

PACIFIC NORTHWEST STRUCTURAL GROUP, LLC

A PROFESSIONAL ENGINEERING COMPANY

BASIC PERMIT PACKAGE
REVIEWED FOR CODE COMPLIANCE
WITH IRC 2015
KITSAP COUNTY BUILDING DEPARTMENT

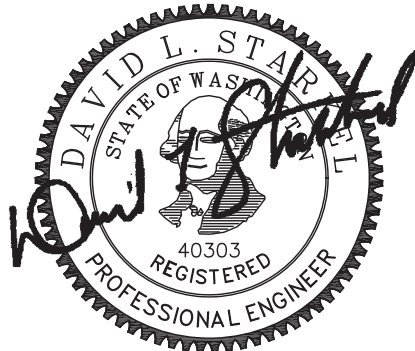
6193 NE MALBON CT.
KINGSTON, WA 98346
360.903.2803

STRUCTURAL CALCULATIONS

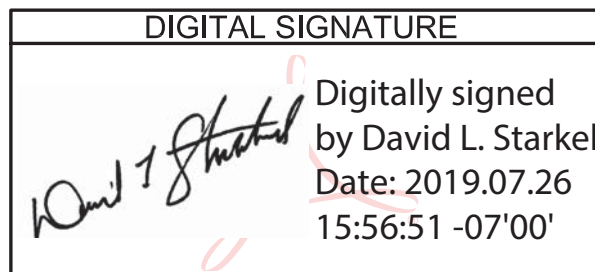
19-002c RED BARN LANE - DUPLEX 1400
NW HOGAN LN & NELS NELSON RD NW
BREMERTON, WA 98311

Reviewed for code compliance
with IRC 2015
Kitsap County Building Department
lasmith@co.kitsap.wa.us
11/13/2020

ALL COMPUTATIONS AND ENGINEERING FOR THIS PROJECT HAVE
BEEN PERFORMED BY MYSELF OR UNDER MY SUPERVISION.



26-JUL-19



Established Basic Permit #

19-03646

Permit Number: 20-04893

Pacific Northwest Structural Group, LLC

Project	Red Barn Lane - Duplex 1400	Designer	DLS
Location	NW Hogan Ln & Nels Nelson Rd NW, Bremerton, WA	Project No.	19-002c
Client	Envision Northwest, LLC	Revised	15-Sep-18
Design Live and Dead Loads, Soil Data			

DESIGN LIVE AND DEAD LOADS

ROOF LOAD :		
Asphalt Shingles	1.5	PSF
Re-Roof	1.5	PSF
Roof Shtg	1.5	PSF
Truss @ 24" oc	3.3	PSF
Insulation	1.6	PSF
Gypsum Shtg	2.2	PSF
		PSF
		PSF
SUB-TOTAL	11.6	PSF
SLOPE CORRECTION "X:12"	5.00	1.1
MISCELLANEOUS	2.4	PSF
ROOF DEAD LOAD	15.0	PSF
ROOF SNOW LOAD	25.0	PSF
REDUCED SNOW LOAD	N/A	PSF
ROOF LIVE LOAD	16.0	PSF

EXTERIOR WALL LOAD		
Siding	4.0	PSF
Wall Shtg	1.5	PSF
2x6 @ 16" oc	1.7	PSF
Bottom & Top Plates	0.8	PSF
Insulation	0.5	PSF
Gypsum Shtg	2.2	PSF
Mech., Elec., & Misc.	0.3	PSF
EXTER. WALL DEAD LOAD	11.0	PSF

INTERIOR WALL LOAD		
Gypsum Shtg	4.4	PSF
2X4 @ 16" oc	1.1	PSF
Insulation	0.5	PSF
Bottom & Top Plates	0.8	PSF
Mech., Elec., & Misc.	1.2	PSF
INTERIOR WALL DEAD LOAD	8.0	PSF

FLOOR LOAD		
Floor Covering	1.0	PSF
Floor Shtg	2.3	PSF
Floor Joist	3.3	PSF
Insulation	1.3	PSF
Gypsum Sheathing	5.6	PSF
Mech., Elec., & Misc.	1.5	PSF
		PSF
FLOOR DEAD LOAD	15.0	PSF
FLOOR LIVE LOAD	40.0	PSF

DECK OR BALCONY DEAD LOAD		
2x Decking	4.5	PSF
Deck Joist	3.3	PSF
Mech., Elec., & Misc.	4.2	PSF
		PSF
DECK DEAD LOAD	12.0	PSF
DECK LIVE LOAD	60.0	PSF

		PSF
		PSF
		PSF
		PSF
		PSF
		PSF
		PSF
FLOOR DEAD LOAD	-	PSF
FLOOR LIVE LOAD		PSF

The soil bearing shall be 1500 PSF unless a soil analysis has been preformed. Please revise the plans or provide a soil analysis showing the 2500 PSF.

SOILS DATA

SOILS REPORT	N/A			DATE OF REPORT			N/A		
GEOTECHNICAL ENGINEER	N/A								
BASIC BEARING PRESSURE				ACTIVE SOIL PRESSURE					
PADS & CONT. FND		2,500	PSF	PASSIVE PRESSURE		N/A	PCF		
INCREASE FOR WIDTH		N/A	%	SOIL FRICTION		N/A			
INCREASE FOR DEPTH		N/A	%	E.F.P. (Cantilever)		N/A	PCF		
MAX. SOIL PRESSURE		2,500	PSF	E.F.P. (Restrained)		N/A	PCF		
ISOLATED FOUNDATIONS		N/A	PSF						

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C:\Users\dista\Dropbox\PNW Project Files\2019 Projects\19-002C Red Barn Lane - Duplex\ENGR\19-002c Design Criteria 2018.xlsxLoads

7/25/2019

Pacific Northwest Structural Group, LLC	Project	Red Barn Lane - Duplex 1400	Designer	DLS
	Location	NW Hogan Ln & Nels Nelson Rd NW, Brem	Project No.	19-002c
	Client	Envision Northwest, LLC	Revised 15-Sep-18	
	2015 IBC Section 1609.6 Wind Loads			

BUILDING DATA:

Ultimate Design Wind Speed, V_{ult}	110	MPH	Figure 1609 1609.4	Exposure		
Exposure	B			B	C	D
Roof Pitch	5.00	:12				
$\theta =$	22.62					
Condition 1						
Building Length	37.00	ft				
Building Width	37.00	ft				
1st Level Plate Height	9.08	ft				
2nd Level Plate Height	9.08	ft				
3rd Level Plate Height	8.08	ft				
Gable Height	33.95	ft				
Roof Height	7.71	ft				
Mean Roof Height $h =$	30.09	ft				

1609.6 Alternate All-Heights Method

Wind directionality factor, K_d	0.85	ASCE 7-10, 27.3-1
Topographic Factor, K_{zt}	1.00	
Velocity pressure factor, K_z	0.70	

IBC 2015 Table 1609.6.2, Net Pressure Coefficients, C_{net}

Description	+ Internal pressure	- Internal pressure
Windward Wall	0.43	0.73
Leeward Wall	(0.51)	(0.21)
Sidewall	(0.66)	(0.35)
Wind perpendicular to ridge Leeward roof or flat roof	(0.66)	(0.35)
Wind parallel to ridge and flat roofs	(1.09)	(0.79)
Windward roof slopes	0.03	0.34

Description	Pressure	
Windward Wall	21.42	psf
Leeward Wall	13.29	psf
Sidewall	18.65	psf
Wind perpendicular to ridge Leeward roof or flat roof	18.65	psf
Windward roof slopes	6.83	psf

Allowable Uniform Wind Load				
Level	Transverse		Longitudinal	
1st Level Plate	189.1	plf	101.6	plf
2nd Level Plate	178.7	plf	96.0	plf
3rd Level Plate	115.7	plf	88.3	plf

Pacific Northwest Structural Group, LLC	Project	Red Barn Lane - Duplex 1400		Designer	DLS
	Location	NW Hogan Ln & Nels Nelson Rd NW, Breme		Project No.	19-002c
	Client	Envision Northwest, LLC		Revised	15-Sep-18
	2015 IBC Section 1613 Earthquake Loads				
ASCE 7-10 & IBC 2015 Section 1613, EARTHQUAKE LOADS					
Soil Site Class	D			ASCE 7-10 11.4.2 (Default=D)	
Response Spectral Acc. (0.2 sec) S_s	1.39			ASCE 7-10 Figure(s) 22-1 through 22-18	
Response Spectral Acc. (1.0 sec) S_1	0.55				
Site Coefficient F_a	1.00			ASCE 7-10 Table 11.4-1	
Site Coefficient F_v	1.50			ASCE 7-10 Table 11.4-2	
Max Considered Earthquake Acc. S_{MS}	1.387	$F_a \cdot S_s$	ASCE 7-10 (11.4-1)		
Max Considered Earthquake Acc. S_{M1}	0.828	$F_v \cdot S_1$	ASCE 7-10 (11.4-2)		
@ 5% Damped Design S_{DS}	0.925	$2/3 \cdot S_{MS}$	ASCE 7-10 (11.4-3)		
S_{D1}	0.552	$2/3 \cdot S_{M1}$	ASCE 7-10 (11.4-4)		
Risk Category			II	ASCE 7-10 Table 1-1	
Design Category Consideration:					
In each of the two orthogonal directions, the approximate fundamental period of the structure, T_a , determined in accordance with Section 12.8.2.1 is less than $0.8T_s$, where T_s is determined in accordance with Section 11.4.5.			Yes	ASCE 7-10 11.6	
In each of two orthogonal directions, the fundamental period of the structure used to calculate the story drift is less than T_s .			Yes		
Diaphragms are rigid as defined in Section 12.3.1 or for diaphragms that are flexible, the distance between vertical elements of the seismic force-resisting system does not exceed 40 ft.			Yes		
Seismic Design Category (SDC)	-			ASCE 7-10 11.4.1	
Seismic Design Category for 0.1 sec	D			ASCE 7-10 Table 11.6-1	
Seismic Design Category for 1.0 sec	D			ASCE 7-10 Table 11.6-2	
$S_1 < .75g$	-			ASCE 7-10 11.6	
Seismic Design Category (SDC)	D			ASCE 7-10 11.6	
Seismic Force-Resisting System	A. BEARING WALL SYSTEMS				
	15. Light-frame (wood) walls sheathed with wood structural panels rated for shear resistance or steel sheets				
Footnotes	-				
	-				
	-				
ASCE 7 Section Where Detailing Requirements Are Specified	14.1 and 14.5				
Building ht. h_n	30.09	ft	Limited Building Height (ft) = 65		
C_t	0.020	x	0.75	ASCE 7-10 Table 12.8-2	
C_u	1.400	for SD1 of 0.552g		ASCE 7-10 Table 12.8-1	
Approximate Fundamental Period, T_a	0.257	sec	$C_t \cdot (h_n)^x$	ASCE 7-10 (12.8-7)	
T_s	0.597	sec	S_{D1}/S_{DS}	ASCE 7-10 11.4.5	
T_L	6.00	sec		ASCE 7-10 11.4.5	
Period for Computing Drift	0.360	sec	$C_u \cdot T_a$		
Fundamental Period, T	0.257	sec			
$0.8T_s$	0.478	sec	$0.8(S_{D1}/S_{DS})$	ASCE 7-10 11.6	
Response Modification Coef. R	6.50			ASCE 7-10 Table 12.14-1	

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Pacific Northwest Structural Group, LLC		Project	Red Barn Lane - Duplex 1400	Designer	DLS
		Location	NW Hogan Ln & Nels Nelson Rd NW, Breme	Project No.	19-002c
		Client	Envision Northwest, LLC	Revised	15-Sep-18
		2015 IBC Section 1613 Earthquake Loads			
Over Strength Factor Ω_o	3.00		ASCE 7-10 Table 12.14-1		
Deflection Amplification Factor, C_{db}	4.00		ASCE 7-10 Table 12.14-1		
Importance factor I_E	1.00		ASCE 7-10 Table 1.5-2, UFC 3-301-01 Table 2-2		
C_s	0.142	$S_{DS}/R/I_E$	ASCE 7-10 (12.8-2)		
$T \leq T_L$ therefore C_s need not to exceed	0.330	$S_{D1}/(T(R/I_E))$	ASCE 7-10 (12.8-3)		
$T < T_L$ therefore (12.8-4) N/A	N/A	$S_{D1} \cdot T_L/T^2 (R/I_E)$	ASCE 7-10 (12.8-4)		
C_s	0.041	$0.044 S_{DS} \cdot I_E \geq 0.01$	ASCE 7-10 (12.8-5)		
$S_1 < 0.6g$ (12.8-6) N/A	N/A	$0.5 S_1/(R/I_E)$	ASCE 7-10 (12.8-6)		
Use C_s	0.142				
Design Base Shear V	0.142 W	Control	ASCE 7-10 (12.8-1)		
Design Service Level Base Shear V	0.1 W				

Seismic Load					
Level	W_x (lbs)	h_x (ft)	$W_x \cdot h_x$	C_{vx}	F_x (lbs)
1st Level Plate	31,398	9.1	285,098	0.374	3,218
2nd Level Plate	31,398	9.1	285,098	0.374	3,218
3rd Level Plate	23,799	8.1	192,298	0.252	2,171
	86,596	$\Sigma W_x \cdot h_x$	762,494		

Design Service Level Base Shear V	8,608	lbs
	Transverse	
	Longitudinal	
Diaphragm Width	37.00	ft
1st Level Plate	87.0	plf
2nd Level Plate	87.0	plf
3rd Level Plate	58.7	plf

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Pacific Northwest Structural Group, LLC	Project	Red Barn Lane - Duplex 1400	Designer	DLS
	Location	NW Hogan Ln & Nels Nelson Rd NW, Brem	Project No.	19-002c
	Client	Envision Northwest, LLC	Revised	18-May-18
	ASCE 7-10 Snow Loads			

ASCE 7-10 7.3 FLAT ROOF SNOW LOAD			
Ground Snow Load, p_g	30.0	PSF	ASCE 7-10 7.2
Exposure Category	B		ASCE 7-10 26.7.3 Exposure Categories
Exposure of Roof	Partially Exposed		ASCE 7-10 Table 7-2 Exposure Factor
Thermal Condition	All structures except as indicated below		
Risk Category	II		ASCE 7-10 Table 1.5-1, UFC 3-301-01 Table 2-2
Snow load importance factor, I_s	1.0		ASCE 7-10 Table 1.5-2, UFC 3-301-01 Table 2-2
Snow exposure factor, C_e	1.00		ASCE 7-10 Table 7-2 Exposure Factor
Thermal factor, C_t	1.00		ASCE 7-10 Table 7-3 Thermal Factor
Flat-roof snow load, p_f	21.0	PSF	ASCE 7-10 (7.3-1) $0.7C_eC_tI_sp_g$
Min. Design Flat Roof Snow Load, p_m	20.0	PSF	ASCE 7-10 7.4 $p_g \leq 20$ PSF I_sp_g , $p_g > 20$ PSF $20I_s$
Design Flat Roof Snow Load, p_f	21.0	PSF	

ASCE 7-10 7.4 SLOPE ROOF SNOW LOAD				
Roof Pitch	5	:12		
Roof Slope, θ	22.62	°		
Roof Surface	All Other Surfaces			
Warm Roof Slope Factor, C_s	1.00		ASCE 7-10 Section 7.4.1, 7.4.2, 7.4.3 Figure(s)	
Slope Roof Design Snow Load, p_s	21.0	PSF	ASCE-7-10 (7.4-1) $C_s \cdot p_f$	

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C:\Users\ldsta\Dropbox\PNW Project Files\2019 Projects\19-002C Red Barn Lane - Duplex\ENGR\19-002c Design Criteria 2018.xlsx Snow Load
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Location: WALL-3RD-1

Wall

[2015 International Building Code(2015 NDS)]

1.5 IN x 5.5 IN x 8.08 FT @ 16 O.C.

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 87.0%

Controlling Factor: Combined Stress Factor

Location: RFB1

Roof Beam

[2015 International Building Code(2015 NDS)]

(2) 1.5 IN x 5.5 IN x 3.33 FT

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 71.1%

Controlling Factor: Moment

Location: RFB2

Roof Beam

[2015 International Building Code(2015 NDS)]

(2) 1.5 IN x 5.5 IN x 5.33 FT

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 219.2%

Controlling Factor: Moment

Location: WALL-3RD-2

Wall

[2015 International Building Code(2015 NDS)]

1.5 IN x 5.5 IN x 8.08 FT @ 16 O.C.

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 87.5%

Controlling Factor: Combined Stress Factor

Location: WALL-3RD-3

Wall

[2015 International Building Code(2015 NDS)]

1.5 IN x 5.5 IN x 8.08 FT @ 16 O.C.

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 87.5%

Controlling Factor: Combined Stress Factor

Location: MLB3-1

Multi-Loaded Multi-Span Beam

[2015 International Building Code(2015 NDS)]

1.75 IN x 11.875 IN x 6.83 FT

LSL 2360 Fb-1.55E - Louisiana Pacific

Section Adequate By: 86.2%

Controlling Factor: Moment

Location: JST3-1

Floor Joist

[2015 International Building Code(2015 NDS)]

SERIES 18 / 11.875 - Louisiana Pacific x 10.83 FT @ 16 O.C.

Section Adequate By: 123.4%

Controlling Factor: End Reaction

Location: JST3-2

Floor Joist

[2015 International Building Code(2015 NDS)]

SERIES 56 / 11.875 - Louisiana Pacific x 17.83 FT @ 16 O.C.

Section Adequate By: 89.6%

Controlling Factor: End Reaction

Location: JST3-3

Floor Joist

[2015 International Building Code(2015 NDS)]

SERIES 56 / 11.875 - Louisiana Pacific x 19.83 FT (17.8 + 2) @ 16 O.C.

Section Adequate By: 34.9%

Controlling Factor: End Reaction

Location: JST3-4

Floor Joist

[2015 International Building Code(2015 NDS)]

SERIES 56 / 11.875 - Louisiana Pacific x 19.83 FT @ 16 O.C.

Section Adequate By: 52.2%

Controlling Factor: Deflection

Location: JST3-5

Floor Joist

[2015 International Building Code(2015 NDS)]

SERIES 56 / 11.875 - Louisiana Pacific x 15.67 FT @ 16 O.C.

Section Adequate By: 105.7%

Controlling Factor: End Reaction

Location: JST3-6

Floor Joist

[2015 International Building Code(2015 NDS)]

SERIES 56 / 11.875 - Louisiana Pacific x 14.17 FT @ 16 O.C.

Section Adequate By: 127.5%

Controlling Factor: End Reaction

Location: MLB3-2

Multi-Loaded Multi-Span Beam

[2015 International Building Code(2015 NDS)]

3.5 IN x 6.0 IN x 5.33 FT

24F-V4 - Visually Graded Western Species - Dry Use

Section Adequate By: 59.5%

Controlling Factor: Moment

Location: WALL-2ND-1

Wall

[2015 International Building Code(2015 NDS)]

1.5 IN x 5.5 IN x 8.08 FT @ 16 O.C.

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 87.5%

Controlling Factor: Combined Stress Factor

Location: WALL-2ND-2

Wall

[2015 International Building Code(2015 NDS)]

1.5 IN x 5.5 IN x 8.08 FT @ 16 O.C.

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 95.1%

Controlling Factor: Combined Stress Factor

Location: WALL-2ND-3

Wall

[2015 International Building Code(2015 NDS)]

1.5 IN x 5.5 IN x 8.08 FT @ 16 O.C.

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 95.1%

Controlling Factor: Combined Stress Factor

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Location: JST3-7
Floor Joist
[2015 International Building Code(2015 NDS)]
SERIES 18 / 11.875 - Louisiana Pacific x 10.75 FT @ 16 O.C.
Section Adequate By: 125.0%
Controlling Factor: End Reaction

Location: MLB3-3
Multi-Loaded Multi-Span Beam
[2015 International Building Code(2015 NDS)]
1.75 IN x 11.25 IN x 6.5 FT (4.8 + 1.8)
LSL 1730 Fb-1.35E - Louisiana Pacific
Section Adequate By: 330.4%
Controlling Factor: Moment

Location: JST3-8
Floor Joist
[2015 International Building Code(2015 NDS)]
SERIES 56 / 11.875 - Louisiana Pacific x 6.33 FT (4.6 + 1.8) @ 16 O.C.
Section Adequate By: 13.7%
Controlling Factor: End Reaction

Location: MLB3-4
Multi-Loaded Multi-Span Beam
[2015 International Building Code(2015 NDS)]
3.5 IN x 11.875 IN x 17.83 FT
LSL 2360 Fb-1.55E - Louisiana Pacific
Section Adequate By: 48.1%
Controlling Factor: Deflection

Location: WALL-2ND-4
Wall
[2015 International Building Code(2015 NDS)]
1.5 IN x 5.5 IN x 8.08 FT @ 16 O.C.
#2 - Douglas-Fir-Larch - Dry Use
Section Adequate By: 87.5%
Controlling Factor: Combined Stress Factor

Location: MLB3-5
Multi-Loaded Multi-Span Beam
[2015 International Building Code(2015 NDS)]
3.5 IN x 6.0 IN x 5.33 FT
24F-V4 - Visually Graded Western Species - Dry Use
Section Adequate By: 42.7%
Controlling Factor: Moment

Location: WALL-2ND-5
Wall
[2015 International Building Code(2015 NDS)]
1.5 IN x 5.5 IN x 8.08 FT @ 16 O.C.
#2 - Douglas-Fir-Larch - Dry Use
Section Adequate By: 87.5%
Controlling Factor: Combined Stress Factor

Location: JST2-2
Floor Joist
[2015 International Building Code(2015 NDS)]
SERIES 56 / 11.875 - Louisiana Pacific x 12.75 FT (11 + 1.8) @ 16 O.C.
Section Adequate By: 22.4%
Controlling Factor: End Reaction

Location: JST2-1
Floor Joist
[2015 International Building Code(2015 NDS)]
SERIES 18 / 11.875 - Louisiana Pacific x 10.83 FT @ 16 O.C.
Section Adequate By: 153.3%
Controlling Factor: End Reaction

Location: JST2-3
Floor Joist
[2015 International Building Code(2015 NDS)]
SERIES 18 / 11.875 - Louisiana Pacific x 6.92 FT @ 16 O.C.
Section Adequate By: 296.5%
Controlling Factor: End Reaction

Location: JST2-4
Floor Joist
[2015 International Building Code(2015 NDS)]
SERIES 18 / 11.875 - Louisiana Pacific x 3.33 FT @ 16 O.C.
Section Adequate By: 723.9%
Controlling Factor: End Reaction

Location: MLB2-1 GLB
Multi-Loaded Multi-Span Beam
[2015 International Building Code(2015 NDS)]
3.5 IN x 11.875 IN x 25.09 FT (12.4 + 12.7)
24F-V4 - Visually Graded Western Species - Dry Use
Section Adequate By: 45.0%
Controlling Factor: Moment

Location: MLB2-1 LSL
Multi-Loaded Multi-Span Beam
[2015 International Building Code(2015 NDS)]
3.5 IN x 11.875 IN x 25.09 FT (12.4 + 12.7)
LSL 2360 Fb-1.55E - Louisiana Pacific
Section Adequate By: 75.7%
Controlling Factor: Moment

Location: FTG-PST-MLB2-1B
Footing
[2015 International Building Code(2015 NDS)]
Footing Size: 2.0 FT x 2.0 FT x 10.00 IN
Reinforcement: #4 Bars @ 8.00 IN. O.C. E/W / (3) min.
Section Footing Design Adequate

Location: PST-MLB2-1A
Column
[2015 International Building Code(2015 NDS)]
1.5 IN x 3.5 IN x 9.08 FT
#2 - Douglas-Fir-Larch - Dry Use
Section Adequate By: 16.4%

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Location: FTG-PST-MLB2-1A

Footing

[2015 International Building Code(2015 NDS)]

Footing Size: 1.0 FT x 1.0 FT x 10.00 IN

Reinforcement in Long Direction: #4 Bars @ 5.50 IN. O.C. / (2) min.

Reinforcement in Short Direction-center band (Equal to width of short side): #4 Bars @ 5.50 IN. O.C. / (2) min.

Reinforcement in Short Direction-outside bands: #4 Bars @ 0.00 IN. O.C. / () Each band.

Section Footing Design Adequate

Location: WALL-1ST-1

Wall

[2015 International Building Code(2015 NDS)]

1.5 IN x 5.5 IN x 8.08 FT @ 16 O.C.

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 87.5%

Controlling Factor: Combined Stress Factor

Location: PST-MLB2-1B

Column

[2015 International Building Code(2015 NDS)]

5.5 IN x 5.5 IN x 9.08 FT

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 60.5%

Location: FTG-WALL-1ST-1

Footing

[2015 International Building Code(2015 NDS)]

Footing Size: 18.0 IN Wide x 8.0 IN Deep Continuous Footing With 8.0 IN Thick x 12.0 IN Tall Stemwall

Longitudinal Reinforcement: (2) Continuous #4 Bars

Transverse Reinforcement: #4 Bars @ 13.00 IN. O.C. (unnecessary)

Section Footing Design Adequate

Location: WALL-2ND-6

Wall

[2015 International Building Code(2015 NDS)]

1.5 IN x 5.5 IN x 8.08 FT @ 16 O.C.

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 87.5%

Controlling Factor: Combined Stress Factor

Location: MLB2-2

Multi-Loaded Multi-Span Beam

[2015 International Building Code(2015 NDS)]

1.75 IN x 11.875 IN x 6.5 FT

LSL 2360 Fb-1.55E - Louisiana Pacific

Section Adequate By: 226.3%

Controlling Factor: Moment

Location: RFB3

Roof Beam

[2015 International Building Code(2015 NDS)]

3.5 IN x 7.25 IN x 8.33 FT

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 150.0%

Controlling Factor: Moment

Location: RFB4

Roof Beam

[2015 International Building Code(2015 NDS)]

5.5 IN x 7.5 IN x 6.83 FT

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 242.3%

Controlling Factor: Moment

Location: MLB2-3

Multi-Loaded Multi-Span Beam

[2015 International Building Code(2015 NDS)]

5.5 IN x 11.875 IN x 17.84 FT (10.9 + 6.9) / 30F - 30F-E

DF2 - Dry Use

Section Adequate By: 5.9%

Controlling Factor: Shear

Location: PST-MLB2-3A

Column

[2015 International Building Code(2015 NDS)]

5.5 IN x 5.5 IN x 9.58 FT

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 36.2%

Location: PST-MLB2-3B

Column

[2015 International Building Code(2015 NDS)]

5.5 IN x 7.5 IN x 9.58 FT

#1 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 11.0%

Location: PST-MLB2-3C

Column

[2015 International Building Code(2015 NDS)]

5.5 IN x 5.5 IN x 9.58 FT

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 67.0%

Location: FTG-PST-MLB2-3A

Footing

[2015 International Building Code(2015 NDS)]

Footing Size: 2.5 FT x 2.5 FT x 10.00 IN

Reinforcement: #4 Bars @ 11.00 IN. O.C. E/W / (3) min.

Section Footing Design Adequate

Location: FTG-PST-MLB2-3C

Footing

[2015 International Building Code(2015 NDS)]

Footing Size: 2.5 FT x 2.5 FT x 12.00 IN

Reinforcement: #4 Bars @ 7.00 IN. O.C. E/W / (4) min.

