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22-214434 REV 01 RS

SUPPLEMENTAL STRUCTURAL CALCULATIONS

Romano Remodel - Vaulted Ceiling Change
6529 SW Burlingame Ave, Portland, OR
Jessica Foote & TJ Romano

March 10, 2023
Project No. 220852

12 pages

Principal Checked: ARL

Building Code: 2019 Oregon Structural Specialty Code (OSSC) **Soils Report:** No

By: **Dated:**

Soil Bearing: 1500 psf **Retaining Walls:** No

Active Pressure: N/A pcf **Passive Bearing:** N/A pcf **Friction:** N/A

Structural System: Building Structure **Risk Category:** II

Vertical System: Wood Framed Construction **Lateral System:** Flexible Diaphragm / Wood Shear Walls

Basic Design Loads:	Element	Roof	Floor		
	Load Type	Dead	Dead		
	Value (psf)	15	15		
	Load Type	Snow	Live		
	Value (psf)	25	40		
	Deflection Criteria	L/240	L/360		

Importance Factors: I_W = 1.00 (ice) I_E = 1.00 (seismic) I_S = 1.00 (snow) I_i = 1.00 (ice)

Lateral Design Parameters:

Wind Speed: 98 MPH **Exposure:** B

Seismic:

Design Summary:

Refer to calculations dated 11/04/22. These supplemental structural calculations are for vaulting the ceiling at the kitchen and living room areas.

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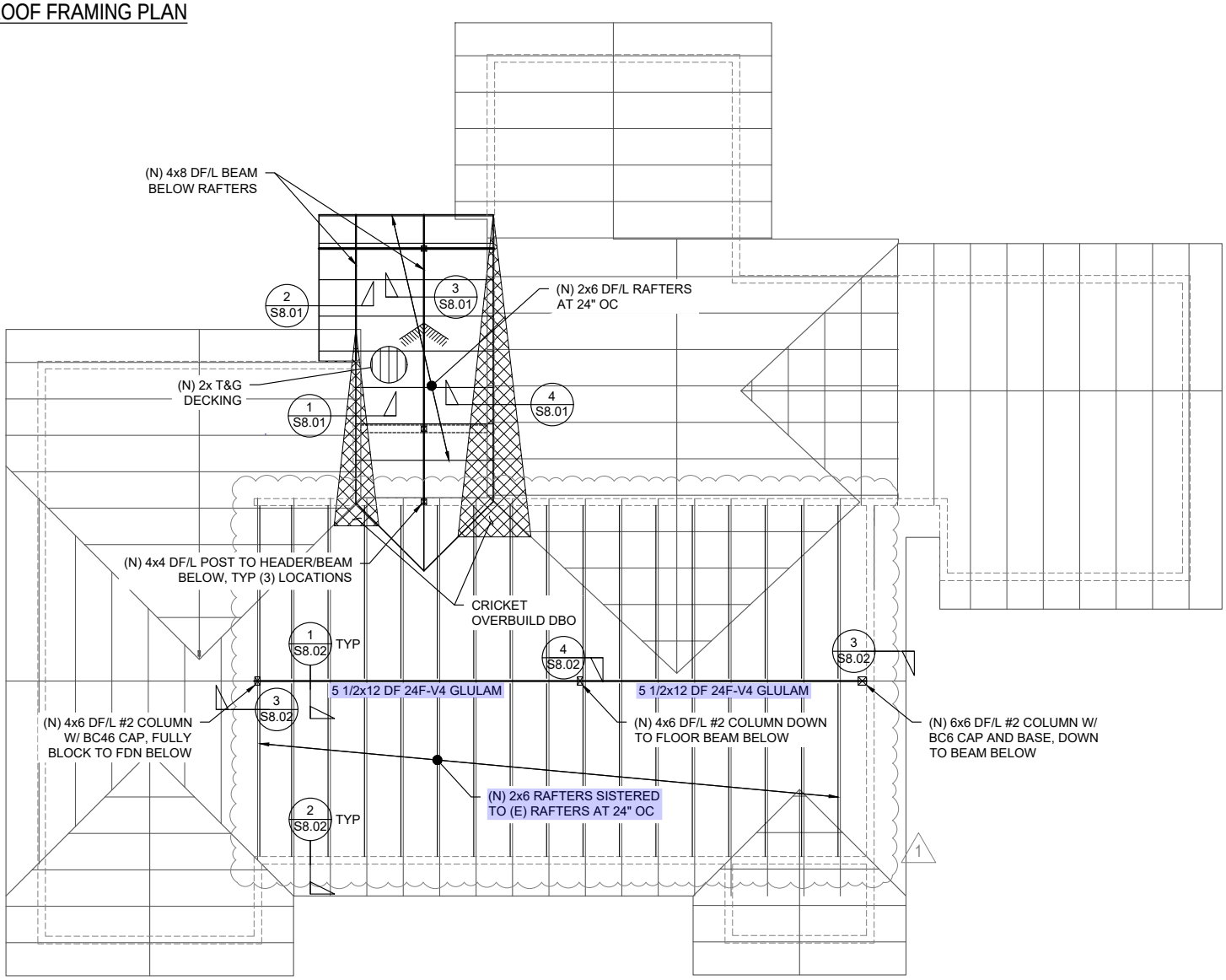
ROOF FRAMING PLAN



