



Structural Design
(801) 876-3501



Structural Calculations

JR BROADBENT RESIDENCE
LOT 20 RED LEDGES
230 N HAYSTACK MOUNTAIN DR
HEBER CITY, UTAH

Prepared For:



RML Design
1436 S. Legend Hills Dr, Suite 320
Clearfield, UT 84015

4/8/2024

4/8/2024

STRUCTURAL CALCULATIONS

For: RML Design
Plan #: JR BROADBENT RESIDENCE
Location: LOT 20 RED LEDGES

From: York Engineering Inc.
4883 Old Highway Rd. Suite A
Morgan, Utah 84050
(801) 876-3501

Design Criteria 2021 IRC

Roof Loads:

Roof Snow Load (psf): 45
Roof Dead Load (psf): 15

Floor Loads:

Floor Live Load (psf): 40
Floor Dead Load (psf): 15
Seismic Design Category: C
Wind Speed: 115 mph for Exposure C

Material Properties:

Concrete (f'_c): 3000 psi (foundation) to 4000 psi (suspended slab)
Concrete Reinforcement: ASTM A615 Grade 60
Site Conditions: Dry & stable granular based, 1500 psf bearing capacity, granular based
Backfill: KH = 35 pcf, slope not to exceed 20%
Setback: See IRC section R403.1.7
Dimensional Lumber: Doug Fir #2 or better
Posts and Timbers: Doug Fir #1 or better
Steel: ASTM Grade 50

Use straps and tie downs, and meet nailing, reinforcement and other structural requirements as noted on the drawing and within the pages of this document. These structural calculations are based on conditions and assumptions listed above. If the conditions listed herein are not met or are different, contractor shall notify York Engineering prior to construction. Prefab trusses to be engineered by the supplier. This engineering assumes that the building site is dry and stable, a high water table or adverse soils such as plastic clays, fills etc. could cause future flooding, settlement, site instability, or other adverse conditions. Verification of and liability for the soil bearing pressure, site stability, and all other site conditions, including site engineering as required, is the responsibility of others. This engineering assumes that the site is stable having no global stability concerns or hazards. If this is not true, contact soils engineer and provide soils/slope stability report to York Engineering for review and further design. These calculations and engineering are for the new building structure only and do not provide any engineering analysis of or liability/warranty for the non-structural portions of the building, or the site itself. York Engineering Inc. does not assume the role of "Registered Design Professional in Responsible Charge" on this project. The purpose of these calculations and engineering is to help reduce structural damage and loss of life due to seismic activity and/or high wind conditions. York Engineering liability is limited to five times the fee collected for services. The contractor(s) must read, understand, and accept all York Engineering documents applicable to this design prior to utilizing the design. By using the design, the owner/contractor accepts the design, assumed loads, and limits on liability stated. If any discrepancies occur between the structural and other project documents, notify York Engineering of the discrepancy prior to construction.

The following general requirements shall be followed during construction:

1. Attach (2) ply headers together with (3) 16d at 12" O.C. [(2) 16d OK for 2x6 headers], use (3) 16d at 12" O.C. each side of (3) ply headers [use (4) 16d when header height is greater than 11"]. Attach (4) ply headers together with (2) 1/2" through bolts at 16" O.C. or (2) SDS 1/4" x 6" screws at 16" O.C. each side of header U.N.O., see plan.
2. Contractor shall assure that all materials are used per manufactures recommendations.
3. Site engineering and liability shall be provided by the owner/builder as required.
4. Contractor shall assure that footings are properly drained, soil is dry, footings rest on undisturbed native soil, building horizontal clearance from footings to adjacent slopes is per IRC Section R403.1.7.2. If setback requirements of R403.1.7.2 cannot be met then contact engineer for further design requirements.
5. The contractor shall conform to all building codes and practices as per the current IRC
6. Provide solid blocking through structure down to footing for all load paths
7. Builder shall follow all recommendations found in all applicable geotechnical reports.
8. Stacking of two sill plates is permitted with 5/8" J-Bolts through both plates. Stacking more than two plates is not permitted without special engineering.
9. All footings, foundations, and interior slabs shall be normal wt. concrete with a compressive strength of 2,500 PSI min. U.N.O. to meet strength requirements (see calcs., no special inspections required U.N.O., see plan) however, per IRC 402.2 use 3000 PSI concrete for durability purposes.



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Plan: JR BROADBENT RESIDENCE
Date: 3/13/2024
Location: LOT 20 RED LEDGES

LOCATION	PASS	PASS	PASS	PASS	PASS
	Back	Front	Left	Right	Interior
	FS: 1.78 DL+0.75LL+0.75S	FS: 1.73 DL+0.75LL+0.75S	FS: 1.84 DL+S	FS: 1.84 DL+S	FS: 1.01 DL+0.75LL+0.75S
SOIL SPECS					
Density (pcf)	125	125	125	125	125
Soil Pressure (psf)	1500	1500	1500	1500	1500
Weight (k/ft)	0.06	0.06	0.06	0.06	0.04
BUILDING LOADS					
Roof Span (ft)	24	24	30	30	48
Floor Span (ft)	17	19	2	2	28
Wall Height (ft)	20	20	20	20	20
Suspended Slab Span (ft)	0	0	0	0	0
Total Load (k/ft)	1.37	1.41	1.32	1.32	2.20
FOOTING SPECS					
Footing Width (in)	24	24	24	24	20
Footing Height (in)	10	10	10	10	10
FOUNDATION					
Height Above Grade (ft)	0.67	0.67	0.67	0.67	0.67
Wall Thickness (ft)	0.67	0.67	0.67	0.67	0.67
Weight (k/ft)	0.07	0.07	0.07	0.07	0.07
CONCRETE SPECS					
Density (pcf)	150	150	150	150	150
Strength (psi)	2500	2500	2500	2500	2500
Clear Cover Thickness (in)	3	3	3	3	3
CALCULATIONS					
Total Weight on Soil (k/ft)	1.68	1.73	1.63	1.63	2.48
Soil Load (ksf)	0.84	0.86	0.82	0.82	1.49
FOOTING SELECTION	F-24	F-24	F-24	F-24	F-20

Plan: JR BROADBENT RESIDENCE
Date: #####
Location: LOT 20 RED LEDGES

LOADING SUMMARY	
Roof Live Load (psf):	45
Roof Dead Load (psf):	15
Floor Live Load (psf):	40
Floor Dead Load (psf):	15
Exterior Wall Dead Load (psf):	20
Interior Wall Dead Load (psf):	10
Suspended Slab Dead Load (psf):	115
Suspended Slab Live Load (psf):	60

Table 1 Building Weight											
	Ext Wall Length (ft)	Wall Height (ft)	Roof SQFT	Weight. (psf)	Snow Wgt. (psf)	Floor SQFT	Weight. (psf)	Misc weight	Diaphragm Weight (lb)	Wall Weight	Total Weight (lb)
Roof	---	---	3565	15	10	---	---	0	88,532	29,200	117,732
---	0	0	0	0	10	0	0	0	0	0	0
---	0	0	0	0	10	0	0	0	0	0	0
Floor 1	292	10	0	0	10	3565	15	0	53,475	46,720	100,195

SNOW LOAD PARAMETERS	
Roof Slope (x/12):	3
Roof Pitch (θ):	14.04
Total Roof Load (psf):	60.00

Table 2								Table 3							
VERTICAL SEISMIC FORCE DISTRIBUTION								STORY DIAPHRAGM TABLE							
	H _x (ft)	W _x (kip)	H _x x W _x	% Force	Total Shear (kip)	F _x	V _x	ΣF _i (i=x to n) ρ = 1.0	ΣW _i (i=x to n)	F _{px}	$\frac{W_{dx} \times F_x}{\sum W_{dx}}$ (0.4'S _{ds} I _e W _{px})	$\frac{W_{mx} \times F_x}{\sum W_{mx}}$ (0.2'S _{ds} I _e W _p)	Design F _{px}		
Roof	16.88	117.73	1,987	77%	11.49	11.49	11.49	8.84	117.73	8.84	16.18	8.09	8.84		
---	---	0.00	0	0%	0.00	0.00	11.49	0.00	117.73	0.00	0.00	0.00	0.00		
---	---	0.00	0	0%	0.00	0.00	11.49	0.00	117.73	0.00	0.00	0.00	0.00		
Floor 1	6.00	100.20	601	23%	14.97	3.48	14.97	11.52	217.93	5.30	19.67	9.83	9.83		
TOTALS	0.01	217.93	2587.89	100%	---	---	14.97								

SEISMIC LOAD PARAMETERS	
Site Class:	D
Importance Factor	1.00
F _a :	1.37
R _t :	6.5
S _s :	0.538
S _{MS} :	0.737
S _{DS} :	0.491
C _s :	0.075
Redundancy Factor, ρ :	1.30
ASD Load Combination Factor:	0.70
Factored C _s :	0.069

Base shear Check (not distributed)
Base Shear Force lb: 14,972 **14972** lbs
Floor 1 Lateral Force lb: 6,884
--- 0
--- 0
Roof Lateral Force lb: 8,089

Diaphragm Forces (from table 3)		Max Diaphragm Shear (lb)	Diaphragm	F.S.	ω Diaphragm (plf)		Chord Forces (lbs)	
					Front/Back	Left/Right	Front/Back	Left/Right
Floor 1 Diaphragm Force lb:	9834	82	3/4 OSB	2.62	114	164	#DIV/0!	#DIV/0!
---	0	---	---	---	---	---	---	---
---	0	---	---	---	---	---	---	---
Roof Diaphragm Force lb:	8842	74	5/8 OSB	2.92	103	147	3168	1542

Seismic (kips)	
	total
---	0 kips
---	0 kips
1st Floor	11.5 kips
Basement	3.5 kips

MISC AREAS *			
Location	Area	Location	Area

% Force on per	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Portal	Transferred	Transferred	Portal	Portal	3.5	FTW	Transferred	Transferred	FTW	FTW	4	4.5	5	5	5	5	5
Wall Height (ft)	10	10	10	10	10	12	10	10	10	10	10	10	10	10	10	10	10
Floor Span (ft)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Roof Span (ft)	18	4	4	4	4	25	20	4	4	4	4	4	4	4	4	4	4
Wind Speed (mph)	200	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240
Total Cd. (qft)	201	138	138	138	162	232.5	210	138	138	138	138	138	138	138	138	138	138
Seis Uplift (lbs)	-	-	-	-	-	4668	0	-	-	-	113	1721	3233	0	-	-	-
Wind Uplift (lbs)	-	-	-	-	-	1715	0	-	-	-	0	544	1180	0	-	-	-

[illegible]

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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Plan: JR BROADBENT RESIDENCE
Date: 3/13/2024
Location: LOT 20 RED LEDGES

1-back-Bath

LOAD PARAMETERS

Seismic Load (lb):	1,298
Wind Load (lb):	546

SHEAR WALL SELECTION

Sheathing	7/16"
Shear Wall Callout:	SW-1
Seismic Strength (lb/ft):	350
Edge Nailing (in o.c.):	4
Field Nailing (in o.c.):	12
Seismic FS	1.11
Wind FS	3.70

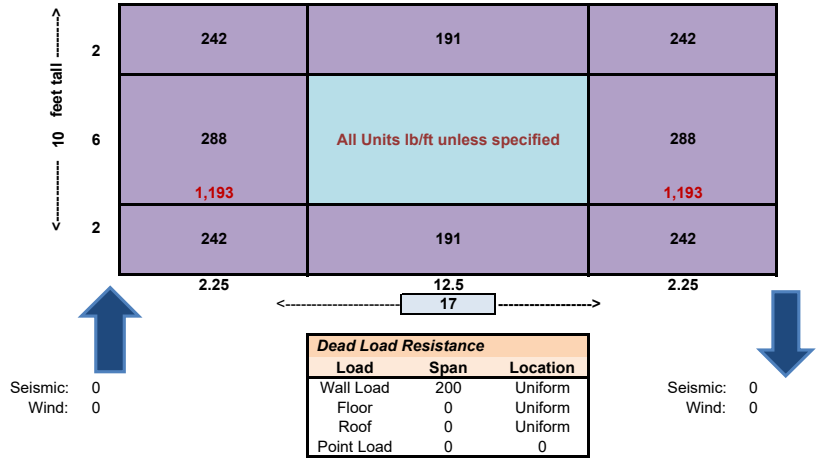
ASPECT RATIO

Left Aspect Ratio:	92%
Right Aspect Ratio:	92%

CONNECTORS

Force-Transfer Wall Location:	Corner
Tie-Down:	LSTHD8/RJ
Tie-Down Seismic FS	Not Needed
Tie-Down Wind FS	Not Needed
Window Strap:	CS16
Window Strap Connector:	Nails
Strap FS	1.43
Bolt Diameter (in):	1/2
Bolt Spacing (in o.c.):	32
Bolt Capacity (plf):	390
Bolt FS	5.11
Stud Size:	2x4
Tension (lb):	534
Stress (psi):	110
F _T (psi)	920
Stud FS:	8.39

