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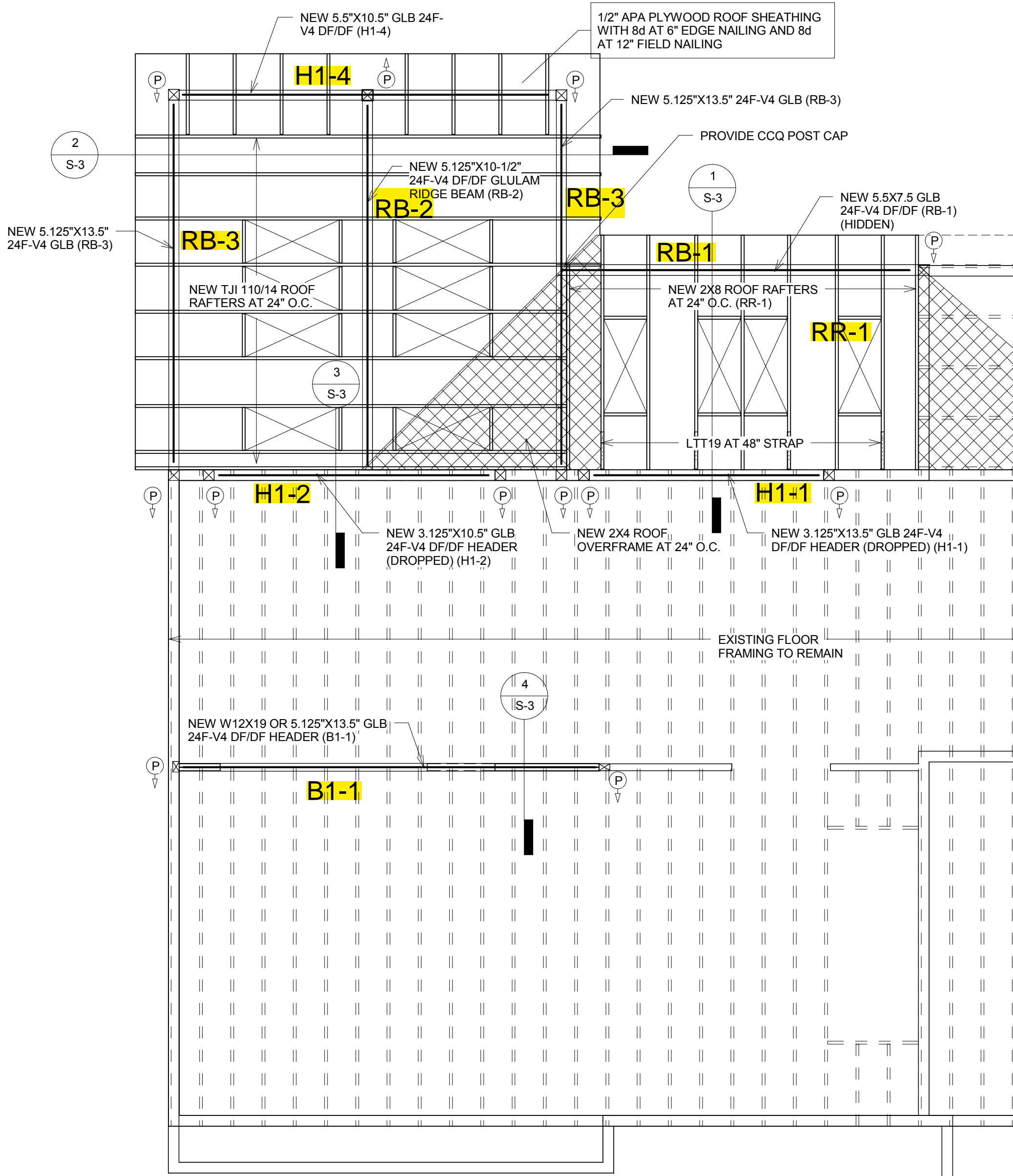


**BARNETT ADDITION
7530 86TH AVE SE, MERCER ISLAND, WA 98040
REVISED DESIGN/ CALCULATIONS**

**PROJECT NO: 20201 DATE:09/14/21
PREPARED BY: BASRI BASRI PE, SE**

Project Description

Revised design to make the addition as covered deck area (instead of living space). The interior beam supporting 2nd floor (to replace existing bearing wall) has also been extended to 19 ft span for ease of construction. Please see attached calculations.



Barnett Addition

B1-1 (STL)

Date: 9/20/21

Selection **W 12x 19 36 ksi Wide Flange Steel** Lateral Support: Lc = 4.2 ft max.