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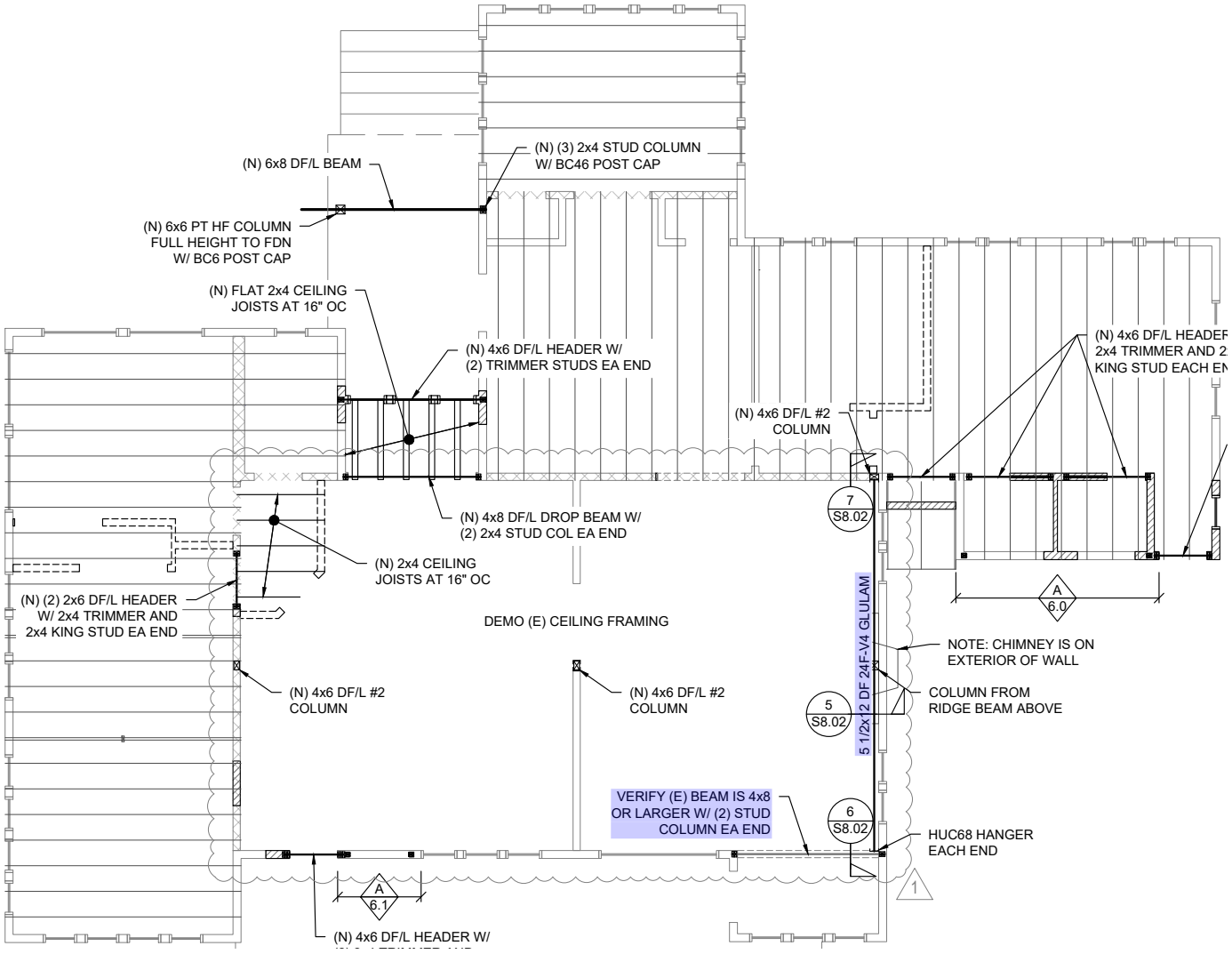
Project Name Romano Remodel - Vaulted Ceiling Change Project # 220852

