CQN

CARTER QUINN NORLIN

STRUCTURAL
ENGINEERING

STRUCTURAL CALCULATIONS

Chu Residence
4332 W. Mercer Way
Mercer Island, WA 98040

Ectypos Architecture
4212 W. Mercer Way
Mercer Island, WA 98040

02/06/2024

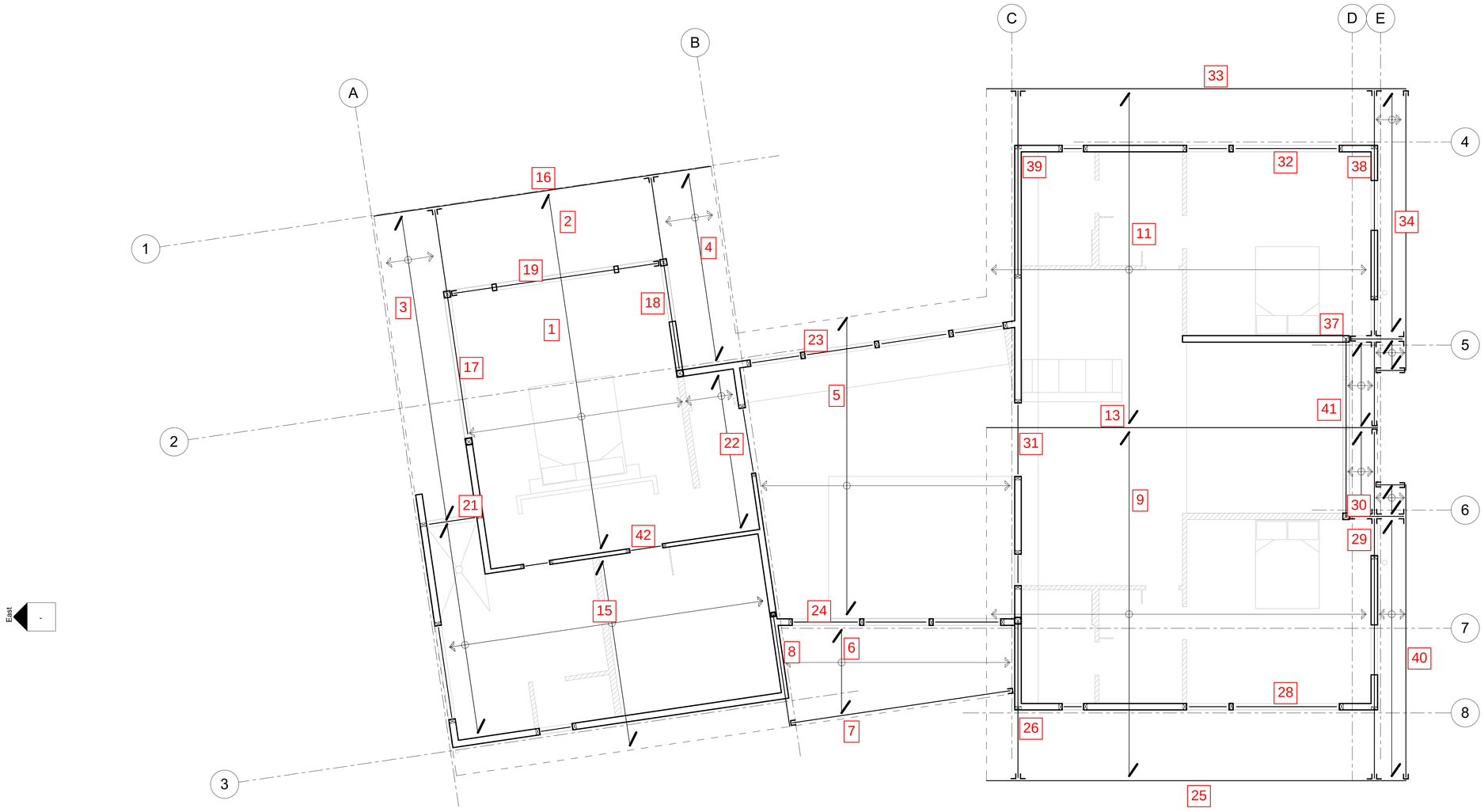
2033 Sixth Avenue #995 Seattle, WA 98121 206-264-7784 www.CQN-SE.com

FRAMING PLAN NOTES: (TYPICAL UNLESS NOTED OTHERWISE)

1. ROOF SHEATHING SHALL BE 1/2" APA RATED SHEATHING (SPAN RATING 24/0). NAIL @ ALL FRAMED PANEL EDGES AND OVER SHEARWALLS w/ 8d @ 6"oc AND 12"oc TO ALL INTERMEDIATE FRAMING. ROOF FRAMING HAS BEEN DESIGNED TO SUPPORT PHOTO-VOLTAIC PANELS. (SDL = 5 PSF)
2. ALL HEADERS AND BEAMS SHALL BE (2) 2x8 MINIMUM, U.N.O. REFER NOTE 3 FOR SUPPORT REQUIRMENTS.
3. COLUMNS SHALL BE DOUBLE STUDS MINIMUM, U.N.O., WITH BEAM OR HEADER BEARING FULLY ON COLUMN.

LEGEND

- HANGER PER TRUSS MANUF. U.N.O. ON PLAN
- COLUMNS BELOW
- COLUMNS ABOVE
- ABRUPT CHANGE IN SLAB/ FRAMING ELEVATION
- FB — INDICATES FLUSH BEAM
- DB — INDICATES DROPPED BEAM
- FH — INDICATES FLUSH HEADER
- SPAN AND EXTENTS
- SW-x — INDICATES SHEARWALL PER SCHEDULE 12/S6.0
- HDU x — INDICATES SIMPSON HOLDOWN. REFER DETAIL 8/S3.0 FOR REQUIRED NUMBER OF STUDS, THREADED ROD CALLOUT & EMBEDMENT INTO CONCRETE.
- MSTCXX — INDICATES SIMPSON STRAP HOLDOWN



1 Roof Framing Plan
1/4" = 1'-0"

CQN CARTER QUINN NOBLIN STRUCTURAL ENGINEERING
2033 Sixth Ave #995
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NICHOLAS VH CARTER — STATE OF WASHINGTON — 17770 — STRUCTURAL — PROFESSIONAL ENGINEER

CHU RESIDENCE
SITE ANALYSIS
4332 W. Mercer Way
Mercer Island, WA 98040

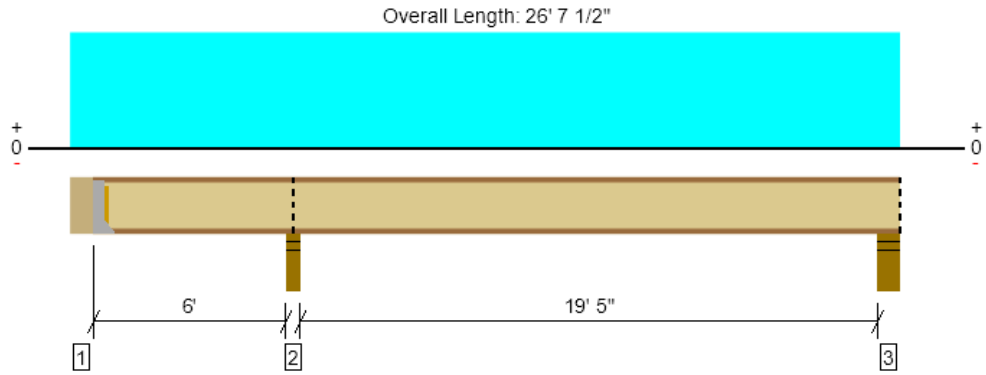
Date:

Scale:

Sheet:
Roof Framing Plan

S2.2

Roof, Roof: Joist 1
1 piece(s) 11 7/8" TJI® 110 @ 19.2" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1511 @ 6' 7 1/4"	2225 (3.50")	Passed (68%)	1.15	1.0 D + 1.0 S (All Spans)
Shear (lbs)	797 @ 6' 9"	1794	Passed (44%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-2727 @ 6' 7 1/4"	3634	Passed (75%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.307 @ 17' 5 3/16"	0.655	Passed (L/767)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.551 @ 17' 5 5/16"	0.982	Passed (L/428)	--	1.0 D + 1.0 S (Alt Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- -247 lbs uplift at support located at 5 1/2". Strapping or other restraint may be required.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Hanger on 11 7/8" HF beam	5.50"	Hanger[1]	1.75" / - [2]	-84	14/-163	-247	See note [1]
2 - Stud wall - HF	3.50"	3.50"	3.50"	672	839	1511	Blocking
3 - Stud wall - HF	5.50"	5.50"	1.75"	265	332	597	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 9" o/c	
Bottom Edge (Lu)	3' 4" o/c	

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

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	U14	2.00"	N/A	14-10dx1.5	6-10dx1.5	Web Stiffeners

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

Vertical Load	Location	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 26' 7 1/2"	19.2"	20.0	25.0	Default Load

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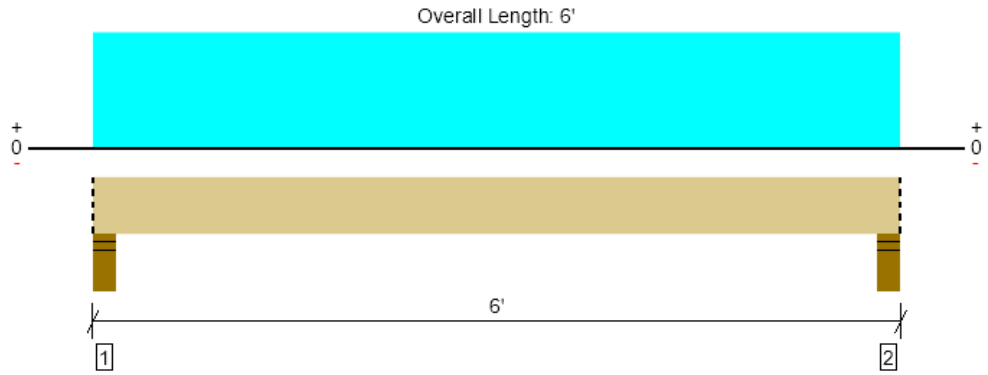
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Roof, Roof: Joist 2
1 piece(s) 2 x 8 HF No.2 @ 24" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	270 @ 4 1/2"	3341 (5.50")	Passed (8%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	174 @ 1' 3/4"	1251	Passed (14%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	310 @ 3'	1477	Passed (21%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.014 @ 3'	0.175	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.025 @ 3'	0.262	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	5.50"	5.50"	1.50"	120	150	270	Blocking
2 - Stud wall - HF	5.50"	5.50"	1.50"	120	150	270	Blocking

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 6'	24"	20.0	25.0	Default Load

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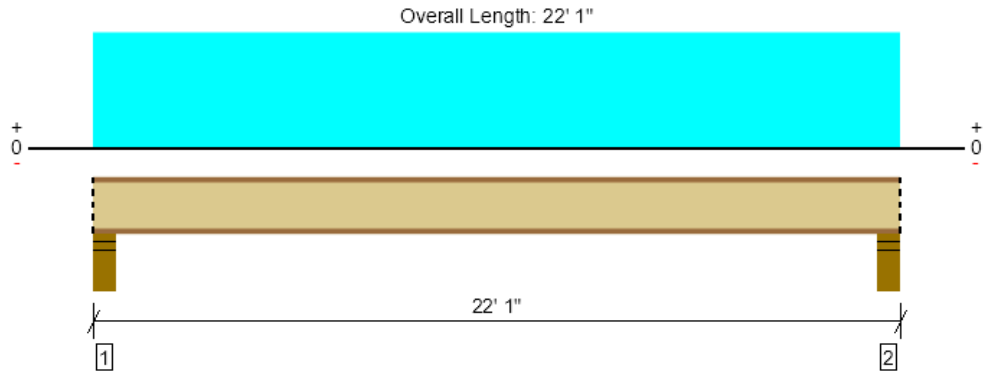
Roof, Roof: Joist 3
2 piece(s) 11 7/8" TJI® 110 @ 24" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	994 @ 4 1/2"	3163 (3.50")	Passed (31%)	1.15	1.0 D + 1.0 S (All Spans)
Shear (lbs)	953 @ 5 1/2"	3588	Passed (27%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	5120 @ 11' 1/2"	7268	Passed (70%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.462 @ 11' 1/2"	0.711	Passed (L/554)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.831 @ 11' 1/2"	1.067	Passed (L/308)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	5.50"	5.50"	1.75"	442	552	994	Blocking
2 - Stud wall - HF	5.50"	5.50"	1.75"	442	552	994	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 6" o/c	
Bottom Edge (Lu)	22' 1" o/c	

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

Vertical Load	Location	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 22' 1"	24"	20.0	25.0	Default Load

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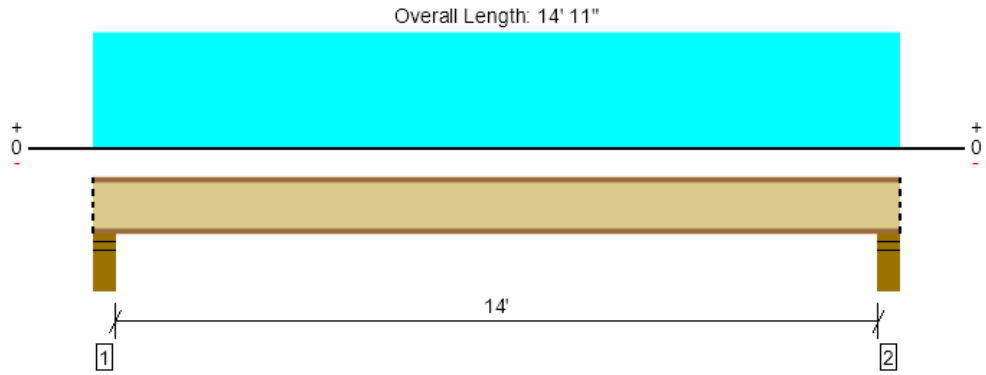
Roof, Roof: Joist 4
1 piece(s) 11 7/8" TJI® 110 @ 24" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	671 @ 4 1/2"	1581 (3.50")	Passed (42%)	1.15	1.0 D + 1.0 S (All Spans)
Shear (lbs)	630 @ 5 1/2"	1794	Passed (35%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	2258 @ 7' 5 1/2"	3634	Passed (62%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.192 @ 7' 5 1/2"	0.472	Passed (L/884)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.346 @ 7' 5 1/2"	0.708	Passed (L/491)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	5.50"	5.50"	1.75"	298	373	671	Blocking
2 - Stud wall - HF	5.50"	5.50"	1.75"	298	373	671	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 9" o/c	
Bottom Edge (Lu)	14' 11" o/c	

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

Vertical Load	Location	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 14' 11"	24"	20.0	25.0	Default Load

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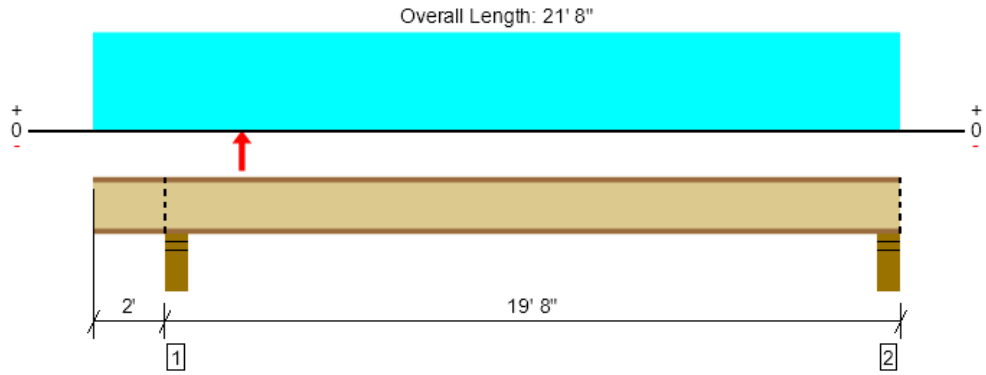
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, Roof: Joist 5
1 piece(s) 11 7/8" TJI® 110 @ 19.2" OC



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Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	700 @ 21' 3 1/2"	1581 (3.50")	Passed (44%)	1.15	1.0 D + 1.0 S (Alt Spans)
Shear (lbs)	667 @ 21' 2 1/2"	1794	Passed (37%)	1.15	1.0 D + 1.0 S (Alt Spans)
Moment (Ft-lbs)	3149 @ 11' 11 1/4"	3634	Passed (87%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.461 @ 11' 9 11/16"	0.635	Passed (L/497)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.823 @ 11' 9 13/16"	0.953	Passed (L/278)	--	1.0 D + 1.0 S (Alt Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Upward deflection on left cantilever exceeds overhang deflection criteria.
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	5.50"	5.50"	3.50"	354	443	797	Blocking
2 - Stud wall - HF	5.50"	5.50"	1.75"	310	390	700	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 1" o/c	
Bottom Edge (Lu)	7' 4" o/c	

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

Vertical Loads	Location	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 21' 8"	19.2"	20.0	25.0	Default Load
2 - Point (lb)	4'	N/A	-29	-36	Linked from: Roof: Joist 4, Support 2

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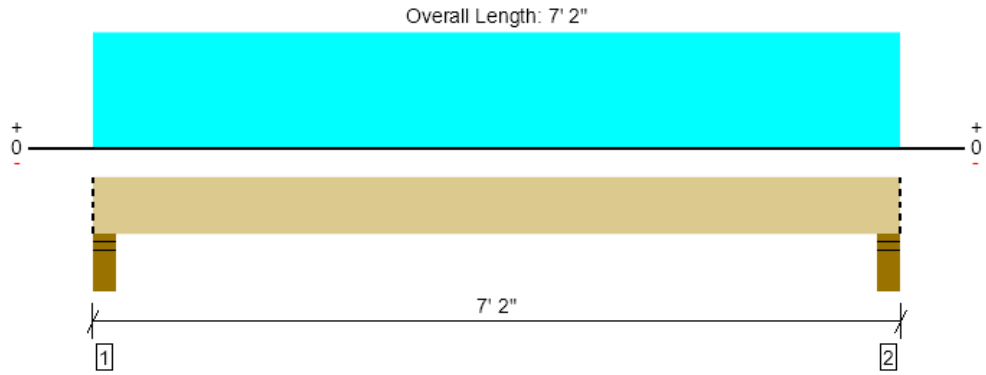
ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Roof, Roof: Joist 6
1 piece(s) 2 x 8 HF No.2 @ 24" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	323 @ 4 1/2"	3341 (5.50")	Passed (10%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	227 @ 1' 3/4"	1251	Passed (18%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	463 @ 3' 7"	1477	Passed (31%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.031 @ 3' 7"	0.214	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.055 @ 3' 7"	0.321	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	5.50"	5.50"	1.50"	143	179	323	Blocking
2 - Stud wall - HF	5.50"	5.50"	1.50"	143	179	323	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	7' 2" o/c	
Bottom Edge (Lu)	7' 2" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 7' 2"	24"	20.0	25.0	Default Load

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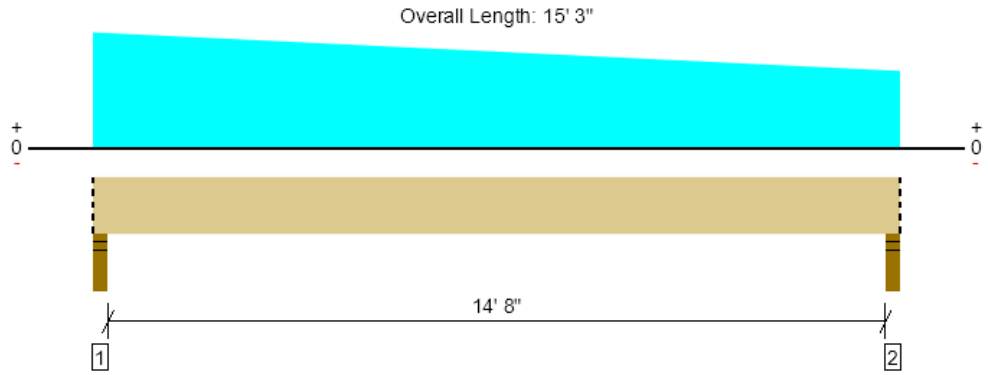
ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Roof, Roof: Drop Beam 7

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



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1125 @ 2"	7656 (3.50")	Passed (15%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	979 @ 10 3/4"	5544	Passed (18%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3860 @ 7' 4 3/4"	8182	Passed (47%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.375 @ 7' 6 13/16"	0.497	Passed (L/478)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.712 @ 7' 6 7/8"	0.746	Passed (L/251)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - DF	3.50"	3.50"	1.50"	532	594	1125	Blocking
2 - Stud wall - DF	3.50"	3.50"	1.50"	471	518	989	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	15' 3" o/c	
Bottom Edge (Lu)	15' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 15' 3"	N/A	7.4	--	
1 - Tapered (PSF)	0 to 15' 3" (Front)	3' 6" to 2' 4"	20.0	25.0	Default Load

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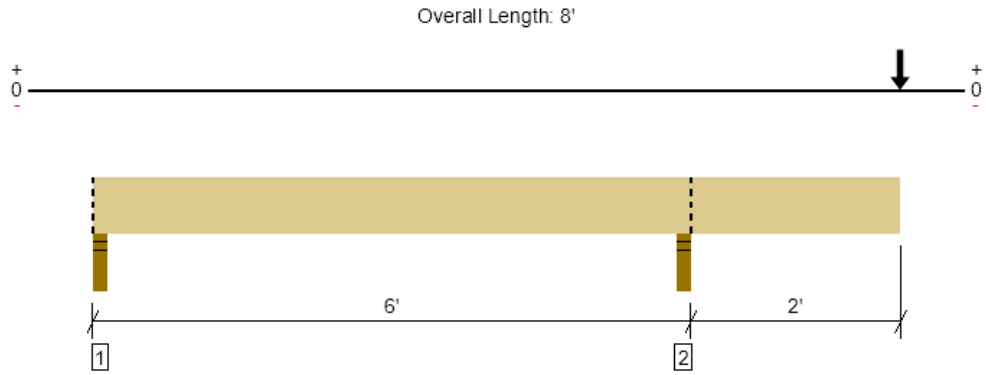
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Roof, Roof: Drop Beam 8

1 piece(s) 3 1/2" x 11 7/8" 2.0E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1621 @ 5' 10 1/4"	7656 (3.50")	Passed (21%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1139 @ 6' 11 7/8"	9241	Passed (12%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-2446 @ 5' 10 1/4"	22888	Passed (11%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.016 @ 8'	0.200	Passed (2L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.031 @ 8'	0.215	Passed (2L/999+)	--	1.0 D + 1.0 S (All Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (0.2") and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- -391 lbs uplift at support located at 2". Strapping or other restraint may be required.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - DF	3.50"	3.50"	1.50"	-167	-224	-391	Blocking
2 - Stud wall - DF	3.50"	3.50"	1.50"	803	818	1621	Blocking

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 8'	N/A	13.0	--	
1 - Point (lb)	8' (Front)	N/A	532	594	Linked from: Roof: Drop Beam 7, Support 1

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ForteWEB Software Operator	Job Notes
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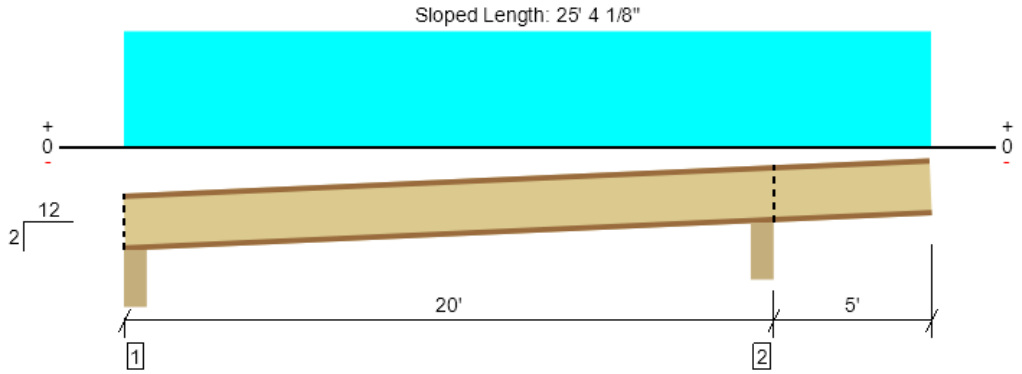
Weyerhaeuser

Roof, Roof: Joist 9
1 piece(s) 11 7/8" TJI® 110 @ 19.2" OC

Right cantilever exceeds the maximum braced cantilever length of 4'.



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

Member Length : 25' 6 1/8"

System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 2/12

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	693 @ 4 1/2"	1581 (3.50")	Passed (44%)	1.15	1.0 D + 1.0 S (Alt Spans)
Shear (lbs)	704 @ 19' 6 1/2"	1794	Passed (39%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3057 @ 9' 6 3/4"	3634	Passed (84%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.481 @ 9' 11 3/8"	0.655	Passed (L/490)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.837 @ 9' 10 5/8"	0.983	Passed (L/282)	--	1.0 D + 1.0 S (Alt Spans)

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Upward deflection on right cantilever exceeds overhang deflection criteria.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Upward deflection on right cantilever exceeds 0.4".

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Beveled Plate - HF	5.50"	5.50"	1.75"	304	389	693	Blocking
2 - Beveled Plate - HF	5.50"	5.50"	3.50"	507	625	1132	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 2" o/c	
Bottom Edge (Lu)	5' 9" o/c	

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

Vertical Load	Location	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 25'	19.2"	20.0	25.0	Default Load

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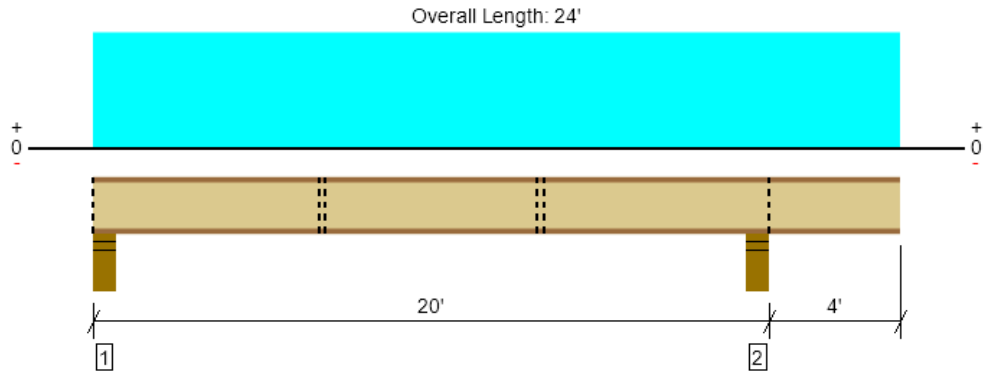
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Roof, Roof: Joist 11
1 piece(s) 11 7/8" TJI® 110 @ 19.2" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	701 @ 4 1/2"	1581 (3.50")	Passed (44%)	1.15	1.0 D + 1.0 S (Alt Spans)
Shear (lbs)	682 @ 19' 6 1/2"	1794	Passed (38%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3157 @ 9' 8 7/8"	3634	Passed (87%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.484 @ 9' 11 15/16"	0.647	Passed (L/481)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.849 @ 9' 11 1/2"	0.970	Passed (L/274)	--	1.0 D + 1.0 S (Alt Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Upward deflection on right cantilever exceeds overhang deflection criteria.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Upward deflection on right cantilever exceeds 0.4".
- Permanent bracing at third points in the back span or a direct applied ceiling over the entire back span length is required at the right span of the member. See literature detail (PB1) For clarification.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	5.50"	5.50"	1.75"	308	394	701	Blocking
2 - Stud wall - HF	5.50"	5.50"	3.50"	460	576	1036	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 1" o/c	
Bottom Edge (Lu)	7' 2" o/c	

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

Vertical Load	Location	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 24'	19.2"	20.0	25.0	Default Load

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ForteWEB Software Operator	Job Notes
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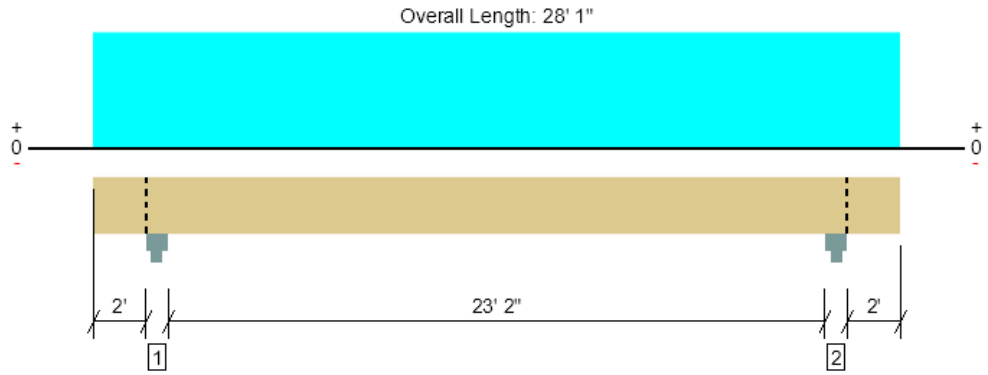
Weyerhaeuser

Roof, Roof: Drop Beam 13
1 piece(s) 7" x 18" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	16040 @ 2' 2 3/4"	24063 (5.50")	Passed (67%)	--	1.0 D + 1.0 S (Adj Spans)
Shear (lbs)	11527 @ 3' 11 1/2"	28014	Passed (41%)	1.15	1.0 D + 1.0 S (Adj Spans)
Moment (Ft-lbs)	77462 @ 14' 1/2"	100429	Passed (77%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.596 @ 14' 1/2"	0.788	Passed (L/476)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	1.100 @ 14' 1/2"	1.181	Passed (L/258)	--	1.0 D + 1.0 S (Alt Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Upward deflection on left and right cantilevers exceeds overhang deflection criteria.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Member should be side-loaded from both sides of the member or braced to prevent rotation.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Column Cap - steel	5.50"	5.50"	3.67"	7422	8618	16040	Blocking
2 - Column Cap - steel	5.50"	5.50"	3.67"	7422	8618	16040	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	28' 1" o/c	
Bottom Edge (Lu)	28' 1" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 28' 1"	N/A	39.4	--	
1 - Uniform (PSF)	0 to 28' 1" (Front)	24' 5 1/2"	20.0	25.0	

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ForteWEB Software Operator	Job Notes
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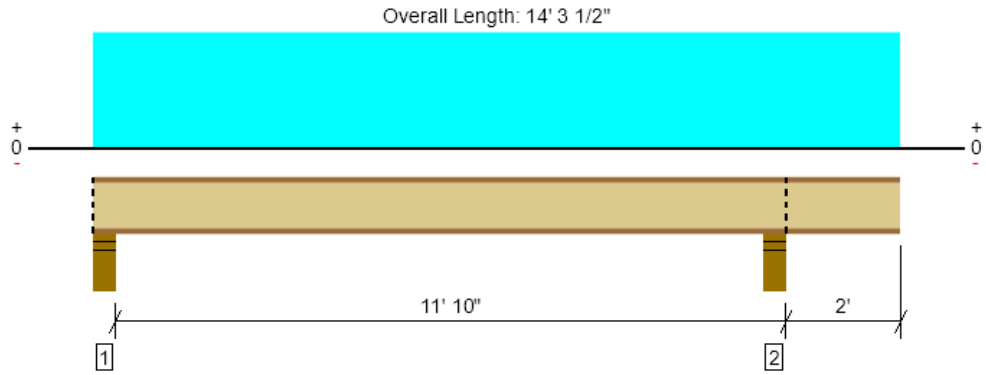
Weyerhaeuser

Roof, Roof: Joist 15
1 piece(s) 11 7/8" TJI® 110 @ 24" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	546 @ 4 1/2"	1581 (3.50")	Passed (35%)	1.15	1.0 D + 1.0 S (Alt Spans)
Shear (lbs)	505 @ 5 1/2"	1794	Passed (28%)	1.15	1.0 D + 1.0 S (Alt Spans)
Moment (Ft-lbs)	1457 @ 6' 13/16"	3634	Passed (40%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.091 @ 6' 2 3/16"	0.390	Passed (L/999+)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.160 @ 6' 2"	0.584	Passed (L/875)	--	1.0 D + 1.0 S (Alt Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	5.50"	5.50"	1.75"	240	306	546	Blocking
2 - Stud wall - HF	5.50"	5.50"	3.50"	331	414	746	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 9" o/c	
Bottom Edge (Lu)	7' 4" o/c	

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

Vertical Load	Location	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 14' 3 1/2"	24"	20.0	25.0	Default Load

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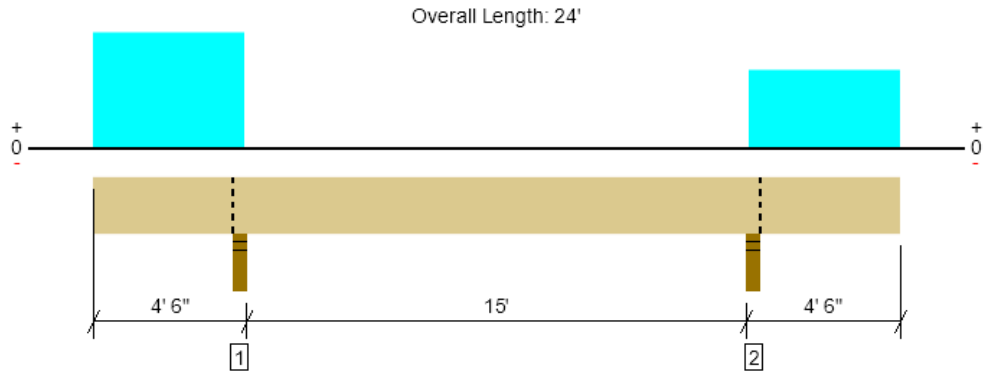
Weyerhaeuser

Roof, Roof: Drop Beam 16
1 piece(s) 3 1/2" x 11 7/8" 2.0E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2550 @ 4' 4 1/4"	4961 (3.50")	Passed (51%)	--	1.0 D + 1.0 S (Adj Spans)
Shear (lbs)	1641 @ 3' 2 5/8"	9241	Passed (18%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-4834 @ 4' 4 1/4"	22888	Passed (21%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.167 @ 0	0.290	Passed (2L/628)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.293 @ 0	0.435	Passed (2L/356)	--	1.0 D + 1.0 S (Alt Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.80"	1195	1355	2550	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	781	869	1651	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	24' o/c	
Bottom Edge (Lu)	24' o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 24'	N/A	13.0	--	
1 - Uniform (PLF)	0 to 4' 6" (Front)	N/A	221.0	276.0	Linked from: Roof: Joist 3, Support 1
2 - Uniform (PLF)	19' 6" to 24' (Front)	N/A	149.0	186.5	Linked from: Roof: Joist 4, Support 1

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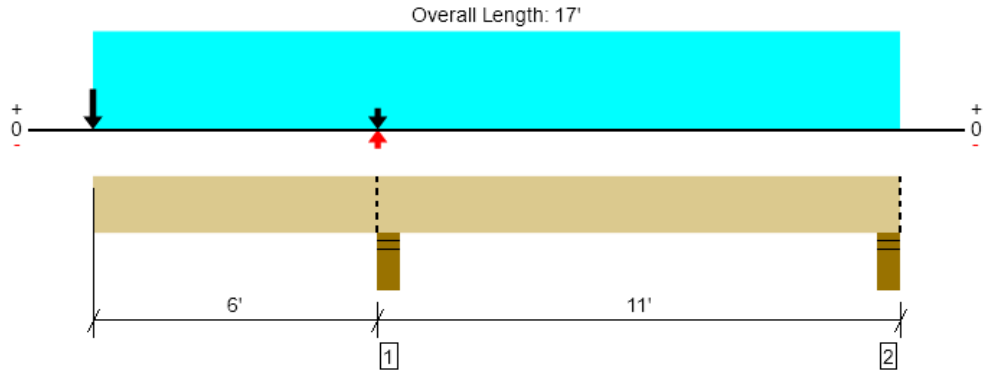
ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Roof, Roof: Drop Beam 17

1 piece(s) 7" x 11 7/8" 2.2E Parallam® PSL

An excessive uplift of -1232 lbs at support located at 16' 8" failed this product.



