00
+D+Lr+H, LL Comb Run (LLL)					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
	Length = 8.50 ft	1	0.285	0.148	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.38	604.62	2125.00	3.33	74.03	500.00
	Length = 8.750 ft	2	0.285	0.148	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.38	604.62	2125.00	3.06	74.03	500.00
	Length = 2.625 ft	3	0.150	0.148	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.37	319.19	2125.00	1.66	74.03	500.00
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00	0.00	0.00	0.00
	Length = 8.50 ft	1	0.344	0.178	1.15	1.000	1.00	1.00	1.00	1.00	1.00	7.09	671.77	1955.00	3.69	82.08	460.00
	Length = 8.750 ft	2	0.344	0.178	1.15	1.000	1.00	1.00	1.00	1.00	1.00	7.09	671.77	1955.00	3.40	82.08	460.00
	Length = 2.625 ft	3	0.177	0.178	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.66	346.63	1955.00	1.80	82.08	460.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr+H, LL Comb Run (L*L)	1	0.0601	3.929		0.0000	0.000
+D+Lr+H, LL Comb Run (*L*)	2	0.0453	4.706	+D+Lr+H, LL Comb Run (L*L)	-0.0064	0.662
	3	0.0000	4.706	Lr Only, LL Comb Run (*L*)	-0.0343	2.625

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	2.826	8.652	6.161	
Overall MINimum	1.368	4.278	2.701	
+D+Lr+H, LL Comb Run (**L)	1.492	4.174	4.508	
+D+Lr+H, LL Comb Run (*L*)	1.266	6.222	4.744	
+D+Lr+H, LL Comb Run (*LL)	1.300	6.022	5.792	
+D+Lr+H, LL Comb Run (L**)	2.710	6.149	3.289	
+D+Lr+H, LL Comb Run (L*L)	2.744	5.948	4.337	
+D+Lr+H, LL Comb Run (LL*)	2.518	7.997	4.573	
+D+Lr+H, LL Comb Run (LLL)	2.552	7.797	5.621	
+D+S+H	2.826	8.652	6.161	
D Only	1.458	4.374	3.460	
Lr Only, LL Comb Run (**L)	0.035	-0.200	1.048	
Lr Only, LL Comb Run (*L*)	-0.192	1.848	1.284	
Lr Only, LL Comb Run (*LL)	-0.157	1.648	2.331	
Lr Only, LL Comb Run (L**)	1.252	1.775	-0.171	
Lr Only, LL Comb Run (L*L)	1.287	1.574	0.877	
Lr Only, LL Comb Run (LL*)	1.060	3.623	1.113	
Lr Only, LL Comb Run (LLL)	1.095	3.423	2.161	
S Only	1.368	4.278	2.701	

PRCTI20221698

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services	
ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) Roof Bm with col 4.7/E moved (right) - updated mech

CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : IBC 2018

Wood Species : iLevel Truss Joist

Wood Grade : TimberStrand LSL 1.3E - Beam/Col

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

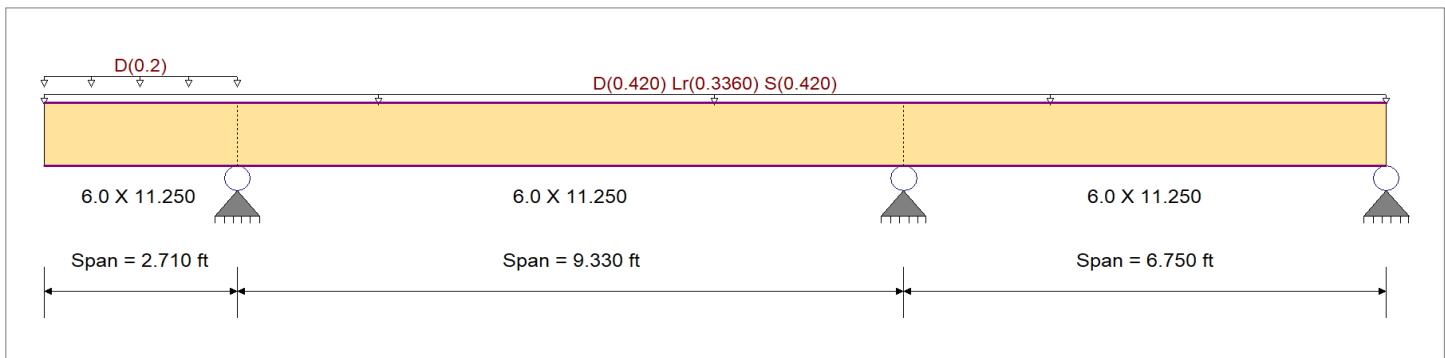
Fb + 1,700.0 psi
 Fb - 1,700.0 psi
 Fc - Prll 1,400.0 psi
 Fc - Perp 680.0 psi
 Fv 400.0 psi
 Ft 1,075.0 psi

E : Modulus of Elasticity

Ebend- xx 1,300.0 ksi

Eminbend - xx 660.75 ksi

Density 45.010 pcf



Applied Loads

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

Beam self weight calculated and added to loading

Loads on all spans...

Uniform Load on ALL spans : D = 0.0250, Lr = 0.020, S = 0.0250 ksf, Tributary Width = 16.80 ft

Load for Span Number 1

Uniform Load : D = 0.20 , Tributary Width = 1.0 ft, (Mech)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio				=	0.309 : 1	Maximum Shear Stress Ratio				=	0.171 : 1
Section used for this span				=	6.0 X 11.250	Section used for this span				=	6.0 X 11.250
fb: Actual				=	603.48psi	fv: Actual				=	78.64 psi
Fb: Allowable				=	1,955.00psi	Fv: Allowable				=	460.00 psi
Load Combination				=	+D+S+H	Load Combination				=	+D+S+H
Location of maximum on span				=	9.330ft	Location of maximum on span				=	8.468 ft
Span # where maximum occurs				=	Span # 2	Span # where maximum occurs				=	Span # 2
Maximum Deflection											
Max Downward Transient Deflection				0.027 in	Ratio =	2392	>=360	Span: 3 : Lr Only, LL Comb Run (L*L)			
Max Upward Transient Deflection				-0.041 in	Ratio =	1592	>=360	Span: 3 : Lr Only, LL Comb Run (*L*)			
Max Downward Total Deflection				0.067 in	Ratio =	1678	>=240	Span: 3 : +D+Lr+H, LL Comb Run (L*L)			
Max Upward Total Deflection				-0.046 in	Ratio =	1402	>=240	Span: 3 : +D+Lr+H, LL Comb Run (*L*)			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	Cd	C _{F/V}	C _i	C _r	C _m	C _t	C _L		M	fb	F'b	V	fv	F'v
+D+H																	
Length = 2.710 ft	1	0.146	0.098	0.90	1.000	1.00	1.00	1.00	1.00	1.00		2.35	223.21	1530.00	1.59	35.36	360.00
Length = 9.330 ft	2	0.196	0.109	0.90	1.000	1.00	1.00	1.00	1.00	1.00		3.16	299.28	1530.00	1.76	39.18	360.00
Length = 6.750 ft	3	0.196	0.109	0.90	1.000	1.00	1.00	1.00	1.00	1.00		3.16	299.28	1530.00	1.56	39.18	360.00
+D+Lr+H, LL Comb Run (**L)																	
Length = 2.710 ft	1	0.105	0.067	1.25	1.000	1.00	1.00	1.00	1.00	1.00		2.35	223.21	2125.00	1.51	33.45	500.00
Length = 9.330 ft	2	0.177	0.111	1.25	1.000	1.00	1.00	1.00	1.00	1.00		3.96	375.44	2125.00	2.50	55.65	500.00
Length = 6.750 ft	3	0.177	0.111	1.25	1.000	1.00	1.00	1.00	1.00	1.00		3.96	375.44	2125.00	2.50	55.65	500.00
+D+Lr+H, LL Comb Run (*L*)																	
Length = 2.710 ft	1	0.105	0.117	1.25	1.000	1.00	1.00	1.00	1.00	1.00		2.35	223.21	2125.00	2.64	58.70	500.00

PRCTI20221698

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) Roof Bm with col 4.7/E moved (right) - updated mech

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v
Length = 9.330 ft	2	0.235	0.145	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.28	500.41	2125.00	3.27	72.63	500.00
Length = 6.750 ft	3	0.235	0.145	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.28	500.41	2125.00	1.87	72.63	500.00
+D+Lr+H, LL Comb Run (*LL)				1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.710 ft	1	0.105	0.114	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.35	223.21	2125.00	2.56	56.79	500.00
Length = 9.330 ft	2	0.271	0.149	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.08	576.58	2125.00	3.35	74.54	500.00
Length = 6.750 ft	3	0.271	0.149	1.25	1.000	1.00	1.00	1.00	1.00	1.00	6.08	576.58	2125.00	2.82	74.54	500.00
+D+Lr+H, LL Comb Run (L**)				1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.710 ft	1	0.160	0.078	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.59	340.19	2125.00	1.76	39.15	500.00
Length = 9.330 ft	2	0.160	0.078	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.59	340.19	2125.00	1.76	39.15	500.00
Length = 6.750 ft	3	0.125	0.078	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.80	265.34	2125.00	1.50	39.15	500.00
+D+Lr+H, LL Comb Run (L*L)				1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.710 ft	1	0.160	0.077	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.59	340.19	2125.00	1.74	38.57	500.00
Length = 9.330 ft	2	0.161	0.109	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.60	341.51	2125.00	2.45	54.47	500.00
Length = 6.750 ft	3	0.161	0.109	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.60	341.51	2125.00	2.45	54.47	500.00
+D+Lr+H, LL Comb Run (LL*)				1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.710 ft	1	0.160	0.125	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.59	340.19	2125.00	2.81	62.49	500.00
Length = 9.330 ft	2	0.220	0.138	1.25	1.000	1.00	1.00	1.00	1.00	1.00	4.92	466.47	2125.00	3.10	68.84	500.00
Length = 6.750 ft	3	0.220	0.138	1.25	1.000	1.00	1.00	1.00	1.00	1.00	4.92	466.47	2125.00	1.82	68.84	500.00
+D+Lr+H, LL Comb Run (LLL)				1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.710 ft	1	0.160	0.121	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.59	340.19	2125.00	2.73	60.58	500.00
Length = 9.330 ft	2	0.255	0.142	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.72	542.64	2125.00	3.18	70.75	500.00
Length = 6.750 ft	3	0.255	0.142	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.72	542.64	2125.00	2.77	70.75	500.00
+D+S+H				1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.710 ft	1	0.189	0.145	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.90	369.44	1955.00	3.01	66.88	460.00
Length = 9.330 ft	2	0.309	0.171	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.36	603.48	1955.00	3.54	78.64	460.00
Length = 6.750 ft	3	0.309	0.171	1.15	1.000	1.00	1.00	1.00	1.00	1.00	6.36	603.48	1955.00	3.07	78.64	460.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+Lr+H, LL Comb Run (*L*)	-0.0464	0.000
+D+Lr+H, LL Comb Run (*L*)	2	0.0667	4.469		0.0000	0.000
+D+Lr+H, LL Comb Run (L*L)	3	0.0205	3.800	Lr Only, LL Comb Run (*L*)	-0.0091	1.418

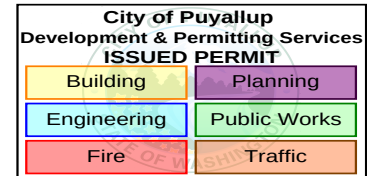
Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum		6.628	8.131	2.089
Overall MINimum		2.919	4.031	0.942
+D+Lr+H, LL Comb Run (**L)		3.623	5.439	2.036
+D+Lr+H, LL Comb Run (*L*)		5.049	6.209	0.707
+D+Lr+H, LL Comb Run (*LL)		4.963	7.548	1.722
+D+Lr+H, LL Comb Run (L**)		4.790	3.876	1.074
+D+Lr+H, LL Comb Run (L*L)		4.704	5.216	2.089
+D+Lr+H, LL Comb Run (LL*)		6.130	5.985	0.760
+D+Lr+H, LL Comb Run (LLL)		6.044	7.325	1.775
+D+S+H		6.628	8.131	1.963
D Only		3.709	4.100	1.021
Lr Only, LL Comb Run (**L)		-0.086	1.339	1.015
Lr Only, LL Comb Run (*L*)		1.340	2.109	-0.314
Lr Only, LL Comb Run (*LL)		1.254	3.448	0.701
Lr Only, LL Comb Run (L**)		1.081	-0.224	0.053
Lr Only, LL Comb Run (L*L)		0.995	1.115	1.068
Lr Only, LL Comb Run (LL*)		2.421	1.885	-0.261
Lr Only, LL Comb Run (LLL)		2.335	3.225	0.754
S Only		2.919	4.031	0.942

PRCTI20221698



New post under roof bms @ demold cols

- @ (E) & (F)
- col demold & (2) posts added to resupport roof bms - @ each location

P max @ new post =

w/ updated mech loading
= 3.7k DL + 3k SL

@ (E) / (4.7) = 11.2k DL + 3k SL = 14.2k (ASD) - max. 6x6 DF #1 cap = 18.9k (Fc & gov's)

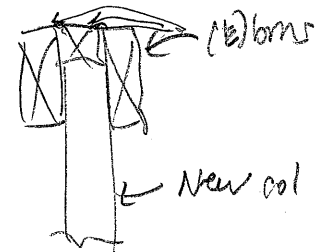
@ (F) / (4.7) = 4.7k DL + 2.9k SL = 7.6k (ASD)

@ (F) / (8.6) = 3.3k DL + 2.7k SL = 5.5k (ASD)

= 2.8k DL + 2.7k SL
w/ updated mech

provide 6x6 posts @ all new posts near col demo

6x6 fits between (e) bms



Existing post w/ new load @ roof - grids (E) & (F)

- New load due to new mech units
- All existing mech units removed
- New mech units in new locations
- New reactions to (e) bms due to col demo's & redistribution of bms reactions

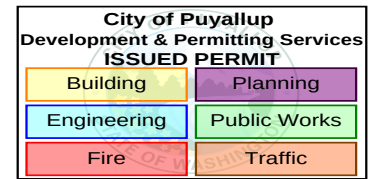
Max reaction @ (e) cols @ (E)-(F) bms w/ demold cols & new mech

= 8.4k DL + 5k SL @ (E) / (F)

= 13.4k = 10.9k w/ updated mech

(E) col = 6x6 post = 18.9k capacity, OK

Project Title: **CHC Puyallup**
 Engineer: **LMC**
 Project ID:
 Project Descr:



Wood Column

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: New Wood col at grids E&F at moved (E) cols

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
 Load Combinations Used : IBC 2018

General Information

Analysis Method	Allowable Stress Design			Wood Section Name	6x6	
End Fixities	Top & Bottom Pinned			Wood Grading/Manuf.	Graded Lumber	
Overall Column Height	10 ft			Wood Member Type	Sawn	
(Used for non-slender calculations)						
Wood Species	Douglas Fir-Larch			Exact Width	5.50 in	Allow Stress Modification Factors
Wood Grade	No.1			Exact Depth	5.50 in	Cf or Cv for Bending 1.0
Fb +	1,200.0 psi	Fv	170.0 psi	Area	30.250 in^2	Cf or Cv for Compression 1.0
Fb -	1,200.0 psi	Ft	825.0 psi	Ix	76.255 in^4	Cf or Cv for Tension 1.0
Fc - Prll	1,000.0 psi	Density	31.210 pcf	Iy	76.255 in^4	Cm : Wet Use Factor 1.0
Fc - Perp	625.0 psi					Ct : Temperature Fact 1.0
E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial			Cfu : Flat Use Factor 1.0
	Basic	1,600.0	1,600.0	1,600.0 ksi		Kf : Built-up columns 1.0 NDS 15.3.2
	Minimum	580.0	580.0			Use Cr : Repetitive ? No
Brace condition for deflection (buckling) along columns :						
				X-X (width) axis :	Unbraced Length for buckling ABOUT Y-Y Axis = 10 ft, k	
				Y-Y (depth) axis :	Unbraced Length for buckling ABOUT X-X Axis = 10 ft, k	

Applied Loads

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

Column self weight included : 65.563 lbs * Dead Load Factor

AXIAL LOADS . . .

Reaction from new beam: Axial Load at 10.0 ft, D = 5.0, S = 3.0 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =	0.3615 : 1	Maximum SERVICE Lateral Load Reactions . .	
Load Combination	+D+S	Top along Y-Y	0.0 k
Governing NDS Formula	Comp Only, f_c/F_c'	Bottom along Y-Y	0.0 k
Location of max.above base	0.0 ft	Top along X-X	0.0 k
At maximum location values are .		Bottom along X-X	0.0 k
Applied Axial	8.066 k	Maximum SERVICE Load Lateral Deflections . .	
Applied Mx	0.0 k-ft	Along Y-Y	0.0 in at 0.0 ft above base
Applied My	0.0 k-ft	for load combination : n/a	
Fc : Allowable	737.63 psi	Along X-X	0.0 in at 0.0 ft above base
		for load combination : n/a	
PASS Maximum Shear Stress Ratio =	0.0 : 1	Other Factors used to calculate allowable stresses . .	
Load Combination	+0.60D	Bending	Compression
Location of max.above base	10.0 ft	Tension	
Applied Design Shear	0.0 psi		
Allowable Shear	272.0 psi		

Load Combination Results

Load Combination	C _D	C _P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location
D Only	0.900	0.727	0.2561	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+S	1.150	0.641	0.3615	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750S	1.150	0.641	0.3279	PASS	0.0 ft	0.0	PASS	10.0 ft
+0.60D	1.600	0.516	0.1217	PASS	0.0 ft	0.0	PASS	10.0 ft

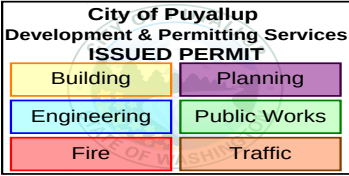
Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		k	My - End Moments		k-ft	Mx - End Moments		k-ft
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top		@ Base	@ Top	
D Only												
+D+S												
+D+0.750S												

PRCTI20221698

Project Title: CHC Puyallup
Engineer: LMC
Project ID:
Project Descr:



Wood Column

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: New Wood col at grids E&F at moved (E) cols

Maximum Reactions

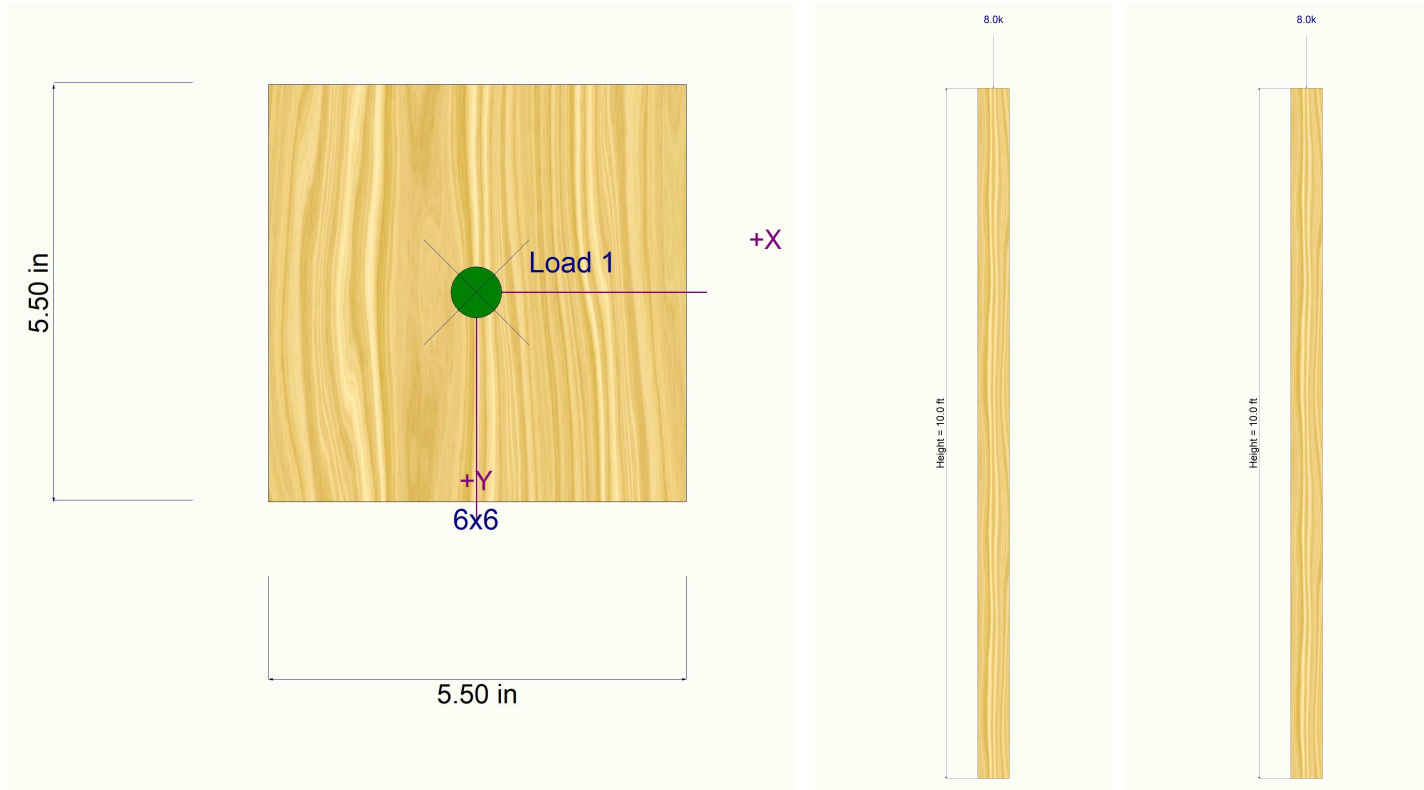
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top		@ Base	@ Top
+0.60D						3.039					
S Only						3.000					

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	0.0000 in	0.000ft	0.000 in	0.000 ft
+D+S	0.0000 in	0.000ft	0.000 in	0.000 ft
+D+0.750S	0.0000 in	0.000ft	0.000 in	0.000 ft
+0.60D	0.0000 in	0.000ft	0.000 in	0.000 ft
S Only	0.0000 in	0.000ft	0.000 in	0.000 ft

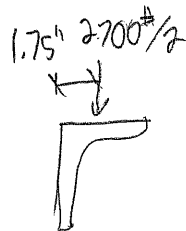
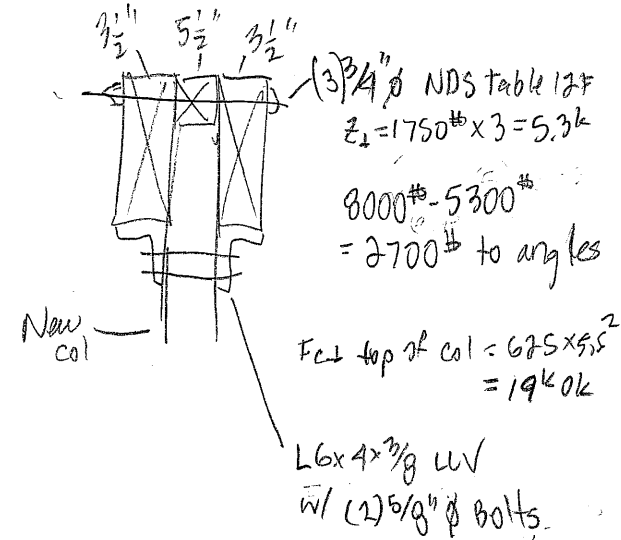
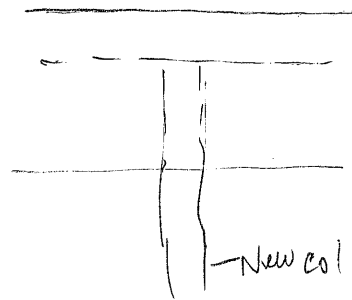
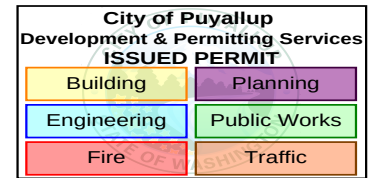
Sketches



CONN (E) Roof Brn to New 2nd floor post

Max Pt load to New 2nd Floor col @ (E) & (F)

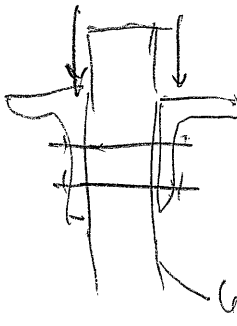
= 8k



$$M = \frac{2700 \#}{2} \times 1.75" = 2.4k"$$

$$f_b = \frac{M}{Z} \quad Z = \frac{6" \times \left(\frac{3}{8}\right)^2}{4} = .21in^3$$

$$\frac{M}{Z} = 11.4 ksi < \frac{36}{1.67} = 22 ksi \checkmark$$

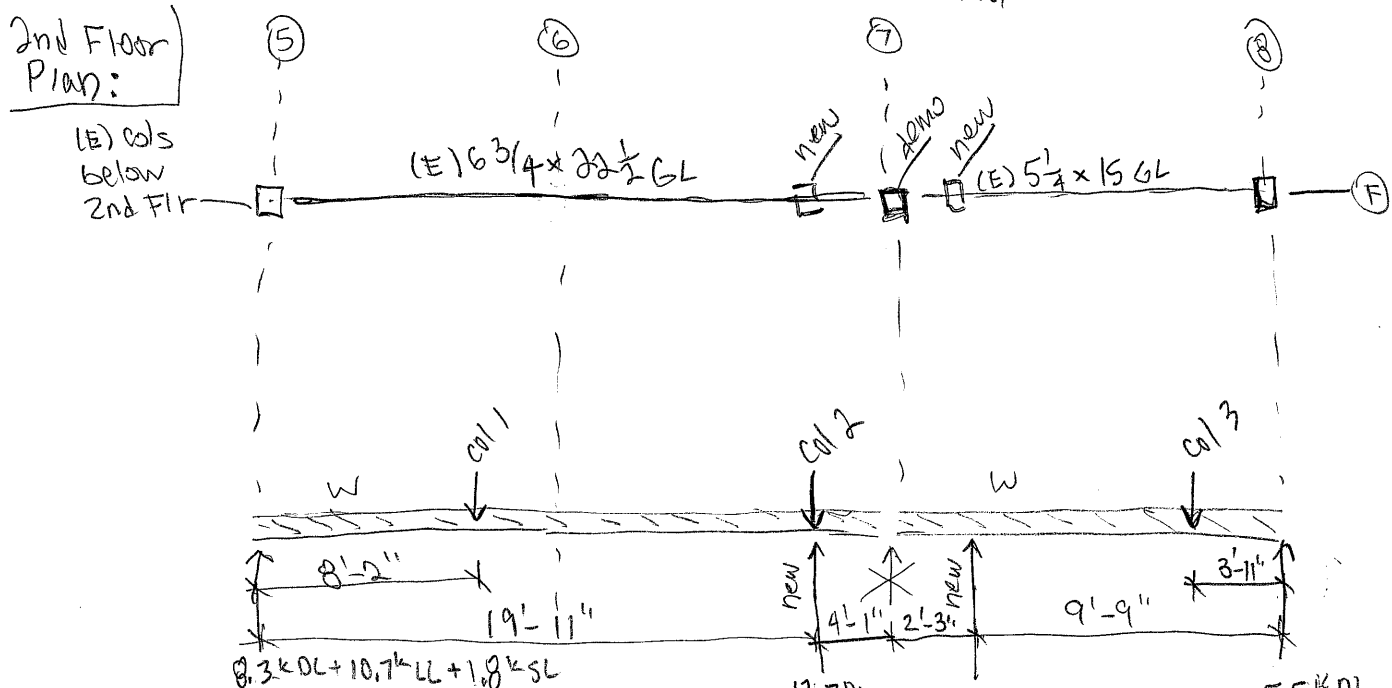


Shear @ bolts:

$$\frac{2700 \#}{2} = 1350 \# = \frac{675 \#}{bolt} < NDS Table 12G = Z_{11} = 2390 \# \checkmark$$

(2) 5/8" ϕ

Demo 1st story col @ (F)/(7) (includes updated mech loads @ roof)



Includes loads from demo'd 2nd story cols:

$$P_{col 1} = 10.9 k (7.9 k DL + 3 k SL)$$

$$P_{col 2} = 9.0 k (5 k DL + 4 k SL)$$

$$P_{col 3} = 12.4 k (6 k DL + 6 k SL)$$

$$W = 20 PSF DL$$

$$65 PSF LL$$

$$trib l of W = \frac{18' + 16.33'}{2} = 17.2'$$

-see encreale, (E) floor bms OK

$$col ht = 11'-3" - 15" bm = 9.5'$$

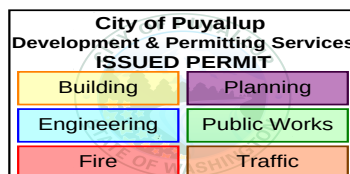
$$5'8" \times 7'2" GL col, type 2 \quad P_{col} = 30 k + Fnd$$

$$FND = \frac{30 k + .15 \times 6' \times 6' \times \frac{14}{12}}{6' \times 6'}$$

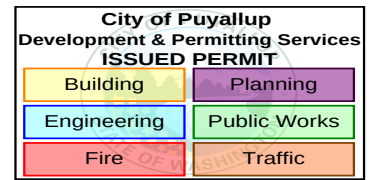
$$= 1000 PSF < 1500 \checkmark$$

$$Provide 6' \times 6' \times \frac{14}{12} Fnd$$

$$P_{Tot} = 37 k < Fnd cap = 47 k \checkmark$$



Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) floor bm at col demo - Grid 7/F (left)

CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : IBC 2018

Wood Species : DF/DF

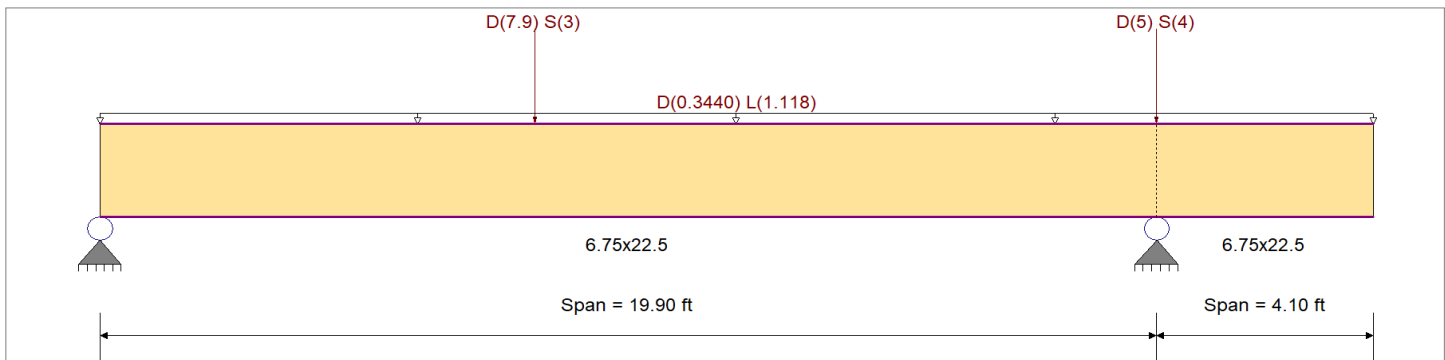
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb + 2,400.0 psi
 Fb - 1,850.0 psi
 Fc - Prll 1,650.0 psi
 Fc - Perp 650.0 psi
 Fv 265.0 psi
 Ft 1,100.0 psi

E : Modulus of Elasticity

Ebend- xx 1,800.0 ksi
 Eminbend - xx 950.0 ksi
 Ebend- yy 1,600.0 ksi
 Eminbend - yy 850.0 ksi
 Density 31.210 pcf



Applied Loads

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

Beam self weight calculated and added to loading

Loads on all spans...

Uniform Load on ALL spans : D = 0.020, L = 0.0650 ksf, Tributary Width = 17.20 ft

Load for Span Number 1

Point Load : D = 7.90, S = 3.0 k @ 8.20 ft, (P col 1)

Load for Span Number 2

Point Load : D = 5.0, S = 4.0 k @ 0.0 ft, (P col 2)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio		=	1.000 : 1	Maximum Shear Stress Ratio		=	0.605 : 1
Section used for this span			6.75x22.5	Section used for this span			6.75x22.5
fb: Actual	=		2,203.62 psi	f _v : Actual	=		160.28 psi
Fb: Allowable	=		2,204.38 psi	Fv: Allowable	=		265.00 psi
Load Combination	=		+D+L	Load Combination	=		+D+L
Location of maximum on span	=		8.227 ft	Location of maximum on span	=		0.000 ft
Span # where maximum occurs	=		Span # 1	Span # where maximum occurs	=		Span # 1
Maximum Deflection							
Max Downward Transient Deflection		0.310 in	Ratio = 770 >= 360	Span: 1 : L Only			
Max Upward Transient Deflection		-0.181 in	Ratio = 542 >= 360	Span: 2 : L Only			
Max Downward Total Deflection		0.603 in	Ratio = 396 >= 240	Span: 1 : +D+L			
Max Upward Total Deflection		-0.352 in	Ratio = 278 >= 240	Span: 2 : +D+L			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L		M	f _b	F' _b	V	f _v	F' _v
D Only																	
Length = 19.90 ft	1	0.582	0.313	0.90	0.918	1.00	1.00	1.00	1.00	1.00		54.79	1,154.38	1983.94	7.57	74.72	238.50
Length = 4.10 ft	2	0.040	0.313	0.90	1.000	1.00	1.00	1.00	1.00	1.00		3.17	66.75	1665.00	0.85	74.72	238.50
+D+L																	
Length = 19.90 ft	1	1.000	0.605	1.00	0.918	1.00	1.00	1.00	1.00	1.00		104.59	2,203.62	2204.38	16.23	160.28	265.00
Length = 4.10 ft	2	0.143	0.605	1.00	1.000	1.00	1.00	1.00	1.00	1.00		12.56	264.74	1850.00	3.36	160.28	265.00
+D+S																	
Length = 19.90 ft	1	0.575	0.302	1.15	0.918	1.00	1.00	1.00	1.00	1.00		69.22	1,458.42	2535.04	9.33	92.14	304.75

PRCTI20221698

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25 PCS STRUCTURAL SOLUTIONS (c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) floor bm at col demo - Grid 7/F (left)

Maximum Forces & Stresses for Load Combinations

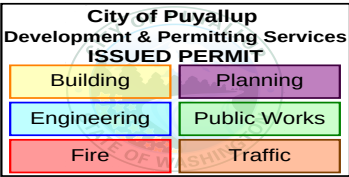
Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L		M	fb	F'b	V	fv	F'v
Length = 4.10 ft	2	0.031	0.302	1.15	1.000	1.00	1.00	1.00	1.00	1.00		3.17	66.75	2127.50	0.85	92.14	304.75

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.6026	9.783	+D+L	0.0000	0.000
	2	0.0000	9.783		-0.3520	4.100

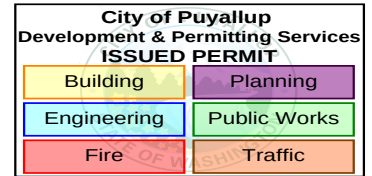
Vertical Reactions

Load Combination	Support notation : Far left is #1			Values in KIPS		
	Support 1	Support 2	Support 3			
Overall MAXimum	18.888	29.890				
Overall MINimum	1.764	5.236				
+D+L	18.888	29.890				
+D+S	10.000	18.946				
D Only	8.236	13.710				
L Only	10.652	16.180				
S Only	1.764	5.236				



PRCTI20221698

Project Title: CHC Puyallup
Engineer: LMC
Project ID:
Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) floor bm at col demo - Grid 7/F (right)

CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : IBC 2018

Wood Species : DF/DF

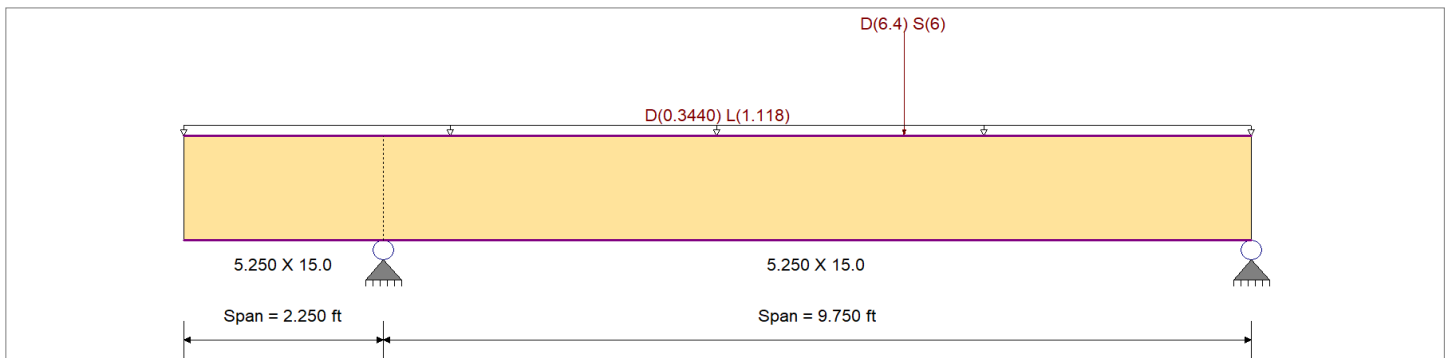
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb + 2,400.0 psi
Fb - 1,850.0 psi
Fc - Prll 1,650.0 psi
Fc - Perp 650.0 psi
Fv 265.0 psi
Ft 1,100.0 psi

E : Modulus of Elasticity

Ebend- xx 1,800.0ksi
Eminbend - xx 950.0ksi
Ebend- yy 1,600.0ksi
Eminbend - yy 850.0ksi
Density 31.210pcf



Applied Loads

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

Beam self weight calculated and added to loading

Loads on all spans...

Uniform Load on ALL spans : D = 0.020, L = 0.0650 ksf, Tributary Width = 17.20 ft

Load for Span Number 2

Point Load : D = 6.40, S = 6.0 k @ 5.850 ft, (P col 3)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.770 : 1	Maximum Shear Stress Ratio	=	0.639 : 1
Section used for this span		5.250 X 15.0	Section used for this span		5.250 X 15.0
fb: Actual	=	1,847.94psi	fv: Actual	=	169.41 psi
Fb: Allowable	=	2,400.00psi	Fv: Allowable	=	265.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	5.828ft	Location of maximum on span	=	8.552 ft
Span # where maximum occurs	=	Span # 2	Span # where maximum occurs	=	Span # 2
Maximum Deflection					
Max Downward Transient Deflection	0.075 in	Ratio = 1555 >= 360	Span: 2 : L Only		
Max Upward Transient Deflection	-0.047 in	Ratio = 1138 >= 360	Span: 1 : L Only		
Max Downward Total Deflection	0.211 in	Ratio = 553 >= 240	Span: 2 : +D+0.750L+0.750S		
Max Upward Total Deflection	-0.136 in	Ratio = 396 >= 240	Span: 1 : +D+0.750L+0.750S		

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L		M	fb	F'b	V	fv	F'v
D Only																	
Length = 2.250 ft	1	0.033	0.318	0.90	1.000	1.00	1.00	1.00	1.00	1.00		0.91	55.71	1665.00	3.98	75.83	238.50
Length = 9.750 ft	2	0.527	0.405	0.90	1.000	1.00	1.00	1.00	1.00	1.00		18.68	1,138.53	2160.00	5.07	96.64	238.50
+D+L																	
Length = 2.250 ft	1	0.123	0.602	1.00	1.000	1.00	1.00	1.00	1.00	1.00		3.74	228.20	1850.00	8.38	159.66	265.00
Length = 9.750 ft	2	0.770	0.639	1.00	1.000	1.00	1.00	1.00	1.00	1.00		30.32	1,847.94	2400.00	8.89	169.41	265.00
+D+S																	
Length = 2.250 ft	1	0.026	0.399	1.15	1.000	1.00	1.00	1.00	1.00	1.00		0.91	55.71	2127.50	6.38	121.55	304.75
Length = 9.750 ft	2	0.721	0.542	1.15	1.000	1.00	1.00	1.00	1.00	1.00		32.67	1,991.12	2760.00	8.67	165.22	304.75

PRCTI20221698

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25 PCS STRUCTURAL SOLUTIONS (c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) floor bm at col demo - Grid 7/F (right)

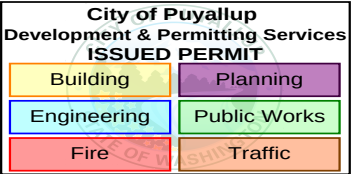
Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+0.750L+0.750S	-0.1357	0.000
+D+0.750L+0.750S	2	0.2114	5.120		0.0000	0.000

Vertical Reactions

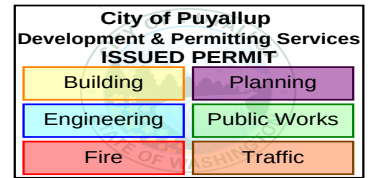
Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		13.482	12.076
Overall MINimum		2.400	3.600
+D+L		13.482	10.666
+D+S		7.626	9.106
+D+0.750L+0.750S		13.218	12.076
D Only		5.226	5.506
L Only		8.256	5.160
S Only		2.400	3.600



PRCTI20221698

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:



Wood Column

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: New wood post 1st floor at col F/7 demo

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
 Load Combinations Used : IBC 2018

General Information

Analysis Method	Allowable Stress Design			Wood Section Name	5.125x7.5	
End Fixities	Top & Bottom Pinned			Wood Grading/Manuf.	Western	
Overall Column Height	9.5 ft			Wood Member Type	GLB	
(Used for non-slender calculations)						
Wood Species	GluLam Column, Species: DF			Exact Width	5.125 in	Allow Stress Modification Factors
Wood Grade				Exact Depth	7.50 in	Cf or Cv for Bending 1.0
Fb +	1300 psi	Fv	230 psi	Area	38.438 in^2	Cf or Cv for Compression 1.0
Fb -	106125.9 psi	Ft	1250 psi	Ix	180.176 in^4	Cf or Cv for Tension 1.0
Fc - Prll	1600 psi	Density	0 pcf	Iy	84.132 in^4	Cm : Wet Use Factor 1.0
Fc - Perp	560 psi					Ct : Temperature Fact 1.0
E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial			Cfu : Flat Use Factor 1.0
	Basic	1600	1600	1600 ksi	Kf : Built-up columns 1.0 NDS 15.3.2	
	Minimum	850	850	Use Cr : Repetitive ? No		
Brace condition for deflection (buckling) along columns :						
X-X (width) axis :					Unbraced Length for buckling ABOUT Y-Y Axis = 9.5 ft,	
Y-Y (depth) axis :					Unbraced Length for buckling ABOUT X-X Axis = 9.5 ft, I	

Applied Loads

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

Column self weight included : 0.0 lbs * Dead Load Factor

AXIAL LOADS . . .

Axial Load at 9.50 ft, D = 14.0, L = 16.0, S = 5.30 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =	0.6876 : 1	Maximum SERVICE Lateral Load Reactions . .	
Load Combination	+D+L	Top along Y-Y	0.0 k
Governing NDS Formula	Comp Only, f_c/F_c'	Bottom along Y-Y	0.0 k
Location of max.above base	9.50 ft	Top along X-X	0.0 k
At maximum location values are .		Bottom along X-X	0.0 k
Applied Axial	30.0 k	Maximum SERVICE Load Lateral Deflections . . .	
Applied Mx	0.0 k-ft	Along Y-Y	0.0 in at 0.0 ft above base
Applied My	0.0 k-ft	for load combination : n/a	
Fc : Allowable	1,135.04 psi	Along X-X	0.0 in at 0.0 ft above base
		for load combination : n/a	
PASS Maximum Shear Stress Ratio =	0.0 : 1	Other Factors used to calculate allowable stresses . . .	
Load Combination	+D+0.750L+0.750S	Bending	Compression
Location of max.above base	9.50 ft	Tension	
Applied Design Shear	0.0 psi		
Allowable Shear	264.50 psi		

Load Combination Results

Load Combination	C _D	C _P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location
+D+L	1.000	0.709	0.6876	PASS	9.50 ft	0.0	PASS	9.50 ft
+D+S	1.150	0.648	0.4211	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S	1.150	0.648	0.6540	PASS	0.0 ft	0.0	PASS	9.50 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top	@ Base	@ Top
+D+L						30.000				
+D+S						19.300				
+D+0.750L+0.750S						29.975				
D Only						14.000				

PRCTI20221698

Wood Column

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: New wood post 1st floor at col F/7 demo

Maximum Reactions

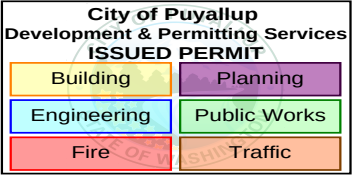
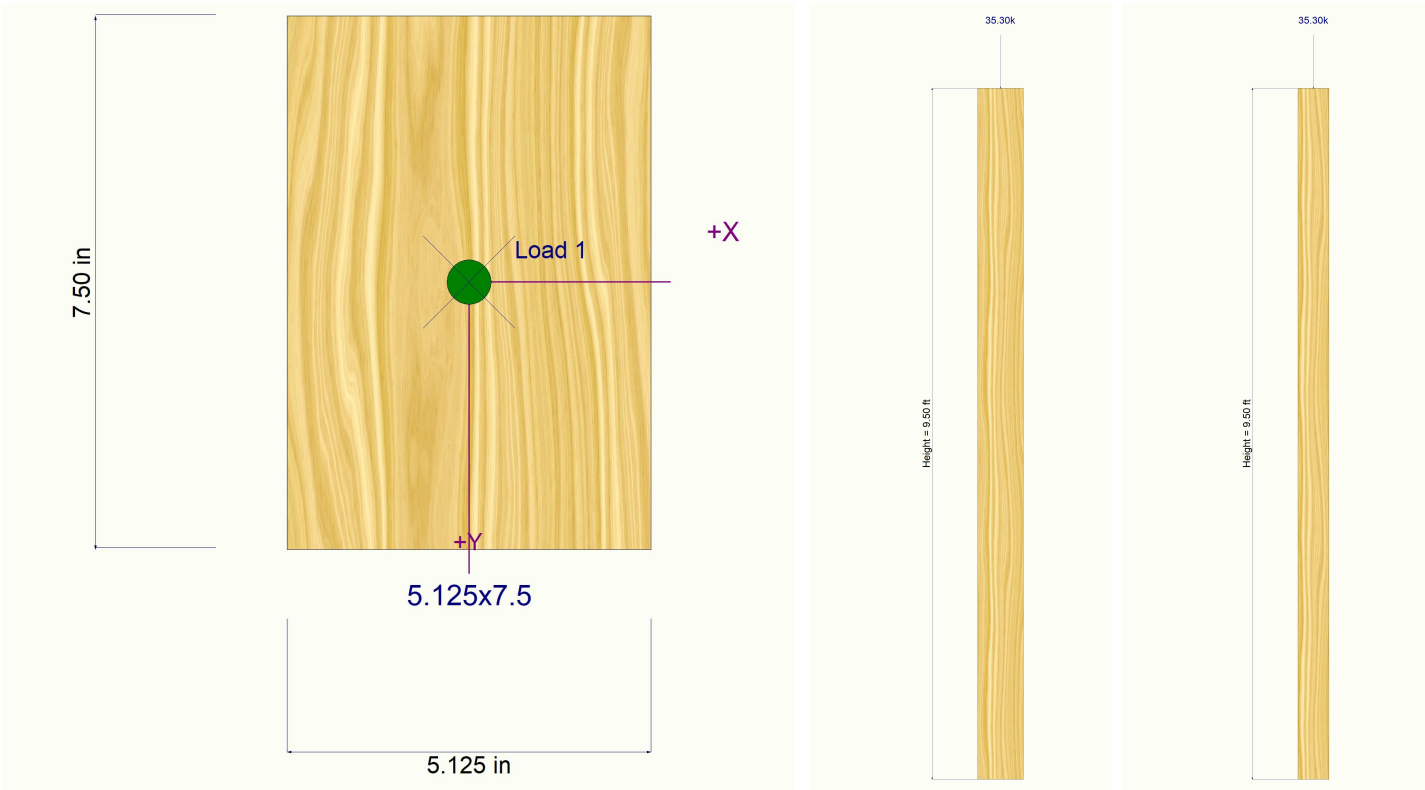
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top		@ Base	@ Top
L Only						16.000					
S Only						5.300					

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
+D+L	0.0000 in	0.000ft	0.000 in	0.000 ft
+D+S	0.0000 in	0.000ft	0.000 in	0.000 ft
+D+0.750L+0.750S	0.0000 in	0.000ft	0.000 in	0.000 ft
D Only	0.0000 in	0.000ft	0.000 in	0.000 ft
L Only	0.0000 in	0.000ft	0.000 in	0.000 ft
S Only	0.0000 in	0.000ft	0.000 in	0.000 ft

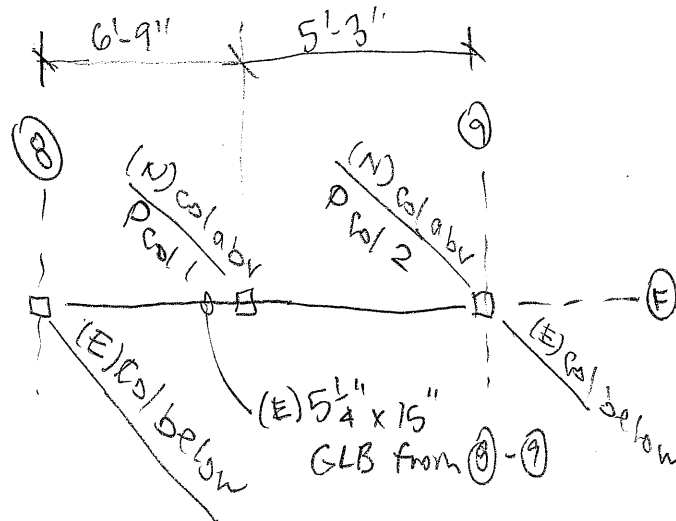
Sketches



check 2nd Floor bms @ demold 2nd story cols & new posts from roof bms

Ⓢ/Ⓢ.6

2nd Floor plan:

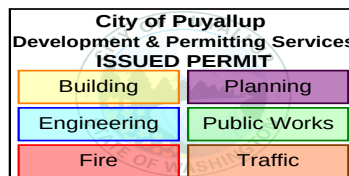
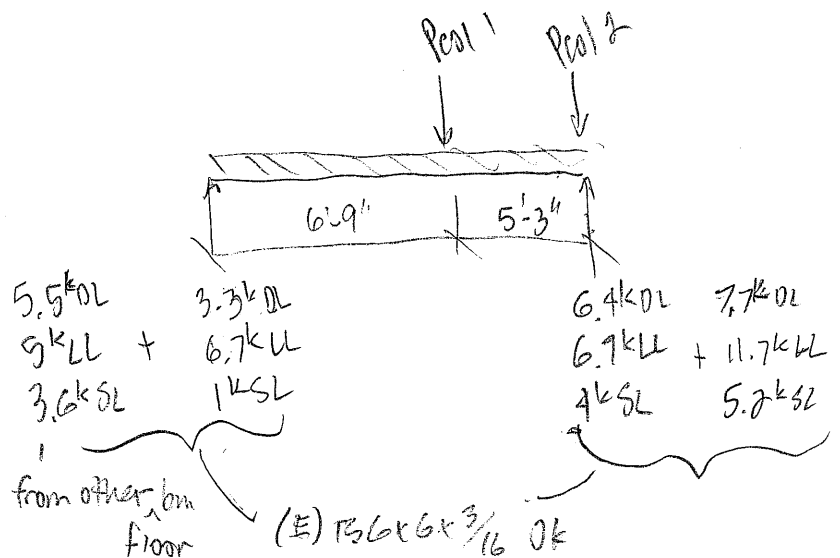


W Floor = 20 PSF DL
65 PSF LL

trib l to bms = (18' + 16.33') / 2 = 17.2'

Pcol 1 = 2.9 k DL + 2.3 k SL
Pcol 2 = 2.8 k DL + 2.7 k SL

- See enerrate
(E) Floor bms OK



Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services	
ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) Floor Bm with new posts above - grid F/8-9

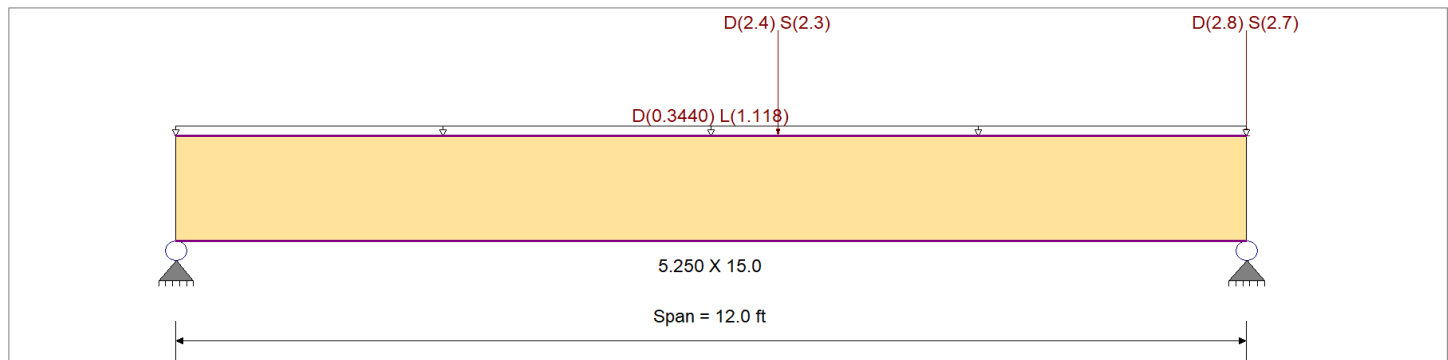
CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design	Fb + 2400 psi	E : Modulus of Elasticity
Load Combination : IBC 2018	Fb - 1850 psi	Ebend- xx 1800ksi
	Fc - Prll 1650 psi	Eminbend - xx 950ksi
Wood Species : DF/DF	Fc - Perp 650 psi	Ebend- yy 1600ksi
Wood Grade : 24F-V4	Fv 265 psi	Eminbend - yy 850ksi
	Ft 1100 psi	Density 31.21pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling		



Applied Loads

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

Beam self weight calculated and added to loading

Loads on all spans...

Uniform Load on ALL spans : D = 0.020, L = 0.0650 ksf, Tributary Width = 17.20 ft

Point Load : D = 2.40, S = 2.30 k @ 6.750 ft, (Pcol 1)

Point Load : D = 2.80, S = 2.70 k @ 12.0 ft, (P col 2)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.846	1	Maximum Shear Stress Ratio	=	0.605	: 1
Section used for this span		5.250 X 15.0		Section used for this span		5.250 X 15.0	
fb: Actual	=	2,029.46psi		fv: Actual	=	160.20 psi	
Fb: Allowable	=	2,400.00psi		Fv: Allowable	=	265.00 psi	
Load Combination		+D+L+H		Load Combination		+D+L+H	
Location of maximum on span	=	6.701ft		Location of maximum on span	=	10.774 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection	0.197 in	Ratio =	729 >= 360	Span: 1 : L Only			
Max Upward Transient Deflection	0 in	Ratio =	0 < 360	n/a			
Max Downward Total Deflection	0.316 in	Ratio =	455 >= 240	Span: 1 : +D+L+H			
Max Upward Total Deflection	0 in	Ratio =	0 < 240	n/a			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L		M	fb	F'b	V	fv	F'v
+D+H														0.00			
Length = 12.0 ft	1	0.380	0.245	0.90	1.000	1.00	1.00	1.00	1.00	1.00		13.48	821.69	2160.00	3.07	58.55	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00			
Length = 12.0 ft	1	0.846	0.605	1.00	1.000	1.00	1.00	1.00	1.00	1.00		33.30	2,029.46	2400.00	8.41	160.20	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00			
Length = 12.0 ft	1	0.274	0.177	1.25	1.000	1.00	1.00	1.00	1.00	1.00		13.48	821.69	3000.00	3.07	58.55	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00			
Length = 12.0 ft	1	0.448	0.273	1.15	1.000	1.00	1.00	1.00	1.00	1.00		20.27	1,235.36	2760.00	4.37	83.19	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00			
Length = 12.0 ft	1	0.576	0.407	1.25	1.000	1.00	1.00	1.00	1.00	1.00		28.34	1,727.48	3000.00	7.08	134.79	331.25

PRCTI20221698

Project Title: **CHC Puyallup**
 Engineer: **LMC**
 Project ID:
 Project Descr:

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) Floor Bm with new posts above - grid F/8-9

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios			C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values			Shear Values		
			M	V									M	fb	F'b	V	fv	F'v
+D+0.750L+0.750S+H						1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.0 ft	1		0.738	0.503	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.00	33.43	2,037.73	2760.00	8.05	153.27	304.75

Overall Maximum Deflections

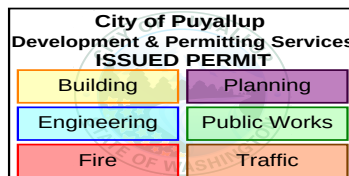
Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.3164	6.088		0.0000	0.000

Vertical Reactions

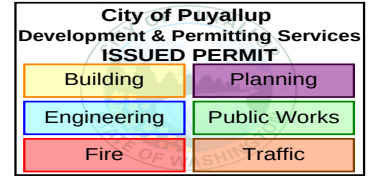
Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	9.924	14.343
Overall MINimum	1.006	3.994
+D+L+H	9.924	13.024
+D+Lr+H	3.216	6.316
+D+S+H	4.223	10.310
+D+0.750Lr+0.750L+H	8.247	11.347
+D+0.750L+0.750S+H	9.002	14.343
D Only	3.216	6.316
L Only	6.708	6.708
S Only	1.006	3.994

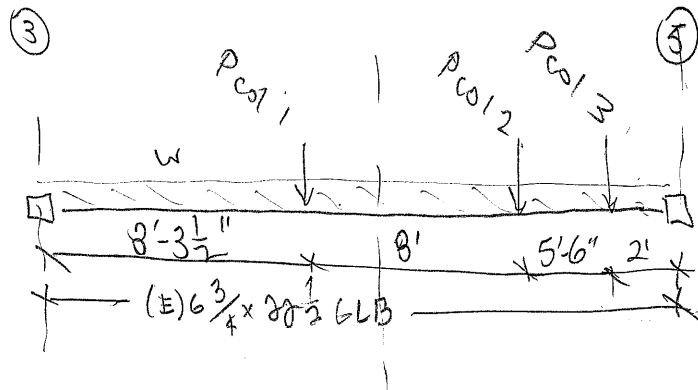


PRCTI20221698



2nd Floor Bms @ demol 2nd story cols, continued

Ⓐ / 4.7



$$P_{col 1} = 5.4^k DL + 5^k SL$$

$$P_{col 2} = 3.0^k DL + 2.9^k SL$$

$$P_{col 3} = 2.4^k DL + 2.5^k SL$$

$W = 20 \text{ PSF DL} - \text{actual} = 16 \text{ PSF, use for this calc}$

$+ 39 \text{ PSF} + 15 \text{ PSF} - \text{only partitions on East side of grid, use } 39 \text{ PSF west of grid } \textcircled{F}$
use $39 + 15$ East of grid $\textcircled{F}$

$$trib = 17.2'$$

LL reduction

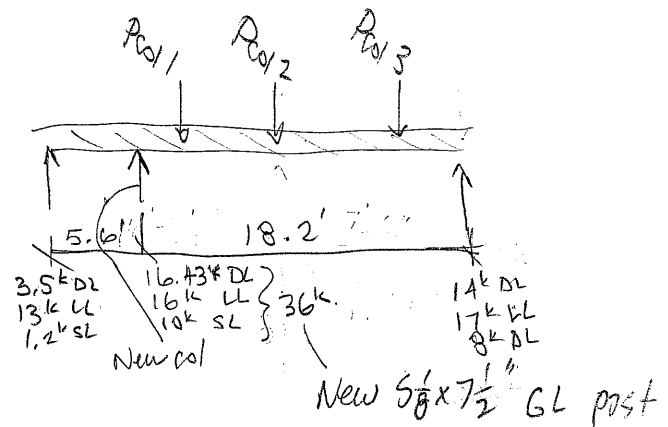
$$A = 17.2' \times 23.8' = 410 \text{ ft}^2$$

$$LL = 50 \times \left(1.25 + \frac{15}{\sqrt{2 \times 410}} \right) = 39 \text{ PSF}$$

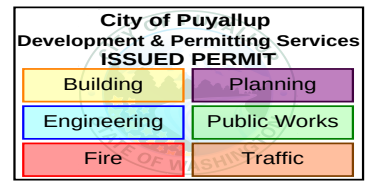
(E) bm N.G., Add col in wall below

Now (E) bm OK.

$$\text{New FND} = \frac{36^k}{5' \times 5'} = 1440 \text{ PSF} < 1500'$$



Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) Floor Bm with new posts above - grid F/4.7

CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : IBC 2018

Wood Species : DF/DF

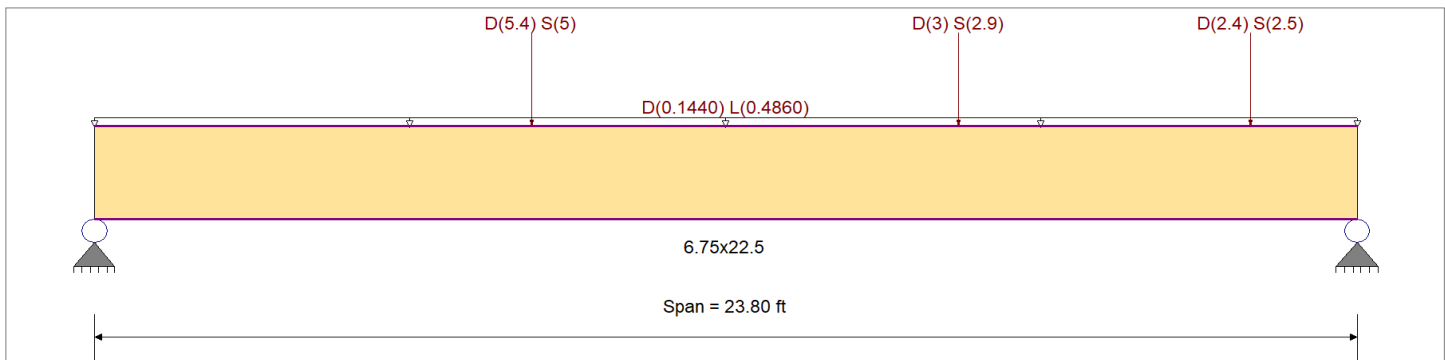
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb + 2,400.0 psi
 Fb - 1,850.0 psi
 Fc - Prll 1,650.0 psi
 Fc - Perp 650.0 psi
 Fv 265.0 psi
 Ft 1,100.0 psi

E : Modulus of Elasticity

Ebend- xx 1,800.0 ksi
 Eminbend - xx 950.0 ksi
 Ebend- yy 1,600.0 ksi
 Eminbend - yy 850.0 ksi
 Density 31.210 pcf



Applied Loads

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

Beam self weight calculated and added to loading

Loads on all spans...

Uniform Load on ALL spans : D = 0.0160, L = 0.0540 ksf, Tributary Width = 9.0 ft

Uniform Load on ALL spans : D = 0.0160, L = 0.0390 ksf, Tributary Width = 8.20 ft

Point Load : D = 5.40, S = 5.0 k @ 8.250 ft, (Pcol 1)

Point Load : D = 3.0, S = 2.90 k @ 16.30 ft, (P col 2)

Point Load : D = 2.40, S = 2.50 k @ 21.80 ft, (P col 3)

No good, therefore add new col below to shorten (E) bm span

DESIGN SUMMARY

Design N.G.

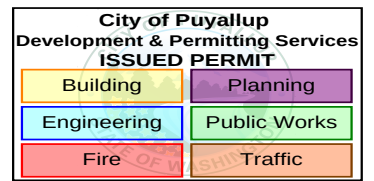
Maximum Bending Stress Ratio				=	1.119	1	Maximum Shear Stress Ratio				=	0.647	1
Section used for this span					6.75x22.5					Section used for this span			
fb: Actual				=	2,423.69psi					fv: Actual			
Fb: Allowable				=	2,165.28psi					Fv: Allowable			
Load Combination					+D+L+H					Load Combination			
Location of maximum on span				=	11.292ft					Location of maximum on span			
Span # where maximum occurs				=	Span # 1					Span # where maximum occurs			
Maximum Deflection													
Max Downward Transient Deflection					0.507 in	Ratio =	562	>=360		Span: 1 : L Only			
Max Upward Transient Deflection					0 in	Ratio =	0	<360		n/a			
Max Downward Total Deflection					1.138 in	Ratio =	251	>=240		Span: 1 : +D+0.750L+0.750S+H			
Max Upward Total Deflection					0 in	Ratio =	0	<240		n/a			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L		M	fb	F'b	V	fv	F'v
+D+H														0.00			
Length = 23.80 ft	1	0.634	0.382	0.90	0.902	1.00	1.00	1.00	1.00	1.00		58.59	1,234.57	1948.75	9.23	91.15	238.50
+D+L+H														0.00			
Length = 23.80 ft	1	1.119	0.647	1.00	0.902	1.00	1.00	1.00	1.00	1.00		115.03	2,423.69	2165.28	17.35	171.34	265.00
+D+Lr+H														0.00			
Length = 23.80 ft	1	0.456	0.275	1.25	0.902	1.00	1.00	1.00	1.00	1.00		58.59	1,234.57	2706.60	9.23	91.15	331.25
+D+S+H														0.00			
Length = 23.80 ft	1	0.800	0.494	1.15	0.902	1.00	1.00	1.00	1.00	1.00		94.56	1,992.32	2490.07	15.24	150.50	304.75

PRCTI20221698

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) Floor Bm with new posts above - grid F/4.7

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios		C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values			Shear Values		
			M	V								M	fb	F'b	V	fv	F'v
+D+0.750Lr+0.750L+H	Length = 23.80 ft	1	0.785	0.457	1.25	0.902	1.00	1.00	1.00	1.00	1.00	100.82	2,124.27	2706.60	15.32	151.30	331.25
+D+0.750L+0.750S+H	Length = 23.80 ft	1	1.073	0.643	1.15	0.902	1.00	1.00	1.00	1.00	1.00	126.80	2,671.62	2490.07	19.83	195.81	304.75

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+H	1	1.1376	11.900		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	18.827	21.490
Overall MINimum	4.391	6.009
+D+L+H	17.931	19.380
+D+Lr+H	8.342	9.791
+D+S+H	12.733	15.801
+D+0.750Lr+0.750L+H	15.534	16.983
+D+0.750L+0.750S+H	18.827	21.490
D Only	8.342	9.791
L Only	9.589	9.589
S Only	4.391	6.009

PRCTI20221698

Project Title: **CHC Puyallup**
 Engineer: **LMC**
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: (E) Floor Bm with new posts above and new post below - grid F/4.7

CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : IBC 2018

Wood Species : DF/DF

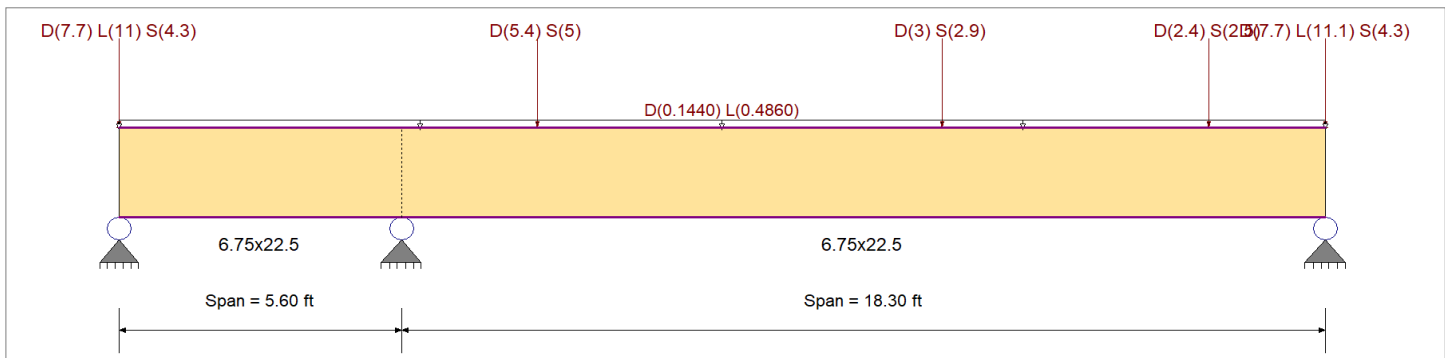
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb + 2,400.0 psi
 Fb - 1,850.0 psi
 Fc - Prll 1,650.0 psi
 Fc - Perp 650.0 psi
 Fv 265.0 psi
 Ft 1,100.0 psi

E : Modulus of Elasticity

Ebend- xx 1,800.0 ksi
 Eminbend - xx 950.0 ksi
 Ebend- yy 1,600.0 ksi
 Eminbend - yy 850.0 ksi
 Density 31.210 pcf



Applied Loads

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

Beam self weight calculated and added to loading

Loads on all spans...

Uniform Load on ALL spans : D = 0.0160, L = 0.0540 ksf, Tributary Width = 9.0 ft

Uniform Load on ALL spans : D = 0.0160, L = 0.0390 ksf, Tributary Width = 8.20 ft

Load for Span Number 1

Point Load : D = 7.70, L = 11.0, S = 4.30 k @ 0.0 ft, (Adjacent Bm)

Load for Span Number 2

Point Load : D = 2.40, S = 2.50 k @ 16.0 ft, (P col 3)

Point Load : D = 5.40, S = 5.0 k @ 2.70 ft, (P col 1)

Point Load : D = 3.0, S = 2.90 k @ 10.70 ft, (P col 2)

Point Load : D = 7.70, L = 11.10, S = 4.30 k @ 18.30 ft, (Adjacent Bm)

DESIGN SUMMARY

Design OK

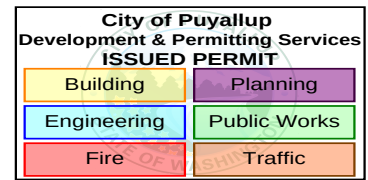
Maximum Bending Stress Ratio				=	0.674	1	Maximum Shear Stress Ratio				=	0.664	: 1
Section used for this span					6.75x22.5		Section used for this span					6.75x22.5	
fb: Actual				=	1,155.58	psi	fv: Actual				=	202.47	psi
Fb: Allowable				=	1,713.51	psi	Fv: Allowable				=	304.75	psi
Load Combination					+D+L+H, LL Comb Run (LL)		Load Combination					+D+0.750L+0.750S+H, LL Comb Run (LL)	
Location of maximum on span				=	0.000ft		Location of maximum on span				=	5.600 ft	
Span # where maximum occurs				=	Span # 2		Span # where maximum occurs				=	Span # 1	
Maximum Deflection													
Max Downward Transient Deflection					0.097	in	Ratio =	2262	>=360	Span: 2 : L Only, LL Comb Run (*L)			
Max Upward Transient Deflection					-0.008	in	Ratio =	8569	>=360	Span: 2 : L Only, LL Comb Run (L*)			
Max Downward Total Deflection					0.214	in	Ratio =	1025	>=240	Span: 2 : +D+0.750L+0.750S+H, LL Comb Run (*L)			
Max Upward Total Deflection					-0.018	in	Ratio =	3769	>=240	Span: 1 : +D+0.750L+0.750S+H, LL Comb Run (*L)			

Maximum Forces & Stresses for Load Combinations

Maximum Forces & Stresses for Load Combinations																
Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 5.60 ft	1	0.358	0.412	0.90	1.000	1.00	1.00	1.00	1.00	1.00	28.28	595.79	1665.00	9.95	98.25	238.50
Length = 18.30 ft	2	0.386	0.412	0.90	0.926	1.00	1.00	1.00	1.00	1.00	28.28	595.79	1542.16	9.95	98.25	238.50

PRCTI20221698

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: (E) Floor Bm with new posts above and new post below - grid F/4.7

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	f _b	F'b	V	f _v	F'v	
+D+L+H, LL Comb Run (*L)					0.926	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 5.60 ft	1	0.616	0.643	1.00	1.000	1.00	1.00	1.00	1.00	1.00	54.10	1,139.99	1850.00	17.25	170.37	265.00	
Length = 18.30 ft	2	0.665	0.643	1.00	0.926	1.00	1.00	1.00	1.00	1.00	54.10	1,139.99	1713.51	17.25	170.37	265.00	
+D+L+H, LL Comb Run (L*)					0.926	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 5.60 ft	1	0.330	0.372	1.00	1.000	1.00	1.00	1.00	1.00	1.00	29.02	611.39	1850.00	9.99	98.65	265.00	
Length = 18.30 ft	2	0.357	0.372	1.00	0.926	1.00	1.00	1.00	1.00	1.00	29.02	611.39	1713.51	9.99	98.65	265.00	
+D+L+H, LL Comb Run (LL)					0.926	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 5.60 ft	1	0.625	0.644	1.00	1.000	1.00	1.00	1.00	1.00	1.00	54.85	1,155.58	1850.00	17.29	170.77	265.00	
Length = 18.30 ft	2	0.674	0.644	1.00	0.926	1.00	1.00	1.00	1.00	1.00	54.85	1,155.58	1713.51	17.29	170.77	265.00	
+D+Lr+H, LL Comb Run (*L)					0.926	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 5.60 ft	1	0.258	0.297	1.25	1.000	1.00	1.00	1.00	1.00	1.00	28.28	595.79	2312.50	9.95	98.25	331.25	
Length = 18.30 ft	2	0.278	0.297	1.25	0.926	1.00	1.00	1.00	1.00	1.00	28.28	595.79	2141.89	9.95	98.25	331.25	
+D+Lr+H, LL Comb Run (L*)					0.926	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 5.60 ft	1	0.258	0.297	1.25	1.000	1.00	1.00	1.00	1.00	1.00	28.28	595.79	2312.50	9.95	98.25	331.25	
Length = 18.30 ft	2	0.278	0.297	1.25	0.926	1.00	1.00	1.00	1.00	1.00	28.28	595.79	2141.89	9.95	98.25	331.25	
+D+Lr+H, LL Comb Run (LL)					0.926	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 5.60 ft	1	0.258	0.297	1.25	1.000	1.00	1.00	1.00	1.00	1.00	28.28	595.79	2312.50	9.95	98.25	331.25	
Length = 18.30 ft	2	0.278	0.297	1.25	0.926	1.00	1.00	1.00	1.00	1.00	28.28	595.79	2141.89	9.95	98.25	331.25	
+D+S+H					0.926	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 5.60 ft	1	0.451	0.540	1.15	1.000	1.00	1.00	1.00	1.00	1.00	45.59	960.53	2127.50	16.68	164.69	304.75	
Length = 18.30 ft	2	0.487	0.540	1.15	0.926	1.00	1.00	1.00	1.00	1.00	45.59	960.53	1970.54	16.68	164.69	304.75	
+D+0.750Lr+0.750L+H, LL Col					0.926	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 5.60 ft	1	0.434	0.460	1.25	1.000	1.00	1.00	1.00	1.00	1.00	47.65	1,003.94	2312.50	15.42	152.34	331.25	
Length = 18.30 ft	2	0.469	0.460	1.25	0.926	1.00	1.00	1.00	1.00	1.00	47.65	1,003.94	2141.89	15.42	152.34	331.25	
+D+0.750Lr+0.750L+H, LL Col					0.926	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 5.60 ft	1	0.263	0.298	1.25	1.000	1.00	1.00	1.00	1.00	1.00	28.83	607.49	2312.50	9.98	98.55	331.25	
Length = 18.30 ft	2	0.284	0.298	1.25	0.926	1.00	1.00	1.00	1.00	1.00	28.83	607.49	2141.89	9.98	98.55	331.25	
+D+0.750Lr+0.750L+H, LL Col					0.926	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 5.60 ft	1	0.439	0.461	1.25	1.000	1.00	1.00	1.00	1.00	1.00	48.20	1,015.64	2312.50	15.45	152.64	331.25	
Length = 18.30 ft	2	0.474	0.461	1.25	0.926	1.00	1.00	1.00	1.00	1.00	48.20	1,015.64	2141.89	15.45	152.64	331.25	
+D+0.750L+0.750S+H, LL Cor					0.926	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 5.60 ft	1	0.600	0.663	1.15	1.000	1.00	1.00	1.00	1.00	1.00	60.63	1,277.49	2127.50	20.47	202.17	304.75	
Length = 18.30 ft	2	0.648	0.663	1.15	0.926	1.00	1.00	1.00	1.00	1.00	60.63	1,277.49	1970.54	20.47	202.17	304.75	
+D+0.750L+0.750S+H, LL Cor					0.926	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 5.60 ft	1	0.414	0.487	1.15	1.000	1.00	1.00	1.00	1.00	1.00	41.82	881.04	2127.50	15.02	148.38	304.75	
Length = 18.30 ft	2	0.447	0.487	1.15	0.926	1.00	1.00	1.00	1.00	1.00	41.82	881.04	1970.54	15.02	148.38	304.75	
+D+0.750L+0.750S+H, LL Cor					0.926	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 5.60 ft	1	0.606	0.664	1.15	1.000	1.00	1.00	1.00	1.00	1.00	61.19	1,289.19	2127.50	20.50	202.47	304.75	
Length = 18.30 ft	2	0.654	0.664	1.15	0.926	1.00	1.00	1.00	1.00	1.00	61.19	1,289.19	1970.54	20.50	202.47	304.75	

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+H, LL Comb F	1	0.0000	0.000	+D+0.750L+0.750S+H, LL Comb F	-0.0178	3.254
	2	0.2141	10.121		0.0000	3.254

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	16.637	35.660	32.399
Overall MINimum	1.209	9.818	7.973
+D+L+H, LL Comb Run (*L)	-1.099	29.824	30.685
+D+L+H, LL Comb Run (L*)	16.637	18.856	13.583
+D+L+H, LL Comb Run (LL)	12.025	32.253	30.645
+D+Lr+H, LL Comb Run (*L)	3.513	16.427	13.623
+D+Lr+H, LL Comb Run (L*)	3.513	16.427	13.623
+D+Lr+H, LL Comb Run (LL)	3.513	16.427	13.623
+D+S+H	4.722	26.245	21.596
+D+0.750Lr+0.750L+H, LL Comb Run (*)	0.054	26.475	26.420
+D+0.750Lr+0.750L+H, LL Comb Run (L)	13.356	18.249	13.593

PRCTI20221698

Project Title: CHC Puyallup
Engineer: LMC
Project ID:
Project Descr:

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

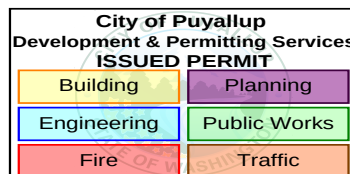
DESCRIPTION: (E) Floor Bm with new posts above and new post below - grid F/4.7

Vertical Reactions

Support notation : Far left is #1

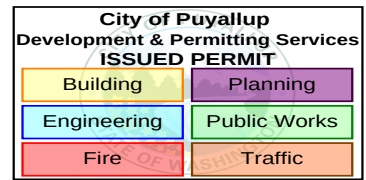
Values in KIPS

Load Combination	Support 1	Support 2	Support 3
+D+0.750Lr+0.750L+H, LL Comb Run (L	9.897	28.297	26.389
+D+0.750L+0.750S+H, LL Comb Run (*L	0.961	33.838	32.399
+D+0.750L+0.750S+H, LL Comb Run (L*	14.263	25.613	19.573
+D+0.750L+0.750S+H, LL Comb Run (LL	10.804	35.660	32.369
D Only	3.513	16.427	13.623
L Only, LL Comb Run (*L)	-4.612	13.397	17.062
L Only, LL Comb Run (L*)	13.124	2.429	-0.040
L Only, LL Comb Run (LL)	8.512	15.825	17.021
S Only	1.209	9.818	7.973



PRCTI20221698

Project Title: **CHC Puyallup**
 Engineer: **LMC**
 Project ID:
 Project Descr:



Wood Column

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: New wood post 1st floor at F/3-5 bm

Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
 Load Combinations Used : IBC 2018

General Information

Analysis Method :	Allowable Stress Design	Wood Section Name	5.125x7.5
End Fixities	Top & Bottom Pinned	Wood Grading/Manuf.	Western
Overall Column Height	9.5 ft	Wood Member Type	GLB
(Used for non-slender calculations)			
Wood Species	GluLam Column, Species: DF	Exact Width	5.125 in
Wood Grade	L2, >= 3 Laminations	Exact Depth	7.50 in
Fb +	1600 psi	Fv	230 psi
Fb -	106125.9 psi	Ft	1250 psi
Fc - Prll	1600 psi	Density	0 pcf
Fc - Perp	560 psi		
E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
	Basic	1600	1600
	Minimum	850	850
			1600 ksi
			Brace condition for deflection (buckling) along columns :
			X-X (width) axis : Unbraced Length for buckling ABOUT Y-Y Axis = 9.5 ft, K
			Y-Y (depth) axis : Unbraced Length for buckling ABOUT X-X Axis = 9.5 ft, K

Applied Loads

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

Column self weight included : 0.0 lbs * Dead Load Factor

AXIAL LOADS . . .

