November 1, 2021

Pfeifer Homes, Inc.
1550 SW Market Street
Lee's Summit, MO 64081

Re: 2143 NW Killarney Lane (Lot 132, Reserve at Woodside Ridge) – Totta residence

Vista Structural Engineering, LLC, was asked to assess the feasibility of extending out the master bedroom hexagonal bay an additional two feet. After performing the attached calculations, we determined that the extension of the bay is feasible with the following changes:

- **Install LVL's in the locations shown on the attached partial foundation plan. Under the outer edge of the bay, install a header at the floor level, fastened at each end to the double LVL joists with a Simpson L90 framing angle.**
- **At the roof, ensure that a purlin is installed no more than 14'-0" in, horizontally, from the exterior wall. This assures that the double 2x10 header above the front of the bumpout will not be overstressed.**
- **All headers above the bumpout windows can remain as the default double 2x10 listed as item #4 of the framing notes.**

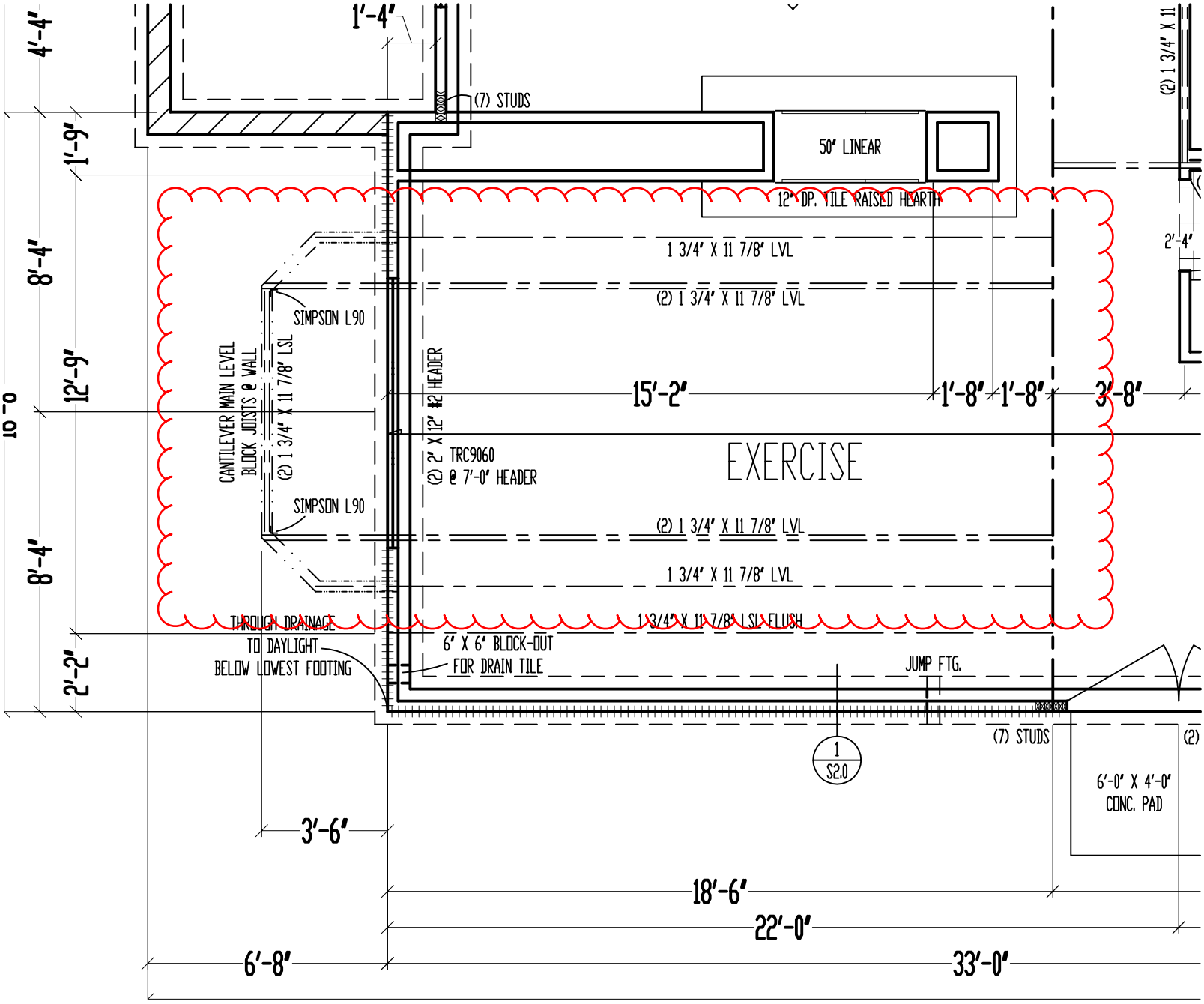
Our firm appreciates the opportunity to serve you. If you have any questions or if you need anything further, please feel free to contact us.

