

Harriott Valentine Engineers Inc.

STRUCTURAL CALCULATIONS

Project:

Rosenwald Residence
4836 E Mercer Way
Mercer Island, WA 98040

Architect:

JML Architects
Mercer Island, WA 98040

Structural Engineer:

Harriott Valentine Engineers, Inc.
1932 First Avenue, Suite 720
Seattle, WA 98101
tel. 206-624-4760



6/17/25

SECTION 1: GENERAL

CRITERIA

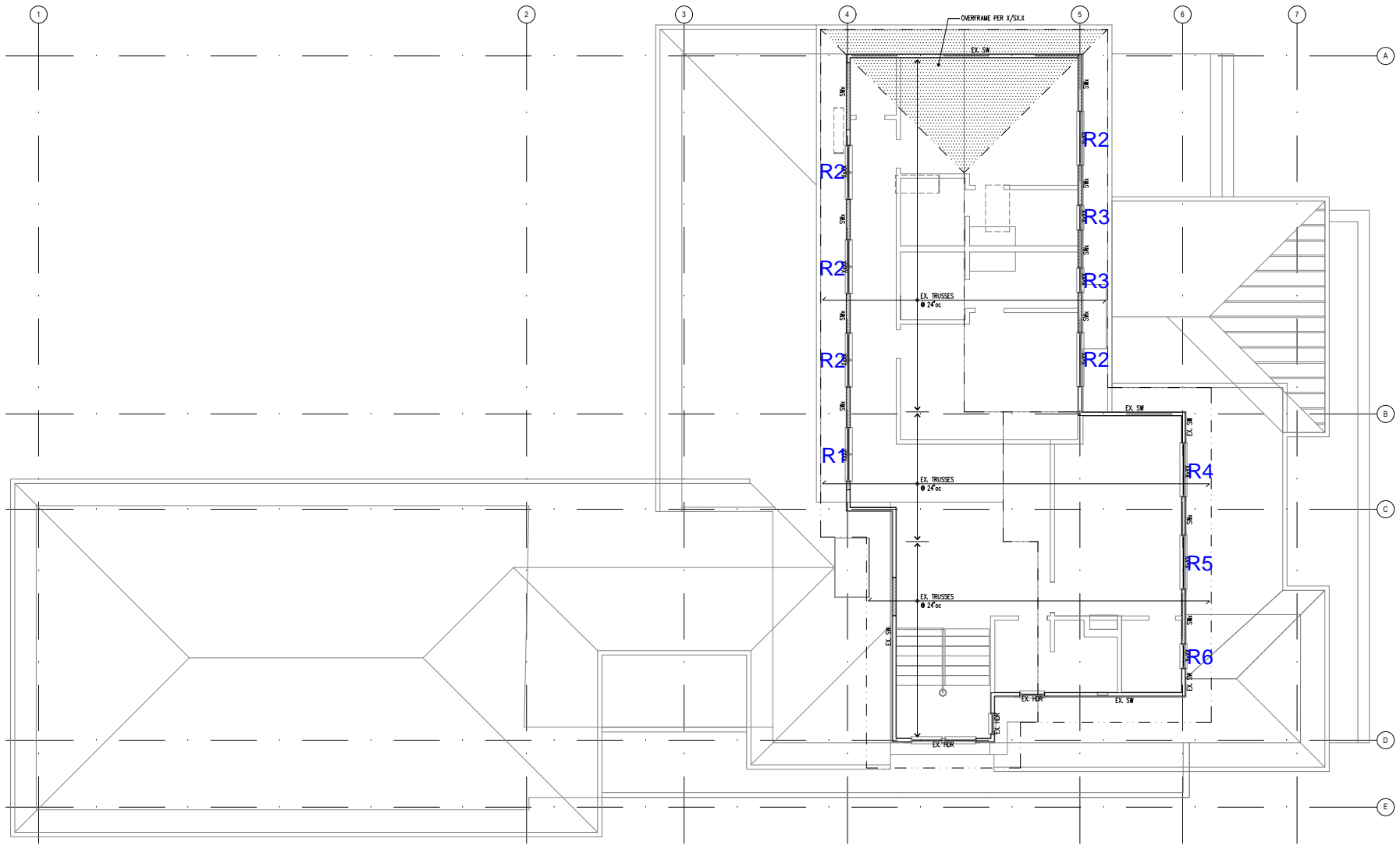
Gravity

exist. roof	dead	asphalt shingles	2.5	live snow	25.0 psf		
		1/2" plywood	1.5				
		R30 insulation	1.2				
		2x8 @ 24"oc (rafter)	1.5				
		2x4 @ 24"oc (ceiling)	0.7				
		5/8" gyp. wallboard	2.8				
		slope factor	0.7				
		miscellaneous	<u>2.1</u> 16%				
		13.0 psf					
	total	dead + live	38.0 psf				
new garage roof	dead	asphalt shingles	2.5	live snow	25.0 psf		
		1/2" plywood	1.5				
		R30 insulation	1.2				
		2x10 @ 24"oc	1.9				
		5/8" gyp. wallboard	2.8				
		slope factor	0.5				
		miscellaneous	<u>1.6</u> 13%				
			12.0 psf				
	total	dead + live	37.0 psf				
new flat roof	dead	asphalt shingles	2.5	live snow	25.0 psf		
		1/2" plywood	1.5				
		R30 insulation	1.2				
		2x8 @ 24"oc	1.5				
		5/8" gyp. wallboard	2.8				
		slope factor	0				
		miscellaneous	<u>1.5</u> 14%				
			11.0 psf				
	total	dead + live	36.0 psf				
new patio roof	dead	asphalt shingles	2.5	live snow	25.0 psf		
		1/2" plywood	1.5				
		2x10 @ 16"oc	2.8				
		T&G boards	2.8				
		slope factor	0.7				
		miscellaneous	<u>1.7</u> 14%				
			12.0 psf				
			total			dead + live	37.0 psf
new patio roof (glazing)	dead	asphalt shingles	2.5	live snow	25.0 psf		
		1/2" plywood	1.5				
		2x10 @ 16"oc	2.8				
		skylights/glazing	5.0				
		slope factor	0.7				
		miscellaneous	<u>1.5</u> 11%				
			14.0 psf				
			total			dead + live	39.0 psf

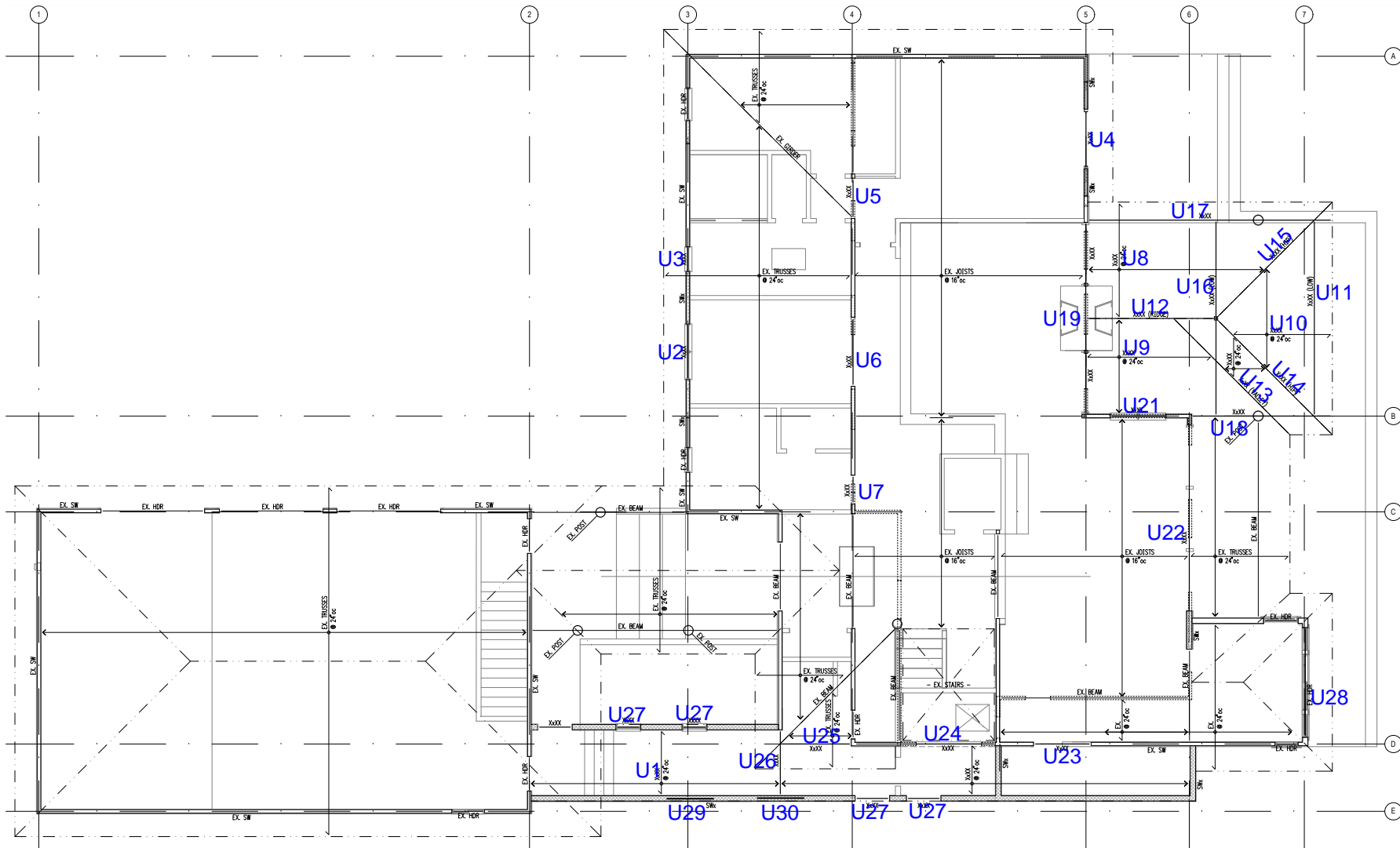
Harriott Valentine Engineers Inc.

floor	dead	3/4" hardwood	3.0	live residential	40.0 psf
		3/4" plywood	2.3		
		2x10 @ 16"oc	2.8		
		acoustic insulation	1.0		
		1/2" gyp. wallboard	2.2		
		miscellaneous	1.7 13%		
			<u>13.0 psf</u>		
total					
	dead + live		53.0 psf		
garage upper floor	dead	3/4" hardwood	3.0	live residential	40.0 psf
		3/4" plywood	2.3		
		11-7/8" TJI 110 @ 16"oc	1.9		
		acoustic insulation	1.0		
		1/2" gyp. wallboard	2.2		
		miscellaneous	1.6 13%		
			<u>12.0 psf</u>		
total					
	dead + live		52.0 psf		
walls		wood siding	2.0		
		battens 2x2 @ 24"oc	0.3		
		1/2" plywood	1.5		
		2x4 @ 16"oc	1.1		
		R21 insulation	0.8		
		1/2" gyp. wallboard	2.2		
		miscellaneous	1.1 12%		
		<u>9.0 psf</u>			

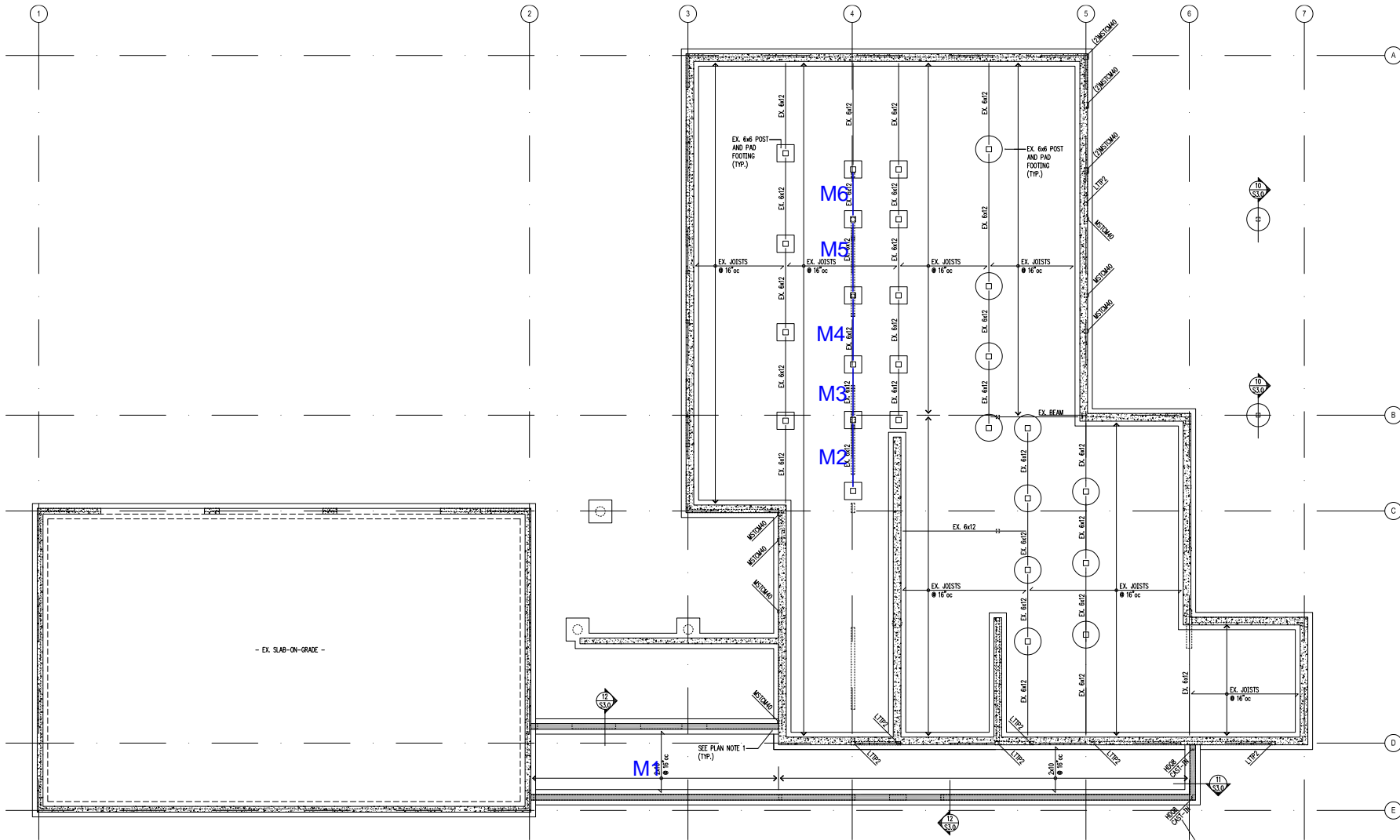
SECTION 2: FRAMING



Roof Beams

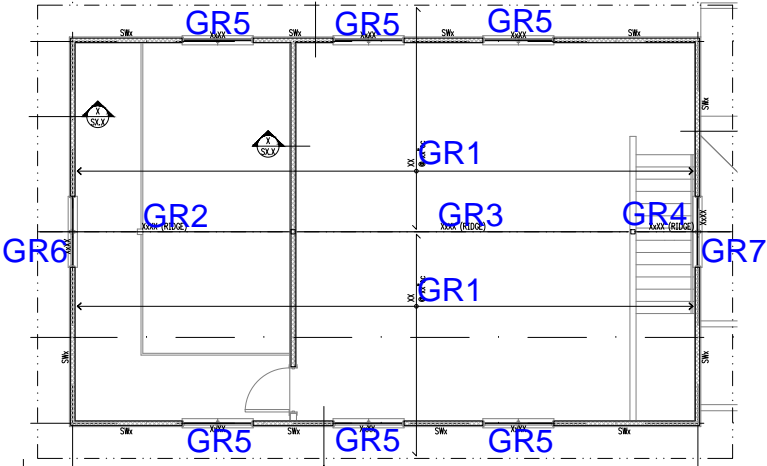


Upper Floor Beams

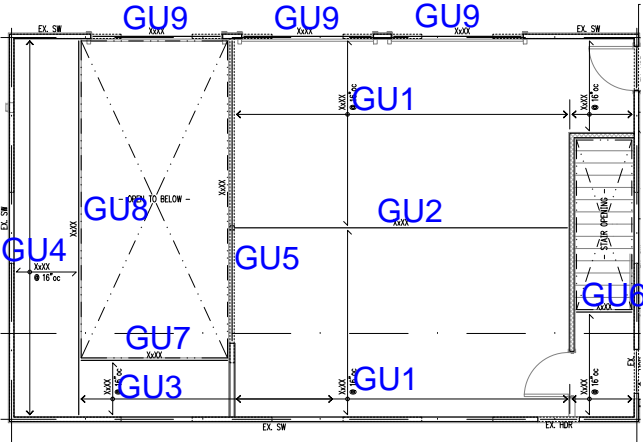


Main Floor Beams

Garage Roof Framing

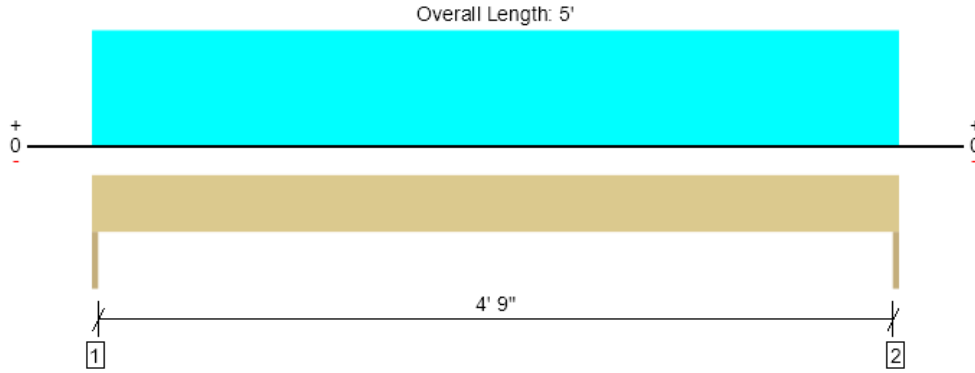


Garage Upper Floor Framing



Roof, R1

2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1726 @ 0	1823 (1.50")	Passed (95%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1223 @ 8 3/4"	2501	Passed (49%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2158 @ 2' 6"	2569	Passed (84%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.049 @ 2' 6"	0.167	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.078 @ 2' 6"	0.250	Passed (L/765)	--	1.0 D + 1.0 S (All Spans)

Member Length : 5'
 System : Wall
 Member Type : Header
 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	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	656	1070	1726	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	656	1070	1726	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' o/c	
Bottom Edge (Lu)	5' o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5'	N/A	5.5	--	
1 - Uniform (PSF)	0 to 5'	17' 1 1/2"	15.0	25.0	Default Load

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC-ES under evaluation reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.weyerhaeuser.com/woodproducts/document-library.

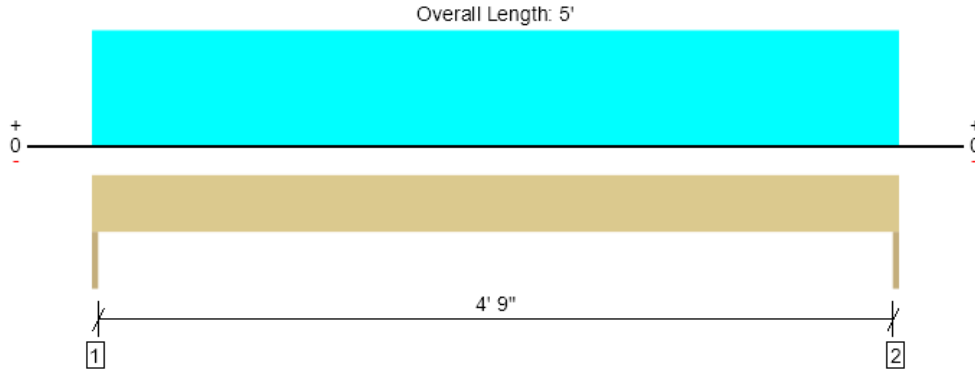
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Roof, R2

2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1276 @ 0	1823 (1.50")	Passed (70%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	904 @ 8 3/4"	2501	Passed (36%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1595 @ 2' 6"	2569	Passed (62%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.036 @ 2' 6"	0.167	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.058 @ 2' 6"	0.250	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 5'
 System : Wall
 Member Type : Header
 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	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	487	789	1276	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	487	789	1276	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' o/c	
Bottom Edge (Lu)	5' o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5'	N/A	5.5	--	
1 - Uniform (PSF)	0 to 5'	12' 7 1/2"	15.0	25.0	Default Load

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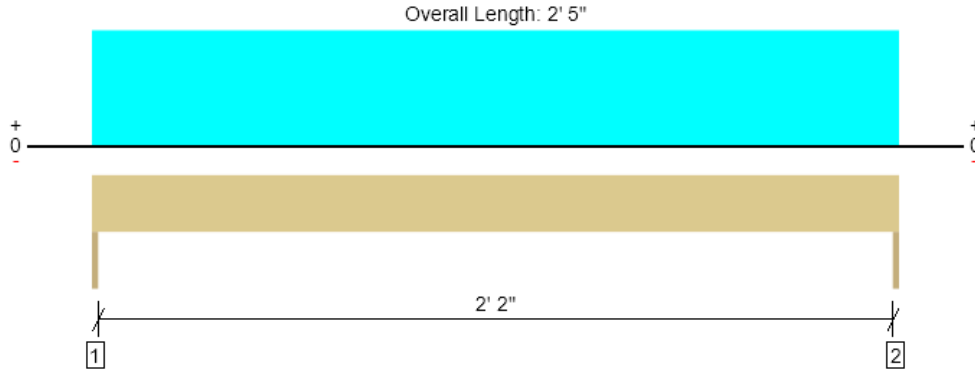
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Roof, R3

2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	617 @ 0	1823 (1.50")	Passed (34%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	245 @ 8 3/4"	2501	Passed (10%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	373 @ 1' 2 1/2"	2569	Passed (15%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.002 @ 1' 2 1/2"	0.081	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.003 @ 1' 2 1/2"	0.121	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 2' 5"
 System : Wall
 Member Type : Header
 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	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	235	381	617	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	235	381	617	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	2' 5" o/c	
Bottom Edge (Lu)	2' 5" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 2' 5"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 2' 5"	12' 7 1/2"	15.0	25.0	Default Load

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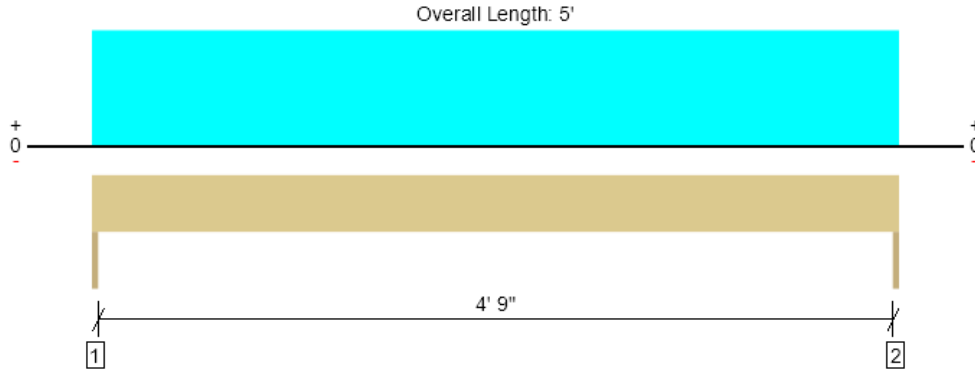
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Roof, R4

2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1726 @ 0	1823 (1.50")	Passed (95%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1223 @ 8 3/4"	2501	Passed (49%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2158 @ 2' 6"	2569	Passed (84%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.049 @ 2' 6"	0.167	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.078 @ 2' 6"	0.250	Passed (L/765)	--	1.0 D + 1.0 S (All Spans)

Member Length : 5'
 System : Wall
 Member Type : Header
 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	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	656	1070	1726	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	656	1070	1726	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' o/c	
Bottom Edge (Lu)	5' o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5'	N/A	5.5	--	
1 - Uniform (PSF)	0 to 5'	17' 1 1/2"	15.0	25.0	Default Load

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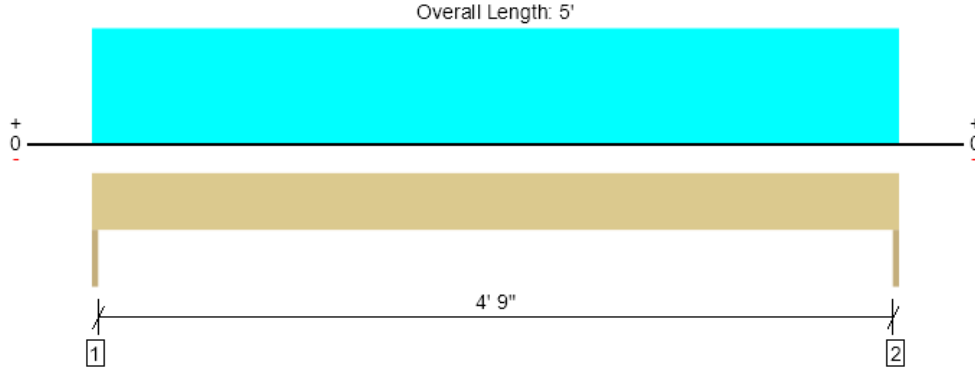
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Roof, R5

2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1726 @ 0	1823 (1.50")	Passed (95%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1223 @ 8 3/4"	2501	Passed (49%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2158 @ 2' 6"	2569	Passed (84%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.049 @ 2' 6"	0.167	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.078 @ 2' 6"	0.250	Passed (L/765)	--	1.0 D + 1.0 S (All Spans)

Member Length : 5'
 System : Wall
 Member Type : Header
 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	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	656	1070	1726	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	656	1070	1726	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' o/c	
Bottom Edge (Lu)	5' o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5'	N/A	5.5	--	
1 - Uniform (PSF)	0 to 5'	17' 1 1/2"	15.0	25.0	Default Load

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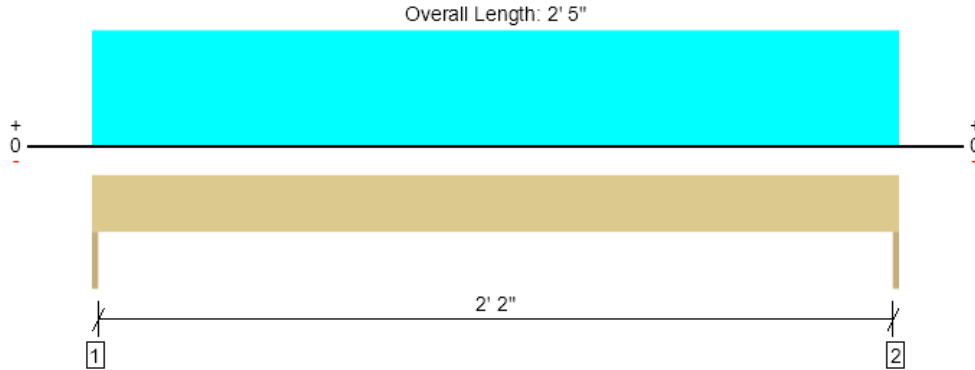
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Roof, R6

2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	617 @ 0	1823 (1.50")	Passed (34%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	245 @ 8 3/4"	2501	Passed (10%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	373 @ 1' 2 1/2"	2569	Passed (15%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.002 @ 1' 2 1/2"	0.081	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.003 @ 1' 2 1/2"	0.121	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 2' 5"
 System : Wall
 Member Type : Header
 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	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	235	381	617	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	235	381	617	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	2' 5" o/c	
Bottom Edge (Lu)	2' 5" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 2' 5"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 2' 5"	12' 7 1/2"	15.0	25.0	Default Load

Weyerhaeuser Notes

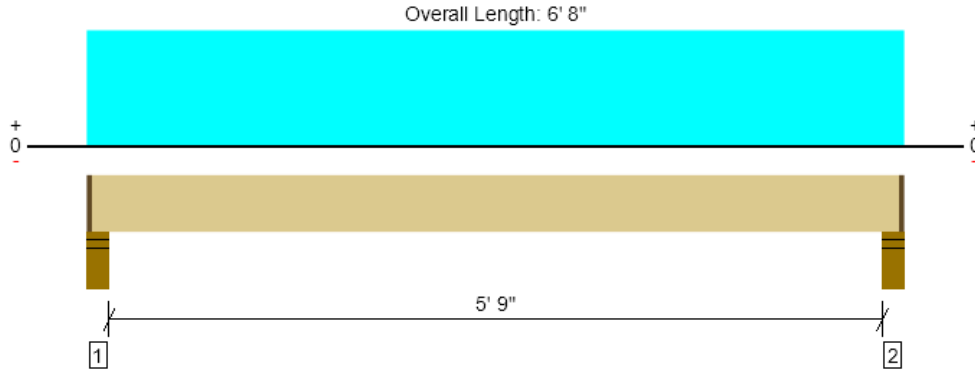
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U1
1 piece(s) 2 x 8 HF No.2 @ 24" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	233 @ 4 1/2"	2582 (4.25")	Passed (9%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	164 @ 1' 3/4"	1251	Passed (13%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	315 @ 3' 4"	1477	Passed (21%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.022 @ 3' 4"	0.197	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.032 @ 3' 4"	0.296	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 6' 5 1/2"
 System : Roof
 Member Type : Joist
 Building Use : Residential
 Building Code : IBC 2018
 Design Methodology : ASD
 Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- 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 - Stud wall - HF	5.50"	4.25"	1.50"	73	167	240	1 1/4" Rim Board
2 - Stud wall - HF	5.50"	4.25"	1.50"	73	167	240	1 1/4" Rim Board

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 6" o/c	
Bottom Edge (Lu)	6' 6" 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 6' 8"	24"	11.0	25.0	Default Load