Axial Load at 9.50 ft, D = 16.50, L = 16.0, S = 10.0 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.7854 : 1**
 Load Combination +D+0.750L+0.750S
 Governing NDS Formula Comp Only, f_c/F_c'
 Location of max.above base 0.0 ft
 At maximum location values are . . .
 Applied Axial 36.0 k
 Applied Mx 0.0 k-ft
 Applied My 0.0 k-ft
 Fc : Allowable 1,192.49 psi

Maximum SERVICE Lateral Load Reactions . .
 Top along Y-Y 0.0 k Bottom along Y-Y 0.0 k
 Top along X-X 0.0 k Bottom along X-X 0.0 k

Maximum SERVICE Load Lateral Deflections . . .
 Along Y-Y 0.0 in at 0.0 ft above base
 for load combination : n/a
 Along X-X 0.0 in at 0.0 ft above base
 for load combination : n/a

Other Factors used to calculate allowable stresses . . .
 Bending Compression Tension

PASS Maximum Shear Stress Ratio = **0.0 : 1**
 Load Combination +D+0.750L+0.750S
 Location of max.above base 9.50 ft
 Applied Design Shear 0.0 psi
 Allowable Shear 264.50 psi

Load Combination Results

Load Combination	C _D	C _P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location
+D+L	1.000	0.709	0.7449	PASS	9.50 ft	0.0	PASS	9.50 ft
+D+S	1.150	0.648	0.5781	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S	1.150	0.648	0.7854	PASS	0.0 ft	0.0	PASS	9.50 ft

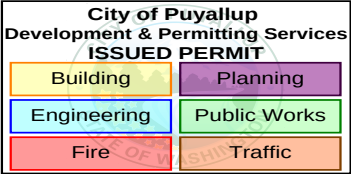
Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top	@ Base	@ Base	@ Top		@ Base	@ Top
+D+L						32.500					
+D+S						26.500					
+D+0.750L+0.750S						36.000					
D Only						16.500					

PRCTI20221698

Project Title: CHC Puyallup
Engineer: LMC
Project ID:
Project Descr:



Wood Column

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: New wood post 1st floor at F/3-5 bm

Maximum Reactions

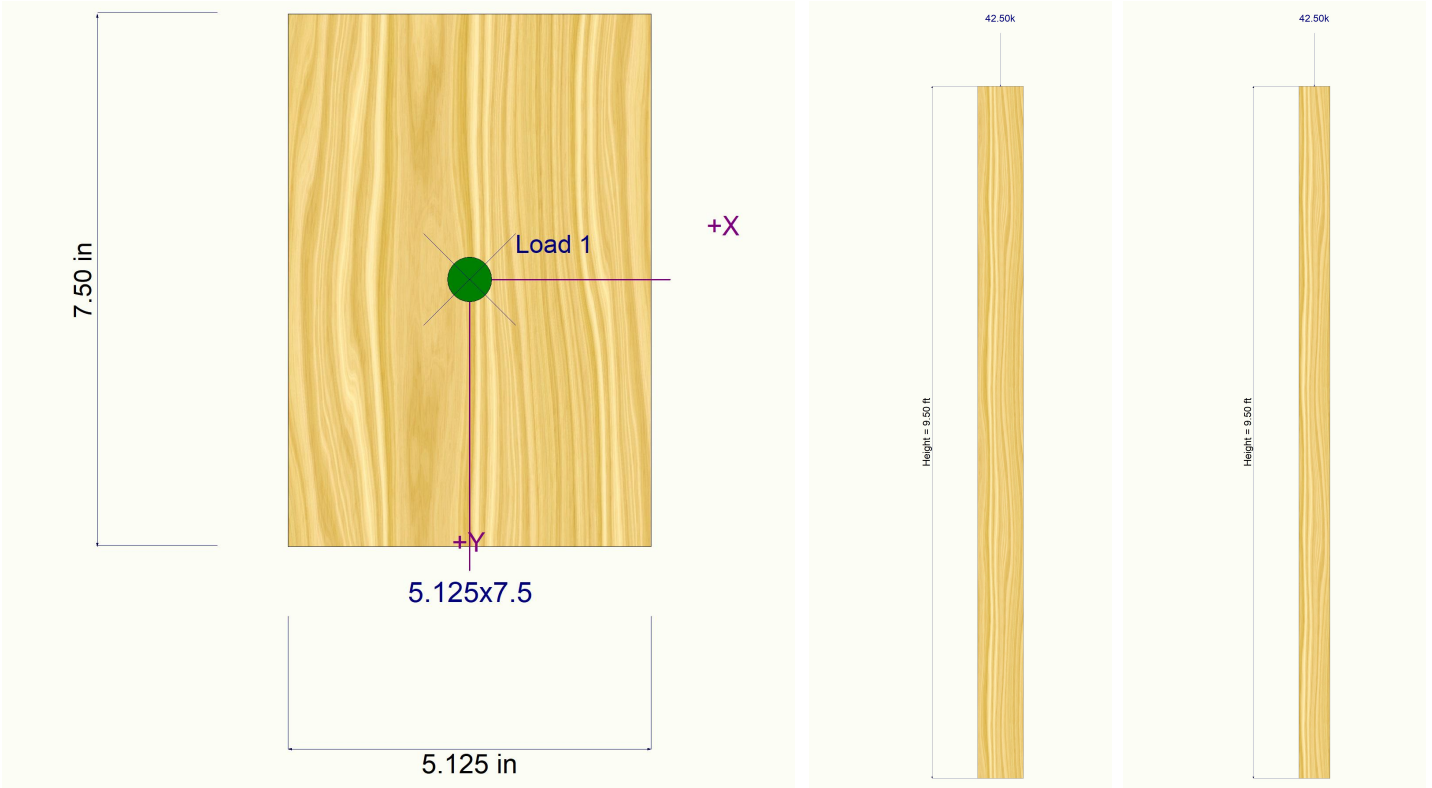
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top	@ Base	@ Base	@ Top		@ Base	@ Top
L Only						16.000					
S Only						10.000					

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
+D+L	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+S	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S	0.0000 in	0.000 ft	0.000 in	0.000 ft
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
L Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft

Sketches



2ND FLOOR LOAD SUMMARY

East of Grid (D) DL summary

Bigger Joists

FLOORING	= 1 PSF
15/32" STHG	= 1.5 PSF
1 1/2" Deck	= 3.5 PSF
3x12 @ 8'	= 11 PSF (5.5)
Mech	= 5 PSF
ceiling items	= 3 PSF
	<u>25 PSF - 20 PSF</u>

West of Grid (D) DL summary

FLOORING	= 1 PSF
15/32" STHG	= 1.5
3/4" Deck	= 1.8
2x10 @ 8'	= 7 - (3.5)
Mech (12)	= 5
ceiling	= 3
	<u>19.3 PSF - Use 20 PSF</u>

crawlspace DL summary

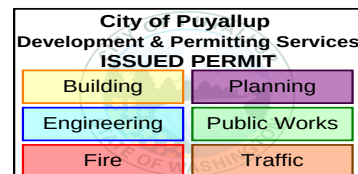
Flooring	= 1.5 PSF
3/4" STHG	= 2.3 PSF
1 7/8" TJI's	= 1.7 PSF (3.3/2)
Insul	= 1.5 PSF
Misc plumb	= 2
Mech	<u>9 PSF - Use 10 PSF</u>

LOADING LISTED ON (E) DWG

Roof SNOW = 25 PSF
Roof Dead = Actual
OFFICE LL = 50 PSF
OFFICE DL = Actual + 20 PSF part
CORR & EXITS = 100 PSF LL
= Actual DL
% (E) framing was designed
for loads matching new
loading. Check new egress
corridor framing locations

New LL

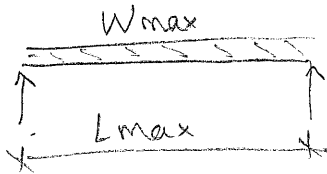
Roof = 25 PSF
Floor = 50 PSF + 15 PSF partition
Corridor = 80 PSF (2nd Floor)
Stair = 100 PSF
Corridor = 100 PSF (a ground)



Cheek (E) 1st Floor Crawlspace joists @ new LL

DL = 10 PSF

LL = 40 PSF (No partitions)
(patient rooms)



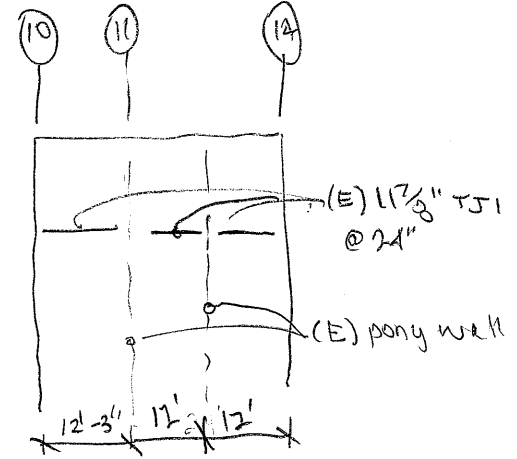
$$L_{max} = 12.25'$$

$$W_{max} = (10 + 40) \times 2' = 100\%$$

$$M_{max} = 1.9 k' < 6.75 k' \checkmark$$

$$V_{max} = 1.6 k < 1.9 k \checkmark$$

(E) Joists OK

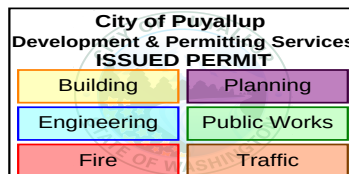


Field measured TJI flange width = 7 5/8"
depth = 1 1/8"

(E) LGS 1 1/8" TJI
M capacity = 6.75 k'
V capacity = 1.9 k'

Assumed
type based
on prev. logs
& field dims

Need field verified stamp



Joist Depth	Basic Properties						Reaction Properties ⁽⁴⁾⁽⁵⁾							
	Joist Weight (lbs/ft)	Resistive Moment ⁽¹⁾ (ft-lbs)	Vertical Shear ⁽²⁾ (lbs)	EI x 10 ⁶ (in. ² -lbs)	EI ⁽³⁾ x 10 ⁶ TJI® Joist with Nailed Floor Sheathing (in. ² -lbs)	EI ⁽³⁾ x 10 ⁶ TJI® Joist with Glue-Nailed Floor Sheathing (in. ² -lbs)	End Reaction (lbs)				Intermediate Reaction (lbs)			
							Bearing Length				Bearing Length			
							1 3/4" (2 1/2" for HS90)		3 1/2"		3 1/2"		5 1/4"	
							Web Stiffeners ⁽⁶⁾		Web Stiffeners ⁽⁶⁾		Web Stiffeners ⁽⁶⁾		Web Stiffeners ⁽⁶⁾	
							No	Yes	No	Yes	No	Yes	No	Yes
TJI® L65 Joist														
11 1/8"	3.3	6,750	1,925	450	512	561	1,375	1,745	1,885	1,925	2,745	3,120	3,365	3,735
14"	3.6	8,030	2,125	666	752	821	1,375	1,750	1,885	2,125	2,745	3,365	3,365	3,985
16"	3.9	9,210	2,330	913	1,025	1,116	1,375	1,750	1,885	2,330	2,745	3,490	3,365	4,105
18"	4.2	10,380	2,535	1,205	1,348	1,462	1,375	1,750	1,885	2,535	2,745	3,615	3,365	4,230
20"	4.4	11,540	2,740	1,545	1,722	1,864	N.A.	1,750	N.A.	2,740	N.A.	3,740	N.A.	4,355
22"	4.7	12,690	2,935	1,934	2,149	2,322	N.A.	1,750	N.A.	2,935	N.A.	3,860	N.A.	4,480
24"	5.0	13,830	3,060	2,374	2,632	2,838	N.A.	1,750	N.A.	3,060	N.A.	3,875	N.A.	4,605
26"	5.3	14,960	2,900	2,868	3,172	3,416	N.A.	1,750	N.A.	2,900	N.A.	4,725 ⁽⁷⁾	N.A.	5,345 ⁽⁸⁾
28"	5.5	16,085	2,900	3,417	3,772	4,056	N.A.	1,750	N.A.	2,900	N.A.	4,850 ⁽⁷⁾	N.A.	5,470 ⁽⁸⁾
30"	5.8	17,205	2,900	4,025	4,434	4,762	N.A.	1,750	N.A.	2,900	N.A.	4,975 ⁽⁷⁾	N.A.	5,590 ⁽⁸⁾
TJI® L90 Joist														
11 1/8"	4.2	9,605	1,925	621	687	741	1,400	1,715	1,885	1,925	3,350	3,665	3,965	4,285
14"	4.5	11,430	2,125	913	1,005	1,079	1,400	1,875	1,885	2,125	3,350	3,825	3,965	4,440
16"	4.7	13,115	2,330	1,246	1,366	1,462	1,400	2,030	1,885	2,330	3,350	3,980	3,965	4,600
18"	5.0	14,785	2,535	1,635	1,786	1,908	1,400	2,030	1,885	2,515	3,350	3,980	3,965	4,600
20"	5.3	16,435	2,740	2,085	2,272	2,422	N.A.	2,190	N.A.	2,675	N.A.	4,140	N.A.	4,755
22"	5.6	18,075	2,935	2,597	2,824	3,006	N.A.	2,345	N.A.	2,830	N.A.	5,090	N.A.	5,705
24"	5.8	19,700	3,060	3,172	3,442	3,659	N.A.	2,345	N.A.	2,830	N.A.	5,405	N.A.	6,020
26"	6.1	21,315	2,900	3,814	4,132	4,387	N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
28"	6.4	22,915	2,900	4,525	4,895	5,191	N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
30"	6.6	24,510	2,900	5,306	5,732	6,073	N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
TJI® H90 Joist														
11 1/8"	4.6	10,960	1,925	687	755	810	1,400	1,715	1,885	1,925	3,495	3,810	4,100	4,420
14"	4.9	13,090	2,125	1,015	1,109	1,185	1,400	1,875	1,885	2,125	3,495	3,970	4,100	4,575
16"	5.2	15,065	2,330	1,389	1,512	1,610	1,400	2,030	1,885	2,330	3,495	4,130	4,100	4,735
18"	5.4	17,010	2,535	1,827	1,982	2,106	1,400	2,030	1,885	2,515	3,495	4,130	4,100	4,735
20"	5.7	18,945	2,740	2,331	2,522	2,676	N.A.	2,190	N.A.	2,675	N.A.	4,285	N.A.	4,890
22"	6.0	20,855	2,935	2,904	3,136	3,321	N.A.	2,345	N.A.	2,830	N.A.	5,235	N.A.	5,840
24"	6.3	22,755	3,060	3,549	3,825	4,046	N.A.	2,345	N.A.	2,830	N.A.	5,425	N.A.	6,155
26"	6.5	24,645	2,900	4,266	4,590	4,850	N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
28"	6.8	26,520	2,900	5,059	5,436	5,737	N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
30"	7.1	28,380	2,900	5,930	6,363	6,710	N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
TJI® HS90 Joist														
11 1/8"	6.0	16,050	2,320	900	941	973	1,835	2,320	2,150	2,320	3,995	4,650	4,690	5,345
14"	6.3	19,425	2,565	1,355	1,410	1,455	1,835	2,565	2,150	2,565	3,995	4,980	4,690	5,670
16"	6.6	22,550	2,790	1,876	1,948	2,005	1,835	2,790	2,150	2,790	3,995	4,980	4,690	5,670
18"	7.0	25,640	3,020	2,488	2,578	2,650	1,835	3,020	2,150	3,020	3,995	5,310	4,690	6,000
20"	7.3	28,695	3,250	3,195	3,306	3,394	N.A.	3,250	N.A.	3,250	N.A.	5,425	N.A.	6,330
22"	7.6	31,725	3,480	3,998	4,131	4,238	N.A.	3,475	N.A.	3,480	N.A.	5,425	N.A.	6,330
24"	7.9	34,730	3,710	4,901	5,059	5,186	N.A.	3,500	N.A.	3,710	N.A.	5,425	N.A.	6,655
26"	8.2	37,715	3,940	5,905	6,090	6,238	N.A.	3,500	N.A.	3,940	N.A.	6,985 ⁽⁷⁾	N.A.	7,675 ⁽⁸⁾
28"	8.5	40,680	4,165	7,014	7,228	7,400	N.A.	3,500	N.A.	4,165	N.A.	6,985 ⁽⁷⁾	N.A.	7,675 ⁽⁸⁾
30"	8.8	43,630	4,375	8,230	8,476	8,672	N.A.	3,500	N.A.	4,375	N.A.	7,310 ⁽⁷⁾	N.A.	8,005 ⁽⁸⁾
32"	9.1	46,560	4,375	9,555	9,834	10,057	N.A.	3,500	N.A.	4,375	N.A.	7,640 ⁽⁷⁾	N.A.	8,335 ⁽⁸⁾

▪ The stated allowable design properties are for loads of normal duration. Adjustments to the allowable design values shall be in accordance with the applicable code.

- (1) **Caution:** Do not increase joist resistive moment properties by a repetitive-member-use factor; resistive moment properties reflect the latest ASTM standards.
- (2) For possible increases in shear capacity see below.
- (3) For deflection calculation only. Assumes 12" joist spacing (24" spacing for HS90 joists) with a 24" span-rated panel.

(4) Interpolation between bearing lengths is permitted for allowable design reactions.

(5) Allowable bearing lengths have been determined based on iLevel Trus Joist® Commercial products. Allowable bearing on supporting members shall be checked.

(6) Refer to page 16 for web stiffener details.

(7) 5 1/4" bearing length is required at intermediate reactions.

(8) 7" bearing length is required at intermediate reactions.

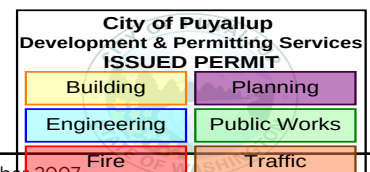
TJI® Joist Shear Design

When joists are used as simple-span members, the design shear is equal to the shear at the face of the support.

When joists **up to 24" in depth** are used as multiple-span members, the design shear is the calculated shear at the interior support reduced by the following:

$$R = \frac{W}{19.25} \leq 18\%$$

Where: R is the percent reduction
W is uniform load in plf



City of Puyallup Development & Permitting Services	
ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Infill Floor Framing (E-G) (7-8)

@ (E) interior stair (west) - stair to be demo'd

New floor joists =

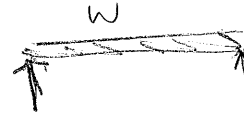
$L = 16.5'$

$W_{DL} = 20 \text{ PSF} \times 1' = 20 \text{ #/ft}$

$W_{LL} = 50 \text{ PSF} + 15 \text{ PSF} \times 1' = 65 \text{ #/ft}$
partitions

2x10 DF #2 @ 6" O.C.

or (2) 2x10 @ 12" O.C.

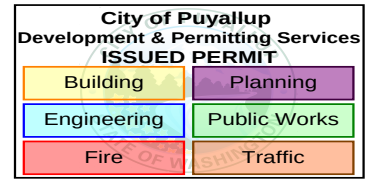


$= 0.4 \text{ k}$

LVS 28 hanger
cap = 1100# ✓

or LVS 28-2 @ DBL

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Infill floor framing at Interior West stair demo- grids F-G

CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : IBC 2018

Wood Species : Douglas Fir-Larch

Wood Grade : No.2

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb + 900.0 psi

Fb - 900.0 psi

Fc - Prll 1,350.0 psi

Fc - Perp 625.0 psi

Fv 180.0 psi

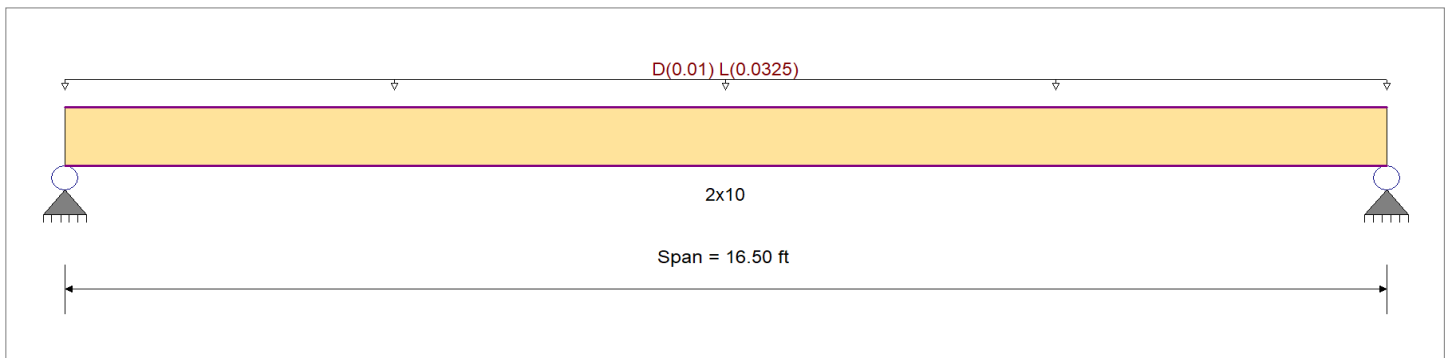
Ft 575.0 psi

E : Modulus of Elasticity

Ebend- xx 1,600.0ksi

Eminbend - xx 580.0ksi

Density 31.210pcf



Applied Loads

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

Beam self weight calculated and added to loading

Uniform Load : D = 0.020, L = 0.0650 ksf, Tributary Width = 0.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio				Maximum Shear Stress Ratio			
Section used for this span	=	0.878	1	Section used for this span	=	0.206	: 1
fb: Actual	=	868.79psi		fv: Actual	=	37.03 psi	
Fb: Allowable	=	990.00psi		Fv: Allowable	=	180.00 psi	
Load Combination		+D+L		Load Combination		+D+L	
Location of maximum on span	=	8.250ft		Location of maximum on span	=	0.000 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection	0.344 in	Ratio =	574 >= 360	Span: 1 : L Only			
Max Upward Transient Deflection	0 in	Ratio =	0 < 360	n/a			
Max Downward Total Deflection	0.482 in	Ratio =	410 >= 240	Span: 1 : +D+L			
Max Upward Total Deflection	0 in	Ratio =	0 < 240	n/a			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values			
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v	
D Only														0.00	0.00	0.00	0.00
Length = 16.50 ft	1	0.279	0.065	0.90	1.100	1.00	1.00	1.00	1.00	1.00	0.44	248.32	891.00	0.10	10.58	162.00	
+D+L					1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	0.00
Length = 16.50 ft	1	0.878	0.206	1.00	1.100	1.00	1.00	1.00	1.00	1.00	1.55	868.79	990.00	0.34	37.03	180.00	
+D+0.750L					1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	0.00
Length = 16.50 ft	1	0.577	0.135	1.25	1.100	1.00	1.00	1.00	1.00	1.00	1.27	713.68	1237.50	0.28	30.42	225.00	
+0.60D					1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	0.00
Length = 16.50 ft	1	0.094	0.022	1.60	1.100	1.00	1.00	1.00	1.00	1.00	0.27	148.99	1584.00	0.06	6.35	288.00	

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.4822	8.310		0.0000	0.000

PRCTI20221698

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

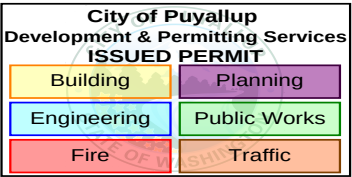
DESCRIPTION: Infill floor framing at Interior West stair demo- grids F-G

Vertical Reactions

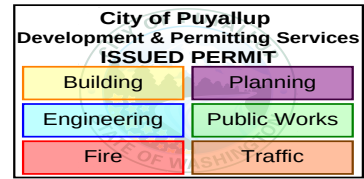
Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.375	0.375
Overall MINimum	0.268	0.268
D Only	0.107	0.107
+D+L	0.375	0.375
+D+0.750L	0.308	0.308
+0.60D	0.064	0.064
L Only	0.268	0.268

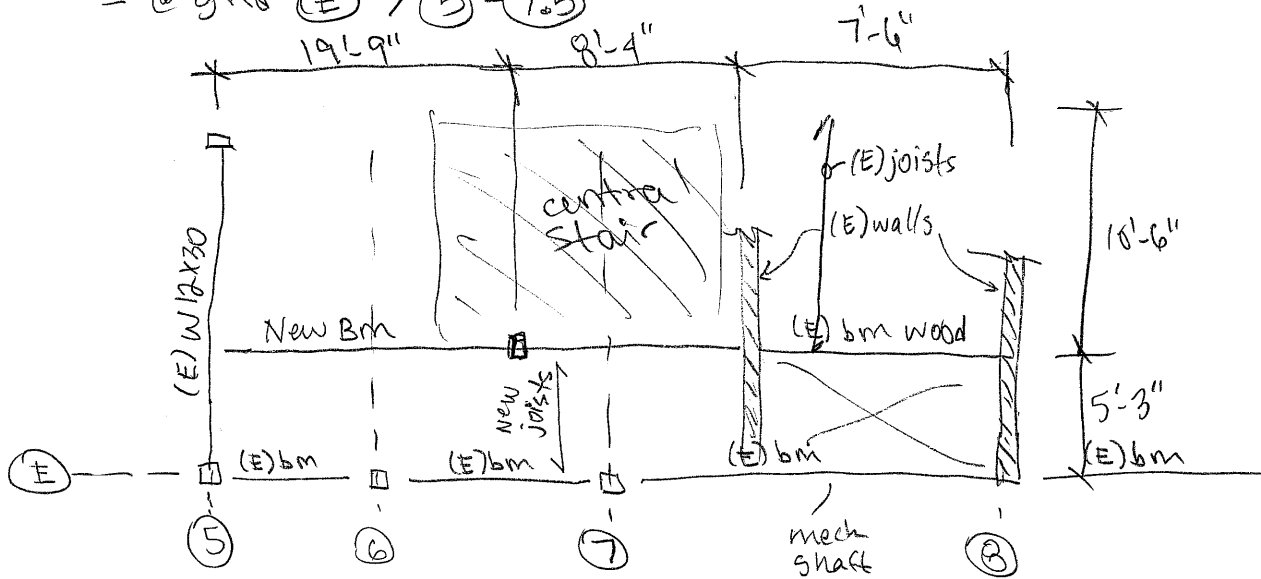


PRCTI20221698



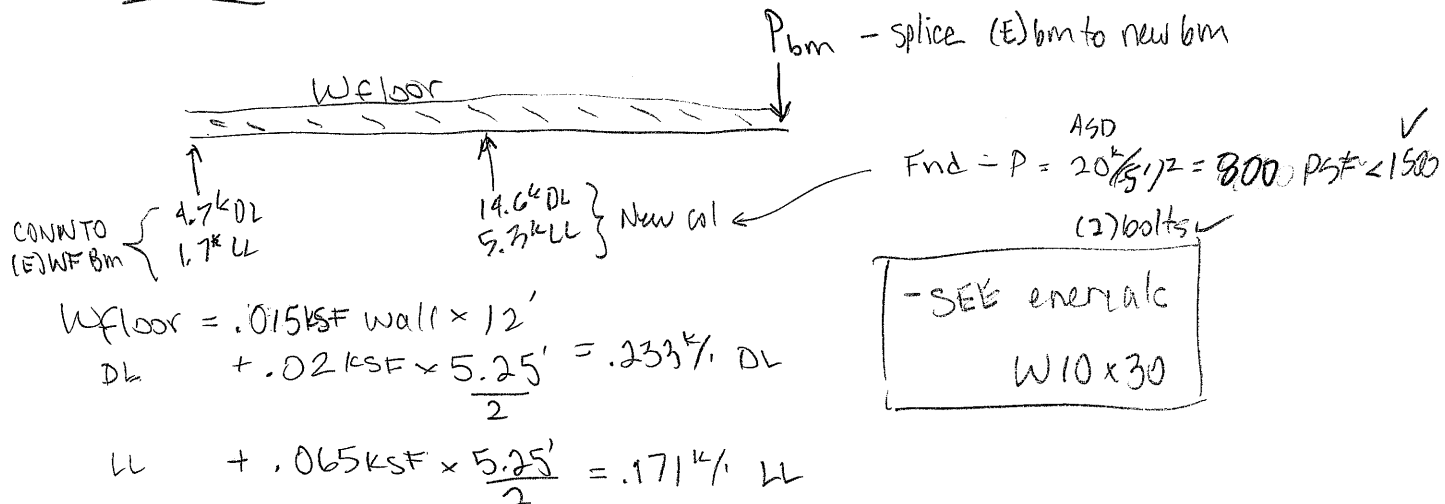
New 2nd Floor Framing @ (E) sloping ramp

- West of central interior stair
- @ grid (E) / (5) - (7.5)



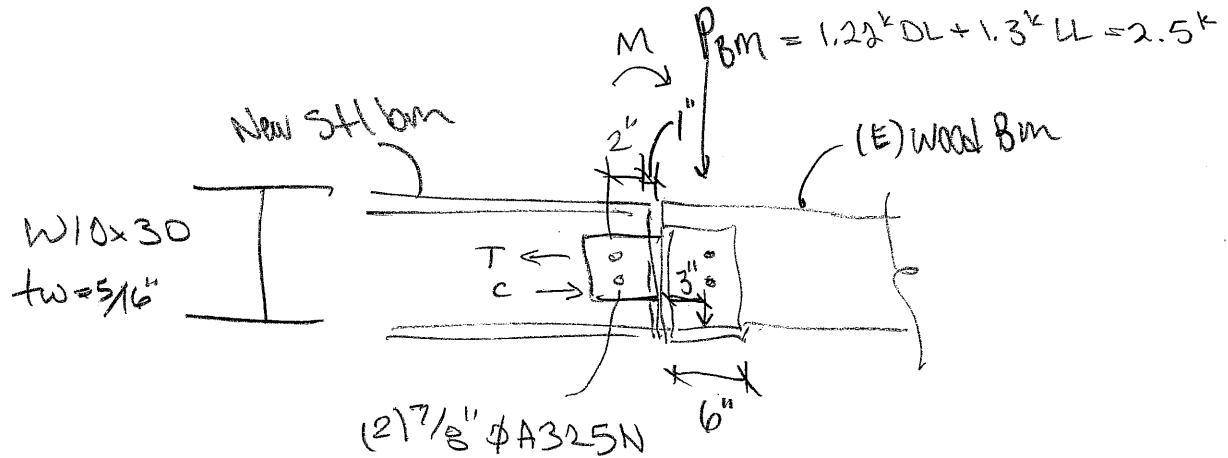
PLAN ← North

New Bm



$$W_{floor} = .015 ksf \text{ wall} \times 12' \\ DL + .02 ksf \times \frac{5.25'}{2} = .233 k/ft \text{ DL} \\ LL + .065 ksf \times \frac{5.25'}{2} = .171 k/ft \text{ LL}$$

$$P_{bm} = (.025 ksf + .065 ksf) \times \frac{10.5'}{2} = .473 k/ft \\ + 0.5 ksf \times 13' \text{ wall} = .2 k/ft \\ \left. \begin{array}{l} .473 k/ft \\ + .2 k/ft \end{array} \right\} \times \frac{7.5'}{2} = 1.22 k \text{ DL} + 1.3 k \text{ LL}$$



$$M = 2.5^k \times (3" + 1" + 2") = 15^k$$

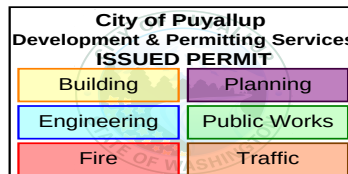
$$T = C = \frac{M}{3"} = 5^k$$

AISC Table 9-3a (ASD)

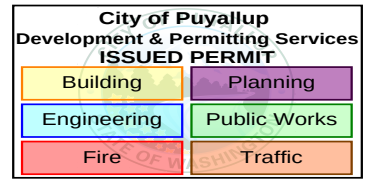
$$\text{Tension Rupture} = 43.5^k/in \times 5/16$$

$$= 13.6^k > 5^k \checkmark$$

Bolt shear allowed = 29k OK
(DBL shear)



Project Title: **CHC Puyallup**
 Engineer: **LMC**
 Project ID:
 Project Descr:



Wood Beam

Lic. #: KW-06002327

File: CHC Puyallup calcs.ec6
 Software copyright ENERCALC, INC. 1983-2020, Build:12.20.8.24
 PCS STRUCTURAL SOLUTIONS

DESCRIPTION: New Joists West of central stair - at demo'd existing ramp

CODE REFERENCES

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

Load Combination Set : IBC 2018

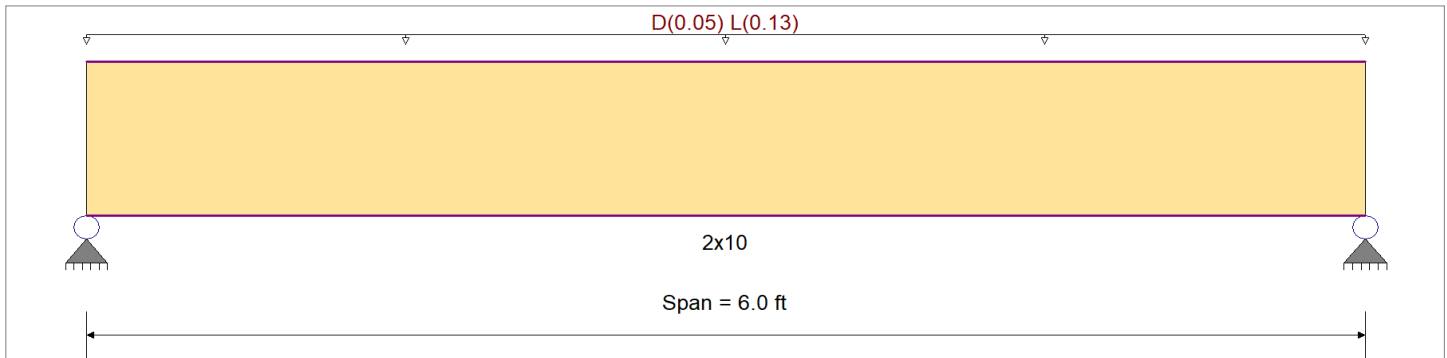
Material Properties

Analysis Method : Allowable Stress Design
 Load Combination IBC 2018

Wood Species : Douglas Fir-Larch
 Wood Grade : No.2

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb + 900 psi E : Modulus of Elasticity
 Fb - 900 psi Ebend- xx 1600ksi
 Fc - Prll 1350 psi Eminbend - xx 580ksi
 Fc - Perp 625 psi
 Fv 180 psi
 Ft 575 psi Density 31.21pcf



Applied Loads

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

Beam self weight calculated and added to loads

Uniform Load : D = 0.0250, L = 0.0650 ksf, Tributary Width = 2.0 ft, (floor)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.467	1	Maximum Shear Stress Ratio	=	0.246	1
Section used for this span		2x10		Section used for this span		2x10	
fb: Actual	=	462.00psi		fv: Actual	=	44.19 psi	
Fb: Allowable	=	990.00psi		Fv: Allowable	=	180.00 psi	
Load Combination		+D+L		Load Combination		+D+L	
Location of maximum on span	=	3.000ft		Location of maximum on span	=	0.000 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.024 in	Ratio =	2989	>=	360	
Max Upward Transient Deflection		0.000 in	Ratio =	0	<	360	
Max Downward Total Deflection		0.034 in	Ratio =	2123	>=	240	
Max Upward Total Deflection		0.000 in	Ratio =	0	<	240	

Maximum Forces & Stresses for Load Combinations

Load Combination Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values		
		M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	Fv
D Only													0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.150	0.079	0.90	1.100	1.00	1.00	1.00	1.00	1.00	0.24	133.82	891.00	0.12	12.80	162.00
+D+L					1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.467	0.246	1.00	1.100	1.00	1.00	1.00	1.00	1.00	0.82	462.00	990.00	0.41	44.19	180.00
+D+0.750L					1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.307	0.162	1.25	1.100	1.00	1.00	1.00	1.00	1.00	0.68	379.95	1237.50	0.34	36.34	225.00
+0.60D					1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.051	0.027	1.60	1.100	1.00	1.00	1.00	1.00	1.00	0.14	80.29	1584.00	0.07	7.68	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0339	3.022		0.0000	0.000

PRCTI20221698

Wood Beam

Lic. # : KW-06002327

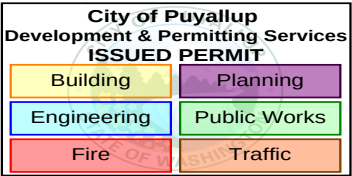
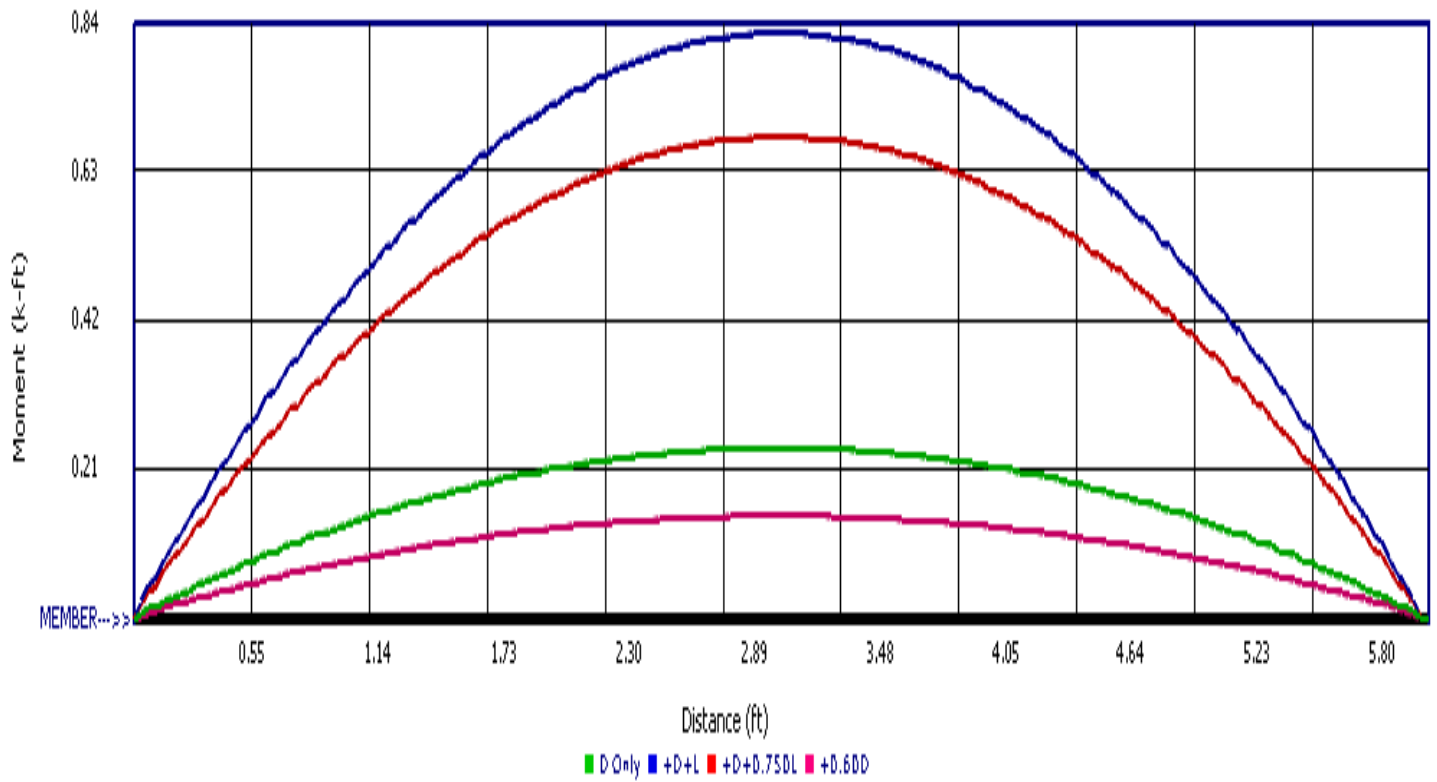
File: CHC Puyallup calcs.ec6
Software copyright ENERCALC, INC. 1983-2020, Build:12.20.8.24
PCS STRUCTURAL SOLUTIONS

DESCRIPTION: New Joists West of central stair - at demo'd existing ramp

Vertical Reactions

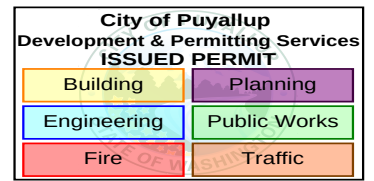
Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.549	0.549
Overall MINimum	0.390	0.390
D Only	0.159	0.159
+D+L	0.549	0.549
+D+0.750L	0.452	0.452
+0.60D	0.095	0.095
L Only	0.390	0.390



PRCTI20221698

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:



Steel Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: New Steel Bm at demo'd West ramp - central stair

At approx grid D.7

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : IBC 2018

Material Properties

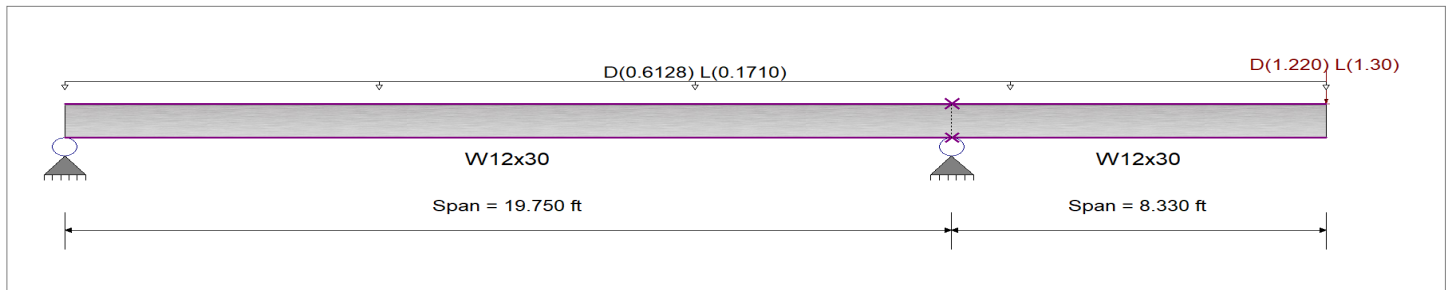
Analysis Method : Allowable Strength Design

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi

E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight calculated and added to loading

Loads on all spans...

Uniform Load on ALL spans : D = 0.2330, L = 0.0650 ksf, Tributary Width = 2.630 ft

Load(s) for Span Number 2

Point Load : D = 1.220, L = 1.30 k @ 8.330 ft, ((E) Bm pt load - East of mech shaft)

DESIGN SUMMARY

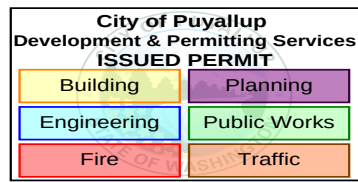
Design OK

Maximum Bending Stress Ratio =			0.458 : 1			Maximum Shear Stress Ratio =			0.165 : 1		
Section used for this span			W12x30			Section used for this span			W12x30		
Ma : Applied			49.224 k-ft			Va : Applied			10.528 k		
Mn / Omega : Allowable			107.535 k-ft			Vn/Omega : Allowable			63.960 k		
Load Combination		+D+L+H, LL Comb Run (LL)				Load Combination		+D+L+H, LL Comb Run (LL)			
						Location of maximum on span		19.750 ft			
Span # where maximum occurs		Span # 1				Span # where maximum occurs		Span # 1			
Maximum Deflection											
Max Downward Transient Deflection		0.318 in		Ratio = 628		>=360		Span: 2 : L Only, LL Comb Run (L*)			
Max Upward Transient Deflection		-0.114 in		Ratio = 1,746		>=360		Span: 2 : L Only, LL Comb Run (*L)			
Max Downward Total Deflection		0.489 in		Ratio = 409		>=240.		Span: 2 : +D+L+H, LL Comb Run (*L)			
Max Upward Total Deflection		-0.042 in		Ratio = 5619		>=240.		Span: 2 : +D+L+H, LL Comb Run (*L)			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values						Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx/Vnx/Omega
+D+H												
Dsgn. L = 19.75 ft	1	0.302	0.125	17.21	-32.46	32.46	179.58	107.53	1.00	1.00	7.99	95.94
Dsgn. L = 8.33 ft	2	0.302	0.103		-32.46	32.46	179.58	107.53	1.00	1.00	6.57	95.94
+D+L+H, LL Comb Run (*L)												
Dsgn. L = 19.75 ft	1	0.458	0.145	11.56	-49.22	49.22	179.58	107.53	1.00	1.00	9.30	95.94
Dsgn. L = 8.33 ft	2	0.458	0.145		-49.22	49.22	179.58	107.53	1.00	1.00	9.30	95.94
+D+L+H, LL Comb Run (L*)												
Dsgn. L = 19.75 ft	1	0.302	0.151	25.10	-32.46	32.46	179.58	107.53	1.00	1.00	9.68	95.94
Dsgn. L = 8.33 ft	2	0.302	0.103		-32.46	32.46	179.58	107.53	1.00	1.00	6.57	95.94
+D+L+H, LL Comb Run (LL)												
Dsgn. L = 19.75 ft	1	0.458	0.165	18.88	-49.22	49.22	179.58	107.53	1.00	1.00	10.53	95.94
Dsgn. L = 8.33 ft	2	0.458	0.145		-49.22	49.22	179.58	107.53	1.00	1.00	9.30	95.94
+D+Lr+H, LL Comb Run (*L)												
Dsgn. L = 19.75 ft	1	0.302	0.125	17.21	-32.46	32.46	179.58	107.53	1.00	1.00	7.99	95.94
Dsgn. L = 8.33 ft	2	0.302	0.103		-32.46	32.46	179.58	107.53	1.00	1.00	6.57	95.94
+D+Lr+H, LL Comb Run (L*)												
Dsgn. L = 19.75 ft	1	0.302	0.125	17.21	-32.46	32.46	179.58	107.53	1.00	1.00	7.99	95.94
Dsgn. L = 8.33 ft	2	0.302	0.103		-32.46	32.46	179.58	107.53	1.00	1.00	6.57	95.94

PRCT120221698



Project Title: CHC Puyallup
Engineer: LMC
Project ID:
Project Descr:

PRCTI20221698

Steel Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

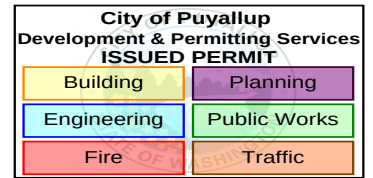
(c) ENERCALC INC 1983-2022

DESCRIPTION: New Steel Bm at demo'd West ramp - central stair

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega Cb	Rm		Va Max	Vnx/Vnx/Omega	
+D+Lr+H, LL Comb Run (LL)													
Dsgn. L = 19.75 ft	1	0.302	0.125	17.21	-32.46	32.46	179.58	107.53	1.00	1.00	7.99	95.94	63.96
Dsgn. L = 8.33 ft	2	0.302	0.103		-32.46	32.46	179.58	107.53	1.00	1.00	6.57	95.94	63.96
+D+S+H													
Dsgn. L = 19.75 ft	1	0.302	0.125	17.21	-32.46	32.46	179.58	107.53	1.00	1.00	7.99	95.94	63.96
Dsgn. L = 8.33 ft	2	0.302	0.103		-32.46	32.46	179.58	107.53	1.00	1.00	6.57	95.94	63.96
+D+0.750Lr+0.750L+H, LL Comb													
Dsgn. L = 19.75 ft	1	0.419	0.135	12.87	-45.03	45.03	179.58	107.53	1.00	1.00	8.63	95.94	63.96
Dsgn. L = 8.33 ft	2	0.419	0.135		-45.03	45.03	179.58	107.53	1.00	1.00	8.62	95.94	63.96
+D+0.750Lr+0.750L+H, LL Comb													
Dsgn. L = 19.75 ft	1	0.302	0.145	23.11	-32.46	32.46	179.58	107.53	1.00	1.00	9.26	95.94	63.96
Dsgn. L = 8.33 ft	2	0.302	0.103		-32.46	32.46	179.58	107.53	1.00	1.00	6.57	95.94	63.96
+D+0.750Lr+0.750L+H, LL Comb													
Dsgn. L = 19.75 ft	1	0.419	0.155	18.45	-45.03	45.03	179.58	107.53	1.00	1.00	9.89	95.94	63.96
Dsgn. L = 8.33 ft	2	0.419	0.135		-45.03	45.03	179.58	107.53	1.00	1.00	8.62	95.94	63.96
+D+0.750L+0.750S+H, LL Comb													
Dsgn. L = 19.75 ft	1	0.419	0.135	12.87	-45.03	45.03	179.58	107.53	1.00	1.00	8.63	95.94	63.96
Dsgn. L = 8.33 ft	2	0.419	0.135		-45.03	45.03	179.58	107.53	1.00	1.00	8.62	95.94	63.96
+D+0.750L+0.750S+H, LL Comb													
Dsgn. L = 19.75 ft	1	0.302	0.145	23.11	-32.46	32.46	179.58	107.53	1.00	1.00	9.26	95.94	63.96
Dsgn. L = 8.33 ft	2	0.302	0.103		-32.46	32.46	179.58	107.53	1.00	1.00	6.57	95.94	63.96
+D+0.750L+0.750S+H, LL Comb													
Dsgn. L = 19.75 ft	1	0.419	0.155	18.45	-45.03	45.03	179.58	107.53	1.00	1.00	9.89	95.94	63.96
Dsgn. L = 8.33 ft	2	0.419	0.135		-45.03	45.03	179.58	107.53	1.00	1.00	8.62	95.94	63.96
+D+0.60W+H													
Dsgn. L = 19.75 ft	1	0.302	0.125	17.21	-32.46	32.46	179.58	107.53	1.00	1.00	7.99	95.94	63.96
Dsgn. L = 8.33 ft	2	0.302	0.103		-32.46	32.46	179.58	107.53	1.00	1.00	6.57	95.94	63.96
+D+0.70E+H													
Dsgn. L = 19.75 ft	1	0.302	0.125	17.21	-32.46	32.46	179.58	107.53	1.00	1.00	7.99	95.94	63.96
Dsgn. L = 8.33 ft	2	0.302	0.103		-32.46	32.46	179.58	107.53	1.00	1.00	6.57	95.94	63.96
+D+0.750Lr+0.750L+0.450W+H, I													
Dsgn. L = 19.75 ft	1	0.419	0.135	12.87	-45.03	45.03	179.58	107.53	1.00	1.00	8.63	95.94	63.96
Dsgn. L = 8.33 ft	2	0.419	0.135		-45.03	45.03	179.58	107.53	1.00	1.00	8.62	95.94	63.96
+D+0.750Lr+0.750L+0.450W+H, I													
Dsgn. L = 19.75 ft	1	0.302	0.145	23.11	-32.46	32.46	179.58	107.53	1.00	1.00	9.26	95.94	63.96
Dsgn. L = 8.33 ft	2	0.302	0.103		-32.46	32.46	179.58	107.53	1.00	1.00	6.57	95.94	63.96
+D+0.750Lr+0.750L+0.450W+H, I													
Dsgn. L = 19.75 ft	1	0.419	0.155	18.45	-45.03	45.03	179.58	107.53	1.00	1.00	9.89	95.94	63.96
Dsgn. L = 8.33 ft	2	0.419	0.135		-45.03	45.03	179.58	107.53	1.00	1.00	8.62	95.94	63.96
+D+0.750L+0.750S+0.450W+H, L													
Dsgn. L = 19.75 ft	1	0.419	0.135	12.87	-45.03	45.03	179.58	107.53	1.00	1.00	8.63	95.94	63.96
Dsgn. L = 8.33 ft	2	0.419	0.135		-45.03	45.03	179.58	107.53	1.00	1.00	8.62	95.94	63.96
+D+0.750L+0.750S+0.450W+H, L													
Dsgn. L = 19.75 ft	1	0.302	0.145	23.11	-32.46	32.46	179.58	107.53	1.00	1.00	9.26	95.94	63.96
Dsgn. L = 8.33 ft	2	0.302	0.103		-32.46	32.46	179.58	107.53	1.00	1.00	6.57	95.94	63.96
+D+0.750L+0.750S+0.450W+H, L													
Dsgn. L = 19.75 ft	1	0.419	0.155	18.45	-45.03	45.03	179.58	107.53	1.00	1.00	9.89	95.94	63.96
Dsgn. L = 8.33 ft	2	0.419	0.135		-45.03	45.03	179.58	107.53	1.00	1.00	8.62	95.94	63.96
+D+0.750L+0.750S+0.5250E+H, I													
Dsgn. L = 19.75 ft	1	0.419	0.135	12.87	-45.03	45.03	179.58	107.53	1.00	1.00	8.63	95.94	63.96
Dsgn. L = 8.33 ft	2	0.419	0.135		-45.03	45.03	179.58	107.53	1.00	1.00	8.62	95.94	63.96
+D+0.750L+0.750S+0.5250E+H, I													
Dsgn. L = 19.75 ft	1	0.302	0.145	23.11	-32.46	32.46	179.58	107.53	1.00	1.00	9.26	95.94	63.96
Dsgn. L = 8.33 ft	2	0.302	0.103		-32.46	32.46	179.58	107.53	1.00	1.00	6.57	95.94	63.96
+D+0.750L+0.750S+0.5250E+H, I													
Dsgn. L = 19.75 ft	1	0.419	0.155	18.45	-45.03	45.03	179.58	107.53	1.00	1.00	9.89	95.94	63.96
Dsgn. L = 8.33 ft	2	0.419	0.135		-45.03	45.03	179.58	107.53	1.00	1.00	8.62	95.94	63.96
+0.60D+0.60W+0.60H													
Dsgn. L = 19.75 ft	1	0.181	0.075	10.33	-19.48	19.48	179.58	107.53	1.00	1.00	4.79	95.94	63.96
Dsgn. L = 8.33 ft	2	0.181	0.062		-19.48	19.48	179.58	107.53	1.00	1.00	3.94	95.94	63.96
+0.60D+0.70E+0.60H													
Dsgn. L = 19.75 ft	1	0.181	0.075	10.33	-19.48	19.48	179.58	107.53	1.00	1.00	4.79	95.94	63.96
Dsgn. L = 8.33 ft	2	0.181	0.062		-19.48	19.48	179.58	107.53	1.00	1.00	3.94	95.94	63.96

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:



Steel Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: New Steel Bm at demo'd West ramp - central stair

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.2107	8.848	L Only	-0.0674	16.669
+D+L+H	2	0.4890	8.330		0.0000	16.669

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	6.392	19.826	
Overall MINimum	0.840	1.688	
+D+H	4.704	14.566	
+D+L+H, LL Comb Run (*L)	3.855	18.138	
+D+L+H, LL Comb Run (L*)	6.392	16.254	
+D+L+H, LL Comb Run (LL)	5.543	19.826	
+D+Lr+H, LL Comb Run (*L)	4.704	14.566	
+D+Lr+H, LL Comb Run (L*)	4.704	14.566	
+D+Lr+H, LL Comb Run (LL)	4.704	14.566	
+D+S+H	4.704	14.566	
+D+0.750Lr+0.750L+H, LL Comb	4.067	17.245	
+D+0.750Lr+0.750L+H, LL Comb	5.970	15.832	
+D+0.750Lr+0.750L+H, LL Comb	5.333	18.511	
+D+0.750L+0.750S+H, LL Comb	4.067	17.245	
+D+0.750L+0.750S+H, LL Comb	5.970	15.832	
+D+0.750L+0.750S+H, LL Comb	5.333	18.511	
+D+0.60W+H	4.704	14.566	
+D+0.70E+H	4.704	14.566	
+D+0.750Lr+0.750L+0.450W+H,	4.067	17.245	
+D+0.750Lr+0.750L+0.450W+H,	5.970	15.832	
+D+0.750Lr+0.750L+0.450W+H,	5.333	18.511	
+D+0.750L+0.750S+0.450W+H, L	4.067	17.245	
+D+0.750L+0.750S+0.450W+H, L	5.970	15.832	
+D+0.750L+0.750S+0.450W+H, L	5.333	18.511	
+D+0.750L+0.750S+0.5250E+H,	4.067	17.245	
+D+0.750L+0.750S+0.5250E+H,	5.970	15.832	
+D+0.750L+0.750S+0.5250E+H,	5.333	18.511	
+0.60D+0.60W+0.60H	2.822	8.739	
+0.60D+0.70E+0.60H	2.822	8.739	
D Only	4.704	14.566	
L Only, LL Comb Run (*L)	-0.849	3.573	
L Only, LL Comb Run (L*)	1.688	1.688	
L Only, LL Comb Run (LL)	0.840	5.261	
H Only			

PRCTI20221698

Project Title: **CHC Puyallup**
 Engineer: **LMC**
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Steel Column

Lic. #: KW-06002327

File: CHC Puyallup calcs.ec6
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 PCS STRUCTURAL SOLUTIONS

DESCRIPTION: New steel col at new bm West of central stair - 6.5/D.7

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
 Load Combinations Used : IBC 2018

General Information

Steel Section Name :	HSS4x4x5/16	Overall Column Height	13 ft
Analysis Method :	Allowable Strength	Top & Bottom Fixity	Top & Bottom Pinned
Steel Stress Grade		Brace condition for deflection (buckling) along columns :	
Fy : Steel Yield	46 ksi	X-X (width) axis :	
E : Elastic Bending Modulus	29,000.0 ksi	Unbraced Length for buckling ABOUT Y-Y Axis = 13 ft, K = 1.0	
		Y-Y (depth) axis :	
		Unbraced Length for buckling ABOUT X-X Axis = 13 ft, K = 1.0	

Applied Loads

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

Column self weight included : 192.790 lbs * Dead Load Factor

AXIAL LOADS . . .

Beam Load: Axial Load at 13.0 ft, D = 14.60, L = 5.30 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =	0.3719 : 1	Maximum Load Reactions . .	
Load Combination	+D+L	Top along X-X	0.0 k
Location of max.above base	0.0 ft	Bottom along X-X	0.0 k
At maximum location values are . . .		Top along Y-Y	0.0 k
Pa : Axial	20.093 k	Bottom along Y-Y	0.0 k
Pn / Omega : Allowable	54.024 k	Maximum Load Deflections . . .	
Ma-x : Applied	0.0 k-ft	Along Y-Y	0.0 in at 0.0 ft above base
Mn-x / Omega : Allowable	12.831 k-ft	for load combination :	
Ma-y : Applied	0.0 k-ft	Along X-X	0.0 in at 0.0 ft above base
Mn-y / Omega : Allowable	12.831 k-ft	for load combination :	
PASS Maximum Shear Stress Ratio =	0.0 : 1		
Load Combination	0.0		
Location of max.above base	0.0 ft		
At maximum location values are . . .			
Va : Applied	0.0 k		
Vn / Omega : Allowable	0.0 k		

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios			CbX	CbY	KxLx/Rx	KyLy/Ry	Maximum Shear Ratios		
	Stress Ratio	Status	Location					Stress Ratio	Status	Location
D Only	0.274	PASS	0.00 ft	1.00	1.00	104.70	104.70	0.000	PASS	0.00 ft
+D+L	0.372	PASS	0.00 ft	1.00	1.00	104.70	104.70	0.000	PASS	0.00 ft
+D+0.750L	0.347	PASS	0.00 ft	1.00	1.00	104.70	104.70	0.000	PASS	0.00 ft
+0.60D	0.164	PASS	0.00 ft	1.00	1.00	104.70	104.70	0.000	PASS	0.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

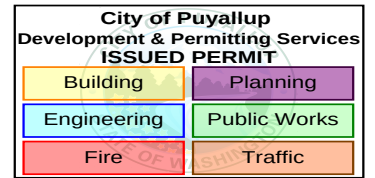
Load Combination	Axial Reaction	X-X Axis Reaction		k	Y-Y Axis Reaction		Mx - End Moments		k-ft	My - End Moments	
	@ Base	@ Base	@ Top		@ Base	@ Top	@ Base	@ Top		@ Base	@ Top
D Only	14.793										
+D+L	20.093										
+D+0.750L	18.768										
+0.60D	8.876										
L Only	5.300										

Extreme Reactions

Item	Extreme Value	Axial Reaction	X-X Axis Reaction		k	Y-Y Axis Reaction		Mx - End Moments		k-ft	My - End Moments	
		@ Base	@ Base	@ Top		@ Base	@ Top	@ Base	@ Top		@ Base	@ Top
Axial @ Base	Maximum	20.093										
"	Minimum	5.300										

PRCTI20221698

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:



Steel Column

File: CHC Puyallup calcs.ec6
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 PCS STRUCTURAL SOLUTIONS

Lic. # : KW-06002327

DESCRIPTION: New steel col at new bm West of central stair - 6.5/D.7

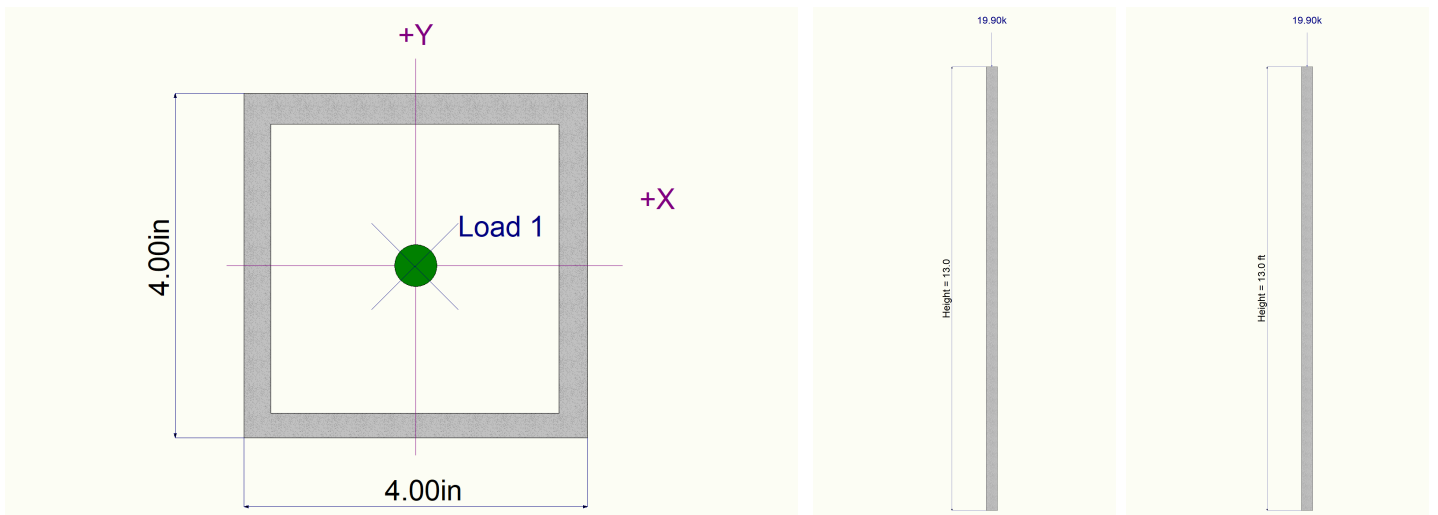
Extreme Reactions

Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction @ Base @ Top	k	Y-Y Axis Reaction @ Base @ Top	Mx - End Moments @ Base @ Top	k-ft	My - End Moments @ Base @ Top
Reaction, X-X Axis Base	Maximum	14.793						
"	Minimum	14.793						
Reaction, Y-Y Axis Base	Maximum	14.793						
"	Minimum	14.793						
Reaction, X-X Axis Top	Maximum	14.793						
"	Minimum	14.793						
Reaction, Y-Y Axis Top	Maximum	14.793						
"	Minimum	14.793						
Moment, X-X Axis Base	Maximum	14.793						
"	Minimum	14.793						
Moment, Y-Y Axis Base	Maximum	14.793						
"	Minimum	14.793						
Moment, X-X Axis Top	Maximum	14.793						
"	Minimum	14.793						
Moment, Y-Y Axis Top	Maximum	14.793						
"	Minimum	14.793						

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+L	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D	0.0000 in	0.000 ft	0.000 in	0.000 ft
L Only	0.0000 in	0.000 ft	0.000 in	0.000 ft

Sketches



PRCTI20221698

CHC Puyallup - Cannery

201 W. Main
Puyallup, WA 98371

Miller Hayashi Architects

118 North 35th St., Suite 200
Seattle, Washington 98103
Tel: 206 634 0177
Fax: 206 634 0167

ARCHITECT'S STAMP



TRES WEST ENGINEERS, INC.

2702 SOUTH 42ND STREET, SUITE 301
TACOMA, WA 98409-7315
Phone: 253.472.3300
www.treswest.com
CONSULTANT

CONSULTANT'S STAMP

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BUILDING DEPARTMENT'S STAMP

PHASE

Schematic
Design

DATE

09/22/2022

REVISIONS

No. Description Date

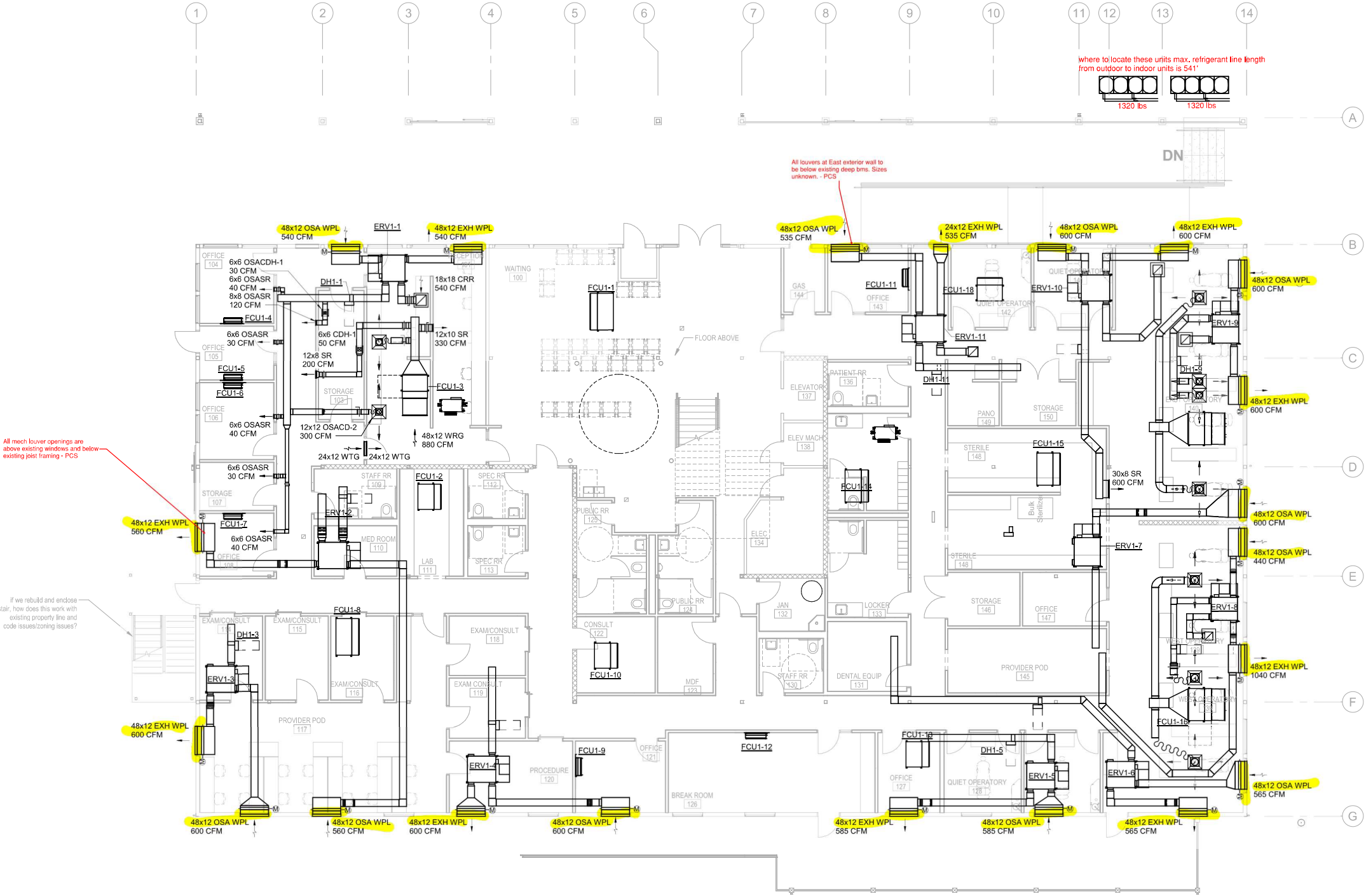
SHEET TITLE

HVAC PLAN -
LEVEL 1

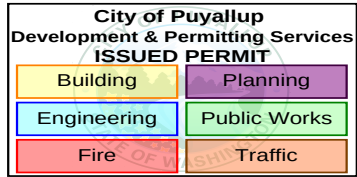
SHEET NO.

M2.01

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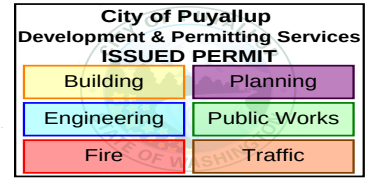


1 HVAC PLAN - LEVEL 1
1/8" = 1'-0"



PRCTI20221698

Louvers below 2nd floor framing



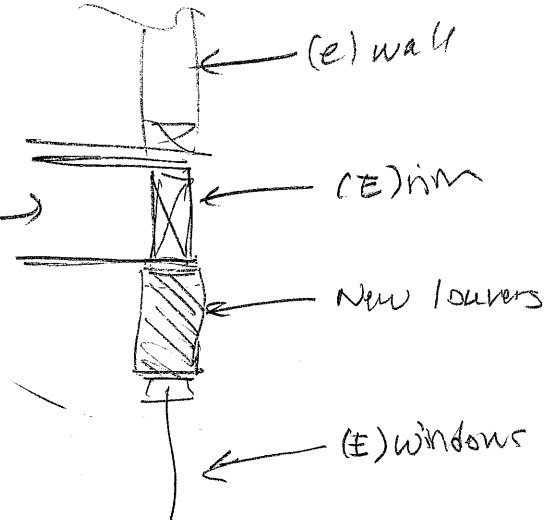
Lower openings below 2nd Floor Framing

- All louvers are 48" x 12" tall
- Louvers may cut out (E) HDR's ∴ check (E) rim bms for floor load

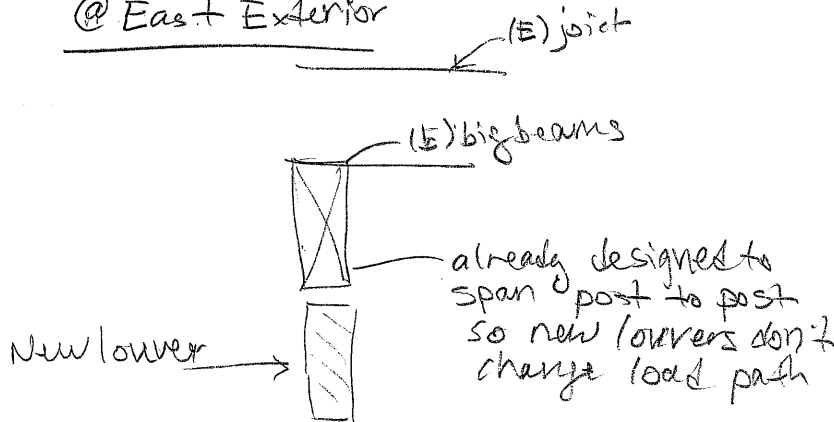
Floor framing

East of (D) = 2x12 @ 16"
West of (D) = 2x10 @ 12"

(E) Joists



@ East Exterior

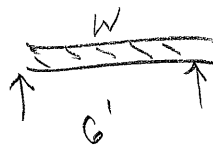


@ North / South Exterior

- 2nd Flr joists @ 11 to wall

(E) 2x12 RIM East of (D)
(E) 2x10 RIM West of (D)

L = 6'



$$WDL + LL = (20PSF + 65PSF) \times \frac{16''}{12 \times 2} = 57\#/\text{ft}$$

$$M = 26k'$$

$$V = 171\#$$

2x10 Mallow = 1.6k' > M ✓
(DF#2) Vallow = 1.7k' > V ✓
O.D

∴ (E) rim OK

cont.

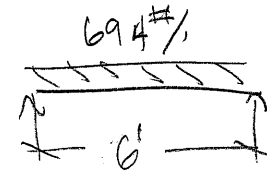
@ West

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

$$W = 20 \text{ PSF} \times \frac{16.33'}{2} = 163 \text{ \#/'}$$

$$+ 65 \text{ PSF} \times \frac{16.33'}{2} = 531 \text{ \#/'}$$

$$\underline{\hspace{1cm}} 694 \text{ \#/'}$$



$$M = 3.1 \text{ k'}$$

$$V = 2.1 \text{ k}$$

(E) rim assume = 2x10

$$M_{allow} = 1.6 \text{ k'}$$

$$V_{allow} = 1.7 \text{ k'}$$

(1) 2x6 stud OK

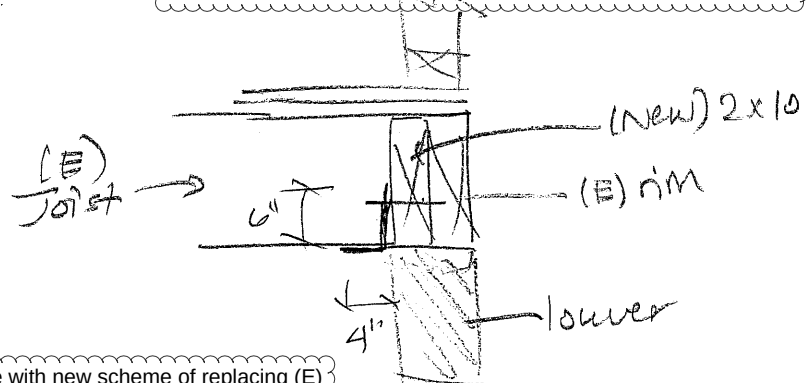
(2) 2x10

$$M_{all} = 3.2 \text{ k'}$$

$$V_{all} = 3.4 \text{ k}$$

∴ provide min (2) 2x10 @ new lower locations @ exterior west wall.

Instead, use 1 3/4"x9 1/2" LSL from outside to replace (E) rim and span across the opening below. $M_{allow} = 5.2 \text{ k'}$ $V_{allow} = 3.4 \text{ k}$, OK



support (E) joist

$$L = 6 \times 4 \times \frac{1}{2}$$

Now, no angle on inside with new scheme of replacing (E) rim. Attach (E) joists with LS70 clips EA side of joist.

$$M = 694 \text{ \#/'} \times 2'' = 2776 \text{ \#/'} = 2.8 \text{ k'/'}$$

$$f_{req'd} = \sqrt{\frac{4M}{21.6}}$$

$$M = 1 \text{ k'/'}$$

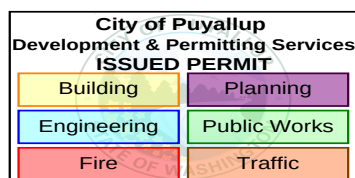
$$T = \frac{M}{A_s} = .62 \text{ k'/'} \times 6'' = 3.10 \text{ \#}$$

withdrawal @ 6" O.C.