Conditions Actual Size is 4 x 12-1/8 in.
Min Bearing Length R1= 0.8 in. R2= 0.8 in. (1.0) DL Defl= 0.13 in Recom Camber= 0.19 in

Data

Beam Span	18.5 ft	Reaction 1 LL	3180 #	Reaction 2 LL	3180 #
Beam Wt per ft	19.0 #	Reaction 1 TL	4882 #	Reaction 2 TL	4882 #
Bm Wt Included	352 #	Maximum V	4882 #		
Max Moment	22578 #	Max V (Reduced)	N/A		
TL Max Defl	L / 180	TL Actual Defl	L / 603		
LL Max Defl	L / 240	LL Actual Defl	L / 925		

Attributes

	Section (in ³)	Shear (in ²)	TL Defl (in)	LL Defl
Actual	21.30	2.86	0.37	0.24
Critical	11.40	0.34	1.23	0.93
Status	OK	OK	OK	OK
Ratio	54%	12%	30%	26%

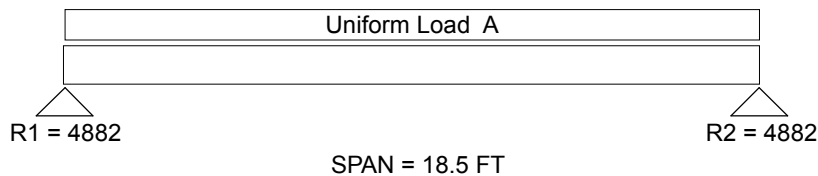
Values

	Fb (psi)	Fv (psi)	E (psi x mil)
Ref. Value Fy	36000	36000	29.0
Adjusted Values	23760	14400	29.0

Adjustments

YP Factor, Lc	0.66	0.40	
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Loads Uniform LL: 344 Uniform TL: 509 = A



Uniform and partial uniform loads are lbs per lineal ft.

Project: BARNETT ADDITION

Location: B1-1 rev

Multi-Span Floor Beam

[2015 International Building Code(2012 NDS)]

5.125 IN x 13.5 IN x 14.3 FT

24F-V4 - Visually Graded Western Species - Dry Use

Section Adequate By: 25.5%

Controlling Factor: Deflection

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DEFLECTIONS		Center
Live Load	0.27	IN L/627
Dead Load	0.13	in
Total Load	0.40	IN L/427
Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/340		

REACTIONS		A	B
Live Load	3933 lb	3933 lb	
Dead Load	1850 lb	1850 lb	
Total Load	5783 lb	5783 lb	
Bearing Length	1.74 in	1.74 in	

BEAM DATA		Center
Span Length	14.3	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	14.3	ft
Floor Duration Factor	1.00	
Camber Adj. Factor	1.5	
Camber Required	0.19	
Notch Depth	0.00	

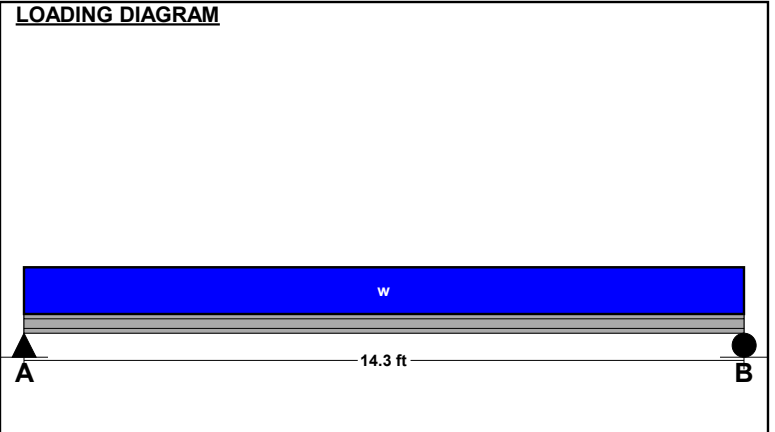
MATERIAL PROPERTIES			
24F-V4 - Visually Graded Western Species			
	<u>Base Values</u>	<u>Adjusted</u>	
Bending Stress:	Fb = 2400 psi	Controlled by:	
	Fb_cmpr = 1850 psi	Fb' = 2400 psi	
	Cd=1.00		
Shear Stress:	Fv = 265 psi	Fv' = 265 psi	
	Cd=1.00		
Modulus of Elasticity:	E = 1800 ksi	E' = 1800 ksi	
Comp. \perp to Grain:	Fc - \perp = 650 psi	Fc - \perp ' = 650 psi	

