These calculations must be on site and made available by the Permittee for all inspections.

PRCNC20250094

ENGINEERING ANALYSIS FOR: EAST TOWN CROSSING COMMERCIAL LOT 1 PIONEER AND SHAW PUYALLUP, WA

DESIGN CRITERIA

BUILDING CODE: 2021 INTERNATIONAL BUILDING CODE (IBC) AS AMENDED BY THE LOCAL JURISDICTION.

VERTICAL LOADS

ROOF LIVE LOAD:	25 PSF (SNOW)
ROOF DEAD LOAD:	20 PSF
FLOOR LIVE LOAD:	100 PSF
FLOOR DEAD LOAD:	15 PSF

SNOW DESIGN DATA (ASCE 7-16)
FLAT SNOW LOAD: 25 PSF
SNOW EXPOSURE FACTOR, C_e=1.0,
SNOW IMPORTANCE FACTOR, I_s=1.0,
THERMAL FACTOR, C_t=1.1

WIND DESIGN DATA (ASCE 7-16)
BASIC WIND SPEED (ASD) V= 85MPH
ULTIMATE WIND SPEED V= 110MPH
RISK CATEGORY: II   EXPOSURE: B
IMPORTANCE FACTOR, I_w= 1.0
TOPOGRAPHIC FACTOR, K_{zt}= 1.0

SEISMIC DESIGN DATA (ASCE7-16)
SEISMIC RESPONSE SYSTEM: WOOD SHEARWALLS
EQUIVALENT LATERAL FORCE PROCEDURE (ASCE 7-16)
RISK CATEGORY: II   SEISMIC IMPORTANCE FACTOR, I_e= 1.0
MAPPED SPECTRAL RESPONSE ACCELERATION: S_s=1.42, S_1=1.43
DESIGN SPECTRAL RESPONSE ACCELERATION: S_{ds}=1.03, S_{d1}=0.61
SITE CLASS: D   SEISMIC DESIGN CATEGORY: D
SEISMIC RESPONSE COEFFICIENT: C_s= 0.113
DESIGN BASE SHEAR: 20,364#

SOIL PROPERTIES:
BEARING CAPACITY: 2,000 PSF
LATERAL CAPACITY: 250 PSF/FT

EAST TOWN CROSSING
LOT 1 COMMERCIAL
PIONEER & SHAW PUYALLUP

REVISIONS

01	CITY REVIEW

City of Puyallup
Building
REVIEWED FOR COMPLIANCE
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REVISIONS

ENGINEER:	CP
CHECKED BY:	CP
DATE:	2025.04.28
TITLE:	STRUCTURAL ANALYSIS
PROJECT # :	----

Roof Framing			
Member Name	**Results (Max UTIL %)**	**Current Solution**	**Comments**
13' Studs	Passed (87% B/C)	1 piece(s) 2 x 6 DF No.2 @ 16" OC	
Grid 1 - 5' Window Header	Passed (69% M)	1 piece(s) 4 x 12 DF No.2	
Grid 1 - 5' Window King Studs	Passed (60% B/C)	2 piece(s) 2 x 6 HF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid 2 - 5' Window Header	Passed (90% R)	1 piece(s) 4 x 10 DF No.2	
Grid 2 - 5' Window King Studs	Passed (51% B/C)	2 piece(s) 2 x 6 HF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid 3 - 6' Door Header	Passed (69% R)	1 piece(s) 3 1/2" x 9" 24F-V4 DF Glulam	
Grid 3 - 6' Door King Studs	Passed (69% B/C)	2 piece(s) 2 x 6 HF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid 3 - 4' Window Header	Passed (102% M)	1 piece(s) 4 x 10 DF No.2	
Grid 3 - 4' Window King Studs	Passed (54% B/C)	2 piece(s) 2 x 6 HF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid 4 - 6' Door Header	Passed (92% M)	1 piece(s) 4 x 12 DF No.2	
Grid 4 - 6' Door King Studs	Passed (97% B/C)	2 piece(s) 2 x 6 HF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid 4 - 6' Window Header	Passed (79% M)	1 piece(s) 4 x 12 DF No.2	
Grid 4 - 6' Window King Studs	Passed (49% B/C)	2 piece(s) 2 x 6 DF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid 4 - 6' Window Header with Awning Load	Passed (60% M+)	1 piece(s) 5 1/2" x 9" 24F-V4 DF Glulam	
Grid 4 - 12' Window Header	Passed (90% R)	1 piece(s) 5 1/2" x 12" 24F-V4 DF Glulam	
Grid 4 - 12' Window King Studs	Passed (83% B/C)	2 piece(s) 2 x 6 DF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid A - 5' Window Header	Passed (18% R)	1 piece(s) 4 x 10 DF No.2	
Grid A- 5' Window King Studs	Passed (78% B/C)	1 piece(s) 2 x 6 HF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid A - 6' Door Header	Passed (23% M)	1 piece(s) 4 x 10 DF No.2	
Grid A - 6' Door King Studs	Passed (96% B/C)	1 piece(s) 2 x 6 HF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid A - 9' Window Header	Passed (46% M)	1 piece(s) 4 x 10 DF No.2	
Grid A - 9' Door King Studs	Passed (69% B/C)	2 piece(s) 2 x 6 HF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid A - 9' Window Header with Awning Load	Passed (56% R)	1 piece(s) 5 1/2" x 9" 24F-V4 DF Glulam	
Grid D - 5' Window Header	Passed (18% R)	1 piece(s) 4 x 10 DF No.2	
Grid D- 5' Window King Studs	Passed (78% B/C)	1 piece(s) 2 x 6 HF No.2	Member thickness on its narrow face is below the minimum value of 3.5.
Grid D - 3' Door Header	Passed (12% R)	1 piece(s) 4 x 10 DF No.2	

Grid D- 3' Door King Studs	Passed (54% B/C)	1 piece(s) 2 x 6 HF No.2		Member thickness on its narrow face is below the minimum value of 3.5.
Grid D - 9' Window Header	Passed (46% M)	1 piece(s) 4 x 10 DF No.2		
Grid D- 9' Window King Studs	Passed (61% B/C)	2 piece(s) 2 x 6 HF No.2		Member thickness on its narrow face is below the minimum value of 3.5.

ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

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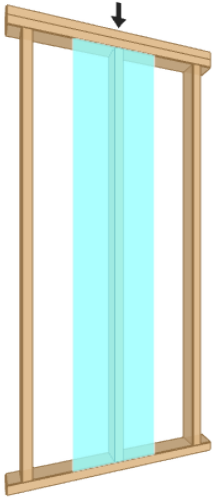
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File Name: East Town Crossing - Commercial Lot 1

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Roof Framing, 13' Studs
1 piece(s) 2 x 6 DF No.2 @ 16" OC

Wall Height: 13'   Member Height: 12' 7 1/2"   O. C. Spacing: 16.00"

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	2770	4711	Passed (59%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	2770	4177	Passed (66%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	110	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	102	1584	Passed (6%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	348 @ mid-span	1342	Passed (26%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.26 @ mid-span	1.26	Passed (L/589)	--	1.0 D + 0.6 W
Bending/Compression	0.87	1	Passed (87%)	1.15	1.0 D + 1.0 S

- Wall deflection criteria: TL (L/120)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- A bearing area factor of 1.25 has been applied to base plate bearing capacity.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Stud
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections

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

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

Vertical Load	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	1160	1610	Default Load

Lateral Load	Location	Spacing	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	16.00"	21.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Weyerhaeuser Notes

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Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

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Drawing is Conceptual

FORTE**WEB**

Overall Length: 5' 6"

5'

1   2

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3847 @ 1 1/2"	6563 (3.00")	Passed (59%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2186 @ 1' 2 1/4"	5434	Passed (40%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	4819 @ 2' 9"	7004	Passed (69%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.021 @ 2' 9"	0.175	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.036 @ 2' 9"	0.262	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 5' 6"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	1.76"	1627	2219	3847	None
2 - Trimmer - HF	3.00"	3.00"	1.76"	1627	2219	3847	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 6" o/c	
Bottom Edge (Lu)	5' 6" o/c	

• Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 6"	N/A	10.0	--	
1 - Uniform (PSF)	0 to 5' 6"	29' 1"	20.0	25.0	Default Load
2 - Uniform (PSF)	0 to 5' 6"	4'	--	20.0	Drift Load

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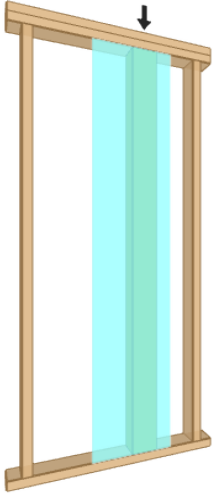| ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

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Roof Framing, Grid 1 - 5' Window King Studs
2 piece(s) 2 x 6 HF No.2

Wall Height: 13'   Member Height: 12' 7 1/2"   Tributary Width: 3' 2"

Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	2770	7777	Passed (36%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	2770	6683	Passed (41%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	262	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	243	2640	Passed (9%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	827 @ mid-span	2223	Passed (37%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.34 @ mid-span	0.84	Passed (L/451)	--	1.0 D + 0.6 W
Bending/Compression	0.60	1	Passed (60%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Wall deflection criteria: TL (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- The column stability factor (Kf = 0.6) applied to this design assumes nailed built-up columns per NDS section 15.3.3. For Weyerhaeuser ELP products refer to the U.S. Wall Guide for multiple-member connection requirements.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A

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

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	1160	1610	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	3' 2"	21.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Weyerhaeuser Notes

ForteWEB Software Operator	Job Notes
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Roof Framing, Grid 2 - 5' Window Header
1 piece(s) 4 x 10 DF No.2

Overall Length: 5' 3"

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2968 @ 0	3281 (1.50")	Passed (90%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1955 @ 10 3/4"	4468	Passed (44%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3896 @ 2' 7 1/2"	5166	Passed (75%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.031 @ 2' 7 1/2"	0.175	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.052 @ 2' 7 1/2"	0.262	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 5' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	1238	1730	2968	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	1238	1730	2968	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 3"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 5' 3"	23' 2"	20.0	25.0	Default Load
2 - Uniform (PSF)	0 to 5' 3"	4'	--	20.0	Drift Load

Weyerhaeuser Notes

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

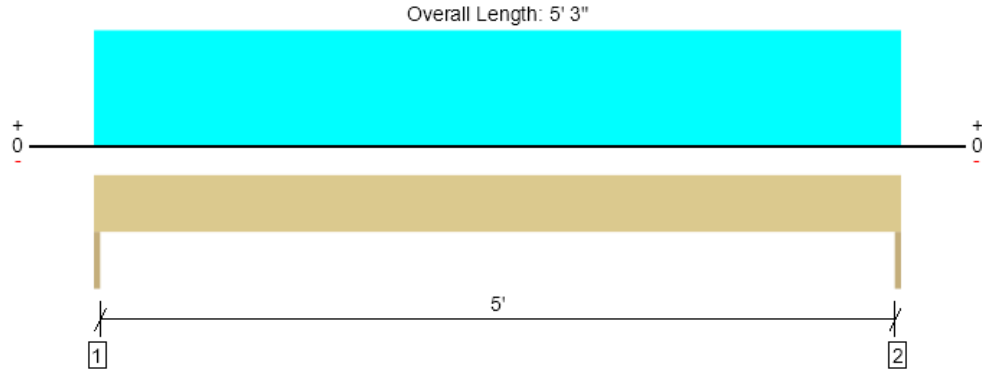| ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

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ForteWEB v3.9, Engine: V8.4.3.94, Data: V8.1.7.3
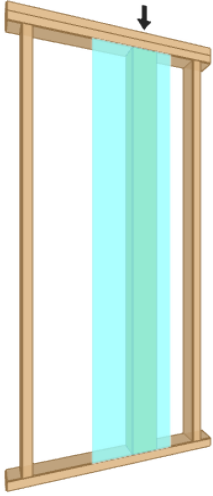File Name: East Town Crossing - Commercial Lot 1

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Roof Framing, Grid 2 - 5' Window King Studs
2 piece(s) 2 x 6 HF No.2

Wall Height: 13'	Member Height: 12' 7 1/2"	Tributary Width: 3' 2"

Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	2244	7777	Passed (29%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	2244	6683	Passed (34%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	262	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	243	2640	Passed (9%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	827 @ mid-span	2223	Passed (37%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.33 @ mid-span	0.84	Passed (L/459)	--	1.0 D + 0.6 W
Bending/Compression	0.51	1	Passed (51%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Wall deflection criteria: TL (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- The column stability factor (Kf = 0.6) applied to this design assumes nailed built-up columns per NDS section 15.3.3. For Weyerhaeuser ELP products refer to the U.S. Wall Guide for multiple-member connection requirements.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A

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

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	926	1318	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	3' 2"	21.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Weyerhaeuser Notes

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

ForteWEB Software Operator	Job Notes
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Roof Framing, Grid 3 - 6' Door Header
1 piece(s) 3 1/2" x 9" 24F-V4 DF Glulam
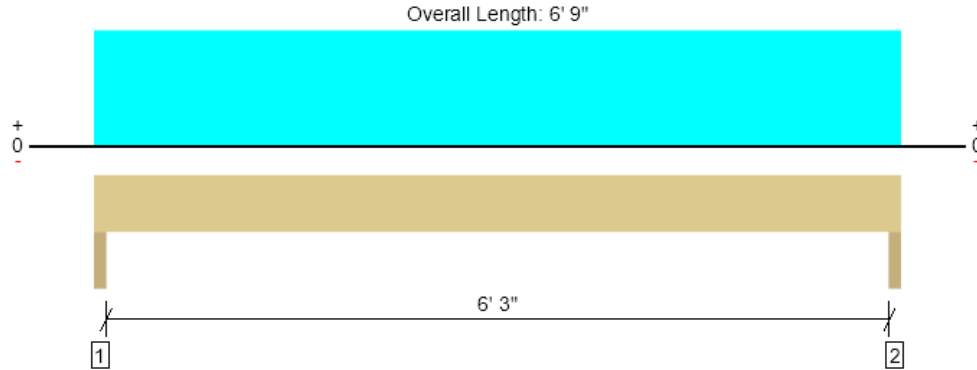
Overall Length: 6' 9"

