McKercher Residence

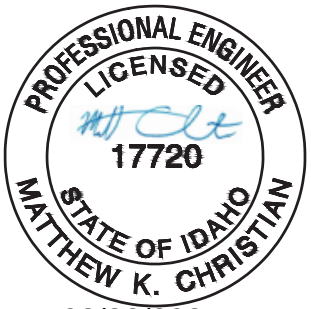
Structure 1: McKercher Residence

Structural Calculations

STRUX Project No.1013.24

For ARCH Community Housing Trust

Book 1 of 1



02/22/2024

STRUX ENGINEERING LLC

McKercher Residence

CLIENT: ARCH Community Housing Trust

STRUX Project Number: 1013.24

Structure 1: McKercher Residence

MCKERCHER RESIDENCE

1.1 Gravity Design

STRUX ENGINEERING LLC

MCKERCHER RESIDENCE

1.1 Gravity Design

1.1.1 Material Weights

Exterior Wall

Ext. Finish	3	psf
Sheathing	2	psf
Studs	3	psf
Insulation	2	psf
Int. Finish	3	psf
Mech Allow	2	psf
Total	15	psf

Interior Wall

Int. Finish	3	psf
Studs	2	psf
Int. Finish	3	psf
Mech Allow	4	psf
Total	12	psf

Roof

Roofing	3	psf
Sheathing	2	psf
Joist/Truss	3	psf
Insulation	2	psf
Clg. Finish	3	psf
Mech Allow	5	psf
Total	18	psf

Floor

Flr. Finish	4	psf
Sheathing	3	psf
Joist/Truss	3	psf
Clg. Finish	3	psf
Mech Allow	2	psf
Total	15	psf

MCKERCHER RESIDENCE

1.1 Gravity Design

1.1.2 Wall Footing Design

Wall Footing Design

Plan ID: TYPICAL WALL WL1

Gravity Loads

Type	p (psf)	L (ft)	% of L	w (plf)
DL (ROOF)	18	15.5	100	279
SL (ROOF)	100	15.5	100	1550
DL (FLOOR)	15	12.75	50	95.625
LL (FLOOR)	40	12.75	50	255
DL (WALL)	15	8	100	120

p_{allow} = 1500.00 psf

w_{ftg} = 1.36 ft

Provide:	**18" wide x 8" deep ftg w/ (2) # 4 (L)** **6" Conc. Stem w/ #4 @ 18" OC (V) & #4 @ 12" OC (H)**

Plan ID: PONY WALL WL2

Gravity Loads

Type	p (psf)	L (ft)	% of L	w (plf)
DL (FLOOR)	15	13	100	195
LL (FLOOR)	40	13	100	520

p_{allow} = 1500.00 psf

w_{ftg} = 0.48 ft

Provide:	**12" wide x 8" deep ftg w/ (2) # 4 (L)**

MCKERCHER RESIDENCE

1.1 Gravity Design

1.1.3 Framing Key Plan

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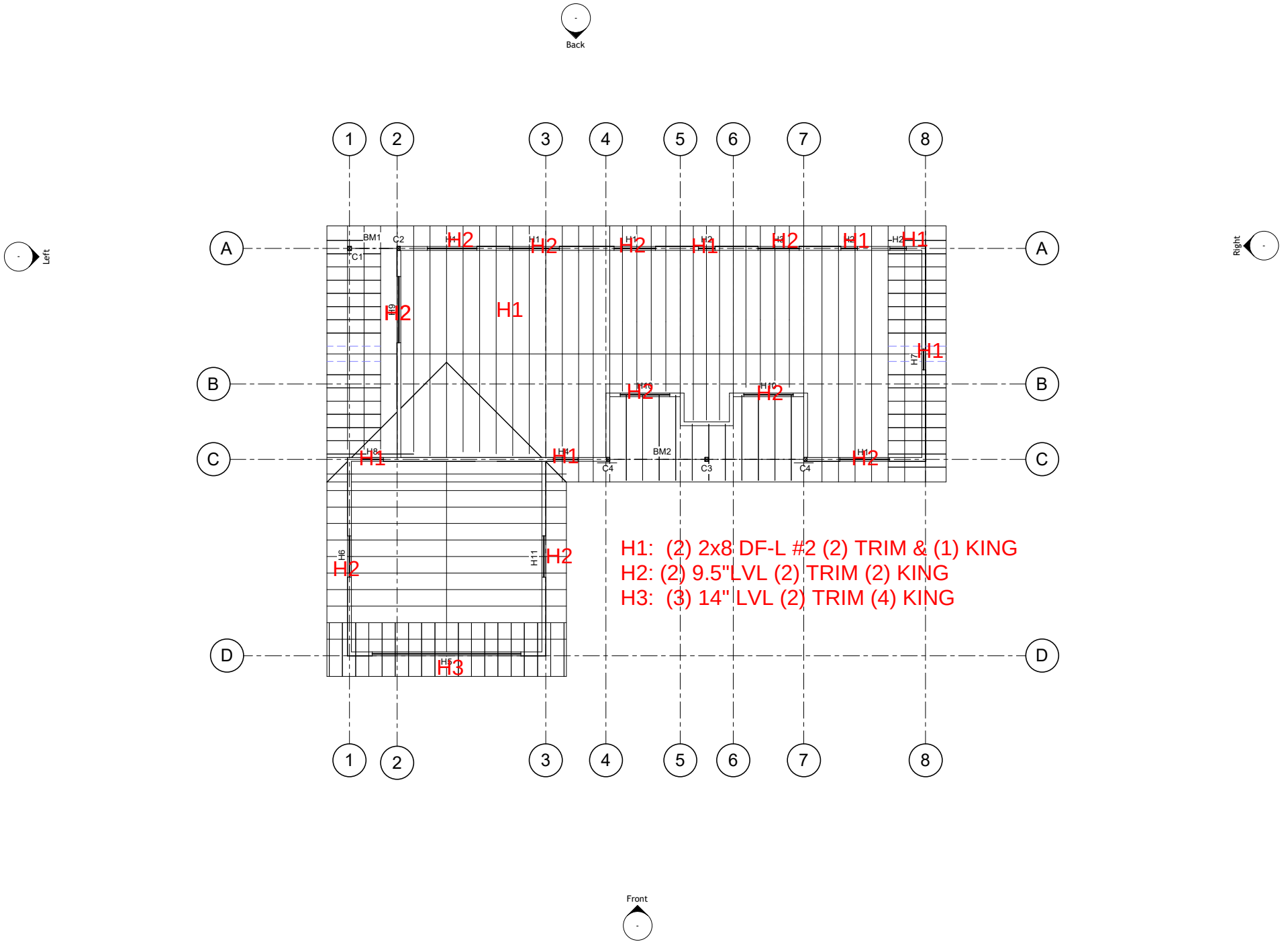

Back
Left
Right
Front
1
2
3
4
5
6
7
8
A
B
C
D
BM1
C1
C2
BM2
C3
C4
H1
H2
H3
H1: (2) 2x8 DF-L #2 (2) TRIM & (1) KING
H2: (2) 9.5"LVL (2) TRIM (2) KING
H3: (3) 14" LVL (2) TRIM (4) KING

MCKERCHER RESIDENCE

1.1 Gravity Design

1.1.4 Header Design

STRUX ENGINEERING LLC

Project Number: 1013.24

Project: MckercherResidence

Date: 2/22/2024

H (KEY PLAN)	L1 (ft)	Type	Uniform Load					Concentrated Load			
			p (psf)	L(ft)	x1 (ft)	x2 (ft)	w (plf)	Type	BM/C	x(ft)	p (lb)
H1	6.00	DL (ROOF)	18	15.50	0.00	6.00	279				
		SL (ROOF)	100	15.50	0.00	6.00	1550				
		DL (WALL)	15	1.13	0.00	6.00	17				
H2	2.00	DL (ROOF)	18	15.50	0.00	2.00	279				
		SL (ROOF)	100	15.50	0.00	2.00	1550				
		DL (WALL)	15	1.13	0.00	2.00	17				
H3	5.00	DL (ROOF)	18	15.50	0.00	5.00	279				
		SL (ROOF)	100	15.50	0.00	5.00	1550				
		DL (WALL)	15	1.13	0.00	5.00	17				
H4	3.00	DL (ROOF)	18	15.50	0.00	3.00	279				
		SL (ROOF)	100	15.50	0.00	3.00	1550				
		DL (WALL)	15	1.13	0.00	3.00	17				
H5	18.00	DL (ROOF)	18	5.25	0.00	18.00	95				
		SL (ROOF)	100	5.25	0.00	18.00	525				
		DL (WALL)	15	1.13	0.00	18.00	17				
H6	NOT USED										
H7	2.50	DL (ROOF)	18	3.50	0.00	2.50	63				
		SL (ROOF)	100	3.50	0.00	2.50	350				
		DL (WALL)	15	1.13	0.00	2.50	17				
H8	2.67	DL (ROOF)	18	14.00	0.00	2.67	252				
		SL (ROOF)	100	14.00	0.00	2.67	1400				
		DL (WALL)	15	1.13	0.00	2.67	17				
H9	8.00	DL (ROOF)	18	2.00	0.00	8.00	36				
		SL (ROOF)	100	2.00	0.00	8.00	200				
		DL (WALL)	15	1.13	0.00	8.00	17				
H10	6.00	DL (ROOF)	18	13.00	0.00	6.00	234				
		SL (ROOF)	100	13.00	0.00	6.00	1300				
		DL (WALL)	15	1.13	0.00	6.00	17				

STRUIX ENGINEERING LLC

Project Number: 1013.24

Project: MckercherResidence

Date: 2/22/2024

H (KEY PLAN)	L1 (ft)	Type	Uniform Load					Concentrated Load			
			p (psf)	L(ft)	x1 (ft)	x2 (ft)	w (plf)	Type	BM/C	x(ft)	p (lb)
H11	5.00	DL (ROOF)	18	14.50	0.00	5.00	261				
		SL (ROOF)	100	14.50	0.00	5.00	1450				
		DL (WALL)	15	1.13	0.00	5.00	17				

STRUIX ENGINEERING LLC

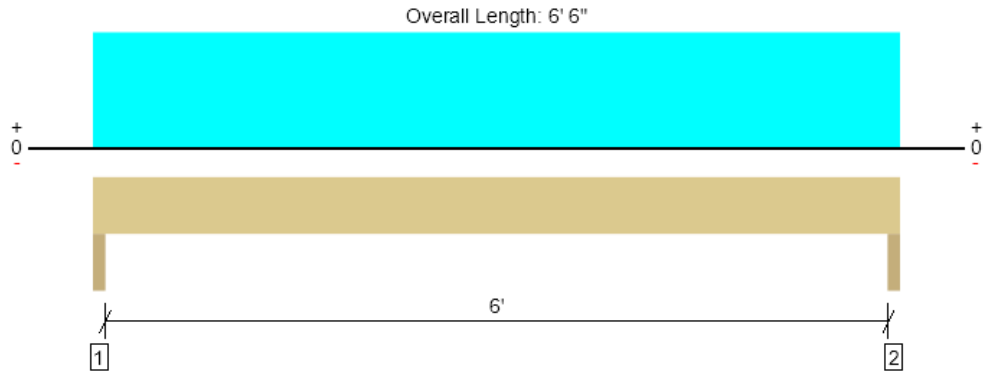
Project Number: 1013.24

Project: MckercherResidence
Date: 2/22/2024

H (KEY PLAN)	H (PLAN)	Header Design	Req. Trimmer
H1	H1	(2) 1.75"x 9.5" 2.0E LVL	(2) 2x
H2	H2	(2) 2x8 DF-L #2	(2) 2x
H3	H1	(2) 1.75"x 9.5" 2.0E LVL	(2) 2x
H4	H2	(2) 2x8 DF-L #2	(2) 2x
H5	H4	(3) 1.75"x 14" 2.0E LVL	(2) 2x
H7	H2	(2) 2x8 DF-L #2	(1) 2x
H8	H2	(2) 2x8 DF-L #2	(2) 2x
H9	H3	(2) 2x8 DF-L #2	(2) 2x
H10	H3	(2) 1.75"x 9.5" 2.0E LVL	(2) 2x
H11	H3	(2) 1.75"x 9.5" 2.0E LVL	(2) 2x

HEADER, H1

2 piece(s) 1 3/4" x 9 1/2" 2.0E Microllam® LVL



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Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	6032 @ 1 1/2"	7875 (3.00")	Passed (77%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	4099 @ 1' 1/2"	7265	Passed (56%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	9062 @ 3' 3"	13541	Passed (67%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.133 @ 3' 3"	0.156	Passed (L/566)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.159 @ 3' 3"	0.313	Passed (L/472)	--	1.0 D + 1.0 S (All Spans)

Member Length : 6' 6"
System : Wall
Member Type : Header
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	Snow	Factored	
1 - Trimmer - DF	3.00"	3.00"	2.30"	994	5037	6032	None
2 - Trimmer - DF	3.00"	3.00"	2.30"	994	5037	6032	None

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 Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 6"	N/A	9.7	--	
1 - Uniform (PSF)	0 to 6' 6"	15' 6"	18.0	100.0	Default Load
2 - Uniform (PSF)	0 to 6' 6"	1' 1 13/16"	15.0	-	

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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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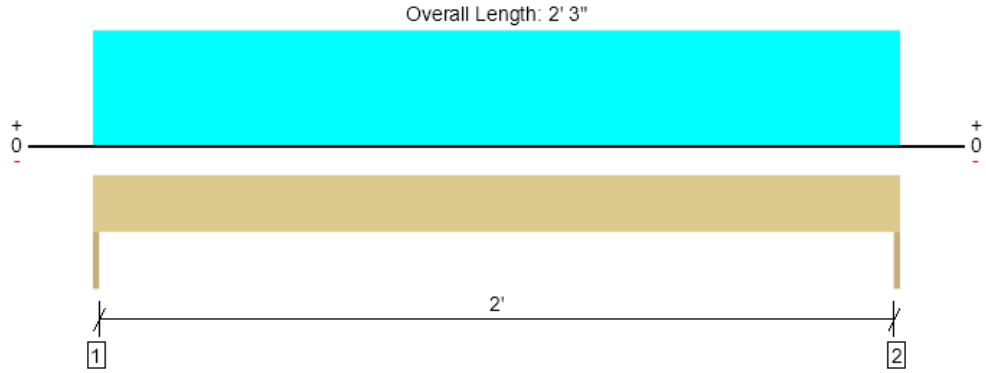
HEADER, H2

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



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Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2083 @ 0	2813 (1.50")	Passed (74%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	733 @ 8 3/4"	3002	Passed (24%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1172 @ 1' 1 1/2"	2720	Passed (43%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.006 @ 1' 1 1/2"	0.056	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.007 @ 1' 1 1/2"	0.112	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 2' 3"
System : Wall
Member Type : Header
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.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	339	1744	2083	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	339	1744	2083	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	2' 3" o/c	
Bottom Edge (Lu)	2' 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 2' 3"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 2' 3"	15' 6"	18.0	100.0	Default Load
2 - Uniform (PSF)	0 to 2' 3"	1' 1 13/16"	15.0	-	

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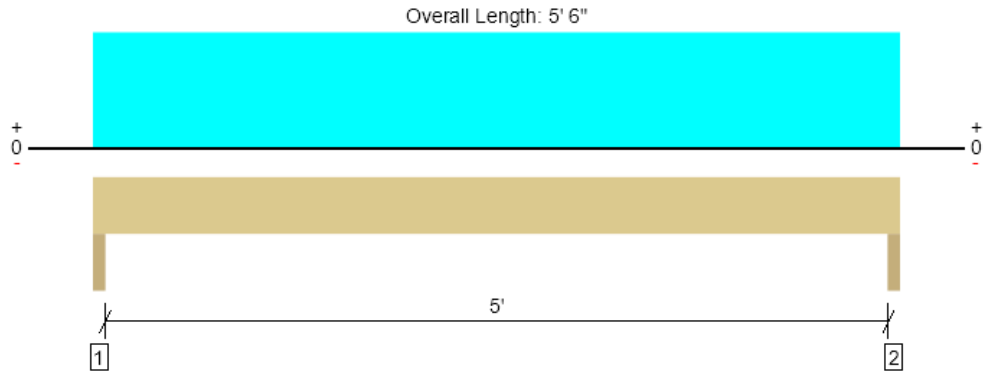
HEADER, H3

2 piece(s) 1 3/4" x 9 1/2" 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.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5104 @ 1 1/2"	7875 (3.00")	Passed (65%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3171 @ 1' 1/2"	7265	Passed (44%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	6394 @ 2' 9"	13541	Passed (47%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.071 @ 2' 9"	0.131	Passed (L/881)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.086 @ 2' 9"	0.262	Passed (L/736)	--	1.0 D + 1.0 S (All Spans)

Member Length : 5' 6"
System : Wall
Member Type : Header
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	Snow	Factored	
1 - Trimmer - DF	3.00"	3.00"	1.94"	841	4262	5104	None
2 - Trimmer - DF	3.00"	3.00"	1.94"	841	4262	5104	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 6" o/c	
Bottom Edge (Lu)	5' 6" 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' 6"	N/A	9.7	--	
1 - Uniform (PSF)	0 to 5' 6"	15' 6"	18.0	100.0	Default Load
2 - Uniform (PSF)	0 to 5' 6"	1' 1 13/16"	15.0	-	

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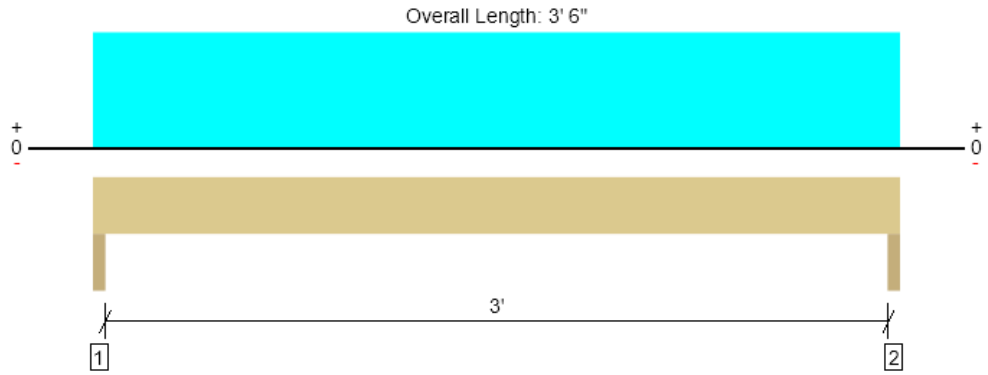
HEADER, H4

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



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Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3210 @ 1 1/2"	5625 (3.00")	Passed (57%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1643 @ 10 1/4"	3002	Passed (55%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2422 @ 1' 9"	2720	Passed (89%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.026 @ 1' 9"	0.108	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.030 @ 1' 9"	0.162	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 3' 6"
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 - DF	3.00"	3.00"	1.71"	498	2712	3210	None
2 - Trimmer - DF	3.00"	3.00"	1.71"	498	2712	3210	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 6" o/c	
Bottom Edge (Lu)	3' 6" 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' 6"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 3' 6"	15' 6"	18.0	100.0	Default Load

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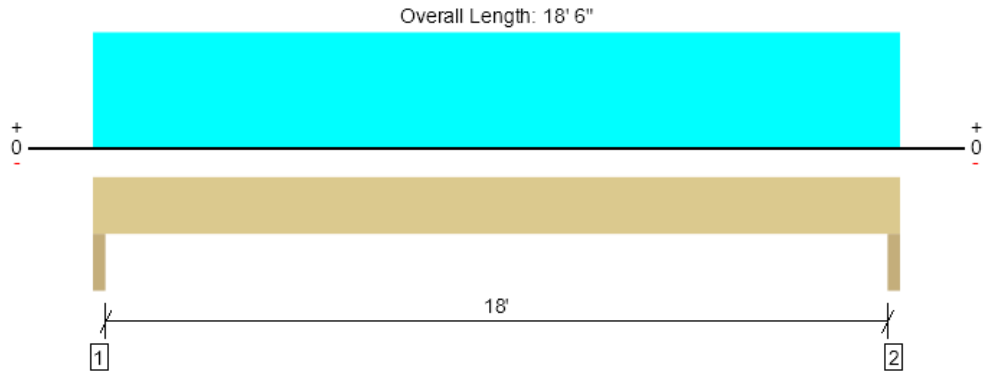
HEADER, H5