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	6070 @ 6' 2 3/4"	15593 (5.50")	Passed (39%)	--	1.0 D + 1.0 S (All Spans) [1]
Shear (lbs)	3131 @ 5' 1/8"	18481	Passed (17%)	1.15	1.0 D + 1.0 S (All Spans) [1]
Moment (Ft-lbs)	-18134 @ 6' 2 3/4"	45776	Passed (40%)	1.15	1.0 D + 1.0 S (All Spans) [1]
Live Load Defl. (in)	0.265 @ 0	0.623	Passed (2L/564)	--	1.0 D + 1.0 S (Alt Spans) [1]
Total Load Defl. (in)	0.500 @ 0	0.831	Passed (2L/298)	--	1.0 D + 1.0 S (Alt Spans) [1]

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

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/180).
- Left cantilever length exceeds 1/3 member length or 1/2 back span length. Additional bracing should be considered.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Member should be side-loaded from both sides of the member or braced to prevent rotation.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	5.50"	5.50"	2.14"	2879	3191	6070	Blocking
2 - Stud wall - HF	5.50"	5.50"	1.50"	-470	-763	-1232	Blocking

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 17'	N/A	26.0	--	
1 - Uniform (PSF)	0 to 17' (Front)	2'	20.0	25.0	Default Load
2 - Point (lb)	6' (Front)	N/A	93	362/-196	Linked from: Roof: Drop Beam 19, Support 1
3 - Point (lb)	0 (Front)	N/A	1195	1355	Linked from: Roof: Drop Beam 16, Support 1

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

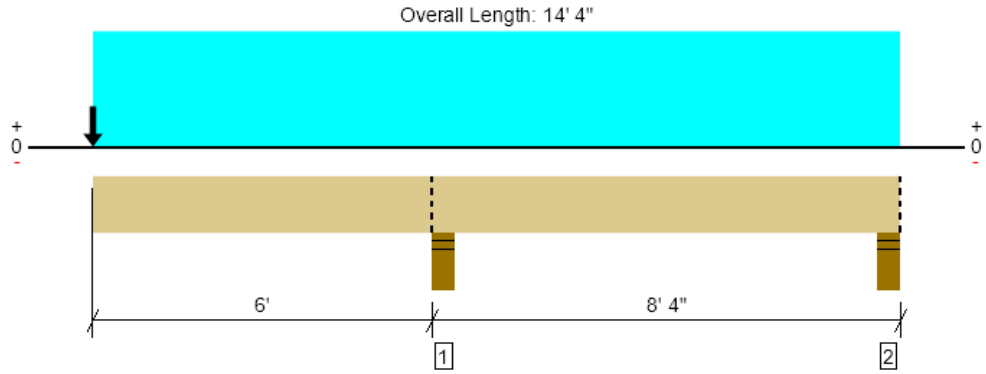
ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Roof, Roof: Drop Beam 18

1 piece(s) 5 1/4" x 11 7/8" 2.2E Parallam® PSL

An excessive uplift of -1240 lbs at support located at 14' failed this product.



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4353 @ 6' 2 3/4"	11694 (5.50")	Passed (37%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2199 @ 5' 1/8"	13861	Passed (16%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-12402 @ 6' 2 3/4"	34332	Passed (36%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.203 @ 0	0.415	Passed (2L/736)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.389 @ 0	0.623	Passed (2L/384)	--	1.0 D + 1.0 S (Alt Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Left cantilever length exceeds 1/3 member length or 1/2 back span length. Additional bracing should be considered.
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	5.50"	5.50"	2.05"	2157	2196	4353	Blocking
2 - Stud wall - HF	5.50"	5.50"	1.50"	-524	-716	-1240	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	14' 4" o/c	
Bottom Edge (Lu)	14' 4" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 14' 4"	N/A	19.5	--	
1 - Uniform (PSF)	0 to 14' 4" (Front)	2'	20.0	25.0	Default Load
2 - Point (lb)	0 (Front)	N/A	781	869	Linked from: Roof: Drop Beam 16, Support 2

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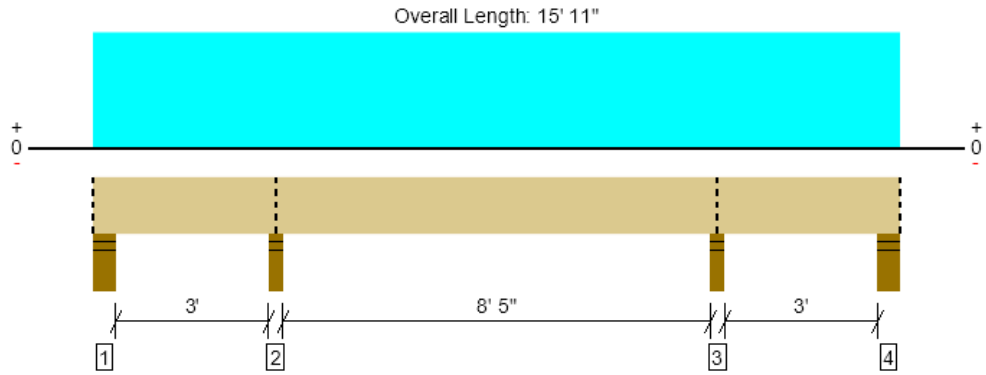
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Roof, Roof: Drop Beam 19
1 piece(s) 3 1/2" x 11 7/8" 1.55E TimberStrand® LSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4573 @ 3' 7 1/4"	4961 (3.50")	Passed (92%)	--	1.0 D + 1.0 S (Adj Spans)
Shear (lbs)	1935 @ 4' 8 7/8"	9878	Passed (20%)	1.15	1.0 D + 1.0 S (Adj Spans)
Moment (Ft-lbs)	-3207 @ 3' 7 1/4"	18346	Passed (17%)	1.15	1.0 D + 1.0 S (Adj Spans)
Live Load Defl. (in)	0.030 @ 7' 11 1/2"	0.290	Passed (L/999+)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.055 @ 7' 11 1/2"	0.435	Passed (L/999+)	--	1.0 D + 1.0 S (Alt Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	5.50"	5.50"	1.50"	93	362/-196	455/-102	Blocking
2 - Stud wall - HF	3.50"	3.50"	3.23"	2079	2494	4573	Blocking
3 - Stud wall - HF	3.50"	3.50"	3.23"	2079	2494	4573	Blocking
4 - Stud wall - HF	5.50"	5.50"	1.50"	93	362/-196	455/-102	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	15' 11" o/c	was 8'-5" clr
Bottom Edge (Lu)	15' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 15' 11"	N/A	13.0	--	
1 - Uniform (PSF)	0 to 15' 11" (Front)	13'	20.0	25.0	Default Load

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

ForteWEB Software Operator	Job Notes
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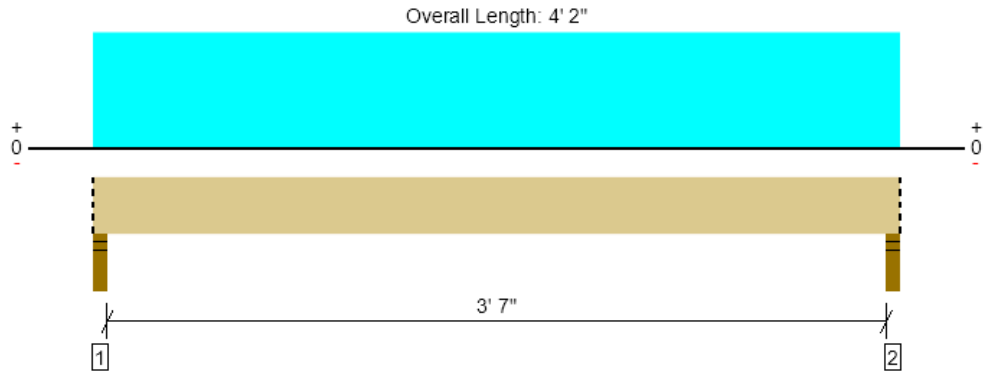
Weyerhaeuser

Roof, Roof: Drop Beam 21
2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1575 @ 2"	4253 (3.50")	Passed (37%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	898 @ 10 3/4"	2501	Passed (36%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1389 @ 2' 1"	2569	Passed (54%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.016 @ 2' 1"	0.128	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.030 @ 2' 1"	0.192	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

- Deflection criteria: LL (L/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 - Stud wall - HF	3.50"	3.50"	1.50"	706	869	1575	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	706	869	1575	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 2" o/c	
Bottom Edge (Lu)	4' 2" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 4' 2"	N/A	5.5	--	
1 - Uniform (PLF)	0 to 4' 2" (Front)	N/A	221.0	276.0	Linked from: Roof: Joist 3, Support 1
2 - Uniform (PLF)	0 to 4' 2" (Front)	N/A	112.5	141.0	Linked from: Roof: Joist 15, Support 1

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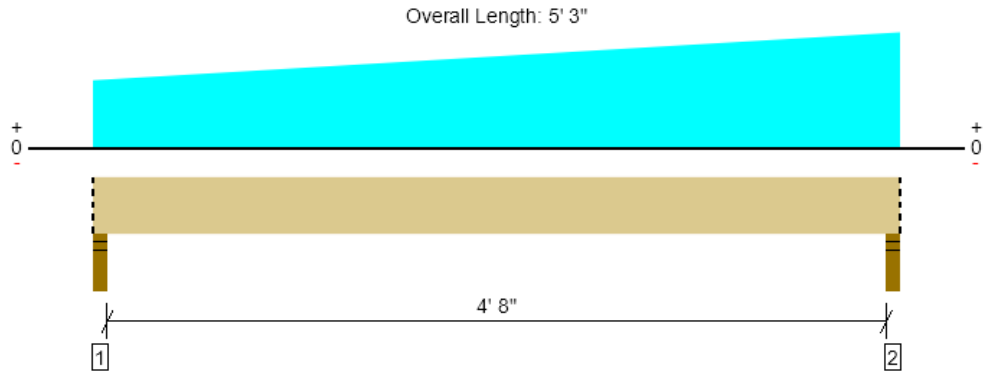
ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Roof, Roof: Drop Beam 22
2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	628 @ 5' 1"	4253 (3.50")	Passed (15%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	390 @ 4' 4 1/4"	2501	Passed (16%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	664 @ 2' 8 11/16"	2569	Passed (26%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.013 @ 2' 7 11/16"	0.164	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.023 @ 2' 7 11/16"	0.246	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

- Deflection criteria: LL (L/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 - Stud wall - HF	3.50"	3.50"	1.50"	241	283	523	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	287	341	628	Blocking

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 3"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 5' 3" (Front)	2'	20.0	25.0	Default Load
2 - Tapered (PSF)	0 to 5' 3" (Front)	1' 6" to 4'	20.0	25.0	

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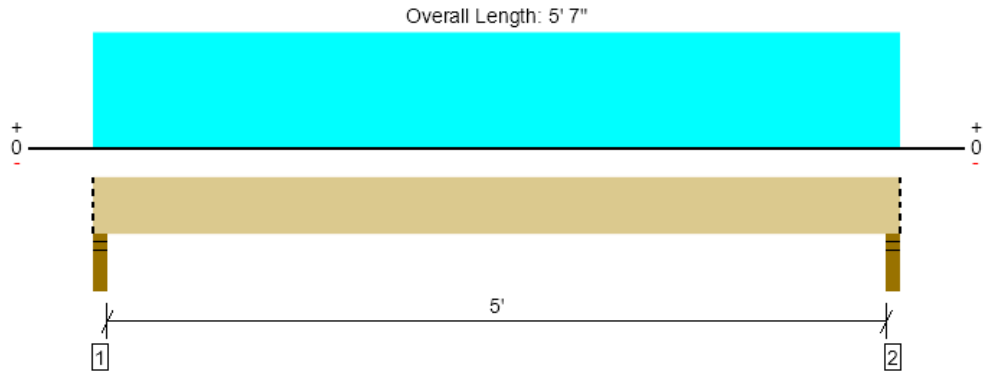
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, Roof: Drop Beam 23
2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1586 @ 2"	4253 (3.50")	Passed (37%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1077 @ 10 3/4"	2501	Passed (43%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1957 @ 2' 9 1/2"	2569	Passed (76%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.043 @ 2' 9 1/2"	0.175	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.078 @ 2' 9 1/2"	0.262	Passed (L/804)	--	1.0 D + 1.0 S (All Spans)

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

- Deflection criteria: LL (L/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 - Stud wall - HF	3.50"	3.50"	1.50"	713	872	1586	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	713	872	1586	Blocking

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 7"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 5' 7" (Front)	12' 6"	20.0	25.0	Default Load

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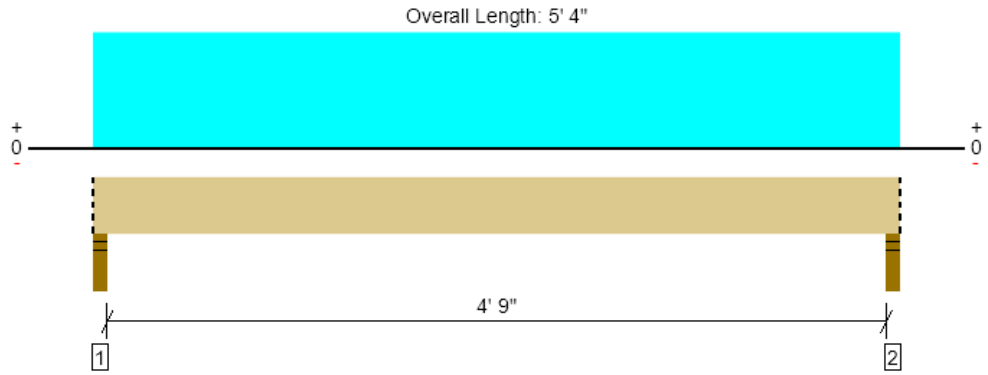
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, Roof: Drop Beam 24
2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1704 @ 2"	4253 (3.50")	Passed (40%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1132 @ 10 3/4"	2501	Passed (45%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1997 @ 2' 8"	2569	Passed (78%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.040 @ 2' 8"	0.167	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.073 @ 2' 8"	0.250	Passed (L/827)	--	1.0 D + 1.0 S (All Spans)

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

- Deflection criteria: LL (L/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 - Stud wall - HF	3.50"	3.50"	1.50"	765	939	1704	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	765	939	1704	Blocking

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 4"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 5' 4" (Front)	10' 6"	20.0	25.0	Default Load
2 - Uniform (PLF)	0 to 5' 4" (Front)	N/A	71.5	89.5	Linked from: Roof: Joist 6, Support 1

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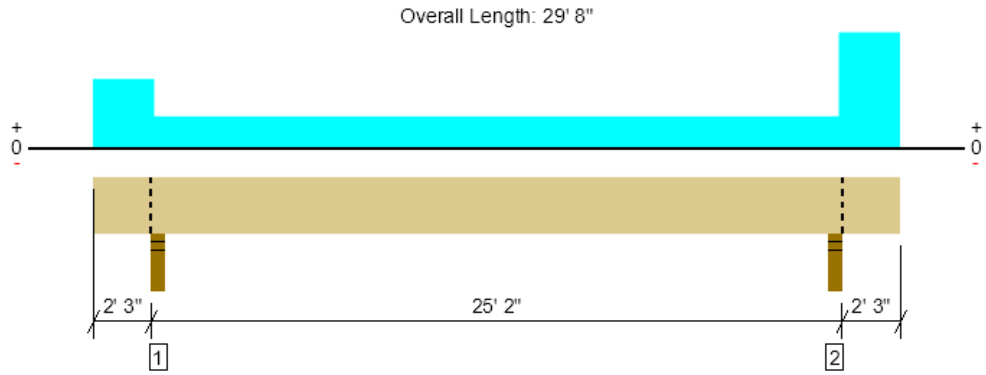
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Roof, Roof: Drop Beam 25

1 piece(s) 3 1/2" x 11 7/8" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2568 @ 27' 3 1/4"	4961 (3.50")	Passed (52%)	--	1.0 D + 1.0 S (Adj Spans)
Shear (lbs)	1445 @ 26' 1 5/8"	9241	Passed (16%)	1.15	1.0 D + 1.0 S (Adj Spans)
Moment (Ft-lbs)	8985 @ 14' 8 11/16"	22888	Passed (39%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.481 @ 14' 9 5/8"	0.829	Passed (L/621)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.941 @ 14' 9 1/2"	1.244	Passed (L/317)	--	1.0 D + 1.0 S (Alt Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Upward deflection on left and right cantilevers exceeds overhang deflection criteria.
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.52"	1061	1098	2159	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.81"	1245	1323	2568	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	29' 8" o/c	
Bottom Edge (Lu)	29' 8" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 29' 8"	N/A	13.0	--	
1 - Uniform (PSF)	0 to 2' 3" (Front)	5' 6"	20.0	25.0	
2 - Uniform (PSF)	27' 5" to 29' 8" (Front)	9' 2 1/2"	20.0	25.0	
3 - Uniform (PSF)	2' 3" to 27' 5" (Front)	2' 6"	20.0	25.0	

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

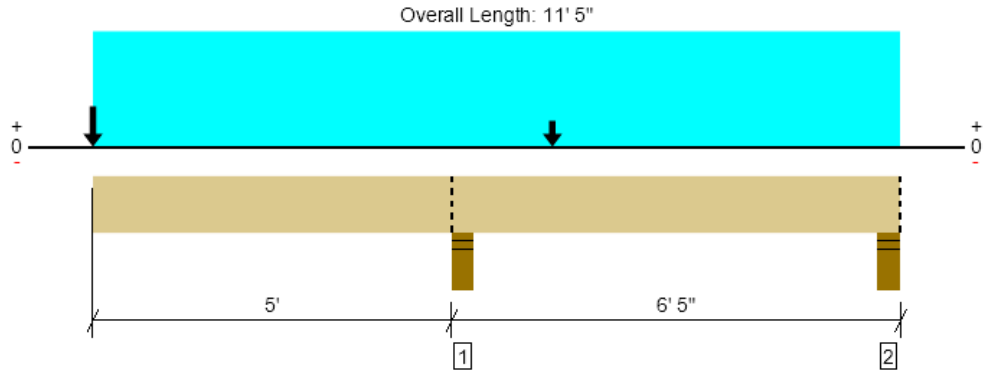
ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Roof, Roof: Drop Beam 26

1 piece(s) 5 1/4" x 11 7/8" 2.0E Parallam® PSL

An excessive uplift of -1750 lbs at support located at 11' 1" failed this product.



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	6011 @ 5' 2 3/4"	11694 (5.50")	Passed (51%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	3146 @ 6' 5 3/8"	13861	Passed (23%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-12787 @ 5' 2 3/4"	34332	Passed (37%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.152 @ 0	0.349	Passed (2L/824)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.299 @ 0	0.523	Passed (2L/420)	--	1.0 D + 1.0 S (Alt Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Left cantilever length exceeds 1/3 member length or 1/2 back span length. Additional bracing should be considered.
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	5.50"	5.50"	2.83"	3002	3009	6011	Blocking
2 - Stud wall - HF	5.50"	5.50"	1.50"	-790	-960	-1750	Blocking

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 11' 5"	N/A	19.5	--	
1 - Uniform (PSF)	0 to 11' 5" (Front)	2'	20.0	25.0	Default Load
2 - Point (lb)	6' 6" (Front)	N/A	471	518	Linked from: Roof: Drop Beam 7, Support 2
3 - Point (lb)	0 (Front)	N/A	1061	1098	Linked from: Roof: Drop Beam 25, Support 1

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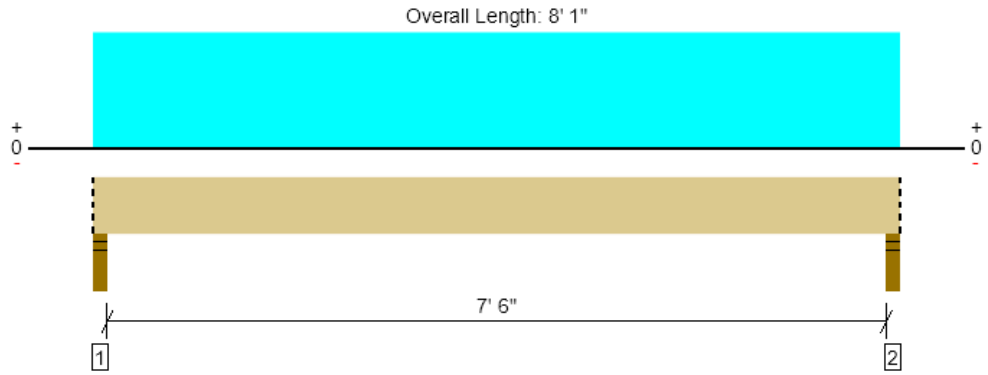
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Roof, Roof: Drop Beam 28
2 piece(s) 2 x 10 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1665 @ 2"	4253 (3.50")	Passed (39%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1228 @ 1' 3/4"	3191	Passed (38%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3093 @ 4' 1/2"	3833	Passed (81%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.071 @ 4' 1/2"	0.258	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.130 @ 4' 1/2"	0.387	Passed (L/715)	--	1.0 D + 1.0 S (All Spans)

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

- Deflection criteria: LL (L/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 - Stud wall - HF	3.50"	3.50"	1.50"	756	909	1665	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	756	909	1665	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' 1" o/c	
Bottom Edge (Lu)	8' 1" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 8' 1"	N/A	7.0	--	
1 - Uniform (PSF)	0 to 8' 1" (Front)	6' 6"	20.0	25.0	Default Load
2 - Uniform (PSF)	0 to 8' 1" (Front)	2' 6"	20.0	25.0	

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

ForteWEB Software Operator	Job Notes
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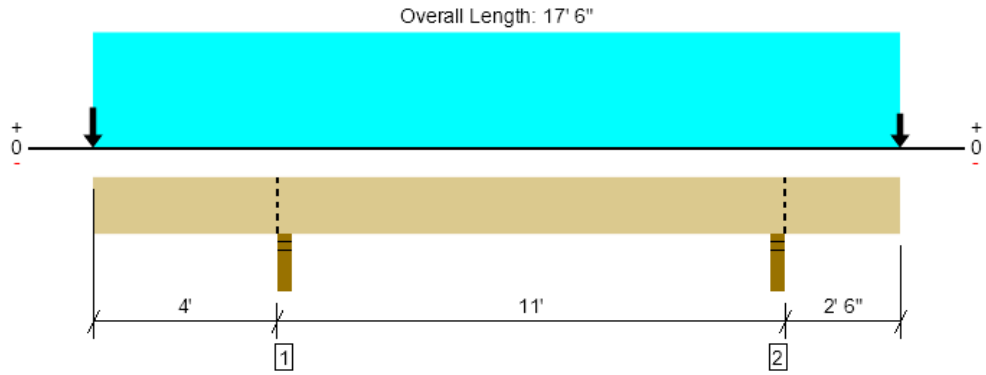
Weyerhaeuser

Roof, Roof: Drop Beam 29

1 piece(s) 5 1/4" x 11 7/8" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4258 @ 4' 1 3/4"	7442 (3.50")	Passed (57%)	--	1.0 D + 1.0 S (Adj Spans)
Shear (lbs)	2898 @ 3' 1/8"	13861	Passed (21%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-11587 @ 4' 1 3/4"	34332	Passed (34%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.161 @ 0	0.276	Passed (2L/620)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.304 @ 0	0.415	Passed (2L/328)	--	1.0 D + 1.0 S (Alt Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	2.00"	2066	2192	4258	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	1249	1655	2904	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	17' 6" o/c	
Bottom Edge (Lu)	17' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 17' 6"	N/A	19.5	--	
1 - Uniform (PSF)	0 to 17' 6" (Front)	2'	20.0	25.0	Default Load
2 - Point (lb)	0 (Front)	N/A	1245	1323	Linked from: Roof: Drop Beam 25, Support 2
3 - Point (lb)	17' 6" (Front)	N/A	1029	1215	Linked from: Roof: Drop Beam 30, Support 2

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

ForteWEB Software Operator	Job Notes
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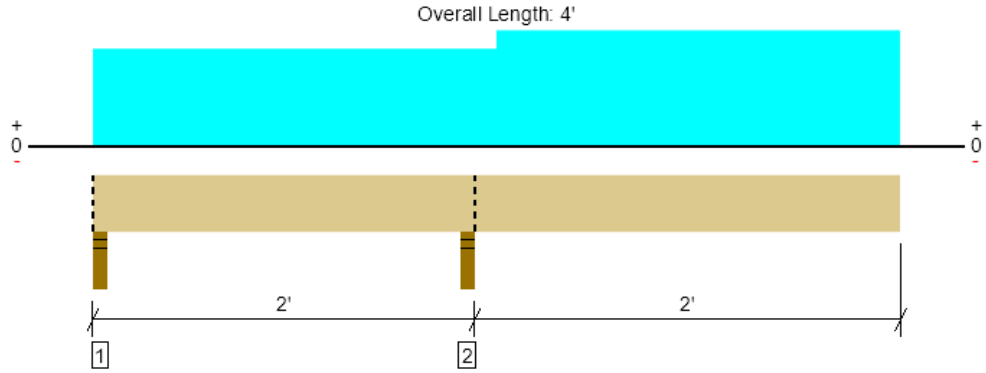
Weyerhaeuser

Roof, Roof: Drop Beam 30

1 piece(s) 3 1/2" x 11 7/8" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2244 @ 1' 10 1/4"	4961 (3.50")	Passed (45%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	851 @ 1' 3 3/8"	9241	Passed (9%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-1229 @ 1' 10 1/4"	22888	Passed (5%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.004 @ 4'	0.200	Passed (2L/999+)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.008 @ 4'	0.215	Passed (2L/999+)	--	1.0 D + 1.0 S (Alt Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (0.2") and TL (2L/240).
- Right cantilever length exceeds 1/3 member length or 1/2 back span length. Additional bracing should be considered.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- -395 lbs uplift at support located at 2". Strapping or other restraint may be required.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	-123	49/-272	-395	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.58"	1029	1215	2244	Blocking

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 4'	N/A	13.0	--	
1 - Uniform (PSF)	0 to 2' (Front)	9' 9"	20.0	25.0	Default Load
2 - Uniform (PSF)	2' to 4' (Front)	11' 7"	20.0	25.0	

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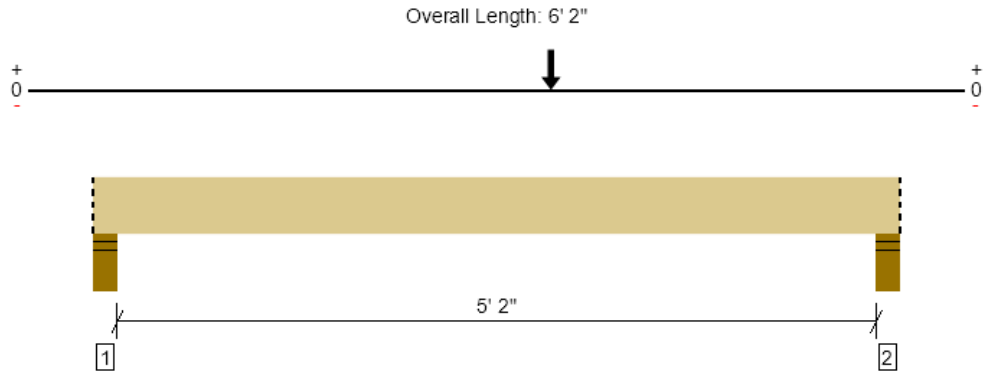
ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Roof, Roof: Drop Beam 31
1 piece(s) 5 1/4" x 11 7/8" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	9314 @ 5' 9 1/2"	12758 (6.00")	Passed (73%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	9285 @ 4' 8 1/8"	13861	Passed (67%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	21276 @ 3' 6"	34332	Passed (62%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.048 @ 3' 6"	0.181	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.090 @ 3' 6"	0.271	Passed (L/720)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	6.00"	6.00"	3.22"	3200	3646	6846	Blocking
2 - Stud wall - HF	6.00"	6.00"	4.38"	4342	4972	9314	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 2" o/c	
Bottom Edge (Lu)	6' 2" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 2"	N/A	19.5	--	
1 - Point (lb)	3' 6" (Front)	N/A	7422	8618	Linked from: Roof: Drop Beam 13, Support 1