Section Footing Design Adequate

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing



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Location: FTG-PST-MLB2-3B

Footing

[2015 International Building Code(2015 NDS)]

Footing Size: 3.5 FT x 3.5 FT x 10.00 IN

Reinforcement: #4 Bars @ 11.00 IN. O.C. E/W / (4) min.

Section Footing Design Adequate

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Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: WALL-3RD-1

Wall

[2015 International Building Code(2015 NDS)]

1.5 IN x 5.5 IN x 8.08 FT @ 16 O.C.

#2 - Douglas-Fir-Larch - Dry Use

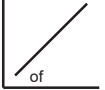
Section Adequate By: 87.0%

Controlling Factor: Combined Stress Factor



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DEFLECTIONS

Deflection due to lateral loads only: Defl = 0.06 IN = L/1638
Live Load Deflection Criteria: L/180

VERTICAL REACTIONS

Live Load: Vert-LL-Rxn = 575 lb
Dead Load: Vert-DL-Rxn = 464 lb
Total Load: Vert-TL-Rxn = 1039 lb

HORIZONTAL REACTIONS

Total Reaction at Top of Column: TL-Rxn-Top = 83 lb
Total Reaction at Bottom of Column: TL-Rxn-Bottom = 83 lb

WALL DATA

Total Stud Length: 8.08 ft
Wall Dead Weight: 11 psf
Unbraced Length (X-Axis) Lx: 8.08 ft
Unbraced Length (Y-Axis) Ly: 0 ft
Stud End Condition-K (e): 1
Axial Load Duration Factor: 1.15
Lateral Load Duration Factor (Wind/Seismic): 1.60

STUD PROPERTIES

#2 - Douglas-Fir-Larch

	Base Values	Adjusted
Compressive Stress:	Fc = 1350 psi	Fc' = 1254 psi
	Cd=1.60 Cf=1.10 Cp=0.53	
Bending Stress (X-X Axis):	Fbx = 900 psi	Fbx' = 2153 psi
	Cd=1.60 CF=1.30 Cr=1.15 Cl=1.00	
Bending Stress (Y-Y Axis):	Fby = 900 psi	Fby' = 2153 psi
	Cd=1.60 CF=1.30 Cr=1.15	
Modulus of Elasticity:	E = 1600 ksi	E' = 1600 ksi

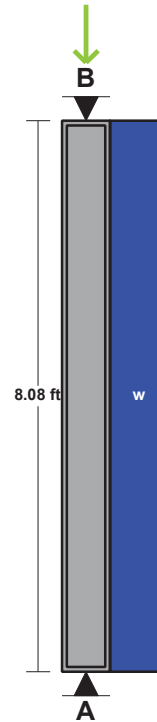
Stud Section (X-X Axis):	dx = 5.5 in
Stud Section (Y-Y Axis):	dy = 1.5 in
Area:	A = 8.25 in ²
Section Modulus (X-X Axis):	Sx = 7.56 in ³
Section Modulus (Y-Y Axis):	Sy = 2.06 in ³
Slenderness Ratio:	Lex/dx = 17.63
	Ley/dy = 0

Stud Calculations (Controlling Case Only):

Controlling Load Case: Axial Dead Load and Lateral loads (D + W or E)

Actual Compressive Stress:	Fc = 56 psi
Allowable Compressive Stress:	Fc' = 1254 psi
Eccentricity Moment (X-X Axis):	Mx-ex = 0 ft-lb
Eccentricity Moment (Y-Y Axis):	My-ey = 0 ft-lb
Moment Due to Lateral Loads (X-X Axis):	Mx = 168 ft-lb
Moment Due to Lateral Loads (Y-Y Axis):	My = 0 ft-lb
Bending Stress Lateral Loads Only (X-X Axis):	Fbx = 266 psi
Allowable Bending Stress (X-X Axis):	Fbx' = 2153 psi
Bending Stress Lateral Loads Only (Y-Y Axis):	Fby = 0 psi
Allowable Bending Stress (Y-Y Axis):	Fby' = 2153 psi
Combined Stress Factor:	CSF = 0.13

LOADING DIAGRAM



WALL LOAD CALCULATOR

	Live Load	Dead Load	Tributary Width
Load Tracker:	LL = 0 plf	DL = 0 plf	
Roof:	LL = 25 psf	DL = 15 psf	TA = 17.3 ft
Upper Floor:	LL = 40 psf	DL = 15 psf	TA = 0 ft
Upper Floor Height:	0 ft		
Middle Floor:	LL = 40 psf	DL = 15 psf	TA = 0 ft
Middle Floor Height:	0 ft		
Calculated Load:	LL = 431.3 plf	DL = 347.6 plf	

AXIAL LOADING

Live Load:	PL = 431 plf
Dead Load:	PD = 348 plf
Total Axial Load:	PT = 779 plf

LATERAL LOADING (Dy Face)

Uniform Lateral Load: wL-Lat = 15 psf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: RFB1

Roof Beam

[2015 International Building Code(2015 NDS)]

(2) 1.5 IN x 5.5 IN x 3.33 FT

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 71.1%

Controlling Factor: Moment



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DEFLECTIONS

Center

Live Load 0.02 IN L/2229

Dead Load 0.01 in

Total Load 0.03 IN L/1344

Live Load Deflection Criteria: L/240 Total Load Deflection Criteria: L/180

REACTIONS

A

B

Live Load 718 lb 718 lb

Dead Load 473 lb 473 lb

Total Load 1191 lb 1191 lb

Bearing Length 0.64 in 0.64 in

BEAM DATA

Span Length 3.3 ft

Unbraced Length-Top 0 ft

Unbraced Length-Bottom 0 ft

Roof Pitch 5 :12

Roof Duration Factor 1.15

MATERIAL PROPERTIES

#2 - Douglas-Fir-Larch

Base Values

Adjusted

Bending Stress: $F_b = 900$ psi $F_b' = 1346$ psi

$C_d = 1.15$ $CF = 1.30$

Shear Stress: $F_v = 180$ psi $F_v' = 207$ psi

$C_d = 1.15$

Modulus of Elasticity: $E = 1600$ ksi $E' = 1600$ ksi

Comp. \perp to Grain: $F_c - \perp = 625$ psi $F_c - \perp' = 625$ psi

Controlling Moment: 991 ft-lb

1.665 ft from left support

Created by combining all dead and live loads.

Controlling Shear: -881 lb

At a distance d from support.

Created by combining all dead and live loads.

Comparisons with required sections:

Req'd

Provided

Section Modulus: 8.84 in³ 15.13 in³

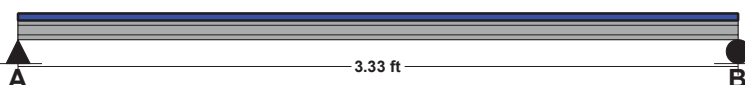
Area (Shear): 6.38 in² 16.5 in²

Moment of Inertia (deflection): 5.57 in⁴ 41.59 in⁴

Moment: 991 ft-lb 1696 ft-lb

Shear: -881 lb 2277 lb

LOADING DIAGRAM



ROOF LOADING

Side One:

Roof Live Load: LL = 25 psf

Roof Dead Load: DL = 15 psf

Tributary Width: TW = 17.3 ft

Side Two:

Roof Live Load: LL = 0 psf

Roof Dead Load: DL = 0 psf

Tributary Width: TW = 0 ft

Wall Load: WALL = 0 plf

SLOPE/PITCH ADJUSTED LENGTHS AND LOADS

Adjusted Beam Length: Ladj = 3.33 ft

Beam Self Weight: BSW = 4 plf

Beam Uniform Live Load: wL = 431 plf

Beam Uniform Dead Load: wD_adj = 284 plf

Total Uniform Load: wT = 715 plf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: RFB2

Roof Beam

[2015 International Building Code(2015 NDS)]

(2) 1.5 IN x 5.5 IN x 5.33 FT

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 219.2%

Controlling Factor: Moment



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DEFLECTIONS

Center

Live Load 0.01 IN L/4689

Dead Load 0.03 in

Total Load 0.04 IN L/1567

Live Load Deflection Criteria: L/240 Total Load Deflection Criteria: L/180

REACTIONS

A

B

Live Load 133 lb 133 lb

Dead Load 266 lb 266 lb

Total Load 399 lb 399 lb

Bearing Length 0.21 in 0.21 in

BEAM DATA

Span Length 5.3 ft

Unbraced Length-Top 0 ft

Unbraced Length-Bottom 0 ft

Roof Pitch 8 :12

Roof Duration Factor 1.15

MATERIAL PROPERTIES

#2 - Douglas-Fir-Larch

Base Values

Adjusted

Bending Stress: $F_b = 900$ psi $F_b' = 1346$ psi

$C_d = 1.15$ $CF = 1.30$

Shear Stress: $F_v = 180$ psi $F_v' = 207$ psi

$C_d = 1.15$

Modulus of Elasticity: $E = 1600$ ksi $E' = 1600$ ksi

Comp. \perp to Grain: $F_c - \perp = 625$ psi $F_c - \perp' = 625$ psi

Controlling Moment: 531 ft-lb

2.665 ft from left support

Created by combining all dead and live loads.

Controlling Shear: -335 lb

At a distance d from support.

Created by combining all dead and live loads.

Comparisons with required sections:

Req'd

Provided

Section Modulus: 4.74 in³ 15.13 in³

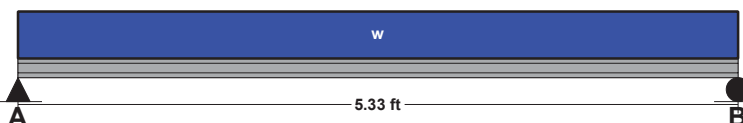
Area (Shear): 2.43 in² 16.5 in²

Moment of Inertia (deflection): 4.78 in⁴ 41.59 in⁴

Moment: 531 ft-lb 1696 ft-lb

Shear: -335 lb 2277 lb

LOADING DIAGRAM



ROOF LOADING

Side One:

Roof Live Load: LL = 25 psf

Roof Dead Load: DL = 15 psf

Tributary Width: TW = 2 ft

Side Two:

Roof Live Load: LL = 0 psf

Roof Dead Load: DL = 0 psf

Tributary Width: TW = 0 ft

Wall Load: WALL = 60 plf

SLOPE/PITCH ADJUSTED LENGTHS AND LOADS

Adjusted Beam Length: Ladj = 5.33 ft

Beam Self Weight: BSW = 4 plf

Beam Uniform Live Load: wL = 50 plf

Beam Uniform Dead Load: wD_adj = 100 plf

Total Uniform Load: wT = 150 plf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: WALL-3RD-2

Wall

[2015 International Building Code(2015 NDS)]

1.5 IN x 5.5 IN x 8.08 FT @ 16 O.C.

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 87.5%

Controlling Factor: Combined Stress Factor



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DEFLECTIONS

Deflection due to lateral loads only: Defl = 0.06 IN = L/1638

Live Load Deflection Criteria: L/180

VERTICAL REACTIONS

Live Load: Vert-LL-Rxn = 73 lb

Dead Load: Vert-DL-Rxn = 163 lb

Total Load: Vert-TL-Rxn = 236 lb

HORIZONTAL REACTIONS

Total Reaction at Top of Column: TL-Rxn-Top = 83 lb

Total Reaction at Bottom of Column: TL-Rxn-Bottom = 83 lb

WALL DATA

Total Stud Length: 8.08 ft

Wall Dead Weight: 11 psf

Unbraced Length (X-Axis) Lx: 8.08 ft

Unbraced Length (Y-Axis) Ly: 0 ft

Stud End Condition-K (e): 1

Axial Load Duration Factor: 1.15

Lateral Load Duration Factor (Wind/Seismic): 1.60

STUD PROPERTIES

#2 - Douglas-Fir-Larch

	Base Values	Adjusted
Compressive Stress:	Fc = 1350 psi	Fc' = 1254 psi
	Cd=1.60 Cf=1.10 Cp=0.53	

Bending Stress (X-X Axis):	Fbx = 900 psi	Fbx' = 2153 psi
	Cd=1.60 CF=1.30 Cr=1.15 Cl=1.00	

Bending Stress (Y-Y Axis):	Fby = 900 psi	Fby' = 2153 psi
	Cd=1.60 CF=1.30 Cr=1.15	

Modulus of Elasticity:	E = 1600 ksi	E' = 1600 ksi
------------------------	--------------	---------------

Stud Section (X-X Axis):	dx = 5.5 in
--------------------------	-------------

Stud Section (Y-Y Axis):	dy = 1.5 in
--------------------------	-------------

Area:	A = 8.25 in ²
-------	--------------------------

Section Modulus (X-X Axis):	Sx = 7.56 in ³
-----------------------------	---------------------------

Section Modulus (Y-Y Axis):	Sy = 2.06 in ³
-----------------------------	---------------------------

Slenderness Ratio:	Lex/dx = 17.63
--------------------	----------------

	Ley/dy = 0
--	------------

Stud Calculations (Controlling Case Only):

Controlling Load Case: Axial Dead Load and Lateral loads (D + W or E)

Actual Compressive Stress:	Fc = 20 psi
----------------------------	-------------

Allowable Compressive Stress:	Fc' = 1254 psi
-------------------------------	----------------

Eccentricity Moment (X-X Axis):	Mx-ex = 0 ft-lb
---------------------------------	-----------------

Eccentricity Moment (Y-Y Axis):	My-ey = 0 ft-lb
---------------------------------	-----------------

Moment Due to Lateral Loads (X-X Axis):	Mx = 168 ft-lb
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Moment Due to Lateral Loads (Y-Y Axis):	My = 0 ft-lb
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Bending Stress Lateral Loads Only (X-X Axis):	Fbx = 266 psi
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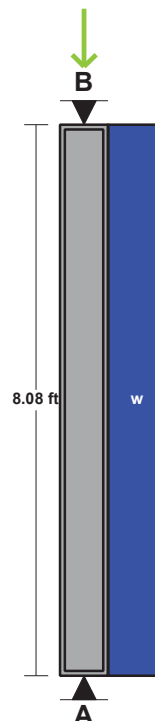
Allowable Bending Stress (X-X Axis):	Fbx' = 2153 psi
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Bending Stress Lateral Loads Only (Y-Y Axis):	Fby = 0 psi
---	-------------

Allowable Bending Stress (Y-Y Axis):	Fby' = 2153 psi
--------------------------------------	-----------------

Combined Stress Factor:	CSF = 0.13
-------------------------	------------

LOADING DIAGRAM



WALL LOAD CALCULATOR

	Live Load	Dead Load	Tributary Width
Load Tracker:	LL = 0 plf	DL = 0 plf	
Roof:	LL = 25 psf	DL = 15 psf	TA = 2.2 ft
Upper Floor:	LL = 40 psf	DL = 15 psf	TA = 0 ft
Upper Floor Height:	0 ft		
Middle Floor:	LL = 40 psf	DL = 15 psf	TA = 0 ft
Middle Floor Height:	0 ft		
Calculated Load:	LL = 55 plf	DL = 121.9 plf	

AXIAL LOADING

Live Load:	PL = 55 plf
Dead Load:	PD = 122 plf
Total Axial Load:	PT = 177 plf

LATERAL LOADING (Dy Face)

Uniform Lateral Load: wL-Lat = 15 psf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: WALL-3RD-3

Wall

[2015 International Building Code(2015 NDS)]

1.5 IN x 5.5 IN x 8.08 FT @ 16 O.C.

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 87.5%

Controlling Factor: Combined Stress Factor



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DEFLECTIONS

Deflection due to lateral loads only: Defl = 0.06 IN = L/1638
Live Load Deflection Criteria: L/180

VERTICAL REACTIONS

Live Load: Vert-LL-Rxn = 73 lb
Dead Load: Vert-DL-Rxn = 163 lb
Total Load: Vert-TL-Rxn = 236 lb

HORIZONTAL REACTIONS

Total Reaction at Top of Column: TL-Rxn-Top = 83 lb
Total Reaction at Bottom of Column: TL-Rxn-Bottom = 83 lb

WALL DATA

Total Stud Length: 8.08 ft
Wall Dead Weight: 11 psf
Unbraced Length (X-Axis) Lx: 8.08 ft
Unbraced Length (Y-Axis) Ly: 0 ft
Stud End Condition-K (e): 1
Axial Load Duration Factor: 1.15
Lateral Load Duration Factor (Wind/Seismic): 1.60

STUD PROPERTIES

#2 - Douglas-Fir-Larch

	Base Values	Adjusted
Compressive Stress:	Fc = 1350 psi	Fc' = 1254 psi
	Cd=1.60 Cf=1.10 Cp=0.53	
Bending Stress (X-X Axis):	Fbx = 900 psi	Fbx' = 2153 psi
	Cd=1.60 CF=1.30 Cr=1.15 Cl=1.00	
Bending Stress (Y-Y Axis):	Fby = 900 psi	Fby' = 2153 psi
	Cd=1.60 CF=1.30 Cr=1.15	
Modulus of Elasticity:	E = 1600 ksi	E' = 1600 ksi

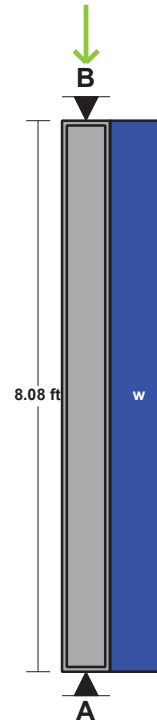
Stud Section (X-X Axis):	dx = 5.5 in
Stud Section (Y-Y Axis):	dy = 1.5 in
Area:	A = 8.25 in ²
Section Modulus (X-X Axis):	Sx = 7.56 in ³
Section Modulus (Y-Y Axis):	Sy = 2.06 in ³
Slenderness Ratio:	Lex/dx = 17.63
	Ley/dy = 0

Stud Calculations (Controlling Case Only):

Controlling Load Case: Axial Dead Load and Lateral loads (D + W or E)

Actual Compressive Stress:	Fc = 20 psi
Allowable Compressive Stress:	Fc' = 1254 psi
Eccentricity Moment (X-X Axis):	Mx-ex = 0 ft-lb
Eccentricity Moment (Y-Y Axis):	My-ey = 0 ft-lb
Moment Due to Lateral Loads (X-X Axis):	Mx = 168 ft-lb
Moment Due to Lateral Loads (Y-Y Axis):	My = 0 ft-lb
Bending Stress Lateral Loads Only (X-X Axis):	Fbx = 266 psi
Allowable Bending Stress (X-X Axis):	Fbx' = 2153 psi
Bending Stress Lateral Loads Only (Y-Y Axis):	Fby = 0 psi
Allowable Bending Stress (Y-Y Axis):	Fby' = 2153 psi
Combined Stress Factor:	CSF = 0.13

LOADING DIAGRAM



WALL LOAD CALCULATOR

	Live Load	Dead Load	Tributary Width
Load Tracker:	LL = 0 plf	DL = 0 plf	
Roof:	LL = 25 psf	DL = 15 psf	TA = 2.2 ft
Upper Floor:	LL = 40 psf	DL = 15 psf	TA = 0 ft
Upper Floor Height:	0 ft		
Middle Floor:	LL = 40 psf	DL = 15 psf	TA = 0 ft
Middle Floor Height:	0 ft		
Calculated Load:	LL = 55 plf	DL = 121.9 plf	

AXIAL LOADING

Live Load:	PL = 55 plf
Dead Load:	PD = 122 plf
Total Axial Load:	PT = 177 plf

LATERAL LOADING (Dy Face)

Uniform Lateral Load: wL-Lat = 15 psf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: MLB3-1

Multi-Loaded Multi-Span Beam

[2015 International Building Code(2015 NDS)]

1.75 IN x 11.875 IN x 6.83 FT

LSL 2360 Fb-1.55E - Louisiana Pacific

Section Adequate By: 86.2%

Controlling Factor: Moment



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DEFLECTIONS

Center

Live Load 0.06 IN L/1309

Dead Load 0.05 in

Total Load 0.11 IN L/739

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS

A

B

Live Load 1653 lb 1653 lb

Dead Load 1277 lb 1277 lb

Total Load 2930 lb 2930 lb

Bearing Length 1.91 in 1.91 in

BEAM DATA

Center

Span Length 6.83 ft

Unbraced Length-Top 0 ft

Unbraced Length-Bottom 6.83 ft

Live Load Duration Factor 1.15

Notch Depth 0.00

MATERIAL PROPERTIES

LSL 2360 Fb-1.55E - Louisiana Pacific

Base Values

Adjusted

Bending Stress: Fb = 2360 psi Fb' = 2718 psi

Cd=1.15 CF=1.00

Shear Stress: Fv = 410 psi Fv' = 472 psi

Cd=1.15

Modulus of Elasticity: E = 1550 ksi E' = 1550 ksi

Comp. \perp to Grain: Fc \perp = 875 psi Fc \perp ' = 875 psi

Controlling Moment: 5003 ft-lb

3.41 Ft from left support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2

Controlling Shear: 2110 lb

At a distance d from left support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2

Comparisons with required sections:

Req'd

Provided

Section Modulus: 22.09 in3 41.13 in3

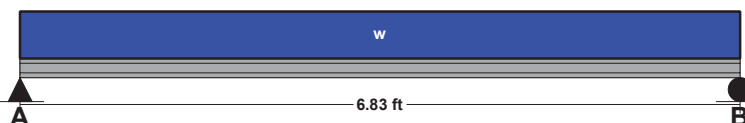
Area (Shear): 6.71 in2 20.78 in2

Moment of Inertia (deflection): 79.36 in4 244.21 in4

Moment: 5003 ft-lb 9316 ft-lb

Shear: 2110 lb 6532 lb

LOADING DIAGRAM



UNIFORM LOADS

Center*

Uniform Live Load 484 plf

Uniform Dead Load 368 plf

Beam Self Weight 6 plf

Total Uniform Load 858 plf

* Load obtained from Load Tracker. See Summary Report for details.

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: JST3-1

Floor Joist

[2015 International Building Code(2015 NDS)]

SERIES 18 / 11.875 - Louisiana Pacific x 10.83 FT @ 16 O.C.

Section Adequate By: 123.4%

Controlling Factor: End Reaction



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DEFLECTIONS

Center

Live Load 0.08 IN L/1606

Dead Load 0.03 in

Total Load 0.11 IN L/1168

Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360

REACTIONS

A

B

Live Load 289 lb 289 lb

Dead Load 108 lb 108 lb

Total Load 397 lb 397 lb

Bearing Length 1.75 in 3.50 in

Web Stiffeners No No

SUPPORT LOADS

A

B

Live Load 217 plf 217 plf

Dead Load 81 plf 81 plf

Total Load 298 plf 298 plf

I-JOIST PROPERTIES

SERIES 18 / 11.875 - Louisiana Pacific

Base Values

Adjusted

Moment Cap: Mcap = 3100 ft-lb Mcap' = 3100 ft-lb

Shear Stress: Vcap = 1335 lb Vcap' = 1335 lb

Reaction A: Rcap = 887 lb Rcap' = 887 lb

Reaction B: Rcap = 1006 lb Rcap' = 1006 lb

E.I.: EI = 248 lb-in² EI' = 248 lb-in²

Controlling Moment: 1075 ft-lb

5.41 Ft from left support of span 3 (Right Span)

Created by combining all dead and live loads.

Controlling Shear: 397 lb

0.0 Ft from left support of span 2 (Center Span)

Created by combining all dead and live loads.

Comparisons with required sections:

Req'd

Provided

E.I.: 76 in²-lb E6

248 in²-lb xE6

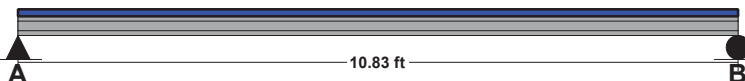
Moment: 1075 ft-lb

3100 ft-lb

Shear: 397 lb

1335 lb

LOADING DIAGRAM



JOIST DATA

Center

Span Length 10.83 ft

Unbraced Length-Top 0 ft

Unbraced Length-Bottom 0 ft

Floor sheathing applied to top of joists-top of joists fully braced.

Floor Duration Factor 1.00

JOIST LOADING

Uniform Floor Loading

Center

Live Load LL = 40 psf

Dead Load DL = 15 psf

Total Load TL = 55 psf

TL Adj. For Joist Spacing wT = 73.3 plf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: JST3-2

Floor Joist

[2015 International Building Code(2015 NDS)]

SERIES 56 / 11.875 - Louisiana Pacific x 17.83 FT @ 16 O.C.

Section Adequate By: 80.8%

Controlling Factor: End Reaction



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DEFLECTIONS

Center

Live Load 0.21 IN L/1007

Dead Load 0.08 in

Total Load 0.29 IN L/733

Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360

REACTIONS

A

B

Live Load 475 lb 475 lb

Dead Load 178 lb 178 lb

Total Load 653 lb 653 lb

Bearing Length 1.75 in 1.75 in

Web Stiffeners No No

SUPPORT LOADS

A

B

Live Load 356 plf 356 plf

Dead Load 134 plf 134 plf

Total Load 490 plf 490 plf

I-JOIST PROPERTIES

SERIES 56 / 11.875 - Louisiana Pacific

Base Values

Adjusted

Moment Cap: Mcap = 10170 ft-lb Mcap' = 10170 ft-lb

Shear Stress: Vcap = 2055 lb Vcap' = 2055 lb

Reaction A: Rcap = 1182 lb Rcap' = 1182 lb

Reaction B: Rcap = 1182 lb Rcap' = 1182 lb

E.I.: EI = 668 lb-in² EI' = 668 lb-in²

Controlling Moment: 2914 ft-lb

8.91 Ft from left support of span 3 (Right Span)

Created by combining all dead and live loads.

Controlling Shear: 654 lb

0.0 Ft from left support of span 2 (Center Span)

Created by combining all dead and live loads.

Comparisons with required sections:

Req'd

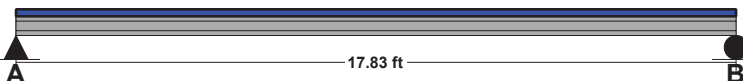
Provided

E.I.: 328 in²-lb E6

Moment: 2914 ft-lb 10170 ft-lb

Shear: 654 lb 2055 lb

LOADING DIAGRAM



JOIST DATA

Center

Span Length 17.83 ft

Unbraced Length-Top 0 ft

Unbraced Length-Bottom 0 ft

Floor sheathing applied to top of joists-top of joists fully braced.

Floor Duration Factor 1.00

JOIST LOADING

Uniform Floor Loading

Center

Live Load LL = 40 psf

Dead Load DL = 15 psf

Total Load TL = 55 psf

TL Adj. For Joist Spacing wT = 73.3 plf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: JST3-3

Floor Joist

[2015 International Building Code(2015 NDS)]

SERIES 56 / 11.875 - Louisiana Pacific x 19.83 FT (17.8 + 2) @ 16 O.C.