6' 3"

1   2

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4701 @ 1 1/2"	6825 (3.00")	Passed (69%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3308 @ 1'	6400	Passed (52%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	7356 @ 3' 4 1/2"	10868	Passed (68%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.084 @ 3' 4 1/2"	0.217	Passed (L/923)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.146 @ 3' 4 1/2"	0.325	Passed (L/534)	--	1.0 D + 1.0 S (All Spans)

Member Length : 6' 9"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Volume factor of 1.00 was calculated for positive bending using length L = 6' 6".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	2.07"	1984	2717	4701	None
2 - Trimmer - HF	3.00"	3.00"	2.07"	1984	2717	4701	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 9"	N/A	7.7	--	
1 - Uniform (PSF)	0 to 6' 9"	29'	20.0	25.0	Default Load
2 - Uniform (PSF)	0 to 6' 9"	4'	--	20.0	Drift Load

Weyerhaeuser Notes

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

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File Name: East Town Crossing - Commercial Lot 1
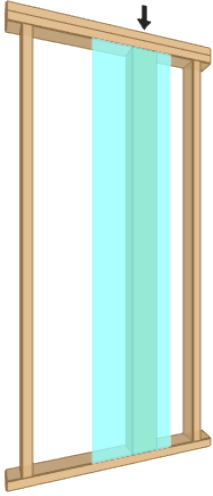
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Roof Framing, Grid 3 - 6' Door King Studs
2 piece(s) 2 x 6 HF No.2

Wall Height: 13'   Member Height: 12' 7 1/2"   Tributary Width: 3' 11"

Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	2770	7777	Passed (36%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	2770	6683	Passed (41%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	324	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	300	2640	Passed (11%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	1022 @ mid-span	2223	Passed (46%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.41 @ mid-span	0.84	Passed (L/371)	--	1.0 D + 0.6 W
Bending/Compression	0.69	1	Passed (69%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Wall deflection criteria: TL (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- The column stability factor (Kf = 0.6) applied to this design assumes nailed built-up columns per NDS section 15.3.3. For Weyerhaeuser ELP products refer to the U.S. Wall Guide for multiple-member connection requirements.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections				
Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A

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

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	1160	1610	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	3' 11"	21.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Weyerhaeuser Notes

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MEMBER REPORT

PASSED

Roof Framing, Grid 3 - 4' Window Header
1 piece(s) 4 x 10 DF No.2
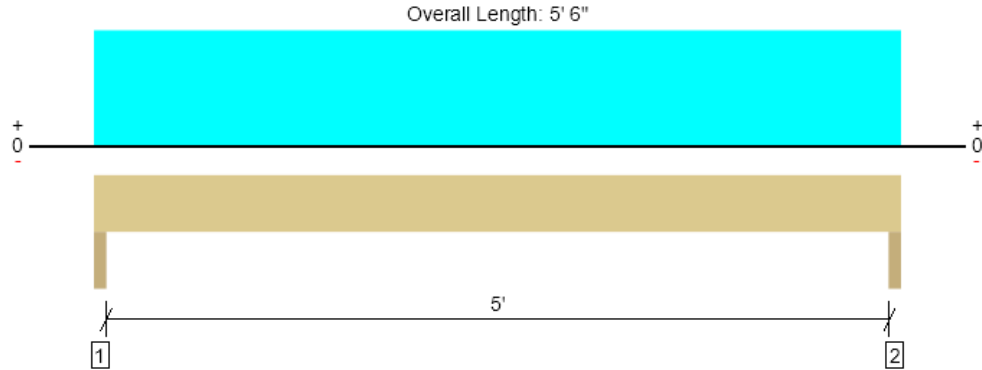
Overall Length: 5' 6"

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4216 @ 1 1/2"	6563 (3.00")	Passed (64%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2651 @ 1' 1/4"	4468	Passed (59%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	5282 @ 2' 9"	5166	Passed (102%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.041 @ 2' 9"	0.175	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.071 @ 2' 9"	0.262	Passed (L/888)	--	1.0 D + 1.0 S (All Spans)

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

Member Length : 5' 6"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	1.93"	1796	2420	4216	None
2 - Trimmer - HF	3.00"	3.00"	1.93"	1796	2420	4216	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6" o/c	
Bottom Edge (Lu)	5' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 6"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 5' 6"	32'	20.2	25.0	Default Load
2 - Uniform (PSF)	0 to 5' 6"	4'	--	20.0	Drift Load

Weyerhaeuser Notes

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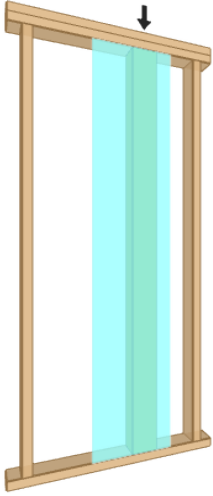File Name: East Town Crossing - Commercial Lot 1

Roof Framing, Grid 3 - 4' Window King Studs
2 piece(s) 2 x 6 HF No.2

Wall Height: 13'	Member Height: 12' 7 1/2"	Tributary Width: 2' 8"

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	2770	7777	Passed (36%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	2770	6683	Passed (41%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	221	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	205	2640	Passed (8%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	696 @ mid-span	2223	Passed (31%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.29 @ mid-span	0.84	Passed (L/527)	--	1.0 D + 0.6 W
Bending/Compression	0.54	1	Passed (54%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Wall deflection criteria: TL (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- The column stability factor (Kf = 0.6) applied to this design assumes nailed built-up columns per NDS section 15.3.3. For Weyerhaeuser ELP products refer to the U.S. Wall Guide for multiple-member connection requirements.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Drawing is Conceptual

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	3	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	3	N/A

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

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	1160	1610	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	2' 8"	21.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Weyerhaeuser Notes

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Roof Framing, Grid 4 - 6' Door Header
1 piece(s) 4 x 12 DF No.2
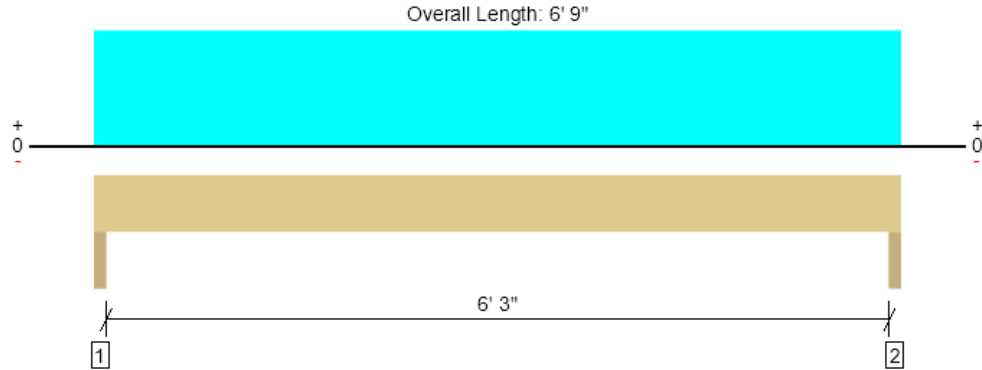
Overall Length: 6' 9"

6' 3"

1   2

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4114 @ 1 1/2"	6563 (3.00")	Passed (63%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2666 @ 1' 2 1/4"	5434	Passed (49%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	6437 @ 3' 4 1/2"	7004	Passed (92%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.043 @ 3' 4 1/2"	0.217	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.074 @ 3' 4 1/2"	0.325	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 6' 9"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	1.88"	1734	2379	4114	None
2 - Trimmer - HF	3.00"	3.00"	1.88"	1734	2379	4114	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 9"	N/A	10.0	--	
1 - Uniform (PSF)	0 to 6' 9"	25'	20.2	25.0	Default Load
2 - Uniform (PSF)	0 to 6' 9"	4'	--	20.0	Drift Loads

Weyerhaeuser Notes

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File Name: East Town Crossing - Commercial Lot 1

Roof Framing, Grid 4 - 6' Door King Studs
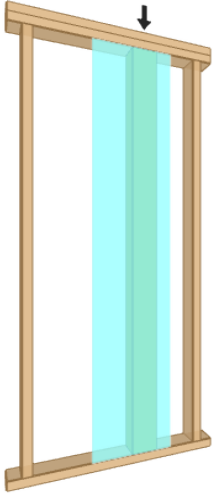**2 piece(s) 2 x 6 HF No.2**

| Wall Height: 13' | Member Height: 12' 7 1/2" | Tributary Width: 7' 3" |

Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	2244	7777	Passed (29%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	2244	6683	Passed (34%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	578	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	536	2640	Passed (20%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	1824 @ mid-span	2223	Passed (82%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.70 @ mid-span	0.84	Passed (L/216)	--	1.0 D + 0.6 W
Bending/Compression	0.97	1	Passed (97%)	1.60	1.0 D + 0.6 W

- Wall deflection criteria: TL (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- The column stability factor (Kf = 0.6) applied to this design assumes nailed built-up columns per NDS section 15.3.3. For Weyerhaeuser ELP products refer to the U.S. Wall Guide for multiple-member connection requirements.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

Max Unbraced Length	Comments
1'	

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Lateral Connections: Simpson Strong-Tie				
Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Angle Connectors	A21	5	(4) - 10d x 1 1/2"
Base	Angle Connectors	A21	5	(4) - 10d x 1 1/2"

- Angle connectors are to be installed staggered each side of members < 3.00" thick.

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	926	1318	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	7' 3"	21.0	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Weyerhaeuser Notes

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Roof Framing, Grid 4 - 6' Window Header
1 piece(s) 4 x 12 DF No.2

Overall Length: 6' 6"

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3668 @ 1 1/2"	6563 (3.00")	Passed (56%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2328 @ 1' 2 1/4"	5434	Passed (43%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	5511 @ 3' 3"	7004	Passed (79%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.034 @ 3' 3"	0.208	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.058 @ 3' 3"	0.313	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

Member Length : 6' 6"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	1.68"	1539	2129	3668	None
2 - Trimmer - HF	3.00"	3.00"	1.68"	1539	2129	3668	None

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

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 6"	N/A	10.0	--	
1 - Uniform (PSF)	0 to 6' 6"	23'	20.2	25.0	Default Load
2 - Uniform (PSF)	0 to 6' 6"	4'	--	20.0	Drift Load

Weyerhaeuser Notes

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Weyerhaeuser

Roof Framing, Grid 4 - 6' Window King Studs
2 piece(s) 2 x 6 DF No.2

Wall Height: 13' Member Height: 12' 7 1/2" Tributary Width: 3' 8"

Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	2244	9421	Passed (24%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	2244	6683	Passed (34%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	303	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	281	3168	Passed (9%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	957 @ mid-span	2355	Passed (41%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.31 @ mid-span	0.84	Passed (L/493)	--	1.0 D + 0.6 W
Bending/Compression	0.49	1	Passed (49%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Wall deflection criteria: TL (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- The column stability factor (Kf = 0.6) applied to this design assumes nailed built-up columns per NDS section 15.3.3. For Weyerhaeuser ELP products refer to the U.S. Wall Guide for multiple-member connection requirements.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A

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

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	926	1318	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	3' 8"	21.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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

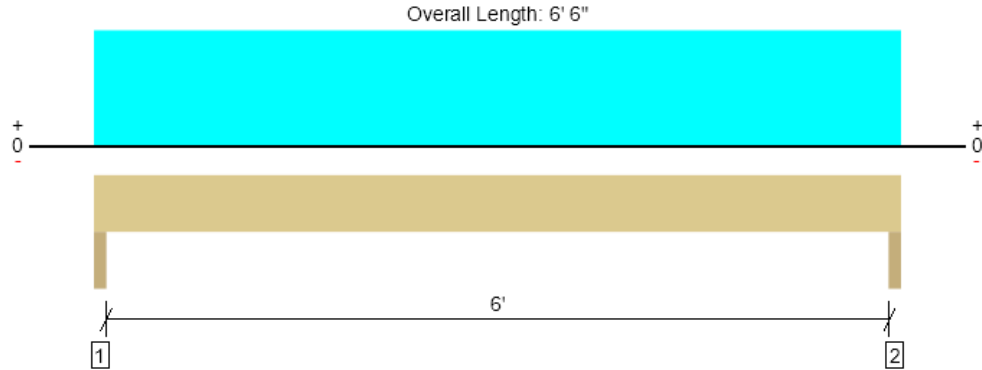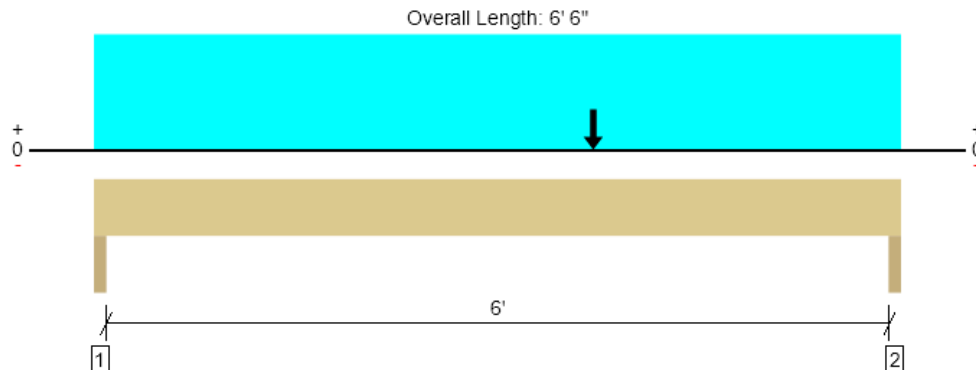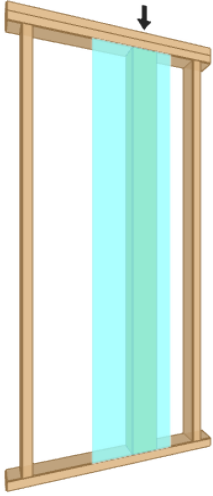| ForteWEB Software Operator	Job Notes
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File Name: East Town Crossing - Commercial Lot 1
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FORTEWEB