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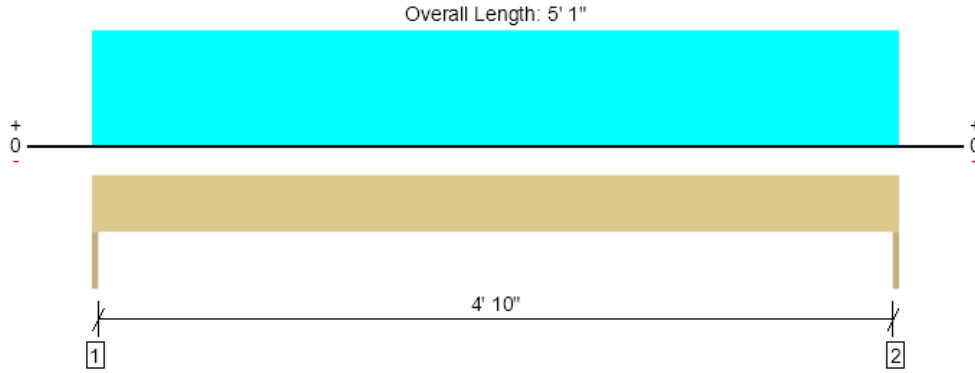
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U2
2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1226 @ 0	1823 (1.50")	Passed (67%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	874 @ 8 3/4"	2175	Passed (40%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1557 @ 2' 6 1/2"	2234	Passed (70%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.044 @ 2' 6 1/2"	0.169	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.058 @ 2' 6 1/2"	0.254	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

Member Length : 5' 1"
 System : Wall
 Member Type : Header
 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	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	294	932	1226	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	294	932	1226	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 1" o/c	
Bottom Edge (Lu)	5' 1" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 5' 1"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 5' 1"	9' 2"	12.0	40.0	Default Load

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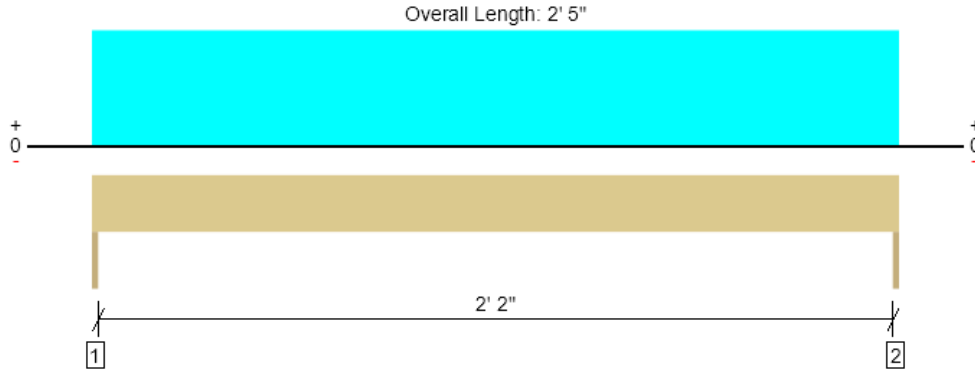
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U3
2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	583 @ 0	1823 (1.50")	Passed (32%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	231 @ 8 3/4"	2175	Passed (11%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	352 @ 1' 2 1/2"	2234	Passed (16%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.002 @ 1' 2 1/2"	0.081	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.003 @ 1' 2 1/2"	0.121	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

Member Length : 2' 5"
 System : Wall
 Member Type : Header
 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	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	140	443	583	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	140	443	583	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	2' 5" o/c	
Bottom Edge (Lu)	2' 5" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 2' 5"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 2' 5"	9' 2"	12.0	40.0	Default Load

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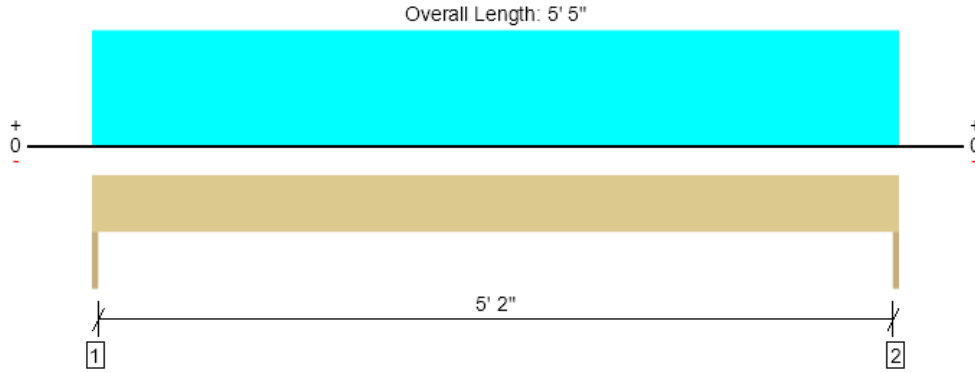
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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U4
2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1618 @ 0	1823 (1.50")	Passed (89%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1183 @ 8 3/4"	2175	Passed (54%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2191 @ 2' 8 1/2"	2234	Passed (98%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.063 @ 2' 8 1/2"	0.181	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.093 @ 2' 8 1/2"	0.271	Passed (L/696)	--	1.0 D + 1.0 L (All Spans)

Member Length : 5' 5"
 System : Wall
 Member Type : Header
 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	Roof Live	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	535	1083	135	1618	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	535	1083	135	1618	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 2" o/c	
Bottom Edge (Lu)	5' 5" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Floor Live (1.00)	Roof Live (1.25)	Comments
0 - Self Weight (PLF)	0 to 5' 5"	N/A	5.5	--	--	
1 - Uniform (PSF)	0 to 5' 5"	10'	12.0	40.0	--	Default Load
2 - Uniform (PSF)	0 to 5' 5"	2'	11.0	--	25.0	
3 - Uniform (PLF)	0 to 5' 5"	N/A	50.0	--	--	

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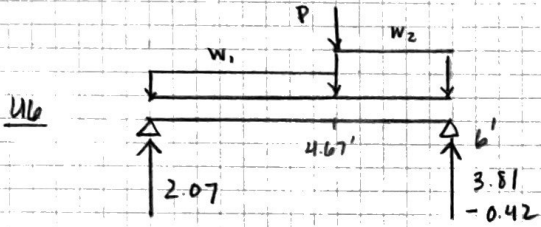
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ForteWEB Software Operator	Job Notes
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UPPER FLOOR FRAMING



	w_1	w_2	P
D	172	396	0.49
L	250	250	-
S	175	606	0.79
E	-	-	± 0.50
W	-	-	± 0.18

$V = 3.81 \text{ k}$

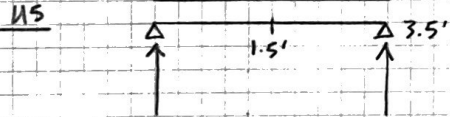
$V_r = 5.40 \text{ k}$

USE (2) 2x12

$M = 4.20 \text{ k-ft}$

$M_r = 8.24 \text{ k-ft}$

$C_d = 1.6$



	w_1	w_2	P
D	396	172	0.49
L	250	250	-
S	606	175	0.79
E	-	-	± 0.50
W	-	-	± 0.18

$V = 2.2$

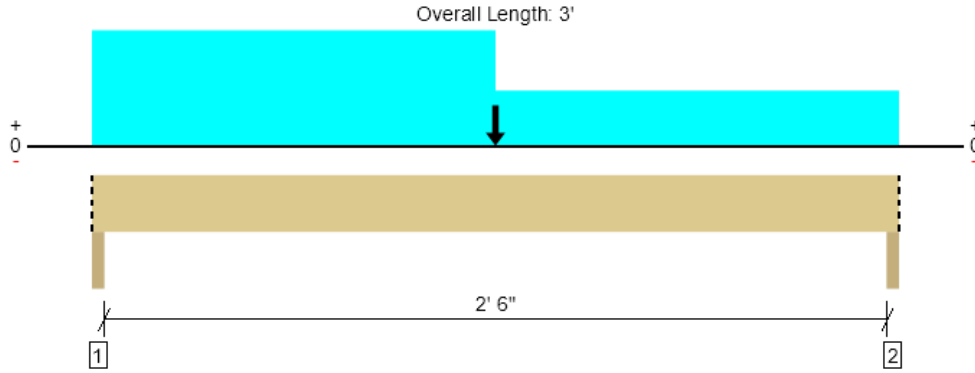
$V_r = 3.38 \text{ k}$

USE (2) 2x12

$M = 2.125 \text{ k-ft}$

$M_r = 5.15 \text{ k-ft}$

Upper Floor, U7
2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2150 @ 1 1/2"	3645 (3.00")	Passed (59%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1316 @ 2' 1 3/4"	2501	Passed (53%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1830 @ 1' 6"	2569	Passed (71%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.011 @ 1' 5 11/16"	0.092	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.018 @ 1' 5 3/4"	0.138	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 3'
 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 - HF	3.00"	3.00"	1.77"	854	375	1296	2150	Blocking
2 - Column - HF	3.00"	3.00"	1.50"	672	375	946	1662	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)	3' o/c	
Bottom Edge (Lu)	3' 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 3'	N/A	5.5	--	--	
1 - Uniform (PSF)	0 to 3' (Front)	6' 3"	13.0	40.0	--	Default Load
2 - Uniform (PSF)	0 to 3' (Back)	7'	13.0	--	25.0	
3 - Uniform (PSF)	0 to 1' 6" (Top)	17' 3"	13.0	--	25.0	
4 - Point (lb)	1' 6" (Top)	N/A	656	--	1070	Linked from: R1, Support 1

• Side loads are assumed to not induce cross-grain tension.

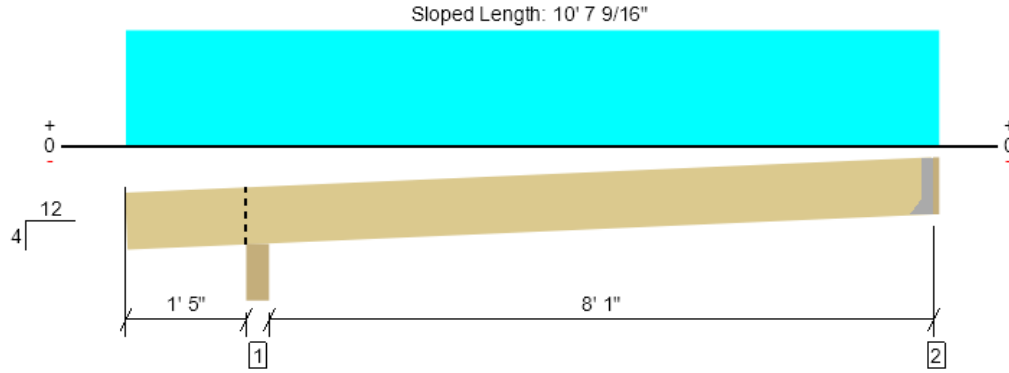
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U8

1 piece(s) 2 x 10 HF No.2 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	203 @ 9' 11 1/2"	911 (1.50")	Passed (22%)	--	1.0 D + 1.0 S (Alt Spans)
Shear (lbs)	169 @ 2' 7 1/4"	1596	Passed (11%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	411 @ 5' 10 15/16"	2204	Passed (19%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.029 @ 5' 9 15/16"	0.438	Passed (L/999+)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.044 @ 5' 10 1/16"	0.584	Passed (L/999+)	--	1.0 D + 1.0 S (Alt Spans)

Member Length : 10' 9 1/16"
 System : Roof
 Member Type : Joist
 Building Use : Residential
 Building Code : IBC 2018
 Design Methodology : ASD
 Member Pitch : 4/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/180).
- Birdsmouth cut has not been analyzed.
- 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 - Birdsmouth - HF	5.50"	5.50"	1.50"	101	199	299	Blocking
2 - Hanger on 9 1/4" HF beam	1.50"	Hanger ¹	1.50"	69	140	209	See note ¹

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	10' 6" o/c	
Bottom Edge (Lu)	10' 6" o/c	

- Maximum allowable bracing intervals based on applied load.
- Dimensions for lateral bracing intervals are measured along the length of the member for sloped conditions.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	LRU28Z	1.94"	N/A	6-10dx1.5	5-10d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 10' 1"	16"	12.0	25.0	Default Load

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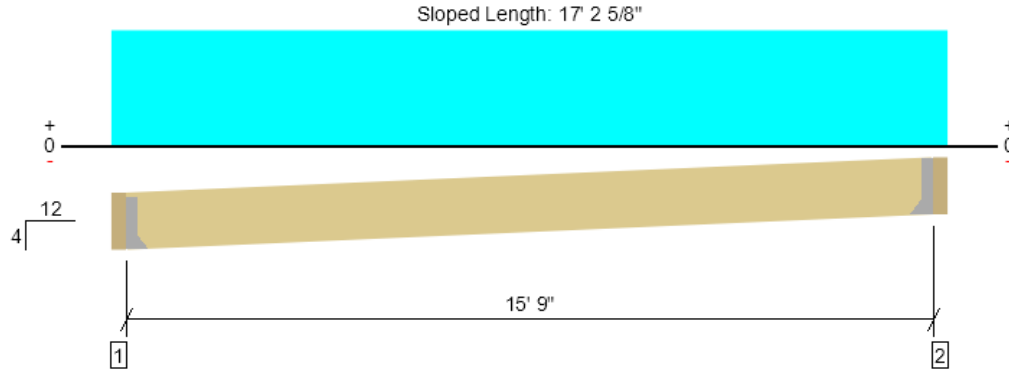
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U9

1 piece(s) 2 x 10 HF No.2 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	395 @ 3 1/2"	911 (1.50")	Passed (43%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	359 @ 1' 1/4"	1596	Passed (22%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1557 @ 8' 2"	2204	Passed (71%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.399 @ 8' 2"	0.830	Passed (L/500)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.600 @ 8' 2"	1.107	Passed (L/332)	--	1.0 D + 1.0 S (All Spans)

Member Length : 16' 10 5/16"
 System : Roof
 Member Type : Joist
 Building Use : Residential
 Building Code : IBC 2018
 Design Methodology : ASD
 Member Pitch : 4/12

- 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 - Hanger on 9 1/4" HF beam	3.50"	Hanger ¹	1.50"	137	272	410	See note ¹
2 - Hanger on 9 1/4" HF beam	3.50"	Hanger ¹	1.50"	137	272	410	See note ¹

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 9" o/c	
Bottom Edge (Lu)	16' 7" o/c	

- Maximum allowable bracing intervals based on applied load.
- Dimensions for lateral bracing intervals are measured along the length of the member for sloped conditions.

Connector: Simpson Strong-Tie							
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories	
1 - Face Mount Hanger	LRU28Z	1.94"	N/A	6-10dx1.5	5-10d		
2 - Face Mount Hanger	LRU28Z	1.94"	N/A	6-10dx1.5	5-10d		

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 16' 4"	16"	12.0	25.0	Default Load

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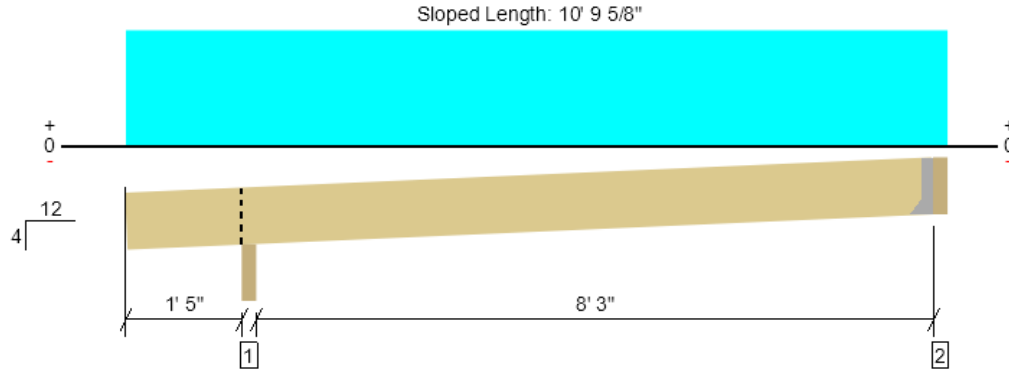
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U10

1 piece(s) 2 x 10 HF No.2 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	217 @ 9' 11 1/2"	911 (1.50")	Passed (24%)	--	1.0 D + 1.0 S (Alt Spans)
Shear (lbs)	184 @ 2' 5 1/4"	1596	Passed (12%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	445 @ 5' 10 5/16"	2204	Passed (20%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.031 @ 5' 9 3/8"	0.442	Passed (L/999+)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.048 @ 5' 9 1/2"	0.590	Passed (L/999+)	--	1.0 D + 1.0 S (Alt Spans)

Member Length : 10' 9 1/16"
 System : Roof
 Member Type : Joist
 Building Use : Residential
 Building Code : IBC 2018
 Design Methodology : ASD
 Member Pitch : 4/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/180).
- Birdsmouth cut has not been analyzed.
- 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 - Birdsmouth - DF	3.50"	3.50"	1.50"	116	197	313	Blocking
2 - Hanger on 9 1/4" HF beam	3.50"	Hanger ¹	1.50"	85	147	232	See note ¹

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	10' 6" o/c	
Bottom Edge (Lu)	10' 6" o/c	

- Maximum allowable bracing intervals based on applied load.
- Dimensions for lateral bracing intervals are measured along the length of the member for sloped conditions.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	LRU28Z	1.94"	N/A	6-10dx1.5	5-10d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 10' 3"	16"	14.0	25.0	Default Load

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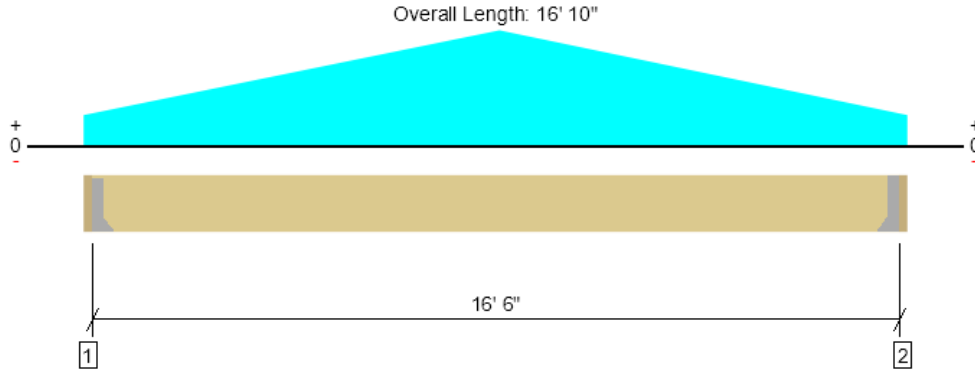
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U11
1 piece(s) 4 x 12 DF No.1



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1251 @ 16' 8"	3281 (1.50")	Passed (38%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1175 @ 15' 8 3/4"	5434	Passed (22%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	6053 @ 8' 5 1/4"	7783	Passed (78%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.248 @ 8' 5"	0.825	Passed (L/799)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.410 @ 8' 5"	1.100	Passed (L/483)	--	1.0 D + 1.0 S (All Spans)

Member Length : 16' 6"
 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 - Hanger on 11 1/4" DF beam	2.00"	Hanger ¹	1.50"	503	752	1256	See note ¹
2 - Hanger on 11 1/4" DF beam	2.00"	Hanger ¹	1.50"	506	756	1261	See note ¹

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	16' 6" o/c	
Bottom Edge (Lu)	16' 6" o/c	

- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie							
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories	
1 - Face Mount Hanger	LUS410	2.00"	N/A	8-10dx1.5	6-10d		
2 - Face Mount Hanger	LUS410	2.00"	N/A	8-10dx1.5	6-10d		

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	2" to 16' 8"	N/A	10.0	--	
1 - Tapered (PSF)	0 to 8' 6" (Top)	1' 6" to 5' 8"	14.0	25.0	
2 - Tapered (PSF)	8' 6" to 16' 10" (Top)	5' 8" to 1' 6"	14.0	25.0	

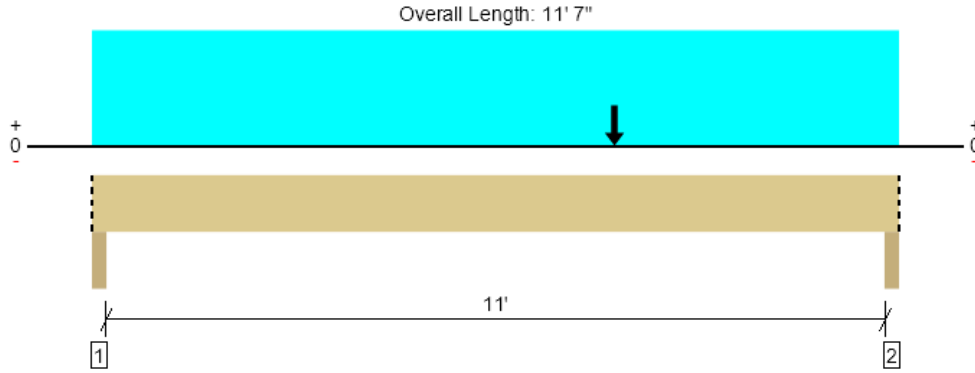
- Side loads are assumed to not induce cross-grain tension.

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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U12
1 piece(s) 4 x 12 DF No.1



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2111 @ 11' 5"	7656 (3.50")	Passed (28%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1876 @ 10' 4 1/4"	5434	Passed (35%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	6675 @ 7' 6"	7783	Passed (86%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.127 @ 6' 3/8"	0.563	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.196 @ 6' 3/8"	0.750	Passed (L/689)	--	1.0 D + 1.0 S (All Spans)

Member Length : 11' 7"
 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 - HF	3.50"	3.50"	1.50"	588	1056	1644	Blocking
2 - Column - HF	3.50"	3.50"	1.50"	748	1363	2111	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)	11' 7" o/c	
Bottom Edge (Lu)	11' 7" 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 11' 7"	N/A	10.0	--	
1 - Uniform (PSF)	0 to 11' 7" (Back)	8"	12.0	25.0	
2 - Uniform (PLF)	0 to 11' 7" (Front)	N/A	51.8	105.0	Linked from: U8, Support 2
3 - Point (lb)	7' 6" (Back)	N/A	528	1010	Linked from: U13, Support 2

• Side loads are assumed to not induce cross-grain tension.

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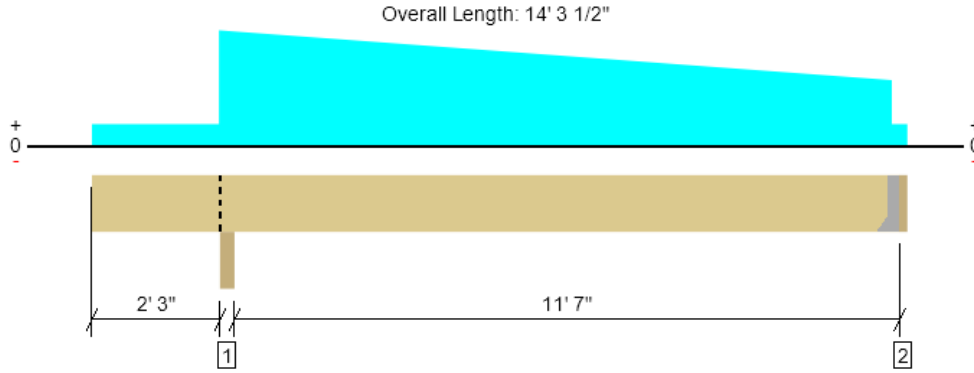
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U13
1 piece(s) 4 x 10 DF No.1



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1527 @ 14' 1 1/2"	3281 (1.50")	Passed (47%)	--	1.0 D + 1.0 S (Alt Spans)
Shear (lbs)	1549 @ 3' 3 3/4"	4468	Passed (35%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	4945 @ 8' 1/2"	5740	Passed (86%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.205 @ 8' 2 1/2"	0.586	Passed (L/686)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.311 @ 8' 2 5/8"	0.782	Passed (L/453)	--	1.0 D + 1.0 S (Alt Spans)

Member Length : 14' 1 1/2"
 System : Roof
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2018
 Design Methodology : ASD
 Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/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 - Beam - GLB	3.50"	3.50"	1.50"	731	1377	2108	Blocking
2 - Hanger on 9 1/4" HF beam	2.00"	Hanger ¹	1.50"	528	1010	1538	See note ¹

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	14' 2" o/c	
Bottom Edge (Lu)	14' 2" o/c	

- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	LUS410	2.00"	N/A	8-16d	6-16d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 14' 1 1/2"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 14' 3 1/2" (Front)	1' 10"	12.0	25.0	Default Load
2 - Tapered (PSF)	2' 3" to 14' (Back)	8' to 3' 9"	12.0	25.0	

- Side loads are assumed to not induce cross-grain tension.

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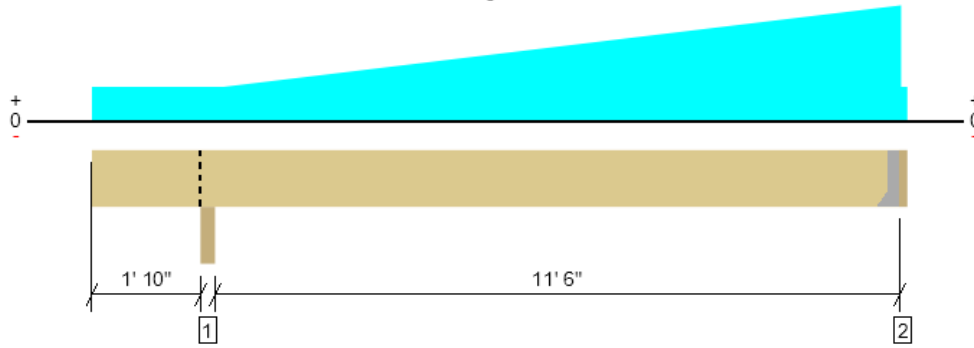
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U14, U15
2 piece(s) 2 x 10 HF No.2

Overall Length: 13' 9 1/2"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1048 @ 13' 7 1/2"	1823 (1.50")	Passed (58%)	--	1.0 D + 1.0 S (Alt Spans)
Shear (lbs)	870 @ 12' 10 1/4"	3191	Passed (27%)	1.15	1.0 D + 1.0 S (Alt Spans)
Moment (Ft-lbs)	2584 @ 8' 4 3/8"	3833	Passed (67%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.153 @ 7' 11 3/16"	0.582	Passed (L/914)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.242 @ 7' 11 1/4"	0.776	Passed (L/577)	--	1.0 D + 1.0 S (Alt Spans)

Member Length : 13' 7 1/2"
 System : Roof
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2018
 Design Methodology : ASD
 Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/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 - Beam - GLB	3.50"	3.50"	1.50"	339	558	897	Blocking
2 - Hanger on 9 1/4" HF beam	2.00"	Hanger ¹	1.50"	393	673	1066	See note ¹

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	12' 4" o/c	
Bottom Edge (Lu)	13' 8" o/c	

- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	LUS28-2	2.00"	N/A	6-10d	4-10d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 13' 7 1/2"	N/A	7.0	--	
1 - Uniform (PSF)	0 to 13' 9 1/2" (Front)	1' 10"	12.0	25.0	Default Load
2 - Tapered (PSF)	2' 3" to 13' 8" (Back)	0 to 4' 2"	14.0	25.0	

- Side loads are assumed to not induce cross-grain tension.

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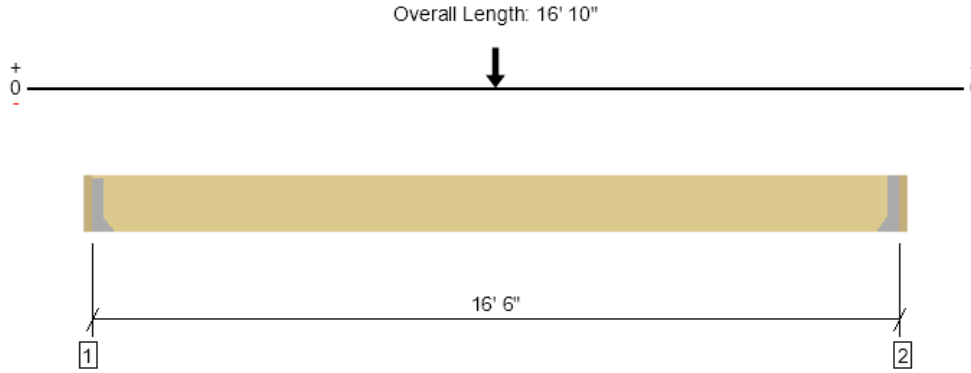
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U16

1 piece(s) 5 1/2" x 10 1/2" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2237 @ 2"	5363 (1.50")	Passed (42%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2225 @ 1' 1/2"	11733	Passed (19%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	17980 @ 8' 5"	23244	Passed (77%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.459 @ 8' 5"	0.825	Passed (L/432)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.743 @ 8' 5"	1.100	Passed (L/266)	--	1.0 D + 1.0 S (All Spans)

Member Length : 16' 6"
 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.
- Volume factor of 1.00 was calculated for positive bending using length L = 16' 6".
- 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 - Hanger on 10 1/2" DF beam	2.00"	Hanger ¹	1.50"	883	1355	2237	See note ¹
2 - Hanger on 10 1/2" DF beam	2.00"	Hanger ¹	1.50"	883	1355	2237	See note ¹

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	16' 6" o/c	
Bottom Edge (Lu)	16' 6" o/c	

- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie							
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories	
1 - Face Mount Hanger	U610	2.00"	N/A	14-16d	6-10d		
2 - Face Mount Hanger	U610	2.00"	N/A	14-16d	6-10d		

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	2" to 16' 8"	N/A	14.0	--	
1 - Point (lb)	8' 5" (Top)	N/A	748	1363	Linked from: U12, Support 2
2 - Point (lb)	8' 5" (Top)	N/A	393	673	Linked from: U14, U15, Support 2
3 - Point (lb)	8' 5" (Top)	N/A	393	673	Linked from: U14, U15, Support 2

- Side loads are assumed to not induce cross-grain tension.