FORCE TRANSFER WALL



FORCE TRANSFER WALL DESIGN

Shear Wall:	SW-1 --- 4" Edge Nailing and 12" Field Nailing
Tie-Down:	LSTHD8/RJ
Straps:	CS16 --- Nails to Connect
Bolts:	1/2" Bolts @ 32" O.C.
Studs:	2x4 Studs

Plan: JR BROADBENT RESIDENCE
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1-back-Kitchen

LOAD PARAMETERS

Seismic Load (lb):	1,926
Wind Load (lb):	810

SHEAR WALL SELECTION

Sheathing	7/16"
Shear Wall Callout:	SW-1
Seismic Strength (lb/ft):	350
Edge Nailing (in o.c.):	4
Field Nailing (in o.c.):	12
Seismic FS	1.18
Wind FS	3.93

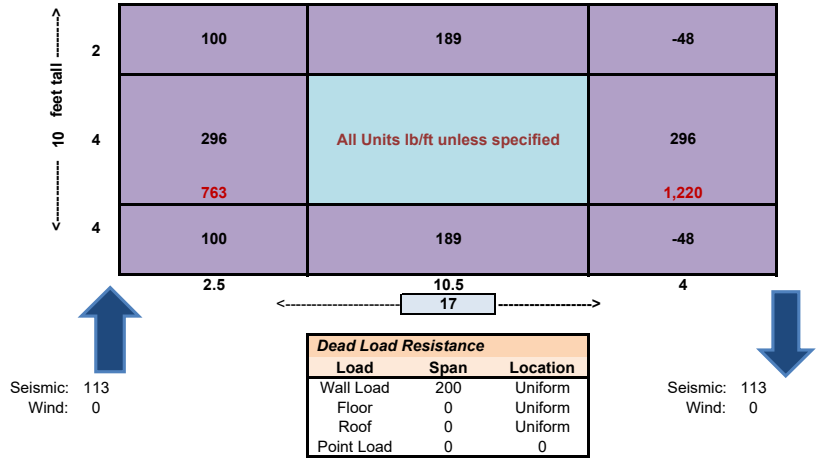
ASPECT RATIO

Left Aspect Ratio:	100%
Right Aspect Ratio:	100%

CONNECTORS

Force-Transfer Wall Location:	Corner
Tie-Down:	LSTHD8/RJ
Tie-Down Seismic FS	17.22
Tie-Down Wind FS	Not Needed
Window Strap:	CS16
Window Strap Connector:	Nails
Strap FS	1.40
Bolt Diameter (in):	1/2
Bolt Spacing (in o.c.):	32
Bolt Capacity (plf):	390
Bolt FS	3.44
Stud Size:	2x4
Tension (lb):	793
Stress (psi):	163
F _T (psi)	920
Stud FS:	5.65

FORCE TRANSFER WALL



FORCE TRANSFER WALL DESIGN	
Shear Wall:	SW-1 --- 4" Edge Nailing and 12" Field Nailing
Tie-Down:	LSTHD8/RJ
Straps:	CS16 --- Nails to Connect
Bolts:	1/2" Bolts @ 32" O.C.
Studs:	2x4 Studs

Plan: JR BROADBENT RESIDENCE
Date: 3/13/2024
Location: LOT 20 RED LEDGES

1-right-Master

LOAD PARAMETERS

Seismic Load (lb):	619
Wind Load (lb):	369

SHEAR WALL SELECTION

Sheathing	7/16"
Shear Wall Callout:	SW-1
Seismic Strength (lb/ft):	350
Edge Nailing (in o.c.):	4
Field Nailing (in o.c.):	12
Seismic FS	2.26
Wind FS	5.31

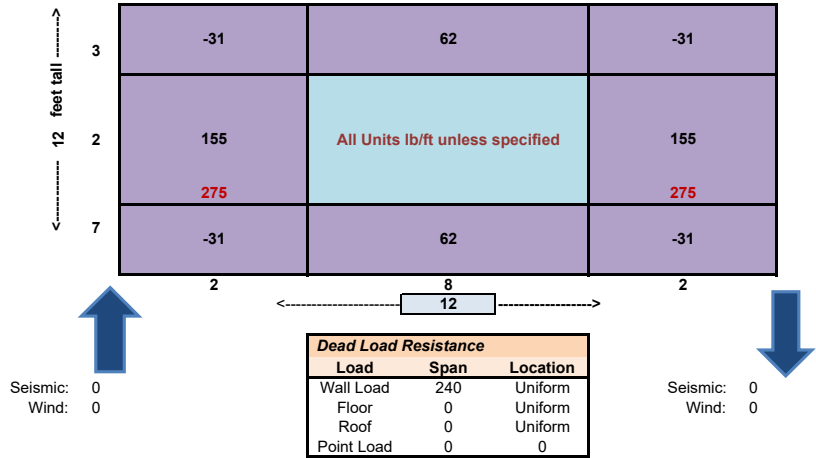
ASPECT RATIO

Left Aspect Ratio:	100%
Right Aspect Ratio:	100%

CONNECTORS

Force-Transfer Wall Location:	Corner
Tie-Down:	LSTHD8/RJ
Tie-Down Seismic FS	Not Needed
Tie-Down Wind FS	Not Needed
Window Strap:	CS16
Window Strap Connector:	Nails
Strap FS	6.20
Bolt Diameter (in):	1/2
Bolt Spacing (in o.c.):	32
Bolt Capacity (plf):	390
Bolt FS	7.56
Stud Size:	2x4
Tension (lb):	433
Stress (psi):	89
F _T (psi)	920
Stud FS:	10.35

FORCE TRANSFER WALL



FORCE TRANSFER WALL DESIGN	
Shear Wall:	SW-1 --- 4" Edge Nailing and 12" Field Nailing
Tie-Down:	LSTHD8/RJ
Straps:	CS16 --- Nails to Connect
Bolts:	1/2" Bolts @ 32" O.C.
Studs:	2x4 Studs

Plan: JR BROADBENT RESIDENCE
Date: 3/13/2024

Location: LOT 20 RED LEDGES

LEFT AND RIGHT LOADING

Wind Loading Calculations using Main Windforce-Resisting System (MWFRS) Longitudinal Direction

Table 27.5-1 Steps to Determine MWFRS Loads Enclosed Simple Diaphragm Buildings

Risk Category	II	Table 1.5-1	
Wind speed	115	Figure 26.5-1 A-B or C	
Exposure Category	C	Section 26.7	
		Cp Windward	Cp Leeward
L/B 3rd Floor	---	0.8	-0.2
L/B 2nd floor	---	0.8	-0.2
L/B 1st floor	0.70	0.8	-0.3
Roof Height	3.75		
Mean roof Height	16.9		
Truss Span	30		
Roof Slope		3 /12	
Lower Truss Span	30		
Lower roof Slope		3 /12	
Wind directionality factor Kd	0.85	Table 26.6-1	
Topography factor Kzt	1	section 26.8	
Ground elevation factor Ke	0.812	Section 26.9	
Gust Factor	0.87	eq 26.11-10	
Internal Pressure Coeff (GCpi)	0.18 +/-	table 26.13-1 enclosed building	
α (table 26.11-1)	9.50		
Zg (ft) Table 26.11-1	900		
Load combination factor	0.6	(ASCE 7-16 2.4.1)	
	elevation (ft)	Kz & Kh (Table 26	qz
qh (leeward and roof)	16.9	0.87	20.3
3rd floor, top	16.0	0.86	20.1
2nd floor, top	15.0	0.85	19.8
1st floor, top	15.0	0.85	19.8
Basement floor, top	6.0	0.85	19.8
Basement floor, bottom	0.0	0.85	19.8
3rd Floor (psf)			
Net Pressure	10.4	Windward	10.5
		Leeward	-0.1
2nd Floor (psf)			
Net Pressure	10.4	Windward	10.4
		Leeward	-0.1
Main Floor (psf)			
Net Pressure	11.4	Windward	10.4
		Leeward	1.0
Basement Floor (psf)			
Net Pressure	11.4	Windward	10.4
		Leeward	1.0
Roof (psf)	winward	leeward	
Load Case 1	-3.5	-2.7	
Load Case 2	1.8	-2.7	
Lower Roof (psf)			
Load Case 1	-3.5	-2.7	
Load Case 2	1.8	-2.7	
Roof Load			
Roof Height	Length	Area (ft ²)	Horizontal Force (lbs)
3.75	86.00	322.5	1454
Lower Roof Load			
Low Roof Height	Upper Length	Lower length	Low Roof Length(ft ²)
0.00	86	86	0
			Area (ft ²)
			0.0
			Horizontal Force (lbs)
			0.0
Wall Load		(height)	(height)
	Basement	6	1st floor
	ft ²	force (lbs)	ft ²
Windward	516	5389.3	946
Leeward	516	502.2	946
		(height)	(height)
	2nd floor	0	3rd floor
	ft ²	force (lbs)	ft ²
Windward	0	0.0	0
Leeward	0	0.0	0
Diaphragm Forces	ω Diaphragm Loading	Diaphragm Shear	Diaphragm
Base Shear Force lb:	18,147	(plf)	(plf)
Floor 1 Lateral Force lb:	8,346	97	70
	0	---	---
	0	---	---
Roof Lateral Force lb:	6,855	80	57
			3/4 OSB
			5/8 OSB
			F.S.
			3.09
			3.76
			2456
			(used 19/32 unblocked values)
			(used 19/32 unblocked values)
			(used 19/32 unblocked values)
			(used 7/16 unblocked values)
Hurricane Ties	Uplift	(lbs)	H1
	Roof (per truss)	0.0	100.00
	Low roof (per truss)	-	-
			H2.5
			100.00
			-

Plan: JR BROADBENT RESIDENCE
Date: 3/13/2024

Location: LOT 20 RED LEDGES

FRONT AND BACK LOADING

Wind Loading Calculations using Main Windforce-Resisting System (MWFRS) Longitudinal Direction