Roof Framing, Grid 4 - 6' Window Header with Awning Load
1 piece(s) 5 1/2" x 9" 24F-V4 DF Glulam

Overall Length: 6' 6"

6'

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	5960 @ 6' 4 1/2"	10725 (3.00")	Passed (56%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	4739 @ 5' 6"	10057	Passed (47%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	10287 @ 4' 1/4"	17078	Passed (60%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.064 @ 3' 3 3/4"	0.208	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.113 @ 3' 3 3/4"	0.313	Passed (L/666)	--	1.0 D + 1.0 S (All Spans)

Member Length : 6' 6"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Volume factor of 1.00 was calculated for positive bending using length L = 6' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	1.50"	2212	2960	5171	None
2 - Trimmer - HF	3.00"	3.00"	1.67"	2562	3398	5960	None

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

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 6"	N/A	12.0	--	
1 - Uniform (PSF)	0 to 6' 6"	25'	20.2	25.0	Default Load
2 - Uniform (PSF)	0 to 6' 6"	4'	--	20.0	Drift Load
3 - Point (lb)	4' 1/4"	N/A	1420	1775	Awning Load

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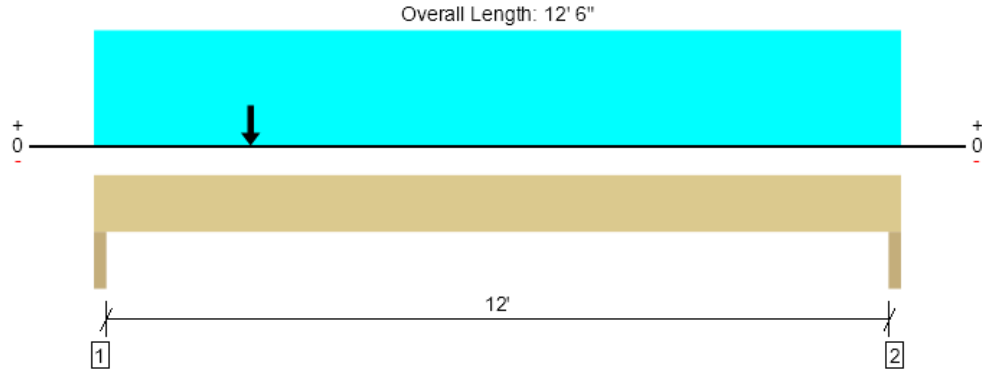
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
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Roof Framing, Grid 4 - 12' Window Header
1 piece(s) 5 1/2" x 12" 24F-V4 DF Glulam

Overall Length: 12' 6"

12'

1   2

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	9686 @ 1 1/2"	10725 (3.00")	Passed (90%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	8268 @ 1' 3"	13409	Passed (62%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	25119 @ 5' 8 5/8"	30360	Passed (83%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.277 @ 6' 1 5/8"	0.408	Passed (L/530)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.483 @ 6' 1 9/16"	0.613	Passed (L/304)	--	1.0 D + 1.0 S (All Spans)

Member Length : 12' 6"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Volume factor of 1.00 was calculated for positive bending using length L = 12' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	3.00"	3.00"	2.71"	4151	5535	9686	None
2 - Trimmer - HF	3.00"	3.00"	2.15"	3264	4427	7692	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	12' 6" o/c	
Bottom Edge (Lu)	12' 6" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 12' 6"	N/A	16.0	--	
1 - Uniform (PSF)	0 to 12' 6"	23'	20.2	25.0	Default Load
2 - Uniform (PSF)	0 to 12' 6"	4'	--	20.0	Drift Load
3 - Point (lb)	2' 5 1/8"	N/A	1420	1775	Awning

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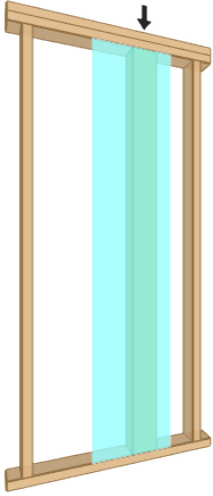
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Roof Framing, Grid 4 - 12' Window King Studs
2 piece(s) 2 x 6 DF No.2

Wall Height: 13'	Member Height: 12' 7 1/2"	Tributary Width: 6' 8"

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	2244	9421	Passed (24%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	2244	6683	Passed (34%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	534	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	496	3168	Passed (16%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	1687 @ mid-span	2355	Passed (72%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.53 @ mid-span	0.84	Passed (L/287)	--	1.0 D + 0.6 W
Bending/Compression	0.83	1	Passed (83%)	1.60	1.0 D + 0.6 W

- Wall deflection criteria: TL (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- The column stability factor (Kf = 0.6) applied to this design assumes nailed built-up columns per NDS section 15.3.3. For Weyerhaeuser ELP products refer to the U.S. Wall Guide for multiple-member connection requirements.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Drawing is Conceptual

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	16d (0.135" x 3 1/2") (End)	6	N/A
Base	Nails	16d (0.135" x 3 1/2") (End)	6	N/A

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

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	926	1318	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	6' 8"	21.2	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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Roof Framing, Grid A - 5' Window Header
1 piece(s) 4 x 10 DF No.2

Overall Length: 5' 3"

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	586 @ 0	3281 (1.50")	Passed (18%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	386 @ 10 3/4"	4468	Passed (9%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	769 @ 2' 7 1/2"	5166	Passed (15%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.004 @ 2' 7 1/2"	0.175	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.010 @ 2' 7 1/2"	0.262	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 5' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	337	249	586	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	337	249	586	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 3"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 5' 3"	3'	20.0	25.0	Default Load
2 - Uniform (PSF)	0 to 5' 3"	1'	--	20.0	Drift
3 - Uniform (PLF)	0 to 5' 3"	N/A	60.0	--	Parapet

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

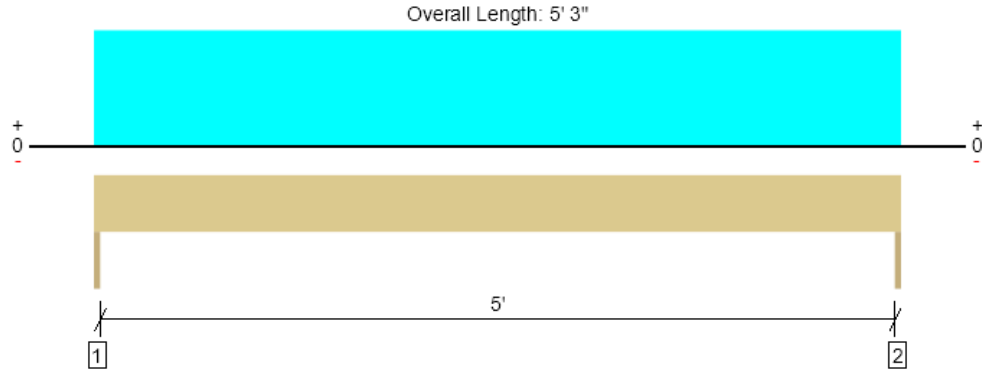| ForteWEB Software Operator	Job Notes
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Roof Framing, Grid A- 5' Window King Studs
1 piece(s) 2 x 6 HF No.2

Wall Height: 13'	Member Height: 12' 7 1/2"	Tributary Width: 3' 2"

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	270	3888	Passed (7%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	270	3341	Passed (8%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	262	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	243	1320	Passed (18%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	827 @ mid-span	1102	Passed (75%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.62 @ mid-span	0.84	Passed (L/244)	--	1.0 D + 0.6 W
Bending/Compression	0.78	1	Passed (78%)	1.60	1.0 D + 0.6 W

- Wall deflection criteria: TL (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A

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

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	120	150	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	3' 2"	21.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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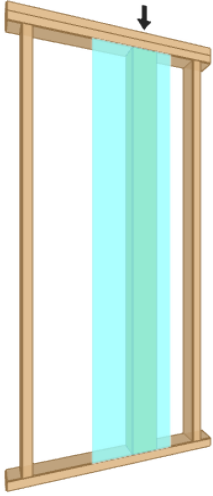File Name: East Town Crossing - Commercial Lot 1
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Roof Framing, Grid A - 6' Door Header
1 piece(s) 4 x 10 DF No.2
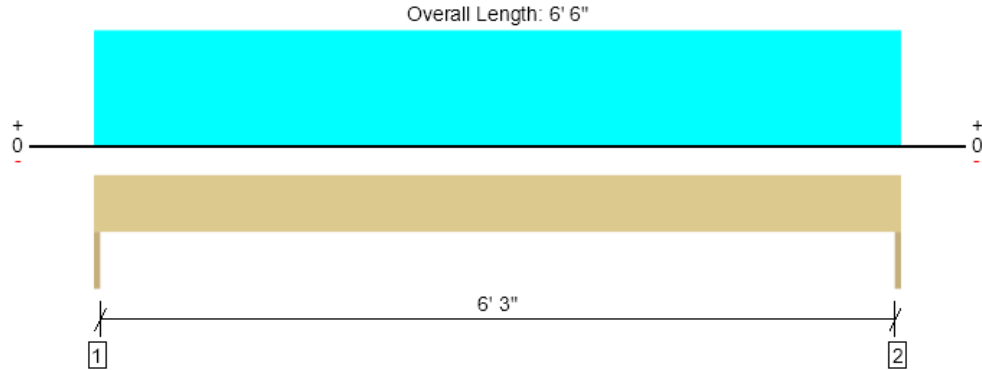
Overall Length: 6' 6"

+ 0 −   + 0 −

6' 3"

1   2

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	725 @ 0	3281 (1.50")	Passed (22%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	525 @ 10 3/4"	4468	Passed (12%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1179 @ 3' 3"	5166	Passed (23%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.010 @ 3' 3"	0.217	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.024 @ 3' 3"	0.325	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 6' 6"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	417	309	725	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	417	309	725	None

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

• Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 6"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 6' 6"	3'	20.0	25.0	Default Load
2 - Uniform (PSF)	0 to 6' 6"	1'	--	20.0	Drift Load
3 - Uniform (PLF)	0 to 6' 6"	N/A	60.0	--	Parapet

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Roof Framing, Grid A - 6' Door King Studs
1 piece(s) 2 x 6 HF No.2
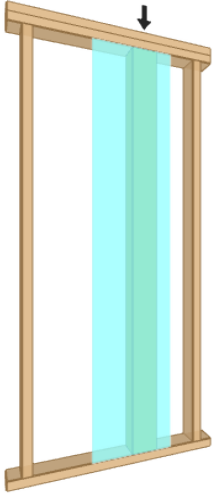
Wall Height: 13'	Member Height: 12' 7 1/2"	Tributary Width: 3' 11"

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	270	3888	Passed (7%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	270	3341	Passed (8%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	324	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	300	1320	Passed (23%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	1022 @ mid-span	1102	Passed (93%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.77 @ mid-span	0.84	Passed (L/198)	--	1.0 D + 0.6 W
Bending/Compression	0.96	1	Passed (96%)	1.60	1.0 D + 0.6 W

- Wall deflection criteria: TL (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Drawing is Conceptual

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A

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

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	120	150	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	3' 11"	21.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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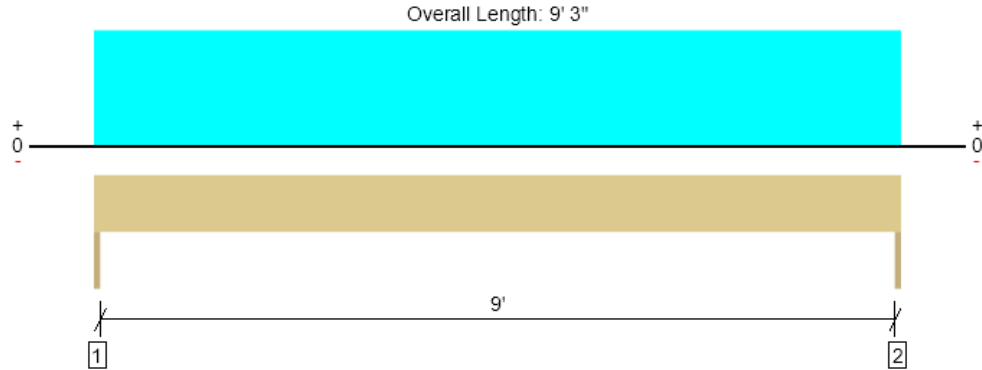
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Roof Framing, Grid A - 9' Window Header
1 piece(s) 4 x 10 DF No.2

Overall Length: 9' 3"

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1032 @ 0	3281 (1.50")	Passed (31%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	832 @ 10 3/4"	4468	Passed (19%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2387 @ 4' 7 1/2"	5166	Passed (46%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.042 @ 4' 7 1/2"	0.308	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.100 @ 4' 7 1/2"	0.463	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 9' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	593	439	1032	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	593	439	1032	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 3" o/c	
Bottom Edge (Lu)	9' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 9' 3"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 9' 3"	3'	20.0	25.0	Default Load
2 - Uniform (PLF)	0 to 9' 3"	N/A	60.0	--	Parapet
3 - Uniform (PSF)	0 to 9' 3"	1'	--	20.0	Drift Load

Weyerhaeuser Notes

ForteWEB Software Operator	Job Notes
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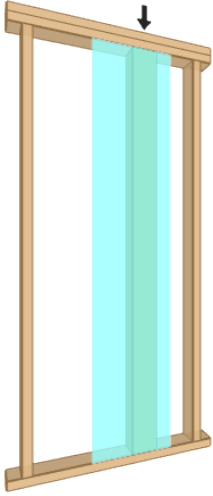File Name: East Town Crossing - Commercial Lot 1