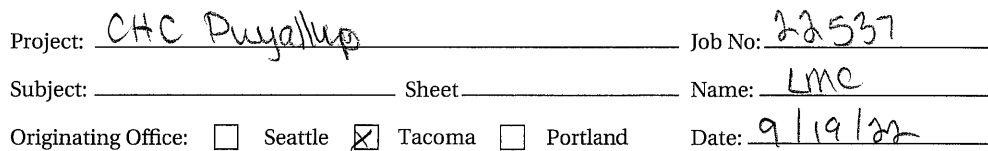
$$= .21'' \therefore \frac{1}{2}'' \text{ OK}$$

$$\frac{1}{2}'' \text{ logs @ 6" O.C.} = 378 \times \frac{15}{16} = 354 \text{ \#}$$

2ND FLOOR INTERIOR RAMP



PRCTI20221698



City of Puyallup
Development & Permitting Services
ISSUED PERMIT

Building	Planning
Engineering	Public Works
Fire	Traffic

DL = 20 PSF
LL = 80 PSF (egress corridor)

$L = 6'$ 
 $W = (2.5 + 0.5) \times \frac{16.25'}{2}$
 $R = 2.5^k$
 - see enercalc
 6x12 HUCQ610-SDS

$L = 16' - 3''$
 $W = (20 + 80) \times 1.33'$
 $P = \text{Bm 1 Reaction}$
 - see enercalc
 $5\frac{1}{2}'' \times 11\frac{1}{4}'' \text{ GLB}$

$L_{max} = 15' - 7''$
 $W = (20 + 80) \times 1'$
 - see enercalc
 2×12 DF #2 @ 12" O.C.
 $R = 705\#$ LVS 210

 $L = 8'$
 $W = (10 + 80) \times 1.6'$
 see enercalc
 2×8 DF #2 @ 12" O.C.

Bm 3

$L = 6'$

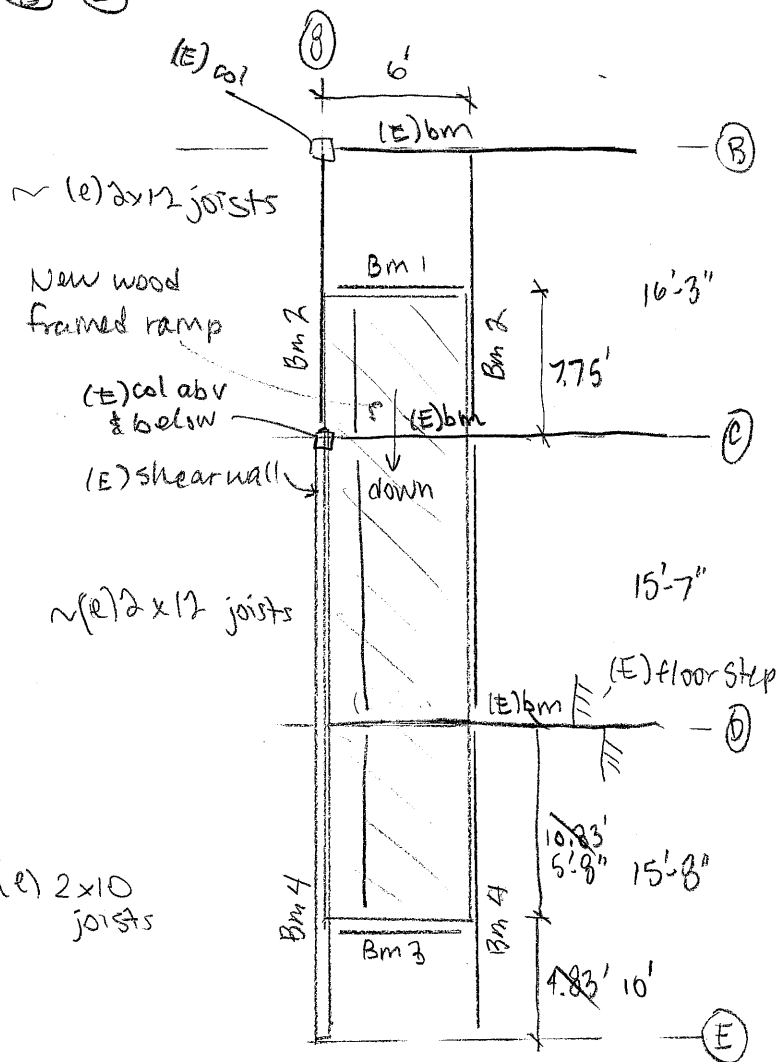
$W = (20 + 80) \times \frac{15.67}{2}$

6×10

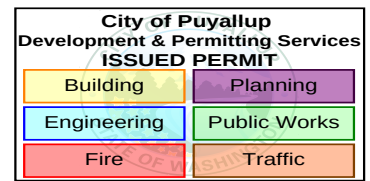
$R = .5^k \text{ DL} + 1.9^k$



Bm_4
 $L = 15.67'$
 $W = (20 + 80) \times \frac{1}{2}$
 $R = 2^k$
www.pcs-structural.com
 $3 \frac{1}{2}'' \times 9 \frac{1}{2}''$ GLB
 14K Q610-SDS



Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

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DESCRIPTION: Ramp Bm 1

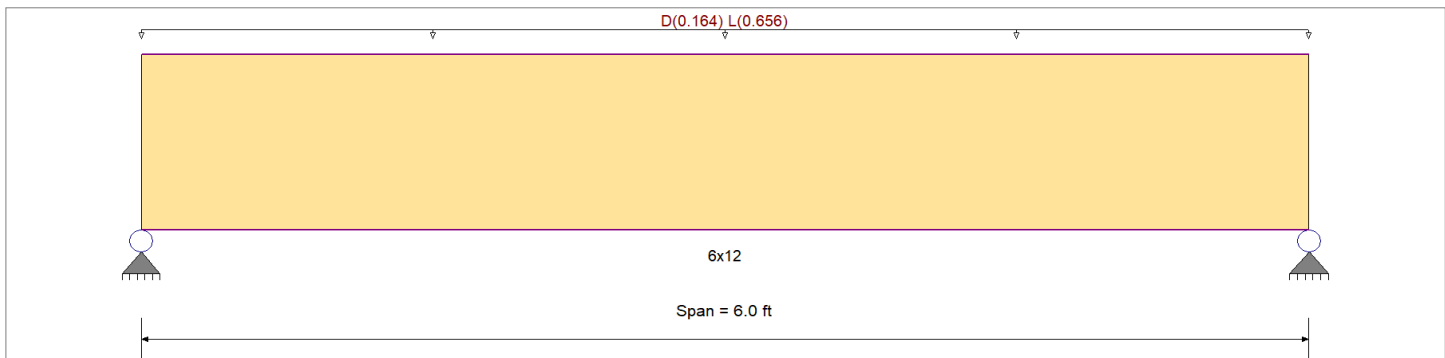
CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	1,000.0 psi	E : Modulus of Elasticity	
Load Combination :	IBC 2018	Fb -	1,000.0 psi	Ebend- xx	1,300.0 ksi
		Fc - Prll	1,000.0 psi	Eminbend - xx	1,300.0 ksi
Wood Species :	Douglas Fir-Larch (North)	Fc - Perp	1,000.0 psi		
Wood Grade :	No. 1/No. 2	Fv	65.0 psi		
		Ft	65.0 psi	Density	34.0 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight calculated and added to loading

Uniform Load : D = 0.020, L = 0.080 ksf, Tributary Width = 8.20 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio				Maximum Shear Stress Ratio			
Section used for this span	=	0.372	1	Section used for this span	=	0.627	1
fb: Actual	=	371.91	psi	fv: Actual	=	40.76	psi
Fb: Allowable	=	1,000.00	psi	Fv: Allowable	=	65.00	psi
Load Combination		+D+L		Load Combination		+D+L	
Location of maximum on span	=	3.000	ft	Location of maximum on span	=	0.000	ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection	0.021 in	Ratio =	3391 >= 360	Span: 1 : L Only			
Max Upward Transient Deflection	0 in	Ratio =	0 < 360	n/a			
Max Downward Total Deflection	0.027 in	Ratio =	2664 >= 240	Span: 1 : +D+L			
Max Upward Total Deflection	0 in	Ratio =	0 < 240	n/a			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v
D Only																
Length = 6.0 ft	1	0.089	0.149	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.81	79.70	900.00	0.37	8.73	58.50
+D+L					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.372	0.627	1.00	1.000	1.00	1.00	1.00	1.00	1.00	3.76	371.91	1000.00	1.72	40.76	65.00
+D+0.750L					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.239	0.403	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.02	298.86	1250.00	1.38	32.75	81.25
+0.60D					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.030	0.050	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.48	47.82	1600.00	0.22	5.24	104.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0270	3.022		0.0000	0.000

PRCTI20221698

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

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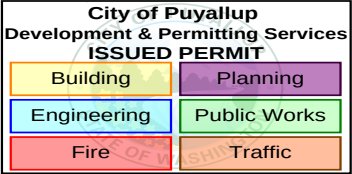
DESCRIPTION: Ramp Bm 1

Vertical Reactions

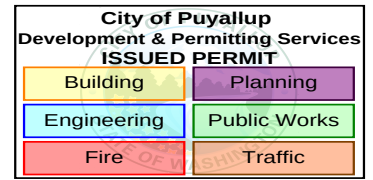
Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.505	2.505
Overall MINimum	1.968	1.968
D Only	0.537	0.537
+D+L	2.505	2.505
+D+0.750L	2.013	2.013
+0.60D	0.322	0.322
L Only	1.968	1.968



Project Title: **CHC Puyallup**
 Engineer: **LMC**
 Project ID:
 Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Ramp Bm 2

CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : IBC 2018

Wood Species : DF/DF

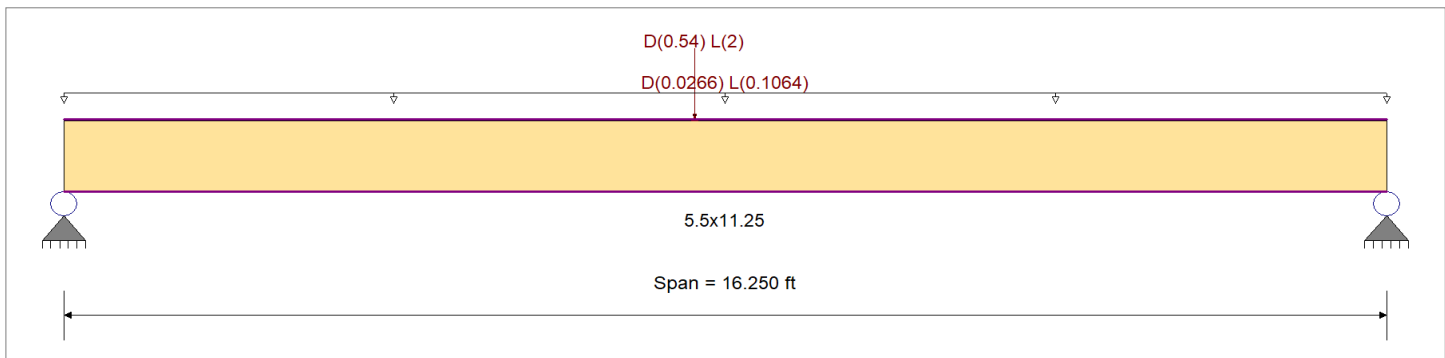
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb + 2,400.0 psi
 Fb - 1,850.0 psi
 Fc - Prll 1,650.0 psi
 Fc - Perp 650.0 psi
 Fv 265.0 psi
 Ft 1,100.0 psi

E : Modulus of Elasticity

Ebend- xx 1,800.0 ksi
 Eminbend - xx 950.0 ksi
 Ebend- yy 1,600.0 ksi
 Eminbend - yy 850.0 ksi
 Density 31.210 pcf



Applied Loads

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

Beam self weight calculated and added to loading

Uniform Load : D = 0.020, L = 0.080 ksf, Tributary Width = 1.330 ft

Point Load : D = 0.540, L = 2.0 k @ 7.750 ft, (Ramp Bm 1)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio				Maximum Shear Stress Ratio			
Section used for this span	=	5.5x11.25		Section used for this span	=	5.5x11.25	
fb: Actual	=	1,561.55psi		fv: Actual	=	57.89 psi	
Fb: Allowable	=	2,400.00psi		Fv: Allowable	=	265.00 psi	
Load Combination		+D+L		Load Combination		+D+L	
Location of maximum on span	=	7.769ft		Location of maximum on span	=	0.000 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection	0.407 in	Ratio =	479 >= 360	Span: 1 : L Only			
Max Upward Transient Deflection	0 in	Ratio =	0 < 360	n/a			
Max Downward Total Deflection	0.532 in	Ratio =	366 >= 240	Span: 1 : +D+L			
Max Upward Total Deflection	0 in	Ratio =	0 < 240	n/a			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values				
Segment	Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v	
D Only															0.00	0.00	0.00	0.00
	Length = 16.250 ft	1	0.168	0.058	0.90	1.000	1.00	1.00	1.00	1.00	1.00	3.50	362.25	2160.00	0.57	13.87	238.50	
+D+L					1.000	1.00	1.00	1.00	1.00	1.00	1.00	0.00			0.00	0.00	0.00	
	Length = 16.250 ft	1	0.651	0.218	1.00	1.000	1.00	1.00	1.00	1.00	1.00	15.10	1,561.55	2400.00	2.39	57.89	265.00	
+D+0.750L					1.000	1.00	1.00	1.00	1.00	1.00	1.00	0.00			0.00	0.00	0.00	
	Length = 16.250 ft	1	0.421	0.142	1.25	1.000	1.00	1.00	1.00	1.00	1.00	12.20	1,261.72	3000.00	1.93	46.88	331.25	
+0.60D					1.000	1.00	1.00	1.00	1.00	1.00	1.00	0.00			0.00	0.00	0.00	
	Length = 16.250 ft	1	0.057	0.020	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.10	217.35	3840.00	0.34	8.32	424.00	

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.5316	8.066		0.0000	0.000

PRCTI20221698

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

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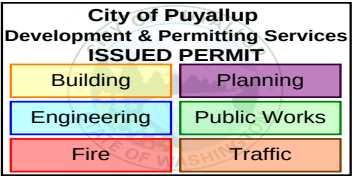
DESCRIPTION: Ramp Bm 2

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.518	2.401
Overall MINimum	1.911	1.818
D Only	0.608	0.583
+D+L	2.518	2.401
+D+0.750L	2.041	1.946
+0.60D	0.365	0.350
L Only	1.911	1.818



PRCTI20221698

Project Title: **CHC Puyallup**
 Engineer: **LMC**
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services	
ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Project File: CHC Puyallup calcs.ec6

Wood Beam

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

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DESCRIPTION: Ramp Bm 3

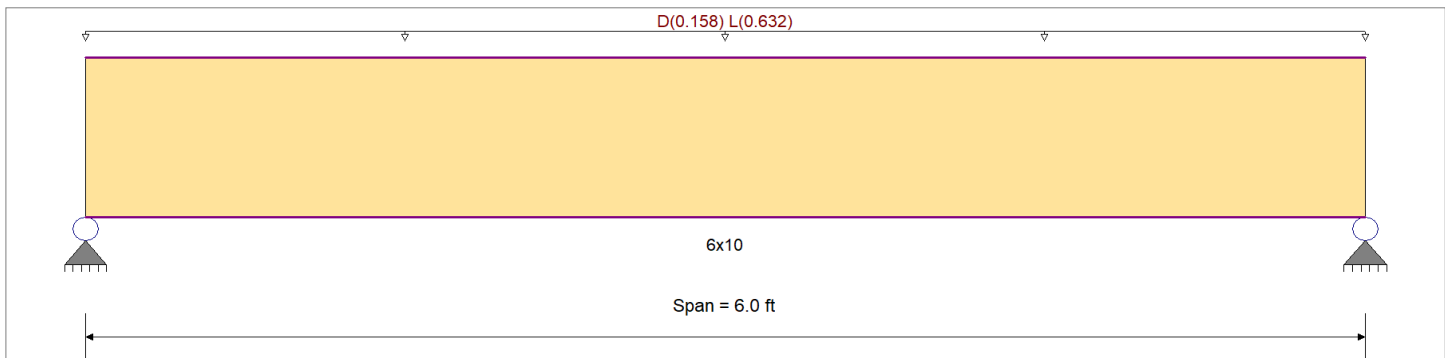
CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	1,000.0 psi	E : Modulus of Elasticity	
Load Combination :	IBC 2018	Fb -	1,000.0 psi	Ebend- xx	1,300.0 ksi
		Fc - Prll	1,000.0 psi	Eminbend - xx	1,300.0 ksi
Wood Species :	Douglas Fir-Larch (North)	Fc - Perp	1,000.0 psi		
Wood Grade :	No. 1/No. 2	Fv	65.0 psi		
		Ft	65.0 psi	Density	34.0 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight calculated and added to loading

Uniform Load : D = 0.020, L = 0.080 ksf, Tributary Width = 7.90 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio			=	0.524 : 1	Maximum Shear Stress Ratio			=	0.784 : 1
Section used for this span				6x10	Section used for this span				6x10
fb: Actual			=	523.71 psi	fv: Actual			=	50.94 psi
Fb: Allowable			=	1,000.00 psi	Fv: Allowable			=	65.00 psi
Load Combination				+D+L	Load Combination				+D+L
Location of maximum on span			=	3.000ft	Location of maximum on span			=	0.000 ft
Span # where maximum occurs			=	Span # 1	Span # where maximum occurs			=	Span # 1
Maximum Deflection									
Max Downward Transient Deflection			0.036 in	Ratio =	1984	>=360		Span: 1 : L Only	
Max Upward Transient Deflection			0 in	Ratio =	0	<360		n/a	
Max Downward Total Deflection			0.046 in	Ratio =	1562	>=240		Span: 1 : +D+L	
Max Upward Total Deflection			0 in	Ratio =	0	<240		n/a	

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios								Moment Values			Shear Values			
			M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v
D Only														0.00	0.00	0.00	0.00
Length = 6.0 ft	1		0.124	0.185	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.77	111.18	900.00	0.38	10.82	58.50
+D+L						1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1		0.524	0.784	1.00	1.000	1.00	1.00	1.00	1.00	1.00	3.61	523.71	1000.00	1.77	50.94	65.00
+D+0.750L						1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1		0.336	0.504	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.90	420.58	1250.00	1.43	40.91	81.25
+0.60D						1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1		0.042	0.062	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.46	66.71	1600.00	0.23	6.49	104.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0461	3.022		0.0000	0.000

PRCTI20221698

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

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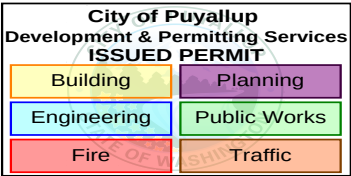
DESCRIPTION: Ramp Bm 3

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.407	2.407
Overall MINimum	1.896	1.896
D Only	0.511	0.511
+D+L	2.407	2.407
+D+0.750L	1.933	1.933
+0.60D	0.307	0.307
L Only	1.896	1.896



PRCTI20221698

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Ramp Bm 4

CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : IBC 2018

Wood Species : DF/DF

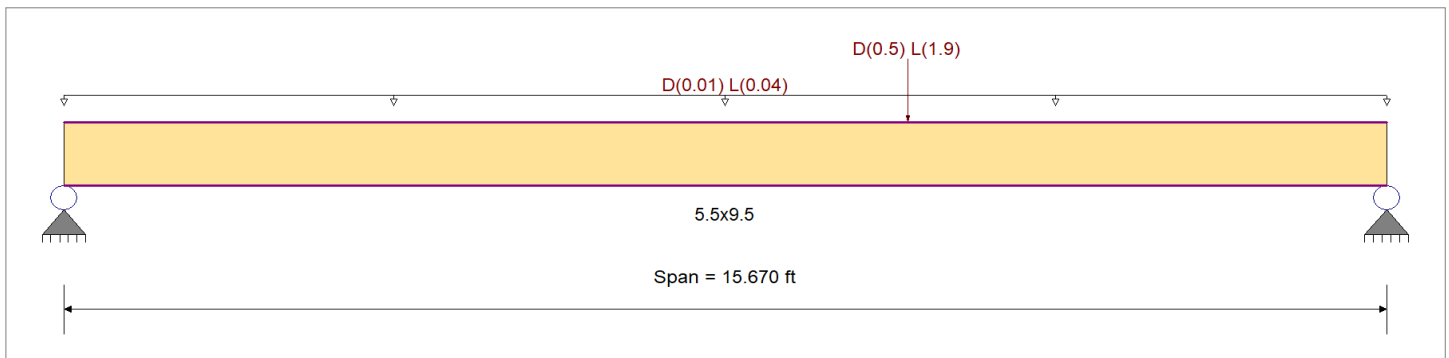
Wood Grade : 24F-V4

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb + 2,400.0 psi
 Fb - 1,850.0 psi
 Fc - Prll 1,650.0 psi
 Fc - Perp 650.0 psi
 Fv 265.0 psi
 Ft 1,100.0 psi

E : Modulus of Elasticity

Ebend- xx 1,800.0 ksi
 Eminbend- xx 950.0 ksi
 Ebend- yy 1,600.0 ksi
 Eminbend- yy 850.0 ksi
 Density 31.210 pcf



Applied Loads

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

Beam self weight calculated and added to loading

Uniform Load : D = 0.020, L = 0.080 ksf, Tributary Width = 0.50 ft

Point Load : D = 0.50, L = 1.90 k @ 10.0 ft, (Ramp Bm 3)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.629	1	Maximum Shear Stress Ratio	=	0.213	1
Section used for this span		5.5x9.5		Section used for this span		5.5x9.5	
fb: Actual	=	1,509.84psi		fv: Actual	=	56.45 psi	
Fb: Allowable	=	2,400.00psi		Fv: Allowable	=	265.00 psi	
Load Combination		+D+L		Load Combination		+D+L	
Location of maximum on span	=	10.008ft		Location of maximum on span	=	14.927 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection	0.414 in	Ratio =	453 >=360	Span: 1 : L Only			
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a			
Max Downward Total Deflection	0.544 in	Ratio =	345 >=240	Span: 1 : +D+L			
Max Upward Total Deflection	0 in	Ratio =	0 <240	n/a			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values			
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v	
D Only														0.00	0.00	0.00	0.00
Length = 15.670 ft	1	0.162	0.057	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.41	349.68	2160.00	0.47	13.50	238.50	
+D+L				1.000	1.00	1.00	1.00	1.00	1.00	1.00	0.00			0.00	0.00	0.00	
Length = 15.670 ft	1	0.629	0.213	1.00	1.000	1.00	1.00	1.00	1.00	1.00	10.41	1,509.84	2400.00	1.97	56.45	265.00	
+D+0.750L				1.000	1.00	1.00	1.00	1.00	1.00	1.00	0.00			0.00	0.00	0.00	
Length = 15.670 ft	1	0.407	0.138	1.25	1.000	1.00	1.00	1.00	1.00	1.00	8.41	1,219.80	3000.00	1.59	45.72	331.25	
+0.60D				1.000	1.00	1.00	1.00	1.00	1.00	1.00	0.00			0.00	0.00	0.00	
Length = 15.670 ft	1	0.055	0.019	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.45	209.81	3840.00	0.28	8.10	424.00	

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.5441	8.350		0.0000	0.000

PRCTI20221698

Wood Beam

Project File: CHC Puyallup calcs.ec6

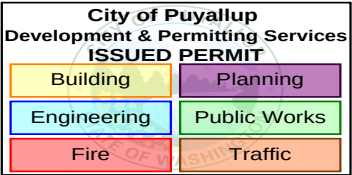
LIC# : KW-06014122, Build:20.22.7.25 PCS STRUCTURAL SOLUTIONS (c) ENERCALC INC 1983-2022

DESCRIPTION: Ramp Bm 4

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.349	2.012
Overall MINimum	1.001	1.526
D Only	0.348	0.486
+D+L	1.349	2.012
+D+0.750L	1.099	1.631
+0.60D	0.209	0.292
L Only	1.001	1.526



PRCTI20221698

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

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DESCRIPTION: Ramp Joists - Lmax

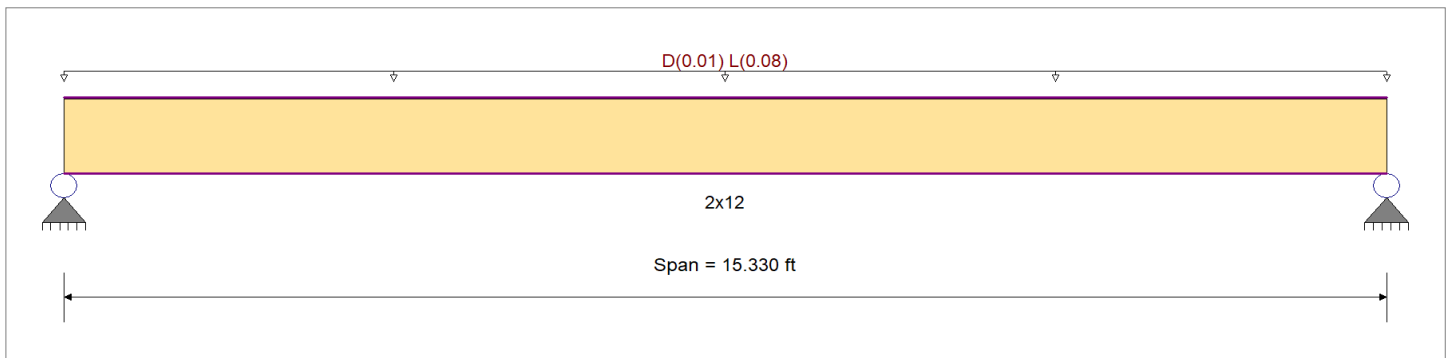
CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	1,000.0 psi	E : Modulus of Elasticity	
Load Combination :	IBC 2018	Fb -	1,000.0 psi	Ebend- xx	1,300.0 ksi
		Fc - Prll	1,000.0 psi	Eminbend - xx	1,300.0 ksi
Wood Species :	Douglas Fir-Larch (North)	Fc - Perp	1,000.0 psi		
Wood Grade :	No. 1/No. 2	Fv	65.0 psi		
		Ft	65.0 psi	Density	34.0 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight NOT internally calculated and added

Uniform Load : D = 0.010, L = 0.080 ksf, Tributary Width = 1.0 ft, (Ramp Joist Loading)

DESIGN SUMMARY

Design N.G.

Maximum Bending Stress Ratio	=	1.003 1	Maximum Shear Stress Ratio	=	0.833 1
Section used for this span		2x12	Section used for this span		2x12
fb: Actual	=	1,002.70 psi	fv: Actual	=	54.16 psi
Fb: Allowable	=	1,000.00 psi	Fv: Allowable	=	65.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	7.665 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection	0.432 in	Ratio = 425 >= 360	Span: 1 : L Only		
Max Upward Transient Deflection	0 in	Ratio = 0 < 360	n/a		
Max Downward Total Deflection	0.486 in	Ratio = 378 >= 240	Span: 1 : +D+L		
Max Upward Total Deflection	0 in	Ratio = 0 < 240	n/a		

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values			
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v	
D Only														0.00	0.00	0.00	0.00
Length = 15.330 ft	1	0.124	0.103	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.29	111.41	900.00	0.07	6.02	58.50	
+D+L														0.00	0.00	0.00	0.00
Length = 15.330 ft	1	1.003	0.833	1.00	1.000	1.00	1.00	1.00	1.00	1.00	2.64	1,002.70	1000.00	0.61	54.16	65.00	
+D+0.750L														0.00	0.00	0.00	0.00
Length = 15.330 ft	1	0.624	0.518	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.06	779.88	1250.00	0.47	42.12	81.25	
+0.60D														0.00	0.00	0.00	0.00
Length = 15.330 ft	1	0.042	0.035	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.18	66.85	1600.00	0.04	3.61	104.00	

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.4862	7.721		0.0000	0.000

PRCTI20221698

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

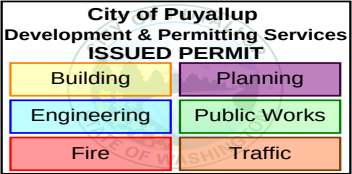
DESCRIPTION: Ramp Joists - Lmax

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.690	0.690
Overall MINimum	0.613	0.613
D Only	0.077	0.077
+D+L	0.690	0.690
+D+0.750L	0.537	0.537
+0.60D	0.046	0.046
L Only	0.613	0.613



PRCTI20221698

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Ramp Joists - L = 8'

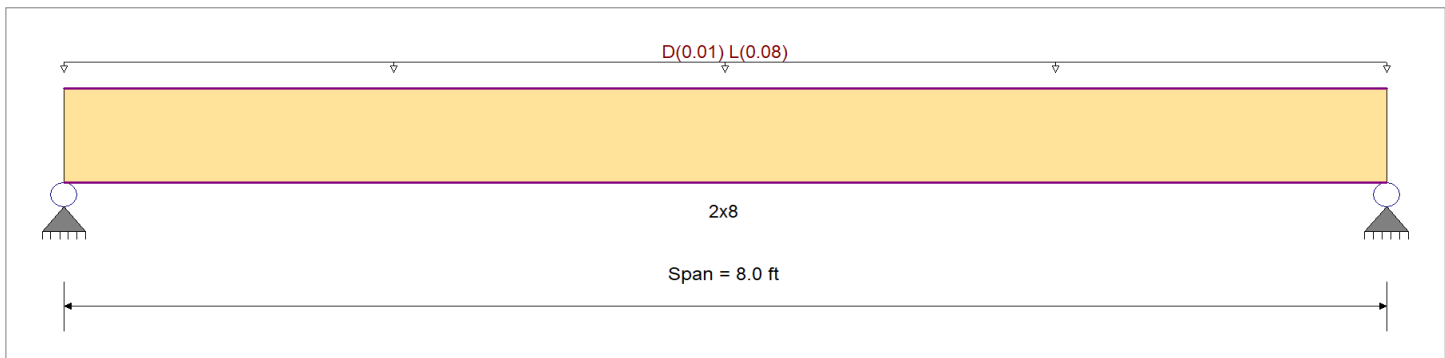
CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	1,000.0 psi	E : Modulus of Elasticity	
Load Combination :	IBC 2018	Fb -	1,000.0 psi	Ebend- xx	1,300.0 ksi
		Fc - Prll	1,000.0 psi	Eminbend - xx	1,300.0 ksi
Wood Species :	Douglas Fir-Larch (North)	Fc - Perp	1,000.0 psi		
Wood Grade :	No. 1/No. 2	Fv	65.0 psi		
		Ft	65.0 psi	Density	34.0 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight NOT internally calculated and added

Uniform Load : D = 0.010, L = 0.080 ksf, Tributary Width = 1.0 ft, (Ramp Joist Loading)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.548	1	Maximum Shear Stress Ratio	=	0.652	1
Section used for this span		2x8		Section used for this span		2x8	
fb: Actual	=	657.50 psi		fv: Actual	=	42.41 psi	
Fb: Allowable	=	1,200.00 psi		Fv: Allowable	=	65.00 psi	
Load Combination		+D+L		Load Combination		+D+L	
Location of maximum on span	=	4.000 ft		Location of maximum on span	=	7.416 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.120 in	Ratio = 801 >= 360	Span: 1 : L Only			
Max Upward Transient Deflection		0 in	Ratio = 0 < 360	n/a			
Max Downward Total Deflection		0.135 in	Ratio = 712 >= 240	Span: 1 : +D+L			
Max Upward Total Deflection		0 in	Ratio = 0 < 240	n/a			

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values		
			M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v
D Only														0.00		0.00	0.00
Length = 8.0 ft	1		0.068	0.081	0.90	1.200	1.00	1.00	1.00	1.00	1.00	0.08	73.06	1080.00	0.03	4.71	58.50
+D+L						1.200	1.00	1.00	1.00	1.00	1.00			0.00		0.00	0.00
Length = 8.0 ft	1		0.548	0.652	1.00	1.200	1.00	1.00	1.00	1.00	1.00	0.72	657.50	1200.00	0.31	42.41	65.00
+D+0.750L						1.200	1.00	1.00	1.00	1.00	1.00			0.00		0.00	0.00
Length = 8.0 ft	1		0.341	0.406	1.25	1.200	1.00	1.00	1.00	1.00	1.00	0.56	511.39	1500.00	0.24	32.98	81.25
+0.60D						1.200	1.00	1.00	1.00	1.00	1.00			0.00		0.00	0.00
Length = 8.0 ft	1		0.023	0.027	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.05	43.83	1920.00	0.02	2.83	104.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.1347	4.029		0.0000	0.000

PRCTI20221698

Project Title: CHC Puyallup
Engineer: LMC
Project ID:
Project Descr:

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

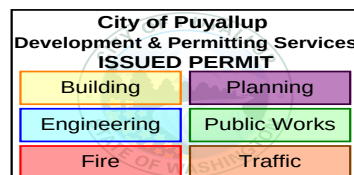
DESCRIPTION: Ramp Joists - L = 8'

Vertical Reactions

Support notation : Far left is #1

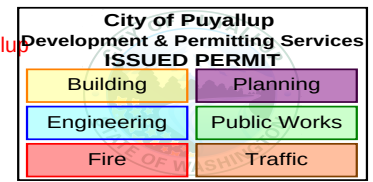
Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.360	0.360
Overall MINimum	0.320	0.320
D Only	0.040	0.040
+D+L	0.360	0.360
+D+0.750L	0.280	0.280
+0.60D	0.024	0.024
L Only	0.320	0.320



PRCTI20221698

Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Ramp Joists - L = 10.83'

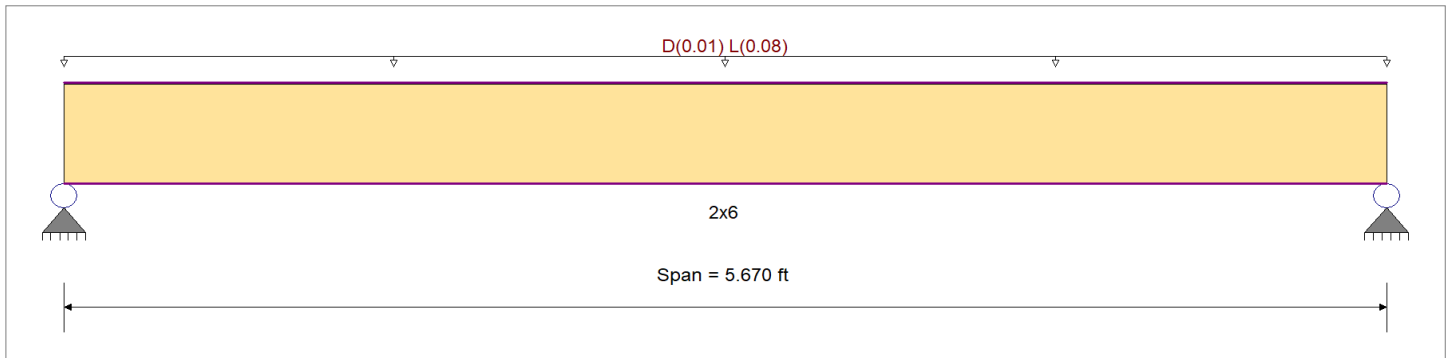
CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	1,000.0 psi	E : Modulus of Elasticity	
Load Combination :	IBC 2018	Fb -	1,000.0 psi	Ebend- xx	1,300.0 ksi
		Fc - Prll	1,000.0 psi	Eminbend - xx	1,300.0 ksi
Wood Species :	Douglas Fir-Larch (North)	Fc - Perp	1,000.0 psi		
Wood Grade :	No. 1/No. 2	Fv	65.0 psi		
		Ft	65.0 psi	Density	34.0 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight NOT internally calculated and added

Uniform Load : D = 0.010, L = 0.080 ksf, Tributary Width = 1.0 ft, (Ramp Joist Loading)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio				Maximum Shear Stress Ratio			
Section used for this span	=	0.441	1	Section used for this span	=	0.599	1
fb: Actual	=	573.90	psi	fv: Actual	=	38.94	psi
Fb: Allowable	=	1,300.00	psi	Fv: Allowable	=	65.00	psi
Load Combination		+D+L		Load Combination		+D+L	
Location of maximum on span	=	2.835	ft	Location of maximum on span	=	5.215	ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection	0.069 in	Ratio =	983 >= 360	Span: 1 : L Only			
Max Upward Transient Deflection	0 in	Ratio =	0 < 360	n/a			
Max Downward Total Deflection	0.078 in	Ratio =	873 >= 240	Span: 1 : +D+L			
Max Upward Total Deflection	0 in	Ratio =	0 < 240	n/a			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values			
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v	
D Only														0.00	0.00	0.00	0.00
Length = 5.670 ft	1	0.055	0.074	0.90	1.300	1.00	1.00	1.00	1.00	1.00	0.04	63.77	1170.00	0.02	4.33	58.50	
+D+L					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 5.670 ft	1	0.441	0.599	1.00	1.300	1.00	1.00	1.00	1.00	1.00	0.36	573.90	1300.00	0.21	38.94	65.00	
+D+0.750L					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 5.670 ft	1	0.275	0.373	1.25	1.300	1.00	1.00	1.00	1.00	1.00	0.28	446.36	1625.00	0.17	30.29	81.25	
+0.60D					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 5.670 ft	1	0.018	0.025	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.02	38.26	2080.00	0.01	2.60	104.00	

Overall Maximum Deflections

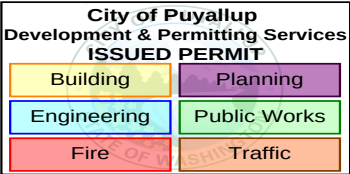
Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0779	2.856		0.0000	0.000

PRCTI20221698

Project Title: CHC Puyallup
Engineer: LMC
Project ID:
Project Descr:

DESCRIPTION: Ramp Joists - L = 10.83'

Vertical Reactions	Support notation : Far left is #1		Values in KIPS
	Support 1	Support 2	
Load Combination			
Overall MAXimum	0.255	0.255	
Overall MINimum	0.227	0.227	
D Only	0.028	0.028	
+D+L	0.255	0.255	
+D+0.750L	0.198	0.198	
+0.60D	0.017	0.017	
L Only	0.227	0.227	



Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Floor edge bm at ramp

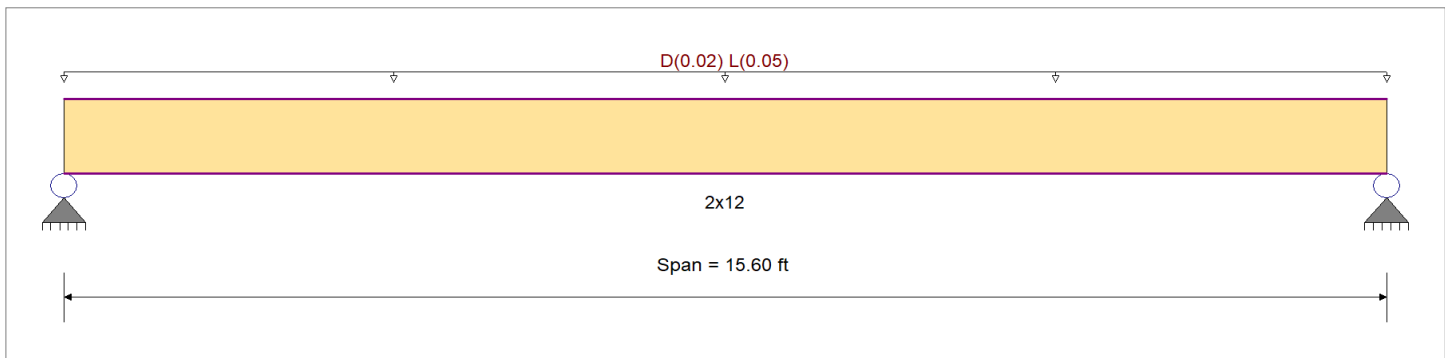
CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	1,000.0 psi	E : Modulus of Elasticity	
Load Combination :	IBC 2018	Fb -	1,000.0 psi	Ebend- xx	1,300.0 ksi
		Fc - Prll	1,000.0 psi	Eminbend - xx	1,300.0 ksi
Wood Species :	Douglas Fir-Larch (North)	Fc - Perp	1,000.0 psi		
Wood Grade :	No. 1/No. 2	Fv	65.0 psi		
		Ft	65.0 psi	Density	34.0 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight NOT internally calculated and added

Uniform Load : D = 0.020, L = 0.050 ksf, Tributary Width = 1.0 ft, (Ramp Joist Loading)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.808	1	Maximum Shear Stress Ratio	=	0.659	1
Section used for this span		2x12		Section used for this span		2x12	
fb: Actual	=	807.59 psi		fv: Actual	=	42.87 psi	
Fb: Allowable	=	1,000.00 psi		Fv: Allowable	=	65.00 psi	
Load Combination		+D+L		Load Combination		+D+L	
Location of maximum on span	=	7.800 ft		Location of maximum on span	=	14.689 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.290 in	Ratio = 646	>=360	Span: 1 : L Only		
Max Upward Transient Deflection		0 in	Ratio = 0	<360	n/a		
Max Downward Total Deflection		0.406 in	Ratio = 461	>=240	Span: 1 : +D+L		
Max Upward Total Deflection		0 in	Ratio = 0	<240	n/a		

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios									Moment Values			Shear Values			
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v	
D Only														0.00	0.00	0.00	0.00
Length = 15.60 ft	1	0.256	0.209	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.61	230.74	900.00	0.14	12.25	58.50	
+D+L					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 15.60 ft	1	0.808	0.659	1.00	1.000	1.00	1.00	1.00	1.00	1.00	2.13	807.59	1000.00	0.48	42.87	65.00	
+D+0.750L					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 15.60 ft	1	0.531	0.433	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.75	663.38	1250.00	0.40	35.21	81.25	
+0.60D					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 15.60 ft	1	0.087	0.071	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.37	138.44	1600.00	0.08	7.35	104.00	

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.4055	7.857		0.0000	0.000

PRCTI20221698

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

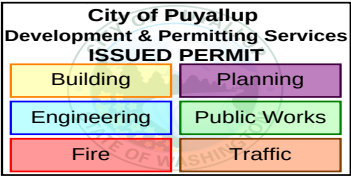
DESCRIPTION: Floor edge bm at ramp

Vertical Reactions

Support notation : Far left is #1

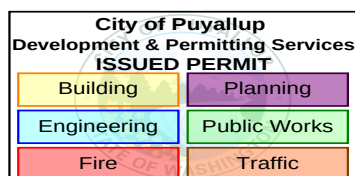
Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.546	0.546
Overall MINimum	0.390	0.390
D Only	0.156	0.156
+D+L	0.546	0.546
+D+0.750L	0.449	0.449
+0.60D	0.094	0.094
L Only	0.390	0.390

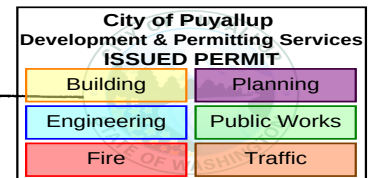


PRCTI20221698

LATERAL



PRCTI20221698



(E) Bldg wt vs New bldg wt

→ compare (e) lateral mass to new lateral mass

→ $\Sigma(E)$ Mech wts on roof = 13,145⁴⁴

↳ mech wts provided on (e) mech dwgs

12,338[#] (moved more units to SOG)

$\Sigma(N)$ wts on roof = 13,848[#] = 5.3% increase < 10% increase in roof wt

↳ units provided by mech

↳ Σ new mech < Σ (e) mech

Σ New roof wt < (E) roof wt x 1.1

↳ No trigger for lateral upgrade of bldg

→ Per mech engr. new mech ducts hanging from 2nd floor framing = existing duct weights

↳ No increase to (e) floor wts

→ (e) joists are OK for new LL's - see (e) joist calcs

↳ No increase to (e) floor wts

→ New West stair

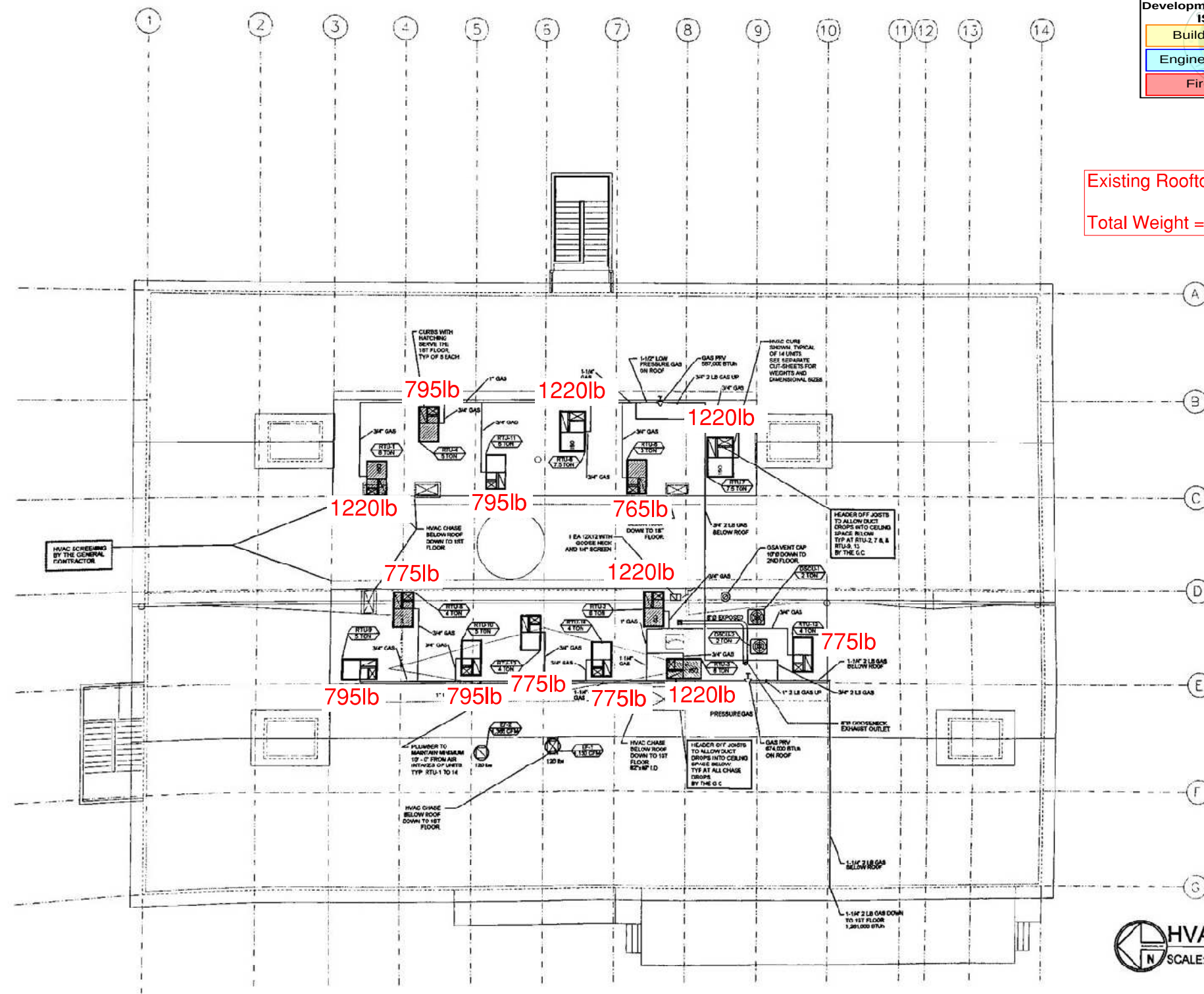
↳ replaces (e) West stair & has it's own new shearwalls to take lateral mass of stair.

↳ No increase to bldg mass

↳ No increase in roof mech wts

Only mass increase is from rooftop mech.
Increase is < 10%.

No trigger for seismic upgrade



Existing Rooftop Mech
Total Weight = 13,145#

HVAC ROOF PLAN
N SCALE: 1/8" = 1' - 0"

ASBUILT: 04-04-05
REV-2: 11-17-04 REVIEW COMMENTS
REV-1: 11-09-04 REVIEW COMMENTS

City of Puyallup
Development & Permitting Services
ISSUED PERMIT

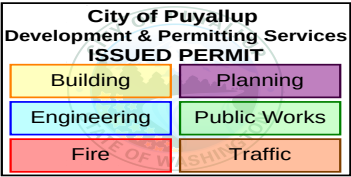
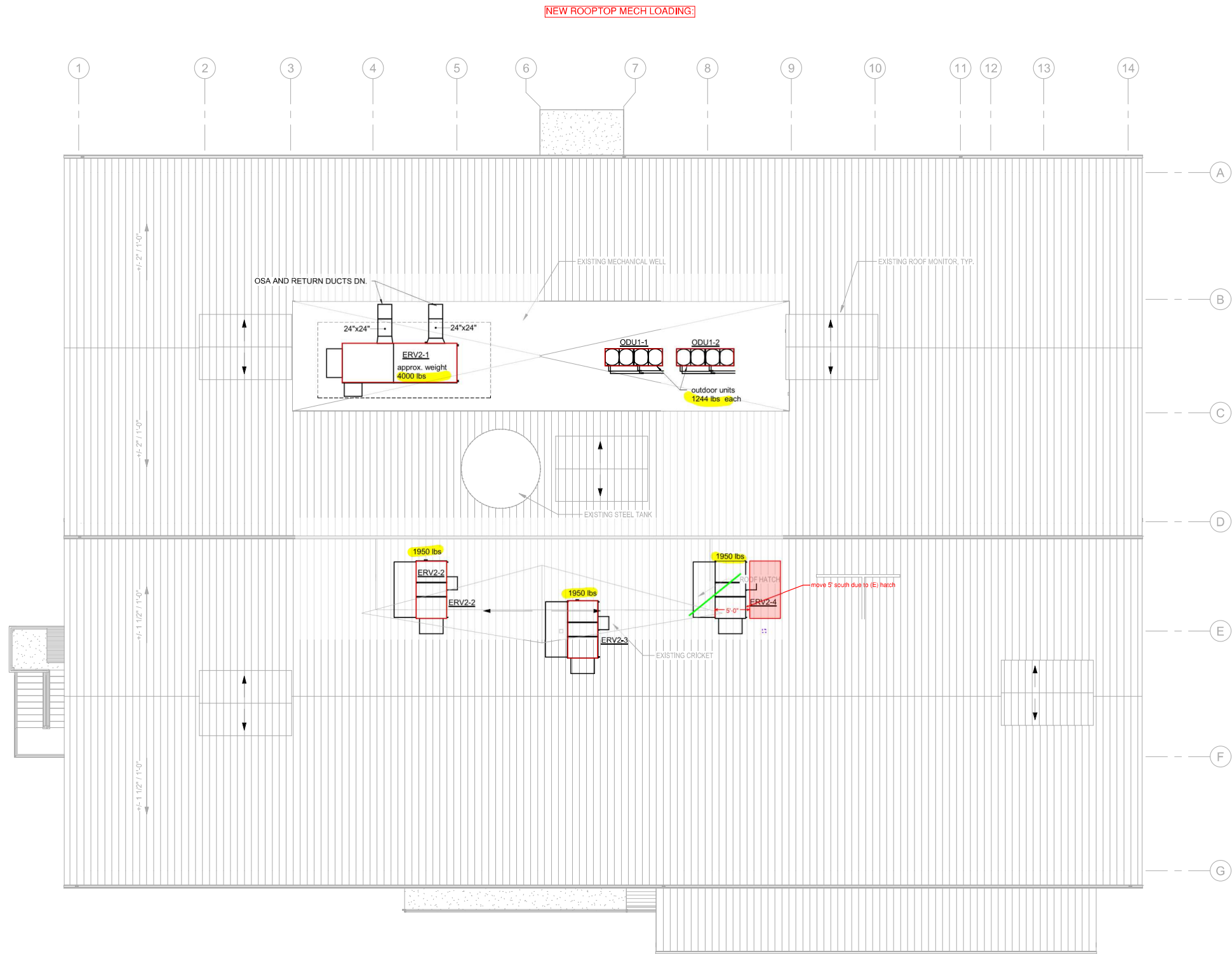
Building	Planning
Engineering	Public Works
Fire	Traffic



Sunset Air
5210 LACEY BLVD
LACEY WA 98503
(360) 456-4856
FAX: (360) 456-4880

CANNERY STATION - BUILDING A - DSHS
HVAC ROOF PLAN
201 WEST MAIN STREET
Date: 17AUG04 Job # BEE054
DWG Name: CANNERY-M4.dwg
Drawn By: JR

M4.0



CHC Puyallup - Cannery

201 W. Main
Puyallup, WA 98371

Miller Hayashi Architects
118 North 35th St., Suite 200
Seattle, Washington 98103
Tel: 206 634 0177
Fax: 206 634 0167

ARCHITECT'S STAMP



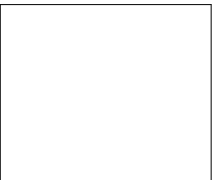
TRES WEST ENGINEERS, INC.
2702 SOUTH 42ND STREET, SUITE 301
TACOMA, WA 98409-7315
Phone: 253.472.3300
www.treswest.com
CONSULTANT

CONSULTANT'S STAMP

PREVIOUS ROOFTOP LOAD OF (E) EQUIPMENT:
13,145 LB.
NEW ROOFTOP MECH LOADING:
12,338 LB

PRELIMINARY COORD SET
NOT FOR CONSTRUCTION

BUILDING DEPARTMENT'S STAMP



PHASE

Schematic Design
DATE

09/22/2022

REVISIONS

No.	Description	Date
-----	-------------	------

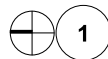
SHEET TITLE

**MECHANICAL
ROOF PLAN**

SHEET NO.

M2.03

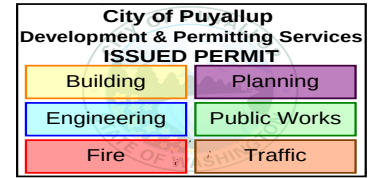
© MILLER HAYASHI ARCHITECTS 2213



MECHANICAL ROOF PLAN

1/8" = 1'-0"

PRCTI20221698



(E) SW's

1 15/32 10d @ 6" ^{edges} Blocked A.B. - 3/4 @ 48" x 6" = 315#/
Vallow = 310#/
= 310#/, = 315#/,

2 15/32 10d @ 4" Blocked 3/4 @ 36" x 6" = 420#/, ← 2x nailer NDS Table 11E
= 460#/,

3 15/32 10d @ 2" Blocked 3/4 @ 32" x 6" = 518#/, ← 3x nailer NDS Table 11E for 2 1/2" R
= 770#/,

section 5/5A.4 (E) strict dwgs show A35 @ 24" O.C.
16d bott @ 8" = 207#/
= 348#/,

(New) SW's

A 15/32 10d @ 6" Blocked A35's @ 24" O.C. = 325#/
Vallow = 310#/,

Bott R Nails
~~10d @ 4" O.C.~~
~~= 345#/,~~
2x 6 SDWS @ 3" O.C.

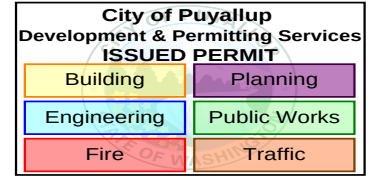
B 15/32 10d @ 4" Blocked A35's @ 16" O.C. = 488#/
= 460#/,

2x 6 SDWS @ 3" O.C.
= 516#/,

C 15/32 10d @ 3" Blocked A35's @ 12" O.C. = 650#/
= 600#/,

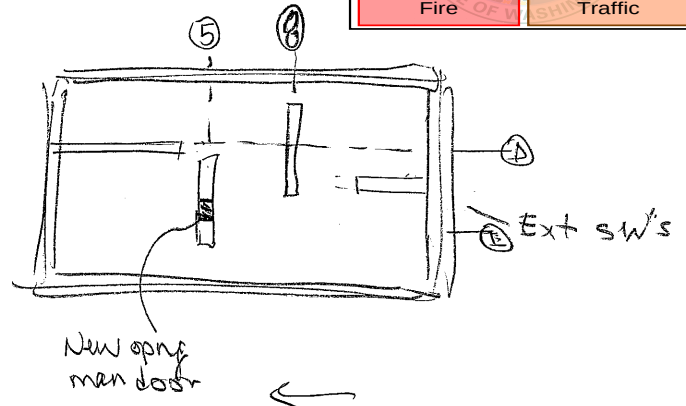
2x 6 SDWS @ 3" O.C.
= 516#/,

3/4" AB's @ (E) 3x bott @
@ 48" = 380#/,
@ 36" = 507#/,
@ 32" = 510#/,



1st story SW opng's added

- at 1st flr : (1) new opng in E-W SW @ ⑤. No other 1st story SW opngs



⑤ SW - 1st Floor

$$\begin{aligned} L_{wall\ original} &= 30' \\ L_{wall\ new} &= 26.67' > = 12.5\% \end{aligned}$$

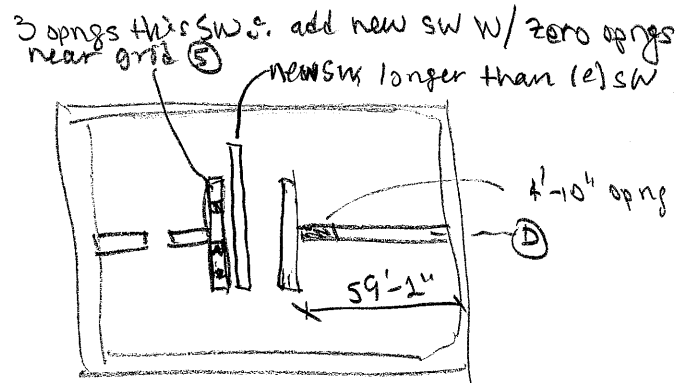
Add back 3'-4" of SW @ East end of wall $\rightarrow$ ①% change in SW length.

- check uplift near door
- connect @ new SW.

2nd Story SW opng's added

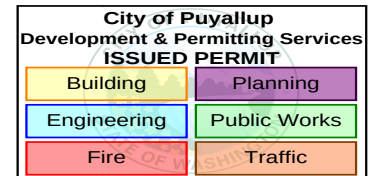
@ grid ①

$$\begin{aligned} 4'-10'' \text{ opng in} \\ L_{wall\ original} &= 59'-2'' \\ L_{wall\ new} &= 54'-6'' > 8.9\% \text{ change} \\ &< 10\%, \text{ OK} \end{aligned}$$



No other opng's in (E) SW's 2nd story

Shearwall @ grid (5), 1st floor



original

new

New total SW
length > existing

check holdowns

Existing SW:
= 2 sides w/ 1st @ 2"
w/ 3/4" x 6" AB @ 32" O.C.

$V_{\text{existing SW capacity}} = 578 \text{ \#/ft (ASD)}$

$V_{\text{SW}} = 578 \text{ \#/ft} \times 29.75' = 17.2 \text{ k (ASD)}$

$$V_1 = \frac{7.6'}{(7.6 + 22.75')} = .25 \quad V_2 = \frac{22.75}{(7.6 + 22.75')} = .75$$

$$V_1 = .25 \times 17.2 \text{ k} = 4.3 \text{ k} \quad V_2 = .75 \times 17.2 \text{ k} = 13 \text{ k (ASD)}$$

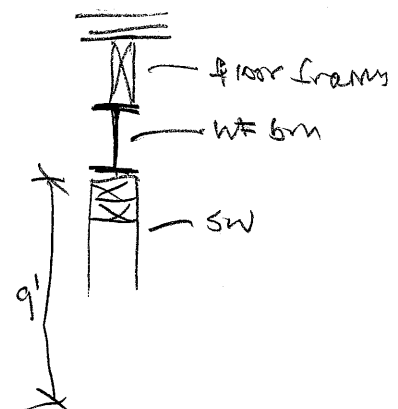
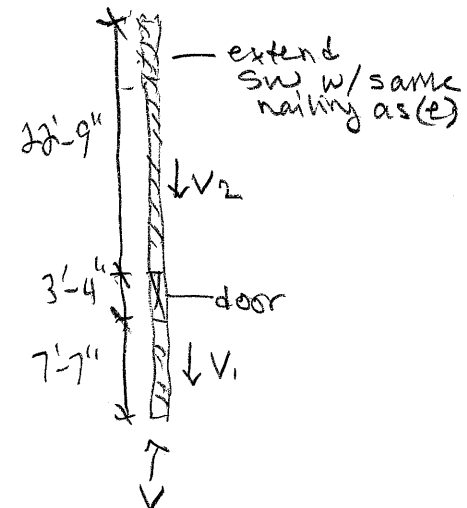
- see excel for holdowns

DL floor = 20 PSF x 4'

DL roof = 0

DL wall = 15 PSF x HT

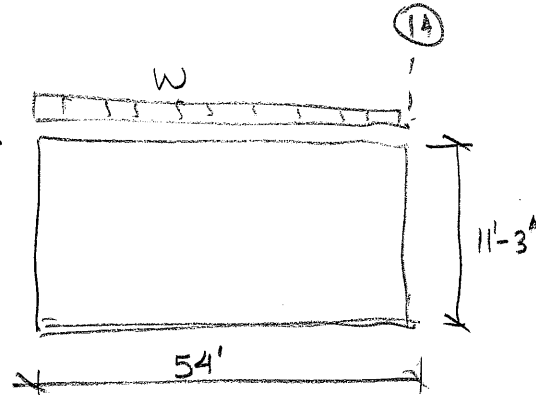
Load case (1.6 - .14 SDS) DL - .7 EQ



shearwall and floor, grid D

$$\begin{aligned} \text{(c) sw capacity} &= 370 \text{ k} \\ V &= 370 \text{ k} \times 59.2' = 18 \text{ k} \\ WDL &= \frac{31.5' \times 20 \text{ PSF}}{2} \end{aligned}$$

18 k
ASD



$$WDL_{\text{wall}} = 15 \text{ PSF} \times 11.25'$$

$$M_{ot} = 18 \text{ k} \times 11.25'$$

$$M_R = \text{factors} \times \left(\frac{WDL_{\text{RF}} + WDL_{\text{Wall}}}{2} \right) \times \frac{(54')^2}{2}$$

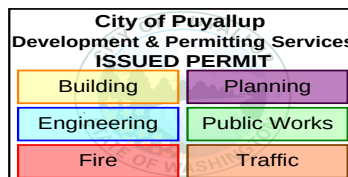
$$Uplift = \frac{M_{ot} - M_R}{(54' - \frac{8''}{12})}$$

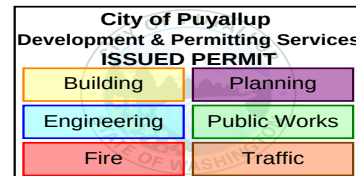
- see overturning spreadsheet - Uplift = None

Add MST37 anyway, to (E) brn below

- change in sw (I) length is < 10% compared to original $\therefore$ OK.

↳ check uplift only





New SW @ 2nd Floor grid 5

grid 4.5
(E) SW gets new doors. ∴ add new SW, longer than (E) W/ no springs.

L wall (E) @ grid 4.5 = 28'

Exist SW capacity = 420# (original struct dwg type 27 SW)

$$V_{wall} = 420\# \times 28' = 11.8^k \text{ (ASD)}$$

Tot New Bldg wt does not exceed 10% increase of (E) Bldg weight. New mech unit on roof included in new wt summary. Add'l mech units move to ground to not exceed (e) bldg weight. ∴ No trigger of lateral sys, upgrade.
∴ Use capacity of (E) SW as force req'd in new SW.

New SW length = 41'

$$V_{wall} = \frac{11.8^k \times 1000}{41'}$$

$$= 288\# \text{ (ASD)}$$

Need new SW type A

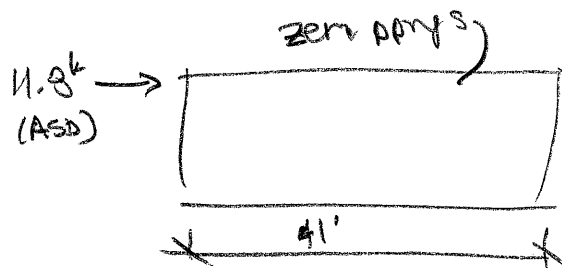
- see overturning spreadsheet for holdowns.

$$\begin{aligned} \text{DL roof} &= 4' \times 20 \text{ PSF} \\ \text{DL wall} &= 15 \text{ PSF} \times 41' \end{aligned}$$

$$\text{Uplift} = 880\# \times 2 = 2.2^k$$

(2.5)

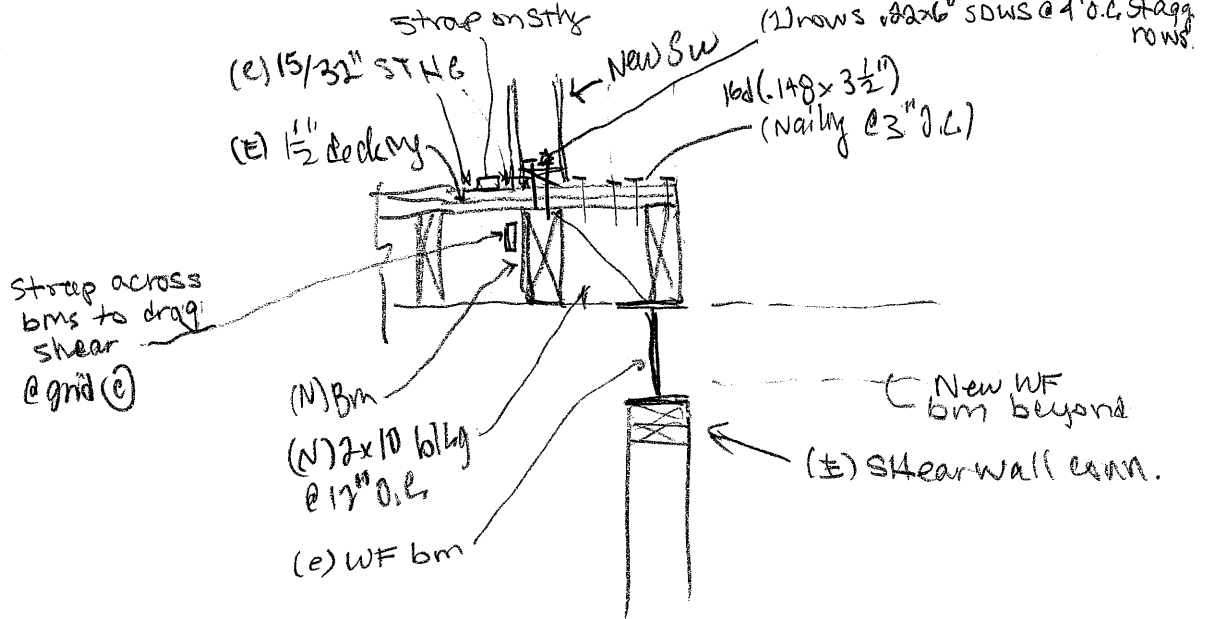
add br under to take force



(due to slight vert irregularity) vert irregularity were already existed w/ (e) SW being 6.5' offset from SW below. Now offset is only 1'-2". Still applying 2 to holdown force @ new wall. Add bllg in floor between two walls for diaph. Add strap on diaph to engage more diaph. length.

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grid ⑤ SW
contin.

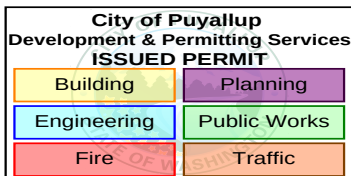


diaph nailty @ blocked:

$\sim \frac{1}{2}$ of wall V transfers through floor diaph into SW below.
@ SW Above

$$V_{diaph} = \frac{11.8k}{2 \times 16'} = 368\#/' \times 1.25 = 461\#/' - \text{Need nailty @ 3" o.c. 16d w/ min 1 1/2" Pen into floor frmg.} \\ \uparrow \quad \uparrow \quad \uparrow \\ \text{25\% increase} \quad \text{diaph shear} \quad \text{need min 3 1/2" long fastener - 16d}$$

bot & nailty @ SW new



strap across bms @ grid ①

$$V_{wall 2nd Floor} = 288\#/' \times 10' = 2.9k \text{ @ grid ① strap } \times 2.5 = 7.2k \text{ (ASD)} \\ \uparrow \\ \text{Wall East of Strap}$$

(2) MST37 w/ (42) 16d = 2 x 5k > 7.2k ✓

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SW bot & A

$$\frac{11.8k}{16'} = 738\#/' - .22 \times 6 \text{ SDWS @ 2" o.c.} \\ = 774\#/' \checkmark \quad \text{Stagg. to not split wood} \\ = 2.53" \text{ penetr.} \quad (2) \text{ rows @ 4"}$$

Wall length west of ①

Change in shearwall demand/capacity is less than 10% increase with new opening in existing shearwall.

For uplift check, use capacity of existing shearwall for the max shearforce applied at top of wall.

CHC Puyallup - 22-537

Wood Shearwall Overturning

SDS 1.018
DL roof 20 PSF
DL flr 20 PSF
DL wall 15 PSF

Cs 0.157
R 6.5

Ω 2.5

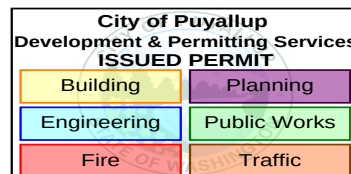
Roof to 2nd Floor

DF#2 to support bm

SW ID	Ht	Length	(0.6-.14SDS)DLroof (k/ft)	(0.6-.14SDS)DL wall(k/ft)	(0.7)EQ (kips)	Mot (k-ft)	Mr (k-ft)	Uplift (k)	Hold down	Ulift* Ω
N-S lateral					V of (E) shearwall*1.0					
Grid D	11.33	54	0.1441	0.078	18.0	203.94	323.46	-2.24	none req'd	-5.60
					18.0					
E-W lateral					V of (E) shearwall*1.0					
Grid 5	11	41	0.037	0.075	11.80	129.80	94.21	0.879	MST37	2.20
		41			11.8					

2nd Floor to ground

SW ID	Ht	Length	(0.6-.14SDS)DL rf+flr (k/ft)	(0.6-.14SDS)DL wall(k/ft)	(0.7)EQ (kips)	Mot (k-ft)	Mr (k-ft)	Uplift (k)	Hold down
N-S lateral									
E-W lateral					V of (E) shearwall*1.0				
Grid 5 -a	9	7.6	0.037	0.062	4.3	38.75	2.84	5.18	HDU5
Grid 5 -b	9	22.75	0.037	0.062	12.9	116.01	25.45	4.10	HDU4
	WF bm on top is under the (E) floor joists								
		30.35			17.2				



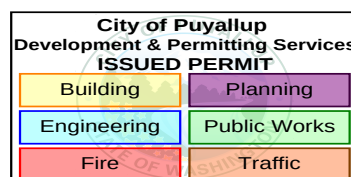
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CHC Puyallup - 22-537
Wood Shearwall Overturning

includes penalty on sw nailing due to aspect ratio > 2

Roof to 2nd Floor		SDPWS 4.3.4.1	
SW ID	h/b	v sw (lb/ft)	New SW type
N-S lateral			
Grid D	0.21	333.3	B
E-W lateral			
Grid 5	0.27	287.8	A

2nd Floor to ground			
SW ID	h/b	v sw (lb/ft)	SW type
N-S lateral			
E-W lateral			
Grid 5 -a	1.18	566.6	D
Grid 5 -b	0.40	566.6	D



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HOLDOWN GRID 5
1st Story Shearwall at HDU's

Company:	PCS	Date:	9/23/2022
Engineer:		Page:	1/5
Project:	CHC Puyallup		
Address:			
Phone:			
E-mail:			

1. Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

General

Design method: ACI 318-14
Units: Imperial units

Anchor Information:

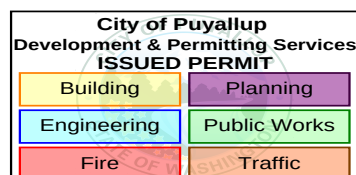
Anchor type: Cast-in-place
Material: AB
Diameter (inch): 0.625
Effective Embedment depth, h_{ef} (inch): 8.000
Anchor category: -
Anchor ductility: Yes
 h_{min} (inch): 10.13
 C_{min} (inch): 3.75
 S_{min} (inch): 3.75

Base Material

Concrete: Normal-weight
Concrete thickness, h (inch): 14.00
State: Cracked
Compressive strength, f'_c (psi): 3000
 $\Psi_{c,v}$: 1.0
Reinforcement condition: A tension, A shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Ignore 6do requirement: No
Build-up grout pad: No

Recommended Anchor

Anchor Name: PAB Pre-Assembled Anchor Bolt - PAB5 (5/8"Ø)



Input data and results must be checked for agreement with the existing circumstances, the standards and guidelines must be checked for plausibility.

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HOLDOWN GRID 5
1st Story Shearwall at HDU's

Company:	PCS	Date:	9/23/2022
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Address:			
Phone:			
E-mail:			

Load and Geometry

Load factor source: ACI 318 Section 5.3

Load combination: not set

Seismic design: Yes

Anchors subjected to sustained tension: Not applicable

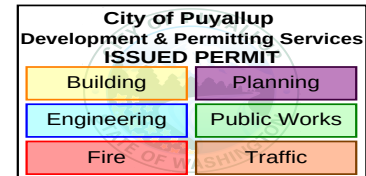
Ductility section for tension: 17.2.3.4.3 (a) (iii)-(vi) is satisfied

Ductility section for shear: 17.2.3.5.3 (a) is satisfied

Ω_0 factor: not set

Apply entire shear load at front row: No

Anchors only resisting wind and/or seismic loads: Yes



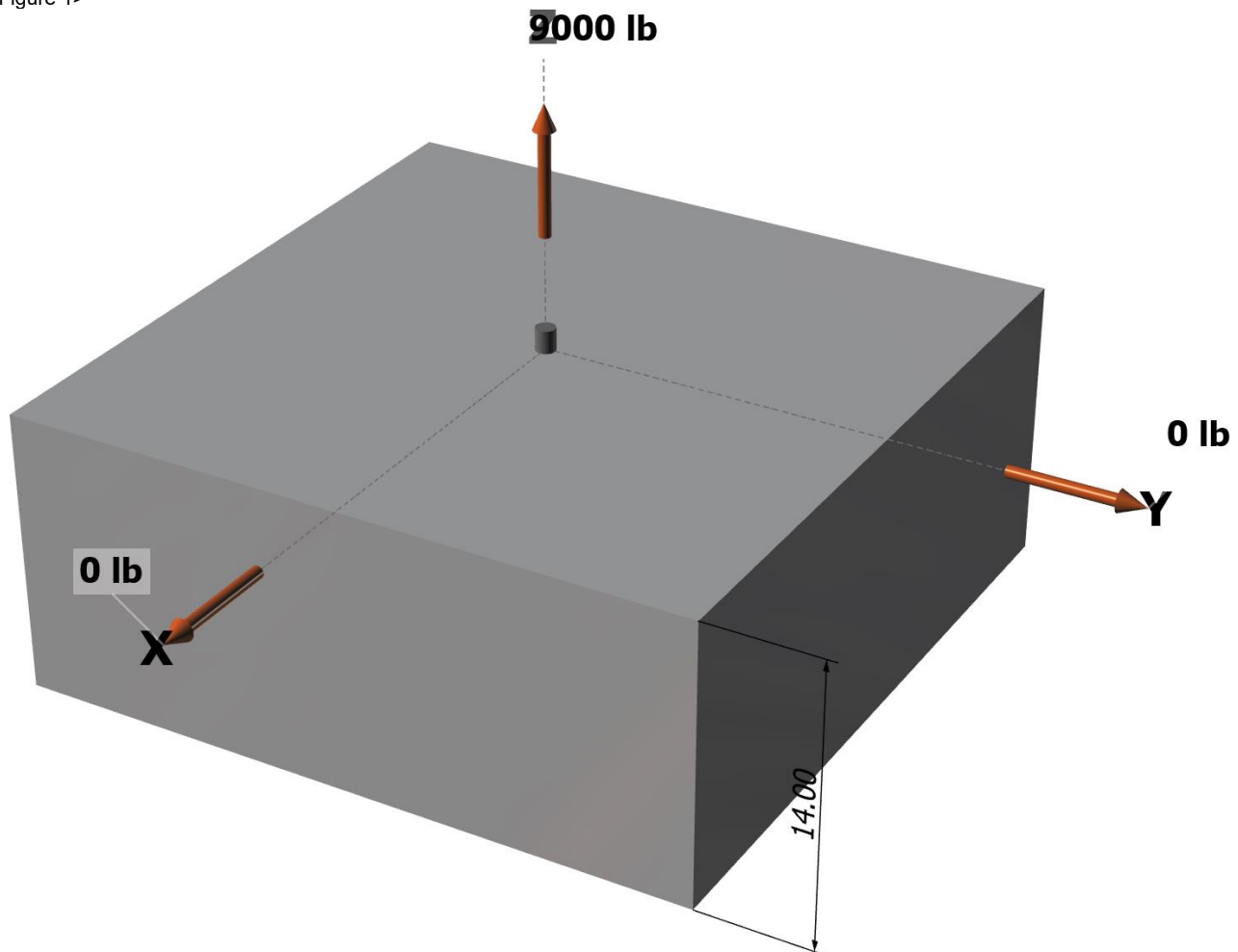
Strength level loads:

N_{ua} [lb]: 9000

V_{uax} [lb]: 0

V_{uay} [lb]: 0

<Figure 1>



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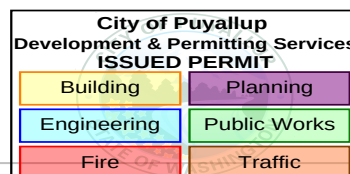
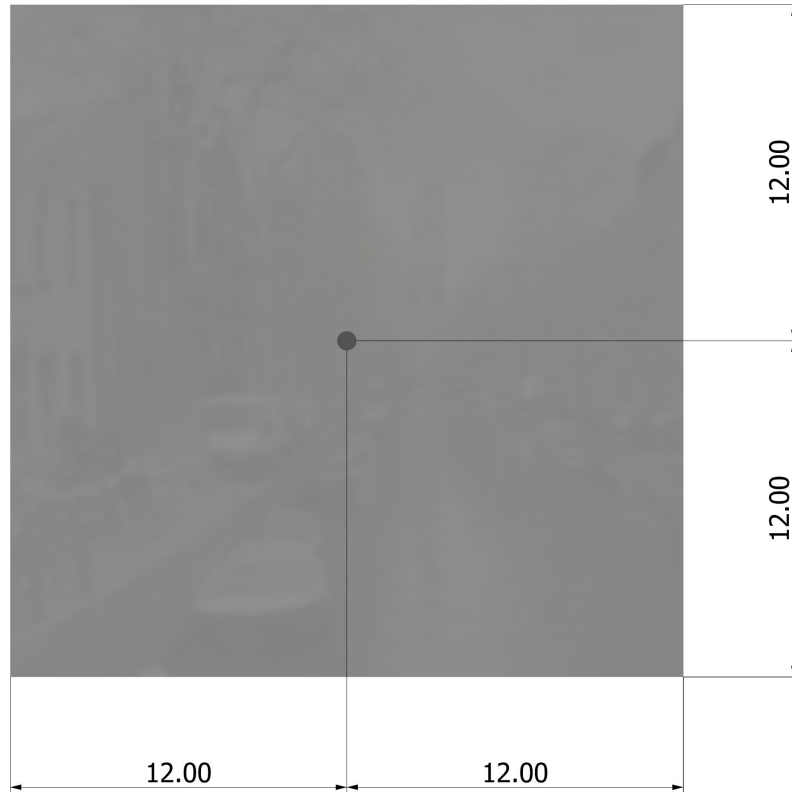


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HOLDOWN GRID 5
1st Story Shearwall at HDU's

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Phone:			
E-mail:			

<Figure 2>



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HOLDOWN GRID 5
1st Story Shearwall at HDU's

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Address:			
Phone:			
E-mail:			

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2 + (V_{uay})^2}$ (lb)
1	9000.0	0.0	0.0	0.0
Sum	9000.0	0.0	0.0	0.0

Maximum concrete compression strain (%): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 9000
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00

4. Steel Strength of Anchor in Tension (Sec. 17.4.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
13100	0.75	9825

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.4.2)

$$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5} \text{ (Eq. 17.4.2.2a)}$$

k_c	λ_a	f'_c (psi)	h_{ef} (in)	N_b (lb)
24.0	1.00	3000	8.000	29745

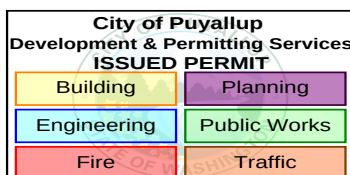
$$0.75 \phi N_{cb} = 0.75 \phi (A_{Nc} / A_{Nco}) \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b \text{ (Sec. 17.3.1 \& Eq. 17.4.2.1a)}$$

A_{Nc} (in ²)	A_{Nco} (in ²)	$c_{a,min}$ (in)	$\psi_{ed,N}$	$\psi_{c,N}$	$\psi_{cp,N}$	N_b (lb)	ϕ	$0.75 \phi N_{cb}$ (lb)
576.00	576.00	12.00	1.000	1.00	1.000	29745	0.75	16731

6. Pullout Strength of Anchor in Tension (Sec. 17.4.3)

$$0.75 \phi N_{pn} = 0.75 \phi \psi_{c,P} N_p = 0.75 \phi \psi_{c,P} 8 A_{brg} f'_c \text{ (Sec. 17.3.1, Eq. 17.4.3.1 \& 17.4.3.4)}$$

$\psi_{c,P}$	A_{brg} (in ²)	f'_c (psi)	ϕ	$0.75 \phi N_{pn}$ (lb)
1.0	2.10	3000	0.70	26435



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HOLDOWN GRID 5
1st Story Shearwall at HDU's

Company:	PCS	Date:	9/23/2022
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11. Results

11. Interaction of Tensile and Shear Forces (Sec. D.7)?

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	9000	9825	0.92	Pass (Governs)
Concrete breakout	9000	16731	0.54	Pass
Pullout	9000	26435	0.34	Pass

PAB5 (5/8"Ø) with hef = 8.000 inch meets the selected design criteria.

