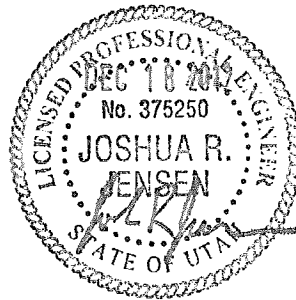


STRUCTURAL CALCULATIONS

For

KH DESIGN PLAN - 1039, Fronk Residence
Lot 13 Cedar Cove Estates, Uintah, Weber County, UT



Prepared By:



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Silver Peak Engineering

Project: Frnk Residence, Lot 13 Cedar Cove Estates
By: Josh Jensen
Date: 12/18/2012

Project No.: khd1039
Plan Name: 1039
Sheet: 1

Structural Design Criteria

Type of Structure: Residential Home
Construction Materials: Wood / Concrete
Design Codes: 2009 International Building Code, ASCE 7-02, NDS 1997

Live Loads

<u>40</u>	psf for	<u>Roof Snow Load</u>	Reducible:	<u>No</u>
<u>40</u>	psf for	<u>Floor Live Load</u>	Reducible:	<u>No</u>
<u>60</u>	psf for	<u>Deck Live Load</u>	Reducible:	<u>No</u>
	psf for		Reducible?	

Dead Loads

<u>15</u>	psf for	<u>Roof Structure</u>
<u>15</u>	psf for	<u>Floor Structure</u>
<u>15</u>	psf for	<u>walls w/ stucco or siding</u>
<u>48</u>	psf for	<u>Brick Veneer</u>
	psf for	
	psf for	

Wind Loads

Exposure: C
Wind Speed: 90 mph 3 - second gust
Importance: 1

Seismic Loads

Importance Factor: 1.00
Ss: 1.78
S1: 0.78
R: 6

Seismic Design Category: E

Beam - Rafter - Joist Deflection Criteria

L/	<u>(TL)</u>	L/	<u>(LL)</u>	for	<u>Roof Structure</u>
L/	<u>240</u>	L/	<u>360</u>	for	<u>Floor Structure</u>
L/	<u>240</u>	L/	<u>360</u>	for	
L/		L/		for	

Structural Specifications for Materials and Hardware

Structural Steel Specifications

Beams: ASTM A36
W Beams: ASTM A572 grade 50 with special requirements per AISC Technical Bulletin #3, dated March 1997
Columns: ASTM A36
Tubing: ASTM A500, Fy = 46 ksi.
Pipe: ASTM A53, Fy = 36 ksi.
Machine Bolts: ASTM A307
High-Strength Bolts: ASTM A325 or A490 (See Calculations).
Welds: E70XX Electrodes.
Steel Deck: per plans

Light Gauge Steel Framing:

14 & 16 gauge studs: ASTM A570, Grade 50.
18 & 20 gauge studs: ASTM A611, Grade C.
14 & 16 gauge track: ASTM A570, Grade 30 or 33.
18 & 20 gauge track: ASTM A611, Grade C.

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Foundation Criteria

Soils Report:

By: n/a
Date of Report: n/a

Foundation consists of concrete spread footings, and simply supported concrete walls.

Allowable Bearing Pressure Q_a : 1500 psf (assumed)
Minimum Footing Depth: 30 inches min or per local Building Code
Passive Pressure γ_p : 300 pct (assumed) $K_p = 1 + \sin(\phi) / 1 - \sin(\phi)$
At Rest Pressure γ_o : 55 pct (assumed) $K_o = 1 - \sin(\phi)$
Active Pressure: 35 pct (assumed) $K_a = 1 - \sin(\phi) / 1 + \sin(\phi)$
Friction Angle ϕ : 30 degrees (assumed)
Soil Weight: 120 pcf (assumed)
Coefficient of Friction: 0.4 alone, 0.3 with passive pressure (assumed).

Reinforcing Steel

ASTM A615 Grade 60
ASTM A706 Grade 60 Weldable Rebar

Welded Wire Fabric

ASTM A185

Minimum Required Concrete Strength

Footings: 3000 psi
Grade Beams: 3000 psi
Slab on Grade: 4000 psi
Walls: 3000 psi

(Strength) (Density)
Topping over Steel Deck: n/a psi n/a pcf
Topping over Plywood: n/a psi n/a pcf

Masonry Block

Units: ASTM C90 Medium Weight, Grade N-1.
Mortar: Type "S" conforming to UBC Table 24-A.
Grout: Compressive Strength = 1500 psi @ 28 days.