Table 27.5-1 Steps to Determine MWFRS Loads Enclosed Simple Diaphragm Buildings

Risk Category	II	Table 1.5-1		
Wind speed	115	Figure 26.5-1 A-B or C		
Exposure Category	C	Section 26.7		
		Cp Windward	Cp Leeward	Figure 27.3-1
L/B 3rd Floor	---	0.8	-0.2	
L/B 2nd floor	---	0.8	-0.2	
L/B 1st floor	1.43	0.8	-0.3	
Roof Height	3.75			
Mean roof Height	16.9			
Truss Span	30			
Roof Slope		3 /12		
Lower Truss Span	30			
Lower roof Slope		3 /12		
Wind directionality factor Kd		0.85 Table 26.6-1		
Topography factor Kzt		1 section 26.8		
Ground elevation factor Ke		0.812 Section 26.9		
Gust Factor		0.88 eq 26.11-10		
Internal Pressure Coeff (GCpi)		0.18 +/- table 26.13-1		
α (table 26.11-1)		9.50	enclosed building	
Zg (ft) Table 26.11-1		900		
Load combination factor	0.6	(ASCE 7-16 2.4.1)		
		elevation (ft)	Kz & Kh (Table 26	qz
qh (leeward and roof)		16.9	0.87	20.3 qh
3rd floor, top		16.0	0.86	20.1
2nd floor, top		15.0	0.85	19.8
1st floor, top		15.0	0.85	19.8
Basement floor, top		6.0	0.85	19.8
Basement floor, bottom		0.0	0.85	19.8
3rd Floor (psf)				
Net Pressure	10.5	Windward	10.6	
		Leeward	-0.1	
2nd Floor (psf)				
Net Pressure	10.5	Windward	10.5	
		Leeward	-0.1	
Main Floor (psf)				
Net Pressure	11.5	Windward	10.5	
		Leeward	1.0	
Basement Floor (psf)				
Net Pressure	11.5	Windward	10.5	
		Leeward	1.0	
Roof (psf)	winward	leeward		
Load Case 1	-3.6	-2.7		
Load Case 2	1.8	-2.7		
Lower Roof (psf)				
Load Case 1	-3.6	-2.7		
Load Case 2	1.8	-2.7		
Roof Load				
Roof Height	Length	Area (ft²)	Horizontal Force (lbs)	
3.75	60.00	225.0	1026	
Lower Roof Load				
Low Roof Height	Upper Length	Lower length	Low Roof Length(ft'	Area (ft²)
0.00	60	60	0	0.0
				Horizontal Force (lbs)
				0.0
Wall Load		(height)	(height)	
	Basement	6	1st floor	11
	ft²	force (lbs)	ft²	force (lbs)
Windward	360	3792.4	660	6952.8
Leeward	360	362.9	660	665.3
	(height)	(height)	(height)	(height)
	2nd floor	0	3rd floor	1
	ft²	force (lbs)	ft²	force (lbs)
Windward	0	0.0	0	0.0
Leeward	0	0.0	0	0.0
Diaphragm Forces				
Base Shear Force lb:	12,799	ω Diaphragm Loading	Diaphragm Shear	Diaphragm F.S.
Floor 1 Lateral Force lb:	5,887	(plf)	(plf)	3/4 OSB 6.28
---	0	---	---	---
---	0	---	---	---
Roof Lateral Force lb:	4,835	81	28	5/8 OSB 7.65
				843
Hurricane Ties				
Uplift	(lbs)	Factors of Safety		
		H1	H2.5	
Roof (per truss)	0.0	100.00	100.00	
Low roof (per truss)	-	-	-	

Plan: JR BROADBENT RESIDENCE
Date: 3/13/2024
Location: LOT 20 RED LEDGES

	PASS	PASS	PASS	pass	PASS
	Moment: 1.68	LL Deflection: 1.86	Moment: 1.56	Moment: 0.59 Deck - Forte - DBL	Moment: 1.24 DECK
JOIST SPECIFICATION	Truss Joists	Truss Joists	Truss Joists		
Joist Type:	TJI	TJI	TJI	SAWN	SAWN
Joist Series:	210	360	210	DF #2	DF #2
Joist Depth (in):	11.88	11.88	11.88	11.25	11.25
Joist Span (ft):	17.67	17.67	16	19	15
Joist Spacing (in):	12	16	16	16	12
LOAD PARAMETERS					
Floor Dead Load	15	15	15	15	15
Floor Live Load	40	40	40	60	60
Total Floor Load	55	55	55	75	75
Pressure Treated (Sawn Only)	No	No	No	No	No
SIMPLE SPAN JOIST					
Duration Increase	1	1	1	1	1
Joist Weight (plf)	2.8	3	2.8	3.375	3.375
Joist Loading (plf)	58	76	76	103	78
Max Reaction (lb)	511	674	609	982	588
Max Moment (ft-lb)	2256	2979	2436	4665	2204
JOIST DETERMINATION					
Max Moment 100% (ft-lb)	3795	6180	3795	1035	1035
Max Bending Stress (Sawn Only) (psi)	767.2	1013.2	828.6	1769.2	836.0
Moment FS	1.68	2.07	1.56	0.59	1.24
Max Shear Capacity (lb)	1655	1705	1655	2025	2025
Shear FS	3.24	2.53	2.72	2.06	3.44
Bearing Required (in)	2.00	2.00	2.00	2.00	2.00
Live Load Deflection Limit	360	360	360	360	360
Live Load Deflection (in)	0.31	0.32	0.28	0.82	0.24
Allowable Live Load Deflection (in)	0.59	0.59	0.53	0.63	0.50
LL Deflection FS	1.92	1.86	1.90	0.77	2.08
Total Load Deflection Limit	240	240	240	240	240
Total Load Deflection (in)	0.44	0.45	0.40	1.06	0.31
Allowable Total Load Deflection (in)	0.88	0.88	0.80	0.95	0.75
TL Deflection FS	1.99	1.95	2.00	0.89	2.39
SELECTION	11 7/8" TJI 210 @ 12" O.C.	11 7/8" TJI 360 @ 16" O.C.	11 7/8" TJI 210 @ 16" O.C.	2x12 DF #2 @ 16" O.C.	2x12 DF #2 @ 12" O.C.

Plan: JR BROADBENT RESIDENCE
Date: 3/13/2024
Location: LOT 20 RED LEDGES

	PASS	PASS	PASS	PASS	
	TL Deflection: 1.46	TL Deflection: 1.51	Moment: 1	Moment: 1.01	
	Roof - Forte - ALT 16" TJI 560 @ 1	Roof - Forte	Roof - Forte	Roof - Forte	
JOIST SPECIFICATION	Truss Joists	Truss Joists	Truss Joists	Truss Joists	Truss Joists
Joist Type:	TJI	TJI	TJI	TJI	TJI
Joist Series:	560	560	360	210	210
Joist Depth (in):	14	11.88	11.88	11.88	11.88
Joist Span (ft):	30	23.75	20	15.67	2
Joist Spacing (in):	12	16	24	24	16
LOAD PARAMETERS	SPAN >23', CHECK FORTE SPAN >21', CHECK FORTE CHECK PRO-RATING IN FORTICHECK PRO-RATING IN FORTI				
Floor Dead Load	15	15	15	15	15
Floor Live Load	45	45	45	45	40
Total Floor Load	60	60	60	60	55
Pressure Treated (Sawn Only)	No	No	No	No	No
SIMPLE SPAN JOIST					
Duration Increase	1	1	1	1	1
Joist Weight (plf)	4.2	4	3	2.8	2.8
Joist Loading (plf)	64	84	123	123	76
Max Reaction (lb)	963	998	1230	962	76
Max Moment (ft-lb)	7223	5923	6150	3769	38
JOIST DETERMINATION					
Max Moment 100% (ft-lb)	11275	9500	6180	3795	3795
Max Bending Stress (Sawn Only) (psi)	1768.8	2014.3	2091.6	1281.9	12.9
Moment FS	1.56	1.60	1.00	1.01	99.69
Max Shear Capacity (lb)	2390	2050	1705	1655	1655
Shear FS	2.48	2.06	1.39	1.72	21.74
Bearing Required (in)	2.00	2.00	2.00	2.00	2.00
Live Load Deflection Limit	240	240	240	240	360
Live Load Deflection (in)	0.96	0.75	0.85	0.44	0.00
Allowable Live Load Deflection (in)	1.50	1.19	1.00	0.78	0.07
LL Deflection FS	1.56	1.58	1.17	1.79	123.36
Total Load Deflection Limit	180	180	180	180	240
Total Load Deflection (in)	1.37	1.05	1.17	0.60	0.00
Allowable Total Load Deflection (in)	2.00	1.58	1.33	1.04	0.10
TL Deflection FS	1.46	1.51	1.14	1.75	129.63
SELECTION	14" TJI 560 @ 12" O.C.	11 7/8" TJI 560 @ 16" O.C.	11 7/8" TJI 360 @ 24" O.C.	11 7/8" TJI 210 @ 24" O.C.	11 7/8" TJI 210 @ 16" O.C.

Plan: JR BROADBENT RESIDENCE
 Date: 3/13/2024
 Location: LOT 20 RED LEDGES

Beam Page 1

RB-1: (2) 2X6's DF #2
 RB-2: (3) 1 3/4" X 11 7/8" LV 2.0E 2600 Fb
 RB-3: (2) 2X10's DF #2
 RB-4: (2) 2X10's DF #2
 RB-5: (3) 1 3/4" X 16" LVL 2.0E 2600 Fb
 RB-6: (3) 1 3/4" X 11 7/8" LV 2.0E 2600 Fb
 RB-7: (4) 1 3/4" X 11 7/8" LV 2.0E 2600 Fb
 RB-8: (2) 1 3/4" X 11 7/8" LV 2.0E 2600 Fb
 RB-9: (2) 1 3/4" X 9 1/2" LVL 2.0E 2600 Fb
 RB-10: (2) 2X10's DF #2

Beam Page 2

RB-11: (3) 1 3/4" X 18" LVL 2.0E 2600 Fb
 RB-12: (2) 2X8's DF #2
 RB-13: W10X19 STEEL Gr 50
 RB-14: W10X30 STEEL Gr 50
 RB-15: (2) 1 3/4" X 9 1/2" LVL 2.0E 2600 Fb
 RB-16: (2) 1 3/4" X 11 7/8" LVL 2.0E 2600 Fb
 RB-17: (3) 2X10's DF #2
 RB-18: W10X19 STEEL Gr 50
 RB-19: 5 1/8" x 21" GLB 24F-V4
 RB-20: (2) 1 3/4" X 7 1/4" LVL 2.0E 2600 Fb

Beam Page 3

RB-21: W10X22 STEEL Gr 50
 RB-22: W10X30 STEEL Gr 50
 MFB-1: (2) 1 3/4" X 11 7/8" LVL 2.0E 2600 Fb
 MFB-2: (2) 1 3/4" X 9 1/2" LVL 2.0E 2600 Fb
 MFB-3: (2) 1 3/4" X 11 7/8" LVL 2.0E 2600 Fb
 MFB-4: W16X67 STEEL Gr 50
 MFB-5: (2) 2X6's DF #2
 MFB-6: (1) 1 3/4" X 11 7/8" LVL 2.0E 2600 Fb

Beam Page 4

MFB-7: (2) 2X6's DF #2
 MFB-8: (2) 1 3/4" X 11 7/8" LV 2.0E 2600 Fb
 MFB-9: W10X39 STEEL Gr 50
 MFB-10: (2) 1 3/4" X 11 7/8" LV 2.0E 2600 Fb
 MFB-11: W10X19 STEEL Gr 50
 MFB-12: W10X19 STEEL Gr 50
 MFB-13: (3) 1 3/4" X 14" LVL 2.0E 2600 Fb
 MFB-14: (3) 2X12's DF #2
 MFB-15: (2) 1 3/4" X 11 7/8" LV 2.0E 2600 Fb