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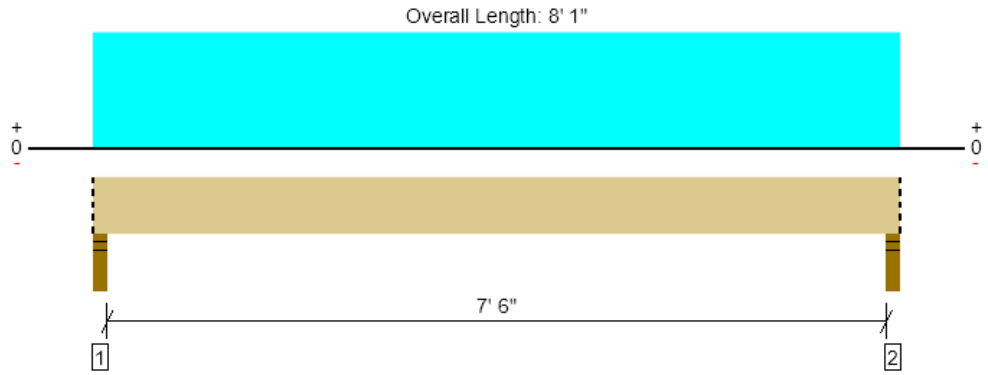
ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Roof, Roof: Drop Beam 32
2 piece(s) 2 x 12 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2217 @ 2"	4253 (3.50")	Passed (52%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1543 @ 1' 2 3/4"	3881	Passed (40%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	4118 @ 4' 1/2"	5155	Passed (80%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.053 @ 4' 1/2"	0.258	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.096 @ 4' 1/2"	0.387	Passed (L/967)	--	1.0 D + 1.0 S (All Spans)

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

- Deflection criteria: LL (L/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 - Stud wall - HF	3.50"	3.50"	1.82"	1005	1213	2217	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.82"	1005	1213	2217	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' 1" o/c	
Bottom Edge (Lu)	8' 1" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 8' 1"	N/A	8.6	--	
1 - Uniform (PSF)	0 to 8' 1" (Front)	12'	20.0	25.0	

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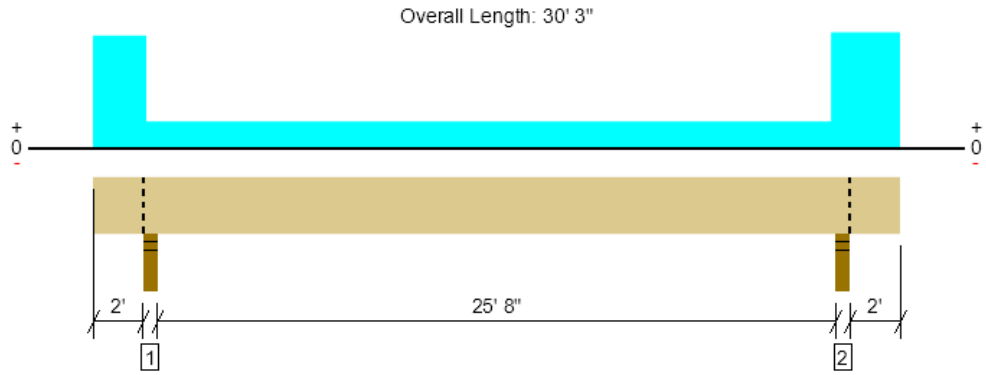
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, Roof: Drop Beam 33
1 piece(s) 3 1/2" x 11 7/8" 2.0E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2351 @ 28' 1 1/4"	4961 (3.50")	Passed (47%)	--	1.0 D + 1.0 S (Adj Spans)
Shear (lbs)	1229 @ 3' 3 3/8"	9241	Passed (13%)	1.15	1.0 D + 1.0 S (Adj Spans)
Moment (Ft-lbs)	8013 @ 15' 1 9/16"	22888	Passed (35%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.499 @ 15' 1 9/16"	0.865	Passed (L/624)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	1.003 @ 15' 1 1/2"	1.298	Passed (L/311)	--	1.0 D + 1.0 S (Alt Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Upward deflection on left and right cantilevers exceeds overhang deflection criteria.
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.52"	1061	1091	2152	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.66"	1150	1202	2351	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	30' 3" o/c	
Bottom Edge (Lu)	30' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 30' 3"	N/A	13.0	--	
1 - Uniform (PSF)	0 to 2' (Front)	8' 6"	20.0	25.0	
2 - Uniform (PSF)	27' 8" to 30' 3" (Front)	8' 9"	20.0	25.0	
3 - Uniform (PLF)	2' to 27' 8" (Front)	N/A	40.0	50.0	Linked from: Roof: Joist 12, Support 1

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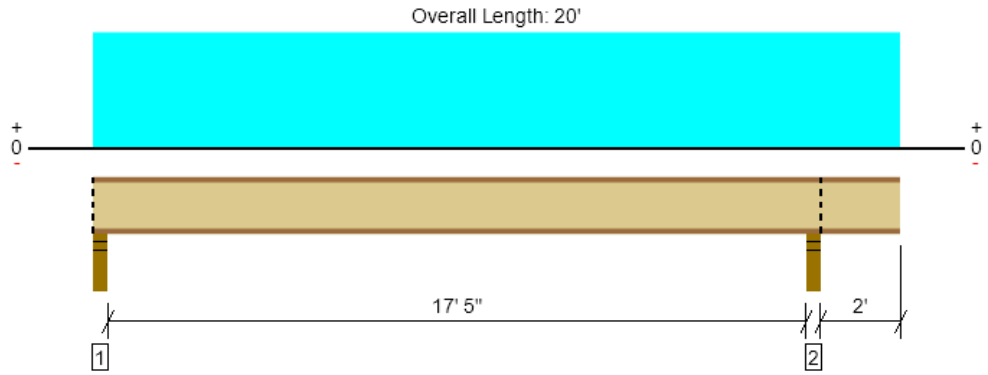
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Roof, Roof: Joist 34
1 piece(s) 11 7/8" TJI® 110 @ 24" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	804 @ 2 1/2"	1581 (3.50")	Passed (51%)	1.15	1.0 D + 1.0 S (Alt Spans)
Shear (lbs)	778 @ 3 1/2"	1794	Passed (43%)	1.15	1.0 D + 1.0 S (Alt Spans)
Moment (Ft-lbs)	3429 @ 8' 11 1/4"	3634	Passed (94%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.436 @ 9' 1/8"	0.588	Passed (L/485)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.779 @ 9'	0.882	Passed (L/272)	--	1.0 D + 1.0 S (Alt Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Upward deflection on right cantilever exceeds overhang deflection criteria.
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.75"	356	448	804	Blocking
2 - Stud wall - HF	3.50"	3.50"	3.50"	444	555	999	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	2' 11" o/c	
Bottom Edge (Lu)	7' 4" o/c	

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

Vertical Load	Location	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 20'	24"	20.0	25.0	Default Load

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

ForteWEB Software Operator	Job Notes
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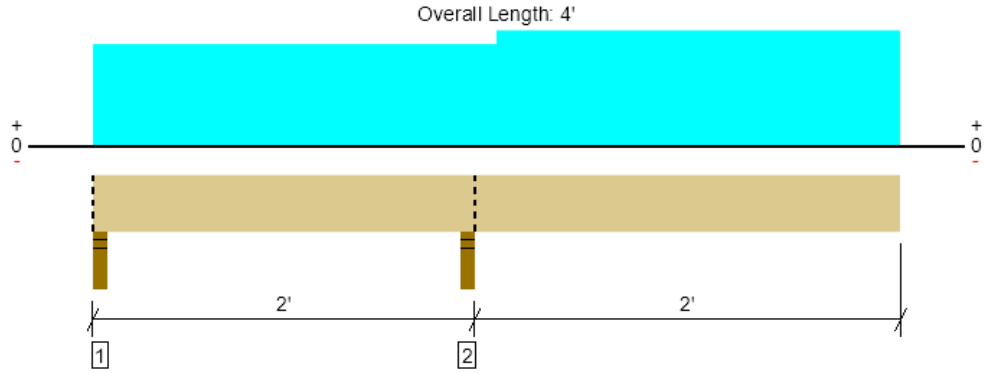
Weyerhaeuser

Roof, Roof: Drop Beam 37

1 piece(s) 3 1/2" x 11 7/8" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2168 @ 1' 10 1/4"	4961 (3.50")	Passed (44%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	820 @ 1' 3 3/8"	9241	Passed (9%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-1178 @ 1' 10 1/4"	22888	Passed (5%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.004 @ 4'	0.200	Passed (2L/999+)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.007 @ 4'	0.215	Passed (2L/999+)	--	1.0 D + 1.0 S (Alt Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (0.2") and TL (2L/240).
- Right cantilever length exceeds 1/3 member length or 1/2 back span length. Additional bracing should be considered.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- -365 lbs uplift at support located at 2". Strapping or other restraint may be required.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	-110	57/-255	-365	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.53"	995	1173	2168	Blocking

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 4'	N/A	13.0	--	
1 - Uniform (PSF)	0 to 2' (Front)	9' 9"	20.0	25.0	
2 - Uniform (PSF)	2' to 4' (Front)	11' 1"	20.0	25.0	

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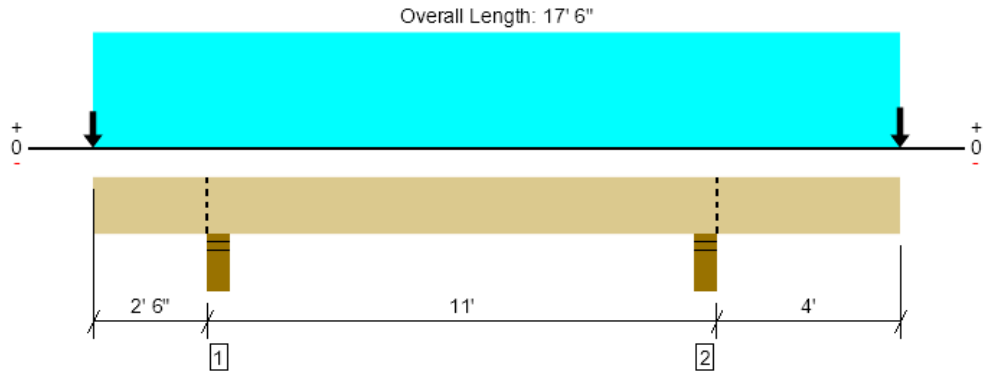
Weyerhaeuser

Roof, Roof: Drop Beam 38

1 piece(s) 5 1/4" x 11 7/8" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3989 @ 13' 3 1/4"	11694 (5.50")	Passed (34%)	--	1.0 D + 1.0 S (Adj Spans)
Shear (lbs)	2682 @ 14' 5 7/8"	13861	Passed (19%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-10926 @ 13' 3 1/4"	34332	Passed (32%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.153 @ 17' 6"	0.282	Passed (2L/662)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.292 @ 17' 6"	0.423	Passed (2L/348)	--	1.0 D + 1.0 S (Alt Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	5.50"	5.50"	1.50"	1238	1632	2870	Blocking
2 - Stud wall - HF	5.50"	5.50"	1.88"	1948	2041	3989	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	17' 6" o/c	
Bottom Edge (Lu)	17' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 17' 6"	N/A	19.5	--	
1 - Uniform (PSF)	0 to 17' 6" (Front)	2'	20.0	25.0	Default Load
2 - Point (lb)	17' 6" (Front)	N/A	1150	1202	Linked from: Roof: Drop Beam 33, Support 2
3 - Point (lb)	0 (Front)	N/A	995	1173	Linked from: Roof: Drop Beam 37, Support 2

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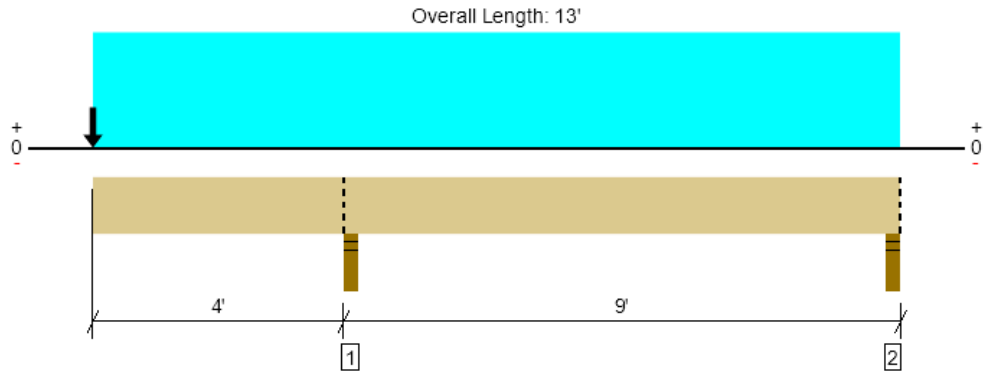
Weyerhaeuser

Roof, Roof: Drop Beam 39

1 piece(s) 3 1/2" x 11 7/8" 2.0E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4155 @ 4' 1 3/4"	4961 (3.50")	Passed (84%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2462 @ 3' 1/8"	9241	Passed (27%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-9807 @ 4' 1 3/4"	22888	Passed (43%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.163 @ 0	0.276	Passed (2L/610)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.317 @ 0	0.415	Passed (2L/314)	--	1.0 D + 1.0 S (Alt Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- -777 lbs uplift at support located at 12' 10". Strapping or other restraint may be required.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	2.93"	2069	2086	4155	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	-320	-457	-777	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	13' o/c	
Bottom Edge (Lu)	13' o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 13'	N/A	13.0	--	
1 - Uniform (PSF)	0 to 13' (Front)	2'	20.0	25.0	Default Load
2 - Point (lb)	0 (Front)	N/A	1061	1091	Linked from: Roof: Drop Beam 33, Support 1

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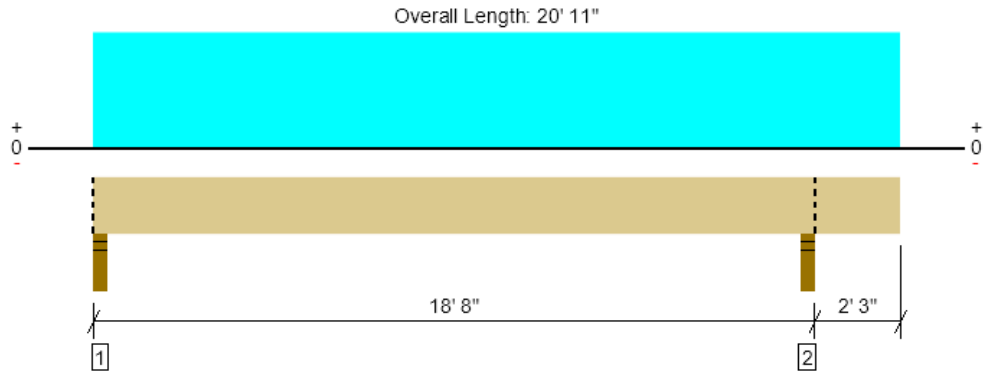
Weyerhaeuser

Roof, Roof: Drop Beam 40 (rim)
1 piece(s) 3 1/2" x 11 7/8" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1091 @ 18' 6 1/4"	4961 (3.50")	Passed (22%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	762 @ 17' 4 5/8"	9241	Passed (8%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3819 @ 9' 2 3/4"	22888	Passed (17%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	0.122 @ 9' 3 13/16"	0.918	Passed (L/999+)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.224 @ 9' 3 5/8"	1.224	Passed (L/982)	--	1.0 D + 1.0 S (Alt Spans)

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

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	395	463	858	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	504	586	1091	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	20' 11" o/c	
Bottom Edge (Lu)	20' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 20' 11"	N/A	13.0	--	
1 - Uniform (PSF)	0 to 20' 11" (Front)	2'	15.0	25.0	Default Load

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ForteWEB Software Operator	Job Notes
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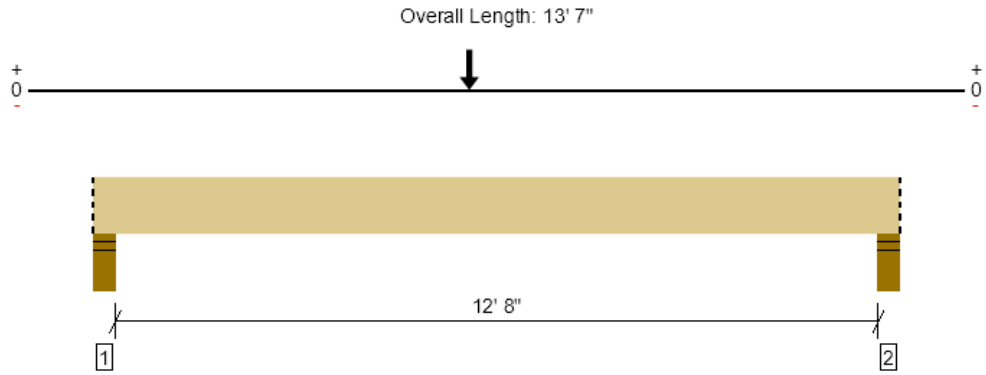
Weyerhaeuser

Roof, Roof: Drop Beam 41
1 piece(s) 5 1/4" x 16" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	8767 @ 4"	11694 (5.50")	Passed (75%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	8720 @ 1' 9 1/2"	18676	Passed (47%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	52080 @ 6' 4"	60297	Passed (86%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.202 @ 6' 4"	0.646	Passed (L/766)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.382 @ 6' 4"	0.861	Passed (L/406)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	5.50"	5.50"	4.12"	4153	4615	8767	Blocking
2 - Stud wall - HF	5.50"	5.50"	3.59"	3626	4003	7629	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	13' 7" o/c	
Bottom Edge (Lu)	13' 7" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 13' 7"	N/A	26.3	--	
1 - Point (lb)	6' 4" (Front)	N/A	7422	8618	Linked from: Roof: Drop Beam 13, Support 1

Weyerhaeuser Notes

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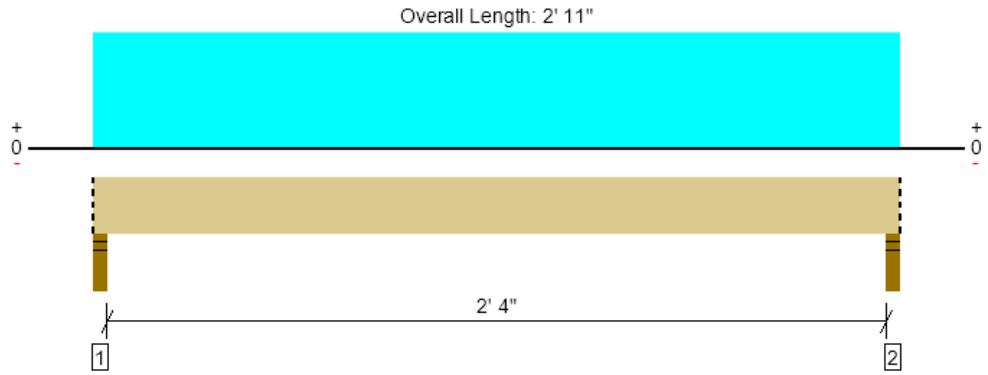
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Roof, Roof: Drop Beam 42
2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	912 @ 2"	4253 (3.50")	Passed (21%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	352 @ 10 3/4"	2501	Passed (14%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	522 @ 1' 5 1/2"	2569	Passed (20%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.003 @ 1' 5 1/2"	0.129	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.005 @ 1' 5 1/2"	0.172	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	347	565	912	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	347	565	912	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	2' 11" o/c	
Bottom Edge (Lu)	2' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 2' 11"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 2' 11" (Front)	15' 6"	15.0	25.0	Default Load

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ForteWEB Software Operator	Job Notes
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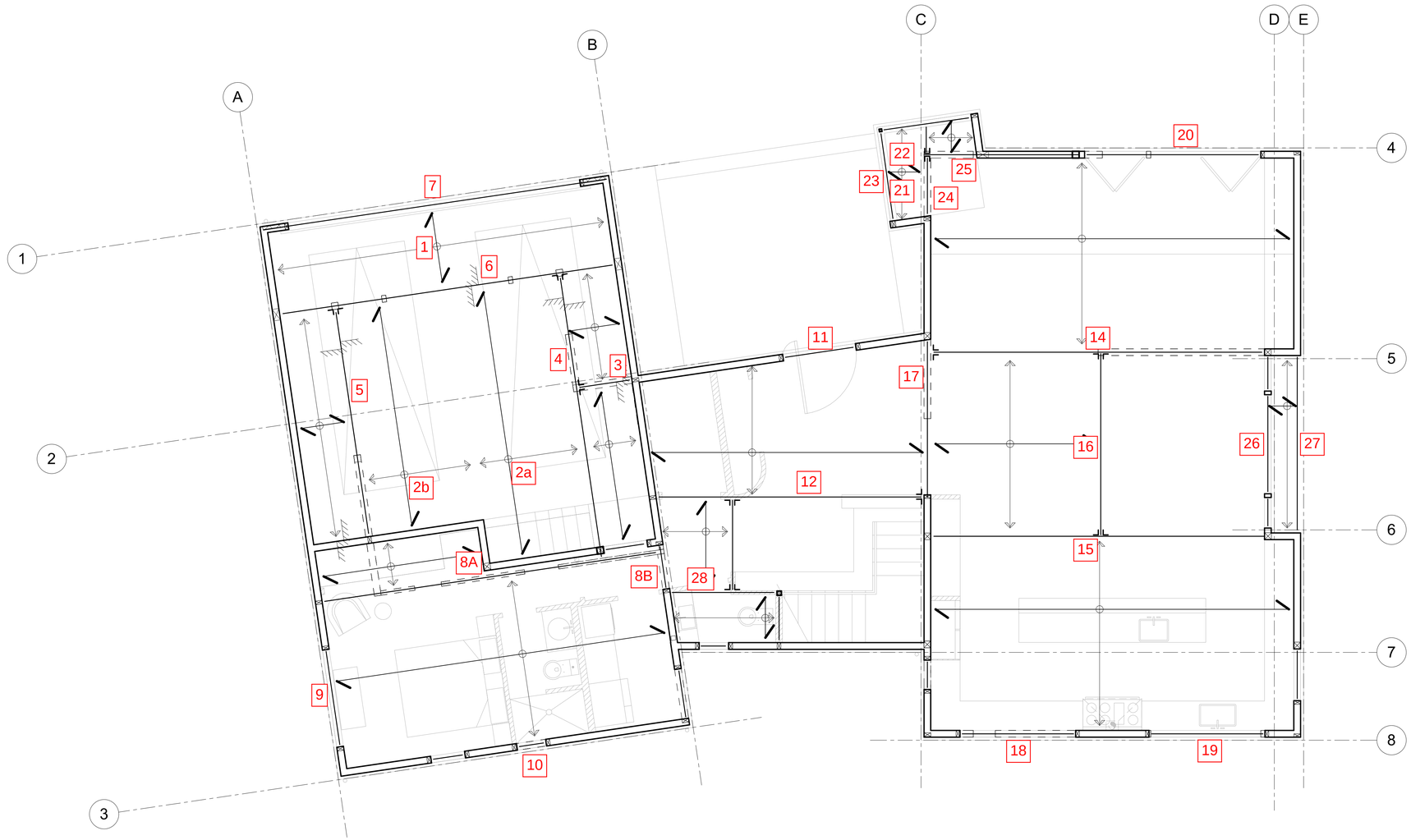
Weyerhaeuser

FRAMING PLAN NOTES: (TYPICAL UNLESS NOTED OTHERWISE)

1. FLOOR SHEATHING SHALL BE 23/32" TONGUE AND GROOVE APA RATED SHEATHING (SPAN RATING 40/20). NAIL @ ALL FRAMED PANEL EDGES AND OVER SHEARWALLS w/10d @ 6"oc AND 12"oc TO ALL INTERMEDIATE FRAMING.
2. DECK SHEATHING SHALL BE 23/32" TONGUE AND GROOVE APA RATED SHEATHING (SPAN RATING 40/20). NAIL @ ALL FRAMED PANEL EDGES AND OVER SHEARWALLS w/10d @ 6"oc AND 12"oc TO ALL INTERMEDIATE FRAMING. DECK DESIGN LOADS INDICATED ON PLANS.
3. ALL HEADERS AND BEAMS SHALL BE (2) 2x8 MINIMUM, U.N.O. REFER NOTE 5 FOR SUPPORT REQUIRMENTS.
4. COLUMNS SHALL BE DOUBLE STUDS MINIMUM, U.N.O., WITH BEAM OR HEADER BEARING FULLY ON COLUMN.
5. REFER TO S6.4 FOR GIRDER TRUSS LOADING DIAGRAMS

LEGEND

- HANGER PER TRUSS MANUF. U.N.O. ON PLAN
- COLUMNS BELOW
- COLUMNS ABOVE
- ABRUPT CHANGE IN SLAB/ FRAMING ELEVATION
- FB INDICATES FLUSH BEAM
- DB INDICATES DROPPED BEAM
- FH INDICATES FLUSH HEADER
- SPAN AND EXTENTS
- SW-x INDICATES SHEARWALL PER SCHEDULE 12/S6.0
- HDU-x INDICATES SIMPSON HOLDOWN. REFER DETAIL 8/S3.0 FOR REQUIRED NUMBER OF STUDS, THREADED ROD CALLOUT & EMBEDMENT INTO CONCRETE.
- MSTCXX INDICATES SIMPSON STRAP HOLDOWN



1 Upper Floor Framing Plan
1/4" = 1'-0"

CQN CARTER QUINN NOBLIN STRUCTURAL ENGINEERING
2033 Sixth Ave #995
Seattle, WA 98121
▸ 206-264-7784
www.CQN-SE.com

NICHOLAS VH CARTER STATE OF WASHINGTON 17770 STRUCTURAL PROFESSIONAL ENGINEER

CHU RESIDENCE
SITE ANALYSIS
4332 W. Mercer Way
Mercer Island, WA 98040

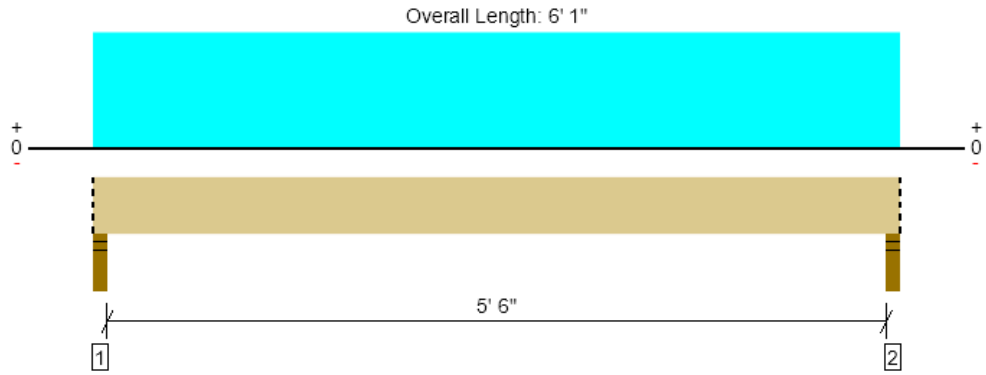
Date:

Scale:

Sheet:
Upper Floor Framing Plan

S2.1

Upper Floor, Floor: Joist 1
1 piece(s) 2 x 8 HF No.2 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	365 @ 2 1/2"	2126 (3.50")	Passed (17%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	258 @ 10 3/4"	1088	Passed (24%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	482 @ 3' 1/2"	1284	Passed (37%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.030 @ 3' 1/2"	0.189	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.045 @ 3' 1/2"	0.283	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	122	243	365	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	122	243	365	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 1" o/c	
Bottom Edge (Lu)	6' 1" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 6' 1"	16"	30.0	60.0	Default Load

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

ForteWEB Software Operator	Job Notes
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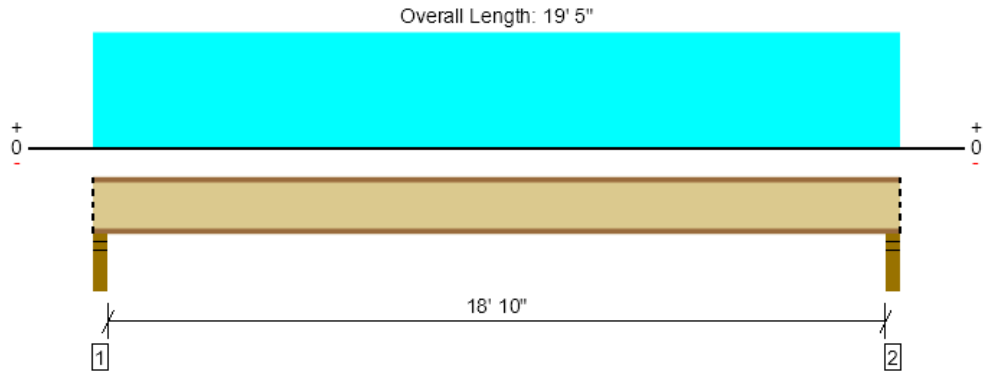
Weyerhaeuser

Upper Floor, Floor: Joist 2a
2 piece(s) 11 7/8" TJI® 110 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	712 @ 2 1/2"	2750 (3.50")	Passed (26%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	691 @ 3 1/2"	3120	Passed (22%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	3309 @ 9' 8 1/2"	6320	Passed (52%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.275 @ 9' 8 1/2"	0.633	Passed (L/830)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.378 @ 9' 8 1/2"	0.950	Passed (L/604)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	51	45	Passed	--	--

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: 1/2" Gypsum ceiling.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.75"	194	518	712	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.75"	194	518	712	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 5" o/c	
Bottom Edge (Lu)	19' 5" o/c	

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

Vertical Load	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 19' 5"	16"	15.0	40.0	Default Load

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ForteWEB Software Operator	Job Notes
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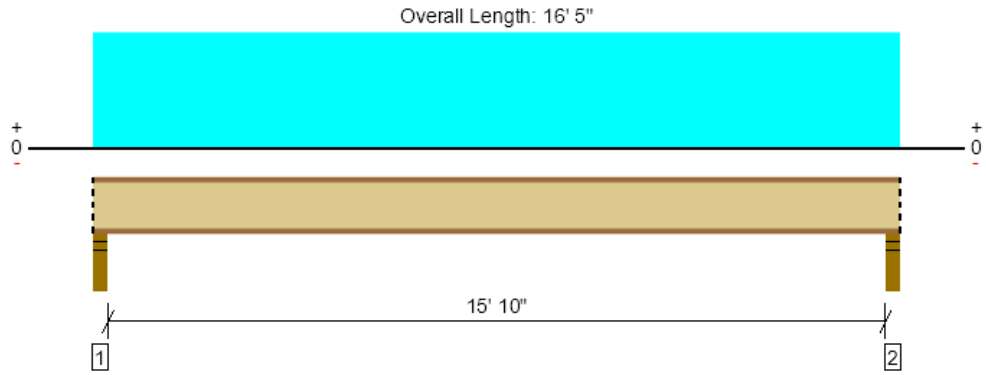
Weyerhaeuser

Upper Floor, Floor: Joist 2b
1 piece(s) 11 7/8" TJI® 110 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	602 @ 2 1/2"	1375 (3.50")	Passed (44%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	581 @ 3 1/2"	1560	Passed (37%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2347 @ 8' 2 1/2"	3160	Passed (74%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.265 @ 8' 2 1/2"	0.533	Passed (L/725)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.364 @ 8' 2 1/2"	0.800	Passed (L/527)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	48	45	Passed	--	--

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: 1/2" Gypsum ceiling.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.75"	164	438	602	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.75"	164	438	602	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 8" o/c	
Bottom Edge (Lu)	16' 5" o/c	

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

Vertical Load	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 16' 5"	16"	15.0	40.0	Default Load

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ForteWEB Software Operator	Job Notes
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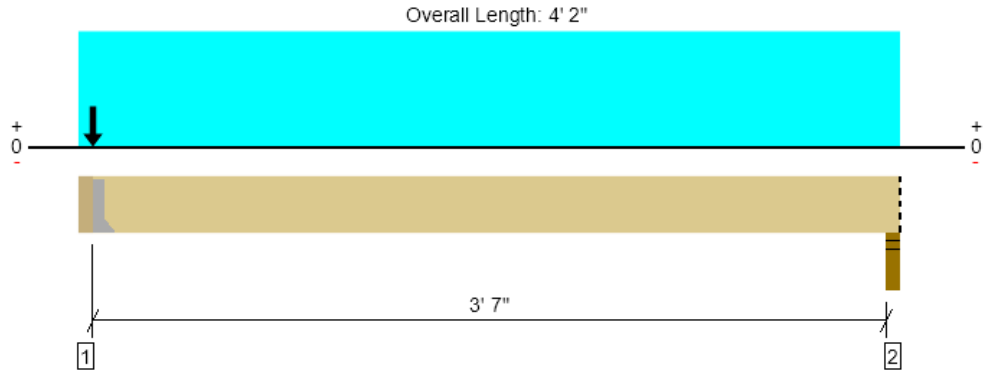
Weyerhaeuser

Upper Floor, Floor: Drop Beam 3

1 piece(s) 3 1/2" x 11 7/8" 1.55E TimberStrand® LSL

An excessive uplift of -2521 lbs at support located at 3 1/2" failed this product.