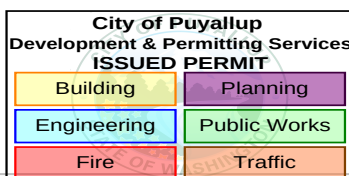
ACI 318-14 Section 17.2.3.4.3(a) (i) & (ii) Calculations for Ductility requirement for tension load

Steel	Factored Load, N_{ua} (lb)	1.2 x Nominal Strength, N_n (lb)	Ratio	
Steel	9000	15720	57.3%	Governs
Concrete	Factored Load, N_{ua} (lb)	Nominal Strength, N_n (lb)	Ratio	
Concrete breakout	9000	29745	30.3%	
Pullout	9000	50352	17.9%	

ACI 318-14 Section 17.2.3.4.3(a) (i) & (ii) satisfied since steel ratio governs and the steel element is ductile.

12. Warnings

- Per designer input, ductility requirements for shear have been determined to be satisfied – designer to verify.
- Designer must exercise own judgement to determine if this design is suitable.

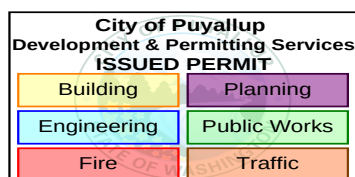


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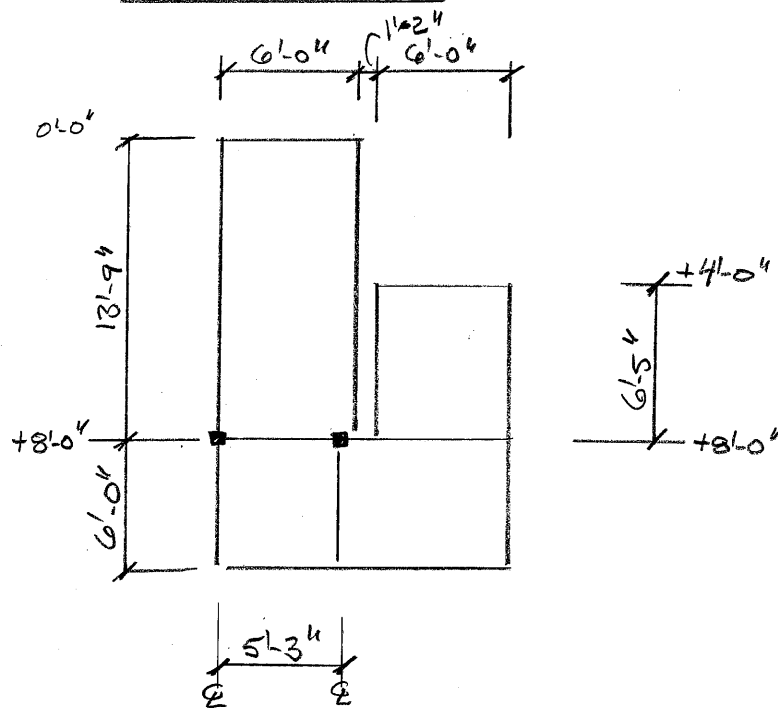
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INTERIOR CENTRAL STAIR



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STAIR DESIGN



ESTIMATE WEIGHT OF STAIR

WOOD TREAD: 8 PSF
1/4" STL PL: 11 PSF
STRINGER: 6 PSF
MISC: 5 PSF
30 PSF

RAILING: (10 PSF)(4.25) = 42.5 PLF

LIVE: 100 PSF

SEISMIC:

$$F_p = \frac{0.4 a_p S_{DS} W_p}{R_p / I_p} \left(1 + 2 \frac{z}{h} \right)$$

$$S_{DS} = 1.02$$

$$a_p = 1.0$$

$$R_p = 2.5$$

$$I_p = 2$$

$$I_p = 1.0$$

$$z/h = 12/24 = 0.5$$

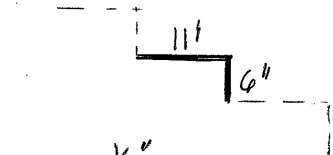
$$F_p = \frac{0.4 (1.0) (1.02) W_p (2)}{2.5 / 1.0} = 0.33 W_p$$

$$F_{p, min} = 0.35 I_p W_p = 0.3 (1.0) (1.0) W_p = 0.3 W_p$$

$$W_p = 12^k$$

$$F_p = (0.33)(12^k) = 4^k$$

TREADS:

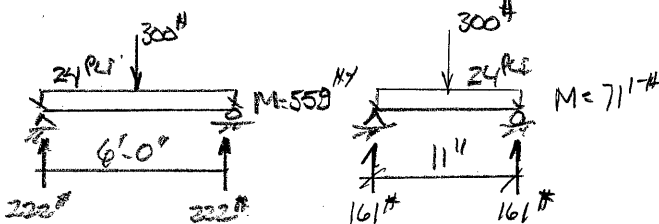


$$Z = 2.25 \text{ in}^3$$

$$I = 4.5 \text{ in}^4$$

$$Z = 0.172 \text{ in}^3$$

$$I = 0.0143 \text{ in}^4$$



$$M_{n/2} = (36/167)(2.25/12)$$

$$M_{n/2} = (36/167)(1.12/12)$$

$$M_{n/2} = 4.04 \text{ in}^k > 0.56 \text{ in}^k \text{ ok}$$

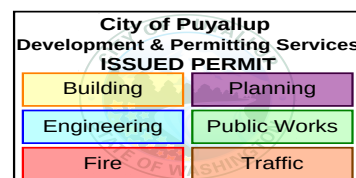
$$M_{n/2} = 0.31 \text{ in}^k > 0.071 \text{ in}^k \text{ ok}$$

$$\Delta = \frac{(3 \times 6)(1725) + 5(12 \times 16)(1725)}{48(29000)(4.5) + 394(29000)(4.5)}$$

$$\Delta = \frac{(3 \times 917)(1725) + 5(12 \times 917)(1725)}{48(29000)(0.0143) + 394(29000)(0.0143)}$$

$$\Delta = 0.02 \text{ in} \text{ ok}$$

$$\Delta = 0.02 \text{ in} \text{ ok}$$

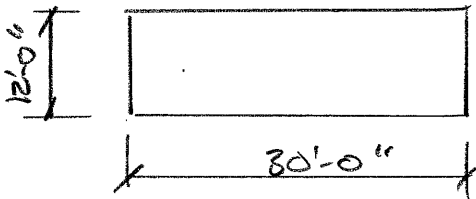


STAIR DESIGN

ESTIMATE DEFLECTION OF PLY WOOD SHEAR WALLS

1/2" PW w/ 10d @ 2" o.c. ER. SIOC

$$V_{ALL} = 2(1740 \text{ PLF}) / 2 = 1740 \text{ PLF}$$



$$\delta_{SW} = \frac{8Vh^3}{EA b} + \frac{Vh}{1000G_a} + \frac{h\Delta_o}{b}$$

$$b = 30'$$

$$V = 1740 \text{ PLF}$$

$$A = 30.25 \text{ ft}^2$$

$$G_a = 5 \text{ K/in}$$

$$E = 1.6 \times 10^6 \text{ psi}$$

$$\Delta_o = 0.196''$$

$$h = 12'$$

$$\delta_{SW} = \frac{8(1740 \text{ PLF})(12')^3}{(1.6 \times 10^6)(30.25)(30')} + \frac{(1740)(12')}{1000(5)} + \frac{(12')(0.196'')}{30'}$$

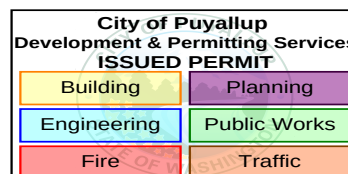
$$= 0.0166'' + 0.409'' + 0.08''$$

$$\delta_{SW} = 0.506''$$

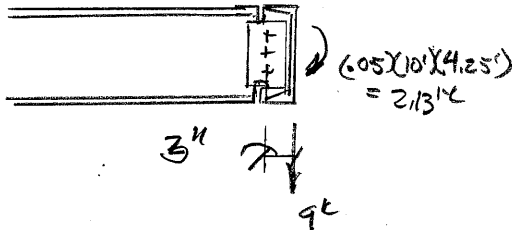
$$C_D = 4$$

$$I = 1.0$$

$$\Delta = (0.506'')(4/1.0) = 2.02''$$



STAIR DESIGN



BOLTS

$$\phi R = \begin{cases} 16.2^k/\text{bolt} \\ (60.9 \times 0.375) = 22.8^k/\text{bolt} \\ (30.5 \times 0.375) = 11.4^k/\text{bolt} \end{cases}$$

$$M = 2.13 \times 9(25) = 4.38^k = 52.6^k$$

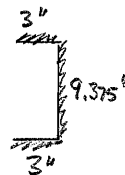
$$R = 9^k$$

$$e = 53^k/9^k = 5.9"$$

$$C = 0.97$$

$$\phi R_n = 0.97(11.4^k/\text{bolt}) = 11.1^k > 9^k \text{ ok}$$

WELDS



$$R = 9^k$$

$$e = 5.9" \Rightarrow a = 5.9/9.375 = 0.63$$

$$k = 3/9.375 = 0.32$$

$$C = 1.74$$

$$R_n/e = (1.74 \times 5)(9.375)/2 = 22.5^k > 9^k \text{ ok}$$

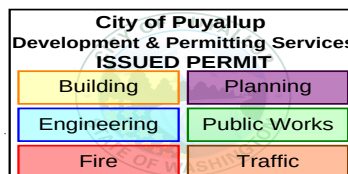
PLATE:

SHEAR YIELD:

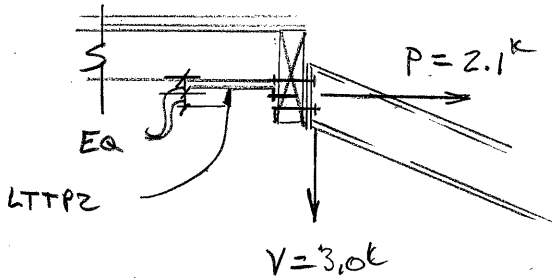
$$R_n/e = .6(50)(9)(0.375)/1.67 = 60.6^k > 9^k \text{ ok}$$

SHEAR FRACTURE:

$$R_n/e = .6(65)(9-3(1))(0.375)/2 = 43.9^k > 9^k \text{ ok}$$



STAIR DESIGN



LTPPZ: $P_{Au} = 1845^{\#}$

$\therefore$ PROVIDE (2) LTPPZ, (1) EA,
SIDE OF STRINGER

$2 \times 1/4" \times 2" \times 0'-2"$ WASHERS

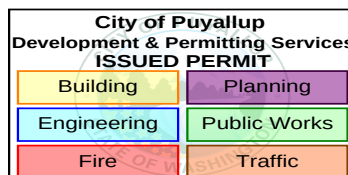
$$f_{ct} = \frac{2.1k/4}{(2)^2 - \pi/4 (15/16)^2} = 0.15 ksi' \text{ ok}$$

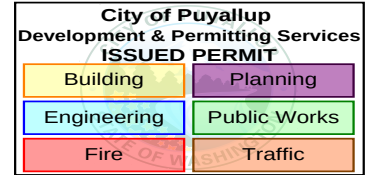
ROLTS:

$$Z'_I = C_D C_M C_E C_g C_A C_{eg} C_{di} C_{en} Z_I$$

$$Z'_I = (1)(1)(1)(1)(1)(1)(1)(1)(940^{\#}) = 940^{\#}/\text{BOLT}$$

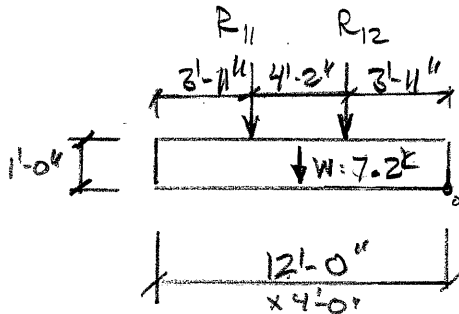
$$Z'_I = (4)(940) = 3760^{\#} \geq 3,000^{\#} \text{ ok}$$





STAIR DESIGN

FOOTING AT POSTS:



MAX: (LC 15) $D+1.75L+5.25E$

$R_{11} = -18.2k$

$R_{12} = 36.1k$

OVERTURNING:

$M_o = (13.2k)(8.083) = 106.7^{ft-k}$

$M_r = (7.2k)(6) + (36.1k)(3.917) = 184.6^{ft-k}$

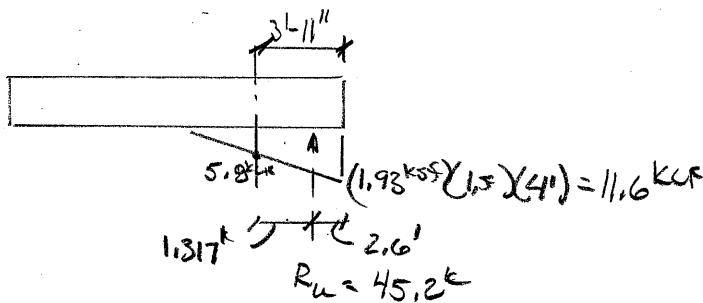
$FS = 185/107 = 1.73 \text{ ok}$

BEARING:

$X = \frac{185/107}{30.1} = 2.59'$

$\phi = \frac{2(30.1k)}{3(2.59 \times 4)} = 1.93^{kss} > (1.5^{kss})(1.83) = 2.0^{kss} \text{ ok}$

REINFORCING:



$V_u = 34.0k$
 $M_u = 59.6^{ft-k}$

$\phi V_c = (0.75)(2) \sqrt{3000} (48)(8) = 31.5k$

$\phi V_{s_{reqd}} = 34.0/0.75 - 31.5 = 13.83k$

$(A_v/s)_{reqd} = (13.83k)/(60k \times 8) = 0.029 \text{ in}^2/\text{in}$

$A_{s_{min}} = (200/47,000)(48)(8) = 1.28 \text{ in}^2$

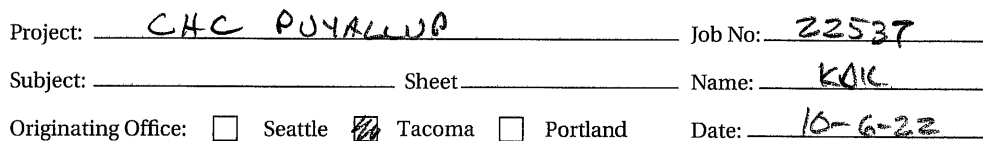
(4) #7 T & B:

$a = (2.4)(60)/105(8)(48) = 1.19'$

$\phi M_n = (0.9)(60)(2.4)(8 - 1.19/2)(4/12) = 80.0^{ft-k} > 60^{ft-k} \text{ ok}$

$\boxed{\#4 \text{ @ } 8" \text{ o.c.}}$

$\boxed{(4) \#7 \text{ T \& B.}}$



COLUMN CONNECTION TO FT6

BASE Q's

BRC: $g_u = \frac{1.5(36.1^k)}{(17'' \times 14'')} = 0.29^{ks} < (0.65)(1.85)(3^{ks}) = 1.65^{ks}$ ok

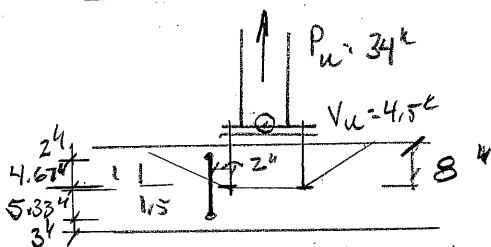
$$M = \frac{(36.1 \text{ k})(4'')^2}{(14'')(14'')(2)} = 1.47 \text{ in-k/in}$$

$$Z_{\text{H2O}} = \frac{1.47 \text{ kg/m}^3}{1000} = 0.00147 \text{ m}^3/\text{m}^3$$

$$\epsilon_{\text{avg}} = \frac{\frac{36 \text{ kg} / 1.67}{4 (1.009)}}{14} = 0.52''$$

$R_{3/4} \times 14' \times 1.2'$

ANCHORAGE

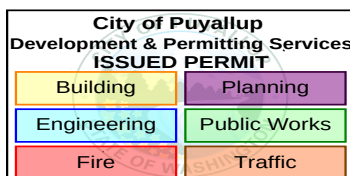


(4) 1" ϕ F1554 GR 36 EMBED 8"

$$Ldh = 8''$$

$$\phi \Gamma_n = (.75)(60^4)(2)(.2)(4.67/8) = 10.5 \text{ k/lineal}$$

$$\phi R_n = 4(10.5) = 42k > 34k \text{ ok}$$



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Company: PCS Structural Solutions
Address:
Phone / Fax:
Design: Concrete - Oct 7, 2022
Fastening point:

Page: 1
Specifier: KDK
E-Mail:
Date: 10/7/2022

Specifier's comments:

1 Input data

Anchor type and diameter: Hex Head ASTM F 1554 GR. 36 1

Item number: not available

Effective embedment depth: $h_{ef} = 8.000$ in.

Material: ASTM F 1554

Evaluation Service Report: Hilti Technical Data

Issued / Valid: - / -

Proof: Design Method ACI 318-14 / CIP

Stand-off installation: without clamping (anchor); restraint level (anchor plate): 2.00; $e_b = 1.181$ in.; $t = 0.500$ in.
Hilti Grout: CB-G EG, epoxy, $f_{c,Grout} = 14,939$ psi

Anchor plate^R: $l_x \times l_y \times t = 14.000$ in. $\times$ 14.000 in. $\times$ 0.500 in.; (Recommended plate thickness: not calculated)

Profile: Square HSS (AISC), HSS6X6X.375; (L x W x T) = 6.000 in. $\times$ 6.000 in. $\times$ 0.375 in.

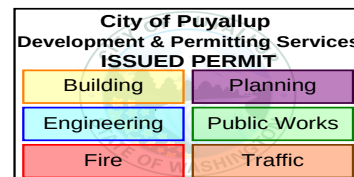
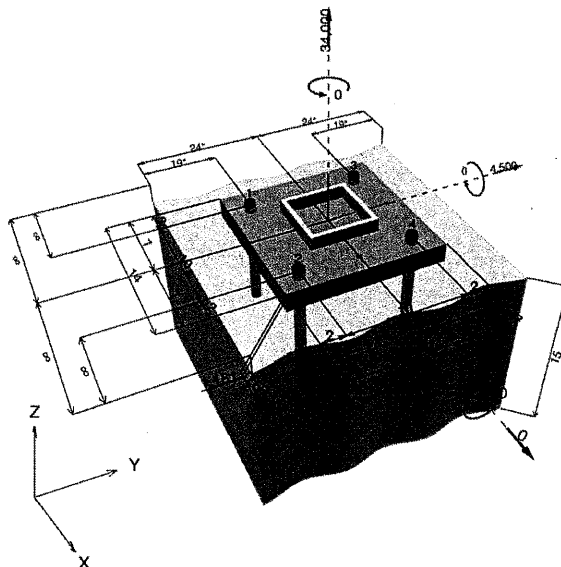
Base material: cracked concrete, 3000, $f'_c = 3,000$ psi; $h = 15.000$ in.

Reinforcement: tension: condition B, shear: condition B;
edge reinforcement: none or $\leq$ No. 4 bar

Seismic loads (cat. C, D, E, or F) Tension load: yes (17.2.3.4.3 (d))
Shear load: yes (17.2.3.5.3 (c))

^R - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]



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1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 34,000; V _x = 0; V _y = 4,500; M _x = 0; M _y = 0; M _z = 0;	yes	137

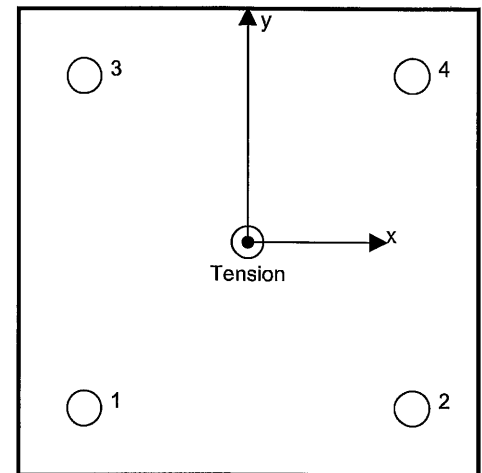
2 Load case/Resulting anchor forces

Anchor reactions [lb]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	8,500	1,125	0	1,125
2	8,500	1,125	0	1,125
3	8,500	1,125	0	1,125
4	8,500	1,125	0	1,125

max. concrete compressive strain: - [%]
max. concrete compressive stress: - [psi]
resulting tension force in (x/y)=(0.000/0.000): 34,000 [lb]
resulting compression force in (x/y)=(0.000/0.000): 0 [lb]



Anchor forces are calculated based on the assumption of a rigid anchor plate.

3 Tension load

	Load N _{ua} [lb]	Capacity ϕN_n [lb]	Utilization $\beta_N = N_{ua} / \phi N_n$	Status
Steel Strength*	8,500	26,361	33	OK
Pullout Strength*	8,500	14,654	59	OK
Concrete Breakout Failure**	34,000	31,340	109	not recommended
Concrete Side-Face Blowout, direction **	N/A	N/A	N/A	N/A

* highest loaded anchor **anchor group (anchors in tension)

Breakout is prevented by supplemental reinforcing--see hand calculations.

3.1 Steel Strength

N _{sa} [lb]	ϕ	ϕN_{sa} [lb]	N _{ua} [lb]
35,148	0.750	26,361	8,500

3.2 Pullout Strength

N _p [lb]	$\psi_{c,p}$	λ_a	ϕ	$\phi_{seismic}$	ϕN_{pn} [lb]	N _{ua} [lb]
27,912	1.000	1	0.700	0.750	14,654	8,500

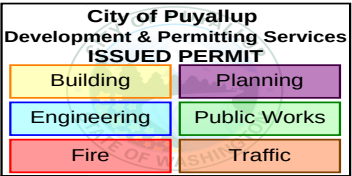


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3.3 Concrete Breakout Failure

A_{Nc} [in. ²]	A_{Nco} [in. ²]	$c_{a,min}$ [in.]	c_{ac} [in.]	$\psi_{c,N}$	
1,156.00	576.00	19.000	-	1.000	
$e_{c1,N}$ [in.]	$\psi_{ec1,N}$	$e_{c2,N}$ [in.]	$\psi_{ec2,N}$	$\psi_{ed,N}$	k_{cr}
0.000	1.000	0.000	1.000	1.000	24
λ_a	N_b [lb]	ϕ	$\phi_{seismic}$	ϕN_{cbg} [lb]	N_{ua} [lb]
1.000	29,745	0.700	0.750	31,340	34,000



Input data and results must be checked for conformity with the existing conditions and for plausibility!
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4 Shear load

	Load V_{ua} [lb]	Capacity ϕV_n [lb]	Utilization $\beta_V = V_{ua} / \phi V_n$	Status
Steel Strength*	1,125	10,966	11	OK
Steel failure (with lever arm)*	1,125	2,015	56	OK
Pryout Strength**	4,500	83,574	6	OK
Concrete edge failure in direction y+**	4,500	24,370	19	OK

* highest loaded anchor ** anchor group (relevant anchors)

4.1 Steel Strength

V_{sa} [lb]	ϕ	ϕ_{eb}	ϕV_{sa} [lb]	V_{ua} [lb]
21,089	0.650	0.800	10,966	1,125

4.2 Steel failure (with lever arm)

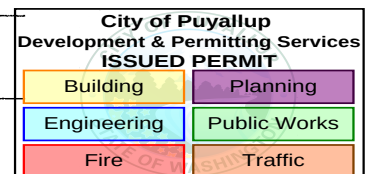
I [in.]	α_M			
1.931	2.00			
$N_u / \phi N_s$	$1 - N_u / \phi N_s$	M_s^0 [in.lb]	$M_s = M_s^0 (1 - N_u / \phi N_s)$ [in.lb]	
0.322	0.678	4,418	2,993	
$V_s^M = \alpha_M * M_s / l_b$ [lb]	ϕ	ϕV_s^M [lb]	V_{ua} [lb]	
3,100	0.650	2,015	1,125	

4.3 Pryout Strength

A_{Nc} [in. ²]	A_{Nc0} [in. ²]	$c_{a,min}$ [in.]	k_{cp}	c_{ac} [in.]	$\psi_{c,N}$
1,156.00	576.00	19.000	2	∞	1.000
$e_{c1,V}$ [in.]	$\psi_{ec1,V}$	$e_{c2,V}$ [in.]	$\psi_{ec2,V}$	$\psi_{ed,N}$	k_{cr}
0.000	1.000	0.000	1.000	1.000	24
λ_a	N_b [lb]	ϕ	$\phi_{seismic}$	ϕV_{cbg} [lb]	V_{ua} [lb]
1.000	29,745	0.700	1.000	83,574	4,500

4.4 Concrete edge failure in direction y+

l_e [in.]	d_0 [in.]	c_1 [in.]	A_{vc} [in. ²]	A_{vc0} [in. ²]	
8.000	1.000	19.000	1,005.00	1,624.50	
$\psi_{ed,V}$	$\psi_{parallel,V}$	$e_{c,V}$ [in.]	$\psi_{ec,V}$	$\psi_{c,V}$	$\psi_{h,V}$
1.000	1.000	0.000	1.000	1.000	1.378
λ_a	V_b [lb]	ϕ	$\phi_{seismic}$	ϕV_{cbg} [lb]	V_{ua} [lb]
1.000	40,826	0.700	1.000	24,370	4,500



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5 Combined tension and shear loads

β_N	β_V	ζ	Utilization β_{NV} [%]	Status
1.085 0.59	0.558	1.000	137 0.96	not recommended OK

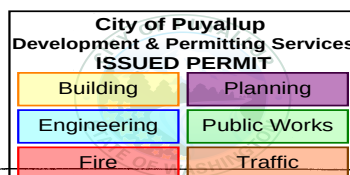
$$\beta_{NV} = (\beta_N + \beta_V) / 1.2 \leq 1$$

controlling DCR for pullout (breakout prevented by supplemental reinforcing).

6 Warnings

- The anchor design methods in PROFIS Engineering require rigid anchor plates per current regulations (AS 5216:2021, ETAG 001/Annex C, EOTA TR029 etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Engineering calculates the minimum required anchor plate thickness with CBFEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid anchor plate assumption is valid is not carried out by PROFIS Engineering. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies where the potential concrete failure surfaces are crossed by supplementary reinforcement proportioned to tie the potential concrete failure prism into the structural member. Condition B applies where such supplementary reinforcement is not provided, or where pullout or pryout strength governs.
- ACI 318 does not specifically address anchor bending when a stand-off condition exists. PROFIS Engineering calculates a shear load corresponding to anchor bending when stand-off exists and includes the results as a shear Design Strength!
- For additional information about ACI 318 strength design provisions, please go to <https://submittals.us.hilti.com/PROFISAnchorDesignGuide/>
- An anchor design approach for structures assigned to Seismic Design Category C, D, E or F is given in ACI 318-14, Chapter 17, Section 17.2.3.4.3 (a) that requires the governing design strength of an anchor or group of anchors be limited by ductile steel failure. If this is NOT the case, the connection design (tension) shall satisfy the provisions of Section 17.2.3.4.3 (b), Section 17.2.3.4.3 (c), or Section 17.2.3.4.3 (d). The connection design (shear) shall satisfy the provisions of Section 17.2.3.5.3 (a), Section 17.2.3.5.3 (b), or Section 17.2.3.5.3 (c).
- Section 17.2.3.4.3 (b) / Section 17.2.3.5.3 (a) require the attachment the anchors are connecting to the structure be designed to undergo ductile yielding at a load level corresponding to anchor forces no greater than the controlling design strength. Section 17.2.3.4.3 (c) / Section 17.2.3.5.3 (b) waive the ductility requirements and require the anchors to be designed for the maximum tension / shear that can be transmitted to the anchors by a non-yielding attachment. Section 17.2.3.4.3 (d) / Section 17.2.3.5.3 (c) waive the ductility requirements and require the design strength of the anchors to equal or exceed the maximum tension / shear obtained from design load combinations that include E, with E increased by ω_0 .

meets
Fastening does not meet the design criteria!



Input data and results must be checked for conformity with the existing conditions and for plausibility!
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Address:
Phone / Fax:
Design: Concrete - Oct 7, 2022
Fastening point:

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E-Mail:
Date: 10/7/2022

7 Installation data

Profile: Square HSS (AISC), HSS6X6X.375; (L x W x T) = 6.000 in. x 6.000 in. x 0.375 in.

Hole diameter in the fixture: $d_f = 1.062$ in.

Plate thickness (input): 0.500 in.

Recommended plate thickness: not calculated

Anchor type and diameter: Hex Head ASTM F 1554 GR. 36 1

Item number: not available

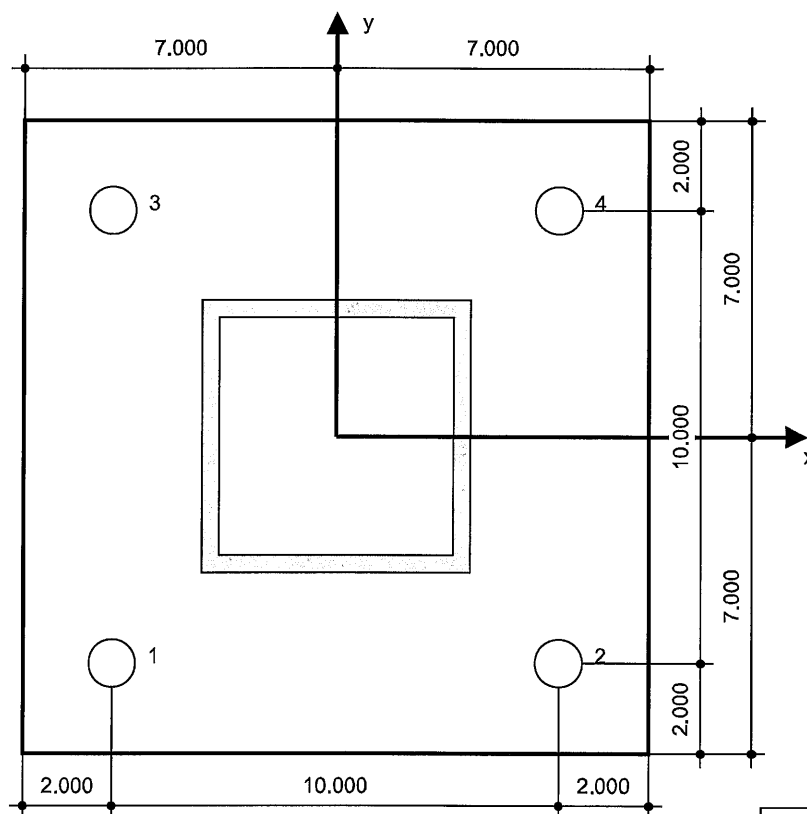
Maximum installation torque: -

Hole diameter in the base material: - in.

Hole depth in the base material: 8.000 in.

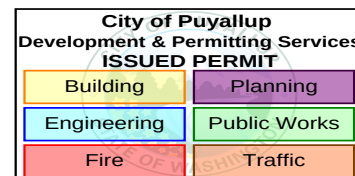
Minimum thickness of the base material: 9.172 in.

Hilti Hex Head headed stud anchor with 8 in embedment, 1, Steel galvanized, installation per instruction for use



Coordinates Anchor [in.]

Anchor	x	y	c _x	c _{+x}	c _{-y}	c _{+y}
1	-5.000	-5.000	-	-	19.000	29.000
2	5.000	-5.000	-	-	19.000	29.000
3	-5.000	5.000	-	-	29.000	19.000
4	5.000	5.000	-	-	29.000	19.000





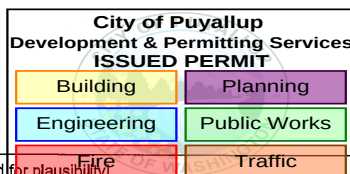
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8 Remarks; Your Cooperation Duties

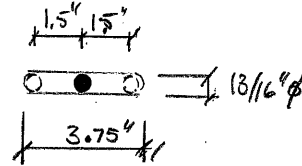
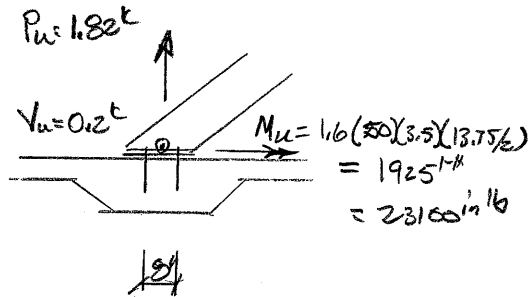
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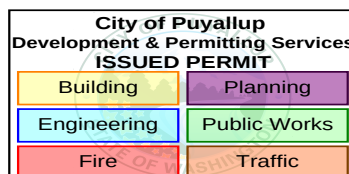
STAIR DESIGN

BASE CONNECTION



(2) $3/4'' \phi$ HAS V 3G W/ HIT NY 200 V3 EPOXY.

SEE ATTACHED DETAILS.



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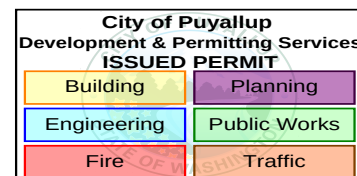
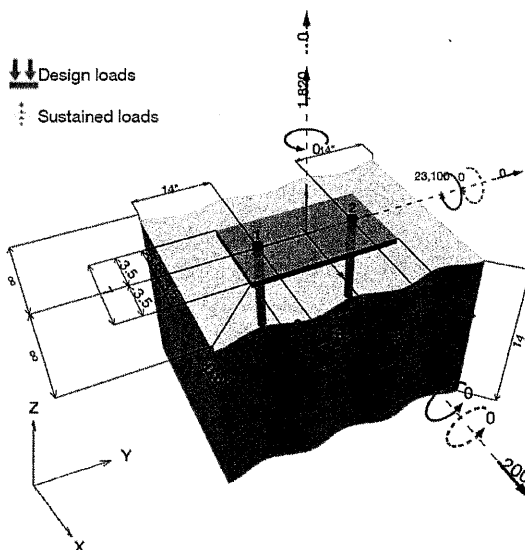
Specifier's comments:

1 Input data

Anchor type and diameter:	HIT-HY 200 V3 + HAS-V-36 (ASTM F1554 Gr.36) 3/4
Item number:	2198030 HAS-V-36 3/4"x10" (element) / 2334276 HIT-HY 200-R V3 (adhesive)
Effective embedment depth:	$h_{ef,act} = 7.000$ in. ($h_{ef,limit} = -$ in.)
Material:	ASTM F1554 Grade 36
Evaluation Service Report:	ESR-4868
Issued / Valid:	11/1/2021 11/1/2022
Proof:	Design Method ACI 318-14 / Chem
Stand-off installation:	$e_b = 0.000$ in. (no stand-off); $t = 0.500$ in.
Anchor plate^R:	$l_x \times l_y \times t = 7.000$ in. x 12.000 in. x 0.500 in.; (Recommended plate thickness: not calculated)
Profile:	no profile
Base material:	cracked concrete, 2500, $f'_c = 2,500$ psi; $h = 14.000$ in., Temp. short/long: 32/32 °F
Installation:	hammer drilled hole, Installation condition: Dry
Reinforcement:	tension: condition B, shear: condition B; no supplemental splitting reinforcement present
	edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (d))
	Shear load: yes (17.2.3.5.3 (c))


^R - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]



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1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 1,820; V _x = 200; V _y = 0; M _x = 0; M _y = 23,100; M _z = 0; N _{sus} = 0; M _{x,sus} = 0; M _{y,sus} = 0;	yes	88

2 Load case/Resulting anchor forces

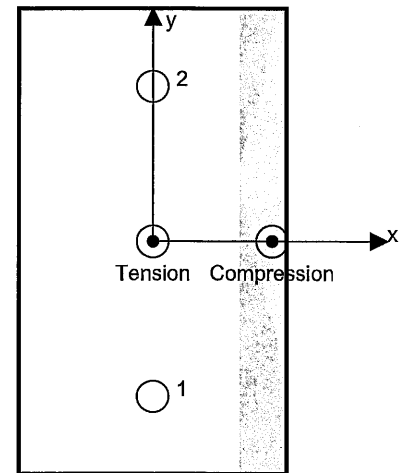
Anchor reactions [lb]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	4,627	100	100	0
2	4,627	100	100	0

max. concrete compressive strain: 0.24 [‰]
 max. concrete compressive stress: 1,052 [psi]
 resulting tension force in (x/y)=(-0.000/0.000): 9,254 [lb]
 resulting compression force in (x/y)=(3.107/0.000): 7,434 [lb]

Anchor forces are calculated based on the assumption of a rigid anchor plate.



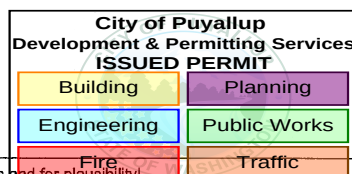
3 Tension load

	Load N _{ua} [lb]	Capacity ϕ N _n [lb]	Utilization $\beta_N = N_{ua} / \phi N_n$	Status
Steel Strength*	4,627	14,550	32	OK
Bond Strength**	9,254	13,952	67	OK
Sustained Tension Load Bond Strength*	N/A	N/A	N/A	N/A
Concrete Breakout Failure**	9,254	10,598	88	OK

* highest loaded anchor **anchor group (anchors in tension)

3.1 Steel Strength

N _{sa} [lb]	ϕ	ϕ N _{sa} [lb]	N _{ua} [lb]
19,400	0.750	14,550	4,627



Input data and results must be checked for conformity with the existing conditions and for plausibility.
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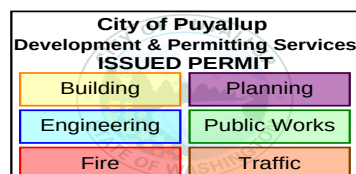
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3.2 Bond Strength

A_{Na} [in. ²]	A_{Na0} [in. ²]	c_{Na} [in.]	$c_{a,min}$ [in.]	c_{ac} [in.]		
619.71	450.00	10.607	14.000	12.635		
$\alpha_{overhead}$	$\tau_{k,uncr}$ [psi]	$\tau_{k,cr}$ [psi]				
1.000	2,220	1,260				
$e_{c1,N}$ [in.]	$\Psi_{ec1,Na}$	$e_{c2,N}$ [in.]	$\Psi_{ec2,Na}$	$\Psi_{ed,Na}$	$\Psi_{cp,Na}$	$\alpha_{N,seis}$
0.000	1.000	0.000	1.000	1.000	1.000	1.000
λ_a	N_{ba} [lb]	ϕ	$\phi_{seismic}$	$\phi_{nonductile}$	ϕN_{ag} [lb]	N_{ua} [lb]
1.000	20,782	0.650	0.750	1.000	13,952	9,254

3.3 Concrete Breakout Failure

A_{Nc} [in. ²]	A_{Nc0} [in. ²]	$c_{a,min}$ [in.]	c_{ac} [in.]	$\psi_{c,N}$		
609.00	441.00	14.000	12.635	1.000		
$e_{c1,N}$ [in.]	$\psi_{ec1,N}$	$e_{c2,N}$ [in.]	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	k_{cr}
0.000	1.000	0.000	1.000	1.000	1.000	17
λ_a	N_b [lb]	ϕ	$\phi_{seismic}$	ϕN_{cbg} [lb]	N_{ua} [lb]	
1.000	15,742	0.650	0.750	10,598	9,254	



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4 Shear load

	Load V_{ua} [lb]	Capacity ϕV_n [lb]	Utilization $\beta_V = V_{ua} / \phi V_n$	Status
Steel Strength*	100	4,540	3	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength (Concrete Breakout Strength controls)**	200	30,435	1	OK
Concrete edge failure in direction y+**	200	26,946	1	OK

* highest loaded anchor **anchor group (relevant anchors)

4.1 Steel Strength

V_{sa} [lb]	$\alpha_{V,seis}$	ϕ	ϕV_{sa} [lb]	V_{ua} [lb]
6,984	0.600	0.650	4,540	100

4.2 Pryout Strength (Concrete Breakout Strength controls)

A_{Nc} [in. ²]	A_{Nc0} [in. ²]	$c_{a,min}$ [in.]	k_{cp}	c_{ac} [in.]	$\psi_{c,N}$	
609,00	441.00	14.000	2	12.635	1.000	
$e_{c1,V}$ [in.]	$\psi_{ec1,V}$	$e_{c2,V}$ [in.]	$\psi_{ec2,V}$	$\psi_{ed,N}$	$\psi_{cp,N}$	k_{cr}
0.000	1.000	0.000	1.000	1.000	1.000	17
λ_a	N_b [lb]	ϕ	$\phi_{seismic}$	ϕV_{cpq} [lb]	V_{ub} [lb]	
1.000	15,742	0.700	1.000	30,435	200	

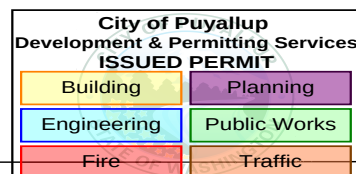
4.3 Concrete edge failure in direction y+

l_a [in.]	d_a [in.]	c_{a1} [in.]	A_{Vc} [in. ²]	A_{Vc0} [in. ²]	
6.000	0.750	14.000	588.00	882.00	
$\psi_{ed,V}$	$\psi_{parallel,V}$	$e_{c,V}$ [in.]	$\psi_{ec,V}$	$\psi_{c,V}$	$\psi_{h,V}$
1.000	2.000	0.000	1.000	1.000	1.225
λ_a	V_b [lb]	ϕ	$\phi_{seismic}$	ϕV_{cbq} [lb]	V_{ua} [lb]
1.000	23,572	0.700	1.000	26,946	200

5 Combined tension and shear loads

β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
0.873	0.022	1.000	75	OK

$$\beta_{NV} = (\beta_N + \beta_V) / 1.2 \leq 1$$



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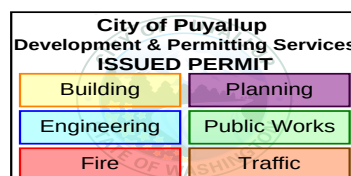
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6 Warnings

- The anchor design methods in PROFIS Engineering require rigid anchor plates per current regulations (AS 5216:2021, ETAG 001/Annex C, EOTA TR029 etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Engineering calculates the minimum required anchor plate thickness with CBFEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid anchor plate assumption is valid is not carried out by PROFIS Engineering. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies where the potential concrete failure surfaces are crossed by supplementary reinforcement proportioned to tie the potential concrete failure prism into the structural member. Condition B applies where such supplementary reinforcement is not provided, or where pullout or pryout strength governs.
- Design Strengths of adhesive anchor systems are influenced by the cleaning method. Refer to the INSTRUCTIONS FOR USE given in the Evaluation Service Report for cleaning and installation instructions.
- For additional information about ACI 318 strength design provisions, please go to <https://submittals.us.hilti.com/PROFISAnchorDesignGuide/>
- An anchor design approach for structures assigned to Seismic Design Category C, D, E or F is given in ACI 318-14, Chapter 17, Section 17.2.3.4.3 (a) that requires the governing design strength of an anchor or group of anchors be limited by ductile steel failure. If this is NOT the case, the connection design (tension) shall satisfy the provisions of Section 17.2.3.4.3 (b), Section 17.2.3.4.3 (c), or Section 17.2.3.4.3 (d). The connection design (shear) shall satisfy the provisions of Section 17.2.3.5.3 (a), Section 17.2.3.5.3 (b), or Section 17.2.3.5.3 (c).
- Section 17.2.3.4.3 (b) / Section 17.2.3.5.3 (a) require the attachment the anchors are connecting to the structure be designed to undergo ductile yielding at a load level corresponding to anchor forces no greater than the controlling design strength. Section 17.2.3.4.3 (c) / Section 17.2.3.5.3 (b) waive the ductility requirements and require the anchors to be designed for the maximum tension / shear that can be transmitted to the anchors by a non-yielding attachment. Section 17.2.3.4.3 (d) / Section 17.2.3.5.3 (c) waive the ductility requirements and require the design strength of the anchors to equal or exceed the maximum tension / shear obtained from design load combinations that include E, with E increased by ω_0 .
- Installation of Hilti adhesive anchor systems shall be performed by personnel trained to install Hilti adhesive anchors. Reference ACI 318-14, Section 17.8.1.

Fastening meets the design criteria!



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7 Installation data

Profile: no profile

Hole diameter in the fixture: $d_f = 0.812$ in.

Plate thickness (input): 0.500 in.

Recommended plate thickness: not calculated

Drilling method: Hammer drilled

Cleaning: Compressed air cleaning of the drilled hole according to instructions for use is required

Anchor type and diameter: HIT-HY 200 V3 + HAS-V-36 (ASTM F1554 Gr.36) 3/4

Item number: 2198030 HAS-V-36 3/4"x10" (element) / 2334276 HIT-HY 200-R V3 (adhesive)

Maximum installation torque: 1,200 in.lb

Hole diameter in the base material: 0.875 in.

Hole depth in the base material: 7.000 in.

Minimum thickness of the base material: 8.750 in.

3/4 Hilti HAS Carbon steel threaded rod with Hilti HIT-HY 200 V3 Safe Set System

7.1 Recommended accessories

Drilling

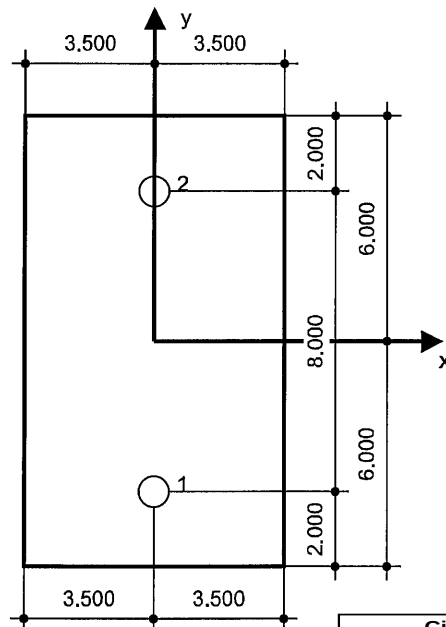
- Suitable Rotary Hammer
- Properly sized drill bit

Cleaning

- Compressed air with required accessories to blow from the bottom of the hole
- Proper diameter wire brush

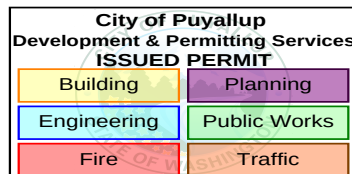
Setting

- Dispenser including cassette and mixer
- Torque wrench



Coordinates Anchor [in.]

Anchor	x	y	c _x	c _{+x}	c _y	c _{+y}
1	0.000	-4.000	-	-	14.000	22.000
2	0.000	4.000	-	-	22.000	14.000



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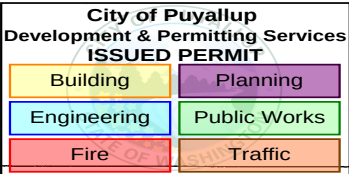


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8 Remarks; Your Cooperation Duties

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Project Title:
 Engineer:
 Project ID:
 Project Descr:

Steel Beam with Torsional Loads

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.8.17

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Stair Stringer with Railing Load

CODE REFERENCES

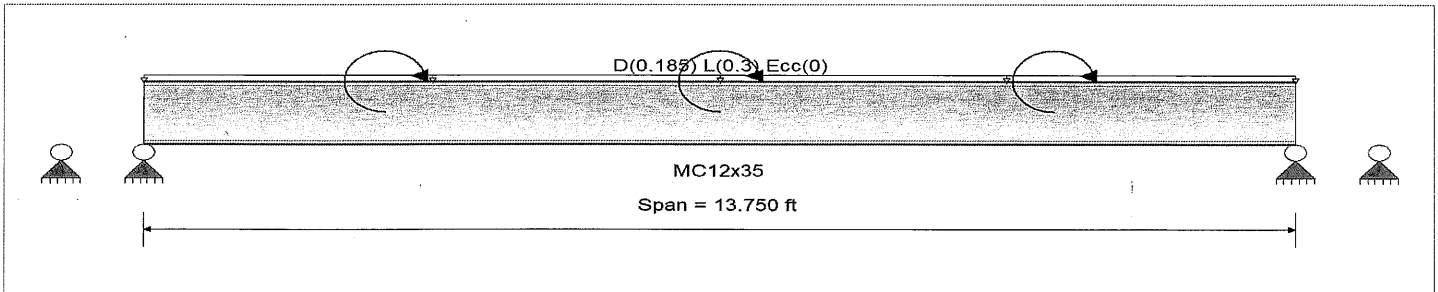
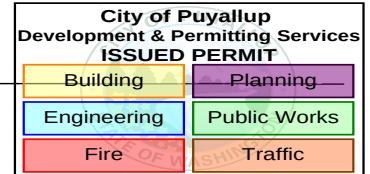
Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : ASCE 7-16

Analysis Settings

Analysis Method : Allowable Strength Design
 Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
 Bending Axis : Major Axis Bending
 Load Combination ASCE 7-16

Fy : Steel Yield : 36.0 ksi
 E: Modulus : 29,000.0 ksi



Applied Loads

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

Load for Span Number 0

Uniform Load : D = 0.1850, L = 0.30 k/ft, Tributary Width = 1.0 ft
 Moment : L = 0.8625 k-ft, Loc = 6.875 ft in span, Torsional Load, (Rail Load)
 Moment : L = 0.8625 k-ft, Loc = 2.875 ft in span, Torsional Load
 Moment : L = 0.8625 k-ft, Loc = 10.875 ft in span, Torsional Load

DESIGN SUMMARY

Design OK

Max. Flange Normal Stress Ratio =	0.416 : 1	Maximum Shear Stress Ratio =	0.579 : 1
Flange Normal Stress	10.76 ksi	Flange Shear Stress	7.49 ksi
Phi vn : Flange Normal Stress	25.87 ksi	Web Shear Stress	5.40 ksi
(Phi Mn/Sxx)		Vn/Omega : Allowable	12.93 ksi
Max Mu : Applied	11.46 k-ft		
Section used for this span	MC12x35	Section used for this span	MC12x35
Load Combination	+D+L	Load Combination	+D+L
Maximum Deflection		Maximum Rotation =	2.5594 deg at 6.88 ft
Max Download Transient Load Deflection	0.039 in	Max Downward Total Deflection	0.063 in
Ratio =	4256	Ratio =	2632
Max Upward Transient Load Deflection	0.000 in	Max Upward Total Deflection	0.000 in
Ratio =	0 < 360	Ratio =	0 < 180

Maximum Forces & Stresses for Load Combinations

Load Combination	Max Stress		Bending Max		Flange Normal (ksi)			Flange Shear (ksi)			Web Shear (ksi)		
	Ratio	Mu (kft)	Vu (k)		Total	Allow	Ratio	Total	Allow	Ratio	Total	Allow	Ratio
D Only	0.056	4.37	1.27		1.457	25.868	0.056	0.110	12.934	0.009	0.271	12.934	0.021
+D+L	0.579	11.46	3.33		10.763	25.868	0.416	7.493	12.934	0.579	5.401	12.934	0.418
+D+0.750L	0.437	9.69	2.82		8.437	25.868	0.326	5.647	12.934	0.437	4.118	12.934	0.318
+0.60D	0.034	2.62	0.76		0.874	25.868	0.034	0.066	12.934	0.005	0.163	12.934	0.013

Overall Maximum Deflections - Unfactored Loads

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
span_1	1	0.0627	6.930		0.0000	0.000

Vertical Reactions - Unfactored

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.334	3.334
D Only	1.272	1.272
+D+L	3.334	3.334
+D+0.750L	2.819	2.819

PRCTI20221698

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam with Torsional Loads

Project File: CHC Puyallup calcs.ec6

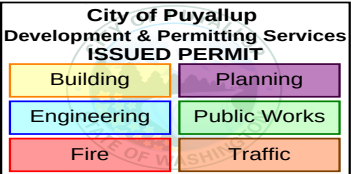
LIC# : KW-06014122, Build:20.22.8.17 PCS STRUCTURAL SOLUTIONS (c) ENERCALC INC 1983-2022

DESCRIPTION: Stair Stringer with Railing Load

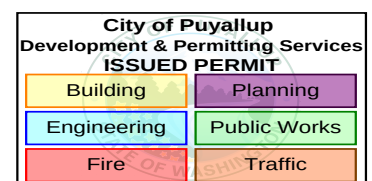
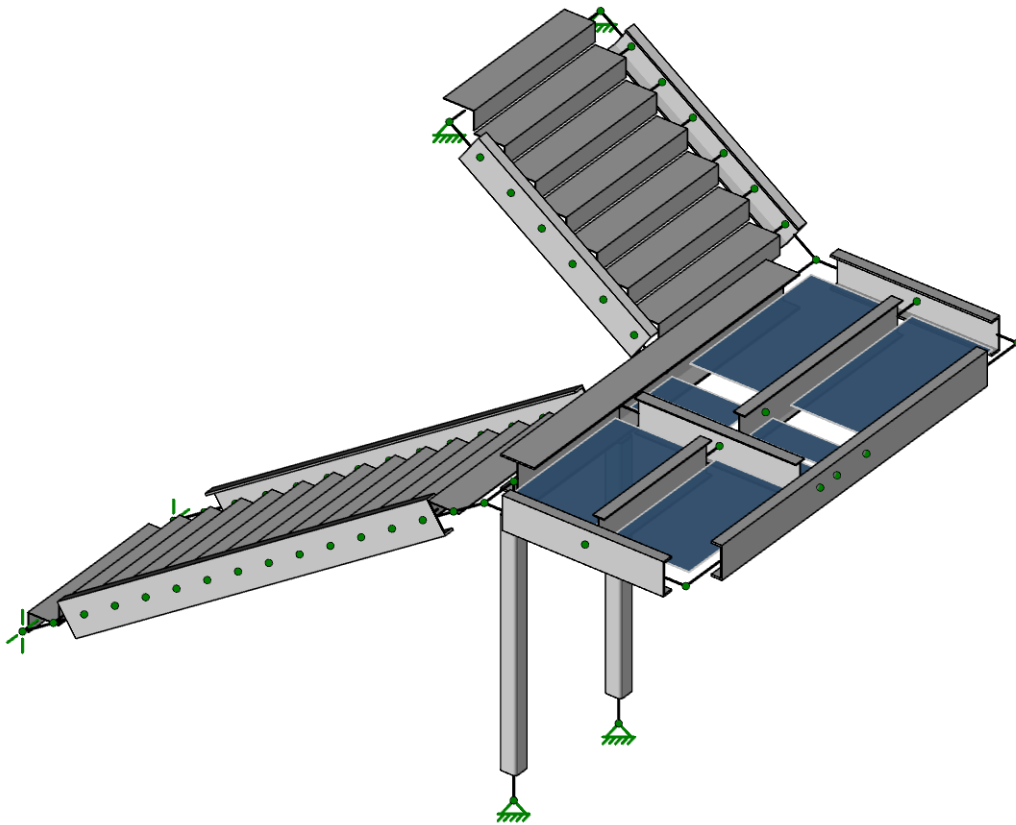
Vertical Reactions - Unfactored

Values in KIPS

Load Combination	Support 1	Support 2
+0.60D	0.763	0.763
L Only	2.063	2.063

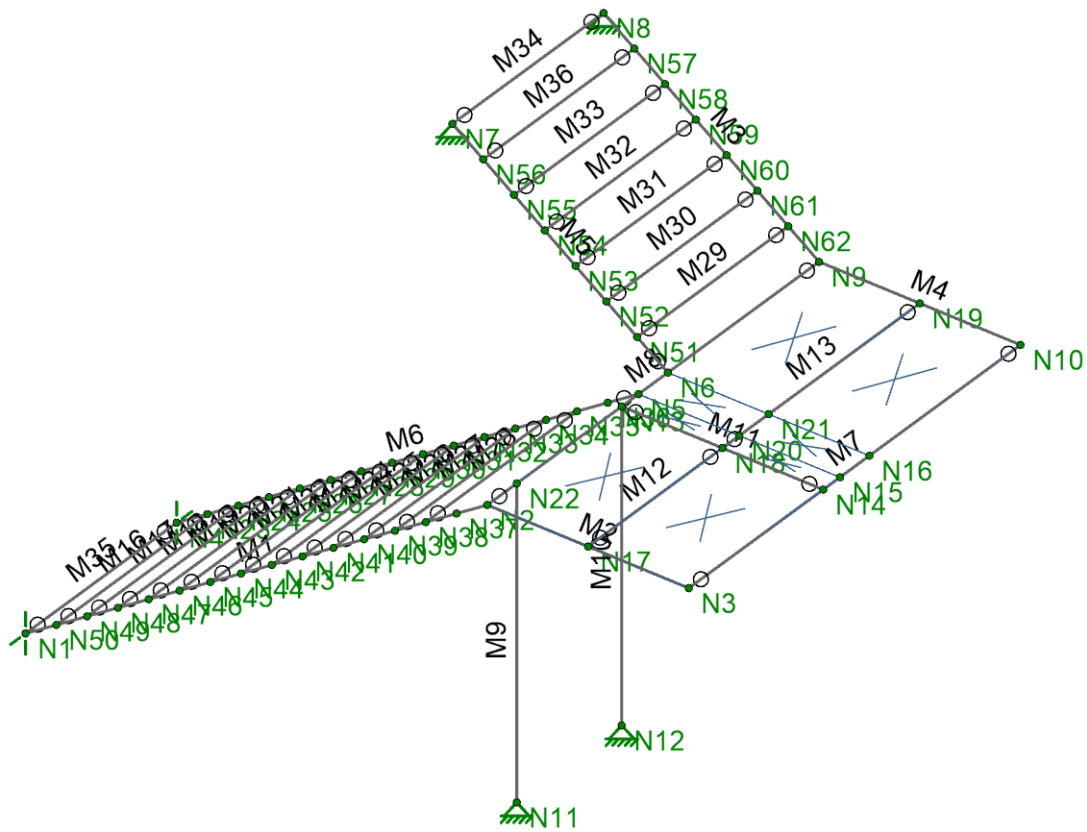
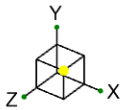


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PCS Structural Solutions	CHC Puyallup Feature Stair	SK-1
KKeppler		Oct 07, 2022
22-537		Feature Stair.r3d

PRCTI20221698



City of Puyallup Development & Permitting Services ISSUED PERMIT			
Building	Planning	Public Works	Traffic
Engineering			
Fire			

PCS Structural Solutions	CHC Puyallup Feature Stair	SK-2
KKeppler		Oct 07, 2022
22-537		Feature Stair.r3d

PRCTI20221698



Section Sets

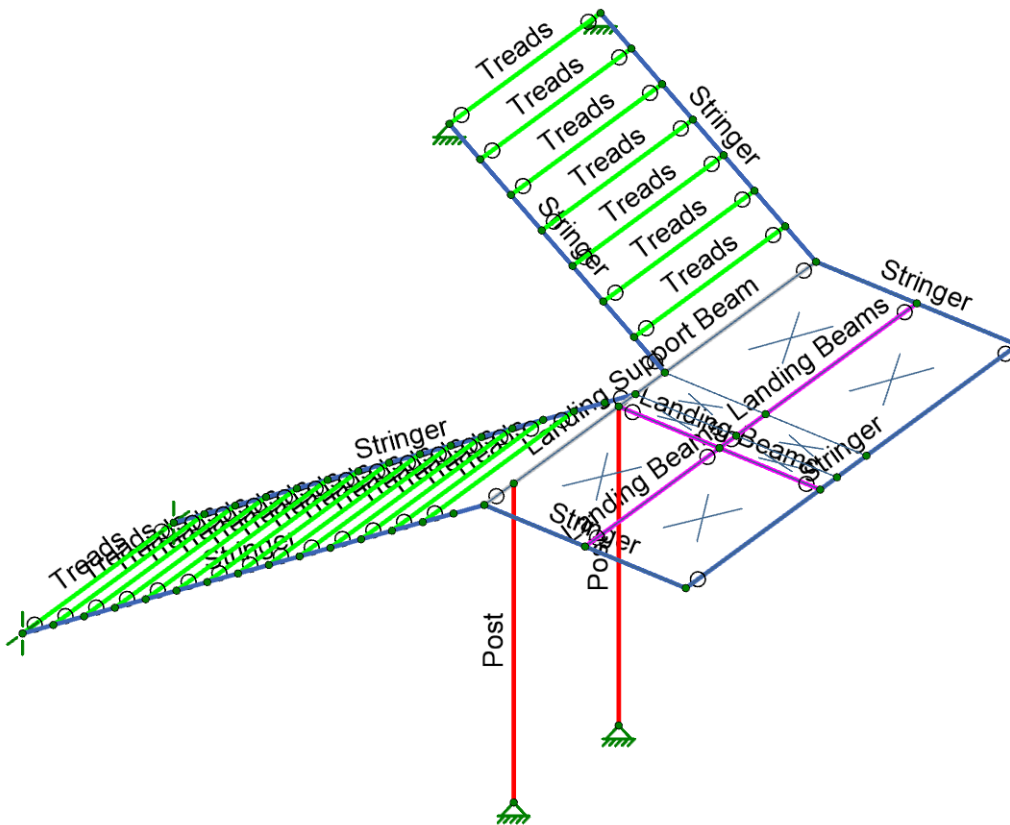
Stringer

Treads

Post

Landing Support Beam

Landing Beams



City of Puyallup
Development & Permitting Services

ISSUED PERMIT

Building

Planning

Engineering

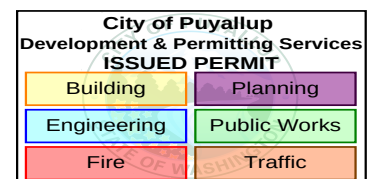
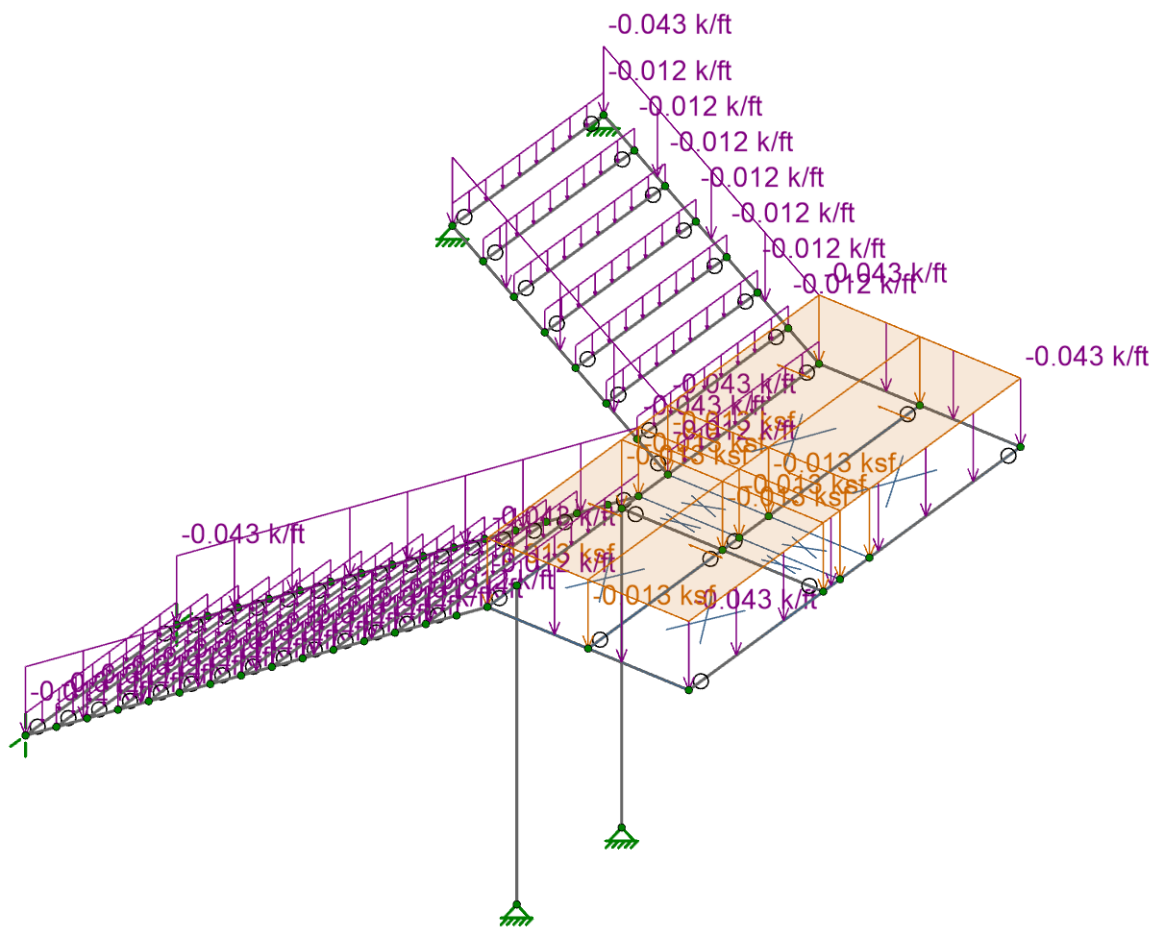
Public Works

Fire

Traffic

PCS Structural Solutions	CHC Puyallup Feature Stair	SK-3
KKeppler		Oct 07, 2022
22-537		Feature Stair.r3d

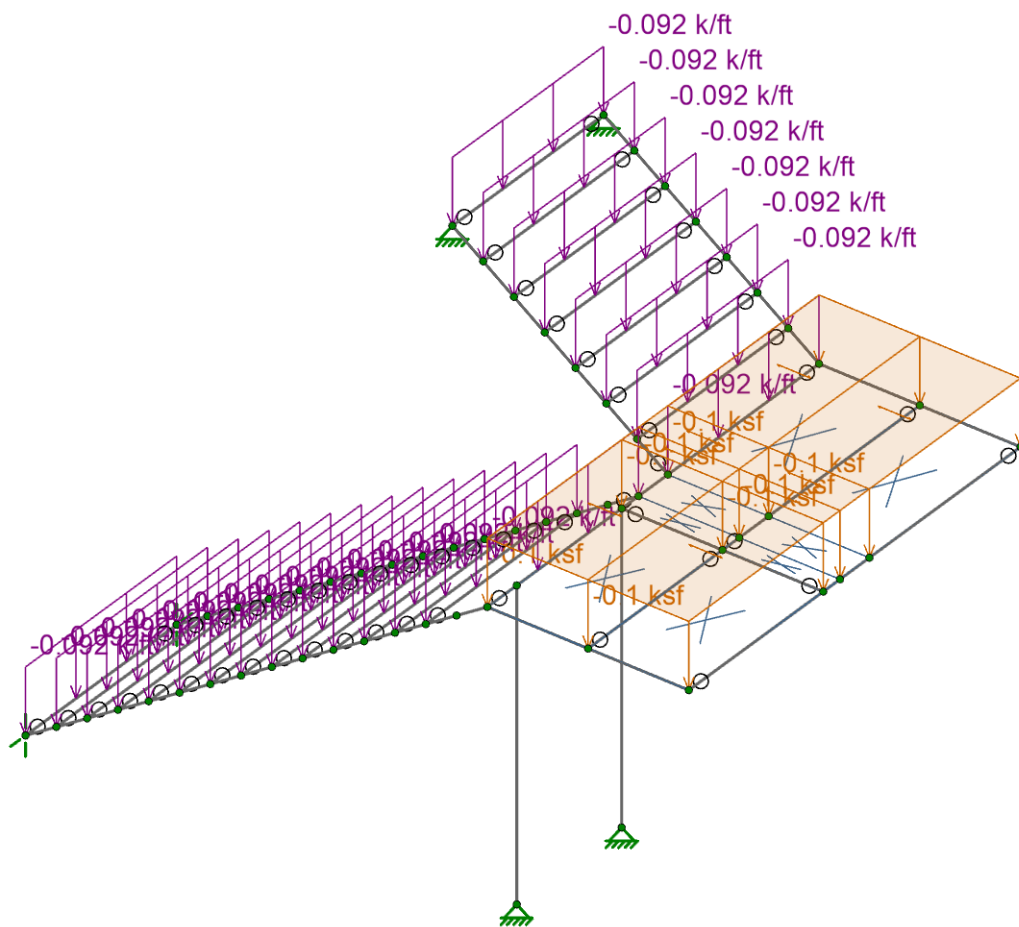
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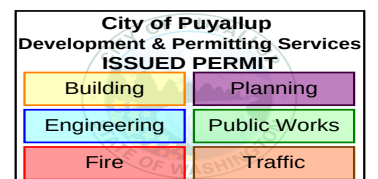
Loads: BLC 1, D

PCS Structural Solutions	CHC Puyallup Feature Stair	SK-4
KKeppler		Oct 07, 2022
22-537		Feature Stair.r3d

PRCTI20221698

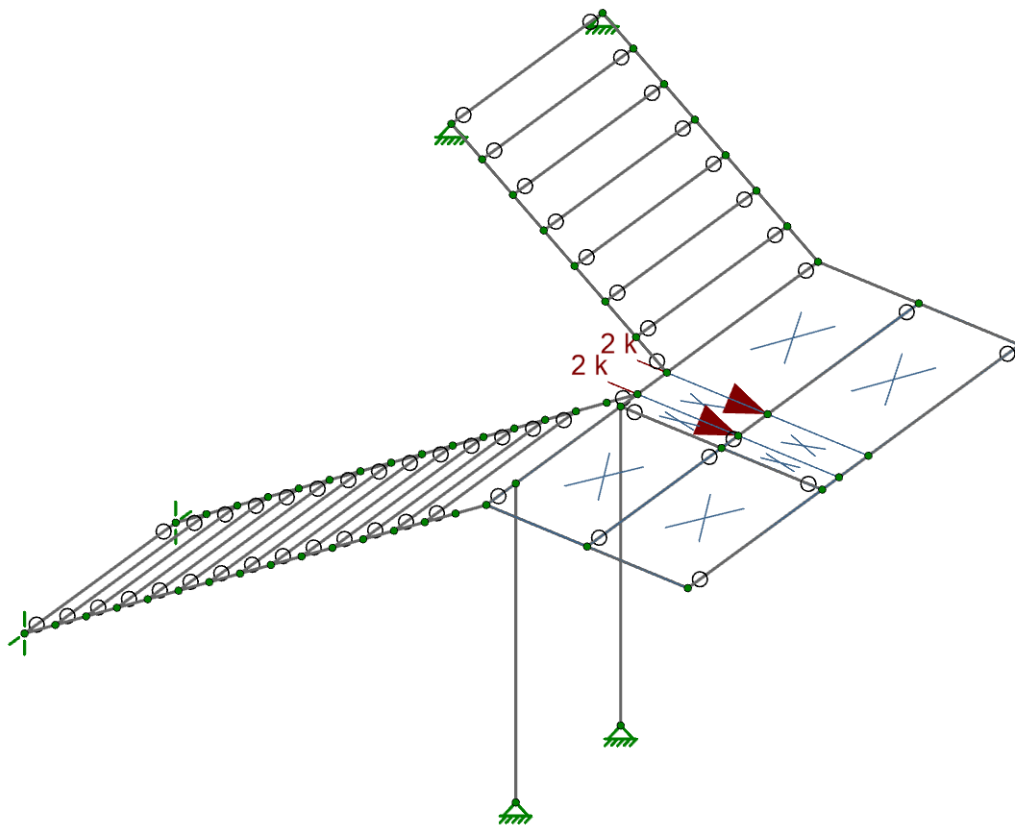
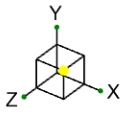


Loads: BLC 2, L



PCS Structural Solutions	CHC Puyallup Feature Stair	SK-5
KKeppler		Oct 07, 2022
22-537		Feature Stair.r3d

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City of Puyallup
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Building	Planning
Engineering	Public Works
Fire	Traffic

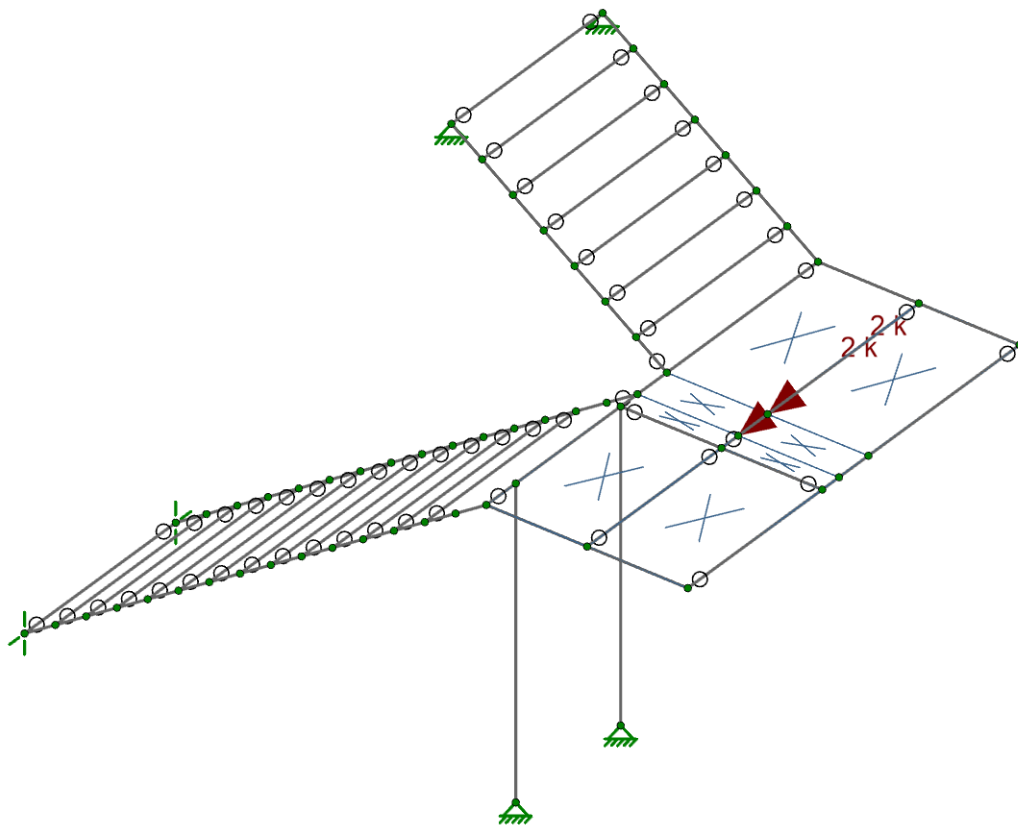
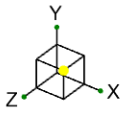
Loads: BLC 3, EQX