Location: LOT 20 RED LEDGES

2 trimmers required

Beams

Plan: JR BROADBENT RESIDENCE
Date: 03/13/2024
Location: LOT 20 RED LEDGES

2 trimmers required

2 trimmers required

2 trimmers required

2 trimmers required

2 trimmers required

2 trimmers required

	ENERCALC	ENERCALC		ENERCALC		ENERCALC		ENERCALC		ENERCALC
	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
	(3) 1 3/4" X 18" LVL	(2) 2X8's DF #2	W10X19 STEEL	W10X30 STEEL	(2) 1 3/4" X 9 1/2" LVL	(2) 1 3/4" X 11 7/8" LVL	(3) 2X10's DF #2	W10X19 STEEL	5 1/8" x 21" GLB	(2) 1 3/4" x 7 1/4" LVL
	TL Deflection: L/734	Moment: 1.39	LL Deflection: L/1000	LL Deflection: L/1000	TL Deflection: L/340	TL Deflection: L/1000	Moment: 1.19	LL Deflection: L/1000	TL Deflection: L/596	TL Deflection: L/311
	DL+S	DL+S	DL+0.75LL+0.75S	DL+0.75LL+0.75S	DL+S	DL+0.75LL+0.75S	DL+S	DL+0.75LL+0.75S	DL+S	DL+S
	RB-11	RB-12	RB-13	RB-14	RB-15	RB-16	RB-17	RB-18	RB-19	RB-20
	LVL	DF #2	STEEL	STEEL	LVL	LVL	DF #2	STEEL	GLB	LVL
Controlling Load Case										
Name										
Grade										
LOADING PARAMETERS										
Floor Live Load (psf)	40	40	40	40	40	40	40	40	40	40
Floor Total Load (psf)	55	55	55	55	55	55	55	55	55	55
Roof Live Load (psf)	45	45	45	45	45	45	45	45	45	45
Roof Total Load (psf)	60	60	60	60	60	60	60	60	60	60
Wall Load (psf)	35	20	20	20	20	20	35	35	35	20
BEAM SPECIFICATIONS			3'1" max unbraced	4'10" max unbraced				3'1" max unbraced		
Beam Span (ft)	14	8	10	10	16	16	6	10	18	8
Beam Weight (plf)	27.41	4.35	19.00	30.00	9.64	12.06	8.33	19.00	26.13	7.36
BEAM SIZING										
Beam Depth (in)	18	7.25	10	10	9.5	11.88	9.25	10	21	7.25
Beam Width/Weight	5.25	3	19	30	3.5	3.5	4.5	19	5.125	3.5
UNIFORM LOADING										
Floor Span (ft)	0	0	0	0	0	0	0	0	0	0
Roof Span (ft)	39	4	0	0	4	0	34	0	30.5	21
Wall Height (ft)	4	6	0	0	3	10	6	0	4	5
Total Uniform Floor Load (plf)	0	0	0	0	0	0	0	0	0	0
Total Live Floor Load (plf)	0	0	0	0	0	0	0	0	0	0
Total Uniform Roof Load (plf)	1170	120	0	0	120	0	1020	0	915	630
Total Live Roof Load (plf)	877.5	90	0	0	90	0	765	0	686.25	472.5
Total Uniform Wall Load (plf)	140	120	0	0	60	200	210	0	140	100
PARTIALLY UNIFORM LOADING										
Partially Uniform Load 1	----	----	----	----	----	----	----	----	----	----
1 Span/Height (ft)	0	0	0	0	0	0	0	0	0	0
1 Start Point (ft)	0	0	0	0	0	0	0	0	0	0
1 End Point (ft)	0	0	0	0	0	0	0	0	0	0
1 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0	0	0
Partially Uniform Load 2	----	----	----	----	----	----	----	----	----	----
2 Span/Height (ft)	0	0	0	0	0	0	0	0	0	0
2 Start Point (ft)	0	0	0	0	0	0	0	0	0	0
2 End Point (ft)	0	0	0	0	0	0	0	0	0	0
2 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0	0	0
Partially Uniform Load 3	----	----	----	----	----	----	----	----	----	----
3 Span/Height (ft)	0	0	0	0	0	0	0	0	0	0
3 Start Point (ft)	0	0	0	0	0	0	0	0	0	0
3 End Point (ft)	0	0	0	0	0	0	0	0	0	0
3 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0	0	0
Partially Uniform Load 4	----	----	----	----	----	----	----	----	----	----
4 Span/Height (ft)	0	0	0	0	0	0	0	0	0	0
4 Start Point (ft)	0	0	0	0	0	0	0	0	0	0
4 End Point (ft)	0	0	0	0	0	0	0	0	0	0
4 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0	0	0
POINT LOADS										
Point Load 1	---	---	---	---	---	---	---	---	---	---
1 Location (ft)	0	0	0	0	0	0	0	0	0	0
1 Total Load (lb)	0	0	0	0	0	0	0	0	0	0
Point Load 2	---	---	---	---	---	---	---	---	---	---
2 Location (ft)	0	0	0	0	0	0	0	0	0	0
2 Total Load (lb)	0	0	0	0	0	0	0	0	0	0
Point Load 3	---	---	---	---	---	---	---	---	---	---
3 Location (ft)	0	0	0	0	0	0	0	0	0	0
3 Total Load (lb)	0	0	0	0	0	0	0	0	0	0
Point Load 4	---	---	---	---	---	---	---	---	---	---
4 Location (ft)	0	0	0	0	0	0	0	0	0	0
4 Total Load (lb)	0	0	0	0	0	0	0	0	0	0
REACTIONS & MOMENT										
Duration Increase	1.15	1.15	1.00	1.00	1.15	1.00	1.15	1.00	1.15	1.15
Left Reaction (lb)	9362	977	95	150	1517	1696	3715	95	9730	2949
Right Reaction (lb)	9362	977	95	150	1517	1696	3715	95	9730	2949
Max Moment (lb-ft)	32766	1955	238	375	6069	6786	5572	238	43786	5899
Max Shear (lb)	9362	977	95	150	1517	1696	3715	95	9730	2949
C _v	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
C _t	1.00	1.20	1.00	1.00	1.00	1.00	1.20	1.00	1.00	1.00
Area (in ²)	94.50	21.75	---	---	33.25	41.58	41.63	---	107.63	25.38
Moment of Inertia I (in ⁴)	2552	95	96	170	250	489	297	96	3955	111
Maximum Bending Stress (psi)	1387	893	148	132	1383	989	1042	148	1395	2309
Allowable Bending Stress (psi)	2830	1242	90000	152500	3087	2604	1242	90000	2760	3202
Allowable Moment (lb-ft)	66849	2720	53892	91317	13541	17862	6642	53892	86638	8182
MOMENT FS	2.04	1.39	226.91	243.51	2.23	2.63	1.19	226.91	1.98	1.39
Allowable Shear Stress (psi)	328	207	---	---	328	285	207	---	305	328
Maximum Shear Capacity (lb)	20648	3002	75000	93750	7265	7900	5744	75000	21866	5544
SHEAR FS	2.21	3.07	789.47	625.00	4.79	4.66	1.55	789.47	2.25	1.88
Bearing Required	2.38	0.52	---	---	0.58	0.65	1.32	---	2.92	1.12
Elastic Modulus (psi)	2,000,000	1,600,000	29,000,000	29,000,000	2,000,000	2,000,000	1,600,000	29,000,000	1,800,000	2,000,000
Live Load Deflection (in)	0.15	0.05	0.00	0.00	0.27	0.00	0.05	0.00	0.23	0.20
Live Load Deflection Limit	600	360	360	360	360	360	600	360	600	360
Allowable Live Load Deflection (in)	0.28	0.27	0.33	0.33	0.53	0.53	0.12	0.33	0.36	0.27
LIVE LOAD DEFLECTION FS	1.87	4.85	100.00	100.00	1.99	100.00	2.53	100.00	1.57	1.35
Total Load Deflection (in)	0.23	0.15	0.00	0.00	0.56	0.32	0.08	0.00	0.36	0.31
Total Load Deflection Limit	600	240	400	400	240	240	600	600	595	240
Allowable Total Load Deflection (in)	0.28	0.40	0.30	0.30	0.80	0.80	0.12	0.20	0.36	0.40
TOTAL LOAD DEFLECTION FS	1.22	2.68	194.04	216.94	1.42	2.48	1.56	129.36	1.00	1.30
SELECTION	LVL	DF #2	STEEL	STEEL	LVL	LVL	DF #2	STEEL	GLB	LVL
	(3) 1 3/4" X 18"	(2) 2X8's	W10X19	W10X30	(2) 1 3/4" X 9 1/2"	(2) 1 3/4" X 11 7/8"	(3) 2X10's	W10X19	5 1/8" x 21"	(2) 1 3/4" X 7 1/4"

Plan: JR BROADBENT RESIDENCE
Date: 03/13/2024
Location: LOT 20 RED LEDGES

2 trimmers required 2 trimmers required 2 trimmers required

ALT: W14X82 STEEL

	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
	W10X22 STEEL	W10X30 STEEL	(2) 1 3/4" X 11 7/8" LVL	(2) 1 3/4" X 9 1/2" LVL	(2) 1 3/4" X 11 7/8" LVL	W16X67 STEEL	(2) 2X6's DF #2	(1) 1 3/4" X 11 7/8" LVL
Controlling Load Case	TL Deflection: L/1401	TL Deflection: L/444	Moment: 3.18	Moment: 2.11	Shear: 1.16	TL Deflection: L/476	Moment: 2.16	Shear: 4.57
Name	DL+S	DL+S	DL+LL	DL+LL	DL+S	DL+0.75LL+0.75S	DL+S	DL+LL
Grade	RB-21	RB-22	MFB-1	MFB-2	MFB-3	MFB-4	MFB-5	MFB-6
	STEEL	STEEL	LVL	LVL	LVL	STEEL	DF #2	LVL
LOADING PARAMETERS								
Floor Live Load (psf)	40	40	40	40	40	40	40	40
Floor Total Load (psf)	55	55	55	55	55	55	55	55
Roof Live Load (psf)	45	45	45	45	45	45	45	45
Roof Total Load (psf)	60	60	60	60	60	60	60	60
Wall Load (psf)	20	20	20	20	20	20	20	20
BEAM SPECIFICATIONS	4'8" max unbraced	4'10" max unbraced				8'8" max unbraced		
Beam Span (ft)	13	19.5	10	10	11.5	27	3	4
Beam Weight (plf)	22.00	30.00	12.06	9.64	12.06	67.00	3.30	6.03
BEAM SIZING								
Beam Depth (in)	10	10	11.88	9.5	11.88	16	5.5	11.88
Beam Width/Weight	22	30	3.5	3.5	3.5	67	3	1.75
UNIFORM LOADING								
Floor Span (ft)	0	0	13	13	2	25	2	15.5
Roof Span (ft)	17.5	24	0	0	25	25	16	0
Wall Height (ft)	2	2	4	4	10	10	10	0
Total Uniform Floor Load (plf)	0	0	357.5	357.5	15	562.5	15	426.25
Total Live Floor Load (plf)	0	0	260	260	0	375	0	310
Total Uniform Roof Load (plf)	525	720	0	0	750	609.375	480	0
Total Live Roof Load (plf)	393.75	540	0	0	562.5	421.875	360	0
Total Uniform Wall Load (plf)	40	40	80	80	200	200	200	0
PARTIALLY UNIFORM LOADING								
Partially Uniform Load 1	----	----	----	----	----	Floor	----	----
1 Span/Height (ft)	0	0	0	0	0	4	0	0
1 Start Point (ft)	0	0	0	0	0	0	0	0
1 End Point (ft)	0	0	0	0	0	16	0	0
1 Total Partially Uniform Load (plf)	0	0	0	0	0	90	0	0
Partially Uniform Load 2	----	----	----	----	----	Roof	----	----
2 Span/Height (ft)	0	0	0	0	0	4	0	0
2 Start Point (ft)	0	0	0	0	0	0	0	0
2 End Point (ft)	0	0	0	0	0	16	0	0
2 Total Partially Uniform Load (plf)	0	0	0	0	0	97.5	0	0
Partially Uniform Load 3	----	----	----	----	----	----	----	----
3 Span/Height (ft)	0	0	0	0	0	0	0	0
3 Start Point (ft)	0	0	0	0	0	0	0	0
3 End Point (ft)	0	0	0	0	0	0	0	0
3 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0
Partially Uniform Load 4	----	----	----	----	----	----	----	----
4 Span/Height (ft)	0	0	0	0	0	0	0	0
4 Start Point (ft)	0	0	0	0	0	0	0	0
4 End Point (ft)	0	0	0	0	0	0	0	0
4 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0
POINT LOADS								
Point Load 1	---	---	---	---	RB-7 Right	---	---	---
1 Location (ft)	0	0	0	0	1	0	0	0
1 Total Load (lb)	0	0	0	0	2432	0	0	0
Point Load 2	---	---	---	---	---	---	---	---
2 Location (ft)	0	0	0	0	0	0	0	0
2 Total Load (lb)	0	0	0	0	0	0	0	0
Point Load 3	---	---	---	---	---	---	---	---
3 Location (ft)	0	0	0	0	0	0	0	0
3 Total Load (lb)	0	0	0	0	0	0	0	0
Point Load 4	---	---	---	---	---	---	---	---
4 Location (ft)	0	0	0	0	0	0	0	0
4 Total Load (lb)	0	0	0	0	0	0	0	0
REACTIONS & MOMENT								
Duration Increase	1.15	1.15	1.00	1.00	1.15	1.15	1.15	1.00
Left Reaction (lb)	3816	7703	2248	2236	7838	21536	1047	865
Right Reaction (lb)	3816	7703	2248	2236	5830	20314	1047	865
Max Moment (lb-ft)	12400	37549	5619	5589	17269	142584	786	865
Max Shear (lb)	3816	7703	2248	2236	7838	21536	1047	865
C _v	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
C _t	1.00	1.00	1.00	1.00	1.00	1.00	1.30	1.00
Area (in ²)	---	---	41.58	33.25	41.58	---	16.50	20.79
Moment of Inertia I (in ⁴)	118	170	489	250	489	954	42	245
Maximum Bending Stress (psi)	6305	13252	819	1274	2517	14348	623	252
Allowable Bending Stress (psi)	108333	152500	2604	2684	2994	541667	1346	2604
Allowable Moment (lb-ft)	64870	91317	17862	11775	20542	324351	1696	8931
MOMENT FS	5.23	2.43	3.18	2.11	1.19	2.27	2.16	10.33
Allowable Shear Stress (psi)	---	---	285	285	328	---	207	285
Maximum Shear Capacity (lb)	75000	93750	7900	6318	9085	180000	2277	3950
SHEAR FS	19.66	12.17	3.51	2.83	1.16	8.36	2.17	4.57
Bearing Required	---	---	0.86	0.85	2.99	---	0.56	0.66
Elastic Modulus (psi)	29,000,000	29,000,000	2,000,000	2,000,000	2,000,000	29,000,000	1,600,000	2,000,000
Live Load Deflection (in)	0.07	0.36	0.06	0.12	0.26	0.38	0.01	0.00
Live Load Deflection Limit	360	360	360	360	360	360	360	360
Allowable Live Load Deflection (in)	0.43	0.65	0.33	0.33	0.38	0.90	0.10	0.13
LIVE LOAD DEFLECTION FS	5.80	1.81	5.52	2.82	1.50	2.34	10.04	36.16
Total Load Deflection (in)	0.11	0.53	0.10	0.20	0.43	0.68	0.02	0.01
Total Load Deflection Limit	400	400	240	240	240	400	240	240
Allowable Total Load Deflection (in)	0.39	0.59	0.50	0.50	0.58	0.81	0.15	0.20
TOTAL LOAD DEFLECTION FS	3.50	1.11	4.79	2.46	1.33	1.19	7.77	38.89
SELECTION	STEEL	STEEL	LVL	LVL	LVL	STEEL	DF #2	LVL
	W10X22	W10X30	(2) 1 3/4" X 11 7/8"	(2) 1 3/4" X 9 1/2"	(2) 1 3/4" X 11 7/8"	W16X67	(2) 2X6's	(1) 1 3/4" X 11 7/8"