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4192 @ 3 1/2"	4725 (1.50")	Passed (89%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	843 @ 1' 3 3/8"	9878	Passed (9%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	1677 @ 2' 1 3/4"	18346	Passed (9%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.005 @ 2' 1 3/4"	0.124	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.011 @ 2' 1 3/4"	0.185	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Hanger on 11 7/8" HF beam	3.50"	Hanger[1]	1.50"	1095	633	693	4540/-4540	4473/-2521	See note [1]
2 - Stud wall - HF	3.50"	3.50"	1.50"	1035	596	653	-	1971	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 11" o/c	
Bottom Edge (Lu)	3' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

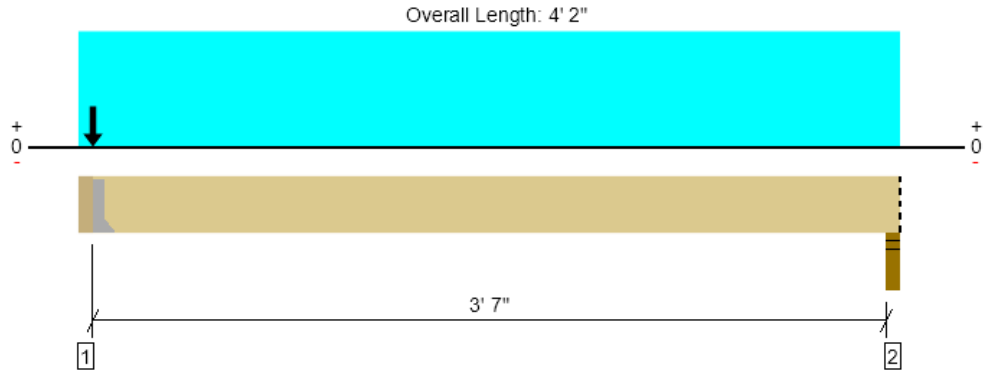
Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	HHUS410	3.00"	N/A	30-16d	10-16d	

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

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	3 1/2" to 4' 2"	N/A	13.0	--	--	--	
1 - Uniform (PSF)	0 to 4' 2" (Front)	5' 4 1/2"	15.0	40.0	-	-	
2 - Uniform (PSF)	0 to 4' 2" (Front)	1' 4"	30.0	60.0	-	-	
3 - Uniform (PLF)	0 to 4' 2" (Front)	N/A	120.0	-	-	-	
4 - Uniform (PSF)	0 to 4' 2" (Front)	12' 11"	20.0	-	25.0	-	
5 - Point (lb)	3 1/2" (Front)	N/A	-	-	-	4540	

Upper Floor, Floor: Drop Beam 3 (OVERSTRENGTH)
1 piece(s) 3 1/2" x 11 7/8" 1.55E TimberStrand® LSL

An excessive uplift of -7288 lbs at support located at 3 1/2" failed this product.



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	8894 @ 3 1/2"	8894 (2.82")	Passed (100%)	--	1.0 D + 0.7 E (All Spans)
Shear (lbs)	843 @ 1' 3 3/8"	9878	Passed (9%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	1677 @ 2' 1 3/4"	18346	Passed (9%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.005 @ 2' 1 3/4"	0.124	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.011 @ 2' 1 3/4"	0.185	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Hanger on 11 7/8" HF beam	3.50"	Hanger[1]	2.82"	1095	633	693	11350/-11350	9040/-7288	See note [1]
2 - Stud wall - HF	3.50"	3.50"	1.50"	1035	596	653	-	1971	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 11" o/c	
Bottom Edge (Lu)	3' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	HGU3.63/11-SDS	5.25"	N/A	36-SDS25212	24-SDS25212	

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

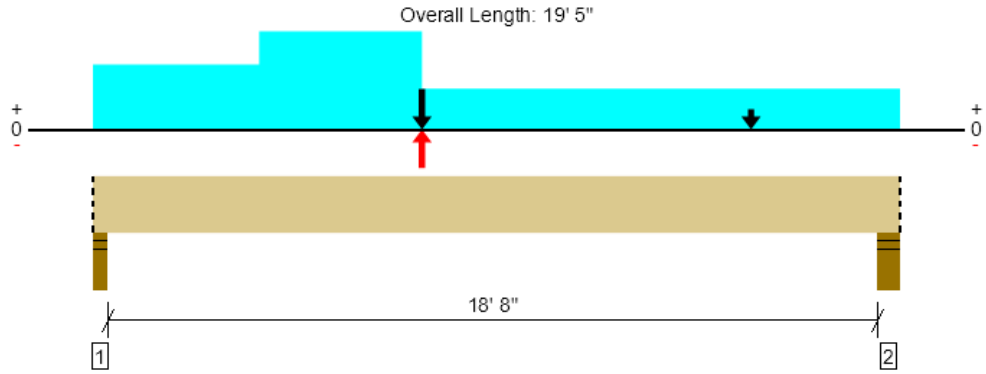
Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	3 1/2" to 4' 2"	N/A	13.0	--	--	--	
1 - Uniform (PSF)	0 to 4' 2" (Front)	5' 4 1/2"	15.0	40.0	-	-	
2 - Uniform (PSF)	0 to 4' 2" (Front)	1' 4"	30.0	60.0	-	-	
3 - Uniform (PLF)	0 to 4' 2" (Front)	N/A	120.0	-	-	-	
4 - Uniform (PSF)	0 to 4' 2" (Front)	12' 11"	20.0	-	25.0	-	
5 - Point (lb)	3 1/2" (Front)	N/A	-	-	-	11350	4540 11350

Upper Floor, Floor: Drop Beam 4

1 piece(s) 5 1/4" x 11 7/8" 2.2E Parallam® PSL

An excessive uplift of -3765 lbs at support located at 2" failed this product.

An excessive uplift of -2382 lbs at support located at 19' 1" failed this product.



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	6520 @ 2"	7442 (3.50")	Passed (88%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Shear (lbs)	6246 @ 1' 3 3/8"	19285	Passed (32%)	1.60	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Moment (Ft-lbs)	44448 @ 7' 11"	47766	Passed (93%)	1.60	1.0 D + 0.7 E (All Spans) [1]
Live Load Defl. (in)	0.429 @ 9' 8 7/16"	0.631	Passed (L/529)	--	1.0 D + 1.0 L (All Spans) [1]
Total Load Defl. (in)	0.749 @ 9' 6 7/8"	0.946	Passed (L/303)	--	1.0 D + 1.0 L (All Spans) [1]

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

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

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Stud wall - HF	3.50"	3.50"	3.07"	1541	1963	-14	6700/-6700	6520/-3765	Blocking
2 - Stud wall - HF	5.50"	5.50"	2.69"	1455	2449	-9	4650/-4650	5726/-2382	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	19' 5" o/c	
Bottom Edge (Lu)	19' 5" o/c	

•Maximum allowable bracing intervals based on applied load.

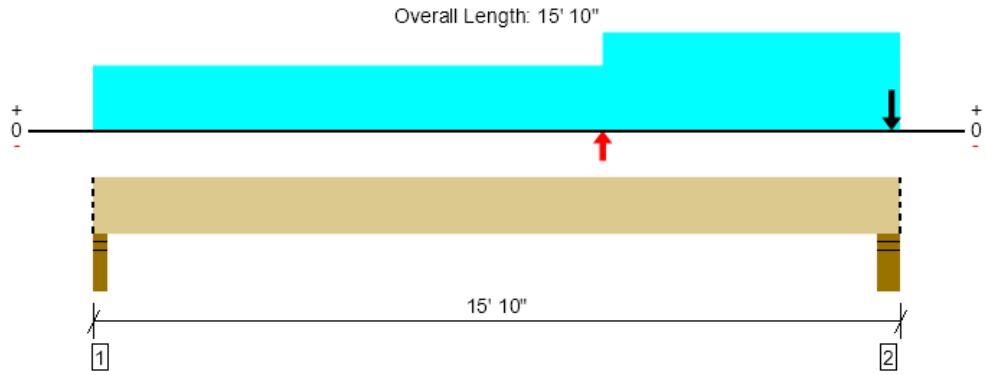
Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 19' 5"	N/A	19.5	--	--	--	
1 - Uniform (PSF)	0 to 19' 5" (Front)	1' 4"	15.0	40.0	-	-	
2 - Uniform (PSF)	7' 11" to 19' 5" (Front)	1' 4"	15.0	40.0	-	-	
3 - Uniform (PSF)	0 to 7' 11" (Front)	1' 9 1/2"	30.0	60.0	-	-	
4 - Uniform (PLF)	4' to 7' 11" (Front)	N/A	120.0	-	-	-	
5 - Point (lb)	15' 10" (Front)	N/A	533	1279	-	-	Linked from: Floor: Drop Beam 4B, Support 1
6 - Point (lb)	7' 11" (Front)	N/A	1095	633	693	11350/-11350	Linked from: Floor: Drop Beam 3 (OVERSTRENGTH), Support 1
7 - Point (lb)	7' 11" (Front)	N/A	-524	-	-716	-	Linked from: Roof: Drop Beam 18, Support 2

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Upper Floor, Floor: Drop Beam 5

1 piece(s) 5 1/4" x 11 7/8" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1940 @ 2"	7442 (3.50")	Passed (26%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1771 @ 14' 4 5/8"	12053	Passed (15%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	7087 @ 7' 7 5/8"	29854	Passed (24%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.132 @ 7' 10"	0.511	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.200 @ 7' 10 1/8"	0.767	Passed (L/918)	--	1.0 D + 1.0 L (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	680	1260	-274	1940	Blocking
2 - Stud wall - HF	5.50"	5.50"	1.50"	1748	1287	405	3035	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	15' 10" o/c	
Bottom Edge (Lu)	15' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 15' 10"	N/A	19.5	--	--	
1 - Uniform (PSF)	0 to 15' 10" (Front)	1' 4"	15.0	40.0	-	Default Load
2 - Uniform (PSF)	0 to 15' 10" (Front)	1' 9 1/2"	30.0	60.0	-	
3 - Uniform (PLF)	10' to 15' 10" (Front)	N/A	120.0	-	-	
4 - Point (lb)	10' (Front)	N/A	-470	-	-763	Linked from: Roof: Drop Beam 17, Support 2
5 - Point (lb)	15' 8" (Front)	N/A	722	-	894	Linked from: Roof: Drop Beam 21, Support 1

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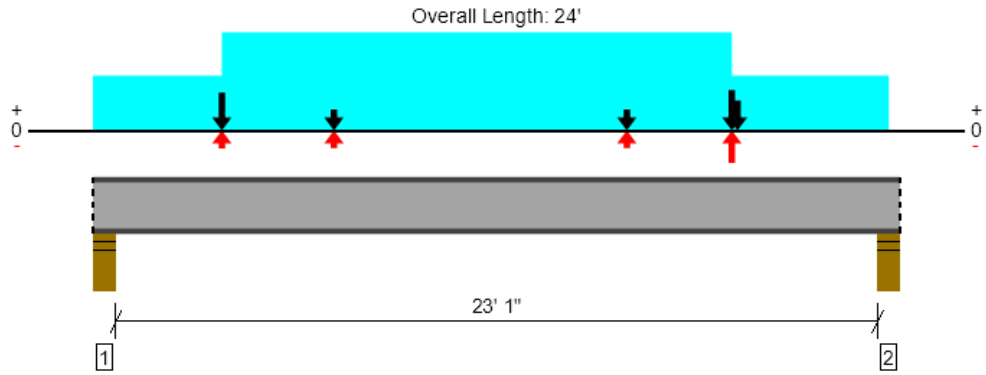
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Upper Floor, Floor: Drop Beam 6

1 piece(s) W12X53 (A992) ASTM Steel



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	17834 @ 23' 8"	22275 (5.50")	Passed (80%)	--	1.0 D - 0.525 E + 0.75 L + 0.75 S (All Spans) [7]
Shear (lbs)	17769 @ 23' 6 1/2"	83490	Passed (21%)	--	1.0 D - 0.525 E + 0.75 L + 0.75 S (All Spans) [7]
Moment (Ft-lbs)	91327 @ 13' 8 1/2"	141113	Passed (65%)	--	1.0 D - 0.525 E + 0.75 L + 0.75 S (All Spans) [5]
Live Load Defl. (in)	0.365 @ 12' 3/8"	0.778	Passed (L/767)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [5]
Total Load Defl. (in)	0.691 @ 12' 5/8"	1.167	Passed (L/405)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [5]

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Bearing reinforcement may be required for point load located at 19' 1".
- Applicable calculations are based on ANSI/AISC 360-16.
- A lateral-torsional buckling factor (Cb) of 1.0 has been assumed.

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Stud wall - HF	5.50"	5.50"	5.50"	7761	6469	4602	1340/-1340	16768	Blocking
2 - Stud wall - HF	5.50"	5.50"	5.50"	7322	6500	3765	5360/-5360	17834	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 24'	N/A	53.0	--	--	--	
1 - Uniform (PLF)	0 to 23' 8"	N/A	91.5	182.3	-	-	Linked from: Floor: Joist 1, Support 1
2 - Uniform (PSF)	3' 10" to 19'	7' 10"	15.0	40.0	-	-	
3 - Uniform (PSF)	0 to 3' 10"	1' 4"	30.0	60.0	-	-	
4 - Uniform (PSF)	19' to 23' 8"	1' 4"	30.0	60.0	-	-	
5 - Point (lb)	3' 10"	N/A	520	-	636	-	Linked from: Roof: Drop Beam 20, Support 1
6 - Point (lb)	7' 2"	N/A	520	-	636	-	Linked from: Roof: Drop Beam 20, Support 1
7 - Point (lb)	15' 10 1/2"	N/A	520	-	636	-	Linked from: Roof: Drop Beam 20, Support 1
8 - Point (lb)	19' 2"	N/A	520	-	636	-	Linked from: Roof: Drop Beam 20, Support 1
9 - Point (lb)	7' 2"	N/A	93	-	362/-196	-	Linked from: Roof: Drop Beam 19, Support 1
10 - Point (lb)	15' 10 1/2"	N/A	93	-	362/-196	-	Linked from: Roof: Drop Beam 19, Support 1
11 - Point (lb)	3' 10"	N/A	2879	-	3191	-	Linked from: Roof: Drop Beam 17, Support 1
12 - Point (lb)	19' 2"	N/A	2157	-	2196	-	Linked from: Roof: Drop Beam 18, Support 1
13 - Point (lb)	19'	N/A	1541	1963	-14	6700/-6700	Linked from: Floor: Drop Beam 4, Support 1
14 - Point (lb)	3' 10"	N/A	680	1260	-274	-	Linked from: Floor: Drop Beam 5, Support 1

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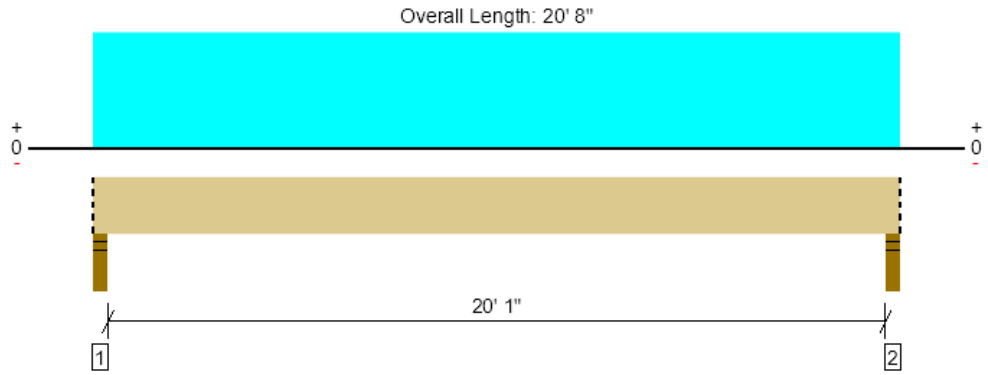
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Upper Floor, Floor: Drop Beam 7

1 piece(s) 5 1/4" x 11 7/8" 2.0E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3030 @ 2"	7442 (3.50")	Passed (41%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	2654 @ 1' 3 3/8"	12053	Passed (22%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	15155 @ 10' 4"	29854	Passed (51%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.496 @ 10' 4"	0.678	Passed (L/492)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.798 @ 10' 4"	1.017	Passed (L/306)	--	1.0 D + 1.0 L (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	1147	1883	3030	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	1147	1883	3030	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	20' 8" o/c	
Bottom Edge (Lu)	20' 8" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 20' 8"	N/A	19.5	--	
1 - Uniform (PLF)	0 to 20' 8" (Front)	N/A	91.5	182.3	Linked from: Floor: Joist 1, Support 1

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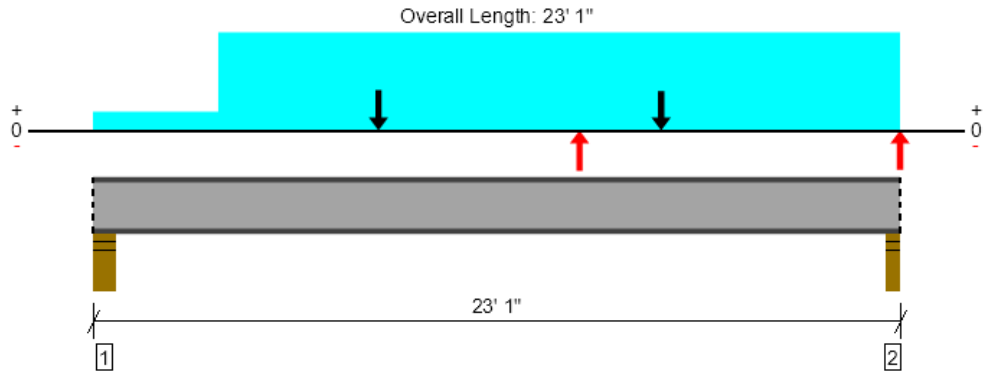
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Upper Floor, Floor: Drop Beam 8A
1 piece(s) W10X54 (A992) ASTM Steel



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	10051 @ 22' 11"	14175 (3.50")	Passed (71%)	--	1.0 D - 0.525 E + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	9770 @ 22' 9 1/2"	74740	Passed (13%)	--	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	54764 @ 11' 10"	132351	Passed (41%)	--	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.245 @ 11' 8 7/16"	0.753	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.568 @ 11' 8 5/16"	1.129	Passed (L/477)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Stud wall - HF	5.50"	5.50"	5.50"	4507	854	3207	1214/-1214	8190	Blocking
2 - Stud wall - HF	3.50"	3.50"	3.50"	5681	627	4349	1214/-1214	10051	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	End Bearing Points	
Bottom Edge (Lu)	End Bearing Points	

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 23' 1"	N/A	54.0	--	--	--	
1 - Uniform (PSF)	0 to 23' 1"	1' 4"	15.0	40.0	-	-	Default Load
2 - Uniform (PSF)	0 to 3' 7"	1' 9"	15.0	40.0	-	-	
3 - Uniform (PLF)	3' 7" to 23' 1"	N/A	120.0	-	-	-	wall above
4 - Uniform (PSF)	3' 7" to 23' 1"	15' 6"	20.0	-	25.0	-	
5 - Point (lb)	8' 2"	N/A	-	-	-	2230	
6 - Point (lb)	13' 11"	N/A	-	-	-	-2230	
7 - Point (lb)	16' 3"	N/A	-	-	-	2190	
8 - Point (lb)	23' 1"	N/A	-	-	-	-2190	

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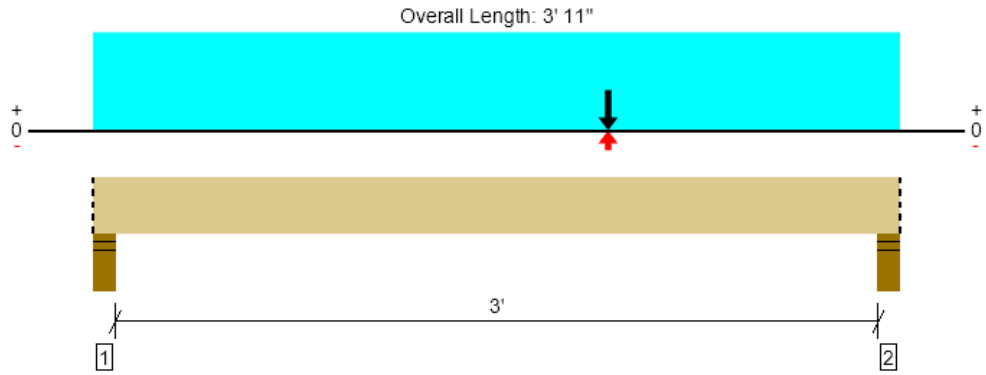
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Upper Floor, Floor: Drop Beam 8B

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



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	8122 @ 3' 7"	11694 (5.50")	Passed (69%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Shear (lbs)	7039 @ 2' 10 1/4"	8317	Passed (85%)	1.15	1.0 D + 1.0 S (All Spans) [1]
Moment (Ft-lbs)	7706 @ 2' 6"	12273	Passed (63%)	1.15	1.0 D + 1.0 S (All Spans) [1]
Live Load Defl. (in)	0.023 @ 2' 6"	0.108	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Total Load Defl. (in)	0.055 @ 2' 6"	0.162	Passed (L/703)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]

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

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

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Stud wall - HF	5.50"	5.50"	2.24"	2567	1110	1548	405/-405	4772	Blocking
2 - Stud wall - HF	5.50"	5.50"	3.82"	4460	1319	2997	809/-809	8122	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 11" o/c	
Bottom Edge (Lu)	3' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 3' 11"	N/A	11.1	--	--	--	
1 - Uniform (PSF)	0 to 3' 11" (Front)	11' 6"	15.0	40.0	-	-	
2 - Uniform (PSF)	0 to 3' 11" (Front)	1'	120.0	-	-	-	
3 - Uniform (PSF)	0 to 3' 11" (Front)	2'	20.0	-	25.0	-	
4 - Point (lb)	2' 6" (Front)	N/A	5681	627	4349	1214/-1214	Linked from: Floor: Drop Beam 8A, Support 2

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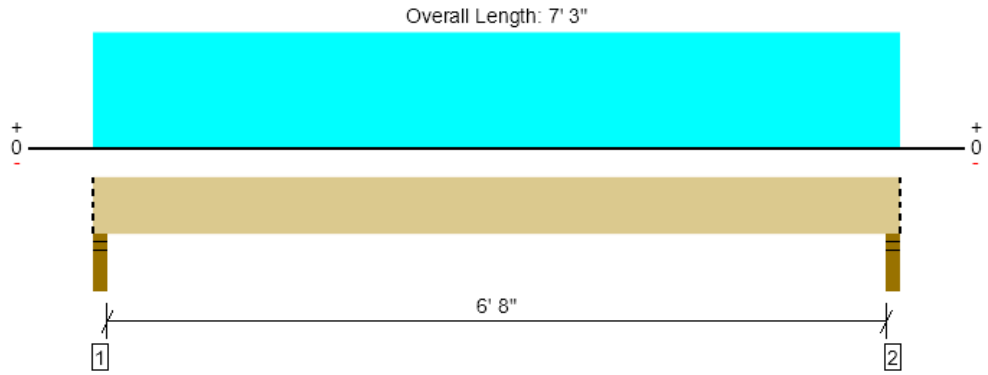
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Upper Floor, Floor: Drop Beam 9
2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	286 @ 2"	4253 (3.50")	Passed (7%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	215 @ 10 3/4"	2175	Passed (10%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	471 @ 3' 7 1/2"	2234	Passed (21%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.022 @ 3' 7 1/2"	0.231	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.033 @ 3' 7 1/2"	0.346	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	92	193	286	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	92	193	286	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	7' 3" o/c	
Bottom Edge (Lu)	7' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 7' 3"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 7' 3" (Front)	1' 4"	15.0	40.0	Default Load

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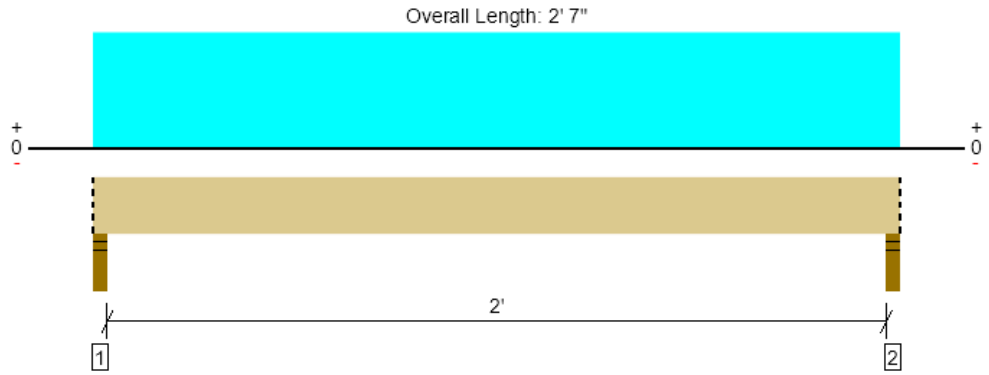
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Upper Floor, Floor: Drop Beam 10
2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	888 @ 2"	4253 (3.50")	Passed (21%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	272 @ 10 3/4"	2501	Passed (11%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	435 @ 1' 3 1/2"	2569	Passed (17%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.001 @ 1' 3 1/2"	0.075	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.003 @ 1' 3 1/2"	0.112	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	476	293	256	888	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	476	293	256	888	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	2' 7" o/c	
Bottom Edge (Lu)	2' 7" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 2' 7"	N/A	5.5	--	--	
1 - Uniform (PSF)	0 to 2' 7" (Front)	5' 8"	15.0	40.0	-	Default Load
2 - Uniform (PLF)	0 to 2' 7" (Front)	N/A	120.0	-	-	
3 - Uniform (PSF)	0 to 2' 7" (Front)	7' 11"	20.0	-	25.0	

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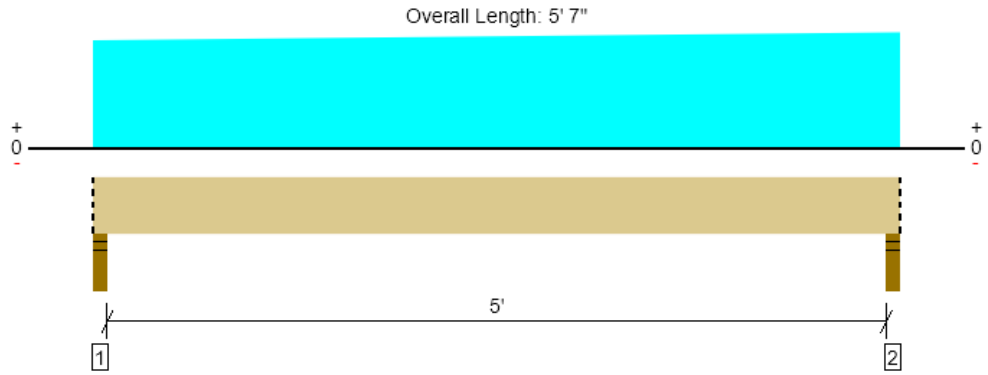
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Upper Floor, Floor: Drop Beam 11
2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	741 @ 5' 5"	4253 (3.50")	Passed (17%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	499 @ 4' 8 1/4"	2175	Passed (23%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	903 @ 2' 9 11/16"	2234	Passed (40%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.026 @ 2' 9 9/16"	0.175	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.036 @ 2' 9 9/16"	0.262	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	208	515	723	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	213	528	741	Blocking

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 5' 7"	N/A	5.5	--	
1 - Tapered (PSF)	0 to 5' 7" (Front)	4' 6" to 4' 10"	15.0	40.0	Default Load

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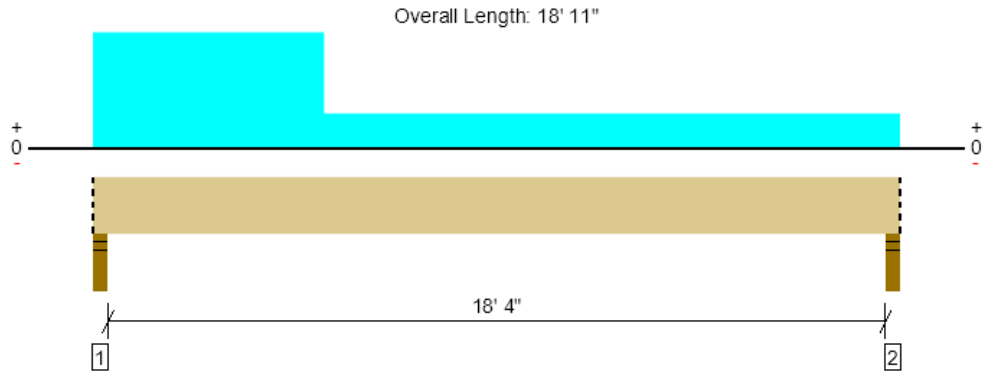
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Upper Floor, Floor: Drop Beam 12

1 piece(s) 3 1/2" x 9 1/2" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1606 @ 2"	4961 (3.50")	Passed (32%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1327 @ 1' 1"	6428	Passed (21%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	4914 @ 7' 11"	13057	Passed (38%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.383 @ 9' 1 5/16"	0.619	Passed (L/582)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.578 @ 9' 1 11/16"	0.929	Passed (L/385)	--	1.0 D + 1.0 L (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	510	1097	1606	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	323	598	921	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	18' 11" o/c	
Bottom Edge (Lu)	18' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 18' 11"	N/A	10.4	--	
1 - Uniform (PSF)	0 to 18' 11" (Front)	1' 4"	15.0	40.0	Default Load
2 - Uniform (PSF)	0 to 5' 5" (Front)	3' 2"	15.0	40.0	

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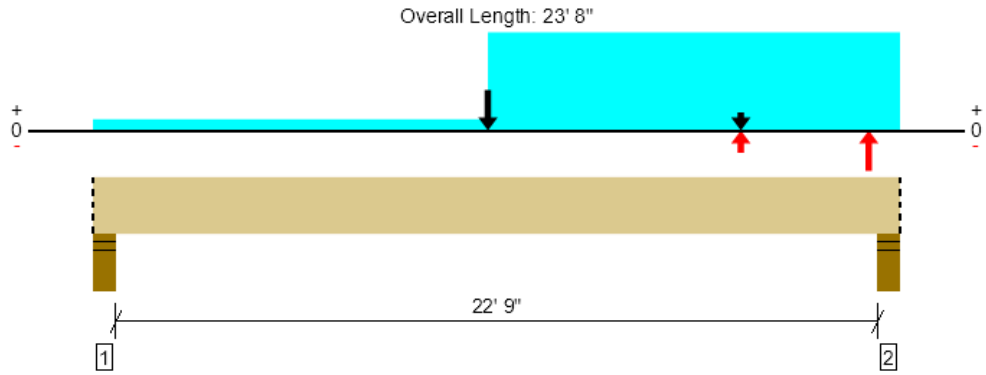
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Upper Floor, Floor: Drop Beam 14 (new)
1 piece(s) 7" x 11 7/8" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	5998 @ 23' 4"	15593 (5.50")	Passed (38%)	--	1.0 D - 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Shear (lbs)	4786 @ 22' 2 5/8"	18481	Passed (26%)	1.15	1.0 D + 1.0 S (All Spans) [1]
Moment (Ft-lbs)	24653 @ 14' 2"	45776	Passed (54%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Live Load Defl. (in)	0.420 @ 12' 5 11/16"	0.767	Passed (L/658)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Total Load Defl. (in)	1.048 @ 12' 5 15/16"	1.150	Passed (L/263)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Member should be side-loaded from both sides of the member or braced to prevent rotation.