Location 6529 SW Burlingame Ave, Portland, OR

Client Jessica Foote & TJ Romano

By KEG Ck'd ARL Date 03/10/2023

CEILING FRAMING PLAN



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Location 6529 SW Burlingame Ave, Portland, OR

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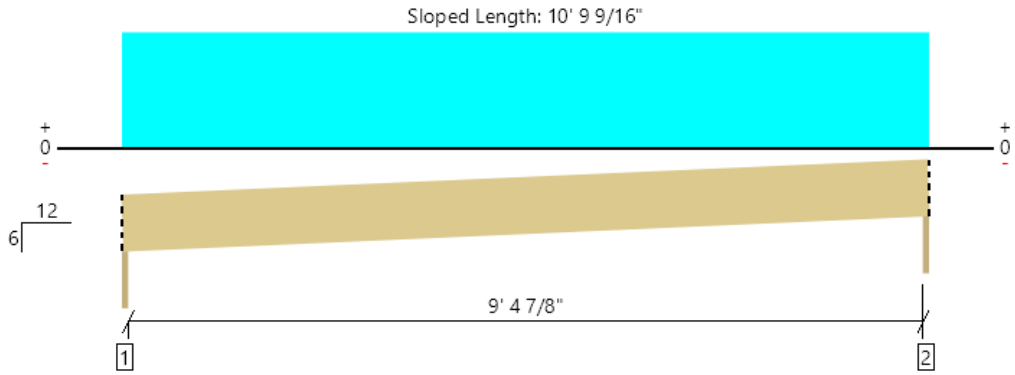
By KEG Ck'd ARL Date 03/10/2023 Page 3 of 12

Roof/Ceiling, Vaulted Roof Rafter
1 piece(s) 2 x 6 DF No.2 @ 24" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Member Length : 11' 5/16"

System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 6/12

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	403 @ 1/2"	956 (1.50")	Passed (42%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	359 @ 6 7/16"	1139	Passed (32%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	957 @ 4' 9 15/16"	975	Passed (98%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.355 @ 4' 9 15/16"	0.535	Passed (L/362)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.593 @ 4' 9 15/16"	0.714	Passed (L/217)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Beveled Plate - SPF	1.50"	1.50"	1.50"	162	241	403	Blocking
2 - Beveled Plate - SPF	1.50"	1.50"	1.50"	162	241	403	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	2' 1" o/c	
Bottom Edge (Lu)	10' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

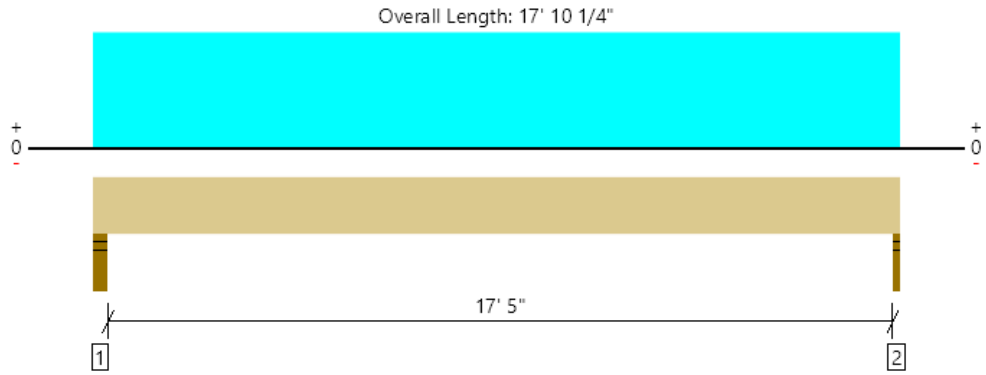
Vertical Load	Location (Side)	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 9' 7 7/8"	24"	15.0	25.0	Dead, Snow