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Roof Framing, Grid A - 9' Door King Studs
2 piece(s) 2 x 6 HF No.2

Wall Height: 13' | Member Height: 12' 7 1/2" | Tributary Width: 5' 11"

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	270	7777	Passed (3%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	270	6683	Passed (4%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	478	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	443	2640	Passed (17%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	1509 @ mid-span	2223	Passed (68%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.56 @ mid-span	0.84	Passed (L/269)	--	1.0 D + 0.6 W
Bending/Compression	0.69	1	Passed (69%)	1.60	1.0 D + 0.6 W

- Wall deflection criteria: TL (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- The column stability factor (Kf = 0.6) applied to this design assumes nailed built-up columns per NDS section 15.3.3. For Weyerhaeuser ELP products refer to the U.S. Wall Guide for multiple-member connection requirements.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Drawing is Conceptual

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	10d (0.128" x 3") (End)	6	N/A
Base	Nails	10d (0.128" x 3") (End)	6	N/A

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

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	120	150	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	5' 11"	21.3	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Weyerhaeuser Notes

ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

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Roof Framing, Grid A - 9' Window Header with Awning Load
1 piece(s) 5 1/2" x 9" 24F-V4 DF Glulam

Overall Length: 9' 3"

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3015 @ 0	5363 (1.50")	Passed (56%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2816 @ 10 1/2"	10057	Passed (28%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	9299 @ 3' 6 3/4"	17078	Passed (54%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.104 @ 4' 5 1/8"	0.308	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.203 @ 4' 5 5/16"	0.463	Passed (L/547)	--	1.0 D + 1.0 S (All Spans)

Member Length : 9' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Volume factor of 1.00 was calculated for positive bending using length L = 9' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	1484	1531	3015	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	1158	1123	2281	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 3" o/c	
Bottom Edge (Lu)	9' 3" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 9' 3"	N/A	12.0	--	
1 - Uniform (PSF)	0 to 9' 3"	3'	20.0	25.0	Default Load
2 - Uniform (PLF)	0 to 9' 3"	N/A	60.0	--	Parapet
3 - Uniform (PSF)	0 to 9' 3"	1'	--	20.0	Drift Load
4 - Point (lb)	3' 6 3/4"	N/A	1420	1775	Awning Load

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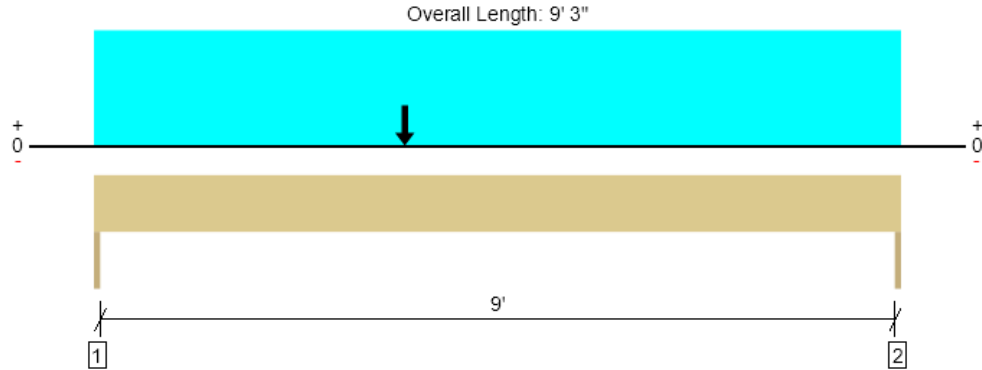4/25/2025 8:00:24 PM UTC
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Roof Framing, Grid D - 5' Window Header
1 piece(s) 4 x 10 DF No.2

Overall Length: 5' 3"

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	586 @ 0	3281 (1.50")	Passed (18%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	386 @ 10 3/4"	4468	Passed (9%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	769 @ 2' 7 1/2"	5166	Passed (15%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.004 @ 2' 7 1/2"	0.175	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.010 @ 2' 7 1/2"	0.262	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	337	249	586	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	337	249	586	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 3"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 5' 3"	3'	20.0	25.0	Default Load
2 - Uniform (PSF)	0 to 5' 3"	1'	--	20.0	Drift Load
3 - Uniform (PLF)	0 to 5' 3"	N/A	60.0	--	Parapet

Member Length : 5' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

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Roof Framing, Grid D- 5' Window King Studs
1 piece(s) 2 x 6 HF No.2

| Wall Height: 13' | Member Height: 12' 7 1/2" | Tributary Width: 3' 2" |

Design Results	**Actual**	**Allowed**	**Result**	**LDF**	**Load: Combination**
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	270	3888	Passed (7%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	270	3341	Passed (8%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	262	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	243	1320	Passed (18%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	827 @ mid-span	1102	Passed (75%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.62 @ mid-span	0.84	Passed (L/244)	--	1.0 D + 0.6 W
Bending/Compression	0.78	1	Passed (78%)	1.60	1.0 D + 0.6 W

- Wall deflection criteria: TL (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.

Supports	**Type**	**Material**
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	**Comments**
1'	

Drawing is Conceptual

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	4	N/A

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

Vertical Load	**Tributary Width**	**Dead (0.90)**	**Snow (1.15)**	**Comments**
1 - Point (lb)	N/A	120	150	Default Load

Lateral Load	**Location**	**Tributary Width**	**Wind (1.60)**	**Comments**
1 - Uniform (PSF)	Full Length	3' 2"	21.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator
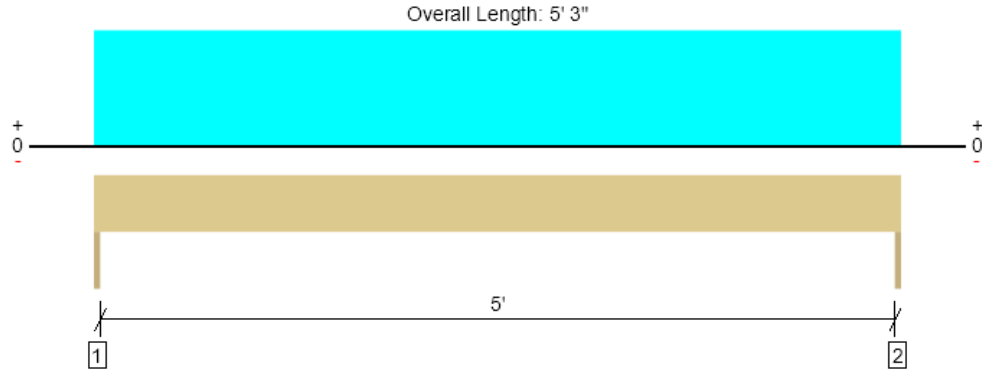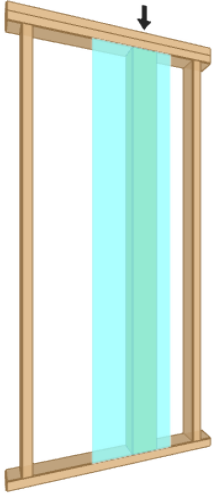
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Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

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Overall Length: 3' 5"

3' 2"

1   2

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	381 @ 0	3281 (1.50")	Passed (12%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	181 @ 10 3/4"	4468	Passed (4%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	326 @ 1' 8 1/2"	5166	Passed (6%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.001 @ 1' 8 1/2"	0.114	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.002 @ 1' 8 1/2"	0.171	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 3' 5"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	219	162	381	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	219	162	381	None

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 3' 5"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 3' 5"	3'	20.0	25.0	Default Load
2 - Uniform (PSF)	0 to 3' 5"	1'	--	20.0	Drift Load
3 - Uniform (PLF)	0 to 3' 5"	N/A	60.0	--	Parapet

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

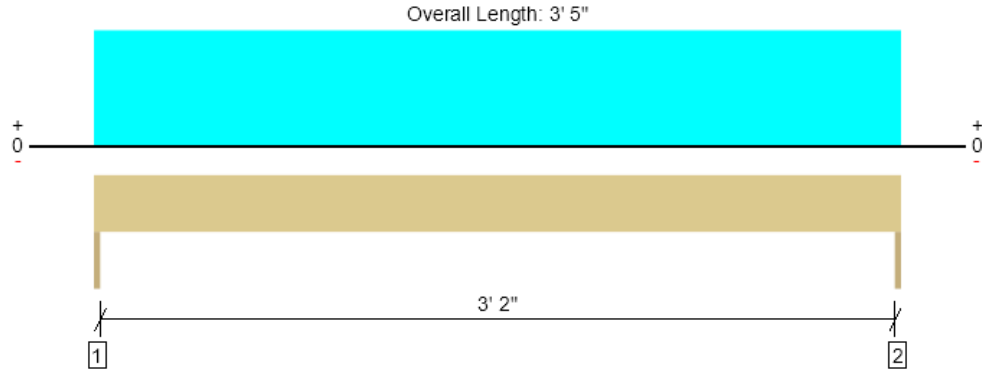| ForteWEB Software Operator	Job Notes
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Roof Framing, Grid D- 3' Door King Studs
1 piece(s) 2 x 6 HF No.2

Wall Height: 13'	Member Height: 12' 7 1/2"	Tributary Width: 2' 2"

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	270	3888	Passed (7%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	270	3341	Passed (8%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	179	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	166	1320	Passed (13%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	566 @ mid-span	1102	Passed (51%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.43 @ mid-span	0.84	Passed (L/356)	--	1.0 D + 0.6 W
Bending/Compression	0.54	1	Passed (54%)	1.60	1.0 D + 0.6 W

- Wall deflection criteria: TL (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Drawing is Conceptual

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d (0.113" x 2 1/2") (Toe)	3	N/A
Base	Nails	8d (0.113" x 2 1/2") (Toe)	3	N/A

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

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	120	150	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	2' 2"	21.8	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Weyerhaeuser Notes

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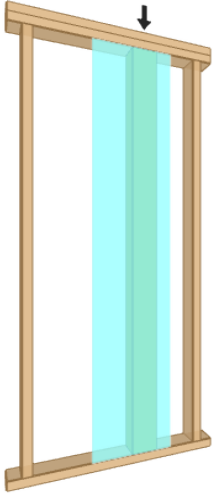
Roof Framing, Grid D - 9' Window Header
1 piece(s) 4 x 10 DF No.2

Overall Length: 9' 3"

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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1032 @ 0	3281 (1.50")	Passed (31%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	832 @ 10 3/4"	4468	Passed (19%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2387 @ 4' 7 1/2"	5166	Passed (46%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.042 @ 4' 7 1/2"	0.308	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.100 @ 4' 7 1/2"	0.463	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

Member Length : 9' 3"
System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Trimmer - HF	1.50"	1.50"	1.50"	593	439	1032	None
2 - Trimmer - HF	1.50"	1.50"	1.50"	593	439	1032	None

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 3" o/c	
Bottom Edge (Lu)	9' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 9' 3"	N/A	8.2	--	
1 - Uniform (PSF)	0 to 9' 3"	3'	20.0	25.0	Default Load
2 - Uniform (PSF)	0 to 9' 3"	1'	--	20.0	Drift Load
3 - Uniform (PLF)	0 to 9' 3"	N/A	60.0	--	Parapet

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

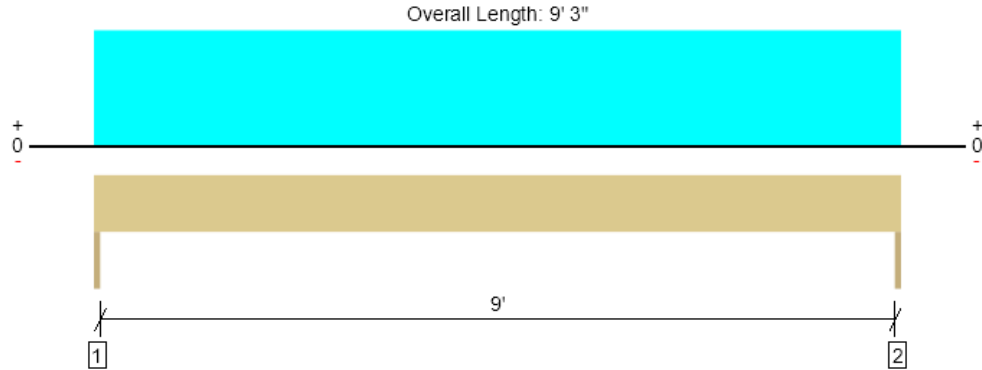| ForteWEB Software Operator	Job Notes
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Roof Framing, Grid D- 9' Window King Studs
2 piece(s) 2 x 6 HF No.2

| Wall Height: 13' | Member Height: 12' 7 1/2" | Tributary Width: 5' 2" |

Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	28	50	Passed (55%)	--	--
Compression (lbs)	270	7777	Passed (3%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	270	6683	Passed (4%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	421	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	391	2640	Passed (15%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	1330 @ mid-span	2223	Passed (60%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.50 @ mid-span	0.84	Passed (L/305)	--	1.0 D + 0.6 W
Bending/Compression	0.61	1	Passed (61%)	1.60	1.0 D + 0.6 W

- Wall deflection criteria: TL (L/180)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- The column stability factor (Kf = 0.6) applied to this design assumes nailed built-up columns per NDS section 15.3.3. For Weyerhaeuser ELP products refer to the U.S. Wall Guide for multiple-member connection requirements.