Wood Framing Specifications

Sawn Lumber: Douglas Fir Larch (North)
2 x 4 studs up to 8'0" long: Stud Grade
2 x 4 studs over 8'0" long: Grade #2
Other studs: Grade #2
Posts: Grade #1
Joists: Grade #2
Beams: Grade #1
Headers: Grade #2
Purlins: Grade #1
Sheathing: APA Rated OSB

Glue Laminated Beams (GLB)

Simple Spans: 24F-V4
Continuous Spans: 24F-V8 (Unless noted otherwise)

Framing Hardware

Connectors: Simpson Strong-Tie Connectors, USP, or Equivalent
Structural Nails: Common Wire Type (Unless otherwise noted).
Bolts in Wood: ASTM A307.

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Seismic Considerations

2009 IBC Earthquake loads - Site Ground Motion

Seismic Force Resisting System: Light framed walls with plywood shear panels

Seismic Design Category: D

Site considered Earthquake spectral response parameters

Ss = 1.78
S1 = 0.78
Site class = B
Fa = 1.00
Fv = 1.50
SMS = Fa Ss = 1.78 g
SM1 = Fv S1 = 1.17 g

SDS = 2/3 SMS = 1.187 g
SD1 = 2/3 SM1 = 0.780 g
R = 6

V = 1.2 SDS / R = 0.2373

V/1.4 = 0.17 from load combination from eq 16-17

Wind Controls

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By: Josh Jensen

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Wind Force Calculations

ASCE 7 SECTION 6.0 WIND LOADS

6.5.10 Velocity Pressure

$q_z = 0.00256K_zK_{zt}K_dV^2I$

Exposure Category = C

$K_z =$	0.85	0-15'
	0.9	20'
	0.94	25'
	0.98	30'
	1.04	40'

$K_d = 0.85$

$V = 90$ mph

$I = 1.00$

Eq. 6-15

Section 6.5.6

Vel. Press. Exp. Coef. Table 6-5

Exposure Coefficients		
	B	C
height	coeff	coeff
0-15	0.57	0.85
20	0.62	0.9
25	0.66	0.94
30	0.7	0.98
40	0.76	1.04

Wind Directionality Factor Table 6-4

Basic Wind Speed Fig. 6-1 (or per city building department)

Importance Factor Table 6-1

6.5.7.2 Topographic Factor

$K_{zt} = (1 + K_1K_2K_3)^2$

Hillside Condition? NO

$K_1 = -$

$K_2 = -$

$K_3 = -$

$K_{zt} = 1.0$

Eq. 6-3

Fig. 6-4

Fig. 6-4

Fig. 6-4

6.5.12.2.3 Flexible buildings

$p = qG_fC_p - q_i(GC_{pi})$

Eq. 6-17

$G = 0.85$

$C_p = 1.3$

$C_p = 1.0$

Roof Slope = 12 / 12

45 degrees

Sec. 6.5.8.2

Fig. 6-6

windward and leeward walls combined

Fig. 6-6

windward and leeward roofs combined

Note: Internal pressures cancel out for base shear effects.

Wind Pressure Table (For Base Shear Calculation)

Height z ft	q_z psf	P_{wall} psf	P_{roof} psf
0-15	15.0	16.6	9.0
20	15.9	17.5	9.5
25	16.6	18.3	10.0
30	17.3	19.1	10.4
40	18.3	20.3	11.0

Wall pressures act

normal to surface.

Roof pressures act

horizontal to projected

area.