PCS Structural Solutions
KKepler
22-537

CHC Puyallup Feature Stair

SK-6
Oct 07, 2022
Feature Stair.r3d

PRCTI20221698

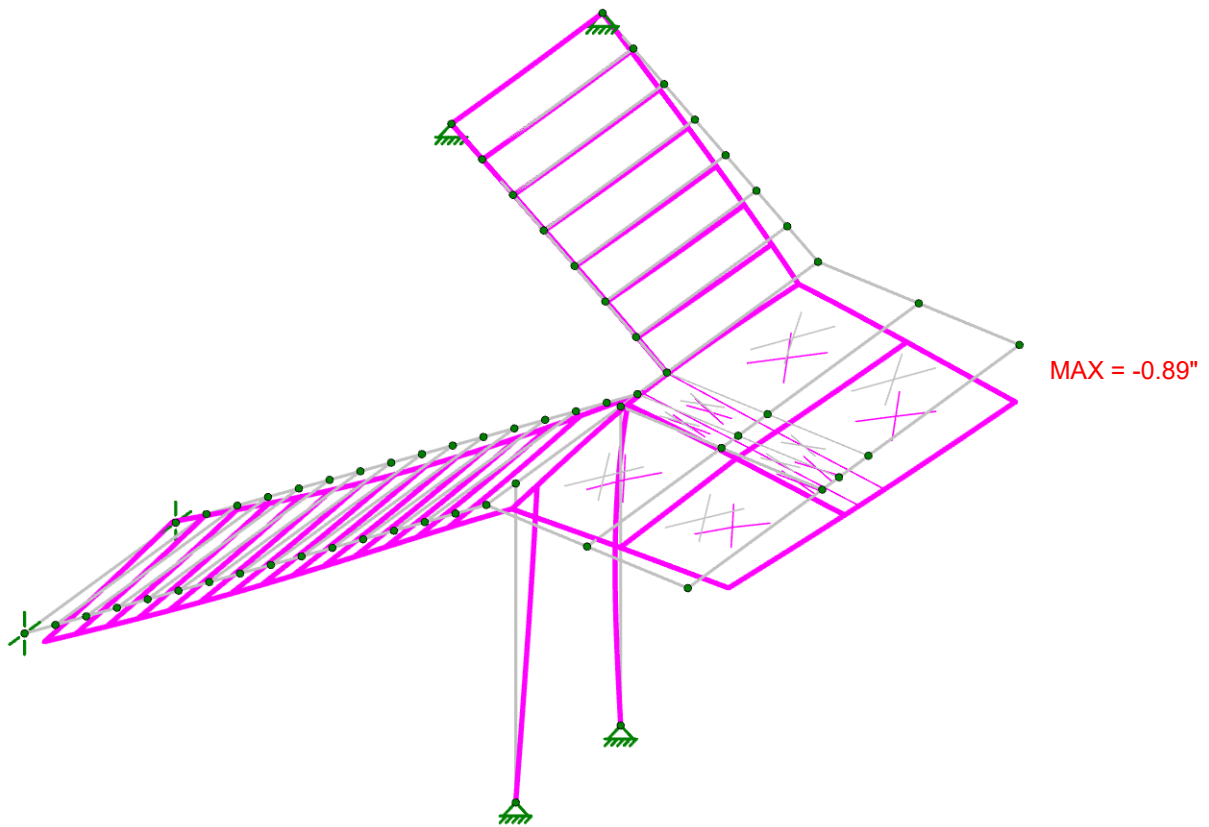
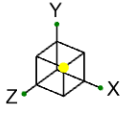


Loads: BLC 4, EQZ

City of Puyallup Development & Permitting Services ISSUED PERMIT			
Building	Planning		
Engineering	Public Works		
Fire	Traffic		

PCS Structural Solutions	CHC Puyallup Feature Stair	SK-7
KKeppler		Oct 07, 2022
22-537		Feature Stair.r3d

PRCTI20221698



Results for LC 3, Deflection 3

City of Puyallup Development & Permitting Services ISSUED PERMIT			
Building	Planning	Engineering	Public Works
Fire	Traffic		

PCS Structural Solutions

CHC Puyallup Feature Stair

SK-8

KKeppler

Oct 07, 2022

22-537

Feature Stair.r3d

PRCTI20221698

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	13.167	
2	N2	13.75	9.1067	13.167	
3	N3	19.75	9.1067	13.167	
4	N4	0	0	7.167	
5	N5	13.75	9.1067	7.167	
6	N6	13.75	9.1067	6	
7	N7	7.333	13.67	6	
8	N8	7.333	13.67	0	
9	N9	13.75	9.1067	0	
10	N10	19.75	9.1067	0	
11	N11	13.75	0	12	
12	N12	13.75	0	7.833	
13	N13	13.75	9.1067	7.833	
14	N14	19.75	9.1067	7.833	
15	N15	19.75	9.1067	7.167	
16	N16	19.75	9.1067	6	
17	N17	16.75	9.1067	13.167	
18	N18	16.75	9.1067	7.833	
19	N19	16.75	9.1067	0	
20	N20	16.75	9.1067	7.167	
21	N21	16.75	9.1067	6	
22	N22	13.75	9.1067	12	
23	N23	0.916667	0.607113	7.167	
24	N24	1.833333	1.214227	7.167	
25	N25	2.75	1.82134	7.167	
26	N26	3.666667	2.428453	7.167	
27	N27	4.583333	3.035567	7.167	
28	N28	5.5	3.64268	7.167	
29	N29	6.416667	4.249793	7.167	
30	N30	7.333333	4.856907	7.167	
31	N31	8.25	5.46402	7.167	
32	N32	9.166667	6.071133	7.167	
33	N33	10.083333	6.678247	7.167	
34	N34	11	7.28536	7.167	
35	N35	11.916667	7.892473	7.167	
36	N36	12.833333	8.499587	7.167	
37	N37	12.833333	8.499587	13.167	
38	N38	11.916667	7.892473	13.167	
39	N39	11	7.28536	13.167	
40	N40	10.083333	6.678247	13.167	
41	N41	9.166667	6.071133	13.167	
42	N42	8.25	5.46402	13.167	
43	N43	7.333333	4.856907	13.167	
44	N44	6.416667	4.249793	13.167	
45	N45	5.5	3.64268	13.167	
46	N46	4.583333	3.035567	13.167	
47	N47	3.666667	2.428453	13.167	
48	N48	2.75	1.82134	13.167	
49	N49	1.833333	1.214227	13.167	
50	N50	0.916667	0.607113	13.167	
51	N51	12.833286	9.7586	6	
52	N52	11.916571	10.4105	6	
53	N53	10.999857	11.0624	6	
54	N54	10.083143	11.7143	6	
55	N55	9.166429	12.3662	6	
56	N56	8.249714	13.0181	6	
57	N57	8.249714	13.0181	0	
58	N58	9.166429	12.3662	0	

Node Coordinates (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
59	N59	10.083143	11.7143	0	
60	N60	10.999857	11.0624	0	
61	N61	11.916571	10.4105	0	
62	N62	12.833286	9.7586	0	

Node Boundary Conditions

	Y [k/in]	X [k/in]	Z [k/in]	Node Label
1	Reaction	Reaction	Reaction	N7
2	Reaction	Reaction	Reaction	N8
3	Reaction		Reaction	N1
4	Reaction		Reaction	N4
5	Reaction	Reaction	Reaction	N11
6	Reaction	Reaction	Reaction	N12

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e ⁻⁵ F ⁻¹]	Density [k/ft ³]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	0.3	0.65	0.527	42	1.4	58	1.3
5	A500 Gr.B RECT	29000	11154	0.3	0.65	0.527	46	1.4	58	1.3
6	A500 Gr.C RND	29000	11154	0.3	0.65	0.527	46	1.4	62	1.3
7	A500 Gr.C RECT	29000	11154	0.3	0.65	0.527	50	1.4	62	1.3
8	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2
9	A1085	29000	11154	0.3	0.65	0.49	50	1.4	65	1.3
10	A913 Gr.65	29000	11154	0.3	0.65	0.49	65	1.1	80	1.1

General Materials Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e ⁻⁵ F ⁻¹]	Density [k/ft ³]	Plate Methodology
1	gen_Conc3NW	3155	1372	0.15	0.6	0.145	Isotropic
2	gen_Conc4NW	3644	1584	0.15	0.6	0.145	Isotropic
3	gen_Conc3LW	2085	906	0.15	0.6	0.11	Isotropic
4	gen_Conc4LW	2408	1047	0.15	0.6	0.11	Isotropic
5	gen_Alum	10100	4077	0.3	1.29	0.173	Isotropic
6	gen_Steel	29000	11154	0.3	0.65	0.49	Isotropic
7	gen_Plywood	1800	38	0	0.3	0.035	Isotropic
8	RIGID	1e+06		0.3	0	0	Isotropic
9	gen_Ortho	N/A	N/A	N/A	0.65	0.49	Orthotropic

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in ²]	Iyy [in ⁴]	Izz [in ⁴]	J [in ⁴]
1	HR1	W10X33	Beam	Wide Flange	A992	Typical	9.71	36.6	171	0.583
2	Stringer	MC12X35	Beam	Channel	A36 Gr.36	Typical	10.3	12.6	216	1.24
3	Treads	Tread6.83*11	Beam	Single Angle	A36 Gr.36	Typical	4.395	17.953	57.475	0.09
4	Post	HSS6X6X8	Column	Tube	A500 Gr.C RECT	Typical	9.74	48.3	48.3	81.1
5	Landing Support Beam	W12X65	Beam	Wide Flange	A992	Typical	19.1	174	533	2.18
6	Landing Beams	W12X19	Beam	Wide Flange	A992	Typical	5.57	3.76	130	0.18

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N2	N1		Stringer	Beam	Channel	A36 Gr.36	Typical
2	M2	N3	N2		Stringer	Beam	Channel	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
3	M3	N8	N9		Stringer	Beam	Channel	A36 Gr.36	Typical
4	M4	N9	N10		Stringer	Beam	Channel	A36 Gr.36	Typical
5	M5	N6	N7		Stringer	Beam	Channel	A36 Gr.36	Typical
6	M6	N4	N5		Stringer	Beam	Channel	A36 Gr.36	Typical
7	M7	N10	N3		Stringer	Beam	Channel	A36 Gr.36	Typical
8	M8	N2	N9		Landing Support Beam	Beam	Wide Flange	A992	Typical
9	M9	N11	N22		Post	Column	Tube	A500 Gr.C RECT	Typical
10	M10	N12	N13		Post	Column	Tube	A500 Gr.C RECT	Typical
11	M11	N13	N14		Landing Beams	Beam	Wide Flange	A992	Typical
12	M12	N17	N18		Landing Beams	Beam	Wide Flange	A992	Typical
13	M13	N18	N19		Landing Beams	Beam	Wide Flange	A992	Typical
14	M34	N8	N7	90	Treads	Beam	Single Angle	A36 Gr.36	Typical
15	M35	N1	N4	90	Treads	Beam	Single Angle	A36 Gr.36	Typical
16	M16	N50	N23	90	Treads	Beam	Single Angle	A36 Gr.36	Typical
17	M17	N49	N24	90	Treads	Beam	Single Angle	A36 Gr.36	Typical
18	M18	N48	N25	90	Treads	Beam	Single Angle	A36 Gr.36	Typical
19	M19	N47	N26	90	Treads	Beam	Single Angle	A36 Gr.36	Typical
20	M20	N46	N27	90	Treads	Beam	Single Angle	A36 Gr.36	Typical
21	M21	N45	N28	90	Treads	Beam	Single Angle	A36 Gr.36	Typical
22	M22	N44	N29	90	Treads	Beam	Single Angle	A36 Gr.36	Typical
23	M23	N43	N30	90	Treads	Beam	Single Angle	A36 Gr.36	Typical
24	M24	N42	N31	90	Treads	Beam	Single Angle	A36 Gr.36	Typical
25	M25	N41	N32	90	Treads	Beam	Single Angle	A36 Gr.36	Typical
26	M26	N40	N33	90	Treads	Beam	Single Angle	A36 Gr.36	Typical
27	M27	N39	N34	90	Treads	Beam	Single Angle	A36 Gr.36	Typical
28	M28	N38	N35	90	Treads	Beam	Single Angle	A36 Gr.36	Typical
29	M29	N62	N51	90	Treads	Beam	Single Angle	A36 Gr.36	Typical
30	M30	N61	N52	90	Treads	Beam	Single Angle	A36 Gr.36	Typical
31	M31	N60	N53	90	Treads	Beam	Single Angle	A36 Gr.36	Typical
32	M32	N59	N54	90	Treads	Beam	Single Angle	A36 Gr.36	Typical
33	M33	N58	N55	90	Treads	Beam	Single Angle	A36 Gr.36	Typical
34	M36	N57	N56	90	Treads	Beam	Single Angle	A36 Gr.36	Typical

Member Advanced Data

	Label	I Release	J Release	Physical	Deflection Ratio Options	Seismic DR
1	M1			Yes	Default	None
2	M2			Yes	Default	None
3	M3			Yes	Default	None
4	M4			Yes	Default	None
5	M5	BenPIN		Yes	Default	None
6	M6		BenPIN	Yes	Default	None
7	M7	BenPIN	BenPIN	Yes	Default	None
8	M8	BenPIN	BenPIN	Yes	Default	None
9	M9			Yes	** NA **	None
10	M10			Yes	** NA **	None
11	M11	BenPIN	BenPIN	Yes	Default	None
12	M12	BenPIN	BenPIN	Yes	Default	None
13	M13	BenPIN	BenPIN	Yes	Default	None
14	M34	BenPIN	BenPIN	Yes	Default	None
15	M35	BenPIN	BenPIN	Yes	Default	None
16	M16	BenPIN	BenPIN	Yes	Default	None
17	M17	BenPIN	BenPIN	Yes	Default	None
18	M18	BenPIN	BenPIN	Yes	Default	None
19	M19	BenPIN	BenPIN	Yes	Default	None
20	M20	BenPIN	BenPIN	Yes	Default	None
21	M21	BenPIN	BenPIN	Yes	Default	None
22	M22	BenPIN	BenPIN	Yes	Default	None
23	M23	BenPIN	BenPIN	Yes	Default	None

Member Advanced Data (Continued)

	Label	I Release	J Release	Physical	Deflection Ratio Options	Seismic DR
24	M24	BenPIN	BenPIN	Yes	Default	None
25	M25	BenPIN	BenPIN	Yes	Default	None
26	M26	BenPIN	BenPIN	Yes	Default	None
27	M27	BenPIN	BenPIN	Yes	Default	None
28	M28	BenPIN	BenPIN	Yes	Default	None
29	M29	BenPIN	BenPIN	Yes	Default	None
30	M30	BenPIN	BenPIN	Yes	Default	None
31	M31	BenPIN	BenPIN	Yes	Default	None
32	M32	BenPIN	BenPIN	Yes	Default	None
33	M33	BenPIN	BenPIN	Yes	Default	None
34	M36	BenPIN	BenPIN	Yes	Default	None

Hot Rolled Steel Design Parameters

	Label	Shape	Length [ft]	Lcomp top [ft]	Function
1	M1	Stringer	16.492	Lbyy	Lateral
2	M2	Stringer	6	Lbyy	Lateral
3	M3	Stringer	7.874	Lbyy	Lateral
4	M4	Stringer	6	Lbyy	Lateral
5	M5	Stringer	7.874	Lbyy	Lateral
6	M6	Stringer	16.492	Lbyy	Lateral
7	M7	Stringer	13.167	Lbyy	Lateral
8	M8	Landing Support Beam	13.167	Lbyy	Lateral
9	M9	Post	9.107	Lbyy	Lateral
10	M10	Post	9.107	Lbyy	Lateral
11	M11	Landing Beams	6	Lbyy	Lateral
12	M12	Landing Beams	5.334	Lbyy	Lateral
13	M13	Landing Beams	7.833	Lbyy	Lateral
14	M34	Treads	6	Lbyy	Lateral
15	M35	Treads	6	Lbyy	Lateral
16	M16	Treads	6	Lbyy	Lateral
17	M17	Treads	6	Lbyy	Lateral
18	M18	Treads	6	Lbyy	Lateral
19	M19	Treads	6	Lbyy	Lateral
20	M20	Treads	6	Lbyy	Lateral
21	M21	Treads	6	Lbyy	Lateral
22	M22	Treads	6	Lbyy	Lateral
23	M23	Treads	6	Lbyy	Lateral
24	M24	Treads	6	Lbyy	Lateral
25	M25	Treads	6	Lbyy	Lateral
26	M26	Treads	6	Lbyy	Lateral
27	M27	Treads	6	Lbyy	Lateral
28	M28	Treads	6	Lbyy	Lateral
29	M29	Treads	6	Lbyy	Lateral
30	M30	Treads	6	Lbyy	Lateral
31	M31	Treads	6	Lbyy	Lateral
32	M32	Treads	6	Lbyy	Lateral
33	M33	Treads	6	Lbyy	Lateral
34	M36	Treads	6	Lbyy	Lateral

Plate Primary Data

	Label	A Node	B Node	C Node	D Node	Material	Thickness [in]
1	P1	N2	N13	N18	N17	gen Steel	0.25
2	P2	N17	N18	N14	N3	gen Steel	0.25
3	P3	N13	N5	N20	N18	gen Steel	0.25
4	P4	N18	N20	N15	N14	gen Steel	0.25
5	P5	N5	N6	N21	N20	gen Steel	0.25

Plate Primary Data (Continued)

	Label	A Node	B Node	C Node	D Node	Material	Thickness [in]
6	P6	N20	N21	N16	N15	gen Steel	0.25
7	P7	N6	N9	N19	N21	gen Steel	0.25
8	P8	N21	N19	N10	N16	gen Steel	0.25

Node Loads and Enforced Displacements (BLC 3 : EQX)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s ² /ft, k*s ² *ft)]
1	N20	L	X	2
2	N21	L	X	2
3	N7	D	X	2.02
4	N8	D	X	2.02

Node Loads and Enforced Displacements (BLC 4 : EQZ)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s ² /ft, k*s ² *ft)]
1	N20	L	Z	2
2	N21	L	Z	2
3	N7	D	Z	2.02
4	N8	D	Z	2.02

Member Distributed Loads (BLC 1 : D)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.043	-0.043	0	%100
2	M2	Y	-0.043	-0.043	0	%100
3	M7	Y	-0.043	-0.043	0	%100
4	M4	Y	-0.043	-0.043	0	%100
5	M3	Y	-0.043	-0.043	0	%100
6	M6	Y	-0.043	-0.043	0	%100
7	M5	Y	-0.043	-0.043	0	%100
8	M8	Y	-0.043	-0.043	6	7.167
9	M35	Y	-0.012	-0.012	0	%100
10	M8	Y	-0.012	-0.012	0	6
11	M8	Y	-0.012	-0.012	7.167	13.167
12	M34	Y	-0.012	-0.012	0	%100
13	M36	Y	-0.012	-0.012	0	%100
14	M33	Y	-0.012	-0.012	0	%100
15	M32	Y	-0.012	-0.012	0	%100
16	M31	Y	-0.012	-0.012	0	%100
17	M30	Y	-0.012	-0.012	0	%100
18	M29	Y	-0.012	-0.012	0	%100
19	M16	Y	-0.012	-0.012	0	%100
20	M17	Y	-0.012	-0.012	0	%100
21	M18	Y	-0.012	-0.012	0	%100
22	M19	Y	-0.012	-0.012	0	%100
23	M20	Y	-0.012	-0.012	0	%100
24	M21	Y	-0.012	-0.012	0	%100
25	M22	Y	-0.012	-0.012	0	%100
26	M23	Y	-0.012	-0.012	0	%100
27	M24	Y	-0.012	-0.012	0	%100
28	M25	Y	-0.012	-0.012	0	%100
29	M26	Y	-0.012	-0.012	0	%100
30	M27	Y	-0.012	-0.012	0	%100
31	M28	Y	-0.012	-0.012	0	%100

Member Distributed Loads (BLC 2 : L)

Member	Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M35	Y	-0.092	-0.092	0	%100
2	M8	Y	-0.092	-0.092	0	6
3	M8	Y	-0.092	-0.092	7.167	13.167
4	M34	Y	-0.092	-0.092	0	%100
5	M36	Y	-0.092	-0.092	0	%100
6	M33	Y	-0.092	-0.092	0	%100
7	M32	Y	-0.092	-0.092	0	%100
8	M31	Y	-0.092	-0.092	0	%100
9	M30	Y	-0.092	-0.092	0	%100
10	M29	Y	-0.092	-0.092	0	%100
11	M28	Y	-0.092	-0.092	0	%100
12	M27	Y	-0.092	-0.092	0	%100
13	M26	Y	-0.092	-0.092	0	%100
14	M25	Y	-0.092	-0.092	0	%100
15	M24	Y	-0.092	-0.092	0	%100
16	M23	Y	-0.092	-0.092	0	%100
17	M22	Y	-0.092	-0.092	0	%100
18	M21	Y	-0.092	-0.092	0	%100
19	M20	Y	-0.092	-0.092	0	%100
20	M19	Y	-0.092	-0.092	0	%100
21	M18	Y	-0.092	-0.092	0	%100
22	M17	Y	-0.092	-0.092	0	%100
23	M16	Y	-0.092	-0.092	0	%100

Member Distributed Loads (BLC 5 : BLC 1 Transient Area Loads)

Member	Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M8	Y	-0.02	-0.02	0	5.334
2	M12	Y	-0.039	-0.039	0	5.334
3	M7	Y	-0.019	-0.019	7.833	13.167
4	M8	Y	-0.019	-0.019	5.334	6
5	M13	Y	-0.039	-0.039	0	0.666
6	M7	Y	-0.019	-0.019	7.167	7.833
7	M8	Y	-0.02	-0.02	6	7.167
8	M13	Y	-0.039	-0.039	0.666	1.833
9	M7	Y	-0.019	-0.019	6	7.167
10	M8	Y	-0.02	-0.02	7.167	13.167
11	M13	Y	-0.039	-0.039	1.833	7.833
12	M7	Y	-0.02	-0.02	5.551e-16	6

Member Distributed Loads (BLC 6 : BLC 2 Transient Area Loads)

Member	Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M8	Y	-0.15	-0.15	0	5.334
2	M12	Y	-0.3	-0.3	0	5.334
3	M7	Y	-0.15	-0.15	7.833	13.167
4	M8	Y	-0.15	-0.15	5.334	6
5	M13	Y	-0.3	-0.3	0	0.666
6	M7	Y	-0.15	-0.15	7.167	7.833
7	M8	Y	-0.15	-0.15	6	7.167
8	M13	Y	-0.3	-0.3	0.666	1.833
9	M7	Y	-0.15	-0.15	6	7.167
10	M8	Y	-0.15	-0.15	7.167	13.167
11	M13	Y	-0.3	-0.3	1.833	7.833
12	M7	Y	-0.15	-0.15	5.551e-16	6

Plate Surface Loads

No Data to Print...

Basic Load Cases

	BLC Description	Category	Y Gravity	Nodal	Distributed	Area(Member)
1	D	DL	-1		31	8
2	L	LL			23	8
3	EQX	ELX		4		
4	EQZ	ELZ		4		
5	BLC 1 Transient Area Loads	None			12	
6	BLC 2 Transient Area Loads	None			12	

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	Deflection 1	Yes	Y	DL	1								
2	Deflection 2	Yes	Y	LL	1								
3	Deflection 3	Yes	Y	DL	1	LL	1						
4	IBC 16-8	Yes	Y	DL	1								
5	IBC 16-9	Yes	Y	DL	1	LL	1	LLS	1				
6	IBC 16-10 (a)	Yes	Y	DL	1	RLL	1						
7	IBC 16-11 (a)	Yes	Y	DL	1	LL	0.75	LLS	0.75	RLL	0.75		
8	IBC 16-12 (b) (a)	Yes	Y	DL	1	Sds*DL	0.14	ELX	0.7				
9	IBC 16-12 (b) (b)	Yes	Y	DL	1	Sds*DL	0.14	ELZ	0.7				
10	IBC 16-12 (b) (c)	Yes	Y	DL	1	Sds*DL	0.14	ELX	-0.7				
11	IBC 16-12 (b) (d)	Yes	Y	DL	1	Sds*DL	0.14	ELZ	-0.7				
12	IBC 16-14 (a)	Yes	Y	DL	1	Sds*DL	0.105	ELX	0.525	LL	0.75	LLS	0.75
13	IBC 16-14 (b)	Yes	Y	DL	1	Sds*DL	0.105	ELZ	0.525	LL	0.75	LLS	0.75
14	IBC 16-14 (c)	Yes	Y	DL	1	Sds*DL	0.105	ELX	-0.525	LL	0.75	LLS	0.75
15	IBC 16-14 (d)	Yes	Y	DL	1	Sds*DL	0.105	ELZ	-0.525	LL	0.75	LLS	0.75
16	IBC 16-16 (a)	Yes	Y	DL	0.6	Sds*DL	-0.14	ELX	0.7				
17	IBC 16-16 (b)	Yes	Y	DL	0.6	Sds*DL	-0.14	ELZ	0.7				
18	IBC 16-16 (c)	Yes	Y	DL	0.6	Sds*DL	-0.14	ELX	-0.7				
19	IBC 16-16 (d)	Yes	Y	DL	0.6	Sds*DL	-0.14	ELZ	-0.7				

Load Combination Design

	Description	CD	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
1	Deflection 1		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	Deflection 2		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	Deflection 3		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	IBC 16-8	0.9	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	IBC 16-9		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	IBC 16-10 (a)	1.25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	IBC 16-11 (a)	1.25	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	IBC 16-12 (b) (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	IBC 16-12 (b) (b)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	IBC 16-12 (b) (c)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	IBC 16-12 (b) (d)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	IBC 16-14 (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13	IBC 16-14 (b)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14	IBC 16-14 (c)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
15	IBC 16-14 (d)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16	IBC 16-16 (a)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17	IBC 16-16 (b)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
18	IBC 16-16 (c)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
19	IBC 16-16 (d)	1.6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Envelope Node Reactions

Node Label			X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N7	max	0.629	17	3.004	15	0.101	12	0	19	0	19	0	19
2		min	-2.083	15	-0.157	17	0.001	18	0	1	0	1	0	1
3	N8	max	0.988	15	0.566	18	0.092	12	0	19	0	19	0	19
4		min	-0.725	17	-1.443	12	0.001	18	0	1	0	1	0	1
5	N1	max	0	19	2.818	14	0.049	19	0	19	0	19	0	19
6		min	0	1	-0.446	16	-0.066	9	0	1	0	1	0	1
7	N4	max	0	19	3.472	5	0.048	19	0	19	0	19	0	19
8		min	0	1	0.591	18	-0.063	9	0	1	0	1	0	1
9	N11	max	0.249	10	8.556	17	2.054	11	0	19	0	19	0	19
10		min	-0.264	8	-13.244	15	-1.667	17	0	1	0	1	0	1
11	N12	max	2.12	10	36.078	15	1.54	19	0	19	0	19	0	19
12		min	-1.51	16	-3.653	17	-1.888	9	0	1	0	1	0	1
13	Totals:	max	2.369	10	33.649	5	3.583	19						
14		min	-1.736	16	6.008	18	-3.68	9						

Envelope Node Displacements

Node Label			X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
1	N1	max	1.558	8	0	16	0	9	3.751e-3	13	5.311e-3	11	7.856e-4	16
2		min	-1.419	18	0	14	0	19	-1.677e-3	19	-4.367e-3	17	-1.293e-3	14
3	N2	max	1.56	8	0.012	11	0.739	17	1.451e-3	12	3.602e-3	15	1.788e-3	18
4		min	-1.421	18	-0.012	9	-0.8	11	-1.085e-4	18	-8.639e-4	17	-2.112e-3	8
5	N3	max	1.56	8	0.166	18	0.75	17	3.908e-4	18	3.396e-3	15	2.466e-3	18
6		min	-1.421	18	-0.22	8	-0.954	11	-6.139e-3	12	-2.383e-4	17	-3.435e-3	8
7	N4	max	1.407	16	0	18	0	9	2.889e-3	9	4.083e-3	11	-2.886e-4	17
8		min	-1.426	10	0	3	0	19	-2.966e-3	11	-4.298e-3	9	-1.977e-3	3
9	N5	max	1.414	16	0.003	17	0.739	17	2.053e-4	17	3.382e-3	15	4.796e-3	18
10		min	-1.418	10	-0.037	15	-0.8	11	-2.588e-3	15	-1.555e-4	17	-8.73e-3	12
11	N6	max	1.397	16	0.005	17	0.739	17	1.506e-4	17	3.377e-3	15	4.e-3	18
12		min	-1.429	10	-0.081	15	-0.801	11	-3.329e-3	15	-1.519e-4	17	-8.858e-3	12
13	N7	max	1.414	16	0	17	1.414	17	5.549e-3	17	8.245e-3	9	3.547e-5	17
14		min	-1.414	10	0	15	-1.414	11	-7.212e-3	11	-6.155e-3	19	-1.203e-3	15
15	N8	max	1.414	16	0	12	1.414	17	4.517e-3	17	9.591e-3	13	3.244e-4	17
16		min	-1.414	10	0	18	-1.414	11	-8.086e-3	15	-6.393e-3	19	-5.124e-3	15
17	N9	max	1.31	16	0.019	17	0.74	17	3.271e-4	17	4.419e-3	13	4.403e-4	18
18		min	-1.485	10	-0.417	15	-0.801	11	-6.062e-3	15	-9.598e-4	19	-6.565e-3	12
19	N10	max	1.31	16	0.056	18	0.75	17	5.094e-4	17	3.37e-3	12	8.349e-4	18
20		min	-1.485	10	-0.946	12	-0.954	11	-4.895e-3	15	-7.019e-5	18	-7.959e-3	12
21	N11	max	0	8	0	15	0	17	9.852e-3	17	3.367e-3	15	1.334e-2	18
22		min	0	10	0	17	0	11	-1.068e-2	11	-1.566e-4	17	-1.436e-2	8
23	N12	max	0	16	0	17	0	9	1.009e-2	9	3.379e-3	15	1.711e-2	10
24		min	0	10	0	15	0	19	-1.024e-2	11	-1.556e-4	17	-1.594e-2	16
25	N13	max	1.428	8	0.002	17	0.739	17	2.524e-4	17	3.379e-3	15	5.557e-3	18
26		min	-1.417	18	-0.017	15	-0.8	11	-2.095e-3	15	-1.556e-4	17	-8.625e-3	12
27	N14	max	1.429	8	0.162	18	0.75	17	2.711e-4	17	3.367e-3	15	7.082e-4	18
28		min	-1.417	18	-0.561	12	-0.954	11	-5.629e-3	15	-1.502e-4	17	-6.954e-3	12
29	N15	max	1.414	16	0.157	18	0.75	17	2.931e-4	17	3.366e-3	15	1.149e-3	18
30		min	-1.418	10	-0.6	12	-0.954	11	-5.57e-3	15	-1.476e-4	17	-6.735e-3	12
31	N16	max	1.397	16	0.145	18	0.75	17	3.32e-4	17	3.363e-3	15	1.166e-3	18
32		min	-1.429	10	-0.666	12	-0.954	11	-5.454e-3	15	-1.445e-4	17	-6.412e-3	12
33	N17	max	1.56	8	0.08	18	0.745	17	2.076e-3	18	3.385e-3	12	2.293e-3	18
34		min	-1.421	18	-0.1	8	-0.877	11	-2.561e-3	8	-6.91e-5	18	-3.126e-3	8
35	N18	max	1.429	8	0.118	18	0.745	17	2.254e-4	17	3.366e-3	15	1.713e-3	18
36		min	-1.417	18	-0.302	12	-0.877	11	-5.137e-3	15	-1.534e-4	17	-7.501e-3	12
37	N19	max	1.31	16	0.027	18	0.744	17	3.12e-4	17	3.676e-3	15	7.283e-4	18
38		min	-1.485	10	-0.664	12	-0.877	11	-4.499e-3	15	-7.901e-4	17	-7.664e-3	12
39	N20	max	1.414	16	0.111	18	0.745	17	2.591e-4	17	3.37e-3	15	1.38e-3	18
40		min	-1.418	10	-0.335	12	-0.877	11	-5.06e-3	15	-1.519e-4	17	-8.003e-3	12

Envelope Node Displacements (Continued)

Node Label			X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
41	N21	max	1.397	16	0.097	18	0.745	17	2.686e-4	17	3.366e-3	15	1.523e-3	18
42		min	-1.429	10	-0.392	12	-0.877	11	-5.01e-3	15	-1.486e-4	17	-8.831e-3	12
43	N22	max	1.531	8	0.006	15	0.739	17	4.81e-4	17	3.367e-3	15	1.229e-2	18
44		min	-1.42	18	-0.004	17	-0.8	11	-5.086e-4	11	-1.566e-4	17	-1.329e-2	8
45	N23	max	1.41	16	-0.003	17	0.068	9	2.877e-3	9	4.071e-3	11	-2.807e-4	17
46		min	-1.419	10	-0.022	3	-0.066	11	-2.958e-3	11	-4.281e-3	9	-1.932e-3	3
47	N24	max	1.412	16	-0.006	17	0.136	9	2.843e-3	9	4.036e-3	11	-2.586e-4	17
48		min	-1.414	10	-0.043	3	-0.133	11	-2.935e-3	11	-4.229e-3	9	-1.804e-3	3
49	N25	max	1.418	8	-0.009	17	0.203	9	2.787e-3	9	3.978e-3	11	-2.242e-4	17
50		min	-1.411	18	-0.063	3	-0.198	11	-2.896e-3	11	-4.144e-3	9	-1.607e-3	3
51	N26	max	1.423	8	-0.011	17	0.268	9	2.708e-3	9	3.898e-3	11	-1.8e-4	17
52		min	-1.409	18	-0.079	3	-0.262	11	-2.843e-3	11	-4.026e-3	9	-1.353e-3	3
53	N27	max	1.427	8	-0.013	17	0.33	9	2.608e-3	9	3.795e-3	11	-1.281e-4	17
54		min	-1.408	18	-0.093	3	-0.325	11	-2.775e-3	11	-3.875e-3	9	-1.054e-3	3
55	N28	max	1.43	8	-0.014	17	0.391	9	2.502e-3	17	3.671e-3	11	-7.068e-5	17
56		min	-1.407	18	-0.103	3	-0.386	11	-2.693e-3	11	-3.691e-3	9	-7.245e-4	3
57	N29	max	1.432	8	-0.015	17	0.448	9	2.378e-3	17	3.526e-3	11	-1.002e-5	17
58		min	-1.406	18	-0.109	3	-0.445	11	-2.597e-3	11	-3.475e-3	9	-3.778e-4	15
59	N30	max	1.433	8	-0.014	17	0.501	9	2.234e-3	17	3.359e-3	11	5.167e-5	17
60		min	-1.406	18	-0.111	3	-0.501	11	-2.487e-3	11	-3.228e-3	9	-6.982e-5	11
61	N31	max	1.432	8	-0.014	17	0.55	9	2.072e-3	17	3.173e-3	11	3.303e-4	13
62		min	-1.406	18	-0.109	3	-0.555	11	-2.363e-3	11	-2.974e-3	17	-1.129e-6	19
63	N32	max	1.431	8	-0.012	17	0.595	9	1.892e-3	17	2.966e-3	11	6.512e-4	5
64		min	-1.407	18	-0.104	3	-0.605	11	-2.226e-3	11	-2.702e-3	17	5.598e-5	19
65	N33	max	1.429	8	-0.01	17	0.634	9	1.694e-3	17	2.741e-3	11	9.452e-4	5
66		min	-1.408	18	-0.095	3	-0.653	11	-2.077e-3	11	-2.403e-3	17	1.075e-4	19
67	N34	max	1.425	8	-0.007	17	0.668	9	1.474e-3	17	2.491e-3	11	1.194e-3	5
68		min	-1.41	18	-0.082	3	-0.696	11	-1.912e-3	11	-2.071e-3	17	1.511e-4	19
69	N35	max	1.421	8	-0.004	17	0.696	9	1.201e-3	17	2.185e-3	11	1.384e-3	5
70		min	-1.412	18	-0.068	3	-0.735	11	-1.751e-3	15	-1.659e-3	17	1.847e-4	19
71	N36	max	1.417	8	0	17	0.719	17	9.688e-4	17	2.001e-3	15	1.503e-3	5
72		min	-1.414	18	-0.052	15	-0.769	11	-1.674e-3	15	-1.308e-3	17	2.06e-4	19
73	N37	max	1.546	8	0.018	8	0.722	17	1.673e-3	13	3.833e-3	15	1.499e-3	18
74		min	-1.409	18	-0.016	18	-0.771	11	-1.114e-4	18	-1.572e-3	17	-1.581e-3	8
75	N38	max	1.537	8	0.032	8	0.696	9	1.977e-3	13	3.973e-3	15	1.254e-3	10
76		min	-1.399	18	-0.031	18	-0.735	11	-3.439e-4	19	-1.991e-3	17	-1.161e-3	16
77	N39	max	1.53	8	0.042	16	0.668	9	2.198e-3	13	4.078e-3	15	1.026e-3	10
78		min	-1.391	18	-0.043	10	-0.696	11	-5.133e-4	19	-2.293e-3	17	-8.199e-4	16
79	N40	max	1.526	8	0.049	16	0.634	9	2.436e-3	13	4.193e-3	15	8.699e-4	14
80		min	-1.386	18	-0.053	10	-0.653	11	-6.952e-4	19	-2.618e-3	17	-5.185e-4	16
81	N41	max	1.525	8	0.053	16	0.595	9	2.659e-3	13	4.302e-3	15	6.829e-4	14
82		min	-1.382	18	-0.06	10	-0.605	11	-8.65e-4	19	-2.921e-3	17	-2.551e-4	16
83	N42	max	1.525	8	0.055	16	0.55	9	2.861e-3	13	4.403e-3	15	4.6e-4	14
84		min	-1.38	18	-0.065	10	-0.555	11	-1.018e-3	19	-3.194e-3	17	-2.737e-5	16
85	N43	max	1.526	8	0.054	16	0.501	9	3.043e-3	13	4.588e-3	11	3.749e-4	12
86		min	-1.379	18	-0.066	10	-0.501	11	-1.155e-3	19	-3.438e-3	17	-5.062e-5	18
87	N44	max	1.528	8	0.051	16	0.448	9	3.205e-3	13	4.754e-3	11	3.922e-4	12
88		min	-1.38	18	-0.065	10	-0.445	11	-1.277e-3	19	-3.655e-3	17	-2.58e-4	18
89	N45	max	1.532	8	0.046	16	0.391	9	3.347e-3	13	4.9e-3	11	4.789e-4	8
90		min	-1.383	18	-0.063	14	-0.386	11	-1.382e-3	19	-3.843e-3	17	-4.449e-4	18
91	N46	max	1.536	8	0.04	16	0.33	9	3.469e-3	13	5.024e-3	11	5.716e-4	16
92		min	-1.387	18	-0.058	14	-0.325	11	-1.472e-3	19	-4.002e-3	17	-6.359e-4	10
93	N47	max	1.54	8	0.033	16	0.268	9	3.569e-3	13	5.126e-3	11	6.545e-4	16
94		min	-1.392	18	-0.051	14	-0.262	11	-1.546e-3	19	-4.133e-3	17	-8.168e-4	10
95	N48	max	1.544	8	0.026	16	0.203	9	3.648e-3	13	5.207e-3	11	7.152e-4	16
96		min	-1.398	18	-0.04	14	-0.198	11	-1.603e-3	19	-4.235e-3	17	-9.972e-4	14
97	N49	max	1.549	8	0.017	16	0.136	9	3.705e-3	13	5.265e-3	11	7.558e-4	16
98		min	-1.405	18	-0.028	14	-0.133	11	-1.644e-3	19	-4.309e-3	17	-1.154e-3	14

Envelope Node Displacements (Continued)

Node Label	X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
99 N50 max	1.553	8	0.009	16	0.068	9	3.739e-3	13	5.3e-3	11	7.785e-4	16
100 min	-1.412	18	-0.015	14	-0.066	11	-1.669e-3	19	-4.353e-3	17	-1.257e-3	14
101 N51 max	1.399	16	0.004	17	0.791	17	2.735e-3	17	4.552e-3	13	9.683e-5	17
102 min	-1.428	10	-0.071	15	-0.85	11	-5.481e-3	15	-2.508e-3	19	-8.943e-4	15
103 N52 max	1.401	16	0.003	17	0.861	17	3.62e-3	17	5.647e-3	13	8.758e-5	17
104 min	-1.426	10	-0.061	15	-0.916	11	-5.909e-3	15	-3.655e-3	19	-9.408e-4	15
105 N53 max	1.404	16	0.002	17	0.95	17	4.331e-3	17	6.525e-3	13	7.487e-5	17
106 min	-1.424	10	-0.05	15	-0.998	11	-6.252e-3	15	-4.577e-3	19	-1.005e-3	15
107 N54 max	1.406	16	0.001	17	1.054	17	4.864e-3	17	7.247e-3	9	6.1e-5	17
108 min	-1.422	10	-0.039	15	-1.091	11	-6.636e-3	11	-5.267e-3	19	-1.075e-3	15
109 N55 max	1.409	16	0.001	17	1.168	17	5.245e-3	17	7.802e-3	9	4.828e-5	17
110 min	-1.42	10	-0.027	15	-1.194	11	-6.956e-3	11	-5.76e-3	19	-1.139e-3	15
111 N56 max	1.411	16	0	17	1.289	17	5.473e-3	17	8.134e-3	9	3.9e-5	17
112 min	-1.417	10	-0.013	15	-1.302	11	-7.148e-3	11	-6.057e-3	19	-1.186e-3	15
113 N57 max	1.402	16	0.004	17	1.289	17	4.441e-3	17	9.498e-3	13	3.205e-4	17
114 min	-1.425	10	-0.056	15	-1.302	11	-8.049e-3	15	-6.294e-3	19	-5.137e-3	15
115 N58 max	1.389	16	0.007	17	1.168	17	4.212e-3	17	9.218e-3	13	3.074e-4	17
116 min	-1.435	10	-0.113	15	-1.194	11	-7.94e-3	15	-5.998e-3	19	-5.181e-3	15
117 N59 max	1.376	16	0.01	17	1.054	17	3.83e-3	17	8.749e-3	13	2.829e-4	17
118 min	-1.446	10	-0.17	15	-1.091	11	-7.757e-3	15	-5.502e-3	19	-5.267e-3	15
119 N60 max	1.362	16	0.013	17	0.95	17	3.294e-3	17	8.09e-3	13	2.445e-4	17
120 min	-1.456	10	-0.228	15	-0.998	11	-7.5e-3	15	-4.809e-3	19	-5.409e-3	15
121 N61 max	1.346	16	0.016	17	0.861	17	2.631e-3	17	7.271e-3	13	1.901e-4	17
122 min	-1.466	10	-0.288	15	-0.916	11	-7.18e-3	15	-3.948e-3	19	-5.616e-3	15
123 N62 max	1.329	16	0.018	17	0.789	17	1.835e-3	17	6.287e-3	13	3.075e-4	18
124 min	-1.475	10	-0.351	15	-0.848	11	-6.794e-3	15	-2.916e-3	19	-6.022e-3	12

Envelope AISC 15TH (360-16): ASD Member Steel Code Checks

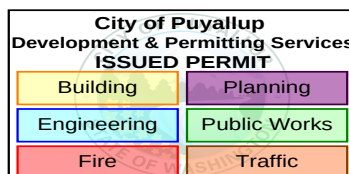
Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Pnc/om [k]	Pnt/om [k]	Mny/om [k-ft]	Mnzz/om [k-ft]	Cb	Eqn
1 M1	MC12X35	0.339	0	12	0.047	0	y	12	48.354	222.036	13.315	77.605	3	H1-1b
2 M2	MC12X35	0.376	6	12	0.15	3	y	14	177.638	222.036	13.315	77.605	1.505	H1-1b
3 M3	MC12X35	0.624	7.874	13	0.053	7.874	z	9	151.202	222.036	13.315	77.605	2.027	H1-1b
4 M4	MC12X35	0.533	0	13	0.079	2.875	y	12	177.638	222.036	13.315	77.605	1.486	H1-1b
5 M5	MC12X35	0.241	1.148	9	0.04	1.066	z	9	151.202	222.036	13.315	77.605	1.136	H1-1b
6 M6	MC12X35	0.202	8.933	13	0.036	0	y	5	48.354	222.036	13.315	62.402	1.139	H1-1b
7 M7	MC12X35	0.132	7.269	12	0.072	7.818	y	14	75.86	222.036	13.315	75.529	1.234	H1-1b
8 M8	W12X65	0.317	5.212	15	0.332	1.097	y	8	468.021	571.856	106.985	237.022	1.58	H1-1b
9 M9	HSS6X6X8	0.375	9.107	11	0.025	9.107	z	11	244.535	291.617	49.401	49.401	1.667	H1-1b
10 M10	HSS6X6X8	0.549	9.107	14	0.032	9.107	y	14	244.535	291.617	49.401	49.401	1.667	H1-1b
11 M11	W12X19	0.511	3	10	0.191	3	y	10	95.115	166.766	7.435	61.627	1.48	H1-1b
12 M12	W12X19	0.022	2.667	5	0.032	5.334	y	5	105.819	166.766	7.435	58.223	1.136	H1-1b
13 M13	W12X19	0.053	4.08	5	0.032	0	y	12	63.966	166.766	7.435	46.904	1.156	H1-1b
14 M34	Tread6.83*11	0.064	3	5	0.025	6	z	5	11.594	94.743	7.297	-54.205	1.136	H2-1
15 M35	Tread6.83*11	0.064	3	5	0.019	6	z	5	11.594	94.743	7.297	-54.205	1.136	H2-1
16 M16	Tread6.83*11	0.064	3	5	0.019	6	z	5	11.594	94.743	7.297	-54.205	1.136	H2-1
17 M17	Tread6.83*11	0.064	3	5	0.019	6	z	5	11.594	94.743	7.297	-54.205	1.136	H2-1
18 M18	Tread6.83*11	0.064	3	5	0.019	6	z	5	11.594	94.743	7.297	-54.205	1.136	H2-1
19 M19	Tread6.83*11	0.064	3	5	0.019	6	z	5	11.594	94.743	7.297	-54.205	1.136	H2-1
20 M20	Tread6.83*11	0.064	3	5	0.018	6	z	5	11.594	94.743	7.297	-54.205	1.136	H2-1
21 M21	Tread6.83*11	0.064	3	5	0.018	6	z	5	11.594	94.743	7.297	-54.205	1.136	H2-1
22 M22	Tread6.83*11	0.064	3	5	0.018	6	z	5	11.594	94.743	7.297	-54.205	1.136	H2-1
23 M23	Tread6.83*11	0.064	3	5	0.017	6	z	5	11.594	94.743	7.297	-54.205	1.136	H2-1
24 M24	Tread6.83*11	0.064	3	5	0.016	6	z	5	11.594	94.743	7.297	-54.205	1.136	H2-1
25 M25	Tread6.83*11	0.064	3	5	0.017	6	z	5	11.594	94.743	7.297	-54.205	1.136	H2-1
26 M26	Tread6.83*11	0.066	3	5	0.017	6	z	5	11.594	94.743	7.297	-54.205	1.136	H2-1
27 M27	Tread6.83*11	0.07	3	5	0.018	6	z	5	11.594	94.743	7.297	-54.205	1.136	H2-1
28 M28	Tread6.83*11	0.073	3	15	0.019	6	z	5	11.594	94.743	7.297	-54.205	1.136	H2-1
29 M29	Tread6.83*11	0.251	3	19	0.028	6	z	5	11.594	94.743	7.297	-54.205	1.136	H2-1

Envelope AISC 15TH (360-16): ASD Member Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[ft]	LcShear	CheckLoc[ft]	DirLcPnc/om [k]	Pnt/om [k]	Mnyy/om [k-ft]	Mnzz/om [k-ft]	Cb	Eqn		
30	M30	Tread6.83*11	0.065	3	5	0.027	6	z 5	11.594	94.743	7.297	-54.205	1.136	H2-1
31	M31	Tread6.83*11	0.067	3	5	0.027	6	z 5	11.594	94.743	7.297	-54.205	1.136	H2-1
32	M32	Tread6.83*11	0.065	3	5	0.026	6	z 5	11.594	94.743	7.297	-54.205	1.136	H2-1
33	M33	Tread6.83*11	0.064	3	5	0.026	6	z 5	11.594	94.743	7.297	-54.205	1.136	H2-1
34	M36	Tread6.83*11	0.064	3	5	0.025	6	z 5	11.594	94.743	7.297	-54.205	1.136	H2-1

Material Take-Off

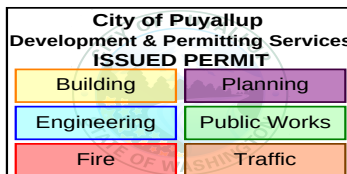
	Material	Size	Pieces	Length[ft]	Weight[K]
1	Hot Rolled Steel				
2	A36 Gr.36	MC12X35	7	73.9	2.59
3	A36 Gr.36	Tread6.83*11	21	126	1.884
4	A500 Gr.C RECT	HSS6X6X8	2	18.2	0.649
5	A992	W12X19	3	19.2	0.363
6	A992	W12X65	1	13.2	0.856
7	Total HR Steel		34	250.4	6.343
8					
9	Plate Elements	Thickness (in)		Volume (yds^3)	
10	gen Steel	0.2	8	0.1	0.806
11	Total Plates		8	0.1	0.806



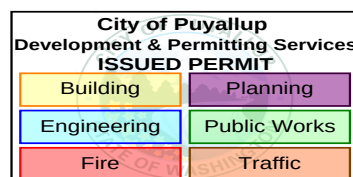
Envelope Overstrength For Post Installed Connections

Envelope Node Reactions - Overstrength or Capacity Limit

Node Label			X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N7	max	2.245	25*	4.148	23*	0.135	20*	0	27*	0	27*	0	27*
2		min	-3.826	23*	-1.155	25*	-0.02	26*	0	20*	0	20*	0	20*
3	N8	max	2.63	23*	1.868	26*	0.119	20*	0	27*	0	27*	0	27*
4		min	-2.221	25*	-3.149	20*	-0.02	26*	0	20*	0	20*	0	20*
5	N1	max	0	27*	4.48	22*	0.145	27*	0	27*	0	27*	0	27*
6		min	0	20*	-1.816	24*	-0.183	21*	0	20*	0	20*	0	20*
7	N4	max	0	27*	2.893	20*	0.143	27*	0	27*	0	27*	0	27*
8		min	0	20*	0.899	26*	-0.17	21*	0	20*	0	20*	0	20*
9	N11	max	0.874	22*	25.97	25*	6.663	23*	0	27*	0	27*	0	27*
10		min	-0.935	20*	-33.747	23*	-4.453	21*	0	20*	0	20*	0	20*
11	N12	max	5.391	26*	55.436	23*	3.85	27*	0	27*	0	27*	0	27*
12		min	-4.27	24*	-18.226	25*	-5.738	25*	0	20*	0	20*	0	20*
13	Totals:	max	6.034	26*	28.579	20*	10.276	27*						
14		min	-4.962	24*	9.142	26*	-10.364	21*						



EXTERIOR NORTH STAIR



PRCTI20221698

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

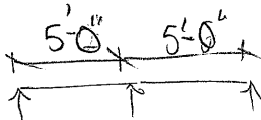
Roof Framing @ North Stair

plain metal deck
Min insulation
↳ (non-conditioned stair)

$$\begin{aligned} WDL &= 15 \text{ PSF} \\ WSL &= 25 \text{ PSF} \\ \hline &= 40 \text{ PSF} \end{aligned}$$

Deck

2 span



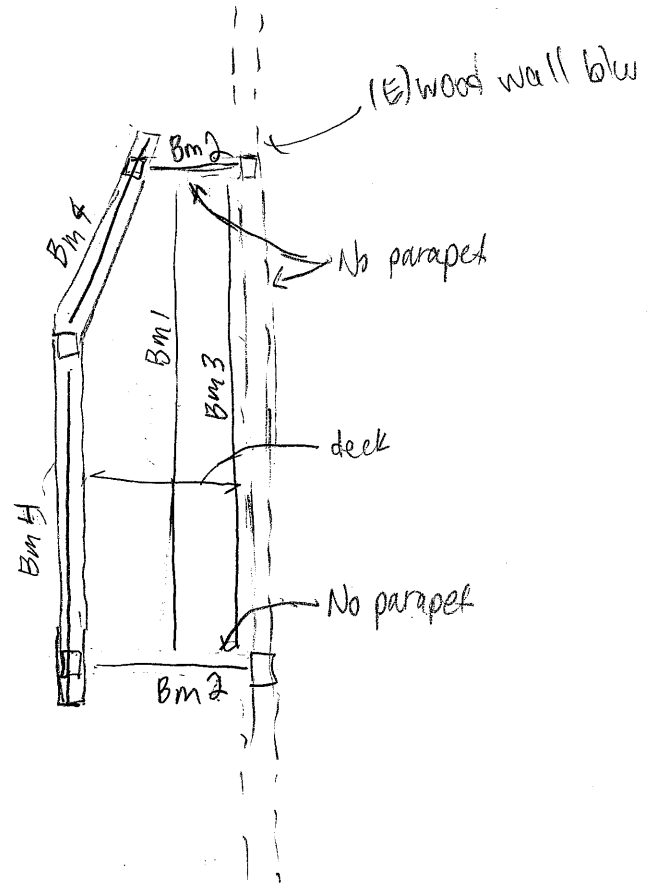
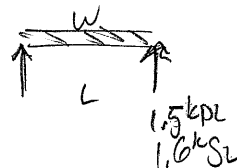
20GA TYPE "B" (double span)
Allowable load = 190 PSF ✓

Bm 1

L = 26'

$$W = 35 \text{ PSF} \times 6' = 210 \text{ \#/'}$$

+ SEE ENERCALC
W12x26



- SEE ENERCALC FOR ROOF BM CALCS
- see enercalc for roof Bm combined vert & out-of-plane load for worst case exterior bms

2nd Floor Landing
North Stair

Bm 1

L = 9'

$$W = 50 \text{ PSF} \times 9.5' / 2 = 238 \# / \text{ft}$$

$$W = 100 \text{ PSF} \times \text{ " } = 475 \# / \text{ft}$$

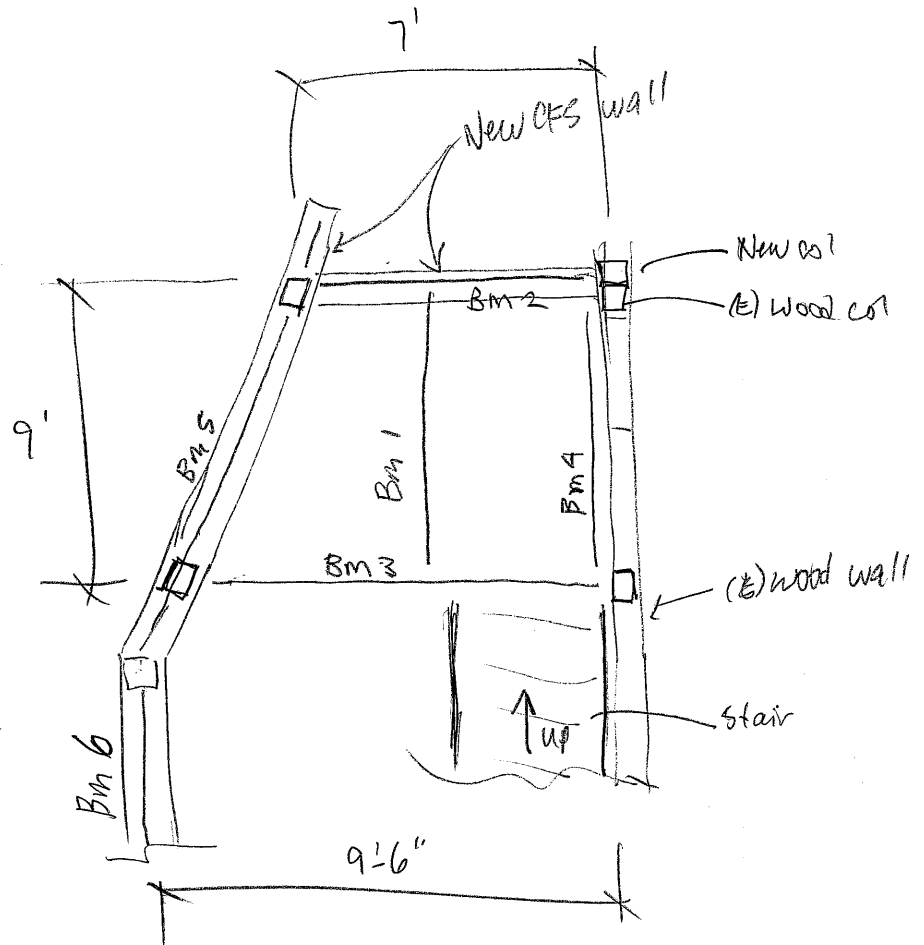
W12x16
see enercalc

Bm 2

L = 7'

$$W = 150 \times 1' = .15 \text{ k / ft}$$

W12x16
see enercalc



Bm 3

L = 9.5'

$$W = (50 + 100) \times 1'$$

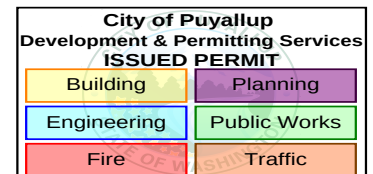
P BM1 =

$$P \text{ stinger} = 150 \text{ PSF} \times \frac{4.5'}{2} \times \frac{12'}{2} = .68 \text{ kDL}$$

$$1.35 \text{ kLL}$$

HSS 10x4x1/4 see enercalc

Use HSS for wider bry surface

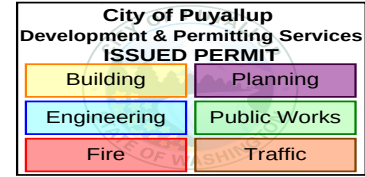


check Exterior Bm for 25 PSF C&C zone 5 wall pressure + ↓ vert load

(see enercalc for worst case bm)

$$W_{bm \text{ wind}} = 25 \text{ PSF} \times 8'$$

(LRFD)



North Exterior Stair

FND PLAN & LOWER LANDING

- Stairs & stringers are bidder designed.
- landings & walls by PCS.

STAIR LOADING

DL = 50 PSF
LL = 100 PSF

DL summary

landing TYPE B deck @ landing w/
4" total concrete = 36.6 PSF
Normal wt concr.

~ landing & stairs Steel = 8 PSF

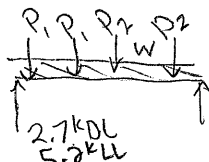
stairs steel tread w/ concr topper ≈ 40 PSF

Σ = 48 PSF @ max - Use 50 PSF DL

Lower Landing Framing

Deck Type B max span = 4'-6"
20 GA # span allowable load = 400 PSF > 7 DL+LL ✓

Bm 1
L = 10'



$$W = 150 \text{ PSF} \times \frac{4.5'}{2} = 337.5'$$

$$P_1 = 150 \times \frac{4.5'}{2} \times 3' \quad P_2 = 150 \times \frac{4.5'}{2} \times 6'$$

Bm 2

L = 4'-6"

W = minimal

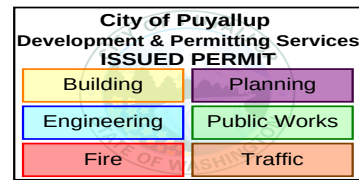
C12 x 20.7 OK by inspection

- see eneralc

C12 x 20.7 - Use HSS for wider

HSS 10 x 4 x 1/4

Project Title:
Engineer:
Project ID:
Project Descr:



Steel Beam

Lic. #: KW-06002327

File: CHC Puyallup calcs.ec6
Software copyright ENERCALC, INC. 1983-2020, Build:12.20.8.24
PCS STRUCTURAL SOLUTIONS

DESCRIPTION: Lower Landing Bm 1

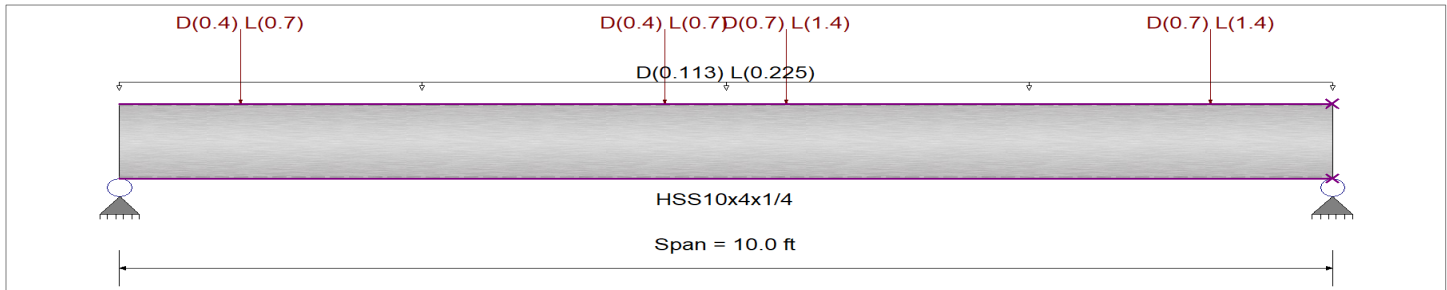
CODE REFERENCES

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

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 46.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : D = 0.1130, L = 0.2250 k/ft, Tributary Width = 1.0 ft, (landing)

Point Load : D = 0.40, L = 0.70 k @ 1.0 ft, (Stringer)

Point Load : D = 0.40, L = 0.70 k @ 4.50 ft, (Stringer)

Point Load : D = 0.70, L = 1.40 k @ 5.50 ft, (Stringer2)

Point Load : D = 0.70, L = 1.40 k @ 9.0 ft, (Stringer2)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.310 : 1	Maximum Shear Stress Ratio =	0.076 : 1
Section used for this span	HSS10x4x1/4	Section used for this span	HSS10x4x1/4
Ma : Applied	13.530 k-ft	Va : Applied	5.452 k
Mn / Omega : Allowable	43.613 k-ft	Vn/Omega : Allowable	71.632 k
Load Combination	+D+L	Load Combination	+D+L
Location of maximum on span	5.486 ft	Location of maximum on span	10.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.068 in	Ratio =	1,754 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.106 in	Ratio =	1131 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values						Summary of Shear Values			
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+L														
Dsgn. L = 10.00 ft		1	0.310	0.076	13.53		13.53	72.83	43.61	1.00	1.00	5.45	119.63	71.63

Overall Maximum Deflections

Load Combination	Span	Max. "+" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.1061	5.057		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	4.552	5.452
Overall MINimum	1.642	1.912
+D+L	4.552	5.452

PRCTI20221698

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Lic. # : KW-06002327

File: CHC Puyallup calcs.ec6
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PCS STRUCTURAL SOLUTIONS

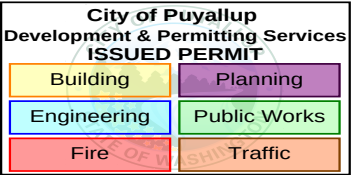
DESCRIPTION: Lower Landing Bm 1

Vertical Reactions

Support notation : Far left is #1

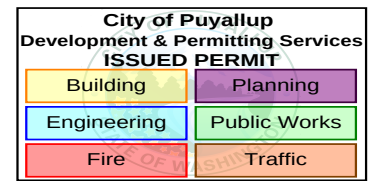
Values in KIPS

Load Combination	Support 1	Support 2
D Only	1.642	1.912
L Only	2.910	3.540



PRCTI20221698

Project Title:
Engineer:
Project ID:
Project Descr:



Steel Beam

Lic. #: KW-06002327

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DESCRIPTION: 2nd Floor Landing Bm 1

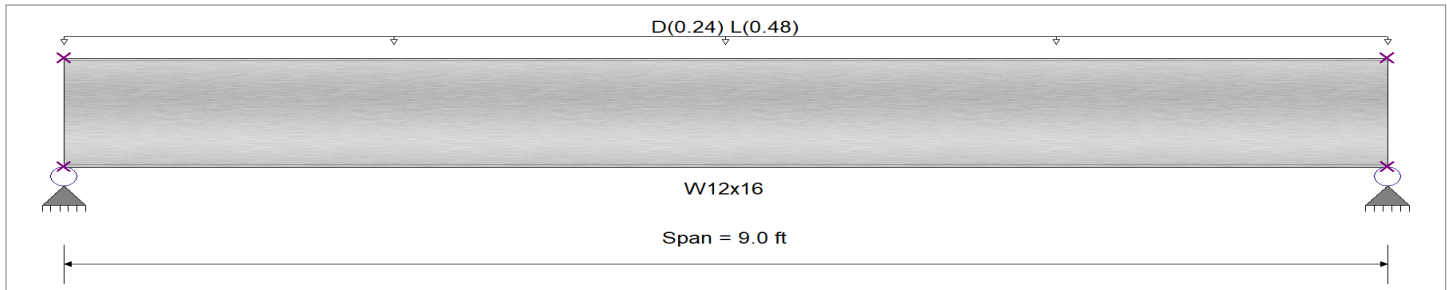
CODE REFERENCES

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

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Completely Unbraced
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : D = 0.240, L = 0.480 k/ft, Tributary Width = 1.0 ft, (landing)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.266 : 1	Maximum Shear Stress Ratio =	0.063 : 1
Section used for this span	W12x16	Section used for this span	W12x16
Ma : Applied	7.452 k-ft	Va : Applied	3.312 k
Mn / Omega : Allowable	28.003 k-ft	Vn/Omega : Allowable	52.80 k
Load Combination	+D+L	Load Combination	+D+L
Location of maximum on span	4.500 ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.024 in	Ratio =	4,531 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.037 in	Ratio =	2956 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Span #	Max Stress Ratios		Summary of Moment Values						Summary of Shear Values			
Segment Length			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
D Only														
Dsgn. L =	9.00 ft	1	0.093	0.022	2.59		2.59	46.76	28.00	1.14	1.00	1.15	79.20	52.80
+D+L														
Dsgn. L =	9.00 ft	1	0.266	0.063	7.45		7.45	46.76	28.00	1.14	1.00	3.31	79.20	52.80
+D+0.750L														
Dsgn. L =	9.00 ft	1	0.223	0.053	6.24		6.24	46.76	28.00	1.14	1.00	2.77	79.20	52.80
+0.60D														
Dsgn. L =	9.00 ft	1	0.056	0.013	1.56		1.56	46.76	28.00	1.14	1.00	0.69	79.20	52.80

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0365	4.526		0.0000	0.000

Vertical Reactions

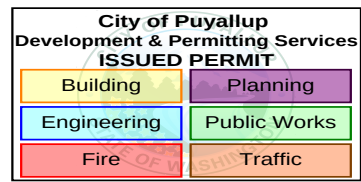
Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.312	3.312
Overall MINimum	0.691	0.691
D Only	1.152	1.152
+D+L	3.312	3.312
+D+0.750L	2.772	2.772
+0.60D	0.691	0.691
L Only	2.160	2.160

PRCTI20221698

Project Title:
 Engineer:
 Project ID:
 Project Descr:



Steel Beam

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 PCS STRUCTURAL SOLUTIONS

DESCRIPTION: 2nd Floor Landing Bm 2

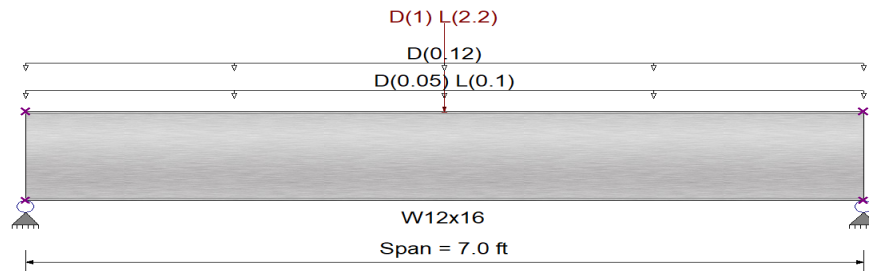
CODE REFERENCES

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

Material Properties

Analysis Method : Allowable Strength Design
 Beam Bracing : Completely Unbraced
 Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
 E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight calculated and added to loading
 Uniform Load : D = 0.050, L = 0.10 k/ft, Tributary Width = 1.0 ft, (landing)

Point Load : D = 1.0, L = 2.20 k @ 3.50 ft, (Pbm1)

Uniform Load : D = 0.0150 ksf, Tributary Width = 8.0 ft, (wall above)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.171 : 1	Maximum Shear Stress Ratio =	0.049 : 1
Section used for this span	W12x16	Section used for this span	W12x16
Ma : Applied	7.352 k-ft	Va : Applied	2.601 k
Mn / Omega : Allowable	42.926 k-ft	Vn/Omega : Allowable	52.80 k
Load Combination	+D+L	Load Combination	+D+L
Location of maximum on span	3.500 ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.011 in	Ratio =	7,670 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.018 in	Ratio =	4545 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values						Summary of Shear Values			
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+L	Dsgn. L = 7.00 ft	1	0.171	0.049	7.35		7.35	71.69	42.93	1.27	1.00	2.60	79.20	52.80

Overall Maximum Deflections

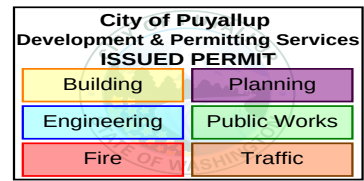
Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0185	3.520		0.0000	0.000

Vertical Reactions

Load Combination	Support 1	Support 2
Overall MAXimum	2.601	2.601
Overall MINimum	1.151	1.151
+D+L	2.601	2.601
D Only	1.151	1.151
L Only	1.450	1.450

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Project Title:
 Engineer:
 Project ID:
 Project Descr:



Steel Beam

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DESCRIPTION: 2nd Floor Landing Bm 3

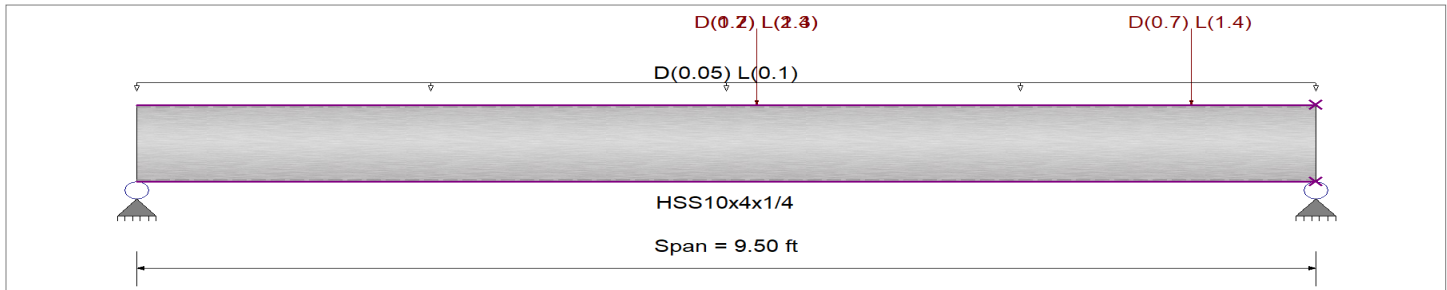
CODE REFERENCES

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

Material Properties

Analysis Method : Allowable Strength Design
 Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
 Bending Axis : Major Axis Bending

Fy : Steel Yield : 46.0 ksi
 E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight calculated and added to loading
 Uniform Load : D = 0.050, L = 0.10 k/ft, Tributary Width = 1.0 ft, (landing)

Point Load : D = 0.70, L = 1.40 k @ 5.0 ft, (Stringer)

Point Load : D = 0.70, L = 1.40 k @ 8.50 ft, (Stringer)

Point Load : D = 1.20, L = 2.30 k @ 5.0 ft, (P Bm 1)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.374 : 1	Maximum Shear Stress Ratio =	0.079 : 1
Section used for this span	HSS10x4x1/4	Section used for this span	HSS10x4x1/4
Ma : Applied	16.292 k-ft	Va : Applied	5.645 k
Mn / Omega : Allowable	43.613 k-ft	Vn/Omega : Allowable	71.632 k
Load Combination	+D+L	Load Combination	+D+L
Location of maximum on span	4.994 ft	Location of maximum on span	9.500 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.067 in	Ratio =	1,688 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.104 in	Ratio =	1097 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values						Summary of Shear Values			
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+L	Dsgn. L = 9.50 ft	1	0.374	0.079	16.29		16.29	72.83	43.61	1.00	1.00	5.65	119.63	71.63

Overall Maximum Deflections

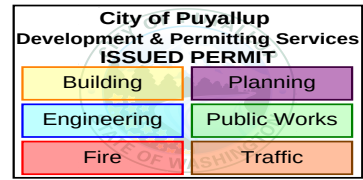
Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.1039	4.886		0.0000	0.000

Vertical Reactions

Load Combination	Support 1	Support 2
Overall MAXimum	3.693	5.645
Overall MINimum	1.318	1.970
+D+L	3.693	5.645
D Only	1.318	1.970
L Only	2.375	3.675

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Project Title:
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PCS STRUCTURAL SOLUTIONS

DESCRIPTION: 2nd Floor Landing Bm 4

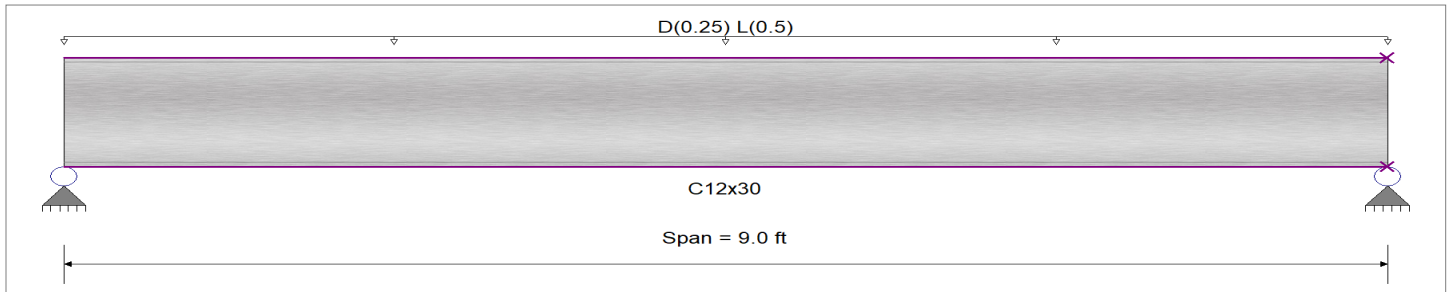
CODE REFERENCES

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

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 36.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : D = 0.050, L = 0.10 ksf, Tributary Width = 5.0 ft, (landing)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.130 : 1	Maximum Shear Stress Ratio =	0.044 : 1
Section used for this span	C12x30	Section used for this span	C12x30
Ma : Applied	7.898 k-ft	Va : Applied	3.510 k
Mn / Omega : Allowable	60.719 k-ft	Vn / Omega : Allowable	79.157 k
Load Combination	+D+L	Load Combination	+D+L
Location of maximum on span	4.500 ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.016 in	Ratio =	6,842 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.025 in	Ratio =	4386 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+L	Dsgn. L = 9.00 ft	1	0.130	0.044	7.90		7.90	101.40	60.72	1.00	1.00	3.51	132.19	79.16

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0246	4.526		0.0000	0.000

Vertical Reactions

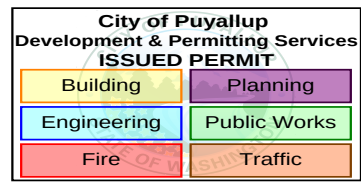
Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.510	3.510
Overall MINimum	1.260	1.260
+D+L	3.510	3.510
D Only	1.260	1.260
L Only	2.250	2.250

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 Engineer:
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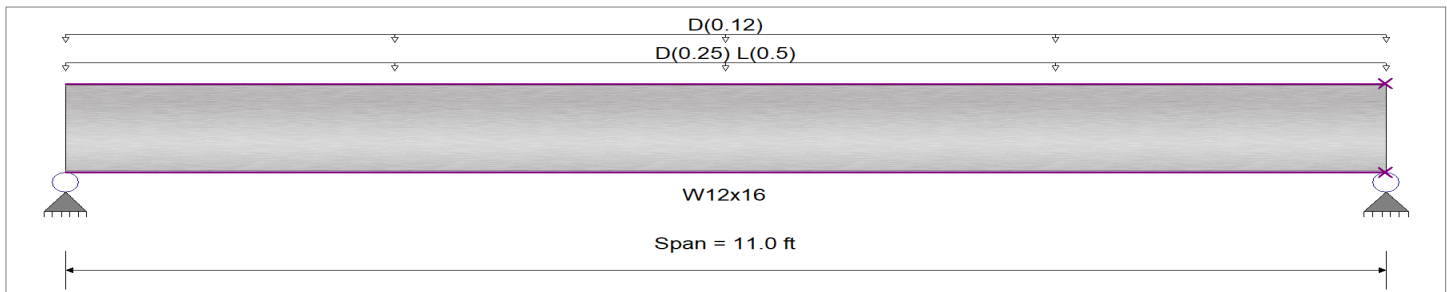
DESCRIPTION: 2nd Floor Landing Bm 5

CODE REFERENCES

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

Material Properties

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



Applied Loads

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

Beam self weight calculated and added to loading
 Uniform Load : D = 0.050, L = 0.10 ksf, Tributary Width = 5.0 ft, (landing)
 Uniform Load : D = 0.0150 ksf, Tributary Width = 8.0 ft, (Wall above)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.267 : 1	Maximum Shear Stress Ratio =	0.092 : 1
Section used for this span	W12x16	Section used for this span	W12x16
Ma : Applied	13.401 k-ft	Va : Applied	4.873 k
Mn / Omega : Allowable	50.150 k-ft	Vn/Omega : Allowable	52.80 k
Load Combination	+D+L	Load Combination	+D+L
Location of maximum on span	5.500 ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.055 in	Ratio =	2,382 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.098 in	Ratio =	1345 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values						Summary of Shear Values			
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+L	Dsgn. L = 11.00 ft	1	0.267	0.092	13.40		13.40	83.75	50.15	1.00	1.00	4.87	79.20	52.80

Overall Maximum Deflections

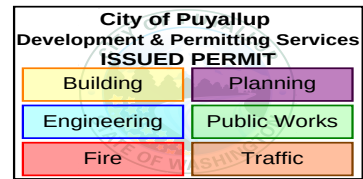
Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0982	5.531		0.0000	0.000

Vertical Reactions

Load Combination	Support 1	Support 2
Overall MAXimum	4.873	4.873
Overall MINimum	2.123	2.123
+D+L	4.873	4.873
D Only	2.123	2.123
L Only	2.750	2.750

PRCTI20221698

Project Title:
Engineer:
Project ID:
Project Descr:



Steel Beam

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DESCRIPTION: Roof Bm 1

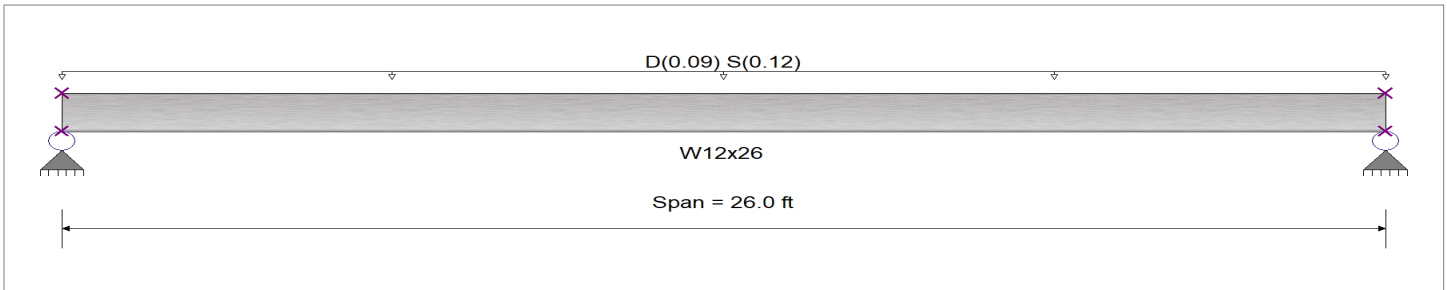
CODE REFERENCES

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

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Completely Unbraced
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E : Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : D = 0.090, S = 0.120 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.688 : 1	Maximum Shear Stress Ratio =	0.055 : 1
Section used for this span	W12x26	Section used for this span	W12x26
Ma : Applied	19.942 k-ft	Va : Applied	3.068 k
Mn / Omega : Allowable	28.989 k-ft	Vn/Omega : Allowable	56.120 k
Load Combination	+D+S	Load Combination	+D+S
Location of maximum on span	13.000 ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.209 in	Ratio =	1,489 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.412 in	Ratio =	757 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 26.00 ft	1	0.338	0.027	9.80		9.80	48.41	28.99	1.14	1.00	1.51	84.18	56.12
+D+S													
Dsgn. L = 26.00 ft	1	0.688	0.055	19.94		19.94	48.41	28.99	1.14	1.00	3.07	84.18	56.12
+D+0.750S													
Dsgn. L = 26.00 ft	1	0.600	0.048	17.41		17.41	48.41	28.99	1.14	1.00	2.68	84.18	56.12
+0.60D													
Dsgn. L = 26.00 ft	1	0.203	0.016	5.88		5.88	48.41	28.99	1.14	1.00	0.90	84.18	56.12

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.4120	13.074		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.068	3.068
Overall MINimum	0.905	0.905
D Only	1.508	1.508
+D+S	3.068	3.068
+D+0.750S	2.678	2.678
+0.60D	0.905	0.905
S Only	1.560	1.560

PRCTI20221698

Project Title:
 Engineer:
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services ISSUED PERMIT	
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DESCRIPTION: Roof Bm 2

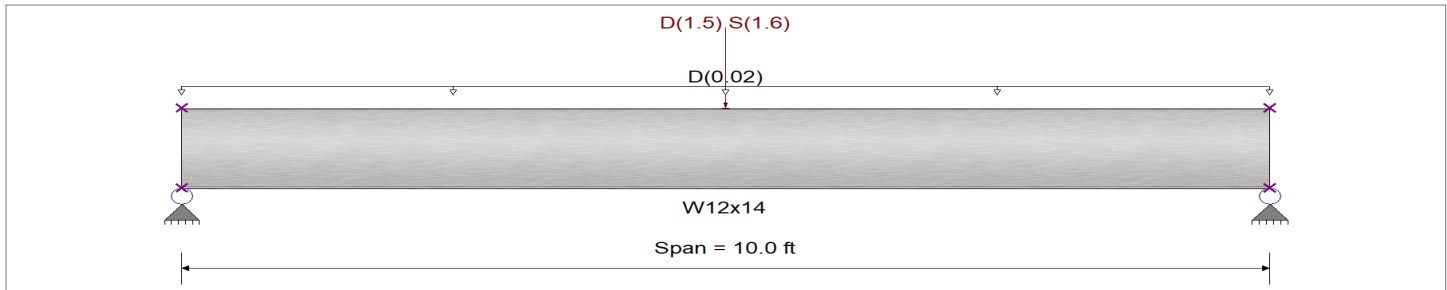
CODE REFERENCES

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

Material Properties

Analysis Method : Allowable Strength Design
 Beam Bracing : Completely Unbraced
 Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
 E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight calculated and added to loading
 Load(s) for Span Number 1
 Point Load : D = 1.50, S = 1.60 k @ 5.0 ft, (bm 1)

Uniform Load : D = 0.020 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.375 : 1	Maximum Shear Stress Ratio =	0.040 : 1
Section used for this span	W12x14	Section used for this span	W12x14
Ma : Applied	8.175 k-ft	Va : Applied	1.720 k
Mn / Omega : Allowable	21.776 k-ft	Vn/Omega : Allowable	42.754 k
Load Combination	+D+S	Load Combination	+D+S
Location of maximum on span	5.000 ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.023 in	Ratio =	5,330 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.047 in	Ratio =	2574 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values						Summary of Shear Values			
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+S	Dsgn. L = 10.00 ft	1	0.375	0.040	8.17		8.17	36.37	21.78	1.31	1.00	1.72	71.40	42.75

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0466	5.029		0.0000	0.000

Vertical Reactions

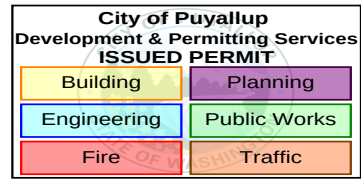
Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.720	1.720
Overall MINimum	0.800	0.800
+D+S	1.720	1.720
D Only	0.920	0.920
S Only	0.800	0.800

PRCTI20221698

Project Title:
Engineer:
Project ID:
Project Descr:



Steel Beam

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DESCRIPTION: Roof Bm 3

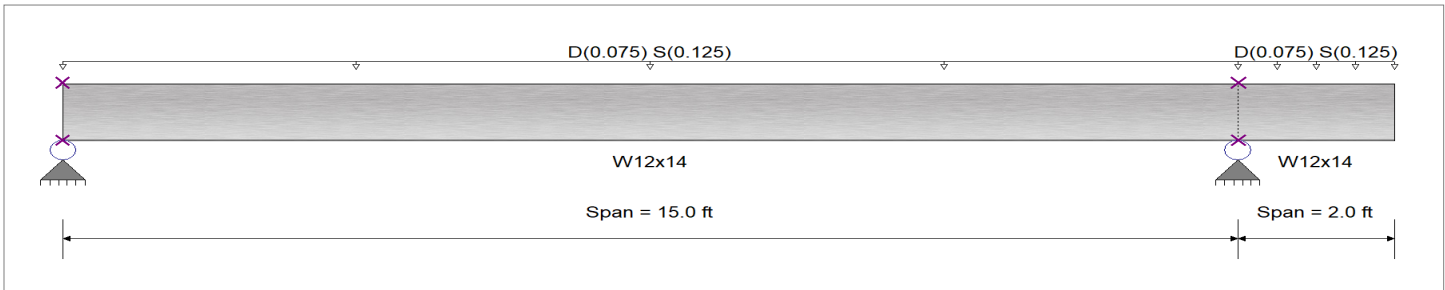
CODE REFERENCES

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

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Completely Unbraced
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight calculated and added to loading
Load for Span Number 1

Uniform Load : D = 0.0750, S = 0.1250 k/ft, Tributary Width = 1.0 ft, (roof)

Load for Span Number 2

Uniform Load : D = 0.0750, S = 0.1250 k/ft, Tributary Width = 1.0 ft, (roof)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.575 : 1	Maximum Shear Stress Ratio =	0.038 : 1
Section used for this span	W12x14	Section used for this span	W12x14
Ma : Applied	5.807 k-ft	Va : Applied	1.634 k
Mn / Omega : Allowable	10.090 k-ft	Vn/Omega : Allowable	42.754 k
Load Combination	+D+S	Load Combination	+D+S
Location of maximum on span	7.380 ft	Location of maximum on span	15.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.053 in	Ratio =	3,371 >=360
Max Upward Transient Deflection	-0.022 in	Ratio =	2,202 >=360
Max Downward Total Deflection	0.091 in	Ratio =	1969 >=240.
Max Upward Total Deflection	-0.037 in	Ratio =	1286 >=240.

