STRUCTURAL CALCULATIONS

Project:
18-022
Mike Rypien Residence
566 Ogden Canyon
Ogden, UT

For:
Mike Rypien

Prepared By:
JDL

SILVERPEAK ENGINEERING

177 E. Antelope Dr. #B, Layton, Utah 84041
(801) 499.5054

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P: 801.499.50.54

PROJECT:

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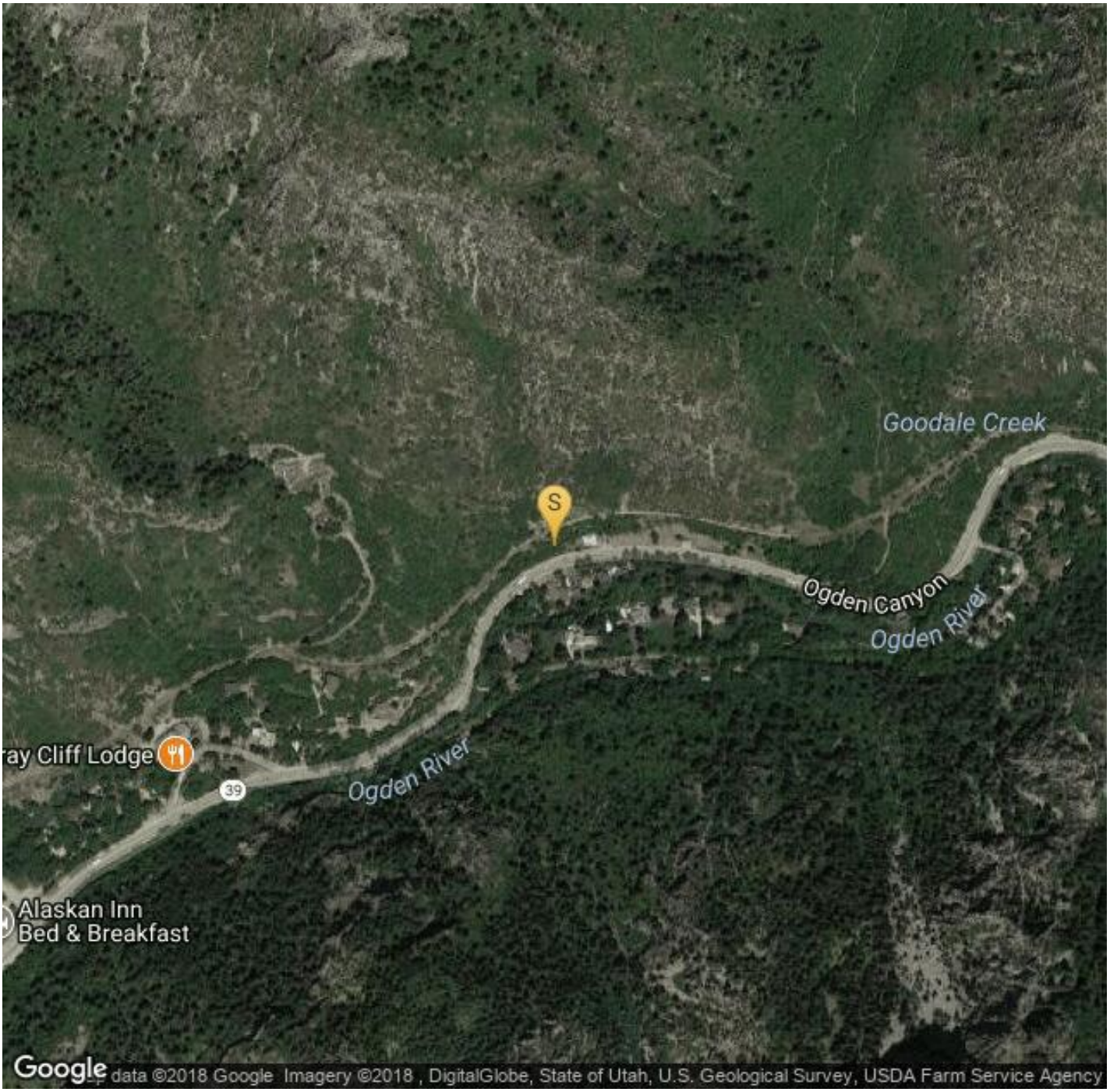
Site Location Information

Address	566 Ogden Canyon					
City	Ogden	Latitude	=	41.2543204	=	41d 15' 15.6''
State	Utah					
Zip	84401	Longitude	=	-111.8755945	=	-111d -52' -32.1''
County	Weber County	Elevation	=	4791	ft	

Site Map



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Governing Design Codes

Governing Building Code	2015	International Building Code		
Concrete	ACI 318-14	Masonry	TMS 402-13/ACI 530-13	
Wood	ANSI/AWC NDS-2015	Metal Stud		
Steel	ANSI/AISC 360-10 / 341-10	Other	ASCE 7-10	

Building Data

Building width (Plan X Dir.)	B	95	ft
Building Depth (Plan Y Dir.)	L	35	ft
Roof Height	H	12	ft
Risk Category		II	

Soil Information

Geotechnical Engineer	N/A			
Report Date				
Project No.				
Foundation Type	Conventional Spread Footings			
Structural Fill		in		
Soil Bearing	1,500	psf	assumed	
Transient loading increase	50 percent			
Soil Site Class	D			
Frost Depth	30	in		
Sulfate Exposure?		ppm	'S' Classification	not applicable
Lateral Pressures				
Active		pcf		
At Rest		pcf		
Passive		pcf		
Seismic Increases?				
Coefficient of Friction	0.30, clay; 0.40, structural fill			
Other Relevant Soil Info?				