Plan: JR BROADBENT RESIDENCE
Date: 03/13/2024
Location: LOT 20 RED LEDGES

2 trimmers required

2 trimmers required

2 trimmers required

2 trimmers required

	PASS	PASS	PASS	PASS	ENERCALC	ENERCALC	PASS	PASS	PASS
	(2) 2X6's DF #2	(2) 1 3/4" X 11 7/8" LVL	W10X39 STEEL	(2) 1 3/4" X 11 7/8" LVL	W10X19 STEEL	W10X19 STEEL	(3) 1 3/4" X 14" LVL	(3) 2X12's DF #2	(2) 1 3/4" X 11 7/8" LVL
Controlling Load Case	Moment: 1.46	Shear: 1.07	TL Deflection: L/437	Moment: 1.08	LL Deflection: L/1000	LL Deflection: L/1000	Moment: 1.86	Moment: 1.39	Moment: 1.91
Name	DL+LL	DL+LL	DL+LL	DL+S	DL+0.75LL+0.75S	DL+0.75LL+0.75S	DL+LL	DL+LL	DL+LL
Grade	MFB-7	MFB-8	MFB-9	MFB-10	MFB-11	MFB-12	MFB-13	MFB-14	MFB-15
LOADING PARAMETERS	DF #2	LVL	STEEL	LVL	STEEL	STEEL	LVL	DF #2	LVL
Floor Live Load (psf)	40	40	40	40	40	40	40	60	40
Floor Total Load (psf)	55	55	55	55	55	55	55	75	55
Roof Live Load (psf)	45	45	45	45	45	45	45	45	45
Roof Total Load (psf)	60	60	60	60	60	60	60	60	60
Wall Load (psf)	20	20	20	20	20	20	20	20	20
BEAM SPECIFICATIONS			6'11" max unbraced		3'1" max unbraced	3'1" max unbraced			
Beam Span (ft)	3	3	18.5	11.5	10	10	16	6	12
Beam Weight (plf)	3.30	12.06	39.00	12.06	19.00	19.00	21.32	10.13	12.06
BEAM SIZING									
Beam Depth (in)	5.5	11.88	10	11.88	10	10	14	11.25	11.88
Beam Width/Weight	3	3.5	39	3.5	19	19	5.25	4.5	3.5
UNIFORM LOADING									
Floor Span (ft)	32.5	27.67	31	2	0	0	20	33	17
Roof Span (ft)	0	0	0	11.5	0	0	0	0	0
Wall Height (ft)	0	0	0	10	0	0	2	0	2
Total Uniform Floor Load (plf)	893.75	760.925	852.5	15	0	0	550	1237.5	467.5
Total Live Floor Load (plf)	650	553.4	620	0	0	0	400	990	340
Total Uniform Roof Load (plf)	0	0	0	345	0	0	0	0	0
Total Live Roof Load (plf)	0	0	0	258.75	0	0	0	0	0
Total Uniform Wall Load (plf)	0	0	0	200	0	0	40	0	40
PARTIALLY UNIFORM LOADING									
Partially Uniform Load 1	----	----	----	Roof	----	----	----	----	----
1 Span/Height (ft)	0	0	0	20.5	0	0	0	0	0
1 Start Point (ft)	0	0	0	0	0	0	0	0	0
1 End Point (ft)	0	0	0	9.5	0	0	0	0	0
1 Total Partially Uniform Load (plf)	0	0	0	615	0	0	0	0	0
Partially Uniform Load 2	----	----	----	----	----	----	----	----	----
2 Span/Height (ft)	0	0	0	0	0	0	0	0	0
2 Start Point (ft)	0	0	0	0	0	0	0	0	0
2 End Point (ft)	0	0	0	0	0	0	0	0	0
2 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0	0
Partially Uniform Load 3	----	----	----	----	----	----	----	----	----
3 Span/Height (ft)	0	0	0	0	0	0	0	0	0
3 Start Point (ft)	0	0	0	0	0	0	0	0	0
3 End Point (ft)	0	0	0	0	0	0	0	0	0
3 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0	0
Partially Uniform Load 4	----	----	----	----	----	----	----	----	----
4 Span/Height (ft)	0	0	0	0	0	0	0	0	0
4 Start Point (ft)	0	0	0	0	0	0	0	0	0
4 End Point (ft)	0	0	0	0	0	0	0	0	0
4 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0	0
POINT LOADS									
Point Load 1	---	RB-11 Right	RB-19 Right	---	---	---	---	---	---
1 Location (ft)	0	1	17	0	0	0	0	0	0
1 Total Load (lb)	0	9362	9730	0	0	0	0	0	0
Point Load 2	---	---	RB-4 Left	---	---	---	---	---	---
2 Location (ft)	0	0	17	0	0	0	0	0	0
2 Total Load (lb)	0	0	2911	0	0	0	0	0	0
Point Load 3	---	---	---	---	---	---	---	---	---
3 Location (ft)	0	0	0	0	0	0	0	0	0
3 Total Load (lb)	0	0	0	0	0	0	0	0	0
Point Load 4	---	---	---	---	---	---	---	---	---
4 Location (ft)	0	0	0	0	0	0	0	0	0
4 Total Load (lb)	0	0	0	0	0	0	0	0	0
REACTIONS & MOMENT									
Duration Increase	1.00	1.00	1.00	1.15	1.00	1.00	1.00	1.00	1.00
Left Reaction (lb)	1346	7401	9271	6719	95	95	4891	3743	3117
Right Reaction (lb)	1346	4280	19863	5703	95	95	4891	3743	3117
Max Moment (lb-ft)	1009	6546	48210	19012	238	238	19562	5614	9352
Max Shear (lb)	1346	7401	19863	6719	95	95	4891	3743	3117
C _v	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
C _t	1.30	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.00
Area (in ²)	16.50	41.58	---	41.58	---	---	73.50	50.63	41.58
Moment of Inertia I (in ⁴)	42	489	209	489	96	96	1201	534	489
Maximum Bending Stress (psi)	801	954	13840	2771	148	148	1369	710	1363
Allowable Bending Stress (psi)	1170	2604	195000	2994	90000	90000	2546	990	2604
Allowable Moment (lb-ft)	1475	17862	116766	20542	53892	53892	36387	7831	17862
MOMENT FS	1.46	2.73	2.42	1.08	226.91	226.91	1.86	1.39	1.91
Allowable Shear Stress (psi)	180	285	---	328	---	---	285	180	285
Maximum Shear Capacity (lb)	1980	7900	93750	9085	75000	75000	13965	6075	7900
SHEAR FS	1.47	1.07	4.72	1.35	789.47	789.47	2.86	1.62	2.53
Bearing Required	0.72	2.82	---	2.56	---	---	1.24	1.33	1.19
Elastic Modulus (psi)	1,600,000	2,000,000	29,000,000	2,000,000	29,000,000	29,000,000	2,000,000	1,600,000	2,000,000
Live Load Deflection (in)	0.02	0.01	0.36	0.28	0.00	0.00	0.25	0.03	0.16
Live Load Deflection Limit	360	360	360	360	360	360	360	360	360
Allowable Live Load Deflection (in)	0.10	0.10	0.62	0.38	0.33	0.33	0.53	0.20	0.40
LIVE LOAD DEFLECTION FS	5.56	14.10	1.71	1.37	100.00	100.00	2.15	5.86	2.44
Total Load Deflection (in)	0.02	0.01	0.51	0.46	0.00	0.00	0.38	0.04	0.25
Total Load Deflection Limit	240	240	400	240	400	400	240	240	240
Allowable Total Load Deflection (in)	0.15	0.15	0.56	0.58	0.30	0.30	0.80	0.30	0.60
TOTAL LOAD DEFLECTION FS	6.05	15.75	1.09	1.24	194.04	194.04	2.11	6.97	2.40
SELECTION	DF #2	LVL	STEEL	LVL	STEEL	STEEL	LVL	DF #2	LVL
	(2) 2X6's	(2) 1 3/4" X 11 7/8"	W10X39	(2) 1 3/4" X 11 7/8"	W10X19	W10X19	(3) 1 3/4" X 14"	(3) 2X12's	(2) 1 3/4" X 11 7/8"

Plan: JR BROADBENT RESIDENCE
Date: 3/13/2024
Location: LOT 20 RED LEDGES

	PASS (4) 2x6 FS:2.1 Axial Compression	PASS 3 1/2" x 5 1/4" Parallam FS:1.2 Axial Compression	PASS (2) 2x6 FS:1.7 Axial Compression	PASS (4) 2x6 FS:2.9 Axial Compression	
Controlling Factor					
Location:	RB-4/RB-19 ---	RB-4/MFB-10 ---	MFB-3 Left ---	MFB-9 Left ---	---
COLUMN DIMENSIONS:	BEARS ON MFB-9	Spot Footing		Spot Footing	
Total Column Length (ft):	10	10	10	10	10
X-Unbraced Length (ft):	10	10	10	10	10
Y-Unbraced Length (ft):	0	10	0	0	0
MATERIAL SPECS:					
Material:	Doug Fir #2	Parallam	Doug Fir #2	Doug Fir #2	Doug Fir #2
Depth-x (in):	5.5	5.25	5.5	5.5	3.5
Width-y (in):	1.5	3.5	1.5	1.5	1.5
# Members	4	1	2	4	2
Choose Post or Stud spacing	Post	Post	Post	Post	Post
Post, Axial Load (lbs)	12641	9630	7838	9271	10
Loading for Stud Design					
Roof Span (ft)	0	0	0	0	0
Floor Span (ft)	0	0	0	0	0
Additional Wall Height (ft)	0	0	0	0	0
Stud Axial Load (plf)	200	200	200	200	200
MATERIAL PROPERTIES:					
Area (in ²)	33.00	18.38	16.50	33.00	10.50
F _c	1,350	2,500	1,350	1,350	1,350
E	1,600,000	1,800,000	1,600,000	1,600,000	1,600,000
E _{min}	580,000	914,880	580,000	580,000	580,000
Lex/dx	21.82	22.86	21.82	21.82	34.29
Ley/dy	0.00	34.29	0.00	0.00	0.00
FACTORS:					
C _d (axial loads)	1	1	1	1	1
C _f (compression)	1.1	1	1.1	1.1	1.15
K _e	1	1	1	1	1
F _c *	1,485	2,500	1,485	1,485	1,553
F _{ce}	1,002	640	1,002	1,002	406
C _p	0.54	0.25	0.54	0.54	0.25
F' _c	808	619	808	808	381
Allowable Load (lbs)	26,676	11,381	13,338	26,676	3,999