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
D Only														
Dsgn. L = 15.00 ft		1	0.239	0.016	2.41	-0.18	2.41	16.85	10.09	1.15	1.00	0.68	71.40	42.75
Dsgn. L = 2.00 ft		2	0.004	0.004		-0.18	0.18	72.50	43.41	1.00	1.00	0.18	71.40	42.75
+D+S														
Dsgn. L = 15.00 ft		1	0.575	0.038	5.81	-0.43	5.81	16.85	10.09	1.15	1.00	1.63	71.40	42.75
Dsgn. L = 2.00 ft		2	0.010	0.010		-0.43	0.43	72.50	43.41	1.00	1.00	0.43	71.40	42.75

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0914	7.500		0.0000	0.000
	2	0.0000	7.500	+D+S	-0.0373	2.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	1.576	2.062	
Overall MINimum	0.656	0.857	
+D+S	1.576	2.062	
D Only	0.656	0.857	

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Project Title:
Engineer:
Project ID:
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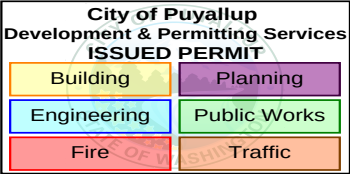
DESCRIPTION: Roof Bm 3

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
S Only	0.921	1.204	



PRCTI20221698

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Steel Beam

Lic. #: KW-06002327

File: CHC Puyallup calcs.ec6
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 PCS STRUCTURAL SOLUTIONS

DESCRIPTION: Roof Bm 3

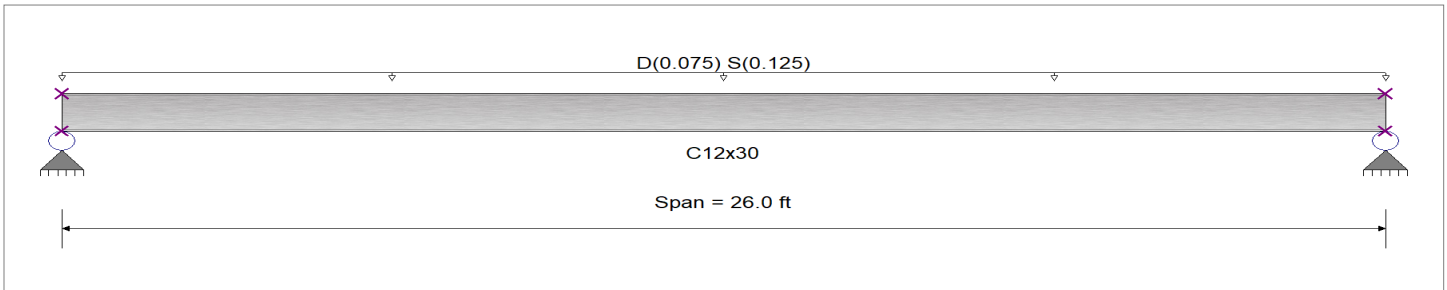
CODE REFERENCES

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

Material Properties

Analysis Method : Allowable Strength Design
 Beam Bracing : Completely Unbraced
 Bending Axis : Major Axis Bending

Fy : Steel Yield : 36.0 ksi
 E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight calculated and added to loading
 Uniform Load : D = 0.0750, S = 0.1250 k/ft, Tributary Width = 1.0 ft, (roof)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.906 : 1	Maximum Shear Stress Ratio =	0.038 : 1
Section used for this span	C12x30	Section used for this span	C12x30
Ma : Applied	19.435 k-ft	Va : Applied	2.990 k
Mn / Omega : Allowable	21.462 k-ft	Vn/Omega : Allowable	79.157 k
Load Combination	+D+S	Load Combination	+D+S
Location of maximum on span	13.000 ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.275 in	Ratio =	1,135 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.506 in	Ratio =	617 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 26.00 ft	1	0.413	0.017	8.87		8.87	35.84	21.46	1.14	1.00	1.37	132.19	79.16
+D+S													
Dsgn. L = 26.00 ft	1	0.906	0.038	19.44		19.44	35.84	21.46	1.14	1.00	2.99	132.19	79.16

Overall Maximum Deflections

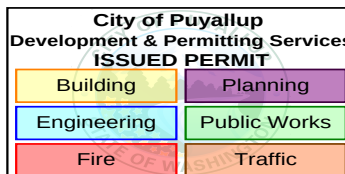
Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.5057	13.074		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.990	2.990
Overall MINimum	1.365	1.365
+D+S	2.990	2.990
D Only	1.365	1.365
S Only	1.625	1.625



PRCTI20221698

Project Title:
Engineer:
Project ID:
Project Descr:

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Steel Beam

Lic. #: KW-06002327

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PCS STRUCTURAL SOLUTIONS

DESCRIPTION: Roof Bm 4

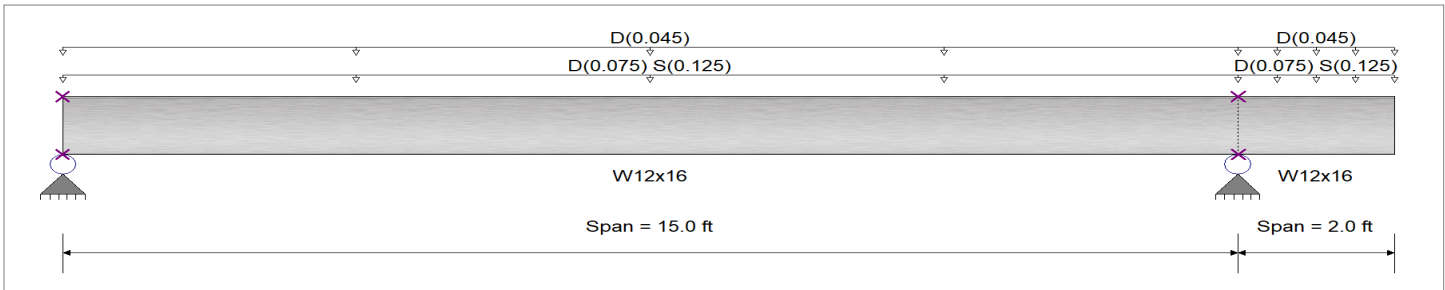
CODE REFERENCES

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

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Completely Unbraced
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight calculated and added to loading
Load for Span Number 1

Uniform Load : D = 0.0750, S = 0.1250 k/ft, Tributary Width = 1.0 ft, (roof)

Uniform Load : D = 0.0450 k/ft, Tributary Width = 1.0 ft, (PARAPET)

Load for Span Number 2

Uniform Load : D = 0.0750, S = 0.1250 k/ft, Tributary Width = 1.0 ft, (roof)

Uniform Load : D = 0.0450 k/ft, Tributary Width = 1.0 ft, (parapet)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.555 : 1	Maximum Shear Stress Ratio =	0.038 : 1
Section used for this span	W12x16	Section used for this span	W12x16
Ma : Applied	7.082 k-ft	Va : Applied	1.992 k
Mn / Omega : Allowable	12.768 k-ft	Vn/Omega : Allowable	52.80 k
Load Combination	+D+S	Load Combination	+D+S
Location of maximum on span	7.380 ft	Location of maximum on span	15.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.046 in	Ratio =	3,918 >=360
Max Upward Transient Deflection	-0.019 in	Ratio =	2,560 >=360
Max Downward Total Deflection	0.096 in	Ratio =	1877 >=240.
Max Upward Total Deflection	-0.039 in	Ratio =	1226 >=240.

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
D Only														
Dsgn. L = 15.00 ft		1	0.289	0.020	3.69	-0.27	3.69	21.32	12.77	1.15	1.00	1.04	79.20	52.80
Dsgn. L = 2.00 ft		2	0.005	0.005		-0.27	0.27	83.75	50.15	1.00	1.00	0.27	79.20	52.80
+D+S														
Dsgn. L = 15.00 ft		1	0.555	0.038	7.08	-0.52	7.08	21.32	12.77	1.15	1.00	1.99	79.20	52.80
Dsgn. L = 2.00 ft		2	0.010	0.010		-0.52	0.52	83.75	50.15	1.00	1.00	0.52	79.20	52.80

Overall Maximum Deflections

Load Combination	Span	Max. "+" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0959	7.500		0.0000	0.000
	2	0.0000	7.500	+D+S	-0.0391	2.000

PRCTI20221698

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

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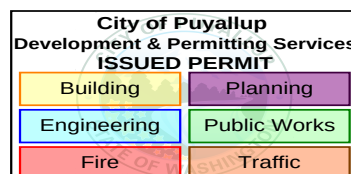
DESCRIPTION: Roof Bm 4

Vertical Reactions

Support notation : Far left is #1

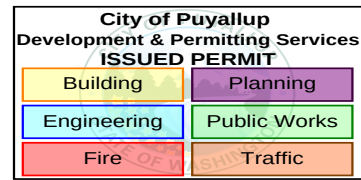
Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	1.923	2.514	
Overall MINimum	0.921	1.204	
+D+S	1.923	2.514	
D Only	1.002	1.310	
S Only	0.921	1.204	



PRCTI20221698

Project Title:
 Engineer:
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 Project Descr:



Steel Column

Lic. #: KW-06002327

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 PCS STRUCTURAL SOLUTIONS

DESCRIPTION: 2nd floor Landing bms - out of plane loading - bm 5

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
 Load Combinations Used : IBC 2018

General Information

Steel Section Name : **W12x16**
 Analysis Method : **Allowable Strength**
 Steel Stress Grade
 Fy : Steel Yield **50.0 ksi**
 E : Elastic Bending Modulus **29,000.0 ksi**

Overall Column Height **11.0 ft**
 Top & Bottom Fixity **Top & Bottom Pinned**
 Brace condition for deflection (buckling) along columns :
 X-X (width) axis :
 Unbraced Length for buckling ABOUT Y-Y Axis = 11.0 ft, K = 1.0
 Y-Y (depth) axis :
 Unbraced Length for buckling ABOUT X-X Axis = 11.0 ft, K = 1.0

Applied Loads

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

BENDING LOADS . . .

wind: Lat. Uniform Load creating My-y, W = 0.20 k/ft
 Vert load: Lat. Uniform Load creating Mx-x, D = 0.550, L = 0.50 k/ft

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.9333** : 1
 Load Combination **+D+0.750L+0.450W**
 Location of max.above base **5.537 ft**
 At maximum location values are . . .
 Pa : Axial **0.0 k**
 Pn / Omega : Allowable **24.278 k**
 Ma-x : Applied **13.990 k-ft**
 Mn-x / Omega : Allowable **20.233 k-ft**
 Ma-y : Applied **1.361 k-ft**
 Mn-y / Omega : Allowable **5.629 k-ft**

PASS Maximum Shear Stress Ratio = **0.1094** : 1
 Load Combination **+D+L**
 Location of max.above base **0.0 ft**
 At maximum location values are . . .
 Va : Applied **5.775 k**
 Vn / Omega : Allowable **52.80 k**

Maximum Load Reactions . .
 Top along X-X **1.10 k**
 Bottom along X-X **1.10 k**
 Top along Y-Y **5.775 k**
 Bottom along Y-Y **5.775 k**

Maximum Load Deflections . . .
 Along Y-Y **0.1170 in** at **5.537 ft** above base
 for load combination : **+D+L**
 Along X-X **0.8143 in** at **5.537 ft** above base
 for load combination : **W Only**

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios			Cbx	Cby	KxLx/Rx	KyLy/Ry	Maximum Shear Ratios		
	Stress Ratio	Status	Location					Stress Ratio	Status	Location
D Only	0.411	PASS	5.46 ft	1.14	1.14	28.27	170.76	0.057	PASS	0.00 ft
+D+L	0.785	PASS	5.46 ft	1.14	1.14	28.27	170.76	0.109	PASS	0.00 ft
+D+0.750L	0.691	PASS	5.54 ft	1.14	1.14	28.27	170.76	0.096	PASS	0.00 ft
+D+0.60W	0.734	PASS	5.46 ft	1.14	1.14	28.27	170.76	0.057	PASS	0.00 ft
+D+0.750L+0.450W	0.933	PASS	5.54 ft	1.14	1.14	28.27	170.76	0.096	PASS	0.00 ft
+0.60D+0.60W	0.569	PASS	5.54 ft	1.14	1.14	28.27	170.76	0.034	PASS	0.00 ft
+0.60D	0.247	PASS	5.54 ft	1.14	1.14	28.27	170.76	0.034	PASS	0.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction		X-X Axis Reaction		k	Y-Y Axis Reaction		Mx - End Moments		My - End Moments	
	@ Base		@ Base	@ Top		@ Base	@ Top	@ Base	@ Top	@ Base	@ Top
D Only						3.025	3.025				
+D+L						5.775	5.775				
+D+0.750L						5.088	5.087				
+D+0.60W			-0.660	0.660		3.025	3.025				
+D+0.750L+0.450W			-0.495	0.495		5.088	5.087				
+0.60D+0.60W			-0.660	0.660		1.815	1.815				
+0.60D						1.815	1.815				
L Only						2.750	2.750				

PRCTI20221698

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Steel Column

Lic. #: KW-06002327

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 PCS STRUCTURAL SOLUTIONS

DESCRIPTION: 2nd floor Landing bms - out of plane loading - bm 5

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction @ Base @ Top	k	Y-Y Axis Reaction @ Base @ Top	Mx - End Moments @ Base @ Top	k-ft	My - End Moments @ Base @ Top
W Only		-1.100 1.100					

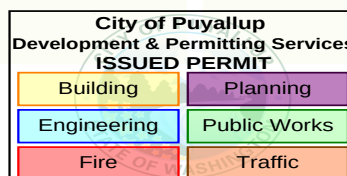
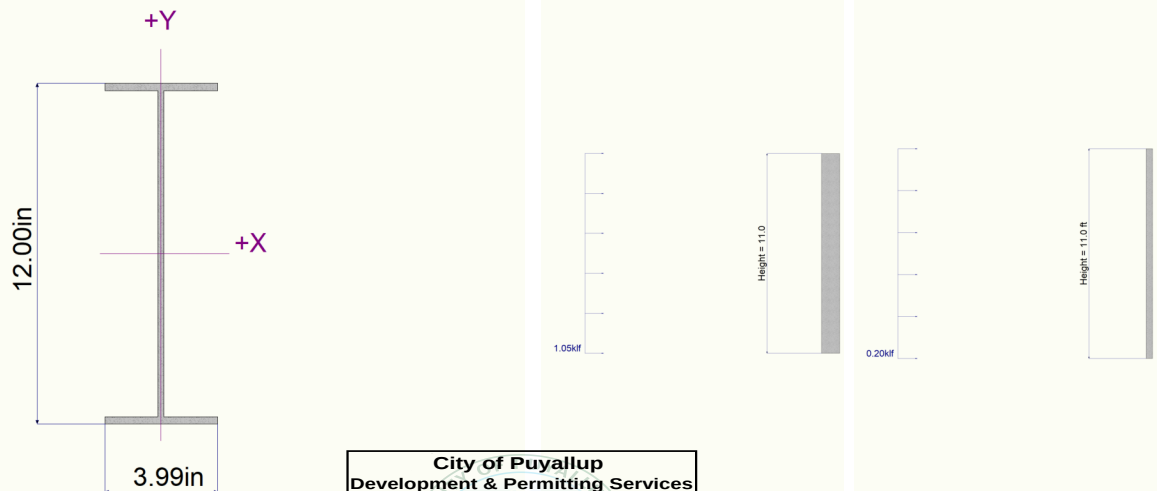
Extreme Reactions

Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction @ Base @ Top	k	Y-Y Axis Reaction @ Base @ Top	Mx - End Moments @ Base @ Top	k-ft	My - End Moments @ Base @ Top
Axial @ Base	Maximum				3.025 3.025			
"	Minimum				3.025 3.025			
Reaction, X-X Axis Base	Maximum				3.025 3.025			
"	Minimum		-1.100 1.100					
Reaction, Y-Y Axis Base	Maximum				5.775 5.775			
"	Minimum		-1.100 1.100					
Reaction, X-X Axis Top	Maximum		-1.100 1.100					
"	Minimum				3.025 3.025			
Reaction, Y-Y Axis Top	Maximum				3.025 3.025			
"	Minimum		-1.100 1.100					
Moment, X-X Axis Base	Maximum				3.025 3.025			
"	Minimum				3.025 3.025			
Moment, Y-Y Axis Base	Maximum				3.025 3.025			
"	Minimum				3.025 3.025			
Moment, X-X Axis Top	Maximum				3.025 3.025			
"	Minimum				3.025 3.025			
Moment, Y-Y Axis Top	Maximum				3.025 3.025			
"	Minimum				3.025 3.025			

Maximum Deflections for Load Combinations

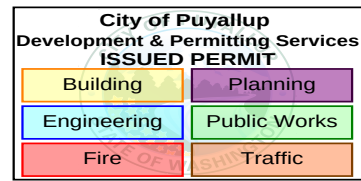
Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	0.0000 in	0.000 ft	0.061 in	5.537 ft
+D+L	0.0000 in	0.000 ft	0.117 in	5.537 ft
+D+0.750L	0.0000 in	0.000 ft	0.103 in	5.537 ft
+D+0.60W	0.4886 in	5.537 ft	0.061 in	5.537 ft
+D+0.750L+0.450W	0.3664 in	5.537 ft	0.103 in	5.537 ft
+0.60D+0.60W	0.4886 in	5.537 ft	0.037 in	5.537 ft
+0.60D	0.0000 in	0.000 ft	0.037 in	5.537 ft
L Only	0.0000 in	0.000 ft	0.056 in	5.537 ft
W Only	0.8143 in	5.537 ft	0.000 in	0.000 ft

Sketches



PRCTI20221698

Project Title:
Engineer:
Project ID:
Project Descr:



Steel Column

Lic. #: KW-06002327

File: CHC Puyallup calcs.ec6
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PCS STRUCTURAL SOLUTIONS

DESCRIPTION: 2nd floor Landing bms - out of plane loading - bm 6

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : IBC 2018

General Information

Steel Section Name :	W12x16	Overall Column Height	14.50 ft
Analysis Method :	Allowable Strength	Top & Bottom Fixity	Top & Bottom Pinned
Steel Stress Grade		Brace condition for deflection (buckling) along columns :	
Fy : Steel Yield	50.0 ksi	X-X (width) axis :	
E : Elastic Bending Modulus	29,000.0 ksi	Unbraced Length for buckling ABOUT Y-Y Axis =	14.50 ft, K = 1.0
		Y-Y (depth) axis :	
		Unbraced Length for buckling ABOUT X-X Axis =	14.50 ft, K = 1.0

Applied Loads

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

BENDING LOADS . . .

wind: Lat. Uniform Load creating My-y, W = 0.20 k/ft
Vert load: Lat. Uniform Load creating Mx-x, D = 0.140 k/ft

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =	0.8364 : 1	Maximum Load Reactions . .	
Load Combination	+D+0.60W	Top along X-X	1.450 k
Location of max.above base	7.299 ft	Bottom along X-X	1.450 k
At maximum location values are . . .		Top along Y-Y	1.015 k
Pa : Axial	0.0 k	Bottom along Y-Y	1.015 k
Pn / Omega : Allowable	13.972 k	Maximum Load Deflections . . .	
Ma-x : Applied	3.679 k-ft	Along Y-Y	0.04712 in at 7.299 ft above base
Mn-x / Omega : Allowable	13.323 k-ft	for load combination : D Only	
Ma-y : Applied	3.154 k-ft	Along X-X	2.459 in at 7.299 ft above base
Mn-y / Omega : Allowable	5.629 k-ft	for load combination : W Only	
PASS Maximum Shear Stress Ratio =	0.02057 : 1	X-X Slenderness Ratio kl/r > 200	
Load Combination	+D+0.60W		
Location of max.above base	0.0 ft		
At maximum location values are . . .			
Va : Applied	0.870 k		
Vn / Omega : Allowable	42.294 k		

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios			Cbx	Cby	KxLx/Rx	KyLy/Ry	Maximum Shear Ratios		
	Stress Ratio	Status	Location					Stress Ratio	Status	Location
D Only	0.276	PASS	7.20 ft	1.14	1.14	37.26	225.10	0.019	PASS	0.00 ft
+D+0.60W	0.836	PASS	7.30 ft	1.14	1.14	37.26	225.10	0.021	PASS	0.00 ft
+D+0.450W	0.696	PASS	7.30 ft	1.14	1.14	37.26	225.10	0.019	PASS	0.00 ft
+0.60D+0.60W	0.726	PASS	7.30 ft	1.14	1.14	37.26	225.10	0.021	PASS	0.00 ft
+0.60D	0.166	PASS	7.20 ft	1.14	1.14	37.26	225.10	0.012	PASS	0.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction		X-X Axis Reaction		k	Y-Y Axis Reaction		Mx - End Moments		My - End Moments	
	@ Base		@ Base	@ Top		@ Base	@ Top	@ Base	@ Top	@ Base	@ Top
D Only						1.015	1.015				
+D+0.60W			-0.870	0.870		1.015	1.015				
+D+0.450W			-0.653	0.652		1.015	1.015				
+0.60D+0.60W			-0.870	0.870		0.609	0.609				
+0.60D						0.609	0.609				
W Only			-1.450	1.450							

PRCTI20221698

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Steel Column

Lic. # : KW-06002327

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 PCS STRUCTURAL SOLUTIONS

DESCRIPTION: 2nd floor Landing bms - out of plane loading - bm 6

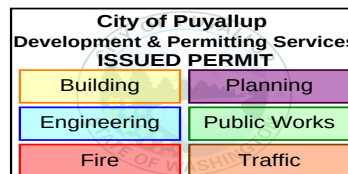
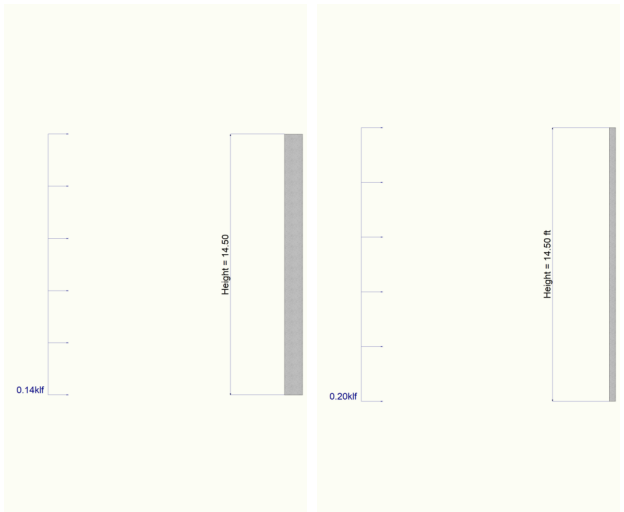
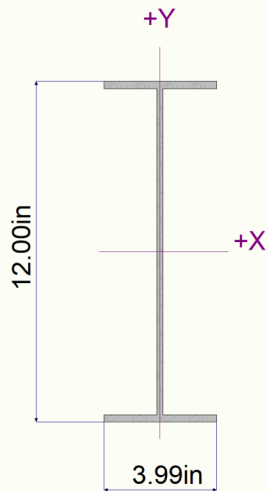
Extreme Reactions

Item	Extreme Value	Axial Reaction	X-X Axis Reaction		k	Y-Y Axis Reaction		Mx - End Moments		k-ft	My - End Moments	
		@ Base	@ Base	@ Top		@ Base	@ Top	@ Base	@ Top		@ Base	@ Top
Axial @ Base	Maximum					1.015	1.015					
"	Minimum					1.015	1.015					
Reaction, X-X Axis Base	Maximum					1.015	1.015					
"	Minimum											
Reaction, Y-Y Axis Base	Maximum		-1.450	1.450								
"	Minimum		-1.450	1.450								
Reaction, X-X Axis Top	Maximum		-1.450	1.450								
"	Minimum					1.015	1.015					
Reaction, Y-Y Axis Top	Maximum					1.015	1.015					
"	Minimum		-1.450	1.450								
Moment, X-X Axis Base	Maximum					1.015	1.015					
"	Minimum					1.015	1.015					
Moment, Y-Y Axis Base	Maximum					1.015	1.015					
"	Minimum					1.015	1.015					
Moment, X-X Axis Top	Maximum					1.015	1.015					
"	Minimum					1.015	1.015					
Moment, Y-Y Axis Top	Maximum					1.015	1.015					
"	Minimum					1.015	1.015					

Maximum Deflections for Load Combinations

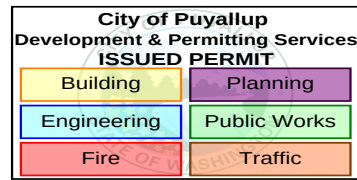
Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
D Only	0.0000	in	0.000	ft	0.047	in	7.299	ft
+D+0.60W	1.4752	in	7.299	ft	0.047	in	7.299	ft
+D+0.450W	1.1064	in	7.299	ft	0.047	in	7.299	ft
+0.60D+0.60W	1.4752	in	7.299	ft	0.028	in	7.299	ft
+0.60D	0.0000	in	0.000	ft	0.028	in	7.299	ft
W Only	2.4587	in	7.299	ft	0.000	in	0.000	ft

Sketches



PRCTI20221698

Project Title:
Engineer:
Project ID:
Project Descr:



Steel Column

Lic. #: KW-06002327

File: CHC Puyallup calcs.ec6
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PCS STRUCTURAL SOLUTIONS

DESCRIPTION: Roof bms - out of plane loading - bm 4

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : IBC 2018

General Information

Steel Section Name : **W12x16**
Analysis Method : **Allowable Strength**
Steel Stress Grade
Fy : Steel Yield **50.0 ksi**
E : Elastic Bending Modulus **29,000.0 ksi**
Overall Column Height **14.50 ft**
Top & Bottom Fixity **Top & Bottom Pinned**
Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Unbraced Length for buckling ABOUT Y-Y Axis = 14.50 ft, K = 1.0
Y-Y (depth) axis :
Unbraced Length for buckling ABOUT X-X Axis = 14.50 ft, K = 1.0

Applied Loads

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

BENDING LOADS . . .

wind: Lat. Uniform Load creating My-y, W = 0.250 k/ft
Vert load: Lat. Uniform Load creating Mx-x, D = 0.0830, S = 0.070 k/ft

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.8641** : 1
Load Combination **+D+0.60W**
Location of max.above base **7.201 ft**
At maximum location values are . . .
Pa : Axial **0.0 k**
Pn / Omega : Allowable **13.972 k**
Ma-x : Applied **2.181 k-ft**
Mn-x / Omega : Allowable **13.323 k-ft**
Ma-y : Applied **3.942 k-ft**
Mn-y / Omega : Allowable **5.629 k-ft**

Maximum Load Reactions . .
Top along X-X **1.813 k**
Bottom along X-X **1.813 k**
Top along Y-Y **1.109 k**
Bottom along Y-Y **1.109 k**

Maximum Load Deflections . . .
Along Y-Y **0.05150 in** at **7.299 ft** above base
for load combination : **+D+S**
Along X-X **3.073 in** at **7.299 ft** above base
for load combination : **W Only**

PASS Maximum Shear Stress Ratio = **0.02571** : 1
Load Combination **+D+0.60W**
Location of max.above base **0.0 ft**
At maximum location values are . . .
Va : Applied **1.088 k**
Vn / Omega : Allowable **42.294 k**

X-X Slenderness Ratio kl/r > 200

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios			Cbz	Cby	KxLx/Rx	KyLy/Ry	Maximum Shear Ratios		
	Stress Ratio	Status	Location					Stress Ratio	Status	Location
D Only	0.164	PASS	7.20 ft	1.14	1.14	37.26	225.10	0.011	PASS	0.00 ft
+D+S	0.302	PASS	7.30 ft	1.14	1.14	37.26	225.10	0.021	PASS	0.00 ft
+D+0.750S	0.267	PASS	7.30 ft	1.14	1.14	37.26	225.10	0.019	PASS	0.00 ft
+D+0.60W	0.864	PASS	7.20 ft	1.14	1.14	37.26	225.10	0.026	PASS	0.00 ft
+D+0.450W	0.689	PASS	7.20 ft	1.14	1.14	37.26	225.10	0.019	PASS	0.00 ft
+D+0.750S+0.450W	0.793	PASS	7.30 ft	1.14	1.14	37.26	225.10	0.019	PASS	0.00 ft
+0.60D+0.60W	0.799	PASS	7.20 ft	1.14	1.14	37.26	225.10	0.026	PASS	0.00 ft
+0.60D	0.098	PASS	7.20 ft	1.14	1.14	37.26	225.10	0.007	PASS	0.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction	X-X Axis Reaction		k	Y-Y Axis Reaction		Mx - End Moments		k-ft	My - End Moments	
	@ Base	@ Base	@ Top		@ Base	@ Top	@ Base	@ Top		@ Base	@ Top
D Only					0.602	0.602					
+D+S					1.109	1.109					
+D+0.750S					0.982	0.982					
+D+0.60W			-1.088	1.088	0.602	0.602					
+D+0.450W			-0.816	0.816	0.602	0.602					
+D+0.750S+0.450W			-0.816	0.816	0.982	0.982					
+0.60D+0.60W			-1.088	1.088	0.361	0.361					

PRCTI20221698

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Steel Column

Lic. # : KW-06002327

File: CHC Puyallup calcs.ec6
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 PCS STRUCTURAL SOLUTIONS

DESCRIPTION: Roof bms - out of plane loading - bm 4

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction @ Base @ Top	k	Y-Y Axis Reaction @ Base @ Top	Mx - End Moments @ Base @ Top	k-ft	My - End Moments @ Base @ Top
+0.60D				0.361 0.361			
S Only				0.508 0.507			
W Only		-1.813 1.813					

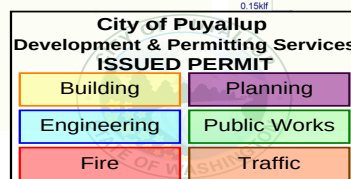
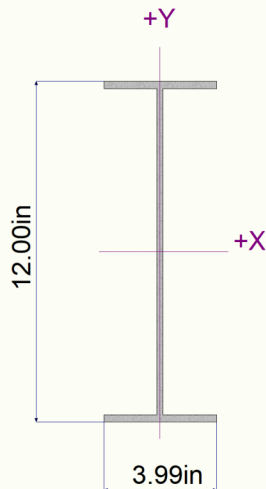
Extreme Reactions

Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction @ Base @ Top	k	Y-Y Axis Reaction @ Base @ Top	Mx - End Moments @ Base @ Top	k-ft	My - End Moments @ Base @ Top
Axial @ Base	Maximum				0.602 0.602			
"	Minimum				0.602 0.602			
Reaction, X-X Axis Base	Maximum				0.602 0.602			
"	Minimum		-1.813 1.813					
Reaction, Y-Y Axis Base	Maximum				1.109 1.109			
"	Minimum		-1.813 1.813					
Reaction, X-X Axis Top	Maximum		-1.813 1.813					
"	Minimum				0.602 0.602			
Reaction, Y-Y Axis Top	Maximum				0.602 0.602			
"	Minimum		-1.813 1.813					
Moment, X-X Axis Base	Maximum				0.602 0.602			
"	Minimum				0.602 0.602			
Moment, Y-Y Axis Base	Maximum				0.602 0.602			
"	Minimum				0.602 0.602			
Moment, X-X Axis Top	Maximum				0.602 0.602			
"	Minimum				0.602 0.602			
Moment, Y-Y Axis Top	Maximum				0.602 0.602			
"	Minimum				0.602 0.602			

Maximum Deflections for Load Combinations

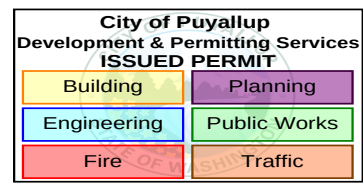
Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	0.0000 in	0.000 ft	0.028 in	7.299 ft
+D+S	0.0000 in	0.000 ft	0.051 in	7.299 ft
+D+0.750S	0.0000 in	0.000 ft	0.046 in	7.299 ft
+D+0.60W	1.8440 in	7.299 ft	0.028 in	7.299 ft
+D+0.450W	1.3830 in	7.299 ft	0.028 in	7.299 ft
+D+0.750S+0.450W	1.3830 in	7.299 ft	0.046 in	7.299 ft
+0.60D+0.60W	1.8440 in	7.299 ft	0.017 in	7.299 ft
+0.60D	0.0000 in	0.000 ft	0.017 in	7.299 ft
S Only	0.0000 in	0.000 ft	0.024 in	7.299 ft
W Only	3.0733 in	7.299 ft	0.000 in	0.000 ft

Sketches



PRCTI20221698

Project Title:
Engineer:
Project ID:
Project Descr:



Steel Column

Lic. # : KW-06002327

File: CHC Puyallup calcs.ec6
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PCS STRUCTURAL SOLUTIONS

DESCRIPTION: Roof bms - out of plane loading - bm 2

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : IBC 2018

General Information

Steel Section Name :	W12x16	Overall Column Height	10 ft
Analysis Method :	Allowable Strength	Top & Bottom Fixity	Top & Bottom Pinned
Steel Stress Grade		Brace condition for deflection (buckling) along columns :	
Fy : Steel Yield	50.0 ksi	X-X (width) axis :	
E : Elastic Bending Modulus	29,000.0 ksi	Unbraced Length for buckling ABOUT Y-Y Axis = 10 ft, K = 1.0	
		Y-Y (depth) axis :	
		Unbraced Length for buckling ABOUT X-X Axis = 10 ft, K = 1.0	

Applied Loads

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

BENDING LOADS . . .

wind: Lat. Uniform Load creating My-y, W = 0.250 k/ft
Vert load: Lat. Uniform Load creating Mx-x, D = 0.240, S = 0.3250 k/ft

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =	0.5063 : 1	Maximum Load Reactions . .	
Load Combination	+D+0.750S+0.450W	Top along X-X	1.250 k
Location of max.above base	4.966 ft	Bottom along X-X	1.250 k
At maximum location values are . . .		Top along Y-Y	2.825 k
Pa : Axial	0.0 k	Bottom along Y-Y	2.825 k
Pn / Omega : Allowable	29.376 k	Maximum Load Deflections . . .	
Ma-x : Applied	6.047 k-ft	Along Y-Y	0.04302 in at 5.034 ft above base
Mn-x / Omega : Allowable	23.574 k-ft	for load combination : +D+S	
Ma-y : Applied	1.406 k-ft	Along X-X	0.6952 in at 5.034 ft above base
Mn-y / Omega : Allowable	5.629 k-ft	for load combination : W Only	
PASS Maximum Shear Stress Ratio =	0.05350 : 1		
Load Combination	+D+S		
Location of max.above base	0.0 ft		
At maximum location values are . . .			
Va : Applied	2.825 k		
Vn / Omega : Allowable	52.80 k		

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios			Cbz	Cby	KxLx/Rx	KyLy/Ry	Maximum Shear Ratios		
	Stress Ratio	Status	Location					Stress Ratio	Status	Location
D Only	0.127	PASS	5.03 ft	1.14	1.14	25.70	155.24	0.023	PASS	10.00 ft
+D+S	0.300	PASS	4.97 ft	1.14	1.14	25.70	155.24	0.054	PASS	0.00 ft
+D+0.750S	0.256	PASS	4.97 ft	1.14	1.14	25.70	155.24	0.046	PASS	0.00 ft
+D+0.60W	0.460	PASS	4.97 ft	1.14	1.14	25.70	155.24	0.023	PASS	10.00 ft
+D+0.450W	0.377	PASS	5.03 ft	1.14	1.14	25.70	155.24	0.023	PASS	10.00 ft
+D+0.750S+0.450W	0.506	PASS	4.97 ft	1.14	1.14	25.70	155.24	0.046	PASS	0.00 ft
+0.60D+0.60W	0.409	PASS	4.97 ft	1.14	1.14	25.70	155.24	0.018	PASS	0.00 ft
+0.60D	0.076	PASS	4.97 ft	1.14	1.14	25.70	155.24	0.014	PASS	10.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction	X-X Axis Reaction		k	Y-Y Axis Reaction		Mx - End Moments		k-ft	My - End Moments	
	@ Base	@ Base	@ Top		@ Base	@ Top	@ Base	@ Top		@ Base	@ Top
D Only					1.200	1.200					
+D+S					2.825	2.825					
+D+0.750S					2.419	2.419					
+D+0.60W		-0.750	0.750		1.200	1.200					
+D+0.450W		-0.563	0.563		1.200	1.200					
+D+0.750S+0.450W		-0.563	0.563		2.419	2.419					
+0.60D+0.60W		-0.750	0.750		0.720	0.720					

PRCTI20221698

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Steel Column

File: CHC Puyallup calcs.ec6
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 PCS STRUCTURAL SOLUTIONS

Lic. #: KW-06002327

DESCRIPTION: Roof bms - out of plane loading - bm 2

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction @ Base @ Top	k	Y-Y Axis Reaction @ Base @ Top	Mx - End Moments @ Base @ Top	k-ft	My - End Moments @ Base @ Top
+0.60D				0.720 0.720			
S Only				1.625 1.625			
W Only		-1.250 1.250					

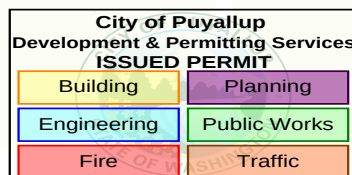
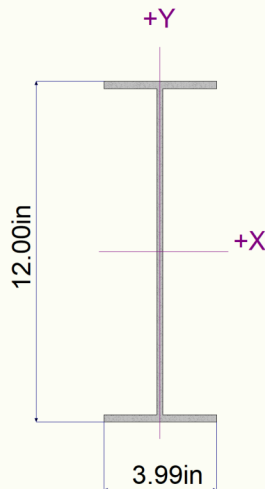
Extreme Reactions

Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction @ Base @ Top	k	Y-Y Axis Reaction @ Base @ Top	Mx - End Moments @ Base @ Top	k-ft	My - End Moments @ Base @ Top
Axial @ Base	Maximum				1.200 1.200			
"	Minimum				1.200 1.200			
Reaction, X-X Axis Base	Maximum				1.200 1.200			
"	Minimum		-1.250 1.250					
Reaction, Y-Y Axis Base	Maximum				2.825 2.825			
"	Minimum		-1.250 1.250					
Reaction, X-X Axis Top	Maximum		-1.250 1.250					
"	Minimum				1.200 1.200			
Reaction, Y-Y Axis Top	Maximum				1.200 1.200			
"	Minimum		-1.250 1.250					
Moment, X-X Axis Base	Maximum				1.200 1.200			
"	Minimum				1.200 1.200			
Moment, Y-Y Axis Base	Maximum				1.200 1.200			
"	Minimum				1.200 1.200			
Moment, X-X Axis Top	Maximum				1.200 1.200			
"	Minimum				1.200 1.200			
Moment, Y-Y Axis Top	Maximum				1.200 1.200			
"	Minimum				1.200 1.200			

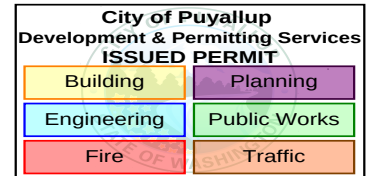
Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	0.0000 in	0.000 ft	0.018 in	5.034 ft
+D+S	0.0000 in	0.000 ft	0.043 in	5.034 ft
+D+0.750S	0.0000 in	0.000 ft	0.037 in	5.034 ft
+D+0.60W	0.4171 in	5.034 ft	0.018 in	5.034 ft
+D+0.450W	0.3129 in	5.034 ft	0.018 in	5.034 ft
+D+0.750S+0.450W	0.3129 in	5.034 ft	0.037 in	5.034 ft
+0.60D+0.60W	0.4171 in	5.034 ft	0.011 in	5.034 ft
+0.60D	0.0000 in	0.000 ft	0.011 in	5.034 ft
S Only	0.0000 in	0.000 ft	0.025 in	5.034 ft
W Only	0.6952 in	5.034 ft	0.000 in	0.000 ft

Sketches

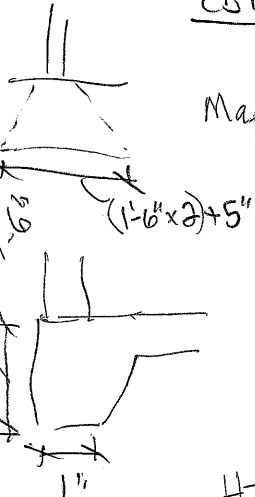


PRCTI20221698



Exterior North Stair - End

col 1

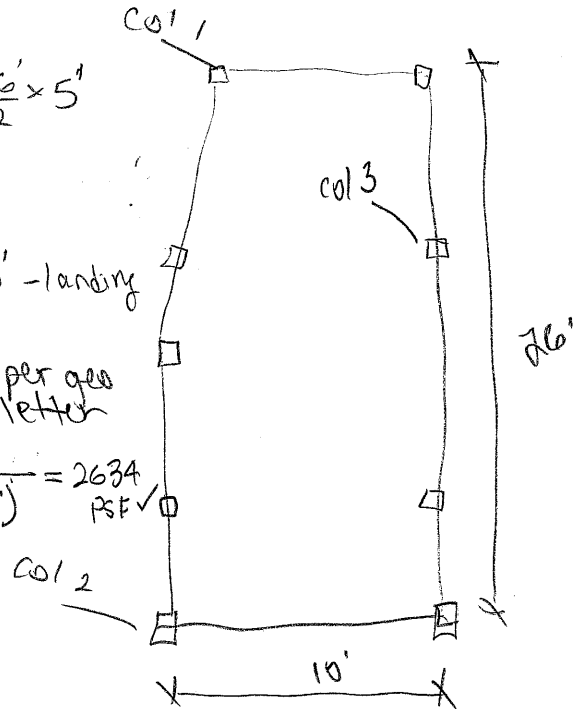


$$\begin{aligned} \text{Max load} &= (15 \text{ PSF DL} + 25 \text{ PSF SL}) \times \frac{26'}{2} \times 5' \\ &= 2.6^k \text{ ROOF} \\ &+ 15 \text{ PSF DL WALLS} \times 18' \times 10' \\ &+ (50 \text{ PSF DL} + 100 \text{ PSF LL}) \times 5' \times 5' \text{ - landing} \\ &= 19^k \end{aligned}$$

HT = ~~10.5'~~ max
19'

HSS 5x5x5/16 OK Pallow = 55^k ✓
AISC Table 4-3

q allow = 3,000 PSF per geo
2022 letter
Fnd = $\frac{9^k}{1' \times (1.5' \times 2 + 5')} = 2634 \text{ PSF} \checkmark$



col 2

$$\begin{aligned} \text{Max load} &= (15 \text{ PSF DL} + 25 \text{ PSF SL}) \times \frac{26'}{2} \times 5' \\ &+ 15 \text{ PSF DL WALLS} \times 18' \times 10' \\ &+ (50 \text{ PSF DL} + 100 \text{ PSF LL}) \times \frac{5'}{2} \times 5' \end{aligned}$$

HT = 19'

= 7^k Fnd = $\frac{7^k}{1' \times (1.5' \times 2 + 5')} = 2059 \text{ PSF} < 3000 \checkmark$

HSS 12x6x3/8 OK AISC Pallow = 185^k ✓
Table 4-3

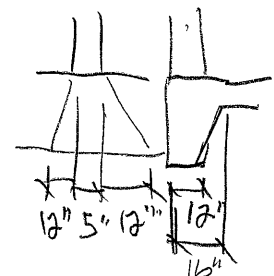
col 3

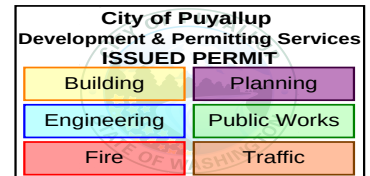
$$\begin{aligned} \text{Max load} &= (50 \text{ PSF} + 100 \text{ LL}) \times 5' \times 5' \text{ landing} \\ &+ (50 + 100) \times 5' \times 6' \text{ - stair} \\ &= 8.3^k \text{ HSS } 5 \times 5 \times 5/16 \text{ OK AISC Table 4-3} \end{aligned}$$

HT = 10.5' max

FND = (E)Fnd assume 1' deep x 1' wide

$q = \frac{8.3^k}{(1.33' \times 2.4')} = 2600 \text{ PSF} < 3000 \checkmark$





North Stair Lat

Non-bearing CFS studs w 2SPSF lat : 600S162-43 @ 16" O.C. OK

$$WT \text{ roof} = 10 \text{ PSF} \times 252 \text{ SF} = 2520^{\#}$$

$$WT \text{ walls} = 10 \text{ PSF} \times 45' \text{ perimeter} \times 6' \text{ to roof} = 2,700^{\#} / \times 8' \text{ to flr} = 3,600^{\#}$$

$$WT \text{ 2nd floor landing} = 50 \text{ PSF} \times 70 \text{ SF} = 3,500^{\#}$$

$$WT \text{ mid landing} = 50 \text{ PSF} \times 41 \text{ SF} = 2,050^{\#}$$

$$WT \text{ stairs to 2nd floor} = 50 \text{ PSF} \times 5' \times 5' = 1,250^{\#} \text{ to mid level} = 2,500^{\#}$$

$$WT \text{ to roof} = 2,520^{\#} + 2,700^{\#} = 5,220^{\#}$$

$$WT \text{ to 2nd flr} = 3,600^{\#} + 3,500^{\#} = 7,100^{\#}$$

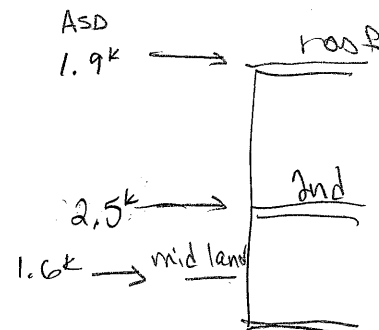
$$WT \text{ to mid landing} = 2,050^{\#} + 2,500^{\#} = 4,550^{\#}$$

Light framed CFS sheboard sw's
 $R = 2$

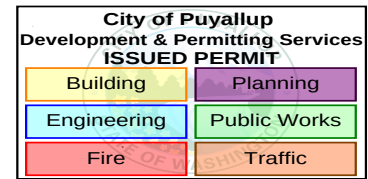
$$S_{PS} = 1.018$$

$$C_s = \frac{1.018}{(2/1)} = .51$$

$$V = WT \times .51 \times .7$$



- HSS col's are tied directly into (E) bldg walls & roof/floor diaph's
- 2nd Floor landing edge channel tied into (E) wood wall w/ bldg
- Exterior walls are CFS w/ sheboard sheathing for stability
- All beams taking vert loading (@ roof, @ landings) are connected to HSS col's within the (E) wood stud walls
- Intent is to conn. HSS cols to (E) structure's diaph's & also brace stair for lat load w/ sheboard SW's around perimeter. Double duty to take out stair's lat.



CONT.

@ Roof

$$V_{\text{roof}} = \frac{1900^{\#}}{10'} = 190^{\#}/'$$

1 1/2" 20 GA deck w/ VSG @ 18" O.C., OK
Double span
Riddle welds @ 12" O.C.
 $V_{\text{allow}} = 919^{\#}/'$

say 1/2 shear @ EA level to HSS col in bldg & half to sureboard

$$V_{\text{roof}} = \frac{1900^{\#}}{2} = 950^{\#}$$

To cols - 950[#] / 2 cols in 1E wall = 475[#] per col

(detail 6/S8.02)

$$\text{To SW} - 475^{\#} \quad l_{\text{wall}} = 6' - V = \frac{475^{\#}}{6'} = 80^{\#}/' < V_{\text{allow}} \quad (ASD)$$

200W series sureboard w/ 43 Gage CFS & #10 @ 6" O.C. $V_{\text{allow}} = 562^{\#}/'$
@ 4" = 770[#]/
@ 3" = 1126[#]/
< 562[#]/
all OK

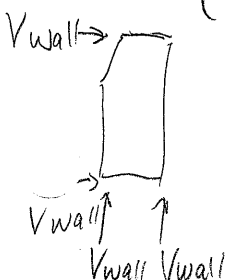
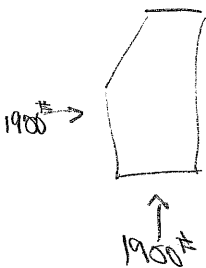
@ Floor

$$\text{2nd Floor } V = 1900 + 2500^{\#} + \frac{1600^{\#}}{2} = 5200^{\#}$$

$$V_{\text{wall}} = \frac{5200^{\#}}{2} \times \frac{1}{2} = 1300^{\#} \quad l_{\text{wall min}} = 2.5' \quad V_{\text{wall max}} = \frac{1300^{\#}}{2.5'} = 520^{\#}/'$$

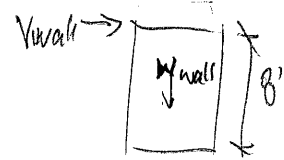
To cols - $\frac{5200^{\#}}{2} \times \frac{1}{3 \text{ cols}} = 867^{\#}$ - Details 7, 8, 9, 10

< 562[#]/
all OK



CONT.

Long Sillboard SW's have no overturning
check SW's @ North & South @ ground



@ North ground Floor - worst case

$$L_{wall} = 2.5' \quad V_{wall} = \frac{4400 \#}{2} \times \frac{1}{2} = 1100 \#$$

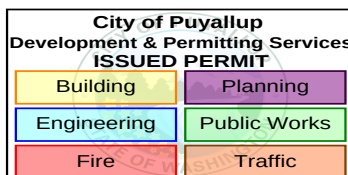
to SW 1/2 diaph

.7EQ-.6D

$$M_{ot} - M_R = 8,575 \#'$$

$$Uplift = \frac{8,575 \#'}{2.5'} = 3.4 \# - \text{S/H DU w/ (2) 43mil studs (6) \#14}$$

$$5/8" \phi \text{ rod } T_{allow} = 3.8 \# \checkmark$$



SURE-BOARD®

Series 200W For Shear

IAPMO ES ER-0126

LARR #25461 / DSA IR A-5

**SURE-BOARD®**

Series 200W For Shear

IAPMO ES ER-0126

LARR #25461

DSA IR A-5



TABLE 4 - NOMINAL AND ALLOWABLE SHEAR RESISTANCE TO WIND OR EARTHQUAKE FORCES AND DISPLACEMENT (inches) FOR SHEAR WALLS WITH SURE-BOARD® SERIES 200W STRUCTURAL PANELS ATTACHED TO DF STUDS AT 16" O.C. WITH 10D NAILS¹

FRAMING	10d (2.25"min X .148) NAIL SPACING AT PANEL EDGES AND FIELD, INCHES ON CENTER²											
Stud: 2 x 4 stud grade DF End post: 4 x 4 No. 1 grade DF *4 x 6 No. 1 grade DF Sill and top plate: 2 x 4 standard grade DF	4/6			3/6			2/6			2/6 Two Sided*		
	Vn 2,345.6 (plf)	Vasd 2,357 (plf)	ΔVasd 9 (inch)	Vn 2,345.6 (plf)	Vasd 2,357 (plf)	ΔVasd 9 (inch)	Vn 2,345.6 (plf)	Vasd 2,357 (plf)	ΔVasd 9 (inch)	Vn 2,345.6 (plf)	Vasd 2,357 (plf)	ΔVasd 9 (inch)
	1,453	583	0.18	—	—	—	2,357	950	0.23	4,884	1,827	0.24

For S1: 1 inch = 25.4 mm, 1 plf = 0.0146 N/mm.

¹ These values are for short term loads due to wind or earthquake

² The nails are described in Section 3.2.5 and are installed in accordance with Section 4.2.3.2 in IAPMO ES ER-0126.

³ All panel edges must be blocked. Panels are installed vertically or horizontally.

Fasteners must be spaced a minimum of 6 inches on center along field framing members.

⁴ For load and resistance factor design (LRFD) loads, the tabulated Vn load values must be multiplied by the resistance factor Φ = 0.55 for Seismic / 0.60 for Wind.

⁵ Tabulated values are for panels applied to one side and two sides of a wall.

⁶ Vn = Nominal Strength.

⁷ Vasd = ASD Design Load.

⁸ Δ Vasd = Deflection at Vasd design Load.

SURE-BOARD®

Series 200 For Shear

IAPMO ES ER-0126 / ICBO ES ER-5762

LARR #25461 / DSA IR A-5



TABLE 1/1A - NOMINAL AND ALLOWABLE SHEAR RESISTANCE TO WIND OR EARTHQUAKE FORCES AND DISPLACEMENT (inches) FOR SHEAR WALLS WITH SURE-BOARD® SERIES 200 STRUCTURAL PANELS ATTACHED TO LIGHT GAGE STEEL C-STUDS AT 24" O.C. WITH SCREWS (pounds per foot)¹

FRAMING	FASTENER SPACING AT PANEL EDGES, INCHES ON CENTER²											
Minimum Gage⁵	6			4			3			2		
	Vn 2,347 (plf)	Vasd 2,38 (plf)	ΔVasd 9 (inch)	Vn 2,347 (plf)	Vasd 2,38 (plf)	ΔVasd 9 (inch)	Vn 2,347 (plf)	Vasd 2,38 (plf)	ΔVasd 9 (inch)	Vn 2,347 (plf)	Vasd 2,38 (plf)	ΔVasd 9 (inch)
20 (0.033 in)	1,085	434	0.21	1,545	618	0.21	1,730	692	0.24	1,915	766	0.26
	1,543¹⁰	617	0.17	2,211¹⁰	885	0.22	2,486¹⁰	977	0.22	2,537¹⁰	906	0.16
18 (0.043 in)	1,405¹⁰	562	0.24	1,925¹⁰	770	0.23	2,821¹⁰	1,126	0.25	2,989¹⁰	1,196	0.21
16 (0.054 in)	1,697	678	0.25	2,306	922	0.25	2,957¹⁰	1,092	0.26	3,647¹⁰	1,253	0.28
16 (0.054 in) 2-Sided	—	—	—	—	—	—	—	—	—	5,011¹⁰	1,710	0.28
14-Ga. (0.071 in)										3,292	1,257	0.24
14-Ga. (0.071 in) 2-Sided *Fasteners 6" O.C. into intermediate framing										4,635*	1,700*	0.22*
14-Ga. (0.071 in) 2-Sided – 16" O.C. Stud Framing										5,079	1,897	0.26

For S1: 1 inch = 25.4 mm, 1 lb/linear = 0.0146 N/mm.

¹ These values are for short-term loads due to wind or earthquake.

² The screws are described in Section 3.2.1 and are installed in accordance with Section 4.2.2.2 of IAPMO ES ER-0126.

³ Tabulated values are for panels applied to one side or two sides of a wall.

⁴ For load and resistance factor design (LRFD) loads, the tabulated Vn load values must be multiplied by the resistance factor Φ = 0.55 for Seismic / 0.60 for Wind.

⁵ Section 3.3.1 in IAPMO ES ER-0126, describes minimum base metal thickness associated with gages.

Note: Sure-Board® Series 200 may be installed on Wood Framing. Refer to IAPMO ES ER-0126 Evaluation Report, Table 5 on page 9 in report, for requirements of use.

⁶ All panel edges must be blocked. Panels can be installed vertically or horizontally. Fasteners must be spaced a maximum of 12 inches on center along intermediate framing members, except as noted with (*) in Table 1 above.

⁷ Vn = Nominal Strength.

⁸ Vasd = ASD Design Load.

⁹ Δ Vasd = Deflection at Vasd design Load.

¹⁰ Nominal strength is based on double C-stud collector to be designed using one gage thicker than the framing material used in shear wall

Sure-Board® Series 200 & 200W Information Table**SURE-BOARD® STANDARDS & SPECIFICATIONS**

The Sure-Board® Series 200 Structural Panel is fabricated using all thicknesses of cement or Type X gypsum board complying with ASTM C1396, or Exterior Gypsum Sheathing having an exterior water repellent paper and water resistant treated core gypsum sheathing, complying with ASTM C79-97, also approved glassmat gypsum substrate ASTM C1177, fiber reinforced gypsum panels ASTM C1278 and cement board ASTM C1325. Our Series 200W is fabricated using non-combustible sheathing or composite MDF, laminated with water soluble adhesive to sheet steel. The sheet steel is No.22 gauge (0.027", 27 mil) minimum base metal thickness complying with ASTM A653, Grade 33 minimum, hot-dipped galvanized coating conforming to ASTM A653 and A924. Panel is available in standard 8, 10, and 12 ft. lengths. The Sure-Board® panel is identified with a label located on top right or bottom left hand corner on the metal facing. Sure-Board® shear panel is also available cut to special lengths upon request.

FASTENERS SPECIFICATIONS

Fasteners used to attach the Sure-Board® Series 200 Panel to steel framing are self-drilling (3/4" long drill-tip) bugle head screws having a minimum #8 shank diameter (0.138"), minimum 0.3145" head diameter and 1 1/4" long, complying with SAE J78 and ASTM C954. 200W Panel on steel studs require the use of #10 pan head self-drilling screws, as tested. Screw fastener head may be flush with the panel surface and must penetrate into the cold-formed steel-framing member a minimum of three exposed threads. Fastener must be installed at a minimum 3/8" edge distance. Sure-Board® Series 200W panels on wood framing are fastened with 10D smooth ply nails, as tested.

STEEL AND WOOD STUD SPECIFICATION

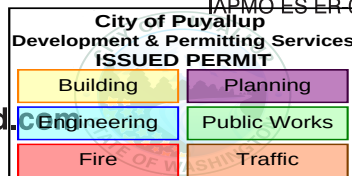
Steel studs used for shear walls are C-shaped, with a minimum 1 5/8-inch flange and 3/8-inch return lip. Steel track shall have a minimum 1 1/4-inch flange. Steel studs are fabricated from 14 gauge (0.071"), 16 gauge (0.054") steel complying with ASTM C653 Grade 50, 18 gauge (0.043") and 20 gauge (0.033") steel complying with ASTM C653 Grade 33. Wood studs are 2x4 stud grade D.F., end posts 4x4 / 4x6 #1 D.F., as tested (actual shear wall to be specifically engineered).

Full scale reverse cyclic testing demonstrates strengths well in excess of those achieved with plywood or sheet metal only diaphragms, using identical test assemblies.

Sure-Board®

IAPMO ES ER-0126 Series 200/200W • ICC ES ER-5762 Series 200

PRCTI20221698

Visit www.sureboard.comwww.cemcosteel.com

Technical Support:

support@sureboard.com

Toll Free: (866) 469-7432

Denver Manufacturing Facility
490 Osage Street • Denver, CO 80204
(303) 572-3626 • Fax (303) 572-3627

Corporate Offices & Main Production Plant
263 N. Covina Lane • City of Industry, CA 91744
(800) 775-2362 • Fax (626) 330-7598

Northern California Manufacturing Facility
1001-A Pittsburg Antioch Hwy. • Pittsburg, CA 94565
(925) 473-9340 • Fax (925) 473-9341

Improve the quality
of your next
framing project
with *Sure-Board*®

The revolutionary
Sure-Board® improves
quality and successfully
eliminates shear wall
problems often
encountered in the
framing and
construction process.

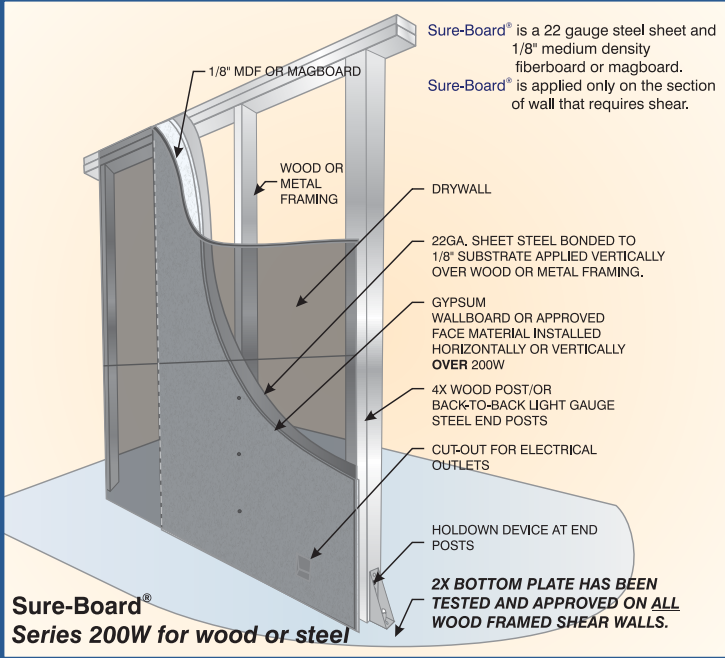


Sure-Board® Series 200

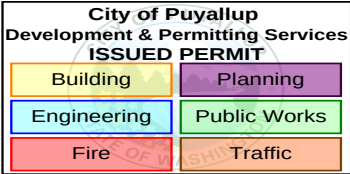
The *Sure-Board*® Series 200 Structural Shear Panels are Patented, IAPMO, ICC, DSA and City of Los Angeles approved products. The Series 200 is manufactured with a single 22 gage galvanized sheet of steel laminated to any manufactured version of gypsum panel with a water based EVA adhesive to create an incredibly **STRONG** shear panel that is 1 and 2 hour fire approved. Series 200W is also a Structural Shear Panel with one **Dynamic** difference. Since 200W is laminated to 1/8” MDF (medium density fiberboard) the attachment can be with nails or screws. This allows 200W to be attached to **WOOD** or **STEEL** framing members with exceptional results. 200W is used as a substrate shear panel and can be installed in the field or in a panelized process, saving even more time in the field. And as we all agree, **TIME** is **MONEY**.

Replace your Present Shear Panels with Sure-Board® Today

The use of cross bracing, brace frames and plywood sheathing are the commonly used methods of our time. For the first time you can reduce your **INSTALLED COSTS** relating to lateral shear by as much as 30%. Don’t hesitate, you need to make the change **TODAY**.



Sure-Board® 200 and 200W require no additional furring of the interior and exterior surfaces. The Series 200W when used as shear panels on Wood framing, require only a **1 1/2” thick bottom plate** per the tested and approved assemblies. This item alone reduces the cost of cutting all of the studs and posts and reduces the labor time of framing on the first floor shear walls **FOREVER!**



Performance of Sure-Board®

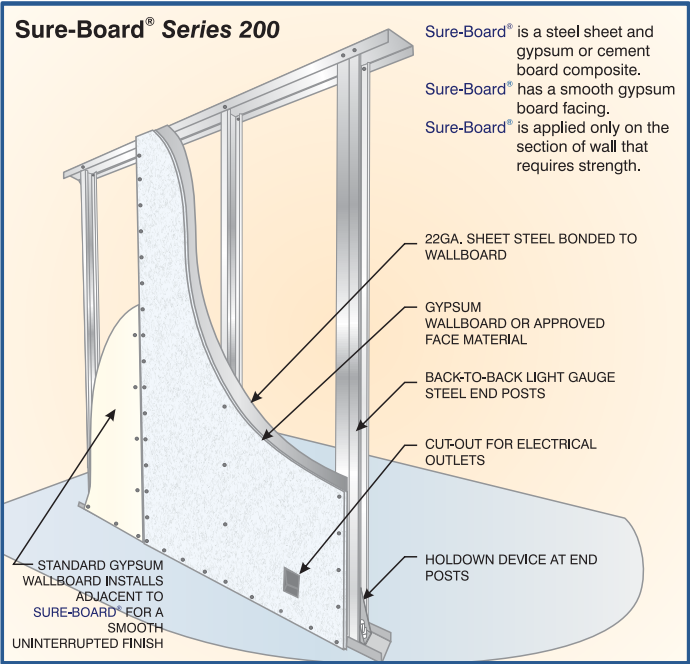
Sure-Board® has the highest tested strength to resist lateral load as well as significantly reduced lateral movement available with shear panel sheathing **TODAY**. Our patented products guarantee these tested results for our customers.

Sure-Board® has been tested with rigorous reverse cyclic testing protocol, unlike the accepted monotonic method used in the past. Our results are guaranteed to provide you with the safest and most reliable earthquake protection available. Our Series 200W has the ability to produce a wood framed shear wall that can perform far beyond anything that has been built in the past. Design your buildings with *Sure-Board*® “for **Shear**” **TODAY**.

Reduced Costs and Stronger Walls using Sure-Board®

Sure-Board® Series 200 and 200W have revolutionized the Wood and Light Gage framing industry. The reduced **Installed Costs** of *Sure-Board*® can also save time during the construction phase. *Sure-Board*® has exceptional resistance to earthquake as well as unequaled 1 and 2 hour fire performance.

Use *Sure-Board*® Series 200 and 200W on all of your Future Projects “for **Shear**”.



Sure-Board®
is available through California Expanded Metal
Products, Inc., (CEMCO)

Founded in 1974, CEMCO is recognized as the largest manufacturer of steel framing and metal lath systems in the Western United States.

With over 125 years combined experience in the manufacturing and marketing of steel products, there is no question why architects specify and contractors alike, request CEMCO products on more projects than any other manufacturer.

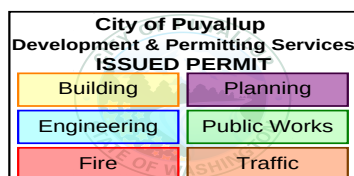
CEMCO’s commitment to quality and service has awarded them some of the most prestigious projects ever built. CEMCO provided all of the steel framing and lath products for the most talked about construction project this century; The Getty Museum. 4.4 million feet of steel studs and track were produced and not one shipment was missed or one quality complaint received. More recently, over 3 million Sq. ft. of *Sure-Board*® structural panel were used on the West Coast alone. *Sure-Board*® is quickly becoming the shear panel of choice on many large steel and wood framing projects in the United States.

CEMCO distributes their products throughout the Western United States, Canada, Mexico and the Pacific Rim.

CEMCO products are available through a network of national building material dealers. We also continue to work very closely with the contractors for technical assistance, specifications, and submittals to ensure that quality and service remain synonymous with the CEMCO name.

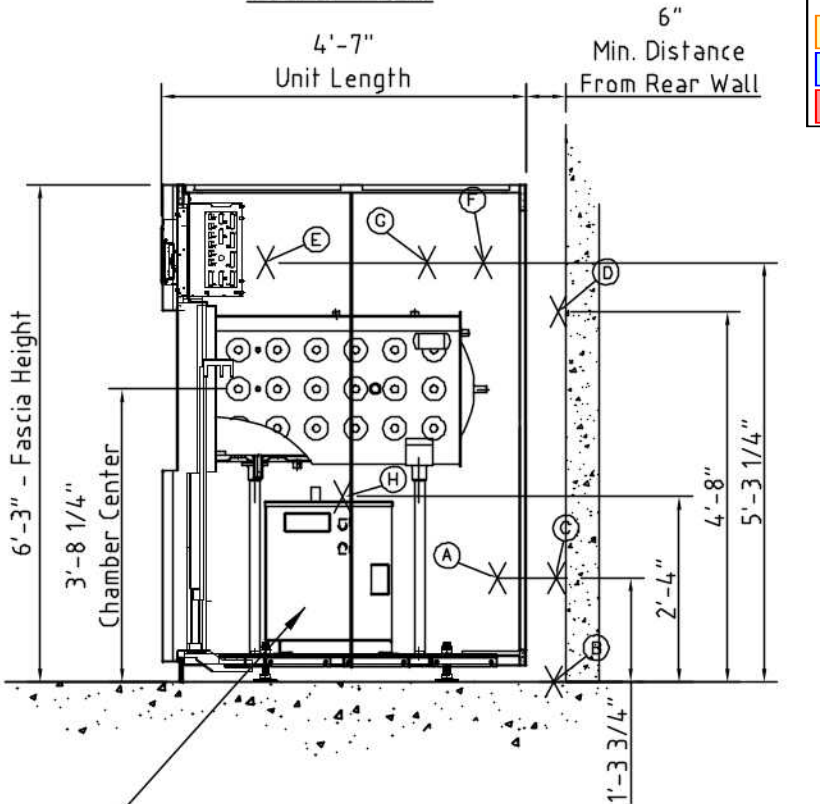
PRCTI20221698

MEDICAL EQUIPMENT SUPPORT AND ANCHORAGE

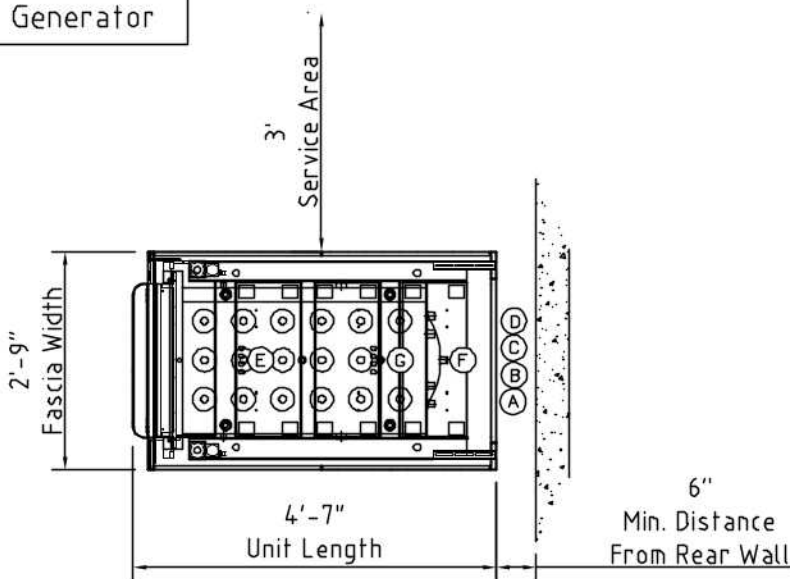


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Side View



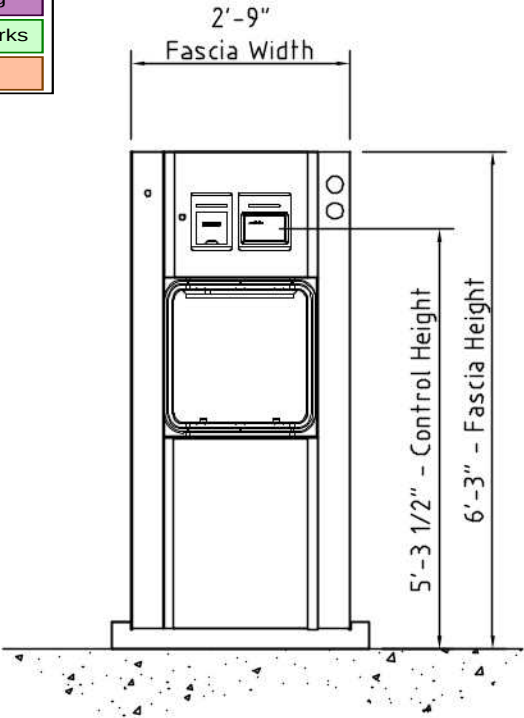
Top View



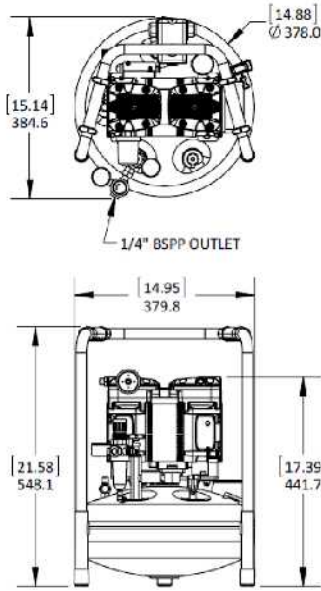
City of Puyallup
Development & Permitting Services
ISSUED PERMIT

Building	Planning
Engineering	Public Works
Fire	Traffic

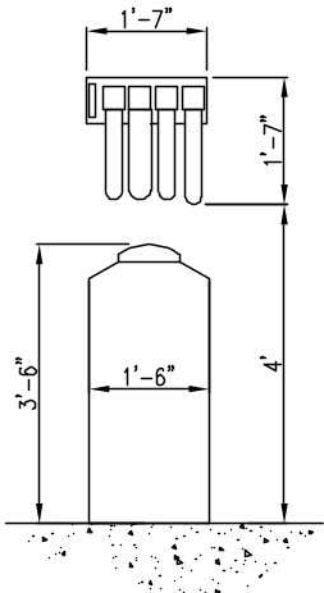
Front View



Air Compressor
Supplied by Tuttnauer



OPTIONAL:
Culligan RO System
Supplied by Tuttnauer
Front View



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REVISIONS

REV.	DESCRIPTION	DATE	APPROVED

MODEL 5596-ECP-V
INTERIOR CHAMBER DIMENSION: 20x20x38
UTILITIES REQUIREMENTS

- A - Water Supply for Carbon Steel Electric Steam Generator - 1/2", <140 Degrees F, 1 GPM Peak, 5 Gallons Per Cycle Average (See GENERAL UTILITY GUIDELINES for Recommended Water Quality) xOPTIONAL CULLIGAN RO SYSTEM CAN BE SUPPLIED BY TUTTNAUER
- B - System Drain - (Outlet 1" NPT) - 2" O.D.T. Located by others. Floor Sink Recommended.
- C - Cold Water Supply - 3/4", <70 Degrees F, 45 PSI Dynamic Minimum, 8 GPM Peak
- D - Compressed Air - AIR COMPRESSOR SUPPLIED BY TUTTNAUER
- E - Electric power supply FOR BACSOFT CONTROL - 120V, 1 phase, 20 AMP. (Dedicated Line)
- AIR COMPRESSOR - 120V, 1-Phase, 6 AMP (Draw)
- Choice Of- CARBON STEEL ELECTRIC STEAM GENERATOR - 30 KW, 208V, 3 phase, 84 AMP. (Draw)
Or- CARBON STEEL ELECTRIC STEAM GENERATOR - 30 KW, 480V, 3 phase, 37 AMP. (Draw)

- F - Chamber Relief Exhaust Valve - 3/4"
- G - Jacket Relief Exhaust Valve - 3/4"
- H - Carbon Steel Steam Generator Relief Exhaust Valve - 1"

HEAT LOSS
- With door open - 6070 Btu / hr at 68°F

WEIGHT
- Autoclave - 1700 lb (772 Kg) Operating - 2250 lb (1021 Kg)

- GENERAL NOTES
- Utilities shown are required at sterilizer within 36" terminating with a shutoff valve.
 - The sterilizer is not supplied with a back flow preventer and, when required by local codes, to be provided and installed by others.
 - Floor Sink Recommended at the side of sterilizer.
 - Safety Relief valves will be piped to floor by installer.
 - If local code requires that relief valves be piped with an alternate method, to be responsibility of others.
 - All wiring up to the sterilizer disconnects to be installed by others.
 - All disconnect switches to be installed by others.
 - Pipe sizes shown indicate terminal outlets only, service lines must supply the specified pressure and flow rates.
 - Clearances shown are minimal for installing and servicing the equipment.
 - All locations of utilities and clearances will be shown on architectural drawings.
 - Drain location can be placed to the side if no space is available behind sterilizer.
 - Softened water systems may be used only when properly maintained. Please note that malfunctioning water softeners can cause damage to the generator and will void the warranty.
 - Some states require that an emergency stop be provided external to the sterilizer. If an external emergency stop is required by local codes, to be provided and installed by others.
 - See GENERAL UTILITY GUIDELINES.