Controlling Moment: 20673 ft-lb
 7.15 Ft from left support of span 2 (Center Span)
 Created by combining all dead loads and live loads on span(s) 2

Controlling Shear: 5783 lb
 At left support of span 2 (Center Span)
 Created by combining all dead loads and live loads on span(s) 2

Comparisons with required sections:	Req'd	Provided
Section Modulus:	103.36 in3	155.67 in3
Area (Shear):	32.73 in2	69.19 in2
Moment of Inertia (deflection):	837.45 in4	1050.79 in4
Moment:	20673 ft-lb	31134 ft-lb
Shear:	5783 lb	12223 lb

NOTES



FLOOR LOADING		Center
Floor Live Load	FLL =	40 psf
Floor Dead Load	FDL =	17 psf
Floor Tributary Width Side One	TW1 =	13.8 ft
Floor Tributary Width Side Two	TW2 =	0 ft
Wall Load	WALL =	10 plf

BEAM LOADING		Center
Reduced Floor Live Load	40	psf
Total Live Load	550	plf
Total Dead Load	244	plf
Beam Self Weight	15	plf
Total Load	809	plf

Barnett Addition

H1-1

Date: 9/20/21

Selection **3-1/8x 13-1/2 GLB 24F-V4 DF/DF** Lu = 0.0 Ft

Conditions NDS 2015
 Min Bearing Area R1= 3.3 in² R2= 3.3 in² (1.5) DL Defl= 0.05 in Recom Camber= 0.07 in

Data

Beam Span	10.5 ft	Reaction 1 LL	1398 #	Reaction 2 LL	1398 #
Beam Wt per ft	10.25 #	Reaction 1 TL	2123 #	Reaction 2 TL	2123 #
Bm Wt Included	108 #	Maximum V	2123 #		
Max Moment	5572 #	Max V (Reduced)	1668 #		
TL Max Defl	L / 180	TL Actual Defl	L / >1000		
LL Max Defl	L / 240	LL Actual Defl	L / >1000		

Attributes

	Section (in ³)	Shear (in ²)	TL Defl (in)	LL Defl
Actual	94.92	42.19	0.11	0.06
Critical	24.23	9.06	0.70	0.53
Status	OK	OK	OK	OK
Ratio	26%	21%	16%	12%

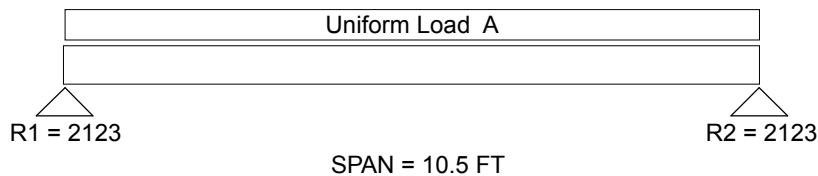
Values

	Fb (psi)	Fv (psi)	E (psi x mil)	Fc _L (psi)
Reference Values	2400	240	1.8	650
Adjusted Values	2760	276	1.8	650

Adjustments

Cv Volume	1.000			
Cd Duration	1.15	1.15		
Cr Repetitive	1.00			
Ch Shear Stress		N/A		
Cm Wet Use	1.00	1.00	1.00	1.00
CI Stability	1.0000	Rb = 0.00	Le = 0.00 Ft	

Loads Uniform LL: 266 Uniform TL: 394 = A



Uniform and partial uniform loads are lbs per lineal ft.

Barnett Addition

RB-2

Date: 8/13/21

Selection **5-1/8x 10-1/2 GLB 24F-V4 DF/DF** Lu = 0.0 Ft

Conditions NDS 2015
 Min Bearing Area R1= 4.7 in² R2= 4.7 in² (1.5) DL Defl= 0.35 in Recom Camber= 0.52 in

Data

Beam Span	16.25 ft	Reaction 1 LL	2011 #	Reaction 2 LL	2011 #
Beam Wt per ft	13.08 #	Reaction 1 TL	3082 #	Reaction 2 TL	3082 #
Bm Wt Included	212 #	Maximum V	3082 #		
Max Moment	12522 #'	Max V (Reduced)	2750 #		
TL Max Defl	L / 180	TL Actual Defl	L / 249		
LL Max Defl	L / 240	LL Actual Defl	L / 448		