Section Adequate By: 34.9%

Controlling Factor: End Reaction



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DEFLECTIONS

	Center	Right
Live Load	0.21 IN L/1007	-0.07 IN 2L/736
Dead Load	0.06 in	-0.01 in
Total Load	0.27 IN L/784	-0.08 IN 2L/610

Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360

REACTIONS

	A	B
Live Load	475 lb	669 lb
Dead Load	160 lb	399 lb
Total Load	635 lb	1068 lb
Bearing Length	3.50 in	3.50 in
Web Stiffeners	No	No

SUPPORT LOADS

	A	B
Live Load	356 plf	502 plf
Dead Load	120 plf	299 plf
Total Load	476 plf	801 plf

I-JOIST PROPERTIES

SERIES 56 / 11.875 - Louisiana Pacific

	Base Values	Adjusted
Moment Cap:	Mcap = 10170 ft-lb Cd = 1.00	Mcap' = 10170 ft-lb
Shear Stress:	Vcap = 2055 lb Cd = 1.00	Vcap' = 2055 lb
Reaction A:	Rcap = 1441 lb	Rcap' = 1441 lb
Reaction B:	Rcap = 1441 lb	Rcap' = 1441 lb
E.I.:	EI = 668 lb-in ²	EI' = 668 lb-in ²

Controlling Moment: 2754 ft-lb

8.74 Ft from left support of span 3 (Right Span)

Created by combining all dead and live loads.

Controlling Shear: -685 lb

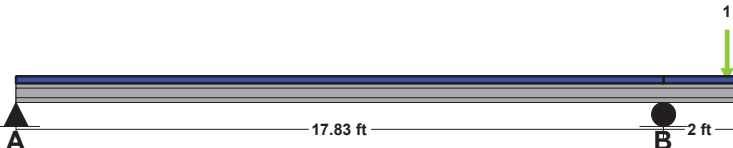
18.0 Ft from left support of span 2 (Center Span)

Created by combining all dead and live loads.

Comparisons with required sections:

	Req'd	Provided
E.I.:	435 in ² -lb E6	668 in ² -lb xE6
Moment:	2754 ft-lb	10170 ft-lb
Shear:	-685 lb	2055 lb

LOADING DIAGRAM



JOIST DATA

	Center	Right
Span Length	17.83 ft	2 ft
Unbraced Length-Top	0 ft	0 ft
Unbraced Length-Bottom	0 ft	0 ft
Floor sheathing applied to top of joists-top of joists fully braced.		
Floor Duration Factor	1.00	

JOIST LOADING

Uniform Floor Loading	Center	Right
Live Load	LL = 40 psf	40 psf
Dead Load	DL = 15 psf	15 psf
Total Load	TL = 55 psf	55 psf
TL Adj. For Joist Spacing wT =	73.3 plf	73.3 plf

Wall Loading

Wall One

Live Load (⊥ to Joists): L1 =	0 plf	55 plf
Dead Load (⊥ to Joists) D1 =	0 plf	122 plf
Load Location X1 =	0 ft	1.75 ft

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: JST3-4

Floor Joist

[2015 International Building Code(2015 NDS)]

SERIES 56 / 11.875 - Louisiana Pacific x 19.83 FT @ 16 O.C.

Section Adequate By: 52.2%

Controlling Factor: Deflection



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DEFLECTIONS

Center

Live Load 0.32 IN L/753

Dead Load 0.12 in

Total Load 0.43 IN L/548

Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360

REACTIONS

A

B

Live Load 529 lb 529 lb

Dead Load 198 lb 198 lb

Total Load 727 lb 727 lb

Bearing Length 1.75 in 1.75 in

Web Stiffeners No No

SUPPORT LOADS

A

B

Live Load 397 plf 397 plf

Dead Load 149 plf 149 plf

Total Load 545 plf 545 plf

I-JOIST PROPERTIES

SERIES 56 / 11.875 - Louisiana Pacific

Base Values

Adjusted

Moment Cap: Mcap = 10170 ft-lb Mcap' = 10170 ft-lb

Shear Stress: Vcap = 2055 lb Vcap' = 2055 lb

Cd = 1.00 Cd = 1.00

Reaction A: Rcap = 1182 lb Rcap' = 1182 lb

Reaction B: Rcap = 1182 lb Rcap' = 1182 lb

E.I.: EI = 668 lb-in² EI' = 668 lb-in²

Controlling Moment: 3605 ft-lb

9.91 Ft from left support of span 3 (Right Span)

Created by combining all dead and live loads.

Controlling Shear: 727 lb

0.0 Ft from left support of span 2 (Center Span)

Created by combining all dead and live loads.

Comparisons with required sections:

Req'd

Provided

E.I.: 439 in²-lb E6

668 in²-lb xE6

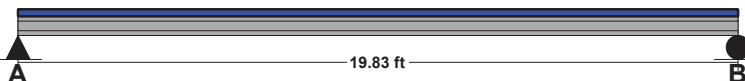
Moment: 3605 ft-lb

10170 ft-lb

Shear: 727 lb

2055 lb

LOADING DIAGRAM



JOIST DATA

Center

Span Length 19.83 ft

Unbraced Length-Top 0 ft

Unbraced Length-Bottom 0 ft

Floor sheathing applied to top of joists-top of joists fully braced.

Floor Duration Factor 1.00

JOIST LOADING

Uniform Floor Loading

Center

Live Load LL = 40 psf

Dead Load DL = 15 psf

Total Load TL = 55 psf

TL Adj. For Joist Spacing wT = 73.3 plf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: JST3-5

Floor Joist

[2015 International Building Code(2015 NDS)]

SERIES 56 / 11.875 - Louisiana Pacific x 15.67 FT @ 16 O.C.

Section Adequate By: 105.7%

Controlling Factor: End Reaction



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DEFLECTIONS

Center

Live Load 0.13 IN L/1423

Dead Load 0.05 in

Total Load 0.18 IN L/1035

Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360

REACTIONS

A

B

Live Load 418 lb 418 lb

Dead Load 157 lb 157 lb

Total Load 575 lb 575 lb

Bearing Length 1.75 in 1.75 in

Web Stiffeners No No

SUPPORT LOADS

A

B

Live Load 314 plf 314 plf

Dead Load 118 plf 118 plf

Total Load 431 plf 431 plf

I-JOIST PROPERTIES

SERIES 56 / 11.875 - Louisiana Pacific

Base Values

Adjusted

Moment Cap: Mcap = 10170 ft-lb Mcap' = 10170 ft-lb

Shear Stress: Vcap = 2055 lb Vcap' = 2055 lb

Reaction A: Rcap = 1182 lb Rcap' = 1182 lb

Reaction B: Rcap = 1182 lb Rcap' = 1182 lb

E.I.: EI = 668 lb-in² EI' = 668 lb-in²

Controlling Moment: 2251 ft-lb

7.84 Ft from left support of span 3 (Right Span)

Created by combining all dead and live loads.

Controlling Shear: -575 lb

16.0 Ft from left support of span 2 (Center Span)

Created by combining all dead and live loads.

Comparisons with required sections:

Req'd

Provided

E.I.: 232 in²-lb E6

668 in²-lb xE6

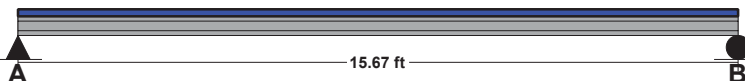
Moment: 2251 ft-lb

10170 ft-lb

Shear: -575 lb

2055 lb

LOADING DIAGRAM



JOIST DATA

Center

Span Length 15.67 ft

Unbraced Length-Top 0 ft

Unbraced Length-Bottom 0 ft

Floor sheathing applied to top of joists-top of joists fully braced.

Floor Duration Factor 1.00

JOIST LOADING

Uniform Floor Loading

Center

Live Load LL = 40 psf

Dead Load DL = 15 psf

Total Load TL = 55 psf

TL Adj. For Joist Spacing wT = 73.3 plf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: JST3-6

Floor Joist

[2015 International Building Code(2015 NDS)]

SERIES 56 / 11.875 - Louisiana Pacific x 14.17 FT @ 16 O.C.

Section Adequate By: 127.5%

Controlling Factor: End Reaction



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DEFLECTIONS

Center

Live Load 0.09 IN L/1850

Dead Load 0.03 in

Total Load 0.13 IN L/1345

Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360

REACTIONS

A

B

Live Load 378 lb 378 lb

Dead Load 142 lb 142 lb

Total Load 520 lb 520 lb

Bearing Length 1.75 in 1.75 in

Web Stiffeners No No

SUPPORT LOADS

A

B

Live Load 284 plf 284 plf

Dead Load 107 plf 107 plf

Total Load 390 plf 390 plf

I-JOIST PROPERTIES

SERIES 56 / 11.875 - Louisiana Pacific

Base Values

Adjusted

Moment Cap: Mcap = 10170 ft-lb Mcap' = 10170 ft-lb

Shear Stress: Vcap = 2055 lb Vcap' = 2055 lb

Reaction A: Rcap = 1182 lb Rcap' = 1182 lb

Reaction B: Rcap = 1182 lb Rcap' = 1182 lb

E.I.: EI = 668 lb-in² EI' = 668 lb-in²

Controlling Moment: 1841 ft-lb

7.09 Ft from left support of span 3 (Right Span)

Created by combining all dead and live loads.

Controlling Shear: 520 lb

0.0 Ft from left support of span 2 (Center Span)

Created by combining all dead and live loads.

Comparisons with required sections:

Req'd

Provided

E.I.: 179 in²-lb E6

668 in²-lb xE6

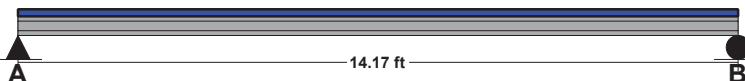
Moment: 1841 ft-lb

10170 ft-lb

Shear: 520 lb

2055 lb

LOADING DIAGRAM



JOIST DATA

Center

Span Length 14.17 ft

Unbraced Length-Top 0 ft

Unbraced Length-Bottom 0 ft

Floor sheathing applied to top of joists-top of joists fully braced.

Floor Duration Factor 1.00

JOIST LOADING

Uniform Floor Loading

Center

Live Load LL = 40 psf

Dead Load DL = 15 psf

Total Load TL = 55 psf

TL Adj. For Joist Spacing wT = 73.3 plf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: MLB3-2

Multi-Loaded Multi-Span Beam

[2015 International Building Code(2015 NDS)]

3.5 IN x 6.0 IN x 5.33 FT

24F-V4 - Visually Graded Western Species - Dry Use

Section Adequate By: 59.5%

Controlling Factor: Moment



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DEFLECTIONS

Center

Live Load 0.07 IN L/982

Dead Load 0.05 in

Total Load 0.12 IN L/549

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS

A

B

Live Load 1062 lb 1038 lb

Dead Load 809 lb 760 lb

Total Load 1871 lb 1798 lb

Bearing Length 0.82 in 0.79 in

BEAM DATA

Center

Span Length 5.33 ft

Unbraced Length-Top 0 ft

Unbraced Length-Bottom 5.33 ft

Live Load Duration Factor 1.00

Camber Adj. Factor 1.5

Camber Required 0.08

Notch Depth 0.00

MATERIAL PROPERTIES

24F-V4 - Visually Graded Western Species

Base Values

Adjusted

Bending Stress: Fb = 2400 psi Controlled by:
Fb_cmpr = 1850 psi Fb' = 2400 psi
Cd=1.00

Shear Stress: Fv = 265 psi Fv' = 265 psi
Cd=1.00

Modulus of Elasticity: E = 1800 ksi E' = 1800 ksi
Comp. \perp to Grain: Fc \perp = 650 psi Fc \perp ' = 650 psi

Controlling Moment: 2633 ft-lb

2.4 Ft from left support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2

Controlling Shear: 1577 lb

At a distance d from left support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2

Comparisons with required sections:

Req'd

Provided

Section Modulus: 13.17 in³ 21 in³

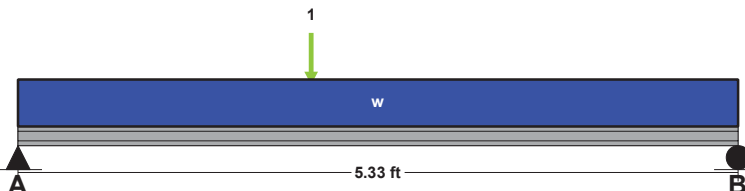
Area (Shear): 8.93 in² 21 in²

Moment of Inertia (deflection): 27.54 in⁴ 63 in⁴

Moment: 2633 ft-lb 4200 ft-lb

Shear: 1577 lb 3710 lb

LOADING DIAGRAM



UNIFORM LOADS

Center*

Uniform Live Load 369 plf

Uniform Dead Load 240 plf

Beam Self Weight 5 plf

Total Uniform Load 614 plf

* Load obtained from Load Tracker. See Summary Report for details.

POINT LOADS - CENTER SPAN

Load Number One *

Live Load 133 lb

Dead Load 266 lb

Location 2.17 ft

* Load obtained from Load Tracker. See Summary Report for details.

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: WALL-2ND-1

Wall

[2015 International Building Code(2015 NDS)]

1.5 IN x 5.5 IN x 8.08 FT @ 16 O.C.

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 87.5%

Controlling Factor: Combined Stress Factor



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DEFLECTIONS

Deflection due to lateral loads only: Defl = 0.06 IN = L/1638

Live Load Deflection Criteria: L/180

VERTICAL REACTIONS

Live Load: Vert-LL-Rxn = 0 lb

Dead Load: Vert-DL-Rxn = 119 lb

Total Load: Vert-TL-Rxn = 119 lb

HORIZONTAL REACTIONS

Total Reaction at Top of Column: TL-Rxn-Top = 83 lb

Total Reaction at Bottom of Column: TL-Rxn-Bottom = 83 lb

WALL DATA

Total Stud Length: 8.08 ft

Wall Dead Weight: 11 psf

Unbraced Length (X-Axis) Lx: 8.08 ft

Unbraced Length (Y-Axis) Ly: 0 ft

Stud End Condition-K (e): 1

Axial Load Duration Factor: 1.00

Lateral Load Duration Factor (Wind/Seismic): 1.60

STUD PROPERTIES

#2 - Douglas-Fir-Larch

Compressive Stress: Base Values Fc = 1350 psi Fc' = 1254 psi
Cd=1.60 Cf=1.10 Cp=0.53

Bending Stress (X-X Axis): Fbx = 900 psi Fbx' = 2153 psi
Cd=1.60 CF=1.30 Cr=1.15 Cl=1.00

Bending Stress (Y-Y Axis): Fby = 900 psi Fby' = 2153 psi
Cd=1.60 CF=1.30 Cr=1.15

Modulus of Elasticity: E = 1600 ksi E' = 1600 ksi

Stud Section (X-X Axis): dx = 5.5 in

Stud Section (Y-Y Axis): dy = 1.5 in

Area: A = 8.25 in²

Section Modulus (X-X Axis): Sx = 7.56 in³

Section Modulus (Y-Y Axis): Sy = 2.06 in³

Slenderness Ratio: Lex/dx = 17.63

Ley/dy = 0

Stud Calculations (Controlling Case Only):

Controlling Load Case: Axial Dead Load and Lateral loads (D + W or E)

Actual Compressive Stress: Fc = 14 psi

Allowable Compressive Stress: Fc' = 1254 psi

Eccentricity Moment (X-X Axis): Mx-ex = 0 ft-lb

Eccentricity Moment (Y-Y Axis): My-ey = 0 ft-lb

Moment Due to Lateral Loads (X-X Axis): Mx = 168 ft-lb

Moment Due to Lateral Loads (Y-Y Axis): My = 0 ft-lb

Bending Stress Lateral Loads Only (X-X Axis): Fbx = 266 psi

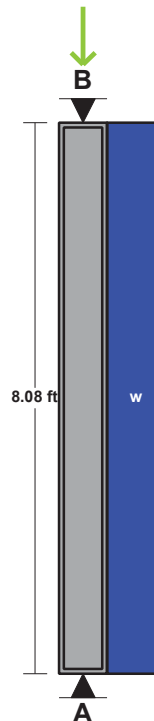
Allowable Bending Stress (X-X Axis): Fbx' = 2153 psi

Bending Stress Lateral Loads Only (Y-Y Axis): Fby = 0 psi

Allowable Bending Stress (Y-Y Axis): Fby' = 2153 psi

Combined Stress Factor: CSF = 0.12

LOADING DIAGRAM



WALL LOAD CALCULATOR

	Live Load	Dead Load	Tributary Width
Load Tracker:	LL = 0 plf	DL = 0 plf	
Roof:	LL = 25 psf	DL = 15 psf	TA = 0 ft
Upper Floor:	LL = 40 psf	DL = 15 psf	TA = 0 ft
Upper Floor Height:	0 ft		
Middle Floor:	LL = 40 psf	DL = 15 psf	TA = 0 ft
Middle Floor Height:	0 ft		
Calculated Load:	LL = 0 plf	DL = 88.9 plf	

AXIAL LOADING

Live Load: PL = 0 plf *

Dead Load: PD = 89 plf *

Total Axial Load: PT = 89 plf

* Load obtained from Load Tracker. See Summary Report for details.

LATERAL LOADING (Dy Face)

Uniform Lateral Load: wL-Lat = 15 psf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: WALL-2ND-2

Wall

[2015 International Building Code(2015 NDS)]

1.5 IN x 5.5 IN x 8.08 FT @ 16 O.C.

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 95.1%

Controlling Factor: Combined Stress Factor



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DEFLECTIONS

Deflection due to lateral loads only: Defl = 0.02 IN = L/5046

Live Load Deflection Criteria: L/180

VERTICAL REACTIONS

Live Load: Vert-LL-Rxn = 0 lb

Dead Load: Vert-DL-Rxn = 119 lb

Total Load: Vert-TL-Rxn = 119 lb

HORIZONTAL REACTIONS

Total Reaction at Top of Column: TL-Rxn-Top = 27 lb

Total Reaction at Bottom of Column: TL-Rxn-Bottom = 27 lb

WALL DATA

Total Stud Length: 8.08 ft
Wall Dead Weight: 11 psf
Unbraced Length (X-Axis) Lx: 8.08 ft
Unbraced Length (Y-Axis) Ly: 0 ft
Stud End Condition-K (e): 1
Axial Load Duration Factor: 1.00
Lateral Load Duration Factor (Wind/Seismic): 1.33

STUD PROPERTIES

#2 - Douglas-Fir-Larch

	Base Values	Adjusted
Compressive Stress:	Fc = 1350 psi	Fc' = 1182 psi
	Cd=1.33 Cf=1.10 Cp=0.60	
Bending Stress (X-X Axis):	Fbx = 900 psi	Fbx' = 1790 psi
	Cd=1.33 CF=1.30 Cr=1.15 Cl=1.00	
Bending Stress (Y-Y Axis):	Fby = 900 psi	Fby' = 1790 psi
	Cd=1.33 CF=1.30 Cr=1.15	
Modulus of Elasticity:	E = 1600 ksi	E' = 1600 ksi

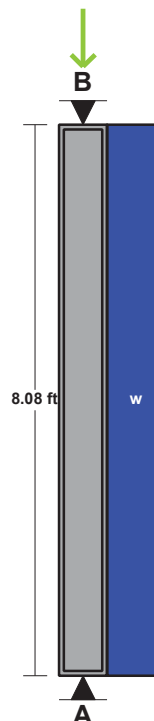
Stud Section (X-X Axis):	dx = 5.5 in
Stud Section (Y-Y Axis):	dy = 1.5 in
Area:	A = 8.25 in ²
Section Modulus (X-X Axis):	Sx = 7.56 in ³
Section Modulus (Y-Y Axis):	Sy = 2.06 in ³
Slenderness Ratio:	Lex/dx = 17.63
	Ley/dy = 0

Stud Calculations (Controlling Case Only):

Controlling Load Case: Axial Dead Load and Lateral loads (D + W or E)

Actual Compressive Stress:	Fc = 14 psi
Allowable Compressive Stress:	Fc' = 1182 psi
Eccentricity Moment (X-X Axis):	Mx-ex = 0 ft-lb
Eccentricity Moment (Y-Y Axis):	My-ey = 0 ft-lb
Moment Due to Lateral Loads (X-X Axis):	Mx = 54 ft-lb
Moment Due to Lateral Loads (Y-Y Axis):	My = 0 ft-lb
Bending Stress Lateral Loads Only (X-X Axis):	Fbx = 86 psi
Allowable Bending Stress (X-X Axis):	Fbx' = 1790 psi
Bending Stress Lateral Loads Only (Y-Y Axis):	Fby = 0 psi
Allowable Bending Stress (Y-Y Axis):	Fby' = 1790 psi
Combined Stress Factor:	CSF = 0.05

LOADING DIAGRAM



WALL LOAD CALCULATOR

	Live Load	Dead Load	Tributary Width
Load Tracker:	LL = 0 plf	DL = 0 plf	
Roof:	LL = 25 psf	DL = 15 psf	TA = 0 ft
Upper Floor:	LL = 40 psf	DL = 15 psf	TA = 0 ft
Upper Floor Height:	0 ft		
Middle Floor:	LL = 40 psf	DL = 15 psf	TA = 0 ft
Middle Floor Height:	0 ft		
Calculated Load:	LL = 0 plf	DL = 88.9 plf	

AXIAL LOADING

Live Load:	PL = 0 plf *
Dead Load:	PD = 89 plf *
Total Axial Load:	PT = 89 plf

* Load obtained from Load Tracker. See Summary Report for details.

LATERAL LOADING (Dy Face)

Uniform Lateral Load: wL-Lat = 5 psf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: WALL-2ND-3

Wall

[2015 International Building Code(2015 NDS)]

1.5 IN x 5.5 IN x 8.08 FT @ 16 O.C.

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 95.1%

Controlling Factor: Combined Stress Factor



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DEFLECTIONS

Deflection due to lateral loads only: Defl = 0.02 IN = L/5046

Live Load Deflection Criteria: L/180

VERTICAL REACTIONS

Live Load: Vert-LL-Rxn = 0 lb

Dead Load: Vert-DL-Rxn = 108 lb

Total Load: Vert-TL-Rxn = 108 lb

HORIZONTAL REACTIONS

Total Reaction at Top of Column: TL-Rxn-Top = 27 lb

Total Reaction at Bottom of Column: TL-Rxn-Bottom = 27 lb

WALL DATA

Total Stud Length: 8.08 ft

Wall Dead Weight: 10 psf

Unbraced Length (X-Axis) Lx: 8.08 ft

Unbraced Length (Y-Axis) Ly: 0 ft

Stud End Condition-K (e): 1

Axial Load Duration Factor: 1.00

Lateral Load Duration Factor (Wind/Seismic): 1.33

STUD PROPERTIES

#2 - Douglas-Fir-Larch

	Base Values	Adjusted
Compressive Stress:	Fc = 1350 psi	Fc' = 1182 psi
	Cd=1.33 Cf=1.10 Cp=0.60	

Bending Stress (X-X Axis):	Fbx = 900 psi	Fbx' = 1790 psi
	Cd=1.33 CF=1.30 Cr=1.15 Cl=1.00	

Bending Stress (Y-Y Axis):	Fby = 900 psi	Fby' = 1790 psi
	Cd=1.33 CF=1.30 Cr=1.15	

Modulus of Elasticity:	E = 1600 ksi	E' = 1600 ksi
------------------------	--------------	---------------

Stud Section (X-X Axis):	dx = 5.5 in
--------------------------	-------------

Stud Section (Y-Y Axis):	dy = 1.5 in
--------------------------	-------------

Area:	A = 8.25 in ²
-------	--------------------------

Section Modulus (X-X Axis):	Sx = 7.56 in ³
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Section Modulus (Y-Y Axis):	Sy = 2.06 in ³
-----------------------------	---------------------------

Slenderness Ratio:	Lex/dx = 17.63
--------------------	----------------

	Ley/dy = 0
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Stud Calculations (Controlling Case Only):

Controlling Load Case: Axial Dead Load and Lateral loads (D + W or E)

Actual Compressive Stress:	Fc = 13 psi
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Allowable Compressive Stress:	Fc' = 1182 psi
-------------------------------	----------------

Eccentricity Moment (X-X Axis):	Mx-ex = 0 ft-lb
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Eccentricity Moment (Y-Y Axis):	My-ey = 0 ft-lb
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Moment Due to Lateral Loads (X-X Axis):	Mx = 54 ft-lb
---	---------------

Moment Due to Lateral Loads (Y-Y Axis):	My = 0 ft-lb
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Bending Stress Lateral Loads Only (X-X Axis):	Fbx = 86 psi
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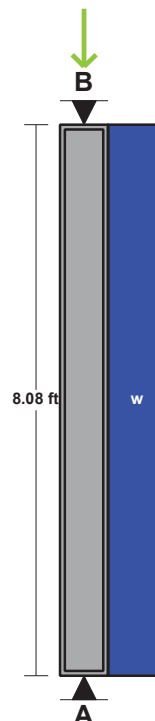
Allowable Bending Stress (X-X Axis):	Fbx' = 1790 psi
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Bending Stress Lateral Loads Only (Y-Y Axis):	Fby = 0 psi
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Allowable Bending Stress (Y-Y Axis):	Fby' = 1790 psi
--------------------------------------	-----------------

Combined Stress Factor:	CSF = 0.05
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LOADING DIAGRAM



WALL LOAD CALCULATOR

	Live Load	Dead Load	Tributary Width
Load Tracker:	LL = 0 plf	DL = 0 plf	
Roof:	LL = 25 psf	DL = 15 psf	TA = 0 ft
Upper Floor:	LL = 40 psf	DL = 15 psf	TA = 0 ft
Upper Floor Height:	0 ft		
Middle Floor:	LL = 40 psf	DL = 15 psf	TA = 0 ft
Middle Floor Height:	0 ft		
Calculated Load:	LL = 0 plf	DL = 80.8 plf	

AXIAL LOADING

Live Load:	PL = 0 plf *
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Dead Load:	PD = 81 plf *
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Total Axial Load:	PT = 81 plf
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* Load obtained from Load Tracker. See Summary Report for details.

LATERAL LOADING (Dy Face)

Uniform Lateral Load:	wL-Lat = 5 psf
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NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: JST3-7

Floor Joist

[2015 International Building Code(2015 NDS)]

SERIES 18 / 11.875 - Louisiana Pacific x 10.75 FT @ 16 O.C.

Section Adequate By: 125.0%

Controlling Factor: End Reaction



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DEFLECTIONS

Center

Live Load 0.08 IN L/1638

Dead Load 0.03 in

Total Load 0.11 IN L/1191

Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360

REACTIONS

A

B

Live Load 287 lb 287 lb

Dead Load 108 lb 108 lb

Total Load 395 lb 395 lb

Bearing Length 1.75 in 1.75 in

Web Stiffeners No No

SUPPORT LOADS

A

B

Live Load 215 plf 215 plf

Dead Load 81 plf 81 plf

Total Load 296 plf 296 plf

I-JOIST PROPERTIES

SERIES 18 / 11.875 - Louisiana Pacific

Base Values

Adjusted

Moment Cap: Mcap = 3100 ft-lb Mcap' = 3100 ft-lb

Cd = 1.00

Shear Stress: Vcap = 1335 lb Vcap' = 1335 lb

Cd = 1.00

Reaction A: Rcap = 887 lb Rcap' = 887 lb

Reaction B: Rcap = 887 lb Rcap' = 887 lb

E.I.: EI = 248 lb-in² EI' = 248 lb-in²

Controlling Moment: 1059 ft-lb

5.38 Ft from left support of span 3 (Right Span)

Created by combining all dead and live loads.