3 piece(s) 1 3/4" x 14" 2.0E Microllam® LVL



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Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	6088 @ 1 1/2"	11813 (3.00")	Passed (52%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	5156 @ 1' 5"	16060	Passed (32%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	27402 @ 9' 3"	41846	Passed (65%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.580 @ 9' 3"	0.608	Passed (L/378)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.727 @ 9' 3"	0.913	Passed (L/301)	--	1.0 D + 1.0 S (All Spans)

Member Length : 18' 6"
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 - DF	3.00"	3.00"	1.55"	1232	4856	6088	None
2 - Trimmer - DF	3.00"	3.00"	1.55"	1232	4856	6088	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	11' 1" o/c	
Bottom Edge (Lu)	18' 6" 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 18' 6"	N/A	21.5	--	
1 - Uniform (PSF)	0 to 18' 6"	5' 3"	18.0	100.0	Default Load
2 - Uniform (PSF)	0 to 18' 6"	1' 1 13/16"	15.0	-	

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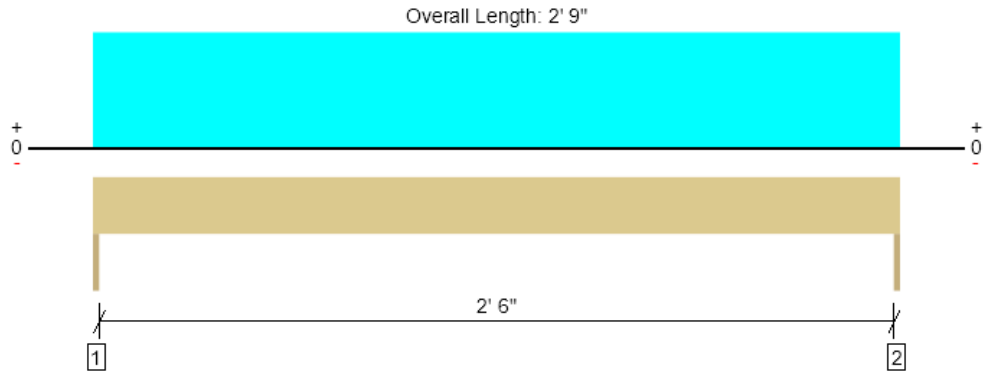
Weyerhaeuser

HEADER, H7

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



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	599 @ 0	2813 (1.50")	Passed (21%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	281 @ 8 3/4"	3002	Passed (9%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	412 @ 1' 4 1/2"	2720	Passed (15%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.003 @ 1' 4 1/2"	0.069	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.004 @ 1' 4 1/2"	0.138	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 2' 9"
System : Wall
Member Type : Header
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.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	118	481	599	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	118	481	599	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	2' 9" o/c	
Bottom Edge (Lu)	2' 9" 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' 9"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 2' 9"	3' 6"	18.0	100.0	Default Load
2 - Uniform (PSF)	0 to 2' 9"	1' 1 13/16"	15.0	-	

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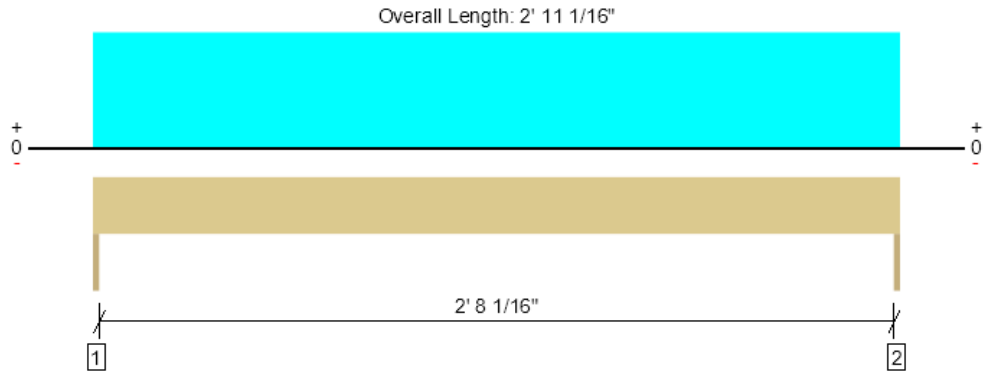
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

HEADER, H8

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



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2445 @ 0	2813 (1.50")	Passed (87%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1224 @ 8 3/4"	3002	Passed (41%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1785 @ 1' 5 1/2"	2720	Passed (66%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.015 @ 1' 5 1/2"	0.073	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.018 @ 1' 5 1/2"	0.146	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 2' 11 1/16"
System : Wall
Member Type : Header
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.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - DF	1.50"	1.50"	1.50"	401	2044	2445	None
2 - Trimmer - DF	1.50"	1.50"	1.50"	401	2044	2445	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	2' 11" o/c	
Bottom Edge (Lu)	2' 11" 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' 11 1/16"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 2' 11 1/16"	14'	18.0	100.0	Default Load
2 - Uniform (PSF)	0 to 2' 11 1/16"	1' 1 13/16"	15.0	-	

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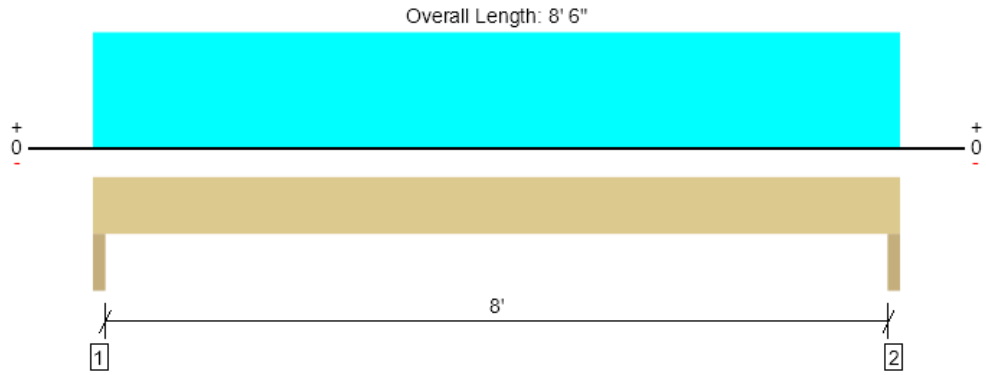
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

HEADER, H9

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



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1100 @ 1 1/2"	5625 (3.00")	Passed (20%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	879 @ 10 1/4"	3002	Passed (29%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2201 @ 4' 3"	2720	Passed (81%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.137 @ 4' 3"	0.206	Passed (L/724)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.177 @ 4' 3"	0.313	Passed (L/560)	--	1.0 D + 1.0 S (All Spans)

Member Length : 8' 6"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (5/16").
- 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 - DF	3.00"	3.00"	1.50"	250	850	1100	None
2 - Trimmer - DF	3.00"	3.00"	1.50"	250	850	1100	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' 6" o/c	
Bottom Edge (Lu)	8' 6" 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 8' 6"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 8' 6"	2'	18.0	100.0	Default Load
2 - Uniform (PSF)	0 to 8' 6"	1' 1 13/16"	15.0	-	

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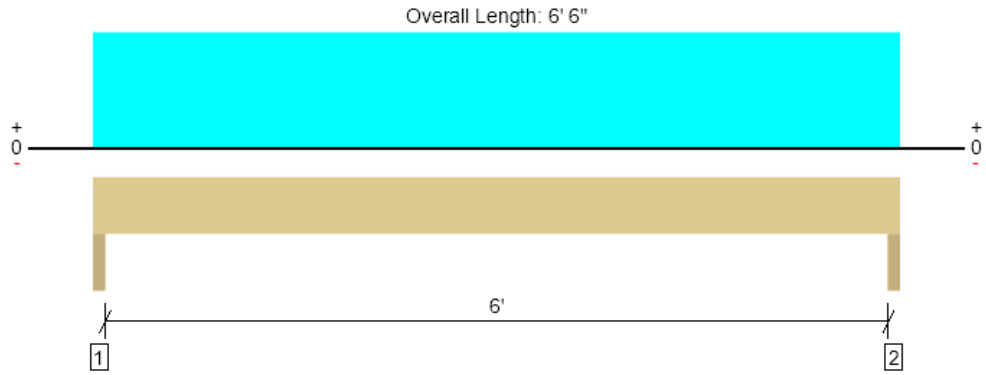
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

HEADER, H10

2 piece(s) 1 3/4" x 9 1/2" 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.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5073 @ 1 1/2"	7875 (3.00")	Passed (64%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3447 @ 1' 1/2"	7265	Passed (47%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	7622 @ 3' 3"	13541	Passed (56%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.111 @ 3' 3"	0.156	Passed (L/674)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.134 @ 3' 3"	0.313	Passed (L/562)	--	1.0 D + 1.0 S (All Spans)

Member Length : 6' 6"
System : Wall
Member Type : Header
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	Snow	Factored	
1 - Trimmer - DF	3.00"	3.00"	1.93"	848	4225	5073	None
2 - Trimmer - DF	3.00"	3.00"	1.93"	848	4225	5073	None

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 Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 6"	N/A	9.7	--	
1 - Uniform (PSF)	0 to 6' 6"	13'	18.0	100.0	Default Load
2 - Uniform (PSF)	0 to 6' 6"	1' 1 13/16"	15.0	-	

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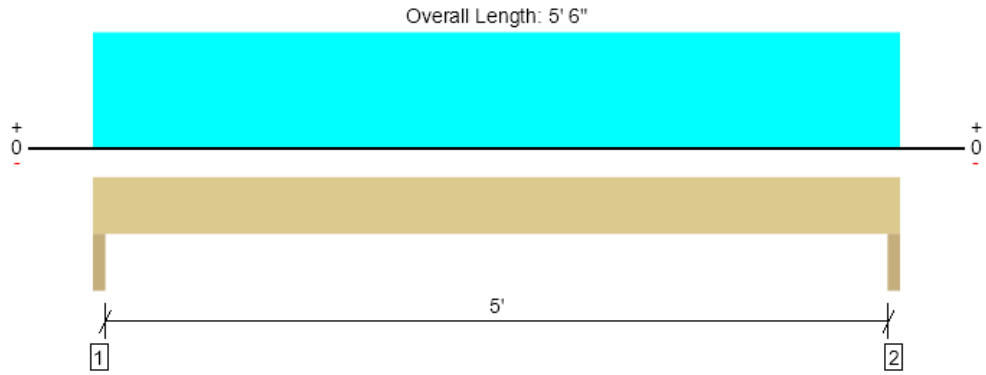
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
matthew Christian STRUX Engineering (512) 676-9004 matt@struxengineering.com	

Weyerhaeuser

HEADER, H11

2 piece(s) 1 3/4" x 9 1/2" 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.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4779 @ 1 1/2"	7875 (3.00")	Passed (61%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2969 @ 1' 1/2"	7265	Passed (41%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	5988 @ 2' 9"	13541	Passed (44%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.067 @ 2' 9"	0.131	Passed (L/942)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.080 @ 2' 9"	0.262	Passed (L/786)	--	1.0 D + 1.0 S (All Spans)

Member Length : 5' 6"
System : Wall
Member Type : Header
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	Snow	Factored	
1 - Trimmer - DF	3.00"	3.00"	1.82"	792	3987	4779	None
2 - Trimmer - DF	3.00"	3.00"	1.82"	792	3987	4779	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 6" o/c	
Bottom Edge (Lu)	5' 6" 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' 6"	N/A	9.7	--	
1 - Uniform (PSF)	0 to 5' 6"	14' 6"	18.0	100.0	Default Load
2 - Uniform (PSF)	0 to 5' 6"	1' 1 13/16"	15.0	-	

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ForteWEB Software Operator	Job Notes
matthew Christian STRUX Engineering (512) 676-9004 matt@struxengineering.com	

Weyerhaeuser

MCKERCHER RESIDENCE

1.1 Gravity Design

1.1.5 Beam Design

Project Number: 1013.24

Project: McKercher Residence
Date: 2/22/2024

BM	L1 (ft)	L2 (ft)	L3 (ft)	Type	Uniform Load					Concentrated Load			
					p (psf)	L_{trib}(ft)	x1 (ft)	x2 (ft)	w (plf)	Type	BM/C	x(ft)	P (lb)
BM1	5.50	0.00	0.00	DL (ROOF)	18	15.5	0	5.50	279				
				SL (ROOF)	100				1550				
BM2	11.50	11.50	0.00	DL (ROOF)	10	6.5	0	23.00	65				
				SL (ROOF)	100				650				

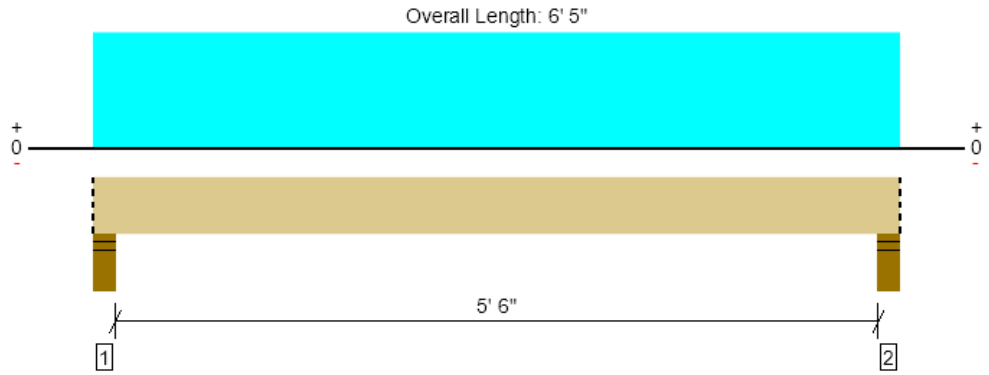
Project Number: 1013.24

Project: McKercher Residence
Date: 2/22/2024

BM/GT	Plan Desig.	Beam Design	Reaction (lbs) and Connection Design					Connections
			R	R DL	R LL	R SL	R Total	
BM1	BM1	(1) 6x 8 DF-L #1	**R1 (lb)**	150	0	610	760	
			R2 (lb)	150	0	610	760	
BM2	BM2	5.5"x10.5" 24F-V4 GLULAM	**R1 (lb)**	437	0	3352	3789	
			R2 (lb)	1354	0	9648	11002	
			R2 (lb)	437	0	3352	3789	

BEAM, BM1

1 piece(s) 5 1/8" 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.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5910 @ 4"	17617 (5.50")	Passed (34%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3454 @ 1' 4"	10933	Passed (32%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	7613 @ 3' 2 1/2"	21660	Passed (35%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.043 @ 3' 2 1/2"	0.192	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.051 @ 3' 2 1/2"	0.287	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 6' 5"
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.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 5' 9".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - DF	5.50"	5.50"	1.85"	937	4973	5910	Blocking
2 - Stud wall - DF	5.50"	5.50"	1.85"	937	4973	5910	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)	6' 5" o/c	
Bottom Edge (Lu)	6' 5" 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 6' 5"	N/A	13.1	--	
1 - Uniform (PSF)	0 to 6' 5" (Front)	15' 6"	18.0	100.0	Default Load

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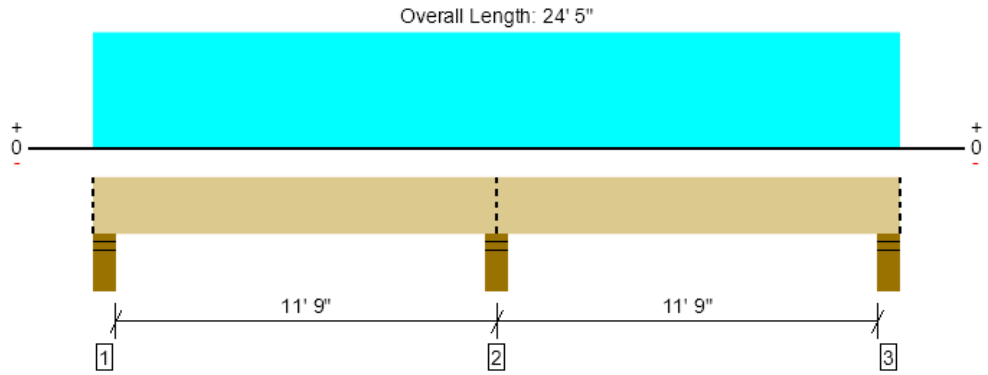
ForteWEB Software Operator	Job Notes
matthew Christian STRUX Engineering (512) 676-9004 matt@struxengineering.com	

Weyerhaeuser

BEAM, BM2

1 piece(s) 5 1/8" 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.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	11002 @ 12' 2 1/2"	17617 (5.50")	Passed (62%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	4683 @ 13' 3 3/4"	10933	Passed (43%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	8463 @ 5' 1 5/16"	21660	Passed (39%)	1.15	1.0 D + 1.0 S (Alt Spans)
Neg Moment (Ft-lbs)	-13065 @ 12' 2 1/2"	16696	Passed (78%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.182 @ 5' 8 1/2"	0.396	Passed (L/782)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.201 @ 5' 8"	0.594	Passed (L/709)	--	1.0 D + 1.0 S (Alt Spans)

Member Length : 24' 5"
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.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 9' 6 11/16".
- Critical negative moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 5' 11 1/4".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - DF	5.50"	5.50"	1.50"	437	3352	3789	Blocking
2 - Stud wall - DF	5.50"	5.50"	3.43"	1354	9648	11002	Blocking
3 - Stud wall - DF	5.50"	5.50"	1.50"	437	3352	3789	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)	24' 5" o/c	
Bottom Edge (Lu)	24' 5" 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 24' 5"	N/A	13.1	--	
1 - Uniform (PSF)	0 to 24' 5" (Front)	6' 6"	12.0	100.0	Default Load

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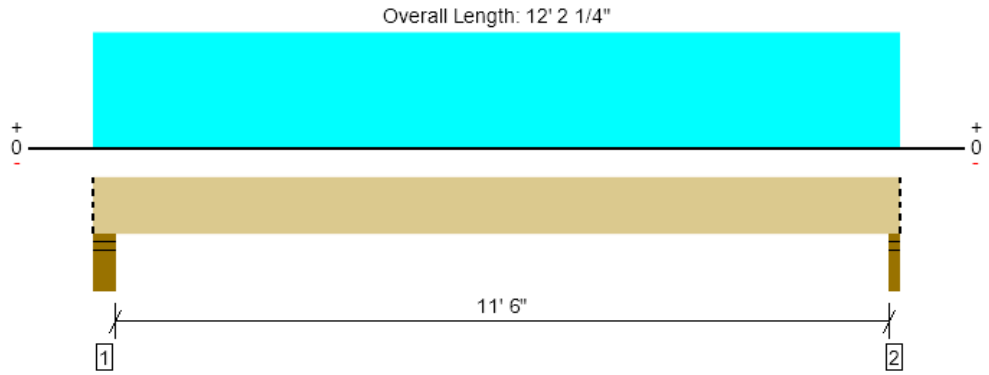
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
matthew Christian STRUX Engineering (512) 676-9004 matt@struxengineering.com	

Weyerhaeuser

BEAM, BM2'

1 piece(s) 5 1/8" 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.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4432 @ 12' 1"	8809 (2.75")	Passed (50%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3613 @ 1' 4"	10933	Passed (33%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	12791 @ 6' 2 1/2"	21660	Passed (59%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.313 @ 6' 2 1/2"	0.392	Passed (L/450)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.357 @ 6' 2 1/2"	0.587	Passed (L/395)	--	1.0 D + 1.0 S (All Spans)

Member Length : 12' 2 1/4"
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.
- Critical positive moment adjusted by a volume/size factor of 1.00 that was calculated using length L = 11' 9".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - DF	5.50"	5.50"	1.50"	566	4035	4602	Blocking
2 - Stud wall - DF	2.75"	2.75"	1.50"	545	3886	4432	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' 2" o/c	
Bottom Edge (Lu)	12' 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 12' 2 1/4"	N/A	13.1	--	
1 - Uniform (PSF)	0 to 12' 2 1/4" (Front)	6' 6"	12.0	100.0	Default Load

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ForteWEB Software Operator	Job Notes
matthew Christian STRUX Engineering (512) 676-9004 matt@struxengineering.com	

Weyerhaeuser

MCKERCHER RESIDENCE

1.1 Gravity Design

1.1.6 Column Design

STRUX ENGINEERING LLC

Project Number: 1013.24

Project: McKercher Residence
Date: 2/22/2024

Wall Stud	L1 (ft)	Type	Uniform Load					Wall Stud Design
			p (psf)	L(ft)	x1 (ft)	x2 (ft)	w (plf)	
Ext Brg Wall	24.00	DL (ROOF)	18	14.42	0.00	24.00	259.56	2x6 DF-L @ 16" OC
		SL (ROOF)	100				1442	
		DL (WALL)	15	9.00	0.00	24.00	135	

Column Design

COLUMN (KEY PLAN	Column Height	COLUMN DESIGN					COLUMN (PLAN)
	H (ft)	Carried	P DL (lb)	P LL (lb)	P SL (lb)	Post Design	
C1	8.0	BM1	150	0	610	(1) 6x6 DF-L #2	C1
C2	8.0	BM1	150	0	610	(3) 2x6 DF-L #2	C2
C3	9.0	BM2	1354	0	9648	(1) 6x6 DF-L #2	C1
C4	9.0	BM2	437	0	3352	(3) 2x6 DF-L #2	C2

COLUMN, C1

1 piece(s) 6 x 6 DF No.2

Post Height: 9'

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	20	50	Passed (39%)	--	--
Compression (lbs)	760	18526	Passed (4%)	1.15	1.0 D + 1.0 S
Base Bearing (lbs)	760	898425	Passed (0%)	--	1.0 D + 1.0 S
Bending/Compression	N/A	1	Passed (N/A)	--	N/A

- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.