ForteWEB Software Operator	Job Notes
Kylean Gunhus Miller Consulting Engineers (503) 246-1250 kylean@miller-se.com	

Weyerhaeuser

Roof/Ceiling, Ridge Beam 1

1 piece(s) 5 1/2" x 12" 24F-V4 DF Glulam



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3710 @ 17' 10"	4091 (1.75")	Passed (91%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3230 @ 1' 3 1/2"	13409	Passed (24%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	16348 @ 9'	30360	Passed (54%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.371 @ 9'	0.883	Passed (L/572)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.644 @ 9'	1.178	Passed (L/329)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 17' 8".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - SPF	3.50"	3.50"	1.61"	1602	2169	3771	None
2 - Stud wall - SPF	1.75"	1.75"	1.59"	1576	2134	3710	None

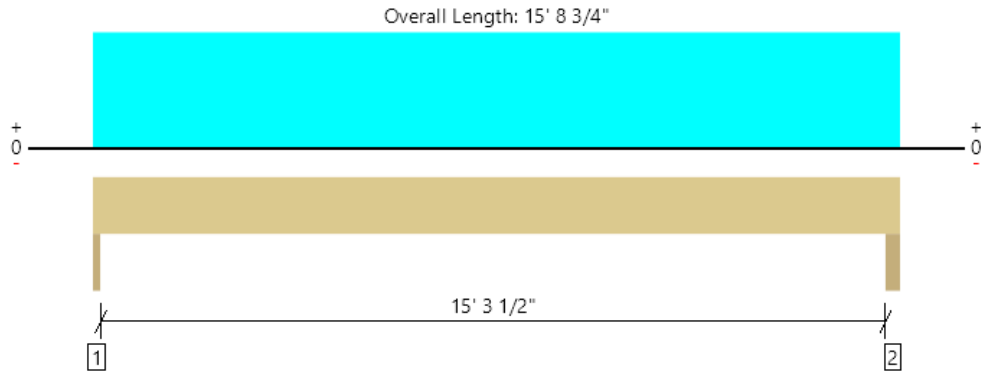
Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	17' 10" o/c	
Bottom Edge (Lu)	17' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 17' 10 1/4"	N/A	16.0	--	
1 - Uniform (PLF)	0 to 17' 10 1/4" (Front)	N/A	81.0	120.5	Dead, Snow
2 - Uniform (PLF)	0 to 17' 10 1/4" (Back)	N/A	81.0	120.5	Dead, Snow

Roof/Ceiling, Ridge Beam 2

1 piece(s) 5 1/2" x 12" 24F-V4 DF Glulam



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3265 @ 1/4"	6256 (1.75")	Passed (52%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2785 @ 1' 1 3/4"	13409	Passed (21%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	12652 @ 7' 9 1/2"	30360	Passed (42%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.222 @ 7' 9 1/2"	0.777	Passed (L/840)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.386 @ 7' 9 1/2"	1.036	Passed (L/483)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 15' 6 1/2".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Column - DF	1.75"	1.75"	1.50"	1387	1878	3265	None
2 - Column - DF	3.50"	3.50"	1.50"	1413	1913	3326	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	15' 9" o/c	
Bottom Edge (Lu)	15' 9" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 15' 8 3/4"	N/A	16.0	--	
1 - Uniform (PLF)	0 to 15' 8 3/4" (Front)	N/A	81.0	120.5	Dead, Snow
2 - Uniform (PLF)	0 to 15' 8 3/4" (Back)	N/A	81.0	120.5	Dead, Snow

ForteWEB Software Operator	Job Notes
Kylean Gunhus Miller Consulting Engineers (503) 246-1250 kylean@miller-se.com	