Forteweb Software Operator	Job Notes
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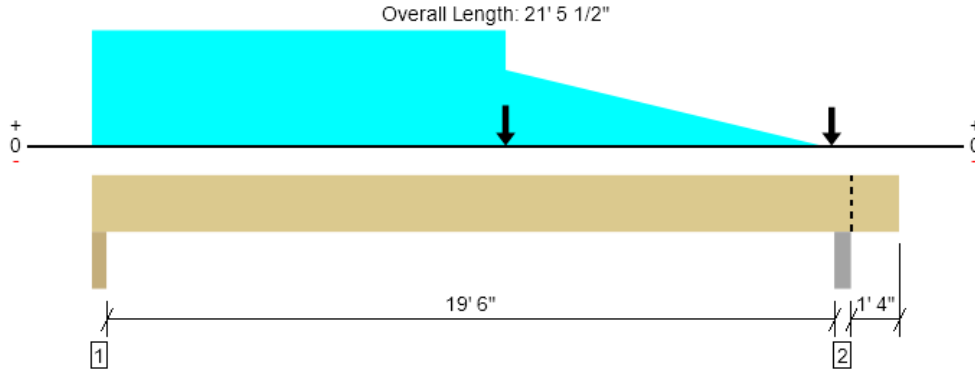
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U17

1 piece(s) 5 1/2" x 10 1/2" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4609 @ 19' 11 1/2"	14300 (4.00")	Passed (32%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2908 @ 1' 2"	11733	Passed (25%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	20065 @ 11'	23244	Passed (86%)	1.15	1.0 D + 1.0 S (All Spans)
Neg Moment (Ft-lbs)	-16 @ 19' 11 1/2"	14022	Passed (0%)	0.90	1.0 D (All Spans)
Live Load Defl. (in)	0.814 @ 10' 13/16"	0.990	Passed (L/292)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	1.333 @ 10' 1"	1.319	Passed (L/178)	--	1.0 D + 1.0 S (All Spans)

Member Length : 21' 5 1/2"
 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).
- Overhang deflection criteria: LL (2L/240) and TL (2L/180).
- Upward deflection on right cantilever exceeds overhang deflection criteria.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Volume factor of 1.00 was calculated for positive bending using length L = 19' 9 7/16".
- Volume factor of 1.00 was calculated for negative bending using length L = 1' 6 1/8".
- 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 - Column - HF	3.50"	3.50"	1.50"	1224	1963	3187	None
2 - Column - steel	4.00"	4.00"	1.50"	1840	2769	4609	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)	21' 6" o/c	
Bottom Edge (Lu)	21' 6" 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 21' 5 1/2"	N/A	14.0	--	
1 - Tapered (PSF)	11' to 19' 5" (Top)	4' to 0	12.0	25.0	
2 - Uniform (PLF)	0 to 11' (Top)	N/A	75.8	149.3	Linked from: U8, Support 1
3 - Point (lb)	19' 8" (Front)	N/A	506	756	Linked from: U11, Support 2
4 - Point (lb)	19' 8" (Top)	N/A	339	558	Linked from: U14, U15, Support 1
5 - Point (lb)	11' (Front)	N/A	883	1355	Linked from: U16, Support 2

• Side loads are assumed to not induce cross-grain tension.

ForTEWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



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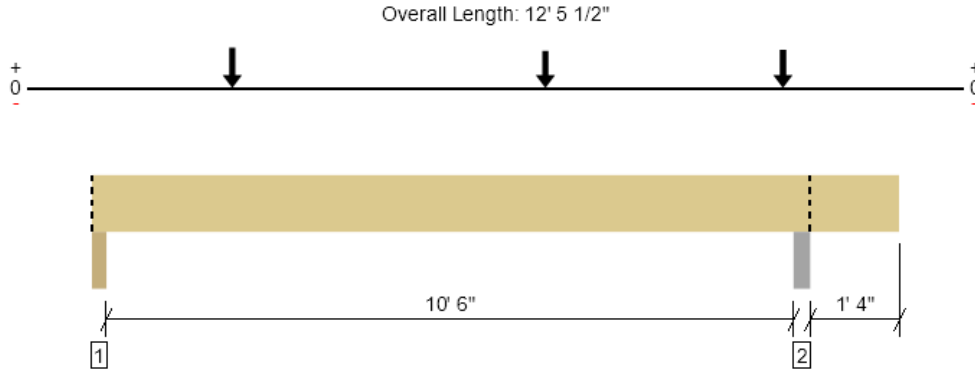
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U18

1 piece(s) 5 1/2" x 10 1/2" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3942 @ 10' 11 1/2"	14300 (4.00")	Passed (28%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2715 @ 1' 2"	11733	Passed (23%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	7503 @ 7'	23244	Passed (32%)	1.15	1.0 D + 1.0 S (All Spans)
Neg Moment (Ft-lbs)	-16 @ 10' 11 1/2"	14022	Passed (0%)	0.90	1.0 D (All Spans)
Live Load Defl. (in)	0.098 @ 5' 7 5/16"	0.540	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.159 @ 5' 7 1/8"	0.719	Passed (L/815)	--	1.0 D + 1.0 S (All Spans)

Member Length : 12' 5 1/2"
 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).
- Overhang deflection criteria: LL (2L/240) and TL (2L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Volume factor of 1.00 was calculated for positive bending using length L = 10' 9 7/16".
- Volume factor of 1.00 was calculated for negative bending using length L = 1' 6 1/8".
- 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 - Column - HF	3.50"	3.50"	1.50"	1087	1644	2731	Blocking
2 - Column - steel	4.00"	4.00"	1.50"	1544	2398	3942	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)	12' 6" o/c	
Bottom Edge (Lu)	12' 6" 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 12' 5 1/2"	N/A	14.0	--	
1 - Point (lb)	10' 8" (Front)	N/A	503	752	Linked from: U11, Support 1
2 - Point (lb)	7' (Top)	N/A	731	1377	Linked from: U13, Support 1
3 - Point (lb)	10' 8" (Top)	N/A	339	558	Linked from: U14, U15, Support 1
4 - Point (lb)	2' 2" (Front)	N/A	883	1355	Linked from: U16, Support 1

• Side loads are assumed to not induce cross-grain tension.

Forteweb Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



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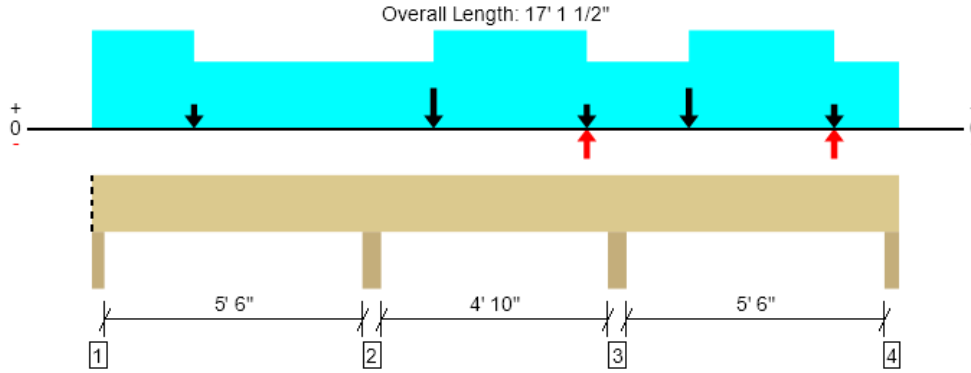
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U19 (EQ)

1 piece(s) 3 1/2" x 9 1/4" 2.0E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	6851 @ 11' 1 3/4"	9844 (4.50")	Passed (70%)	--	1.0 D + 0.75 L + 0.75 S (Adj Spans)
Shear (lbs)	3002 @ 12' 1 1/4"	7198	Passed (42%)	1.15	1.0 D + 0.75 L + 0.75 S (Adj Spans)
Moment (Ft-lbs)	-3701 @ 11' 1 3/4"	14278	Passed (26%)	1.15	1.0 D + 0.75 L + 0.75 S (Adj Spans)
Live Load Defl. (in)	0.032 @ 14' 2 11/16"	0.145	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (Alt Spans)
Total Load Defl. (in)	0.053 @ 14' 3 3/16"	0.291	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (Alt Spans)

Member Length : 17' 1 1/2"
 System : Floor
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2018
 Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- An excessive uplift of -1708 lbs detected at support located at 5' 11 1/4".
- An excessive uplift of -1225 lbs detected at support located at 11' 1 3/4".
- An excessive uplift of -1588 lbs detected at support located at 16' 11 1/2".
- An allowable stress increase factor of 1.2 is used for seismic overstrength load combinations.

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Column - HF	3.00"	3.00"	1.50"	940	1089/-89	759	93/-93	2464	Blocking
2 - Column - HF	4.50"	4.50"	2.81"	2064	2680	1455	1494/-1494	7375/-1708	None
3 - Column - HF	4.50"	4.50"	3.13"	2825	2680	2688	1410/-1410	7354/-1225	None
4 - Column - HF	3.50"	3.50"	1.63"	1067	1105/-89	937	1176/-1176	4270/-1588	None

• 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)	17' 2" o/c	
Bottom Edge (Lu)	17' 2" 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)	Seismic (Q _E) (1.60)	Comments
0 - Self Weight (PLF)	0 to 17' 1 1/2"	N/A	10.1	--	--	--	
1 - Uniform (PSF)	0 to 17' 1 1/2" (Front)	10'	13.0	40.0	--	--	Default Load
2 - Uniform (PSF)	0 to 2' 2" (Top)	7' 6"	13.0	--	25.0	--	
3 - Point (lb)	2' 2" (Top)	N/A	487	--	789	--	
4 - Point (lb)	7' 3" (Top)	N/A	487	--	789	2067	
5 - Point (lb)	10' 6" (Top)	N/A	487	--	789	-2067	
6 - Point (lb)	12' 8" (Top)	N/A	487	--	789	2067	
7 - Point (lb)	15' 9" (Top)	N/A	487	--	789	-2067	
8 - Uniform (PSF)	7' 3" to 10' 6" (Top)	7' 6"	13.0	--	25.0	--	
9 - Uniform (PSF)	12' 8" to 15' 9" (Top)	7' 6"	13.0	--	25.0	--	
10 - Uniform (PLF)	0 to 17' 1 1/2" (Top)	N/A	72.0	--	--	--	

• ASCE/SEI 7 Sec. 12.4.3: Overstrength Factor (2.5), Design Parameter at Short Periods (1.145), Seismic Design Category (D) are used to determine E_v and E_m.

Forteweb Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



- Axial load effects on the member from Q_E loads are not considered.
- Side loads are assumed to not induce cross-grain tension.

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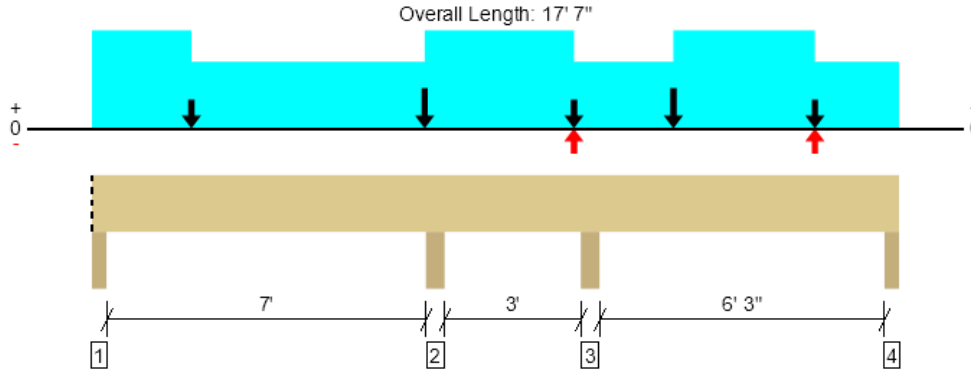
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U19 (WIND)

1 piece(s) 3 1/2" x 9 1/4" 2.0E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	6758 @ 10' 10 1/4"	9844 (4.50")	Passed (69%)	--	1.0 D - 0.525 E + 0.75 L + 0.75 S (Adj Spans)
Shear (lbs)	3205 @ 11' 9 3/4"	7198	Passed (45%)	1.15	1.0 D + 0.75 L + 0.75 S (Adj Spans)
Moment (Ft-lbs)	3490 @ 2' 11 1/16"	12416	Passed (28%)	1.00	1.0 D + 1.0 L (Alt Spans)
Live Load Defl. (in)	0.047 @ 14' 4 1/4"	0.164	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (Alt Spans)
Total Load Defl. (in)	0.080 @ 14' 4 7/16"	0.328	Passed (L/982)	--	1.0 D + 0.75 L + 0.75 S (Alt Spans)

Member Length : 17' 7"
 System : Floor
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2018
 Design Methodology : ASD

- Deflection criteria: LL (L/480) 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	Floor Live	Snow	Seismic	Factored	
1 - Column - HF	3.50"	3.50"	1.50"	1182	1304/-21	874	21/-21	2823	Blocking
2 - Column - HF	4.50"	4.50"	2.78"	2116	3063	1571	944/-944	6083	None
3 - Column - HF	4.50"	4.50"	3.09"	2551	2741	2635	970/-970	6758	None
4 - Column - HF	3.50"	3.50"	1.50"	1144	1205/-26	887	496/-496	2974	None

• 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)	17' 7" o/c	
Bottom Edge (Lu)	17' 7" 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)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 17' 7"	N/A	10.1	--	--	--	
1 - Uniform (PSF)	0 to 17' 7" (Front)	10'	13.0	40.0	--	--	Default Load
2 - Uniform (PSF)	0 to 2' 2" (Top)	7' 6"	13.0	--	25.0	--	
3 - Point (lb)	2' 2" (Top)	N/A	487	--	789	--	
4 - Point (lb)	7' 3" (Top)	N/A	487	--	789	987	
5 - Point (lb)	10' 6" (Top)	N/A	487	--	789	-987	
6 - Point (lb)	12' 8" (Top)	N/A	487	--	789	987	
7 - Point (lb)	15' 9" (Top)	N/A	487	--	789	-987	
8 - Uniform (PSF)	7' 3" to 10' 6" (Top)	7' 6"	13.0	--	25.0	--	
9 - Uniform (PSF)	12' 8" to 15' 9" (Top)	7' 6"	13.0	--	25.0	--	
10 - Uniform (PLF)	0 to 17' 7" (Top)	N/A	72.0	--	--	--	

• Side loads are assumed to not induce cross-grain tension.

ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



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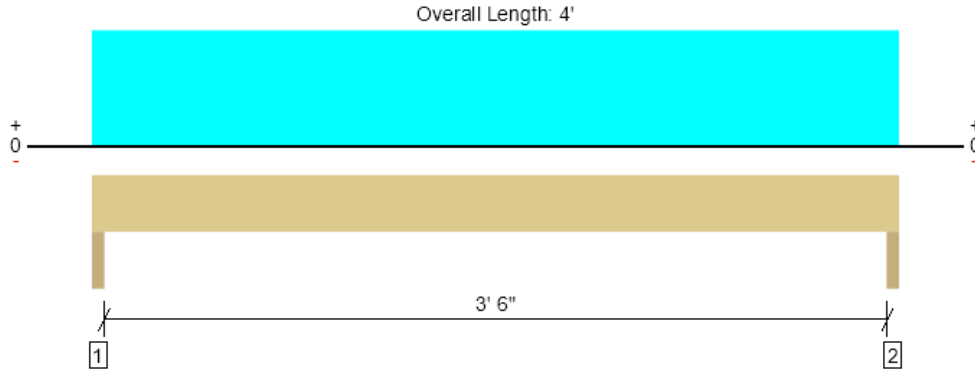
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U21
2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1002 @ 1 1/2"	3645 (3.00")	Passed (27%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	574 @ 10 1/4"	2501	Passed (23%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	880 @ 2'	2569	Passed (34%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.010 @ 2'	0.125	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.018 @ 2'	0.188	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 4'
 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 - Trimmer - HF	3.00"	3.00"	1.50"	469	53	533	1002	None
2 - Trimmer - HF	3.00"	3.00"	1.50"	469	53	533	1002	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' o/c	
Bottom Edge (Lu)	4' 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 4'	N/A	5.5	--	--	
1 - Uniform (PSF)	0 to 4' (Top)	8"	12.0	40.0	--	Default Load
2 - Uniform (PLF)	0 to 4' (Front)	N/A	102.8	--	204.0	Linked from: U9, Support 1
3 - Uniform (PSF)	0 to 4' (Top)	2' 6"	12.0	--	25.0	
4 - Uniform (PLF)	0 to 4' (Top)	N/A	88.0	--	--	

• Side loads are assumed to not induce cross-grain tension.

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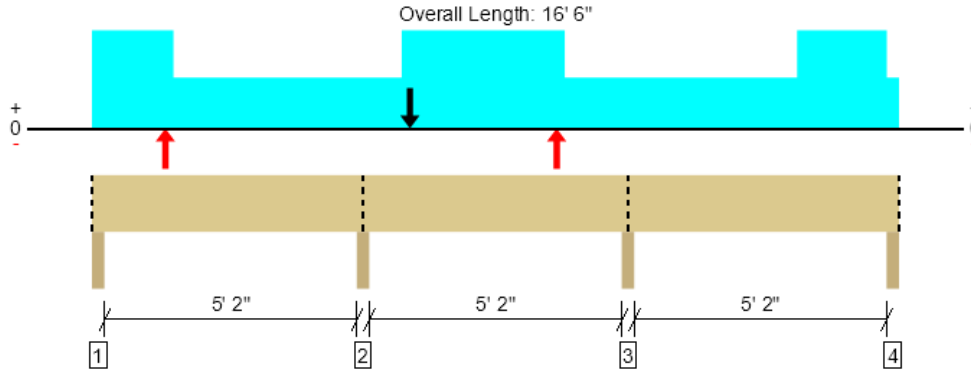
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U22 (EQ)

1 piece(s) 5 1/4" x 9 1/4" 2.0E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4120 @ 5' 6 1/2"	9844 (3.00")	Passed (42%)	--	1.0 D + 0.75 L + 0.75 Lr (Adj Spans)
Shear (lbs)	1506 @ 6' 5 1/4"	9389	Passed (16%)	1.00	1.0 D + 1.0 L (Adj Spans)
Moment (Ft-lbs)	-2118 @ 10' 11 1/2"	18623	Passed (11%)	1.00	1.0 D + 1.0 L (Adj Spans)
Live Load Defl. (in)	0.011 @ 8' 3 1/16"	0.181	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 Lr (Alt Spans)
Total Load Defl. (in)	0.017 @ 8' 3"	0.271	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 Lr (Alt Spans)

Member Length : 16' 6"
 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.
- An allowable stress increase factor of 1.2 is used for seismic overstrength load combinations.

Supports	Bearing Length			Loads to Supports (lbs)						Accessories
	Total	Available	Required	Dead	Floor Live	Roof Live	Snow	Seismic	Factored	
1 - Column - HF	3.00"	3.00"	1.50"	771	846/-89	496	182	207/-207	1899/-23	Blocking
2 - Column - HF	3.00"	3.00"	1.50"	1842	2145	892	467	187/-187	4120	Blocking
3 - Column - HF	3.00"	3.00"	1.50"	1821	2145	844	467	196/-196	4257	Blocking
4 - Column - HF	3.00"	3.00"	1.50"	773	846/-89	497	182	14/-14	1779	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)	16' 6" o/c	
Bottom Edge (Lu)	16' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Roof Live (1.25)	Snow (1.15)	Seismic (Q _e) (1.60)	Comments
0 - Self Weight (PLF)	0 to 16' 6"	N/A	15.2	--	--	--	--	
1 - Uniform (PSF)	0 to 16' 6" (Front)	8' 3"	13.0	40.0	--	--	--	Default Load
2 - Uniform (PSF)	0 to 16' 6" (Back)	3'	13.0	--	--	25.0	--	
3 - Uniform (PSF)	0 to 1' 8" (Top)	15' 3"	13.0	--	25.0	--	--	
4 - Uniform (PSF)	6' 4" to 9' 8" (Top)	15' 3"	13.0	--	25.0	--	--	
5 - Uniform (PSF)	14' 5" to 16' 3" (Top)	15' 3"	13.0	--	25.0	--	--	
6 - Uniform (PLF)	0 to 16' 6" (Top)	N/A	72.0	--	--	--	--	
7 - Point (lb)	1' 6" (Top)	N/A	--	--	--	--	-296	
8 - Point (lb)	6' 6" (Top)	N/A	--	--	--	--	296	
9 - Point (lb)	9' 6" (Top)	N/A	--	--	--	--	-296	

- ASCE/SEI 7 Sec. 12.4.3: Overstrength Factor (2.5), Design Parameter at Short Periods (1.145), Seismic Design Category (D) are used to determine E_v and E_m.
- Axial load affects on the member from Q_e loads are not considered.
- Side loads are assumed to not induce cross-grain tension.

Forteweb Software Operator	Job Notes
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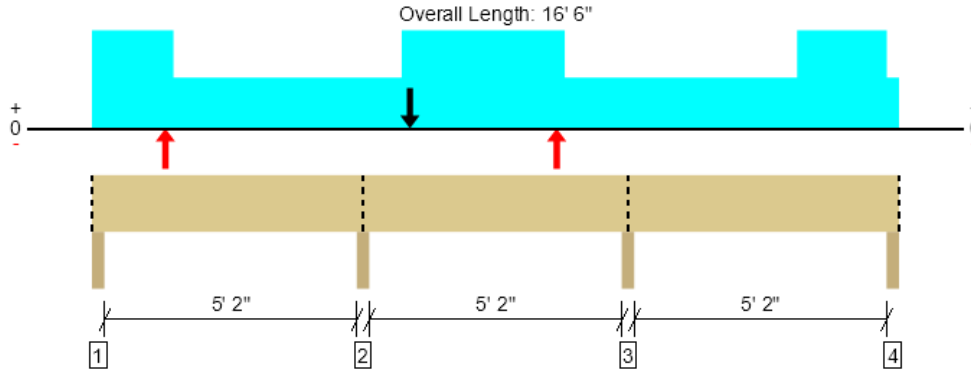
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
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Upper Floor, U22 (WIND)

1 piece(s) 5 1/4" x 9 1/4" 2.0E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4120 @ 5' 6 1/2"	9844 (3.00")	Passed (42%)	--	1.0 D + 0.75 L + 0.75 Lr (Adj Spans)
Shear (lbs)	1506 @ 6' 5 1/4"	9389	Passed (16%)	1.00	1.0 D + 1.0 L (Adj Spans)
Moment (Ft-lbs)	-2118 @ 10' 11 1/2"	18623	Passed (11%)	1.00	1.0 D + 1.0 L (Adj Spans)
Live Load Defl. (in)	0.011 @ 8' 3 1/16"	0.181	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 Lr (Alt Spans)
Total Load Defl. (in)	0.017 @ 8' 3"	0.271	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 Lr (Alt Spans)

Member Length : 16' 6"
 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.

Supports	Bearing Length			Loads to Supports (lbs)						Accessories
	Total	Available	Required	Dead	Floor Live	Roof Live	Snow	Seismic	Factored	
1 - Column - HF	3.00"	3.00"	1.50"	771	846/-89	496	182	207/-207	1777	Blocking
2 - Column - HF	3.00"	3.00"	1.50"	1842	2145	892	467	187/-187	4120	Blocking
3 - Column - HF	3.00"	3.00"	1.50"	1821	2145	844	467	196/-196	4063	Blocking
4 - Column - HF	3.00"	3.00"	1.50"	773	846/-89	497	182	14/-14	1779	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)	16' 6" o/c	
Bottom Edge (Lu)	16' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Roof Live (1.25)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 16' 6"	N/A	15.2	--	--	--	--	
1 - Uniform (PSF)	0 to 16' 6" (Front)	8' 3"	13.0	40.0	--	--	--	Default Load
2 - Uniform (PSF)	0 to 16' 6" (Back)	3'	13.0	--	--	25.0	--	
3 - Uniform (PSF)	0 to 1' 8" (Top)	15' 3"	13.0	--	25.0	--	--	
4 - Uniform (PSF)	6' 4" to 9' 8" (Top)	15' 3"	13.0	--	25.0	--	--	
5 - Uniform (PSF)	14' 5" to 16' 3" (Top)	15' 3"	13.0	--	25.0	--	--	
6 - Uniform (PLF)	0 to 16' 6" (Top)	N/A	72.0	--	--	--	--	
7 - Point (lb)	1' 6" (Top)	N/A	--	--	--	--	-296	
8 - Point (lb)	6' 6" (Top)	N/A	--	--	--	--	296	
9 - Point (lb)	9' 6" (Top)	N/A	--	--	--	--	-296	

• Side loads are assumed to not induce cross-grain tension.

Forteweb Software Operator	Job Notes
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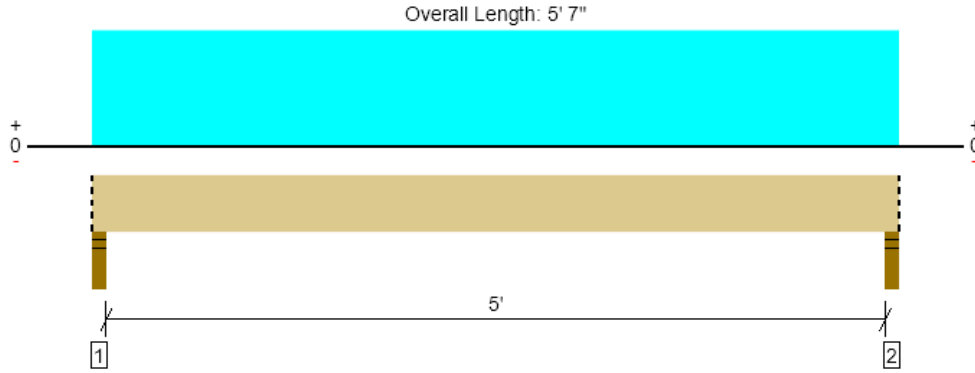
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Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U23
2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	565 @ 2"	4253 (3.50")	Passed (13%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	384 @ 10 3/4"	2501	Passed (15%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	697 @ 2' 9 1/2"	2569	Passed (27%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.018 @ 2' 9 1/2"	0.262	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.028 @ 2' 9 1/2"	0.350	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 5' 7"
 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 - Stud wall - HF	3.50"	3.50"	1.50"	198	367	565	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	198	367	565	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)	5' 7" o/c	
Bottom Edge (Lu)	5' 7" 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 5' 7"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 5' 7" (Back)	1' 11 1/16"	15.0	25.0	
2 - Uniform (PLF)	0 to 5' 7" (Front)	N/A	36.5	83.5	Linked from: U1, Support 1

• Side loads are assumed to not induce cross-grain tension.

Weyerhaeuser Notes

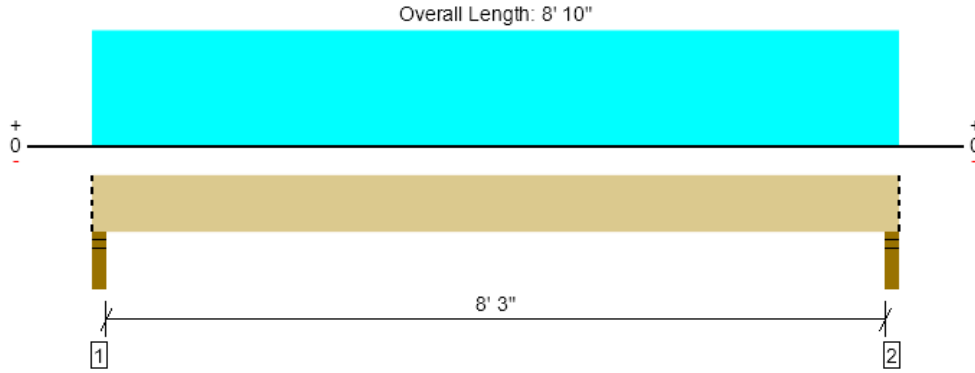
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U24
2 piece(s) 2 x 10 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1321 @ 2"	4253 (3.50")	Passed (31%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1003 @ 1' 3/4"	3191	Passed (31%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2701 @ 4' 5"	3833	Passed (70%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.067 @ 4' 5"	0.425	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.137 @ 4' 5"	0.567	Passed (L/747)	--	1.0 D + 1.0 S (All Spans)

Member Length : 8' 10"
 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 - Stud wall - HF	3.50"	3.50"	1.50"	676	645	1321	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	676	645	1321	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)	8' 10" o/c	
Bottom Edge (Lu)	8' 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 8' 10"	N/A	7.0	--	
1 - Uniform (PSF)	0 to 8' 10" (Front)	2' 6"	15.0	25.0	
2 - Uniform (PLF)	0 to 8' 10" (Top)	N/A	72.0	--	
3 - Uniform (PLF)	0 to 8' 10" (Front)	N/A	36.5	83.5	Linked from: U1, Support 1

• Side loads are assumed to not induce cross-grain tension.