Controlling Shear: 394 lb

0.0 Ft from left support of span 2 (Center Span)

Created by combining all dead and live loads.

Comparisons with required sections:

Req'd

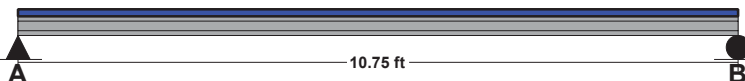
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E.I.: 75 in²-lb E6 248 in²-lb xE6

Moment: 1059 ft-lb 3100 ft-lb

Shear: 394 lb 1335 lb

LOADING DIAGRAM



JOIST DATA

Center

Span Length 10.75 ft

Unbraced Length-Top 0 ft

Unbraced Length-Bottom 0 ft

Floor sheathing applied to top of joists-top of joists fully braced.

Floor Duration Factor 1.00

JOIST LOADING

Uniform Floor Loading

Center

Live Load LL = 40 psf

Dead Load DL = 15 psf

Total Load TL = 55 psf

TL Adj. For Joist Spacing wT = 73.3 plf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: MLB3-3

Multi-Loaded Multi-Span Beam

[2015 International Building Code(2015 NDS)]

1.75 IN x 11.25 IN x 6.5 FT (4.8 + 1.8)

LSL 1730 Fb-1.35E - Louisiana Pacific

Section Adequate By: 330.4%

Controlling Factor: Moment



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DEFLECTIONS

	Center	Right
Live Load	0.01 IN L/5695	0.01 IN 2L/3430
Dead Load	0.00 in	0.01 in
Total Load	0.01 IN L/6066	0.02 IN 2L/2132
Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240		

REACTIONS

	A	B
Live Load	582 lb	1036 lb
Dead Load	118 lb	739 lb
Total Load	700 lb	1775 lb
Uplift (1.5 F.S)	-33 lb	0 lb
Bearing Length	0.53 in	1.35 in

BEAM DATA

	Center	Right
Span Length	4.75 ft	1.75 ft
Unbraced Length-Top	0 ft	0 ft
Unbraced Length-Bottom	4.75 ft	1.75 ft
Live Load Duration Factor	1.00	
Notch Depth	0.00	

MATERIAL PROPERTIES

LSL 1730 Fb-1.35E - Louisiana Pacific

	Base Values	Adjusted
Bending Stress:	Fb = 1730 psi	Fb' = 1485 psi
	Cd=1.00 Cl=0.85 CF=1.01	
Shear Stress:	Fv = 410 psi	Fv' = 410 psi
	Cd=1.00	
Modulus of Elasticity:	E = 1350 ksi	E' = 1350 ksi
Comp. \perp to Grain:	Fc - \perp = 750 psi	Fc - \perp = 750 psi

Controlling Moment:

-1061 ft-lb

Over right support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 3

Controlling Shear:

-727 lb

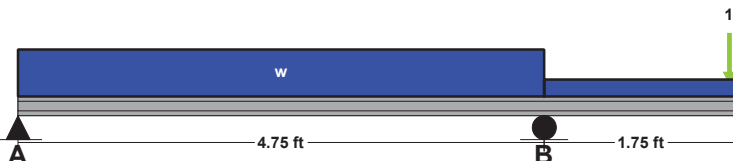
At a distance d from right support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2, 3

Comparisons with required sections:

	Req'd	Provided
Section Modulus:	8.58 in3	36.91 in3
Area (Shear):	2.66 in2	19.69 in2
Moment of Inertia (deflection):	23.38 in4	207.64 in4
Moment:	-1061 ft-lb	4567 ft-lb
Shear:	-727 lb	5381 lb

LOADING DIAGRAM



UNIFORM LOADS

	Center*	Right
Uniform Live Load	245 plf	30 plf
Uniform Dead Load	91 plf	90 plf
Beam Self Weight	6 plf	6 plf
Total Uniform Load	342 plf	126 plf

* Load obtained from Load Tracker. See Summary Report for details.

POINT LOADS - RIGHT SPAN

Load Number	One
Live Load	290 lb
Dead Load	230 lb
Location	1.67 ft

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: JST3-8

Floor Joist

[2015 International Building Code(2015 NDS)]

SERIES 56 / 11.875 - Louisiana Pacific x 6.33 FT (4.6 + 1.8) @ 16 O.C.

Section Adequate By: 13.7%

Controlling Factor: End Reaction



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DEFLECTIONS

	Center	Right
Live Load	-0.02 IN L/3593	-0.01 IN 2L/2810
Dead Load	-0.01 in	-0.01 in
Total Load	-0.03 IN L/2040	-0.03 IN 2L/1584

Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360

REACTIONS

	A	B
Live Load	122 lb	1018 lb
Dead Load	-130 lb	721 lb
Total Load	-8 lb	1739 lb

Uplift (1.5 F.S) -357 lb 0 lb

Bearing Length 3.50 in 3.50 in

Web Stiffeners Yes Yes

SUPPORT LOADS

	A	B
Live Load	92 plf	764 plf
Dead Load	-98 plf	541 plf
Total Load	-6 plf	1304 plf

JOIST PROPERTIES

SERIES 56 / 11.875 - Louisiana Pacific

	Base Values	Adjusted
Moment Cap:	Mcap = 10170 ft-lb Cd = 1.00	Mcap' = 10170 ft-lb
Shear Stress:	Vcap = 2055 lb Cd = 1.00	Vcap' = 2055 lb
Reaction A:	Rcap = 1976 lb	Rcap' = 1976 lb
Reaction B:	Rcap = 1976 lb	Rcap' = 1976 lb
E.I.:	EI = 668 lb-in ²	EI' = 668 lb-in ²

Controlling Moment: -1847 ft-lb

4.58 Ft from left support of span 3 (Right Span)

Created by combining all dead and live loads.

Controlling Shear: 1167 lb

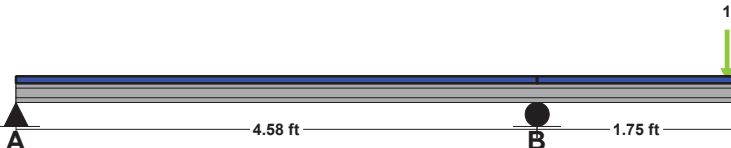
0.0 Ft from left support of span 3 (Right Span)

Created by combining all dead and live loads.

Comparisons with required sections:

	Req'd	Provided
E.I.:	152 in ² -lb E6	668 in ² -lb xE6
Moment:	-1847 ft-lb	10170 ft-lb
Shear:	1167 lb	2055 lb

LOADING DIAGRAM



JOIST DATA

	Center	Right
Span Length	4.58 ft	1.75 ft
Unbraced Length-Top	0 ft	0 ft
Unbraced Length-Bottom	0 ft	0 ft
Floor sheathing applied to top of joists-top of joists fully braced.		
Floor Duration Factor	1.00	

JOIST LOADING

Uniform Floor Loading

	Center	Right
Live Load	LL = 40 psf	40 psf
Dead Load	DL = 15 psf	15 psf
Total Load	TL = 55 psf	55 psf
TL Adj. For Joist Spacing wT =	73.3 plf	73.3 plf

Wall Loading

Wall One

Live Load (⊥ to Joists): L1 =	0 plf	431 plf
Dead Load (⊥ to Joists): D1 =	0 plf	348 plf
Load Location	X1 = 0 ft	1.67 ft

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: MLB3-4

Multi-Loaded Multi-Span Beam

[2015 International Building Code(2015 NDS)]

3.5 IN x 11.875 IN x 17.83 FT

LSL 2360 Fb-1.55E - Louisiana Pacific

Section Adequate By: 48.1%

Controlling Factor: Deflection



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DEFLECTIONS

Center

Live Load 0.40 IN L/533

Dead Load 0.03 in

Total Load 0.43 IN L/501

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS

A

B

Live Load 833 lb 1345 lb

Dead Load 195 lb -199 lb

Total Load 1028 lb 1146 lb

Uplift (1.5 F.S) 0 lb -199 lb

Bearing Length 0.34 in 0.37 in

BEAM DATA

Center

Span Length 17.83 ft

Unbraced Length-Top 0 ft

Unbraced Length-Bottom 17.83 ft

Live Load Duration Factor 1.00

Notch Depth 0.00

MATERIAL PROPERTIES

LSL 2360 Fb-1.55E - Louisiana Pacific

Base Values

Adjusted

Bending Stress: Fb = 2360 psi Fb' = 2364 psi

Cd=1.00 CF=1.00

Shear Stress: Fv = 410 psi Fv' = 410 psi

Cd=1.00

Modulus of Elasticity: E = 1550 ksi E' = 1550 ksi

Comp. \perp to Grain: Fc \perp = 875 psi Fc \perp ' = 875 psi

Controlling Moment:

6131 ft-lb

10.7 Ft from left support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2

Controlling Shear:

-1076 lb

At a distance d from right support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2

Comparisons with required sections:

Req'd

Provided

Section Modulus: 31.13 in³ 82.26 in³

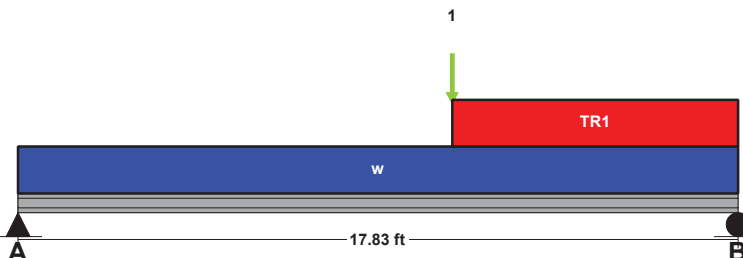
Area (Shear): 3.94 in² 41.56 in²

Moment of Inertia (deflection): 329.87 in⁴ 488.41 in⁴

Moment: 6131 ft-lb 16202 ft-lb

Shear: -1076 lb 11360 lb

LOADING DIAGRAM



UNIFORM LOADS

Center

Uniform Live Load 53 plf

Uniform Dead Load 20 plf

Beam Self Weight 12 plf

Total Uniform Load 85 plf

POINT LOADS - CENTER SPAN

Load Number One *

Live Load 582 lb

Dead Load 118 lb

Location 10.75 ft

* Load obtained from Load Tracker. See Summary Report for details.

TRAPEZOIDAL LOADS - CENTER SPAN

Load Number One *

Left Live Load 92 plf

Left Dead Load -98 plf

Right Live Load 92 plf

Right Dead Load -98 plf

Load Start 10.75 ft

Load End 17.83 ft

Load Length 7.08 ft

* Load obtained from Load Tracker. See Summary Report for details.

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: WALL-2ND-4

Wall

[2015 International Building Code(2015 NDS)]

1.5 IN x 5.5 IN x 8.08 FT @ 16 O.C.

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 87.5%

Controlling Factor: Combined Stress Factor



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DEFLECTIONS

Deflection due to lateral loads only: Defl = 0.06 IN = L/1638

Live Load Deflection Criteria: L/180

VERTICAL REACTIONS

Live Load: Vert-LL-Rxn = 0 lb

Dead Load: Vert-DL-Rxn = 119 lb

Total Load: Vert-TL-Rxn = 119 lb

HORIZONTAL REACTIONS

Total Reaction at Top of Column: TL-Rxn-Top = 83 lb

Total Reaction at Bottom of Column: TL-Rxn-Bottom = 83 lb

WALL DATA

Total Stud Length: 8.08 ft

Wall Dead Weight: 11 psf

Unbraced Length (X-Axis) Lx: 8.08 ft

Unbraced Length (Y-Axis) Ly: 0 ft

Stud End Condition-K (e): 1

Axial Load Duration Factor: 1.00

Lateral Load Duration Factor (Wind/Seismic): 1.60

STUD PROPERTIES

#2 - Douglas-Fir-Larch

Base Values Adjusted

Compressive Stress: Fc = 1350 psi Fc' = 1254 psi

Cd=1.60 Cf=1.10 Cp=0.53

Bending Stress (X-X Axis): Fbx = 900 psi Fbx' = 2153 psi

Cd=1.60 CF=1.30 Cr=1.15 Cl=1.00

Bending Stress (Y-Y Axis): Fby = 900 psi Fby' = 2153 psi

Cd=1.60 CF=1.30 Cr=1.15

Modulus of Elasticity: E = 1600 ksi E' = 1600 ksi

Stud Section (X-X Axis): dx = 5.5 in

Stud Section (Y-Y Axis): dy = 1.5 in

Area: A = 8.25 in²

Section Modulus (X-X Axis): Sx = 7.56 in³

Section Modulus (Y-Y Axis): Sy = 2.06 in³

Slenderness Ratio: Lex/dx = 17.63

Ley/dy = 0

Stud Calculations (Controlling Case Only):

Controlling Load Case: Axial Dead Load and Lateral loads (D + W or E)

Actual Compressive Stress: Fc = 14 psi

Allowable Compressive Stress: Fc' = 1254 psi

Eccentricity Moment (X-X Axis): Mx-ex = 0 ft-lb

Eccentricity Moment (Y-Y Axis): My-ey = 0 ft-lb

Moment Due to Lateral Loads (X-X Axis): Mx = 168 ft-lb

Moment Due to Lateral Loads (Y-Y Axis): My = 0 ft-lb

Bending Stress Lateral Loads Only (X-X Axis): Fbx = 266 psi

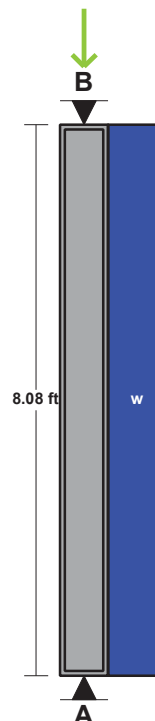
Allowable Bending Stress (X-X Axis): Fbx' = 2153 psi

Bending Stress Lateral Loads Only (Y-Y Axis): Fby = 0 psi

Allowable Bending Stress (Y-Y Axis): Fby' = 2153 psi

Combined Stress Factor: CSF = 0.12

LOADING DIAGRAM



WALL LOAD CALCULATOR

	Live Load	Dead Load	Tributary Width
Load Tracker:	LL = 0 plf	DL = 0 plf	
Roof:	LL = 25 psf	DL = 15 psf	TA = 0 ft
Upper Floor:	LL = 40 psf	DL = 15 psf	TA = 0 ft
Upper Floor Height:	0 ft		
Middle Floor:	LL = 40 psf	DL = 15 psf	TA = 0 ft
Middle Floor Height:	0 ft		
Calculated Load:	LL = 0 plf	DL = 88.9 plf	

AXIAL LOADING

Live Load: PL = 0 plf *

Dead Load: PD = 89 plf *

Total Axial Load: PT = 89 plf

* Load obtained from Load Tracker. See Summary Report for details.

LATERAL LOADING (Dy Face)

Uniform Lateral Load: wL-Lat = 15 psf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: MLB3-5

Multi-Loaded Multi-Span Beam

[2015 International Building Code(2015 NDS)]

3.5 IN x 6.0 IN x 5.33 FT

24F-V4 - Visually Graded Western Species - Dry Use

Section Adequate By: 42.7%

Controlling Factor: Moment



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DEFLECTIONS

Center

Live Load 0.09 IN L/748

Dead Load 0.04 in

Total Load 0.13 IN L/493

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS

A

B

Live Load 1362 lb 1157 lb

Dead Load 715 lb 679 lb

Total Load 2077 lb 1836 lb

Bearing Length 0.91 in 0.81 in

BEAM DATA

Center

Span Length 5.33 ft

Unbraced Length-Top 0 ft

Unbraced Length-Bottom 5.33 ft

Live Load Duration Factor 1.00

Camber Adj. Factor 1.5

Camber Required 0.07

Notch Depth 0.00

MATERIAL PROPERTIES

24F-V4 - Visually Graded Western Species

Base Values

Adjusted

Bending Stress: Fb = 2400 psi Controlled by:
Fb_cmpr = 1850 psi Fb' = 2400 psi
Cd=1.00

Shear Stress: Fv = 265 psi Fv' = 265 psi
Cd=1.00

Modulus of Elasticity: E = 1800 ksi E' = 1800 ksi
Comp. \perp to Grain: Fc \perp = 650 psi Fc \perp ' = 650 psi

Controlling Moment: 2944 ft-lb

2.13 Ft from left support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2

Controlling Shear: 1848 lb

At a distance d from left support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2

Comparisons with required sections:

Req'd

Provided

Section Modulus: 14.72 in³ 21 in³

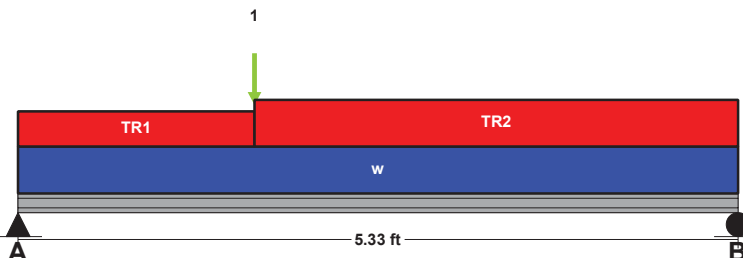
Area (Shear): 10.46 in² 21 in²

Moment of Inertia (deflection): 30.68 in⁴ 63 in⁴

Moment: 2944 ft-lb 4200 ft-lb

Shear: 1848 lb 3710 lb

LOADING DIAGRAM



UNIFORM LOADS

Center*

Uniform Live Load 55 plf

Uniform Dead Load 122 plf

Beam Self Weight 5 plf

Total Uniform Load 182 plf

* Load obtained from Load Tracker. See Summary Report for details.

POINT LOADS - CENTER SPAN

Load Number One *

Live Load 833 lb

Dead Load 195 lb

Location 1.75 ft

* Load obtained from Load Tracker. See Summary Report for details.

TRAPEZOIDAL LOADS - CENTER SPAN

Load Number One * Two *

Left Live Load 215 plf 284 plf

Left Dead Load 81 plf 107 plf

Right Live Load 215 plf 284 plf

Right Dead Load 81 plf 107 plf

Load Start 0 ft 1.75 ft

Load End 1.75 ft 5.33 ft

Load Length 1.75 ft 3.58 ft

* Load obtained from Load Tracker. See Summary Report for details.

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: WALL-2ND-5

Wall

[2015 International Building Code(2015 NDS)]

1.5 IN x 5.5 IN x 8.08 FT @ 16 O.C.

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 87.5%

Controlling Factor: Combined Stress Factor



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DEFLECTIONS

Deflection due to lateral loads only: Defl = 0.06 IN = L/1638

Live Load Deflection Criteria: L/180

VERTICAL REACTIONS

Live Load: Vert-LL-Rxn = 0 lb

Dead Load: Vert-DL-Rxn = 119 lb

Total Load: Vert-TL-Rxn = 119 lb

HORIZONTAL REACTIONS

Total Reaction at Top of Column: TL-Rxn-Top = 83 lb

Total Reaction at Bottom of Column: TL-Rxn-Bottom = 83 lb

WALL DATA

Total Stud Length: 8.08 ft

Wall Dead Weight: 11 psf

Unbraced Length (X-Axis) Lx: 8.08 ft

Unbraced Length (Y-Axis) Ly: 0 ft

Stud End Condition-K (e): 1

Axial Load Duration Factor: 1.00

Lateral Load Duration Factor (Wind/Seismic): 1.60

STUD PROPERTIES

#2 - Douglas-Fir-Larch

Base Values Adjusted

Compressive Stress: Fc = 1350 psi Fc' = 1254 psi

Cd=1.60 Cf=1.10 Cp=0.53

Bending Stress (X-X Axis): Fbx = 900 psi Fbx' = 2153 psi

Cd=1.60 CF=1.30 Cr=1.15 Cl=1.00

Bending Stress (Y-Y Axis): Fby = 900 psi Fby' = 2153 psi

Cd=1.60 CF=1.30 Cr=1.15

Modulus of Elasticity: E = 1600 ksi E' = 1600 ksi

Stud Section (X-X Axis): dx = 5.5 in

Stud Section (Y-Y Axis): dy = 1.5 in

Area: A = 8.25 in²

Section Modulus (X-X Axis): Sx = 7.56 in³

Section Modulus (Y-Y Axis): Sy = 2.06 in³

Slenderness Ratio: Lex/dx = 17.63

Ley/dy = 0

Stud Calculations (Controlling Case Only):

Controlling Load Case: Axial Dead Load and Lateral loads (D + W or E)

Actual Compressive Stress: Fc = 14 psi

Allowable Compressive Stress: Fc' = 1254 psi

Eccentricity Moment (X-X Axis): Mx-ex = 0 ft-lb

Eccentricity Moment (Y-Y Axis): My-ey = 0 ft-lb

Moment Due to Lateral Loads (X-X Axis): Mx = 168 ft-lb

Moment Due to Lateral Loads (Y-Y Axis): My = 0 ft-lb

Bending Stress Lateral Loads Only (X-X Axis): Fbx = 266 psi

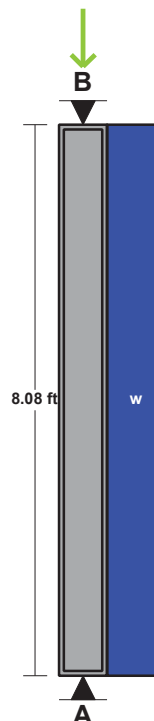
Allowable Bending Stress (X-X Axis): Fbx' = 2153 psi

Bending Stress Lateral Loads Only (Y-Y Axis): Fby = 0 psi

Allowable Bending Stress (Y-Y Axis): Fby' = 2153 psi

Combined Stress Factor: CSF = 0.12

LOADING DIAGRAM



WALL LOAD CALCULATOR

	Live Load	Dead Load	Tributary Width
Load Tracker:	LL = 0 plf	DL = 0 plf	
Roof:	LL = 25 psf	DL = 15 psf	TA = 0 ft
Upper Floor:	LL = 40 psf	DL = 15 psf	TA = 0 ft
Upper Floor Height:	0 ft		
Middle Floor:	LL = 40 psf	DL = 15 psf	TA = 0 ft
Middle Floor Height:	0 ft		
Calculated Load:	LL = 0 plf	DL = 88.9 plf	

AXIAL LOADING

Live Load: PL = 0 plf *

Dead Load: PD = 89 plf *

Total Axial Load: PT = 89 plf

* Load obtained from Load Tracker. See Summary Report for details.

LATERAL LOADING (Dy Face)

Uniform Lateral Load: wL-Lat = 15 psf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: JST2-2

Floor Joist

[2015 International Building Code(2015 NDS)]

SERIES 56 / 11.875 - Louisiana Pacific x 12.75 FT (11 + 1.8) @ 16 O.C.

Section Adequate By: 22.4%

Controlling Factor: End Reaction



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DEFLECTIONS

	Center	Right
Live Load	0.04 IN L/3469	0.02 IN 2L/2432
Dead Load	-0.01 in	-0.01 in
Total Load	-0.04 IN L/3621	0.03 IN 2L/1564

Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360

REACTIONS

	A	B
Live Load	293 lb	961 lb
Dead Load	41 lb	653 lb
Total Load	334 lb	1614 lb
Uplift (1.5 F.S)	-55 lb	0 lb
Bearing Length	1.75 in	3.50 in
Web Stiffeners	Yes	Yes

SUPPORT LOADS

	A	B
Live Load	220 plf	721 plf
Dead Load	31 plf	490 plf
Total Load	251 plf	1211 plf

JOIST PROPERTIES

SERIES 56 / 11.875 - Louisiana Pacific

	Base Values	Adjusted
Moment Cap:	Mcap = 10170 ft-lb Cd = 1.00	Mcap' = 10170 ft-lb
Shear Stress:	Vcap = 2055 lb Cd = 1.00	Vcap' = 2055 lb
Reaction A:	Rcap = 1700 lb	Rcap' = 1700 lb
Reaction B:	Rcap = 1976 lb	Rcap' = 1976 lb
E.I.:	EI = 668 lb-in ²	EI' = 668 lb-in ²

Controlling Moment: -1667 ft-lb

11.0 Ft from left support of span 3 (Right Span)

Created by combining all dead and live loads.

Controlling Shear: 1059 lb

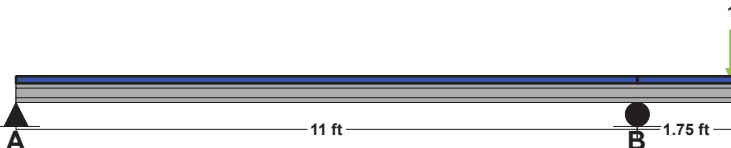
0.0 Ft from left support of span 3 (Right Span)

Created by combining all dead and live loads.

Comparisons with required sections:

	Req'd	Provided
E.I.:	154 in ² -lb E6	668 in ² -lb xE6
Moment:	-1667 ft-lb	10170 ft-lb
Shear:	1059 lb	2055 lb

LOADING DIAGRAM



JOIST DATA

	Center	Right
Span Length	11 ft	1.75 ft
Unbraced Length-Top	0 ft	0 ft
Unbraced Length-Bottom	0 ft	0 ft
Floor sheathing applied to top of joists-top of joists fully braced.		
Floor Duration Factor	1.00	

JOIST LOADING

Uniform Floor Loading	Center	Right
Live Load	LL = 40 psf	40 psf
Dead Load	DL = 15 psf	15 psf
Total Load	TL = 55 psf	55 psf
TL Adj. For Joist Spacing wT =	73.3 plf	73.3 plf

Wall Loading

Wall One

Live Load (⊥ to Joists): L1 =	0 plf	369 plf
Dead Load (⊥ to Joists) D1 =	0 plf	329 plf
Load Location X1 =	0 ft	1.67 ft

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: JST2-1

Floor Joist

[2015 International Building Code(2015 NDS)]

SERIES 18 / 11.875 - Louisiana Pacific x 10.83 FT @ 16 O.C.

Section Adequate By: 153.3%

Controlling Factor: End Reaction



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DEFLECTIONS

Center

Live Load 0.08 IN L/1606

Dead Load 0.03 in

Total Load 0.11 IN L/1168

Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360

REACTIONS

A

B

Live Load 289 lb 289 lb

Dead Load 108 lb 108 lb

Total Load 397 lb 397 lb

Bearing Length 1.75 in 3.50 in

Web Stiffeners Yes No

SUPPORT LOADS

A

B

Live Load 217 plf 217 plf

Dead Load 81 plf 81 plf

Total Load 298 plf 298 plf

I-JOIST PROPERTIES

SERIES 18 / 11.875 - Louisiana Pacific

Base Values

Adjusted

Moment Cap: Mcap = 3100 ft-lb Mcap' = 3100 ft-lb

Cd = 1.00

Shear Stress: Vcap = 1335 lb Vcap' = 1335 lb

Cd = 1.00

Reaction A: Rcap = 1164 lb Rcap' = 1164 lb

Reaction B: Rcap = 1006 lb Rcap' = 1006 lb

E.I.: EI = 248 lb-in² EI' = 248 lb-in²

Controlling Moment: 1075 ft-lb

5.41 Ft from left support of span 3 (Right Span)

Created by combining all dead and live loads.

Controlling Shear: 397 lb

0.0 Ft from left support of span 2 (Center Span)

Created by combining all dead and live loads.