Attributes

	Section (in ³)	Shear (in ²)	TL Defl (in)	LL Defl
Actual	94.17	53.81	0.78	0.44
Critical	54.45	14.95	1.08	0.81
Status	OK	OK	OK	OK
Ratio	58%	28%	72%	54%

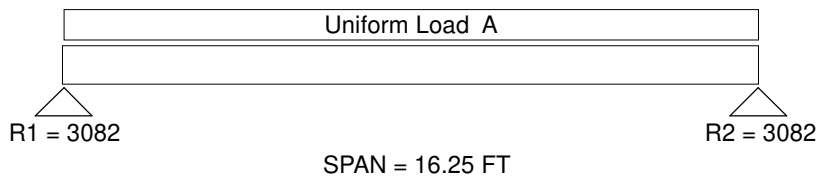
Values

	Fb (psi)	Fv (psi)	E (psi x mil)	Fc _L (psi)
Reference Values	2400	240	1.8	650
Adjusted Values	2760	276	1.8	650

Adjustments

Cv Volume	1.000			
Cd Duration	1.15	1.15		
Cr Repetitive	1.00			
Ch Shear Stress		N/A		
Cm Wet Use	1.00	1.00	1.00	1.00
Cl Stability	1.0000	Rb = 0.00	Le = 0.00 Ft	

Loads Uniform LL: 248 Uniform TL: 366 = A



Uniform and partial uniform loads are lbs per lineal ft.

Barnett Addition

DB1-1

Date: 8/25/21

<u>Selection</u>	6x 12 HF #2	Lu = 0.0 Ft
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<u>Conditions</u>	NDS 2015		
	Min Bearing Area	R1= 6.3 in ² R2= 6.3 in ²	(1.5) DL Defl= 0.02 in

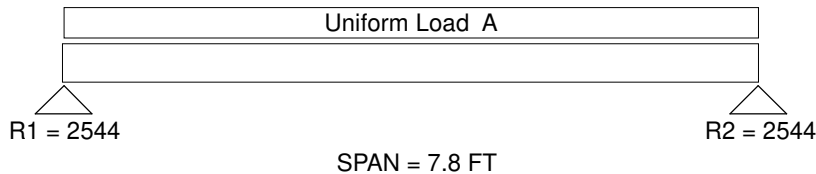
<u>Data</u>	Beam Span	7.8 ft	Reaction 1 LL	2129 #	Reaction 2 LL	2129 #
	Beam Wt per ft	15.37 #	Reaction 1 TL	2544 #	Reaction 2 TL	2544 #
	Bm Wt Included	120 #	Maximum V	2544 #		
	Max Moment	4961 #'	Max V (Reduced)	1919 #		
	TL Max Defl	L / 360	TL Actual Defl	L / >1000		
	LL Max Defl	L / 480	LL Actual Defl	L / >1000		

<u>Attributes</u>	Section (in ³)	Shear (in ²)	TL Defl (in)	LL Defl
Actual	121.23	63.25	0.08	0.06
Critical	88.20	20.56	0.26	0.20
Status	OK	OK	OK	OK
Ratio	73%	33%	29%	30%

<u>Values</u>		Fb (psi)	Fv (psi)	E (psi x mil)	Fc _L (psi)
Reference Values		675	140	1.1	405
Adjusted Values		675	140	1.1	405

<u>Adjustments</u>	CF Size Factor	1.000			
	Cd Duration	1.00	1.00		
	Cr Repetitive	1.00			
	Ch Shear Stress		N/A		
	Cm Wet Use	1.00	1.00	1.00	1.00
	Cl Stability	1.0000	Rb = 0.00	Le = 0.00 Ft	

Loads Uniform LL: 546 Uniform TL: 637 = A



Uniform and partial uniform loads are lbs per lineal ft.

Barnett Addition

DJ1-1

Date: 8/11/21

Selection **2x 10 HF #2 @ 16 in oc** Lu = 0.0 Ft

Conditions NDS 2015, Repetitive Use, Wet Use
 Min Bearing Area R1= 1.7 in² R2= 1.7 in² (2.0) DL Defl= 0.05 in

Data

Beam Span	10.0 ft	Reaction 1 LL	400 #	Reaction 2 LL	400 #
Beam Wt per ft	0 #	Reaction 1 TL	467 #	Reaction 2 TL	467 #
Bm Wt Included	0 #	Maximum V	467 #		
Max Moment	1167 #	Max V (Reduced)	395 #		
TL Max Defl	L / 360	TL Actual Defl	L / 580		
LL Max Defl	L / 480	LL Actual Defl	L / 773		