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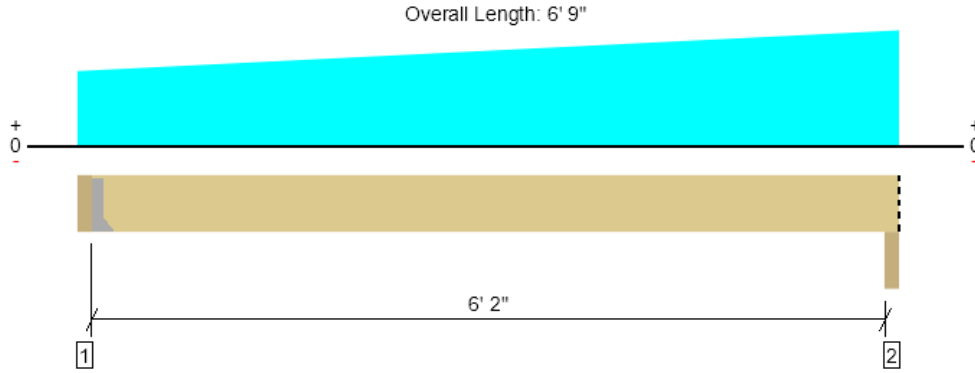
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ForteWEB Software Operator	Job Notes
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Upper Floor, U25
2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	843 @ 3' 1/2"	1823 (1.50")	Passed (46%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	715 @ 5' 10 1/4"	2501	Passed (29%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1420 @ 3' 6 1/2"	2569	Passed (55%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.052 @ 3' 5 9/16"	0.315	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.082 @ 3' 5 9/16"	0.419	Passed (L/925)	--	1.0 D + 1.0 S (All Spans)

Member Length : 6' 5 1/2"
 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 - Hanger on 7 1/4" HF beam	3.50"	Hanger ¹	1.50"	322	585	906	See note ¹
2 - Column - HF	3.50"	3.50"	1.50"	365	653	1018	Blocking

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

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

- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	LUS26-2	2.00"	N/A	4-10d	4-10d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	3 1/2" to 6' 9"	N/A	5.5	--	
1 - Tapered (PSF)	0 to 6' 9" (Front)	2' 6" to 5' 6"	15.0	25.0	
2 - Uniform (PLF)	0 to 6' 9" (Front)	N/A	36.5	83.5	Linked from: U1, Support 1

- Side loads are assumed to not induce cross-grain tension.

Weyerhaeuser Notes

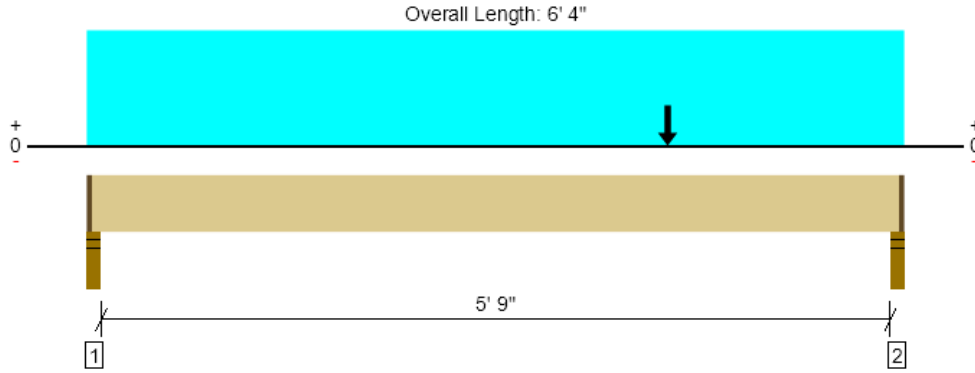
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ForteWEB Software Operator	Job Notes
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Upper Floor, U26
1 piece(s) 4 x 8 DF No.1



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1639 @ 6' 2"	3189 (2.25")	Passed (51%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1577 @ 5' 5 1/4"	3502	Passed (45%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2615 @ 4' 6"	3820	Passed (68%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.044 @ 3' 4 3/4"	0.300	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.072 @ 3' 4 3/4"	0.400	Passed (L/995)	--	1.0 D + 1.0 S (All Spans)

Member Length : 6' 1 1/2"
 System : Roof
 Member Type : Flush 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 - Stud wall - HF	3.50"	2.25"	1.50"	300	485	786	1 1/4" Rim Board
2 - Stud wall - HF	3.50"	2.25"	1.50"	638	1008	1647	1 1/4" Rim Board

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 2" o/c	
Bottom Edge (Lu)	6' 2" 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)	1 1/4" to 6' 2 3/4"	N/A	6.4	--	
1 - Uniform (PSF)	0 to 6' 4" (Front)	2'	11.0	25.0	Default Load
2 - Point (lb)	4' 6" (Top)	N/A	438	592	Linked from: Ex. hip (SW corner), Support 1
3 - Point (lb)	4' 6" (Front)	N/A	322	585	Linked from: U25, Support 1

• Side loads are assumed to not induce cross-grain tension.

Weyerhaeuser Notes

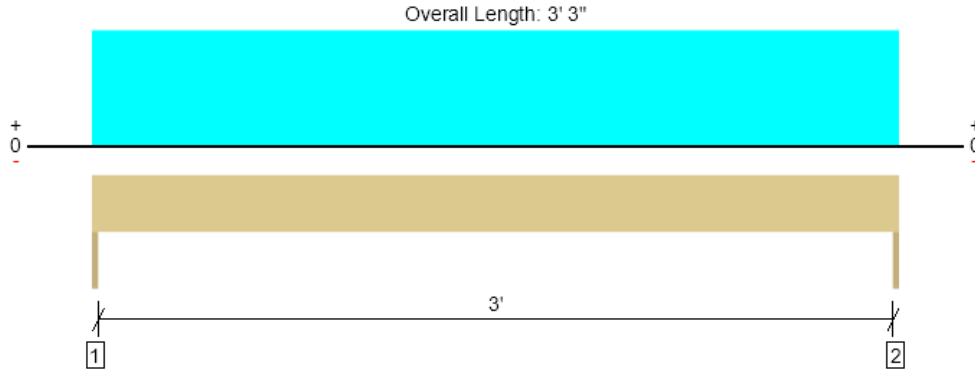
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U27
2 piece(s) 2 x 6 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	202 @ 0	1823 (1.50")	Passed (11%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	129 @ 7"	1898	Passed (7%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	164 @ 1' 7 1/2"	1602	Passed (10%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.004 @ 1' 7 1/2"	0.108	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.006 @ 1' 7 1/2"	0.162	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 3' 3"
 System : Wall
 Member Type : Header
 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	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	66	136	202	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	66	136	202	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 3" o/c	
Bottom Edge (Lu)	3' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 3' 3"	N/A	4.2	--	
1 - Uniform (PLF)	0 to 3' 3"	N/A	36.5	83.5	Linked from: U1, Support 1

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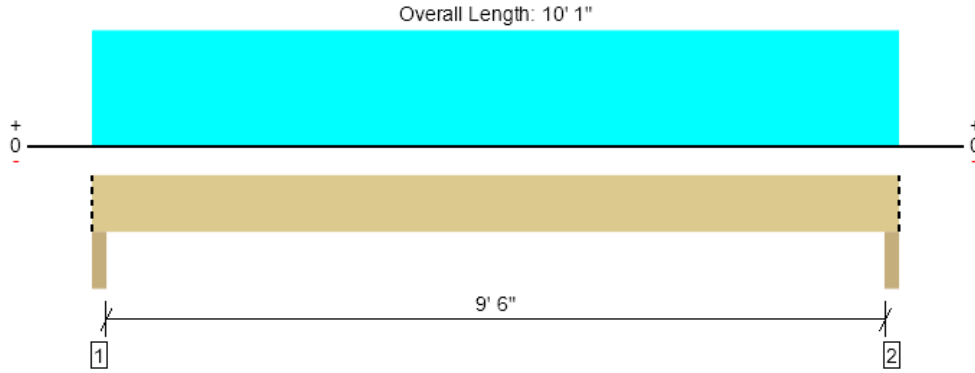
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U28

3 piece(s) 1 3/4" x 7 1/4" 2.0E Microllam® LVL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1541 @ 2"	13322 (3.50")	Passed (12%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1267 @ 10 3/4"	8317	Passed (15%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3631 @ 5' 1/2"	12273	Passed (30%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.125 @ 5' 1/2"	0.488	Passed (L/935)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.197 @ 5' 1/2"	0.650	Passed (L/593)	--	1.0 D + 1.0 S (All Spans)

Member Length : 10' 1"
 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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Column - HF	3.50"	3.50"	1.50"	564	977	1541	Blocking
2 - Column - HF	3.50"	3.50"	1.50"	564	977	1541	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' 1" o/c	
Bottom Edge (Lu)	10' 1" 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' 1"	N/A	11.1	--	
1 - Uniform (PSF)	0 to 10' 1" (Front)	7' 9"	13.0	25.0	Default Load

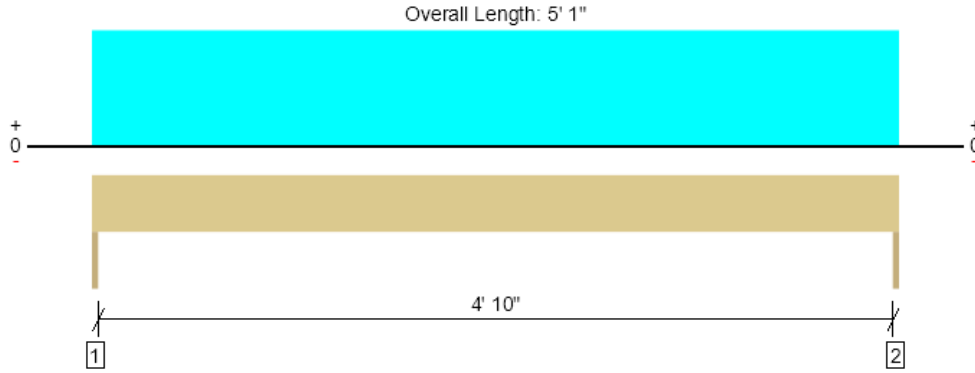
- Side loads are assumed to not induce cross-grain tension.

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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U29
2 piece(s) 2 x 6 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	316 @ 0	1823 (1.50")	Passed (17%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	243 @ 7"	1898	Passed (13%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	401 @ 2' 6 1/2"	1602	Passed (25%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.023 @ 2' 6 1/2"	0.169	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.035 @ 2' 6 1/2"	0.254	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 5' 1"
 System : Wall
 Member Type : Header
 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	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	103	212	316	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	103	212	316	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 1" o/c	
Bottom Edge (Lu)	5' 1" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 1"	N/A	4.2	--	
1 - Uniform (PLF)	0 to 5' 1"	N/A	36.5	83.5	Linked from: U1, Support 1

Weyerhaeuser Notes

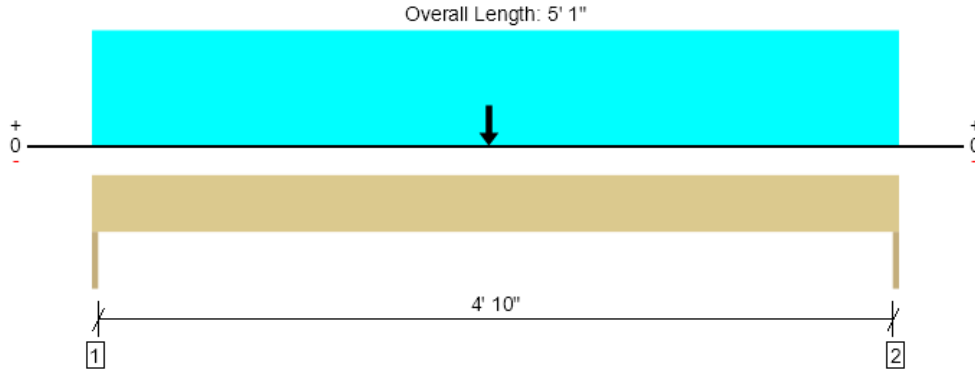
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Upper Floor, U30
2 piece(s) 2 x 6 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	715 @ 0	1823 (1.50")	Passed (39%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	642 @ 7"	1898	Passed (34%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1398 @ 2' 6"	1602	Passed (87%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.066 @ 2' 6 1/2"	0.169	Passed (L/930)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.103 @ 2' 6 1/2"	0.254	Passed (L/592)	--	1.0 D + 1.0 S (All Spans)

Member Length : 5' 1"
 System : Wall
 Member Type : Header
 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	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	256	459	715	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	251	451	702	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 1" o/c	
Bottom Edge (Lu)	5' 1" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 1"	N/A	4.2	--	
1 - Uniform (PLF)	0 to 5' 1"	N/A	36.5	83.5	Linked from: U1, Support 1
2 - Point (lb)	2' 6"	N/A	300	485	Linked from: U26, Support 1

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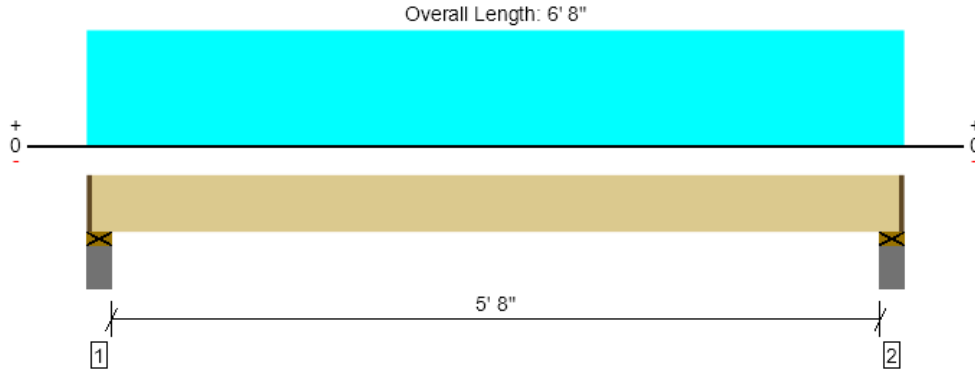
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Main Floor, M1
1 piece(s) 2 x 10 HF No.2 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	228 @ 5"	2886 (4.75")	Passed (8%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	146 @ 1' 3 1/4"	1388	Passed (11%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	301 @ 3' 4"	1917	Passed (16%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.011 @ 3' 4"	0.146	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.014 @ 3' 4"	0.292	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

Member Length : 6' 5 1/2"
 System : Floor
 Member Type : Joist
 Building Use : Residential
 Building Code : IBC 2018
 Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- 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.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Plate on concrete - HF	6.00"	4.75"	1.50"	58	178	236	1 1/4" Rim Board
2 - Plate on concrete - HF	6.00"	4.75"	1.50"	58	178	236	1 1/4" Rim Board

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

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

•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 6' 8"	16"	13.0	40.0	Default Load

Weyerhaeuser Notes

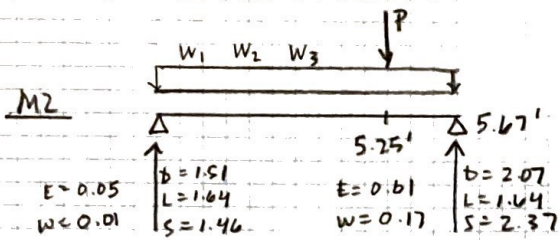
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



MAIN FLOOR FRAMING



$V = 6.44 k$

$V_r = 7.01 k$

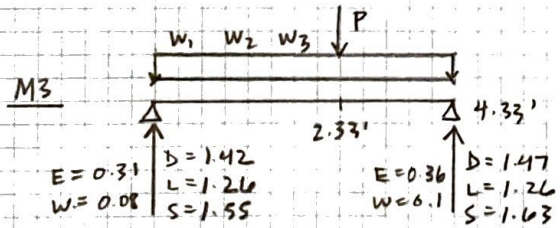
$M = 6.09 kft$

$M_r = 13.64 kft$

$\Delta_{D+L} = 0.024'' = L/1000+$

	<u>W₁</u>	<u>W₂</u>	<u>W₃</u>	<u>P</u>
D	189	254	72	0.66
L	580	-	-	-
S	-	488	-	1.07
E	-	-	-	±0.50
W	-	-	-	±0.18

Ex. 6x12 OK



$V = 4.45 k$

$V_r = 7.01 k$

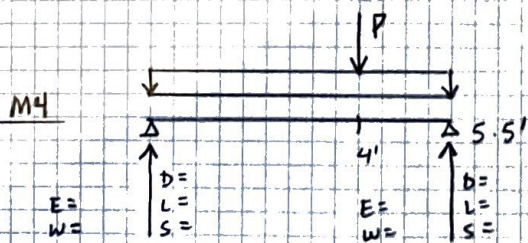
$M = 6.16 kft$

$M_r = 13.64 kft$

$\Delta_{D+L} = 0.009'' = L/1000+$

	<u>W₁</u>	<u>W₂</u>	<u>W₃</u>	<u>P</u>
D				
L				
S				
E				
W				

Ex. 6x12 OK



$V = 5.77$

$V_r = 7.01 k$

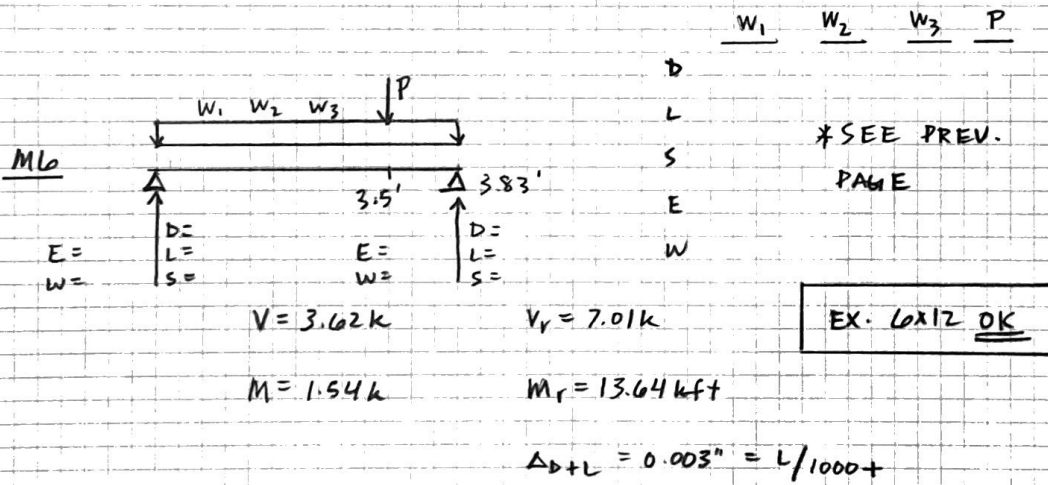
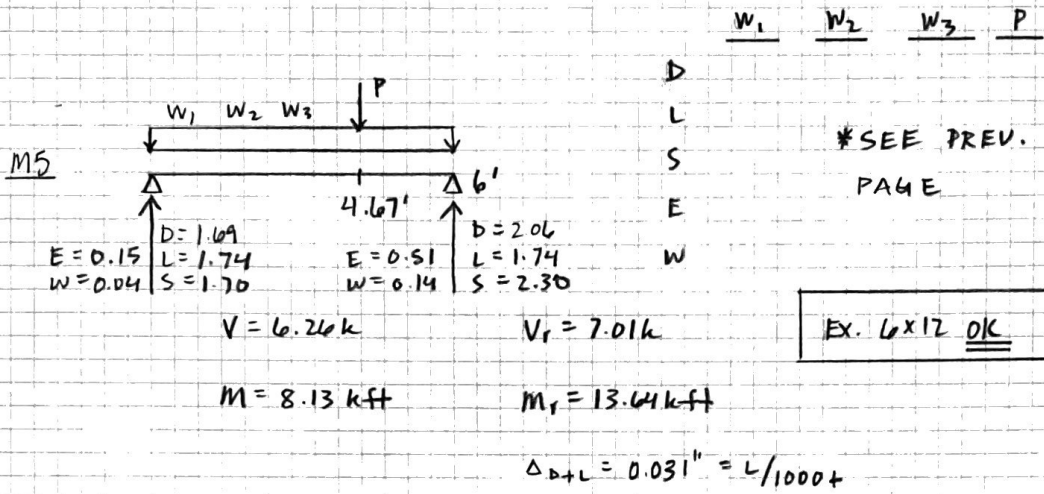
$M = 7.45 kft$

$M_r = 13.64 kft$

	<u>W₁</u>	<u>W₂</u>	<u>W₃</u>	<u>P</u>
D				
L				
S				
E				
W				

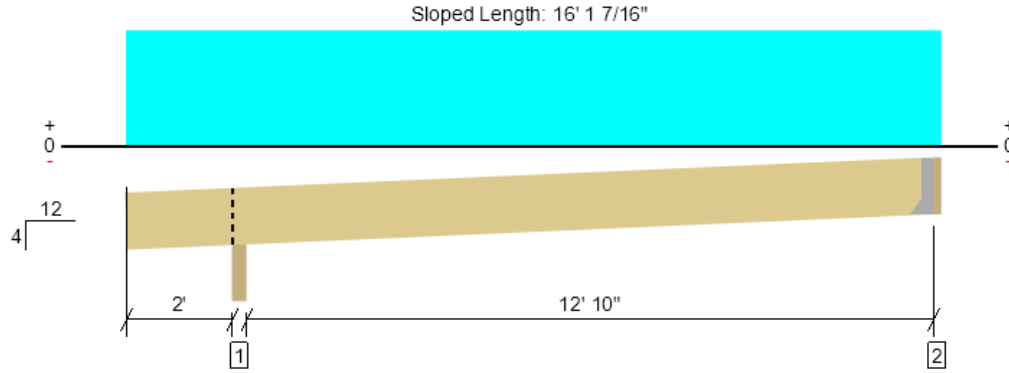
Ex. 6x12 OK

MAIN FLOOR FRAMING (CONT.)



Garage Roof, GR1

1 piece(s) 2 x 10 HF No.2 @ 24" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	480 @ 15' 1 1/2"	911 (1.50")	Passed (53%)	--	1.0 D + 1.0 S (Alt Spans)
Shear (lbs)	436 @ 3' 1/4"	1596	Passed (27%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1528 @ 8' 9 1/16"	2204	Passed (69%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.267 @ 8' 8"	0.684	Passed (L/615)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.397 @ 8' 8 1/8"	0.912	Passed (L/413)	--	1.0 D + 1.0 S (Alt Spans)

Member Length : 16' 2 3/8"
 System : Roof
 Member Type : Joist
 Building Use : Residential
 Building Code : IBC 2018
 Design Methodology : ASD
 Member Pitch : 4/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/180).
- Birdsmouth cut has not been analyzed.
- 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 - Birdsmouth - HF	3.50"	3.50"	1.50"	223	441	664	Blocking
2 - Hanger on 9 1/4" LVL beam	2.00"	Hanger ¹	1.50"	164	328	492	See note ¹

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 11" o/c	
Bottom Edge (Lu)	15' 11" o/c	

- Maximum allowable bracing intervals based on applied load.
- Dimensions for lateral bracing intervals are measured along the length of the member for sloped conditions.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	LRU28Z	1.94"	N/A	6-10dx1.5	5-10d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 15' 3 1/2"	24"	12.0	25.0	Default Load

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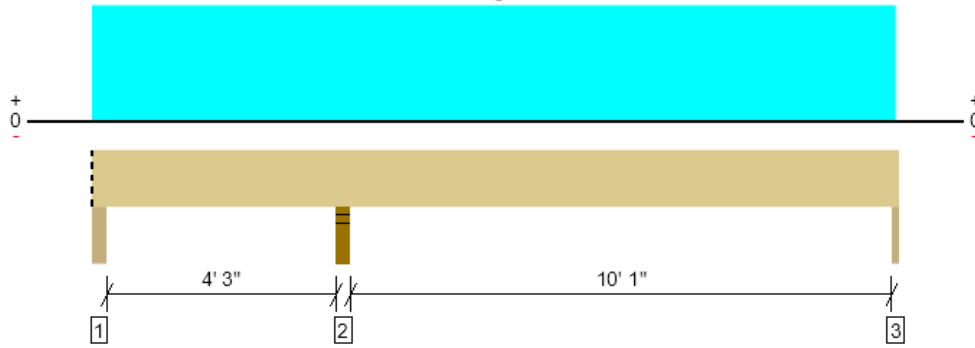
ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Garage Roof, GR2

3 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL

Overall Length: 15' 3/4"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5500 @ 4' 8 1/4"	7809 (3.50")	Passed (70%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2414 @ 6' 2"	18354	Passed (13%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-5219 @ 4' 8 1/4"	53672	Passed (10%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.020 @ 10' 4 1/16"	0.518	Passed (L/999+)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.030 @ 10' 4 3/16"	0.690	Passed (L/999+)	--	1.0 D + 1.0 S (Alt Spans)

Member Length : 15' 3/4"
 System : Roof
 Member Type : Flush 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.
- -271 lbs uplift at support located at 2". Strapping or other restraint may be required.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Column - HF	3.50"	3.50"	1.50"	36	401/-307	438/-271	Blocking
2 - Stud wall - SPF	3.50"	3.50"	2.46"	2007	3493	5500	None
3 - Column - HF	1.75"	1.75"	1.50"	792	1390	2183	None

• 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)	15' 1" o/c	
Bottom Edge (Lu)	15' 1" 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' 3/4"	N/A	24.5	--	
1 - Uniform (PLF)	0 to 15' (Front)	N/A	82.0	164.0	Linked from: GR1, Support 2
2 - Uniform (PLF)	0 to 15' (Back)	N/A	82.0	164.0	Linked from: GR1, Support 2

• Side loads are assumed to not induce cross-grain tension.

Weyerhaeuser Notes

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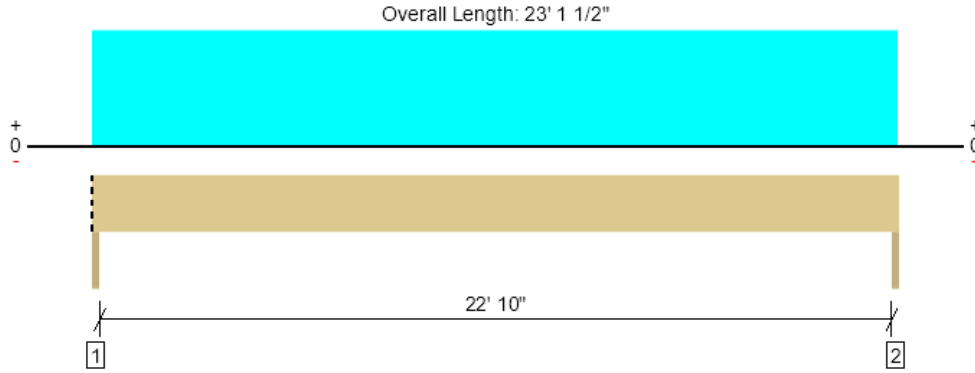
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Garage Roof, GR3

3 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5972 @ 1/4"	6661 (1.75")	Passed (90%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	5208 @ 1' 5 3/4"	18354	Passed (28%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	34402 @ 11' 6 3/4"	53672	Passed (64%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.615 @ 11' 6 3/4"	1.154	Passed (L/451)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.968 @ 11' 6 3/4"	1.539	Passed (L/286)	--	1.0 D + 1.0 S (All Spans)

Member Length : 23' 1 1/2"
 System : Roof
 Member Type : Flush 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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Column - HF	1.75"	1.75"	1.57"	2180	3793	5972	Blocking
2 - Column - HF	1.75"	1.75"	1.57"	2176	3786	5962	None

• 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)	9' 5" o/c	
Bottom Edge (Lu)	23' 2" 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 23' 1 1/2"	N/A	24.5	--	
1 - Uniform (PLF)	0 to 23' 1" (Front)	N/A	82.0	164.0	Linked from: GR1, Support 2
2 - Uniform (PLF)	0 to 23' 1" (Back)	N/A	82.0	164.0	Linked from: GR1, Support 2

• Side loads are assumed to not induce cross-grain tension.

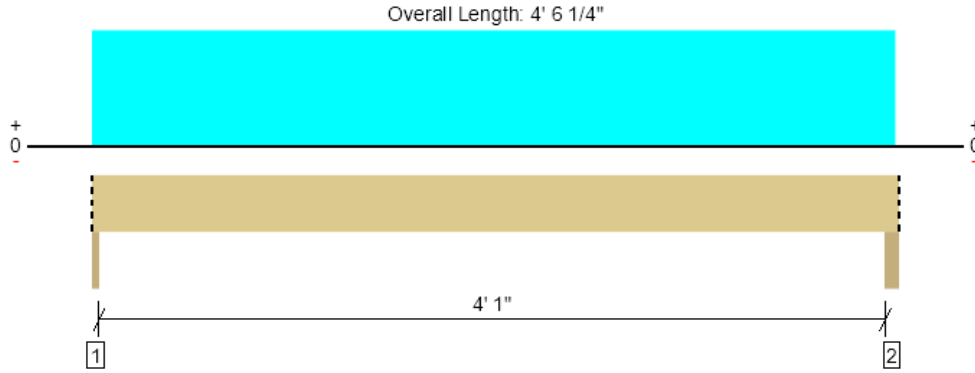
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNNuckles@harriottvalentine.com	



Garage Roof, GR4

3 piece(s) 1 3/4" x 16" 2.0E Microllam® LVL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1130 @ 1/4"	6661 (1.75")	Passed (17%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	366 @ 1' 5 3/4"	18354	Passed (2%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1212 @ 2' 2 1/4"	53672	Passed (2%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.002 @ 2' 2 1/4"	0.217	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.003 @ 2' 2 1/4"	0.289	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 4' 6 1/4"
 System : Roof
 Member Type : Flush 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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Column - HF	1.75"	1.75"	1.50"	412	718	1130	Blocking
2 - Column - HF	3.50"	3.50"	1.50"	436	759	1195	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)	4' 6" o/c	
Bottom Edge (Lu)	4' 6" 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 4' 6 1/4"	N/A	24.5	--	
1 - Uniform (PLF)	0 to 4' 6" (Front)	N/A	82.0	164.0	Linked from: GR1, Support 2
2 - Uniform (PLF)	0 to 4' 6" (Back)	N/A	82.0	164.0	Linked from: GR1, Support 2

- Side loads are assumed to not induce cross-grain tension.