Comparisons with required sections:

Req'd

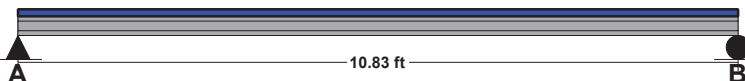
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E.I.: 76 in²-lb E6 248 in²-lb xE6

Moment: 1075 ft-lb 3100 ft-lb

Shear: 397 lb 1335 lb

LOADING DIAGRAM



JOIST DATA

Center

Span Length 10.83 ft

Unbraced Length-Top 0 ft

Unbraced Length-Bottom 0 ft

Floor sheathing applied to top of joists-top of joists fully braced.

Floor Duration Factor 1.00

JOIST LOADING

Uniform Floor Loading

Center

Live Load LL = 40 psf

Dead Load DL = 15 psf

Total Load TL = 55 psf

TL Adj. For Joist Spacing wT = 73.3 plf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: JST2-3

Floor Joist

[2015 International Building Code(2015 NDS)]

SERIES 18 / 11.875 - Louisiana Pacific x 6.92 FT @ 16 O.C.

Section Adequate By: 296.5%

Controlling Factor: End Reaction



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DEFLECTIONS

Center

Live Load 0.02 IN L/4895

Dead Load 0.01 in

Total Load 0.02 IN L/3560

Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360

REACTIONS

A

B

Live Load 185 lb 185 lb

Dead Load 69 lb 69 lb

Total Load 254 lb 254 lb

Bearing Length 1.75 in 3.50 in

Web Stiffeners Yes No

SUPPORT LOADS

A

B

Live Load 139 plf 139 plf

Dead Load 52 plf 52 plf

Total Load 191 plf 191 plf

I-JOIST PROPERTIES

SERIES 18 / 11.875 - Louisiana Pacific

Base Values

Adjusted

Moment Cap: Mcap = 3100 ft-lb Mcap' = 3100 ft-lb

Cd = 1.00

Shear Stress: Vcap = 1335 lb Vcap' = 1335 lb

Cd = 1.00

Reaction A: Rcap = 1164 lb Rcap' = 1164 lb

Reaction B: Rcap = 1006 lb Rcap' = 1006 lb

E.I.: EI = 248 lb-in² EI' = 248 lb-in²

Controlling Moment: 439 ft-lb

3.46 Ft from left support of span 3 (Right Span)

Created by combining all dead and live loads.

Controlling Shear: 254 lb

0.0 Ft from left support of span 2 (Center Span)

Created by combining all dead and live loads.

Comparisons with required sections:

Req'd

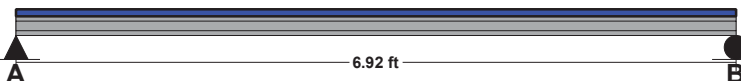
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E.I.: 25 in²-lb E6 248 in²-lb xE6

Moment: 439 ft-lb 3100 ft-lb

Shear: 254 lb 1335 lb

LOADING DIAGRAM



JOIST DATA

Center

Span Length 6.92 ft

Unbraced Length-Top 0 ft

Unbraced Length-Bottom 0 ft

Floor sheathing applied to top of joists-top of joists fully braced.

Floor Duration Factor 1.00

JOIST LOADING

Uniform Floor Loading

Center

Live Load LL = 40 psf

Dead Load DL = 15 psf

Total Load TL = 55 psf

TL Adj. For Joist Spacing wT = 73.3 plf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: JST2-4

Floor Joist

[2015 International Building Code(2015 NDS)]

SERIES 18 / 11.875 - Louisiana Pacific x 3.33 FT @ 16 O.C.

Section Adequate By: 723.9%

Controlling Factor: End Reaction



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DEFLECTIONS

Center

Live Load 0.00 IN L/MAX

Dead Load 0.00 in

Total Load 0.00 IN L/MAX

Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360

REACTIONS

A

B

Live Load 89 lb 89 lb

Dead Load 33 lb 33 lb

Total Load 122 lb 122 lb

Bearing Length 1.75 in 3.50 in

Web Stiffeners Yes No

SUPPORT LOADS

A

B

Live Load 67 plf 67 plf

Dead Load 25 plf 25 plf

Total Load 92 plf 92 plf

I-JOIST PROPERTIES

SERIES 18 / 11.875 - Louisiana Pacific

Base Values

Adjusted

Moment Cap: Mcap = 3100 ft-lb Mcap' = 3100 ft-lb

Cd = 1.00

Shear Stress: Vcap = 1335 lb Vcap' = 1335 lb

Cd = 1.00

Reaction A: Rcap = 1164 lb Rcap' = 1164 lb

Reaction B: Rcap = 1006 lb Rcap' = 1006 lb

E.I.: EI = 248 lb-in² EI' = 248 lb-in²

Controlling Moment: 102 ft-lb

1.66 Ft from left support of span 3 (Right Span)

Created by combining all dead and live loads.

Controlling Shear: -122 lb

3.0 Ft from left support of span 2 (Center Span)

Created by combining all dead and live loads.

Comparisons with required sections:

Req'd

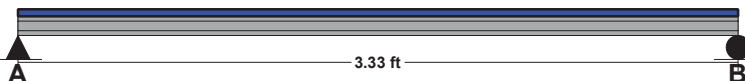
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E.I.: 6 in²-lb E6 248 in²-lb xE6

Moment: 102 ft-lb 3100 ft-lb

Shear: -122 lb 1335 lb

LOADING DIAGRAM



JOIST DATA

Center

Span Length 3.33 ft

Unbraced Length-Top 0 ft

Unbraced Length-Bottom 0 ft

Floor sheathing applied to top of joists-top of joists fully braced.

Floor Duration Factor 1.00

JOIST LOADING

Uniform Floor Loading

Center

Live Load LL = 40 psf

Dead Load DL = 15 psf

Total Load TL = 55 psf

TL Adj. For Joist Spacing wT = 73.3 plf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: MLB2-1 GLB

Multi-Loaded Multi-Span Beam

[2015 International Building Code(2015 NDS)]

3.5 IN x 11.875 IN x 25.09 FT (12.4 + 12.7)

24F-V4 - Visually Graded Western Species - Dry Use

Section Adequate By: 45.0%

Controlling Factor: Moment



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DEFLECTIONS

	Center	Right
Live Load	0.12 IN L/1214	0.16 IN L/925
Dead Load	0.01 in	0.05 in
Total Load	0.13 IN L/1111	0.21 IN L/717
Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240		

REACTIONS

	A	B	C
Live Load	1551 lb	5055 lb	1971 lb
Dead Load	433 lb	1533 lb	711 lb
Total Load	1984 lb	6588 lb	2682 lb
Uplift (1.5 F.S)	-2 lb	0 lb	0 lb
Bearing Length	0.87 in	2.90 in	1.18 in

BEAM DATA

	Center	Right
Span Length	12.42 ft	12.67 ft
Unbraced Length-Top	0 ft	0 ft
Unbraced Length-Bottom	12.42 ft	12.67 ft
Live Load Duration Factor	1.00	
Notch Depth	0.00	

MATERIAL PROPERTIES

24F-V4 - Visually Graded Western Species

	Base Values	Adjusted
Bending Stress:	Fb = 2400 psi Fb_cmpr = 1850 psi Cd=1.00 Ci=0.96	Controlled by: Fb_cmpr' = 1783 psi
Shear Stress:	Fv = 265 psi Cd=1.00	Fv' = 265 psi
Modulus of Elasticity:	E = 1800 ksi	E' = 1800 ksi
Comp. ⊥ to Grain:	Fc - ⊥ = 650 psi	Fc - ⊥' = 650 psi

Controlling Moment:

-8428 ft-lb

Over left support of span 3 (Right Span)

Created by combining all dead loads and live loads on span(s) 2, 3

Controlling Shear:

3278 lb

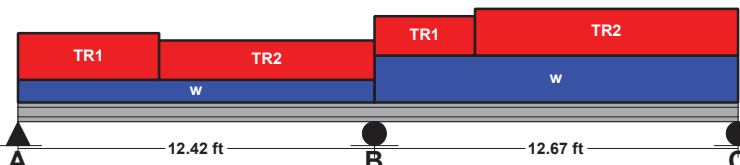
At a distance d from left support of span 3 (Right Span)

Created by combining all dead loads and live loads on span(s) 2, 3

Comparisons with required sections:

	Req'd	Provided
Section Modulus:	56.73 in3	82.26 in3
Area (Shear):	18.56 in2	41.56 in2
Moment of Inertia (deflection):	190.18 in4	488.41 in4
Moment:	-8428 ft-lb	12221 ft-lb
Shear:	3278 lb	7343 lb

LOADING DIAGRAM



UNIFORM LOADS

	Center*	Right*
Uniform Live Load	67 plf	139 plf
Uniform Dead Load	25 plf	52 plf
Beam Self Weight	9 plf	9 plf
Total Uniform Load	101 plf	200 plf

* Load obtained from Load Tracker. See Summary Report for details.

TRAPEZOIDAL LOADS - CENTER SPAN

Load Number	One *	Two *
Left Live Load	217 plf	220 plf
Left Dead Load	81 plf	31 plf
Right Live Load	217 plf	220 plf
Right Dead Load	81 plf	31 plf
Load Start	0 ft	4.92 ft
Load End	4.92 ft	12.42 ft
Load Length	4.92 ft	7.5 ft

RIGHT SPAN

Load Number	One *	Two *
Left Live Load	220 plf	217 plf
Left Dead Load	31 plf	81 plf
Right Live Load	220 plf	217 plf
Right Dead Load	31 plf	81 plf
Load Start	0 ft	3.5 ft
Load End	3.5 ft	12.67 ft
Load Length	3.5 ft	9.17 ft

* Load obtained from Load Tracker. See Summary Report for details.

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: MLB2-1 LSL

Multi-Loaded Multi-Span Beam

[2015 International Building Code(2015 NDS)]

3.5 IN x 11.875 IN x 25.09 FT (12.4 + 12.7)

LSL 2360 Fb-1.55E - Louisiana Pacific

Section Adequate By: 75.7%

Controlling Factor: Moment



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DEFLECTIONS

	Center	Right
Live Load	0.14 IN L/1045	0.19 IN L/796
Dead Load	0.02 in	0.06 in
Total Load	0.16 IN L/951	0.25 IN L/615
Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240		

REACTIONS

	A	B	C
Live Load	1551 lb	5055 lb	1971 lb
Dead Load	448 lb	1582 lb	726 lb
Total Load	1999 lb	6637 lb	2697 lb
Bearing Length	0.65 in	2.17 in	0.88 in

BEAM DATA

	Center	Right
Span Length	12.42 ft	12.67 ft
Unbraced Length-Top	0 ft	0 ft
Unbraced Length-Bottom	12.42 ft	12.67 ft
Live Load Duration Factor	1.00	
Notch Depth	0.00	

MATERIAL PROPERTIES

LSL 2360 Fb-1.55E - Louisiana Pacific

	Base Values	Adjusted
Bending Stress:	Fb = 2360 psi Cd=1.00 Cl=0.92 CF=1.00	Fb' = 2176 psi
Shear Stress:	Fv = 410 psi Cd=1.00	Fv' = 410 psi
Modulus of Elasticity:	E = 1550 ksi	E' = 1550 ksi
Comp. \perp to Grain:	Fc \perp = 875 psi	Fc \perp = 875 psi

Controlling Moment:

-8490 ft-lb

Over left support of span 3 (Right Span)

Created by combining all dead loads and live loads on span(s) 2, 3

Controlling Shear:

3300 lb

At a distance d from left support of span 3 (Right Span)

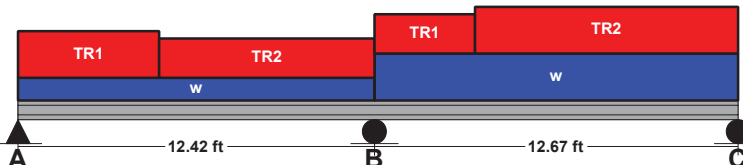
Created by combining all dead loads and live loads on span(s) 2, 3

Comparisons with required sections:

	Req'd	Provided
Section Modulus:	46.83 in3	82.26 in3
Area (Shear):	12.07 in2	41.56 in2
Moment of Inertia (deflection):	220.86 in4	488.41 in4
Moment:	-8490 ft-lb	14914 ft-lb
Shear:	3300 lb	11360 lb

NOTES

LOADING DIAGRAM



UNIFORM LOADS

	Center*	Right*
Uniform Live Load	67 plf	139 plf
Uniform Dead Load	25 plf	52 plf
Beam Self Weight	12 plf	12 plf
Total Uniform Load	104 plf	203 plf

* Load obtained from Load Tracker. See Summary Report for details.

TRAPEZOIDAL LOADS - CENTER SPAN

Load Number	One *	Two *
Left Live Load	217 plf	220 plf
Left Dead Load	81 plf	31 plf
Right Live Load	217 plf	220 plf
Right Dead Load	81 plf	31 plf
Load Start	0 ft	4.92 ft
Load End	4.92 ft	12.42 ft
Load Length	4.92 ft	7.5 ft

RIGHT SPAN

Load Number	One *	Two *
Left Live Load	220 plf	217 plf
Left Dead Load	31 plf	81 plf
Right Live Load	220 plf	217 plf
Right Dead Load	31 plf	81 plf
Load Start	0 ft	3.5 ft
Load End	3.5 ft	12.67 ft
Load Length	3.5 ft	9.17 ft

* Load obtained from Load Tracker. See Summary Report for details.

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: FTG-PST-MLB2-1B

Footing

[2015 International Building Code(2015 NDS)]

Footing Size: 2.0 FT x 2.0 FT x 10.00 IN

Reinforcement: #4 Bars @ 8.00 IN. O.C. E/W / (3) min.

Section Footing Design Adequate



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FOOTING PROPERTIES

Allowable Soil Bearing Pressure: $Q_s = 2500$ psf
Concrete Compressive Strength: $F'_c = 2500$ psi
Reinforcing Steel Yield Strength: $F_y = 60000$ psi
Concrete Reinforcement Cover: $c = 3$ in

FOOTING SIZE

Width: $W = 2$ ft
Length: $L = 2$ ft
Depth: $\text{Depth} = 10$ in
Effective Depth to Top Layer of Steel: $d = 6.25$ in

COLUMN AND BASEPLATE SIZE

Column Type: Wood
Column Width: $m = 3.5$ in
Column Depth: $n = 3.5$ in

FOOTING CALCULATIONS

Bearing Calculations:

Ultimate Bearing Pressure: $Q_u = 1652$ psf
Effective Allowable Soil Bearing Pressure: $Q_e = 2375$ psf
Required Footing Area: $A_{req} = 2.78$ sf
Area Provided: $A = 4.00$ sf

Baseplate Bearing:

Bearing Required: $\text{Bear} = 9953$ lb
Allowable Bearing: $\text{Bear-A} = 33841$ lb

Beam Shear Calculations (One Way Shear):

Beam Shear: $V_{u1} = 2385$ lb
Allowable Beam Shear: $V_{c1} = 11250$ lb

Punching Shear Calculations (Two Way Shear):

Critical Perimeter: $B_o = 39$ in
Punching Shear: $V_{u2} = 8310$ lb
Allowable Punching Shear (ACI 11-35): $vc2-a = 54844$ lb
Allowable Punching Shear (ACI 11-36): $vc2-b = 76875$ lb
Allowable Punching Shear (ACI 11-37): $vc2-c = 36563$ lb
Controlling Allowable Punching Shear: $vc2 = 36563$ lb

Bending Calculations:

Factored Moment: $M_u = 29858$ in-lb
Nominal Moment Strength: $M_n = 187693$ in-lb

Reinforcement Calculations:

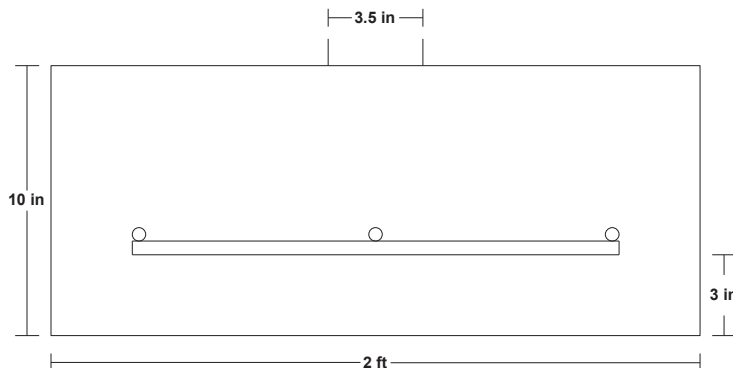
Concrete Compressive Block Depth: $a = 0.69$ in
Steel Required Based on Moment: $A_s(1) = 0.09$ in²
Min. Code Req'd Reinf. Shrink./Temp. (ACI-10.5.4): $A_s(2) = 0.43$ in²
Controlling Reinforcing Steel: $A_{s-reqd} = 0.43$ in²
Selected Reinforcement: #4's @ 8.0 in. o.c. e/w (3) Min.
Reinforcement Area Provided: $A_s = 0.59$ in²

Development Length Calculations:

Development Length Required: $L_d = 15$ in
Development Length Supplied: $L_{d-sup} = 9$ in

Note: Plain concrete adequate for bending,
therefore adequate development length not required.

LOADING DIAGRAM



FOOTING LOADING

Live Load: $PL = 5055$ lb *
Dead Load: $PD = 1554$ lb *
Total Load: $PT = 6609$ lb *
Ultimate Factored Load: $P_u = 9953$ lb
Footing plus soil above footing weight: $W_t = 322$ lb

* Load obtained from Load Tracker. See Summary Report for details.

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: PST-MLB2-1A

Column

[2015 International Building Code(2015 NDS)]

1.5 IN x 3.5 IN x 9.08 FT

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 16.4%



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VERTICAL REACTIONS

Live Load: Vert-LL-Rxn = 1551 lb
Dead Load: Vert-DL-Rxn = 443 lb
Total Load: Vert-TL-Rxn = 1994 lb

COLUMN DATA

Total Column Length: 9.08 ft
Unbraced Length (X-Axis) Lx: 9.08 ft
Unbraced Length (Y-Axis) Ly: 0 ft
Column End Condition-K (e): 1
Axial Load Duration Factor 1.00

COLUMN PROPERTIES

#2 - Douglas-Fir-Larch

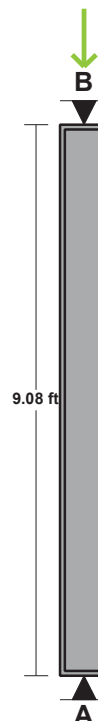
	Base Values	Adjusted
Compressive Stress:	Fc = 1350 psi	Fc' = 454 psi
	Cd=1.00 Cf=1.15 Cp=0.29	
Bending Stress (X-X Axis):	Fbx = 900 psi	Fbx' = 1350 psi
	Cd=1.00 CF=1.50	
Bending Stress (Y-Y Axis):	Fby = 900 psi	Fby' = 1350 psi
	Cd=1.00 CF=1.50	
Modulus of Elasticity:	E = 1600 ksi	E' = 1600 ksi
Column Section (X-X Axis):	dx = 3.5 in	
Column Section (Y-Y Axis):	dy = 1.5 in	
Area:	A = 5.25 in ²	
Section Modulus (X-X Axis):	Sx = 3.06 in ³	
Section Modulus (Y-Y Axis):	Sy = 1.31 in ³	
Slenderness Ratio:	Lex/dx = 31.13	
	Ley/dy = 0	

Column Calculations (Controlling Case Only):

Controlling Load Case: Axial Total Load Only (L + D)

Actual Compressive Stress:	Fc = 380 psi
Allowable Compressive Stress:	Fc' = 454 psi
Eccentricity Moment (X-X Axis):	Mx-ex = 0 ft-lb
Eccentricity Moment (Y-Y Axis):	My-ey = 0 ft-lb
Moment Due to Lateral Loads (X-X Axis):	Mx = 0 ft-lb
Moment Due to Lateral Loads (Y-Y Axis):	My = 0 ft-lb
Bending Stress Lateral Loads Only (X-X Axis):	Fbx = 0 psi
Allowable Bending Stress (X-X Axis):	Fbx' = 1350 psi
Bending Stress Lateral Loads Only (Y-Y Axis):	Fby = 0 psi
Allowable Bending Stress (Y-Y Axis):	Fby' = 1350 psi
Combined Stress Factor:	CSF = 0.84

LOADING DIAGRAM



AXIAL LOADING

Live Load: PL = 1551 lb *
Dead Load: PD = 433 lb *
Column Self Weight: CSW = 10 lb
Total Axial Load: PT = 1994 lb

* Load obtained from Load Tracker. See Summary Report for details.

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: FTG-PST-MLB2-1A

Footing

[2015 International Building Code(2015 NDS)]

Footing Size: 1.0 FT x 1.0 FT x 10.00 IN

Reinforcement in Long Direction: #4 Bars @ 5.50 IN. O.C. / (2) min.

Reinforcement in Short Direction-center band (Equal to width of short side): #4 Bars @ 5.50 IN. O.C. / (2) min.

Reinforcement in Short Direction-outside bands: #4 Bars @ 0.00 IN. O.C. / () Each band.

Section Footing Design Adequate



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FOOTING PROPERTIES

Allowable Soil Bearing Pressure: $Q_s = 2500$ psf
Concrete Compressive Strength: $F'_c = 2500$ psi
Reinforcing Steel Yield Strength: $F_y = 60000$ psi
Concrete Reinforcement Cover: $c = 3$ in

FOOTING SIZE

Width: $W = 1$ ft
Length: $L = 1$ ft
Depth: $\text{Depth} = 10$ in
Effective Depth to Top Layer of Steel: $d = 6.25$ in

COLUMN AND BASEPLATE SIZE

Column Type: Other
Column Width: $m = 4$ in
Column Depth: $n = 4$ in

FOOTING CALCULATIONS

Bearing Calculations:

Ultimate Bearing Pressure: $Q_u = 1994$ psf
Effective Allowable Soil Bearing Pressure: $Q_e = 2375$ psf
Required Footing Area: $A_{req} = 0.84$ sf
Area Provided: $A = 1.00$ sf

Baseplate Bearing:

Bearing Required: $Bear = 3013$ lb
Allowable Bearing: $Bear-A = 44200$ lb

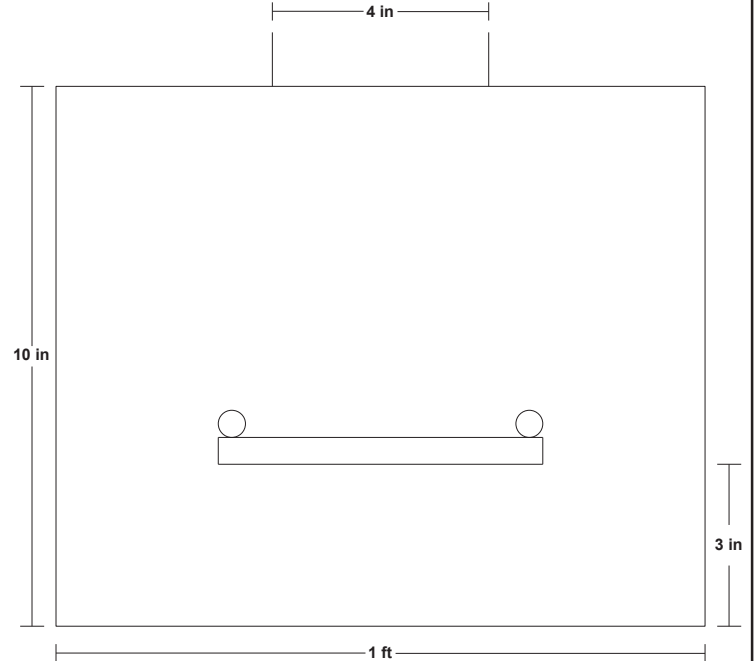
Beam Shear Calculations (One Way Shear):

Beam Shear: $V_{u1} = 0$ lb
Allowable Beam Shear: $V_{c1} = 5625$ lb

Punching Shear Calculations (Two Way Shear):

Critical Perimeter: $B_o = 41$ in
Punching Shear: $V_{u2} = 815$ lb
Allowable Punching Shear (ACI 11-35): $vc2-a = 57656$ lb
Allowable Punching Shear (ACI 11-36): $vc2-b = 77813$ lb
Allowable Punching Shear (ACI 11-37): $vc2-c = 38438$ lb
Controlling Allowable Punching Shear: $vc2 = 38438$ lb

LOADING DIAGRAM



FOOTING LOADING

Live Load: $PL = 1551$ lb *
Dead Load: $PD = 443$ lb *
Total Load: $PT = 1994$ lb *
Ultimate Factored Load: $P_u = 3013$ lb
Footing plus soil above footing weight: $W_t = 81$ lb

* Load obtained from Load Tracker. See Summary Report for details.

Short Direction:

Bending Calculations:

Factored Moment: $M_u = 4520$ in-lb
Nominal Moment Strength: $M_n = 122682$ in-lb

Reinforcement Calculations:

Concrete Compressive Block Depth: $a = 0.92$ in
Steel Required Based on Moment: $As(1) = 0.01$ in²
Min. Code Req'd Reinf. Shrink./Temp. (ACI-10.5.4): $As(2) = 0.22$ in²
Controlling Reinforcing Steel: $As_{reqd} = 0.22$ in²
Selected Reinforcement: Short Dir: #4's @ 5.5 in. o.c.(2) Min.
Reinforcement Area Provided: $As = 0.39$ in²

Development Length Calculations:

Development Length Required: $L_d = 15$ in
Development Length Supplied: $L_{d-sup} = 3$ in

Long Direction:

Bending Calculations:

Factored Moment: $M_u = 4520$ in-lb
Nominal Moment Strength: $M_n = 122739$ in-lb

Reinforcement Calculations:

Concrete Compressive Block Depth: $a = 0.92$ in
Steel Required Based on Moment: $As(1) = 0.01$ in²
Min. Code Req'd Reinf. Shrink./Temp. (ACI-10.5.4): $As(2) = 0.22$ in²
Controlling Reinforcing Steel: $As_{reqd} = 0.22$ in²
Selected Reinforcement: Long Dir: #4's @ 5.5 in. o.c.(2) Min.
Reinforcement Area Provided: $As = 0.39$ in²

Development Length Calculations:

Development Length Required: $L_d = 15$ in
Development Length Supplied: $L_{d-sup} = 3$ in

Established Basis Permit # 19-03646
therefore adequate development length not required.

