



October 12, 2021

Bellah Homes  
Attn: Paul Miller  
1272 SW Arborcrest Circle  
Lee's Summit, MO

Re: 1024 SW Armie Street (Lot 91, New Longview)

Vista Structural Engineering, LLC, was asked to address one item called out during the city's rough-in inspection. It was requested that our firm either approve the existing construction, or if the existing construction is inadequate, provide a cost-effective remediation. The item called out by the city is below, in bold lettering, followed by our responses.

- 1) First floor joists were headered off for a plumbing run approximately 24" from foundation wall in the location shown on the attached partial plan and picture. Please approve or provide solution.**  
*Per the attached calculations, the 2x10 joists supporting the headered-off area at the plumbing run will adequately support applicable design loads. We recommend approval of the first floor framed structure as it is currently constructed.*

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.



# VISTA STRUCTURAL ENGINEERING, LLC

14718 NW DELIA STREET  
PORTLAND, OREGON 97229

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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

File: calc.ec6  
 Software copyright ENERCALC, INC. 1983-2020, Build:12.20.8.24  
 Vista Structural Engineering, LLC

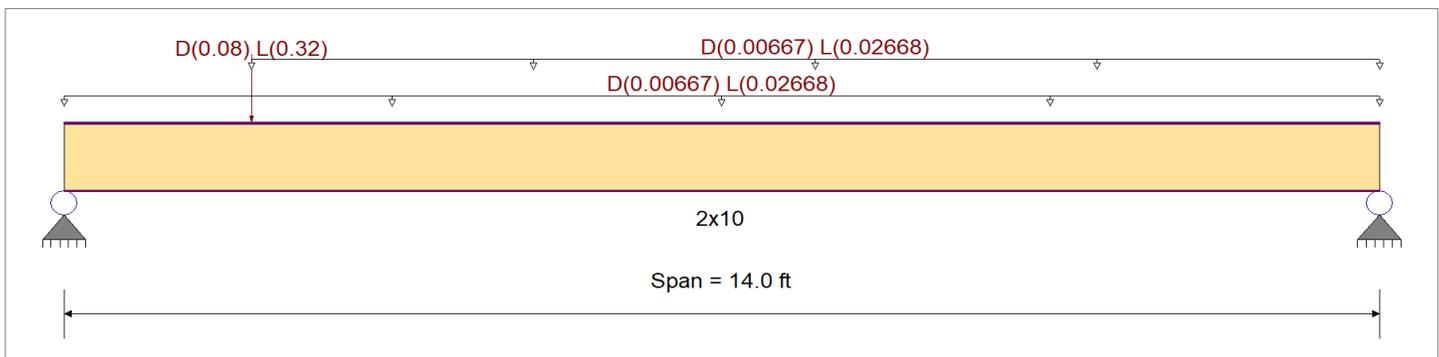
DESCRIPTION: joists at plumbing run

### 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 +	900.0 psi	E : Modulus of Elasticity
Load Combination IBC 2018	Fb -	900.0 psi	Ebend- xx
	Fc - Prll	1,350.0 psi	Eminbend - xx
Wood Species : DouglasFir-Larch	Fc - Perp	625.0 psi	
Wood Grade : No.2	Fv	180.0 psi	Density
	Ft	575.0 psi	Repetitive Member Stress Increase
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, L = 0.040 ksf, Tributary Width = 0.6670 ft  
 Point Load : D = 0.080, L = 0.320 k @ 2.0 ft  
 Uniform Load : D = 0.010, L = 0.040 ksf, Extent = 2.0 --> 14.0 ft, Tributary Width = 0.6670 ft

### DESIGN SUMMARY

**Design OK**

Maximum Bending Stress Ratio	=	<b>0.996</b> < 1	Maximum Shear Stress Ratio	=	<b>0.434</b> < 1
Section used for this span		<b>2x10</b>	Section used for this span		<b>2x10</b>
fb: Actual	=	1,133.97 psi	fv: Actual	=	78.08 psi
Fb: Allowable	=	1,138.50 psi	Fv: Allowable	=	180.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	6.234 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
<b>Maximum Deflection</b>					
Max Downward Transient Deflection		0.370 in	Ratio =		453 >= 360
Max Upward Transient Deflection		0.000 in	Ratio =		0 < 360
Max Downward Total Deflection		0.463 in	Ratio =		363 >= 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								Moment Values			Shear Values						
			M	V	C <sub>d</sub>	C <sub>F/V</sub>	C <sub>i</sub>	C <sub>r</sub>	C <sub>m</sub>	C <sub>t</sub>	C <sub>L</sub>	M	fb	F'b	V	fv	F'v			
D Only	Length = 14.0 ft	1	0.221	0.096	0.90	1.100	1.00	1.15	1.00	1.00	1.00	0.40	226.79	1024.65	0.00	0.00	0.00	0.00	0.00	162.00
+D+L	Length = 14.0 ft	1	0.996	0.434	1.00	1.100	1.00	1.15	1.00	1.00	1.00	2.02	1,133.97	1138.50	0.00	0.00	0.00	0.00	0.00	180.00
+D+0.750L	Length = 14.0 ft	1	0.637	0.278	1.25	1.100	1.00	1.15	1.00	1.00	1.00	1.62	907.17	1423.13	0.00	0.00	0.00	0.00	0.00	225.00
+0.60D	Length = 14.0 ft	1	0.075	0.033	1.60	1.100	1.00	1.15	1.00	1.00	1.00	0.24	136.08	1821.60	0.00	0.00	0.00	0.00	0.00	288.00

### Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.4628	6.847		0.0000	0.000



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DESCRIPTION: joists at plumbing run

### Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.748	0.519
Overall MINimum	0.598	0.415
D Only	0.150	0.104
+D+L	0.748	0.519
+D+0.750L	0.598	0.415
+0.60D	0.090	0.062
L Only	0.598	0.415