Supports	Type	Material
Base	Plate	Steel

Max Unbraced Length	Comments
Full Member Length	No bracing assumed.

Member Type : Free Standing Post
Building Code : IBC 2018
Design Methodology : ASD

Drawing is Conceptual

Vertical Load	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	150	610	Default Load

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

COLUMN, C2

1 piece(s) 6 x 6 DF No.2

Post Height: 9'

Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	20	50	Passed (39%)	--	--
Compression (lbs)	11730	18526	Passed (63%)	1.15	1.0 D + 1.0 S
Base Bearing (lbs)	11730	898425	Passed (1%)	--	1.0 D + 1.0 S
Bending/Compression	N/A	1	Passed (N/A)	--	N/A

- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.

Supports	Type	Material
Base	Plate	Steel

Max Unbraced Length	Comments
Full Member Length	No bracing assumed.

Member Type : Free Standing Post
Building Code : IBC 2018
Design Methodology : ASD

Vertical Load	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	1980	9750	Default Load

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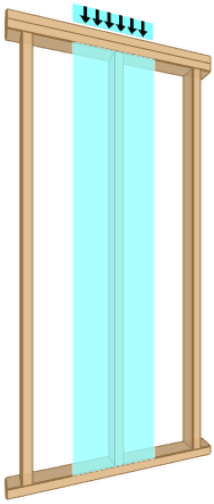
WALL STUD, WS1

1 piece(s) 2 x 6 DF No.2 @ 16" OC

Wall Height: 9' Member Height: 8' 7 1/2" O. C. Spacing: 16.00"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	19	50	Passed (38%)	--	--
Compression (lbs)	2449	8510	Passed (29%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	2449	6445	Passed (38%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	102	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	91	1584	Passed (6%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	220 @ mid-span	1342	Passed (16%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.06 @ mid-span	0.57	Passed (L/1670)	--	1.0 D + 0.6 W
Bending/Compression	0.19	1	Passed (19%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/180)
- Input axial load eccentricity for the design is zero
- Applicable calculations are based on NDS.
- A bearing area factor of 1.25 has been applied to base plate bearing capacity.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.

Supports	Type	Material
Top	Dbl 2X	Douglas Fir-Larch
Base	2X	Douglas Fir-Larch

System : Wall
Member Type : Stud
Building Code : IBC 2018
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	2	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Point (PLF)	16.00"	395.0	1442.0	Default Load

Lateral Load	Location	Spacing	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	16.00"	29.6	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (C), Mean Roof Height (15'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (115), Risk Category(II), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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MCKERCHER RESIDENCE

1.1 Gravity Design

1.1.7 Column Footing Design

STRUX ENGINEERING LLC

Column Footing Design

COLUMN	POST FOOTING DESIGN						
	Key Label	P DL (lb)	P LL (lb)	P SL (lb)	SQ Ftg Size (ft)	FTG Size	Plan Label
C1	CF1	150.0	0.0	610.0	0.71	FOOTING OK	CF1
C2	CF1	150.0	0.0	610.0	0.71	FOOTING OK	CF1
C3	CF1	1354.0	0.0	9648.0	2.71	FOOTING OK	CF1
C4	CF1	437.0	0.0	3352.0	1.59	FOOTING OK	CF1

Project Title: McKercher Residence
Engineer:
Project ID: 1013.24
Project Descr:

General Footing

Project File: 1013.24 McKercher Residence.ec6

DESCRIPTION: C1

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : IBC 2021

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	1.50	ksf
Soil Density	=	110.0	pcf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	250.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=	ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

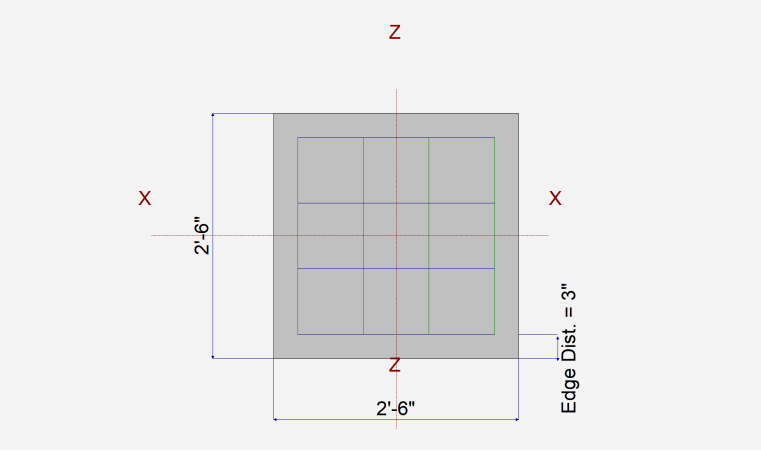
Width parallel to X-X Axis	=	2.50 ft
Length parallel to Z-Z Axis	=	2.50 ft
Footing Thickness	=	8.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in

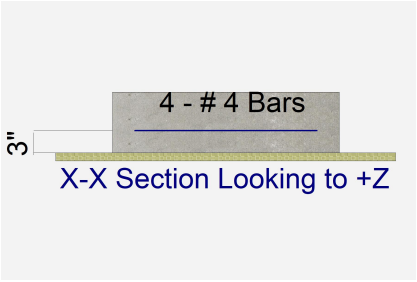


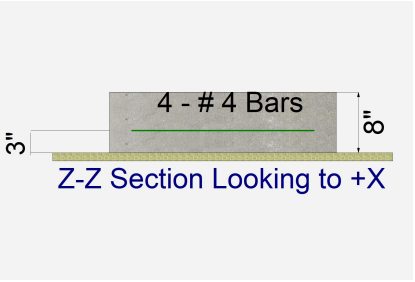
Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		4.0
Reinforcing Bar Size	=	#	4
Bars parallel to Z-Z Axis			
Number of Bars	=		4.0
Reinforcing Bar Size	=	#	4

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	0.150			0.610				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

Project Title: McKercher Residence
Engineer:
Project ID: 1013.24
Project Descr:

General Footing

Project File: 1013.24 McKercher Residence.ec6

DESCRIPTION: C1

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.1455	Soil Bearing	0.2183 ksf	1.50 ksf	+D+S about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.02141	Z Flexure (+X)	0.1445 k-ft/ft	6.748 k-ft/ft	+1.20D+1.60S
PASS	0.02141	Z Flexure (-X)	0.1445 k-ft/ft	6.748 k-ft/ft	+1.20D+1.60S
PASS	0.02141	X Flexure (+Z)	0.1445 k-ft/ft	6.748 k-ft/ft	+1.20D+1.60S
PASS	0.02141	X Flexure (-Z)	0.1445 k-ft/ft	6.748 k-ft/ft	+1.20D+1.60S
PASS	0.03096	1-way Shear (+X)	2.543 psi	82.158 psi	+1.20D+1.60S
PASS	0.03096	1-way Shear (-X)	2.543 psi	82.158 psi	+1.20D+1.60S
PASS	0.03096	1-way Shear (+Z)	2.543 psi	82.158 psi	+1.20D+1.60S
PASS	0.03096	1-way Shear (-Z)	2.543 psi	82.158 psi	+1.20D+1.60S
PASS	0.06855	2-way Punching	11.264 psi	164.317 psi	+1.20D+1.60S

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	1.50	n/a	0.0	0.1207	0.1207	n/a	n/a	0.080
X-X, +D+S	1.50	n/a	0.0	0.2183	0.2183	n/a	n/a	0.146
X-X, +D+0.750S	1.50	n/a	0.0	0.1939	0.1939	n/a	n/a	0.129
X-X, +0.60D	1.50	n/a	0.0	0.07240	0.07240	n/a	n/a	0.048
Z-Z, D Only	1.50	0.0	n/a	n/a	n/a	0.1207	0.1207	0.080
Z-Z, +D+S	1.50	0.0	n/a	n/a	n/a	0.2183	0.2183	0.146
Z-Z, +D+0.750S	1.50	0.0	n/a	n/a	n/a	0.1939	0.1939	0.129
Z-Z, +0.60D	1.50	0.0	n/a	n/a	n/a	0.07240	0.07240	0.048

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	0.02625	+Z	Bottom	0.1728	AsMin	0.320	6.748	OK
X-X, +1.40D	0.02625	-Z	Bottom	0.1728	AsMin	0.320	6.748	OK
X-X, +1.20D	0.02250	+Z	Bottom	0.1728	AsMin	0.320	6.748	OK
X-X, +1.20D	0.02250	-Z	Bottom	0.1728	AsMin	0.320	6.748	OK
X-X, +1.20D+0.50S	0.06063	+Z	Bottom	0.1728	AsMin	0.320	6.748	OK
X-X, +1.20D+0.50S	0.06063	-Z	Bottom	0.1728	AsMin	0.320	6.748	OK
X-X, +1.20D+1.60S	0.1445	+Z	Bottom	0.1728	AsMin	0.320	6.748	OK
X-X, +1.20D+1.60S	0.1445	-Z	Bottom	0.1728	AsMin	0.320	6.748	OK
X-X, +1.20D+0.70S	0.07588	+Z	Bottom	0.1728	AsMin	0.320	6.748	OK
X-X, +1.20D+0.70S	0.07588	-Z	Bottom	0.1728	AsMin	0.320	6.748	OK
X-X, +0.90D	0.01688	+Z	Bottom	0.1728	AsMin	0.320	6.748	OK
X-X, +0.90D	0.01688	-Z	Bottom	0.1728	AsMin	0.320	6.748	OK
Z-Z, +1.40D	0.02625	-X	Bottom	0.1728	AsMin	0.320	6.748	OK
Z-Z, +1.40D	0.02625	+X	Bottom	0.1728	AsMin	0.320	6.748	OK
Z-Z, +1.20D	0.02250	-X	Bottom	0.1728	AsMin	0.320	6.748	OK
Z-Z, +1.20D	0.02250	+X	Bottom	0.1728	AsMin	0.320	6.748	OK
Z-Z, +1.20D+0.50S	0.06063	-X	Bottom	0.1728	AsMin	0.320	6.748	OK

Project Title: McKercher Residence
Engineer:
Project ID: 1013.24
Project Descr:

General Footing

Project File: 1013.24 McKercher Residence.ec6

DESCRIPTION: C1

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
Z-Z, +1.20D+0.50S	0.06063	+X	Bottom	0.1728	AsMin	0.320	6.748	OK
Z-Z, +1.20D+1.60S	0.1445	-X	Bottom	0.1728	AsMin	0.320	6.748	OK
Z-Z, +1.20D+1.60S	0.1445	+X	Bottom	0.1728	AsMin	0.320	6.748	OK
Z-Z, +1.20D+0.70S	0.07588	-X	Bottom	0.1728	AsMin	0.320	6.748	OK
Z-Z, +1.20D+0.70S	0.07588	+X	Bottom	0.1728	AsMin	0.320	6.748	OK
Z-Z, +0.90D	0.01688	-X	Bottom	0.1728	AsMin	0.320	6.748	OK
Z-Z, +0.90D	0.01688	+X	Bottom	0.1728	AsMin	0.320	6.748	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	0.46 psi	0.46 psi	0.46 psi	0.46 psi	0.46 psi	82.16 psi	0.01	OK
+1.20D	0.40 psi	0.40 psi	0.40 psi	0.40 psi	0.40 psi	82.16 psi	0.00	OK
+1.20D+0.50S	1.07 psi	1.07 psi	1.07 psi	1.07 psi	1.07 psi	82.16 psi	0.01	OK
+1.20D+1.60S	2.54 psi	2.54 psi	2.54 psi	2.54 psi	2.54 psi	82.16 psi	0.03	OK
+1.20D+0.70S	1.34 psi	1.34 psi	1.34 psi	1.34 psi	1.34 psi	82.16 psi	0.02	OK
+0.90D	0.30 psi	0.30 psi	0.30 psi	0.30 psi	0.30 psi	82.16 psi	0.00	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	2.05 psi	164.32 psi	0.01245	OK
+1.20D	1.75 psi	164.32 psi	0.01067	OK
+1.20D+0.50S	4.73 psi	164.32 psi	0.02876	OK
+1.20D+1.60S	11.26 psi	164.32 psi	0.06855	OK
+1.20D+0.70S	5.92 psi	164.32 psi	0.036	OK
+0.90D	1.32 psi	164.32 psi	0.008006	OK

Project Title: McKercher Residence
Engineer:
Project ID: 1013.24
Project Descr:

General Footing

Project File: 1013.24 McKercher Residence.ec6

DESCRIPTION: C2

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : IBC 2021

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00090
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	1.50	ksf
Soil Density	=	110.0	pcf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	250.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=	ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

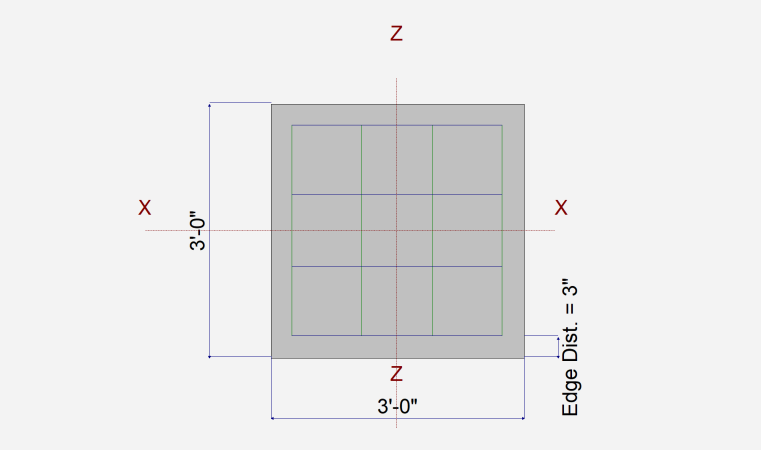
Width parallel to X-X Axis	=	3.0 ft
Length parallel to Z-Z Axis	=	3.0 ft
Footing Thickness	=	10.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in

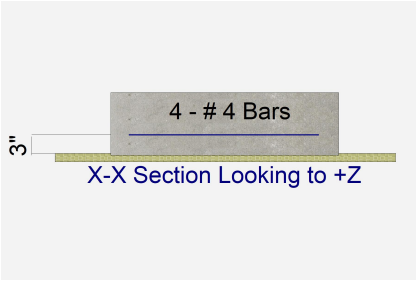


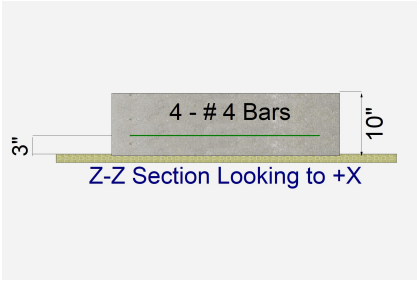
Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		4.0
Reinforcing Bar Size	=	#	4
Bars parallel to Z-Z Axis			
Number of Bars	=		4.0
Reinforcing Bar Size	=	#	4

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	1.980			9.750				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

Project Title: McKercher Residence
Engineer:
Project ID: 1013.24
Project Descr:

General Footing

Project File: 1013.24 McKercher Residence.ec6

DESCRIPTION: C2

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9493	Soil Bearing	1.424 ksf	1.50 ksf	+D+S about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.2779	Z Flexure (+X)	2.247 k-ft/ft	8.086 k-ft/ft	+1.20D+1.60S
PASS	0.2779	Z Flexure (-X)	2.247 k-ft/ft	8.086 k-ft/ft	+1.20D+1.60S
PASS	0.2779	X Flexure (+Z)	2.247 k-ft/ft	8.086 k-ft/ft	+1.20D+1.60S
PASS	0.2779	X Flexure (-Z)	2.247 k-ft/ft	8.086 k-ft/ft	+1.20D+1.60S
PASS	0.2692	1-way Shear (+X)	22.113 psi	82.158 psi	+1.20D+1.60S
PASS	0.2692	1-way Shear (-X)	22.113 psi	82.158 psi	+1.20D+1.60S
PASS	0.2692	1-way Shear (+Z)	22.113 psi	82.158 psi	+1.20D+1.60S
PASS	0.2692	1-way Shear (-Z)	22.113 psi	82.158 psi	+1.20D+1.60S
PASS	0.5358	2-way Punching	88.046 psi	164.317 psi	+1.20D+1.60S

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	1.50	n/a	0.0	0.3408	0.3408	n/a	n/a	0.227
X-X, +D+S	1.50	n/a	0.0	1.424	1.424	n/a	n/a	0.949
X-X, +D+0.750S	1.50	n/a	0.0	1.153	1.153	n/a	n/a	0.769
X-X, +0.60D	1.50	n/a	0.0	0.2045	0.2045	n/a	n/a	0.136
Z-Z, D Only	1.50	0.0	n/a	n/a	n/a	0.3408	0.3408	0.227
Z-Z, +D+S	1.50	0.0	n/a	n/a	n/a	1.424	1.424	0.949
Z-Z, +D+0.750S	1.50	0.0	n/a	n/a	n/a	1.153	1.153	0.769
Z-Z, +0.60D	1.50	0.0	n/a	n/a	n/a	0.2045	0.2045	0.136

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	0.3465	+Z	Bottom	0.1080	AsMin	0.2667	8.086	OK
X-X, +1.40D	0.3465	-Z	Bottom	0.1080	AsMin	0.2667	8.086	OK
X-X, +1.20D	0.2970	+Z	Bottom	0.1080	AsMin	0.2667	8.086	OK
X-X, +1.20D	0.2970	-Z	Bottom	0.1080	AsMin	0.2667	8.086	OK
X-X, +1.20D+0.50S	0.9064	+Z	Bottom	0.1080	AsMin	0.2667	8.086	OK
X-X, +1.20D+0.50S	0.9064	-Z	Bottom	0.1080	AsMin	0.2667	8.086	OK
X-X, +1.20D+1.60S	2.247	+Z	Bottom	0.1080	AsMin	0.2667	8.086	OK
X-X, +1.20D+1.60S	2.247	-Z	Bottom	0.1080	AsMin	0.2667	8.086	OK
X-X, +1.20D+0.70S	1.150	+Z	Bottom	0.1080	AsMin	0.2667	8.086	OK
X-X, +1.20D+0.70S	1.150	-Z	Bottom	0.1080	AsMin	0.2667	8.086	OK
X-X, +0.90D	0.2228	+Z	Bottom	0.1080	AsMin	0.2667	8.086	OK
X-X, +0.90D	0.2228	-Z	Bottom	0.1080	AsMin	0.2667	8.086	OK
Z-Z, +1.40D	0.3465	-X	Bottom	0.1080	AsMin	0.2667	8.086	OK
Z-Z, +1.40D	0.3465	+X	Bottom	0.1080	AsMin	0.2667	8.086	OK
Z-Z, +1.20D	0.2970	-X	Bottom	0.1080	AsMin	0.2667	8.086	OK
Z-Z, +1.20D	0.2970	+X	Bottom	0.1080	AsMin	0.2667	8.086	OK
Z-Z, +1.20D+0.50S	0.9064	-X	Bottom	0.1080	AsMin	0.2667	8.086	OK

Project Title: McKercher Residence
Engineer:
Project ID: 1013.24
Project Descr:

General Footing

Project File: 1013.24 McKercher Residence.ec6

DESCRIPTION: C2

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
Z-Z, +1.20D+0.50S	0.9064	+X	Bottom	0.1080	AsMin	0.2667	8.086	OK
Z-Z, +1.20D+1.60S	2.247	-X	Bottom	0.1080	AsMin	0.2667	8.086	OK
Z-Z, +1.20D+1.60S	2.247	+X	Bottom	0.1080	AsMin	0.2667	8.086	OK
Z-Z, +1.20D+0.70S	1.150	-X	Bottom	0.1080	AsMin	0.2667	8.086	OK
Z-Z, +1.20D+0.70S	1.150	+X	Bottom	0.1080	AsMin	0.2667	8.086	OK
Z-Z, +0.90D	0.2228	-X	Bottom	0.1080	AsMin	0.2667	8.086	OK
Z-Z, +0.90D	0.2228	+X	Bottom	0.1080	AsMin	0.2667	8.086	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	3.41 psi	3.41 psi	3.41 psi	3.41 psi	3.41 psi	82.16 psi	0.04	OK
+1.20D	2.92 psi	2.92 psi	2.92 psi	2.92 psi	2.92 psi	82.16 psi	0.04	OK
+1.20D+0.50S	8.92 psi	8.92 psi	8.92 psi	8.92 psi	8.92 psi	82.16 psi	0.11	OK
+1.20D+1.60S	22.11 psi	22.11 psi	22.11 psi	22.11 psi	22.11 psi	82.16 psi	0.27	OK
+1.20D+0.70S	11.32 psi	11.32 psi	11.32 psi	11.32 psi	11.32 psi	82.16 psi	0.14	OK
+0.90D	2.19 psi	2.19 psi	2.19 psi	2.19 psi	2.19 psi	82.16 psi	0.03	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	13.58 psi	164.32 psi	0.08263	OK
+1.20D	11.64 psi	164.32 psi	0.07082	OK
+1.20D+0.50S	35.52 psi	164.32 psi	0.2161	OK
+1.20D+1.60S	88.05 psi	164.32 psi	0.5358	OK
+1.20D+0.70S	45.07 psi	164.32 psi	0.2743	OK
+0.90D	8.73 psi	164.32 psi	0.05312	OK

MCKERCHER RESIDENCE

1.1 Gravity Design

1.1.8 Joist Design

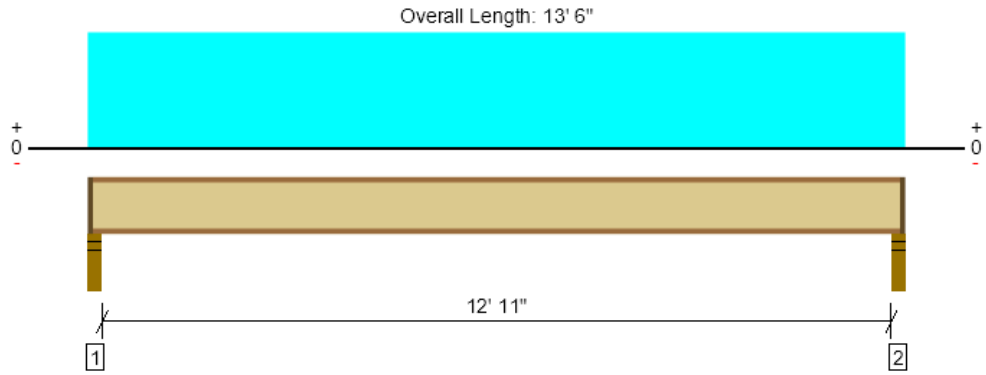
Project Number: 1013.24

Project: McKercher Residence
Date: 2/22/2024

(KEY PLAN)	L1 (ft)	L2 (ft)	Type	Uniform Load p (psf)	Joist Design	Hanger
FJ1	12.92	0.00	DL (FLOOR)	15	9.5" TJI 110 @ 16" O.C.	
			LL (FLOOR)	40		

FLOOR JOIST, FJ1

1 piece(s) 9 1/2" 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.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	487 @ 2 1/2"	1041 (2.25")	Passed (47%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	474 @ 3 1/2"	1220	Passed (39%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1569 @ 6' 9"	2500	Passed (63%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.200 @ 6' 9"	0.327	Passed (L/784)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.275 @ 6' 9"	0.654	Passed (L/570)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	44	40	Passed	--	--

Member Length : 13' 3 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 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
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - DF	3.50"	2.25"	1.75"	135	360	495	1 1/4" Rim Board
2 - Stud wall - DF	3.50"	2.25"	1.75"	135	360	495	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)	3' 11" o/c	
Bottom Edge (Lu)	13' 4" o/c	

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

Vertical Load	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 13' 6"	16"	15.0	40.0	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
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Weyerhaeuser

MCKERCHER RESIDENCE

1.2 Lateral Design

STRUX ENGINEERING LLC

MCKERCHER RESIDENCE

1.2 Lateral Design

1.2.1 Wind Loading

STRUX ENGINEERING LLC

STRUIX ENGINEERING LLC

Project Number: 1013.24

Project: McKercher Residence
Date: 2/22/2024

ENVELOPE PROCEDURE

ASCE7-22 General Wind Inputs

Risk Cat =	II			
Wind Speed =	103	mph		
Exposure =	B			
Roof Pitch =	9	/12	36.87	degrees

Wind Directionality Factor, K_d

Structure Type =	MWFRS
K_d =	0.850

Velocity Pressure Exposure Coefficient, K_z

z =	14.29	ft
α =	7.5	
z_g =	3280	ft
K_z =	0.700	

Topographic Factor, K_{zt}

Topography =	Flat Terrain	
Direction =	Downwind	
H =	100	ft
L_h =	150	ft
x =	150	ft
H/L_h =	0.667	
γ =	0	
μ =	0	
K_1 =	0.000	
K_2 =	0.000	
K_3 =	0.000	
K_{zt} =	1.000	

Ground Elevation Factor, K_e

Elevation =	5327	ft
K_e =	0.825	

Velocity Pressure, q_h

q_h =	15.68	psf

Internal Pressure Coefficient, GC_{pi}

GC_{PI} = 0.18 (+/-)(Enclosed Buildings)

Building Surface (Load Case 1)							
1	2	3	4	1E	2E	3E	4E
0.4	-0.69	-0.37	-0.29	0.61	-1.07	-0.53	-0.43
0.53	-0.69	-0.48	-0.43	0.8	-1.07	-0.69	-0.64
0.56	0.21	-0.43	-0.37	0.69	0.27	-0.53	-0.48
0.56	0.56	-0.37	-0.37	0.69	0.69	-0.48	-0.48

Building Surface (Load Case 2)											
1	2	3	4	5	6	1E	2E	3E	4E	5E	6E
-0.45	-0.69	-0.37	-0.45	0.4	-0.29	-0.48	-1.07	-0.53	-0.48	0.61	-0.43

External Pressure Coefficients, GC_{pf}

LC	1	2	3	4	5	6	1E	2E	3E	4E	5E	6E
LC1	0.56	0.21	-0.43	-0.37	NA	NA	0.69	0.27	-0.53	-0.48	NA	NA
LC2	-0.45	-0.69	-0.37	-0.45	0.40	-0.29	-0.48	-1.07	-0.53	-0.48	0.61	-0.43

Determine End Zone Length (a)

Min Horiz. Dim. =	49.50	ft
10% Min Horiz. Dim. =	4.95	ft
0.4Ht =	5.72	ft
4% Min Horiz. Dim. =	1.98	ft
Min =	3.00	ft
a =	4.95	ft
End Zone = 2a =	9.90	ft

STRUIX ENGINEERING LLC

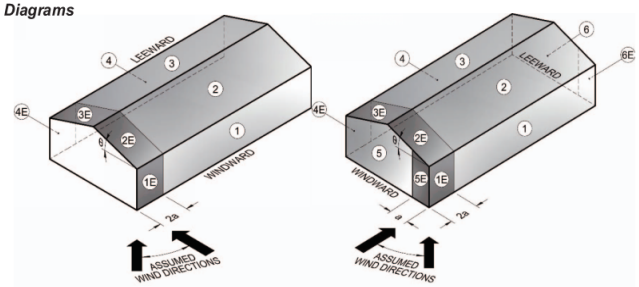
Project Number: 1013.24

Project: McKercher Residence
Date: 2/22/2024

Wind Pressures

LC	1	2	3	4	5	6	1E	2E	3E	4E	5E	6E
LC1 (+)	9.86	5.20	-3.33	-2.53	NA	NA	11.59	6.00	-4.66	-4.00	NA	NA
LC1 (-)	5.06	0.40	-8.13	-7.33	NA	NA	6.80	1.20	-9.46	-8.79	NA	NA
LC2 (+)	-3.60	-6.80	-2.53	-3.60	7.73	-1.47	-4.00	-11.86	-4.66	-4.00	10.53	-3.33
LC2 (-)	-8.40	-11.59	-7.33	-8.40	2.93	-6.26	-8.79	-16.66	-9.46	-8.79	5.73	-8.13

Basic Load Cases
Diagrams



Load Case 1 Load Case 2

Design Wind Pressures

Direction =	N/S	
Wall Length =	64.00	ft
Wall Pressure =	16.00	psf
Roof Pressure =	9.19	psf
Parapet Pressure =	33.31	psf

Direction =	W/E	
Wall Length =	49.50	ft
Wall Pressure =	16.00	psf
Roof Pressure =	9.38	psf
Parapet Pressure =	33.31	psf

MCKERCHER RESIDENCE

1.2 Lateral Design

1.2.2 Seismic Loading

STRUX ENGINEERING LLC

STRUIX ENGINEERING LLC

Project Number: 1013.24

Project:McKercher Residence
Date: 2/22/2024

Equivalent Lateral Force Procedure

Structure Type Selection

SFRS =	Light-frame walls sheathed with wood structural panels rated for shear resistance
Type =	All other structural systems

Seismic Data from ASCE7 Hazard Tool

RC =	II		(Risk Category)
S_1 =	0.14		(Spectral response acceleration parameter, 1s)
S_{DS} =	0.45		(Design spectral response acceleration parameter, short)
S_{D1} =	0.25		(Design spectral response acceleration parameter,1s)
T_L =	6	s	(Long period transition period)
SDC =	D		(Seismic Design Category)
h_n =	14.29	ft	(Structural height, taken at mid point of roof)

Outputs

I_e =	1	(Importance factor)
R =	6.5	(Response modification coefficient)
Ω =	3	(Overstrength factor)
C_d =	4	(Deflection amplification factor)
C_t =	0.02	(Building period coefficient)
x =	0.75	(Building period coefficient)

Seismic Response Coefficient, Cs

T =	0.147	s	(Approximate fundamental period of the building)
k =	1.000		(Exponent related to structure period)
C_s =	0.069		(Seismic response coefficient)
$C_{s,min}$ =	0.020		(C_s lower bound)
$C_{s,min}$ =	NA		(C_s lower bound, for S1>0.6)
$C_{s,max}$ =	0.262		(C_s upper bound, for T<T_L)
$C_{s,max}$ =	NA		(C_s upper bound, for T>T_L)
$C_{s,design}$ =	0.069		(C_s design value)

Effective Seismic Weight

Level	Element	q (psf)	A (ft^2)	W_i (kip)
ROOF	Ext Wall	15	630	9.45
	Int Wall	5	1300	6.50
	Roof	18	2396	43.13
	Snow	35	2396	83.86
	NA	0	0	0.00
	NA	0	0	0.00
NA	Ext Wall	0	0	0.00
	Int Wall	0	0	0.00
	Floor	0	0	0.00
	Deck	0	0	0.00
	NA	0	0	0.00
	NA	0	0	0.00
NA	Ext Wall	0	0	0.00
	Int Wall	0	0	0.00
	Floor	0	0	0.00
	Deck	0	0	0.00
	NA	0	0	0.00
	NA	0	0	0.00
NA	NA	0	0	0.00
	NA	0	0	0.00
	NA	0	0	0.00
	NA	0	0	0.00
	NA	0	0	0.00
	NA	0	0	0.00
NA	NA	0	0	0.00
	NA	0	0	0.00
	NA	0	0	0.00
	NA	0	0	0.00
	NA	0	0	0.00
	NA	0	0	0.00

Seismic Base Shear

V_{base} = 9.90 kips (Seismic base shear)

Vertical Distribution of Seismic Forces, Fx

Level	W (k)	h (ft)	wh^k (k*ft)	C_{vx}	F_x (k)
ROOF	142.94	14.29	2043	1.00	9.90
NA	0.00	0	0	0.00	0.00
NA	0.00	0	0	0.00	0.00
NA	0.00	0	0	0.00	0.00
NA	0.00	0	0	0.00	0.00

Diaphragm Design Forces, Fpx

Level	F_{px} (k)	$F_{px,min}$ (k)	$F_{px,max}$ (k)	Design F_{px}
ROOF	9.90	12.86	25.73	12.86
NA	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00

Seismic Pressures

Level	A (ft^2)	q_{DIA} (psf)	q_{SW} (psf)
ROOF	2396	5.37	4.13
NA	0	0.00	0.00
NA	0	0.00	0.00
NA	0	0.00	0.00
NA	0	0.00	0.00

Seismic Uniform Load Summary, N/S

Level	Diaph	D (ft)	q_{DIA} (psf)	w_{DIA} (plf)	q_{SW} (psf)	w_{SW} (plf)
ROOF	D1	26	5.37	140	4.13	107
ROOF	D2	24	5.37	129	4.13	99

Seismic Uniform Load Summary, E/W

Level	Diaph	D (ft)	q_{DIA} (psf)	w_{DIA} (plf)	q_{SW} (psf)	w_{SW} (plf)	
ROOF	D3	50	5.37	268	4.13	207	26
ROOF	D4	14	5.37	75	4.13	58	26
ROOF	D5	24	5.37	129	4.13	99	

MCKERCHER RESIDENCE

1.2 Lateral Design

1.2.3 Diaphragm Design

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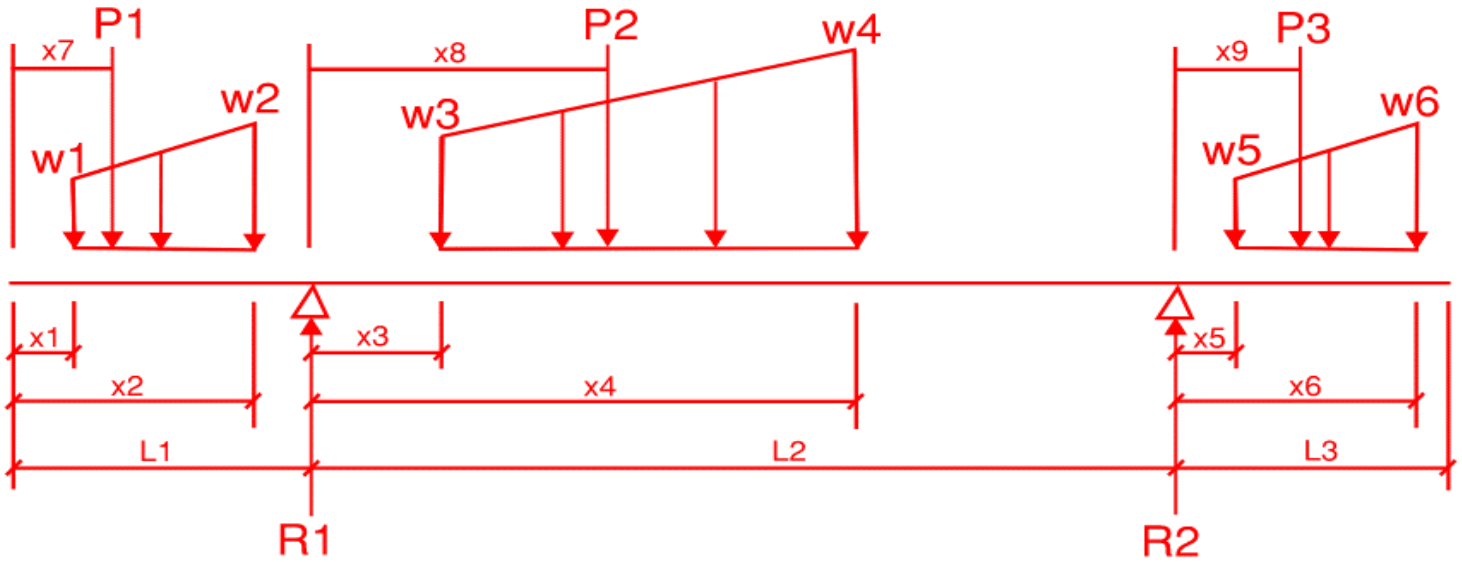
Diaphragm Design Inputs

Diaphragm = 1 **(See Key Plan)**



LOADING DIAGRAM

NOTE: 100% CANTILEVER LOADS APPLIED TO NEAREST SUPPORT

L1 = 0 ft (Cantilever Span)
L2 = 64 ft (Main Span)
L3 = 0 ft (Cantilever Span)

WIND LOADING

Load Factor = 0.6 (ASD)

Uniform Load Designations (WIND)

L1						
q (psf)	h_1 (ft)	h_2 (ft)	x_1 (ft)	x_2 (ft)	w_1 (plf)	w_2 (plf)
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

L2						
q (psf)	h_3 (ft)	h_4 (ft)	x_3 (ft)	x_4 (ft)	w_3 (plf)	w_4 (plf)
9.19	10.5	10.5	0	64	96.495	96.495
16	4	4	0	64	64	64
0	0	0	0	0	0	0
0	0	0	0	0	0	0

L3						
q (psf)	h_5 (ft)	h_6 (ft)	x_5 (ft)	x_6 (ft)	w_5 (plf)	w_6 (plf)
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Point Load Designations (WIND)

L1		L2		L3	
P_1 (lbf)	x_7 (ft)	P_2 (lbf)	x_8 (ft)	P_3 (lbf)	x_9 (ft)
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Uniform Load Reactions (WIND)

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	1852.704	1852.7	0
0	1228.8	1228.8	0
0	0	0	0
0	0	0	0

Point Load Reactions (WIND)

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

$R1_{WIND}$ TOTAL = 3081.5 lbf

$R2_{WIND}$ TOTAL = 3081.5 lbf

SEISMIC LOADING

Load Factor = 0.7 (ASD)

Uniform Load Designations (SEISMIC)

L1				L2				L3			
w_1 (plf)	x_1 (ft)	w_2 (plf)	x_2 (ft)	w_3 (plf)	x_3 (ft)	w_4 (plf)	x_4 (ft)	w_5 (plf)	x_5 (ft)	w_6 (plf)	x_6 (ft)
0.00	0	0.00	0	140.00	0	140.00	64	0.00	0	0.00	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

Point Load Designations (SEISMIC)

L1		L2		L3	
P_1 (lbf)	x_7 (ft)	P_2 (lbf)	x_8 (ft)	P_3 (lbf)	x_9 (ft)
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Reactions (SEISMIC)

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	3136	3136	0
0	0	0	0
0	0	0	0
0	0	0	0

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

$R1_{SEISMIC}$ TOTAL = 3136 lbf

$R2_{SEISMIC}$ TOTAL = 3136 lbf

Diaphragm Design

Diaphragm =	1	(See Key Plan)	
Width =	64	ft	
Depth =	26	ft	
A/R =	2.46154	<=3.5; OK	
$r1_{WIND}$ =	118.519	plf	(Diaphragm Shear @ Support 1) (WIND)
$r2_{WIND}$ =	118.519	plf	(Diaphragm Shear @ Support 2) (WIND)
$r1_{SEISMIC}$ =	120.615	plf	(Diaphragm Shear @ Support 1) (SEISMIC)
$r2_{SEISMIC}$ =	120.615	plf	(Diaphragm Shear @ Support 2) (SEISMIC)
Roof/Flr Sheathing (min):	19/32" OSB w/ 10d @ 12" O.C. (F.N.) & 10d @ 6" O.C. (E.N.) (UNBLOCKED)		
$v_{Diaghram(WIND)}$ =	400	plf	
$v_{Diaghram(SEISMIC)}$ =	285.714	plf	

CHECK WIND:	**OK**
CHECK SEISMIC:	**OK**

Wood Requirement:
1) Nominal support to be 2x minimum.
2) Sheathing must be applied with long dimension perpendicular to supports.
3) Panel ends to be staggered 2'-0" from adjacent panels.