Wind Force on Projected Surfaces of Structure

Diaphragm Force Per Lineal Foot

Location	avg. Ht. ft	Wind Press. psf
Roof	9	12
Upper Level	9	20
Main Level	9	20
Walkout Level	0	18

Upper = 198 plf

Main = 378 plf

Walkout = na plf

Wind Controls

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Project: Fronk Residence, Lot 13 Cedar Cove Estates
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Shear Wall Schedule

SHEARWALL SCHEDULE

Mark	Nailing Requirements		Sill Plate	Anchor Bolts		Notes	V _{allow} (plf)
	Edge in. o.c.	Field in. o.c.	8d Common In. o.c.	Diameter in.	Spacing in. o.c.		
SW1	6	12	6	1/2	32	1,2,3,4	260
SW2	4	12	4	1/2	32	1,2,3,4	350
SW3	3	12	3	1/2	32	1,2,3,4,5	490

- 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 panel edges shall be 3" nominal or (2) 2x nailed together with (2) rows of 16d common nails @ 12" o.c.

STAPLE EQUIVALENCY CHART

Common Nails		Equivalent Spacing of Staples (in.)		
		16 Ga.	15 Ga.	14 Ga.
8d @	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
10d @	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 from panel edge to staple.
 4. Table valid for shearwalls only.

Equivalent spacing for 8d common @ 4" & 12" o.c. is highlighted in schedule.

Anchor Bolt Design:

SW1/SW2 Bolt Spacing = 32 in
 Sill Plate Force = 250 plf
 Bolt Diameter = 0.5 in
 Shear/Bolt = 666.67 lbs
 Allowable bolt shear: 827 ok

- Notes:
1. See shearwall table for anchor bolt 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 embedded 7-inches minimum into foundation wall

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Project: Fronk Residence, Lot 13 Cedar Cove Estates

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Hold downs and Straps

Mark ∇	Anchor Requirement	Wall Ht. (ft.)	Vmax (plf)	Treq. (lbs.)	Tallow. (lbs.)	
A	STHD14 HOLDOWN	9.	393	3532.85	4430	OK
B	STHD14RJ HOLDOWN	9	393	3532.85	4430	OK
C	MST48 STRAP	9	393	3532.85	3695	OK

NOTES: Provide hardware at locations specified on plans and shear wall diagrams.
All anchors are Simpson Strong-Tie.
Install according to manufacturers specifications.

Roof Sheathing:

Provide 7/16 in or thicker APA rated panel w/ 8d common nails @ 6" Edge / 12" Field O.C. nailing. 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 @ 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"Edge/12" Field O.C. nailing.

Shear-Wall Forces

Controlling Lateral Force East-West = 378
Controlling Lateral Force North-South = 378

Building Width = 54
Building Depth = 54

East wall Lateral Force = 10,206
Total Shear Wall Length = 48.0
Shear Wall Force = 213

West wall Lateral Force = 10,206
Total Shear Wall Length = 35.0
Shear Wall Force = 292

South wall Lateral Force = 10,206
Total Shear Wall Length = 34.0
Shear Wall Force = 300

North wall Lateral Force = 10,206
Total Shear Wall Length = 26.0
Shear Wall Force = 393

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Project: Frnk Residence, Lot 13 Cedar Cove Estates

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Footing & Foundation Calculations

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

Continuous Footings

Mark	Load Type					Min Width Req'd (in)
	Roof (plf)	Floor (plf)	Wall (plf)	Fnd. (plf)	Total (plf)	
24"	880	880	270	800	2,830	22.64
18"		1,870	270	300	2,440	19.52

Spot Footings

Mark	Load Type					Width Req'd (in)	
	Roof (lb)	Floor (lb)	Wall (lb)	Fnd. (lb)	Total (lb)		
36"	10,450	4,800	0	2,400	17,650	41.16	use 42 X 42 footing
20"					0	0.00	use 0 X 0 footing
					0	0.00	
					0	0.00	
					0	0.00	
					0	0.00	

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 for ea. Foot of opening	18" Note 5
4'-0"		#4 @ 32"	(4) #4 Bars	above. (1) #4	3 ft		42" Note 5
6'-0"	Floor or Roof Diaphragm	#4 @ 24"	(5) #4 Bars	Bar ea. side	6 ft	width Min. 6"	5 ft Note 6
8'-0"			(6) #4 Bars	(1) #4 Bar	6 ft		5 ft Note 6
9'-0"			(7) #4 Bars	below Note 3	6 ft		5 ft Note 6
Over 9'-0"	Engineering Required						

Notes:

- 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.
- 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".
- 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.
- 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.
- Difference in grade from one side of the wall to the other.
- Difference in grade from the highest grade to the lowest grade on the perimeter of fndtn.
- ALL REBAR TO BE GRADE 60
- 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	
		L /	240
Live Load:	40	load (lb)	Max. Span (ft)
2x6	Spacing	55	11.03
		73	10.02
		110	8.18
2x8	Spacing	55	14.54
		73	12.69
		110	10.36
2x10	Spacing	55	17.91
		73	15.51
		110	12.66
2x12	Spacing	55	20.76
		73	17.98
		110	14.68

$$V_{max} = 2At_v/3 = w(L/2-d)$$

Max. span for Shear:
 $L_{shear} = 2d + 4AF_v/3w$

$$M_{max} = S_x F_b = wL^2/8$$

Max. span for Bending:
 $L_{bend} = (8S_x F_b/w)^{0.5}$

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

Max. span for Deflection:
 $L_{defl} = (384EI/5dw)^{0.333}$

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"

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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
F _c	850.00	psi	Ci:	1.00	Incising Factor	
F _c '	850.00	psi				

$F_c' = (F_c) * C_d * C_m * C_t * C_F * C_i * C_p$

$F_c * C_F = 850$ (When $F_c * C_F < 750$ psi $C_m = 1.0$)

F_{ce} = 504.1152263

K_{ce}

0.3
1.60E+06
108
3.5
0.8

psi

1.6

C_p = 0.495654238

Le

in

d

in

c

F_c' 421.306102 psi provided

Check

f_c 421.2743559 psi required

ok

Provide: 6 2X4 D.F. #2

2X4 COLUMNS				2X6 COLUMNS			
# 2X4'S	HEIGHT	MAX LOAD		# 2X6'S	HEIGHT	MAX LOAD	
2	8'	5,200	LB	2	8'	11,800	LB
3	8'	7,800	LB	3	8'	17,000	LB
4	8'	10,400	LB	4	8'	23,000	LB
5	8'	13,000	LB	5	8'	29,000	LB
# 2X4'S	HEIGHT	MAX LOAD		# 2X6'S	HEIGHT	MAX LOAD	
2	9'	4,400	LB	2	9'	11,200	LB
3	9'	6,600	LB	3	9'	16,000	LB
4	9'	8,800	LB	4	9'	22,000	LB
5	9'	11,000	LB	5	9'	28,000	LB
6	9'	13,200	LB				
7	9'	15,400	LB				
# 2X4'S	HEIGHT	MAX LOAD		# 2X6'S	HEIGHT	MAX LOAD	
2	10'	3,700	LB	2	10'	10,000	LB
3	10'	5,600	LB	3	10'	15,000	LB
4	10'	7,400	LB	4	10'	20,000	LB
5	10'	9,300	LB	5	10'	26,000	LB
6	10'	11,200	LB				

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* TRIBUTARY LENGTH = 1/2 TRUSS SPAN + EAWE

ROOF BEAM UNIFORM LOAD TABLE

BEAM	DEAD LOAD	SNOW LOAD	TRIB L	MAX SPAN	chk M	chk V	chk I	A	Sxx	Ixx	Fb	Fv	Mmax	Vmax	M	V	I reqd	E
(2) 2X6	15	40	12	3	ok	ok	ok	16.50	15.13	41.60	850.00	95.00	1,071.43	1,045.00	742.50	990.00	5.01	1.60E+06
	15	40	9	4	ok	ok	ok	16.50	15.13	41.60	850.00	95.00	1,071.43	1,045.00	990.00	990.00	8.91	1.60E+06
	15	40	6	5	ok	ok	ok	16.50	15.13	41.60	850.00	95.00	1,071.43	1,045.00	1,031.25	825.00	11.60	1.60E+06