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Stud wall - HF	5.50"	5.50"	1.50"	1484	631	761	811/-811	2954	Blocking
2 - Stud wall - HF	5.50"	5.50"	2.12"	3361	631	2317	811/-811	5998	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	23' 8" o/c	
Bottom Edge (Lu)	23' 8" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 23' 8"	N/A	26.0	--	--	--	
1 - Uniform (PSF)	0 to 11' 7" (Front)	1' 4"	15.0	40.0	-	-	
2 - Uniform (PSF)	11' 7" to 23' 8" (Front)	1' 4"	15.0	40.0	-	-	
3 - Uniform (PLF)	11' 7" to 23' 8" (Front)	N/A	120.0	-	-	-	(19' TO END)
4 - Point (lb)	11' 7" (Front)	N/A	-	-	-	1670	1670 4175
5 - Point (lb)	22' 9" (Front)	N/A	-	-	-	-1670	-1670 -4175
6 - Uniform (PSF)	11' 7" to 23' 8" (Front)	10'	20.0	-	25.0	-	
7 - Point (lb)	19' (Front)	N/A	-110	-	57/-255	-	Linked from: Roof: Drop Beam 37, Support 1

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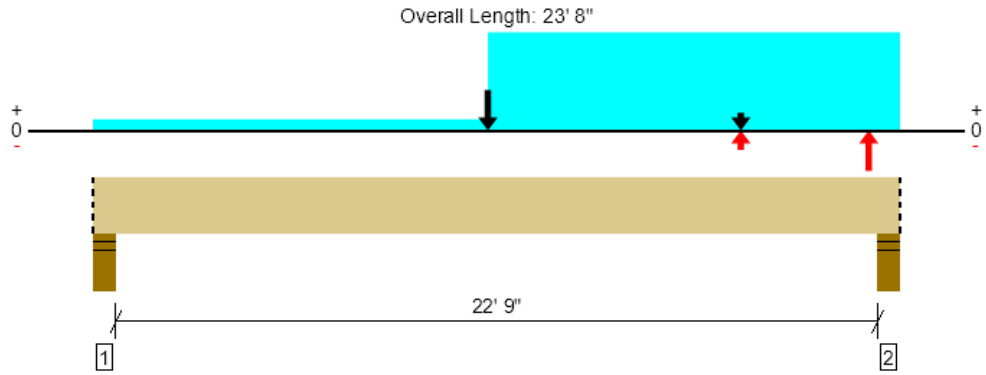
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Upper Floor, Floor: Drop Beam 14 (new) overstrength
1 piece(s) 7" x 11 7/8" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	6636 @ 23' 4"	15593 (5.50")	Passed (43%)	--	1.0 D - 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Shear (lbs)	4786 @ 22' 2 5/8"	18481	Passed (26%)	1.15	1.0 D + 1.0 S (All Spans) [1]
Moment (Ft-lbs)	34785 @ 12' 3 3/16"	63688	Passed (55%)	1.60	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Live Load Defl. (in)	0.420 @ 12' 5 11/16"	0.767	Passed (L/658)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Total Load Defl. (in)	1.048 @ 12' 5 15/16"	1.150	Passed (L/263)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- -529 lbs uplift at support located at 4". Strapping or other restraint may be required.
- Member should be side-loaded from both sides of the member or braced to prevent rotation.

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Stud wall - HF	5.50"	5.50"	1.50"	1484	631	761	2027/-2027	3592/-529	Blocking
2 - Stud wall - HF	5.50"	5.50"	2.34"	3361	631	2317	2027/-2027	6636	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	23' 8" o/c	
Bottom Edge (Lu)	23' 8" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 23' 8"	N/A	26.0	--	--	--	
1 - Uniform (PSF)	0 to 11' 7" (Front)	1' 4"	15.0	40.0	-	-	
2 - Uniform (PSF)	11' 7" to 23' 8" (Front)	1' 4"	15.0	40.0	-	-	
3 - Uniform (PLF)	11' 7" to 23' 8" (Front)	N/A	120.0	-	-	-	(19' TO END)
4 - Point (lb)	11' 7" (Front)	N/A	-	-	-	4175	1670 4175
5 - Point (lb)	22' 9" (Front)	N/A	-	-	-	-4175	-1670 -4175
6 - Uniform (PSF)	11' 7" to 23' 8" (Front)	10'	20.0	-	25.0	-	
7 - Point (lb)	19' (Front)	N/A	-110	-	57/-255	-	Linked from: Roof: Drop Beam 37, Support 1

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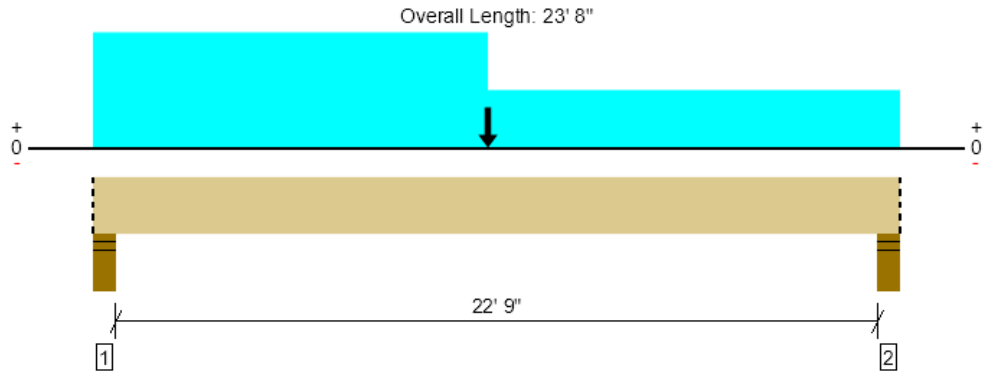
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Upper Floor, Floor: Drop Beam 15 (new)
1 piece(s) 5 1/4" x 11 7/8" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2795 @ 4"	11694 (5.50")	Passed (24%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	2555 @ 1' 5 3/8"	12053	Passed (21%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	20310 @ 11' 7"	29854	Passed (68%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.725 @ 11' 7"	0.767	Passed (L/381)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	1.093 @ 11' 7"	1.150	Passed (L/253)	--	1.0 D + 1.0 L (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - HF	5.50"	5.50"	1.50"	953	1842	2795	Blocking
2 - Stud wall - HF	5.50"	5.50"	1.50"	819	1486	2305	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	23' 8" o/c	
Bottom Edge (Lu)	23' 8" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 23' 8"	N/A	19.5	--	
1 - Uniform (PSF)	0 to 23' 8" (Front)	1' 4"	15.0	40.0	
2 - Uniform (PSF)	0 to 11' 7" (Front)	1' 4"	15.0	40.0	
3 - Point (lb)	11' 7" (Front)	N/A	606	1448	Linked from: Floor: Drop Beam 16, Support 1

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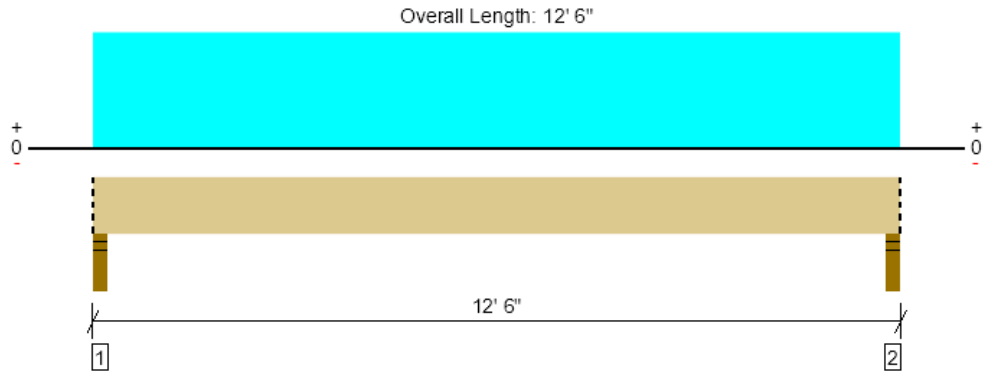
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Upper Floor, Floor: Drop Beam 16

1 piece(s) 3 1/2" x 9 1/4" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2054 @ 2"	4961 (3.50")	Passed (41%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1705 @ 1' 3/4"	6259	Passed (27%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	6081 @ 6' 3"	12416	Passed (49%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.239 @ 6' 3"	0.406	Passed (L/611)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.339 @ 6' 3"	0.608	Passed (L/431)	--	1.0 D + 1.0 L (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	606	1448	2054	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	606	1448	2054	Blocking

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 12' 6"	N/A	10.1	--	
1 - Uniform (PSF)	0 to 12' 6" (Front)	5' 9 1/2"	15.0	40.0	

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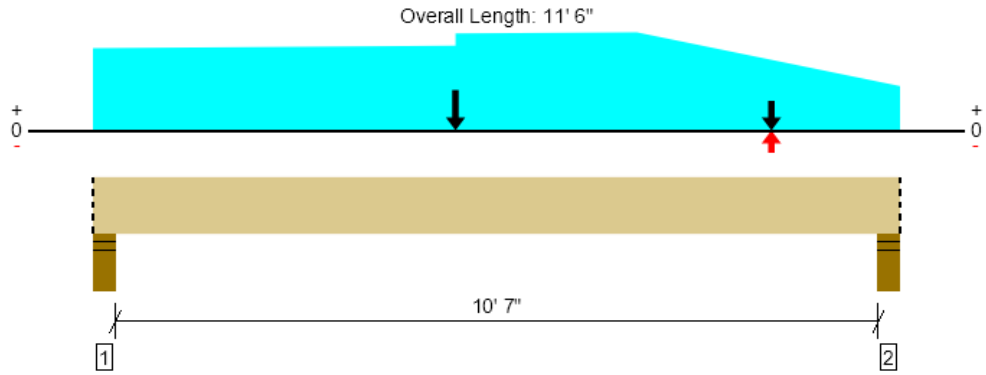
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Upper Floor, Floor: Drop Beam 17 (new)
1 piece(s) 5 1/4" x 11 7/8" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	10599 @ 11' 2"	11694 (5.50")	Passed (91%)	--	1.0 D + 0.525 E + 0.75 L + 0.75 S (All Spans) [1]
Shear (lbs)	8982 @ 10' 5/8"	13861	Passed (65%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Moment (Ft-lbs)	34151 @ 5' 2"	34332	Passed (99%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Live Load Defl. (in)	0.228 @ 5' 8 3/8"	0.361	Passed (L/571)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Total Load Defl. (in)	0.453 @ 5' 8 9/16"	0.542	Passed (L/287)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]

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

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

Supports	Bearing Length			Loads to Supports (lbs)					Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Seismic	Factored	
1 - Stud wall - HF	5.50"	5.50"	4.29"	4201	3498	2859	281/-281	9116	Blocking
2 - Stud wall - HF	5.50"	5.50"	4.99"	4965	3416	2874	1746/-1746	10599	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 8" o/c	
Bottom Edge (Lu)	11' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Seismic (1.60)	Comments
0 - Self Weight (PLF)	0 to 11' 6"	N/A	19.5	--	--	--	
1 - Uniform (PSF)	0 to 11' 6" (Front)	5' 9 1/2"	15.0	40.0	-	-	
2 - Uniform (PLF)	5' 2" to 11' 6" (Front)	N/A	120.0	-	-	-	
3 - Tapered (PSF)	0 to 7' 9" (Front)	9' to 9' 8"	15.0	40.0	-	-	
4 - Tapered (PSF)	7' 9" to 11' 6" (Front)	9' 8" to 0	15.0	40.0	-	-	
5 - Point (lb)	9' 8" (Front)	N/A	1484	631	761	2027/-2027	Linked from: Floor: Drop Beam 14 (new) overstrength, Support 1
6 - Point (lb)	5' 2" (Front)	N/A	4342	-	4972	-	Linked from: Roof: Drop Beam 31, Support 2

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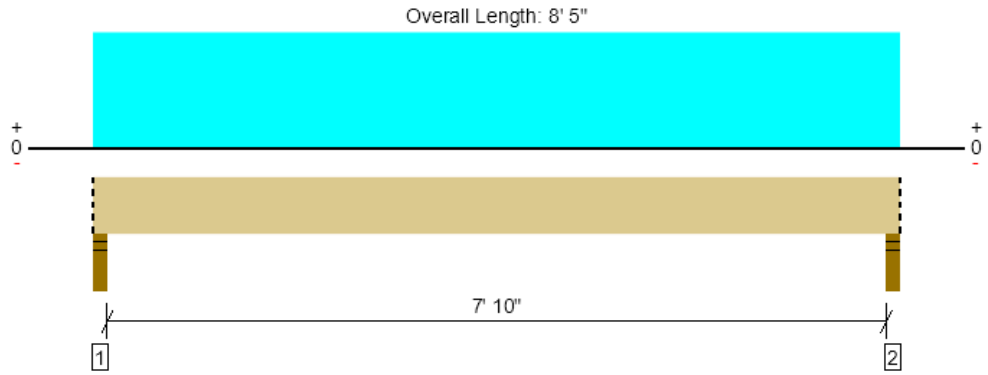
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Upper Floor, Floor: Drop Beam 18
3 piece(s) 2 x 10 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3001 @ 2"	6379 (3.50")	Passed (47%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2243 @ 1' 3/4"	4787	Passed (47%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	5824 @ 4' 2 1/2"	5750	Passed (101%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.078 @ 4' 2 1/2"	0.269	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.178 @ 4' 2 1/2"	0.404	Passed (L/546)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.65"	1686	224	1315	3001	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.65"	1686	224	1315	3001	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6" o/c	
Bottom Edge (Lu)	8' 5" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 8' 5"	N/A	10.6	--	--	
1 - Uniform (PSF)	0 to 8' 5" (Front)	1' 4"	15.0	40.0	-	
2 - Uniform (PLF)	0 to 8' 5" (Front)	N/A	120.0	-	-	
3 - Uniform (PSF)	0 to 8' 5" (Front)	12' 6"	20.0	-	25.0	

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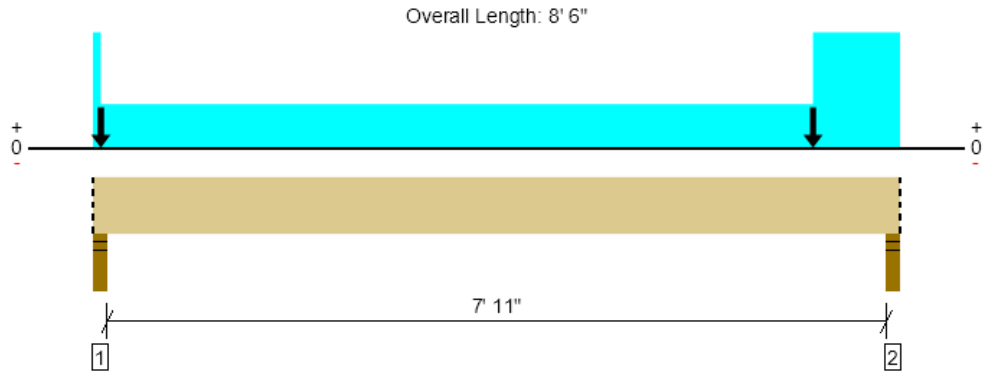
ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Upper Floor, Floor: Drop Beam 19
2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1940 @ 2"	4253 (3.50")	Passed (46%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1596 @ 7' 7 1/4"	2501	Passed (64%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1244 @ 6' 3 15/16"	2569	Passed (48%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.062 @ 4' 6 5/16"	0.272	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.118 @ 4' 6 7/8"	0.408	Passed (L/832)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.60"	948	227	992	1940	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	901	227	826	1726	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' 6" o/c	
Bottom Edge (Lu)	8' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 8' 6"	N/A	5.5	--	--	
1 - Uniform (PSF)	0 to 8' 6" (Front)	1' 4"	15.0	40.0	-	
2 - Uniform (PLF)	0 to 1" (Front)	N/A	120.0	-	-	
3 - Uniform (PLF)	7' 7" to 8' 6" (Front)	N/A	120.0	-	-	
4 - Point (lb)	1" (Front)	N/A	756	-	909	Linked from: Roof: Drop Beam 28, Support 1
5 - Point (lb)	7' 7" (Front)	N/A	756	-	909	Linked from: Roof: Drop Beam 28, Support 1

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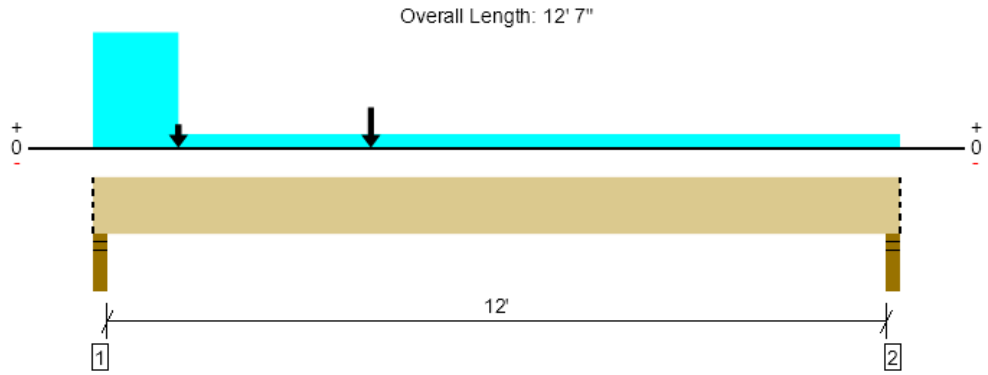
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Upper Floor, Floor: Drop Beam 20
1 piece(s) 3 1/2" x 18" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3450 @ 2"	4961 (3.50")	Passed (70%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	2495 @ 1' 9 1/2"	14007	Passed (18%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	9270 @ 4' 4"	50215	Passed (18%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Live Load Defl. (in)	0.033 @ 5' 10 1/8"	0.408	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.069 @ 5' 10 1/8"	0.613	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	2.43"	1783	1040	1184	3450	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	762	531	429	1482	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	12' 7" o/c	
Bottom Edge (Lu)	12' 7" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 12' 7"	N/A	19.7	--	--	
1 - Uniform (PSF)	0 to 12' 7" (Front)	1' 4"	15.0	40.0	-	
2 - Point (lb)	1' 4" (Front)	N/A	360	450	-	
3 - Point (lb)	4' 4" (Front)	N/A	360	450	-	
4 - Uniform (PSF)	0 to 1' 4" (Front)	12'	20.0	-	25.0	
5 - Point (lb)	4' 4" (Front)	N/A	1005	-	1213	Linked from: Roof: Drop Beam 32, Support 1

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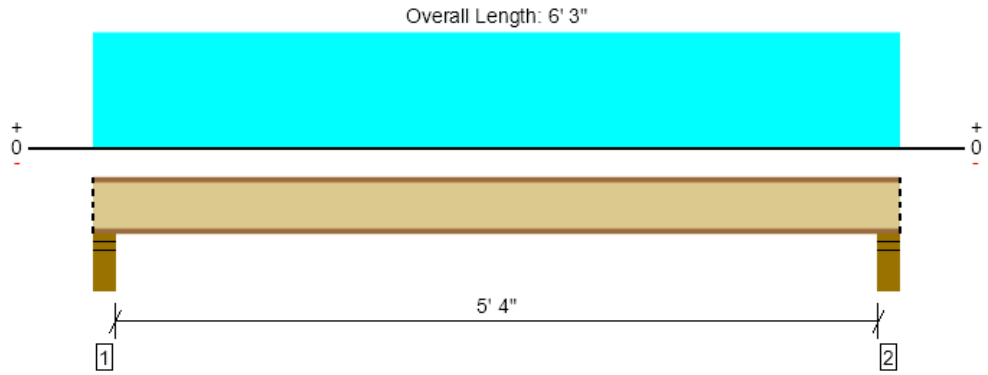
ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Upper Floor, Roof: Joist 21
1 piece(s) 11 7/8" TJI® 110 @ 24" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	281 @ 4 1/2"	1581 (3.50")	Passed (18%)	1.15	1.0 D + 1.0 S (All Spans)
Shear (lbs)	240 @ 5 1/2"	1794	Passed (13%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	340 @ 3' 1 1/2"	3634	Passed (9%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.007 @ 3' 1 1/2"	0.183	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.013 @ 3' 1 1/2"	0.275	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	5.50"	5.50"	1.75"	125	156	281	Blocking
2 - Stud wall - HF	5.50"	5.50"	1.75"	125	156	281	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 3" o/c	
Bottom Edge (Lu)	6' 3" o/c	

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

Vertical Load	Location	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 6' 3"	24"	20.0	25.0	Default Load

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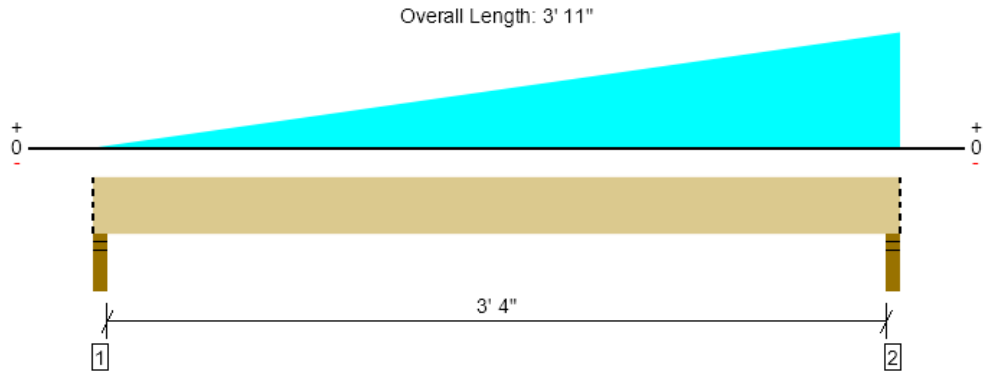
ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Upper Floor, Roof: Drop Beam 22

1 piece(s) 3 1/2" x 11 7/8" 1.55E TimberStrand® LSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	241 @ 3' 9"	4961 (3.50")	Passed (5%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	76 @ 1' 3 3/8"	9878	Passed (1%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	153 @ 2' 2 3/16"	18346	Passed (1%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.000 @ 1' 11 15/16"	0.119	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.001 @ 1' 11 7/8"	0.179	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	70	56	127	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	121	120	241	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 11" o/c	
Bottom Edge (Lu)	3' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 3' 11"	N/A	13.0	--	
1 - Tapered (PSF)	0 to 3' 11" (Front)	0 to 3' 7"	20.0	25.0	Default Load

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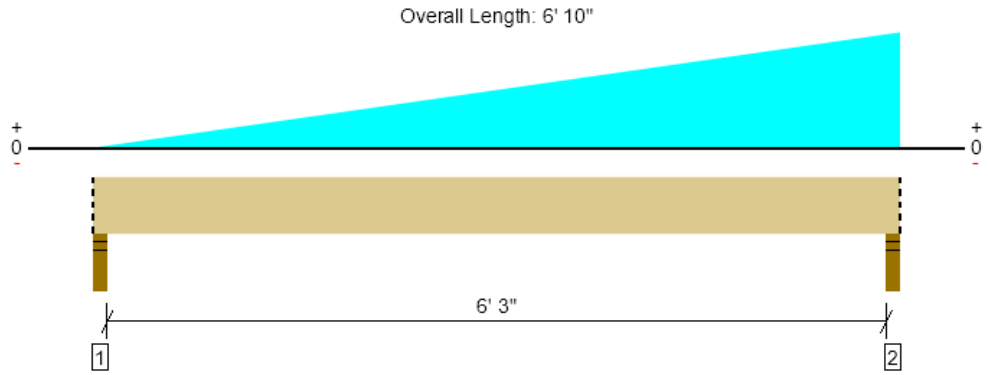
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Upper Floor, Floor: Drop Beam 23
2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	304 @ 6' 8"	4253 (3.50")	Passed (7%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	196 @ 5' 11 1/4"	2501	Passed (8%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	363 @ 3' 10 3/8"	2569	Passed (14%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.011 @ 3' 6 7/16"	0.217	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.022 @ 3' 6 3/8"	0.325	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	80	76	156	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	146	159	304	Blocking

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 6' 10"	N/A	5.5	--	
1 - Tapered (PSF)	0 to 6' 10" (Front)	0 to 2' 9"	20.0	25.0	

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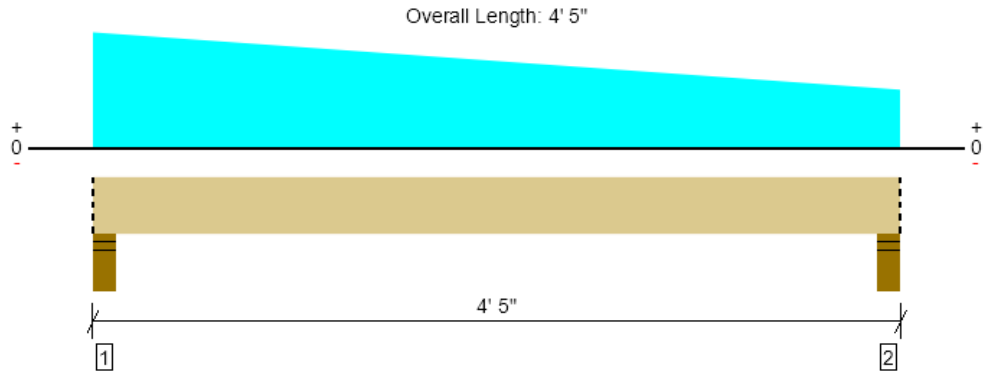
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Upper Floor, Floor: Drop Beam 24

1 piece(s) 3 1/2" x 18" 2.2E Parallam® PSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	488 @ 4"	7796 (5.50")	Passed (6%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	65 @ 2' 5 1/2"	14007	Passed (0%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	292 @ 2' 2"	39298	Passed (1%)	0.90	1.0 D (All Spans)
Live Load Defl. (in)	0.000 @ 0	0.125	Passed (2L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.001 @ 2' 2 3/8"	0.188	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	5.50"	5.50"	1.50"	388	100	488	Blocking
2 - Stud wall - HF	5.50"	5.50"	1.50"	344	44	388	Blocking

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 4' 5"	N/A	19.7	--	
1 - Tapered (PSF)	0 to 4' 5" (Front)	2' 7 1/2" to 0	20.0	25.0	
2 - Uniform (PLF)	0 to 4' 5" (Front)	N/A	120.0	-	

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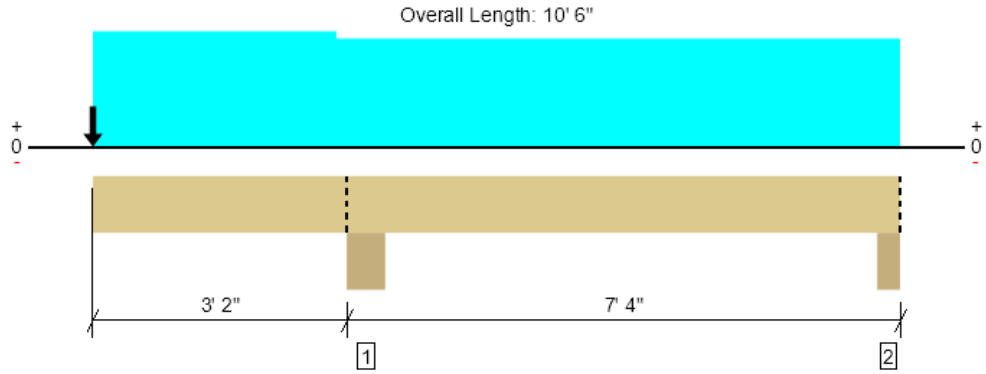
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Upper Floor, Floor: Drop Beam 25
1 piece(s) 3 1/2" x 18" 2.2E Parallam® PSL

An excessive uplift of -1144 lbs at support located at 10' 2" failed this product.