Supports	Type	Material
Top	Dbl 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Column
Building Code : IBC 2021
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections				
Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	10d (0.128" x 3") (End)	5	N/A
Base	Nails	10d (0.128" x 3") (End)	5	N/A

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

Vertical Load	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	120	150	Default Load

Lateral Load	Location	Tributary Width	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	5' 2"	21.5	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (110), Risk Category(II), Wind Zone (4), GCpi (+/- 0.18), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Weyerhaeuser Notes

ForteWEB Software Operator	Job Notes
Chon Pieruccioni Pieruccioni Engineering (206) 949-7866 cpieru@hotmail.com	

Weyerhaeuser

4/25/2025 8:00:24 PM UTC
ForteWEB v3.9, Engine: V8.4.3.94, Data: V8.1.7.3
File Name: East Town Crossing - Commercial Lot 1
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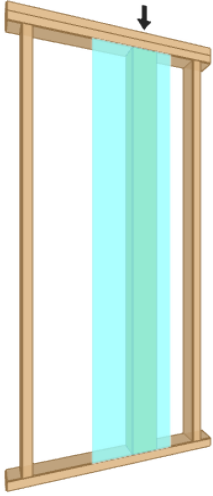**Pieruccioni Engineering and Construction, L**

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GEOMETRY

Footing Length (X-dir)	2.00	ft
Footing Width (Z-dir)	2.80	ft
Footing Thickness	8.0 in	OK
Soil Cover	1.00	ft
Column Length (X-dir)	6.0	in
Column Width (Z-dir)	6.0	in
Offset (X-dir)	0.00 in	OK
Offset (Z-dir)	0.00 in	OK
Base Plate (L x W)	6.0 x 6.0	in

SOIL PRESSURES (D+S)

Gross Allow. Soil Pressure	2.0	ksf
Soil Pressure at Corner 1	1.7	ksf
Soil Pressure at Corner 2	1.7	ksf
Soil Pressure at Corner 3	1.7	ksf
Soil Pressure at Corner 4	1.7	ksf
Bearing Pressure Ratio	0.85	OK
Ftg. Area in Contact with Soil	100.0	%
X-eccentricity / Ftg. Length	0.00	OK
Z-eccentricity / Ftg. Width	0.00	OK

APPLIED LOADS

	Dead	Live	RLive	Snow	Wind	Seismic	
Axial Force P	3.9	0.0	0.0	4.7	0.0	0.0	kip
Moment about X Mx ..	0.0	0.0	0.0	0.0	0.0	0.0	k-ft
Moment about Z Mz ..	0.0	0.0	0.0	0.0	0.0	0.0	k-ft
Shear Force Vx	0.0	0.0	0.0	0.0	0.0	0.0	kip
Shear Force Vz	0.0	0.0	0.0	0.0	0.0	0.0	kip

OVERTURNING CALCULATIONS (Comb: 0.6D+0.6W)

- Overturning about X-X

- Moment Mx = 0.6 * 0.0 + 0.6 * 0.0 = 0.0 k-ft

- Shear Force Vz = 0.6 * 0.0 + 0.6 * 0.0 = 0.0 kip

　Arm = 0.00 + 8.0 / 12 = 0.67 ft　　　　　　　Moment = 0.0 * 0.67 = 0.0 k-ft

- Passive Force = 0.0 kip　　　　　Arm = 0.27 ft　　　　Moment = 0.0 k-ft

- Overturning moment X-X = 0.0 + 0.0 = 0.0 k-ft

- Resisting about X-X

- Footing weight = *0.6 * W * L * Thick * Density* =   0.6 * 2.80 * 2.00 * 8.0 / 12 * 0.15 = 0.3 kip

　Arm = *W / 2* = 2.80 / 2 = 1.40 ft　　　　　　Moment = 0.3 * 1.40 = 0.5 k-ft

- Pedestal weight = *0.6 * W * L * H * Density* =   0.6 * 6.0 / 12 * 6.0 / 12 * 0.0 * 0.15 = 0.0 kip

　Arm = *W / 2 - Offset* = 2.80 / 2 - 0.0 / 12 = 1.40 ft　　　　Moment = 0.0 * 1.40 = 0.0 k-ft

- Soil cover =　　　*0.6 * W * L * SC * Density* = 0.6 * (2.80 * 2.00 - 6.0 / 12 * 6.0 / 12) * 1.0 * 110 = 0.4 kip

　Arm = *W / 2* = 2.80 / 2 = 1.40 ft　　　　　　Moment = 0.4 * 1.40 = 0.5 k-ft

- Buoyancy = *0.6 * W * L * γ * (SC + Thick - WT)* =   0.6 * 2.80 * 2.00 * 62 * (0.67) = -0.1 kip

　Arm = *W / 2* = 2.80 / 2 = 1.40 ft　　　　　　Moment = 0.1 * 1.40 = -0.2 k-ft

- Axial force P = 0.6 * 3.9 + 0.6 * 0.0 = 2.3 kip

　Arm = *W / 2 - Offset* = 2.80 / 2 - 0.0 / 12 = 1.40 ft　　　　Moment = 2.3 * 1.40 = 3.3 k-ft

- Resisting moment X-X = 0.5 + 0.0 + 0.5 + 3.3 + -0.2 = 4.0 k-ft

- Overturning safety factor X-X = $\dfrac{Resisting\ moment}{Overturning\ moment}$ = $\dfrac{4.0}{0.0}$ = 40.45 > 1.50   OK

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- Overturning about Z-Z

- Moment Mz = 0.6 * 0.0 + 0.6 * 0.0 = 0.0 k-ft

- Shear Force Vx = 0.6 * 0.0 + 0.6 * 0.0 = 0.0 kip

  Arm = 0.00 + 8.0 / 12 = 0.67 ft   Moment = 0.0 * 0.67 = 0.0 k-ft

- Passive Force = 0.0 kip   Arm = 0.27 ft   Moment = 0.0 k-ft

- Overturning moment Z-Z = 0.0 + 0.0 = 0.0 k-ft

- Resisting about Z-Z

- Footing weight = *0.6 * W * L * Thick * Density =*   0.6 * 2.80 * 2.00 * 8.0 / 12 * 0.15 = 0.3 kip

  Arm = *L / 2 =*   2.00 / 2 = 1.00 ft   Moment = 0.3 * 1.00 = 0.3 k-ft

- Pedestal weight = *0.6 * W * L * H * Density =*   0.6 * 6.0 / 12 * 6.0 / 12 * 0.0 * 0.15 = 0.0 kip

  Arm = *L / 2 - Offset*   2.00 / 2 - 0.0 / 12 = 1.00 ft   Moment = 0.0 * 1.00 = 0.0 k-ft

- Soil cover = *0.6 * W * L * SC * Density =* 0.6 * (2.80 * 2.00 - 6.0 / 12 * 6.0 / 12) * 1.0 * 110 = 0.4 kip

  Arm = *L / 2 =*   2.00 / 2 = 1.00 ft   Moment = 0.4 * 1.00 = 0.4 k-ft

- Buoyancy = *0.6 * W * L * γ * (SC + Thick - WT) =*   0.6 * 2.80 * 2.00 * 62 * (0.67) = -0.1 kip

  Arm = *L / 2 =*   2.00 / 2 = 1.00 ft   Moment = 0.1 * 1.00 = -0.1 k-ft

- Axial force P = 0.6 * 3.9 + 0.6 * 0.0 = 2.3 kip

  Arm = *L / 2 - Offset =*   2.00 / 2 - 0.0 / 12 = 1.00 ft   Moment = 2.3 * 1.00 = 2.3 k-ft

- Resisting moment Z-Z = 0.3 + 0.0 + 0.4 + 2.3 + -0.1 = 2.9 k-ft

- Overturning safety factor Z-Z = $\dfrac{Resisting\ moment}{Overturning\ moment}$ = $\dfrac{2.9}{0.0}$ = 28.89 > 1.50   OK

<div align="center">

SOIL BEARING PRESSURES (Comb: D+S)

</div>

Overturning moment X-X = 0.0 + 0.0 = 0.0 k-ft

Resisting moment X-X = 0.8 + 0.0 + 0.8 + -0.3 + 12.0 = 13.3 k-ft

Overturning moment Z-Z = 0.0 + 0.0 = 0.0 k-ft

Resisting moment Z-Z = 0.6 + 0.0 + 0.6 + -0.2 + 8.6 = 9.5 k-ft

Resisting force = *Footing + Pedestal + Soil - Buoyancy + P =*   0.6 + 0.0 + 0.6 - 0.2 + 8.6 = 9.5 kip

X-coordinate of resultant from maximum bearing corner:

Xp = $\dfrac{Z\text{-}Resisting\ moment - Z\text{-}Overturning\ moment}{Resisting\ force}$ = $\dfrac{9.5 - 0.0}{9.5}$ = 1.00 ft

Z-coordinate of resultant from maximum bearing corner:

Zp = $\dfrac{X\text{-}Resisting\ moment - X\text{-}Overturning\ moment}{Resisting\ force}$ = $\dfrac{13.3 - 0.0}{9.5}$ = 1.40 ft

X-ecc = *Length / 2 - Xp =* 2.00 / 2 - 1.00 = 0.00 ft

Z-ecc = *Width / 2 - Zp =* 2.80 / 2 - 1.40 = 0.00 ft

Area = *Width * Length =*   2.80 * 2.00 = 5.6 ft²

Sx = *Length * Width² / 6 =* 2.00 * 2.80² / 6 = 2.6 ft³

Sz = *Width * Length² / 6 =* 2.80 * 2.00² / 6 = 1.9 ft³

- Footing is in full bearing. Soil pressures are as follows:

P1 = *P * (1/ A + Z-ecc / Sx + X-ecc / Sz) =* 9.5 * (1 / 5.6 + 0.00 / 2.6 + 0.00 / 1.9) = 1.70 ksf

P2 = *P * (1/ A - Z-ecc / Sx + X-ecc / Sz) =* 9.5 * (1 / 5.6 - 0.00 / 2.6 + 0.00 / 1.9) = 1.70 ksf

P3 = *P * (1/ A - Z-ecc / Sx - X-ecc / Sz) =* 9.5 * (1 / 5.6 - 0.00 / 2.6 - 0.00 / 1.9) = 1.70 ksf

P4 = *P * (1/ A + Z-ecc / Sx - X-ecc / Sz) =* 9.5 * (1 / 5.6 + 0.00 / 2.6 - 0.00 / 1.9) = 1.70 ksf

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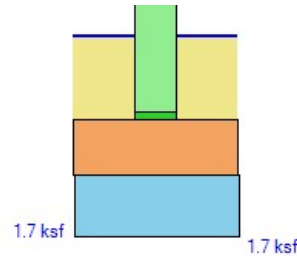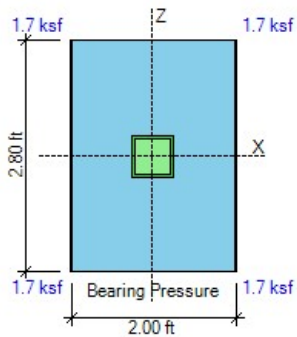
SLIDING CALCULATIONS (Comb: 0.6D+0.6W)

Internal friction angle = 28.0 deg

Passive coefficient $kp = 4.33$ *(per Coulomb)*

Pressure at mid-depth = $kp * Density * (Cover + Thick / 2)$ = 4.33 * 110 * (1.00 + 8.0 / 12 / 2) = 0.63 ksf

X-Passive force = *Pressure * Thick * Width* =   0.63 * 8.0 / 12 * 2.80 = 1.2 kip

Z-Passive force = *Pressure * Thick * Length* = 0.63 * 8.0 / 12 * 2.00 = 0.8 kip

Friction force = *Resisting force * Friction coeff.* =   Max (0, 2.9 * 0.35) = 1.0 kip

Use 100% of Passive + 100% of Friction for sliding resistance

- Sliding safety factor X-X = $\dfrac{X\text{-}Passive\ force + Friction}{X\text{-}Horizontal\ load}$ = $\dfrac{1.00 * 1.2 + 1.00 * 1.0}{0.0}$ = 21.95 > 1.50 OK

- Sliding safety factor Z-Z = $\dfrac{Z\text{-}Passive\ force + Friction}{Z\text{-}Horizontal\ load}$ = $\dfrac{1.00 * 0.8 + 1.00 * 1.0}{0.0}$ = 18.57 > 1.50 OK

UPLIFT CALCULATIONS (Comb: 0.6D+0.6W)

- Uplift safety factor = $\dfrac{Pedestal + Footing + Cover - Buoyancy}{Uplift\ load}$ = $\dfrac{0.0 + 0.3 + 0.4 - 0.1}{0.0}$ = 99.99 > 1.00 OK

ONE-WAY SHEAR CALCULATIONS (Comb: 1.2D+1.6S+0.5W)

Concrete f'c = 2.5 ksi   Steel fy = 40.0 ksi   Soil density =   110 pcf

Use Plain Concrete Shear Strength

ϕVcx = *4/3 * ϕ * √(f'c) * Width * t / 1000* =4/3 * 0.60 * √(2500) * 2.8 * 12 * 8.0 / 1000 = 10.8 kip   ACI 14.5.5.1

ϕVcz = *4/3 * ϕ * √(f'c) * Length * t / 1000* =4/3 * 0.60 * √(2500) * 2.0 * 12 * 8.0 / 1000 = 7.7 kip

- Shear forces calculated as the volume of the bearing pressures under the effective areas:

One-way shear Vux (- Side) = 0.5 kip   < 10.8 kip OK

One-way shear Vux (+ Side) = 0.5 kip   < 10.8 kip OK

One-way shear Vuz (- Side) = 2.1 kip   < 7.7 kip OK

One-way shear Vuz (+ Side) = 2.1 kip   < 7.7 kip OK

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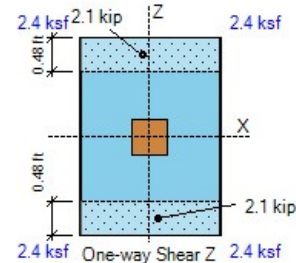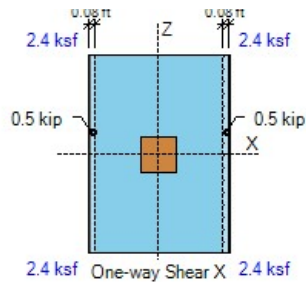
FLEXURE CALCULATIONS (Comb: 1.2D+1.6S+0.5W)