Plan: JR BROADBENT RESIDENCE
Date: 3/13/2024
Location: LOT 20 RED LEDGES

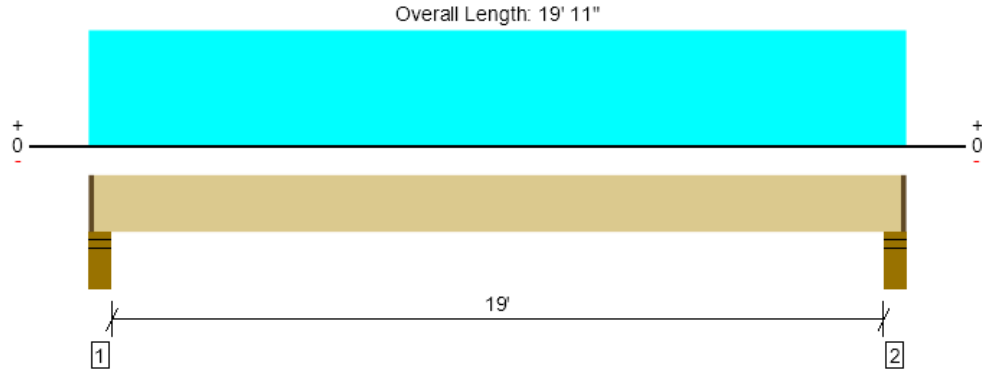
	PASS	PASS	PASS	PASS	
	HSS4X4X1/4	HSS4X4X1/4	HSS4X4X1/4	HSS4X4X1/4	
	FS: 5.3	FS: 1.97	FS: 2.23	FS: 3	
Location:	Decks	RB-19/MFB-7/MFB-9	MFB-3/MFB-4	MFB-4 Right	---
	---	---	---	---	---
COLUMN DIMENSIONS:	Spot Footing	Spot Footing	Spot Footing	Spot Footing	
X-Unbraced Length (ft):	14	10	10	10	10
Y-Unbraced Length (ft):	14	10	10	10	10
MATERIAL SPECS:					
Column Shape	HSS4x	HSS4x	HSS4x	HSS4x	STD_Pipe
Member	HSS4X4X1/4	HSS4X4X1/4	HSS4X4X1/4	HSS4X4X1/4	Pipe3STD
r _x (in.)	1.52	1.52	1.52	1.52	1.17
r _y (in.)	1.52	1.52	1.52	1.52	1.17
A _g (in ²)	3.37	3.37	3.37	3.37	2.07
Axial Load:	7,703	30,938	27,365	20,314	10
MATERIAL PROPERTIES:					
F _y (ksi)	46	46	46	46	35
E (ksi)	29,000	29,000	29,000	29,000	29,000
KL/r _x	110.53	78.95	78.95	78.95	102.56
KL/r _y	110.53	78.95	78.95	78.95	102.56
FACTORS:					
K	1	1	1	1	1
F _e (ksi)	23.43	45.92	45.92	45.92	27.21
F _{cr} (ksi)	20.22	30.25	30.25	30.25	20.43
Allowable Load (lbs)	40,812	61,036	61,036	61,036	25,322
Location:	---	---	---	---	---
	---	---	---	---	---
COLUMN DIMENSIONS:					
X-Unbraced Length (ft):	10	10	10	10	10
Y-Unbraced Length (ft):	10	10	10	10	10
MATERIAL SPECS:					
Column Shape	STD_Pipe	STD_Pipe	STD_Pipe	STD_Pipe	STD_Pipe
Member	Pipe3STD	Pipe3STD	Pipe3STD	Pipe3STD	Pipe3STD
r _x (in.)	1.17	1.17	1.17	1.17	1.17
r _y (in.)	1.17	1.17	1.17	1.17	1.17
A _g (in ²)	2.07	2.07	2.07	2.07	2.07
Axial Load:	10	10	10	10	10
MATERIAL PROPERTIES:					
F _y (ksi)	35	35	35	35	35
E (ksi)	29,000	29,000	29,000	29,000	29,000
KL/r _x	102.56	102.56	102.56	102.56	102.56
KL/r _y	102.56	102.56	102.56	102.56	102.56
FACTORS:					
K	1	1	1	1	1
F _e (ksi)	27.21	27.21	27.21	27.21	27.21
F _{cr} (ksi)	20.43	20.43	20.43	20.43	20.43
Allowable Load (lbs)	25,322	25,322	25,322	25,322	25,322

Plan: JR BROADBENT RESIDENCE
Date: 3/13/2024
Location: LOT 20 RED LEDGES

	PASS FS: 1.82	PASS FS: 1.53	PASS FS: 1.47	PASS FS: 2.46	PASS FS: 1.75
INPUT	DECKS				
Location:	RB-17x2/MFB-14x2	RB-13/MFB-11	RB-14/MFB-12	RB-21	RB-22
Callout	S-36	S-36	S-60	S-30	S-36
Column Width (in)	3.5	3.5	3.5	3.5	3.5
Load (lb)	7,430	8,800	25,500	3,816	7,703
SPECS					
Soil Bearing Pressure (psf)	1500	1500	1500	1500	1500
Footing Width/Diameter (in)	36	36	60	30	36
Footing Length/Diameter (in)	36	36	60	30	36
Footing Depth (in)	10	10	12	10	10
CALCULATIONS					
Area Required (ft ²)	4.95	5.87	17.00	2.54	5.14
Area Provided (ft ²)	9.00	9.00	25.00	6.25	9.00
FLEXURE					
M _u (lb-ft/ft)	1135.40	1344.76	4239.71	558.22	1177.05
ΦMn (lb-ft/ft)	5988.56	5988.56	8374.26	5413.24	5988.56
ONE WAY SHEAR					
V _u (kip)	1.03	1.22	2.55	0.53	1.07
ΦV _c (kip)	6.16	6.16	8.13	6.16	6.16
PUNCHING SHEAR					
V _u (kip)	10.3	12.2	36.8	5.1	10.7
ΦV _c (kip)	40.1	40.1	63.7	40.1	40.1
SELECTION	S-36 36" Square by 10" Deep Concrete Footing with (4) #4 Bars Each Way	S-36 36" Square by 10" Deep Concrete Footing with (4) #4 Bars Each Way	S-60 60" Square by 12" Deep Concrete Footing with (7) #4 Bars Each Way	S-30 30" Square by 10" Deep Concrete Footing with (3) #4 Bars Each Way	S-36 36" Square by 10" Deep Concrete Footing with (4) #4 Bars Each Way

	PASS FS: 1.4	PASS FS: 1.21	PASS FS: 1.37	PASS FS: 1.18	PASS FS: 1.01
INPUT					
Location:	RB-4/MFB-10	RB-19/MFB-7/MFB-9	MFB-3/MFB-4	MFB-4 Right	MFB-9 Left
Callout	S-36	S-60	S-60	S-48	S-30
Column Width (in)	3.5	3.5	3.5	3.5	3.5
Load (lb)	9,630	30,938	27,365	20,314	9,271
SPECS					
Soil Bearing Pressure (psf)	1500	1500	1500	1500	1500
Footing Width/Diameter (in)	36	60	60	48	30
Footing Length/Diameter (in)	36	60	60	48	30
Footing Depth (in)	10	12	12	12	10
CALCULATIONS					
Area Required (ft ²)	6.42	20.63	18.24	13.54	6.18
Area Provided (ft ²)	9.00	25.00	25.00	16.00	6.25
FLEXURE					
M _u (lb-ft/ft)	1471.56	5143.92	4549.86	3273.62	1356.42
ΦMn (lb-ft/ft)	5988.56	8374.26	8374.26	8950.37	5413.24
ONE WAY SHEAR					
V _u (kip)	1.34	3.09	2.74	2.22	1.30
ΦV _c (kip)	6.16	8.13	8.13	8.13	6.16
PUNCHING SHEAR					
V _u (kip)	13.4	44.6	39.5	28.6	12.4
ΦV _c (kip)	40.1	63.7	63.7	63.7	40.1
SELECTION	S-36 36" Square by 10" Deep Concrete Footing with (4) #4 Bars Each Way	S-60 60" Square by 12" Deep Concrete Footing with (7) #4 Bars Each Way	S-60 60" Square by 12" Deep Concrete Footing with (7) #4 Bars Each Way	S-48 48" Square by 12" Deep Concrete Footing with (6) #4 Bars Each Way	S-30 30" Square by 10" Deep Concrete Footing with (3) #4 Bars Each Way

Level, Floor: Joist - Deck - 19'-0"
2 piece(s) 2 x 12 DF No.2 @ 16" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	985 @ 4 1/2"	7969 (4.25")	Passed (12%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	856 @ 1' 4 3/4"	4050	Passed (21%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	4592 @ 9' 11 1/2"	5458	Passed (84%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.427 @ 9' 11 1/2"	0.479	Passed (L/539)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.533 @ 9' 11 1/2"	0.958	Passed (L/431)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	N/A	N/A	N/A	--	N/A

Member Length : 19' 8 1/2"
System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.
- No composite action between deck and joist was considered in analysis.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - DF	5.50"	4.25"	1.50"	199	797	996	1 1/4" Rim Board
2 - Stud wall - DF	5.50"	4.25"	1.50"	199	797	996	1 1/4" Rim Board

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

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' 6" o/c	
Bottom Edge (Lu)	19' 9" 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 19' 11"	16"	15.0	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
Jacob Wilding York Engineering (801) 876-3501 jacob.wilding@yorkengineering.com	



3/13/2024 6:42:41 PM UTC
ForteWEB v3.7, Engine: V8.4.0.40, Data: V8.1.5.0

File Name: Broadbent Residence

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Enercalc - Broadbent Residence.ec6

LIC# : KW-06015377, Build:20.22.6.12

York Engineering

(c) ENERCALC INC 1983-2022

DESCRIPTION: MFB-11

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : IBC 2018

Material Properties

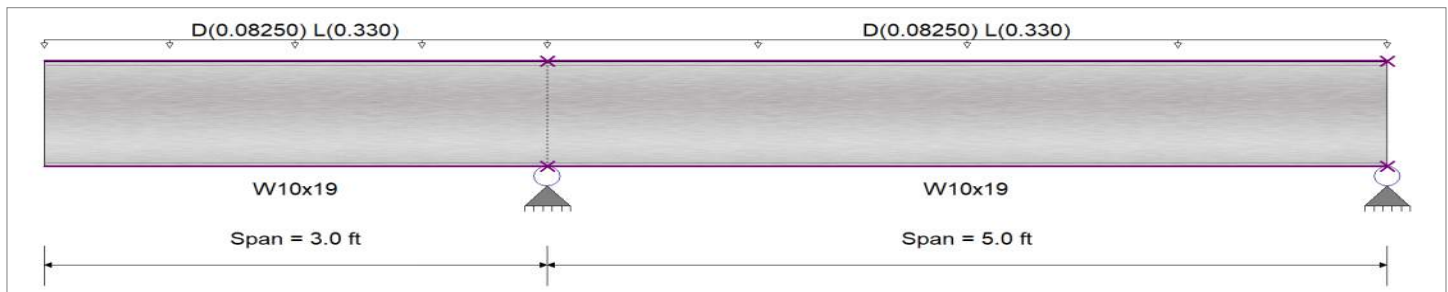
Analysis Method : Allowable Strength Design

Fy : Steel Yield : 50.0 ksi

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

E: Modulus : 29,000.0 ksi

Bending Axis : Major Axis Bending



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading

Load for Span Number 1

Uniform Load : D = 0.0150, L = 0.060 ksf, Tributary Width = 5.50 ft, (Deck)