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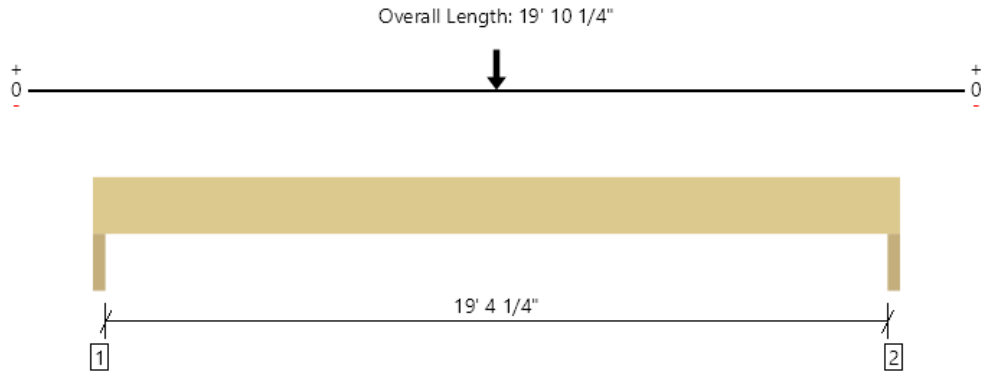
Roof/Ceiling, Fireplace Beam

1 piece(s) 5 1/2" x 12" 24F-V4 DF Glulam



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1822 @ 1 1/2"	10725 (3.00")	Passed (17%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1802 @ 1' 3"	13409	Passed (13%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	17072 @ 9' 11 1/8"	30354	Passed (56%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.364 @ 9' 11 1/8"	0.980	Passed (L/646)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.670 @ 9' 11 1/8"	1.307	Passed (L/351)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 19' 7 1/4".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Column - DF	3.00"	3.00"	1.50"	866	957	1822	None
2 - Column - DF	3.00"	3.00"	1.50"	866	957	1822	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	19' 10" o/c	
Bottom Edge (Lu)	19' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 19' 10 1/4"	N/A	16.0	--	
1 - Point (lb)	9' 11 1/8" (Top)	N/A	1413	1913	Dead, Snow

ForteWEB Software Operator	Job Notes
Kylean Gunhus Miller Consulting Engineers (503) 246-1250 kylean@miller-se.com	

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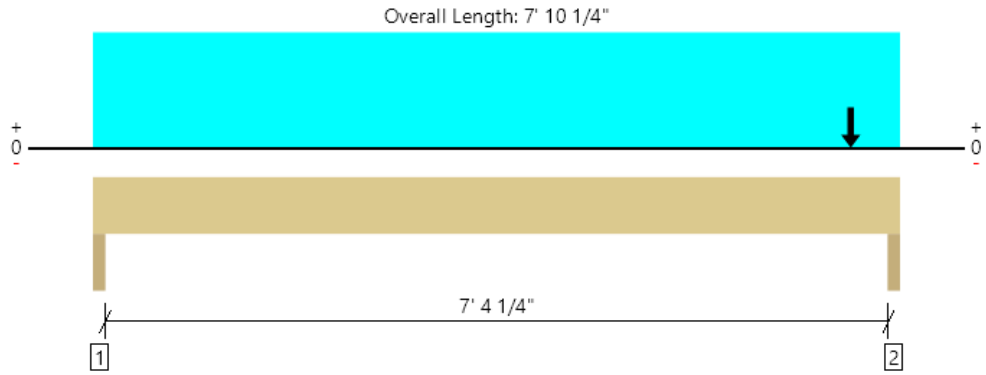
Roof/Ceiling, (E) South Beam @ Living Room
1 piece(s) 4 x 8 DF No.2



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2902 @ 7' 8 3/4"	6563 (3.00")	Passed (44%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1517 @ 7'	3502	Passed (43%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2478 @ 4' 2 9/16"	3438	Passed (72%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.089 @ 3' 11 7/8"	0.380	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.148 @ 4'	0.507	Passed (L/616)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Column - DF	3.00"	3.00"	1.50"	493	756	1249	None
2 - Column - DF	3.00"	3.00"	1.50"	1278	1624	2902	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	7' 10" o/c	
Bottom Edge (Lu)	7' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 7' 10 1/4"	N/A	6.4	--	
1 - Uniform (PLF)	0 to 7' 10 1/4" (Front)	N/A	108.8	181.3	Dead, Snow
2 - Point (lb)	7' 4 1/2" (Front)	N/A	866	957	Dead, Snow