Chord Design

M_{MAX} =	50176	lbf*ft	(Max Moment)
T = C =	1929.85	lbf	(Max Chord Tension/Compression)
Fasten.(Wood)/Bar(CMU/Conc) =	16d NAILS		(Chord Splice Fastener)
$\mathbf{T_{fasten}}$ =	248.16	lbf	(Fastener Capacity)
N_{fasten} =	10		(Number of Fasteners)
$\mathbf{T_{allow}}$ =	2481.6	lbf	(Splice Capacity)

CHECK SPICE:	**OK**

Table 4.2C Nominal Unit Shear Values for Sheathed Wood-Frame Diaphragms

Unblocked Wood Structural Panel Diaphragms[1,2,3,4,6]

Sheathing Grade	Common Nail Size[5] Length (in.) x Shank diameter (in.) x Head diameter (in.)	Minimum Nail Bearing Length in Framing Member, ℓ_m (in.)	Minimum Nominal Panel Thickness (in.)	Minimum Nominal Width of Nailed Face at Adjoining Panel Edges and Boundaries (in.)	6 in. Nail Spacing at diaphragm boundaries and supported panel edges					
					Case 1			Cases 2,3,4,5,6		
					v_n (plf)	G_a (kips/in)		v_n (plf)	G_a (kips/in)	
						OSB	PLY		OSB	PLY
Structural I	6d (2 x 0.113 x 0.266)	1-1/4	5/16	2	460	9.0	7.0	350	6.0	4.5
				3	520	7.0	6.0	390	4.5	4.0
	8d (2-1/2 x 0.131 x 0.281)	1-3/8	3/8	2	670	8.5	7.0	505	6.0	4.5
				3	740	7.5	6.0	560	5.0	4.0
	10d (3 x 0.148 x 0.312)	1-1/2	15/32	2	800	14	10	600	9.5	7.0
				3	895	12	9.0	670	8.0	6.0
Sheathing and Single-Floor	6d (2 x 0.113 x 0.266)	1-1/4	5/16	2	420	9.0	6.5	310	6.0	4.0
				3	475	7.0	5.5	350	5.0	3.5
			3/8	2	460	7.5	5.5	350	5.0	4.0
				3	520	6.0	4.5	390	4.0	3.0
	8d (2-1/2 x 0.131 x 0.281)	1-3/8	3/8	2	600	9.0	6.5	450	6.0	4.5
				3	670	7.5	5.5	505	5.0	3.5
			7/16	2	645	8.5	6.0	475	5.5	4.0
				3	715	7.0	5.5	530	4.5	3.5
			15/32	2	670	7.5	5.5	505	5.0	4.0
				3	740	6.5	5.0	560	4.0	3.5
	10d (3 x 0.148 x 0.312)	1-1/2	15/32	2	715	15	9.0	530	10	6.0
				3	810	12	8.0	600	8.0	5.5
			19/32	2	800	13	8.5	600	8.5	5.5
				3	895	10	7.5	670	7.0	5.0

1. Nominal unit shear capacities shall be adjusted in accordance with 4.1.4 to determine ASD allowable unit shear capacity and LRFD factored unit resistance. For general construction requirements see 4.2.7. For specific requirements, see 4.2.8.1 for wood structural panel diaphragms. See Appendix A for common nail dimensions.
2. For species and grades of framing other than Douglas-Fir-Larch or Southern Pine, reduced nominal unit shear capacities shall be determined by multiplying the tabulated nominal unit shear capacity by the Specific Gravity Adjustment Factor = [1-(0.5-G)], where G = Specific Gravity of the framing lumber from the NDS (Table 12.3.3A). The Specific Gravity Adjustment Factor shall not be greater than 1.
3. Apparent shear stiffness values, G_a, are based on nail slip in framing with moisture content less than or equal to 19% at time of fabrication and panel stiffness values for diaphragms constructed with either OSB or 3-ply plywood panels. When 4-ply, or 5-ply plywood panels or composite panels are used, G_a values shall be permitted to be increased by 1.2.
4. Where moisture content of the framing is greater than 19% at time of fabrication, G_a values shall be multiplied by 0.5.
5. Tabulated nominal unit shear capacities are applicable for carbon steel smooth shank nails of the specified type and size.
6. Diaphragm resistance depends on the direction of continuous adjoining panel edges with respect to the loading direction and direction of framing members, and is independent of the panel orientation.

Seismic Loads to Shear Walls

Load Factor = 0.7 (ASD)

Uniform Load Designations (SEISMIC)

L1				L2				L3			
w_1 (plf)	x_1 (ft)	w_2 (plf)	x_2 (ft)	w_3 (plf)	x_3 (ft)	w_4 (plf)	x_4 (ft)	w_5 (plf)	x_5 (ft)	w_6 (plf)	x_6 (ft)
0.00	0	0.00	0	99.00	0	99.00	64	0.00	0	0.00	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

Point Load Designations (SEISMIC)

L1		L2		L3	
P_1 (lbf)	x_7 (ft)	P_2 (lbf)	x_8 (ft)	P_3 (lbf)	x_9 (ft)
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Reactions (SEISMIC)

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	2217.6	2217.6	0
0	0	0	0
0	0	0	0
0	0	0	0

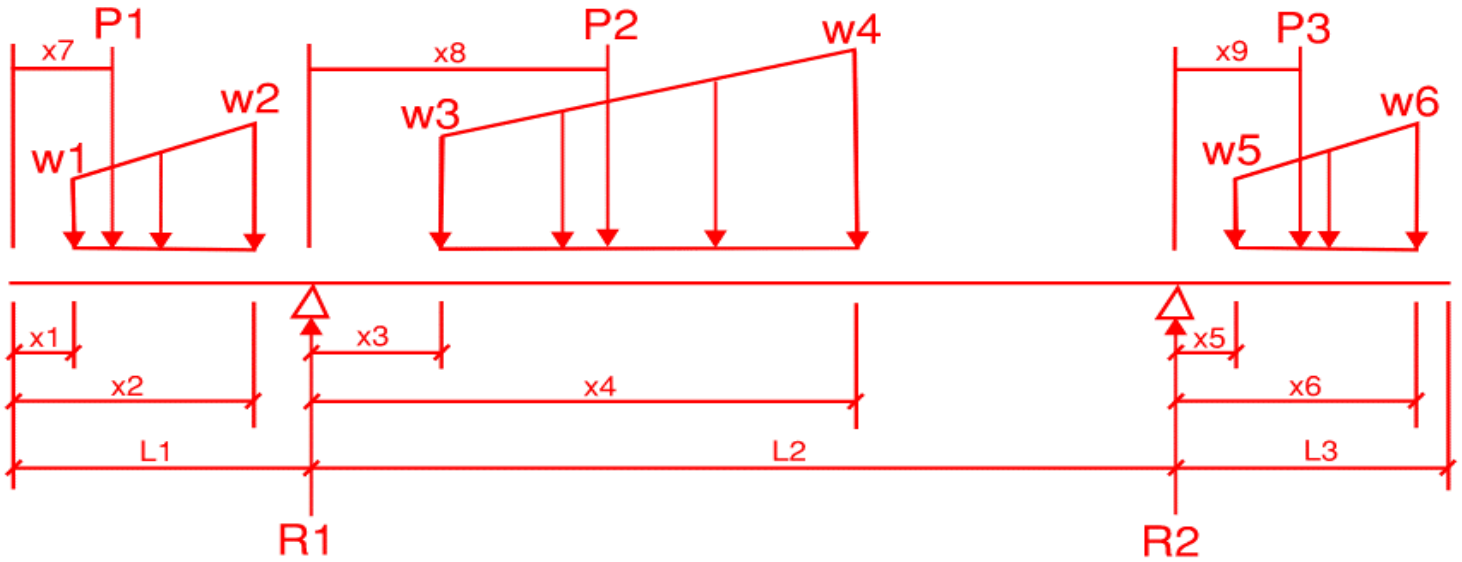
R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

$R1_{SEISMIC}$ TOTAL = 2217.6 lbf

$R2_{SEISMIC}$ TOTAL = 2217.6 lbf

Diaphragm Design Inputs

Diaphragm = 2 **(See Key Plan)**



LOADING DIAGRAM

NOTE: 100% CANTILEVER LOADS APPLIED TO NEAREST SUPPORT

L1 = 0 ft (Cantilever Span)
L2 = 24 ft (Main Span)
L3 = 0 ft (Cantilever Span)

WIND LOADING

Load Factor = 0.6 (ASD)

Uniform Load Designations (WIND)

L1						
q (psf)	h_1 (ft)	h_2 (ft)	x_1 (ft)	x_2 (ft)	w_1 (plf)	w_2 (plf)
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

L2						
q (psf)	h_3 (ft)	h_4 (ft)	x_3 (ft)	x_4 (ft)	w_3 (plf)	w_4 (plf)
16	5.25	5.25	0	24	84	84
16	4	4	0	24	64	64
0	0	0	0	0	0	0
0	0	0	0	0	0	0

L3						
q (psf)	h_5 (ft)	h_6 (ft)	x_5 (ft)	x_6 (ft)	w_5 (plf)	w_6 (plf)
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Point Load Designations (WIND)

L1		L2		L3	
P_1 (lbf)	x_7 (ft)	P_2 (lbf)	x_8 (ft)	P_3 (lbf)	x_9 (ft)
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Uniform Load Reactions (WIND)

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	604.8	604.8	0
0	460.8	460.8	0
0	0	0	0
0	0	0	0

Point Load Reactions (WIND)

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

$R1_{WIND}$ TOTAL = 1065.6 lbf

$R2_{WIND}$ TOTAL = 1065.6 lbf

SEISMIC LOADING

Load Factor = 0.7 (ASD)

Uniform Load Designations (SEISMIC)

L1				L2				L3			
w_1 (plf)	x_1 (ft)	w_2 (plf)	x_2 (ft)	w_3 (plf)	x_3 (ft)	w_4 (plf)	x_4 (ft)	w_5 (plf)	x_5 (ft)	w_6 (plf)	x_6 (ft)
0.00	0	0.00	0	129.00	0	129.00	24	0.00	0	0.00	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

Point Load Designations (SEISMIC)

L1		L2		L3	
P_1 (lbf)	x_7 (ft)	P_2 (lbf)	x_8 (ft)	P_3 (lbf)	x_9 (ft)
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Reactions (SEISMIC)

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	1083.6	1083.6	0
0	0	0	0
0	0	0	0
0	0	0	0

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

$R1_{SEISMIC}$ TOTAL = 1083.6 lbf

$R2_{SEISMIC}$ TOTAL = 1083.6 lbf

Diaphragm Design

Diaphragm =	2	(See Key Plan)	
Width =	24	ft	
Depth =	24	ft	
A/R =	1	<=3.5; OK	
$r1_{WIND}$ =	44.4	plf	(Diaphragm Shear @ Support 1) (WIND)
$r2_{WIND}$ =	44.4	plf	(Diaphragm Shear @ Support 2) (WIND)
$r1_{SEISMIC}$ =	45.15	plf	(Diaphragm Shear @ Support 1) (SEISMIC)
$r2_{SEISMIC}$ =	45.15	plf	(Diaphragm Shear @ Support 2) (SEISMIC)
Roof/Flr Sheathing (min):	19/32" OSB w/ 10d @ 12" O.C. (F.N.) & 10d @ 6" O.C. (E.N.) (UNBLOCKED)		
$v_{Diaghram(WIND)}$ =	400	plf	
$v_{Diaghram(SEISMIC)}$ =	285.714	plf	

CHECK WIND:	**OK**
CHECK SEISMIC:	**OK**

Wood Requirement:
1) Nominal support to be 2x minimum.
2) Sheathing must be applied with long dimension perpendicular to supports.
3) Panel ends to be staggered 2'-0" from adjacent panels.

Chord Design

M_{MAX} =	6501.6	lbf*ft	(Max Moment)
T = C =	270.9	lbf	(Max Chord Tension/Compression)
Fasten.(Wood)/Bar(CMU/Conc) =	16d NAILS		(Chord Splice Fastener)
$\mathbf{T_{fasten}}$ =	248.16	lbf	(Fastener Capacity)
N_{fasten} =	8		(Number of Fasteners)
$\mathbf{T_{allow}}$ =	1985.28	lbf	(Splice Capacity)

CHECK SPICE:	**OK**

Table 4.2C Nominal Unit Shear Values for Sheathed Wood-Frame Diaphragms

Unblocked Wood Structural Panel Diaphragms[1,2,3,4,6]

Sheathing Grade	Common Nail Size[5] Length (in.) x Shank diameter (in.) x Head diameter (in.)	Minimum Nail Bearing Length in Framing Member, ℓ_m (in.)	Minimum Nominal Panel Thickness (in.)	Minimum Nominal Width of Nailed Face at Adjoining Panel Edges and Boundaries (in.)	6 in. Nail Spacing at diaphragm boundaries and supported panel edges					
					Case 1			Cases 2,3,4,5,6		
					v_n (plf)	G_a (kips/in)		v_n (plf)	G_a (kips/in)	
						OSB	PLY		OSB	PLY
Structural I	6d (2 x 0.113 x 0.266)	1-1/4	5/16	2	460	9.0	7.0	350	6.0	4.5
				3	520	7.0	6.0	390	4.5	4.0
	8d (2-1/2 x 0.131 x 0.281)	1-3/8	3/8	2	670	8.5	7.0	505	6.0	4.5
				3	740	7.5	6.0	560	5.0	4.0
	10d (3 x 0.148 x 0.312)	1-1/2	15/32	2	800	14	10	600	9.5	7.0
				3	895	12	9.0	670	8.0	6.0
Sheathing and Single-Floor	6d (2 x 0.113 x 0.266)	1-1/4	5/16	2	420	9.0	6.5	310	6.0	4.0
				3	475	7.0	5.5	350	5.0	3.5
			3/8	2	460	7.5	5.5	350	5.0	4.0
				3	520	6.0	4.5	390	4.0	3.0
	8d (2-1/2 x 0.131 x 0.281)	1-3/8	3/8	2	600	9.0	6.5	450	6.0	4.5
				3	670	7.5	5.5	505	5.0	3.5
			7/16	2	645	8.5	6.0	475	5.5	4.0
				3	715	7.0	5.5	530	4.5	3.5
			15/32	2	670	7.5	5.5	505	5.0	4.0
				3	740	6.5	5.0	560	4.0	3.5
	10d (3 x 0.148 x 0.312)	1-1/2	15/32	2	715	15	9.0	530	10	6.0
				3	810	12	8.0	600	8.0	5.5
			19/32	2	800	13	8.5	600	8.5	5.5
				3	895	10	7.5	670	7.0	5.0

1. Nominal unit shear capacities shall be adjusted in accordance with 4.1.4 to determine ASD allowable unit shear capacity and LRFD factored unit resistance. For general construction requirements see 4.2.7. For specific requirements, see 4.2.8.1 for wood structural panel diaphragms. See Appendix A for common nail dimensions.
2. For species and grades of framing other than Douglas-Fir-Larch or Southern Pine, reduced nominal unit shear capacities shall be determined by multiplying the tabulated nominal unit shear capacity by the Specific Gravity Adjustment Factor = [1-(0.5-G)], where G = Specific Gravity of the framing lumber from the NDS (Table 12.3.3A). The Specific Gravity Adjustment Factor shall not be greater than 1.
3. Apparent shear stiffness values, G_a, are based on nail slip in framing with moisture content less than or equal to 19% at time of fabrication and panel stiffness values for diaphragms constructed with either OSB or 3-ply plywood panels. When 4-ply, or 5-ply plywood panels or composite panels are used, G_a values shall be permitted to be increased by 1.2.
4. Where moisture content of the framing is greater than 19% at time of fabrication, G_a values shall be multiplied by 0.5.
5. Tabulated nominal unit shear capacities are applicable for carbon steel smooth shank nails of the specified type and size.
6. Diaphragm resistance depends on the direction of continuous adjoining panel edges with respect to the loading direction and direction of framing members, and is independent of the panel orientation.

Seismic Loads to Shear Walls

Load Factor = 0.7 (ASD)

Uniform Load Designations (SEISMIC)

L1				L2				L3			
w_1 (plf)	x_1 (ft)	w_2 (plf)	x_2 (ft)	w_3 (plf)	x_3 (ft)	w_4 (plf)	x_4 (ft)	w_5 (plf)	x_5 (ft)	w_6 (plf)	x_6 (ft)
0.00	0	0.00	0	99.00	0	99.00	24	0.00	0	0.00	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

Point Load Designations (SEISMIC)

L1		L2		L3	
P_1 (lbf)	x_7 (ft)	P_2 (lbf)	x_8 (ft)	P_3 (lbf)	x_9 (ft)
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Reactions (SEISMIC)

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	831.6	831.6	0
0	0	0	0
0	0	0	0
0	0	0	0

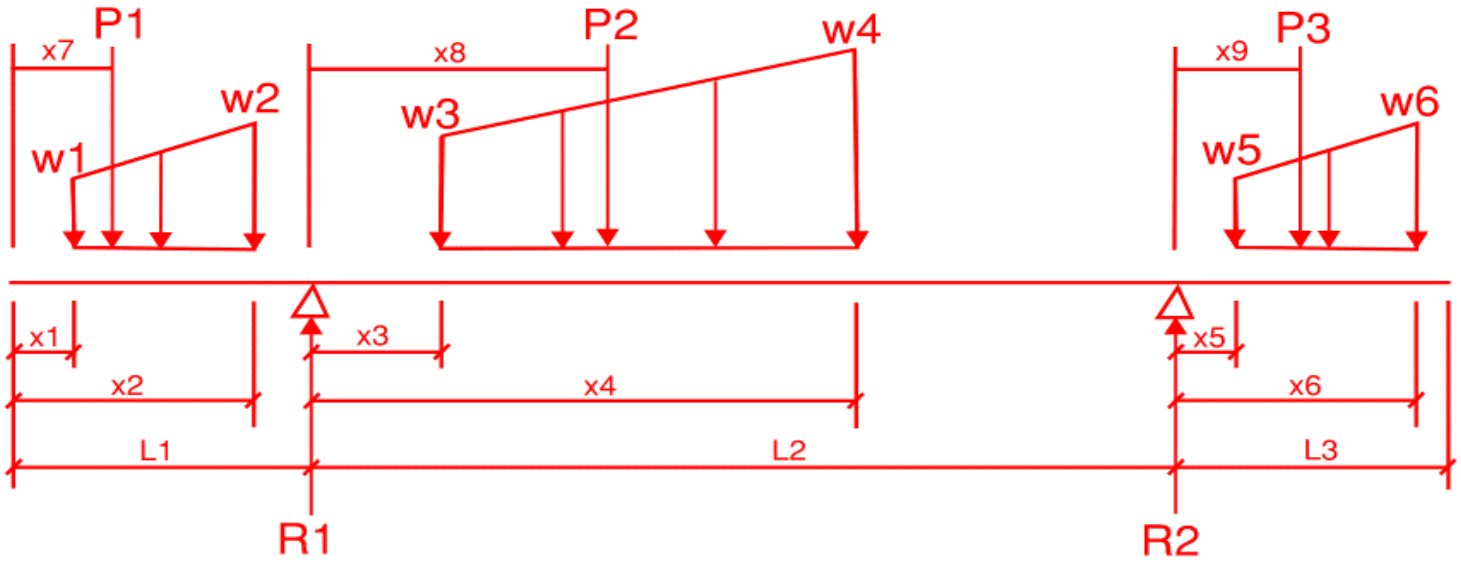
R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

$R1_{SEISMIC}$ TOTAL = 831.6 lbf

$R2_{SEISMIC}$ TOTAL = 831.6 lbf

Diaphragm Design Inputs

Diaphragm = 3 **(See Key Plan)**



LOADING DIAGRAM

NOTE: 100% CANTILEVER LOADS APPLIED TO NEAREST SUPPORT

L1 = 0 ft (Cantilever Span)
L2 = 26 ft (Main Span)
L3 = 0 ft (Cantilever Span)

WIND LOADING

Load Factor = 0.6 (ASD)

Uniform Load Designations (WIND)

L1						
q (psf)	h_1 (ft)	h_2 (ft)	x_1 (ft)	x_2 (ft)	w_1 (plf)	w_2 (plf)
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

L2						
q (psf)	h_3 (ft)	h_4 (ft)	x_3 (ft)	x_4 (ft)	w_3 (plf)	w_4 (plf)
16	5.5	5.5	0	26	88	88
16	4	4	0	26	64	64
0	0	0	0	0	0	0
0	0	0	0	0	0	0

L3						
q (psf)	h_5 (ft)	h_6 (ft)	x_5 (ft)	x_6 (ft)	w_5 (plf)	w_6 (plf)
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Point Load Designations (WIND)

L1		L2		L3	
P_1 (lbf)	x_7 (ft)	P_2 (lbf)	x_8 (ft)	P_3 (lbf)	x_9 (ft)
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Uniform Load Reactions (WIND)

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	686.4	686.4	0
0	499.2	499.2	0
0	0	0	0
0	0	0	0

Point Load Reactions (WIND)

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

$R1_{WIND}$ TOTAL = 1185.6 lbf
$R2_{WIND}$ TOTAL = 1185.6 lbf

SEISMIC LOADING

Load Factor = 0.7 (ASD)

Uniform Load Designations (SEISMIC)

L1				L2				L3			
w_1 (plf)	x_1 (ft)	w_2 (plf)	x_2 (ft)	w_3 (plf)	x_3 (ft)	w_4 (plf)	x_4 (ft)	w_5 (plf)	x_5 (ft)	w_6 (plf)	x_6 (ft)
0.00	0	0.00	0	268.00	0	268.00	26	0.00	0	0.00	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

Point Load Designations (SEISMIC)

L1		L2		L3	
P_1 (lbf)	x_7 (ft)	P_2 (lbf)	x_8 (ft)	P_3 (lbf)	x_9 (ft)
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Reactions (SEISMIC)

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	2438.8	2438.8	0
0	0	0	0
0	0	0	0
0	0	0	0

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

$R1_{SEISMIC}$ TOTAL = 2438.8 lbf

$R2_{SEISMIC}$ TOTAL = 2438.8 lbf

Diaphragm Design

Diaphragm =	3	(See Key Plan)	
Width =	26	ft	
Depth =	50	ft	
A/R =	0.52	<=3.5; OK	
$r1_{WIND}$ =	23.712	plf	(Diaphragm Shear @ Support 1) (WIND)
$r2_{WIND}$ =	23.712	plf	(Diaphragm Shear @ Support 2) (WIND)
$r1_{SEISMIC}$ =	48.776	plf	(Diaphragm Shear @ Support 1) (SEISMIC)
$r2_{SEISMIC}$ =	48.776	plf	(Diaphragm Shear @ Support 2) (SEISMIC)
Roof/Flr Sheathing (min):	19/32" OSB w/ 10d @ 12" O.C. (F.N.) & 10d @ 6" O.C. (E.N.) (UNBLOCKED)		
$v_{Diaghram(WIND)}$ =	400	plf	
$v_{Diaghram(SEISMIC)}$ =	285.714	plf	

CHECK WIND:	**OK**
CHECK SEISMIC:	**OK**

Wood Requirement:
1) Nominal support to be 2x minimum.
2) Sheathing must be applied with long dimension perpendicular to supports.
3) Panel ends to be staggered 2'-0" from adjacent panels.