Plain ϕMnx = *5 * ϕ * $\sqrt{(f'c)}$ * L * Thick² / 6* = 5 * 0.60 * $\sqrt{(2500)}$ * 2.00 * 8.0² / 6 / 1000 = 0.9 k-ft   ACI Eq. (14.5.2.1a)

Plain ϕMnz = *5 * ϕ * $\sqrt{(f'c)}$ * W * Thick² / 6* = 5 * 0.60 * $\sqrt{(2500)}$ * 2.80 * 8.0² / 6 / 1000 = 1.2 k-ft

- Top Bars

No Top Reinforcement Provided at the Footing

Use Plain Concrete Flexural Strength at Top

- Top moments calculated as the overburden minus the bearing pressures times the lever arm:

Top moment -Mux (- Side) = 0.0 k-ft   < 3.2 k-ft OK

Top moment -Mux (+ Side) = 0.0 k-ft   < 3.2 k-ft OK

Top moment -Muz (- Side) = 0.0 k-ft   < 4.5 k-ft OK

Top moment -Muz (+ Side) = 0.0 k-ft   < 4.5 k-ft OK

- Bottom Bars

No Bottom Reinforcement Provided at the Footing

Use Plain Concrete Flexural Strength at Bottom

- Bottom moments calculated as the bearing minus the overburden pressures times the lever arm:

Bottom moment Mux (- Side) = 2.9 k-ft   < 3.2 k-ft OK   ratio = 0.90

Bottom moment Mux (+ Side) = 2.9 k-ft   < 3.2 k-ft OK   ratio = 0.90

Bottom moment Muz (- Side) = 1.7 k-ft   < 4.5 k-ft OK   ratio = 0.38

Bottom moment Muz (+ Side) = 1.7 k-ft   < 4.5 k-ft OK   ratio = 0.39

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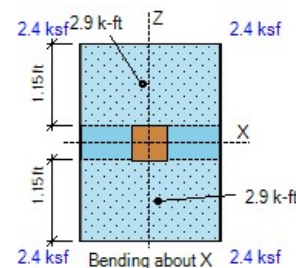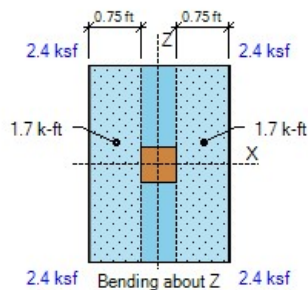
LOAD TRANSFER CALCULATIONS (Comb: 1.2D+1.6S+0.5W)

Area $A1 = col\ L * col\ W = 6.0 * 6.0 = 36.0$ in²

$Sx = col\ W * col\ L^2 / 6 = 6.0 * 6.0^2 / 6 = 36.0$ in³

$Sz = col\ L * col\ W^2 / 6 = 6.0 * 6.0^2 / 6 = 36.0$ in³

Bearing $Pbu = P / A1 + Mz / Sx + Mx / Sz = 12.2 / 36.0 + 0.0 * 12 / 36.0 + 0.0 * 12 / 36.0 = 0.3$ ksi

Min edge = $Min (L / 2 - X\text{-}offset - col\ L / 2,\ W / 2 - Z\text{-}offset - col\ W / 2)$

  Min edge = Min (2.00 * 12 / 2 - 0.0 - 6.0 / 2, 2.80 * 12 / 2 - 0.0 - 6.0 / 2 = 9.0 in

Area $A2 = Min [L * W,\ (col\ L + 2 * Min\ edge) * (col\ W + 2 * Min\ edge)]$ ACI R22.8.3.2

  A2 = Min [2.00 * 12 * 2.8 * 12, (6.0 + 2 * 9.0) * (6.0 + 2 * 9.0)] = 576.0 in²

Footing $\phi Pnc = \phi * 0.85 * f'c * Min [2,\ \sqrt{(A2 / A1)}] = 0.65 * 0.85 * 2.5 * Min [2, \sqrt{(576.0 / 36.0)}] = 2.8$ ksi

Footing $\phi Pns = \phi * As * Fy / A1 = 0.0$ ksi   ACI 22.8.3.2

Footing bearing $\phi Pn = \phi Pnc + \phi Pns = 2.8 + 0.0 = 2.8$ ksi   > 0.3 psi OK

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Hooked *Ldh = Max (8 db, 6, 1 / 55 * fy / (f'c)½ * Confining * Location * Concrete * db^1.5)* ACI 25.4.3

  Ldh = Max (8 db, 6, 1 / 55 * 60.0 * 1000 / (2500)½ * 1.6 * 1.0 * 0.8 * 0.75^1.5) = 17.4 in

Ld provided = *Dowel length =* 3.00 * 12 = 36.0 in   > 12.0 in OK

Ldh provided = *Footing thickness - Cover =* 8.00 - 3.0 = 5.0 in   < 17.4 in NG

<p style="text-align:center;color:green">PUNCHING SHEAR CALCULATIONS (Comb: 1.2D+0.5L+1.6S)</p>

X-Edge = *Length / 2 - Offset - Col / 2 =* 2.00 * 12 / 2 - 0.0 - 6.0 / 2 = 9.0 in α_{sx} = 10

Z-Edge = *Width / 2 - Offset - Col / 2 =* 2.80 * 12 / 2 - 0.0 - 6.0 / 2 = 13.8 in α_{sz} = 10

α_s = *α_{sx} + α_{sz} =* 10 + 10 = 20   Col type = Corner β = *L / W =* 6.0 / 6.0 = 1.00   ACI 22.6.5.2

Perimeter *bo = α_{sz} / 10 * (L + d / 2 + X-Edge) + α_{sx} / 10 * (W + d / 2 + Z-Edge)*   ACI 22.6.4.2

  bo = 10 / 10 * (6.0 + 8.0 / 2 + 9.0) + 10 / 10 * (6.0 + 8.0 / 2 + 13.8) = 42.8 in

Area *Abo = (L + d / 2 + X-Edge) * (W + d / 2 + Z-Edge) =* (6.0 + 8.0 / 2 + 9.0) * (6.0 + 8.0 / 2 + 13.8) = 452.2 in²

Use Plain Concrete Shear Strength

ϕVc = *ϕ * Min (1 + 2 / β, 2) * 4/3 * √(f'c)*   ACI 14.5.5.1

  ϕVc = 0.60 * Min (1 + 2 / 1.00, 2) * 4/3 √(2500) = 80.0 psi

Punching force *F = P + Overburden * Abo - Bearing*

  F = 12.2 + 0.20 * 452.2 / 144 - 3.2 = 9.6 kip

b1 = *L + d / 2 + X-Edge =* 6.0 + 8.0 / 2 + 9.0 = 19.0 in   b2 = *W + d / 2 + Z-Edge =* 6.0 + 8.0 / 2 + 13.8 = 23.8 in

γ_{vx} factor = $1 - \dfrac{1}{1 + (2/3)\,\sqrt{(b2/b1)}}$ $= 1 - \dfrac{1}{1 + (2/3)\,\sqrt{(23.8/19.0)}} = 0.43$ ACI Eq. (8.4.4.2.2)

γ_{vz} factor = $1 - \dfrac{1}{1 + (2/3)\,\sqrt{(b1/b2)}}$ $= 1 - \dfrac{1}{1 + (2/3)\,\sqrt{(19.0/23.8)}} = 0.37$ ACI Eq. (8.4.2.3.2)

X2z = *b1² / 2 / (b1 + b2) =* 19.0² / 2 / (19.0 + 23.8) = 4.2 in   X2x = *b2² / 2 / (b2 + b1) =* 6.6 in

Jcz = *b1 * d³ / 12 + b1³ * d / 12 + b1 * d * (b1 / 2 - X2z)² + b2 * d * X2z²*   ACI R8.4.4.2.3

  Jcz = 19.0 * 8.0³ / 12 + 19.0³ * 8.0 / 12 + 19.0 * 8.0 * (19.0 / 2 * 4.2)² + 23.8 * 8.0 * 4.2² = 13012 in⁴

Jcx = *b2 * d³ / 12 + b2³ * d / 12 + b2 * d * (b2 / 2 - X2x)² + b1 * d * X2x²*   ACI R8.4.4.2.3

  Jcz = 23.8 * 8.0³ / 12 + 23.8³ * 8.0 / 12 + 23.8 * 8.0 * (23.8 / 2 * 6.6)² + 19.0 * 8.0 * 6.6² = 21972 in⁴

Stress due to P = *F / (bo * d) * 1000 =* 9.6 / (42.8 * 8.0) * 1000 = 28.0 psi

Stress due to Mx = *γ_{vx} * X-OTM * X2x / Jcx =* 0.43 * 0.0 * 12 * 6.6 / 21972 * 1000 = 0.0 psi

Stress due to Mz = *γ_{vz} * Z-OTM * X2z / Jcz =* 0.43 * 0.0 * 12 * 4.2 / 13012 * 1000 = 0.0 psi

Punching stress = *P-stress + Mx-stress + Mz-stress =* 28.0 + 0.0 + 0.0 = 28.0 psi   < 80.0 psi OK

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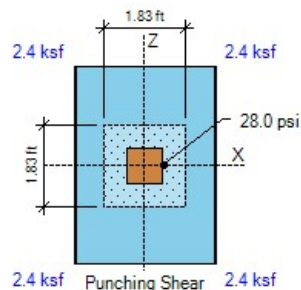
DESIGN CODES

Concrete Design ....   ACI 318-19

Load Combinations ....   ASCE 7-10/16
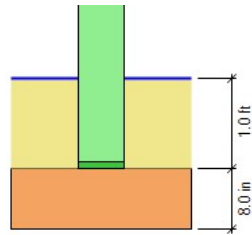
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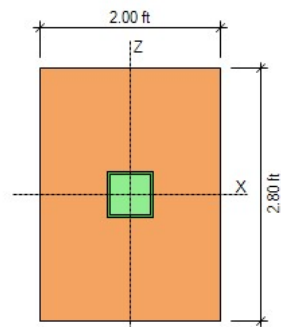
PLAN
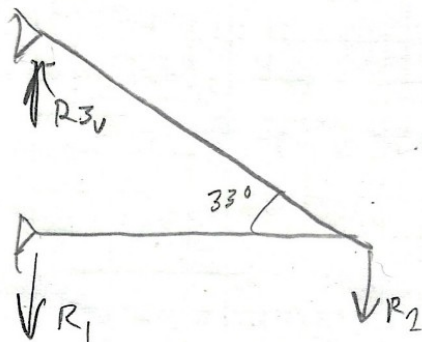
$R_1 = R_2 = (15 psf + 23 psf) \times 3' \times 14.75'' = 1,770^\#$

$R_{2up} = (19 psf - 5 psf) \times 3' \times 14.75'' = 620^\#$

$R_{3v} = 1,500^\#$

$T_{ROD} = 1,770^\# / \tan 33° = 2,726^\# \ T$

$C_{ROD} = 620^\# / \tan 33° = 954^\# \ C$

$\underline{TRY \ 1'' \ \varnothing \ SS \ ROD \ \approx (25mm)}$

TENSION

$A_T = 0.763 in^2$

$T_U = 0.85 F_y A_t = 0.85 \times 30 ksi \times 0.763 in^2 = 19,457^\#$

$T_S = T_U / 1.6 = 19,457^\# / 1.6 = 12,160^\# \ > T = 2,726^\# \ So \ OKAY$

COMPRESSION

$A_{BAR} = (1''/2)^2 \times \pi = 0.785 in^2$

$r = d/4 = 1''/4 = 0.25 in^2$

$K = 10 \qquad K\ell/r = (1.0 \times 86'' / 0.25 in^2) = 344$

$F_n = \pi^2 E_t / (K\ell/r)^2 = \pi^2 \times 29,000 ksi / (344)^2 = 2.34 ksi$

$P_n = A F_n = 0.785 in^2 \times 2.34 ksi = 1,833^\#$

$P_U = 0.8 P_n = 0.8 \times 1,835^\# = 1,467^\# \ > C = 954^\# \ So \ OKAY$

R₁ PLATE CONNECTION
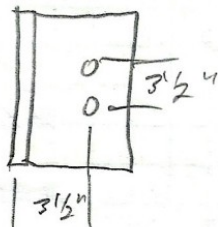
$P = 1,770^{\#}$

$M = 1,770^{\#} \times 3\frac{1}{2}'' = 6,195 \, in\text{-}\#$

$T = C = 6,195 \, in\text{-}\# / 3.5'' = 1,770^{\#}$

CHECK BOLT SHEAR $\frac{1}{4}''$ PLATE w/ $3\frac{1}{2}''$ MIN WOOD (DF#2)

$V = 1,770^{\#}$

USE ④ $\frac{1}{2}''$ BOLTS

$V_{allow_{ZL}} = 4 \times 510^{\#} = 2,040^{\#} > V$ SO OKAY

ASDIP Steel 5.6.4.1   **STEEL BEAM DESIGN**   *www.asdipsoft.com*

GEOMETRY

Beam Designation MC8X8.5

Span	Length		Support	Type
①	14.75	ft	①	Pinned
②	N.A.		②	Pinned
③	N.A.		③	N.A.
④	N.A.		④	N.A.
⑤	N.A.		⑤	N.A.
			⑥	N.A.