Weyerhaeuser Notes

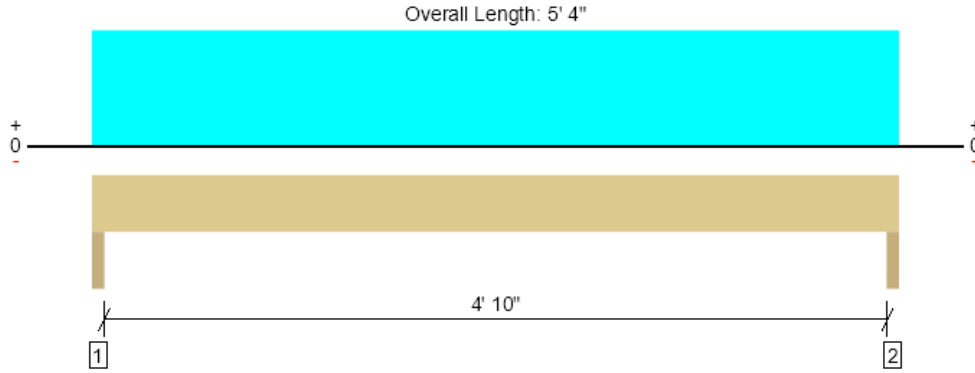
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Garage Roof, GR5
2 piece(s) 2 x 6 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	896 @ 1 1/2"	3645 (3.00")	Passed (25%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	658 @ 8 1/2"	1898	Passed (35%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1086 @ 2' 8"	1602	Passed (68%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.061 @ 2' 8"	0.169	Passed (L/996)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.093 @ 2' 8"	0.254	Passed (L/653)	--	1.0 D + 1.0 S (All Spans)

Member Length : 5' 4"
 System : Wall
 Member Type : Header
 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	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	1.50"	308	588	896	None
2 - Trimmer - HF	3.00"	3.00"	1.50"	308	588	896	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 4" o/c	
Bottom Edge (Lu)	5' 4" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 4"	N/A	4.2	--	
1 - Uniform (PLF)	0 to 5' 4"	N/A	111.5	220.5	Linked from: GR1, Support 1

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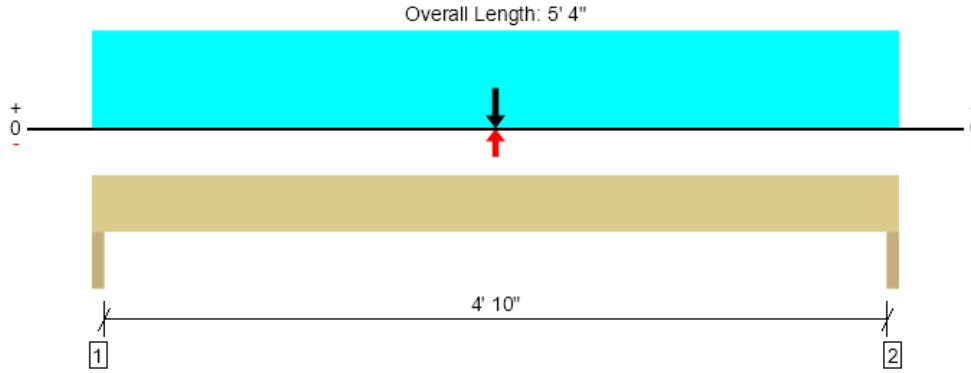
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Garage Roof, GR6

2 piece(s) 1 3/4" x 7 1/4" 2.0E Microllam® LVL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	633 @ 1 1/2"	7613 (3.00")	Passed (8%)	--	1.0 D + 1.0 S (All Spans) [1]
Shear (lbs)	500 @ 10 1/4"	5544	Passed (9%)	1.15	1.0 D + 1.0 S (All Spans) [1]
Moment (Ft-lbs)	1057 @ 2' 8"	8182	Passed (13%)	1.15	1.0 D + 1.0 S (All Spans) [1]
Live Load Defl. (in)	0.019 @ 2' 8"	0.169	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans) [1]
Total Load Defl. (in)	0.025 @ 2' 8"	0.254	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans) [1]

Member Length : 5' 4"
 System : Wall
 Member Type : Header
 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 - Trimmer - HF	3.00"	3.00"	1.50"	166	467	633	None
2 - Trimmer - HF	3.00"	3.00"	1.50"	166	467	633	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 4" o/c	
Bottom Edge (Lu)	5' 4" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 4"	N/A	7.4	--	
1 - Uniform (PSF)	0 to 5' 4"	4'	12.0	25.0	Default Load
2 - Point (lb)	2' 8"	N/A	36	401/-307	Linked from: GR2, Support 1

Weyerhaeuser Notes

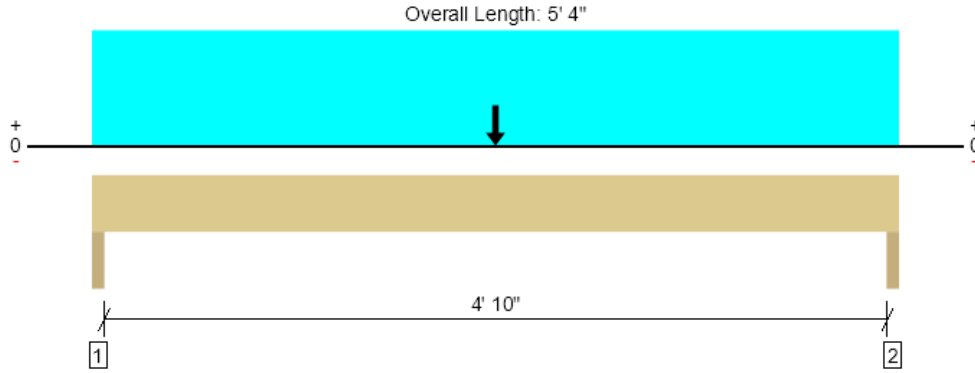
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Garage Roof, GR7
2 piece(s) 2 x 10 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1011 @ 1' 1/2"	3645 (3.00")	Passed (28%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	853 @ 1' 1/4"	3191	Passed (27%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2019 @ 2' 8"	3833	Passed (53%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.020 @ 2' 8"	0.169	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.031 @ 2' 8"	0.254	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 5' 4"
 System : Wall
 Member Type : Header
 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	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	1.50"	365	646	1011	None
2 - Trimmer - HF	3.00"	3.00"	1.50"	365	646	1011	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 4" o/c	
Bottom Edge (Lu)	5' 4" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 4"	N/A	7.0	--	
1 - Uniform (PSF)	0 to 5' 4"	4'	12.0	25.0	Default Load
2 - Point (lb)	2' 8"	N/A	436	759	Linked from: GR4, Support 2

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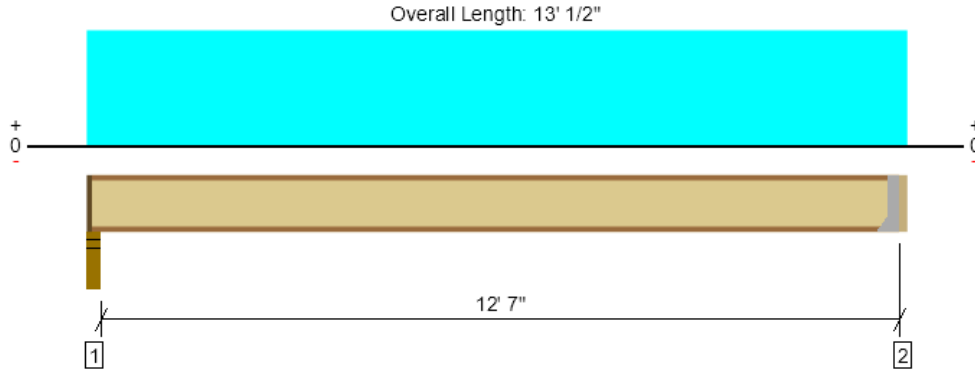
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Garage Upper Floor, GU1

1 piece(s) 11 7/8" TJI® 110 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	448 @ 12' 10 1/2"	910 (1.75")	Passed (49%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	448 @ 12' 10 1/2"	1560	Passed (29%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1417 @ 6' 6 1/2"	3160	Passed (45%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.111 @ 6' 6 1/2"	0.317	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.147 @ 6' 6 1/2"	0.633	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	51	40	Passed	--	--

Member Length : 12' 9 1/4"
 System : Floor
 Member Type : Joist
 Building Use : Residential
 Building Code : IBC 2018
 Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories	Details
	Total	Available	Required	Dead	Floor Live	Factored		
1 - Stud wall - HF	3.50"	2.25"	1.75"	113	349	462	1 1/4" Rim Board	A3
2 - Hanger on 11 7/8" HF beam	2.00"	Hanger ¹	1.75" / - ²	113	347	459	See note ¹	--

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.
- ² Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 9" o/c	
Bottom Edge (Lu)	12' 9" o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	IUS1.81/11.88	2.00"	N/A	10-10dx1.5	2-Strong-Grip	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Load	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 13' 1/2"	16"	13.0	40.0	Default Load

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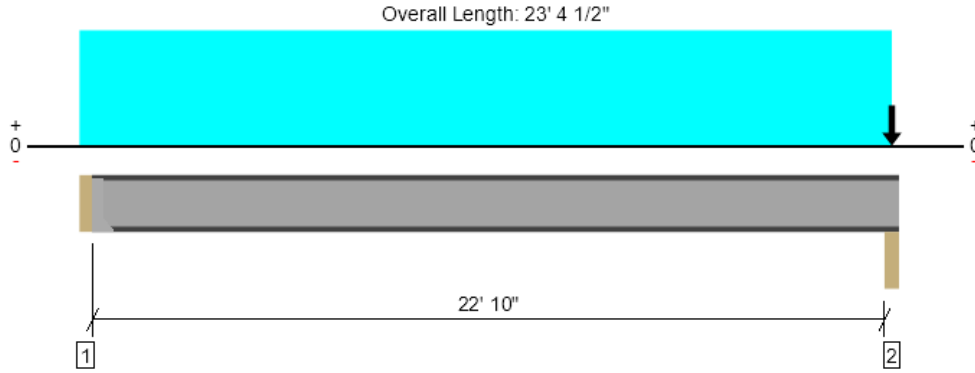
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ForteWEB Software Operator	Job Notes
Henry Nuckles Harriott Valentine Engineers (715) 571-0533 HNuckles@harriottvalentine.com	



Garage Upper Floor, GU2

1 piece(s) W10X39 (A992) ASTM Steel



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	12847 @ 23' 2 1/2"	20275 (3.50")	Passed (63%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	8368 @ 3"	62496	Passed (13%)	--	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	48031 @ 11' 8 3/4"	116766	Passed (41%)	--	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.537 @ 11' 8 3/4"	0.765	Passed (L/513)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.752 @ 11' 8 3/4"	1.148	Passed (L/366)	--	1.0 D + 1.0 L (All Spans)

Member Length : 23' 1 1/2"
 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).
- Bearing reinforcement may be required for support located at 0".
- Applicable calculations are based on ANSI/AISC 360-16.
- A lateral-torsional buckling factor (C_b) of 1.0 has been assumed.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Hanger on 9 15/16" HF beam	3.00"	Hanger ¹	1.50" / - ²	2436	6105	--	8541	See note ¹
2 - Column - HF	3.50"	3.50"	3.50"	4988	5975	4504	12847	None

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.
- ² Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	Continuous	

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	Connector not found	N/A	N/A	N/A	N/A	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	3" to 23' 4 1/2"	N/A	39.0	--	--	
1 - Uniform (PLF)	0 to 23' 2" (Front)	N/A	84.8	260.3	--	Linked from: GU1, Support 2
2 - Uniform (PLF)	0 to 23' 2" (Back)	N/A	84.8	260.3	--	Linked from: GU1, Support 2
3 - Point (lb)	23' 2" (Top)	N/A	2176	--	3786	Linked from: GR3, Support 2
4 - Point (lb)	23' 2" (Top)	N/A	412	--	718	Linked from: GR4, Support 1

- Side loads are assumed to not induce cross-grain tension.

ForteWEB Software Operator	Job Notes
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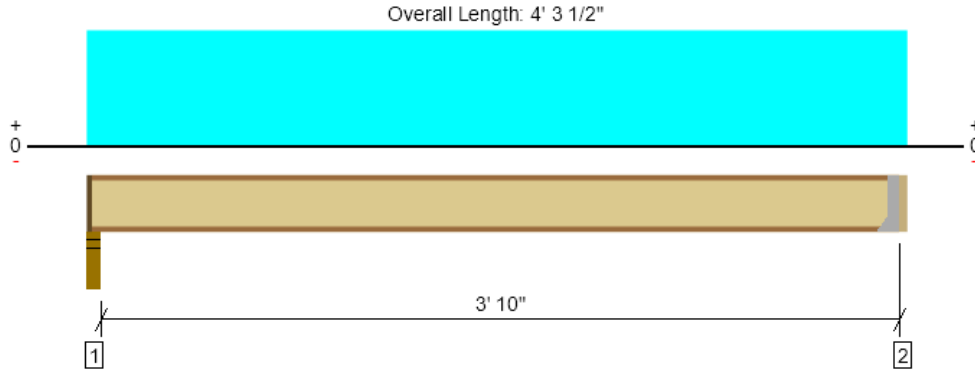
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ForteWEB Software Operator	Job Notes
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Garage Upper Floor, GU3

1 piece(s) 11 7/8" TJI® 110 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	138 @ 4' 1 1/2"	910 (1.75")	Passed (15%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	138 @ 4' 1 1/2"	1560	Passed (9%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	136 @ 2' 2"	3160	Passed (4%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.003 @ 2' 2"	0.098	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.004 @ 2' 2"	0.196	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	72	40	Passed	--	--

Member Length : 4' 1/4"
 System : Floor
 Member Type : Joist
 Building Use : Residential
 Building Code : IBC 2018
 Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories	Details
	Total	Available	Required	Dead	Floor Live	Factored		
1 - Stud wall - HF	3.50"	2.25"	1.75"	38	116	153	1 1/4" Rim Board	A3
2 - Hanger on 11 7/8" HF beam	2.00"	Hanger ¹	1.75" / - ²	37	113	150	See note ¹	--

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.
- ² Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' o/c	
Bottom Edge (Lu)	4' o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	IUS1.81/11.88	2.00"	N/A	10-10dx1.5	2-Strong-Grip	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Load	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 4' 3 1/2"	16"	13.0	40.0	Default Load

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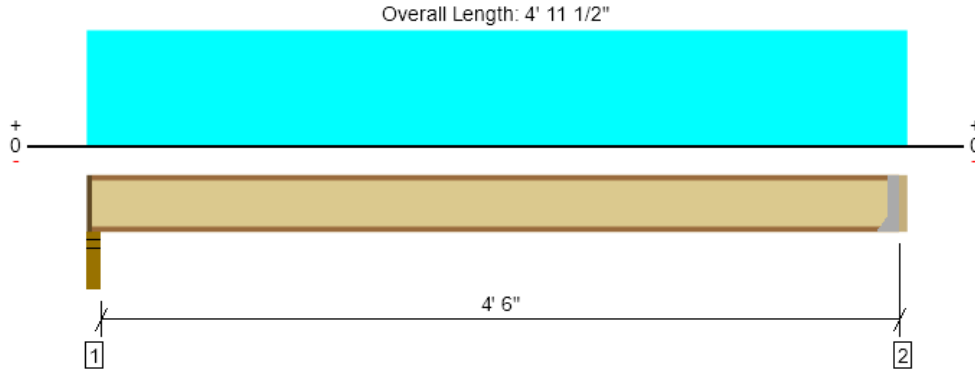
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Garage Upper Floor, GU4

1 piece(s) 11 7/8" TJI® 110 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	162 @ 4' 9 1/2"	910 (1.75")	Passed (18%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	162 @ 4' 9 1/2"	1560	Passed (10%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	186 @ 2' 6"	3160	Passed (6%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.004 @ 2' 6"	0.115	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.005 @ 2' 6"	0.229	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	71	40	Passed	--	--

Member Length : 4' 8 1/4"
 System : Floor
 Member Type : Joist
 Building Use : Residential
 Building Code : IBC 2018
 Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories	Details
	Total	Available	Required	Dead	Floor Live	Factored		
1 - Stud wall - HF	3.50"	2.25"	1.75"	43	133	177	1 1/4" Rim Board	A3
2 - Hanger on 11 7/8" HF beam	2.00"	Hanger ¹	1.75" / - ²	43	131	174	See note ¹	--

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.
- ² Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 8" o/c	
Bottom Edge (Lu)	4' 8" o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	IUS1.81/11.88	2.00"	N/A	10-10dx1.5	2-Strong-Grip	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Load	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 4' 11 1/2"	16"	13.0	40.0	Default Load

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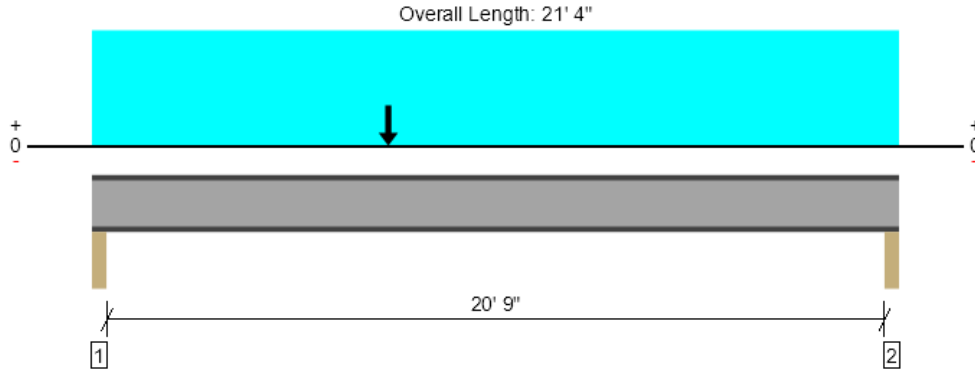
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Garage Upper Floor, GU5

1 piece(s) W10X33 (A992) ASTM Steel



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	10284 @ 2"	20199 (3.50")	Passed (51%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	10244 @ 3 1/2"	56434	Passed (18%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	74605 @ 7' 10"	96806	Passed (77%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.551 @ 9' 11 3/8"	0.700	Passed (L/457)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.967 @ 9' 11 15/16"	1.050	Passed (L/260)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

Member Length : 21' 4"
 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).
- Bearing reinforcement may be required for support located at 2".
- Bearing reinforcement may be required for point load located at 7' 10".
- Applicable calculations are based on ANSI/AISC 360-16.
- A lateral-torsional buckling factor (C_b) of 1.0 has been assumed.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Column - HF	3.50"	3.50"	3.50"	4483	4445	3291	10284	None
2 - Column - HF	3.50"	3.50"	3.50"	3023	2798	1892	6541	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' o/c	
Bottom Edge (Lu)	4' o/c	

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 21' 4"	N/A	33.0	--	--	
1 - Uniform (PSF)	0 to 21' 4" (Front)	1' 4"	13.0	40.0	--	Default Load
2 - Point (lb)	7' 10" (Top)	N/A	2180	--	3793	Linked from: GR3, Support 1
3 - Uniform (PLF)	0 to 21' 4" (Top)	N/A	48.0	--	--	
4 - Point (lb)	7' 10" (Top)	N/A	792	--	1390	Linked from: GR2, Support 3
5 - Point (lb)	7' 10" (Front)	N/A	2436	6105	--	Linked from: GU2, Support 1

• Side loads are assumed to not induce cross-grain tension.

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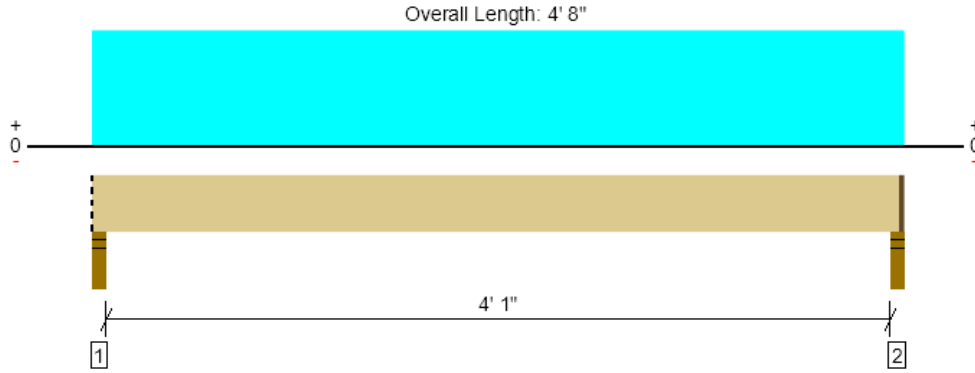
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Garage Upper Floor, GU6

1 piece(s) 1 3/4" x 11 7/8" 2.0E Microllam® LVL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	427 @ 4' 6"	1595 (2.25")	Passed (27%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	202 @ 1' 3 3/8"	3948	Passed (5%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	450 @ 2' 4"	8924	Passed (5%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.004 @ 2' 4"	0.108	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.006 @ 2' 4"	0.217	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

Member Length : 4' 6 3/4"
 System : Floor
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2018
 Design Methodology : ASD

- Deflection criteria: LL (L/480) 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	Floor Live	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	120	327	447	Blocking
2 - Stud wall - HF	3.50"	2.25"	1.50"	120	327	446	1 1/4" Rim Board

- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- 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)	4' 7" o/c	
Bottom Edge (Lu)	4' 7" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 4' 6 3/4"	N/A	6.1	--	
1 - Uniform (PSF)	0 to 4' 8" (Front)	3' 6"	13.0	40.0	Default Load

- Side loads are assumed to not induce cross-grain tension.

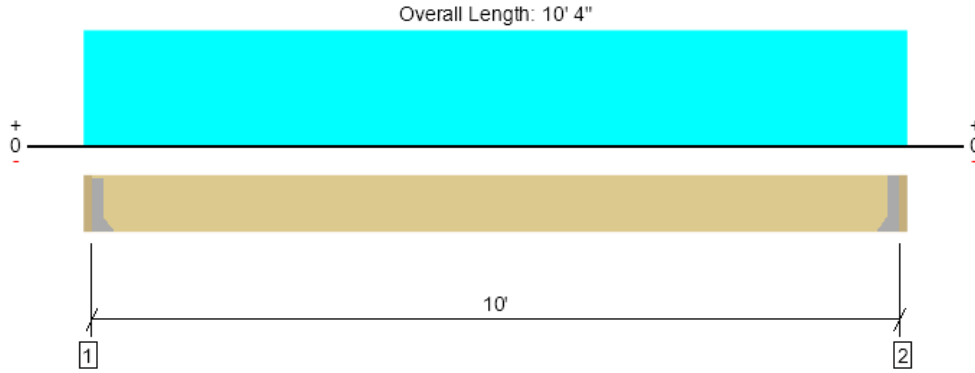
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Garage Upper Floor, GU7

1 piece(s) 1 3/4" x 11 7/8" 2.0E Microllam® LVL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	593 @ 2"	1969 (1.50")	Passed (30%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	475 @ 1' 1 7/8"	3948	Passed (12%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1482 @ 5' 2"	8924	Passed (17%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.045 @ 5' 2"	0.250	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.063 @ 5' 2"	0.500	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

Member Length : 10'
 System : Floor
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2018
 Design Methodology : ASD

- Deflection criteria: LL (L/480) 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	Floor Live	Factored	
1 - Hanger on 11 7/8" HF beam	2.00"	Hanger ¹	1.50"	174	438	612	See note ¹
2 - Hanger on 11 7/8" HF beam	2.00"	Hanger ¹	1.50"	174	438	612	See note ¹

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.

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

- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie							
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories	
1 - Face Mount Hanger	IUS1.81/9.5	2.00"	N/A	8-10dx1.5	2-10dx1.5		
2 - Face Mount Hanger	IUS1.81/9.5	2.00"	N/A	8-10dx1.5	2-10dx1.5		

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	2" to 10' 2"	N/A	6.1	--	
1 - Uniform (PLF)	0 to 10' 4" (Front)	N/A	27.8	84.8	Linked from: GU3, Support 2

- Side loads are assumed to not induce cross-grain tension.

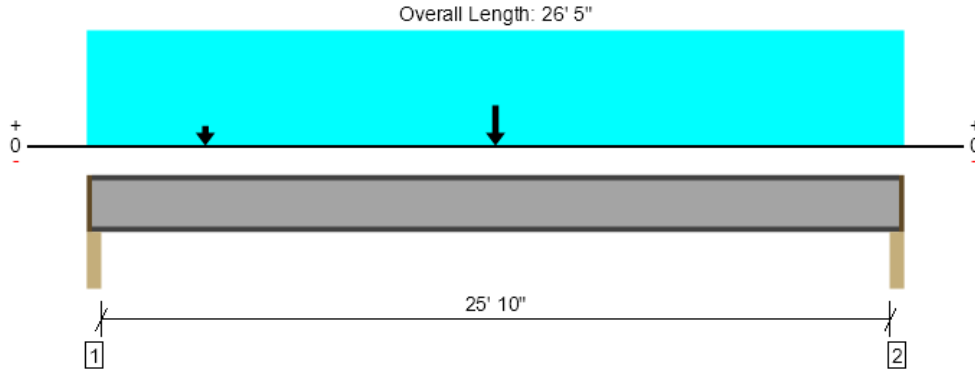
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Garage Upper Floor, GU8

1 piece(s) W10X30 (A992) ASTM Steel



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4538 @ 2"	9478 (2.25")	Passed (48%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	4501 @ 3 1/2"	63000	Passed (7%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	42652 @ 13' 2 1/2"	91317	Passed (47%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.513 @ 13' 1 7/8"	0.652	Passed (L/611)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.913 @ 13' 1 15/16"	1.304	Passed (L/343)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

Member Length : 26' 2 1/2"
 System : Floor
 Member Type : Flush Beam
 Building Use : Residential
 Building Code : IBC 2018
 Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Applicable calculations are based on ANSI/AISC 360-16.
- A lateral-torsional buckling factor (C_b) of 1.0 has been assumed.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Column - HF	3.50"	2.25"	2.25"	1972	1674	1747	4538	1 1/4" Rim Board
2 - Column - HF	3.50"	2.25"	2.25"	1847	1359	1747	4176	1 1/4" Rim Board

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	Continuous	
Bottom Edge (Lu)	Continuous	

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	1 1/4" to 26' 3 3/4"	N/A	30.0	--	--	
1 - Uniform (PLF)	0 to 26' 5" (Front)	N/A	32.3	98.3	--	Linked from: GU4, Support 2
2 - Point (lb)	3' 10" (Back)	N/A	174	438	--	Linked from: GU7, Support 1
3 - Point (lb)	13' 2 1/2" (Top)	N/A	2007	--	3493	Linked from: GR2, Support 2

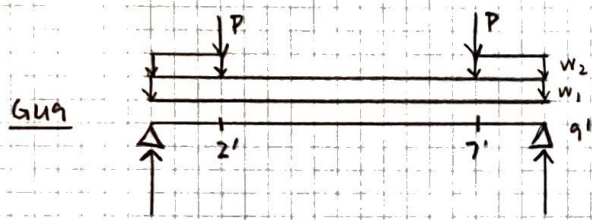
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GARAGE UPPER FLOOR FRAMING



	D	L	S	E	W
w_1	1157	262	-	-	-
w_2	112	-	221	-	-
P	0.31	-	0.59	± 0.23	± 0.19

$V = 3.26$

$V_r = 6.15 k$

USE (2) LVL 1 3/4 x 9 1/4

$M = 5.93 k$

$M_r = 11.2 k ft$

$\Delta_{TL} = 0.186" = L/581$

SECTION 3: LATERAL

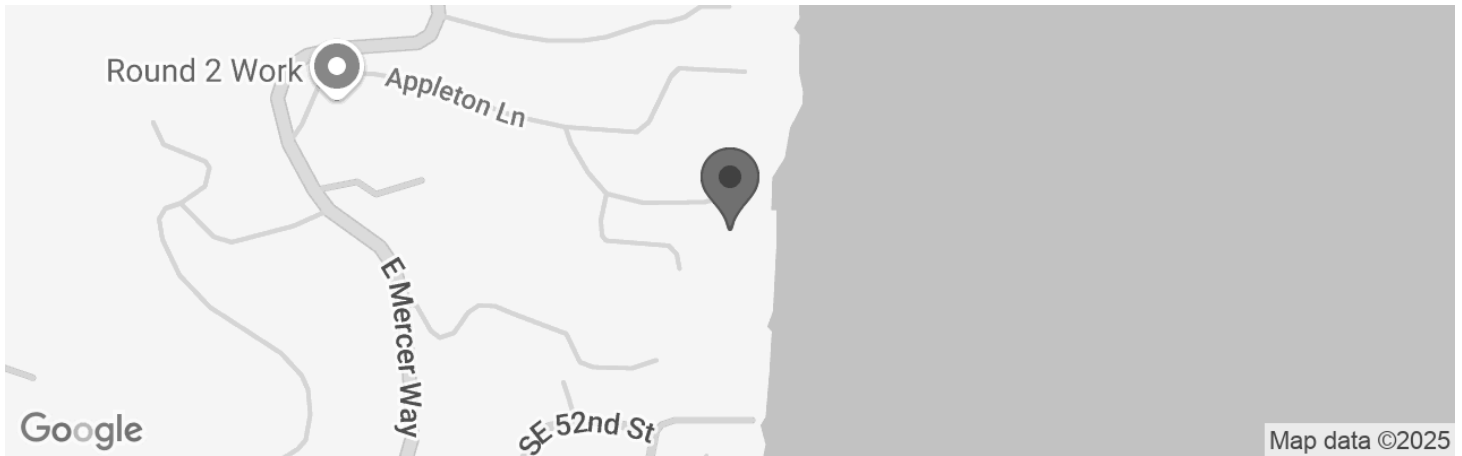
USGS web services were down for some period of time and as a result this tool wasn't operational, resulting in *timeout* error.
 USGS web services are now operational so this tool should work as expected.