Chord Design

M_{MAX} =	15852.2	lbf*ft	(Max Moment)
T = C =	317.044	lbf	(Max Chord Tension/Compression)
Fasten.(Wood)/Bar(CMU/Conc) =	16d NAILS		(Chord Splice Fastener)
$\mathbf{T_{fasten}}$ =	248.16	lbf	(Fastener Capacity)
N_{fasten} =	8		(Number of Fasteners)
$\mathbf{T_{allow}}$ =	1985.28	lbf	(Splice Capacity)

CHECK SPICE:	**OK**

Table 4.2C Nominal Unit Shear Values for Sheathed Wood-Frame Diaphragms

Unblocked Wood Structural Panel Diaphragms[1,2,3,4,6]

Sheathing Grade	Common Nail Size[5] Length (in.) x Shank diameter (in.) x Head diameter (in.)	Minimum Nail Bearing Length in Framing Member, ℓ_m (in.)	Minimum Nominal Panel Thickness (in.)	Minimum Nominal Width of Nailed Face at Adjoining Panel Edges and Boundaries (in.)	6 in. Nail Spacing at diaphragm boundaries and supported panel edges					
					Case 1			Cases 2,3,4,5,6		
					v_n (plf)	G_a (kips/in)		v_n (plf)	G_a (kips/in)	
						OSB	PLY		OSB	PLY
Structural I	6d (2 x 0.113 x 0.266)	1-1/4	5/16	2	460	9.0	7.0	350	6.0	4.5
				3	520	7.0	6.0	390	4.5	4.0
	8d (2-1/2 x 0.131 x 0.281)	1-3/8	3/8	2	670	8.5	7.0	505	6.0	4.5
				3	740	7.5	6.0	560	5.0	4.0
	10d (3 x 0.148 x 0.312)	1-1/2	15/32	2	800	14	10	600	9.5	7.0
				3	895	12	9.0	670	8.0	6.0
Sheathing and Single-Floor	6d (2 x 0.113 x 0.266)	1-1/4	5/16	2	420	9.0	6.5	310	6.0	4.0
				3	475	7.0	5.5	350	5.0	3.5
			3/8	2	460	7.5	5.5	350	5.0	4.0
				3	520	6.0	4.5	390	4.0	3.0
	8d (2-1/2 x 0.131 x 0.281)	1-3/8	3/8	2	600	9.0	6.5	450	6.0	4.5
				3	670	7.5	5.5	505	5.0	3.5
			7/16	2	645	8.5	6.0	475	5.5	4.0
				3	715	7.0	5.5	530	4.5	3.5
			15/32	2	670	7.5	5.5	505	5.0	4.0
				3	740	6.5	5.0	560	4.0	3.5
	10d (3 x 0.148 x 0.312)	1-1/2	15/32	2	715	15	9.0	530	10	6.0
				3	810	12	8.0	600	8.0	5.5
			19/32	2	800	13	8.5	600	8.5	5.5
				3	895	10	7.5	670	7.0	5.0

1. Nominal unit shear capacities shall be adjusted in accordance with 4.1.4 to determine ASD allowable unit shear capacity and LRFD factored unit resistance. For general construction requirements see 4.2.7. For specific requirements, see 4.2.8.1 for wood structural panel diaphragms. See Appendix A for common nail dimensions.
2. For species and grades of framing other than Douglas-Fir-Larch or Southern Pine, reduced nominal unit shear capacities shall be determined by multiplying the tabulated nominal unit shear capacity by the Specific Gravity Adjustment Factor = [1-(0.5-G)], where G = Specific Gravity of the framing lumber from the NDS (Table 12.3.3A). The Specific Gravity Adjustment Factor shall not be greater than 1.
3. Apparent shear stiffness values, G_a, are based on nail slip in framing with moisture content less than or equal to 19% at time of fabrication and panel stiffness values for diaphragms constructed with either OSB or 3-ply plywood panels. When 4-ply, or 5-ply plywood panels or composite panels are used, G_a values shall be permitted to be increased by 1.2.
4. Where moisture content of the framing is greater than 19% at time of fabrication, G_a values shall be multiplied by 0.5.
5. Tabulated nominal unit shear capacities are applicable for carbon steel smooth shank nails of the specified type and size.
6. Diaphragm resistance depends on the direction of continuous adjoining panel edges with respect to the loading direction and direction of framing members, and is independent of the panel orientation.

Seismic Loads to Shear Walls

Load Factor = 0.7 (ASD)

Uniform Load Designations (SEISMIC)

L1				L2				L3			
w_1 (plf)	x_1 (ft)	w_2 (plf)	x_2 (ft)	w_3 (plf)	x_3 (ft)	w_4 (plf)	x_4 (ft)	w_5 (plf)	x_5 (ft)	w_6 (plf)	x_6 (ft)
0.00	0	0.00	0	207.00	0	207.00	26	0.00	0	0.00	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

Point Load Designations (SEISMIC)

L1		L2		L3	
P_1 (lbf)	x_7 (ft)	P_2 (lbf)	x_8 (ft)	P_3 (lbf)	x_9 (ft)
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Reactions (SEISMIC)

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	1883.7	1883.7	0
0	0	0	0
0	0	0	0
0	0	0	0

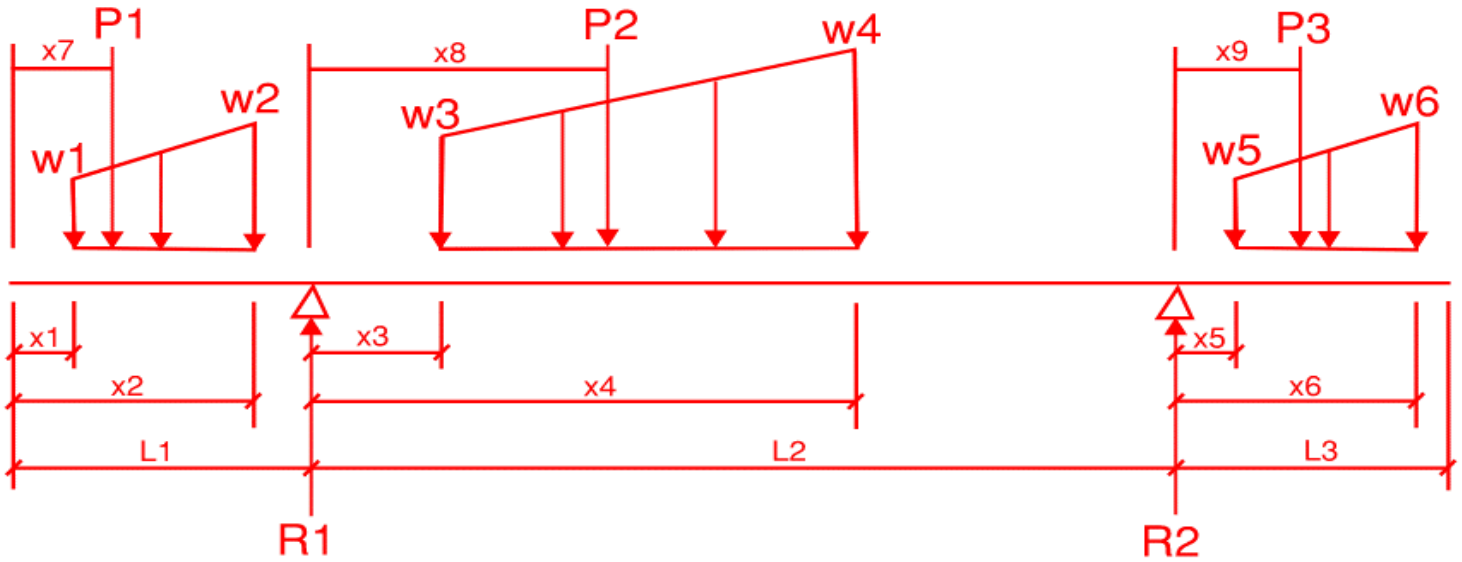
R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

$R1_{SEISMIC}$ TOTAL = 1883.7 lbf

$R2_{SEISMIC}$ TOTAL = 1883.7 lbf

Diaphragm Design Inputs

Diaphragm = 4 **(See Key Plan)**



LOADING DIAGRAM

NOTE: 100% CANTILEVER LOADS APPLIED TO NEAREST SUPPORT

L1 = 0 ft (Cantilever Span)
L2 = 26 ft (Main Span)
L3 = 0 ft (Cantilever Span)

WIND LOADING

Load Factor = 0.6 (ASD)

Uniform Load Designations (WIND)

L1						
q (psf)	h_1 (ft)	h_2 (ft)	x_1 (ft)	x_2 (ft)	w_1 (plf)	w_2 (plf)
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

L2						
q (psf)	h_3 (ft)	h_4 (ft)	x_3 (ft)	x_4 (ft)	w_3 (plf)	w_4 (plf)
16	5.5	5.5	0	26	88	88
16	4	4	0	26	64	64
0	0	0	0	0	0	0
0	0	0	0	0	0	0

L3						
q (psf)	h_5 (ft)	h_6 (ft)	x_5 (ft)	x_6 (ft)	w_5 (plf)	w_6 (plf)
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Point Load Designations (WIND)

L1		L2		L3	
P_1 (lbf)	x_7 (ft)	P_2 (lbf)	x_8 (ft)	P_3 (lbf)	x_9 (ft)
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Uniform Load Reactions (WIND)

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	686.4	686.4	0
0	499.2	499.2	0
0	0	0	0
0	0	0	0

Point Load Reactions (WIND)

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

$R1_{WIND}$ TOTAL = 1185.6 lbf
$R2_{WIND}$ TOTAL = 1185.6 lbf

SEISMIC LOADING

Load Factor = 0.7 (ASD)

Uniform Load Designations (SEISMIC)

L1				L2				L3			
w_1 (plf)	x_1 (ft)	w_2 (plf)	x_2 (ft)	w_3 (plf)	x_3 (ft)	w_4 (plf)	x_4 (ft)	w_5 (plf)	x_5 (ft)	w_6 (plf)	x_6 (ft)
0.00	0	0.00	0	75.00	0	75.00	26	0.00	0	0.00	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

Point Load Designations (SEISMIC)

L1		L2		L3	
P_1 (lbf)	x_7 (ft)	P_2 (lbf)	x_8 (ft)	P_3 (lbf)	x_9 (ft)
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Reactions (SEISMIC)

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	682.5	682.5	0
0	0	0	0
0	0	0	0
0	0	0	0

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

$R1_{SEISMIC}$ TOTAL = 682.5 lbf

$R2_{SEISMIC}$ TOTAL = 682.5 lbf

Diaphragm Design

Diaphragm =	4	(See Key Plan)	
Width =	26	ft	
Depth =	14	ft	
A/R =	1.85714	<=3.5; OK	
$r1_{WIND}$ =	84.6857	plf	(Diaphragm Shear @ Support 1) (WIND)
$r2_{WIND}$ =	84.6857	plf	(Diaphragm Shear @ Support 2) (WIND)
$r1_{SEISMIC}$ =	48.75	plf	(Diaphragm Shear @ Support 1) (SEISMIC)
$r2_{SEISMIC}$ =	48.75	plf	(Diaphragm Shear @ Support 2) (SEISMIC)
Roof/Flr Sheathing (min):	19/32" OSB w/ 10d @ 12" O.C. (F.N.) & 10d @ 6" O.C. (E.N.) (UNBLOCKED)		
$v_{Diaghram(WIND)}$ =	400	plf	
$v_{Diaghram(SEISMIC)}$ =	285.714	plf	

CHECK WIND:	**OK**
CHECK SEISMIC:	**OK**

Wood Requirement:
1) Nominal support to be 2x minimum.
2) Sheathing must be applied with long dimension perpendicular to supports.
3) Panel ends to be staggered 2'-0" from adjacent panels.

Chord Design

M_{MAX} =	7706.4	lbf*ft	(Max Moment)
T = C =	550.457	lbf	(Max Chord Tension/Compression)
Fasten.(Wood)/Bar(CMU/Conc) =	16d NAILS		(Chord Splice Fastener)
$\mathbf{T_{fasten}}$ =	248.16	lbf	(Fastener Capacity)
N_{fasten} =	8		(Number of Fasteners)
$\mathbf{T_{allow}}$ =	1985.28	lbf	(Splice Capacity)

CHECK SPICE:	**OK**

Table 4.2C Nominal Unit Shear Values for Sheathed Wood-Frame Diaphragms

Unblocked Wood Structural Panel Diaphragms[1,2,3,4,6]

Sheathing Grade	Common Nail Size[5] Length (in.) x Shank diameter (in.) x Head diameter (in.)	Minimum Nail Bearing Length in Framing Member, ℓ_m (in.)	Minimum Nominal Panel Thickness (in.)	Minimum Nominal Width of Nailed Face at Adjoining Panel Edges and Boundaries (in.)	6 in. Nail Spacing at diaphragm boundaries and supported panel edges					
					Case 1			Cases 2,3,4,5,6		
					v_n (plf)	G_a (kips/in)		v_n (plf)	G_a (kips/in)	
						OSB	PLY		OSB	PLY
Structural I	6d (2 x 0.113 x 0.266)	1-1/4	5/16	2	460	9.0	7.0	350	6.0	4.5
				3	520	7.0	6.0	390	4.5	4.0
	8d (2-1/2 x 0.131 x 0.281)	1-3/8	3/8	2	670	8.5	7.0	505	6.0	4.5
				3	740	7.5	6.0	560	5.0	4.0
	10d (3 x 0.148 x 0.312)	1-1/2	15/32	2	800	14	10	600	9.5	7.0
				3	895	12	9.0	670	8.0	6.0
Sheathing and Single-Floor	6d (2 x 0.113 x 0.266)	1-1/4	5/16	2	420	9.0	6.5	310	6.0	4.0
				3	475	7.0	5.5	350	5.0	3.5
			3/8	2	460	7.5	5.5	350	5.0	4.0
				3	520	6.0	4.5	390	4.0	3.0
	8d (2-1/2 x 0.131 x 0.281)	1-3/8	3/8	2	600	9.0	6.5	450	6.0	4.5
				3	670	7.5	5.5	505	5.0	3.5
			7/16	2	645	8.5	6.0	475	5.5	4.0
				3	715	7.0	5.5	530	4.5	3.5
			15/32	2	670	7.5	5.5	505	5.0	4.0
				3	740	6.5	5.0	560	4.0	3.5
	10d (3 x 0.148 x 0.312)	1-1/2	15/32	2	715	15	9.0	530	10	6.0
				3	810	12	8.0	600	8.0	5.5
			19/32	2	800	13	8.5	600	8.5	5.5
				3	895	10	7.5	670	7.0	5.0

1. Nominal unit shear capacities shall be adjusted in accordance with 4.1.4 to determine ASD allowable unit shear capacity and LRFD factored unit resistance. For general construction requirements see 4.2.7. For specific requirements, see 4.2.8.1 for wood structural panel diaphragms. See Appendix A for common nail dimensions.
2. For species and grades of framing other than Douglas-Fir-Larch or Southern Pine, reduced nominal unit shear capacities shall be determined by multiplying the tabulated nominal unit shear capacity by the Specific Gravity Adjustment Factor = [1-(0.5-G)], where G = Specific Gravity of the framing lumber from the NDS (Table 12.3.3A). The Specific Gravity Adjustment Factor shall not be greater than 1.
3. Apparent shear stiffness values, G_a, are based on nail slip in framing with moisture content less than or equal to 19% at time of fabrication and panel stiffness values for diaphragms constructed with either OSB or 3-ply plywood panels. When 4-ply, or 5-ply plywood panels or composite panels are used, G_a values shall be permitted to be increased by 1.2.
4. Where moisture content of the framing is greater than 19% at time of fabrication, G_a values shall be multiplied by 0.5.
5. Tabulated nominal unit shear capacities are applicable for carbon steel smooth shank nails of the specified type and size.
6. Diaphragm resistance depends on the direction of continuous adjoining panel edges with respect to the loading direction and direction of framing members, and is independent of the panel orientation.