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Material specifications

Structural Steel Specifications	ASTM	Fy (ksi)	Other specifications
Wide Flange Sections	A992	50	
Square or Rectangular HSS	A500 Grade B or C	46	
Other steel shapes and plates	A36	36	
Steel Pipe Sections	A53 Grade B	35	
Anchor Rods (Gravity)	F1554	36	ASTM A563 hex (or heavy hex) nuts and
Anchor Rods (Moment Frame)	F1554	55 (or 105)	F436 Hardened washers Grade A
bolted connections	A325 (or A490)		

Concrete Specifications	28d Strength (psi)	Other Specifications
Exterior Footings and Foundations	3000	
Interior Footings and Foundations	3000	
Concrete Slab on Grade	4000	
Warehouse Concrete Slab on Grade	3,000(28)/4,000(56)	
Tilt up wall panels	4500	
Normal weight concrete over steel deck	4000	
Light weight concrete over steel deck	3000	

Wood Specifications	Grade / Type	Other Specifications
2x4 studs	DF #2	
Other studs	DF #2	
Posts	DF #1	
Joists	DF #2	
Beams	DF #1	
Headers	DF #2	
Purlins	DF #1	
Sheathing	APA Rated (OSB/Ply)	
Glu-Lam (simple span)	24F-V4	
Glu-lam (continuous / cantilevered)	24F-V8	
LVL (Microllam)	1.9E	

Masonry Specifications	Grade/Type/Strength	Other Specifications
Concrete Masonry Unit (CMU) f'm	2,000 psi	
Minimum Net Area Unit Strength	2,800 psi	
Mortar Cement type	S	
CMU type	Lightweight	
CMU weight	103 pcf	
CMU Grade	N	
Grout Weight	140 pcf	

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Dead Loads

Roof Dead Loads			Floor Dead Loads		
Typical Residential Roof			**Typical Residential (no Gypcrete)**		
sheating	2	psf	sheathing	3	psf
roofing	2	psf	flooring	2	psf
roof trusses / framing	5	psf	framing	5	psf
insulation	1	psf	mechanical	1	psf
mechanical	1	psf	electrical/lighting	2	psf
electrical / lighting	2	psf	ceiling	2	psf
ceiling	2	psf			psf
		psf			psf
Total	15	psf	Total	15	psf

Live Loads

Roof Live Loads			Floor Live Loads		
Roof Live Load	20	psf	Typical Floor	40	psf
		psf			psf
		psf			psf
		psf			psf
		psf			psf
		psf			psf
		psf			psf
Typ.	20	psf	Typ.	40	psf

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Snow Loads

Uniform Snow Load — Elevation 4791 ft — County: Weber County

ground snow load, pg	47	psf	unit wt	20 pcf
Exposure factor, Ce	1.1			
Thermal factor, Ct	1			
Importance Factor, Is	1			
pf = 0.7 * Ce * Ct * Is * pg	36	psf		

Snow drifts

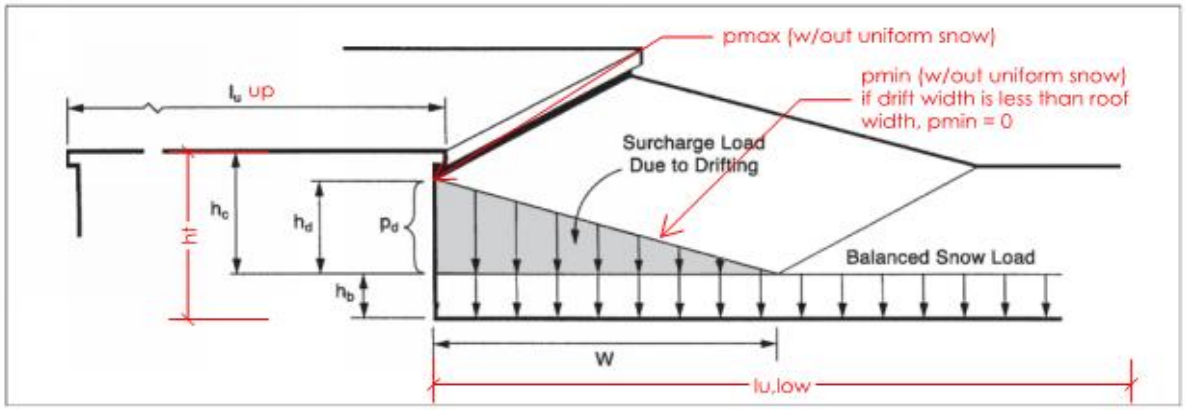

FIGURE 7-8 Configuration of Snow Drifts on Lower Roofs.

	location/description	lu,up	lu,low	ht	hd	w	pmax	pmin	w,use
1	Drift desc.	38	12	4	2.5	11.1	44.3	0.0	11.1

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Seismic Design

Site Data

Lattitude	41.2543204	deg	Building Period, T	0	s
Longitude	-111.875595	deg	Building Height, hn	12	ft
IBC	2015		Period Parameter, Ct	0.02	
Risk Category	II		Period Paramater, x	0.75	
Site Class	D		Calculated Period, Ta	0.129	s
Importance factor, Ie	1		Max Period Coefficient, Cu	1.4	
Seismic Design Category	D		Max Allowed Period, Tmax	0.181	s
			T0 = 0.2 * (Sd1/Sds)	0.108889733	
			Ts = Sd1/Sds	0.544448663	
			Long Period, TL	8	s

Response Spectrum Data, 5% damped

Risk-Targeted Maximum Considered Earthquake (MCE)

Short period (0.2s)	Ss	1.042	g
1s period	S1	0.370	g

Site coefficients

Fa	1.08
Fv	1.66

Site Adjusted MCE Acceleration

Sms = Fa * Ss	Sms	1.128	g
Sm1 = Fv * S1	Sm1	0.614	g

Design Spectral Acceleration

Sds = 2/3 * Sms	0.752	g
Sd1 = 2/3 * Sm1	0.410	g

Seismic Force Resisting System Data

Analysis Type(s): Equivalent Lateral Force

System number 1 — Description: Typical Lateral System

A. Bearing Wall Systems

A.13 Light-framed walls sheathed with wood structural panels rated for shear resistance or steel sheets

Response Modification Coefficient, R	6.5	Height limitations	65
System Overstrength Factor, Omega	3	Height Ok	
Deflection Amplification Factor, Cd	4		
Sesimic Response Coefficient, Cs (LRFD)	0.11573	Seismic Drift	0.02 * hsx
Seismic Response Coefficient, Cs (ASD)	0.08101		

Equivalent Lateral Force Distribution - NOT USED

Level	Area	Wt	Wall Tr	Wall Wt	Wall Lx	Wall Ly	Wi	hi	hx	Wx*hx^k	Cvx	Fx	Fx Tot
Level	ft^2	psf	ft	psf	ft	ft	k	ft	ft			k	k
Roof							0		0	0	0	0	0
3rd							0		0	0	0	0	0
2nd							0		0	0	0	0	0
							0		0	0	0	0	0
							0		0	0	0	0	0
							0		0	0	0	0	0
Total	0						0	0		0	0	0	

Vbase = 0 k = 1

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Wind Design

NOTE: all wind forces are stength level (UNO)

Site Data

City: Ogden

Enclosure Classification: Enclosed

IBC	2015	
Risk Category	II	
Wind Speed, V	115	mph
Exposure	C	

Wind design in conformance with Chapter 26 & 27 ASCE 7-10
26, Wind Loads: General Requirements
27, Wind Loads on buildings