Load for Span Number 2

Uniform Load : D = 0.0150, L = 0.060 ksf, Tributary Width = 5.50 ft, (Deck)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.036 : 1	Maximum Shear Stress Ratio =	0.029 : 1
Section used for this span	W10x19	Section used for this span	W10x19
Ma : Applied	1.942 k-ft	Va : Applied	1.467 k
Mn / Omega : Allowable	53.892 k-ft	Vn/Omega : Allowable	51.0 k
Load Combination	+D+L	Load Combination	+D+L
Span # where maximum occurs	Span # 1	Location of maximum on span	3.000 ft
		Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.003 in Ratio = 20,709	>=360	Span: 2 : L Only
Max Upward Transient Deflection	0.000 in Ratio = 0	<360	Span: 2 : L Only
Max Downward Total Deflection	0.005 in Ratio = 15838	>=180	Span: 2 : +D+L
Max Upward Total Deflection	-0.000 in Ratio = 316279	>=180	Span: 2 : +D+L

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 3.00 ft	1	0.008	0.007		-0.46	0.46	90.00	53.89	1.00	1.00	0.35	76.50	51.00
Dsgn. L = 5.00 ft	2	0.008	0.007	0.13	-0.46	0.46	90.00	53.89	1.00	1.00	0.35	76.50	51.00
+D+L													
Dsgn. L = 3.00 ft	1	0.036	0.029		-1.94	1.94	90.00	53.89	1.00	1.00	1.47	76.50	51.00
Dsgn. L = 5.00 ft	2	0.036	0.029	0.55	-1.94	1.94	90.00	53.89	1.00	1.00	1.47	76.50	51.00
+D+0.750L													
Dsgn. L = 3.00 ft	1	0.029	0.023		-1.57	1.57	90.00	53.89	1.00	1.00	1.19	76.50	51.00
Dsgn. L = 5.00 ft	2	0.029	0.023	0.45	-1.57	1.57	90.00	53.89	1.00	1.00	1.19	76.50	51.00
+0.60D													
Dsgn. L = 3.00 ft	1	0.005	0.004		-0.27	0.27	90.00	53.89	1.00	1.00	0.21	76.50	51.00
Dsgn. L = 5.00 ft	2	0.005	0.004	0.08	-0.27	0.27	90.00	53.89	1.00	1.00	0.21	76.50	51.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0045	0.000		0.0000	0.000
+D+L	2	0.0004	3.340	+D+L	-0.0002	0.680

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Enercalc - Broadbent Residence.ec6

LIC# : KW-06015377, Build:20.22.6.12

York Engineering

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DESCRIPTION: [MFB-11](#)

Vertical Reactions

Support notation : Far left is #.

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		2.762	0.690
Overall MINimum		0.390	0.097
D Only		0.650	0.162
+D+L		2.762	0.690
+D+0.750L		2.234	0.558
+0.60D		0.390	0.097
L Only		2.112	0.528

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Enercalc - Broadbent Residence.ec6

LIC# : KW-06015377, Build:20.22.6.12

York Engineering

(c) ENERCALC INC 1983-2022

DESCRIPTION: MFB-12

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : IBC 2018

Material Properties

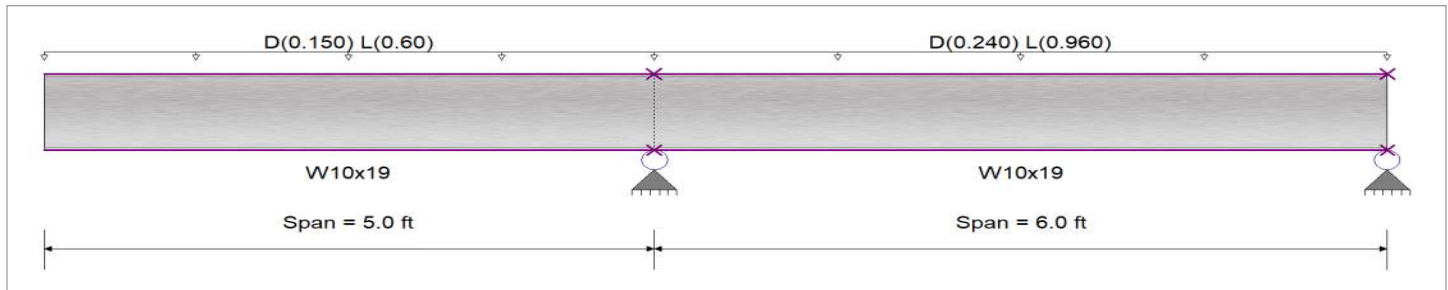
Analysis Method : Allowable Strength Design

Fy : Steel Yield : 50.0 ksi

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

E: Modulus : 29,000.0 ksi

Bending Axis : Major Axis Bending



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading

Load for Span Number 1

Uniform Load : D = 0.0150, L = 0.060 ksf, Tributary Width = 10.0 ft, (Deck)

Load for Span Number 2

Uniform Load : D = 0.0150, L = 0.060 ksf, Tributary Width = 16.0 ft, (Deck)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.178 : 1	Maximum Shear Stress Ratio =	0.103 : 1
Section used for this span	W10x19	Section used for this span	W10x19
Ma : Applied	9.613 k-ft	Va : Applied	5.259 k
Mn / Omega : Allowable	53.892 k-ft	Vn/Omega : Allowable	51.0 k
Load Combination	+D+L	Load Combination	+D+L
Span # where maximum occurs	Span # 1	Location of maximum on span	5.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.049 in Ratio = 2,461	>=360	Span: 2 : L Only
Max Upward Transient Deflection	-0.002 in Ratio = 34,067	>=360	Span: 2 : L Only
Max Downward Total Deflection	0.063 in Ratio = 1911	>=180	Span: 2 : +D+L
Max Upward Total Deflection	-0.003 in Ratio = 25884	>=180	Span: 2 : +D+L

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 5.00 ft	1	0.039	0.022		-2.11	2.11	90.00	53.89	1.00	1.00	1.13	76.50	51.00
Dsgn. L = 6.00 ft	2	0.039	0.022	0.35	-2.11	2.11	90.00	53.89	1.00	1.00	1.13	76.50	51.00
+D+L													
Dsgn. L = 5.00 ft	1	0.178	0.103		-9.61	9.61	90.00	53.89	1.00	1.00	5.26	76.50	51.00
Dsgn. L = 6.00 ft	2	0.178	0.103	1.73	-9.61	9.61	90.00	53.89	1.00	1.00	5.26	76.50	51.00
+D+0.750L													
Dsgn. L = 5.00 ft	1	0.144	0.083		-7.74	7.74	90.00	53.89	1.00	1.00	4.23	76.50	51.00
Dsgn. L = 6.00 ft	2	0.144	0.083	1.39	-7.74	7.74	90.00	53.89	1.00	1.00	4.23	76.50	51.00
+0.60D													
Dsgn. L = 5.00 ft	1	0.024	0.013		-1.27	1.27	90.00	53.89	1.00	1.00	0.68	76.50	51.00
Dsgn. L = 6.00 ft	2	0.024	0.013	0.21	-1.27	1.27	90.00	53.89	1.00	1.00	0.68	76.50	51.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0628	0.000		0.0000	0.000
+D+L	2	0.0007	4.680	+D+L	-0.0028	1.248

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Enercalc - Broadbent Residence.ec6

LIC# : KW-06015377, Build:20.22.6.12

York Engineering

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DESCRIPTION: [MFB-12](#)

Vertical Reactions

Support notation : Far left is #.

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		9.104	2.055
Overall MINimum		1.184	0.255
D Only		1.974	0.425
+D+L		9.104	2.055
+D+0.750L		7.322	1.647
+0.60D		1.184	0.255
L Only		7.130	1.630

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Steel Beam

Project File: Enercalc - Broadbent Residence.ec6

LIC# : KW-06015377, Build:20.22.6.12

York Engineering

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DESCRIPTION: **RB-13**

CODE REFERENCES

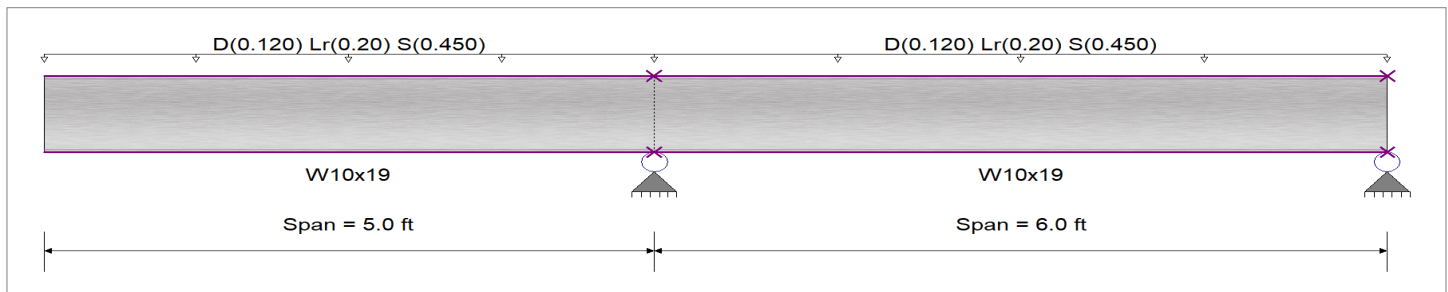
Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Strength Design
 Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
 Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
 E: Modulus : 29,000.0 ksi



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading

Load for Span Number 1

Uniform Load : D = 0.0120, Lr = 0.020, S = 0.0450 ksf, Tributary Width = 10.0 ft, (Roof)

Load for Span Number 2

Uniform Load : D = 0.0120, Lr = 0.020, S = 0.0450 ksf, Tributary Width = 10.0 ft, (Roof)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =		0.137 : 1	Maximum Shear Stress Ratio =		0.059 : 1
Section used for this span		W10x19	Section used for this span		W10x19
Ma : Applied		7.363 k-ft	Va : Applied		2.994 k
Mn / Omega : Allowable		53.892 k-ft	Vn/Omega : Allowable		51.0 k
Load Combination		+D+S	Load Combination		+D+S
Span # where maximum occurs		Span # 1	Location of maximum on span		5.000 ft
Span # where maximum occurs		Span # 1	Span # where maximum occurs		Span # 1
Maximum Deflection					
Max Downward Transient Deflection		0.044 in	Ratio = 2,721	>=360	Span: 2 : S Only
Max Upward Transient Deflection		-0.004 in	Ratio = 19,432	>=360	Span: 2 : S Only
Max Downward Total Deflection		0.058 in	Ratio = 2080	>=400.	Span: 2 : +D+S
Max Upward Total Deflection		-0.005 in	Ratio = 14846	>=400.	Span: 2 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 5.00 ft	1	0.032	0.014		-1.74	1.74	90.00	53.89	1.00	1.00	0.71	76.50	51.00
Dsgn. L = 6.00 ft	2	0.032	0.014	0.06	-1.74	1.74	90.00	53.89	1.00	1.00	0.71	76.50	51.00
+D+Lr													
Dsgn. L = 5.00 ft	1	0.079	0.034		-4.24	4.24	90.00	53.89	1.00	1.00	1.72	76.50	51.00
Dsgn. L = 6.00 ft	2	0.079	0.034	0.14	-4.24	4.24	90.00	53.89	1.00	1.00	1.72	76.50	51.00
+D+S													
Dsgn. L = 5.00 ft	1	0.137	0.059		-7.36	7.36	90.00	53.89	1.00	1.00	2.99	76.50	51.00
Dsgn. L = 6.00 ft	2	0.137	0.059	0.25	-7.36	7.36	90.00	53.89	1.00	1.00	2.99	76.50	51.00
+D+0.750Lr													
Dsgn. L = 5.00 ft	1	0.067	0.029		-3.61	3.61	90.00	53.89	1.00	1.00	1.47	76.50	51.00
Dsgn. L = 6.00 ft	2	0.067	0.029	0.12	-3.61	3.61	90.00	53.89	1.00	1.00	1.47	76.50	51.00
+D+0.750S													
Dsgn. L = 5.00 ft	1	0.111	0.047		-5.96	5.96	90.00	53.89	1.00	1.00	2.42	76.50	51.00
Dsgn. L = 6.00 ft	2	0.111	0.047	0.20	-5.96	5.96	90.00	53.89	1.00	1.00	2.42	76.50	51.00
+0.60D													
Dsgn. L = 5.00 ft	1	0.019	0.008		-1.04	1.04	90.00	53.89	1.00	1.00	0.42	76.50	51.00
Dsgn. L = 6.00 ft	2	0.019	0.008	0.04	-1.04	1.04	90.00	53.89	1.00	1.00	0.42	76.50	51.00