NOTES

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: WALL-1ST-1

Wall

[2015 International Building Code(2015 NDS)]

1.5 IN x 5.5 IN x 8.08 FT @ 16 O.C.

#2 - Douglas-Fir-Larch - Dry Use

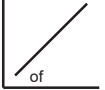
Section Adequate By: 87.5%

Controlling Factor: Combined Stress Factor



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DEFLECTIONS

Deflection due to lateral loads only: Defl = 0.06 IN = L/1638
Live Load Deflection Criteria: L/180

VERTICAL REACTIONS

Live Load: Vert-LL-Rxn = 0 lb
Dead Load: Vert-DL-Rxn = 119 lb
Total Load: Vert-TL-Rxn = 119 lb

HORIZONTAL REACTIONS

Total Reaction at Top of Column: TL-Rxn-Top = 83 lb
Total Reaction at Bottom of Column: TL-Rxn-Bottom = 83 lb

WALL DATA

Total Stud Length: 8.08 ft
Wall Dead Weight: 11 psf
Unbraced Length (X-Axis) Lx: 8.08 ft
Unbraced Length (Y-Axis) Ly: 0 ft
Stud End Condition-K (e): 1
Axial Load Duration Factor: 1.00
Lateral Load Duration Factor (Wind/Seismic): 1.60

STUD PROPERTIES

#2 - Douglas-Fir-Larch

	Base Values	Adjusted
Compressive Stress:	Fc = 1350 psi	Fc' = 1254 psi
	Cd=1.60 Cf=1.10 Cp=0.53	
Bending Stress (X-X Axis):	Fbx = 900 psi	Fbx' = 2153 psi
	Cd=1.60 CF=1.30 Cr=1.15 Cl=1.00	
Bending Stress (Y-Y Axis):	Fby = 900 psi	Fby' = 2153 psi
	Cd=1.60 CF=1.30 Cr=1.15	
Modulus of Elasticity:	E = 1600 ksi	E' = 1600 ksi

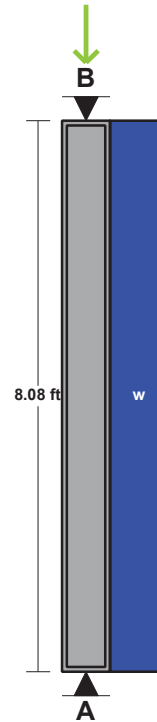
Stud Section (X-X Axis):	dx = 5.5 in
Stud Section (Y-Y Axis):	dy = 1.5 in
Area:	A = 8.25 in ²
Section Modulus (X-X Axis):	Sx = 7.56 in ³
Section Modulus (Y-Y Axis):	Sy = 2.06 in ³
Slenderness Ratio:	Lex/dx = 17.63
	Ley/dy = 0

Stud Calculations (Controlling Case Only):

Controlling Load Case: Axial Dead Load and Lateral loads (D + W or E)

Actual Compressive Stress:	Fc = 14 psi
Allowable Compressive Stress:	Fc' = 1254 psi
Eccentricity Moment (X-X Axis):	Mx-ex = 0 ft-lb
Eccentricity Moment (Y-Y Axis):	My-ey = 0 ft-lb
Moment Due to Lateral Loads (X-X Axis):	Mx = 168 ft-lb
Moment Due to Lateral Loads (Y-Y Axis):	My = 0 ft-lb
Bending Stress Lateral Loads Only (X-X Axis):	Fbx = 266 psi
Allowable Bending Stress (X-X Axis):	Fbx' = 2153 psi
Bending Stress Lateral Loads Only (Y-Y Axis):	Fby = 0 psi
Allowable Bending Stress (Y-Y Axis):	Fby' = 2153 psi
Combined Stress Factor:	CSF = 0.12

LOADING DIAGRAM



WALL LOAD CALCULATOR

	Live Load	Dead Load	Tributary Width
Load Tracker:	LL = 0 plf	DL = 0 plf	
Roof:	LL = 25 psf	DL = 15 psf	TA = 0 ft
Upper Floor:	LL = 40 psf	DL = 15 psf	TA = 0 ft
Upper Floor Height:	0 ft		
Middle Floor:	LL = 40 psf	DL = 15 psf	TA = 0 ft
Middle Floor Height:	0 ft		
Calculated Load:	LL = 0 plf	DL = 88.9 plf	

AXIAL LOADING

Live Load:	PL = 0 plf *
Dead Load:	PD = 89 plf *
Total Axial Load:	PT = 89 plf

* Load obtained from Load Tracker. See Summary Report for details.

LATERAL LOADING (Dy Face)

Uniform Lateral Load: wL-Lat = 15 psf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: PST-MLB2-1B

Column

[2015 International Building Code(2015 NDS)]

5.5 IN x 5.5 IN x 9.08 FT

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 60.5%



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VERTICAL REACTIONS

Live Load: Vert-LL-Rxn = 5055 lb
Dead Load: Vert-DL-Rxn = 1593 lb
Total Load: Vert-TL-Rxn = 6648 lb

COLUMN DATA

Total Column Length: 9.08 ft
Unbraced Length (X-Axis) Lx: 9.08 ft
Unbraced Length (Y-Axis) Ly: 9.08 ft
Column End Condition-K (e): 1
Axial Load Duration Factor 1.00

COLUMN PROPERTIES

#2 - Douglas-Fir-Larch

	Base Values	Adjusted
Compressive Stress:	Fc = 700 psi	Fc' = 556 psi
	Cd=1.00 Cp=0.79	
Bending Stress (X-X Axis):	Fbx = 750 psi	Fbx' = 750 psi
	Cd=1.00 CF=1.00	
Bending Stress (Y-Y Axis):	Fby = 750 psi	Fby' = 750 psi
	Cd=1.00 CF=1.00	
Modulus of Elasticity:	E = 1300 ksi	E' = 1300 ksi

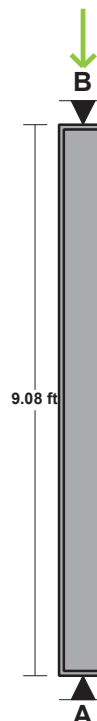
Column Section (X-X Axis):	dx =	5.5 in
Column Section (Y-Y Axis):	dy =	5.5 in
Area:	A =	30.25 in ²
Section Modulus (X-X Axis):	Sx =	27.73 in ³
Section Modulus (Y-Y Axis):	Sy =	27.73 in ³
Slenderness Ratio:	Lex/dx =	19.81
	Ley/dy =	19.81

Column Calculations (Controlling Case Only):

Controlling Load Case: Axial Total Load Only (L + D)

Actual Compressive Stress:	Fc =	220 psi
Allowable Compressive Stress:	Fc' =	556 psi
Eccentricity Moment (X-X Axis):	Mx-ex =	0 ft-lb
Eccentricity Moment (Y-Y Axis):	My-ey =	0 ft-lb
Moment Due to Lateral Loads (X-X Axis):	Mx =	0 ft-lb
Moment Due to Lateral Loads (Y-Y Axis):	My =	0 ft-lb
Bending Stress Lateral Loads Only (X-X Axis):	Fbx =	0 psi
Allowable Bending Stress (X-X Axis):	Fbx' =	750 psi
Bending Stress Lateral Loads Only (Y-Y Axis):	Fby =	0 psi
Allowable Bending Stress (Y-Y Axis):	Fby' =	750 psi
Combined Stress Factor:	CSF =	0.4

LOADING DIAGRAM



AXIAL LOADING

Live Load:	PL =	5055 lb *
Dead Load:	PD =	1533 lb *
Column Self Weight:	CSW =	60 lb
Total Axial Load:	PT =	6648 lb

* Load obtained from Load Tracker. See Summary Report for details.

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: FTG-WALL-1ST-1

Footing

[2015 International Building Code(2015 NDS)]

Footing Size: 18.0 IN Wide x 8.0 IN Deep Continuous Footing With 8.0 IN Thick x 12.0 IN Tall Stemwall

Longitudinal Reinforcement: (2) Continuous #4 Bars

Transverse Reinforcement: #4 Bars @ 13.00 IN. O.C. (unnecessary)

Section Footing Design Adequate



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FOOTING PROPERTIES

Allowable Soil Bearing Pressure: $Q_s = 2500$ psf
Concrete Compressive Strength: $F'_c = 2500$ psi
Reinforcing Steel Yield Strength: $F_y = 60000$ psi
Concrete Reinforcement Cover: $c = 3$ in

FOOTING SIZE

Width: $W = 18$ in
Depth: $\text{Depth} = 8$ in
Effective Depth to Top Layer of Steel: $d = 4.25$ in

STEMWALL SIZE

Stemwall Width: 8 in
Stemwall Height: 12 in
Stemwall Weight: 150 pcf

FOOTING CALCULATIONS

Bearing Calculations:

Ultimate Bearing Pressure: $Q_u = 933$ psf
Effective Allowable Soil Bearing Pressure: $Q_e = 2400$ psf
Width Required: $W_{req} = 0.58$ ft

Beam Shear Calculations (One Way Shear):

Beam Shear: $V_{u1} = 82$ lb
Allowable Beam Shear: $V_{c1} = 3825$ lb

Transverse Direction:

Bending Calculations:

Factored Moment: $M_u = 1367$ in-lb
Nominal Moment Strength: $M_n = 0$ in-lb

Reinforcement Calculations:

Concrete Compressive Block Depth: $a = 0.41$ in
Steel Required Based on Moment: $A_s(1) = 0.01$ in²
Min. Code Req'd Reinf. Shrink./Temp. (ACI-10.5.4) $A_s(2) = 0.17$ in²
Controlling Reinforcing Steel: $A_{s-reqd} = 0.17$ in²
Selected Reinforcement: Trans: #4's @ 13.0 in. o.c.
Reinforcement Area Provided: $A_s = 0.17$ in²

Development Length Calculations:

Development Length Required: $L_d = 15$ in
Development Length Supplied: $L_{d-sup} = 2$ in

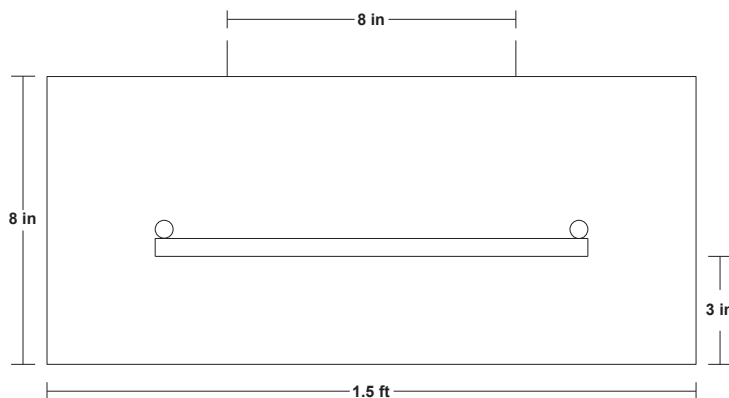
Longitudinal Direction:

Reinforcement Calculations:

Min. Code Req'd Reinf. Shrink./Temp. (ACI-10.5.4): $A_s(2) = 0.26$ in²
Controlling Reinforcing Steel: $A_{s-reqd} = 0.26$ in²
Selected Reinforcement: Longitudinal: (2) Cont. #4 Bars
Reinforcement Area Provided: $A_s = 0.39$ in²

NOTES

LOADING DIAGRAM



FOOTING LOADING

Live Load: $PL = 721$ plf *
Dead Load: $PD = 579$ plf *
Total Load: $PT = 1400$ plf *
Ultimate Factored Load: $P_u = 1968$ plf

* Load obtained from Load Tracker. See Summary Report for details.

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: WALL-2ND-6

Wall

[2015 International Building Code(2015 NDS)]

1.5 IN x 5.5 IN x 8.08 FT @ 16 O.C.

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 87.5%

Controlling Factor: Combined Stress Factor



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DEFLECTIONS

Deflection due to lateral loads only: Defl = 0.06 IN = L/1638
Live Load Deflection Criteria: L/180

VERTICAL REACTIONS

Live Load: Vert-LL-Rxn = 0 lb
Dead Load: Vert-DL-Rxn = 108 lb
Total Load: Vert-TL-Rxn = 108 lb

HORIZONTAL REACTIONS

Total Reaction at Top of Column: TL-Rxn-Top = 83 lb
Total Reaction at Bottom of Column: TL-Rxn-Bottom = 83 lb

WALL DATA

Total Stud Length: 8.08 ft
Wall Dead Weight: 10 psf
Unbraced Length (X-Axis) Lx: 8.08 ft
Unbraced Length (Y-Axis) Ly: 0 ft
Stud End Condition-K (e): 1
Axial Load Duration Factor: 1.00
Lateral Load Duration Factor (Wind/Seismic): 1.60

STUD PROPERTIES

#2 - Douglas-Fir-Larch

	Base Values	Adjusted
Compressive Stress:	Fc = 1350 psi	Fc' = 1254 psi
	Cd=1.60 Cf=1.10 Cp=0.53	
Bending Stress (X-X Axis):	Fbx = 900 psi	Fbx' = 2153 psi
	Cd=1.60 CF=1.30 Cr=1.15 Cl=1.00	
Bending Stress (Y-Y Axis):	Fby = 900 psi	Fby' = 2153 psi
	Cd=1.60 CF=1.30 Cr=1.15	
Modulus of Elasticity:	E = 1600 ksi	E' = 1600 ksi

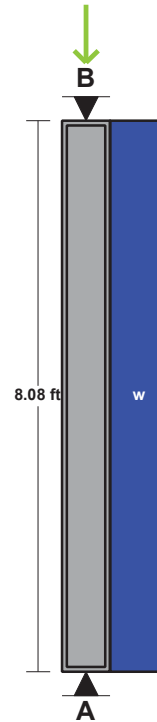
Stud Section (X-X Axis):	dx =	5.5 in
Stud Section (Y-Y Axis):	dy =	1.5 in
Area:	A =	8.25 in ²
Section Modulus (X-X Axis):	Sx =	7.56 in ³
Section Modulus (Y-Y Axis):	Sy =	2.06 in ³
Slenderness Ratio:	Lex/dx =	17.63
	Ley/dy =	0

Stud Calculations (Controlling Case Only):

Controlling Load Case: Axial Dead Load and Lateral loads (D + W or E)

Actual Compressive Stress:	Fc =	13 psi
Allowable Compressive Stress:	Fc' =	1254 psi
Eccentricity Moment (X-X Axis):	Mx-ex =	0 ft-lb
Eccentricity Moment (Y-Y Axis):	My-ey =	0 ft-lb
Moment Due to Lateral Loads (X-X Axis):	Mx =	168 ft-lb
Moment Due to Lateral Loads (Y-Y Axis):	My =	0 ft-lb
Bending Stress Lateral Loads Only (X-X Axis):	Fbx =	266 psi
Allowable Bending Stress (X-X Axis):	Fbx' =	2153 psi
Bending Stress Lateral Loads Only (Y-Y Axis):	Fby =	0 psi
Allowable Bending Stress (Y-Y Axis):	Fby' =	2153 psi
Combined Stress Factor:	CSF =	0.12

LOADING DIAGRAM



WALL LOAD CALCULATOR

	Live Load	Dead Load	Tributary Width
Load Tracker:	LL = 0 plf	DL = 0 plf	
Roof:	LL = 25 psf	DL = 15 psf	TA = 0 ft
Upper Floor:	LL = 40 psf	DL = 15 psf	TA = 0 ft
Upper Floor Height:	0 ft		
Middle Floor:	LL = 40 psf	DL = 15 psf	TA = 0 ft
Middle Floor Height:	0 ft		
Calculated Load:	LL = 0 plf	DL = 80.8 plf	

AXIAL LOADING

Live Load:	PL =	0 plf *
Dead Load:	PD =	81 plf *
Total Axial Load:	PT =	81 plf

* Load obtained from Load Tracker. See Summary Report for details.

LATERAL LOADING (Dy Face)

Uniform Lateral Load: wL-Lat = 15 psf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: MLB2-2

Multi-Loaded Multi-Span Beam

[2015 International Building Code(2015 NDS)]

1.75 IN x 11.875 IN x 6.5 FT

LSL 2360 Fb-1.55E - Louisiana Pacific

Section Adequate By: 226.3%

Controlling Factor: Moment



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DEFLECTIONS

Center

Live Load 0.02 IN L/3704

Dead Load 0.03 in

Total Load 0.05 IN L/1564

Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240

REACTIONS

A

B

Live Load 645 lb 645 lb

Dead Load 883 lb 883 lb

Total Load 1528 lb 1528 lb

Bearing Length 1.00 in 1.00 in

BEAM DATA

Center

Span Length 6.5 ft

Unbraced Length-Top 0 ft

Unbraced Length-Bottom 6.5 ft

Live Load Duration Factor 1.00

Notch Depth 0.00

MATERIAL PROPERTIES

LSL 2360 Fb-1.55E - Louisiana Pacific

Base Values

Adjusted

Bending Stress: Fb = 2360 psi Fb' = 2364 psi

Cd=1.00 CF=1.00

Shear Stress: Fv = 410 psi Fv' = 410 psi

Cd=1.00

Modulus of Elasticity: E = 1550 ksi E' = 1550 ksi

Comp. \perp to Grain: Fc \perp = 875 psi Fc \perp ' = 875 psi

Controlling Moment: 2483 ft-lb

3.25 Ft from left support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2

Controlling Shear: 1069 lb

At a distance d from left support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2

Comparisons with required sections:

Req'd

Provided

Section Modulus: 12.6 in3 41.13 in3

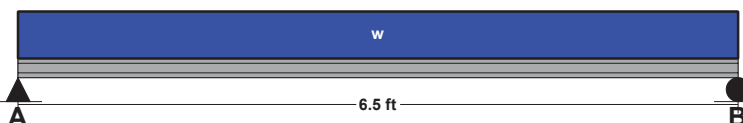
Area (Shear): 3.91 in2 20.78 in2

Moment of Inertia (deflection): 37.47 in4 244.21 in4

Moment: 2483 ft-lb 8101 ft-lb

Shear: 1069 lb 5680 lb

LOADING DIAGRAM



UNIFORM LOADS

Center*

Uniform Live Load 199 plf

Uniform Dead Load 266 plf

Beam Self Weight 6 plf

Total Uniform Load 470 plf

* Load obtained from Load Tracker. See Summary Report for details.

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: RFB3

Roof Beam

[2015 International Building Code(2015 NDS)]

3.5 IN x 7.25 IN x 8.33 FT

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 150.0%

Controlling Factor: Moment



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DEFLECTIONS

Center

Live Load 0.06 IN L/1751

Dead Load 0.04 in

Total Load 0.10 IN L/1035

Live Load Deflection Criteria: L/240 Total Load Deflection Criteria: L/180

REACTIONS

A

B

Live Load 390 lb 390 lb

Dead Load 270 lb 270 lb

Total Load 660 lb 660 lb

Bearing Length 0.30 in 0.30 in

BEAM DATA

Span Length 8.33 ft

Unbraced Length-Top 0 ft

Unbraced Length-Bottom 0 ft

Roof Pitch 4 :12

Roof Duration Factor 1.15

MATERIAL PROPERTIES

#2 - Douglas-Fir-Larch

Base Values

Adjusted

Bending Stress: $F_b = 900$ psi $F_b' = 1346$ psi

$C_d = 1.15$ $CF = 1.30$

Shear Stress: $F_v = 180$ psi $F_v' = 207$ psi

$C_d = 1.15$

Modulus of Elasticity: $E = 1600$ ksi $E' = 1600$ ksi

Comp. \perp to Grain: $F_c \perp = 625$ psi $F_c \perp' = 625$ psi

Controlling Moment: 1375 ft-lb

4.165 ft from left support

Created by combining all dead and live loads.

Controlling Shear: -568 lb

At a distance d from support.

Created by combining all dead and live loads.

Comparisons with required sections:

Req'd

Provided

Section Modulus: 12.26 in³ 30.66 in³

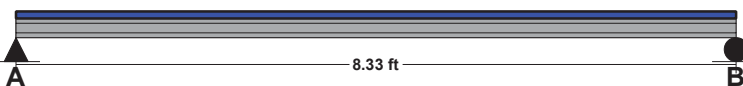
Area (Shear): 4.12 in² 25.38 in²

Moment of Inertia (deflection): 19.33 in⁴ 111.15 in⁴

Moment: 1375 ft-lb 3438 ft-lb

Shear: -568 lb 3502 lb

LOADING DIAGRAM



ROOF LOADING

Side One:

Roof Live Load: LL = 25 psf

Roof Dead Load: DL = 15 psf

Tributary Width: TW = 3.8 ft

Side Two:

Roof Live Load: LL = 0 psf

Roof Dead Load: DL = 0 psf

Tributary Width: TW = 0 ft

Wall Load: WALL = 0 plf

SLOPE/PITCH ADJUSTED LENGTHS AND LOADS

Adjusted Beam Length: Ladj = 8.33 ft

Beam Self Weight: BSW = 6 plf

Beam Uniform Live Load: wL = 94 plf

Beam Uniform Dead Load: wD_adj = 65 plf

Total Uniform Load: wT = 159 plf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: RFB4

Roof Beam

[2015 International Building Code(2015 NDS)]

5.5 IN x 7.5 IN x 6.83 FT

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 242.3%

Controlling Factor: Moment



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DEFLECTIONS

Center

Live Load 0.02 IN L/3888

Dead Load 0.02 in

Total Load 0.04 IN L/2267

Live Load Deflection Criteria: L/240 Total Load Deflection Criteria: L/180

REACTIONS

A

B

Live Load 370 lb 370 lb

Dead Load 264 lb 264 lb

Total Load 634 lb 634 lb

Bearing Length 0.18 in 0.18 in

BEAM DATA

Span Length 6.8 ft

Unbraced Length-Top 0 ft

Unbraced Length-Bottom 0 ft

Roof Pitch 4 :12

Roof Duration Factor 1.15

MATERIAL PROPERTIES

#2 - Douglas-Fir-Larch

Base Values

Adjusted

Bending Stress: $F_b = 750$ psi $F_b' = 863$ psi

$C_d = 1.15$ $CF = 1.00$

Shear Stress: $F_v = 170$ psi $F_v' = 196$ psi

$C_d = 1.15$

Modulus of Elasticity: $E = 1300$ ksi $E' = 1300$ ksi

Comp. \perp to Grain: $F_c \perp = 625$ psi $F_c \perp' = 625$ psi

Controlling Moment: 1083 ft-lb

3.415 ft from left support

Created by combining all dead and live loads.

Controlling Shear: 520 lb

At a distance d from support.

Created by combining all dead and live loads.

Comparisons with required sections:

Req'd

Provided

Section Modulus: 15.06 in³ 51.56 in³

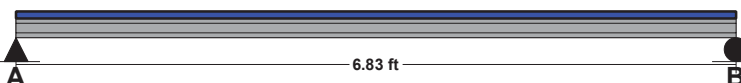
Area (Shear): 3.99 in² 41.25 in²

Moment of Inertia (deflection): 15.35 in⁴ 193.36 in⁴

Moment: 1083 ft-lb 3706 ft-lb

Shear: 520 lb 5376 lb

LOADING DIAGRAM



ROOF LOADING

Side One:

Roof Live Load: LL = 25 psf

Roof Dead Load: DL = 15 psf

Tributary Width: TW = 4.3 ft

Side Two:

Roof Live Load: LL = 0 psf

Roof Dead Load: DL = 0 psf

Tributary Width: TW = 0 ft

Wall Load: WALL = 0 plf

SLOPE/PITCH ADJUSTED LENGTHS AND LOADS

Adjusted Beam Length: Ladj = 6.83 ft

Beam Self Weight: BSW = 9 plf

Beam Uniform Live Load: wL = 108 plf

Beam Uniform Dead Load: wD_adj = 77 plf

Total Uniform Load: wT = 186 plf

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: MLB2-3

Multi-Loaded Multi-Span Beam

[2015 International Building Code(2015 NDS)]

5.5 IN x 11.875 IN x 17.84 FT (10.9 + 6.9) / 30F - 30F-E

DF2 - Dry Use

Section Adequate By: 5.9%

Controlling Factor: Shear



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DEFLECTIONS

	Center	Right
Live Load	0.16 IN L/832	-0.04 IN L/2219
Dead Load	0.11 in	-0.01 in
Total Load	0.27 IN L/488	-0.04 IN L/1849
Live Load Deflection Criteria: L/360 Total Load Deflection Criteria: L/240		

REACTIONS

	A	B	C
Live Load	5757 lb	14470 lb	3890 lb
Dead Load	4510 lb	11880 lb	1846 lb
Total Load	10267 lb	26350 lb	5736 lb
Uplift (1.5 F.S)	0 lb	0 lb	-411 lb
Bearing Length	2.87 in	7.37 in	1.60 in

BEAM DATA

	Center	Right
Span Length	10.92 ft	6.92 ft
Unbraced Length-Top	0 ft	0 ft
Unbraced Length-Bottom	10.92 ft	6.92 ft
Live Load Duration Factor	1.15	
Notch Depth	0.00	

MATERIAL PROPERTIES

30F - 30F-E/DF2

	Base Values	Adjusted
Bending Stress:	Fb = 3000 psi	Controlled by: Fb_cmpr = 3000 psi Fb_cmpr' = 3424 psi Cd=1.15 Cl=0.99
Shear Stress:	Fv = 265 psi	Fv' = 305 psi Cd=1.15
Modulus of Elasticity:	E = 2100 ksi	E' = 2100 ksi
Comp. \perp to Grain:	Fc - \perp = 650 psi	Fc - \perp ' = 650 psi

Controlling Moment:

-25950 ft-lb

10.92 Ft from left support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2, 3

Controlling Shear:

-12527 lb

At a distance d from right support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2, 3

Comparisons with required sections:

	Req'd	Provided
Section Modulus:	90.95 in3	129.26 in3
Area (Shear):	61.66 in2	65.31 in2
Moment of Inertia (deflection):	377.17 in4	767.51 in4
Moment:	-25950 ft-lb	36881 ft-lb
Shear:	-12527 lb	13269 lb

LOADING DIAGRAM



UNIFORM LOADS

	Center	Right*
Uniform Live Load	1245 plf	1245 plf
Uniform Dead Load	1008 plf	1008 plf
Beam Self Weight	14 plf	14 plf
Total Uniform Load	2267 plf	2267 plf

* Load obtained from Load Tracker. See Summary Report for details.

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: PST-MLB2-3A

Column

[2015 International Building Code(2015 NDS)]

5.5 IN x 5.5 IN x 9.58 FT

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 36.2%



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VERTICAL REACTIONS

Live Load:	Vert-LL-Rxn =	5757 lb
Dead Load:	Vert-DL-Rxn =	4573 lb
Total Load:	Vert-TL-Rxn =	10330 lb

COLUMN DATA

Total Column Length:	9.58 ft
Unbraced Length (X-Axis) Lx:	9.58 ft
Unbraced Length (Y-Axis) Ly:	9.58 ft
Column End Condition-K (e):	1
Axial Load Duration Factor	1.00

COLUMN PROPERTIES

#2 - Douglas-Fir-Larch

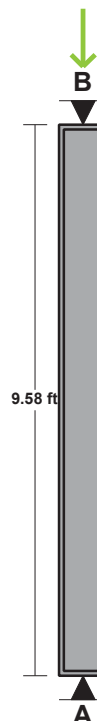
	Base Values	Adjusted
Compressive Stress:	Fc = 700 psi	Fc' = 536 psi
	Cd=1.00 Cp=0.77	
Bending Stress (X-X Axis):	Fbx = 750 psi	Fbx' = 750 psi
	Cd=1.00 CF=1.00	
Bending Stress (Y-Y Axis):	Fby = 750 psi	Fby' = 750 psi
	Cd=1.00 CF=1.00	
Modulus of Elasticity:	E = 1300 ksi	E' = 1300 ksi
Column Section (X-X Axis):	dx = 5.5 in	
Column Section (Y-Y Axis):	dy = 5.5 in	
Area:	A = 30.25 in ²	
Section Modulus (X-X Axis):	Sx = 27.73 in ³	
Section Modulus (Y-Y Axis):	Sy = 27.73 in ³	
Slenderness Ratio:	Lex/dx = 20.9	Ley/dy = 20.9

Column Calculations (Controlling Case Only):

Controlling Load Case: Axial Total Load Only (L + D)

Actual Compressive Stress:	Fc =	341 psi
Allowable Compressive Stress:	Fc' =	536 psi
Eccentricity Moment (X-X Axis):	Mx-ex =	0 ft-lb
Eccentricity Moment (Y-Y Axis):	My-ey =	0 ft-lb
Moment Due to Lateral Loads (X-X Axis):	Mx =	0 ft-lb
Moment Due to Lateral Loads (Y-Y Axis):	My =	0 ft-lb
Bending Stress Lateral Loads Only (X-X Axis):	Fbx =	0 psi
Allowable Bending Stress (X-X Axis):	Fbx' =	750 psi
Bending Stress Lateral Loads Only (Y-Y Axis):	Fby =	0 psi
Allowable Bending Stress (Y-Y Axis):	Fby' =	750 psi
Combined Stress Factor:	CSF =	0.64

LOADING DIAGRAM



AXIAL LOADING

Live Load:	PL =	5757 lb *
Dead Load:	PD =	4510 lb *
Column Self Weight:	CSW =	63 lb
Total Axial Load:	PT =	10330 lb

* Load obtained from Load Tracker. See Summary Report for details.