Building ht, h	12	ft	Roof Pitch	9.00	:12	Kz	0.85	zg	900	ft
Bldg. Width (B)	95	ft	Roof Angle	36.9	deg	Kzt	1	alpha	9.5	
Bldg. Depth (L)	35	ft	Parapet Ht	2	ft	Kd	0.85			

qz = 0.00256*Kz*Kzt*Kd*V^2 = 24.4 psf (strength) * 0.6 = 14.7 psf (Allowable)

Main Wind Force Resisting System (STRENGTH)

Surface		G	Cp	qzGCp	qz	Gcpi	qzGCPi	Combined (psf)		
Windward Walls		0.85	0.8	16.6	24.4	0.18	4.4	21.0	or	12.2
Leeward Walls		0.85	-0.5	-10.4	24.4	0.18	4.4	-6.0	or	-14.8
Side Walls		0.85	-0.7	-14.5	24.4	0.18	4.4	-10.1	or	-18.9
Roof (Normal, Theta > 10, +WW)		0.85	-0.1626	-3.3764	24.4	0.18	4.4	1.0	or	-7.8
Roof (Normal, Theta > 10, -WW)		0.85	0.2187	4.54118	24.4	0.18	4.4	8.9	or	0.1
Roof (Normal, Theta > 10, LW)		0.85	-0.6	-12.459	24.4	0.18	4.4	-8.1	or	-16.9
Roof Parallel and Normal, Theta < 10	0 - h/2	0.85	-0.9	-18.688	24.4	0.18	4.4	-14.3	or	-23.1
	h/2 - h	0.85	-0.9	-18.688	24.4	0.18	4.4	-14.3	or	-23.1
	h - 2h	0.85	-0.5	-10.382	24.4	0.18	4.4	-6.0	or	-14.8
	> 2h	0.85	-0.3	-6.2294	24.4	0.18	4.4	-1.8	or	-10.6
Windward Parapet					24.4	1.5	36.6			36.6
Leeward Parapet					24.4	-1	-24.4			-24.4

	Strength		Allow	
Total Windward + Leeward Wall Force	27.0	psf	16.2	psf
Total Windward + Leeward Parapet Force	61.1	psf	36.6	psf
Max Roof Uplift Force	-23.1	psf	-13.9	psf

Wind analysis per level

Levels above ground: 1

Average Level height	12	ft
Roof Height (0 if flat)	10	ft
Parapet Ht (0 if none)	0	ft

Level	Ht	Kz	qh	Roof Ht	Parp. Ht.	Wall Ht.	Roof F	Parp. F	Wall F	Total F
Roof	12	0.85	24.4	10	0	6	102	0	162	264
0	0	0.85	24.4			0			0	0
0	0	0.85	24.4			0			0	0
0	0	0.85	24.4			0			0	0
0	0	0.85	24.4			0			0	0
0	0	0.85	24.4			0			0	0
Total										264.0

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Load distribution for seismic

Roof Diaphragm

Area	2920	SF
DL	15	PSF
Seismic Snow	7.238	PSF
Total Wt/SF	22.238	PSF
Total Wt	64,935	#
Force	7,515	#

Walls below Roof

Length	325	SF
Trib Ht	6	PSF
wt/SF	15	PSF
Total Wt	29250	PSF
Force	3,385	#

Upper Diaphragm

Area	1211	SF
DL	15	PSF
Total Wt	18,165	#
Force	2,102	#

Walls below Upper

Length	0	SF
Trib Ht	0	PSF
wt/SF	0	PSF
Total Wt	0	PSF
Force	0	#

Lower Diaphragm

Area	0	SF
DL	15	PSF
Total Wt	0	#
Force	0	#

Walls below Lower

Length	0	SF
Trib Ht	0	PSF
wt/SF	0	PSF
Total Wt	0	PSF
Force	0	#

Total Seismic / Level

Force / Level

Roof Sesmic	10,900	#
Upper Seismic	2,102	#
Lower Seismic	0	#

Cumulative force / Level

Roof Sesmic	10,900	#
Upper Seismic	13,002	#
Lower Seismic	13,002	#

Diaphragm length

Diaphragm Length, x direction	95	ft
Diaphragm Length, y direction	35	ft

dir.	worst case unit force	
Y	137	PLF
X	371	PLF

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Holddowns

MARK	PRODUCT	TYPE	CAPACITY	Wall HT	Vmax	Treq.	Check
A	STHD14	HOLDDOWN	3815	12	202	2430	OK
B	STHD14RJ	HOLDDOWN	3815	12	202	2430	OK
C	MST48	STRAP	3960	12	202	2430	OK

Notes:

Provide hardware at locations specified on the plans and shearwall diagrams
All Holddowns and straps are Simpson Stron-Tie
Install per manufacturers specifications

Controlling Forces and Shearwall Forces

LRFD

Controlling Lat Force E-W EQ	371	PLF
Controlling Lat Force N-S EQ	137	PLF

Controlling Lat Force E-W WIND	264	PLF
Controlling Lat Force E-W WIND	264	PLF

ASD

Controlling Lat Force E-W EQ	260	PLF
Controlling Lat Force N-S EQ	96	PLF

Controlling Lat Force E-W WIND	158	PLF
Controlling Lat Force E-W WIND	158	PLF

Controlling force E-W	EQ	260	PLF
Controlling force N-S	WIND	158	PLF

Diaphragm length

Diaphragm Length, x direction	95	ft
Diaphragm Length, y direction	35	ft

North-South Force Resisting Walls

East wall

trib length	9	ft
Total Force	1425	#
Max Opening Height	7	ft
Wall Length	16	ft
Shear Wall Force	125	PLF
T = C =	1504	#

West wall

trib length	17	ft
Total Force	2692	#
Max Opening Height	7	ft
Wall Length	19	ft
Shear Wall Force	190	PLF
T = C =	2283	#

Int E_W Wall no.1

trib length	22	ft
Total Force	3484	#
Max Opening Height	7	ft
Wall Length	22	ft
Shear Wall Force	202	PLF
T = C =	2430	#

Int E_W Wall no.2

trib length	25	ft
Total Force	3959	#
Max Opening Height	0	ft
Wall Length	24	ft
Shear Wall Force	165	PLF
T = C =	1980	#

East-West Force Resisting Walls

North wall

trib length	16	ft
Total Force	4161	#
Max Opening Height	7	ft
Wall Length	32	ft
Shear Wall Force	195	PLF
T = C =	2336	#

South wall

trib length	16	ft
Total Force	4161	#
Max Opening Height	7	ft
Wall Length	77	ft
Shear Wall Force	62	PLF
T = C =	741	#