ForteWEB Software Operator	Job Notes
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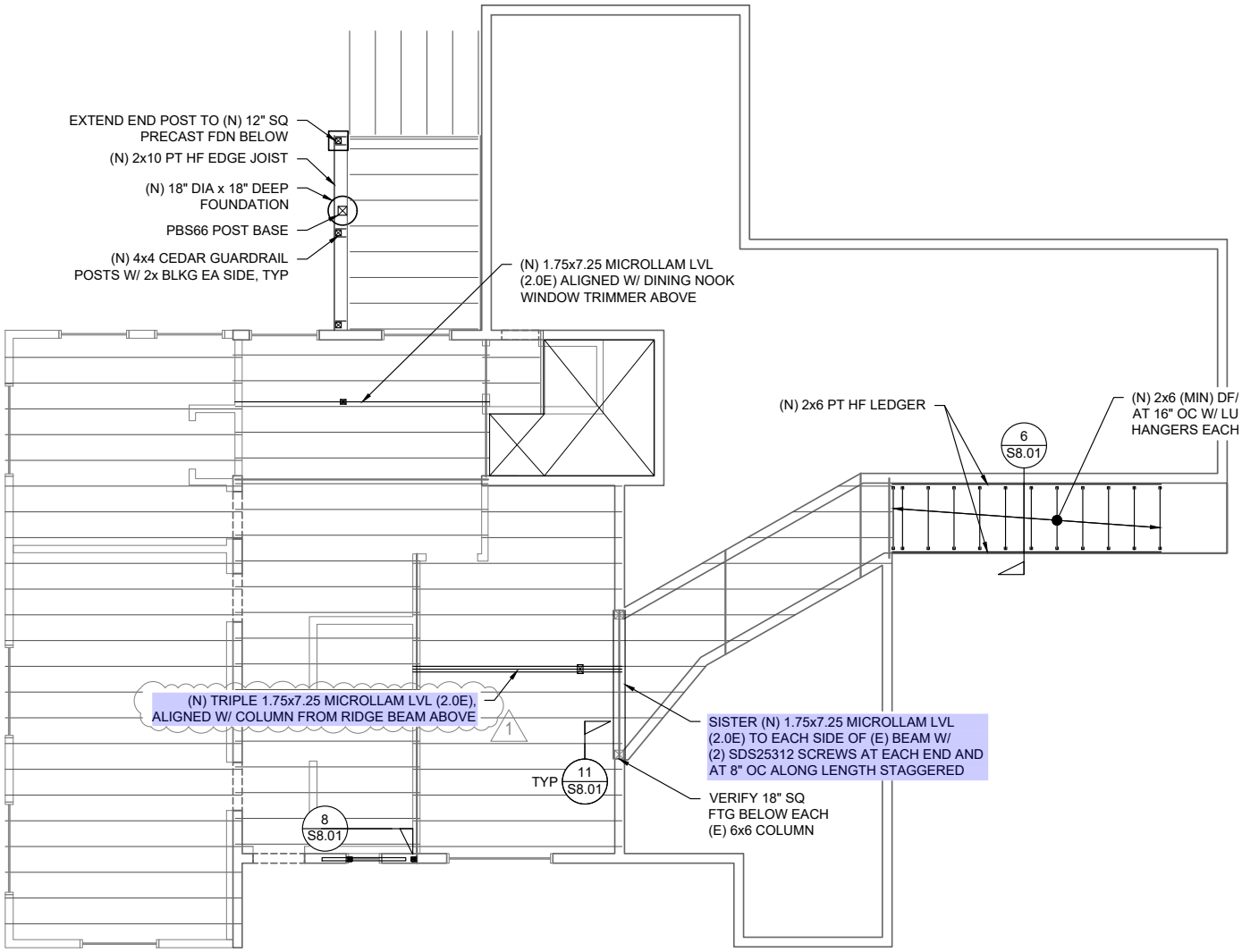
FLOOR FRAMING PLAN