OSHDPD

4836 E Mercer Way, Mercer Island, WA 98040, USA

Latitude, Longitude: 47.55892189999999, -122.2098538



Date	1/3/2025, 3:33:12 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Default (See Section 11.4.3)

Type	Value	Description
S_S	1.431	MCE_R ground motion. (for 0.2 second period)
S_1	0.497	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.718	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1.145	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1.2	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.613	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	0.735	Site modified peak ground acceleration
T_L	6	Long-period transition period in seconds
S_sRT	1.431	Probabilistic risk-targeted ground motion. (0.2 second)
S_sUH	1.587	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
S_sD	4.039	Factored deterministic acceleration value. (0.2 second)
S_1RT	0.497	Probabilistic risk-targeted ground motion. (1.0 second)
S_1UH	0.553	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S_1D	1.574	Factored deterministic acceleration value. (1.0 second)
PGAd	1.355	Factored deterministic acceleration value. (Peak Ground Acceleration)

Type	Value	Description
PGA _{UH}	0.613	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C _{RS}	0.902	Mapped value of the risk coefficient at short periods
C _{R1}	0.898	Mapped value of the risk coefficient at a period of 1 s
C _V	1.386	Vertical coefficient

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SEISMIC DESIGN

HOUSE

ASCE 7-16

Equivalent Lateral Force Procedure

RISK Category	II	Table 1.5-1
Seismic Design Category	D	Table 11.6-1
Importance Factor	1.00	Table 1.5-2
Site Class	D	Table 20.3-1 per Geotech or DEFAULT
S _s	143.10 %g	(from SEAOC/OSHPD website tool)
S ₁	49.70 %g	(from SEAOC/OSHPD website tool)
F _a	1.20	Table 11.4-1 USE Fa=1.2 for DEFAULT Site Class D
F _v	1.80	Table 11.4-2
C _t	0.02	Table 12.8-2
x	0.75	Table 12.8-2
h _n	24.00 feet	(height to highest level)
S _{MS} = F _a *S _s	1.7172	Eq. 11.4-1
S _{M1} = F _v *S ₁	0.8946	Eq. 11.4-2
S _{DS} = (2/3)*S _{MS}	1.1448 g	Eq. 11.4-3
S _{D1} = (2/3)*S _{M1}	0.5964 g	Eq. 11.4-4
Period T _a = C _t *h _n ^{0.75}	0.2169 s	Eq. 12.8-7
T _o	0.1042 s	per section 11.4.6
T _s	0.5210 s	per section 11.4.6
S _a	1.1448 g	per section 11.4.6
R	6.5	Table 12.2-1
Ω _o	2.5	Table 12.2-1
C _d	4	Table 12.2-1
Section 12.8 (ELF) ok?	Yes	Table 12.6-1

Equivalent Lateral Force Procedure (section 12.8)

C _s	0.1761	Eq. 12.8-2
W, weight	86,505 lb	per table below
Q _E	15,235 lb	Eq. 12.8-1

Vertical Force Distribution (section 12.8.3)

k = 1.00

Level	Hx (ft)	Floor Area (ft ²)	Seismic Dead Ld (psf)	Floor Wt. (k)	Wall Length (ft)	Wall Wt. (k)	Total Wt. (k)	WxHx (k-ft)	Cvx (%)	(LRFD) Q _E (k)	(ASD) 0.7Q _E (k)
Roof	21.00	1346	15	20.2	179	8.6	28.8	604.5	50.3	7.67	5.37
Upper Floor	10.33	2304	13	30.0	224	21.2	51.1	528.1	44.0	6.70	4.69
Patio Roof	10.33	550	12	6.6	0	0.0	6.6	68.2	5.7	0.87	0.61
							86.50	1200.73	100.00	15.24	10.66

SEISMIC DESIGN

HOUSE

ASCE 7-16

Equivalent Lateral Force Procedure

RISK Category	II	Table 1.5-1
Seismic Design Category	D	Table 11.6-1
Importance Factor	1.00	Table 1.5-2
Site Class	D	Table 20.3-1 per Geotech or DEFAULT
S _s	143.10 %g	(from SEAOC/OSHPD website tool)
S ₁	49.70 %g	(from SEAOC/OSHPD website tool)
F _a	1.20	Table 11.4-1 USE Fa=1.2 for DEFAULT Site Class D
F _v	1.80	Table 11.4-2
C _t	0.02	Table 12.8-2
x	0.75	Table 12.8-2
h _n	24.00 feet	(height to highest level)
S _{MS} = F _a *S _s	1.7172	Eq. 11.4-1
S _{M1} = F _v *S ₁	0.8946	Eq. 11.4-2
S _{DS} = (2/3)*S _{MS}	1.1448 g	Eq. 11.4-3
S _{D1} = (2/3)*S _{M1}	0.5964 g	Eq. 11.4-4
Period T _a = C _t *h _n ^{0.75}	0.2169 s	Eq. 12.8-7
T _o	0.1042 s	per section 11.4.6
T _s	0.5210 s	per section 11.4.6
S _a	1.1448 g	per section 11.4.6
R	1.25	Table 12.2-1
Ω _o	1.25	Table 12.2-1
C _d	1.25	Table 12.2-1
Section 12.8 (ELF) ok?	Yes	Table 12.6-1

Equivalent Lateral Force Procedure (section 12.8)

C _s	0.9158	Eq. 12.8-2
W, weight	84,861 lb	per table below
Q _E	77,719 lb	Eq. 12.8-1

Vertical Force Distribution (section 12.8.3)

k = 1.00

Level	Hx (ft)	Floor Area (ft ²)	Seismic Dead Ld (psf)	Floor Wt. (k)	Wall Length (ft)	Wall Wt. (k)	Total Wt. (k)	WxHx (k-ft)	Cvx (%)	(LRFD) Q _E (k)	(ASD) 0.7Q _E (k)
Roof	21.00	1346	15	20.2	179	8.6	28.8	604.5	51.1	39.69	27.78
Upper Floor	10.33	2304	13	30.0	224	21.2	51.1	528.1	44.6	34.67	24.27
Patio Roof	10.33	413	12	5.0	0	0.0	5.0	51.2	4.3	3.36	2.35
							84.86	1183.74	100.00	77.72	54.40

SEISMIC DESIGN

GARAGE

ASCE 7-16

Equivalent Lateral Force Procedure

RISK Category	II	Table 1.5-1
Seismic Design Category	D	Table 11.6-1
Importance Factor	1.00	Table 1.5-2
Site Class	D	Table 20.3-1 per Geotech or DEFAULT
S _s	143.10 %g	(from SEAOC/OSHPD website tool)
S ₁	49.70 %g	(from SEAOC/OSHPD website tool)
F _a	1.20	Table 11.4-1 USE Fa=1.2 for DEFAULT Site Class D
F _v	1.80	Table 11.4-2
C _t	0.02	Table 12.8-2
x	0.75	Table 12.8-2
h _n	21.00 feet	(height to highest level)
S _{MS} = F _a *S _s	1.7172	Eq. 11.4-1
S _{M1} = F _v *S ₁	0.8946	Eq. 11.4-2
S _{DS} = (2/3)*S _{MS}	1.1448 g	Eq. 11.4-3
S _{D1} = (2/3)*S _{M1}	0.5964 g	Eq. 11.4-4
Period T _a = C _t *h _n ^{0.75}	0.1962 s	Eq. 12.8-7
T _o	0.1042 s	per section 11.4.6
T _s	0.5210 s	per section 11.4.6
S _a	1.1448 g	per section 11.4.6
R	6.5	Table 12.2-1
Ω _o	2.5	Table 12.2-1
C _d	3.5	Table 12.2-1
Section 12.8 (ELF) ok?	Yes	Table 12.6-1

Equivalent Lateral Force Procedure (section 12.8)

C _s	0.1761	Eq. 12.8-2
W, weight	47,980 lb	per table below
Q _E	8,450 lb	Eq. 12.8-1

Vertical Force Distribution (section 12.8.3)

k = 1.00

Level	Hx (ft)	Floor Area (ft ²)	Seismic Dead Ld (psf)	Floor Wt. (k)	Wall Length (ft)	Wall Wt. (k)	Total Wt. (k)	WxHx (k-ft)	Cvx (%)	(LRFD) Q _E (k)	(ASD) 0.7Q _E (k)
Roof	18.00	1464	12	17.6	138.5	5.6	23.2	417.2	65.1	5.50	3.85
Upper Floor	9.00	1132	12	13.6	138.5	11.2	24.8	223.2	34.9	2.95	2.06
							47.98	640.41	100.00	8.45	5.92

WIND DESIGN

ASCE 7-16

Simplified Envelope Method (Chapter 28)

$$p_s = \lambda K_{zt} I p_{s30}$$

$$\lambda = \text{adjustment factor} = 1.55$$

$$I = \text{importance factor} = 1.00$$

$$K_{zt} = \text{topographic factor} = 1.00$$

Part of Figure 28.6-1 - Adjustment Factor for Building Height and Exposure, λ

Mean Roof Height (ft)	Exposure		
	B	C	D
15	1.00	1.21	1.47
16	1.00	1.23	1.49
17	1.00	1.24	1.50
18	1.00	1.26	1.52
19	1.00	1.27	1.53
20	1.00	1.29	1.55
21	1.00	1.30	1.56
22	1.00	1.31	1.57
23	1.00	1.33	1.59
24	1.00	1.34	1.60
25	1.00	1.35	1.61
26	1.00	1.36	1.62
27	1.00	1.37	1.63
28	1.00	1.38	1.64
29	1.00	1.39	1.65
30	1.00	1.40	1.66

Zone
Computation

a = 10% of least horizontal dimension or 0.4 x h, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 feet.

$$w = 26.50 \text{ ft} \times 0.1 = 2.65 \text{ ft}$$

$$h = 21.00 \text{ ft} \times 0.4 = 8.40 \text{ ft}$$

$$w = 26.50 \text{ ft} \times 0.04 = 1.06 \text{ ft}$$

$$a = 3.00 \text{ ft}$$

$$2a = 6 \text{ ft}$$

Zone B - end zone of roof

Zone A - end zone of wall

Zone D - interior zone of roof

Zone C - interior zone of wall

Part of Figure 28.6-1 - Method 2
Design Wind Pressure, p_{s30}

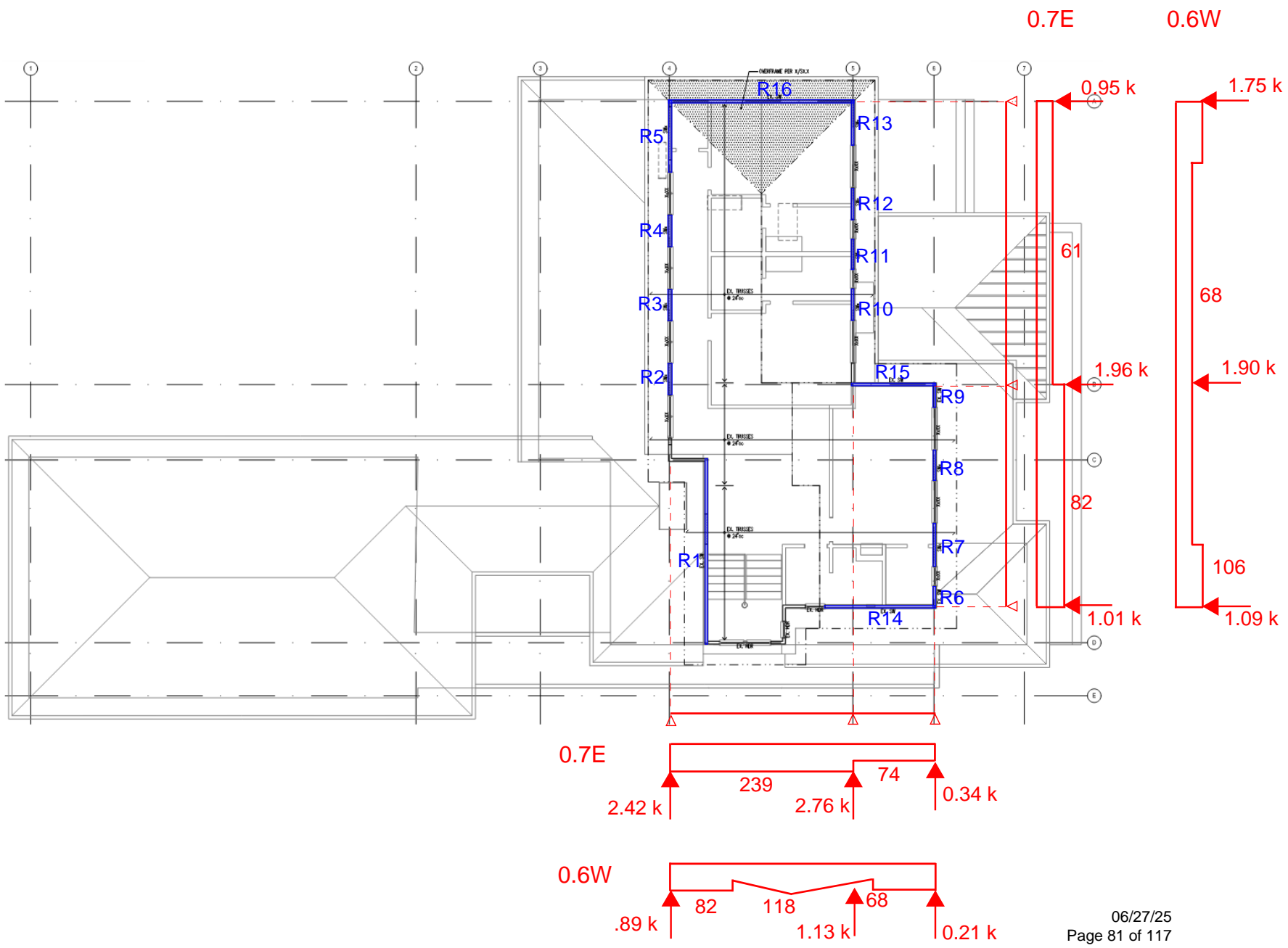
Basic Speed	Roof Angle	Roof Pitch	Horizontal Pressures (psf)			
			A	B	C	D
100	0 to 5	flat	15.9	-8.2	10.5	-4.9
	10	2	17.9	-7.4	11.9	-4.3
	15	3	19.9	-6.6	13.3	-3.8
	20	4	22.0	-5.8	14.6	-3.2
	25	6	19.9	3.2	14.4	3.3
	30 to 45	7 to 12	17.8	12.2	14.2	9.8

Design Wind Pressure, ps

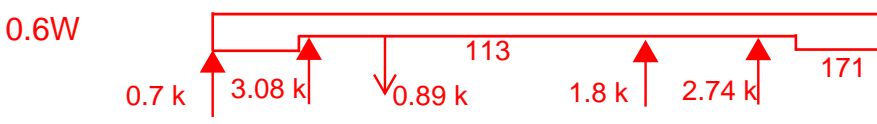
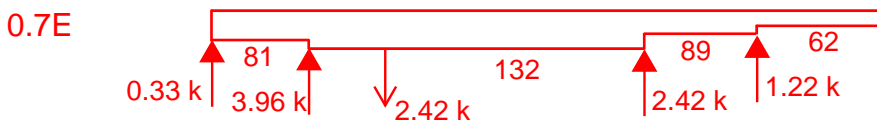
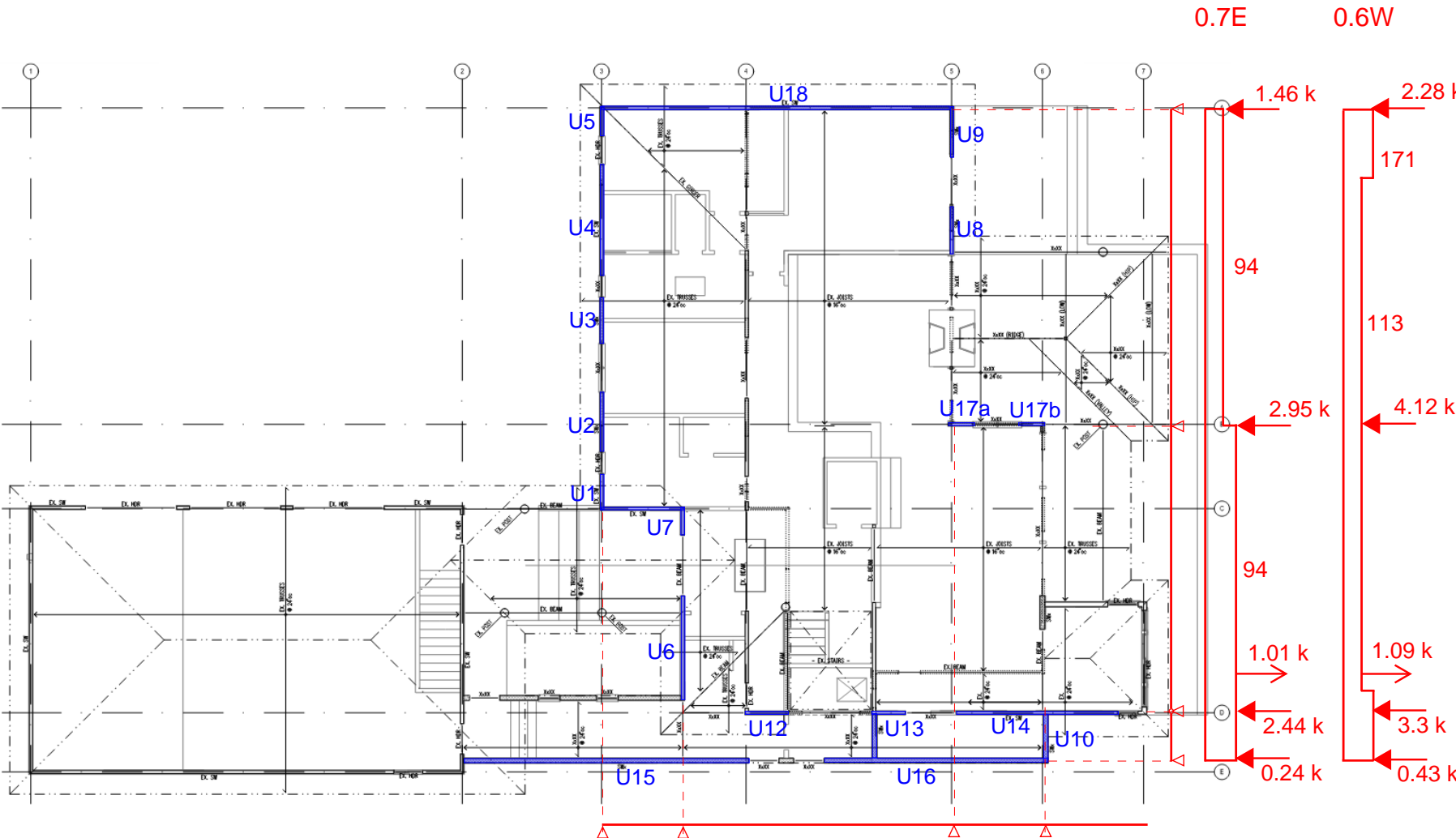
Basic Speed	Roof Angle	Roof Pitch	Horizontal Pressures (psf)			
			A	B	C	D
100	0 to 5	flat	24.6	-12.7	16.3	-7.6
	10	2	27.7	-11.5	18.4	-6.7
	15	3	30.8	-10.2	20.6	-5.9
	20	4	34.1	-9.0	22.6	-5.0
	25	6	30.8	5.0	22.3	5.1
	30 to 45	7 to 12	27.6	18.9	22.0	15.2

<<<

Roof Lateral Load Distribution



Upper Floor Lateral Load Distribution



LATERAL FORCE DISTRIBUTION

North-South
Walls Below Roof

va' = allowable shear values multiplied by (1.25-0.125 * h/l)
for wall aspect ratios greater than 2:1, and only for seismic

WALL	L (ft)	h (ft)	h/l	WIND				SW	SEISMIC					SW	SW	M ot (lbf)	M ot (abv)	M ot (total)	OT (lb)	DL max (lb)	I (lb)	HD	TL (lb)	C (lb)	POST
				F (lb)	V (abv)	V (total)	v (plf)		F (lb)	V (abv)	V (total)	v (plf)	va'												
R1	20.50	8.00	0.39	468	0	468	23	--	1272	0	1272	62	N/A	--	EX. SW	10176	0	10176	496	1827	-1330	--	0	496	(2)2x4
																10176	0	10176	496	1827	-1330	--	0	496	(2)2x4
R2	3.50	8.00	2.29	80	0	80	23	SW1	217	0	217	62	64	SW1	SW1	1737	0	1737	496	272	224	CS20	0	496	(2)2x4
																1737	0	1737	496	272	224	CS20	0	496	(2)2x4
R3	3.50	8.00	2.29	80	0	80	23	SW1	217	0	217	62	64	SW1	SW1	1737	0	1737	496	272	224	CS20	0	496	(2)2x4
																1737	0	1737	496	272	224	CS20	0	496	(2)2x4
R4	3.50	8.00	2.29	80	0	80	23	SW1	217	0	217	62	64	SW1	SW1	1737	0	1737	496	272	224	CS20	0	496	(2)2x4
																1737	0	1737	496	272	224	CS20	0	496	(2)2x4
R5	8.00	8.00	1.00	183	0	183	23	SW1	496	0	496	62	N/A	SW1	SW1	3971	0	3971	496	623	-126	--	0	496	(2)2x4
																3971	0	3971	496	623	-126	--	0	496	(2)2x4
R6	2.33	8.00	3.43	37	0	37	16	--	61	0	61	26	32	--	EX. SW	485	0	485	208	208	0	--	0	208	(2)2x4
																485	0	485	208	208	0	--	0	208	(2)2x4
R7	4.75	8.00	1.68	76	0	76	16	SW1	123	0	123	26	N/A	SW1	SW1	988	0	988	208	423	-215	--	0	208	(2)2x4
																988	0	988	208	423	-215	--	0	208	(2)2x4
R8	3.33	8.00	2.40	53	0	53	16	SW1	87	0	87	26	27	SW1	SW1	692	0	692	208	297	-89	--	0	208	(2)2x4
																692	0	692	208	297	-89	--	0	208	(2)2x4
R9	2.67	8.00	3.00	43	0	43	16	--	69	0	69	26	30	--	EX. SW	555	0	555	208	238	-30	--	0	208	(2)2x4
																555	0	555	208	238	-30	--	0	208	(2)2x4
R10	3.50	8.00	2.29	259	0	259	74	SW1	633	0	633	181	188	SW1	SW1	5068	0	5068	1448	272	1175	CS16	0	1448	(2)2x4
																5068	0	5068	1448	272	1175	CS16	0	1448	(2)2x4
R11	3.25	8.00	2.46	241	0	241	74	SW1	588	0	588	181	192	SW1	SW1	4706	0	4706	1448	253	1195	CS16	0	1448	(2)2x4
																4706	0	4706	1448	253	1195	CS16	0	1448	(2)2x4
R12	3.50	8.00	2.29	259	0	259	74	SW1	633	0	633	181	188	SW1	SW1	5068	0	5068	1448	272	1175	CS16	0	1448	(2)2x4
																5068	0	5068	1448	272	1175	CS16	0	1448	(2)2x4
R13	5.00	8.00	1.60	370	0	370	74	SW1	905	0	905	181	N/A	SW1	SW1	7239	0	7239	1448	389	1059	CS16	0	1448	(2)2x4
																7239	0	7239	1448	389	1059	CS16	0	1448	(2)2x4

East-West

Walls Below Roof

WALL	L (ft)	h (ft)	h/l	WIND				SW	SEISMIC					SW	SW	M _{ot} (lbft)	M _{ot} (abv)	M _{ot} (total)	OT (lb)	DL max (lb)	I (lb)	HD	IL (lb)	C (lb)	POST
				E (lb)	V (abv)	V (total)	V (plf)		E (lb)	V (abv)	V (total)	V (plf)	va'												
R14	12.25	8.00	0.65	1090	0	1090	89	--	1010	0	1010	82	N/A	--	EX. SW	8720	0	8720	712	402	309	CS20	0	712	(2)2x4
																8720	0	8720	712	402	309	CS20	0	712	(2)2x4
R15	9.33	8.00	0.86	1900	0	1900	204	SW1	1960	0	1960	210	N/A	SW1	SW1	15680	0	15680	1681	306	1374	CS16	0	1681	(2)2x4
																15680	0	15680	1681	306	1374	CS16	0	1681	(2)2x4
R16	20.50	8.00	0.39	1750	0	1750	85	--	950	0	950	46	N/A	--	EX. SW	14000	0	14000	683	673	10	CS20	0	683	(2)2x4
																14000	0	14000	683	673	10	CS20	0	683	(2)2x4

rho = 1.00 per ASCE 7-10 12.3.4.2

LATERAL FORCE DISTRIBUTION

East-West
Walls Below Third

va' = allowable shear values multiplied by (1.25-0.125 * h/l)
for wall aspect ratios greater than 2:1, and only for seismic

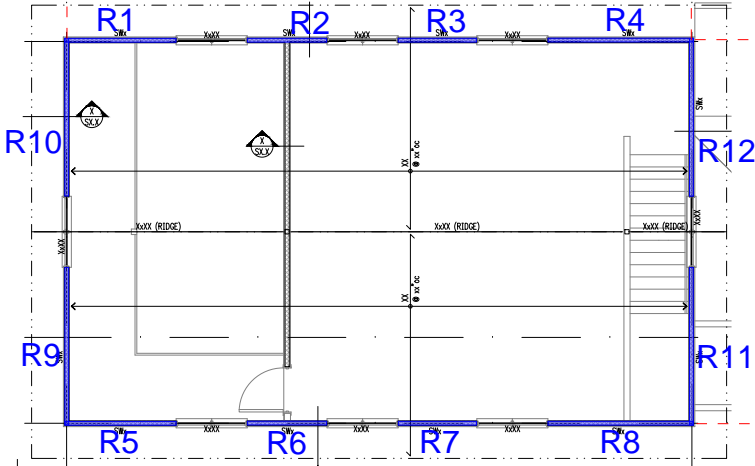
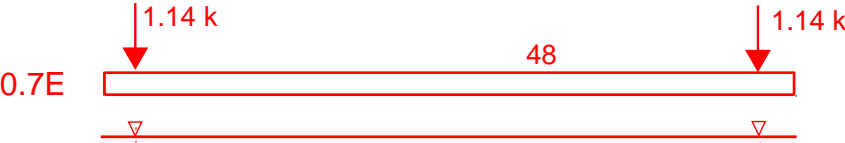
WALL	WIND			SEISMIC				SW	F (lb)	V (abv)	V (total)	v (plf)	va'	SW	SW	M ot (lbft)	M ot (abv)	M ot (total)	OT (lb)	DL max (lb)	I (lb)	HD	TL (lb)	C (lb)	POST
	L (ft)	h (ft)	h/l	F (lb)	V (abv)	V (total)	v (plf)																		
U1	3.50	8.67	2.48	88	0	88	25	--	42	0	42	12	13	--	EX. SW	763	0	763	218	224	-6	--	0	218	(2)2x4
																763	0	763	218	224	-6	--	0	218	(2)2x4
U2	5.83	8.67	1.49	147	0	147	25	SW1	69	0	69	12	N/A	SW1	SW1	1271	0	1271	218	373	-155	--	0	218	(2)2x4
																1271	0	1271	218	373	-155	--	0	218	(2)2x4
U3	4.50	8.67	1.93	113	0	113	25	SW1	53	0	53	12	N/A	SW1	SW1	981	0	981	218	288	-70	--	0	218	(2)2x4
																981	0	981	218	288	-70	--	0	218	(2)2x4
U4	11.00	8.67	0.79	277	0	277	25	--	130	0	130	12	N/A	--	EX. SW	2399	0	2399	218	703	-485	--	0	218	(2)2x4
																2399	0	2399	218	703	-485	--	0	218	(2)2x4
U5	3.00	8.67	2.89	75	0	75	25	--	36	0	36	12	13	--	EX. SW	654	0	654	218	192	26	LTPP2	0	218	(2)2x4
																654	0	654	218	192	26	LTPP2	0	218	(2)2x4
U6	10.25	8.67	0.85	2428	0	2428	237	SW1	3122	0	3122	305	N/A	SW2	SW2	27070	0	27070	2641	378	2263	MSTCM40	0	2641	(2)2x4
																27070	0	27070	2641	378	2263	MSTCM40	0	2641	(2)2x4
U7	2.75	8.67	3.15	652	0	652	237	SW1	838	0	838	305	356	SW2	SW2	7263	0	7263	2641	101	2540	MSTCM40	0	2641	(2)2x4
																7263	0	7263	2641	101	2540	MSTCM40	0	2641	(2)2x4
U8	4.67	8.67	1.86	892	560	1453	311	SW1	1200	1368	2568	550	N/A	SW4	SW4	22265	0	22265	4768	655	4113	MSTCM40	0	4768	(3)2x4
																22265	5068	27332	5853	655	5198	(2)MSTCM40	0	5853	(4)2x4
U9	4.75	8.67	1.83	908	570	1477	311	SW1	1220	1392	2612	550	N/A	SW4	SW4	22646	7239	29885	6292	666	5625	(2)MSTCM40	0	6292	(4)2x4
																22646	7239	29885	6292	666	5625	(2)MSTCM40	0	6292	(4)2x4
U10	5.00	8.67	1.73	2740	210	2950	590	SW3	1220	340	1560	312	N/A	SW2	SW3	25577	0	25577	5115	0	5115	HDQ8	0	5115	(3)2x6
																25577	0	25577	5115	0	5115	HDQ8	0	5115	(3)2x6