PROPERTIES

Area ...	2.5	in²	Sx ...	5.8	in³
Depth	8.0	in	Zx ...	7.0	in³
bf	1.9	in	rx	3.05	in
tw	0.18	in	Iy	0.6	in⁴
tf	0.31	in	Sy ...	0.4	in³
k des .	0.81	in	Zy ...	0.9	in³
Ix	23.3	in⁴	ry	0.50	in
Cw	8.2	in⁶	J	0.06	in⁴

ASD SUPPORT REACTIONS (kip)

Load Comb.		
D+L	0.1	0.1
D+Lr	0.1	0.1
D+S	0.1	0.1
D+0.75L+0.75Lr	0.1	0.1
D+0.75L+0.75S	0.1	0.1
D+0.6W	0.1	0.1
D+0.7E	0.1	0.1
D+0.75L+0.75Lr+0.45W	0.1	0.1
D+0.75L+0.75S+0.45W	0.1	0.1
D+0.75L+0.75S+0.525E	0.1	0.1
0.6D+0.6W	0.0	0.0
0.6D+0.7E	0.0	0.0
CD	0.1	0.1

DESIGN FOR SHEAR

Maximum Shear Force V = 0.1 kip   (Comb: D+L)

$h = d - 3 * tf =$ 8.0 - 3 * 0.3 = 7.1 in

$Aw = d * tw =$ 8.0 * 0.2 = 1.4 in² $kv = 5.34$ AISC G2.1(b)

$h / tw = 7.1 / 0.2 = 39.5$ $< 1.1 * \sqrt{\dfrac{kv * E}{Fy}} =$ $1.1 * \sqrt{\dfrac{5.3 * 29000}{36}}$ $= 72.1$

$Cv = 1.00$ AISC Eq. (G2-3)

- Shear Yielding

Nominal strength $Vn = 0.6 * Fy * Aw = 0.6 * 36.0 * 1.4 = 30.9$ kip

- Shear Buckling

Nominal strength $Vn = 0.6 * Fy * Aw * Cv = 0.6 * 36.0 * 1.4 * 1.00 = 30.9$ kip   AISC Eq. (G2-1)

- Controlling limit state: Shear Yielding

Shear allowable strength = $Vn / \Omega =$ 30.9 / 1.67 = 18.5 kip

Shear design ratio = $\dfrac{V}{Vn / \Omega}$ = $\dfrac{0.1}{18.5}$ = 0.00   < 1.0 OK   AISC G1

ASDIP Steel 5.6.4.1	**STEEL BEAM DESIGN**	*www.asdipsoft.com*

DESIGN FOR FLEXURE (Non-Composite)

Lateral Bracing ....   Continuous (Top) ,   Unbraced (Bottom)

- Max. Bending Moment M = 0.2 k-ft   (Comb: D+L)

$Cb = Min (3.0, 12.5\ Mmax * Rm / (2.5\ Mmax + 3\ Ma + 4\ Mb + 3\ Mc))$ **AISC Eq F1-1**

$= 12.5 * 0.2 * 1.0 / (2.5 * 0.2 + 3 * 0.0 + 4 * 0.0 + 3 * 0.0) = 3.00$

- Yielding

Plastic moment $Mpx = Fy * Zx = 36.0 * 7.0 = 250.2$ k-in   **AISC Eq. F2-1**

Nominal strength $Mnx = Mpx = 250.2 / 12 = 20.9$ k-ft

- Lateral-Torsional Buckling

$$Lp = 1.76 * ry\sqrt{\frac{E}{Fy}} \quad = \quad 1.76 * ry\sqrt{\frac{29000}{36}} \qquad Lp = 25.0\ in$$ **AISC Eq. F2-5**

$$rts = \sqrt{\frac{\sqrt{Iy * Cw}}{Sx}} \quad = \quad \sqrt{\frac{\sqrt{0.6 * 8.2}}{5.8}} \qquad rts = 0.6\ in$$ **AISC Eq. F2-7**

$ho = d - tf = 8.0 - 0.3 = 7.7$ in

$$c = \frac{ho}{2 * \sqrt{\frac{Iy}{Cw}}} \quad = \quad \frac{7.689}{2 * \sqrt{\frac{0.624}{8.21}}} \qquad c = 1.1\ in$$ **AISC Eq. F2-8b**

$$Lr = \frac{1.95 * rts * E}{(0.7 * Fy)} * \sqrt{\frac{J * c}{(Sx * ho)} + \sqrt{(\frac{J * c}{(Sx * ho)})^2 + 6.76 * (\frac{0.7 * Fy}{E})^2}}$$ **AISC Eq. F2-6**

$$\frac{1.95 * 0.6 * 29000}{(0.7 * 36)} * \sqrt{\frac{0.1 * 1.1}{(5.8 * 7.7)} + \sqrt{(\frac{0.1 * 1.1}{(5.8 * 7.7)})^2 + 6.76 * (\frac{0.7 * 36}{29000})^2}} \qquad Lr = 89.0\ in$$

$$Fcr = \frac{Cb * \pi^2 * E}{(Lb / rts)^2} \sqrt{1 + \frac{0.078 * J * c}{(Sx * ho)} * (\frac{Lb}{rts})^2}$$ **AISC Eq. F2-4**

$$= \frac{3.00 * \pi^2 * 29000}{(0.0 * 12 / 0.6)^2} \sqrt{1 + \frac{0.078 * 0.1 * 1.1}{(5.8 * 7.7)} * (\frac{0}{0.6})^2} \qquad Fcr = \infty\ ksi$$

Plastic moment $Mpx = Fy * Zx = 36.0 * 7.0 = 250.2$ k-in

Nominal strength $Mnx = Mpx = 250.2 / 12 = 20.9$ k-ft

- Controlling limit state: Yielding

Flexural allowable strength = $Mnx / \Omega = $ 20.9 / 1.67 = 12.5 k-ft

Flexural design ratio = $\dfrac{Mx}{Mnx / \Omega} = \dfrac{0.2}{12.5} = 0.02$ < 1.0 OK   **AISC F1**

DEFLECTIONS

Stiffness factor		1.0			
Required Camber		0.00 in			
Long-term Deflection		N.A.			

Loading	δ (in)	L/δ	L/δ Min	Ratio	
CL	0.00	1200	180	0.15	OK
CD+CL	0.00	1200	120	0.10	OK
L	0.00	1200	180	0.15	OK
D+L	0.00	1200	120	0.10	OK

DESIGN CODES

Steel Design	AISC 360-16
Load Combinations	ASCE 7-10/16

ASDIP Steel 5.6.4.1   **STEEL BEAM DESIGN**   *www.asdipsoft.com*

R = 0.1 kip   R = 0.1 kip

1.00 ft   14.75 ft

○ indicates lateral bracing

SHEAR DIAGRAM (kip)

MOMENT DIAGRAM (k-ft)

(Comb: CD)

R = 0.1 kip   R = 0.1 kip

1.00 ft   14.75 ft

○ indicates lateral bracing
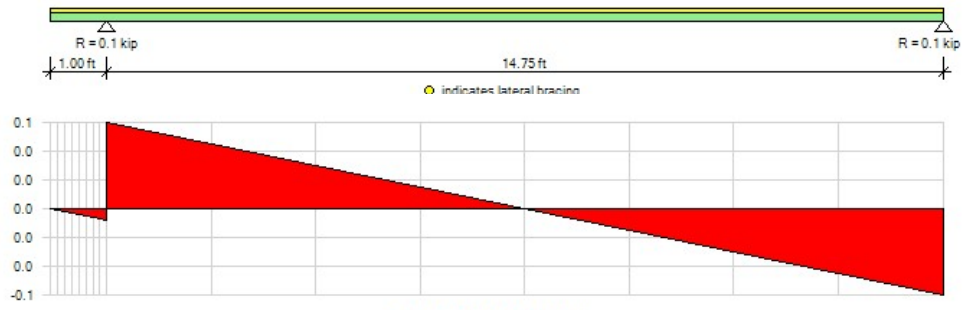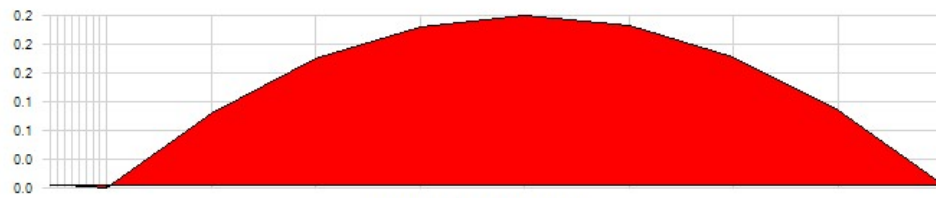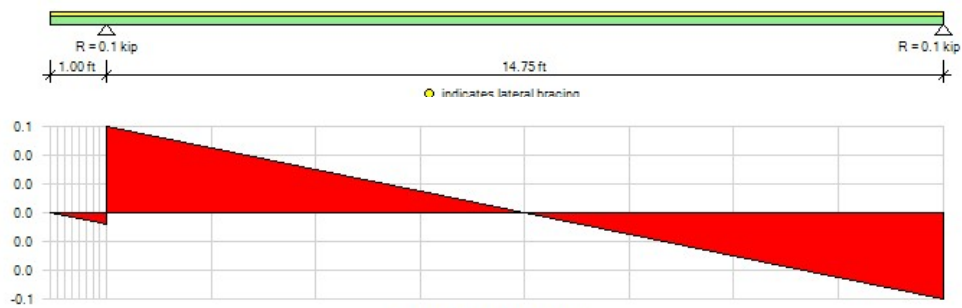
SHEAR DIAGRAM (kip)
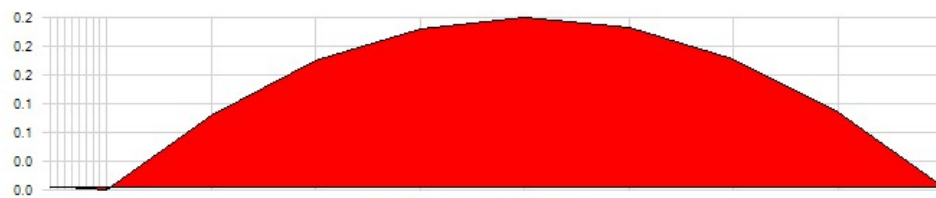
MOMENT DIAGRAM (k-ft)

(Comb: D+L)

ASDIP Steel 5.6.4.1 **STEEL BEAM DESIGN** *www.asdipsoft.com*

UNFACTORED FINAL LOADS (Selfweight calculated internally) (kip, ft, k-ft, psf)

Start	End	Width	Dead	Live	RLive	Snow	Wind	Seismic
Dist	Dead	Live	RLive	Snow	Wind	Seismic		

UNFACTORED CONSTRUCTION LOADS (Selfweight calculated internally) (kip, ft, k-ft, psf)

Start	End	Width	Dead	Live		Dist	Dead	Live

ASDIP Steel 5.6.4.1　　　　　**STEEL BEAM DESIGN**　　　　*www.asdipsoft.com*

GEOMETRY

Beam Designation ....　　MC12X10.6

Span	Length		Support	Type
①	14.75	ft	①	Pinned
②	N.A.		②	Pinned
③	N.A.		③	N.A.
④	N.A.		④	N.A.
⑤	N.A.		⑤	N.A.
			⑥	N.A.

PROPERTIES

Area ...	3.1	in²	Sx ...	9.2	in³
Depth	12.0	in	Zx ...	11.6	in³
bf	1.5	in	rx	4.22	in
tw	0.19	in	ly	0.4	in⁴
tf	0.31	in	Sy ...	0.3	in³
k des .	0.75	in	Zy ...	0.6	in³
Ix	55.3	in⁴	ry	0.35	in
Cw	11.7	in⁶	J	0.06	in⁴

ASD SUPPORT REACTIONS (kip)

Load Comb.	△	△
D+L	0.1	0.1
D+Lr	0.1	0.1
D+S	0.1	0.1
D+0.75L+0.75Lr	0.1	0.1
D+0.75L+0.75S	0.1	0.1
D+0.6W	0.1	0.1
D+0.7E	0.1	0.1
D+0.75L+0.75Lr+0.45W	0.1	0.1
D+0.75L+0.75S+0.45W	0.1	0.1
D+0.75L+0.75S+0.525E	0.1	0.1
0.6D+0.6W	0.0	0.1
0.6D+0.7E	0.0	0.1
CD	0.1	0.1

DESIGN FOR SHEAR

Maximum Shear Force V = 0.1 kip　　　(Comb: D+L)

$h = d - 3 * tf =$ 12.0 - 3 * 0.3 = 11.1 in

$Aw = d * tw =$ 12.0 * 0.2 = 2.3 in²　　　　　　　$kv = 5.34$　　　　　　　AISC G2.1(b)

$h / tw =$ 11.1 / 0.2 = 58.3 < $1.1 * \sqrt{\dfrac{kv * E}{Fy}} =$　$1.1 * \sqrt{\dfrac{5.3 * 29000}{36}}$　= 72.1

$Cv = 1.00$　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　AISC Eq. (G2-3)

- Shear Yielding

Nominal strength　$Vn = 0.6 * Fy * Aw =$ 0.6 * 36.0 * 2.3 = 49.2 kip

- Shear Buckling

Nominal strength　$Vn = 0.6 * Fy * Aw * Cv =$ 0.6 * 36.0 * 2.3 * 1.00 = 49.2 kip　　　AISC Eq. (G2-1)

- Controlling limit state: Shear Yielding

Shear allowable strength = $Vn / \Omega =$ 49.2 / 1.67 = 29.5 kip

Shear design ratio = $\dfrac{V}{Vn / \Omega}$ = $\dfrac{0.1}{29.5}$ = 0.00　　　< 1.0 OK　　　　　AISC G1

ASDIP Steel 5.6.4.1   **STEEL BEAM DESIGN**   *www.asdipsoft.com*

DESIGN FOR FLEXURE (Non-Composite)

Lateral Bracing ....   Continuous (Top) ,   Unbraced (Bottom)

- Max. Bending Moment M = 0.3 k-ft   (Comb: CD)

Cb = Min (3.0, 12.5 Mmax * Rm / (2.5 Mmax + 3 Ma + 4 Mb + 3 Mc))   AISC Eq F1-1

   = 12.5 * 0.3 * 1.0 / (2.5 * 0.3 + 3 * 0.0 + 4 * 0.0 + 3 * 0.0) = 3.00

- Yielding

Plastic moment $Mpx = Fy * Zx$ = 36.0 * 11.6 = 417.6 k-in   AISC Eq. F2-1

Nominal strength $Mnx = Mpx$ = 417.6 / 12 = 34.8 k-ft

- Lateral-Torsional Buckling

$$Lp = 1.76 * ry\sqrt{\frac{E}{Fy}} \quad = \quad 1.76 * ry\sqrt{\frac{29000}{36}} \qquad Lp = 17.4 \text{ in}$$ AISC Eq. F2-5

$$rts = \sqrt{\frac{\sqrt{Iy * Cw}}{Sx}} \quad = \quad \sqrt{\frac{\sqrt{0.4 * 11.7}}{9.2}} \qquad rts = 0.5 \text{ in}$$ AISC Eq. F2-7