Sincerely,

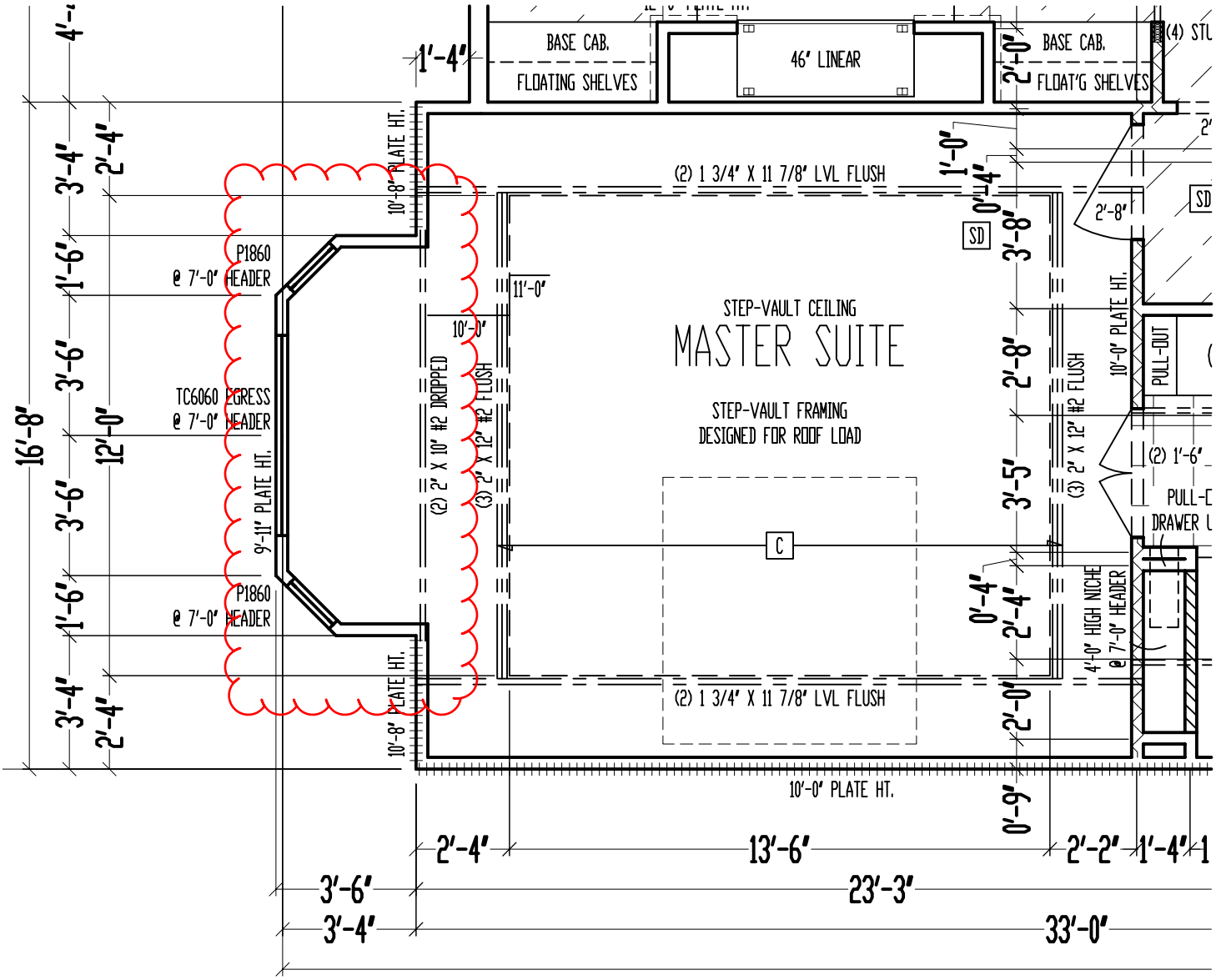
Vista Structural Engineering, LLC

Dennis Heier, P.E.