FOR REFERENCE ONLY - NOT FOR CONSTRUCTION!!!

PLEASE NOTE:

- xMinimum 36" wide doorways (34.5" clear pathway) required for autoclave transport, with free and clear path.
- xAutoclave can be provided with either left or right side piping/service access. Left side piping/service access currently shown.
- x3-phase electrical supply must be installed by others, located within 5' of rear of sterilizer and connected to an appropriate electrical disconnect, as per local codes and regulations.

PRCTI20221698

Customer: Community Health Care (Tacoma, WA)

Description: 5596-ECP-V		Job No.:	Scale:	Drawing No:
5596-ECP-V, 20"x20"x38"				
Material:	Design:	Drawing: Santino F.	Quant./Unit: 1	Quant./Job:
	Rev.No: 00	Preparation By: Santino F. 10-29-2021	Approved By:	Approved By:

PCS Structural Solutions

Job Number = 22-537
Date = 7-Sep-22
Name = LMC

Project: CHC Puyallup

Unit = Sterilizer 5596-ECP-V, 20"x20"x38"

Unit Information

Weight, W_p = 2250 lb
Height to Unit = 30.0 ft
Unit Width (w) = 2.8 ft
Unit Height (h) = 6.3 ft
Unit Length (ℓ) = 4.6 ft
Center of Gravity (Vertical) = 4.2 ft 2/3(Unit Height Assumed)

Curb Information

Is there a curb? YES
Weight, $W_{p,2}$ = 0 lb
Curb Width at Base (w) = 1.7 ft
Curb Height (h) = 0.0 ft
Curb Length at Base (ℓ) = 2.3 ft

Total Weight, W_{tot} = 2250 lb
 h_{wind} = 3.1 ft 1/2(Unit height + Curb Height)
 $h_{seismic}$ = 4.2 ft Center of Gravity + Curb Height
Design Width, w_{des} = 1.7 ft
Design Length, ℓ_{des} = 2.3 ft

Building Information

Are building dimensions known? YES
Building Width (B) = 150.0 ft
Building Length (L) = 600.0 ft

Design Criteria = ASCE 7-16, IBC 2018

Gravity

Roof Dead = 25 psf
Roof Snow = 25 psf
 $P_{Roof DL}$ = 316 lb
 $P_{Roof SL}$ = 316 lb

Lateral

The new unit does not have a significant impact to the building's capacity to resist wind or seismic forces

Seismic - ASCE 7-16 Chapter 13

S_{DS} = 1.018
 a_p = 1 Tbl. 13.6-1
 I_p = 1 § 13.1.3
 R_p = 2.5 Tbl. 13.6-1
Height of Attachment or Bot of Curb (z) = 0.0 ft
Total Building Height (H) = 30.0 ft
 $F_p = 0.4 * S_{DS} * (I_p/R_p) * a_p * W_p * [1 + 2 * z/H] =$ 366 lb Eqn. 13.3-1
 $F_{p max} = 1.6 * S_{DS} * I_p * W_p =$ 3665 lb Eqn. 13.3-2
 $F_{p min} = 0.3 * S_{DS} * I_p * W_p =$ 687 lb Eqn. 13.3-3
Controlling F_p = 687 lb
Vertical F_p = 458 lb

Wind - ASCE 7-16 Chapter 29

Wind Lateral:

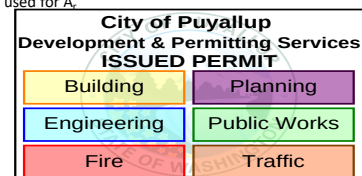
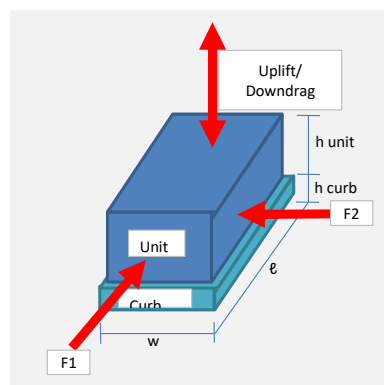
Wind Speed = 0 mph inside the building
Risk Category = II
Wind Exposure = B
 K_{zt} , Topographical Effect = 1.00
 K_e , Ground Elevation Factor = 1.00
 K_h (Table 29.3-1) = 0.70

F_1 = 17.2 sq ft
 F_2 = 28.8 sq ft
 $A_f =$ 12.7 sq ft
 $q_h = .00256 * K_d * K_h * K_{zt} * K_e * V^2 =$ 0.0 psf Eqn. 26.10-1

Building $B * h$ = 18000 sq ft
Building $B * L$ = 90000 sq ft

$(G * C_r)_1$ = 1.90
 $(G * C_r)_2$ = 1.90 for horizontal force - See § 29.4.1 - Worst case used for $B * h$ or $L * h$
for vertical force - See § 29.4.1 - Maximum dimensions used for A_v
 F_1 = F_2

PRCTI20221698



PCS Structural Solutions

Job Number = 22-537
Date = 7-Sep-22
Name = LMC

Project: CHC Puyallup

Unit = Sterilizer 5596-ECP-V, 20"x20"x38"

$F_h = q_h \cdot (G \cdot C_e) \cdot A_f = 0 \text{ lb}$ 0 lb Eqn. 29.4-2
 $F_v = q_h \cdot (G \cdot C_e) \cdot A_f = 0 \text{ lb}$ Eqn. 29.4-3

Moments (Unfactored)

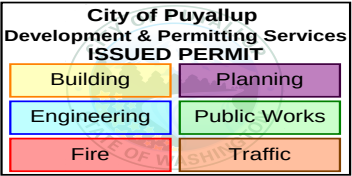
	F ₁	F ₂
M _{OT Seismic} =	2863 lb-ft	2863 lb-ft
M _{OT Wind} =	0 lb-ft	0 lb-ft
M _{R SL} =	356 lb-ft	264 lb-ft
M _{R DL Unit} =	2531 lb-ft	1879 lb-ft
M _{R DL Curb} =	0 lb-ft	0 lb-ft

Combinations (ASD):

Combination	Overturning		Vertical Force		Tension		Compression		Shear	
	OT ₁	OT ₂	Uplift	Downdrag	T ₁	T ₂	C ₁	C ₂	V ₁	V ₂
0.6DL-0.6WL	-1519 lb-ft	-1127 lb-ft	0 lb	0 lb	0 lb	0 lb	675 lb	675 lb	0 lb	0 lb
0.6DL-0.7EQ	485 lb-ft	877 lb-ft	321 lb	321 lb	376 lb	685 lb	0 lb	0 lb	-481 lb	-481 lb
DL+SL	-2887 lb-ft	-2143 lb-ft	0 lb	0 lb	0 lb	0 lb	1283 lb	1283 lb	0 lb	0 lb
DL+0.6WL	-2531 lb-ft	-1879 lb-ft	0 lb	0 lb	0 lb	0 lb	1125 lb	1125 lb	0 lb	0 lb
DL+0.45WL+0.75SL	-2798 lb-ft	-2077 lb-ft	0 lb	0 lb	0 lb	0 lb	1244 lb	1244 lb	0 lb	0 lb
DL+0.7EQ	-4535 lb-ft	-3883 lb-ft	321 lb	321 lb	0 lb	0 lb	2176 lb	2485 lb	481 lb	481 lb
DL+0.525EQ+0.75SL	-4301 lb-ft	-3580 lb-ft	241 lb	241 lb	0 lb	0 lb	2032 lb	2264 lb	361 lb	361 lb

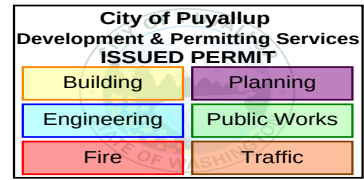
Design (ASD):

Tension		Compression		Shear	
T ₁	T ₂	C ₁	C ₂	V ₁	V ₂
376 lb	685 lb	2176 lb	2485 lb	481 lb	481 lb



PRCTI20221698

Project Title:
 Engineer:
 Project ID:
 Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Sterilizer Bm

CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design

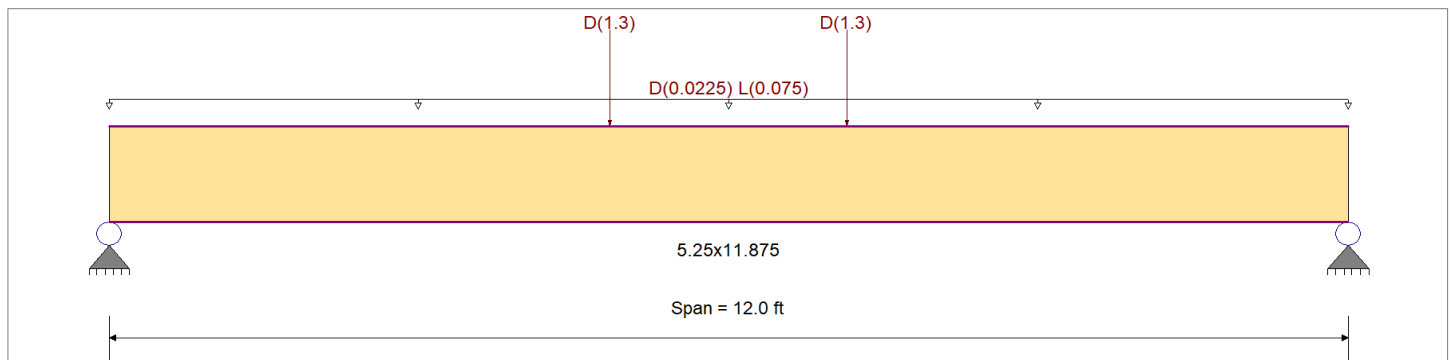
Load Combination : IBC 2018

Wood Species : iLevel Truss Joist

Wood Grade : Parallam PSL 2.0E

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	2900 psi	E : Modulus of Elasticity	
Fb -	2900 psi	Ebend- xx	2000ksi
Fc - Prll	2900 psi	Eminbend - xx	1016.535ksi
Fc - Perp	750 psi		
Fv	290 psi		
Ft	2025 psi	Density	45.07 pcf



Applied Loads

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

Beam self weight calculated and added to loading

Uniform Load : D = 0.0150, L = 0.050 ksf, Tributary Width = 1.50 ft

Point Load : D = 1.30 k @ 4.850 ft, (Overturning)

Point Load : D = 1.30 k @ 7.150 ft, (Overturning)

DESIGN SUMMARY

Design OK

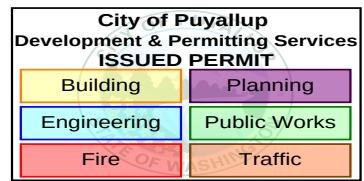
Maximum Bending Stress Ratio	=	0.282	1	Maximum Shear Stress Ratio	=	0.157	: 1
Section used for this span		5.25x11.875		Section used for this span		5.25x11.875	
fb: Actual	=	818.02 psi		fv: Actual	=	45.46 psi	
Fb: Allowable	=	2,900.00 psi		Fv: Allowable	=	290.00 psi	
Load Combination		+D+L		Load Combination		+D+L	
Location of maximum on span	=	6.000ft		Location of maximum on span	=	0.000 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.024 in	Ratio =	5994	>=360	Span: 1 : L Only	
Max Upward Transient Deflection		0 in	Ratio =	0	<360	n/a	
Max Downward Total Deflection		0.143 in	Ratio =	1008	>=240	Span: 1 : +D+L	
Max Upward Total Deflection		0 in	Ratio =	0	<240	n/a	

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L		M	fb	F'b	V	fv	F'v
D Only														0.00			
Length = 12.0 ft	1	0.263	0.139	0.90	1.000	1.00	1.00	1.00	1.00	1.00		7.06	686.73	2610.00	0.00	0.00	261.00
+D+L					1.000	1.00	1.00	1.00	1.00	1.00				0.00			
Length = 12.0 ft	1	0.282	0.157	1.00	1.000	1.00	1.00	1.00	1.00	1.00		8.41	818.02	2900.00	1.89	45.46	290.00
+D+0.750L					1.000	1.00	1.00	1.00	1.00	1.00				0.00			
Length = 12.0 ft	1	0.217	0.119	1.25	1.000	1.00	1.00	1.00	1.00	1.00		8.07	785.20	3625.00	1.79	43.19	362.50
+0.60D					1.000	1.00	1.00	1.00	1.00	1.00				0.00			
Length = 12.0 ft	1	0.089	0.047	1.60	1.000	1.00	1.00	1.00	1.00	1.00		4.24	412.04	4640.00	0.91	21.82	464.00

PRCTI20221698

Project Title:
 Engineer:
 Project ID:
 Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Sterilizer Bm

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.1427	6.044		0.0000	0.000

Vertical Reactions

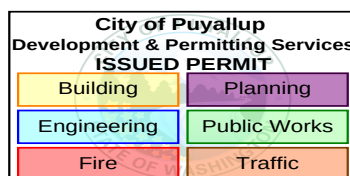
Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.002	2.002
Overall MINimum	0.450	0.450
D Only	1.552	1.552
+D+L	2.002	2.002
+D+0.750L	1.890	1.890
+0.60D	0.931	0.931
L Only	0.450	0.450

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ROOFTOP MECH ANCHORAGE

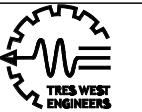


PRCTI20221698

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Puyallup, WA 98371

Miller Hayashi Architects
118 North 35th St. Suite 200
Seattle, Washington 98103
Tel: 206 634 0177
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CHASE

Schematic Design

DATE _____

09/22/2022

REVISIONS

No.	Description	Date
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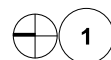
EET TITLE

MECHANICAL
ROOF PLAN

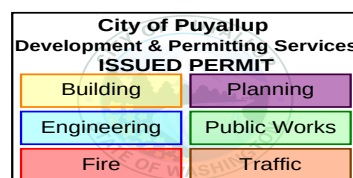
SHEET NO.

M2.03

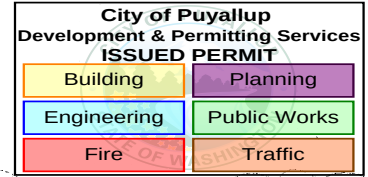
© MILLER HAYASHI ARCHITECTS 2213



MECHANICAL ROOF PLAN

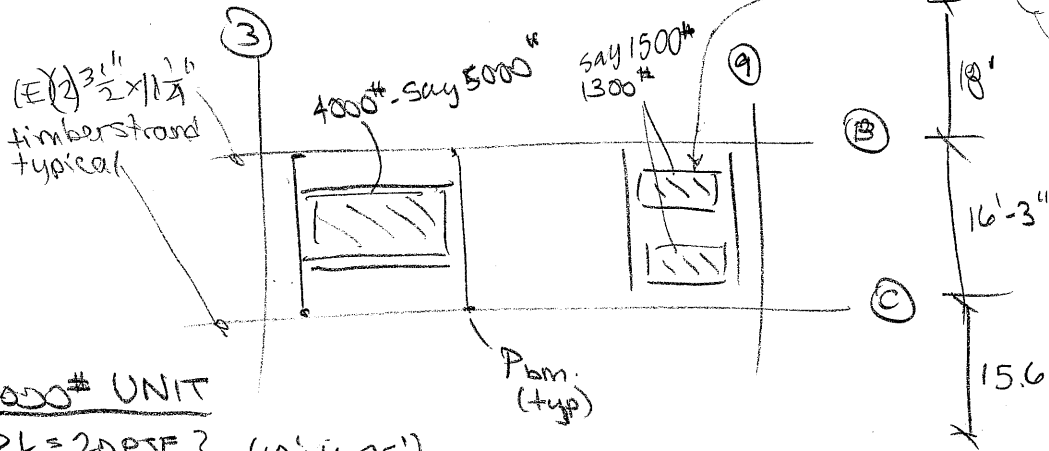
$$1/8'' = 1'-0'$$


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Check (E) Roof Bms w/ mech loading

@ meek well



@ 4000# UNIT

$$\left. \begin{array}{l} DL = 20 \text{ PSF} \\ SL = 25 \text{ PSF} \end{array} \right\} \times \frac{(18' + 16.25')}{2} = 770\# = W$$

$$P_{bm} = \frac{5000\#}{4} = 1250\#$$

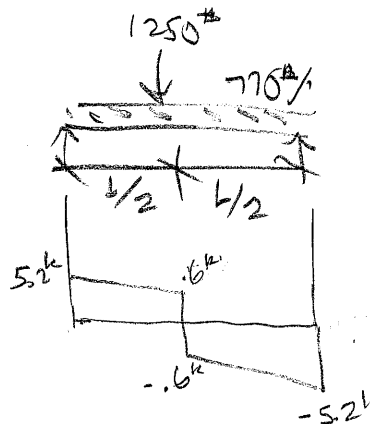
$$L_{max} = 12'$$

(E)(2) 3 1/2" x 11 1/4" Timberstrand bms sistered to original bms

$$\begin{aligned} M_{allow} &= f_b \times 1.15 \times S \\ &= \frac{2325 \times 1.15 \times (3.5 \times 2)}{12} \times \frac{(11.25)^2}{6} \\ &= 32.9 \text{ k'} > M \checkmark \end{aligned}$$

$$\begin{aligned} V_{allow} &= 2 \times A/3 \times f_v \times 1.15 \\ &= 310 \text{ psi} \times \frac{2}{3} \times (3.5 \times 2) \times (11.25) \times 1.15 \\ &= 18.7 \text{ k} > V_{max} \checkmark \end{aligned}$$

Load to (E) roof bms:



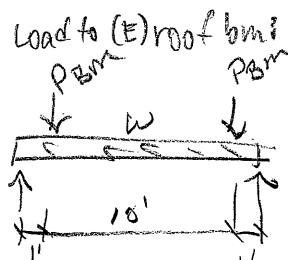
$$\begin{aligned} M &\leq 17.4 \text{ k'} \\ V &= 5.2 \text{ k} \\ V_{max} &= 5.9 \text{ k} \\ &\quad (P_{bm} @ \text{support}) \end{aligned}$$

(E)(2) 3 1/2" x 11 1/4" bms ok

@ 1500# Units

$$W = 770\#$$

$$P_{beam} = 1500 \times 2 / 2 / 2 = 750\#$$

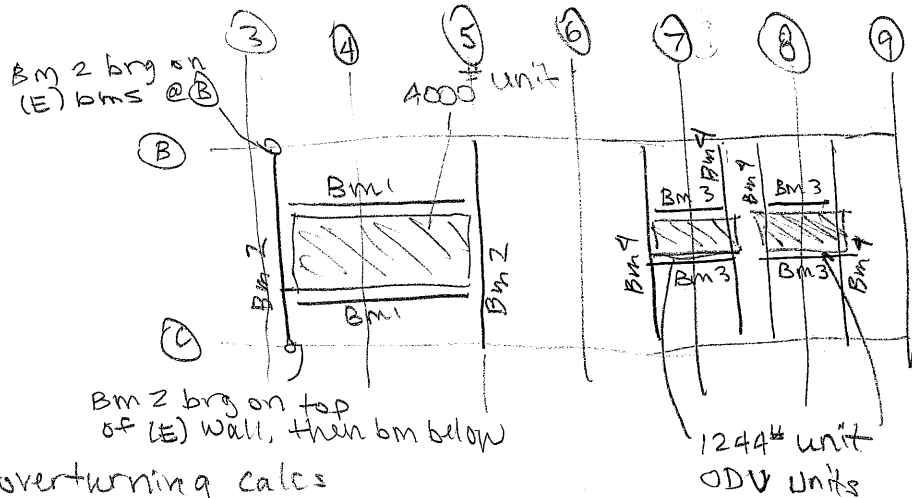


By inspection, V_{max}^{calc} above governs.
By inspection, M above governs.
Same (E) bms as calc abv.
 $\therefore$ bms ok.

City of Puyallup Development & Permitting Services ISSUED PERMIT	
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ROOF TOP MECH ANCHORAGE & SUPPORT

@ mech well



4000# UNIT ERV 2-1

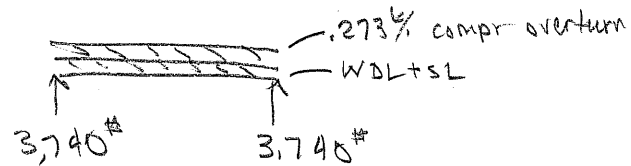
Bm 1

$L = 16'$

$$WDL = 25 \text{ PSF} \times 7' / 2 = .088 \text{ k/ft}$$

$$SL = 25 \text{ PSF} \times 7' / 2 = .088 \text{ k/ft}$$

$$.175 \text{ k/ft}$$



Overturning results (excel)

$3 \frac{1}{2} \times 11 \frac{7}{8}$ PSL 2.0E

Use $5 \frac{1}{4}$ " bry for conn's of mech unit to bry

Bm 2

$L = 16.85'$

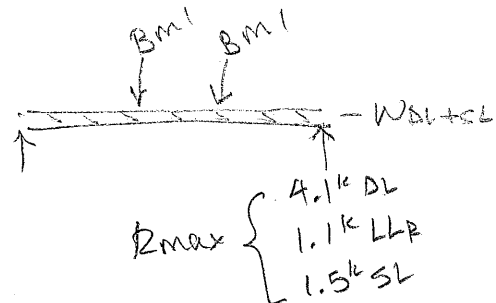
$$WDL = 25 \text{ PSF} \times 1' = .025 \text{ k/ft}$$

$$SL = \quad \quad = .025 \text{ k/ft}$$

$$.05 \text{ k/ft}$$

$$T = 845 \text{ \#} / 16' = .053 \text{ k/ft} \quad \text{OK by inspection}$$

$$C = 4,365 \text{ \#} / 16' = .273 \text{ k/ft} \quad \text{DL is higher}$$



$$\text{Bm 1 Reaction} = 3 \text{ k DL} + .8 \text{ k SL}$$

$5 \frac{1}{4} \times 11 \frac{7}{8}$ PSL 2.0E

$$\text{Net uplift @ Bm 2 end} = \frac{845 \text{ \#}}{2} \times \frac{2}{3} - .6 \times 25 \text{ PSF} \times 1 \times \frac{16.85}{2}$$

$$= 160 \text{ \#} \text{ H6A10KT} \checkmark$$

CONT.

Anchor 4000# UNIT for uplift / overturning

$$Tension = \frac{845\#}{16'} = 53\#/' \times 2' = 106\# / conn < \#12 \text{ wood screw} \\ = 154\#/' \times \left(\frac{2}{3} \times 7'\right) = 205\# \checkmark$$

↳ screws @ 2' o.c.

$$V = \frac{1969\#}{20 \text{ screws}} = 99\# / conn$$

$$< \frac{1}{2}" \text{ lag screw} \\ @ 2' = 378\#/' \times 3' = 1134\#$$

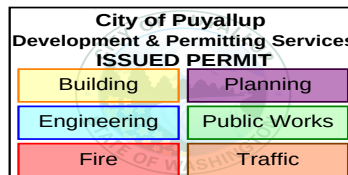
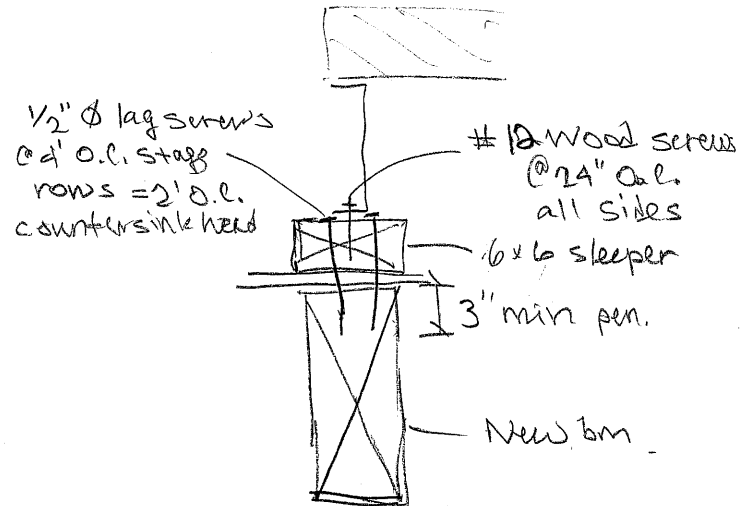
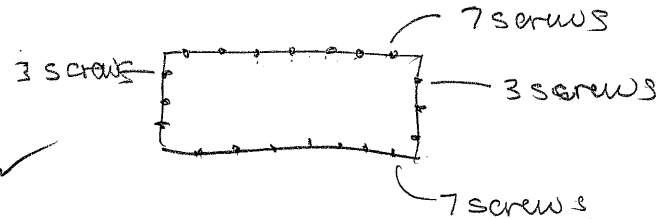
Combined

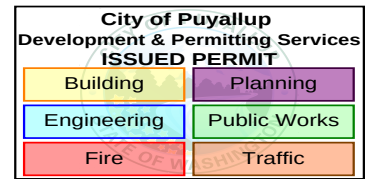
WOOD SCREWS

$$\left(\frac{99\#}{197\#}\right)^2 + \left(\frac{106\#}{205\#}\right)^2 = .52 < 1.0 \checkmark$$

Lag SCREWS

$$\left(\frac{99\#}{240}\right)^2 + \left(\frac{106\#}{1134}\right)^2 < 1.0 \checkmark$$





Roof top: ODU

$$wt = 1244 \# \times 2$$

- see enercalc for overturning

Bm 3

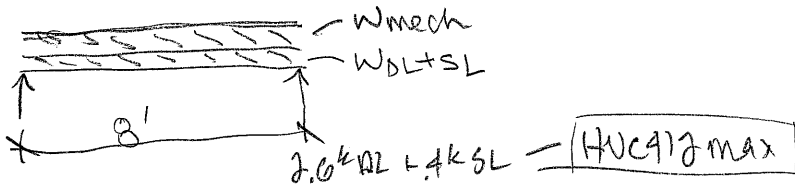
$$L = 8'$$

$$WDL = 25 \times 16.25' / 4 = 102 \# /'$$

$$SL = 25 \times 16.25' / 4 = 102 \# /'$$

$$W_{mech} = (1244 \# \times 2 + 300 \# \text{ curb}) / 2 / 8' = 174 \# /'$$

(Assumed)



Overturning forces $C = \frac{2150 \# \times 2}{8'} = 538 \# /'$ gors = W_{mech}

$$T = \frac{915 \# \times 2}{8'} = 229 \# /'$$

$$3 \frac{1}{2} \times 11 \frac{3}{8} \text{ PSF } (2.0E)$$

Bm 4

$$L = 16.25'$$

$$WDL + SL = (50) \times 1' = .05 \# /'$$

$$P_{Bm3} = 2.0 \text{ kDL} + 4 \text{ kSL}$$

$$5 \frac{1}{4} \times 11 \frac{3}{8} \text{ PSL } (2.0E)$$

$$\text{Net uplift @ end of bm 4} = \frac{2}{3} 915 \# - .6 \times 25 \text{ PSF} \times 1' \times \frac{16.25'}{2}$$

$$= 488 \# - \text{HGA10KT @ Bm end}$$

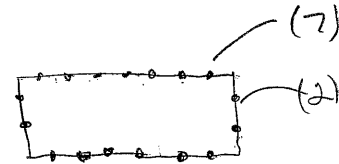
City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Anchor ODU's

$$T = 915^{\#} \times 2 = 1830^{\#} = 229^{\#}/' \times \frac{10''}{12} = 191^{\#}/\text{CONN}$$

$$V = 550^{\#}/18 = 31^{\#}$$

CONN @ 10" O.C.



#12 WOOD SCREWS (CURB TO SLEEPER)

$$T_{\text{allow}} = 154^{\#}/' \times (\frac{2}{3} \times 2'') = 205^{\#} > 191^{\#} \checkmark$$

$$V_{\text{allow}} = 197^{\#} > 31^{\#} \checkmark \quad (\text{NDS})$$

$$\left(\frac{31}{197}\right)^2 + \left(\frac{191}{205}\right)^2 = .89 \leq 1.0 \checkmark$$

1/2" Ø lag screw @ 2' O.C. (SLEEPER TO BM)

$$T_{\text{allow}} = 378^{\#}/' \times 3'' = 1134^{\#} > 229^{\#}/' \times 2' = 458^{\#} \checkmark$$

$$V_{\text{allow}} = 240^{\#} > \frac{550^{\#}}{10} = 55^{\#} \checkmark$$

$$\left(\frac{55}{240}\right)^2 + \left(\frac{458}{1134}\right)^2 = .22 \leq 1.0 \checkmark$$

#12 WOOD SCREWS @ 10" O.C. CURB TO SLEEPER
1/2" Ø lag (2) row stagger @ 4' O.C. (SLEEPER TO BM)

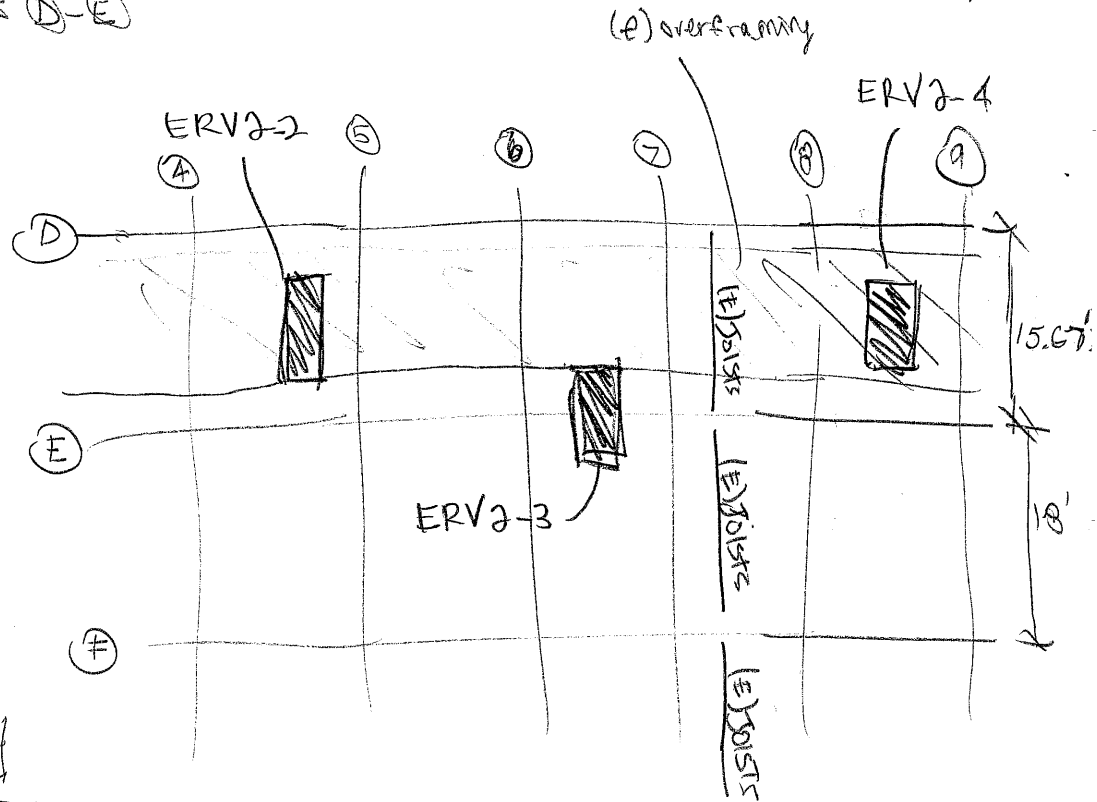
City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

(E) roof joist w/ mech unit

Between grids (D)-E

New mech on top
(E) overframing

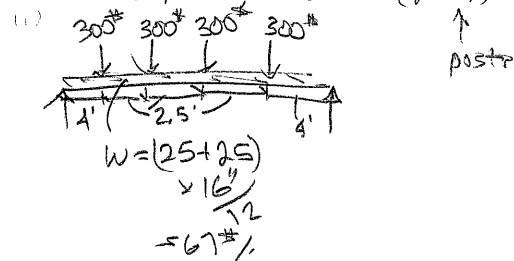
(E) joists = 11 7/8"
LG5 TJ1
@ 24" O.C.



(4) post @ EA long side of unit
(2) @ EA short side

max mech unit = 1950[#]
— say 2400[#]

Assume 1/2 wt to EA long side
P unit @ post = 2400[#] / (2 x 4) = 300[#]



PRCTI20221698

@ (E)-(E) Mech units on overframing
to bear on (E) TJ1's OK.

M_{max} = 5.93k' < M_{allow} ✓
V_{max} = 1.1k < V_{allow} ✓

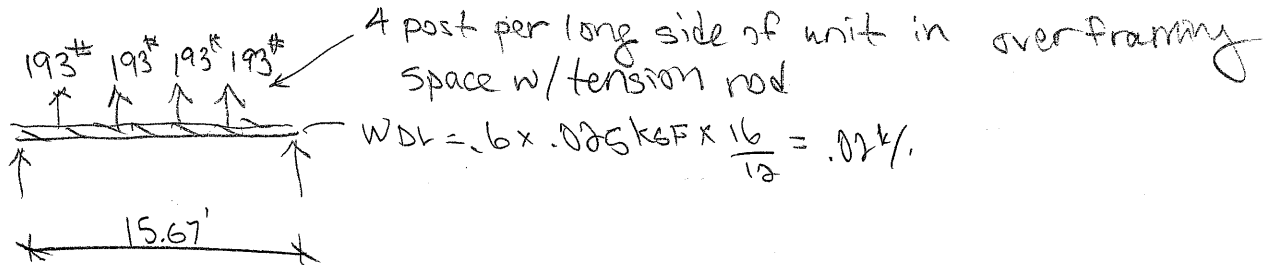
LG5 TJ1 11 7/8"
M_{allow} = 6.75k'
V_{allow} = 1.9k

overturning of ERV2-2 - 4

see spreadsheet

$$T = 773\# / 4 = 193\#$$

check (E) TJ1 below:



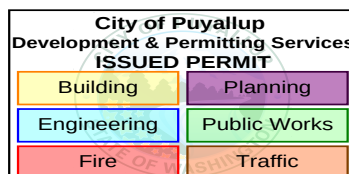
$$M = -1.58k'$$

$$V = -.95k$$

(E) L65 TJ1 117/8" JOIST

$$M_{allow} = 6.75k' \checkmark$$

$$V_{allow} = 1.9k \checkmark$$



Joist Depth	Basic Properties						Reaction Properties ⁽⁴⁾⁽⁵⁾							
	Joist Weight (lbs/ft)	Resistive Moment ⁽¹⁾ (ft-lbs)	Vertical Shear ⁽²⁾ (lbs)	EI x 10 ⁶ (in. ² -lbs)	EI ⁽³⁾ x 10 ⁶ TJI® Joist with Nailed Floor Sheathing (in. ² -lbs)	EI ⁽³⁾ x 10 ⁶ TJI® Joist with Glue-Nailed Floor Sheathing (in. ² -lbs)	End Reaction (lbs)				Intermediate Reaction (lbs)			
							Bearing Length				Bearing Length			
							1¼" (2½" for HS90)		3½"		3½"		5¼"	
							Web Stiffeners ⁽⁶⁾		Web Stiffeners ⁽⁶⁾		Web Stiffeners ⁽⁶⁾		Web Stiffeners ⁽⁶⁾	
							No	Yes	No	Yes	No	Yes	No	Yes
TJI® L65 Joist														
11½"	3.3	6,750	1,925	450	512	561	1,375	1,745	1,885	1,925	2,745	3,120	3,365	3,735
14"	3.6	8,030	2,125	666	752	821	1,375	1,750	1,885	2,125	2,745	3,365	3,365	3,985
16"	3.9	9,210	2,330	913	1,025	1,116	1,375	1,750	1,885	2,330	2,745	3,490	3,365	4,105
18"	4.2	10,380	2,535	1,205	1,348	1,462	1,375	1,750	1,885	2,535	2,745	3,615	3,365	4,230
20"	4.4	11,540	2,740	1,545	1,722	1,864	N.A.	1,750	N.A.	2,740	N.A.	3,740	N.A.	4,355
22"	4.7	12,690	2,935	1,934	2,149	2,322	N.A.	1,750	N.A.	2,935	N.A.	3,860	N.A.	4,480
24"	5.0	13,830	3,060	2,374	2,632	2,838	N.A.	1,750	N.A.	3,060	N.A.	3,875	N.A.	4,605
26"	5.3	14,960	2,900	2,868	3,172	3,416	N.A.	1,750	N.A.	2,900	N.A.	4,725 ⁽⁷⁾	N.A.	5,345 ⁽⁸⁾
28"	5.5	16,085	2,900	3,417	3,772	4,056	N.A.	1,750	N.A.	2,900	N.A.	4,850 ⁽⁷⁾	N.A.	5,470 ⁽⁸⁾
30"	5.8	17,205	2,900	4,025	4,434	4,762	N.A.	1,750	N.A.	2,900	N.A.	4,975 ⁽⁷⁾	N.A.	5,590 ⁽⁸⁾
TJI® L90 Joist														
11½"	4.2	9,605	1,925	621	687	741	1,400	1,715	1,885	1,925	3,350	3,665	3,965	4,285
14"	4.5	11,430	2,125	913	1,005	1,079	1,400	1,875	1,885	2,125	3,350	3,825	3,965	4,440
16"	4.7	13,115	2,330	1,246	1,366	1,462	1,400	2,030	1,885	2,330	3,350	3,980	3,965	4,600
18"	5.0	14,785	2,535	1,635	1,786	1,908	1,400	2,030	1,885	2,515	3,350	3,980	3,965	4,600
20"	5.3	16,435	2,740	2,085	2,272	2,422	N.A.	2,190	N.A.	2,675	N.A.	4,140	N.A.	4,755
22"	5.6	18,075	2,935	2,597	2,824	3,006	N.A.	2,345	N.A.	2,830	N.A.	5,090	N.A.	5,705
24"	5.8	19,700	3,060	3,172	3,442	3,659	N.A.	2,345	N.A.	2,830	N.A.	5,405	N.A.	6,020
26"	6.1	21,315	2,900	3,814	4,132	4,387	N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
28"	6.4	22,915	2,900	4,525	4,895	5,191	N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
30"	6.6	24,510	2,900	5,306	5,732	6,073	N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
TJI® H90 Joist														
11½"	4.6	10,960	1,925	687	755	810	1,400	1,715	1,885	1,925	3,495	3,810	4,100	4,420
14"	4.9	13,090	2,125	1,015	1,109	1,185	1,400	1,875	1,885	2,125	3,495	3,970	4,100	4,575
16"	5.2	15,065	2,330	1,389	1,512	1,610	1,400	2,030	1,885	2,330	3,495	4,130	4,100	4,735
18"	5.4	17,010	2,535	1,827	1,982	2,106	1,400	2,030	1,885	2,515	3,495	4,130	4,100	4,735
20"	5.7	18,945	2,740	2,331	2,522	2,676	N.A.	2,190	N.A.	2,675	N.A.	4,285	N.A.	4,890
22"	6.0	20,855	2,935	2,904	3,136	3,321	N.A.	2,345	N.A.	2,830	N.A.	5,235	N.A.	5,840
24"	6.3	22,755	3,060	3,549	3,825	4,046	N.A.	2,345	N.A.	2,830	N.A.	5,425	N.A.	6,155
26"	6.5	24,645	2,900	4,266	4,590	4,850	N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
28"	6.8	26,520	2,900	5,059	5,436	5,737	N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
30"	7.1	28,380	2,900	5,930	6,363	6,710	N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
TJI® HS90 Joist														
11½"	6.0	16,050	2,320	900	941	973	1,835	2,320	2,150	2,320	3,995	4,650	4,690	5,345
14"	6.3	19,425	2,565	1,355	1,410	1,455	1,835	2,565	2,150	2,565	3,995	4,980	4,690	5,670
16"	6.6	22,550	2,790	1,876	1,948	2,005	1,835	2,790	2,150	2,790	3,995	4,980	4,690	5,670
18"	7.0	25,640	3,020	2,488	2,578	2,650	1,835	3,020	2,150	3,020	3,995	5,310	4,690	6,000
20"	7.3	28,695	3,250	3,195	3,306	3,394	N.A.	3,250	N.A.	3,250	N.A.	5,425	N.A.	6,330
22"	7.6	31,725	3,480	3,998	4,131	4,238	N.A.	3,475	N.A.	3,480	N.A.	5,425	N.A.	6,330
24"	7.9	34,730	3,710	4,901	5,059	5,186	N.A.	3,500	N.A.	3,710	N.A.	5,425	N.A.	6,655
26"	8.2	37,715	3,940	5,905	6,090	6,238	N.A.	3,500	N.A.	3,940	N.A.	6,985 ⁽⁷⁾	N.A.	7,675 ⁽⁸⁾
28"	8.5	40,680	4,165	7,014	7,228	7,400	N.A.	3,500	N.A.	4,165	N.A.	6,985 ⁽⁷⁾	N.A.	7,675 ⁽⁸⁾
30"	8.8	43,630	4,375	8,230	8,476	8,672	N.A.	3,500	N.A.	4,375	N.A.	7,310 ⁽⁷⁾	N.A.	8,005 ⁽⁸⁾
32"	9.1	46,560	4,375	9,555	9,834	10,057	N.A.	3,500	N.A.	4,375	N.A.	7,640 ⁽⁷⁾	N.A.	8,335 ⁽⁸⁾

▪ The stated allowable design properties are for loads of normal duration. Adjustments to the allowable design values shall be in accordance with the applicable code.

- (1) **Caution:** Do not increase joist resistive moment properties by a repetitive-member-use factor; resistive moment properties reflect the latest ASTM standards.
- (2) For possible increases in shear capacity see below.
- (3) For deflection calculation only. Assumes 12" joist spacing (24" spacing for HS90 joists) with a 24" span-rated panel.

(4) Interpolation between bearing lengths is permitted for allowable design reactions.

(5) Allowable bearing lengths have been determined based on iLevel Trus Joist® Commercial products. Allowable bearing on supporting members shall be checked.

(6) Refer to page 16 for web stiffener details.

(7) 5¼" bearing length is required at intermediate reactions.

(8) 7" bearing length is required at intermediate reactions.

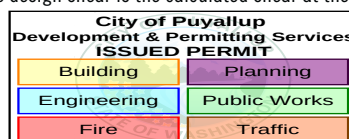
TJI® Joist Shear Design

When joists are used as simple-span members, the design shear is equal to the shear at the face of the support.

When joists **up to 24" in depth** are used as multiple-span members, the design shear is the calculated shear at the interior support reduced by the following:

$$R = \frac{W}{19.25} \leq 18\%$$

Where: R is the percent reduction
W is uniform load in plf



PRCTI20221698

PCS Structural Solutions

Job Number = 22-537
 Date =
 Name = LMC

Project: CHC Puyallup

Unit = ERV2-1 - in mech well - Unit RVE-85-52-30H

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Unit Information

Weight, W_p = 3832 lb lb
 Height to Unit = 30.0 ft ft
 Unit Width (w) = 5.7 ft ft
 Unit Height (h) = 6.1 ft ft
 Unit Length (ℓ) = 16.4 ft ft
 Center of Gravity (Vertical) = 4.1 ft 2/3(Unit Height Assumed)

Curb Information

Is there a curb? YES
 Weight, $W_{p,2}$ = 316 lb lb
 Curb Width at Base (w) = 4.8 ft ft
 Curb Height (h) = 1.2 ft ft
 Curb Length at Base (ℓ) = 15.6 ft ft

Total Weight, W_{tot} = 4148 lb
 h_{wind} = 3.6 ft 1/2(Unit height + Curb Height)
 $h_{seismic}$ = 5.2 ft Center of Gravity + Curb Height
 Design Width, w_{des} = 4.8 ft
 Design Length, ℓ_{des} = 15.6 ft

Building Information

Are building dimensions known? YES
 Building Width (B) = 100.0 ft ft
 Building Length (L) = 150.0 ft ft

Design Criteria = ASCE 7-16, IBC 2018

Gravity

Roof Dead = 25 psf
 Roof Snow = 25 psf
 $P_{Roof DL}$ = 2326 lb
 $P_{Roof SL}$ = 2326 lb

Lateral

The new unit does not have a significant impact to the building's capacity to resist wind or seismic forces

Seismic - ASCE 7-16 Chapter 13

S_{DS} = 1.018
 a_p = 2.5 Tbl. 13.6-1
 I_p = 1 § 13.1.3
 R_p = 6 Tbl. 13.6-1
 Height of Attachment or Bot of Curb (z) = 30.0 ft
 Total Building Height (H) = 30.0 ft
 $F_p = 0.4 * S_{DS} * (I_p / R_p) * a_p * W_p * [1 + 2 * z / H] =$ 2111 lb Eqn. 13.3-1
 $F_{p max} = 1.6 * S_{DS} * I_p * W_p =$ 6756 lb Eqn. 13.3-2
 $F_{p min} = 0.3 * S_{DS} * I_p * W_p =$ 1267 lb Eqn. 13.3-3
 Controlling F_p = 2111 lb
 Vertical F_p = 845 lb

Wind - ASCE 7-16 Chapter 29

Wind Lateral:

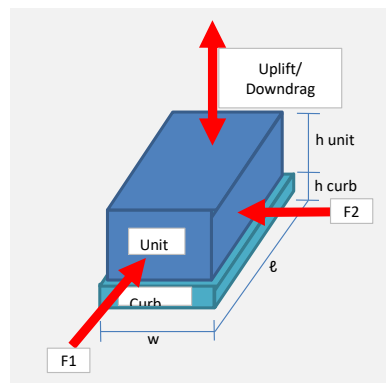
Wind Speed = 98 mph
 Risk Category = II
 Wind Exposure = B
 K_{zt} , Topographical Effect = 1.00
 K_e , Ground Elevation Factor = 1.00

 K_h (Table 29.3-1) = 0.70

F_1 F_2
 $A_f =$ 40.1 sq ft 118.0 sq ft
 $A_v =$ 93.0 sq ft
 $q_h = .00256 * K_d * K_h * K_{zt} * K_e * V^2 =$ 14.6 psf Eqn. 26.10-1

Building $B * h$ = 4500 sq ft
 Building $B * L$ = 15000 sq ft

$(G * C_f)_1$ $(G * C_f)_2$
 1.90 1.90 for horizontal force - See § 29.4.1 - Worst case used for $B * h$ or $L * h$
 1.50 for vertical force - See § 29.4.1 - Maximum dimensions used for A_v

 F_1 F_2 

PCS Structural Solutions

Job Number = 22-537

Date =

Name = LMC

Unit = ERV2-1 - in mech well - Unit RVE-85-52-30H

Project: CHC Puyallup

$F_h = q_h \cdot (G \cdot C_e) \cdot A_f =$

1115 lb

3281 lb

Eqn. 29.4-2

$F_v = q_h \cdot (G \cdot C_e) \cdot A_f =$

2041 lb

Eqn. 29.4-3

Moments (Unfactored)

	F ₁	F ₂
M _{OT Seismic} =	11026 lb-ft	11026 lb-ft
M _{OT Wind} =	4041 lb-ft	11894 lb-ft
M _{R SL} =	18121 lb-ft	5620 lb-ft
M _{R DL Unit} =	29858 lb-ft	9261 lb-ft
M _{R DL Curb} =	2462 lb-ft	764 lb-ft

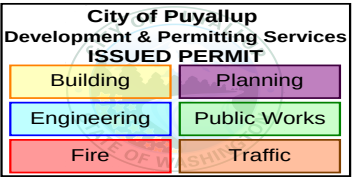
Combinations (ASD):

Combination	Overturning		Vertical Force		Tension		Compression		Shear	
	OT ₁	OT ₂	Uplift	Downdrag	T ₁	T ₂	C ₁	C ₂	V ₁	V ₂
0.6DL-0.6WL	-16967 lb-ft	1122 lb-ft	1225 lb	0 lb	0 lb	845 lb	1089 lb	0 lb	-669 lb	-1969 lb
0.6DL-0.7EQ	-11674 lb-ft	1703 lb-ft	591 lb	591 lb	0 lb	648 lb	1045 lb	0 lb	-1478 lb	-1478 lb
DL+SL	-50441 lb-ft	-15645 lb-ft	0 lb	0 lb	0 lb	0 lb	3237 lb	3237 lb	0 lb	0 lb
DL+0.6WL	-34745 lb-ft	-17161 lb-ft	1225 lb	0 lb	0 lb	0 lb	2230 lb	3551 lb	669 lb	1969 lb
DL+0.45WL+0.75SL	-47729 lb-ft	-19592 lb-ft	919 lb	0 lb	0 lb	0 lb	3063 lb	4054 lb	502 lb	1477 lb
DL+0.7EQ	-40038 lb-ft	-17742 lb-ft	591 lb	591 lb	0 lb	0 lb	2865 lb	3966 lb	1478 lb	1478 lb
DL+0.525EQ+0.75SL	-51699 lb-ft	-20028 lb-ft	443 lb	443 lb	0 lb	0 lb	3539 lb	4365 lb	1108 lb	1108 lb

Design (ASD):

Tension		Compression		Shear	
T ₁	T ₂	C ₁	C ₂	V ₁	V ₂
0 lb	845 lb	3539 lb	4365 lb	1478 lb	1969 lb

w mech=4365/16' = 273 #/ft

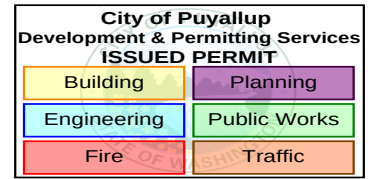


PCS Structural Solutions

Job Number = 22-537
Date =
Name = LMC

Project: CHC Puyallup

Unit = Rooftop ODU - 20 Ton - TURYE2403BN40A(N/B)



Unit Information

Weight, W_p = 1244 lb lb
Height to Unit = 30.0 ft ft
Unit Width (w) = 2.4 ft ft
Unit Height (h) = 6.0 ft ft
Unit Length (ℓ) = 4.1 ft ft
Center of Gravity (Vertical) = 4.0 ft 2/3(Unit Height Assumed)

Curb Information

Is there a curb? YES
Weight, $W_{p,2}$ = 300 lb lb
Curb Width at Base (w) = 2.2 ft ft
Curb Height (h) = 1.2 ft ft
Curb Length at Base (ℓ) = 3.5 ft ft

Assumed

Assumed

Total Weight, W_{tot} = 1544 lb
 h_{wind} = 3.6 ft 1/2(Unit height + Curb Height)
 $h_{seismic}$ = 5.1 ft Center of Gravity + Curb Height
Design Width, w_{des} = 2.2 ft
Design Length, ℓ_{des} = 3.5 ft

Building Information

Are building dimensions known? YES
Building Width (B) = 100.0 ft ft
Building Length (L) = 150.0 ft ft

Design Criteria = ASCE 7-16, IBC 2018

Gravity

Roof Dead = 25 psf
Roof Snow = 25 psf
 $P_{Roof DL}$ = 247 lb
 $P_{Roof SL}$ = 247 lb

Lateral

The new unit does not have a significant impact to the building's capacity to resist wind or seismic forces

Seismic - ASCE 7-16 Chapter 13

S_{DS} = 1.018
 a_p = 2.5 Tbl. 13.6-1
 I_p = 1 § 13.1.3
 R_p = 6 Tbl. 13.6-1
Height of Attachment or Bot of Curb (z) = 30.0 ft
Total Building Height (H) = 30.0 ft
 $F_p = 0.4 * S_{DS} * (I_p/R_p) * a_p * W_p * [1 + 2 * z/H]$ = 786 lb Eqn. 13.3-1
 $F_{p max} = 1.6 * S_{DS} * I_p * W_p$ = 2515 lb Eqn. 13.3-2
 $F_{p min} = 0.3 * S_{DS} * I_p * W_p$ = 472 lb Eqn. 13.3-3
Controlling F_p = 786 lb
Vertical F_p = 314 lb

Wind - ASCE 7-16 Chapter 29

Wind Lateral:

Wind Speed = 98 mph
Risk Category = II
Wind Exposure = B
 K_{zt} , Topographical Effect = 1.00
 K_e , Ground Elevation Factor = 1.00

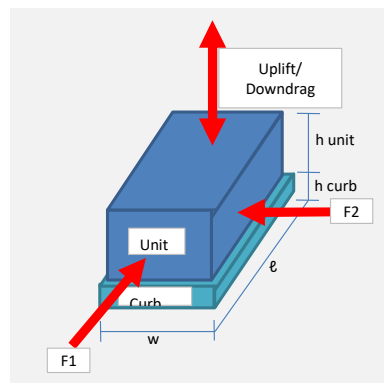
K_h (Table 29.3-1) = 0.70

F_1 F_2
 A_f = 17.0 sq ft 28.4 sq ft
 A_v = 9.9 sq ft
 $q_h = .00256 * K_d * K_h * K_{zt} * K_e * V^2$ = 14.6 psf Eqn. 26.10-1

Building $B * h$ = 4500 sq ft
Building $B * L$ = 15000 sq ft

$(G * C_r)_1$ $(G * C_r)_2$
1.90 1.90 for horizontal force - See § 29.4.1 - Worst case used for $B * h$ or $L * h$
1.50 for vertical force - See § 29.4.1 - Maximum dimensions used for A_v

F_1 F_2



PRCTI20221698

PCS Structural Solutions

Job Number = 22-537

Date =

Name = LMC

Project: CHC Puyallup

Unit = Rooftop ODU - 20 Ton - TURYE2403BN40A(N/B)

$F_h = q_h \cdot (G \cdot C_e) \cdot A_f =$

473 lb

789 lb

Eqn. 29.4-2

$F_v = q_h \cdot (G \cdot C_e) \cdot A_f =$

217 lb

Eqn. 29.4-3

Moments (Unfactored)

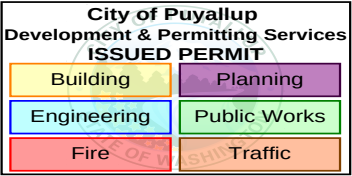
	F ₁	F ₂
M _{OT Seismic} =	4039 lb-ft	4039 lb-ft
M _{OT Wind} =	1683 lb-ft	2811 lb-ft
M _{R SL} =	429 lb-ft	275 lb-ft
M _{R DL Unit} =	2164 lb-ft	1387 lb-ft
M _{R DL Curb} =	522 lb-ft	334 lb-ft

Combinations (ASD):

Combination	Overturning		Vertical Force		Tension		Compression		Shear	
	OT ₁	OT ₂	Uplift	Downdrag	T ₁	T ₂	C ₁	C ₂	V ₁	V ₂
0.6DL-0.6WL	-602 lb-ft	654 lb-ft	130 lb	0 lb	0 lb	358 lb	173 lb	0 lb	-284 lb	-473 lb
0.6DL-0.7EQ	1215 lb-ft	1794 lb-ft	220 lb	220 lb	459 lb	915 lb	0 lb	0 lb	-550 lb	-550 lb
DL+SL	-3115 lb-ft	-1996 lb-ft	0 lb	0 lb	0 lb	0 lb	895 lb	895 lb	0 lb	0 lb
DL+0.6WL	-3696 lb-ft	-3408 lb-ft	130 lb	0 lb	0 lb	0 lb	1062 lb	1529 lb	284 lb	473 lb
DL+0.45WL+0.75SL	-3765 lb-ft	-3192 lb-ft	97 lb	0 lb	0 lb	0 lb	1082 lb	1432 lb	213 lb	355 lb
DL+0.7EQ	-5513 lb-ft	-4548 lb-ft	220 lb	220 lb	0 lb	0 lb	1695 lb	2150 lb	550 lb	550 lb
DL+0.525EQ+0.75SL	-5128 lb-ft	-4047 lb-ft	165 lb	165 lb	0 lb	0 lb	1556 lb	1898 lb	413 lb	413 lb

Design (ASD):

Tension		Compression		Shear	
T ₁	T ₂	C ₁	C ₂	V ₁	V ₂
459 lb	915 lb	1695 lb	2150 lb	550 lb	550 lb



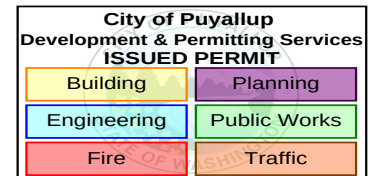
PRCTI20221698

PCS Structural Solutions

Job Number = 22-537
Date =
Name = LMC

Project: CHC Puyallup

Unit = Rooftop ERV2-2, ERV2-3, ERV2-4



Unit Information

Weight, W_p = 1950 lb lb
Height to Unit = 30.0 ft ft
Unit Width (w) = 4.0 ft ft
Unit Height (h) = 6.1 ft ft
Unit Length (ℓ) = 7.9 ft ft
Center of Gravity (Vertical) = 4.1 ft 2/3(Unit Height Assumed)

Curb Information

Is there a curb? YES
Weight, $W_{p,2}$ = 300 lb lb
Curb Width at Base (w) = 3.3 ft ft
Curb Height (h) = 1.2 ft ft
Curb Length at Base (ℓ) = 7.4 ft ft

Assumed

Total Weight, W_{tot} = 2250 lb
 h_{wind} = 3.6 ft 1/2(Unit height + Curb Height)
 $h_{seismic}$ = 5.2 ft Center of Gravity + Curb Height
Design Width, w_{des} = 3.3 ft
Design Length, ℓ_{des} = 7.4 ft

Building Information

Are building dimensions known? YES
Building Width (B) = 100.0 ft ft
Building Length (L) = 150.0 ft ft

Design Criteria = ASCE 7-16, IBC 2018

Gravity

Roof Dead = 25 psf
Roof Snow = 25 psf
 $P_{Roof DL}$ = 792 lb
 $P_{Roof SL}$ = 792 lb

Lateral

The new unit does not have a significant impact to the building's capacity to resist wind or seismic forces

Seismic - ASCE 7-16 Chapter 13

S_{DS} = 1.018
 a_p = 2.5 Tbl. 13.6-1
 I_p = 1 § 13.1.3
 R_p = 6 Tbl. 13.6-1
Height of Attachment or Bot of Curb (z) = 30.0 ft
Total Building Height (H) = 30.0 ft
 $F_p = 0.4 * S_{DS} * (I_p/R_p) * a_p * W_p * [1 + 2 * z/H]$ = 1145 lb Eqn. 13.3-1
 $F_{p max} = 1.6 * S_{DS} * I_p * W_p$ = 3665 lb Eqn. 13.3-2
 $F_{p min} = 0.3 * S_{DS} * I_p * W_p$ = 687 lb Eqn. 13.3-3
Controlling F_p = 1145 lb
Vertical F_p = 458 lb

Wind - ASCE 7-16 Chapter 29

Wind Lateral:

Wind Speed = 98 mph
Risk Category = II
Wind Exposure = B
 K_{zt} , Topographical Effect = 1.00
 K_e , Ground Elevation Factor = 1.00

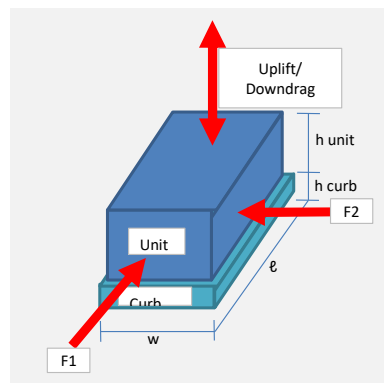
K_h (Table 29.3-1) = 0.70

F_1 F_2
 A_f = 28.1 sq ft 56.8 sq ft
 A_g = 31.7 sq ft
 $q_h = .00256 * K_d * K_h * K_{zt} * K_e * V^2$ = 14.6 psf Eqn. 26.10-1

Building $B * h$ = 4500 sq ft
Building $B * L$ = 15000 sq ft

$(G * C_r)_1$ $(G * C_r)_2$
1.90 1.90 for horizontal force - See § 29.4.1 - Worst case used for $B * h$ or $L * h$
1.50 for vertical force - See § 29.4.1 - Maximum dimensions used for A_g

F_1 F_2



PRCTI20221698

PCS Structural Solutions

Job Number = 22-537

Date =

Name = LMC

Unit = Rooftop ERV2-2, ERV2-3, ERV2-4

Project: CHC Puyallup

$F_h = q_h \cdot (G \cdot C_e) \cdot A_f =$ 782 lb1579 lbEqn. 29.4-2

$F_v = q_h \cdot (G \cdot C_e) \cdot A_f =$ 695 lbEqn. 29.4-3

Moments (Unfactored)

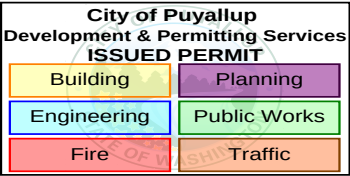
	F ₁	F ₂
M _{OT Seismic} =	5981 lb-ft	5981 lb-ft
M _{OT Wind} =	2834 lb-ft	5724 lb-ft
M _{R SL} =	2936 lb-ft	1286 lb-ft
M _{R DL Unit} =	7231 lb-ft	3169 lb-ft
M _{R DL Curb} =	1113 lb-ft	488 lb-ft

Combinations (ASD):

Combination	Overturning		Vertical Force		Tension		Compression		Shear	
	OT ₁	OT ₂	Uplift	Downdrag	T ₁	T ₂	C ₁	C ₂	V ₁	V ₂
0.6DL-0.6WL	-3306 lb-ft	1241 lb-ft	417 lb	0 lb	0 lb	590 lb	446 lb	0 lb	-469 lb	-947 lb
0.6DL-0.7EQ	-820 lb-ft	1993 lb-ft	321 lb	321 lb	50 lb	773 lb	271 lb	0 lb	-802 lb	-802 lb
DL+SL	-11280 lb-ft	-4943 lb-ft	0 lb	0 lb	0 lb	0 lb	1521 lb	1521 lb	0 lb	0 lb
DL+0.6WL	-10044 lb-ft	-7091 lb-ft	417 lb	0 lb	0 lb	0 lb	1354 lb	2182 lb	469 lb	947 lb
DL+0.45WL+0.75SL	-11821 lb-ft	-7197 lb-ft	313 lb	0 lb	0 lb	0 lb	1594 lb	2214 lb	352 lb	711 lb
DL+0.7EQ	-12530 lb-ft	-7843 lb-ft	321 lb	321 lb	0 lb	0 lb	1850 lb	2573 lb	802 lb	802 lb
DL+0.525EQ+0.75SL	-13685 lb-ft	-7761 lb-ft	241 lb	241 lb	0 lb	0 lb	1965 lb	2508 lb	601 lb	601 lb

Design (ASD):

Tension		Compression		Shear	
T ₁	T ₂	C ₁	C ₂	V ₁	V ₂
50 lb	773 lb	1965 lb	2573 lb	802 lb	947 lb



Project Title: CHC Puyallup
 Engineer: LMC
 Project ID:
 Project Descr:

City of Puyallup Development & Permitting Services ISSUED PERMIT	
Building	Planning
Engineering	Public Works
Fire	Traffic

Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: New roof bm grid D near grids 8 & 5

CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : IBC 2018

Wood Species : Douglas Fir-Larch

Wood Grade : No.2

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb + 900 psi

Fb - 900 psi

Fc - Prll 1350 psi

Fc - Perp 625 psi

Fv 180 psi

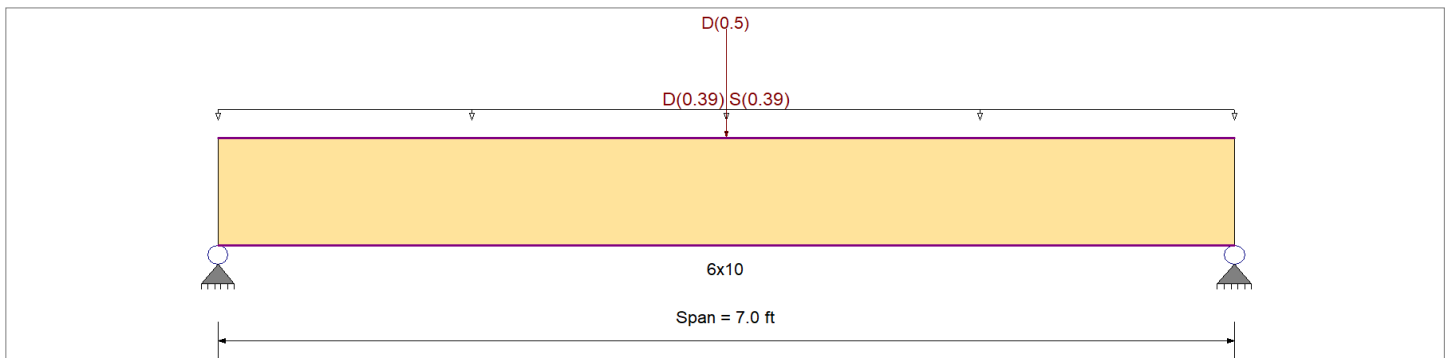
Ft 575 psi

E : Modulus of Elasticity

Ebend- xx 1600ksi

Eminbend - xx 580ksi

Density 31.21pcf



Applied Loads

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

Beam self weight NOT internally calculated and added

Uniform Load : D = 0.0250, S = 0.0250 ksf, Tributary Width = 15.60 ft, (roof)

Point Load : D = 0.50 k @ 3.50 ft, (mech)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.792	1	Maximum Shear Stress Ratio	=	0.330	: 1
Section used for this span		6x10		Section used for this span		6x10	
fb: Actual	=	819.90psi		fv: Actual	=	68.39 psi	
Fb: Allowable	=	1,035.00psi		Fv: Allowable	=	207.00 psi	
Load Combination		+D+S		Load Combination		+D+S	
Location of maximum on span	=	3.500ft		Location of maximum on span	=	6.234 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	

Maximum Deflection

Max Downward Transient Deflection	0.034 in	Ratio =	2492	>=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.077 in	Ratio =	1086	>=240	Span: 1 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0	<240	n/a

Maximum Forces & Stresses for Load Combinations

Load Combinations																	
Load Combination		Max Stress Ratios									Moment Values			Shear Values			
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v	
D Only													0.00	0.00	0.00	0.00	
Length = 7.0 ft	1	0.584	0.233	0.90	1.000	1.00	1.00	1.00	1.00	1.00	3.26	473.41	810.00	1.32	37.78	162.00	
+D+S					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 7.0 ft	1	0.792	0.330	1.15	1.000	1.00	1.00	1.00	1.00	1.00	5.65	819.90	1035.00	2.38	68.39	207.00	
+D+0.750S					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 7.0 ft	1	0.708	0.293	1.15	1.000	1.00	1.00	1.00	1.00	1.00	5.06	733.28	1035.00	2.12	60.74	207.00	
+0.60D					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 7.0 ft	1	0.197	0.079	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.96	284.05	1440.00	0.79	22.67	288.00	

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0773	3.526		0.0000	0.000

PRCTI20221698

Wood Beam

Project File: CHC Puyallup calcs.ec6

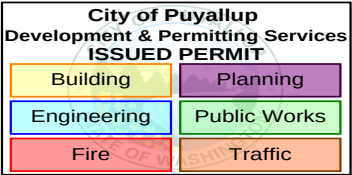
LIC# : KW-06014122, Build:20.22.7.25 PCS STRUCTURAL SOLUTIONS (c) ENERCALC INC 1983-2022

DESCRIPTION: New roof bm grid D near grids 8 & 5

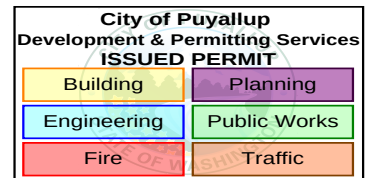
Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.980	2.980
Overall MINimum	1.365	1.365
D Only	1.615	1.615
+D+S	2.980	2.980
+D+0.750S	2.639	2.639
+0.60D	0.969	0.969
S Only	1.365	1.365



Project Title: **CHC Puyallup**
 Engineer: **LMC**
 Project ID:
 Project Descr:



Project File: CHC Puyallup calcs.ec6

Wood Beam

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) Roof Bm at 8.6/E w/ mech load

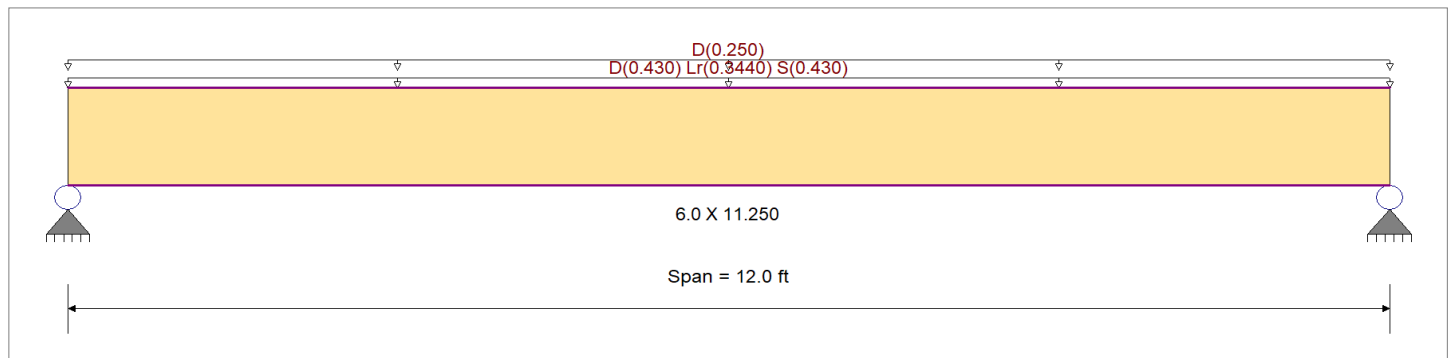
CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design	Fb +	1,700.0 psi	E : Modulus of Elasticity	
Load Combination : IBC 2018	Fb -	1,700.0 psi	Ebend- xx	1,300.0ksi
	Fc - Prll	1,400.0 psi	Eminbend - xx	660.75ksi
Wood Species : iLevel Truss Joist	Fc - Perp	680.0 psi		
Wood Grade : TimberStrand LSL 1.3E - Beam/Col	Fv	400.0 psi		
	Ft	1,075.0 psi	Density	45.010pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

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

Beam self weight calculated and added to loading

Loads on all spans...