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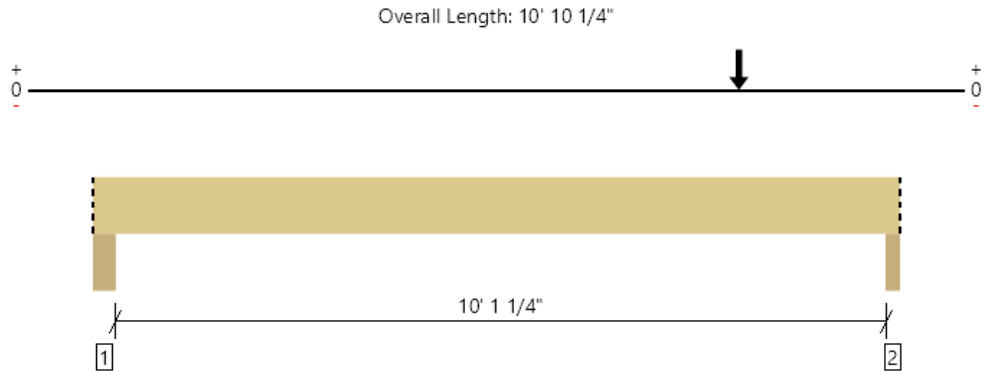
Project Name Romano Remodel - Vaulted Ceiling Change Project # 220852

Location 6529 SW Burlingame Ave, Portland, OR

Client Jessica Foote & TJ Romano

By KEG Ck'd ARL Date 03/10/2023

Floor, Beam Below Ridge Beam Column
3 piece(s) 1 3/4" x 7 1/4" 2.0E Microllam® LVL



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5687 @ 10' 8 1/4"	11484 (3.50")	Passed (50%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	5677 @ 9' 11 1/2"	8317	Passed (68%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	11348 @ 8' 8 1/4"	12273	Passed (92%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.284 @ 6' 1 11/16"	0.259	Passed (L/438)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.502 @ 6' 1 9/16"	0.518	Passed (L/247)	--	1.0 D + 1.0 S (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Beam - DF	5.50"	5.50"	1.50"	634	775	1408	Blocking
2 - Beam - DF	3.50"	3.50"	1.73"	2450	3237	5687	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	10' 2" o/c	
Bottom Edge (Lu)	10' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 10' 10 1/4"	N/A	11.1	--	
1 - Point (lb)	8' 8 1/4" (Top)	N/A	1576	2134	Roof Dead, Roof Snow
2 - Point (lb)	8' 8 1/4" (Top)	N/A	1387	1878	Roof Dead, Roof Snow

ForteWEB Software Operator	Job Notes
Kylean Gunhus Miller Consulting Engineers (503) 246-1250 kylean@miller-se.com	

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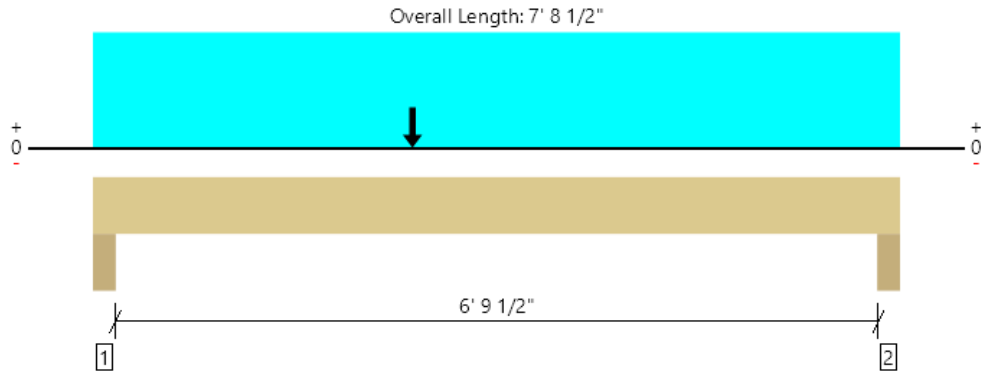
Floor, Beam @ Basement "Hall"
1 piece(s) 4 x 6 DF No.1



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4227 @ 4"	12031 (5.50")	Passed (35%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	3934 @ 11"	2657	Failed (148%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	10138 @ 3' 5/8"	2198	Failed (461%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.485 @ 3' 8 7/8"	0.235	Failed (L/174)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.907 @ 3' 8 3/4"	0.352	Failed (L/93)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