Int N_S Wall no.1

trib length	0	ft
Total Force	0	#
Max Opening Height	0	ft
Wall Length	0	ft
Shear Wall Force	0	PLF
T = C =	0	#

Int N_S Wall no.2

trib length	0	ft
Total Force	0	#
Max Opening Height	0	ft
Wall Length	0	ft
Shear Wall Force	0	PLF
T = C =	0	#

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ShearWall Schedule

Mark	Nailing		Sill pl	Anchor Bolts			Notes
	Edge	Field	8d	Dia.	Spacing	Capac.	
	in o.c.	in o.c.	in o.c.	in	in o.c.	PLF	
SW1	6	12	6	0.5	32	260	1,2,3,4
SW2	4	12	4	0.5	24	380	1,2,3,4
SW3	3	12	3	0.5	16	490	1,2,3,4,5
SW4	2	12	2	0.5	8	640	1,2,3,4,5
SW5	3	12	3	0.5	8	980	1,3,4,5,6

Notes:
1. 8d common or galvanized box nails
2. 7/16" APA OSB on one side of wall
3. Block all panel edges
4. Provide 3" x 3" x 1/4" plate washers on anchor bolts (Typical)
5. Framing at adjoining panle edges shall be 3" nominal or (2) 2x nailed together with (2) rows of 16d common nails at 12" o.c.
6. 7/16" APA OSB sheathing both sides of wall.

Staple Equivalency Chart

		EQUIVALENT SPACING OF STAPLES (IN.)		
Common Nails	in.	16 GA.	15 GA.	14 GA.
8d AT	3	2	3	3.5
	4	2.5	3.5	4
	6	4	5	6
	8	5.5	6.5	8
	10	6.5	8	10
	12	8	10	12

		EQUIVALENT SPACING OF STAPLES (IN.)		
Common Nails	in.	16 GA.	15 GA.	14 GA.
10d AT	4	2	2.5	3
	6	3.5	4	5
	8	4.5	5.5	6.5
	10	5.5	7	8
	12	6.5	8	9.5

Notes:
1. Minimum staple penetration into main member is 1"
2. Place staples parallel to panel edge
3. Provide 3/8" distance to panel edge

Table valid for shearwalls only.

Anchor Bolt Design

Mark	Sill Plate Force PLF	Bolt Diameter in	All. Shear / Bolt PLF	Reqd. Spacing
SW1	260	0.5	827	32
SW2	380	0.5	827	24
SW3	490	0.5	827	16
SW4	640	0.5	827	8
SW5	980	0.5	827	8

Notes:
1. See shearwall table for anchor size and spacing
2. Use 3" x 3" x 1/4" plate washers to fasten anchor bolts to sill plate
3. Anchor bolts to be embeded 7-inches minimum into foudnation wall

Roof Sheathing:

Provide 5/8" or thicker APA rated panel w/ 8d common nails at 6" o.c. Edge / 12" o.c. field.
Provide 'H' clips at all unsupported edges.
Sheath beneath all overbuilds

Provide a Simpson H1 or H2.5 connector on every truss to connect truss to top plate
Provide solid blocking that extends to and is nailed to the roof sheathing with 8d common nails at 3" o.c. in every other truss space.

Floor Sheathing:

Provide 3/4" APA rated T&G panel glued and nailed w/ 10D common nails @ 6" o.c. edge / 12" o.c. field.

Silver Peak Engineering

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Footing & Foundation Calculations

Allowable Soil Bearing Pressure (Qa) = 1,500 psf (assumed)

Continuous Footings

Width (in)				
18	Good for	2250	plf	use 10" footing w/ (2) #4 bars
20	Good for	2500	plf	use 10" footing w/ (2) #4 bars
24	Good for	3000	plf	use 10" footing w/ (2) #4 bars
30	Good for	3750	plf	use 10" footing w/ (3) #4 bars
36	Good for	4500	plf	use 12" footing w/ (3) #5 bars
42	Good for	5250	plf	use 12" footing w/ (4) #5 bars
48	Good for	6000	plf	use 12" footing w/ (4) #5 bars

Spot Footings

Mark	MAX Load	
24"	6,000	lbs
36"	13,500	lbs
48"	24,000	lbs
60"	37,500	lbs

Foundation Walls:

UTAH AMENDED FOUNDATION CODE

Max Ht	Top Edge Support	Vert Steel Note 1	Hori Steel Note 2	Steel at Openings	Max Lintel Length	Max Lintel Depth	Max Grade Differential
2'-0"	None	Note 4	(2) #4 Bars	(2) #4 Bars	2 ft	Two inches	18" Note 5
4'-0"		#4 @ 32"	(4) #4 Bars	above. (1) #4	3 ft	for ea. Foot	42" Note 5
6'-0"	Floor or	#4 @ 24"	(5) #4 Bars	Bar ea. side	6 ft	of opening	5 ft Note 6
8'-0"	Roof		(6) #4 Bars	(1) #4 Bar	6 ft	width	5 ft Note 6
9'-0"	Diaphragm	#4 @ 16"	(7) #4 Bars	below Note 3	6 ft	Min. 6"	5 ft Note 6
Over 9'-0"	Engineering Required						

Notes:

1. To be placed in the center of wall & extend from the footing to within 3" of the top of wall. Dowel of #4 rebar w/ standard hook shall be provided in the footing to match the vert steel with the vert leg extending 24" into fndtn wall.
2. One bar shall be located in the top 4", one bar in the bottom 4" and the other bars equally spaced between. Corner reinforcing shall be provided so as to lap 24".
3. Bars shall be placed within 2" of the openings & extend 24" beyond edge of opening. Vert bars may terminate 3" from the top of concrete.
4. Dowels of #4 rebar at 32" o.c. with standard hook shall be provided in the footing with vert leg extending within 3" of the top of the fndtn wall.
5. Difference in grade from one side of the wall to the other.
6. Difference in grade from the highest grade to the lowest grade on the perimeter of fndtn.
7. ALL REBAR TO BE GRADE 60
8. 2 ft tall wall may be 6" thick. All other walls to be 8" thick.