North-South
Walls Below Third

WALL	WIND				SEISMIC								SW	SW	M _{ot} (lbf)	M _{ot} (abv)	M _{ot} (total)	OT (lb)	DL _{max} (lb)	I (lb)	HD	IL (lb)	C (lb)	POST	
	L (ft)	h (ft)	h/l	E (lb)	V (abv)	V (total)	V (plf)	SW	E (lb)	V (abv)	V (total)	V (plf)													va'
U12	4.25	8.67	2.04	595	196	791	186	SW1	440	182	622	146	147	SW1	SW1	6860	0	6860	1614	206	1408	LTPP2	0	1614	(2)2x4
																6860	0	6860	1614	206	1408	LTPP2	0	1614	(2)2x4
U13	3.33	8.67	2.60	466	154	620	186	SW1	345	143	487	146	158	SW1	SW1	5375	0	5375	1614	138	1476	LTPP2	0	1614	(2)2x4
																5375	0	5375	1614	138	1476	LTPP2	0	1614	(2)2x4
U14	16.00	8.67	0.54	2239	740	2979	186	SW1	1656	685	2341	146	N/A	SW1	SW1	25826	0	25826	1614	665	949	LTPP2	0	1614	(2)2x4
																25826	0	25826	1614	665	949	LTPP2	0	1614	(2)2x4
U15	28.00	8.67	0.31	241	0	241	9	SW1	134	0	134	5	N/A	SW1	SW1	2088	0	2088	75	863	-789	--	0	75	(2)2x4
																2088	0	2088	75	863	-789	--	0	75	(2)2x4
U16	22.00	8.67	0.39	189	0	189	9	SW1	106	0	106	5	N/A	SW1	SW1	1640	0	1640	75	678	-604	--	0	75	(2)2x4
																1640	0	1640	75	678	-604	--	0	75	(2)2x4
U17a	3.00	8.67	2.89	2105	950	3055	1018	SW5	1475	980	2455	818	921	SW6	SW6	26487	15680	42167	14056	733	13323	HD19	0	14056	(5)2x4
																26487	0	26487	8829	169	8660	HDU11	0	8829	(5)2x4
U17b	3.00	8.67	2.89	2105	950	3055	1018	SW5	1475	980	2455	818	921	SW6	SW6	26487	0	26487	8829	169	8660	HDU11	0	8829	(5)2x4
																26487	14000	40487	13496	821	12675	HD19	0	13496	(5)2x4
U18	34.83	8.67	0.25	2280	1750	4030	116	--	1460	950	2410	69	N/A	--	EX. SW	34940	0	34940	1003	2051	-1047	--	0	1003	(2)2x4
																34940	14000	48940	1405	2051	-645	--	0	1405	(2)2x4

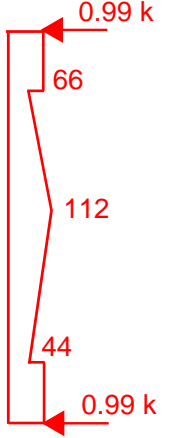
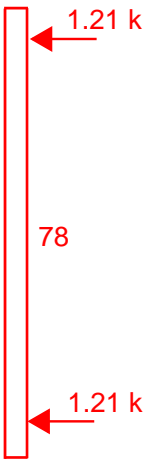
rho = 1.00 per ASCE 7-10 12.3.4.2

Garage Roof Lateral Load Distribution

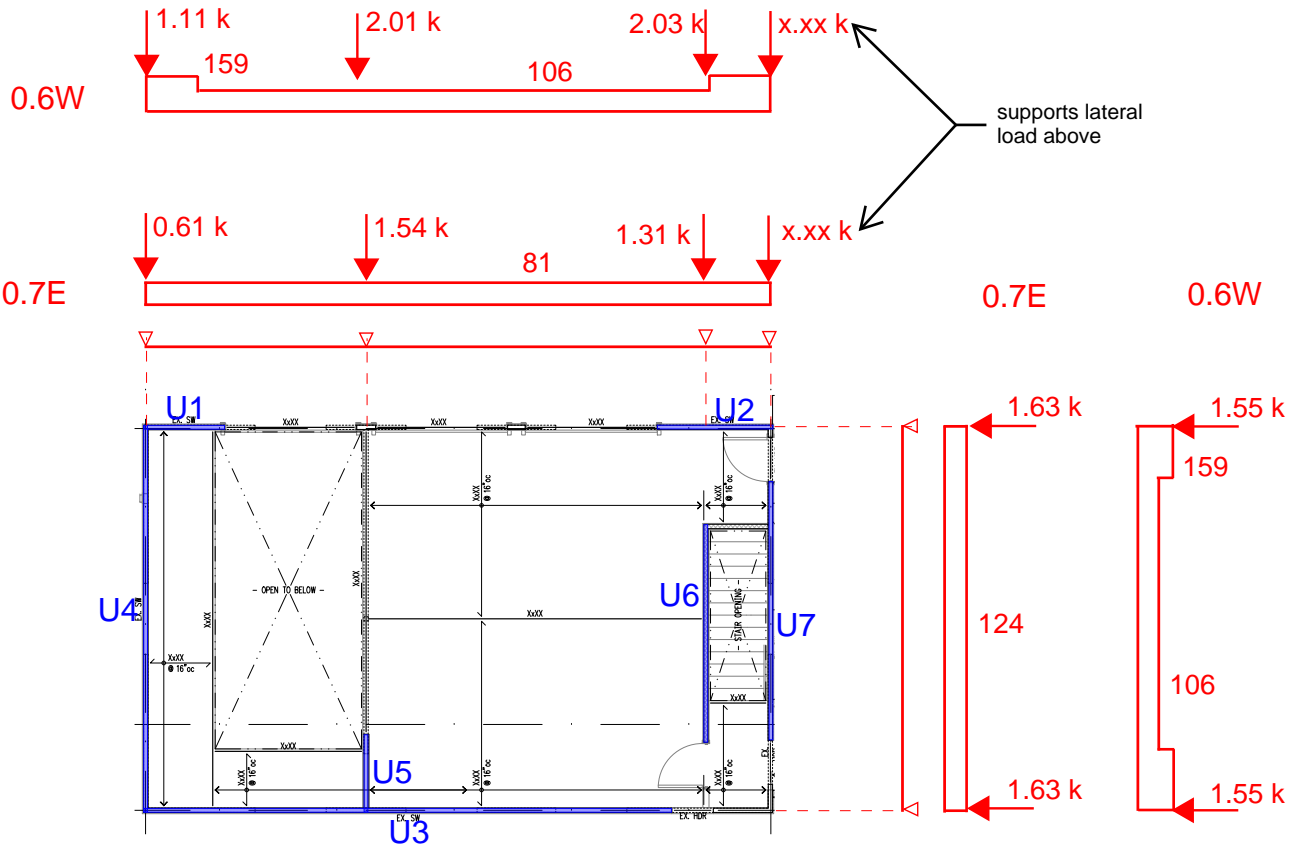


0.7E

0.6W



Garage Upper Floor Lateral Load Distribution



LATERAL FORCE DISTRIBUTION

East-West
Walls Below Roof

va' = allowable shear values multiplied by (1.25-0.125 * h/l)
for wall aspect ratios greater than 2:1, and only for seismic

WALL	L (ft)	h (ft)	h/l	WIND				SW	SEISMIC					SW	SW	M _{ot} (lbft)	M _{ot} (abv)	M _{ot} (total)	OT (lb)	DL _{max} (lb)	I (lb)	HD	TL (lb)	C (lb)	POST
				F (lb)	V (abv)	V (total)	v (plf)		F (lb)	V (abv)	V (total)	v (plf)	va'												
R1	7.67	5.50	0.72	266	0	266	35	SW1	326	0	326	55	N/A	SW1	SW1	2328	0	2328	304	358	-54	--	0	304	(2)2x4
																2328	0	2328	304	358	-54	--	0	304	(2)2x4
R2	5.50	5.50	1.00	191	0	191	35	SW1	234	0	234	55	N/A	SW1	SW1	1670	0	1670	304	257	47	CS20	0	304	(2)2x4
																1670	0	1670	304	257	47	CS20	0	304	(2)2x4
R3	5.33	5.50	1.03	185	0	185	35	SW1	226	0	226	55	N/A	SW1	SW1	1618	0	1618	304	249	55	CS20	0	304	(2)2x4
																1618	0	1618	304	249	55	CS20	0	304	(2)2x4
R4	10.00	5.50	0.55	347	0	347	35	SW1	425	0	425	55	N/A	SW1	SW1	3036	0	3036	304	466	-163	--	0	304	(2)2x4
																3036	0	3036	304	466	-163	--	0	304	(2)2x4
R5	7.67	5.50	0.72	266	0	266	35	SW1	326	0	326	55	N/A	SW1	SW1	2328	0	2328	304	358	-54	--	0	304	(2)2x4
																2328	0	2328	304	358	-54	--	0	304	(2)2x4
R6	5.50	5.50	1.00	191	0	191	35	SW1	234	0	234	55	N/A	SW1	SW1	1670	0	1670	304	257	47	CS20	0	304	(2)2x4
																1670	0	1670	304	257	47	CS20	0	304	(2)2x4
R7	5.33	5.50	1.03	185	0	185	35	SW1	226	0	226	55	N/A	SW1	SW1	1618	0	1618	304	249	55	CS20	0	304	(2)2x4
																1618	0	1618	304	249	55	CS20	0	304	(2)2x4
R8	10.00	5.50	0.55	347	0	347	35	SW1	425	0	425	55	N/A	SW1	SW1	3036	0	3036	304	466	-163	--	0	304	(2)2x4
																3036	0	3036	304	466	-163	--	0	304	(2)2x4

North South
Walls Below Roof

WALL	L (ft)	h (ft)	h/l	WIND				SW	SEISMIC					SW	SW	M _{ot} (lbft)	M _{ot} (abv)	M _{ot} (total)	OT (lb)	DL _{max} (lb)	I (lb)	HD	TL (lb)	C (lb)	POST
				F (lb)	V (abv)	V (total)	v (plf)		F (lb)	V (abv)	V (total)	v (plf)	va'												
R9	10.75	7.50	0.70	735	0	735	68	SW1	570	0	570	69	N/A	SW1	SW1	5558	0	5558	517	372	144	CS20	0	517	(2)2x4
																5558	0	5558	517	372	144	CS20	0	517	(2)2x4
R10	10.75	7.50	0.70	735	0	735	68	SW1	570	0	570	69	N/A	SW1	SW1	5558	0	5558	517	372	144	CS20	0	517	(2)2x4
																5558	0	5558	517	372	144	CS20	0	517	(2)2x4
R11	10.75	7.50	0.70	735	0	735	68	SW1	570	0	570	69	N/A	SW1	SW1	5558	0	5558	517	372	144	CS20	0	517	(2)2x4
																5558	0	5558	517	372	144	CS20	0	517	(2)2x4
R12	10.75	7.50	0.70	735	0	735	68	SW1	570	0	570	69	N/A	SW1	SW1	5558	0	5558	517	372	144	CS20	0	517	(2)2x4
																5558	0	5558	517	372	144	CS20	0	517	(2)2x4

rho = 1.30 per ASCE 7-10 12.3.4.2

LATERAL FORCE DISTRIBUTION

East-West

Walls Below Upper

va' = allowable shear values multiplied by (1.25-0.125 * h/l)
for wall aspect ratios greater than 2:1, and only for seismic

WALL	L (ft)	h (ft)	h/l	WIND				SW	SEISMIC				va'	SW	SW	M _{ot} (lbft)	M _{ot} (abv)	M _{ot} (total)	OT (lb)	DL _{max}		I (lb)	HD	TL (lb)	C (lb)	POST
				E (lb)	V (abv)	V (total)	V (plf)		E (lb)	V (abv)	V (total)	V (plf)								(lb)	(lb)					
U1	5.50	8.00	1.45	775	495	1270	231	SW1	815	605	1420	336	N/A	SW2	SW2	14768	0	14768	2685	1450	1236	LTTTP2	0	2685	(2)2x4	
																				342	2344					MSTCM40
U2	5.50	8.00	1.45	775	495	1270	231	SW1	815	605	1420	336	N/A	SW2	SW2	14768	0	14768	2685	342	2344	MSTCM40	0	2685	(2)2x4	
																				342	2344					MSTCM40
U3	36.00	8.00	0.22	1550	990	2540	71	EX. SW	1630	1210	2840	103	N/A	EX. SW	EX. SW	29536	0	29536	820	2236	-1415	--	0	820	(2)2x4	
																				2236	-1415					--

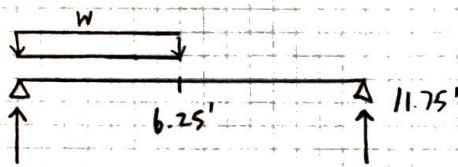
North-South

Walls Below Upper

WALL	L (ft)	h (ft)	h/l	WIND				SW	SEISMIC				va'	SW	SW	M _{ot} (lbft)	M _{ot} (abv)	M _{ot} (total)	OT (lb)	DL _{max}		I (lb)	HD	TL (lb)	C (lb)	POST
				E (lb)	V (abv)	V (total)	V (plf)		E (lb)	V (abv)	V (total)	V (plf)								(lb)	(lb)					
U4	26.33	8.00	0.30	1110	1470	2580	98	EX. SW	610	1140	1750	86	N/A	EX. SW	EX. SW	20640	5558	26198	995	1161	-166	--	0	995	(2)2x4	
																				1161	-166					--
U5	5.33	8.00	1.50	2010	0	2010	377	SW2	1540	0	1540	376	N/A	SW3	SW3	16080	0	16080	3017	2689	328	LTTTP2	0	3017	(2)2x6	
																				0	3017					MSTCM40
U6	14.83	8.00	0.54	2030	0	2030	137	SW1	1310	0	1310	115	N/A	SW1	SW1	16240	0	16240	1095	0	1095	LTTTP2	0	1095	(2)2x4	
																				0	1095					LTTTP2
U7	17.67	8.00	0.45	0	1470	1470	83	EX. SW	0	1140	1140	84	N/A	EX. SW	EX. SW	11856	0	11856	671	1018	-347	--	0	671	(2)2x4	
																				1018	-347					--

rho = 1.30 per ASCE 7-10 12.3.4.2

GARAGE WIND BEAM



$w = 153 \text{ pf (0.6w)}$

$V = 0.7k$

$V_r = 8.04k$

$M = 1.6 \text{ k-ft}$

$M_r = 9.67 \text{ k-ft}$

USE PSL 3 1/2 x 11 3/8
(FLAT)

$\Delta_w = 0.383" = L/366$

Allowable Design Properties

FLAT FRAMING PSL

Wind Beam at Stairway

11.875



3.5

$A = 41.56 \text{ in}^2$

$S = 24.24 \text{ in}^3$

$I = 42.43 \text{ in}^4$

$F_v = 290 \text{ psi}$

$F_b = 2900 \text{ psi}$

$C_F = 1.5$

$C_{fu} = 1.1$

$F_b' = 4785 \text{ psi}$

$E = 2.0E+06 \text{ psi}$

$V_R =$	8.04	k
$V_R \text{ 1.15} =$	9.24	k
$M_R =$	9.67	k-ft
$M_R \text{ 1.15} =$	11.12	k-ft
$EI =$	8.49E+07	lb-in ²

SECTION 4: FOUNDATION



Cantilever Column Anchorage

1. Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

General

Design method: ACI 318-14
Units: Imperial units

Anchor Information:

Anchor type: Cast-in-place
Material: AB_H
Diameter (inch): 0.625
Effective Embedment depth, h_{ef} (inch): 20.000
Anchor category: -
Anchor ductility: Yes
 h_{min} (inch): 22.13
 C_{min} (inch): 3.75
 S_{min} (inch): 3.75

Base Material

Concrete: Normal-weight
Concrete thickness, h (inch): 24.00
State: Cracked
Compressive strength, f'_c (psi): 2500
 $\Psi_{c,v}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Ignore $6d_o$ requirement: No
Build-up grout pad: No

Base Plate

Length x Width x Thickness (inch): 8.00 x 8.00 x 1.00
Yield stress: 36000 psi

Profile type/size: HSS4X4X1/2

Recommended Anchor

Anchor Name: PAB Pre-Assembled Anchor Bolt - PAB5H (5/8"Ø)



Load and Geometry

Load factor source: ACI 318 Section 5.3

Load combination: not set

Seismic design: No

Anchors subjected to sustained tension: Not applicable

Apply entire shear load at front row: No

Anchors only resisting wind and/or seismic loads: No

Strength level loads:

N_{ua} [lb]: 0

V_{uax} [lb]: 0

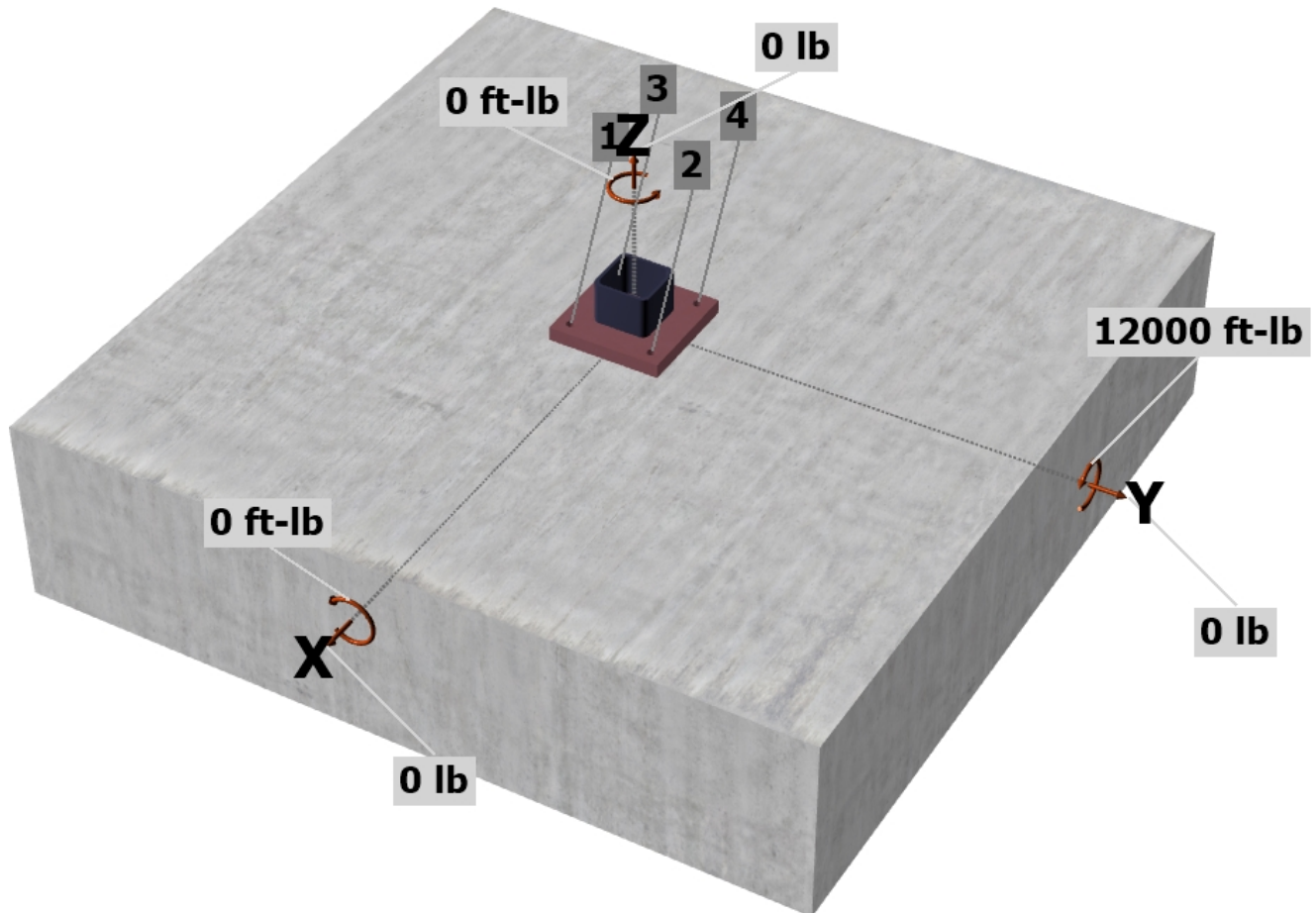
V_{uay} [lb]: 0

M_{ux} [ft-lb]: 0

M_{uy} [ft-lb]: 12000

M_{uz} [ft-lb]: 0

<Figure 1>

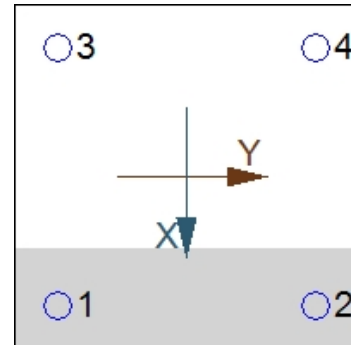


3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2 + (V_{uay})^2}$ (lb)
1	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0
3	11562.2	0.0	0.0	0.0
4	11562.2	0.0	0.0	0.0
Sum	23124.3	0.0	0.0	0.0

Maximum concrete compression strain (%): 0.57
 Maximum concrete compression stress (psi): 2492
 Resultant tension force (lb): 23124
 Resultant compression force (lb): 23125
 Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
 Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00

<Figure 3>



4. Steel Strength of Anchor in Tension (Sec. 17.4.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
27120	0.75	20340

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.4.2)

$N_b = 16\lambda_a \sqrt{f_c} h_{ef}^{5/3}$ (Eq. 17.4.2.2b)

λ_a	f_c (psi)	h_{ef} (in)	N_b (lb)
1.00	2500	17.000	89916

$\phi N_{cbg} = \phi (A_{Nc} / A_{Nco}) \Psi_{ec,N} \Psi_{ed,N} \Psi_{c,N} \Psi_{cp,N} N_b$ (Sec. 17.3.1 & Eq. 17.4.2.1b)

A_{Nc} (in ²)	A_{Nco} (in ²)	$c_{a,min}$ (in)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cbg} (lb)
2956.88	2601.00	25.50	1.000	1.000	1.00	1.000	89916	0.70	71553

6. Pullout Strength of Anchor in Tension (Sec. 17.4.3)

$\phi N_{pn} = \phi \Psi_{c,P} N_p = \phi \Psi_{c,P} 8 A_{brg} f_c$ (Sec. 17.3.1, Eq. 17.4.3.1 & 17.4.3.4)

$\Psi_{c,P}$	A_{brg} (in ²)	f_c (psi)	ϕ	ϕN_{pn} (lb)
1.0	2.10	2500	0.70	29372



11. Results

11. Interaction of Tensile and Shear Forces (Sec. D.7)?

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	11562	20340	0.57	Pass (Governs)
Concrete breakout	23124	71553	0.32	Pass
Pullout	11562	29372	0.39	Pass

PAB5H (5/8"Ø) with hef = 20.000 inch meets the selected design criteria.

12. Warnings

- Calculated concrete compression stress exceeds the permissible bearing stress of diameter 0.85f_c per ACI 318 Section 22.8.3.2.
- Designer must exercise own judgement to determine if this design is suitable.

SPREAD FOOTING DESIGN -- SQUARE

for 2000 psf Allowable Bearing Pressure

$f'_c = 2,500$ psi
 $f_y = 40$ ksi

1'-6" square

P =	4.50 k	one-way:				
$P_u =$	7.34 k	$\phi V_c =$	7.09 k	$V_u =$	1.53 k	o.k.
p =	2,000 psf	(2) #4 each way				
h =	9.00 in	$\phi M_n =$	6.05 k-ft	$M_u =$	1.38 k-ft	o.k.
d =	5.25 in					
b =	18.00 in	two-way:				
$bo =$	35.00 in	$\phi V_c =$	31.24 k	$V_u =$	5.60 k	o.k.

2'-0" square

P =	8.00 k	one-way:				
$P_u =$	13.04 k	$\phi V_c =$	9.45 k	$V_u =$	3.67 k	o.k.
p =	2,000 psf	(3) #4 each way				
h =	9.00 in	$\phi M_n =$	9.03 k-ft	$M_u =$	3.26 k-ft	o.k.
d =	5.25 in					
b =	24.00 in	two-way:				
$bo =$	35.00 in	$\phi V_c =$	31.24 k	$V_u =$	11.31 k	o.k.

2'-6" square

P =	12.50 k	one-way:				
$P_u =$	20.38 k	$\phi V_c =$	11.81 k	$V_u =$	6.62 k	o.k.
p =	2,000 psf	(3) #4 each way				
h =	9.00 in	$\phi M_n =$	9.11 k-ft	$M_u =$	6.37 k-ft	o.k.
d =	5.25 in					
b =	30.00 in	two-way:				
$bo =$	35.00 in	$\phi V_c =$	31.24 k	$V_u =$	18.64 k	o.k.

3'-0" square

P =	18.00 k	one-way:				
$P_u =$	29.34 k	$\phi V_c =$	14.18 k	$V_u =$	10.39 k	o.k.
p =	2,000 psf	(5) #4 each way				
h =	9.00 in	$\phi M_n =$	14.95 k-ft	$M_u =$	11.00 k-ft	o.k.
d =	5.25 in					
b =	36.00 in	two-way:				
$bo =$	35.00 in	$\phi V_c =$	31.24 k	$V_u =$	27.61 k	o.k.

3'-6" square

P =	24.50 k	one-way:				
$P_u =$	39.94 k	$\phi V_c =$	22.84 k	$V_u =$	13.07 k	o.k.
p =	2,000 psf	(5) #4 each way				
h =	11.00 in	$\phi M_n =$	21.08 k-ft	$M_u =$	17.47 k-ft	o.k.
d =	7.25 in					
b =	42.00 in	two-way:				
$bo =$	43.00 in	$\phi V_c =$	53.00 k	$V_u =$	37.32 k	o.k.

4'-9" square

P =	45.13 k	one-way:				
$P_u =$	73.55 k	$\phi V_c =$	73.74 k	$V_u =$	14.52 k	o.k.
p =	2,000 psf	(8) #4 each way				
h =	21.00 in	$\phi M_n =$	148.35 k-ft	$M_u =$	43.67 k-ft	o.k.
d =	17.25 in					
b =	57.00 in	two-way:				
$bo =$	83.00 in	$\phi V_c =$	243.40 k	$V_u =$	63.81 k	o.k.

FOOTING WITH COMBINED AXIAL AND FLEXURAL LOADS

CANTILEVER COLUMN FOOTING

Sizes and Loads:

superstructure:

wall 2,000 lb

footing:

length 6.00 ft (along same axis as applied moment)
width 6.00 ft (perpendicular to applied moment)
depth 2.00 ft
weight 10,440 lb

soil abv. 0 lb

total R = 12,440 lb

M = 12,000 lbft

e = 0.96 ft

B/6 = 1.00 ft

Bearing Pressures:

(Do not use these results)

x = 2.04 ft

fp = 679 psf

Fa = 2,667 psf

Reaction is INSIDE kern.