Attributes

	Section (in ³)	Shear (in ²)	TL Defl (in)	LL Defl
Actual	21.39	13.88	0.21	0.16
Critical	13.02	4.07	0.33	0.25
Status	OK	OK	OK	OK
Ratio	61%	29%	62%	62%

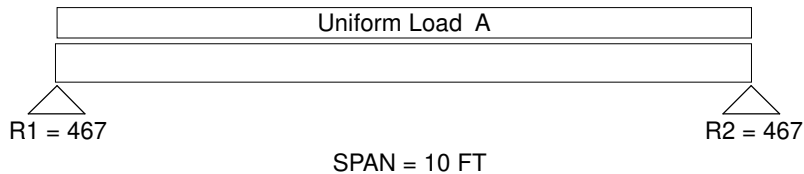
Values

	Fb (psi)	Fv (psi)	E (psi x mil)	Fc _L (psi)
Reference Values	850	150	1.3	405
Adjusted Values	1075	146	1.2	271

Adjustments

CF Size Factor	1.100			
Cd Duration	1.00	1.00		
Cr Repetitive	1.15			
Ch Shear Stress		N/A		
Cm Wet Use	1.00	0.97	0.90	0.67
CI Stability	1.0000	Rb = 0.00	Le = 0.00 Ft	

Loads Uniform LL: 80 Uniform TL: 93 = A



Uniform and partial uniform loads are lbs per lineal ft.

Location: **RB-1**

Roof Beam

[2015 International Building Code(2012 NDS)]

5.5 IN x 7.5 IN x 15.0 FT

24F-V4 - Visually Graded Western Species - Dry Use

Section Adequate By: 3.5%

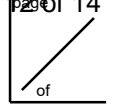
Controlling Factor: Deflection



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DEFLECTIONS		Center
Live Load	0.48	IN L/373
Dead Load	0.27	in
Total Load	0.76	IN L/238
Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/230		

REACTIONS		
	A	B
Live Load	1106 lb	1106 lb
Dead Load	627 lb	627 lb
Total Load	1733 lb	1733 lb
Bearing Length	0.48 in	0.48 in

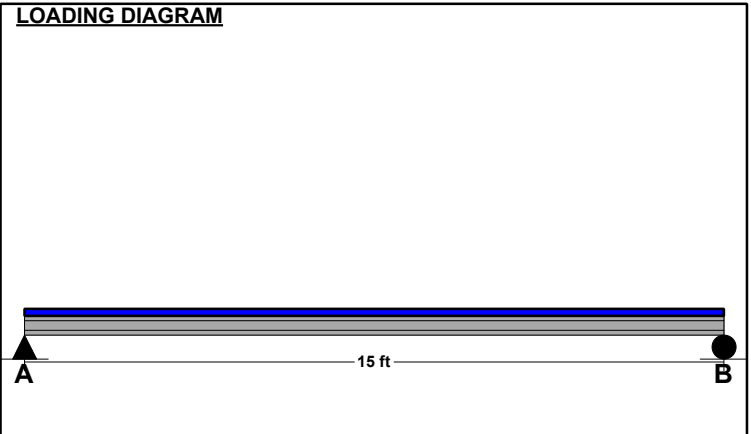
BEAM DATA	
Span Length	15 ft
Unbraced Length-Top	0 ft
Unbraced Length-Bottom	0 ft
Roof Pitch	4 :12
Roof Duration Factor	1.15

MATERIAL PROPERTIES			
24F-V4 - Visually Graded Western Species			
	<u>Base Values</u>		<u>Adjusted</u>
Bending Stress:	Fb =	2400 psi	<i>Controlled by:</i>
	Fb _{cmpr} =	1850 psi	Fb' = 2760 psi
	Cd=	1.15	
Shear Stress:	Fv =	265 psi	Fv' = 305 psi
	Cd=	1.15	
	E =	1800 ksi	E' = 1800 ksi
Modulus of Elasticity:	E =	1800 ksi	E' = 1800 ksi
Comp. ⊥ to Grain:	Fc ⊥ =	650 psi	Fc ⊥' = 650 psi

Controlling Moment: 6499 ft-lb
7.5 ft from left support
Created by combining all dead and live loads.

Controlling Shear: -1733 lb
At support.
Created by combining all dead and live loads.