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Roof rafter calculations for stick framed areas

Rafter Calculations for stick framed areas

Section Properties

Joist	Depth (in)	Area (in^2)	Modulus (in^3)	Inertia (in^4)	CF
2x6	5.50	8.25	7.56	20.80	1.3
2x8	7.25	10.88	13.14	47.63	1.2
2x10	9.25	13.88	21.39	98.93	1.1
2x12	11.25	16.88	31.64	177.98	1.0

Wood Properties

Fb:	850	psi
Fv:	95	psi
E:	1600	ksi

Strength Factors

Cd:	1.15
Cr:	1.15

Rafter Span Chart

Dead Load:	15		Deflection Criteria
Live Load:	36.19	L /	240
Joist	Spacing	load (lb)	Max. Span (ft)
2x6	12	51	11.30
	16	68	10.27
	24	102	8.48
2x8	12	51	14.89
	16	68	13.16
	24	102	10.74
2x10	12	51	18.56
	16	68	16.07
	24	102	13.12
2x12	12	51	21.52
	16	68	18.64
	24	102	15.22

$V_{max} = 2AF_v/3 = w(L/2-a)$

Max. span for Shear:

$L_{shear} = 2a+4AF_v/3w$

$M_{max} = S_xF_b = wL^2/8$

Max. span for Bending:

$L_{bend} = (8S_xF_b/w)^{0.5}$

$D_{max} = 5wL^4/384EI = L/a$

Max. span for Deflection:

$L_{defl} = (384EI/5aw)^{0.333}$

Note: Do not span rafters more than 6' at overbuilds.

Stud Height Chart

Stud	spacing	Maximum Height
2x4	16" o.c.	9'-0"
2x4	12" o.c.	10'-6"
2x6	16" o.c.	14'-6"
2x6	12" o.c.	16'-6"
5-1/2" LVL	16" o.c.	18'-0"

Silver Peak Engineering

Project: Mike Kypien Residence | Project No.: 18-022
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Wood Columns

Description:

Load:	13270.14	lb	Cd:	1.00	Load Duration Factor	small pg. 25
Size:	2X4		Cm:	1.00	Wet Service Factor	1 under 150 deg
# used:	6		Ct:	1.00	Temperature Factor	small pg. 25
Area:	31.50	in^2	CF:	1.00	Size Factor	big pg. 11
Fc	850.00	psi	Ci:	1.00	Incinsing Factor	
F*c	850.00	psi				

F'c = (F*c)*Cd*Cm*Ct*CF*Ci*Cp Fc*CF = 850 (When Fc*CF < 750 psi Cm = 1.0)

Fce =	504.115	Kce	0.3			
		E'	1.60E+06	psi	1.6	
Cp =	0.49565	Le	108	in		
		d	3.5	in		
		c	0.8			

F'c	421.306	psi provided	Check
fc	421.274	psi required	ok

Provide: 6 2X4 D.F. #2

2X4 COLUMNS			
# 2X4'S	HEIGHT	MAX LOAD	
2	8'	5,200	LB
3	8'	7,800	LB
4	8'	10,400	LB
5	8'	13,000	LB
# 2X4'S	HEIGHT	MAX LOAD	
2	9'	4,400	LB
3	9'	6,600	LB
4	9'	8,800	LB
5	9'	11,000	LB
6	9'	13,200	LB
7	9'	15,400	LB
# 2X4'S	HEIGHT	MAX LOAD	
2	10'	3,700	LB
3	10'	5,600	LB
4	10'	7,400	LB
5	10'	9,300	LB
6	10'	11,200	LB

2X6 COLUMNS			
# 2X6'S	HEIGHT	MAX LOAD	
2	8'	11,800	LB
3	8'	17,000	LB
4	8'	23,000	LB
5	8'	29,000	LB
# 2X6'S	HEIGHT	MAX LOAD	
2	9'	11,200	LB
3	9'	16,000	LB
4	9'	22,000	LB
5	9'	28,000	LB
# 2X6'S	HEIGHT	MAX LOAD	
2	10'	10,000	LB
3	10'	15,000	LB
4	10'	20,000	LB
5	10'	26,000	LB

SILVERPEAK ENGINEERING

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JOB NO.	18-022
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BY	JDL

Floor Beams

(2) 2x8 Plys: 2 Section: 2x8 Nominal Depth: 8 Depth: 7.25 Width: 3

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	Fb	Fv	Mmax	Vmax	M	V	I,240	I,360	E
15	40	16	3	ok	ok	ok	ok	21.75	26.3	95.3	850	95	1,862	1,378	990	1320	6.6825	7.29	1600000
15	40	12	4	ok	ok	ok	ok	21.75	26.3	95.3	850	95	1,862	1,378	1320	1320	11.88	12.96	1600000
15	40	10	5	ok	ok	ok	ok	21.75	26.3	95.3	850	95	1,862	1,378	1718.75	1375	19.3359	21.0938	1600000
15	40	7	6	ok	ok	ok	ok	21.75	26.3	95.3	850	95	1,862	1,378	1732.5	1155	23.3888	25.515	1600000

(2) 2x10 Plys: 2 Section: 2x10 Nominal Depth: 10 Depth: 9.25 Width: 3

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	Fb	Fv	Mmax	Vmax	M	V	I,240	I,360	E
15	40	21	3	ok	ok	ok	ok	27.75	42.8	197.9	850	95	3,030	1,758	1299.38	1732.5	8.77078	9.56813	1600000
15	40	15	4	ok	ok	ok	ok	27.75	42.8	197.9	850	95	3,030	1,758	1650	1650	14.85	16.2	1600000
15	40	10	6	ok	ok	ok	ok	27.75	42.8	197.9	850	95	3,030	1,758	2475	1650	33.4125	36.45	1600000
15	40	6	8	ok	ok	ok	ok	27.75	42.8	197.9	850	95	3,030	1,758	2640	1320	47.52	51.84	1600000

(3) 2x8 Plys: 3 Section: 2x8 Nominal Depth: 8 Depth: 7.25 Width: 4.5

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	Fb	Fv	Mmax	Vmax	M	V	I,240	I,360	E
15	40	25	3	ok	ok	ok	ok	32.625	39.4	142.9	850	95	2,792	2,066	1546.88	2062.5	10.4414	11.3906	1600000
15	40	18	4	ok	ok	ok	ok	32.625	39.4	142.9	850	95	2,792	2,066	1980	1980	17.82	19.44	1600000
15	40	15	5	ok	ok	ok	ok	32.625	39.4	142.9	850	95	2,792	2,066	2578.13	2062.5	29.0039	31.6406	1600000
15	40	11	6	ok	ok	ok	ok	32.625	39.4	142.9	850	95	2,792	2,066	2722.5	1815	36.7538	40.095	1600000

(3) 2x10 Plys: 3 Section: 2x10 Nominal Depth: 10 Depth: 9.25 Width: 4.5

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	Fb	Fv	Mmax	Vmax	M	V	I,240	I,360	E
15	40	31	3	ok	ok	ok	ok	41.625	64.2	296.8	850	95	4,546	2,636	1918.13	2557.5	12.9473	14.1244	1600000
15	40	23	4	ok	ok	ok	ok	41.625	64.2	296.8	850	95	4,546	2,636	2530	2530	22.77	24.84	1600000
15	40	15	6	ok	ok	ok	ok	41.625	64.2	296.8	850	95	4,546	2,636	3712.5	2475	50.1188	54.675	1600000
15	40	10	8	ok	ok	ok	ok	41.625	64.2	296.8	850	95	4,546	2,636	4400	2200	79.2	86.4	1600000