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	13869 @ 3' 6 5/8"	20234 (9.25")	Passed (69%)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	6292 @ 1' 8"	14007	Passed (45%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-22672 @ 3' 6 5/8"	50215	Passed (45%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.071 @ 0	0.237	Passed (2L/999+)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.149 @ 0	0.355	Passed (2L/574)	--	1.0 D + 1.0 S (Alt Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Overhang deflection criteria: LL (2L/360) and TL (2L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Factored	
1 - Column - HF	9.25"	9.25"	6.34"	7814	2031	6042	13869	Blocking
2 - Column - HF	5.50"	5.50"	1.50"	-131	947/-248	312/-1014	816/-1144	Blocking

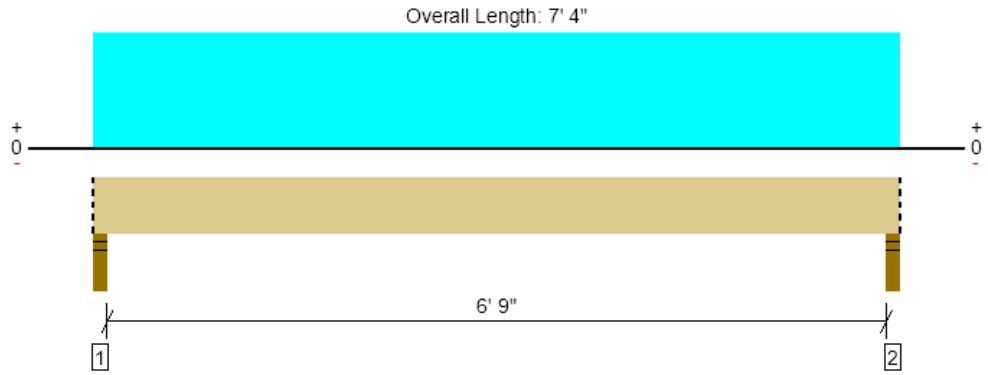
• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 10' 6"	N/A	19.7	--	--	
1 - Uniform (PSF)	0 to 10' 6" (Front)	6' 6"	15.0	40.0	-	
2 - Uniform (PSF)	0 to 3' 2" (Front)	1' 6"	20.0	-	25.0	
3 - Uniform (PLF)	0 to 10' 6" (Front)	N/A	120.0	-	-	
4 - Uniform (PSF)	0 to 10' 6" (Front)	12'	20.0	-	25.0	
5 - Point (lb)	0 (Front)	N/A	121	-	120	Linked from: Roof: Drop Beam 22, Support 2
6 - Point (lb)	0 (Front)	N/A	2069	-	2086	Linked from: Roof: Drop Beam 39, Support 1
7 - Point (lb)	0 (Front)	N/A	388	-	100	Linked from: Floor: Drop Beam 24, Support 1

Upper Floor, Floor: Drop Beam 26
2 piece(s) 2 x 8 HF No.2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	185 @ 2"	4253 (3.50")	Passed (4%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	140 @ 10 3/4"	2501	Passed (6%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	309 @ 3' 8"	2569	Passed (12%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.011 @ 3' 8"	0.233	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.022 @ 3' 8"	0.350	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	94	92	185	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	94	92	185	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	7' 4" o/c	
Bottom Edge (Lu)	7' 4" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 7' 4"	N/A	5.5	--	
1 - Uniform (PSF)	0 to 7' 4" (Front)	1'	20.0	25.0	

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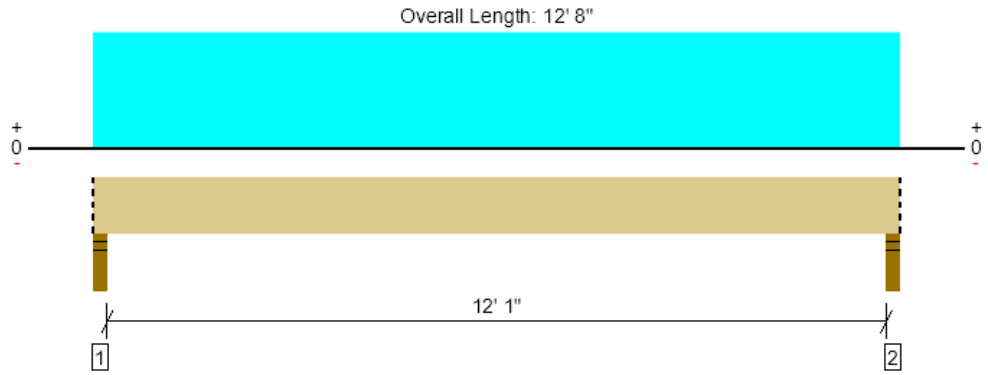
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Upper Floor, Roof: Drop Beam 27

1 piece(s) 3 1/2" x 11 7/8" 1.55E TimberStrand® LSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	367 @ 2"	4961 (3.50")	Passed (7%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	293 @ 1' 3 3/8"	9878	Passed (3%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1103 @ 6' 4"	18346	Passed (6%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.019 @ 6' 4"	0.411	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.044 @ 6' 4"	0.617	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	209	158	367	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	209	158	367	Blocking

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

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

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 12' 8"	N/A	13.0	--	
1 - Uniform (PSF)	0 to 12' 8" (Front)	1'	20.0	25.0	Default Load

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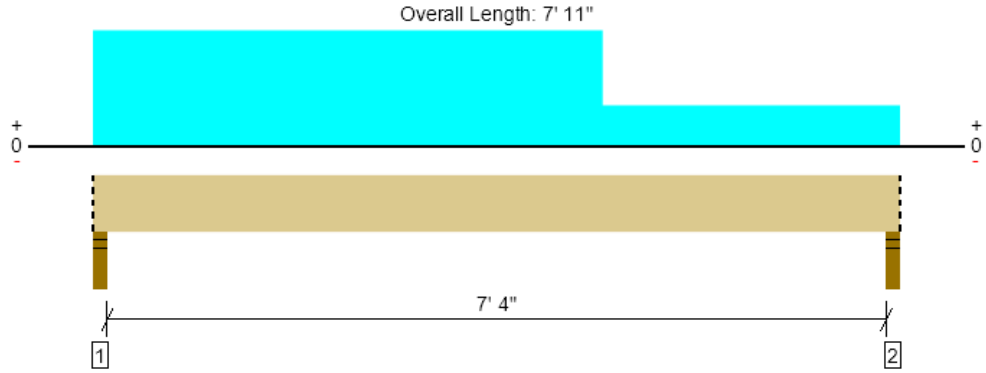
ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Upper Floor, Floor: Drop Beam 28

1 piece(s) 3 1/2" x 9 1/2" 1.55E TimberStrand® LSL



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1041 @ 2"	4961 (3.50")	Passed (21%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	731 @ 1' 1"	6872	Passed (11%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1727 @ 3' 7 3/4"	10422	Passed (17%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.037 @ 3' 10 5/8"	0.253	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.053 @ 3' 10 5/8"	0.379	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	314	727	1041	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	220	477	697	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	7' 11" o/c	
Bottom Edge (Lu)	7' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 7' 11"	N/A	10.4	--	
1 - Uniform (PSF)	0 to 5' (Front)	5'	15.0	40.0	
2 - Uniform (PSF)	5' to 7' 11" (Front)	1' 9"	15.0	40.0	

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

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

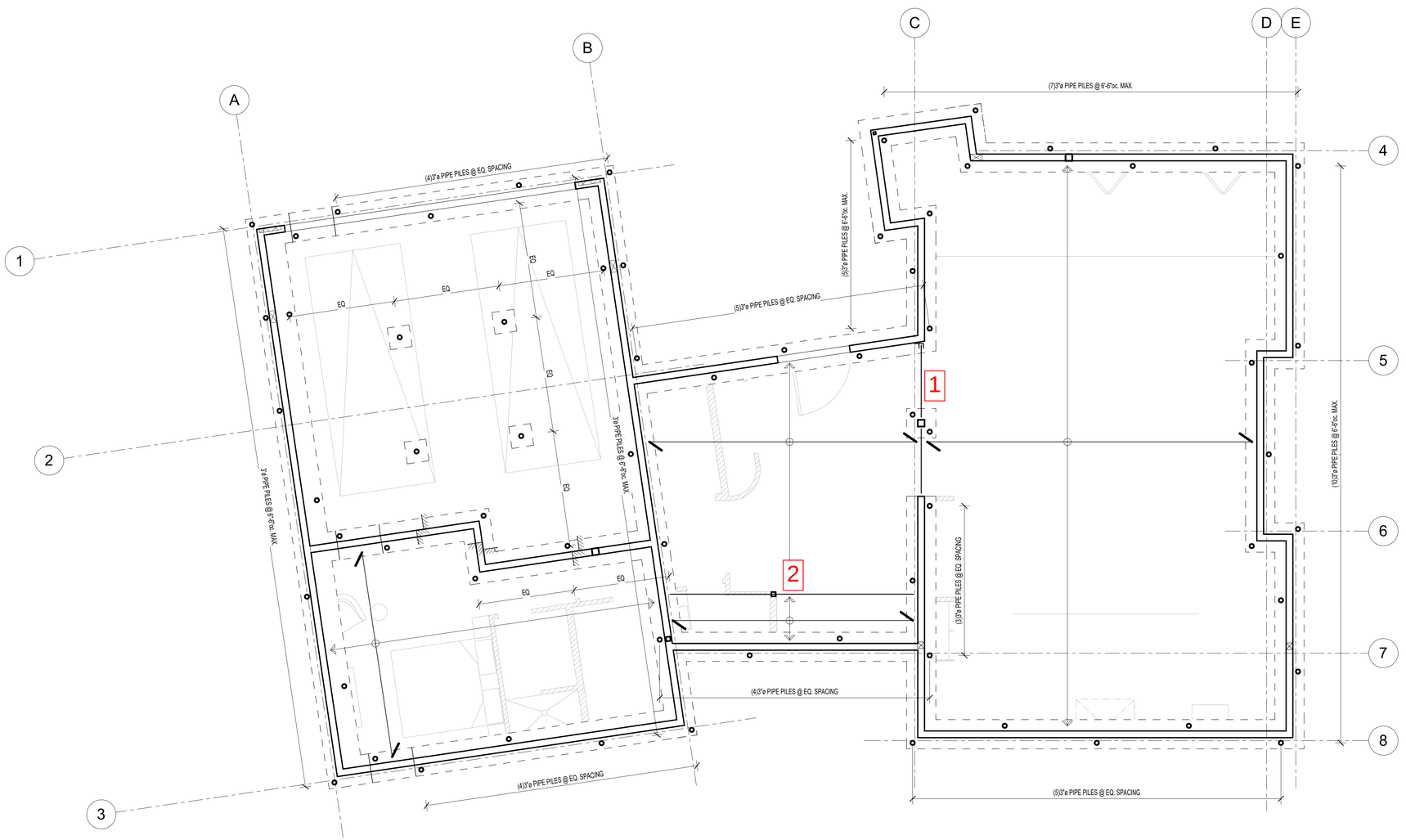
Weyerhaeuser

FOUNDATION PLAN NOTES

1. SLAB ON GRADE ELEVATION VARIES PER ARCHITECTURAL PLAN. SLAB SHALL BE 6" THICK WITH #4@18"oc. E.W. CTR'D. PREPARE SOILS AND PROVIDE MINIMUM 6-MIL VISQUEEN VAPOR BARRIER UNDER ALL SLABS. SLABS SHALL BE SUPPORTED ON MINIMUM 4 INCHES OF FREE DRAINING MATERIAL.
2. AT HOLDOWNS PROVIDE THE FOLLOWING ANCHOR BOLTS REFER TO DETAIL 8/S3.0 FOR BOLT SIZE AND DIAMETER. ALL HOLDOWN ANCHOR BOLTS SHALL BE CAST IN PLACE UNLESS OTHERWISE NOTED IN DETAIL 8/S3.0.
3. ALL ANCHORS TO BE INSTALLED AS REQUIRED BY MANUFACTURER. MINIMUM (2) 2X STUDS UNLESS OTHERWISE NOTED ON PLANS.
4. REFER TO S6.4 FOR GIRDER TRUSS LOADING DIAGRAMS

PERMANENT SHORING- PILE SCHEDULE

PILE MARK	WIDE FLANGE SIZE	MAX RETAINED HEIGHT "H" w/ FREEBOARD (ft)	MIN. EMBED. "D" (ft)
P1	W12x40	6'-0"	18'-8"
P2	W12x40	6'-0"	18'-8"
P3	W12x40	6'-0"	18'-8"
P4	W12x40	6'-0"	18'-8"
P5	W12x40	6'-0"	18'-8"
P6	W12x40	6'-0"	18'-8"
P7	W12x40	6'-0"	18'-8"
P8	W12x40	6'-0"	18'-8"
P9	W12x40	6'-0"	18'-8"
P10	W12x40	6'-0"	18'-8"
P11	W12x40	6'-0"	18'-8"
P12	W12x40	6'-0"	18'-8"



1 Main Level Framing/ Foundation Plan
1/4" = 1'-0"

CQN CARTER QUINN NOBLIN STRUCTURAL ENGINEERING

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Seattle, WA 98121
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NICHOLAS VH CARTER
STATE OF WASHINGTON
37770
STRUCTURAL
PROFESSIONAL ENGINEER

CHU RESIDENCE

SITE ANALYSIS

4332 W. Mercer Way

Mercer Island, WA 98040

Date:

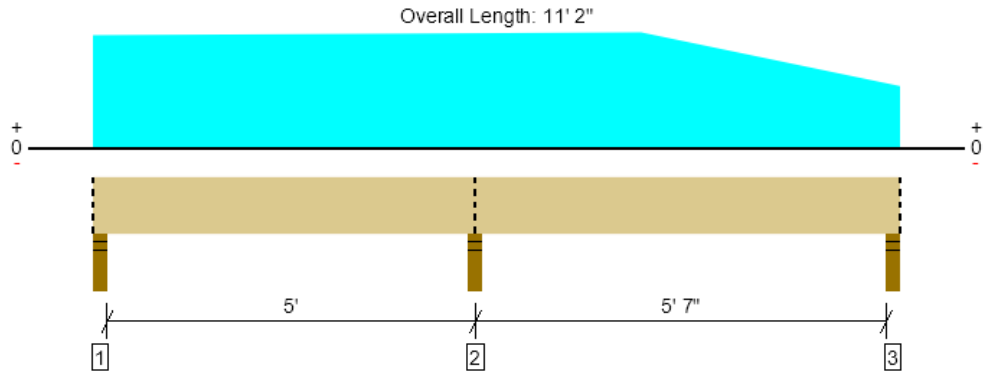
Scale:

Sheet:

Main Level Framing/ Foundation Plan

S2.0

Foundation, Floor: Drop Beam 1
1 piece(s) 6 x 8 DF No.1



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	7682 @ 5' 3 1/2"	7796 (3.50")	Passed (99%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	2995 @ 6' 3/4"	4675	Passed (64%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	-4096 @ 5' 3 1/2"	5156	Passed (79%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.040 @ 8' 3 3/16"	0.190	Passed (L/999+)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.050 @ 8' 3 3/4"	0.285	Passed (L/999+)	--	1.0 D + 1.0 L (Alt Spans)

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

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

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	659	2024/-322	2683	Blocking
2 - Stud wall - HF	3.50"	3.50"	3.45"	2147	5536	7682	Blocking
3 - Stud wall - HF	3.50"	3.50"	1.50"	576	1698/-228	2275	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	11' 2" o/c	
Bottom Edge (Lu)	11' 2" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 11' 2"	N/A	10.4	--	
1 - Tapered (PSF)	0 to 7' 7" (Front)	20' 9" to 21' 3"	15.0	40.0	
2 - Tapered (PSF)	7' 7" to 11' 2" (Front)	21' 3" to 11' 4 1/2"	15.0	40.0	

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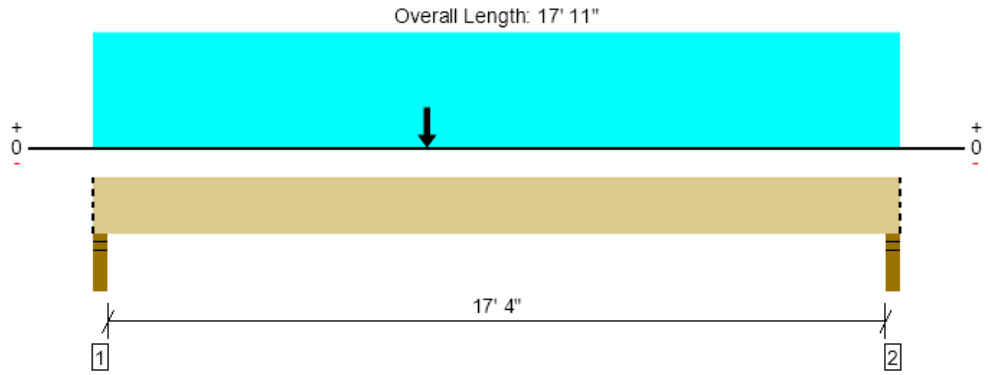
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

Weyerhaeuser

Foundation, Floor: Drop Beam 2
1 piece(s) 6 x 10 DF No.1



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1460 @ 2"	7796 (3.50")	Passed (19%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1366 @ 1' 1"	5922	Passed (23%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	8206 @ 7' 5"	9307	Passed (88%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.426 @ 8' 8 7/16"	0.586	Passed (L/495)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.644 @ 8' 8 9/16"	0.879	Passed (L/328)	--	1.0 D + 1.0 L (All Spans)

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

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Lumber grading provisions must be extended over the length of the member per NDS 4.2.5.5.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	502	958	1460	Blocking
2 - Stud wall - HF	3.50"	3.50"	1.50"	441	815	1256	Blocking

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	17' 11" o/c	
Bottom Edge (Lu)	17' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	0 to 17' 11"	N/A	13.2	--	
1 - Uniform (PSF)	0 to 17' 11" (Front)	1' 4"	15.0	40.0	Default Load
2 - Point (lb)	7' 5" (Front)	N/A	220	477	Linked from: Floor: Drop Beam 28, Support 2
3 - Point (lb)	7' 5" (Front)	N/A	128	340	STAIR TRIB

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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
Jeffrey Kranz Carter Quinn Norlin (206) 264-7784 jk@cqn-se.com	

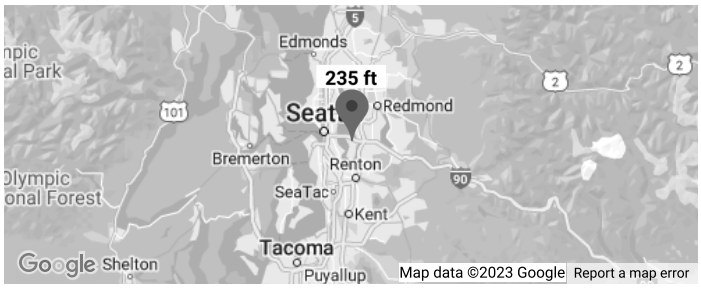
Weyerhaeuser

This is a beta release of the new ATC Hazards by Location website. Please contact us with feedback.

The ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.

Hazards by Location

Search Information



Address:	4332 W Mercer Way, Mercer Island, WA 98040, USA
Coordinates:	47.5681032, -122.2281234
Elevation:	235 ft
Timestamp:	2023-11-10T22:18:35.083Z
Hazard Type:	Seismic
Reference Document:	ASCE7-16
Risk Category:	II
Site Class:	D

Basic Parameters

Name	Value	Description
S_S	1.426	MCE_R ground motion (period=0.2s)
S_1	0.496	MCE_R ground motion (period=1.0s)
S_{MS}	1.426	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	0.951	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.902	Coefficient of risk (0.2s)
CR_1	0.897	Coefficient of risk (1.0s)
PGA	0.611	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.672	Site modified peak ground acceleration
T_L	6	Long-period transition period (s)
SsRT	1.426	Probabilistic risk-targeted ground motion (0.2s)
SsUH	1.581	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	3.758	Factored deterministic acceleration value (0.2s)
S1RT	0.496	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.552	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.489	Factored deterministic acceleration value (1.0s)
PGAd	1.274	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

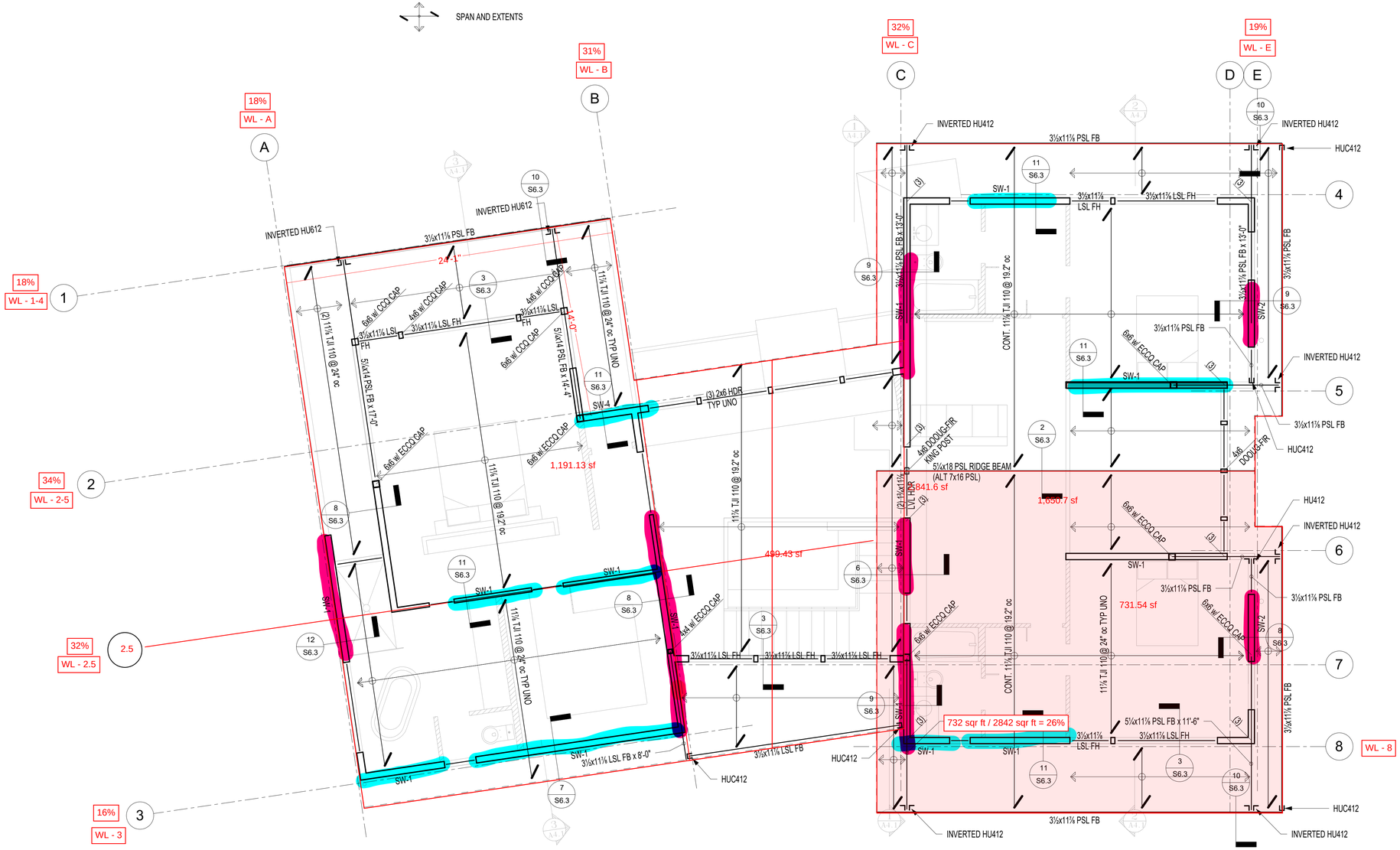
The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

FRAMING PLAN NOTES: (TYPICAL UNLESS NOTED OTHERWISE)

1. ROOF SHEATHING SHALL BE 3/4" APA RATED SHEATHING (SPAN RATING 48/24). NAIL @ ALL FRAMED PANEL EDGES AND OVER SHEARWALLS w/ 8d @ 6"oc AND 12"oc TO ALL INTERMEDIATE FRAMING. ROOF FRAMING HAS BEEN DESIGNED TO SUPPORT PHOTO-VOLTAIC PANELS.
2. ALL HEADERS AND BEAMS SHALL BE (2) 2x8 MINIMUM, U.N.O. REFER NOTE 3 FOR SUPPORT REQUIRMENTS.
3. COLUMNS SHALL BE DOUBLE STUDS MINIMUM, U.N.O., WITH BEAM OR HEADER BEARING FULLY ON COLUMN.

LEGEND

- HANGER
- COLUMNS BELOW
- COLUMNS ABOVE
- ABRUPT CHANGE IN SLAB/ FRAMING ELEVATION
- FB INDICATES FLUSH BEAM
- DB INDICATES DROPPED BEAM
- FH INDICATES FLUSH HEADER
- SPAN AND EXTENTS
- SW-x INDICATES SHEARWALL PER SCHEDULE 12/S6.0
- HDU x INDICATES SIMPSON HOLDOWN. REFER DETAIL 4/S3.1 FOR REQUIRED NUMBER OF STUDS, THREADED ROD CALLOUT & EMBEDMENT INTO CONCRETE.
- MSTCXX INDICATES SIMPSON STRAP HOLDOWN



1 Roof Framing Plan
1/4" = 1'-0"

BYKONEN CARTER QUINN
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CHU RESIDENCE
SITE ANALYSIS
4332 W. Mercer Way
Mercer Island, WA 98040

Date:

Scale:

Sheet:

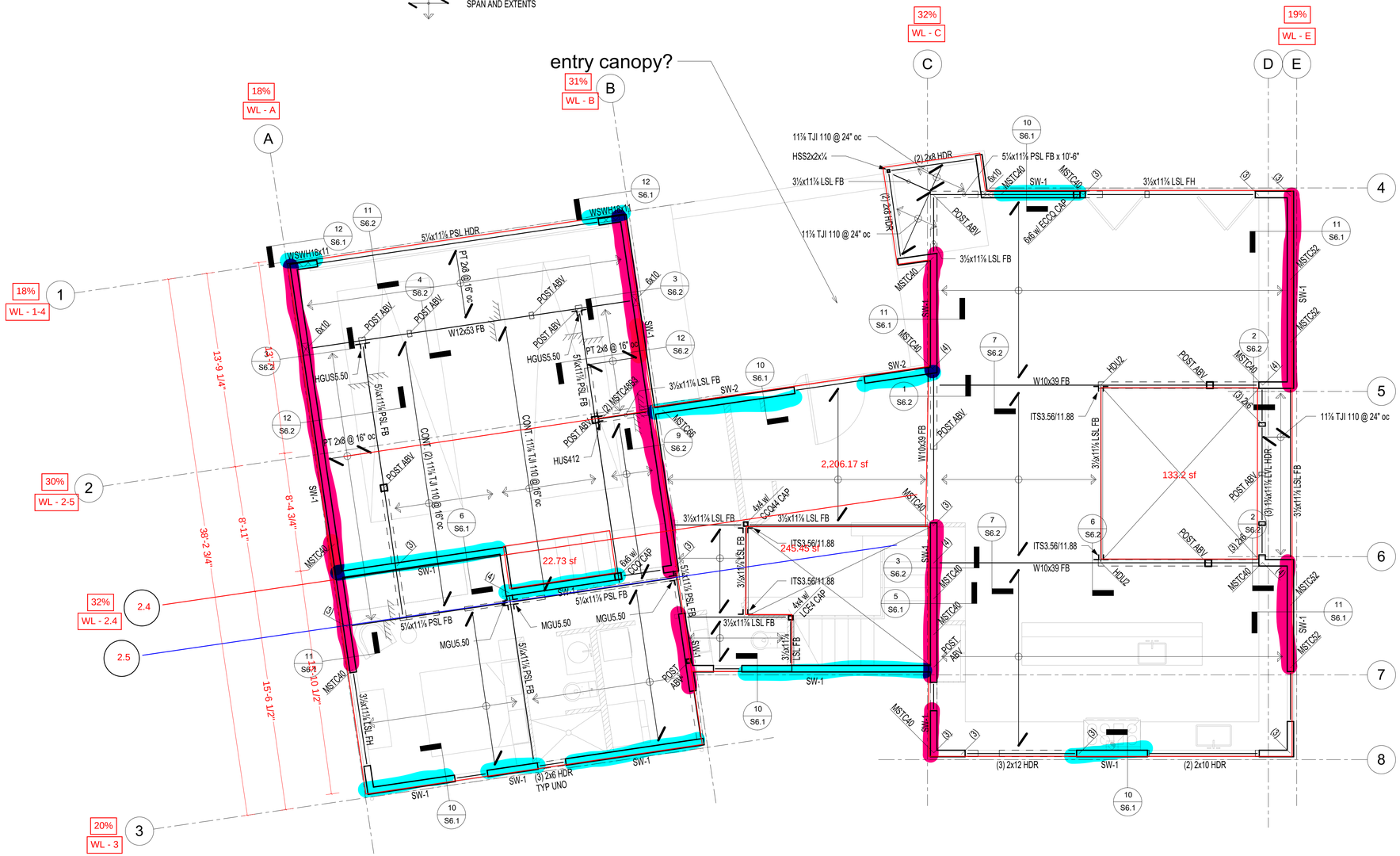
S2.2

FRAMING PLAN NOTES: (TYPICAL UNLESS NOTED OTHERWISE)

1. FLOOR SHEATHING SHALL BE 23/32" TONGUE AND GROOVE APA RATED SHEATHING (SPAN RATING 40/20). NAIL @ ALL FRAMED PANEL EDGES AND OVER SHEARWALLS w/10d @ 6"oc AND 12"oc TO ALL INTERMEDIATE FRAMING.
2. DECK SHEATHING SHALL BE 23/32" TONGUE AND GROOVE APA RATED SHEATHING (SPAN RATING 40/20). NAIL @ ALL FRAMED PANEL EDGES AND OVER SHEARWALLS w/10d @ 6"oc AND 12"oc TO ALL INTERMEDIATE FRAMING. DECK DESIGN LOADS INDICATED ON PLANS.
3. ALL HEADERS AND BEAMS SHALL BE (2) 2x8 MINIMUM, U.N.O. REFER NOTE 5 FOR SUPPORT REQUIRMENTS.
4. COLUMNS SHALL BE DOUBLE STUDS MINIMUM, U.N.O., WITH BEAM OR HEADER BEARING FULLY ON COLUMN.

LEGEND

- HANGER
- COLUMNS BELOW
- COLUMNS ABOVE
- ABRUPT CHANGE IN SLAB/ FRAMING ELEVATION
- FB — INDICATES FLUSH BEAM
- DB — INDICATES DROPPED BEAM
- FH — INDICATES FLUSH HEADER
- SPAN AND EXTENTS
- SW-x — INDICATES SHEARWALL PER SCHEDULE 12/S6.0
- HDU x — INDICATES SIMPSON HOLDOWN. REFER DETAIL 4/S3.1 FOR REQUIRED NUMBER OF STUDS, THREADED ROD CALLOUT & EMBEDMENT INTO CONCRETE.
- MSTCXX — INDICATES SIMPSON STRAP HOLDOWN



1 Upper Floor Framing Plan
1/4" = 1'-0"

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CHU RESIDENCE

SITE ANALYSIS

4332 W. Mercer Way

Mercer Island, WA 98040

Date:

Scale:

Sheet:

S2.1

Seismic

Project:

Seismic Design Parameters		
Site Class	D (default)	
Risk Category	II	*Table 1.5-1*
Importance Factor	1	*Table 1.5-2*
Ss	1.426	*From USGS*
S1	0.496	
Fa	1.000	*Table 11.4-1*
Fv	1.804	*Table 11.4-2*
Sms	1.426	*Eq. 11.4-1*
Sm1	0.895	*Eq. 11.4-2*
Sds	0.951	*Eq. 11.4-3*
Sd1	0.597	*Eq. 11.4-4*
R	6.5	*Table 12.2-1*
C_s	0.146	*Eq. 12.8-2*
k	1	*12.8.3*
Seismic Design Category	D	*Table 11.6-1*

Seismic Weight

Areas (ft^2)			
Roof	2842		area
Upper Floor	1770	Upper Floor Deck	230

Loads	
DL-Floor (psf)	15
DL-Roof (psf)	20
DL - Deck (psf)	15
DL - Walls (psf)	12

Seismic Base Shear		
$V_{ultimate}$ (k)	18.5	*Eq. 12.8-1*
$V_{allowable}$ (k)	13.0	

Level	Weight (k)	Height (ft)	$w_x f_x^k$	C_{vx}	F_x (ult.)	F_x (allow.)
Roof	73.892	23.583	1742.6	0.76	14.1	9.9
Upper Floor	52.62	10.416	548.1	0.24	4.4	3.1
TOTAL	126.5	-	2290.7	1	18.5	13.0

All references are from ASCE 7-16: Minimum Design Loads and Associated Criteria for Buildings and Other Structures

Project:

Wind Load Parameters

Chapter 28 - Envelope Procedure

Exposure	C	*Sec. 26.7*
Risk Category	II	*Table 1.5-1*
Mean Roof Height (ft)	23.583	
Roof Slope (X/12)	2	
Angle	9.5	
a (ft)	4.25	*Figure 28.3-1 Note "a"*
K_d	0.85	*Table 26.6-1*
K_{zt}	1.6	
V (mph)	97	
K_z	0.93	*Table 26.10-1*
q_h (psf)	30.42	*Eq. 26.10-1*
Minimum Wind Pressure on Walls (psf)	16	*Sec. 28.3.4*
Minimum Wind Pressure on Roof (psf)	8	

	Load Case A		Load Case B
Roof	If roof slope is greater than or equal to 6:12		-
	Zone 2 - Zone 3		
	If roof slope is less than 6:12		
	Zone 2 + Zone 3		
Roof Corners	If roof slope is greater than or equal to 6:12		-
	Zone 2E - Zone 3E		
	If roof slope is less than 6:12		
	Zone 2E + Zone 3E		
Wall	Zone 1 - Zone 4		Zone 5 - Zone 6
Wall Corners	Zone 1E - Zone 4E		Zone 5E - Zone 6E

Building Geometry

Level	Height (ft)	Trib. Height (ft)	Load Case A Direction (ft)	Load Case B Direction (ft)
			Dimension Parallel to Ridge	Dimension Perpendicular to Ridge
Above Roof	3.33	3.33	48.916	73
Roof	11.5	5.75	42.5	71
Upper Floor	9	10.25	42.5	71
	Height below Level		"Long" Dimension	"Short" Dimension

External Pressure Coefficients

Zone	Case A angle = 0	Case B
1	0.44	-0.45
2	-0.69	-0.69
3	-0.40	-0.37
4	-0.33	-0.45
5		0.40
6		-0.29
1E	0.67	-0.48
2E	-1.07	-1.07
3E	-0.58	-0.53
4E	-0.49	-0.48
5E		0.61
6E		-0.43

GC_{pf} Values Summary (28.3-1)

Building Surface	Load Case A	Load Case B
Roof	0.29	-
Roof Corners	0.49	-
Wall	0.77	0.69
Wall Corners	1.16	1.04

Load Case A - Dimension Parallel to Ridge

Level	A (ft^2)	$F = q_h * GC_{pf} * A$ (k)	Total Wind Load (Ultimate, k)	Minimum Load (Ultimate, k)	Total (allowable, k)
Roof - roof	135	1.16	1.58	1.30	0.95
Corners	28	0.42			
Roof - walls	196	4.58	6.30	3.91	3.78
Corners	49	1.72			
Upper Floor	349	8.17	11.24	6.97	6.74
Corners	87	3.07			