(Use these results)

fa = 346 psf

fb = 333 psf

fp = 679 psf

Fa = 2,000 psf

Stability:

Mot = 12,000 lbft (using 0.7E, per ASD Load Combinations)

Mr = 22,392 lbft (using 0.6D, per ASD Load Combinations)



LTPP2 (epoxy)

1. Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description: LTPP2
LRFD Loads:

1.0E = 1813 lb
1.0W = 2689 lb
Location:
Fastening description:

2. Input Data & Anchor Parameters

General

Design method: ACI 318-14
Units: Imperial units

Anchor Information:

Anchor type: Bonded anchor
Material: F1554 Grade 36
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 8.000
Code report: ICC-ES ESR-4057
Anchor category: -
Anchor ductility: Yes
 h_{min} (inch): 9.25
 c_{ac} (inch): 14.57
 c_{min} (inch): 1.75
 s_{min} (inch): 2.50

Base Material

Concrete: Normal-weight
Concrete thickness, h (inch): 24.00
State: Cracked
Compressive strength, f'_c (psi): 2500
 $\Psi_{c,v}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Hole condition: Dry concrete
Inspection: Continuous
Temperature range, Short/Long: 150/110°F
Ignore 6do requirement: Not applicable
Build-up grout pad: No

Recommended Anchor

Anchor Name: SET-3G - SET-3G w/ 1/2"Ø F1554 Gr. 36
Code Report: ICC-ES ESR-4057



Load and Geometry

Load factor source: ACI 318 Section 5.3

Load combination: not set

Seismic design: No

Anchors subjected to sustained tension: No

Apply entire shear load at front row: No

Anchors only resisting wind and/or seismic loads: No

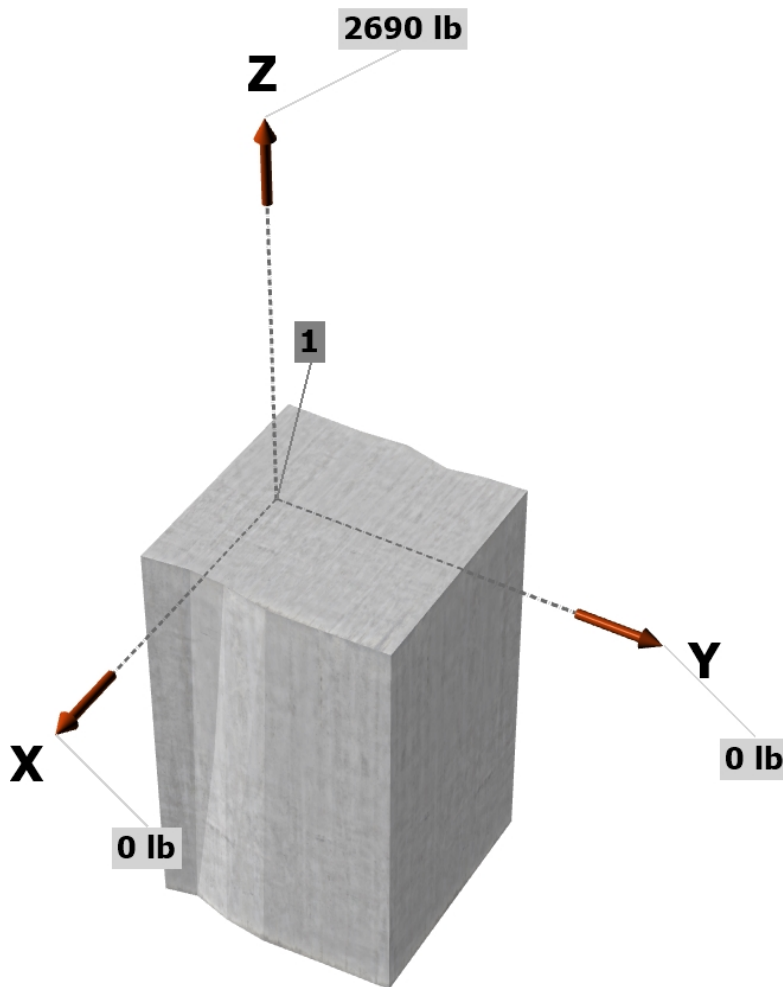
Strength level loads:

N_{ua} [lb]: 2690

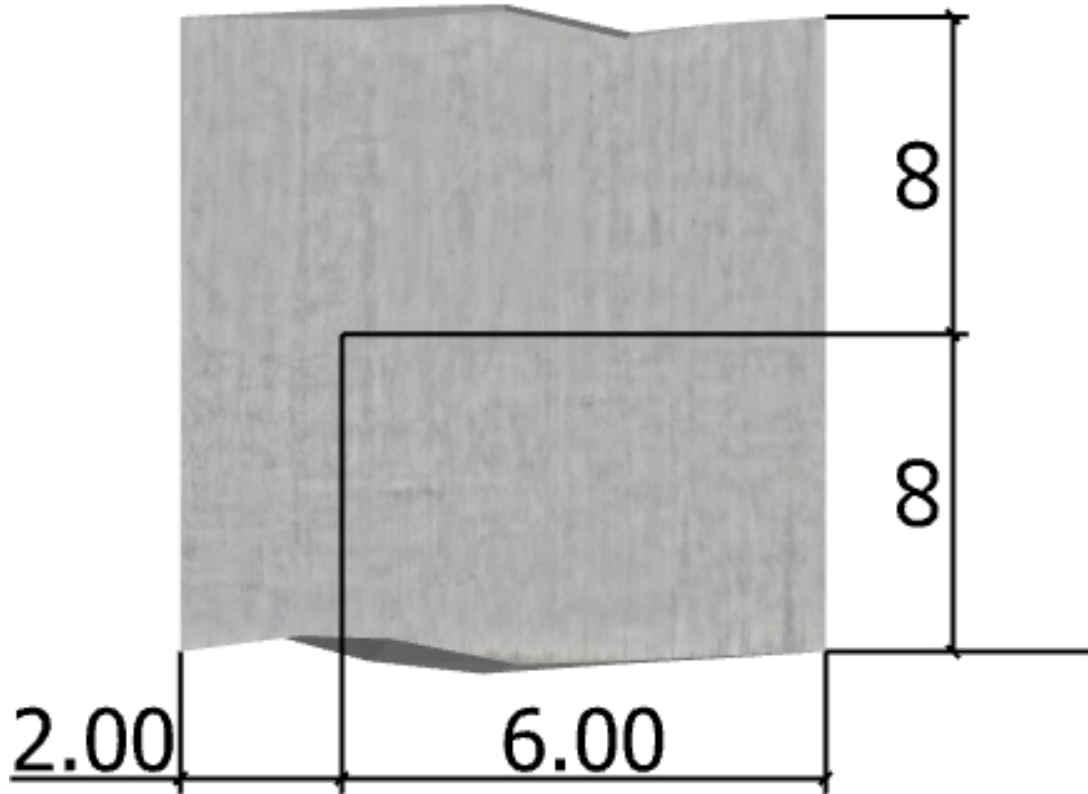
V_{uax} [lb]: 0

V_{uay} [lb]: 0

<Figure 1>



<Figure 2>





3. Resulting Anchor Forces

Anchor	Tension load, N _{ua} (lb)	Shear load x, V _{uax} (lb)	Shear load y, V _{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2 + (V_{uay})^2}$ (lb)
1	2690.0	0.0	0.0	0.0
Sum	2690.0	0.0	0.0	0.0

Maximum concrete compression strain (%): 0.00
 Maximum concrete compression stress (psi): 0
 Resultant tension force (lb): 2690
 Resultant compression force (lb): 0
 Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
 Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00

4. Steel Strength of Anchor in Tension (Sec. 17.4.1)

N _{sa} (lb)	φ	φN _{sa} (lb)
8235	0.75	6176

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.4.2)

$$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5} \text{ (Eq. 17.4.2.2a)}$$

k _c	λ _a	f' _c (psi)	h _{ef} (in)	N _b (lb)
17.0	1.00	2500	8.000	19233

$$\phi N_{cb} = \phi (A_{Nc} / A_{Nco}) \Psi_{ed,N} \Psi_{c,N} \Psi_{cp,N} N_b \text{ (Sec. 17.3.1 \& Eq. 17.4.2.1a)}$$

A _{Nc} (in ²)	A _{Nco} (in ²)	c _{a,min} (in)	Ψ _{ed,N}	Ψ _{c,N}	Ψ _{cp,N}	N _b (lb)	φ	φN _{cb} (lb)
192.00	576.00	2.00	0.750	1.00	1.000	19233	0.65	3125

6. Adhesive Strength of Anchor in Tension (Sec. 17.4.5)

$$\tau_{k,cr} = \tau_{k,cr} f_{short-term} K_{sat} (f'_c / 2,500)^n$$

τ _{k,cr} (psi)	f _{short-term}	K _{sat}	f' _c (psi)	n	τ _{k,cr} (psi)
1402	1.00	1.00	2500	0.24	1402

$$N_{ba} = \lambda_a \tau_{cr} \pi d_a h_{ef} \text{ (Eq. 17.4.5.2)}$$

λ _a	τ _{cr} (psi)	d _a (in)	h _{ef} (in)	N _{ba} (lb)
1.00	1402	0.50	8.000	17618

$$\phi N_a = \phi (A_{Na} / A_{Na0}) \Psi_{ed,Na} \Psi_{c,Na} N_{ba} \text{ (Sec. 17.3.1 \& Eq. 17.4.5.1a)}$$

A _{Na} (in ²)	A _{Na0} (in ²)	c _{Na} (in)	c _{a,min} (in)	Ψ _{ed,Na}	Ψ _{c,Na}	N _{ba} (lb)	φ	φN _a (lb)
114.67	205.45	7.17	2.00	0.784	1.000	17618	0.65	5009



11. Results

11. Interaction of Tensile and Shear Forces (Sec. D.7)?

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	2690	6176	0.44	Pass
Concrete breakout	2690	3125	0.86	Pass (Governs)
Adhesive	2690	5009	0.54	Pass

SET-3G w/ 1/2"Ø F1554 Gr. 36 with hef = 8.000 inch meets the selected design criteria.

12. Warnings

- Minimum spacing and edge distance requirement of $6d_a$ per ACI 318 Sections 17.7.1 and 17.7.2 for torqued cast-in-place anchor is waived per designer option.
- Designer must exercise own judgement to determine if this design is suitable.
- Refer to manufacturer's product literature for hole cleaning and installation instructions.



HDQ8 (cast in)

1. Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description: HDQ8

LRFD Loads:

1.0E = 3894 lb

1.0W = 7308 lb

Location:

Fastening description:

2. Input Data & Anchor Parameters

General

Design method: ACI 318-14

Units: Imperial units

Anchor Information:

Anchor type: Cast-in-place

Material: AB

Diameter (inch): 0.875

Effective Embedment depth, h_{ef} (inch): 6.000

Anchor category: -

Anchor ductility: Yes

h_{min} (inch): 8.38

C_{min} (inch): 5.25

S_{min} (inch): 5.25

Base Material

Concrete: Normal-weight

Concrete thickness, h (inch): 9.00

State: Cracked

Compressive strength, f'_c (psi): 2500

$\Psi_{c,v}$: 1.0

Reinforcement condition: B tension, B shear

Supplemental reinforcement: Not applicable

Reinforcement provided at corners: No

Ignore concrete breakout in tension: No

Ignore concrete breakout in shear: No

Ignore 6do requirement: No

Build-up grout pad: No

Recommended Anchor

Anchor Name: PAB Pre-Assembled Anchor Bolt - PAB7 (7/8"Ø)



Load and Geometry

Load factor source: ACI 318 Section 5.3

Load combination: not set

Seismic design: No

Anchors subjected to sustained tension: Not applicable

Apply entire shear load at front row: No

Anchors only resisting wind and/or seismic loads: No

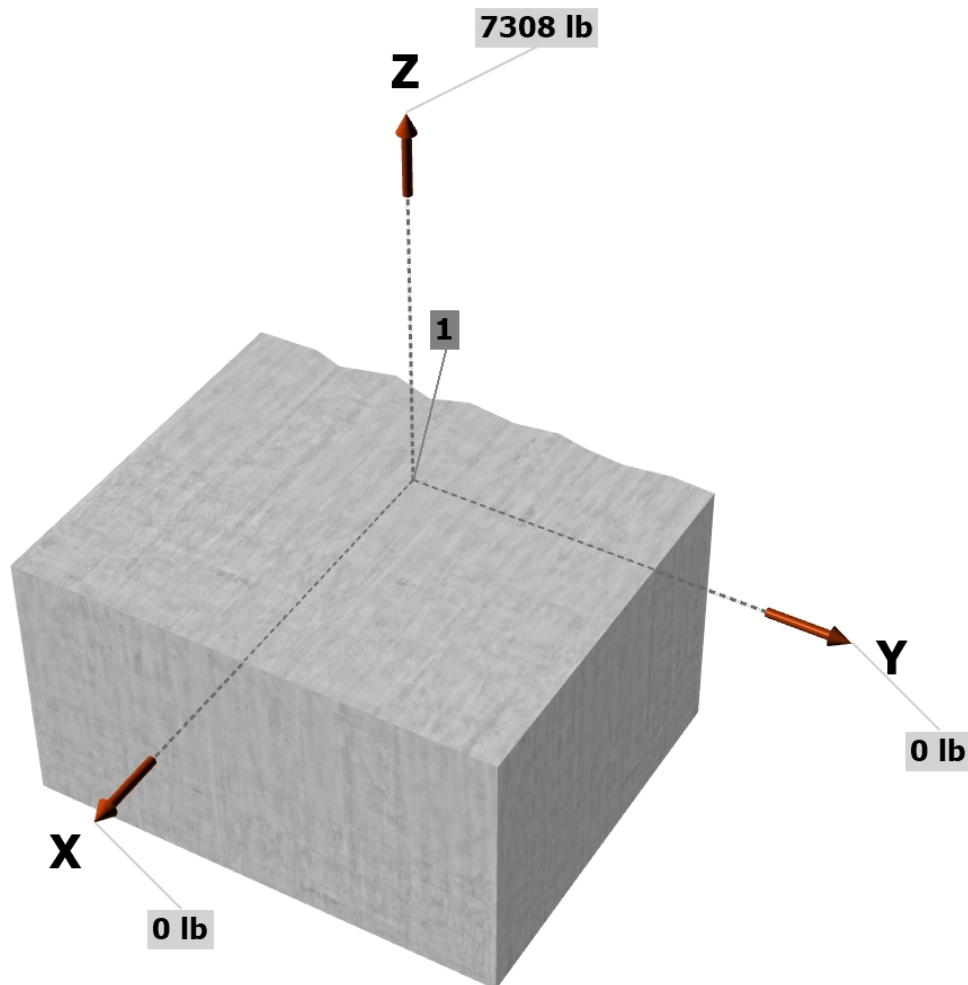
Strength level loads:

N_{ua} [lb]: 7308

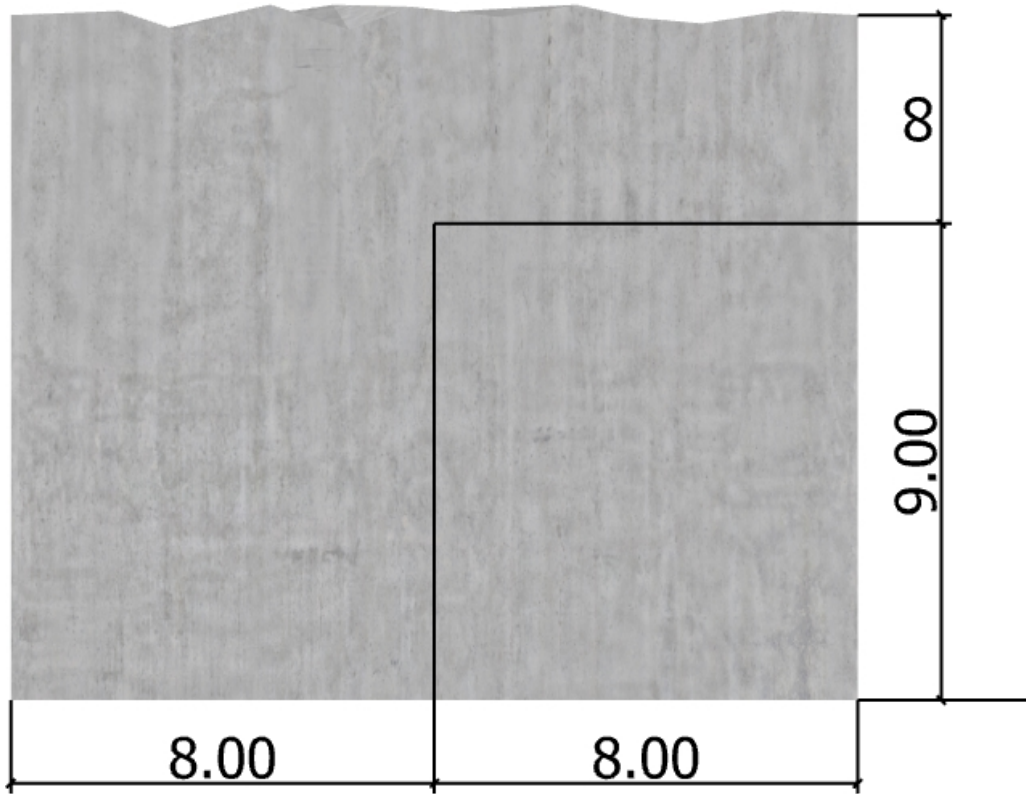
V_{uax} [lb]: 0

V_{uay} [lb]: 0

<Figure 1>



<Figure 2>





3. Resulting Anchor Forces

Anchor	Tension load, N _{ua} (lb)	Shear load x, V _{uax} (lb)	Shear load y, V _{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2 + (V_{uay})^2}$ (lb)
1	7308.0	0.0	0.0	0.0
Sum	7308.0	0.0	0.0	0.0

Maximum concrete compression strain (%): 0.00
 Maximum concrete compression stress (psi): 0
 Resultant tension force (lb): 7308
 Resultant compression force (lb): 0
 Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
 Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00

4. Steel Strength of Anchor in Tension (Sec. 17.4.1)

N _{sa} (lb)	φ	φN _{sa} (lb)
26795	0.75	20096

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.4.2)

$$N_b = k_c \lambda_a \sqrt{f_c} h_{ef}^{1.5} \text{ (Eq. 17.4.2.2a)}$$

k _c	λ _a	f _c (psi)	h _{ef} (in)	N _b (lb)
24.0	1.00	2500	6.000	17636

$$\phi N_{cb} = \phi (A_{Nc} / A_{Nco}) \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b \text{ (Sec. 17.3.1 \& Eq. 17.4.2.1a)}$$

A _{Nc} (in ²)	A _{Nco} (in ²)	c _{a,min} (in)	ψ _{ed,N}	ψ _{c,N}	ψ _{cp,N}	N _b (lb)	φ	φN _{cb} (lb)
307.50	324.00	8.00	0.967	1.00	1.000	17636	0.70	11326

6. Pullout Strength of Anchor in Tension (Sec. 17.4.3)

$$\phi N_{pn} = \phi \psi_{c,P} N_p = \phi \psi_{c,P} 8 A_{brg} f_c \text{ (Sec. 17.3.1, Eq. 17.4.3.1 \& 17.4.3.4)}$$

ψ _{c,P}	A _{brg} (in ²)	f _c (psi)	φ	φN _{pn} (lb)
1.0	4.07	2500	0.70	56910



11. Results

11. Interaction of Tensile and Shear Forces (Sec. D.7)?

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	7308	20096	0.36	Pass
Concrete breakout	7308	11326	0.65	Pass (Governs)
Pullout	7308	56910	0.13	Pass

PAB7 (7/8"Ø) with hef = 6.000 inch meets the selected design criteria.

12. Warnings

- Designer must exercise own judgement to determine if this design is suitable.



HD19/HDU11 (cast in)

1. Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description: HD19/HDU11
LRFD Loads:
1.0E = 11438 lb
1.0W = 16331 lb
Location:
Fastening description:

2. Input Data & Anchor Parameters

General

Design method: ACI 318-14
Units: Imperial units

Anchor Information:

Anchor type: Cast-in-place
Material: AB
Diameter (inch): 1.250
Effective Embedment depth, h_{ef} (inch): 24.000
Anchor category: -
Anchor ductility: Yes
 h_{min} (inch): 27.00
 C_{min} (inch): 7.50
 S_{min} (inch): 7.50

Base Material

Concrete: Normal-weight
Concrete thickness, h (inch): 30.00
State: Cracked
Compressive strength, f'_c (psi): 2500
 $\Psi_{c,v}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Ignore 6do requirement: No
Build-up grout pad: No

Recommended Anchor

Anchor Name: PAB Pre-Assembled Anchor Bolt - PAB10 (1 1/4"Ø)



Load and Geometry

Load factor source: ACI 318 Section 5.3

Load combination: not set

Seismic design: No

Anchors subjected to sustained tension: Not applicable

Apply entire shear load at front row: No

Anchors only resisting wind and/or seismic loads: No

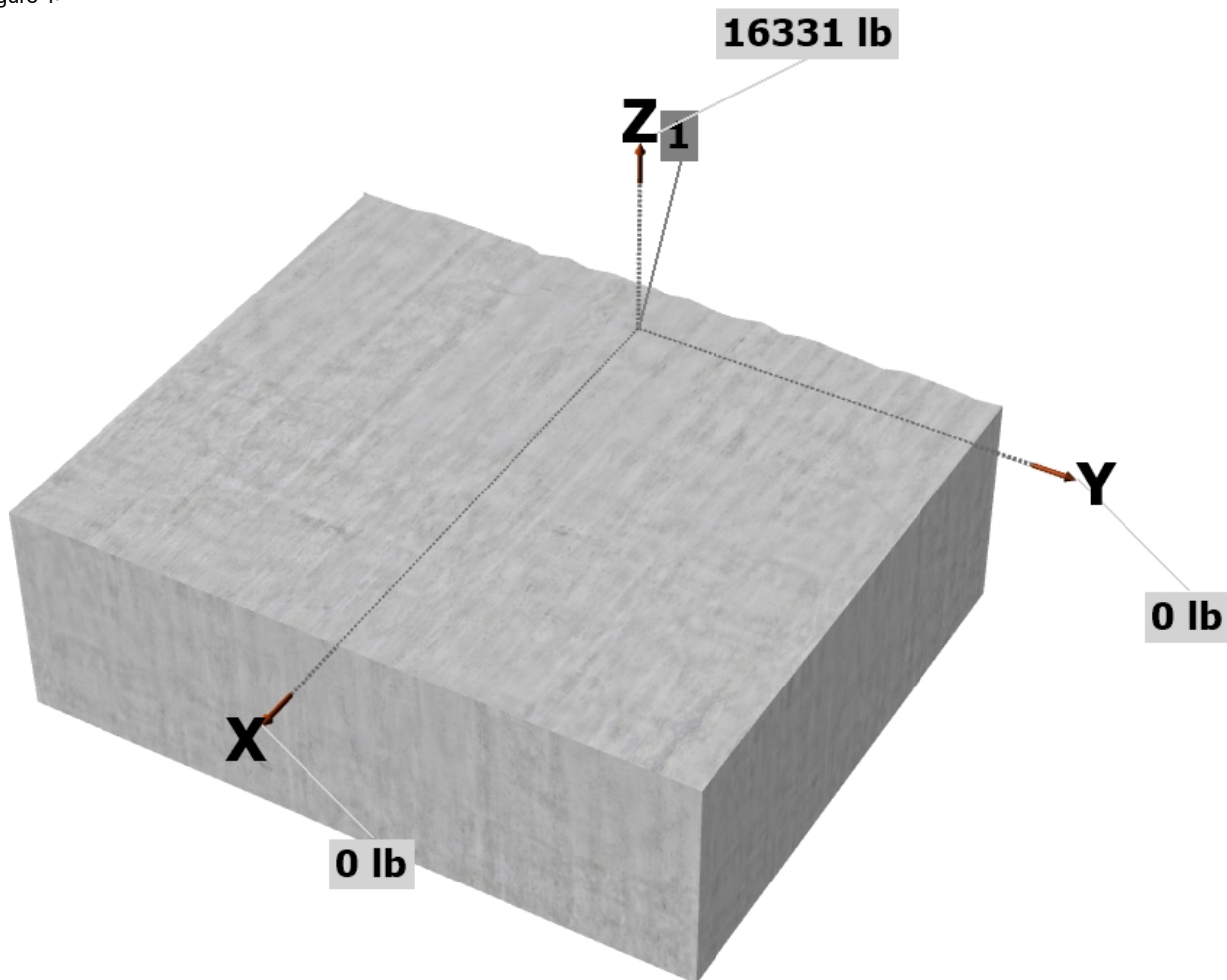
Strength level loads:

N_{ua} [lb]: 16331

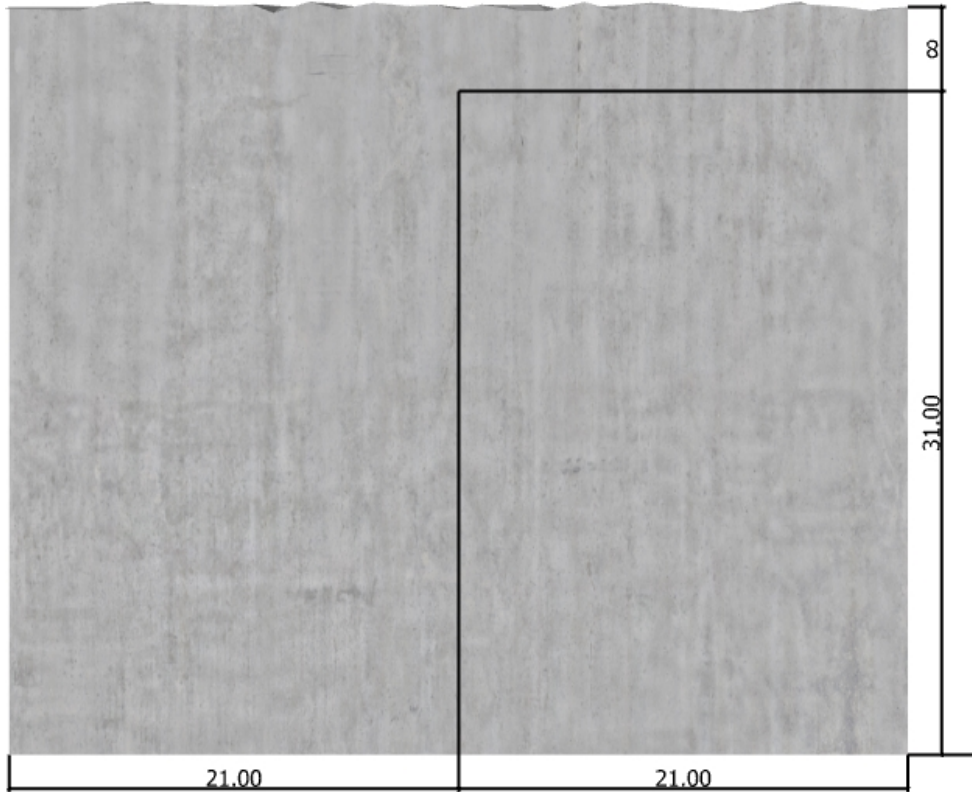
V_{uax} [lb]: 0

V_{uay} [lb]: 0

<Figure 1>



<Figure 2>





3. Resulting Anchor Forces

Anchor	Tension load, N _{ua} (lb)	Shear load x, V _{uax} (lb)	Shear load y, V _{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2 + (V_{uay})^2}$ (lb)
1	16331.0	0.0	0.0	0.0
Sum	16331.0	0.0	0.0	0.0

Maximum concrete compression strain (%): 0.00
 Maximum concrete compression stress (psi): 0
 Resultant tension force (lb): 16331
 Resultant compression force (lb): 0
 Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
 Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00

4. Steel Strength of Anchor in Tension (Sec. 17.4.1)

N _{sa} (lb)	φ	φN _{sa} (lb)
56200	0.75	42150

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.4.2)

$$N_b = 16\lambda_a \sqrt{f_c} h_{ef}^{5/3} \text{ (Eq. 17.4.2.2b)}$$

λ _a	f _c (psi)	h _{ef} (in)	N _b (lb)
1.00	2500	20.667	124511

$$\phi N_{cb} = \phi (A_{Nc} / A_{Nco}) \Psi_{ed,N} \Psi_{c,N} \Psi_{cp,N} N_b \text{ (Sec. 17.3.1 \& Eq. 17.4.2.1a)}$$

A _{Nc} (in ²)	A _{Nco} (in ²)	c _{a,min} (in)	Ψ _{ed,N}	Ψ _{c,N}	Ψ _{cp,N}	N _b (lb)	φ	φN _{cb} (lb)
2677.50	3844.00	21.00	0.903	1.00	1.000	124511	0.70	54834

6. Pullout Strength of Anchor in Tension (Sec. 17.4.3)

$$\phi N_{pn} = \phi \Psi_{c,P} N_p = \phi \Psi_{c,P} 8A_{brg} f_c \text{ (Sec. 17.3.1, Eq. 17.4.3.1 \& 17.4.3.4)}$$

Ψ _{c,P}	A _{brg} (in ²)	f _c (psi)	φ	φN _{pn} (lb)
1.0	8.39	2500	0.70	117516



11. Results

11. Interaction of Tensile and Shear Forces (Sec. D.7)?

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	16331	42150	0.39	Pass (Governs)
Concrete breakout	16331	54834	0.30	Pass
Pullout	16331	117516	0.14	Pass

PAB10 (1 1/4"Ø) with hef = 24.000 inch meets the selected design criteria.

12. Warnings

- Designer must exercise own judgement to determine if this design is suitable.

FOOTING WITH COMBINED AXIAL AND FLEXURAL LOADS

FOOTING AT GRID B

Sizes and Loads:

superstructure:

wall 5,642 lb

footing:

length	13.00 ft	(along same axis as applied moment)
width	3.50 ft	(perpendicular to applied moment)
depth	2.50 ft	
weight	16,494 lb	

soil abv. 0 lb

total R = 22,136 lb

M = 82,654 lbft

e = 3.73 ft

B/6 = 2.17 ft

Bearing Pressures:

Reaction is OUTSIDE kern.
(Use these results)

(Do not use these results)

x = 2.77 ft

fa = 487 psf

fb = 838 psf

fp = 1524 psf

fp = 1325 psf

Fa = 2,667 psf

Fa = 2,667 psf

Stability:

Mot = 82,654 lbft (using 0.7E, per ASD Load Combinations)

Mr = 86,329 lbft (using 0.6D, per ASD Load Combinations)

CONCRETE BEAM ANALYSIS

FOOTING AT GRID B

Moment

$$\phi M_n = \phi \left[A_s f_y (d - A_s f_y / 1.7 f'_c b) \right]$$

$f_y =$ 60.00 ksi
 $f'_c =$ 2.50 ksi
 $b =$ 42.00 in
 $d =$ 26.00 in
 $A_s =$ 3.95 in²
 $\phi =$ 0.90

Minimum flexural reinforcement ($\rho = 200/f_y$):

$$A_{s \text{ min}} = 3.64 \text{ in}^2$$

For structural slabs, temperature and shrinkage reinforcement shall be provided:

$$\phi M_n = 438.55 \text{ kft}$$
$$5262.59 \text{ k-in}$$

$$\text{ratio} = 0.0020 \text{ (Grade 40)}$$

$$b = 42.00 \text{ in}$$

$$\text{cover} = 1.00 \text{ in}$$

$$h = 4.00 \text{ in}$$

$$A_{s \text{ min}} = 0.34 \text{ in}^2$$

(5) #8 cont.

$$\text{ratio} = 0.0018 \text{ (Grade 60)}$$

$$b = 42.00 \text{ in}$$

$$\text{cover} = 1.50 \text{ in}$$

$$h = 8.00 \text{ in}$$

$$A_{s \text{ min}} = 0.60 \text{ in}^2$$

Shear

$$\phi V_c = \phi \left[2 (f'_c \wedge 1/2) b d \right]$$

$f'_c =$ 2.50 ksi
 $b =$ 42.00 in
 $d =$ 26.00 in
 $\phi =$ 0.85

A minimum area of shear reinforcement shall be provided where V_u exceeds $1/2 \phi V_c$:

$$1/2 \phi V_c = 46.41 \text{ k}$$

$$\phi V_c = 92.82 \text{ k}$$

Except for:

$$\phi V_s = \phi A_v f_y d / s$$

1. Slabs and footings.
2. Concrete joist construction (per 1908.11).
3. Beams with total depth not greater than 10",
2-1/2 x flange thickness, or 1/2 web width.

$$s = 6.00 \text{ in}$$

$$A_v = 0.39 \text{ in}^2$$

$$\phi V_s = 86.19 \text{ k}$$

Minimum shear reinforcement $A_v = 50 b w s / f_y$

$$\phi V_n = \phi V_c + \phi V_s$$

$$\phi V_n = 179.01 \text{ k}$$

$$A_{v \text{ min}} = 0.21 \text{ in}^2$$

$$s = d/2 = 13.00 \text{ in}$$

$$s = d/4 = 6.50 \text{ in}$$

#4 @ 6in