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: PST-MLB2-3B

Column

[2015 International Building Code(2015 NDS)]

5.5 IN x 7.5 IN x 9.58 FT

#1 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 11.0%



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VERTICAL REACTIONS

Live Load: Vert-LL-Rxn = 14470 lb
Dead Load: Vert-DL-Rxn = 11966 lb
Total Load: Vert-TL-Rxn = 26436 lb

COLUMN DATA

Total Column Length: 9.58 ft
Unbraced Length (X-Axis) Lx: 9.58 ft
Unbraced Length (Y-Axis) Ly: 9.58 ft
Column End Condition-K (e): 1
Axial Load Duration Factor 1.00

COLUMN PROPERTIES

#1 - Douglas-Fir-Larch

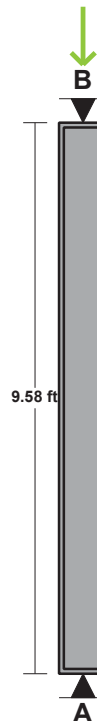
	Base Values	Adjusted
Compressive Stress:	Fc = 1000 psi	Fc' = 720 psi
	Cd=1.00 Cp=0.72	
Bending Stress (X-X Axis):	Fbx = 1200 psi	Fbx' = 1200 psi
	Cd=1.00 CF=1.00	
Bending Stress (Y-Y Axis):	Fby = 1200 psi	Fby' = 1200 psi
	Cd=1.00 CF=1.00	
Modulus of Elasticity:	E = 1600 ksi	E' = 1600 ksi
Column Section (X-X Axis):	dx = 7.5 in	
Column Section (Y-Y Axis):	dy = 5.5 in	
Area:	A = 41.25 in ²	
Section Modulus (X-X Axis):	Sx = 51.56 in ³	
Section Modulus (Y-Y Axis):	Sy = 37.81 in ³	
Slenderness Ratio:	Lex/dx = 15.33	
	Ley/dy = 20.9	

Column Calculations (Controlling Case Only):

Controlling Load Case: Axial Total Load Only (L + D)

Actual Compressive Stress:	Fc = 641 psi
Allowable Compressive Stress:	Fc' = 720 psi
Eccentricity Moment (X-X Axis):	Mx-ex = 0 ft-lb
Eccentricity Moment (Y-Y Axis):	My-ey = 0 ft-lb
Moment Due to Lateral Loads (X-X Axis):	Mx = 0 ft-lb
Moment Due to Lateral Loads (Y-Y Axis):	My = 0 ft-lb
Bending Stress Lateral Loads Only (X-X Axis):	Fbx = 0 psi
Allowable Bending Stress (X-X Axis):	Fbx' = 1200 psi
Bending Stress Lateral Loads Only (Y-Y Axis):	Fby = 0 psi
Allowable Bending Stress (Y-Y Axis):	Fby' = 1200 psi
Combined Stress Factor:	CSF = 0.89

LOADING DIAGRAM



AXIAL LOADING

Live Load: PL = 14470 lb *
Dead Load: PD = 11880 lb *
Column Self Weight: CSW = 86 lb
Total Axial Load: PT = 26436 lb

* Load obtained from Load Tracker. See Summary Report for details.

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: PST-MLB2-3C

Column

[2015 International Building Code(2015 NDS)]

5.5 IN x 5.5 IN x 9.58 FT

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 67.0%



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VERTICAL REACTIONS

Live Load: Vert-LL-Rxn = 3890 lb
Dead Load: Vert-DL-Rxn = 1909 lb
Total Load: Vert-TL-Rxn = 5799 lb

COLUMN DATA

Total Column Length: 9.58 ft
Unbraced Length (X-Axis) Lx: 9.58 ft
Unbraced Length (Y-Axis) Ly: 9.58 ft
Column End Condition-K (e): 1
Axial Load Duration Factor 1.15

COLUMN PROPERTIES

#2 - Douglas-Fir-Larch

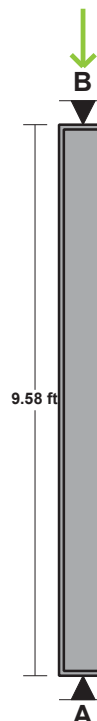
	Base Values	Adjusted
Compressive Stress:	Fc = 700 psi	Fc' = 582 psi
	Cd=1.15 Cp=0.72	
Bending Stress (X-X Axis):	Fbx = 750 psi	Fbx' = 863 psi
	Cd=1.15 CF=1.00	
Bending Stress (Y-Y Axis):	Fby = 750 psi	Fby' = 863 psi
	Cd=1.15 CF=1.00	
Modulus of Elasticity:	E = 1300 ksi	E' = 1300 ksi
Column Section (X-X Axis):	dx = 5.5 in	
Column Section (Y-Y Axis):	dy = 5.5 in	
Area:	A = 30.25 in ²	
Section Modulus (X-X Axis):	Sx = 27.73 in ³	
Section Modulus (Y-Y Axis):	Sy = 27.73 in ³	
Slenderness Ratio:	Lex/dx = 20.9	Ley/dy = 20.9

Column Calculations (Controlling Case Only):

Controlling Load Case: Axial Total Load Only (L + D)

Actual Compressive Stress:	Fc = 192 psi
Allowable Compressive Stress:	Fc' = 582 psi
Eccentricity Moment (X-X Axis):	Mx-ex = 0 ft-lb
Eccentricity Moment (Y-Y Axis):	My-ey = 0 ft-lb
Moment Due to Lateral Loads (X-X Axis):	Mx = 0 ft-lb
Moment Due to Lateral Loads (Y-Y Axis):	My = 0 ft-lb
Bending Stress Lateral Loads Only (X-X Axis):	Fbx = 0 psi
Allowable Bending Stress (X-X Axis):	Fbx' = 863 psi
Bending Stress Lateral Loads Only (Y-Y Axis):	Fby = 0 psi
Allowable Bending Stress (Y-Y Axis):	Fby' = 863 psi
Combined Stress Factor:	CSF = 0.33

LOADING DIAGRAM



AXIAL LOADING

Live Load: PL = 3890 lb *
Dead Load: PD = 1846 lb *
Column Self Weight: CSW = 63 lb
Total Axial Load: PT = 5799 lb

* Load obtained from Load Tracker. See Summary Report for details.

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: FTG-PST-MLB2-3A

Footing

[2015 International Building Code(2015 NDS)]

Footing Size: 2.5 FT x 2.5 FT x 10.00 IN

Reinforcement: #4 Bars @ 11.00 IN. O.C. E/W / (3) min.

Section Footing Design Adequate



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FOOTING PROPERTIES

Allowable Soil Bearing Pressure: $Q_s = 2500$ psf
Concrete Compressive Strength: $F'_c = 2500$ psi
Reinforcing Steel Yield Strength: $F_y = 60000$ psi
Concrete Reinforcement Cover: $c = 3$ in

FOOTING SIZE

Width: $W = 2.5$ ft
Length: $L = 2.5$ ft
Depth: $\text{Depth} = 10$ in
Effective Depth to Top Layer of Steel: $d = 6.25$ in

COLUMN AND BASEPLATE SIZE

Column Type: Steel
Column Width: $m = 4$ in
Column Depth: $n = 4$ in
Baseplate Width: $bsw = 6$ in
Baseplate Length: $bsl = 6$ in

FOOTING CALCULATIONS

Bearing Calculations:

Ultimate Bearing Pressure: $Q_u = 1653$ psf
Effective Allowable Soil Bearing Pressure: $Q_e = 2375$ psf
Required Footing Area: $A_{req} = 4.35$ sf
Area Provided: $A = 6.25$ sf

Baseplate Bearing:

Bearing Required: $\text{Bear} = 14699$ lb
Allowable Bearing: $\text{Bear-A} = 99450$ lb

Beam Shear Calculations (One Way Shear):

Beam Shear: $V_{u1} = 3062$ lb
Allowable Beam Shear: $V_{c1} = 14063$ lb

Punching Shear Calculations (Two Way Shear):

Critical Perimeter: $B_o = 45$ in
Punching Shear: $V_{u2} = 12632$ lb
Allowable Punching Shear (ACI 11-35): $vc2-a = 63281$ lb
Allowable Punching Shear (ACI 11-36): $vc2-b = 79688$ lb
Allowable Punching Shear (ACI 11-37): $vc2-c = 42188$ lb
Controlling Allowable Punching Shear: $vc2 = 42188$ lb

Bending Calculations:

Factored Moment: $M_u = 38278$ in-lb
Nominal Moment Strength: $M_n = 189895$ in-lb

Reinforcement Calculations:

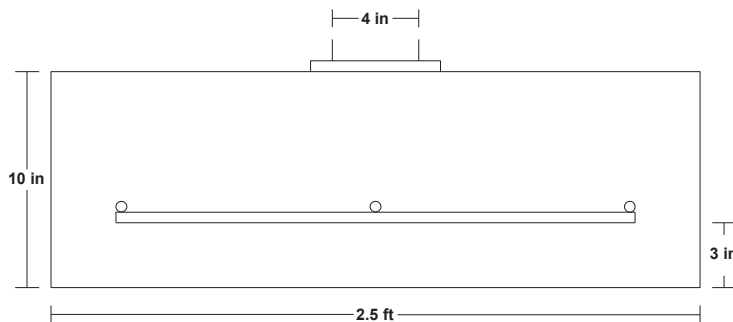
Concrete Compressive Block Depth: $a = 0.55$ in
Steel Required Based on Moment: $As(1) = 0.11$ in²
Min. Code Req'd Reinf. Shrink./Temp. (ACI-10.5.4): $As(2) = 0.54$ in²
Controlling Reinforcing Steel: $As-reqd = 0.54$ in²
Selected Reinforcement: #4's @ 11.0 in. o.c. e/w (3) Min.
Reinforcement Area Provided: $As = 0.59$ in²

Development Length Calculations:

Development Length Required: $L_d = 15$ in
Development Length Supplied: $L_{d-sup} = 9.5$ in

Note: Plain concrete adequate for bending,
therefore adequate development length not required.

LOADING DIAGRAM



FOOTING LOADING

Live Load: $PL = 5757$ lb *
Dead Load: $PD = 4573$ lb *
Total Load: $PT = 10330$ lb *
Ultimate Factored Load: $P_u = 14699$ lb
Footing plus soil above footing weight: $W_t = 503$ lb
* Load obtained from Load Tracker. See Summary Report for details.

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: FTG-PST-MLB2-3C

Footing

[2015 International Building Code(2015 NDS)]

Footing Size: 2.5 FT x 2.5 FT x 12.00 IN

Reinforcement: #4 Bars @ 7.00 IN. O.C. E/W / (4) min.

Section Footing Design Adequate



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FOOTING PROPERTIES

Allowable Soil Bearing Pressure: $Q_s = 2500$ psf
Concrete Compressive Strength: $F'_c = 2500$ psi
Reinforcing Steel Yield Strength: $F_y = 60000$ psi
Concrete Reinforcement Cover: $c = 3$ in

FOOTING SIZE

Width: $W = 2.5$ ft
Length: $L = 2.5$ ft
Depth: $\text{Depth} = 12$ in
Effective Depth to Top Layer of Steel: $d = 8.25$ in

COLUMN AND BASEPLATE SIZE

Column Type: Concrete
Column Width: $m = 4$ in
Column Depth: $n = 4$ in

FOOTING CALCULATIONS

Bearing Calculations:

Ultimate Bearing Pressure: $Q_u = 1856$ psf
Effective Allowable Soil Bearing Pressure: $Q_e = 2350$ psf
Required Footing Area: $A_{req} = 4.94$ sf
Area Provided: $A = 6.25$ sf

Baseplate Bearing:

Bearing Required: $\text{Bear} = 17030$ lb
Allowable Bearing: $\text{Bear-A} = 44200$ lb

Beam Shear Calculations (One Way Shear):

Beam Shear: $V_{u1} = 2696$ lb
Allowable Beam Shear: $V_{c1} = 18563$ lb

Punching Shear Calculations (Two Way Shear):

Critical Perimeter: $B_o = 49$ in
Punching Shear: $V_{u2} = 14190$ lb
Allowable Punching Shear (ACI 11-35): $vc2-a = 90956$ lb
Allowable Punching Shear (ACI 11-36): $vc2-b = 132413$ lb
Allowable Punching Shear (ACI 11-37): $vc2-c = 60638$ lb
Controlling Allowable Punching Shear: $vc2 = 60638$ lb

Bending Calculations:

Factored Moment: $M_u = 47967$ in-lb
Nominal Moment Strength: $M_n = 334058$ in-lb

Reinforcement Calculations:

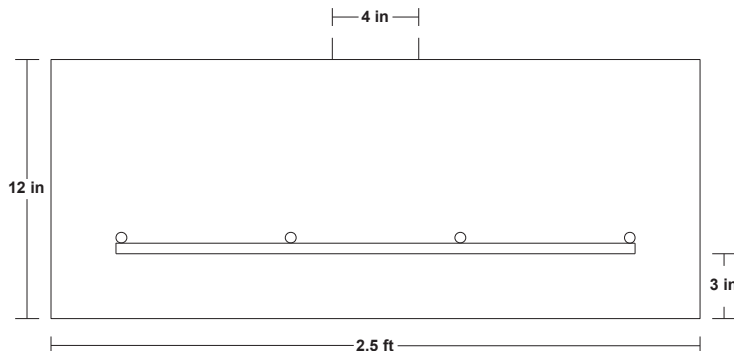
Concrete Compressive Block Depth: $a = 0.74$ in
Steel Required Based on Moment: $A_s(1) = 0.11$ in²
Min. Code Req'd Reinf. Shrink./Temp. (ACI-10.5.4): $A_s(2) = 0.65$ in²
Controlling Reinforcing Steel: $A_{s-reqd} = 0.65$ in²
Selected Reinforcement: #4's @ 7.0 in. o.c. e/w (4) Min.
Reinforcement Area Provided: $A_s = 0.79$ in²

Development Length Calculations:

Development Length Required: $L_d = 15$ in
Development Length Supplied: $L_{d-sup} = 10$ in

Note: Plain concrete adequate for bending,
therefore adequate development length not required.

LOADING DIAGRAM



FOOTING LOADING

Live Load: $PL = 7780$ lb *
Dead Load: $PD = 3818$ lb *
Total Load: $PT = 11598$ lb *
Ultimate Factored Load: $P_u = 17030$ lb
Footing plus soil above footing weight: $W_t = 604$ lb

* Load obtained from Load Tracker. See Summary Report for details.

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Project: 19-002c Framing

Location: FTG-PST-MLB2-3B

Footing

[2015 International Building Code(2015 NDS)]

Footing Size: 3.5 FT x 3.5 FT x 10.00 IN

Reinforcement: #4 Bars @ 11.00 IN. O.C. E/W / (4) min.

Section Footing Design Adequate



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FOOTING PROPERTIES

Allowable Soil Bearing Pressure: $Q_s = 2500$ psf
Concrete Compressive Strength: $F'_c = 2500$ psi
Reinforcing Steel Yield Strength: $F_y = 60000$ psi
Concrete Reinforcement Cover: $c = 3$ in

FOOTING SIZE

Width: $W = 3.5$ ft
Length: $L = 3.5$ ft
Depth: $\text{Depth} = 10$ in
Effective Depth to Top Layer of Steel: $d = 6.25$ in

COLUMN AND BASEPLATE SIZE

Column Type: Concrete
Column Width: $m = 6$ in
Column Depth: $n = 8$ in

FOOTING CALCULATIONS

Bearing Calculations:

Ultimate Bearing Pressure: $Q_u = 2158$ psf
Effective Allowable Soil Bearing Pressure: $Q_e = 2375$ psf
Required Footing Area: $A_{req} = 11.13$ sf
Area Provided: $A = 12.25$ sf

Baseplate Bearing:

Bearing Required: $Bear = 37511$ lb
Allowable Bearing: $Bear-A = 132600$ lb

Beam Shear Calculations (One Way Shear):

Beam Shear: $V_{u1} = 10494$ lb
Allowable Beam Shear: $V_{c1} = 19688$ lb

Punching Shear Calculations (Two Way Shear):

Critical Perimeter: $B_o = 53$ in
Punching Shear: $V_{u2} = 33799$ lb
Allowable Punching Shear (ACI 11-35): $vc2-a = 62109$ lb
Allowable Punching Shear (ACI 11-36): $vc2-b = 83438$ lb
Allowable Punching Shear (ACI 11-37): $vc2-c = 49688$ lb
Controlling Allowable Punching Shear: $vc2 = 49688$ lb

Bending Calculations:

Factored Moment: $M_u = 144686$ in-lb
Nominal Moment Strength: $M_n = 253752$ in-lb

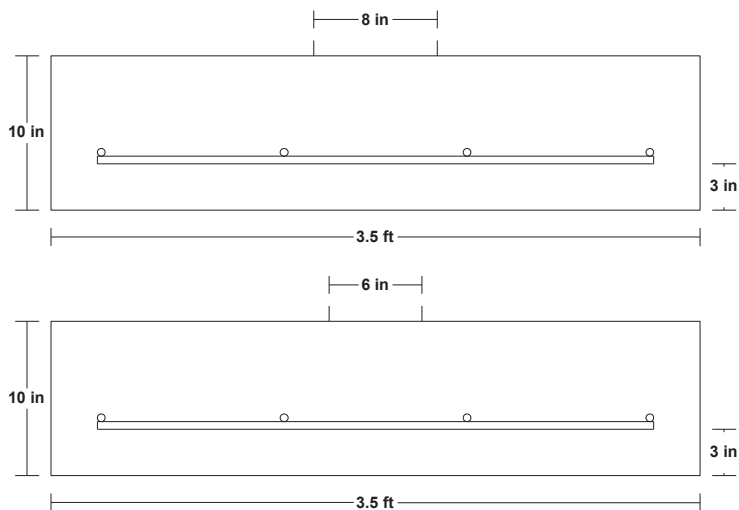
Reinforcement Calculations:

Concrete Compressive Block Depth: $a = 0.53$ in
Steel Required Based on Moment: $A_s(1) = 0.44$ in²
Min. Code Req'd Reinf. Shrink./Temp. (ACI-10.5.4): $A_s(2) = 0.76$ in²
Controlling Reinforcing Steel: $A_{s-reqd} = 0.76$ in²
Selected Reinforcement: #4's @ 11.0 in. o.c. e/w (4) Min.
Reinforcement Area Provided: $A_s = 0.79$ in²

Development Length Calculations:

Development Length Required: $L_d = 15$ in
Development Length Supplied: $L_{d-sup} = 15$ in

LOADING DIAGRAM



FOOTING LOADING

Live Load: $PL = 14470$ lb *
Dead Load: $PD = 11966$ lb *
Total Load: $PT = 26436$ lb *
Ultimate Factored Load: $P_u = 37511$ lb
Footing plus soil above footing weight: $W_t = 987$ lb

* Load obtained from Load Tracker. See Summary Report for details.

NOTES

Established Basic Permit #

19-03646

Permit Number: 20-04893

Pacific Northwest Structural
Group, LLC

Project:	Red Barn Lane - Duplex 1400	By:	DLS
Location:	NW Hogan Ln & Nels Nelson Rd NW, Bremerton, WA 98311	Project No.:	19-002c
Client:	Envision Northwest, LLC	Last Update:	27-Apr-19
AWC SDPWS-2008 - Wood Shear Wall Design Aid ALLOWABLE STRESS DESIGN			

Mark	Sheathing Type, Nail Size, Panel Edges Fastener Spacing, & Capacity	Capacity (plf)
A	15/32" Sheathing W/ 8d @ 6" oc	365
B	15/32" Sheathing W/ 8d @ 4" oc	533
	None	#N/A
	None	#N/A
	None	#N/A
	None	#N/A

Mark	Simpson Strong-Tie Holdowns	Capacity (lb)	Holdown Deflection at Highest Load (in)
①	HDU2-SDS2.5 W/ 3" Post	3,075	0.088
②	HDU5-SDS2.5 W/ 3" Post	5,645	0.115
③	HDU11-SDS2.5 W/ 5.5" Post	9,535	0.137
○	None	N/A	N/A
○	None	N/A	N/A
○	None	N/A	N/A
○	None	N/A	N/A
○	None	N/A	N/A
○	None	N/A	N/A
○	None	N/A	N/A
○	None	N/A	N/A
○	None	N/A	N/A

○ SEISMIC
● WIND

Shear Wall Deflection		
G	90,000	psi
E	1,200,000	psi
A	8.25	in ²

Established Basic Permit #

19-03646

Permit Number: 20-04893

3rd Level									
Lateral Trib. Width	ft	9.3	Shearwall Type						
V from above	k	-	A						
Uniform v this level	psf	115.7							
Total Wall Length	ft	31.00							
V this level	k	1.1							
V accum	k	1.1							
Unit Wall Shear	psf	35							
Shear Wall Capacity	psf	365							
Demand vs. Capacity Ratio		0.09							
Apparent Stiffness, Ga	K/in	10.00							
Overturning Moment									
M _{OT} from above	k-ft	Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Wall 6		
Story Ht	ft	8.08	8.08	8.08	8.08	-	-		
Length	ft	11.00	5.00	5.00	10.00	-	-		
Diaphragm Ratio		0.73	1.62	1.62	0.81	-	-		
Modified Capacity		365	365	365	365	-	-		
M _{OT}	k-ft	3.1	1.4	1.4	2.8	-	-		
M _{OT} accum	k-ft	3.1	1.4	1.4	2.8	-	-		
Shear Wall Deflection									
A _B	in	0.016	0.035	0.035	0.018	-	-		
A _V	in	0.246	0.246	0.246	0.246	-	-		
A _{HD}	in	-	-	-	-	-	-		
A _{SW}	in	0.262	0.281	0.281	0.264	-	-		
Resisting Moment									
M _R from above	k-ft	-	-	-	-	-	-		
Distr Wall Wt	psf	10.0	10.0	10.0	10.0	-	-		
Trib above	ft	6.0	6.0	6.0	6.0	-	-		
Wts above	psf	12.0	12.0	12.0	12.0	-	-		
Hdr. Trib	ft	-	-	-	-	-	-		
End Wts	psf	-	-	-	-	-	-		
Wt to hdr	psf	-	-	-	-	-	-		
Perp. Wall	ft	11.00	5.00	5.00	10.00	-	-		
Wt of wall	lb	250	250	250	250	-	-		
Wts	lb	-	-	-	-	-	-		
M _R this level	k-ft	11.99	3.16	3.16	10.14	-	-		
M _R accum	k-ft	11.99	3.16	3.16	10.14	-	-		
Hold Down Forces									
Wt. Reduction		0.60	0.60	0.60	0.60	0.60	0.60		
T _e accum	k	1.09	0.63	0.63	1.01	-	-		
HD Offset	ft	-	-	-	-	-	-		
HD Force	k	-	-	-	-	-	-		
HD Capacity	k	-	-	-	-	-	-		
Hold Down Type		-	-	-	-	-	-		

Project:		Red Barn Lane - Duplex 1400							
Location:		TF-1							
Client:		Envision Northwest, LLC							
Wood Shear Wall Design Aut		Comments: See Perforated Shear Calculations							

2nd Level									
Lateral Trib. Width	ft	9.3	Shearwall Type						
V from above	k	1.1	A						
Uniform v this level	psf	178.7							
Total Wall Length	ft	26.00							
V this level	k	1.7							
V accum	k	2.7							
Unit Wall Shear	psf	105							
Shear Wall Capacity	psf	365							
Demand vs. Capacity Ratio		0.29							
Apparent Stiffness, Ga	K/in	10.00							
Overturning Moment									
M_{OT} from above	k-ft	Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Wall 6		
Story Ht	ft	8.08	8.08	8.08	8.08	8.08	-		
Length	ft	3.25	3.00	3.00	14.00	2.75	-		
Diaphragm Ratio		2.49	2.69	2.69	0.58	2.94	-		
Modified Capacity		294	271	271	365	248	-		
M_{OT}	k-ft	2.8	2.5	2.5	11.9	2.3	-		
M_{OT} accum	k-ft	5.8	4.0	4.0	14.7	2.3	-		
Shear Wall Deflection									
A_B	in	0.166	0.179	0.179	0.038	0.196	-		
A_V	in	0.246	0.246	0.246	0.246	0.246	-		
A_{HD}	in	-	0.237	0.237	-	0.259	-		
A_{SW}	in	0.411	0.662	0.662	0.284	0.700	-		
Resisting Moment									
M_R from above	k-ft	12.0	3.2	3.2	10.1	-	-		
Distr Wall Wt	psf	10.0	10.0	10.0	10.0	10.0	-		
Trib above	ft	6.0	6.0	6.0	6.0	6.0	-		
Wts above	psf	12.0	12.0	12.0	12.0	12.0	-		
Hdr. Trib	ft	-	-	-	-	-	-		
End Wts	psf	-	-	-	-	-	-		
Wt to hdr	psf	-	-	-	-	-	-		
Perp. Wall	ft	3.25	3.00	3.00	14.00	2.75	-		
Wt of wall	lb	250	250	250	250	250	-		
Wts	lb	-	-	-	-	-	-		
M_R this level	k-ft	1.62	1.44	1.44	18.47	1.27	-		
M_R accum	k-ft	13.61	4.60	4.60	28.61	1.27	-		
Hold Down Forces									
Wt. Reduction		0.60	0.60	0.60	0.60	0.60	0.60		
T_e accum	k	4.19	1.53	1.53	2.04	0.46	-		
HD Offset	ft	-	-	-	4.00	-	-		
HD Force	k	-	0.40	0.40	-	0.57	-		
HD Capacity	k	-	3.08	3.08	-	3.08	-		
Hold Down Type		-	I	I	-	I	-		