Uniform Load on ALL spans : D = 0.0250, Lr = 0.020, S = 0.0250 ksf, Tributary Width = 17.20 ft

Partial Length Uniform Load : D = 0.250 k/ft, Extent = 0.0 --> 12.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio				Maximum Shear Stress Ratio			
Section used for this span	=	0.987	1	Section used for this span	=	0.278	1
fb: Actual	=	1,930.41psi		fv: Actual	=	127.70 psi	
Fb: Allowable	=	1,955.00psi		Fv: Allowable	=	460.00 psi	
Load Combination	=	+D+S+H		Load Combination	=	+D+S+H	
Location of maximum on span	=	6.000ft		Location of maximum on span	=	0.000 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection	0.218 in	Ratio =	660 >= 360	Span: 1 : S Only			
Max Upward Transient Deflection	0 in	Ratio =	0 < 360	n/a			
Max Downward Total Deflection	0.574 in	Ratio =	251 >= 240	Span: 1 : +D+S+H			
Max Upward Total Deflection	0 in	Ratio =	0 < 240	n/a			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L		M	fb	F'b	V	fv	F'v
+D+H														0.00			
Length = 12.0 ft	1	0.782	0.220	0.90	1.000	1.00	1.00	1.00	1.00	1.00		12.62	1,196.54	1530.00	3.56	79.15	360.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00			
Length = 12.0 ft	1	0.839	0.236	1.25	1.000	1.00	1.00	1.00	1.00	1.00		18.81	1,783.63	2125.00	5.31	117.99	500.00
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00				0.00			
Length = 12.0 ft	1	0.987	0.278	1.15	1.000	1.00	1.00	1.00	1.00	1.00		20.36	1,930.41	1955.00	5.75	127.70	460.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.5735	6.044		0.0000	0.000

PRCTI20221698

Wood Beam

Project File: CHC Puyallup calcs.ec6

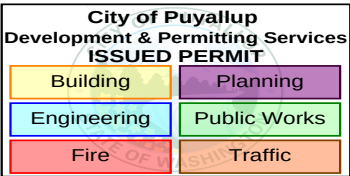
LIC# : KW-06014122, Build:20.22.7.25 PCS STRUCTURAL SOLUTIONS (c) ENERCALC INC 1983-2022

DESCRIPTION: Check (E) Roof Bm at 8.6/E

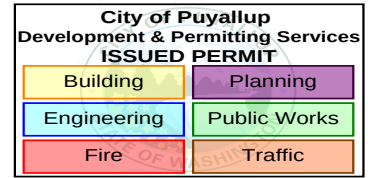
Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	6.787	6.787
Overall MINimum	2.580	2.580
+D+Lr+H	6.271	6.271
+D+S+H	6.787	6.787
D Only	4.207	4.207
Lr Only	2.064	2.064
S Only	2.580	2.580



Project Title:
 Engineer:
 Project ID:
 Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: New Roof Bm 1 under 4000# unit in mech well

CODE REFERENCES

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

Load Combination Set : IBC 2018

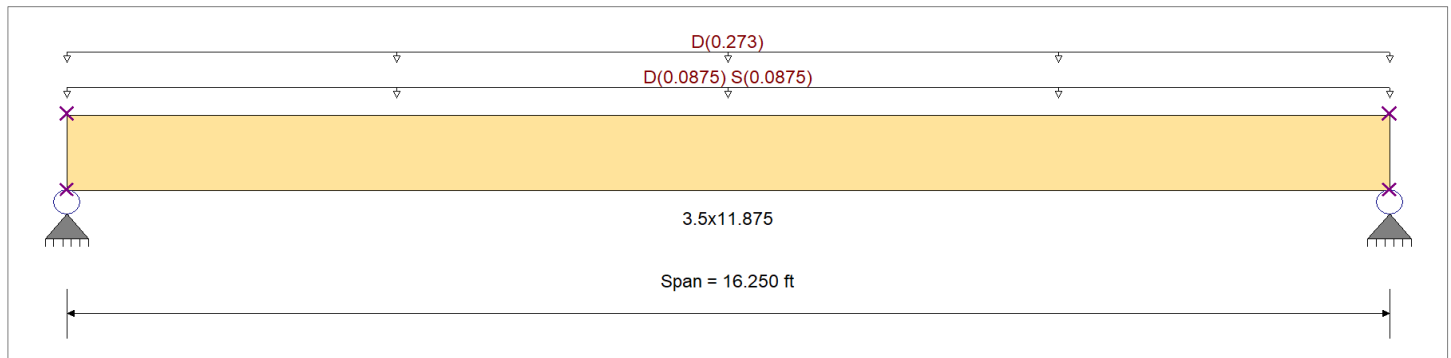
Material Properties

Analysis Method : Allowable Stress Design
 Load Combination : IBC 2018

Wood Species : iLevel Truss Joist
 Wood Grade : Parallam PSL 2.0E

Beam Bracing : Completely Unbraced

Fb +	2,900.0 psi	E : Modulus of Elasticity	
Fb -	2,900.0 psi	Ebend- xx	2,000.0 ksi
Fc - Prll	2,900.0 psi	Eminbend - xx	1,016.54 ksi
Fc - Perp	750.0 psi		
Fv	290.0 psi		
Ft	2,025.0 psi	Density	45.070 pcf



Applied Loads

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

Beam self weight calculated and added to loading

Uniform Load : D = 0.0250, S = 0.0250 ksf, Tributary Width = 3.50 ft, (roof)

Uniform Load : D = 0.2730, Tributary Width = 1.0 ft, (w mech)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.795	1	Maximum Shear Stress Ratio	=	0.371	1
Section used for this span		3.5x11.875		Section used for this span		3.5x11.875	
fb: Actual	=	2,219.85 psi		fv: Actual	=	96.73 psi	
Fb: Allowable	=	2,791.07 psi		Fv: Allowable	=	261.00 psi	
Load Combination		+D+S		Load Combination		D Only	
Location of maximum on span	=	8.125 ft		Location of maximum on span	=	0.000 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	

Maximum Deflection

Max Downward Transient Deflection	0.141 in	Ratio =	1379	>=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.745 in	Ratio =	261	>=240	Span: 1 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0	<240	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L		M	fb	F'b	V	fv	F'v
D Only																	
Length = 16.250 ft	1	0.760	0.371	0.90	1.000	1.00	1.00	1.00	1.00	0.91		12.33	1,798.52	2365.10	0.00	0.00	0.00
+D+S																	
Length = 16.250 ft	1	0.795	0.358	1.15	1.000	1.00	1.00	1.00	1.00	0.84		15.22	2,219.85	2791.07	3.31	119.40	333.50

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.7448	8.184		0.0000	0.000

Vertical Reactions

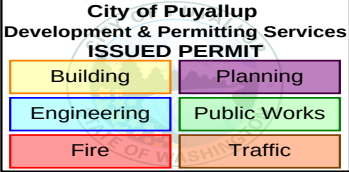
Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.746	3.746

PRCTI20221698

Project Title:
Engineer:
Project ID:
Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25 PCS STRUCTURAL SOLUTIONS (c) ENERCALC INC 1983-2022

DESCRIPTION: New Roof Bm 1 under 4000# unit in mech well

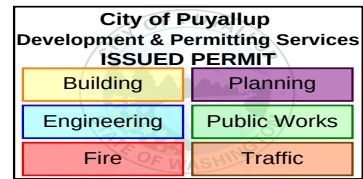
Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MINimum	0.711	0.711
+D+S	3.746	3.746
D Only	3.035	3.035
S Only	0.711	0.711

Project Title:
Engineer:
Project ID:
Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: New Roof Bm 2 under 4000# unit in mech well

CODE REFERENCES

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

Load Combination Set : IBC 2018

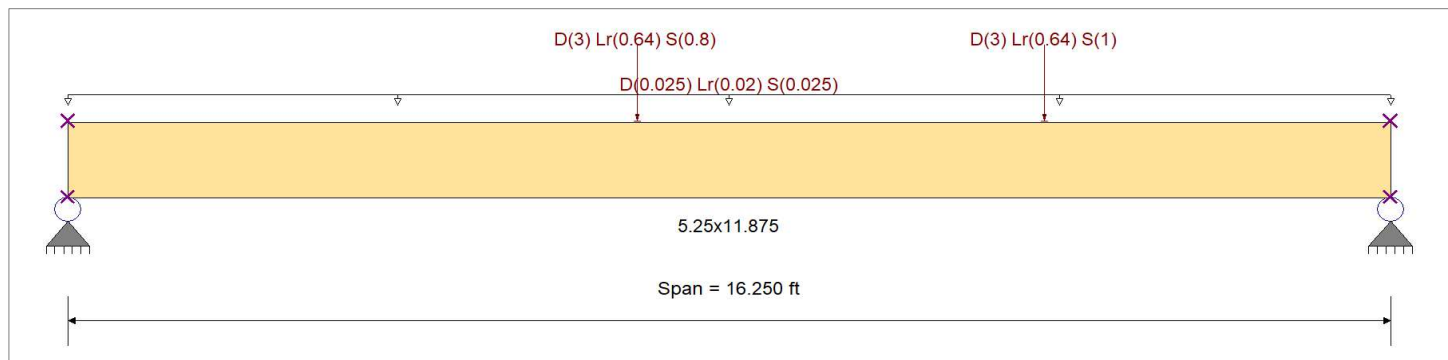
Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2018

Wood Species : iLevel Truss Joist
Wood Grade : Parallam PSL 2.0E

Beam Bracing : Completely Unbraced

Fb +	2,900.0 psi	E : Modulus of Elasticity	
Fb -	2,900.0 psi	Ebend- xx	2,000.0ksi
Fc - Prll	2,900.0 psi	Eminbend - xx	1,016.54ksi
Fc - Perp	750.0 psi		
Fv	290.0 psi		
Ft	2,025.0 psi	Density	45.070pcf



Applied Loads

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

Beam self weight calculated and added to loading

Uniform Load : D = 0.0250, Lr = 0.020, S = 0.0250 ksf, Tributary Width = 1.0 ft, (roof)

Point Load : D = 3.0, Lr = 0.640, S = 0.80 k @ 7.0 ft, (mech bm1)

Point Load : D = 3.0, Lr = 0.640, S = 1.0 k @ 12.0 ft, (mech bm 1)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio			=	0.745	1	Maximum Shear Stress Ratio			=	0.367	: 1
Section used for this span				5.25x11.875		Section used for this span				5.25x11.875	
fb: Actual			=	2,403.05 psi		fv: Actual			=	122.46 psi	
Fb: Allowable			=	3,223.67 psi		Fv: Allowable			=	333.50 psi	
Load Combination				+D+S		Load Combination				+D+S	
Location of maximum on span			=	6.998 ft		Location of maximum on span			=	15.301 ft	
Span # where maximum occurs			=	Span # 1		Span # where maximum occurs			=	Span # 1	
Maximum Deflection											
Max Downward Transient Deflection				0.185 in	Ratio =	1053	>=360	Span: 1 : S Only			
Max Upward Transient Deflection				0 in	Ratio =	0	<360	n/a			
Max Downward Total Deflection				0.769 in	Ratio =	253	>=240	Span: 1 : +D+S			
Max Upward Total Deflection				0 in	Ratio =	0	<240	n/a			

Maximum Forces & Stresses for Load Combinations

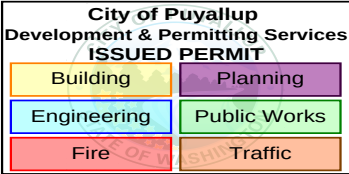
Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v
+D+Lr													0.00	0.00	0.00	0.00
Length = 16.250 ft	1	0.648	0.313	1.25	1.000	1.00	1.00	1.00	1.00	0.96	23.25	2,261.24	3486.96	4.72	113.54	362.50
+D+S													0.00	0.00	0.00	0.00
Length = 16.250 ft	1	0.745	0.367	1.15	1.000	1.00	1.00	1.00	1.00	0.97	24.71	2,403.05	3223.67	5.09	122.46	333.50

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.7693	8.303		0.0000	0.000

PRCTI20221698

Project Title:
Engineer:
Project ID:
Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25 PCS STRUCTURAL SOLUTIONS (c) ENERCALC INC 1983-2022

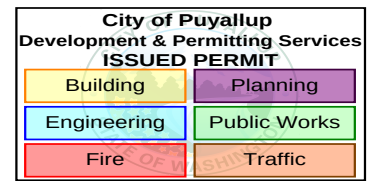
DESCRIPTION: New Roof Bm 2 under 4000# unit in mech well

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.774	5.156
Overall MINimum	0.920	1.286
+D+Lr	3.548	4.780
+D+S	3.774	5.156
D Only	2.854	3.869
Lr Only	0.694	0.911
S Only	0.920	1.286

Project Title:
Engineer:
Project ID:
Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC#: KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: New Roof Bm 3 under Rooftop ODUs in mech well

CODE REFERENCES

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

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2018

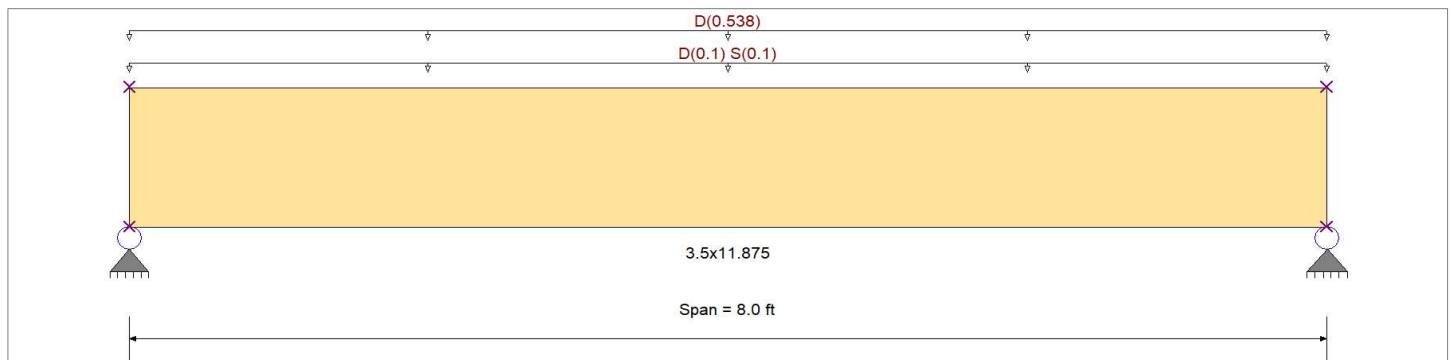
Wood Species : iLevel Truss Joist
Wood Grade : Parallam PSL 2.0E

Beam Bracing : Completely Unbraced

Fb + 2,900.0 psi
Fb - 2,900.0 psi
Fc - Prll 2,900.0 psi
Fc - Perp 750.0 psi
Fv 290.0 psi
Ft 2,025.0 psi

E : Modulus of Elasticity
Ebend- xx 2,000.0ksi
Eminbend - xx 1,016.54ksi

Density 45.070pcf



Applied Loads

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

Beam self weight calculated and added to loading

Uniform Load : D = 0.0250, S = 0.0250 ksf, Tributary Width = 4.0 ft, (roof)

Uniform Load : D = 0.5380, Tributary Width = 1.0 ft, (w mech)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio				Maximum Shear Stress Ratio			
Section used for this span	=	0.300	1	Section used for this span	=	0.273	1
fb: Actual	=	759.76	psi	fv: Actual	=	71.34	psi
Fb: Allowable	=	2,530.37	psi	Fv: Allowable	=	261.00	psi
Load Combination	=	D Only		Load Combination	=	D Only	
Location of maximum on span	=	4.000	ft	Location of maximum on span	=	7.036	ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	

Maximum Deflection

Max Downward Transient Deflection	0.009 in	Ratio =	10116	>=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.071 in	Ratio =	1347	>=240	Span: 1 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0	<240	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L		M	fb	F'b	V	fv	F'v
D Only																	
Length = 8.0 ft	1	0.300	0.273	0.90	1.000	1.00	1.00	1.00	1.00	0.97		5.21	759.76	2530.37	0.00	0.00	0.00
+D+S																	
Length = 8.0 ft	1	0.275	0.247	1.15	1.000	1.00	1.00	1.00	1.00	0.95		6.01	876.46	3184.37	2.28	82.30	333.50

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0713	4.029		0.0000	0.000

Vertical Reactions

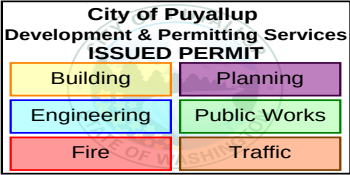
Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.004	3.004

PRCTI20221698

Project Title:
Engineer:
Project ID:
Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: New Roof Bm 3 under Rooftop ODUs in mech well

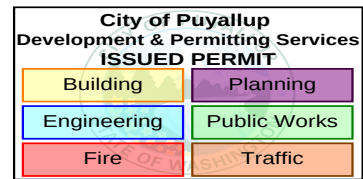
Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MINimum	0.400	0.400
+D+S	3.004	3.004
D Only	2.604	2.604
S Only	0.400	0.400

Project Title:
 Engineer:
 Project ID:
 Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2022

DESCRIPTION: New Roof Bm 4 under Rooftop ODUs in mech well

CODE REFERENCES

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

Load Combination Set : IBC 2018

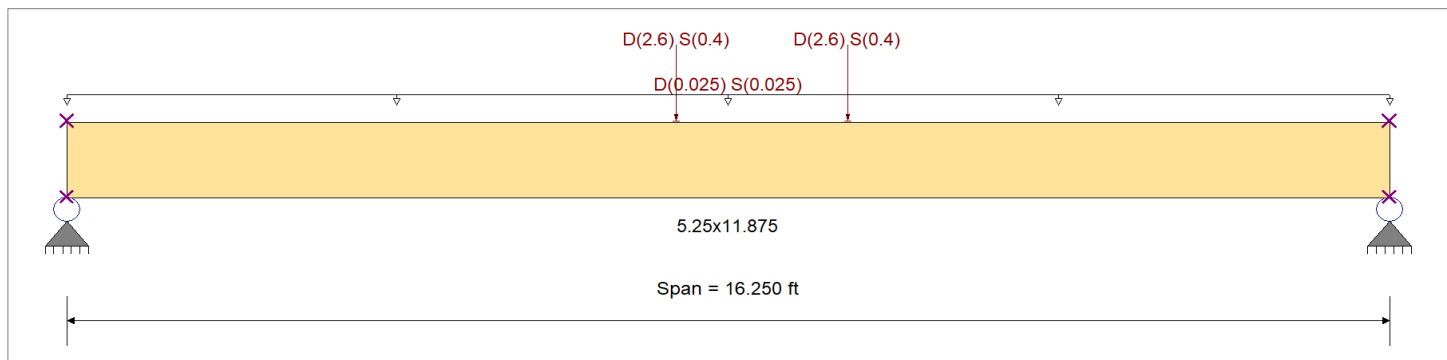
Material Properties

Analysis Method : Allowable Stress Design
 Load Combination : IBC 2018

Wood Species : iLevel Truss Joist
 Wood Grade : Parallam PSL 2.0E

Beam Bracing : Completely Unbraced

Fb + 2,900.0 psi E : Modulus of Elasticity
 Fb - 2,900.0 psi Ebend- xx 2,000.0ksi
 Fc - Prll 2,900.0 psi Eminbend - xx 1,016.54ksi
 Fc - Perp 750.0 psi
 Fv 290.0 psi
 Ft 2,025.0 psi Density 45.070pcf



Applied Loads

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

Beam self weight calculated and added to loading

Uniform Load : D = 0.0250, S = 0.0250 ksf, Tributary Width = 1.0 ft, (roof)

Point Load : D = 2.60, S = 0.40 k @ 7.50 ft, (P bm 3)

Point Load : D = 2.60, S = 0.40 k @ 9.60 ft, (P bm 3)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio			=	0.761 : 1	Maximum Shear Stress Ratio			=	0.282 : 1
Section used for this span				5.25x11.875	Section used for this span				5.25x11.875
fb: Actual			=	1,938.96 psi	fv: Actual			=	73.51 psi
Fb: Allowable			=	2,549.18 psi	Fv: Allowable			=	261.00 psi
Load Combination				D Only	Load Combination				D Only
Location of maximum on span			=	7.532ft	Location of maximum on span			=	15.301 ft
Span # where maximum occurs			=	Span # 1	Span # where maximum occurs			=	Span # 1
Maximum Deflection									
Max Downward Transient Deflection			0.109 in	Ratio =	1782	>=360		Span: 1 : S Only	
Max Upward Transient Deflection			0 in	Ratio =	0	<360		n/a	
Max Downward Total Deflection			0.693 in	Ratio =	281	>=240		Span: 1 : +D+S	
Max Upward Total Deflection			0 in	Ratio =	0	<240		n/a	

Maximum Forces & Stresses for Load Combinations

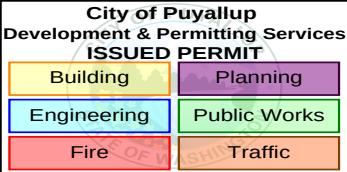
Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v
D Only													0.00			
Length = 16.250 ft	1	0.761	0.282	0.90	1.000	1.00	1.00	1.00	1.00	0.98	19.94	1,938.96	2549.18	3.06	73.51	261.00
+D+S													0.00			
Length = 16.250 ft	1	0.712	0.264	1.15	1.000	1.00	1.00	1.00	1.00	0.97	23.60	2,295.22	3223.67	3.66	87.96	333.50

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.6935	8.244		0.0000	0.000

PRCTI20221698

Project Title:
Engineer:
Project ID:
Project Descr:



Wood Beam

Project File: CHC Puyallup calcs.ec6

LIC# : KW-06014122, Build:20.22.7.25 PCS STRUCTURAL SOLUTIONS (c) ENERCALC INC 1983-2022

DESCRIPTION: New Roof Bm 4 under Rooftop ODUs in mech well

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.408	3.722
Overall MINimum	0.582	0.624
+D+S	3.408	3.722
D Only	2.826	3.098
S Only	0.582	0.624

RVE-85-52-30H

Unit Performance

Design Conditions						
Elevation (ft)	Summer		Winter DB (F)	Supply (CFM)	Outdoor Air (CFM)	Exhaust Air (CFM)
	DB (F)	WB (F)				
299	83.7	65.9	29.5	5,400	5,400	5,400

Unit Specifications					
Qty	Weight (lb)	Cooling Type	Heating Type	Unit Installation	Unit ETL Listing
1	3,832 (+/- 5%)	None	Electric	Outdoor	ULcUL 1995

Configuration				
Outdoor Air			Exhaust Air	
Intake	Discharge		Intake	Discharge
End	Side		Access Side	Side

Energy Recovery Performance									
Design Condition	Temperature (F)								Capacity Reduction (BTU/h)
	Outdoor Air		Supply Air		Return Air		Exhaust Air		
	DB	WB	DB	WB	DB	WB/RH	DB	WB	
Summer	83.7	65.9	77.7	63.6	75.0	62.5/50	80.9	64.9	43,740.0
Winter	29.5	24.8	57.9	46.7	72.0	55.8/35	43.1	36.8	165,629.0

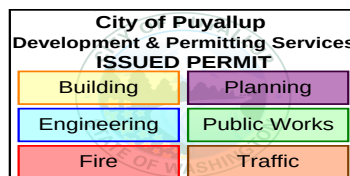
Heating Specifications				
Type	Capacity (kW)	Capacity Control	Performance	
			EAT (F)	LAT (F)
Electric	32.8	Modulating (SCR)	57.9	77.0

Air Performance							
Type	Total Volume (CFM)	External SP (in. wg)	Total SP (in. wg)	FRPM	Fan		
					Qty	Type	Drive-Type
Supply	5,400	1.5	4.071	1750	1	Plenum	Direct
Exhaust	5,400	1.5	3.06	1609	1	Plenum	Direct

Motor Specifications						
Motor	Qty	Operating Power (hp)	Size (hp)	Enclosure	Efficiency	RPM
Supply	1	5.63	7-1/2	ODP	PE	1770
Exhaust	1	4.49	5	ODP	PE	1760

Electrical Specifications				
Power Supply	Rating (V/C/P)	MCA (A)	MOP (A)	Fan Power (W/CFM)*
Unit	208/60/3	159.9	175.0	1.398

*Fan Power (W/CFM) = (Supply BHP + Exhaust BHP) / Supply CFM



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Construction Features And Accessories

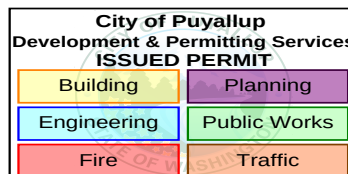
Unit	
Unit Installation - Outdoor	Std
Unit Construction - Double Wall	Std
Insulation - 2 inch 2.4# R13 foam	Std
Corrosion Resistant Fasteners	Std
Hinged Access	Std
Factory Wired Non-Fused Disconnect Switch	X
Direct Drive Plenum Blower & Motor Assemblies	Std
Factory Wired VFDs	Std
Unit Finish - Permatector, Concrete Gray (RAL 7023)	X
Stainless Steel Condensate Drain Pan and Connection	
Condensate Drain Trap	
Short Circuit Current - 5 kA	Std
Energy Recovery Device - Polymer Wheel w/ Silica Gel Desiccant	Std
Controls	
Unit Controls - Full Control	Std
Internally Mounted Control Center with 24 VAC control transformer(s) and control circuiting fusing	Std
BMS Protocol - None	
BMS Monitoring Points	
Supply Fan Control - Constant Volume-Adj. Setpoint	X
Exhaust Fan Control - Constant Volume-Adj. Setpoint	X
Energy Wheel Economizer Control	
Economizer Control	
Exhaust Fan Only Power	
Energy Wheel Rotation Sensor	
Web-Based User Interface	Std
Outd/Rec. Air Damper Ctrl - 100% OA-No Recirculation	X
Control Accessories	
Remote Display	
Dirty Filter Sensor(s)	
Airflow Monitor	
Room Thermostat	
Phase/Brownout Protection	
Economizer Fault Detection Diagnostics	

Accessories	
Frost Control - Modulating Wheel	X
Outdoor Air Damper - Low Leakage	X
Return Air Damper	
Roof Curb - GKD - 63.74/192.7-G14	X
Supply Air Filters - 2" Merv 13, 8-16x25x2	X
Service Outlet	
Piping Vestibule	
Vapor Tight Lights	
Condensate Overflow Switch	
Spare Filters	
Exhaust Discharge Gravity Backdraft Damper	Std
ElectroFin Coil Coating	
Motor Shaft Grounding	
Energy Wheel Bypass Damper	
Return Air Filters - 2" Merv 8, 4-16x25x2	Std
Outdoor Air Filters - 2" Merv 8, 4-16x25x2	Std
Furnace Control	
Spare Energy Wheel Belt	
Spare Energy Wheel Segments	
UV Lights	
Bipolar Ionization	
Warranty Options	
Unit Warranty - 1 Yr (Standard)	Std
Energy Wheel Warranty - 5 Yrs Less Motor	Std

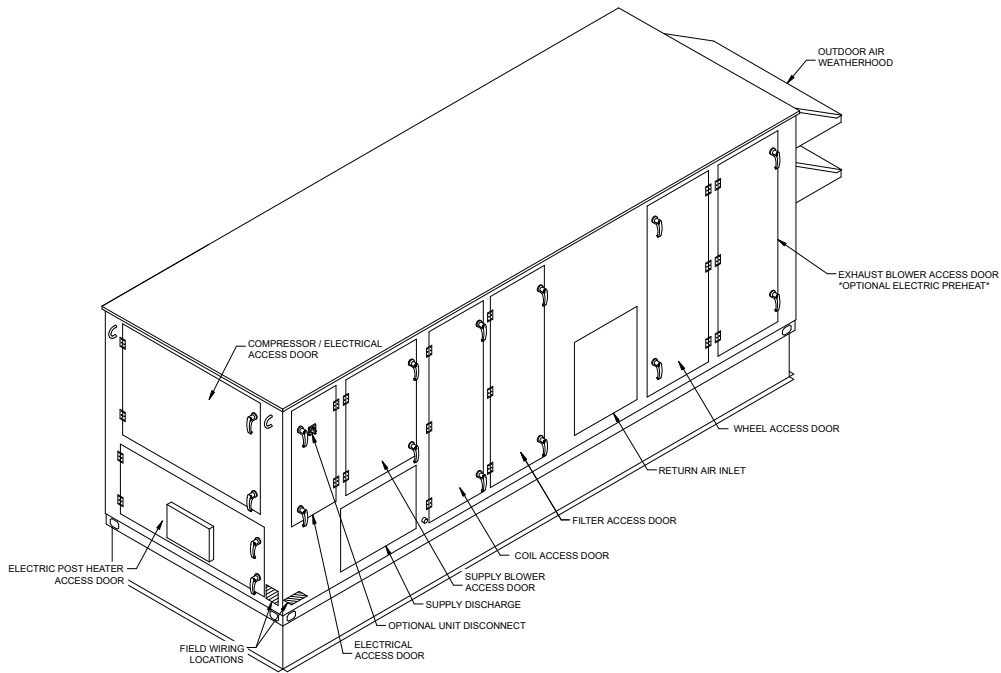
Standard Option	Std
Not Included	
Included	X

Notes

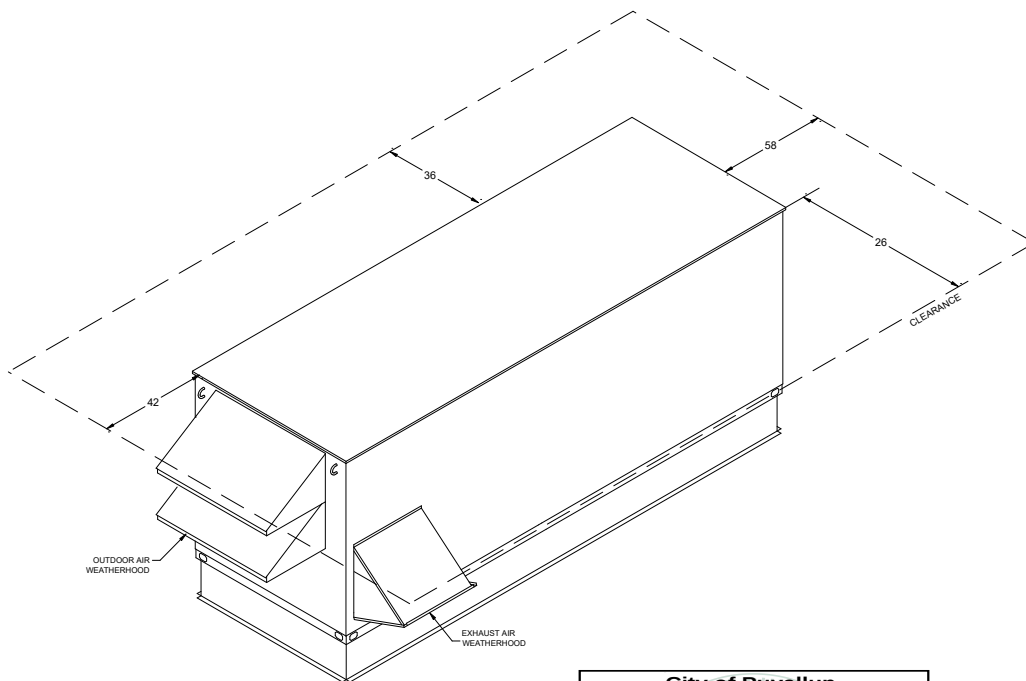
Outdoor Air Damper supplied is low leakage, motorized VCD-23 (leakage rate of 3 CFM / ft² @ 1 in. wg), Class 1A



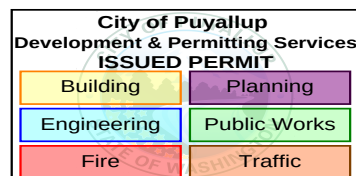
Isometric Drawings



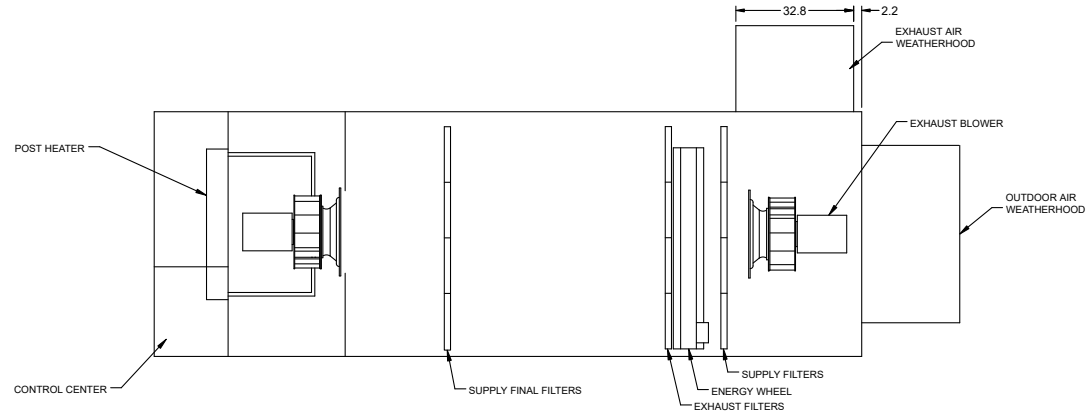
Back Right Isometric



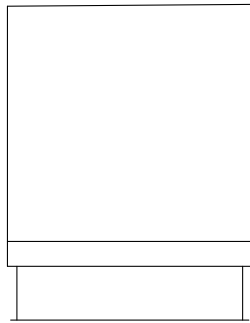
Front Left Isometric



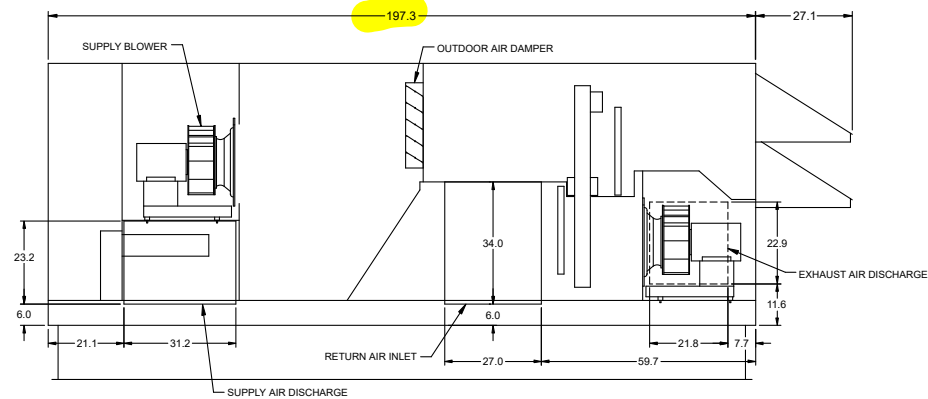
Overview Drawings



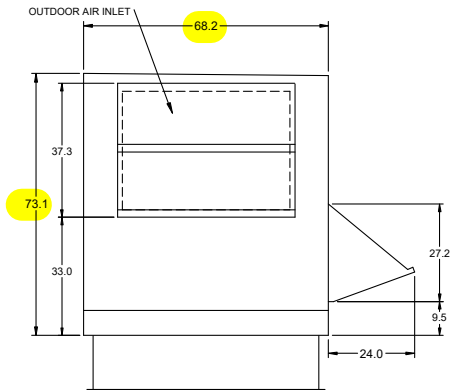
Plan



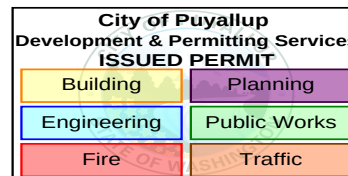
Left End



Elevation



Right End

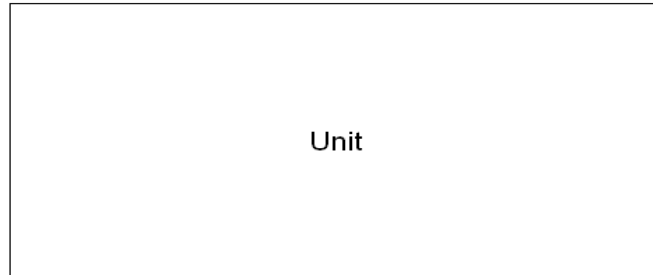


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Unit Corner Weights

920 lb

1,007 lb



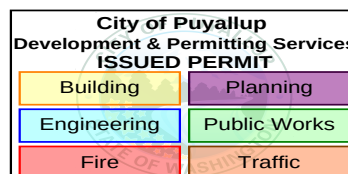
Unit

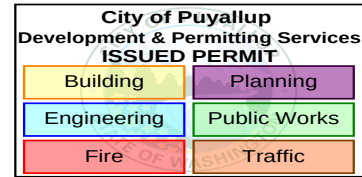
909 lb

995 lb

Note

Estimated corner weights are shown looking down on unit and the outside air intake will be on the right. Weights are applied at the base of the unit. Images not drawn to scale.



**GKD Roof Curb**

Model: GKD-63.74/192.7-G14

Curb Height (in.)	Curb Length (in.)	Curb Width (in.)	Material	Finish Type	Duct Adapter	Curb Weight (lb)
14	192.7	63.74	Galvanized	Galvanized	Yes	316

Standard Construction Features:

All dimensions shown are actual and in units of in.'s

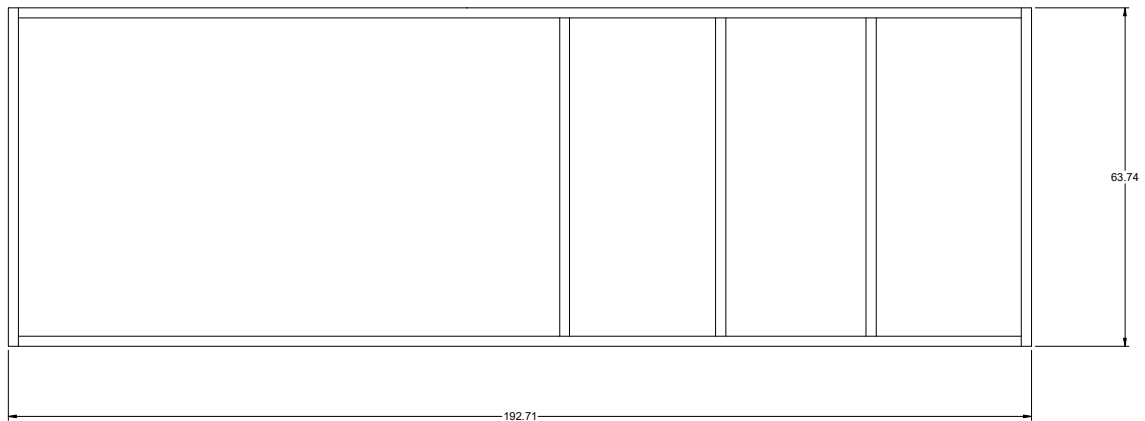
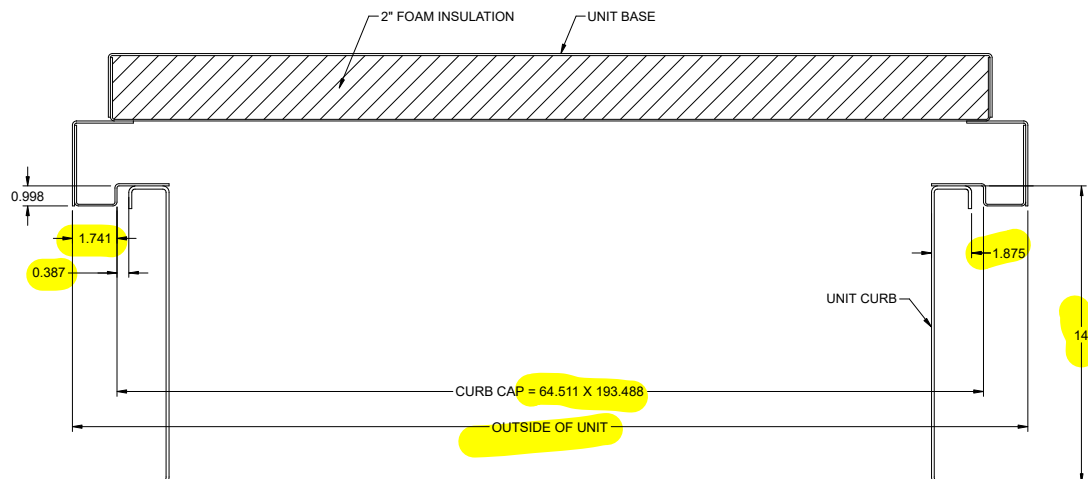
If unit is selected with side or end discharge/return, there will not be bottom connections supplied with the curb.

14 gauge galvanized steel (perimeter channels).

14 gauge galvanized steel (interior channels).

Ships knocked down for field assembly.

Curb insulation to be provided by others.

**Top View
of Curb****Cross-Section
View of Unit
on Curb**



DN SERIES DOAS

DEDICATED OUTDOOR AIR SYSTEMS AVAILABLE WITH
PACKAGED REFRIGERATION & ENERGY RECOVERY

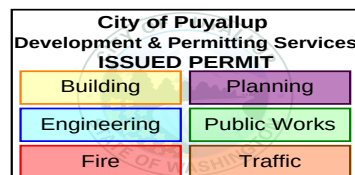


DOAS with Packaged
Refrigeration and Energy
Recovery shown

- ◆ DOAS units with static-plate total energy recovery
- ◆ 375–4,950 CFM
- ◆ Single-point connection, direct-drive EC fans, foam-injected panels
- ◆ Modular design
- ◆ Low dew point supply air
- ◆ Indoor/Outdoor (outdoor available with Packaged Refrigeration)

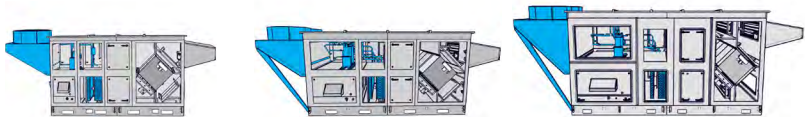


 **VENTILATION SOLUTIONS
FOR EVERY APPLICATION**



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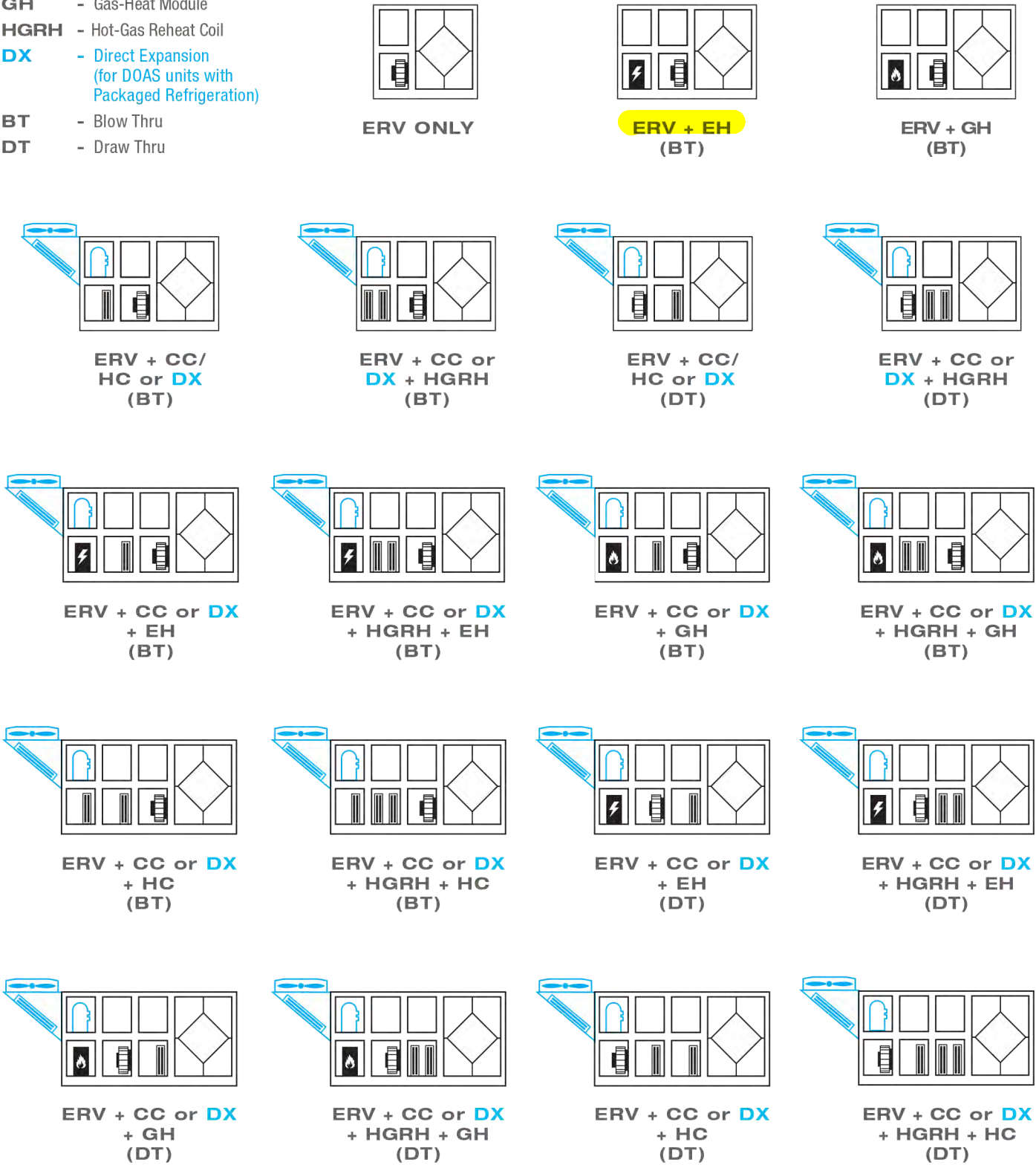
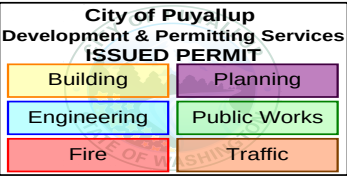
DN MODELS AT A GLANCE



		DN2	DN3	DN5
UNIT	Airflow Range	375–1,650 CFM	750–3,300 CFM	1,125–4,950 CFM
	Refrigeration Capacity (Packaged only)	2–10 tons	3.5–20 tons	5.5–30 tons
	Installation Location	Indoor/Outdoor	Indoor/Outdoor	Indoor/Outdoor
	Airflow Orientation	Vertical/Horizontal		
	Available Voltages	208–230V 1P (EC DN-2 only)/3P (all); 460V 3P (all); 575V (VFD only)		
	Unit Disconnect	Single-point connection/fused (optional)		
	Energy Recovery	RenewAire enthalpic static-plate G5		
	Theoretical ISMRE	49°F/49°F	5.6	5.7
		53°F/53°F	6.1	5.9
	Internal Bypass of Energy Recovery	Yes, modulating bypass using face and bypass dampers		
CABINET	Refrigerant	R410A (DN Series with Packaged Refrigeration)		
	Wall Construction	1" or 2" double-wall, injected foam panels (2" optional)		
	Insulation	1" R-6.5/2" R-13.0		
	Panels with Thermal Break	Available on 2" double-wall units		
	Painted Cabinets	2,500-hour salt spray rated in white, grey or custom (optional)		
SUPPLY/EXHAUST FAN	Isolation Dampers	Low-leakage Class I dampers		
	Supply Blower	High-efficiency plenum fans		
	Supply Fan Type	Direct-drive		
	Supply Fan Speed Control	ECM/VFD (optional)		
	Supply Fan Vibration Isolation	Neoprene/spring (VFD only)		
	Supply/Exhaust Fan Motor HP (kW)	200–277V 1P	1.35 kW	N/A
		200–240V 3P	2.70 kW	2.70 kW x2
		380–480V 3P	3.70 kW	3.70 kW x2
		575V 3P	3 HP	5 HP x2
		VFD	3 HP	5 HP x2
	Unit ESP	2" WC at 1,500 CFM	2.5" WC at 3,000 CFM	3" WC at 4,500 CFM
COOLING/ HEATING	Cooling Section	Direct expansion (R410A), chilled water, heat pump (optional)		
	Heating Section	Electric heat (SCR), indirect gas furnace (5:1, 10:1 modulation), hot water, heat pump, steam (optional)		
	Hot-Gas Reheat	Modulating (optional)		
CONTROLS	Economizer/Defrost Capability	Modulating		
	Microprocessor Controller	Integrated programmable controller		
	Control Hardware	Carel c.pCO mini		
	Optional Communications	BACnet MS/TP or IP, Modbus RTU or TCP		
	Airflow Monitoring	Yes		
OPTIONS	Recirculation Mode	Yes (optional)		
	GFCI Convenience Outlet	120VAC, 20A (field powered)		
	Roof Curbs	14" height		
	Seismic and Wind-Rated Curbs	Yes		
	MERV 8 (2" only), 13 and 14 Filters	Available in 2" and 4"		
	Mist Eliminator	3/8"		
	Drain-Overflow Switch	Yes		
	Coil Coatings	Yes		
	Certifications	For Core:  For Unit:  Tested to UL standards 1812 and 1995		

MODULAR DESIGNS

- ERV - Energy Recovery Ventilator
- EH - Electric Heater
- CC - Cooling Coil
- HC - Heating Coil
- GH - Gas-Heat Module
- HGRH - Hot-Gas Reheat Coil
- DX - Direct Expansion (for DOAS units with Packaged Refrigeration)
- BT - Blow Thru
- DT - Draw Thru



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ROOFTOP ERV2-2; ERV2-3; ERV2-4

Date: 9/20/2022
 Project Number: O-106127
 Project Name: CHC Puyallup Cannery
 Unit Tag: ERV2-2
 Model: DN-2-JRTBF133---E2EF4---L
 Qty: 1



Specifications



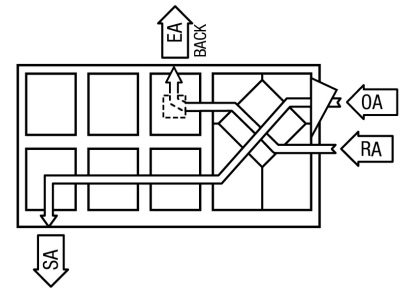
DN-3-JIN shown with electric heat and fan before coils

Ventilation Type: Static plate, heat and humidity transfer
 Typical Airflow Range: 375-1,650 CFM
 AHRI 1060 Certified Core: One L62-G5, One L125-G5
 OA Filters: Total Qty. 2, MERV 8: 16" x 20" x 2"
 RA Filters: Total Qty. 2, MERV 8: 16" x 20" x 2"
 Unit Weight: ~~1700 - 2800 lbs. (varies by option)~~
 1950#

Configuration

Unit Tag: ERV2-2
 Model: [DN-2] DN-2
 Core Type: [J] G5 Core
 Installation Location: [RT] Outdoor Unit
 SA Fan Location: [B] Before Coil
 Airflow Orientation: [F] Orientation F
 Insulation: [1] 1 Inch
 Electrical Service: [33] 208V / 3 Phase / 60 HZ
 Refrigeration Type: [-] None
 Cooling: [-] None
 Heating: [E] Electric Heater
 Heater Size: [2] 10 kW
 Fan Control: [E] ECM
 Unit Fusing: [F] Fused
 BACNet: [4] Yes
 Paint/Custom Unit: [-] None
 Safety Listing: [L] Listed
 Fan Power: 2.70kW
 GFCI Convenience Outlet: Yes
 Paint: No Paint
 OA Hood Moisture Eliminator: No
 Recirculation Damper: Yes
 Element Material: 60-20-20 Ni-Cr-Fe with Nickel-Plate Terminal Pins

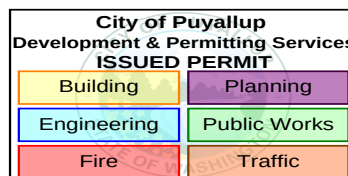
Airflow Orientation



Unit Accessories and Service Parts

Type	Part Number	Description	Quantity
Service Part	990229	RPART FILTER MERV 8 16X20X2	1
Accessory	109177	CURB DN-2 ERV+COIL OR HEAT	1
Accessory	131332	HEATER ELECTRIC RHW5208-10	1
Service Part	990230	RPART FILTER MERV 8 16X20X2 CASE 12	1

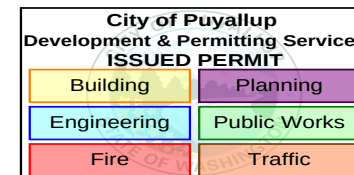
Unit ships with MERV-8 filters, all other accessory filters are shipped loose for field installation post startup.



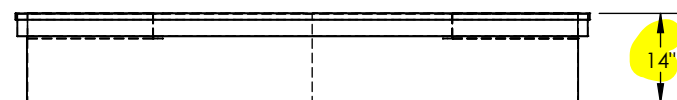
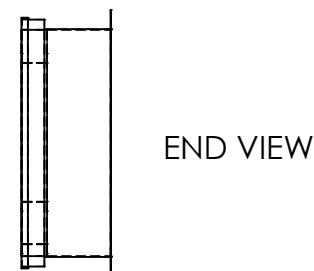
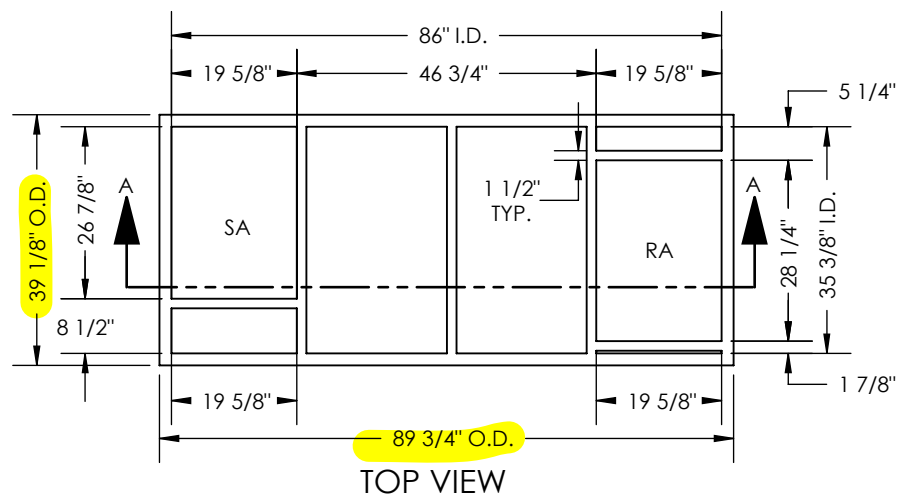
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DUCT SUPPORT DIMENSIONS
WIDTH: 1 1/2" DEPTH: 3"

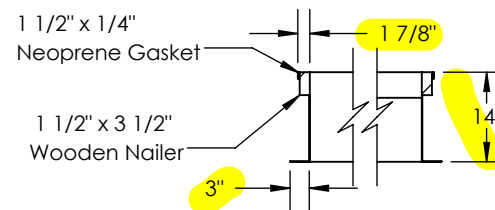
RA: Room Air to be exhausted
SA: Supply Air to inside



DN2RT
CURB DN2-ERV+C/H



CURB CROSS-SECTION A-A (TYP.)



SECTION A-A

ABBREVIATIONS

EA: Exhaust Air to outside
OA: Outside Air intake
RA: Room Air to be exhausted
SA: Supply Air to inside

INSTALLATION ORIENTATION

Unit must be installed in orientation shown.

NOTE

1. UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE ROUNDED TO THE NEAREST EIGHTH OF AN INCH.

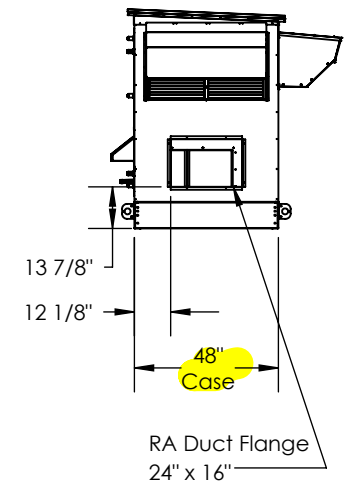
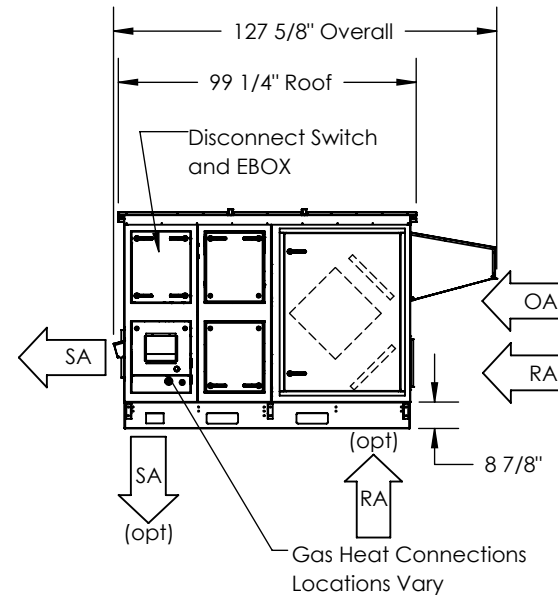
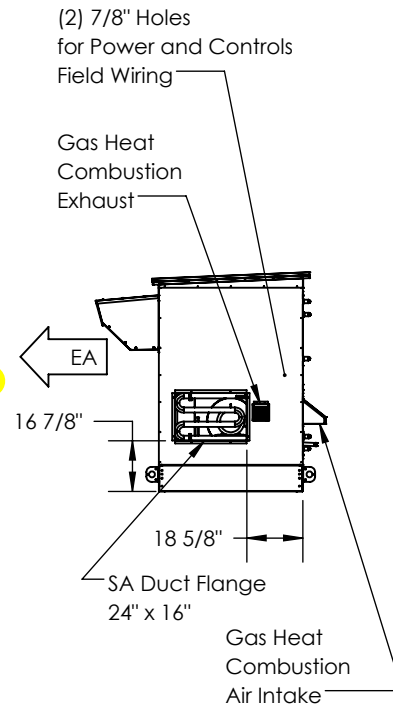
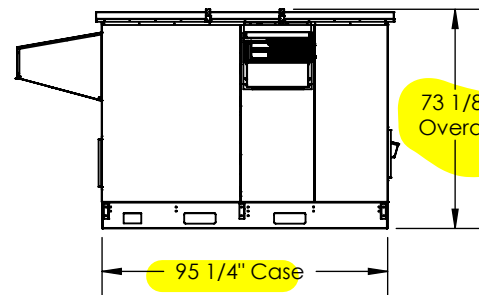
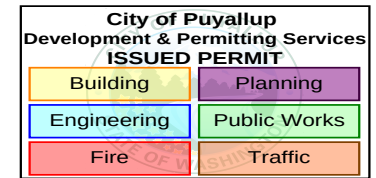
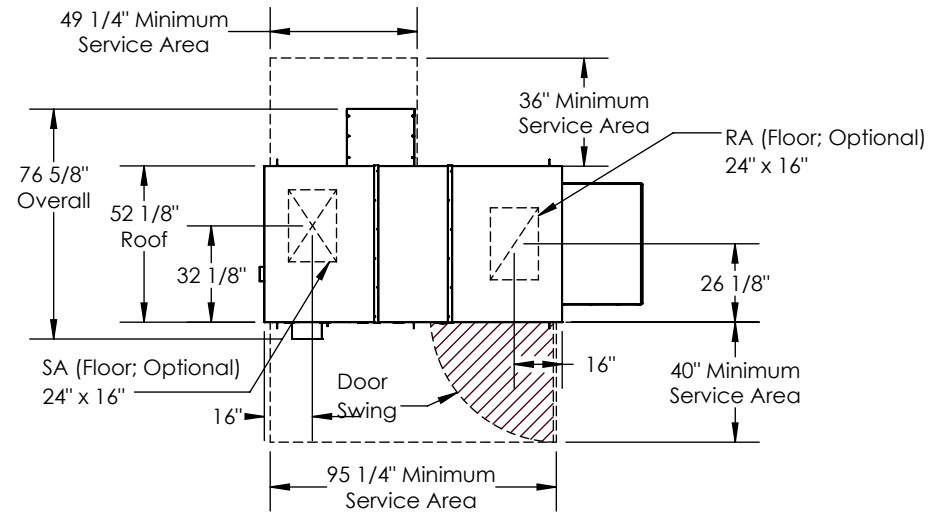
2. SPECIFICATIONS MAY BE SUBJECT TO CHANGE WITHOUT NOTICE.

3. FOR PIPE CONNECTION DETAILS REFER TO CORES OR UNIT SELECTION SUBMITTAL.

4. UNIT AND UNIT DOORS CANNOT BE MIRRORRED.

5. FOR CURB DETAILS REFER TO CURB DRAWING.

6. FOR PROJECT SPECIFIC DRAWINGS REFER TO PROJECT SUBMITTAL.



CITYMULTI®

20-TON TURYE2403BN40A(N/B)



Job Name:

System Reference:

Date:

208/230V OUTDOOR VRF HEAT RECOVERY SYSTEM



UNIT OPTION

- ☐ Standard Model.....TURYE2403BN40AN
☐ Seacoast (BS) Model.....TURYE2403BN40AB

ACCESSORIES

- ☒ Twinning Kit (Required).....CMY-R200NCBK
☒ BC Controller (Required).....for details see BC Controller Submittals
☐ Joint Kit.....for details see Pipe Accessories Submittal
☐ Panel Heater Kit.....for details see Panel Heater Kit Submittal
☐ Snow/Hail Guards Kit.....for details see Snow/Hail Guards Kit Submittal

Specifications			System
Unit Type			TURYE2403BN40A(N/B)
Cooling Capacity (Nominal)		BTU/H	240,000
Heating Capacity (Nominal)		BTU/H	270,000
Net Weight		Lbs. [kg]	1,244 [564]
Refrigerant Piping Diameter	Liquid (High Pressure)	In. [mm]	7/8 [22.2] Braze (Pipe Size Dependent on Piping Length)
	Gas (Low Pressure)	In. [mm]	1-3/8 [34.93] Braze
Max. Total Refrigerant Line Length		Ft.	2,460
Max. Refrigerant Line Length (Between ODU & IDU)		Ft.	541
Max. Control Wiring Length		Ft.	1,640
Indoor Unit Connectable	Total Capacity		50.0~150.0% of outdoor unit capacity
	Model/Quantity		P04~P96/2.0~50.0
Sound Pressure Levels		dB(A)	63.0/65.0
Sound Power Levels		dB(A)	83.0/83.5
Compressor Operating Range			7.5% to 100.0%
AHRI Ratings (Ducted/Non-ducted)	EER		11.7/12.2
	IEER		23.9/23.3
	COP		3.46/3.58
	SCHE		22.9/26.8

Specifications			Module 1	Module 2
Unit Type			TURYE1203AN40A(N/B)	TURYE1203AN40A(N/B)
Cooling Capacity (Nominal)		BTU/H	120,000	120,000
Heating Capacity (Nominal)		BTU/H	135,000	135,000
Guaranteed Operating Range ¹	Cooling ²	°F [°C]	23~126 [-5.0~52.0]	23~126 [-5.0~52.0]
Guaranteed Operating Range	Heating	°F [°C]	-13~60 [-25.0~15.5]	-13~60 [-25.0~15.5]
Extended Operating Range	Heating	°F [°C]	-27.4~60 [-33.0~15.5]	-27.4~60 [-33.0~15.5]
External Dimensions (H x W x D)		In. [mm]	71-5/8 x 48-7/8 x 29-3/16 [1,818 x 1,240 x 740]	71-5/8 x 48-7/8 x 29-3/16 [1,818 x 1,240 x 740]
Net Weight		Lbs. [kg]	622 [282]	622 [282]
External Finish			Pre-coated galvanized steel sheet (+powder coating for -BS type) [MUNSELL 5Y 8/1]	Pre-coated galvanized steel sheet (+powder coating for -BS type) [MUNSELL 5Y 8/1]
Electrical Power Requirements	Voltage, Phase, Hertz, Power Tolerance		208/230V, 3-phase, 60 Hz, ±10%	208/230V, 3-phase, 60 Hz, ±10%
Minimum Circuit Ampacity	A		41.0/38.0	41.0/38.0
Maximum Overcurrent Protection	A		60/60	60/60
Recommended Fuse Size	A		60/60	60/60
Recommended Minimum Wire Size	AWG [mm]		4/4 [21.2/21.2]	4/4 [21.2/21.2]
SCCR	kA		5	5
FAN ⁴	Type x Quantity		Propeller fan x 2	Propeller fan x 2
	Airflow Rate	CFM	8,300	8,300
	External Static Pressure	In. WG	Selectable; 0.00, 0.12, 0.24, 0.32, In. WG; factory set to 0 In. WG	Selectable; 0.00, 0.12, 0.24, 0.32, In. WG; factory set to 0 In. WG
Compressor	Type x Quantity		Inverter scroll hermetic compressor x 1	Inverter scroll hermetic compressor x 1
Refrigerant	Type x Original Charge		R410A x 17 lbs + 10.0 oz [8.0 kg]	R410A x 17 lbs + 10.0 oz [8.0 kg]
Protection Devices	High Pressure Protection		High pressure sensor, High pressure switch at 4.15 MPa (601 psi)	High pressure sensor, High pressure switch at 4.15 MPa (601 psi)
	Inverter Circuit (Comp./Fan)		Over-current protection	Over-current protection

NOTES:

Nominal cooling conditions (Test conditions are based on AHRI 1230)
 Indoor: 80°F DB./67°F WB. (26.7°C DB./19.4°C WB.), Outdoor: 95°F DB. (35°C DB.)
 Nominal heating conditions (Test conditions are based on AHRI 1230)
 Indoor: 70°F DB. (21.1°C DB.), Outdoor: 47°F DB./43°F WB. (8.3°C DB./6.1°C WB.)

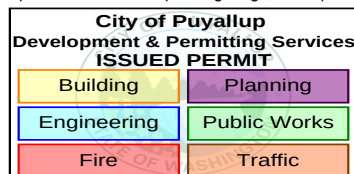
¹Harsh weather environments may demand performance enhancing equipment. Ask your Mitsubishi Electric representative for more details about your region

²For details on extended cooling operation range down to -10° F DB, see Low Ambient Kit Submittal

³When applying product below -4°F, consult your design engineer for cold climate application best practices, including the use of a backup source for heating

⁴Unit will continue to operate in extended operating range, but capacity is not guaranteed

Each individual module requires a separate electrical connection. Refer to electrical data for each individual module.

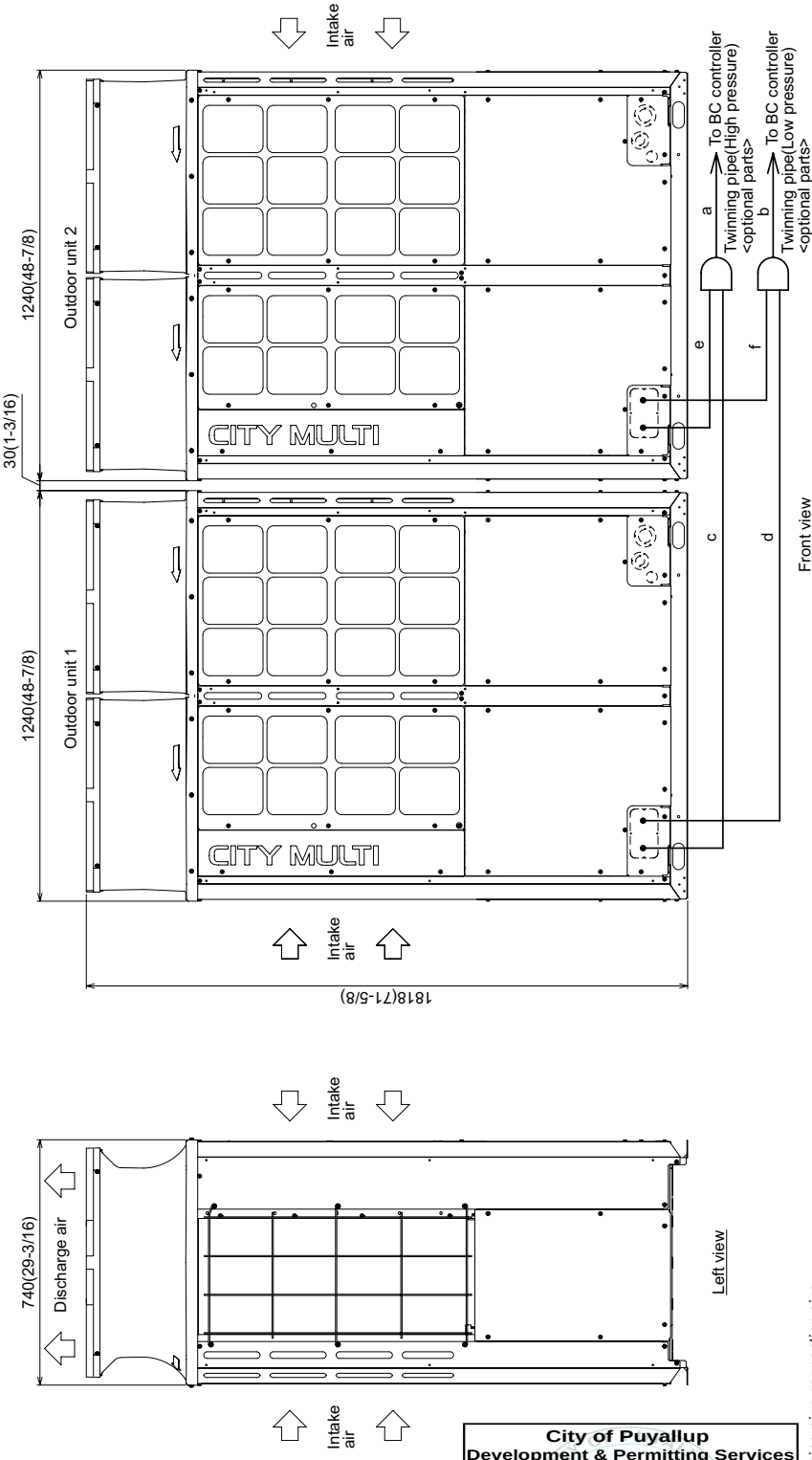


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OUTDOOR UNIT: TURYE2403BN40A(N/B) – DIMENSIONS

TURYE(192/216/240/264/288)3BN40A(N/B)

Unit: mm(in)



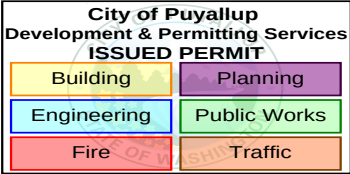
Unit model	High pressure core	Low pressure core
E096	ø19.05(3/4)	ø22.2(7/8)
E120	ø19.05(3/4)	ø28.58(1-1/8)
E144	ø22.2(7/8)	ø28.58(1-1/8)

Package unit name	TURYE192BN40A(N/B)	TURYE216BN40A(N/B)	TURYE240BN40A(N/B)	TURYE264BN40A(N/B)	TURYE288BN40A(N/B)
Component unit name	Outdoor unit 1	TURYE0963AN40A(N/B)	TURYE1203AN40A(N/B)	TURYE1443AN40A(N/B)	TURYE1683AN40A(N/B)
Outdoor unit 2	TURYE0963AN40A(N/B)	TURYE1203AN40A(N/B)	TURYE1443AN40A(N/B)	TURYE1683AN40A(N/B)	TURYE1923AN40A(N/B)
Outdoor twinning kit(optional parts)	TURYE0963AN40A(N/B)	TURYE1203AN40A(N/B)	TURYE1443AN40A(N/B)	TURYE1683AN40A(N/B)	TURYE1923AN40A(N/B)
BC controller	CMY-200NCBK	CMY-200NCBK	CMY-200NCBK	CMY-200NCBK	CMY-200NCBK
- twinning pipe	ø22.2(7/8)	ø22.2(7/8)	ø22.2(7/8)	ø22.2(7/8)	ø22.2(7/8)
High pressure	ø22.2(7/8)	ø22.2(7/8)	ø22.2(7/8)	ø22.2(7/8)	ø22.2(7/8)
Low pressure	ø28.58(1-1/8)	ø28.58(1-1/8)	ø28.58(1-1/8)	ø28.58(1-1/8)	ø28.58(1-1/8)

Twinning pipe connection size

- * When the piping length is 65m(213ft) or longer, use the ø28.58(1-1/8) pipe for the part that exceeds 65m(213ft).
- Note 1. Connect the pipes as shown in the figure above. Refer to the table above for the pipe size.
2. Twinning pipes should not be tilted more than 15 degrees from the horizontal plane. Be sure to see the Installation Manual for details of Twinning pipe installation.
3. The pipe section before the Twinning pipe (section "a" and "b" in the figure) must have at least 500mm(19-11/16) of straight section (*including the straight pipe that is supplied with the Twinning pipe).
4. Only use the Twinning pipe by Mitsubishi (optional parts).

NOTES:
SEACOAST PROTECTION
Anti-corrosion Protection: A coating treatment is applied to condenser coil for protection from air contaminants.
Standard: Salt Spray Test Method - no unusual rust development to 480 hours.
Sea Coast (BS): Salt Spray Test Method (JRA 9002) - no unusual rust development to 960 hours.



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MODULE 1: TURYE1203AN40A(N/B) – DIMENSIONS

TURYE(096/120/144)3AN40A(N/B)

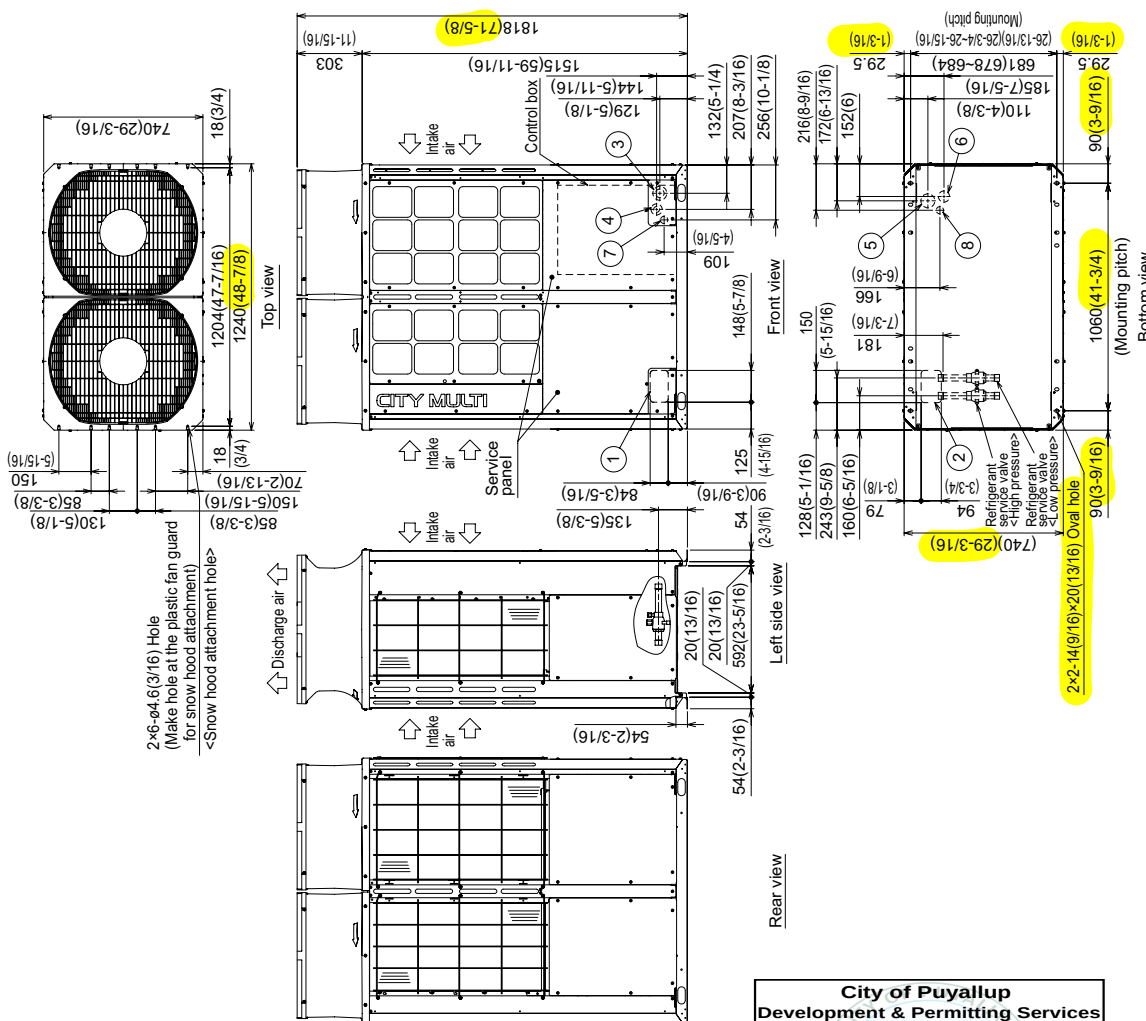
Unit: mm(in)

Note 1. At brazing of pipes, wrap the refrigerant service valve with wet cloth and keep the temperature of refrigerant service valve under 120°C(248°F).

Connecting pipe specifications		Diameter			
Model	Refrigerant pipe	Low pressure		Service valve	
		High pressure	Low pressure	High pressure	Low pressure
E096	ø 19.05(3/4)	Brazed ¹⁾	ø 22.7(1/2)	Brazed ¹⁾	
E120				ø 25.5(1-1/8)	ø 28.5(1-1/8)
E144	ø 22.7(1/2)	Brazed ¹⁾			

*1 Connect the refrigerant pipe to the service valve according to the Installation Manual.

NO.	Usage	Specifications
①	For pipes	Front through hole $148(5-7/8) \times 84(3-5/16)$ Knockout hole
②		Bottom through hole $150(5-15/16) \times 94(3-3/4)$ Knockout hole
③		Front through hole $172(7-1/2) \times 63(2-1/8)$ Knockout hole
④	For wires	Front through hole $64(3-1/4) \times 62(2-7/8)$ Knockout hole
⑤		Bottom through hole $65(2-9/16)$ Knockout hole
⑥		Bottom through hole $65(2-1/16)$ Knockout hole
⑦	For transmission cables	Front through hole $63(4-1/8)$ Knockout hole
⑧		Bottom through hole $63(4-1/8)$ Knockout hole



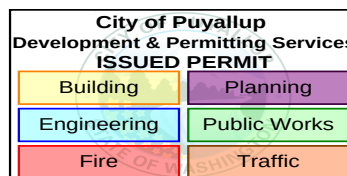
NOTES:

SEACOAST PROTECTION

Anti-corrosion Protection: A coating treatment is applied to condenser coil for protection from air contaminants.

Standard: Salt Spray Test Method - no unusual rust development to 480 hours.

Sea Coast (BS): Salt Spray Test Method (JRA 9002) - no unusual rust development to 960 hours.



MODULE 2: TURYE1203AN40A(N/B) – DIMENSIONS

TURYE(096/120/144)3AN40A(N/B)

Unit: mm(in)

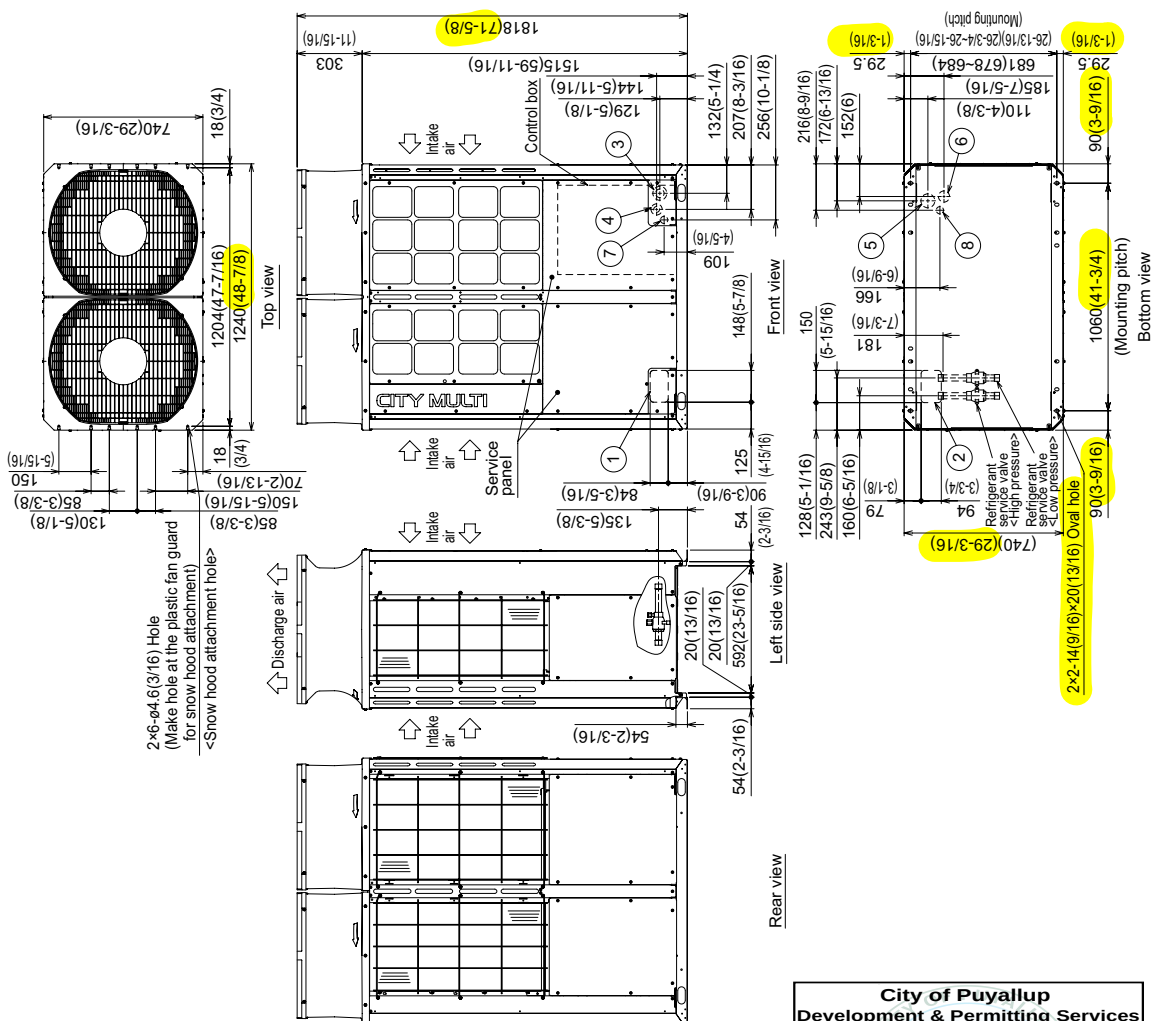
Note 1. At brazing of pipes, wrap the refrigerant service valve with wet cloth and keep the temperature of refrigerant service valve under 120°C(248°F).

Connecting pipe specifications

Model	Diameter	
	Refrigerant pipe	Service valve
E096	High pressure	Low pressure
E120	Low pressure	High pressure
E144	High pressure	Low pressure

*1 Connect the refrigerant pipe to the service valve according to the Installation Manual.

NO.	Usage	Specifications
①	Front through hole	148(5.78) x 84(3.31) Knockout hole
②	Bottom through hole	150(5.91) x 94(3.70) Knockout hole
③	Front through hole	ø62(2.44) or ø34(1.34) Knockout hole
④	Front through hole	ø43(1.71) or ø22(0.87) Knockout hole
⑤	Bottom through hole	ø65(2.56) Knockout hole
⑥	Bottom through hole	ø52(2.05) Knockout hole
⑦	Front through hole	ø34(1.34) Knockout hole
⑧	Bottom through hole	ø34(1.34) Knockout hole



NOTES:

SEACOAST PROTECTION

Anti-corrosion Protection: A coating treatment is applied to condenser coil for protection from air contaminants.

Standard: Salt Spray Test Method - no unusual rust development to 480 hours.

Sea Coast (BS): Salt Spray Test Method (JRA 9002) - no unusual rust development to 960 hours.

Specifications are subject to change without notice.

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