Comparisons with required sections:	Req'd	Provided
Section Modulus:	28.26 in ³	51.56 in ³
Area (Shear):	8.53 in ²	41.25 in ²
Moment of Inertia (deflection):	186.81 in ⁴	193.36 in ⁴
Moment:	6499 ft-lb	11859 ft-lb
Shear:	-1733 lb	8381 lb



ROOF LOADING	
Side One:	
Roof Live Load: LL =	25 psf
Roof Dead Load: DL =	12 psf
Tributary Width: TW =	5.9 ft
Side Two:	
Roof Live Load: LL =	25 psf
Roof Dead Load: DL =	15 psf
Tributary Width: TW =	0 ft
Wall Load: WALL =	0 plf

SLOPE/PITCH ADJUSTED LENGTHS AND LOADS	
Adjusted Beam Length: L _{adj} =	15 ft
Beam Self Weight: BSW =	9 plf
Beam Uniform Live Load: w _L =	148 plf
Beam Uniform Dead Load: w _{D_adj} =	84 plf
Total Uniform Load: w _T =	231 plf

NOTES

Project: BARNETT ADDITION

Location: **RB-1**

Roof Beam

[2015 International Building Code(2012 NDS)]

5.5 IN x 7.5 IN x 15.0 FT

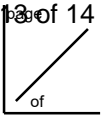
24F-V4 - Visually Graded Western Species - Dry Use

Section Adequate By: 3.5%

Controlling Factor: Deflection



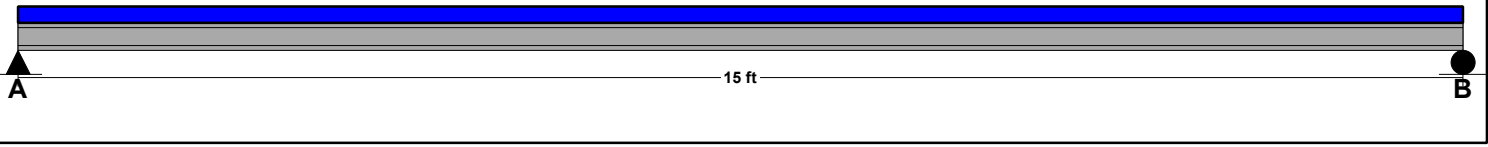
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LOADING DIAGRAM



Barnett Addition rev2

RB-3

Date: 8/24/21

Selection **5-1/8x 13-1/2 GLB 24F-V4 DF/DF** Lu = 0.0 Ft

Conditions NDS 2015
 Min Bearing Area R1= 3.8 in² R2= 3.9 in² (1.5) DL Defl= 0.31 in Recom Camber= 0.46 in

Data

Beam Span	16.25 ft	Reaction 1 LL	1016 #	Reaction 2 LL	1016 #
Beam Wt per ft	16.81 #	Reaction 1 TL	2466 #	Reaction 2 TL	2546 #
Bm Wt Included	273 #	Maximum V	2546 #		
Max Moment	13643 #	Max V (Reduced)	2319 #		
TL Max Defl	L / 360	TL Actual Defl	L / 477		
LL Max Defl	L / 480	LL Actual Defl	L / >1000		

Attributes

	Section (in ³)	Shear (in ²)	TL Defl (in)	LL Defl
Actual	155.67	69.19	0.41	0.10
Critical	59.32	12.60	0.54	0.41
Status	OK	OK	OK	OK
Ratio	38%	18%	75%	25%

Values

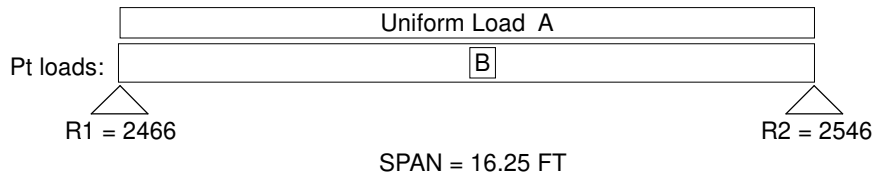
	Fb (psi)	Fv (psi)	E (psi x mil)	Fc _L (psi)
Reference Values	2400	240	1.8	650
Adjusted Values	2760	276	1.8	650

Adjustments

Cv Volume	1.000			
Cd Duration	1.15	1.15		
Cr Repetitive	1.00			
Ch Shear Stress		N/A		
Cm Wet Use	1.00	1.00	1.00	1.00
Cl Stability	1.0000	Rb = 0.00	Le = 0.00 Ft	

Loads

	Uniform LL: 125	Uniform TL: 185 = A
Point TL	Distance	
B = 1733	8.5	



Uniform and partial uniform loads are lbs per lineal ft.