Seismic Loads to Shear Walls

Load Factor = 0.7 (ASD)

Uniform Load Designations (SEISMIC)

L1				L2				L3			
w_1 (plf)	x_1 (ft)	w_2 (plf)	x_2 (ft)	w_3 (plf)	x_3 (ft)	w_4 (plf)	x_4 (ft)	w_5 (plf)	x_5 (ft)	w_6 (plf)	x_6 (ft)
0.00	0	0.00	0	58.00	0	58.00	26	0.00	0	0.00	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

Point Load Designations (SEISMIC)

L1		L2		L3	
P_1 (lbf)	x_7 (ft)	P_2 (lbf)	x_8 (ft)	P_3 (lbf)	x_9 (ft)
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Reactions (SEISMIC)

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	527.8	527.8	0
0	0	0	0
0	0	0	0
0	0	0	0

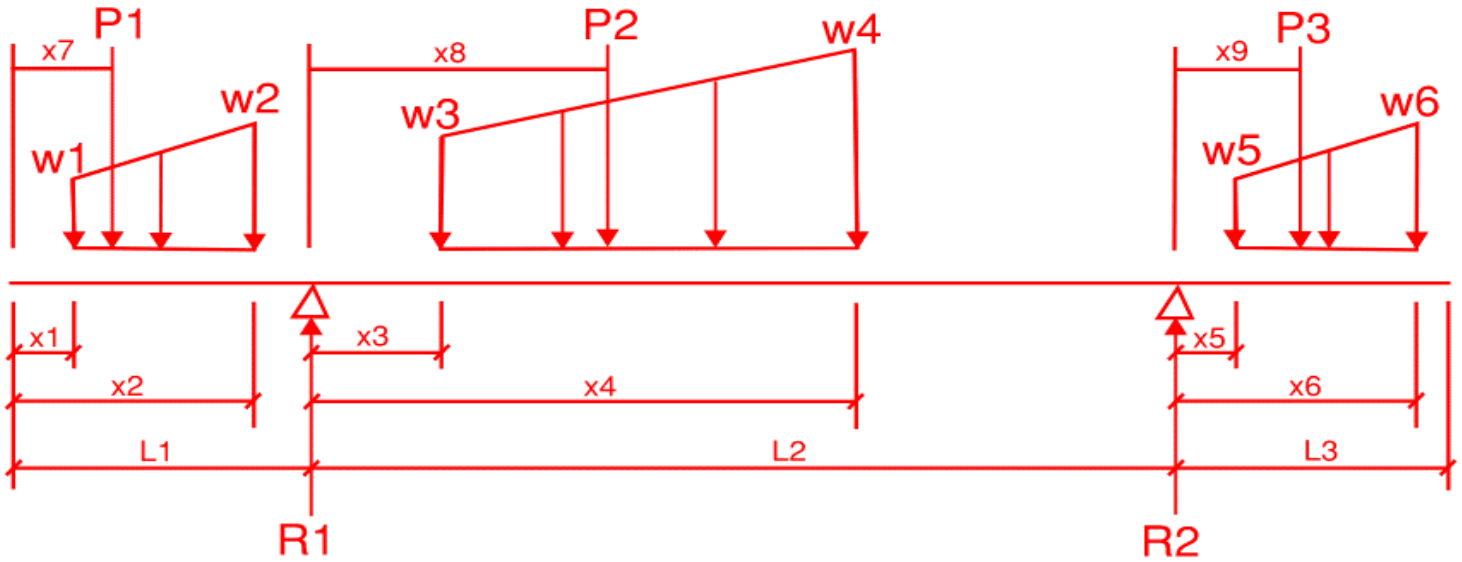
R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

$R1_{SEISMIC}$ TOTAL = 527.8 lbf

$R2_{SEISMIC}$ TOTAL = 527.8 lbf

Diaphragm Design Inputs

Diaphragm = 6 **(See Key Plan)**



LOADING DIAGRAM

NOTE: 100% CANTILEVER LOADS APPLIED TO NEAREST SUPPORT

L1 = 0 ft (Cantilever Span)
L2 = 24 ft (Main Span)
L3 = 0 ft (Cantilever Span)

WIND LOADING

Load Factor = 0.6 (ASD)

Uniform Load Designations (WIND)

L1						
q (psf)	h_1 (ft)	h_2 (ft)	x_1 (ft)	x_2 (ft)	w_1 (plf)	w_2 (plf)
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

L2						
q (psf)	h_3 (ft)	h_4 (ft)	x_3 (ft)	x_4 (ft)	w_3 (plf)	w_4 (plf)
9.2	10.5	10.5	0	24	96.6	96.6
16	4	4	0	24	64	64
0	0	0	0	0	0	0
0	0	0	0	0	0	0

L3						
q (psf)	h_5 (ft)	h_6 (ft)	x_5 (ft)	x_6 (ft)	w_5 (plf)	w_6 (plf)
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0

Point Load Designations (WIND)

L1		L2		L3	
P_1 (lbf)	x_7 (ft)	P_2 (lbf)	x_8 (ft)	P_3 (lbf)	x_9 (ft)
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Uniform Load Reactions (WIND)

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	695.52	695.52	0
0	460.8	460.8	0
0	0	0	0
0	0	0	0

Point Load Reactions (WIND)

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

$R1_{WIND}$ TOTAL = 1156.32 lbf

$R2_{WIND}$ TOTAL = 1156.32 lbf

SEISMIC LOADING

Load Factor = 0.7 (ASD)

Uniform Load Designations (SEISMIC)

L1				L2				L3			
w_1 (plf)	x_1 (ft)	w_2 (plf)	x_2 (ft)	w_3 (plf)	x_3 (ft)	w_4 (plf)	x_4 (ft)	w_5 (plf)	x_5 (ft)	w_6 (plf)	x_6 (ft)
0.00	0	0.00	0	129.00	0	129.00	24	0.00	0	0.00	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

Point Load Designations (SEISMIC)

L1		L2		L3	
P_1 (lbf)	x_7 (ft)	P_2 (lbf)	x_8 (ft)	P_3 (lbf)	x_9 (ft)
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Reactions (SEISMIC)

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	1083.6	1083.6	0
0	0	0	0
0	0	0	0
0	0	0	0

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

$R1_{SEISMIC}$ TOTAL = 1083.6 lbf

$R2_{SEISMIC}$ TOTAL = 1083.6 lbf

Diaphragm Design

Diaphragm =	6	(See Key Plan)	
Width =	24	ft	
Depth =	24	ft	
A/R =	1	<=3.5; OK	
$r1_{WIND}$ =	48.18	plf	(Diaphragm Shear @ Support 1) (WIND)
$r2_{WIND}$ =	48.18	plf	(Diaphragm Shear @ Support 2) (WIND)
$r1_{SEISMIC}$ =	45.15	plf	(Diaphragm Shear @ Support 1) (SEISMIC)
$r2_{SEISMIC}$ =	45.15	plf	(Diaphragm Shear @ Support 2) (SEISMIC)
Roof/Flr Sheathing (min):	19/32" OSB w/ 10d @ 12" O.C. (F.N.) & 10d @ 6" O.C. (E.N.) (UNBLOCKED)		
$v_{Diaghram(WIND)}$ =	400	plf	
$v_{Diaghram(SEISMIC)}$ =	285.714	plf	

CHECK WIND:	**OK**
CHECK SEISMIC:	**OK**

Wood Requirement:
1) Nominal support to be 2x minimum.
2) Sheathing must be applied with long dimension perpendicular to supports.
3) Panel ends to be staggered 2'-0" from adjacent panels.

Chord Design

M_{MAX} =	6937.92	lbf*ft	(Max Moment)
T = C =	289.08	lbf	(Max Chord Tension/Compression)
Fasten.(Wood)/Bar(CMU/Conc) =	16d NAILS		(Chord Splice Fastener)
$\mathbf{T_{fasten}}$ =	248.16	lbf	(Fastener Capacity)
N_{fasten} =	8		(Number of Fasteners)
$\mathbf{T_{allow}}$ =	1985.28	lbf	(Splice Capacity)

CHECK SPICE:	**OK**

Table 4.2C Nominal Unit Shear Values for Sheathed Wood-Frame Diaphragms

Unblocked Wood Structural Panel Diaphragms[1,2,3,4,6]

Sheathing Grade	Common Nail Size[5] Length (in.) x Shank diameter (in.) x Head diameter (in.)	Minimum Nail Bearing Length in Framing Member, ℓ_m (in.)	Minimum Nominal Panel Thickness (in.)	Minimum Nominal Width of Nailed Face at Adjoining Panel Edges and Boundaries (in.)	6 in. Nail Spacing at diaphragm boundaries and supported panel edges					
					Case 1			Cases 2,3,4,5,6		
					v_n (plf)	G_a (kips/in)		v_n (plf)	G_a (kips/in)	
						OSB	PLY		OSB	PLY
Structural I	6d (2 x 0.113 x 0.266)	1-1/4	5/16	2	460	9.0	7.0	350	6.0	4.5
				3	520	7.0	6.0	390	4.5	4.0
	8d (2-1/2 x 0.131 x 0.281)	1-3/8	3/8	2	670	8.5	7.0	505	6.0	4.5
				3	740	7.5	6.0	560	5.0	4.0
	10d (3 x 0.148 x 0.312)	1-1/2	15/32	2	800	14	10	600	9.5	7.0
				3	895	12	9.0	670	8.0	6.0
Sheathing and Single-Floor	6d (2 x 0.113 x 0.266)	1-1/4	5/16	2	420	9.0	6.5	310	6.0	4.0
				3	475	7.0	5.5	350	5.0	3.5
			3/8	2	460	7.5	5.5	350	5.0	4.0
				3	520	6.0	4.5	390	4.0	3.0
	8d (2-1/2 x 0.131 x 0.281)	1-3/8	3/8	2	600	9.0	6.5	450	6.0	4.5
				3	670	7.5	5.5	505	5.0	3.5
			7/16	2	645	8.5	6.0	475	5.5	4.0
				3	715	7.0	5.5	530	4.5	3.5
			15/32	2	670	7.5	5.5	505	5.0	4.0
				3	740	6.5	5.0	560	4.0	3.5
	10d (3 x 0.148 x 0.312)	1-1/2	15/32	2	715	15	9.0	530	10	6.0
				3	810	12	8.0	600	8.0	5.5
			19/32	2	800	13	8.5	600	8.5	5.5
				3	895	10	7.5	670	7.0	5.0

1. Nominal unit shear capacities shall be adjusted in accordance with 4.1.4 to determine ASD allowable unit shear capacity and LRFD factored unit resistance. For general construction requirements see 4.2.7. For specific requirements, see 4.2.8.1 for wood structural panel diaphragms. See Appendix A for common nail dimensions.
2. For species and grades of framing other than Douglas-Fir-Larch or Southern Pine, reduced nominal unit shear capacities shall be determined by multiplying the tabulated nominal unit shear capacity by the Specific Gravity Adjustment Factor = [1-(0.5-G)], where G = Specific Gravity of the framing lumber from the NDS (Table 12.3.3A). The Specific Gravity Adjustment Factor shall not be greater than 1.
3. Apparent shear stiffness values, G_a, are based on nail slip in framing with moisture content less than or equal to 19% at time of fabrication and panel stiffness values for diaphragms constructed with either OSB or 3-ply plywood panels. When 4-ply, or 5-ply plywood panels or composite panels are used, G_a values shall be permitted to be increased by 1.2.
4. Where moisture content of the framing is greater than 19% at time of fabrication, G_a values shall be multiplied by 0.5.
5. Tabulated nominal unit shear capacities are applicable for carbon steel smooth shank nails of the specified type and size.
6. Diaphragm resistance depends on the direction of continuous adjoining panel edges with respect to the loading direction and direction of framing members, and is independent of the panel orientation.

Seismic Loads to Shear Walls

Load Factor = 0.7 (ASD)

Uniform Load Designations (SEISMIC)

L1				L2				L3			
w_1 (plf)	x_1 (ft)	w_2 (plf)	x_2 (ft)	w_3 (plf)	x_3 (ft)	w_4 (plf)	x_4 (ft)	w_5 (plf)	x_5 (ft)	w_6 (plf)	x_6 (ft)
0.00	0	0.00	0	99.00	0	99.00	24	0.00	0	0.00	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

Point Load Designations (SEISMIC)

L1		L2		L3	
P_1 (lbf)	x_7 (ft)	P_2 (lbf)	x_8 (ft)	P_3 (lbf)	x_9 (ft)
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Reactions (SEISMIC)

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	831.6	831.6	0
0	0	0	0
0	0	0	0
0	0	0	0

R1 (L1)	R1 (L2)	R2 (L2)	R2 (L3)
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

$R1_{SEISMIC}$ TOTAL = 831.6 lbf

$R2_{SEISMIC}$ TOTAL = 831.6 lbf

WIND: SUMMARY OF WALL LINE FORCES

Diaphragm	R1	R2
1	3082	3082
2	1066	1066
3	1186	1186
4	1186	1186
5	1156	1156

SEISMIC: SUMMARY OF WALL LINE FORCES

Diaphragm	R1	R2
1	2218	2218
2	831.6	831.6
3	1884	1884
4	527.8	527.8
5	831.6	831.6

WALL LINE FORCE SUMMARY

NOTE: Lateral loads are given for each wall line. Loads will be combined in the shear wall analysis.

Wall Line	Diaphragm								F_{wind} (lb)	$F_{seismic}$ (lb)
1	1	R1							3081.5	2217.6
2	1	R2							3081.5	2217.6
3	2	R2							1065.6	831.6
4	2	R1							1065.6	831.6
A	3	R2	4	R2					2371.2	2411.5
B	3	R1	5	R2					2341.9	2715.3
C	4	R2							1185.6	527.8
D	4	R1							1185.6	527.8
E	5	R1							1156.3	831.6

MCKERCHER RESIDENCE

1.2 Lateral Design

1.2.4 Shear Wall Key Plans

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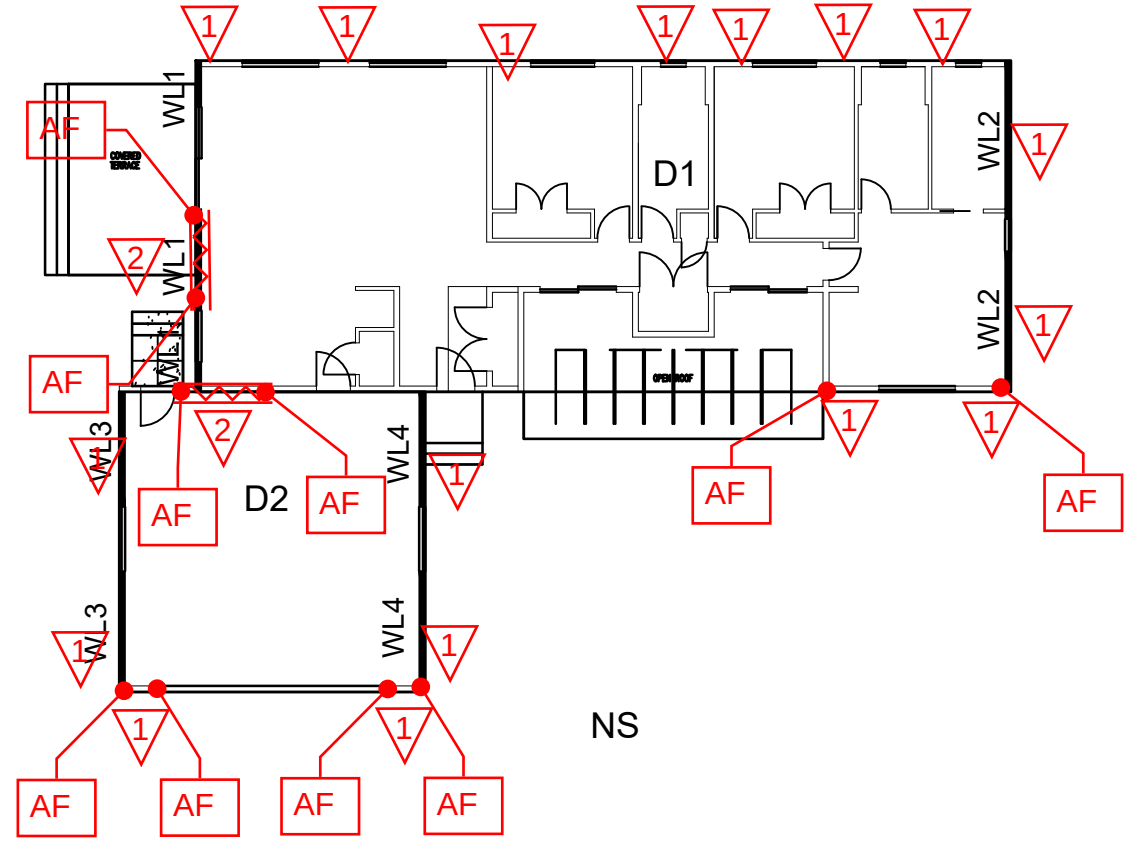
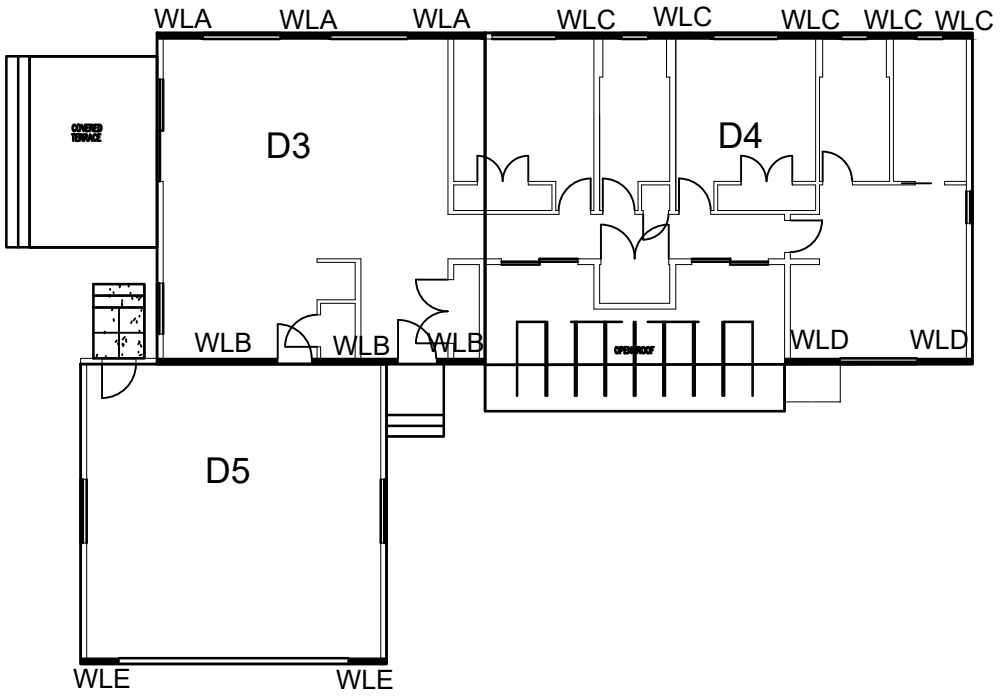

D1
D2
WL1
WL2
WL3
WL4
AF
1
2
NS


D3
D4
D5
WLA
WLB
WLC
WLD
WLE
EW

MCKERCHER RESIDENCE

1.2 Lateral Design

1.2.5 Shear Wall Design

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Project Number: 1013.24

Project: McKercher Residence
Date: 2/22/2024

Segmented Shear Wall

Shear Wall Line 1

Story Shears					
Load	V_w (lb)	V_{eq} (lb)	y (ft)	M_w (lb*ft)	M_{eq} (lb*ft)
1	3081	2217	8	24648	17736
2	0	0	0	0	0
3	0	0	0	0	0
Totals	3081	2217	NA	24648	17736

Chord Selection		
Chord	A (ft^2)	E (ksi)
(2) 2x6 DF-L #2	16.5	1600

Holdown Selection				
HD	Configuration	Δ_a (in)	T_w (lb)	T_{eq} (lb)
STHD	STHD10, 6" Stem Wall, Midwall	0.146	2910	2550

Sheathing Selection					
Sheathing Type	v_w (plf)	v_{eq} (plf)	G_a (k/in)	AR (MAX)	C_d
7/16" OSB w/ 8d @ 4/12" O.C. (B)	532.5	380.4	22	3.5	4

Shear Wall Deflection Limits				
RC	Structure Type	h*Δ_a (in)	Exterior Wall Finish	H/
II	All other structures	0.02	Interior gypsum board	180

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SW Geometry & Distribution Factors						
SW#	L (ft)	H_{eff} (ft)	A/R	WSP	1/k	Dist (%)
1	8	8	1.00	1.00	1.95	1.00
2	0	0	NA	NA	NA	NA
3	0	0	NA	NA	NA	NA
4	0	0	NA	NA	NA	NA
5	0	0	NA	NA	NA	NA
6	0	0	NA	NA	NA	NA
	8				1.95	

Sheathing Capacity Calculations					
Wind			Seismic		
V_{max} (lb)	V_{all} (lb)	Unity	V_{max} (lb)	V_{all} (lb)	Unity
385	533	0.72	277	380	0.73
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA

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Project Number: 1013.24

Project: McKercher Residence
Date: 2/22/2024

Dead Loads Acting on Shear Wall Segments										
SW#	Walls			Roof			Floor			P_{tot} (lb)
	q (psf)	H (ft)	P (lb)	q (psf)	L (ft)	P (lb)	q (psf)	L (ft)	P (lb)	
1	15	8	960	18	2	288	0	0	0	749
2	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0

Shear Wall Overturning Calculations										
SW#	Wind					Seismic				
	T_{above} (lb)	M_{OT} (lb*ft)	M_R (lb*ft)	T_{max} (lb)	Unity	T_{above} (lb)	M_{OT} (lb*ft)	M_R (lb*ft)	T_{max} (lb)	Unity
1	0	24648	2995	2707	0.93	0	17736	2995	1843	0.63
2	0	NA	NA	NA	NA	0	NA	NA	NA	NA
3	0	NA	NA	NA	NA	0	NA	NA	NA	NA
4	0	NA	NA	NA	NA	0	NA	NA	NA	NA
5	0	NA	NA	NA	NA	0	NA	NA	NA	NA
6	0	NA	NA	NA	NA	0	NA	NA	NA	NA

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Project Number: 1013.24

Project: McKercher Residence
Date: 2/22/2024

Segmented Shear Wall

Shear Wall Line 2

Story Shears					
Load	V_w (lb)	V_{eq} (lb)	y (ft)	M_w (lb*ft)	M_{eq} (lb*ft)
1	3081	2217	8	24648	17736
2	0	0	0	0	0
3	0	0	0	0	0
Totals	3081	2217	NA	24648	17736