(2) 1.75 x 5.5 LVL Plys: 2 Section: 1.75 x 5.5 Nominal Depth: 5.5 Depth: 5.5 Width: 3.5

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	M(1)ply	V(1)ply	Mallow	Vallow	M	V	I,240	I,360	E
15	40	33	4	ok	ok	ok	ok	19.25	17.6	48.5	2125	1830	4,250	3,660	3630	3630	27.5116	30.0126	1900000
15	40	24	5	ok	ok	ok	ok	19.25	17.6	48.5	2125	1830	4,250	3,660	4125	3300	39.0789	42.6316	1900000
15	40	15	6	ok	ok	ok	ok	19.25	17.6	48.5	2125	1830	4,250	3,660	3712.5	2475	42.2053	46.0421	1900000
15	40	9	7	ok	ok	ok	ok	19.25	17.6	48.5	2125	1830	4,250	3,660	3031.88	1732.5	40.2122	43.8679	1900000

(2) 1.75 x 7.25 LVL Plys: 2 Section: 1.75 x 7.25 Nominal Depth: 7.25 Depth: 7.25 Width: 3.5

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	M(1)ply	V(1)ply	Mallow	Vallow	M	V	I,240	I,360	E
15	40	43	4	ok	ok	ok	ok	25.375	30.7	111.1	3555	2410	7,110	4,820	4730	4730	35.8484	39.1074	1900000
15	40	35	5	ok	ok	ok	ok	25.375	30.7	111.1	3555	2410	7,110	4,820	6015.63	4812.5	56.9901	62.1711	1900000
15	40	28	6	ok	ok	ok	ok	25.375	30.7	111.1	3555	2410	7,110	4,820	6930	4620	78.7832	85.9453	1900000
15	40	21	7	ok	ok	ok	ok	25.375	30.7	111.1	3555	2410	7,110	4,820	7074.38	4042.5	93.8286	102.358	1900000

SILVERPEAK ENGINEERING

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Floor Beams

(2) 1.75 x 9.5 LVL — Plys: 2 — Section: 1.75 x 9.5 — Nominal Depth: 9.5 — Depth: 9.5 — Width: 3.5

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	M(1)ply	V(1)ply	Mallow	Vallow	M	V	I,240	I,360	E
15	40	57	4	ok	ok	ok	ok	33.25	52.6	250.1	5885	3160	11,770	6,320	6270	6270	47.52	51.84	1900000
15	40	45	5	ok	ok	ok	ok	33.25	52.6	250.1	5885	3160	11,770	6,320	7734.38	6187.5	73.273	79.9342	1900000
15	40	38	6	ok	ok	ok	ok	33.25	52.6	250.1	5885	3160	11,770	6,320	9405	6270	106.92	116.64	1900000
15	40	32	7	ok	ok	ok	ok	33.25	52.6	250.1	5885	3160	11,770	6,320	10780	6160	142.977	155.975	1900000
15	40	26	8	ok	ok	ok	ok	33.25	52.6	250.1	5885	3160	11,770	6,320	11440	5720	173.406	189.171	1900000
15	40	21	9	ok	ok	ok	ok	33.25	52.6	250.1	5885	3160	11,770	6,320	11694.4	5197.5	199.42	217.549	1900000
15	40	17	10	ok	ok	ok	ok	33.25	52.6	250.1	5885	3160	11,770	6,320	11687.5	4675	221.447	241.579	1900000
15	40	13	11	ok	ok	ok	ok	33.25	52.6	250.1	5885	3160	11,770	6,320	10814.4	3932.5	225.394	245.885	1900000
15	40	10	12	ok	ok	ok	ok	33.25	52.6	250.1	5885	3160	11,770	6,320	9900	3300	225.095	245.558	1900000

(2) 1.75 x 11.875 LVL — Plys: 2 — Section: 1.75 x 11.875 — Nominal Depth: 11.875 — Depth: 11.875 — Width: 3.5

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	M(1)ply	V(1)ply	Mallow	Vallow	M	V	I,240	I,360	E
15	40	31	9	ok	ok	ok	ok	41.5625	82.3	488.4	8925	3950	17,850	7,900	17263.1	7672.5	294.382	321.144	1900000
15	40	25	10	ok	ok	ok	ok	41.5625	82.3	488.4	8925	3950	17,850	7,900	17187.5	6875	325.658	355.263	1900000
15	40	21	11	ok	ok	ok	ok	41.5625	82.3	488.4	8925	3950	17,850	7,900	17469.4	6352.5	364.099	397.198	1900000
15	40	18	12	ok	ok	ok	ok	41.5625	82.3	488.4	8925	3950	17,850	7,900	17820	5940	405.171	442.004	1900000
15	40	15	13	ok	ok	ok	ok	41.5625	82.3	488.4	8925	3950	17,850	7,900	17428.1	5362.5	429.282	468.308	1900000
15	40	12	14	ok	ok	ok	ok	41.5625	82.3	488.4	8925	3950	17,850	7,900	16170	4620	428.931	467.924	1900000
15	40	10	15	ok	ok	ok	ok	41.5625	82.3	488.4	8925	3950	17,850	7,900	15468.8	4125	439.638	479.605	1900000
15	40	8	16	ok	ok	ok	ok	41.5625	82.3	488.4	8925	3950	17,850	7,900	14080	3520	426.846	465.651	1900000
15	40	6	17	ok	ok	ok	ok	41.5625	82.3	488.4	8925	3950	17,850	7,900	11921.3	2805	383.99	418.898	1900000

(3) 1.75 x 9.5 LVL — Plys: 3 — Section: 1.75 x 9.5 — Nominal Depth: 9.5 — Depth: 9.5 — Width: 5.25

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	M(1)ply	V(1)ply	Mallow	Vallow	M	V	I,240	I,360	E
15	40	12	13	ok	ok	ok	ok	49.875	79.0	375.1	5885	3160	17,655	9,480	13942.5	4290	343.426	374.646	1900000
15	40	7	15	ok	ok	ok	ok	49.875	79.0	375.1	5885	3160	17,655	9,480	10828.1	2887.5	307.747	335.724	1900000

(3) 1.75 x 11.875 LVL — Plys: 3 — Section: 1.75 x 11.875 — Nominal Depth: 11.875 — Depth: 11.875 — Width: 5.25