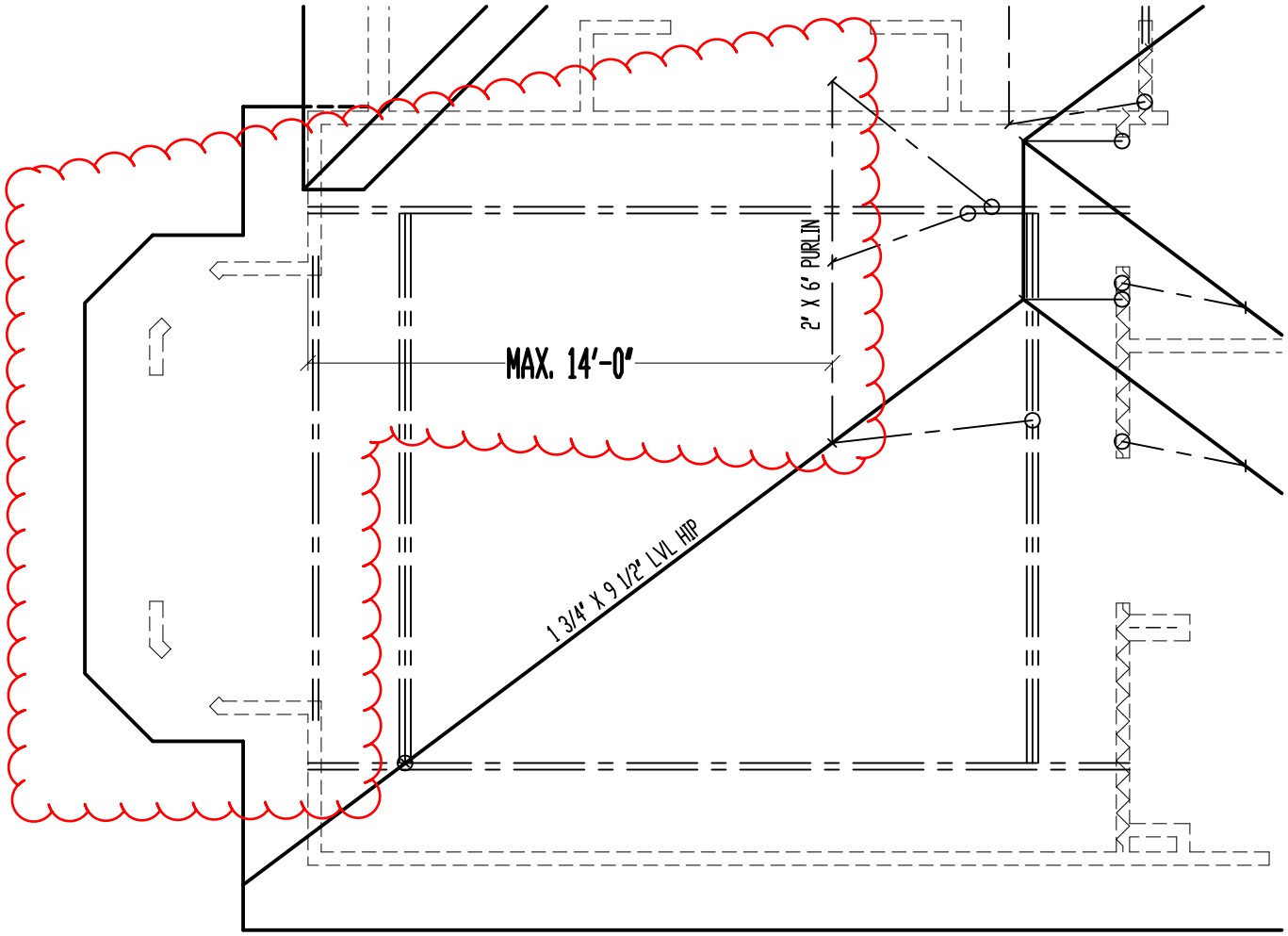
RWR132 TOTTA
PARTIAL FOUNDATION PLAN
MASTER BEDROOM BUMPOUT REVISION



RWR132 TOTTA
PARTIAL MAIN FLOOR PLAN
MASTER BEDROOM BUMPOUT REVISION



RWR132 TOTTA
PARTIAL ROOF PLAN
MASTER BEDROOM BUMPOUT REVISION



Vista Structural Engineering, LLC
14718 NW Delia Street
Portland, OR 97229
(971) 233-6099
dennis@vistastructural.com

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Lic. # : KW-06010523 — Vista Structural Engineering, LLC