Chord Selection		
Chord	A (ft^2)	E (ksi)
(2) 2x6 DF-L #2	16.5	1600

Holdown Selection				
HD	Configuration	Δ_a (in)	T_w (lb)	T_{eq} (lb)
None	No Holdown Required	0	300	300

Sheathing Selection					
Sheathing Type	v_w (plf)	v_{eq} (plf)	G_a (k/in)	AR (MAX)	C_d
7/16" OSB w/ 8d @ 6/12" O.C. (B)	365.0	260.7	15	3.5	4

Shear Wall Deflection Limits				
RC	Structure Type	h*Δ_a (in)	Exterior Wall Finish	H/
II	All other structures	0.02	Interior gypsum board	180

STRUIX ENGINEERING LLC

Project Number: 1013.24

Project: McKercher Residence
Date: 2/22/2024

SW Geometry & Distribution Factors						
SW#	L (ft)	H_{eff} (ft)	A/R	WSP	1/k	Dist (%)
1	12.5	8	0.64	1.00	3.05	0.53
2	11	8	0.73	1.00	2.69	0.47
3	0	0	NA	NA	NA	NA
4	0	0	NA	NA	NA	NA
5	0	0	NA	NA	NA	NA
6	0	0	NA	NA	NA	NA
	23.5				5.74	

Sheathing Capacity Calculations					
Wind			Seismic		
V_{max} (lb)	V_{all} (lb)	Unity	V_{max} (lb)	V_{all} (lb)	Unity
131	365	0.36	94	261	0.36
131	365	0.36	94	261	0.36
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA

Dead Loads Acting on Shear Wall Segments										
SW#	Walls			Roof			Floor			P_{tot} (lb)
	q (psf)	H (ft)	P (lb)	q (psf)	L (ft)	P (lb)	q (psf)	L (ft)	P (lb)	
1	15	8	1500	18	5.25	1181	0	0	0	1609
2	15	8	1320	18	5.25	1040	0	0	0	1416
3	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0

Shear Wall Overturning Calculations										
SW#	Wind					Seismic				
	T_{above} (lb)	M_{OT} (lb*ft)	M_R (lb*ft)	T_{max} (lb)	Unity	T_{above} (lb)	M_{OT} (lb*ft)	M_R (lb*ft)	T_{max} (lb)	Unity
1	0	13111	10055	244	0.81	0	9434	10055	-50	-0.17
2	-50	11537	7786	291	0.97	0	8302	7786	47	0.16
3	0	NA	NA	NA	NA	0	NA	NA	NA	NA
4	0	NA	NA	NA	NA	0	NA	NA	NA	NA
5	0	NA	NA	NA	NA	0	NA	NA	NA	NA
6	0	NA	NA	NA	NA	0	NA	NA	NA	NA

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Project Number: 1013.24

Project: McKercher Residence
Date: 2/22/2024

Segmented Shear Wall

Shear Wall Line 3

Story Shears					
Load	V_w (lb)	V_{eq} (lb)	y (ft)	M_w (lb*ft)	M_{eq} (lb*ft)
1	1065	831	9	9585	7479
2	0	0	0	0	0
3	0	0	0	0	0
Totals	1065	831	NA	9585	7479

Chord Selection		
Chord	A (ft^2)	E (ksi)
(2) 2x6 DF-L #2	16.5	1600

Holdown Selection				
HD	Configuration	Δ_a (in)	T_w (lb)	T_{eq} (lb)
None	No Holdown Required	0	300	300

Sheathing Selection					
Sheathing Type	v_w (plf)	v_{eq} (plf)	G_a (k/in)	AR (MAX)	C_d
7/16" OSB w/ 8d @ 6/12" O.C. (B)	365.0	260.7	15	3.5	4

Shear Wall Deflection Limits				
RC	Structure Type	h*Δ_a (in)	Exterior Wall Finish	H/
II	All other structures	0.02	Interior gypsum board	180

STRUIX ENGINEERING LLC

Project Number: 1013.24

Project: McKercher Residence
Date: 2/22/2024

SW Geometry & Distribution Factors						
SW#	L (ft)	H_{eff} (ft)	A/R	WSP	1/k	Dist (%)
1	9.5	9	0.95	1.00	1.63	0.50
2	9.5	9	0.95	1.00	1.63	0.50
3	0	0	NA	NA	NA	NA
4	0	0	NA	NA	NA	NA
5	0	0	NA	NA	NA	NA
6	0	0	NA	NA	NA	NA
	19				3.26	

Sheathing Capacity Calculations					
Wind			Seismic		
V_{max} (lb)	V_{all} (lb)	Unity	V_{max} (lb)	V_{all} (lb)	Unity
56	365	0.15	44	261	0.17
56	365	0.15	44	261	0.17
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA

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Project Number: 1013.24

Project: McKercher Residence
Date: 2/22/2024

Dead Loads Acting on Shear Wall Segments										
SW#	Walls			Roof			Floor			P_{tot} (lb)
	q (psf)	H (ft)	P (lb)	q (psf)	L (ft)	P (lb)	q (psf)	L (ft)	P (lb)	
1	15	9	1283	18	14.5	2480	0	0	0	2257
2	15	9	1283	18	14.5	2480	0	0	0	2257
3	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0

Shear Wall Overturning Calculations										
SW#	Wind					Seismic				
	T_{above} (lb)	M_{OT} (lb*ft)	M_R (lb*ft)	T_{max} (lb)	Unity	T_{above} (lb)	M_{OT} (lb*ft)	M_R (lb*ft)	T_{max} (lb)	Unity
1	0	4793	10722	-624	-2.08	0	3740	10722	-735	-2.45
2	0	4793	10722	-624	-2.08	0	3740	10722	-735	-2.45
3	0	NA	NA	NA	NA	0	NA	NA	NA	NA
4	0	NA	NA	NA	NA	0	NA	NA	NA	NA
5	0	NA	NA	NA	NA	0	NA	NA	NA	NA
6	0	NA	NA	NA	NA	0	NA	NA	NA	NA

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Segmented Shear Wall

Shear Wall Line 4

Story Shears					
Load	V_w (lb)	V_{eq} (lb)	y (ft)	M_w (lb*ft)	M_{eq} (lb*ft)
1	1185.8	344.4	9	10672.2	3099.6
2	0	0	0	0	0
3	0	0	0	0	0
Totals	1186	344	NA	10672	3100

Chord Selection		
Chord	A (ft^2)	E (ksi)
(2) 2x6 DF-L #2	16.5	1600

Holdown Selection				
HD	Configuration	Δ_a (in)	T_w (lb)	T_{eq} (lb)
None	No Holdown Required	0	300	300

Sheathing Selection					
Sheathing Type	v_w (plf)	v_{eq} (plf)	G_a (k/in)	AR (MAX)	C_d
7/16" OSB w/ 8d @ 6/12" O.C. (B)	365.0	260.7	15	3.5	4

Shear Wall Deflection Limits				
RC	Structure Type	h*Δ_a (in)	Exterior Wall Finish	H/
II	All other structures	0.02	Interior gypsum board	180

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SW Geometry & Distribution Factors						
SW#	L (ft)	H_{eff} (ft)	A/R	WSP	1/k	Dist (%)
1	9	9	1.00	1.00	1.54	0.50
2	9	9	1.00	1.00	1.54	0.50
3	0	0	NA	NA	NA	NA
4	0	0	NA	NA	NA	NA
5	0	0	NA	NA	NA	NA
6	0	0	NA	NA	NA	NA
	18				3.09	

Sheathing Capacity Calculations					
Wind			Seismic		
V_{max} (lb)	V_{all} (lb)	Unity	V_{max} (lb)	V_{all} (lb)	Unity
66	365	0.18	19	261	0.07
66	365	0.18	19	261	0.07
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA

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Dead Loads Acting on Shear Wall Segments										
SW#	Walls			Roof			Floor			P_{tot} (lb)
	q (psf)	H (ft)	P (lb)	q (psf)	L (ft)	P (lb)	q (psf)	L (ft)	P (lb)	
1	15	9	1215	18	14.5	2349	0	0	0	2138
2	15	9	1215	18	14.5	2349	0	0	0	2138
3	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0

Shear Wall Overturning Calculations										
SW#	Wind					Seismic				
	T_{above} (lb)	M_{OT} (lb*ft)	M_R (lb*ft)	T_{max} (lb)	Unity	T_{above} (lb)	M_{OT} (lb*ft)	M_R (lb*ft)	T_{max} (lb)	Unity
1	0	5336	9623	-476	-1.59	0	1550	9623	-897	-2.99
2	0	5336	9623	-476	-1.59	0	1550	9623	-897	-2.99
3	0	NA	NA	NA	NA	0	NA	NA	NA	NA
4	0	NA	NA	NA	NA	0	NA	NA	NA	NA
5	0	NA	NA	NA	NA	0	NA	NA	NA	NA
6	0	NA	NA	NA	NA	0	NA	NA	NA	NA

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Segmented Shear Wall

Shear Wall Line A

Story Shears					
Load	V_w (lb)	V_{eq} (lb)	y (ft)	M_w (lb*ft)	M_{eq} (lb*ft)
1	2371	2411	8	18968	19288
2	0	0	0	0	0
3	0	0	0	0	0
Totals	2371	2411	NA	18968	19288

Chord Selection		
Chord	A (ft^2)	E (ksi)
(2) 2x6 DF-L #2	16.5	1600

Holdown Selection				
HD	Configuration	Δ_a (in)	T_w (lb)	T_{eq} (lb)
None	No Holdown Required	0	300	300

Sheathing Selection					
Sheathing Type	v_w (plf)	v_{eq} (plf)	G_a (k/in)	AR (MAX)	C_d
7/16" OSB w/ 8d @ 6/12" O.C. (B)	365.0	260.7	15	3.5	4

Shear Wall Deflection Limits				
RC	Structure Type	h*Δ_a (in)	Exterior Wall Finish	H/
II	All other structures	0.02	Interior gypsum board	180

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SW Geometry & Distribution Factors						
SW#	L (ft)	H_{eff} (ft)	A/R	WSP	1/k	Dist (%)
1	6.5	8	1.23	1.00	1.59	0.22
2	5	8	1.60	1.00	1.22	0.17
3	4	8	2.00	1.00	0.98	0.13
4	5	8	1.60	1.00	1.22	0.17
5	5.25	8	1.52	1.00	1.28	0.18
6	4	8	2.00	1.00	0.98	0.13
	29.75				7.26	

Sheathing Capacity Calculations					
Wind			Seismic		
V_{max} (lb)	V_{all} (lb)	Unity	V_{max} (lb)	V_{all} (lb)	Unity
80	365	0.22	81	261	0.31
80	365	0.22	81	261	0.31
80	365	0.22	81	261	0.31
80	365	0.22	81	261	0.31
80	365	0.22	81	261	0.31
80	365	0.22	81	261	0.31

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Dead Loads Acting on Shear Wall Segments										
SW#	Walls			Roof			Floor			P_{tot} (lb)
	q (psf)	H (ft)	P (lb)	q (psf)	L (ft)	P (lb)	q (psf)	L (ft)	P (lb)	
1	15	8	780	18	15.5	1814	0	0	0	1556
2	15	8	600	18	15.5	1395	0	0	0	1197
3	15	8	480	18	15.5	1116	0	0	0	958
4	15	8	600	18	15.5	1395	0	0	0	1197
5	15	8	630	18	15.5	1465	0	0	0	1257
6	15	8	480	18	15.5	1116	0	0	0	958

Shear Wall Overturning Calculations										
SW#	Wind					Seismic				
	T_{above} (lb)	M_{OT} (lb*ft)	M_R (lb*ft)	T_{max} (lb)	Unity	T_{above} (lb)	M_{OT} (lb*ft)	M_R (lb*ft)	T_{max} (lb)	Unity
1	0	4144	5057	-140	-0.47	0	4214	5057	-130	-0.43
2	0	3188	2993	39	0.13	0	3242	2993	50	0.17
3	0	2550	1915	159	0.53	0	2593	1915	170	0.57
4	0	3188	2993	39	0.13	0	3242	2993	50	0.17
5	0	3347	3299	9	0.03	0	3404	3299	20	0.07
6	0	2550	1915	159	0.53	0	2593	1915	170	0.57

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Segmented Shear Wall

Shear Wall Line B

Story Shears					
Load	V_w (lb)	V_{eq} (lb)	y (ft)	M_w (lb*ft)	M_{eq} (lb*ft)
1	2341	2715	8	18728	21720
2	0	0	0	0	0
3	0	0	0	0	0
Totals	2341	2715	NA	18728	21720

Chord Selection		
Chord	A (ft^2)	E (ksi)
(2) 2x6 DF-L #2	16.5	1600

Holdown Selection				
HD	Configuration	Δ_a (in)	T_w (lb)	T_{eq} (lb)
STHD	STHD10, 6" Stem Wall, Midwall	0.146	2910	2550

Sheathing Selection					
Sheathing Type	v_w (plf)	v_{eq} (plf)	G_a (k/in)	AR (MAX)	C_d
7/16" OSB w/ 8d @ 4/12" O.C. (B)	532.5	380.4	22	3.5	4

Shear Wall Deflection Limits				
RC	Structure Type	h*Δ_a (in)	Exterior Wall Finish	H/
II	All other structures	0.02	Interior gypsum board	180

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SW Geometry & Distribution Factors						
SW#	L (ft)	H_{eff} (ft)	A/R	WSP	1/k	Dist (%)
1	11.125	8	0.72	1.00	2.72	1.00
2	0	0	NA	NA	NA	NA
3	0	0	NA	NA	NA	NA
4	0	0	NA	NA	NA	NA
5	0	0	NA	NA	NA	NA
6	0	0	NA	NA	NA	NA
	11.125				2.72	

Sheathing Capacity Calculations					
Wind			Seismic		
V_{max} (lb)	V_{all} (lb)	Unity	V_{max} (lb)	V_{all} (lb)	Unity
210	533	0.40	244	380	0.64
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA

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Dead Loads Acting on Shear Wall Segments										
SW#	Walls			Roof			Floor			P_{tot} (lb)
	q (psf)	H (ft)	P (lb)	q (psf)	L (ft)	P (lb)	q (psf)	L (ft)	P (lb)	
1	15	8	1335	18	14	2804	0	0	0	2483
2	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0

Shear Wall Overturning Calculations										
SW#	Wind					Seismic				
	T_{above} (lb)	M_{OT} (lb*ft)	M_R (lb*ft)	T_{max} (lb)	Unity	T_{above} (lb)	M_{OT} (lb*ft)	M_R (lb*ft)	T_{max} (lb)	Unity
1	0	18728	13812	442	0.15	0	21720	13812	711	0.24
2	0	NA	NA	NA	NA	0	NA	NA	NA	NA
3	0	NA	NA	NA	NA	0	NA	NA	NA	NA
4	0	NA	NA	NA	NA	0	NA	NA	NA	NA
5	0	NA	NA	NA	NA	0	NA	NA	NA	NA
6	0	NA	NA	NA	NA	0	NA	NA	NA	NA

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Perforated Shear Wall

Shear Wall Line D

Story Shears	
V_{wind} (lb)	$V_{seismic}$ (lb)
1185	527

Chord Selection		
Chord	A (ft^2)	E (ksi)
(2) 2x6 DF-L #2	16.5	1600

Holdown Selection				
HD	Configuration	Δ_a (in)	T_w (lb)	T_{eq} (lb)
STHD	STHD10, 6" Stem Wall, Corner	0.146	2910	2550

Sheathing Selection				
Configuration	v_w (plf)	v_{eq} (plf)	G_a (k/in)	AR
7/16" OSB w/ 8d @ 6/12" O.C. (B)	365.0	260.7	15	3.5

SW Geometry & Adjustment Factors						Opening Dimensions & Areas			
SW#	L_i (ft)	H (ft)	A/R	WSP	b_i (ft)	O#	LO_i (ft)	HO_i (ft)	AO_i (ft)
1	4.5	8	1.78	1.00	4.50	1	6	7	42
2	4.5		1.78	1.00	4.50	2	0	0	NA
3	0		NA	NA	NA	3	0	0	NA
4	0		NA	NA	NA	4	0	0	NA
5	0		NA	NA	NA	5	0	0	NA
6	0		NA	NA	NA		**6**		**42**
	9.00				**9.00**				

A_{wall} =	120.0	ft^2	(Total area of the perforated shear wall)
A_o =	42	ft^2	(Total area of openings in the perforated shear wall)
A_{fhs} =	72	ft^2	(Total area sheathed with full height sheathing)

C_o = 0.6060606 (Shear capacity adjustment factor)

Sheathing Capacity Calculations					
Wind			Seismic		
v_{max} (plf)	v_n (plf)	Unity	v_{max} (plf)	v_n (plf)	Unity
217.3	365.0	0.60	96.6	260.7	0.37

Shear Wall Overturning Calculations							
Wind				Seismic			
T_{above} (lb)	M_o (lb*ft)	T_{max} (lb)	Unity	T_{above} (lb)	M_o (lb*ft)	T_{max} (lb)	Unity
0	9480	1738	0.60	0	4216	772.9	0.30

Shear Wall Deflection Limits				
RC	Structure Type	h*Δ_a (in)	Exterior Wall Finish	H/
II	All other structures	0.02	Interior gypsum board	180

Shear Wall Deflection Calculations					
Wind			Seismic		
δ_{max} (in)	δ_{allow} (in)	Unity	δ_{max} (in)	δ_{allow} (in)	Unity
0.249	0.533	0.47	0.183	1.92	0.10

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Segmented Shear Wall

Shear Wall Line E

Story Shears					
Load	V_w (lb)	V_{eq} (lb)	y (ft)	M_w (lb*ft)	M_{eq} (lb*ft)
1	1156	831	9	10404	7479
2	0	0	0	0	0
3	0	0	0	0	0
Totals	1156	831	NA	10404	7479

Chord Selection		
Chord	A (ft^2)	E (ksi)
(2) 2x6 DF-L #2	16.5	1600

Holdown Selection				
HD	Configuration	Δ_a (in)	T_w (lb)	T_{eq} (lb)
STHD	STHD10, 6" Stem Wall, Corner	0.146	2910	2550

Sheathing Selection					
Sheathing Type	v_w (plf)	v_{eq} (plf)	G_a (k/in)	AR (MAX)	C_d
7/16" OSB w/ 8d @ 6/12" O.C. (B)	365.0	260.7	15	3.5	4

Shear Wall Deflection Limits				
RC	Structure Type	h*Δ_a (in)	Exterior Wall Finish	H/
II	All other structures	0.02	Interior gypsum board	180

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SW Geometry & Distribution Factors						
SW#	L (ft)	H_{eff} (ft)	A/R	WSP	1/k	Dist (%)
1	3	9	3.00	0.67	0.51	0.50
2	3	9	3.00	0.67	0.51	0.50
3	0	0	NA	NA	NA	NA
4	0	0	NA	NA	NA	NA
5	0	0	NA	NA	NA	NA
6	0	0	NA	NA	NA	NA
	6				1.03	

Sheathing Capacity Calculations					
Wind			Seismic		
V_{max} (lb)	V_{all} (lb)	Unity	V_{max} (lb)	V_{all} (lb)	Unity
193	243	0.79	139	174	0.80
193	243	0.79	139	174	0.80
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA

Dead Loads Acting on Shear Wall Segments										
SW#	Walls			Roof			Floor			P_{tot} (lb)
	q (psf)	H (ft)	P (lb)	q (psf)	L (ft)	P (lb)	q (psf)	L (ft)	P (lb)	
1	15	8	360	18	4.5	243	0	0	0	362
2	15	8	360	18	4.5	243	0	0	0	362
3	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0

Shear Wall Overturning Calculations										
SW#	Wind					Seismic				
	T_{above} (lb)	M_{OT} (lb*ft)	M_R (lb*ft)	T_{max} (lb)	Unity	T_{above} (lb)	M_{OT} (lb*ft)	M_R (lb*ft)	T_{max} (lb)	Unity
1	0	5202	543	1553	0.53	0	3740	543	1066	0.37
2	0	5202	543	1553	0.53	0	3740	543	1066	0.37
3	0	NA	NA	NA	NA	0	NA	NA	NA	NA
4	0	NA	NA	NA	NA	0	NA	NA	NA	NA
5	0	NA	NA	NA	NA	0	NA	NA	NA	NA
6	0	NA	NA	NA	NA	0	NA	NA	NA	NA