BEAM	DEAD LOAD	SNOW LOAD	TRIB L	MAX SPAN	chk M	chk V	chk I	A	Sxx	Ixx	Fb	Fv	Mmax	Vmax	M	V	I reqd	E
(2) 2X8	15	40	16	3	ok	ok	ok	21.76	26.28	95.26	850.00	95.00	1,861.50	1,378.13	990.00	1,320.00	6.68	1.60E+06
	15	40	12	4	ok	ok	ok	21.76	26.28	95.26	850.00	95.00	1,861.50	1,378.13	1,320.00	1,320.00	11.88	1.60E+06
	15	40	10	5	ok	ok	ok	21.76	26.28	95.26	850.00	95.00	1,861.50	1,378.13	1,718.75	1,375.00	19.34	1.60E+06
	15	40	7	6	ok	ok	ok	21.76	26.28	95.26	850.00	95.00	1,861.50	1,378.13	1,792.50	1,155.00	23.39	1.60E+06

BEAM	DEAD LOAD	SNOW LOAD	TRIB L	MAX SPAN	chk M	chk V	chk I	A	Sxx	Ixx	Fb	Fv	Mallow	Vallow	M	V	I reqd	E
(2) 2X10	15	40	21	3	ok	ok	ok	27.76	42.78	197.86	850.00	95.00	3,030.25	1,758.13	1,299.38	1,732.50	8.77	1.60E+06
	15	40	15	4	ok	ok	ok	27.76	42.78	197.86	850.00	95.00	3,030.25	1,758.13	1,650.00	1,650.00	14.85	1.60E+06
	15	40	12	5	ok	ok	ok	27.76	42.78	197.86	850.00	95.00	3,030.25	1,758.13	2,062.50	1,650.00	23.20	1.60E+06
	15	40	10	6	ok	ok	ok	27.76	42.78	197.86	850.00	95.00	3,030.25	1,758.13	2,475.00	1,650.00	33.41	1.60E+06
	15	40	8	7	ok	ok	ok	27.76	42.78	197.86	850.00	95.00	3,030.25	1,758.13	2,695.00	1,540.00	42.45	1.60E+06
	15	40	6	8	ok	ok	ok	27.76	42.78	197.86	850.00	95.00	3,030.25	1,758.13	2,640.00	1,320.00	47.52	1.60E+06
	15	40	5	9	ok	ok	ok	27.76	42.78	197.86	850.00	95.00	3,030.25	1,758.13	2,784.38	1,237.50	56.38	1.60E+06
	15	40	3	11	ok	ok	ok	27.76	42.78	197.86	850.00	95.00	3,030.25	1,758.13	2,495.63	907.50	61.77	1.60E+06

BEAM	DEAD LOAD	SNOW LOAD	TRIB L	MAX SPAN	chk M	chk V	chk I	I	Mallow	Vallow	M	V	I reqd	E
(2) 9.5" LVL	15	40	45	5	ok	ok	ok	250.00	11,770	6,320	7,734.4	6,187.5	73.27	1,90E+06
	15	40	38	6	ok	ok	ok	250.00	11,770	6,320	9,406.0	6,270.0	106.92	1,90E+06
	15	40	32	7	ok	ok	ok	250.00	11,770	6,320	10,760.0	6,160.0	142.98	1,90E+06
	15	40	26	8	ok	ok	ok	250.00	11,770	6,320	11,440.0	5,720.0	173.41	1,90E+06
	15	40	21	9	ok	ok	ok	250.00	11,770	6,320	11,694.4	5,197.5	199.42	1,90E+06
	15	40	17	10	ok	ok	ok	250.00	11,770	6,320	11,687.5	4,675.0	221.45	1,90E+06
	15	40	14	11	ok	ok	ok	250.00	11,770	6,320	11,646.3	4,235.0	242.73	1,90E+06
	15	40	11	12	ok	ok	ok	250.00	11,770	6,320	10,890.0	3,630.0	247.60	1,90E+06
	15	40	8	13	ok	ok	ok	250.00	11,770	6,320	9,295.0	2,860.0	229.95	1,90E+06
	15	40	6	14	ok	ok	ok	250.00	11,770	6,320	8,085.0	2,310.0	214.46	1,90E+06