Load Case B - Dimension Perpendicular to Ridge

Level	A (ft^2)	$F = q_h * GC_{pf} * A$ (k)	Total Wind Load (Ultimate, k)	Minimum Load (Ultimate, k)	Total (allowable, k)
Roof - roof	229	4.81	5.25	1.94	3.15
Corners	14	0.45			
Roof - walls	384	8.06	8.83	6.53	5.30
Corners	24	0.77			
Upper Floor	684	14.36	15.74	11.64	9.44
Corners	44	1.38			

Wind Loads Summary

Level	Dimension Parallel to Ridge		Dimension Perpendicular to Ridge	
	Wind Load (Ultimate, k)	Wind Load (Allowable, k)	Wind Load (Ultimate, k)	Wind Load (Allowable, k)
Roof	7.88	4.73	14.08	8.45
Upper Floor	11.24	6.74	15.74	9.44
Base Shear	19.12	11.47	29.82	17.89

WL-A

Level	Total Wall Line Lengths (ft)	Seismic Forces (k)	Wind Forces (k)	Story Heights (ft)
Roof	9.33	1.8	1.5	9.75
Upper Floor	29	2.3	3.2	9

Max H/W Ratio [2] 3.5

ROOF

Length (ft)	H/W Ratio	Increase [1]	Force in Wall Elements		Ultimate		Ultimate	Allowable
			Seismic Shear (plf)	Wind Shear (plf)	T/C Overturning	T/C Resisting	Hold Down Force (kips)	Hold Down Force (kips)
9.33	1.05	1.00	193	161	2.63	0.55	2.14	1.51
		Shear Wall	SW-1				Strap Tie	MSTC40

UPPER FLOOR

Length (ft)	H/W Ratio	Increase [1]	Force in Wall Elements		Ultimate		Ultimate	Allowable
			Seismic Shear (plf)	Wind Shear (plf)	T/C Overturning	T/C Resisting	Hold Down Force (kips)	Hold Down Force (kips)
29	0.31	1.00	79	110	1.00	1.59	1.70	1.26
		Shear Wall	SW-1				Holdown	HDU2 w/ (2) 2x

[1] Increase per 4.3.4.2 ANSI/AWC SDPWS-2015

[2] Per Table 4.3.4 ANSI/AWC SDPWS-2015

WL-B

Level	Total Wall Line Lengths (ft)	Seismic Forces (k)	Wind Forces (k)	Story Heights (ft)
Roof	16	3.1	2.6	9.75
Upper Floor	30.916	4.0	5.5	9

Max H/W Ratio [2] 3.5

ROOF

Length (ft)	H/W Ratio	Increase [1]	Force in Wall Elements		Ultimate		Ultimate	Allowable
			Seismic Shear (plf)	Wind Shear (plf)	T/C Overturning	T/C Resisting	Hold Down Force (kips)	Hold Down Force (kips)
16	0.61	1.00	194	163	2.64	1.02	1.73	1.24
		Shear Wall	SW-1				Strap Tie	MSTC40

UPPER FLOOR

Length (ft)	H/W Ratio	Increase [1]	Force in Wall Elements		Ultimate		Ultimate	Allowable
			Seismic Shear (plf)	Wind Shear (plf)	T/C Overturning	T/C Resisting	Hold Down Force (kips)	Hold Down Force (kips)
5.5	1.64	1.00	129	178	1.63	0.30	1.36	0.96
25.416	0.35	1.00	129	178	1.63	1.40	0.37	0.30
		Shear Wall	SW-1				Holdown	Strap Tie/Holdown Not Required

[1] Increase per 4.3.4.2 ANSI/AWC SDPWS-2015

[2] Per Table 4.3.4 ANSI/AWC SDPWS-2015

WL-C

Level	Total Wall Line Lengths (ft)	Seismic Forces (k)	Wind Forces (k)	Story Heights (ft)
Roof	22.666	3.2	2.7	11.5
Upper Floor	22.916	4.1	5.7	9

Max H/W Ratio [2] 3.5

ROOF

Length (ft)	H/W Ratio	Increase [1]	Force in Wall Elements		Ultimate		Ultimate	Allowable
			Seismic Shear (plf)	Wind Shear (plf)	T/C Overturning	T/C Resisting	Hold Down Force (kips)	Hold Down Force (kips)
8.416	1.37	1.00	141	119	2.27	0.61	1.72	1.23
5.5	2.09	1.01	143	119	2.27	0.40	1.91	1.35
8.75	1.31	1.00	141	119	2.27	0.63	1.70	1.21
		Shear Wall	SW-1				Strap Tie	MSTC40

UPPER FLOOR

Length (ft)	H/W Ratio	Increase [1]	Force in Wall Elements		Ultimate		Ultimate	Allowable
			Seismic Shear (plf)	Wind Shear (plf)	T/C Overturning	T/C Resisting	Hold Down Force (kips)	Hold Down Force (kips)
8.416	1.07	1.00	179	249	2.25	1.14	2.96	2.12
11.25	0.80	1.00	179	249	2.25	1.52	2.80	2.02
3.25	2.77	1.11	198	249	2.25	0.44	3.56	2.53
		Shear Wall	SW-1				Holdown	HDU4 w/ (2) 2x

[1] Increase per 4.3.4.2 ANSI/AWC SDPWS-2015

[2] Per Table 4.3.4 ANSI/AWC SDPWS-2015

WL-E

Level	Total Wall Line Lengths (ft)	Seismic Forces (k)	Wind Forces (k)	Story Heights (ft)
Roof	9.832	1.9	1.6	11.5
Upper Floor	21.832	2.5	3.4	9

Max H/W Ratio [2] 3.5

ROOF

Length (ft)	H/W Ratio	Increase [1]	Force in Wall Elements		Ultimate		Ultimate	Allowable
			Seismic Shear (plf)	Wind Shear (plf)	T/C Overturning	T/C Resisting	Hold Down Force (kips)	Hold Down Force (kips)
4.916	2.34	1.04	202	163	3.11	0.36	2.79	1.96
4.916	2.34	1.04	202	163	3.11	0.36	2.79	1.96
		Shear Wall	SW-1				Strap Tie	MSTC40

UPPER FLOOR

Length (ft)	H/W Ratio	Increase [1]	Force in Wall Elements		Ultimate		Ultimate	Allowable
			Seismic Shear (plf)	Wind Shear (plf)	T/C Overturning	T/C Resisting	Hold Down Force (kips)	Hold Down Force (kips)
13.916	0.65	1.00	115	156	1.44	1.88	2.54	1.85
7.916	1.14	1.00	115	156	1.44	1.07	3.27	2.33
		Shear Wall	SW-1				Holdown	HDU4 w/ (2) 2x

[1] Increase per 4.3.4.2 ANSI/AWC SDPWS-2015

[2] Per Table 4.3.4 ANSI/AWC SDPWS-2015

WL-1-4

Level	Total Wall Line Lengths (ft)	Seismic Forces (k)	Wind Forces (k)	Story Heights (ft)
Roof	7.33	1.8	0.9	11.5
Upper Floor	10.33	2.3	2.1	9

Max H/W Ratio [2] 3.5

ROOF

Length (ft)	H/W Ratio	Increase [1]	Force in Wall Elements		Ultimate		Ultimate	Allowable
			Seismic Shear (plf)	Wind Shear (plf)	T/C Overturning	T/C Resisting	Hold Down Force (kips)	Hold Down Force (kips)
7.33	1.57	1.00	246	123	3.95	1.08	2.98	2.12
		Shear Wall	SW-2				Strap Tie	MSTC40

UPPER FLOOR

Length (ft)	H/W Ratio	Increase [1]	Force in Wall Elements		Ultimate		Ultimate	Allowable
			Seismic Shear (plf)	Wind Shear (plf)	T/C Overturning	T/C Resisting	Hold Down Force (kips)	Hold Down Force (kips)
7.33	1.23	1.00	223	203	2.81	0.40	5.42	3.84
1.5	-	1.00	223	203	2.81	0.10	2.72	1.91
1.5	-	1.00	223	203	2.81	0.10	2.72	1.91
		Shear Wall	SW-1				Holdown	HDU5 w/ (2) 2x
			WSWH18					WSWH-AB1

[1] Increase per 4.3.4.2 ANSI/AWC SDPWS-2015

[2] Per Table 4.3.4 ANSI/AWC SDPWS-2015

WL-2-5

Level	Total Wall Line Lengths (ft)	Seismic Forces (k)	Wind Forces (k)	Story Heights (ft)
Roof	16.25	3.4	1.6	10
Upper Floor	14.75	4.3	3.6	9

Max H/W Ratio [2] 3.5

ROOF

Length (ft)	H/W Ratio	Increase [1]	Force in Wall Elements		Ultimate		Ultimate	Allowable
			Seismic Shear (plf)	Wind Shear (plf)	T/C Overturning	T/C Resisting	Hold Down Force (kips)	Hold Down Force (kips)
11.75	0.87	1.00	209	98	2.93	1.45	1.63	1.18
4.5	2.22	1.03	215	98	2.93	0.63	2.36	1.67
		Shear Wall	SW-1				Strap Tie	MSTC40

UPPER FLOOR

Length (ft)	H/W Ratio	Increase [1]	Force in Wall Elements		Ultimate		Ultimate	Allowable
			Seismic Shear (plf)	Wind Shear (plf)	T/C Overturning	T/C Resisting	Hold Down Force (kips)	Hold Down Force (kips)
10	0.90	1.00	292	244	3.67	0.55	5.54	3.91
4.75	1.89	1.00	292	244	3.67	0.26	3.44	2.41
		Shear Wall	SW-2				Holdown	HDU5 w/ (2) 2x

[1] Increase per 4.3.4.2 ANSI/AWC SDPWS-2015

[2] Per Table 4.3.4 ANSI/AWC SDPWS-2015

WL-2.4

Level	Total Wall Line Lengths (ft)	Seismic Forces (k)	Wind Forces (k)	Story Heights (ft)
Upper Floor	19.92	4.5	3.9	9

Max H/W Ratio [2] 3.5

UPPER FLOOR

Length (ft)	H/W Ratio	Increase [1]	Force in Wall Elements		Ultimate		Ultimate	Allowable
			Seismic Shear (plf)	Wind Shear (plf)	T/C Overturning	T/C Resisting	Hold Down Force (kips)	Hold Down Force (kips)
11.67	0.77	1.00	226	196	2.85	1.23	1.74	1.26
8.25	1.09	1.00	226	196	2.85	0.93	2.01	1.44
		Shear Wall	SW-1				Holdown	HDU2 w/ (2) 2x

[1] Increase per 4.3.4.2 ANSI/AWC SDPWS-2015

[2] Per Table 4.3.4 ANSI/AWC SDPWS-2015

WL-2.5

Level	Total Wall Line Lengths (ft)	Seismic Forces (k)	Wind Forces (k)	Story Heights (ft)
Roof	12.75	3.2	1.5	9.75

Max H/W Ratio [2] 3.5

ROOF

Length (ft)	H/W Ratio	Increase [1]	Force in Wall Elements		Ultimate		Ultimate	Allowable
			Seismic Shear (plf)	Wind Shear (plf)	T/C Overturning	T/C Resisting	Hold Down Force (kips)	Hold Down Force (kips)
7	1.39	1.00	251	118	3.43	0.95	2.58	1.83
5.75	1.70	1.00	251	118	3.43	0.95	2.57	1.83
		Shear Wall	SW-2				Holdown	HDU2 w/ (2) 2x

[1] Increase per 4.3.4.2 ANSI/AWC SDPWS-2015

[2] Per Table 4.3.4 ANSI/AWC SDPWS-2015

WL-3

Level	Total Wall Line Lengths (ft)	Seismic Forces (k)	Wind Forces (k)	Story Heights (ft)
Roof	21.666	1.6	0.8	8
Upper Floor	37.913	5.4	3.7	9

Max H/W Ratio [2] 3.5

ROOF

Length (ft)	H/W Ratio	Increase [1]	Force in Wall Elements		Ultimate		Ultimate	Allowable
			Seismic Shear (plf)	Wind Shear (plf)	T/C Overturning	T/C Resisting	Hold Down Force (kips)	Hold Down Force (kips)
15.416	0.52	1.00	74	37	0.83	0.85	0.06	0.07
6.25	1.28	1.00	74	37	0.83	0.34	0.52	0.37
		Shear Wall	SW-1				Strap Tie	Strap Tie/Holdown Not Required

UPPER FLOOR

Length (ft)	H/W Ratio	Increase [1]	Force in Wall Elements		Ultimate		Ultimate	Allowable
			Seismic Shear (plf)	Wind Shear (plf)	T/C Overturning	T/C Resisting	Hold Down Force (kips)	Hold Down Force (kips)
9.83	0.92	1.00	142	98	1.79	0.59	1.33	0.97
3.583	2.51	1.07	152	98	1.79	0.21	1.67	1.20
6.25	1.44	1.00	142	98	1.79	0.38	1.97	1.40
13.25	0.68	1.00	142	98	1.79	0.80	1.08	0.78
5	1.80	1.00	142	98	1.79	0.30	5.01	3.53
		Shear Wall	SW-1				Holdown	HDU5 w/ (2) 2x
								HDU2 where acceptable

[1] Increase per 4.3.4.2 ANSI/AWC SDPWS-2015

[2] Per Table 4.3.4 ANSI/AWC SDPWS-2015

WL-8

Level	Total Wall Line Lengths (ft)	Seismic Forces (k)	Wind Forces (k)	Story Heights (ft)
Roof	10.58	2.6	1.2	11.5

REFER TO WL-3 FOR UPPER FLOOR SHEARWALLS

Max H/W Ratio [2] 3.5

ROOF

Length (ft)	H/W Ratio	Increase [1]	Force in Wall Elements		Ultimate		Ultimate	Allowable
			Seismic Shear (plf)	Wind Shear (plf)	T/C Overturning	T/C Resisting	Hold Down Force (kips)	Hold Down Force (kips)
7.25	1.59	1.00	246	113	3.96	0.53	3.48	2.45
3.33	3.45	1.22	300	113	3.96	0.24	3.74	2.62
		Shear Wall	SW-2				Strap Tie	MSTC52

[1] Increase per 4.3.4.2 ANSI/AWC SDPWS-2015

[2] Per Table 4.3.4 ANSI/AWC SDPWS-2015

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: Chu Residence.ec6

DESCRIPTION: West Retaining Wall 5'-0"

Code Reference

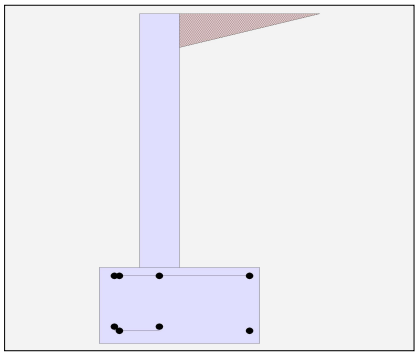
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	5.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	0.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	2,000.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	10.0 psf/ft
	=	
Passive Pressure	=	300.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	0.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Earth Pressure Seismic Load

Method : Uniform		
Multiplier Used	=	9.000
(Multiplier used on soil density)		
Uniform Seismic Force	=	58.500
Total Seismic Force	=	380.250

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: Chu Residence.ec6

DESCRIPTION: West Retaining Wall 5'-0"

Design Summary

Wall Stability Ratios

Overturning	=	2.09	OK
Sliding	=	2.24	OK
Global Stability	=	6.67	

Total Bearing Load	=	1,833 lbs	
...resultant ecc.	=	6.55 in	
Eccentricity outside middle third			
Soil Pressure @ Toe	=	1,551 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	2,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	2,172 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	0.8 psi	OK
Footing Shear @ Heel	=	4.0 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	477.4 lbs	
less 100% Passive Force	-	337.5 lbs	
less 100% Friction Force	-	733.4 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Bottom
		Stem OK
Design Height Above Ftg	ft =	0.00
Wall Material Above "Ht"	=	Concrete
Design Method	=	SD SD
Thickness	=	8.00
Rebar Size	=	# 4
Rebar Spacing	=	10.00
Rebar Placed at	=	Center

Design Data

fb/FB + fa/Fa	=	**0.265**
Total Force @ Section		
Service Level	lbs =	
Strength Level	lbs =	492.5
Moment....Actual		
Service Level	ft-# =	
Strength Level	ft-# =	1,064.6
Moment.....Allowable	=	4,014.1
Shear.....Actual		
Service Level	psi =	
Strength Level	psi =	10.3
Shear.....Allowable	psi =	75.0
Anet (Masonry)	in2 =	
Wall Weight	psf =	100.0
Rebar Depth 'd'	in =	4.00

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	2,500.0
Fy	psi =	60,000.0

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: Chu Residence.ec6

DESCRIPTION: West Retaining Wall 5'-0"

Concrete Stem Rebar Area Details

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.0643 in2/ft		
(4/3) * As :	0.0857 in2/ft	Min Stem T&S Reinf Area 0.960 in2	
200bd/fy : 200(12)(4)/60000 :	0.16 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft	
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.1728 in2/ft	#4@ 12.50 in	#4@ 25.00 in
Provided Area :	0.24 in2/ft	#5@ 19.38 in	#5@ 38.75 in
Maximum Area :	0.5419 in2/ft	#6@ 27.50 in	#6@ 55.00 in

Footing Data

Toe Width	=	0.67 ft
Heel Width	=	2.00
Total Footing Width	=	2.67
Footing Thickness	=	18.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	2,172	0 psf	
Mu' : Upward	=	438	167 ft-#	
Mu' : Downward	=	60	827 ft-#	
Mu: Design	=	378 NG	659 ft-#	OK
phiMn	=	15,625	26,769 ft-#	
Actual 1-Way Shear	=	0.84	4.05 psi	
Allow 1-Way Shear	=	75.00	75.00 psi	

Toe Reinforcing = # 4 @ 10.00 in
Heel Reinforcing = # 4 @ 6.17 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 6.17 in, #5@ 9.56 in, #6@ 13.58 in, #7@ 18.51 in, #8@ 24.38 in, #9@ 30.86 in, #10@ 39.19 in

Heel: #4@ 6.17 in, #5@ 9.56 in, #6@ 13.58 in, #7@ 18.51 in, #8@ 24.38 in, #9@ 30.86 in, #10@ 39.19 in

Key: No key defined

Min footing T&S reinf Area 1.04 in2
Min footing T&S reinf Area per foot 0.39 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 6.17 in	#4@ 12.35 in
#5@ 9.57 in	#5@ 19.14 in
#6@ 13.58 in	#6@ 27.16 in

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: Chu Residence.ec6

DESCRIPTION: West Retaining Wall 5'-0"

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		211.3	2.17	457.7	Soil Over HL (ab. water tbl)	733.3	2.00	1,466.9
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		2.00	1,466.9
Hydrostatic Force					Water Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	=		
Added Lateral Load	=				* Axial Live Load on Stem	=		
Load @ Stem Above Soil	=				Soil Over Toe	=		
Seismic Earth Load	=	266.2	3.25	865.1	Surcharge Over Toe	=		
	=				Stem Weight(s)	=	500.0	1.00	500.2
					Earth @ Stem Transitions	=			
Total	=	477.4	**O.T.M.** =	1,322.8	Footing Weight	=	600.1	1.33	800.2
					Key Weight	=			
					Vert. Component	=			
					Total =		1,833.4 lbs	**R.M.=**	2,767.3

Resisting/Overturning Ratio = **2.09**

Vertical Loads used for Soil Pressure = 1,833.4 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

If seismic is included, the OTM and sliding ratios may be 1.1 per section 1807.2.3 of IBC.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.081	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

DESCRIPTION: West Retaining Wall 5'-0"

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

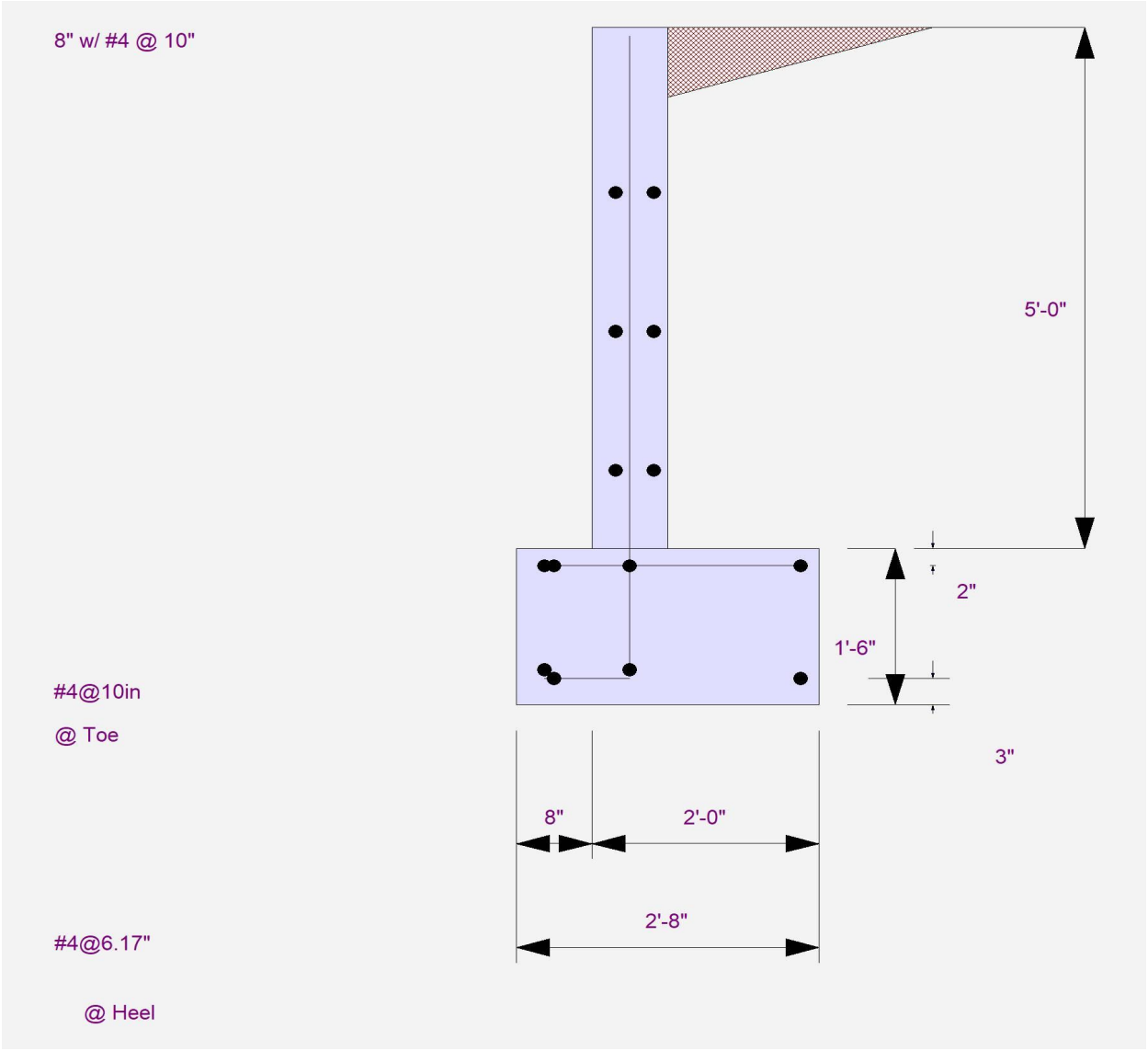
Lap Splice length for #4 bar specified in this stem design segment (25.4.2.3a) =	18.72 in
Development length for #4 bar specified in this stem design segment =	14.40 in
Hooked embedment length into footing for #4 bar specified in this stem design segment =	6.05 in
As Provided =	0.2400 in2/ft
As Required =	0.1728 in2/ft

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: Chu Residence.ec6

DESCRIPTION: West Retaining Wall 5'-0"

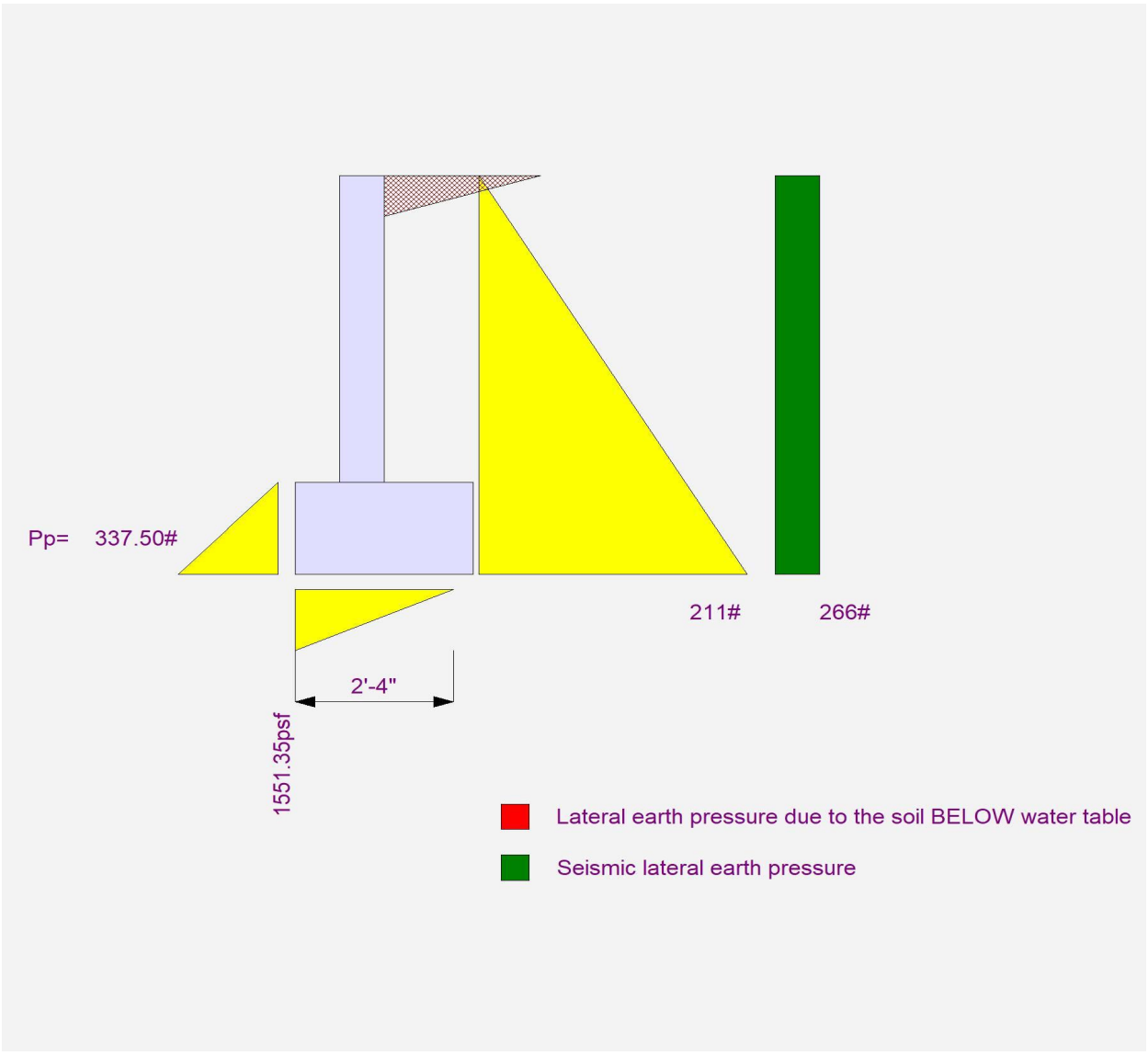


Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: Chu Residence.ec6

DESCRIPTION: West Retaining Wall 5'-0"



Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Beam

Project File: Chu Residence.ec6

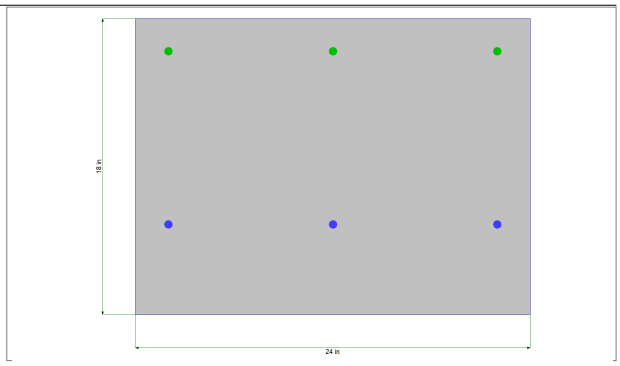
DESCRIPTION: Typical Grade Beam 2'-0" Wide

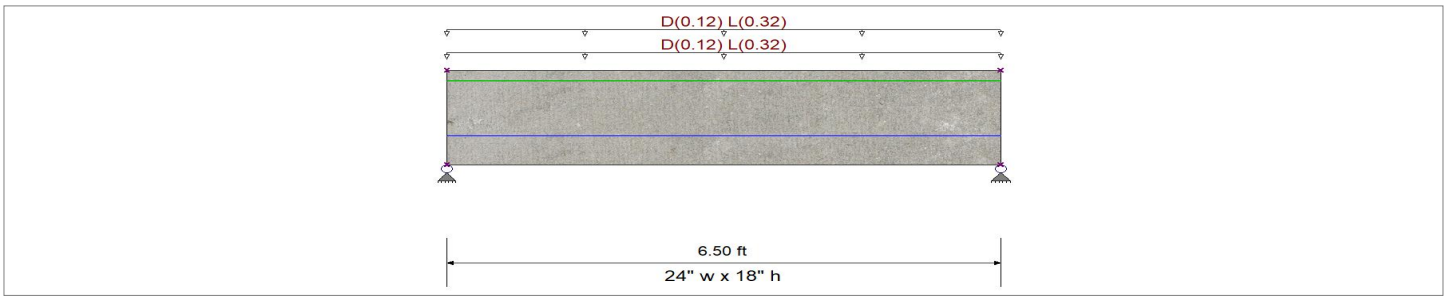
CODE REFERENCES

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

General Information

f'c	=	2.50 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c$^{1/2}$ * 7.50	=	375.0 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	2,850.0 ksi	Fy - Stirrups		40.0 ksi
fy - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #		3
			Number of Resisting Legs Per Stirrup	=	2





Cross Section & Reinforcing Details

Rectangular Section, Width = 24.0 in, Height = 18.0 in
Span #1 Reinforcing....
3-#4 at 5.50 in from Bottom, from 0.0 to 6.50 ft in this span
3-#4 at 2.0 in from Top, from 0.0 to 6.50 ft in this span

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 8.0 ft, (Main Floor Framing)
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 8.0 ft, (Upper Floor)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.279**	: 1
Section used for this span	**Typical Section**	
Mu : Applied	9.686	k-ft
Mn * Phi : Allowable	34.682	k-ft
Location of maximum on span	3.244	ft
Span # where maximum occurs	Span # 1	

Maximum Deflection

Max Downward Transient Deflection	0.000 in	Ratio =	0	<360.0	L Only
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360.0	L Only
Max Downward Total Deflection	0.002 in	Ratio =	49109	>=180.0	Span: 1 : +D+L
Max Upward Total Deflection	0.000 in	Ratio =	0	<180.0	Span: 1 : +D+L

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	4.274	4.274
Max Upward from Load Combinations	4.274	4.274
Max Upward from Load Cases	2.194	2.194
D Only	2.194	2.194
+D+L	4.274	4.274
+D+0.750L	3.754	3.754

Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Beam

Project File: Chu Residence.ec6

DESCRIPTION: Typical Grade Beam 2'-0" Wide

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
+0.60D	1.316	1.316
L Only	2.080	2.080

Shear Stirrup Requirements

Entire Beam Span Length : Vu < Phi*Vc / 2, Req'd Vs = Not Reqd per 9.6.3.1, Stirrups are not required.