DESCRIPTION: JOISTS ABOVE EXERCISE ROOM, TO SUPPORT EXTENDED MASTER BEDROOM BAY

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

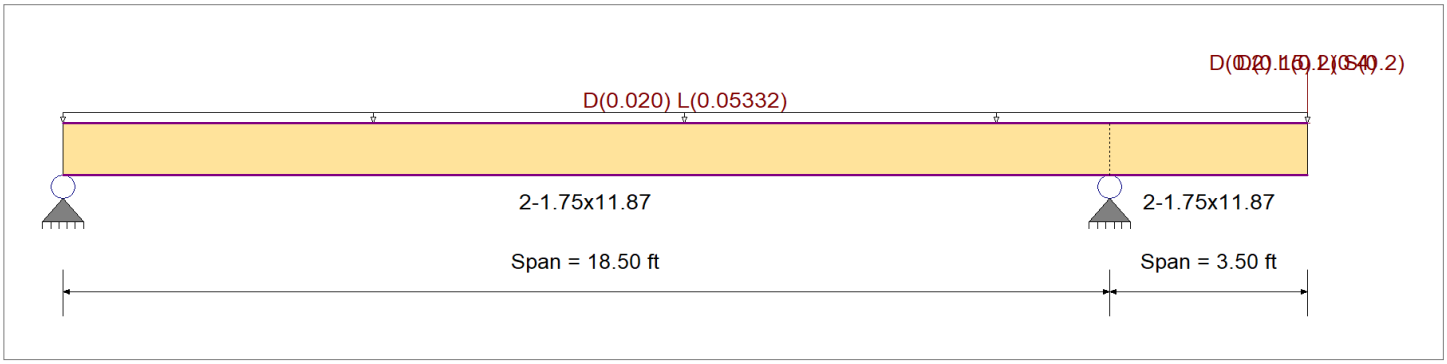
Wood Species : iLevel Truss Joist
Wood Grade : MicroLam LVL 1.9 E

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

Fb +	2600 psi
Fb -	2600 psi
Fc - Prll	2510 psi
Fc - Perp	750 psi
Fv	285 psi
Ft	1555 psi