System : Floor
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Column - DF	5.50"	5.50"	1.93"	1928	1079	1987	4227	None
2 - Column - DF	5.50"	5.50"	1.50"	1369	1079	1250	3116	None

Verify 20" Square Footing Below (E) 6x6 Columns

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6" o/c	
Bottom Edge (Lu)	7' 9" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 7' 8 1/2"	N/A	4.9	--	--	
1 - Uniform (PSF)	0 to 7' 8 1/2" (Front)	7'	15.0	40.0	-	Floor Dead, Floor Live
2 - Point (lb)	3' 5/8" (Top)	N/A	2450	-	3237	Roof Dead, Roof Snow

USE BUILT-UP MEMBER, SEE NEXT PAGE

ForteWEB Software Operator	Job Notes
Kylean Gunhus Miller Consulting Engineers (503) 246-1250 kylean@miller-se.com	

Weyerhaeuser

COMPOSITE BEAM DESIGN

2018 National Design Specification for Wood Construction **(ASD)**

Built-Up Floor Beam

LOADING AND BEAM LENGTH:

M_T =	4227	ft-lbs
V_T =	3934	lbs
L =	6.79	ft beam span
Equivalent w_T =	733	plf = $8M_T/L$

(E) MAIN MEMBER PROPERTIES:

Type:	DF-L #1	
Mark:	4 x 6	
E_1 =	1700	ksi
I_1 =	48.5	$in^4 = b_1d_1^3/12$
S_1 =	17.6	$in^3 = b_1d_1^2/6$
A_1 =	19.3	$in^2 = b_1d_1$
n_1 =	1	
EI_1 =	82494	$kip\text{-}in^2 = n_1E_1I_1C_{i1\ E}$
C_{r1} =	1	
C_{D1} =	1	
C_{F1} =	1.5	
C_{V1} =	1	
$C_{i1\ Fb,Fv}$ =	1	
$C_{i1\ E}$ =	1	
M_1 =	1144	ft-lbs = M_TEI_1/EI_T
V_1 =	1065	lbs = V_TEI_1/EI_T
Equivalent w_1 =	198	plf = $8M_1/L$
f_{b1} =	778	psi = $M_1/S_1/n_1$
F_{b1}' =	1500	psi
Utilization =	**51.9%**	OKAY
f_{v1} =	83	psi = $1.5V_1/A_1/n_1$
F_{v1}' =	180	psi
Utilization =	**46.1%**	OKAY

(N) SIDE MEMBER PROPERTIES:

Type:	LVL	
Mark:	1.75 x 7.25	
E_2 =	2000	ksi
I_2 =	55.6	$in^4 = b_2d_2^3/12$
S_2 =	15.3	$in^3 = b_2d_2^2/6$
A_2 =	12.7	$in^2 = b_2d_2$
n_2 =	2	
EI_2 =	222296	$kip\text{-}in^2 = nE_2I_2C_{i2\ E}$
C_{r2} =	1	
C_{D2} =	1	
C_{F2} =	1	
C_{V2} =	1	
$C_{i2\ Fb,Fv}$ =	1	
$C_{i2\ E}$ =	1	
M_2 =	3083	ft-lbs = M_TEI_2/EI_T
V_2 =	2869	lbs = V_TEI_2/EI_T
Equivalent w_2 =	535	plf = $8M_2/L$
f_{b2} =	1207	psi = $M_2/S_2/n_2$
F_{b2}' =	2600	psi
Utilization =	**46.4%**	OKAY
f_{v2} =	170	psi = $1.5V_2/A_2/n_2$
F_{v2}' =	285	psi
Utilization =	**59.5%**	OKAY

DEFLECTION ANALYSIS:

EI_1 / EI_2 =	0.37	
EI_T =	304790	$kip\text{-}in^2 = EI_1+EI_2$
Δ =	0.12	in L / 708

ATTACHMENT:

Side member directly bearing against supported member(s).

Attachment to side member(s) are to be designed for

Δw = 336.3 plf = w_2-w_1

Use (N) (2) 1.75 x 7.25 LVL with the (E) 4 x 6 DF-L #1

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Project Name Romano Remodel - Vaulted Ceiling Change Project # 220852

Location 6529 SW Burlingame Ave, Portland, OR

Client Jessica Foote & TJ Romano

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