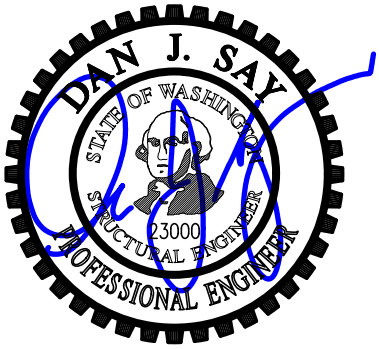
Supplemental Structural Calculations For:

Clarkson Residence

8613 West Mercer Way

Mercer Island, WA 98040



Prepared for: Brandt Design Group

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STRUCTURAL ENGINEERING

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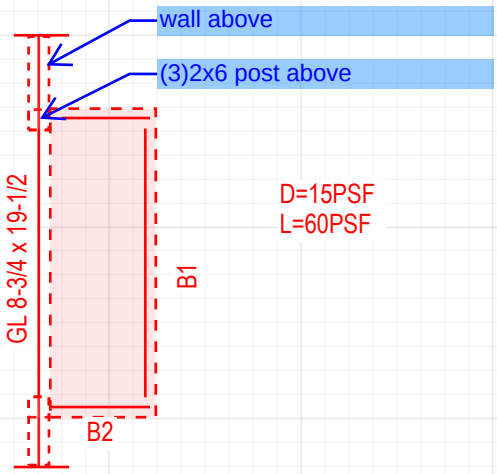
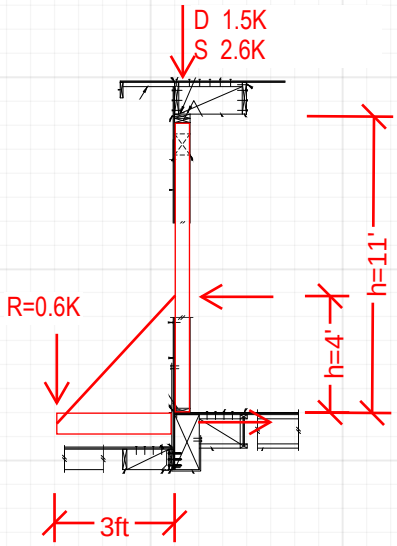
Balcony Design

Key Plan:





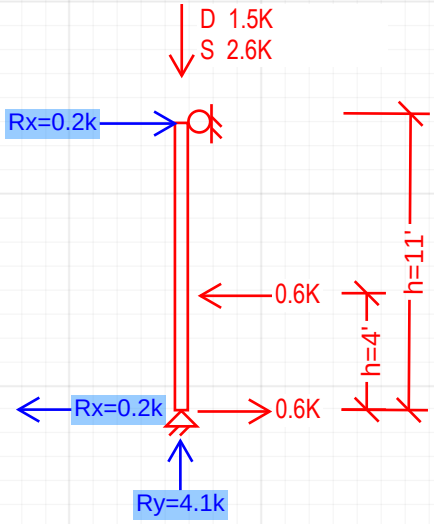
M=0.6*3 = 1.8KFT

M/d = 1.8 KFT / 4FT = 0.45K
(M/d = 1.8 KFT / 3FT = 0.6K)

B1

L= 11'	DCRm = 0.16
w= 113 plf	DCRv = 0.03
R= 0.6 k	Δ= 0.18"
M= 1.7 k-ft	L/733

HSS4x4x1/4



THREADED ROD & PIN:
ROD AXIAL = 0.6*SQRT(2) = 0.85K
T (1/4" ROD) = 36KSI(PI*D^2)/4 / Ω = 1.0K > 0.85K OK

CLEVIS #2 = 1.9K OK

CONN. TO POST:
SCREW IN WITHDRAWAL :
W=172LBS/IN W/ 5" PENETRATION = 860LBS (1 SCREW MIN)

CONCENTRATED TENSION ON WALL OF HSS:
CHECK 4" X 1/4" PLATE IN BENDING
FOR TENSION ON TOP OF BEAM

M = PL/4 = 850*4/4=850 LB-IN

Mn/Ω = Fy*Zx/1.67
= (36ksi)(4*(0.25^2)/4)/1.67
= 1.35k-in

1.35k-in > 0.85 k-in OK

CHECK WELD: 2" * 2.78K/IN * 2 = 11.2K > 0.9K OK

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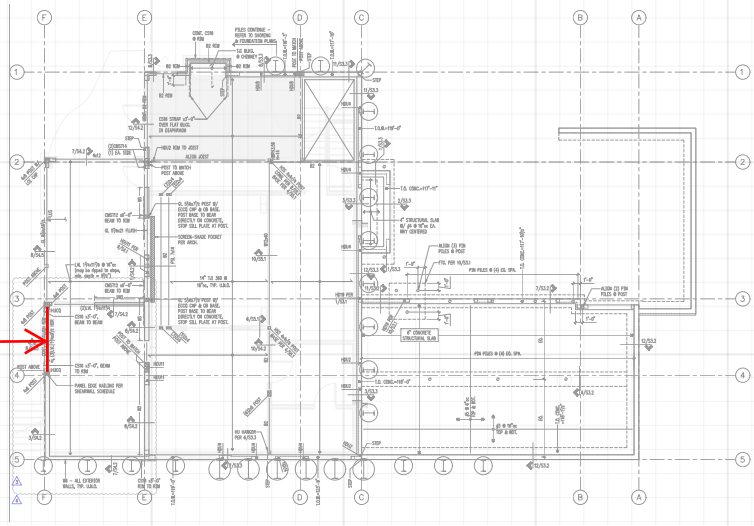
Check header at bifold door:

Bifold door weight = 430 lbs
Deflection criteria <1/16" after door installed

Check strength under full load

B7		
w1=	552	plf
w2=	552	plf
L1=	8	ft
L2=	1	ft
P=	2100	lbs
b=	3.5	in
d=	10.5	in
E=	1550	ksi
R1=	**2716**	**lbs**
R2=	**4350**	**lbs**
M=	**6686**	**lb-ft**
Fb=	**1248**	**psi**
Fv=	**158**	**psi**
	.190	**in**
x=	**568**	

B7



B2 RIPPED TO 10.5" OK FOR STRENGTH,

Check deflection w/ Live Load + Door weight
(live controls over snow)

B7 LIVE + DOOR DEFL		
w1=	327.8	plf
w2=	327.8	plf
L1=	8	ft
L2=	1	ft
P=	0	lbs
b=	5.25	in
d=	9.5	in
E=	2000	ksi
R1=	**1475**	**lbs**
R2=	**1475**	**lbs**
M=	**3319**	**lb-ft**
Fb=	**504**	**psi**
Fv=	**37**	**psi**
	.064	**in**
x=	**1674**	

(3) LVL 1-3/4 X 9-1/2 REQUIRED FOR DEFLECTION (CONTROLS)

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