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	M(1)ply	V(1)ply	Mallow	Vallow	M	V	I,240	I,360	E
15	40	15	15	ok	ok	ok	ok	62.3438	123.4	732.6	8925	3950	26,775	11,850	23203.1	6187.5	659.457	719.408	1900000
15	40	8	18	ok	ok	ok	ok	62.3438	123.4	732.6	8925	3950	26,775	11,850	17820	3960	607.756	663.006	1900000

(4) 1.75 x 11.875 LVL — Plys: 4 — Section: 1.75 x 11.875 — Nominal Depth: 11.875 — Depth: 11.875 — Width: 7

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	M(1)ply	V(1)ply	Mallow	Vallow	M	V	I,240	I,360	E
15	40	11	18	ok	ok	ok	ok	83.125	164.5	976.8	8925	3950	35,700	15,800	24502.5	5445	835.664	911.634	1900000
15	40	8	20	ok	ok	ok	ok	83.125	164.5	976.8	8925	3950	35,700	15,800	22000	4400	833.684	909.474	1900000

(3) 1.75 x 14 LVL — Plys: 3 — Section: 1.75 x 14 — Nominal Depth: 14 — Depth: 14 — Width: 5.25

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	M(1)ply	V(1)ply	Mallow	Vallow	M	V	I,240	I,360	E
15	40	14	18	ok	ok	ok	ok	73.5	171.5	1200.5	12130	4655	36,390	13,965	31185	6930	1063.57	1160.26	1900000
15	40	10	20	ok	ok	ok	ok	73.5	171.5	1200.5	12130	4655	36,390	13,965	27500	5500	1042.11	1136.84	1900000

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Roof Beams

(2) 2x6 — Plys: 2 — Section: 2x6 — Nominal Depth: 6 — Depth: 5.5 — Width: 3

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	Fb	Fv	Mmax	Vmax	M	V	I,240	I,360	E
15	36	13	3	ok	ok	ok	ok	16.5	15.1	41.6	850	95	1,071	1,045	748.654	998.205	5.05341	5.35895	1600000
15	36	10	4	ok	ok	ok	ok	16.5	15.1	41.6	850	95	1,071	1,045	1023.8	1023.8	9.2142	9.7713	1600000
15	36	6	5	ok	ok	ok	ok	16.5	15.1	41.6	850	95	1,071	1,045	959.813	767.85	10.7979	11.4507	1600000
15	36	4	6	ok	ok	ok	ok	16.5	15.1	41.6	850	95	1,071	1,045	921.42	614.28	12.4392	13.1913	1600000

(2) 2x8 — Plys: 2 — Section: 2x8 — Nominal Depth: 8 — Depth: 7.25 — Width: 3

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	Fb	Fv	Mmax	Vmax	M	V	I,240	I,360	E
15	36	17	3	ok	ok	ok	ok	21.75	26.3	95.3	850	95	1,862	1,378	979.009	1305.35	6.60831	7.00785	1600000
15	36	13	4	ok	ok	ok	ok	21.75	26.3	95.3	850	95	1,862	1,378	1330.94	1330.94	11.9785	12.7027	1600000
15	36	8	6	ok	ok	ok	ok	21.75	26.3	95.3	850	95	1,862	1,378	1842.84	1228.56	24.8783	26.3825	1600000
15	36	4	8	ok	ok	ok	ok	21.75	26.3	95.3	850	95	1,862	1,378	1638.08	819.04	29.4854	31.2682	1600000

(2) 2x10 — Plys: 2 — Section: 2x10 — Nominal Depth: 10 — Depth: 9.25 — Width: 3

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	Fb	Fv	Mmax	Vmax	M	V	I,240	I,360	E
15	36	22	3	ok	ok	ok	ok	27.75	42.8	197.9	850	95	3,030	1,758	1266.95	1689.27	8.55193	9.06899	1600000
15	36	17	4	ok	ok	ok	ok	27.75	42.8	197.9	850	95	3,030	1,758	1740.46	1740.46	15.6641	16.6112	1600000
15	36	13	5	ok	ok	ok	ok	27.75	42.8	197.9	850	95	3,030	1,758	2079.59	1663.68	23.3954	24.8099	1600000
15	36	11	6	ok	ok	ok	ok	27.75	42.8	197.9	850	95	3,030	1,758	2533.91	1689.27	34.2077	36.276	1600000
15	36	9	7	ok	ok	ok	ok	27.75	42.8	197.9	850	95	3,030	1,758	2821.85	1612.49	44.4441	47.1313	1600000
15	36	7	8	ok	ok	ok	ok	27.75	42.8	197.9	850	95	3,030	1,758	2866.64	1433.32	51.5995	54.7193	1600000
15	36	4	10	ok	ok	ok	ok	27.75	42.8	197.9	850	95	3,030	1,758	2559.5	1023.8	57.5888	61.0706	1600000
15	36	3	11	ok	ok	ok	ok	27.75	42.8	197.9	850	95	3,030	1,758	2322.75	844.635	57.488	60.9638	1600000

(2) 1.75 x 5.5 LVL — Plys: 2 — Section: 1.75 x 5.5 — Nominal Depth: 5.5 — Depth: 5.5 — Width: 3.5

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	M(1)ply	V(1)ply	Mallow	Vallow	M	V	I,240	I,360	E
15	36	35	4	ok	ok	ok	ok	19.25	17.6	48.5	2125	1830	4,250	3,660	3583.3	3583.3	27.1576	28.7996	1900000
15	36	26	5	ok	ok	ok	ok	19.25	17.6	48.5	2125	1830	4,250	3,660	4159.19	3327.35	39.4028	41.7852	1900000
15	36	17	6	ok	ok	ok	ok	19.25	17.6	48.5	2125	1830	4,250	3,660	3916.04	2610.69	44.5191	47.2108	1900000
15	36	11	7	ok	ok	ok	ok	19.25	17.6	48.5	2125	1830	4,250	3,660	3448.93	1970.82	45.7437	48.5094	1900000

(2) 1.75 x 7.25 LVL — Plys: 2 — Section: 1.75 x 7.25 — Nominal Depth: 7.25 — Depth: 7.25 — Width: 3.5

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	M(1)ply	V(1)ply	Mallow	Vallow	M	V	I,240	I,360	E
15	36	47	4	ok	ok	ok	ok	25.375	30.7	111.1	3555	2410	7,110	4,820	4811.86	4811.86	36.4688	38.6738	1900000
15	36	37	5	ok	ok	ok	ok	25.375	30.7	111.1	3555	2410	7,110	4,820	5918.84	4735.08	56.0733	59.4635	1900000
15	36	30	6	ok	ok	ok	ok	25.375	30.7	111.1	3555	2410	7,110	4,820	6910.65	4607.1	78.5632	83.3132	1900000
15	36	22	7	ok	ok	ok	ok	25.375	30.7	111.1	3555	2410	7,110	4,820	6897.85	3941.63	91.4873	97.0187	1900000