$ho = d - tf =$ 12.0 - 0.3 = 11.7 in

$$c = \frac{ho}{2 * \sqrt{\frac{Iy}{Cw}}} \quad = \quad \frac{11.691}{2 * \sqrt{\frac{0.378}{11.7}}} \qquad c = 1.1 \text{ in}$$ AISC Eq. F2-8b

$$Lr = \frac{1.95 * rts * E}{(0.7 * Fy)} * \sqrt{\frac{J * c}{(Sx * ho)} + \sqrt{(\frac{J * c}{(Sx * ho)})^2 + 6.76 * (\frac{0.7 * Fy}{E})^2}}$$ AISC Eq. F2-6

$$\frac{1.95 * 0.5 * 29000}{(0.7 * 36)} * \sqrt{\frac{0.1 * 1.1}{(9.2 * 11.7)} + \sqrt{(\frac{0.1 * 1.1}{(9.2 * 11.7)})^2 + 6.76 * (\frac{0.7 * 36}{29000})^2}} \qquad Lr = 57.9 \text{ in}$$

$$Fcr = \frac{Cb * \pi^2 * E}{(Lb / rts)^2} \sqrt{1 + \frac{0.078 * J * c}{(Sx * ho)} * (\frac{Lb}{rts})^2}$$ AISC Eq. F2-4

$$= \frac{3.00 * \pi^2 * 29000}{(0.0 * 12 / 0.5)^2} \sqrt{1 + \frac{0.078 * 0.1 * 1.1}{(9.2 * 11.7)} * (\frac{0}{0.5})^2} \qquad Fcr = \infty \text{ ksi}$$

Plastic moment $Mpx = Fy * Zx$ = 36.0 * 11.6 = 417.6 k-in

Nominal strength $Mnx = Mpx$ = 417.6 / 12 = 34.8 k-ft

- Controlling limit state: Yielding

Flexural allowable strength = Mnx / Ω = 34.8 / 1.67 = 20.8 k-ft

Flexural design ratio = $\dfrac{Mx}{Mnx / \Omega}$ = $\dfrac{0.3}{20.8}$ = 0.01   < 1.0 OK   AISC F1

DEFLECTIONS						DESIGN CODES	
Stiffness factor			1.0			Steel Design	AISC 360-16
Required Camber			0.00 in			Load Combinations	ASCE 7-10/16
Long-term Deflection			N.A.				
Loading	δ (in)	L/δ	L/δ Min	Ratio			
CL	0.00	1800	180	0.10	OK		
CD+CL	0.00	1800	120	0.07	OK		
L	0.00	1800	180	0.10	OK		
D+L	0.00	1800	120	0.07	OK		

R = 0.1 kip   R = 0.1 kip
                    14.75 ft   1.50 ft
                  ○ indicates lateral bracing

SHEAR DIAGRAM (kip)

MOMENT DIAGRAM (k-ft)

(Comb: CD)

R = 0.1 kip   R = 0.1 kip
                    14.75 ft   1.50 ft
                  ○ indicates lateral bracing

SHEAR DIAGRAM (kip)

MOMENT DIAGRAM (k-ft)

(Comb: D+L)

UNFACTORED FINAL LOADS (Selfweight calculated internally) (kip, ft, k-ft, psf)

	Start	End	Width	Dead	Live	RLive	Snow	Wind	Seismic
	Dist	Dead	Live	RLive	Snow	Wind	Seismic		

UNFACTORED CONSTRUCTION LOADS (Selfweight calculated internally) (kip, ft, k-ft, psf)

	Start	End	Width	Dead	Live		Dist	Dead	Live

<u>WIND</u> $V_{ASD} = 95 mph$ $V_{ULT} = 110 mph$ $K_{zt} = 1.0$ EXP. B   SLOPE $= 7°$

ZONE A = 12.2 PSF   16.0 PSF MIN

ZONE B = 5.7 PSF   8.0 PSF MIN

ZONE C = 8.1 PSF   16.0 PSF MIN

ZONE D = 3.3 PSF   8.0 PSF MIN

<u>SEISMIC</u> $S_{DS} = 1.03$ $R = 6.5$ $I_e = 1.0$

$$C_s = \frac{1.03}{(6.5/1.0)} / 1.4 = 0.113$$

$$W_{ROOF} = (30 PSF \times 6,007 SF) = 180,210^{\#}$$

$$V_s = 180,210^{\#} \times 0.113 = 20,369^{\#}$$

<u>GRID 1</u>

$F_w = (16 PSF \times 323 SF)$ $= 5,168^{\#}$

$F_E = 20,364^{\#} \times (1,811 SF / 6,007 SF)$ $= 6,139^{\#}$

<u>GRID 2</u>

$F_w = (16 PSF \times 355 SF)$ $= 5,680^{\#}$

$F_E = 20,364^{\#} \times (1,034 SF / 6,007 SF)$ $= 3,505^{\#}$

<u>GRID 3</u>

$F_w = (16 PSF \times 327 SF)$ $= 5,232^{\#}$

$F_E = 20,364^{\#} \times (2,050 SF / 6,007 SF)$ $= 6,950^{\#}$

<u>GRID 4</u>

$F_w = (16 PSF \times 351 SF)$ $= 5,616^{\#}$

$F_E = 20,364^{\#} \times (1,112 SF / 6,007 SF)$ $= 3,770^{\#}$

GRID A

$F_W = (16 PSF \times 326 SF)$ $= 5,216^\#$

$F_E = 20,364^\# \times (1,896 SF / 6,007 SF)$ $= 6,428^\#$

GRID C

$F_W = (16 PSF \times 743 SF)$ $= 11,888^\#$

$F_E = 20,364^\# \times (2,898 SF / 6,007 SF)$ $= 9,824^\#$

GRID D

$F_W = (16 PSF \times 354 SF)$ $= 5,664^\#$

$F_E = 20,364^\# \times (1,213 SF / 6,007 SF)$ $= 4,112^\#$

GRID 1 $F_E = 6,139^\#$

$V_E = 6,139^\# / 9' = 682 \text{ PLF}$

2-SEGMENTS $L = 4'-6"$ $h = 13'$
$\underline{L = 4'6"}$
$L_T = 9'-0"$

USE W8 $V_{E\,ALLOW} = 770 \text{ PLF} \times (1.25 - 0.125 \times 13'/4.5') = 685 \text{ PLF}$
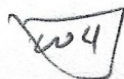
$\underline{\text{HOLD DOWNS}}$

$T_E = 682 \text{ PLF} \times 13' \times 1.25 - \frac{1}{2}(20 \text{ PSF} \times 29' \times 2.25') - \frac{1}{2}(12 \text{ PSF} \times 6.5' \times 2.25') = 10,342^\#$

USE HDU14-SDS2.5 w/ 4 DF/z STUDS $T_{E\,ALLOW} = 14,445^\# \times 1.4/1.6 = 12,639^\#$

GRID 2 $F_W = 5,680^\#$ $F_E = 3,505^\#$ 1 SEGMENT $L = 8'-4"$ $h = 13'$

$V_W = 5,680^\# / 8.33' = 682 \text{ PLF}$
$V_E = 3,505^\# / 8.33' = 421 \text{ PLF}$

USE W4 $V_{W\,ALLOW} = 832 \text{ PLF}$
$V_{E\,ALLOW} = 595 \text{ PLF}$

$\underline{\text{HOLD DOWNS}}$

$T_W = 682 \text{ PLF} \times 13' - \frac{1}{2}(20 \text{ PSF} \times 23.3' \times 4.16') - \frac{1}{2}(12 \text{ PSF} \times 6.5' \times 4.16') = 7,734^\#$
$T_{EC} = 421 \text{ PLF} \times 13' \times 1.25 - \frac{1}{2}(20 \text{ PSF} \times 23.3' \times 4.16') - \frac{1}{2}(12 \text{ PSF} \times 6.5' \times 4.16') = 5,706^\#$

USE HDU11-SDS2.5 w/ 3 STUDS $T_{W\,ALLOW} = 8,030^\#$
$T_{E\,ALLOW} = 8,030^\# \times 1.4/1.6 = 7,026^\#$

GRID 3 $F_E = 6,950^\#$ 3 SEGMENTS $L = 5'-7"$ $h = 13'$
$L = 5'-4"$
$L = 13'-2"$
$L_T = 24'-1"$

$V_E = 6,950^\# / 24.08' = 289 \text{ PLF}$

USE W2 $V_{E\,ALLOW} = 353 \text{ PLF} < (1.25 - 0.125 \times 13'/5.33') = 334 \text{ PLF}$

$\underline{\text{HOLD DOWNS}}$

$T_E = 289 \text{ PLF} \times 13' \times 1.25 - \frac{1}{2}(20 \text{ PSF} \times 29' \times 2.67') - \frac{1}{2}(12 \text{ PSF} \times 6.5' \times 2.67') = 3,818^\#$

USE HDU8-SDS2.5 w/ 2 STUDS $T_{E\,ALLOW} = 5,920^\# \times 1.4/1.6 = 5,093^\#$

GRID 4 $F_W = 5,616^\#$ $F_E = 3,770^\#$ 2 SEGMENTS $L = 16'-3"$ $h = 13'$
$L = 7'-1"$
$L_T = 23'-4"$

$V_W = 5,616^\# / 23.33' = 241 \text{ PLF}$
$V_E = 3,770^\# / 23.33' = 162 \text{ PLF}$

USE W1 $V_{W\,ALLOW} = 339 \text{ PLF}$
$V_{E\,ALLOW} = 242 \text{ PLF}$

$\underline{\text{HOLD DOWNS}}$

$T_W = 241 \text{ PLF} \times 13' - \frac{1}{2}(20 \text{ PSF} \times 23' \times 3.54') - \frac{1}{2}(12 \text{ PSF} \times 6.5' \times 3.54') = 2,181^\#$
$T_E = 162 \text{ PLF} \times 13' \times 1.25 - \frac{1}{2}(20 \text{ PSF} \times 23' \times 3.54') - \frac{1}{2}(12 \text{ PSF} \times 6.5' \times 3.54') = 1,674^\#$

USE HDU2-SDS2.5 w/ 2 STUDS $T_{W\,ALLOW} = 2,215^\#$
$T_{E\,ALLOW} = 2,215^\# \times 1.4/1.6 = 1,938^\#$

GRID A $F_E = 6,428^\#$ 2 SEGMENTS $L = 4'-9''$ $h = 13'$
                                           $L = 5'-3''$
$V_E = 6,428^\# / 10' = 643\,plf$ $L_T = 10'-0''$

USE $\boxed{W8}$ $V_{E\,ALLOW} = 770\,plf \times (1.75 - 0.25 \times 13'/4.75') = 699\,plf$

HOLD DOWNS

$T_E = 643\,plf \times 13' \times .75 - \frac{1}{2}(20psf \times 3' \times 2.38') - \frac{1}{2}(12psf \times 6.5 \times 2.38') = 10,285^\#$

$\boxed{USE\ HDU14-SDS2.5\ w/\ H\ DF\#2\ STUDS}$ $T_{E\,ALLOW} = 14,445^\# \times 1.4/1.6 = 12,639^\#$

GRID C $F_W = 11,988^\#$ $F_E = 9,824^\#$ 1 SEGMENT $L = 42'-8''$ $h = 13'$

$V_W = 11,988^\# / 42.67' = 279\,plf$
$V_E = 9,824^\# / 42.67' = 230\,plf$

USE $\boxed{W1}$ $V_{W\,ALLOW} = 339\,plf$
                 $V_{E\,ALLOW} = 242\,plf$

HOLD DOWNS

$T_W = 279\,plf \times 13'$ $-\frac{1}{2}(8psf \times 6.5 \times 21.33') = 3,072^\#$
$T_E = 230\,plf \times 13 \times 1.25 - \frac{1}{2}(8psf \times 6.5 \times 21.33') = 3,137^\#$

$\boxed{USE\ HDU5-SDS2.5\ w/2\ STUDS}$ $T_{W\,ALLOW} = 4,340^\#$
                                      $T_{E\,ALLOW} = 4,340^\# \times 1.4/1.6 = 3,798^\#$

GRID D $F_W = 5,664^\#$ $F_E = 4,112^\#$ 2 SEGMENT $L = 14'-6''$ $h = 13'$
                                                            $L = 5'-8''$
$V_W = 5,664^\# / 20.16' = 281\,plf$ $L_T = 20'-2''$
$V_E = 4,112^\# / 20.16' = 204\,plf$

USE $\boxed{W1}$ $V_{W\,ALLOW} = 339\,plf \times (1.25 - 0.125 \times 13'/5.67') = 327\,plf$
                 $V_{E\,ALLOW} = 242\,plf \times (1.25 - 0.125 \times 13'/5.67') = 233\,plf$
HOLD DOWNS

$T_W = 281\,plf \times 13'$ $-\frac{1}{2}(20psf \times 3' \times 2.83') - \frac{1}{2}(12psf \times 6.5 \times 2.83') = 3,458^\#$
$T_E = 204\,plf \times 13 \times 1.25 - \frac{1}{2}(20psf \times 3' \times 2.83') - \frac{1}{2}(12psf \times 6.5 \times 2.83') = 3,120^\#$

$\boxed{USE\ HDU5-SDS2.5\ w/2\ STUDS}$ $T_{W\,ALLOW} = 4,340^\#$
                                      $T_{E\,ALLOW} = 4,340^\# \times 1.4/1.6 = 3,798^\#$