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd
+1.20D+1.60L	1	0.00	12.50	5.96	5.96	0.00	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	0.07	12.50	5.83	5.83	0.42	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	0.14	12.50	5.70	5.70	0.83	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	0.21	12.50	5.57	5.57	1.23	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	0.28	12.50	5.44	5.44	1.62	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	0.36	12.50	5.31	5.31	2.00	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	0.43	12.50	5.18	5.18	2.37	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	0.50	12.50	5.05	5.05	2.74	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	0.57	12.50	4.92	4.92	3.09	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	0.64	12.50	4.79	4.79	3.44	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	0.71	12.50	4.66	4.66	3.77	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	0.78	12.50	4.53	4.53	4.10	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	0.85	12.50	4.40	4.40	4.41	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	0.92	12.50	4.27	4.27	4.72	0.94	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	0.99	12.50	4.14	4.14	5.02	0.86	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	1.07	12.50	4.01	4.01	5.31	0.79	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	1.14	12.50	3.88	3.88	5.59	0.72	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	1.21	12.50	3.75	3.75	5.86	0.67	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	1.28	12.50	3.62	3.62	6.12	0.62	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	1.35	12.50	3.49	3.49	6.37	0.57	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	1.42	12.50	3.35	3.35	6.62	0.53	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	1.49	12.50	3.22	3.22	6.85	0.49	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	1.56	12.50	3.09	3.09	7.08	0.46	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	1.63	12.50	2.96	2.96	7.29	0.42	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	1.70	12.50	2.83	2.83	7.50	0.39	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	1.78	12.50	2.70	2.70	7.69	0.37	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	1.85	12.50	2.57	2.57	7.88	0.34	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	1.92	12.50	2.44	2.44	8.06	0.32	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	1.99	12.50	2.31	2.31	8.23	0.29	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	2.06	12.50	2.18	2.18	8.39	0.27	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	2.13	12.50	2.05	2.05	8.54	0.25	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	2.20	12.50	1.92	1.92	8.68	0.23	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	2.27	12.50	1.79	1.79	8.81	0.21	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	2.34	12.50	1.66	1.66	8.93	0.19	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	2.42	12.50	1.53	1.53	9.05	0.18	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	2.49	12.50	1.40	1.40	9.15	0.16	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	2.56	12.50	1.27	1.27	9.25	0.14	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	2.63	12.50	1.14	1.14	9.33	0.13	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	2.70	12.50	1.01	1.01	9.41	0.11	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	2.77	12.50	0.88	0.88	9.47	0.10	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	2.84	12.50	0.75	0.75	9.53	0.08	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	2.91	12.50	0.62	0.62	9.58	0.07	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	2.98	12.50	0.49	0.49	9.62	0.05	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	3.05	12.50	0.36	0.36	9.65	0.04	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	3.13	12.50	0.23	0.23	9.67	0.02	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	3.20	12.50	0.10	0.10	9.68	0.01	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	3.27	12.50	-0.03	0.03	9.69	0.00	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	3.34	12.50	-0.16	0.16	9.68	0.02	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	3.41	12.50	-0.29	0.29	9.66	0.03	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	3.48	12.50	-0.42	0.42	9.64	0.05	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0
+1.20D+1.60L	1	3.55	12.50	-0.55	0.55	9.60	0.06	22.50	Vu < Phi*Vc / 2	ot Reqd per	22.5	0.0

Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Beam

Project File: Chu Residence.ec6

DESCRIPTION: Typical Grade Beam 2'-0" Wide

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu Actual	(k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd
+1.20D+1.60L	1	3.62	12.50	-0.68	0.68	9.56	0.07	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	3.69	12.50	-0.81	0.81	9.51	0.09	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	3.77	12.50	-0.94	0.94	9.44	0.10	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	3.84	12.50	-1.07	1.07	9.37	0.12	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	3.91	12.50	-1.21	1.21	9.29	0.14	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	3.98	12.50	-1.34	1.34	9.20	0.15	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	4.05	12.50	-1.47	1.47	9.10	0.17	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	4.12	12.50	-1.60	1.60	8.99	0.18	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	4.19	12.50	-1.73	1.73	8.87	0.20	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	4.26	12.50	-1.86	1.86	8.75	0.22	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	4.33	12.50	-1.99	1.99	8.61	0.24	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	4.40	12.50	-2.12	2.12	8.46	0.26	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	4.48	12.50	-2.25	2.25	8.31	0.28	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	4.55	12.50	-2.38	2.38	8.14	0.30	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	4.62	12.50	-2.51	2.51	7.97	0.33	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	4.69	12.50	-2.64	2.64	7.79	0.35	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	4.76	12.50	-2.77	2.77	7.60	0.38	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	4.83	12.50	-2.90	2.90	7.39	0.41	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	4.90	12.50	-3.03	3.03	7.18	0.44	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	4.97	12.50	-3.16	3.16	6.96	0.47	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	5.04	12.50	-3.29	3.29	6.74	0.51	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	5.11	12.50	-3.42	3.42	6.50	0.55	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	5.19	12.50	-3.55	3.55	6.25	0.59	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	5.26	12.50	-3.68	3.68	5.99	0.64	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	5.33	12.50	-3.81	3.81	5.73	0.69	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	5.40	12.50	-3.94	3.94	5.45	0.75	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	5.47	12.50	-4.07	4.07	5.17	0.82	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	5.54	12.50	-4.20	4.20	4.87	0.90	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	5.61	12.50	-4.33	4.33	4.57	0.99	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	5.68	12.50	-4.46	4.46	4.26	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	5.75	12.50	-4.59	4.59	3.94	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	5.83	12.50	-4.72	4.72	3.60	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	5.90	12.50	-4.85	4.85	3.26	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	5.97	12.50	-4.98	4.98	2.92	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	6.04	12.50	-5.11	5.11	2.56	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	6.11	12.50	-5.24	5.24	2.19	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	6.18	12.50	-5.37	5.37	1.81	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	6.25	12.50	-5.50	5.50	1.43	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	6.32	12.50	-5.63	5.63	1.03	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	6.39	12.50	-5.77	5.77	0.62	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0
+1.20D+1.60L	1	6.46	12.50	-5.90	5.90	0.21	1.00	22.50	Vu < Phi*Vc / 2	ot Reqd pe	22.5	0.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	6.500	9.69	34.68	0.28
+1.40D					
Span # 1	1	6.500	4.99	34.68	0.14
+1.20D+1.60L					
Span # 1	1	6.500	9.69	34.68	0.28
+1.20D+0.50L					
Span # 1	1	6.500	5.97	34.68	0.17
+1.20D					
Span # 1	1	6.500	4.28	34.68	0.12
+0.90D					
Span # 1	1	6.500	3.21	34.68	0.09

Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Beam

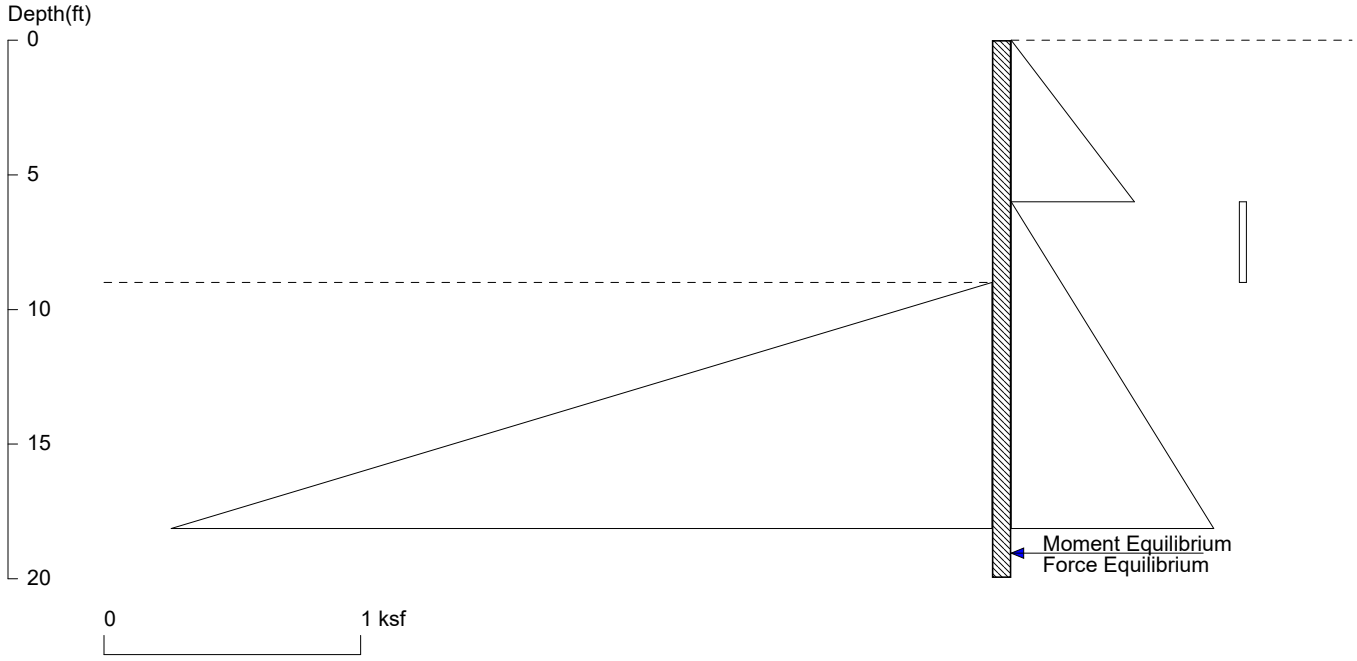
Project File: Chu Residence.ec6

DESCRIPTION: Typical Grade Beam 2'-0" Wide

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft	Load Combination	Max. "+" Defl (in)	Location in Span (ft
+D+L	1	0.0016	3.250		0.0000	0.000

Chu Residence
9' Drilled



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Wall Height=9.0 Pile Diameter=2.0 Pile Spacing=6.0 Wall Type: 2. Soldier Pile, Drilled

PILE LENGTH: Min. Embedment=10.96 Min. Pile Length=19.96
MOMENT IN PILE: Max. Moment=79.31 per Pile Spacing=6.0 at Depth=13.46

VERTICAL BEARING CAPACITY: Vertical Loading=0.0, Resistance=0.1, Vertical Factor of Safety=999.00

PILE SELECTION:
Request Min. Section Modulus = 28.8 in3/pile=472.62 cm3/pile, Fy= 50 ksi = 345 MPa, Fb/Fy=0.66
W12X40 has Section Modulus = 51.5 in3/pile=843.93 cm3/pile. It is greater than Min. Requirements!
Top Deflection = 0.62(in) based on E (ksi)=29000.00 and I (in4)/pile=307.0

DRIVING PRESSURES (ACTIVE, WATER, & SURCHARGE):

Z1	P1	Z2	P2	Slope
0	0	6	0.480	0.08
6	0	800	51.61	0.065
6	0.027	9	0.027	

PASSIVE PRESSURES: Pressures below will be divided by a Factor of Safety =1.5

Z1	P1	Z2	P2	Slope
9	0	800	276.8	0.35

ACTIVE SPACING:

No.	Z depth	Spacing
1	0.00	6.00
2	9.00	2.00

PASSIVE SPACING:

No.	Z depth	Spacing
1	9.00	6.00

UNITS: Width,Spacing,Diameter,Length,and Depth - ft; Force - kip; Moment - kip-ft
Friction,Bearing,and Pressure - ksf; Pres. Slope - kip/ft3; Deflection - in

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SHORING WALL CALCULATION SUMMARY
The leading shoring design and calculation software
Software Copyright by CivilTech Software
www.civiltech.com

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ShoringSuite Software is developed by CivilTech Software, Bellevue, WA, USA.
The calculation method is based on the following references:

1. FHWA 98-011, FHWA-RD-97-130, FHWA SA 96-069, FHWA-IF-99-015
2. STEEL SHEET PILING DESIGN MANUAL by Pile Buck Inc., 1987
3. DESIGN MANUAL DM-7 (NAVFAC), Department of the Navy, May 1982
4. TRENCHING AND SHORING MANUAL Revision 12, California Department of Transportation, January 2000
6. EARTH SUPPORT SYSTEM & RETAINING STRUCTURES, Pile Buck Inc. 2002
5. DESIGN OF SHEET PILE WALLS, EM 1110-2-2504, U.S. Army Corps of Engineers, 31 March 1994
7. EARTH RETENTION SYSTEMS HANDBOOK, Alan Macnab, McGraw-Hill. 2002
8. Temporary Structures in Construction, Robert T. Ratay (Co-author of Chapter 7: John J. Peirce), McGraw-Hill. 2012
9. AASHTO HB-17, American Association of State and Highway Transportation Officials, 2 September 2002

UNITS: Width/Spacing/Diameter/Length/Depth - ft, Force - kip, Moment - kip-ft, Friction/Bearing/Pressure - ksf, Pres. Slope - kip/ft3, Deflection - in

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Title: Chu Residence
Subtitle: 9' Drilled

**********INPUT DATA**********

Wall Type: 2. Soldier Pile, Drilled
- Wall Height: 9.00
- Pile Diameter: 2.00
- Pile Spacing: 6.00
- Factor of Safety (F.S.): 1.50

Lateral Support Type (Braces): 1. No
- Top Brace Increase (Multi-Bracing): Add 15%*

Embedment Option: 1. Yes
- Friction at Pile Tip: No

Check Vertical Bearing Capacity:
- Side Friction for Bearing: 0.00
- Tip Resistance for Bearing: 0.00

Pile Properties:
- Steel Strength, Fy: 50 ksi = 345 MPa
- Allowable Fb/Fy: 0.66
- Elastic Module, E: 29000.00

Moment of Inertia, I: 204.00
User Input Pile: W12X40

* DRIVING PRESSURE (ACTIVE, WATER, & SURCHARGE) *

No.	Z1 top	Top Pres.	Z2 bottom	Bottom Pres.	Slope
1	0	0	6	0.480	0.08
2	6	0	800	51.61	0.065
3	6	0.027	9	0.027	

* PASSIVE PRESSURE *

The pressures below will be divided by a Factor of Safety =1.5

No.	Z1 top	Top Pres.	Z2 bottom	Bottom Pres.	Slope
1	9	0	800	276.8	0.35

* ACTIVE SPACE *

No.	Z depth	Spacing
1	0.00	6.00
2	9.00	2.00

* PASSIVE SPACE *

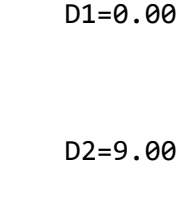
No.	Z depth	Spacing
1	9.00	6.00

*For Tieback: Input1 = Diameter; Input2 = Bond Strength
*For Plate: Input1 = Diameter; Input2 = Allowable Pressure
*For Deadman: Input1 = Horz. Width; Input2 = Passive Pressure;
*For Sheet Pile Anchor: Input1 = Horz. Width; Input2 = Passive Slope;

**********CALCULATION**********

The calculated moment and shear are per pile spacing. Sheet piles are per one foot or meter; Soldier piles are per pile.

Top Pressures start at depth = 0.00



```
        |
        |      D3=19.96

        D1 - TOP DEPTH
        D2 - EXCAVATION BASE
        D3 - PILE TIP

   MOMENT equilibrium   AT DEPTH=18.13  WITH EMBEDMENT OF 9.13
   FORCE equilibrium   AT DEPTH=19.96  WITH EMBEDMENT OF 10.96

   The program calculates an embedment for moment equilibrium, then increase the
embedment by 1.2


**********RESULTS**********

* EMBEDMENT Notes *
Based on USS Design Manual, first calculate embedment for moment equilibrium, then
increased the embedment to get the design depth.
The embedment for moment equilibrium is 9.13
The program calculates an embedment for moment equilibrium, then increase the
embedment by 1.2
The total desigh embedment is 10.96

Embedment Information:
If 20% increased, the total design embedment is 10.96
If 30% increased, the total design embedment is 11.88
If 40% increased, the total design embedment is 12.79
If 50% increased, the total design embedment is 13.70


* MOMENT IN PILE (per pile spacing)*
Pile Spacing:  sheet piles are one foot or one meter; soldier piles are one pile.
Overall Maximum Moment = 79.31 at 13.46
Maximum Shear = 38.38
Moment and Shear are per pile spacing: 6.0 foot or meter

* VERTICAL LOADING *
Vertical Loading from Braces = 0.00
Vertical Loading from External Load = 0.00
Total Vertical Loading = 0.00

* VERTICAL BEARING CAPACITY CHECK (Option 1, Not including side area above base) *
Tip area + Total side area of embedment below base only.

Tip Depth       Tip Area*       Bearing         Tip Resistance
-------------------------------------------------------------------
19.96           3.14            0.00            0.00
*Tip Area is based on shaft diameter, D=2.0 (input in Page A, Item 3)
```

Embedment	Side Area*	Friction	Side Resistance
10.96	68.88	0.00	0.07

*Total side area is the surface area of embedment below base only.

Total Vertical Resistance = 0.07
Total Vertical Loading = 0.00
Vertical Factor of Safety = 999.00

* VERTICAL BEARING CAPACITY CHECK (Option 2, including side area above base) *
Tip area + Total side area of embedment below base + Back side between pile and soil above base.

Tip Depth	Tip Area*	Bearing	Tip Resistance
19.96	3.14	0.00	0.00

*Tip Area is based on shaft diameter, D=2.0 (input in Page A, Item 3)

Embedment	Side Area*	Friction	Side Resistance
10.96	97.15	0.00	0.10

*Total side area is the surface area of embedment below base and back side between pile and soil above base.

Total Vertical Resistance = 0.10
Total Vertical Loading = 0.00
Vertical Factor of Safety = 999.00

**********SPECIFIED PILE **********

Overall Maximum Moment = 79.31 at 13.46
The pile selection is based on the magnitude of the moment only. Axial force is neglected.

Request Min. Section Modulus = 28.84 in3/pile = 472.62 cm3/pile, Fy= 50 ksi = 345 MPa, Fb/Fy=0.66

W12X40 has been found in Soldier Pile list!
(English Units):
Area= 11.7 in. Depth= 11.9 in. Width= 8.01 in. Height= 12 in.
Flange thickness= 0.515 in. Web thickness= 0.295 in.
Ix= 307 in4/pile Sx= 51.5 in3/pile Iy= 44.1 in4/pile Sy= 11 in3/pile
(Metric Units):
Ix= 127.77 x100cm4/pile Sx= 843.93 cm3/pile Iy= 18.35 x100cm4/pile Sy= 180.26 cm3/pile

The pile selection is based on the magnitude of the moment only. Axial force is neglected.

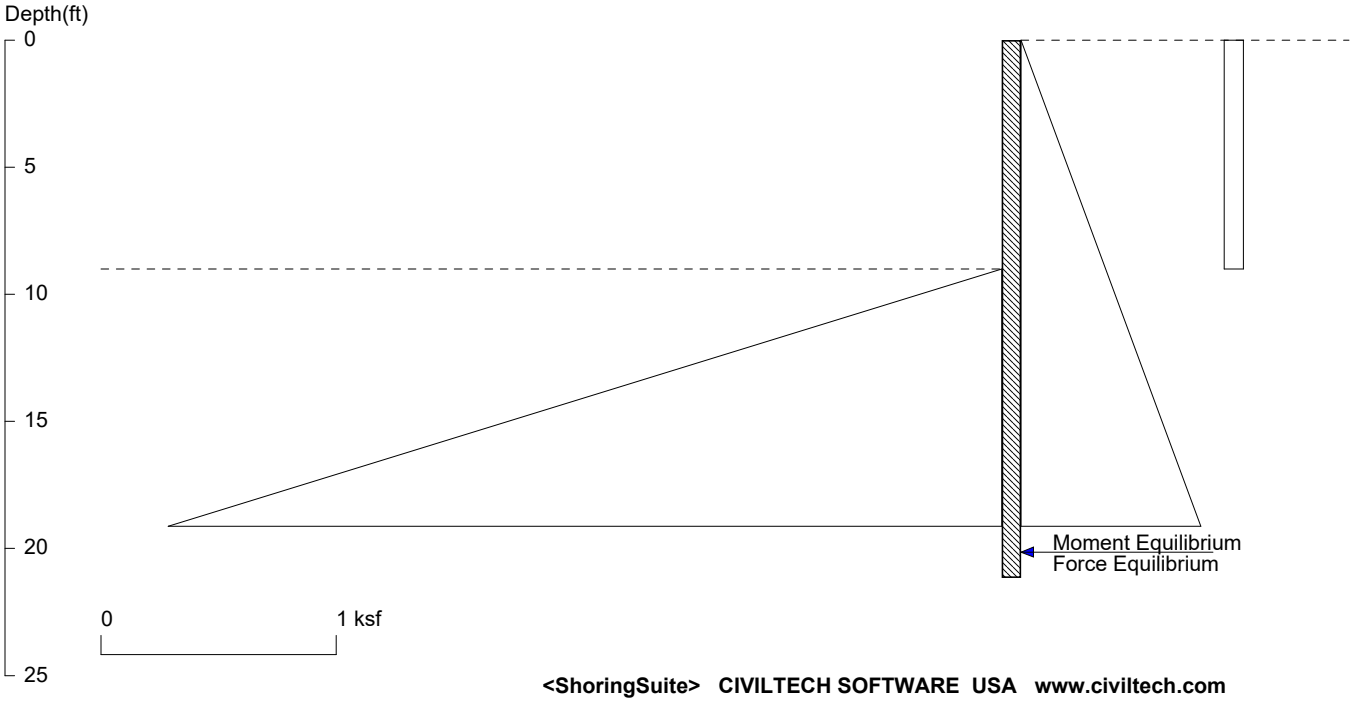
W12X40 is capable to support the shoring!
Top deflection = 0.617(in)
Max. deflection = 0.617(in)

********** LAGGING SIZE ESTIMATION **********
Max. Pressure above base = 0.48
Piles are more rigid than timber lagging, due to arching, only portion of pressures are acting to lagging, 30-50% loading is suggested.
If 50% loading is used for lagging design, Design Pressure = 0.24
Pile Spacing =6.0, Max. Moment in lagging = 1.08
For 4"x12" Timber, Section Modules S=23.47 in3. The request allowable bending strength, fb=M/S=0.55
For 6"x12" Timber, Section Modules S=57.98 in3. The request allowable bending strength, fb=M/S=0.22

If 30% loading is used for lagging design, Design Pressure = 0.14
Pile Spacing =6.0, Max. Moment in lagging = 0.65
For 4"x12" Timber, Section Modules S=23.47 in3. The request allowable bending strength, fb=M/S=0.33
For 6"x12" Timber, Section Modules S=57.98 in3. The request allowable bending strength, fb=M/S=0.13

Unit: Pressure: ksf, Spacing: ft, Moment: kip-ft, Bending Strength, fb: ksi

Chu Residence
9' Drilled, No impact



<ShoringSuite> CIVILTECH SOFTWARE USA www.civiltech.com

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File: P:\Studio Ectypos\Chu Residence\Calculations\9' Pile, no impact.sh8

Wall Height=9.0 Pile Diameter=2.0 Pile Spacing=6.0 Wall Type: 2. Soldier Pile, Drilled

PILE LENGTH: Min. Embedment=12.15 Min. Pile Length=21.15
MOMENT IN PILE: Max. Moment=100.93 per Pile Spacing=6.0 at Depth=14.19

VERTICAL BEARING CAPACITY: Vertical Loading=0.0, Resistance=0.1, Vertical Factor of Safety=999.00

PILE SELECTION:
Request Min. Section Modulus = 36.7 in3/pile=601.45 cm3/pile, Fy= 50 ksi = 345 MPa, Fb/Fy=0.66
W12X40 has Section Modulus = 51.5 in3/pile=843.93 cm3/pile. It is greater than Min. Requirements!
Top Deflection = 0.76(in) based on E (ksi)=29000.00 and I (in4)/pile=307.0

DRIVING PRESSURES (ACTIVE, WATER, & SURCHARGE):

Z1	P1	Z2	P2	Slope
0	0	800	32.000	0.04
0	0.081	9	0.081	0

PASSIVE PRESSURES: Pressures below will be divided by a Factor of Safety =1.5

Z1	P1	Z2	P2	Slope
9	0	800	276.8	0.35

ACTIVE SPACING:

No.	Z depth	Spacing
1	0.00	6.00
2	9.00	2.00

PASSIVE SPACING:

No.	Z depth	Spacing
1	9.00	6.00

UNITS: Width,Spacing,Diameter,Length,and Depth - ft; Force - kip; Moment - kip-ft
Friction,Bearing,and Pressure - ksf; Pres. Slope - kip/ft3; Deflection - in

****

SHORING WALL CALCULATION SUMMARY
The leading shoring design and calculation software
Software Copyright by CivilTech Software
www.civiltech.com

****
ShoringSuite Software is developed by CivilTech Software, Bellevue, WA, USA.
The calculation method is based on the following references:

1. FHWA 98-011, FHWA-RD-97-130, FHWA SA 96-069, FHWA-IF-99-015
2. STEEL SHEET PILING DESIGN MANUAL by Pile Buck Inc., 1987
3. DESIGN MANUAL DM-7 (NAVFAC), Department of the Navy, May 1982
4. TRENCHING AND SHORING MANUAL Revision 12, California Department of Transportation, January 2000
6. EARTH SUPPORT SYSTEM & RETAINING STRUCTURES, Pile Buck Inc. 2002
5. DESIGN OF SHEET PILE WALLS, EM 1110-2-2504, U.S. Army Corps of Engineers, 31 March 1994
7. EARTH RETENTION SYSTEMS HANDBOOK, Alan Macnab, McGraw-Hill. 2002
8. Temporary Structures in Construction, Robert T. Ratay (Co-author of Chapter 7: John J. Peirce), McGraw-Hill. 2012
9. AASHTO HB-17, American Association of State and Highway Transportation Officials, 2 September 2002

UNITS: Width/Spacing/Diameter/Length/Depth - ft, Force - kip, Moment - kip-ft, Friction/Bearing/Pressure - ksf, Pres. Slope - kip/ft3, Deflection - in

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Date: 11/16/2023 File: P:\Studio Ectypos\Chu Residence\Calculations\9' Pile, no impact.sh8

Title: Chu Residence
Subtitle: 9' Drilled, No impact

**********INPUT DATA**********
Wall Type: 2. Soldier Pile, Drilled
Wall Height: 9.00
Pile Diameter: 2.00
Pile Spacing: 6.00
Factor of Safety (F.S.): 1.50
Lateral Support Type (Braces): 1. No
Top Brace Increase (Multi-Bracing): Add 15%*
Embedment Option: 1. Yes
Friction at Pile Tip: No
Check Vertical Bearing Capacity:
Side Friction for Bearing: 0.00
Tip Resistance for Bearing: 0.00
Pile Properties:
Steel Strength, Fy: 50 ksi = 345 MPa
Allowable Fb/Fy: 0.66

Elastic Module, E: 29000.00
Moment of Inertia, I: 238.00
User Input Pile: W12X40

* DRIVING PRESSURE (ACTIVE, WATER, & SURCHARGE) *

No.	Z1 top	Top Pres.	Z2 bottom	Bottom Pres.	Slope
1	0	0	800	32.000	0.04
2	0	0.081	9	0.081	0

* PASSIVE PRESSURE *
The pressures below will be divided by a Factor of Safety =1.5

No.	Z1 top	Top Pres.	Z2 bottom	Bottom Pres.	Slope
1	9	0	800	276.8	0.35

* ACTIVE SPACE *

No.	Z depth	Spacing
1	0.00	6.00
2	9.00	2.00

* PASSIVE SPACE *

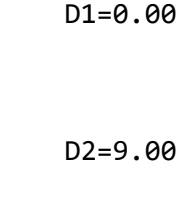
No.	Z depth	Spacing
1	9.00	6.00

*For Tieback: Input1 = Diameter; Input2 = Bond Strength
*For Plate: Input1 = Diameter; Input2 = Allowable Pressure
*For Deadman: Input1 = Horz. Width; Input2 = Passive Pressure;
*For Sheet Pile Anchor: Input1 = Horz. Width; Input2 = Passive Slope;

**********CALCULATION**********

The calculated moment and shear are per pile spacing. Sheet piles are per one foot or meter; Soldier piles are per pile.

Top Pressures start at depth = 0.00



```
        |
        |      D3=21.15

        D1 - TOP DEPTH
        D2 - EXCAVATION BASE
        D3 - PILE TIP

   MOMENT equilibrium   AT DEPTH=19.13  WITH EMBEDMENT OF 10.13
   FORCE equilibrium   AT DEPTH=21.15  WITH EMBEDMENT OF 12.15

   The program calculates an embedment for moment equilibrium, then increase the
embedment by 1.2


**********RESULTS**********

* EMBEDMENT Notes *
Based on USS Design Manual, first calculate embedment for moment equilibrium, then
increased the embedment to get the design depth.
The embedment for moment equilibrium is 10.13
The program calculates an embedment for moment equilibrium, then increase the
embedment by 1.2
The total desigh embedment is 12.15

Embedment Information:
If 20% increased, the total design embedment is 12.15
If 30% increased, the total design embedment is 13.17
If 40% increased, the total design embedment is 14.18
If 50% increased, the total design embedment is 15.19


* MOMENT IN PILE (per pile spacing)*
Pile Spacing:  sheet piles are one foot or one meter; soldier piles are one pile.
Overall Maximum Moment = 100.93 at 14.19
Maximum Shear = 46.10
Moment and Shear are per pile spacing: 6.0 foot or meter

* VERTICAL LOADING *
Vertical Loading from Braces = 0.00
Vertical Loading from External Load = 0.00
Total Vertical Loading = 0.00

* VERTICAL BEARING CAPACITY CHECK (Option 1, Not including side area above base) *
Tip area + Total side area of embedment below base only.

Tip Depth       Tip Area*       Bearing         Tip Resistance
-------------------------------------------------------------------
21.15           3.14            0.00            0.00
*Tip Area is based on shaft diameter, D=2.0 (input in Page A, Item 3)
```

Embedment	Side Area*	Friction	Side Resistance
12.15	76.36	0.00	0.08

*Total side area is the surface area of embedment below base only.

Total Vertical Resistance = 0.08
Total Vertical Loading = 0.00
Vertical Factor of Safety = 999.00

* VERTICAL BEARING CAPACITY CHECK (Option 2, including side area above base) *
Tip area + Total side area of embedment below base + Back side between pile and soil above base.

Tip Depth	Tip Area*	Bearing	Tip Resistance
21.15	3.14	0.00	0.00

*Tip Area is based on shaft diameter, D=2.0 (input in Page A, Item 3)

Embedment	Side Area*	Friction	Side Resistance
12.15	104.63	0.00	0.10

*Total side area is the surface area of embedment below base and back side between pile and soil above base.

Total Vertical Resistance = 0.11
Total Vertical Loading = 0.00
Vertical Factor of Safety = 999.00

**********SPECIFIED PILE **********

Overall Maximum Moment = 100.93 at 14.19
The pile selection is based on the magnitude of the moment only. Axial force is neglected.

Request Min. Section Modulus = 36.70 in3/pile = 601.45 cm3/pile, Fy= 50 ksi = 345 MPa, Fb/Fy=0.66

W12X40 has been found in Soldier Pile list!
(English Units):
Area= 11.7 in. Depth= 11.9 in. Width= 8.01 in. Height= 12 in.
Flange thickness= 0.515 in. Web thickness= 0.295 in.
Ix= 307 in4/pile Sx= 51.5 in3/pile Iy= 44.1 in4/pile Sy= 11 in3/pile
(Metric Units):
Ix= 127.77 x100cm4/pile Sx= 843.93 cm3/pile Iy= 18.35 x100cm4/pile Sy= 180.26 cm3/pile

The pile selection is based on the magnitude of the moment only. Axial force is neglected.

W12X40 is capable to support the shoring!
Top deflection = 0.765(in)
Max. deflection = 0.765(in)

********** LAGGING SIZE ESTIMATION **********
Max. Pressure above base = 0.44
Piles are more rigid than timber lagging, due to arching, only portion of pressures are acting to lagging, 30-50% loading is suggested.

If 50% loading is used for lagging design, Design Pressure = 0.22
Pile Spacing =6.0, Max. Moment in lagging = 0.99
For 4"x12" Timber, Section Modules S=23.47 in3. The request allowable bending strength, fb=M/S=0.51
For 6"x12" Timber, Section Modules S=57.98 in3. The request allowable bending strength, fb=M/S=0.21

If 30% loading is used for lagging design, Design Pressure = 0.13
Pile Spacing =6.0, Max. Moment in lagging = 0.59
For 4"x12" Timber, Section Modules S=23.47 in3. The request allowable bending strength, fb=M/S=0.30
For 6"x12" Timber, Section Modules S=57.98 in3. The request allowable bending strength, fb=M/S=0.12

Unit: Pressure: ksf, Spacing: ft, Moment: kip-ft, Bending Strength, fb: ksi