E : Modulus of Elasticity

Ebend- xx	1900 ksi
Eminbend - xx	965.71 ksi
Density	42.01 pcf



Applied Loads

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

Loads on all spans...
Uniform Load on ALL spans : D = 0.0150, L = 0.040 ksf, Tributary Width = 1.333 ft
Load for Span Number 2
Point Load : D = 0.20, L = 0.20, S = 0.20 k @ 3.50 ft
Point Load : D = 0.150, L = 0.40 k @ 3.50 ft, (FLOOR LOAD)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.212 : 1	Maximum Shear Stress Ratio	=	0.144 : 1
Section used for this span		2-1.75x11.87	Section used for this span		2-1.75x11.87
fb: Actual	=	550.56 psi	fv: Actual	=	40.96 psi
Fb: Allowable	=	2,600.00 psi	Fv: Allowable	=	285.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	18.500 ft	Location of maximum on span	=	18.500 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.033 in	Ratio =	2512 >=360
Max Upward Transient Deflection	-0.029 in	Ratio =	7701 >=360
Max Downward Total Deflection	0.073 in	Ratio =	1158 >=180
Max Upward Total Deflection	-0.032 in	Ratio =	7033 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only													0.00	0.00	0.00	0.00
Length = 18.50 ft	1	0.084	0.056	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.35	196.57	2340.00	0.40	14.45	256.50
Length = 3.50 ft	2	0.084	0.056	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.35	196.57	2340.00	0.40	14.45	256.50
+D+L					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.50 ft	1	0.212	0.144	1.00	1.000	1.00	1.00	1.00	1.00	1.00	3.77	550.56	2600.00	1.13	40.96	285.00
Length = 3.50 ft	2	0.212	0.144	1.00	1.000	1.00	1.00	1.00	1.00	1.00	3.77	550.56	2600.00	1.13	40.96	285.00
+D+S					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.50 ft	1	0.100	0.066	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.05	298.69	2990.00	0.60	21.67	327.75
Length = 3.50 ft	2	0.100	0.066	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.05	298.69	2990.00	0.60	21.67	327.75
+D+0.750L					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

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Wood Beam

Lic. # : KW-06010523 — Vista Structural Engineering, LLC

DESCRIPTION: JOISTS ABOVE EXERCISE ROOM, TO SUPPORT EXTENDED MASTER BEDROOM BAY

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 = 18.50 ft	1	0.142	0.096	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.17	462.06	3250.00	0.95	34.33	356.25
Length = 3.50 ft	2	0.142	0.096	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.17	462.06	3250.00	0.95	34.33	356.25
+D+0.750L+0.750S					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.50 ft	1	0.180	0.121	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.69	538.65	2990.00	1.10	39.75	327.75
Length = 3.50 ft	2	0.180	0.121	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.69	538.65	2990.00	1.10	39.75	327.75
+0.60D					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 18.50 ft	1	0.028	0.019	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.81	117.94	4160.00	0.24	8.67	456.00
Length = 3.50 ft	2	0.028	0.019	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.81	117.94	4160.00	0.24	8.67	456.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0644	7.235	+D+S	-0.0316	13.126
+D+0.750L+0.750S	2	0.0725	3.500		0.0000	13.126

Vertical Reactions

Support notation : Far left is #1 — Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	0.474	2.089	
Overall MINimum	-0.038	0.238	
D Only	0.112	0.678	
+D+L	0.474	2.089	
+D+S	0.074	0.916	
+D+0.750L	0.384	1.736	
+D+0.750L+0.750S	0.355	1.914	
+0.60D	0.067	0.407	
L Only	0.362	1.411	
S Only	-0.038	0.238	