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Steel Beam

Project File: Enercalc - Broadbent Residence.ec6

LIC# : KW-06015377, Build:20.22.6.12

York Engineering

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DESCRIPTION: RB-13

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0577	0.000	+D+S	0.0000	0.000
	2	0.0000	0.000		-0.0048	1.968

Vertical Reactions

Support notation : Far left is #:

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		5.939	0.540
Overall MINimum		0.841	0.076
D Only		1.402	0.127
+D+Lr		3.418	0.311
+D+S		5.939	0.540
+D+0.750Lr		2.914	0.265
+D+0.750S		4.805	0.437
+0.60D		0.841	0.076
Lr Only		2.017	0.183
S Only		4.538	0.413

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Steel Beam

Project File: Enercalc - Broadbent Residence.ec6

LIC# : KW-06015377, Build:20.22.6.12

York Engineering

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DESCRIPTION: RB-14

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : IBC 2018

Material Properties

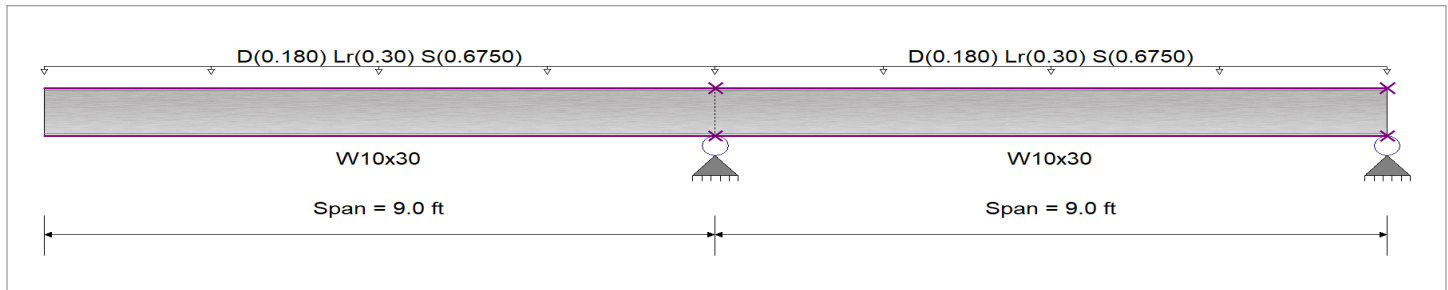
Analysis Method : Allowable Strength Design

Fy : Steel Yield : 50.0 ksi

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

E: Modulus : 29,000.0 ksi

Bending Axis : Major Axis Bending



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading

Load for Span Number 1

Uniform Load : D = 0.0120, Lr = 0.020, S = 0.0450 ksf, Tributary Width = 15.0 ft, (Roof)

Load for Span Number 2

Uniform Load : D = 0.0120, Lr = 0.020, S = 0.0450 ksf, Tributary Width = 15.0 ft, (Roof)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =		0.393 : 1		Maximum Shear Stress Ratio =		0.126 : 1	
Section used for this span		W10x30		Section used for this span		W10x30	
Ma : Applied		35.843 k-ft		Va : Applied		7.965 k	
Mn / Omega : Allowable		91.317 k-ft		Vn/Omega : Allowable		63.0 k	
Load Combination		+D+S		Load Combination		+D+S	
Span # where maximum occurs		Span # 1		Location of maximum on span		9.000 ft	
Span # where maximum occurs		Span # 1		Span # where maximum occurs		Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.389 in	Ratio =	555	>=360	Span: 2 : S Only	
Max Upward Transient Deflection		-0.031 in	Ratio =	3,489	>=360	Span: 2 : S Only	
Max Downward Total Deflection		0.509 in	Ratio =	424	>=400.	Span: 2 : +D+S	
Max Upward Total Deflection		-0.041 in	Ratio =	2662	>=400.	Span: 2 : +D+S	

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values						Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx/Vnx/Omega
D Only												
Dsgn. L = 9.00 ft	1	0.093	0.030		-8.51	8.51	152.50	91.32	1.00	1.00	1.89	94.50
Dsgn. L = 9.00 ft	2	0.093	0.030		-8.51	8.51	152.50	91.32	1.00	1.00	1.89	94.50
+D+Lr												
Dsgn. L = 9.00 ft	1	0.226	0.073		-20.66	20.66	152.50	91.32	1.00	1.00	4.59	94.50
Dsgn. L = 9.00 ft	2	0.226	0.073		-20.66	20.66	152.50	91.32	1.00	1.00	4.59	94.50
+D+S												
Dsgn. L = 9.00 ft	1	0.393	0.126		-35.84	35.84	152.50	91.32	1.00	1.00	7.97	94.50
Dsgn. L = 9.00 ft	2	0.393	0.126		-35.84	35.84	152.50	91.32	1.00	1.00	7.97	94.50
+D+0.750Lr												
Dsgn. L = 9.00 ft	1	0.193	0.062		-17.62	17.62	152.50	91.32	1.00	1.00	3.92	94.50
Dsgn. L = 9.00 ft	2	0.193	0.062		-17.62	17.62	152.50	91.32	1.00	1.00	3.92	94.50
+D+0.750S												
Dsgn. L = 9.00 ft	1	0.318	0.102		-29.01	29.01	152.50	91.32	1.00	1.00	6.45	94.50
Dsgn. L = 9.00 ft	2	0.318	0.102		-29.01	29.01	152.50	91.32	1.00	1.00	6.45	94.50
+0.60D												
Dsgn. L = 9.00 ft	1	0.056	0.018		-5.10	5.10	152.50	91.32	1.00	1.00	1.13	94.50
Dsgn. L = 9.00 ft	2	0.056	0.018		-5.10	5.10	152.50	91.32	1.00	1.00	1.13	94.50

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Enercalc - Broadbent Residence.ec6

LIC# : KW-06015377, Build:20.22.6.12

York Engineering

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DESCRIPTION: RB-14

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.5095	0.000		0.0000	0.000
	2	0.0000	0.000	+D+S	-0.0406	3.348

Vertical Reactions

Support notation : Far left is #:

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		15.930	-0.000
Overall MINimum		2.268	0.000
D Only		3.780	-0.000
+D+Lr		9.180	0.000
+D+S		15.930	-0.000
+D+0.750Lr		7.830	-0.000
+D+0.750S		12.893	-0.000
+0.60D		2.268	
Lr Only		5.400	
S Only		12.150	0.000

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Steel Beam

Project File: Enercalc - Broadbent Residence.ec6

LIC# : KW-06015377, Build:20.22.6.12

York Engineering

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DESCRIPTION: **RB-18**

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : IBC 2018

Material Properties

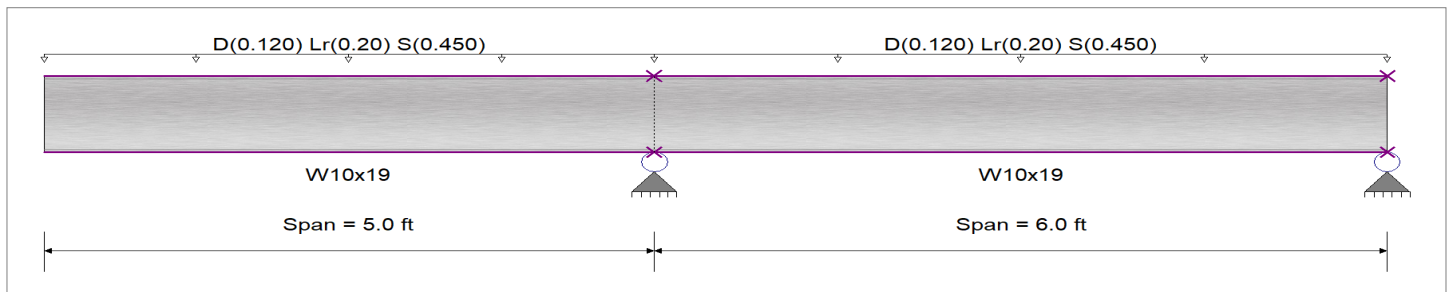
Analysis Method : Allowable Strength Design

Fy : Steel Yield : 50.0 ksi

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

E: Modulus : 29,000.0 ksi

Bending Axis : Major Axis Bending



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading

Load for Span Number 1

Uniform Load : D = 0.0120, Lr = 0.020, S = 0.0450 ksf, Tributary Width = 10.0 ft, (Roof)

Load for Span Number 2

Uniform Load : D = 0.0120, Lr = 0.020, S = 0.0450 ksf, Tributary Width = 10.0 ft, (Roof)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =		0.137 : 1	Maximum Shear Stress Ratio =		0.059 : 1
Section used for this span		W10x19	Section used for this span		W10x19
Ma : Applied		7.363 k-ft	Va : Applied		2.994 k
Mn / Omega : Allowable		53.892 k-ft	Vn/Omega : Allowable		51.0 k
Load Combination		+D+S	Load Combination		+D+S
Span # where maximum occurs		Span # 1	Location of maximum on span		5.000 ft
Span # where maximum occurs		Span # 1	Span # where maximum occurs		Span # 1
Maximum Deflection					
Max Downward Transient Deflection		0.044 in	Ratio =	2,721	>=360
Max Upward Transient Deflection		-0.004 in	Ratio =	19,432	>=360
Max Downward Total Deflection		0.058 in	Ratio =	2080	>=400.
Max Upward Total Deflection		-0.005 in	Ratio =	14846	>=400.
			Span: 2 : S Only		
			Span: 2 : S Only		
			Span: 2 : +D+S		
			Span: 2 : +D+S		

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 5.00 ft	1	0.032	0.014		-1.74	1.74	90.00	53.89	1.00	1.00	0.71	76.50	51.00
Dsgn. L = 6.00 ft	2	0.032	0.014	0.06	-1.74	1.74	90.00	53.89	1.00	1.00	0.71	76.50	51.00
+D+Lr													
Dsgn. L = 5.00 ft	1	0.079	0.034		-4.24	4.24	90.00	53.89	1.00	1.00	1.72	76.50	51.00
Dsgn. L = 6.00 ft	2	0.079	0.034	0.14	-4.24	4.24	90.00	53.89	1.00	1.00	1.72	76.50	51.00
+D+S													
Dsgn. L = 5.00 ft	1	0.137	0.059		-7.36	7.36	90.00	53.89	1.00	1.00	2.99	76.50	51.00
Dsgn. L = 6.00 ft	2	0.137	0.059	0.25	-7.36	7.36	90.00	53.89	1.00	1.00	2.99	76.50	51.00
+D+0.750Lr													
Dsgn. L = 5.00 ft	1	0.067	0.029		-3.61	3.61	90.00	53.89	1.00	1.00	1.47	76.50	51.00
Dsgn. L = 6.00 ft	2	0.067	0.029	0.12	-3.61	3.61	90.00	53.89	1.00	1.00	1.47	76.50	51.00
+D+0.750S													
Dsgn. L = 5.00 ft	1	0.111	0.047		-5.96	5.96	90.00	53.89	1.00	1.00	2.42	76.50	51.00
Dsgn. L = 6.00 ft	2	0.111	0.047	0.20	-5.96	5.96	90.00	53.89	1.00	1.00	2.42	76.50	51.00
+0.60D													
Dsgn. L = 5.00 ft	1	0.019	0.008		-1.04	1.04	90.00	53.89	1.00	1.00	0.42	76.50	51.00
Dsgn. L = 6.00 ft	2	0.019	0.008	0.04	-1.04	1.04	90.00	53.89	1.00	1.00	0.42	76.50	51.00

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Steel Beam

Project File: Enercalc - Broadbent Residence.ec6

LIC# : KW-06015377, Build:20.22.6.12

York Engineering

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DESCRIPTION: RB-18

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0577	0.000		0.0000	0.000
	2	0.0000	0.000	+D+S	-0.0048	1.968

Vertical Reactions

Support notation : Far left is #:

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		5.939	0.540
Overall MINimum		0.841	0.076
D Only		1.402	0.127
+D+Lr		3.418	0.311
+D+S		5.939	0.540
+D+0.750Lr		2.914	0.265
+D+0.750S		4.805	0.437
+0.60D		0.841	0.076
Lr Only		2.017	0.183
S Only		4.538	0.413