By:		DLS							
Job No.:		19-002c							
Last Update:		27-Apr-2019							

1st Level									
Lateral Trib. Width	ft	9.3	Shearwall Type						
V from above	k	2.7	A						
Uniform v this level	psf	178.7							
Total Wall Length	ft	36.00							
V this level	k	1.7							
V accum	k	4.4							
Unit Wall Shear	psf	122							
Shear Wall Capacity	psf	365							
Demand vs. Capacity Ratio		0.33							
Apparent Stiffness, Ga	K/in	10.00							
Overturning Moment									
M_{OT} from above	k-ft	Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Wall 6		
Story Ht	ft	5.8	4.0	4.0	14.7	2.3	-		
Length	ft	9.58	9.58	-	9.58	-	-		
Diaphragm Ratio		0.87	0.87	-	0.68	-	-		
Modified Capacity		365	365	-	365	-	-		
M_{OT}	k-ft	12.9	12.9	-	16.4	-	-		
M_{OT} accum	k-ft	18.7	16.8	4.0	31.1	2.3	-		
Shear Wall Deflection									
A_B	in	0.095	0.095	-	0.074	-	-		
A_V	in	0.291	0.291	-	0.291	-	-		
A_{HD}	in	0.077	0.077	-	-	-	-		
A_{SW}	in	0.463	0.463	-	0.366	-	-		
Resisting Moment									
M_R from above	k-ft	13.6	4.6	4.6	28.6	1.3	-		
Distr Wall Wt	psf	10.0	10.0	-	10.0	-	-		
Trib above	ft	6.0	6.0	-	6.0	-	-		
Wts above	psf	12.0	12.0	-	12.0	-	-		
Hdr. Trib	ft	-	-	-	-	-	-		
End Wts	psf	-	-	-	-	-	-		
Wt to hdr	psf	-	-	-	-	-	-		
Perp. Wall	ft	11.00	11.00	-	14.00	-	-		
Wt of wall	lb	500	500	-	500	-	-		
Wts	lb	-	-	-	-	-	-		
M_R this level	k-ft	15.65	15.65	-	23.44	-	-		
M_R accum	k-ft	29.27	20.25	4.60	52.06	1.27	-		
Hold Down Forces									
Wt. Reduction		0.60	0.60	0.60	0.60	0.60	0.60		
T_e accum	k	2.66	1.84	-	3.72	-	-		
HD Offset	ft	-	-	-	-	-	-		
HD Force	k	0.10	0.42	-	-	-	-		
HD Capacity	k	3.08	3.08	-	-	-	-		
Hold Down Type		I	I	-	-	-	-		

Established Basic Permit #

19-03646

3rd Level									
Lateral Trib. Width	ft	9.3	Shearwall Type						
V from above	k	-							
Uniform v this level	psf	115.7							
Total Wall Length	ft	16.50							
V this level	k	1.1							
V accum	k	1.1							
Unit Wall Shear	psf	65							
Shear Wall Capacity	psf	365							
Demand vs. Capacity Ratio		0.18							
Apparent Stiffness, G _a	K/in	10.00							
Overturning Moment									
		Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Wall 6		
M _{OT} from above	k-ft	-	-	-	-	-	-		
Story Ht	ft	8.08	8.08	-	-	-	-		
Length	ft	5.25	11.25	-	-	-	-		
Diaphragm Ratio		1.54	0.72	-	-	-	-		
Modified Capacity		365	365	-	-	-	-		
M _{OT}	k-ft	2.8	5.9	-	-	-	-		
M _{OT} accum	k-ft	2.8	5.9	-	-	-	-		
Shear Wall Deflection									
Δ _B	in	0.063	0.030	-	-	-	-		
Δ _V	in	0.246	0.246	-	-	-	-		
Δ _{HD}	in	-	-	-	-	-	-		
Δ _{SW}	in	0.309	0.275	-	-	-	-		
Resisting Moment									
M _R from above	k-ft	-	-	-	-	-	-		
Distr Wall Wt	psf	10.0	10.0	-	-	-	-		
Trib above	ft	6.0	6.0	-	-	-	-		
Wts	psf	12.0	12.0	-	-	-	-		
Hdr. Trib	ft	-	-	-	-	-	-		
End Wts	psf	-	-	-	-	-	-		
Wt to hdr	ft	-	-	-	-	-	-		
Perp Wall	psf	-	-	-	-	-	-		
Dist to wall	ft	11.00	5.00	-	-	-	-		
Wt of wall	lb	250	250	-	-	-	-		
Wts	lb	-	-	-	-	-	-		
M _R this level	k-ft	4.86	10.92	-	-	-	-		
M _R accum	k-ft	4.86	10.92	-	-	-	-		
Hold Down Forces									
Wt. Reduction		0.60	0.60	0.60	0.60	0.60	0.60		
T _e accum	k	0.92	0.97	-	-	-	-		
HD Offset	ft	-	-	-	-	-	-		
HD Force	k	-	-	-	-	-	-		
HD Capacity	k	-	-	-	-	-	-		
Hold Down Type		○	○	○	○	○	○		

Project: Red Barn Lane - Duplex 1400									
Location: TF-2									
Client: Envision Northwest, LLC									
Wood Shear Wall Design Aid									
Comments:									


2nd Level									
Lateral Trib. Width	ft	9.3	Shearwall Type						
V from above	k	1.1							
Uniform v this level	psf	178.7							
Total Wall Length	ft	16.50							
V this level	k	1.7							
V accum	k	2.7							
Unit Wall Shear	psf	166							
Shear Wall Capacity	psf	365							
Demand vs. Capacity Ratio		0.45							
Apparent Stiffness, G_a	K/in	10.00							
Overturning Moment									
		Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Wall 6		
M_{OT} from above	k-ft	2.8	5.9	-	-	-	-		
Story Ht	ft	8.08	8.08	-	-	-	-		
Length	ft	5.25	11.25	-	-	-	-		
Diaphragm Ratio		1.54	0.72	-	-	-	-		
Modified Capacity		365	365	-	-	-	-		
M_{OT}	k-ft	7.0	15.1	-	-	-	-		
M_{OT} accum	k-ft	9.8	21.0	-	-	-	-		
Shear Wall Deflection									
Δ_B	in	0.162	0.075	-	-	-	-		
Δ_V	in	0.246	0.246	-	-	-	-		
Δ_{HD}	in	0.135	0.063	-	-	-	-		
Δ_{SW}	in	0.543	0.384	-	-	-	-		
Resisting Moment									
M_R from above	k-ft	4.9	10.9	-	-	-	-		
Distr Wall Wt	psf	10.0	10.0	-	-	-	-		
Trib above	ft	6.0	6.0	-	-	-	-		
Wts	psf	12.0	12.0	-	-	-	-		
Hdr. Trib	ft	-	-	-	-	-	-		
End Wts	psf	-	-	-	-	-	-		
Wt to hdr	ft	-	-	-	-	-	-		
Perp Wall	psf	-	-	-	-	-	-		
Dist to wall	ft	5.25	11.25	-	-	-	-		
Wt of wall	lb	250	250	-	-	-	-		
Wts	lb	-	-	-	-	-	-		
M_R this level	k-ft	3.42	14.57	-	-	-	-		
M_R accum	k-ft	8.27	25.49	-	-	-	-		
Hold Down Forces									
Wt. Reduction		0.60	0.60	0.60	0.60	0.60	0.60		
T_e accum	k	1.55	2.27	-	-	-	-		
HD Offset	ft	-	-	-	-	-	-		
HD Force	k	0.92	0.51	-	-	-	-		
HD Capacity	k	3.08	3.08	-	-	-	-		
Hold Down Type		Ⓡ	Ⓡ	○	○	○	○		

Project: Red Barn Lane - Duplex 1400									
Location: TF-2									
Client: Envision Northwest, LLC									
Wood Shear Wall Design Aid									
Comments:									


1st Level									
Lateral Trib. Width	ft	9.3	Shearwall Type						
V from above	k	2.7							
Uniform v this level	psf	178.7							
Total Wall Length	ft	20.50							
V this level	k	1.7							
V accum	k	4.4							
Unit Wall Shear	psf	214							
Shear Wall Capacity	psf	365							
Demand vs. Capacity Ratio		0.59							
Apparent Stiffness, G_a	K/in	10.00							
Overturning Moment									
		Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Wall 6		
M_{OT} from above	k-ft	9.8	21.0	-	-	-	-		
Story Ht	ft	9.58	9.58	-	-	-	-		
Length	ft	9.25	11.25	-	-	-	-		
Diaphragm Ratio		1.04	0.85	-	-	-	-		
Modified Capacity		365	365	-	-	-	-		
M_{OT}	k-ft	19.0	23.1	-	-	-	-		
M_{OT} accum	k-ft	28.8	44.1	-	-	-	-		
Shear Wall Deflection									
Δ_B	in	0.198	0.162	-	-	-	-		
Δ_V	in	0.291	0.291	-	-	-	-		
Δ_{HD}	in	0.091	0.075	-	-	-	-		
Δ_{SW}	in	0.580	0.529	-	-	-	-		
Resisting Moment									
M_R from above	k-ft	8.3	25.5	-	-	-	-		
Distr Wall Wt	psf	10.0	10.0	-	-	-	-		
Trib above	ft	6.0	6.0	-	-	-	-		
Wts	psf	12.0	12.0	-	-	-	-		
Hdr. Trib	ft	-	-	-	-	-	-		
End Wts	psf	-	-	-	-	-	-		
Wt to hdr	ft	-	-	-	-	-	-		
Perp Wall	psf	-	-	-	-	-	-		
Dist to wall	ft	9.25	11.25	-	-	-	-		
Wt of wall	lb	250	250	-	-	-	-		
Wts	lb	-	-	-	-	-	-		
M_R this level	k-ft	9.49	13.43	-	-	-	-		
M_R accum	k-ft	17.77	38.92	-	-	-	-		
Hold Down Forces									
Wt. Reduction		0.60	0.60	0.60	0.60	0.60	0.60		
T_e accum	k	1.92	3.46	-	-	-	-		
HD Offset	ft	-	-	-	-	-	-		
HD Force	k	1.96	1.84	-	-	-	-		
HD Capacity	k	3.08	3.08	-	-	-	-		
Hold Down Type		Ⓡ	Ⓡ	○	○	○	○		

Project: Red Barn Lane - Duplex 1400									
Location: TF-2									
Client: Envision Northwest, LLC									
Wood Shear Wall Design Aid									
Comments:									


By: DLS	
Job No.: 19-002c	
Last Update: 27-Apr-2019	

3rd Level									
Lateral Trib. Width	ft	18.5	Shearwall Type						
V from above	k	-							
Uniform v this level	psf	65.3							
Total Wall Length	ft	7.84							
V this level	k	1.6							
V accum	k	1.6							
Unit Wall Shear	psf	206							
Shear Wall Capacity	psf	365							
Demand vs. Capacity Ratio		0.57							
Apparent Stiffness, G _a	K/In	10.00							
Overturning Moment									
M _{OT} from above	k-ft		Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Wall 6	
Story Ht	ft	8.05	8.05	8.05	-	-	-	-	-
Length	ft	2.42	3.00	2.42	-	-	-	-	-
Diaphragm Ratio		3.34	2.69	3.34	-	-	-	-	-
Modified Capacity		219	271	219	-	-	-	-	-
M _{OT}	k-ft	4.1	5.1	4.1	-	-	-	-	-
M _{OT} accum	k-ft	4.1	5.1	4.1	-	-	-	-	-
Shear Wall Deflection									
Δ _B	in	0.440	0.355	0.440	-	-	-	-	-
Δ _V	in	0.246	0.246	0.246	-	-	-	-	-
Δ _{HD}	in	0.294	0.237	0.294	-	-	-	-	-
Δ _{SW}	in	0.960	0.836	0.960	-	-	-	-	-
Resisting Moment									
M _R from above	k-ft	-	-	-	-	-	-	-	-
Distr Wall Wt	psf	10.0	10.0	10.0	-	-	-	-	-
Trib above	ft	16.3	16.3	16.3	-	-	-	-	-
Wts	psf	12.0	12.0	12.0	-	-	-	-	-
Hdr. Trib	ft	-	-	-	-	-	-	-	-
End Wts	ft	-	-	-	-	-	-	-	-
Wts	psf	-	-	-	-	-	-	-	-
Wt to hdr	psf	-	-	-	-	-	-	-	-
Perp Wall	ft	-	-	-	-	-	-	-	-
Dist to wall	ft	-	-	-	-	-	-	-	-
Wt of wall	lb	-	-	-	-	-	-	-	-
Dist to wall	ft	-	-	-	-	-	-	-	-
Wt of wall	lb	-	-	-	-	-	-	-	-
M _R this level	k-ft	0.81	1.24	0.81	-	-	-	-	-
M _R accum	k-ft	0.81	1.24	0.81	-	-	-	-	-
Hold Down Forces									
Wt. Reduction		0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
T _e accum	k	0.33	0.41	0.33	-	-	-	-	-
HD Offset	ft	-	-	-	-	-	-	-	-
HD Force	k	1.48	1.44	1.48	-	-	-	-	-
HD Capacity	k	3.08	3.08	3.08	-	-	-	-	-
Hold Down Type		①	①	①	-	-	-	-	-

Project:		Red Barn Lane - Duplex 1400							
Location:		LF-1							
Client:		Envision Northwest, LLC							
		Wood Shear Wall Design Asst							
		Comments: See Perforated Shear Calculations							

2nd Level									
Lateral Trib. Width	ft	18.5	Shearwall Type						
V from above	k	1.6							
Uniform v this level	psf	96.0							
Total Wall Length	ft	13.05							
V this level	k	1.5							
V accum	k	3.4							
Unit Wall Shear	psf	261							
Shear Wall Capacity	psf	365							
Demand vs. Capacity Ratio		0.71							
Apparent Stiffness, G _a	K/In	10.00							
Overturning Moment									
M _{OT} from above	k-ft		Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Wall 6	
Story Ht	ft	8.05	8.05	8.05	8.05	8.05	-	-	-
Length	ft	2.50	4.08	2.50	2.00	2.00	-	-	-
Diaphragm Ratio		3.23	1.96	3.23	4.04	4.04	-	-	-
Modified Capacity		226	365	226	N/A	N/A	-	-	-
M _{OT}	k-ft	5.3	6.6	5.3	4.2	4.2	-	-	-
M _{OT} accum	k-ft	9.3	13.6	9.3	4.2	4.2	-	-	-
Shear Wall Deflection									
Δ _B	in	0.533	0.327	0.533	0.667	0.667	-	-	-
Δ _V	in	0.246	0.246	0.246	0.246	0.246	-	-	-
Δ _{HD}	in	0.372	0.174	0.372	0.356	0.356	-	-	-
Δ _{SW}	in	1.151	0.747	1.151	1.268	1.268	-	-	-
Resisting Moment									
M _R from above	k-ft	0.8	1.2	0.8	-	-	-	-	-
Distr Wall Wt	psf	10.0	10.0	10.0	10.0	10.0	-	-	-
Trib above	ft	6.0	6.0	6.0	6.0	6.0	-	-	-
Wts	psf	12.0	12.0	12.0	12.0	12.0	-	-	-
Hdr. Trib	ft	-	-	-	-	-	-	-	-
End Wts	ft	-	-	-	-	-	-	-	-
Wts	psf	-	-	-	-	-	-	-	-
Wt to hdr	psf	-	-	-	-	-	-	-	-
Perp Wall	ft	-	-	-	-	-	-	-	-
Dist to wall	ft	-	-	-	-	-	-	-	-
Wt of wall	lb	-	-	-	-	-	-	-	-
Dist to wall	ft	-	-	-	-	-	-	-	-
Wt of wall	lb	-	-	-	-	-	-	-	-
M _R this level	k-ft	0.48	1.27	0.48	0.31	0.31	-	-	-
M _R accum	k-ft	1.29	2.51	1.29	0.31	0.31	-	-	-
Hold Down Forces									
Wt. Reduction		0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
T _e accum	k	0.51	0.62	0.51	0.15	0.15	-	-	-
HD Offset	ft	-	-	-	-	-	-	-	-
HD Force	k	3.43	2.97	3.43	2.01	2.01	-	-	-
HD Capacity	k	5.65	3.08	5.65	3.08	3.08	-	-	-
Hold Down Type		②	①	②	①	①	-	-	-

By:		DLS							
Job No.:		19-002c							
Last Update:		27-Apr-2019							

1st Level									
Lateral Trib. Width	ft	18.5	Shearwall Type						
V from above	k	3.4							
Uniform v this level	psf	101.6							
Total Wall Length	ft	15.05							
V this level	k	1.9							
V accum	k	5.3							
Unit Wall Shear	psf	351							
Shear Wall Capacity	psf	365							
Demand vs. Capacity Ratio		0.96							
Apparent Stiffness, G _a	K/In	10.00							
Overturning Moment									
M _{OT} from above	k-ft		Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Wall 6	
Story Ht	ft	9.55	9.55	9.55	9.55	9.55	9.55	-	-
Length	ft	1.75	7.55	1.75	2.00	2.00	2.00	-	-
Diaphragm Ratio		5.47	1.26	5.47	4.79	4.79	4.79	-	-
Modified Capacity		N/A	365	N/A	N/A	N/A	N/A	-	-
M _{OT}	k-ft	5.9	25.5	5.9	6.7	6.7	6.7	-	-
M _{OT} accum	k-ft	15.2	39.1	15.2	10.9	10.9	10.9	-	-
Shear Wall Deflection									
Δ _B	in	1.709	0.395	1.709	1.495	1.495	-	-	-
Δ _V	in	0.291	0.291	0.291	0.291	0.291	0.291	-	-
Δ _{HD}	in	0.750	0.145	0.750	0.551	0.551	-	-	-
Δ _{SW}	in	2.750	0.831	2.750	2.337	2.337	-	-	-
Resisting Moment									
M _R from above	k-ft	1.3	2.5	1.3	0.3	0.3	0.3	-	-
Distr Wall Wt	psf	10.0	10.0	10.0	10.0	10.0	10.0	-	-
Trib above	ft	6.0	6.0	6.0	6.0	6.0	6.0	-	-
Wts	psf	12.0	12.0	12.0	12.0	12.0	12.0	-	-
Hdr. Trib	ft	-	-	-	-	-	-	-	-
End Wts	ft	-	-	-	-	-	-	-	-
Wts	psf	-	-	-	-	-	-	-	-
Wt to hdr	psf	-	-	-	-	-	-	-	-
Perp Wall	ft	-	-	-	-	-	-	-	-
Dist to wall	ft	-	-	-	-	-	-	-	-
Wt of wall	lb	-	-	-	-	-	-	-	-
Dist to wall	ft	-	-	-	-	-	-	-	-
Wt of wall	lb	-	-	-	-	-	-	-	-
M _R this level	k-ft	0.26	4.62	0.26	0.34	0.34	0.34	-	-
M _R accum	k-ft	1.54	7.33	1.54	0.64	0.64	0.64	-	-
Hold Down Forces									
Wt. Reduction		0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
T _e accum	k	0.58	0.97	0.58	0.32	0.32	0.32	-	-
HD Offset	ft	-	-	-	-	-	-	-	-
HD Force	k	8.17	4.58	8.17	5.27	5.27	5.27	-	-
HD Capacity	k	9.54	5.65	9.54	5.65	5.65	5.65	-	-
Hold Down Type		③	②	③	②	②	②	-	-

Established Basic Permit #

19-03646

Permit Number: 20-04893

3rd Level									
Lateral Trib. Width	ft	18.5	Shearwall Type						
V from above	k	-	A						
Uniform v this level	psf	65.3							
Total Wall Length	ft	21.08							
V this level	k	1.6							
V accum	k	1.6							
Unit Wall Shear	psf	77							
Shear Wall Capacity	psf	365							
Demand vs. Capacity Ratio		0.21							
Apparent Stiffness, Ga	K/in	10.00							
Overturning Moment									
M _{OT} from above	k-ft	Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Wall 6		
Story Ht	ft	8.08	8.08	8.08	8.08	-	-		
Length	ft	3.25	3.25	2.50	3.08	-	-		
Diaphragm Ratio		2.49	2.49	3.23	2.62	-	-		
Modified Capacity		294	294	226	278	-	-		
M _{OT}	k-ft	2.0	2.0	1.6	1.9	-	-		
M _{OT} accum	k-ft	2.0	2.0	1.6	1.9	-	-		
Shear Wall Deflection									
Δ _B	in	0.122	0.122	0.159	0.129	-	-		
Δ _V	in	0.246	0.246	0.246	0.246	-	-		
Δ _{HD}	in	0.219	0.219	0.284	-	-	-		
Δ _{SW}	in	0.587	0.587	0.689	0.374	-	-		
Resisting Moment									
M _R from above	k-ft	-	-	-	-	-	-		
Distr Wall Wt	psf	10.0	10.0	10.0	10.0	-	-		
Trib above	ft	6.0	6.0	16.3	16.3	-	-		
Wts	psf	12.0	12.0	12.0	12.0	-	-		
Hdr. Trib	ft	-	-	-	-	-	-		
End Wts	trib to hdr	ft	-	-	-	-	-		
Wts	trib to hdr	psf	-	-	-	-	-		
Perp Wall	Dist to wall	ft	3.25	3.25	2.50	3.08	-		
Wts	Wt of wall	lb	250	250	250	500	-		
Wts	Dist to wall	ft	-	-	-	-	-		
Wt of wall	lb	-	-	-	-	-	-		
M _R this level	k-ft	1.62	1.62	1.49	2.85	-	-		
M _R accum	k-ft	1.62	1.62	1.49	2.85	-	-		
Hold Down Forces									
Wt. Reduction		0.60	0.60	0.60	0.60	0.60	0.60		
T _E accum	k	0.50	0.50	0.59	0.92	-	-		
HD Offset	ft	-	-	-	-	-	-		
HD Force	k	0.33	0.33	0.27	-	-	-		
HD Capacity	k	3.08	3.08	3.08	-	-	-		
Hold Down Type		I	I	I	-	-	-		

Project:		Red Barn Lane - Duplex 1400							
Location:		LF-2							
Client:		Envision Northwest, LLC							
		Wood Shear Wall Design Aut							
Comments:		See Perforated Shear Calculations							

2nd Level									
Lateral Trib. Width	ft	18.5	Shearwall Type						
V from above	k	1.6	A						
Uniform v this level	psf	96.0							
Total Wall Length	ft	31.56							
V this level	k	1.5							
V accum	k	3.4							
Unit Wall Shear	psf	105							
Shear Wall Capacity	psf	365							
Demand vs. Capacity Ratio		0.30							
Apparent Stiffness, Ga	K/in	10.00							
Overturning Moment									
M_{OT} from above	k-ft	Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Wall 6		
Story Ht	ft	8.08	8.08	8.08	8.08	-	-		
Length	ft	3.75	3.75	2.50	14.08	-	-		
Diaphragm Ratio		2.15	2.15	3.23	0.57	-	-		
Modified Capacity		339	339	226	365	-	-		
M_{OT}	k-ft	3.3	3.3	2.2	12.3	-	-		
M_{OT} accum	k-ft	5.3	5.3	3.7	14.2	-	-		
Shear Wall Deflection									
Δ_B	in	0.147	0.147	0.221	0.039	-	-		
Δ_V	in	0.246	0.246	0.246	0.246	-	-		
Δ_{HD}	in	0.190	0.190	0.284	0.051	-	-		
Δ_{SW}	in	0.583	0.583	0.751	0.335	-	-		
Resisting Moment									
M_R from above	k-ft	1.6	1.6	1.5	2.8	-	-		
Distr Wall Wt	psf	10.0	10.0	10.0	10.0	-	-		
Trib above	ft	6.0	6.0	6.0	6.0	-	-		
Wts	psf	12.0	12.0	12.0	12.0	-	-		
Hdr. Trib	ft	-	-	-	-	-	-		
End Wts	trib to hdr	ft	-	-	-	-	-		
Wts	trib to hdr	psf	-	-	-	-	-		
Perp Wall	Dist to wall	ft	-	-	-	-	-		
Wts	Wt of wall	lb	-	-	-	-	-		
Wts	Dist to wall	ft	-	-	-	-	-		
Wt of wall	lb	-	-	-	-	-	-		
M_R this level	k-ft	1.07	1.07	0.48	15.15	-	-		
M_R accum	k-ft	2.69	2.69	1.96	17.99	-	-		
Hold Down Forces									
Wt. Reduction		0.60	0.60	0.60	0.60	0.60	0.60		
T_E accum	k	0.72	0.72	0.79	1.28	-	-		
HD Offset	ft	-	-	-	7.00	-	-		
HD Force	k	0.98	0.98	1.03	0.48	-	-		
HD Capacity	k	3.08	3.08	3.08	3.08	-	-		
Hold Down Type		I	I	I	I	-	-		

By:		DLS							
Job No.:		19-002c							
Last Update:		27-Apr-2019							

1st Level									
Lateral Trib. Width	ft	20.0	Shearwall Type						
V from above	k	3.4	A						
Uniform v this level	psf	101.6							
Total Wall Length	ft	30.08							
V this level	k	2.0							
V accum	k	5.4							
Unit Wall Shear	psf	161							
Shear Wall Capacity	psf	365							
Demand vs. Capacity Ratio		0.50							
Apparent Stiffness, Ga	K/in	10.00							
Overturning Moment									
M_{OT} from above	k-ft	Wall 1	Wall 2	Wall 3	Wall 4	Wall 5	Wall 6		
Story Ht	ft	9.58	-	-	9.58	-	-		
Length	ft	11.50	-	-	7.08	-	-		
Diaphragm Ratio		0.83	-	-	1.35	-	-		
Modified Capacity		365	-	-	365	-	-		
M_{OT}	k-ft	19.9	-	-	12.3	-	-		
M_{OT} accum	k-ft	25.2	-	-	26.5	-	-		
Shear Wall Deflection									
Δ_B	in	0.134	-	-	0.216	-	-		
Δ_V	in	0.291	-	-	0.291	-	-		
Δ_{HD}	in	0.073	-	-	0.119	-	-		
Δ_{SW}	in	0.499	-	-	0.628	-	-		
Resisting Moment									
M_R from above	k-ft	2.7	2.7	2.0	16.0	-	-		
Distr Wall Wt	psf	10.0	-	-	10.0	-	-		
Trib above	ft	6.0	-	-	6.0	-	-		
Wts	psf	12.0	-	-	12.0	-	-		
Hdr. Trib	ft	-	-	-	-	-	-		
End Wts	trib to hdr	ft	-	-	-	-	-		
Wts	trib to hdr	psf	-	-	-	-	-		
Perp Wall	Dist to wall	ft	-	-	-	-	-		
Wts	Wt of wall	lb	-	-	-	-	-		
Wts	Dist to wall	ft	-	-	-	-	-		
Wt of wall	lb	-	-	-	-	-	-		
M_R this level	k-ft	11.10	-	-	4.21	-	-		
M_R accum	k-ft	13.79	-	-	1.96	22.20	-		
Hold Down Forces									
Wt. Reduction		0.60	0.60	0.60	0.60	0.60	0.60		
T_E accum	k	1.20	-	-	3.14	-	-		
HD Offset	ft	-	-	-	-	-	-		
HD Force	k	1.48	-	-	1.86	-	-		
HD Capacity	k	3.08	-	-	3.08	-	-		
Hold Down Type		I	-	-	I	-	-		

Established Basic Permit #

19-03646

Permit Number: 20-04893