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Wood Beam

Lic. # : KW-06010523 — Vista Structural Engineering, LLC

DESCRIPTION: HEADER ABOVE FRONT OF MASTER BEDROOM BAY

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

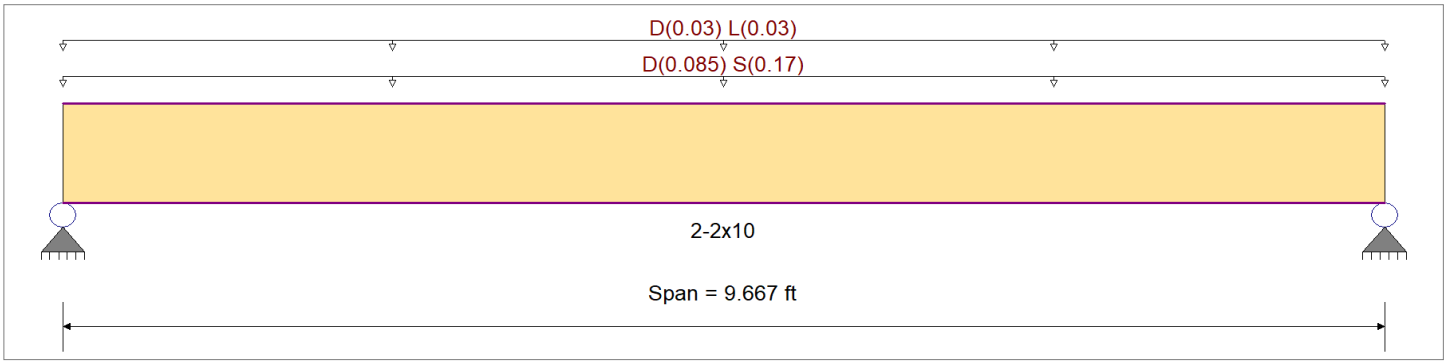
Wood Species : DouglasFir-Larch
Wood Grade : No.2

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	1,600.0 ksi
Eminbend - xx	580.0 ksi
Density	31.210 pcf

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



Applied Loads

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

Uniform Load : D = 0.010, S = 0.020 ksf, Tributary Width = 8.50 ft, (ROOF LOAD)
Uniform Load : D = 0.010, L = 0.010 ksf, Tributary Width = 3.0 ft, (CEILING LOAD)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.820 : 1	Maximum Shear Stress Ratio	=	0.305 : 1
Section used for this span		2-2x10	Section used for this span		2-2x10
fb: Actual	=	933.83 psi	fv: Actual	=	63.05 psi
Fb: Allowable	=	1,138.50 psi	Fv: Allowable	=	207.00 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	4.834 ft	Location of maximum on span	=	8.926 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.106 in	Ratio =	1093 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.178 in	Ratio =	651 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
D Only													0.00	0.00	0.00	0.00
Length = 9.667 ft	1	0.423	0.157	0.90	1.100	1.00	1.00	1.00	1.00	1.00	1.34	376.81	891.00	0.47	25.44	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 = 9.667 ft	1	0.480	0.178	1.00	1.100	1.00	1.00	1.00	1.00	1.00	1.69	475.10	990.00	0.59	32.08	180.00
+D+S					1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.667 ft	1	0.820	0.305	1.15	1.100	1.00	1.00	1.00	1.00	1.00	3.33	933.83	1138.50	1.17	63.05	207.00
+D+0.750L					1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.667 ft	1	0.364	0.135	1.25	1.100	1.00	1.00	1.00	1.00	1.00	1.61	450.53	1237.50	0.56	30.42	225.00
+D+0.750L+0.750S					1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.667 ft	1	0.763	0.283	1.15	1.100	1.00	1.00	1.00	1.00	1.00	3.10	868.29	1138.50	1.08	58.62	207.00
+0.60D					1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.667 ft	1	0.143	0.053	1.60	1.100	1.00	1.00	1.00	1.00	1.00	0.81	226.08	1584.00	0.28	15.26	288.00

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Wood Beam

Lic. # : KW-06010523 — Vista Structural Engineering, LLC

DESCRIPTION: HEADER ABOVE FRONT OF MASTER BEDROOM BAY

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.1779	4.869		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 — Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.378	1.378
Overall MINimum	0.822	0.822
D Only	0.556	0.556
+D+L	0.701	0.701
+D+S	1.378	1.378
+D+0.750L	0.665	0.665
+D+0.750L+0.750S	1.281	1.281
+0.60D	0.334	0.334
L Only	0.145	0.145
S Only	0.822	0.822