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Roof Beams

(2) 1.75 x 9.5 LVL — Plys: 2 — Section: 1.75 x 9.5 — Nominal Depth: 9.5 — Depth: 9.5 — Width: 3.5

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	M(1)ply	V(1)ply	Mallow	Vallow	M	V	I,240	I,360	E
15	36	49	5	ok	ok	ok	ok	33.25	52.6	250.1	5885	3160	11,770	6,320	7838.47	6270.78	74.2592	78.749	1900000
15	36	41	6	ok	ok	ok	ok	33.25	52.6	250.1	5885	3160	11,770	6,320	9444.56	6296.37	107.37	113.861	1900000
15	36	35	7	ok	ok	ok	ok	33.25	52.6	250.1	5885	3160	11,770	6,320	10973.9	6270.78	145.548	154.348	1900000
15	36	28	8	ok	ok	ok	ok	33.25	52.6	250.1	5885	3160	11,770	6,320	11466.6	5733.28	173.809	184.318	1900000
15	36	22	9	ok	ok	ok	ok	33.25	52.6	250.1	5885	3160	11,770	6,320	11402.6	5067.81	194.444	206.2	1900000
15	36	18	10	ok	ok	ok	ok	33.25	52.6	250.1	5885	3160	11,770	6,320	11517.8	4607.1	218.231	231.426	1900000
15	36	14	11	ok	ok	ok	ok	33.25	52.6	250.1	5885	3160	11,770	6,320	10839.5	3941.63	225.918	239.577	1900000
15	36	11	12	ok	ok	ok	ok	33.25	52.6	250.1	5885	3160	11,770	6,320	10135.6	3378.54	230.452	244.385	1900000
15	36	8	13	ok	ok	ok	ok	33.25	52.6	250.1	5885	3160	11,770	6,320	8651.11	2661.88	213.09	225.974	1900000

(2) 1.75 x 11.875 LVL — Plys: 2 — Section: 1.75 x 11.875 — Nominal Depth: 11.875 — Depth: 11.875 — Width: 3.5

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	M(1)ply	V(1)ply	Mallow	Vallow	M	V	I,240	I,360	E
15	36	34	9	ok	ok	ok	ok	41.5625	82.3	488.4	8925	3950	17,850	7,900	17622.2	7832.07	300.504	318.673	1900000
15	36	27	10	ok	ok	ok	ok	41.5625	82.3	488.4	8925	3950	17,850	7,900	17276.6	6910.65	327.347	347.138	1900000
15	36	23	11	ok	ok	ok	ok	41.5625	82.3	488.4	8925	3950	17,850	7,900	17807.7	6475.54	371.15	393.591	1900000
15	36	19	12	ok	ok	ok	ok	41.5625	82.3	488.4	8925	3950	17,850	7,900	17507	5835.66	398.053	422.12	1900000
15	36	16	13	ok	ok	ok	ok	41.5625	82.3	488.4	8925	3950	17,850	7,900	17302.2	5323.76	426.181	451.948	1900000
15	36	13	14	ok	ok	ok	ok	41.5625	82.3	488.4	8925	3950	17,850	7,900	16304	4658.29	432.485	458.634	1900000
15	36	11	15	ok	ok	ok	ok	41.5625	82.3	488.4	8925	3950	17,850	7,900	15836.9	4223.18	450.102	477.315	1900000
15	36	9	16	ok	ok	ok	ok	41.5625	82.3	488.4	8925	3950	17,850	7,900	14742.7	3685.68	446.937	473.959	1900000
15	36	7	17	ok	ok	ok	ok	41.5625	82.3	488.4	8925	3950	17,850	7,900	12944.7	3045.81	416.955	442.164	1900000

(3) 1.75 x 9.5 LVL — Plys: 3 — Section: 1.75 x 9.5 — Nominal Depth: 9.5 — Depth: 9.5 — Width: 5.25

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	M(1)ply	V(1)ply	Mallow	Vallow	M	V	I,240	I,360	E
15	36	13	13	ok	ok	ok	ok	49.875	79.0	375.1	5885	3160	17,655	9,480	14058.1	4325.56	346.272	367.208	1900000
15	36	8	15	ok	ok	ok	ok	49.875	79.0	375.1	5885	3160	17,655	9,480	11517.8	3071.4	327.347	347.138	1900000

(3) 1.75 x 11.875 LVL — Plys: 3 — Section: 1.75 x 11.875 — Nominal Depth: 11.875 — Depth: 11.875 — Width: 5.25

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	M(1)ply	V(1)ply	Mallow	Vallow	M	V	I,240	I,360	E
15	36	16	15	ok	ok	ok	ok	62.3438	123.4	732.6	8925	3950	26,775	11,850	23035.5	6142.8	654.693	694.277	1900000
15	36	9	18	ok	ok	ok	ok	62.3438	123.4	732.6	8925	3950	26,775	11,850	18658.8	4146.39	636.362	674.837	1900000

(4) 1.75 x 11.875 LVL — Plys: 4 — Section: 1.75 x 11.875 — Nominal Depth: 11.875 — Depth: 11.875 — Width: 7

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	M(1)ply	V(1)ply	Mallow	Vallow	M	V	I,240	I,360	E
15	36	13	18	ok	ok	ok	ok	83.125	164.5	976.8	8925	3950	35,700	15,800	26951.5	5989.23	919.189	974.764	1900000
15	36	9	20	ok	ok	ok	ok	83.125	164.5	976.8	8925	3950	35,700	15,800	23035.5	4607.1	872.924	925.702	1900000

(3) 1.75 x 16 LVL - L/600 W/ BRICK — Plys: 3 — Section: 1.75 x 16 — Nominal Depth: 16 — Depth: 16 — Width: 5.25

DL	LL	Trib L.	MaxSpan	Chk M	Chk V	DL/240	LL/360	A	Sxx	Ixx	M(1)ply	V(1)ply	Mallow	Vallow	M	V	I,600	I,600	E
15	36	10	18	ok	ok	ok	ok	84	224.0	1792.0	15555	5320	46,665	15,960	20732	4607.1	1767.67	1249.7	1900000
15	36	7	20	ok	ok	ok	ok	84	224.0	1792.0	15555	5320	46,665	15,960	17916.5	3583.3	1697.35	1199.98	1900000