BEAM	DEAD LOAD	SNOW LOAD	TRIB L	MAX SPAN	chk M	chk V	chk I	I	Mallow	Vallow	M	V	I reqd	E
(2) 11-7/8" LVL	15	40	25	10	ok	ok	ok	488.00	17,850	7,900	17,187.5	6,875.0	325.66	1,90E+06
	15	40	21	11	ok	ok	ok	488.00	17,850	7,900	17,469.4	6,352.5	364.10	1,90E+06
	15	40	18	12	ok	ok	ok	488.00	17,850	7,900	17,820.0	5,940.0	405.17	1,90E+06
	15	40	15	13	ok	ok	ok	488.00	17,850	7,900	17,428.1	5,362.5	429.28	1,90E+06
	15	40	13	14	ok	ok	ok	488.00	17,850	7,900	17,517.5	5,005.0	464.67	1,90E+06
	15	40	11	15	ok	ok	ok	488.00	17,850	7,900	17,015.6	4,537.5	483.60	1,90E+06
	15	40	9	16	ok	ok	ok	488.00	17,850	7,900	15,840.0	3,860.0	480.20	1,90E+06
	15	40	7	17	ok	ok	ok	488.00	17,850	7,900	13,908.1	3,272.5	447.99	1,90E+06
	15	40	6	18	ok	ok	ok	488.00	17,850	7,900	13,365.0	2,970.0	455.82	1,90E+06

BEAM	DEAD LOAD	SNOW LOAD	TRIB L	MAX SPAN	chk M	chk V	chk I	I	Mallow	Vallow	M	V	I reqd	E
(2) 16" LVL	15	40	14	16.25	ok	ok	ok	1,194.00	31,110	10,840	25,416.0	6,256.3	1,173.81	1,90E+06

BEAM	DEAD LOAD	SNOW LOAD	TRIB L	MAX SPAN	chk M	chk V	chk I	I	Mallow	Vallow	M	V	I reqd	E
(3) 11-7/8" LVL	15	40	10	17.5	ok	ok	ok	732.00	26,775	11,850	21,054.7	4,812.5	698.13	1,90E+06

Project: Frank Residence, Lot 13 Cedar Cove Estates
 By: Josh Jensen
 Date: 12/18/2012

Silver Peak Engineering
 Project No.: khdi039
 Plan Name: 1039
 Sheet: 11

TRIBUTARY LENGTH = 1/2 JOIST SPAN

FLOOR BEAM UNIFORM LOAD TABLE

BEAM	DEAD LOAD	LIVE LOAD	TRIBUTARY	MAX SPAN	chk M	chk V	DL/240	LL/360	A	Sxx	Ixx	Fb	Fv	Mmax	Vmax	M	V	total load		Live Load	
																		I reqd	I reqd	I reqd	I reqd
(2) 2x8	15	40	16	3	ok	ok	ok	ok	21.76	26.28	95.26	850	95	1,862	1,378	990	1,320	6.68	6.68	7.29	1.60E+06
	15	40	12	4	ok	ok	ok	ok	21.76	26.28	95.26	850	95	1,862	1,378	1,320	1,320	11.88	11.88	12.96	1.60E+06
	15	40	10	5	ok	ok	ok	ok	21.76	26.28	95.26	850	95	1,862	1,378	1,719	1,375	19.34	19.34	21.09	1.60E+06

BEAM	DEAD LOAD	LIVE LOAD	TRIBUT L	MAX SPAN	chk M	chk V	DL/240	LL/360	A	Sxx	Ixx	Fb	Fv	Mallow	Vallow	M	V	I reqd		E	
																		I reqd	I reqd	E	E
(2) 2x10	15	40	21	3	ok	ok	ok	ok	27.76	42.78	197.86	850	95	3,030	1,758	1,299	1,733	8.77	8.77	9.57	1.60E+06
	15	40	15	4	ok	ok	ok	ok	27.76	42.78	197.86	850	95	3,030	1,758	1,650	1,650	14.85	14.85	16.20	1.60E+06
	15	40	12	5	ok	ok	ok	ok	27.76	42.78	197.86	850	95	3,030	1,758	2,063	1,650	23.20	23.20	25.31	1.60E+06
	15	40	4	10	ok	ok	ok	ok	27.76	42.78	197.86	850	95	3,030	1,758	2,750	1,100	61.87	61.87	67.50	1.60E+06

Timberstrand LSL (1.3E)	DEAD LOAD	LIVE LOAD	TRIBUT L	MAX SPAN	chk M	chk V	DL/240	LL/360	I	Mallow	Vallow	M	V	I reqd	I reqd	E	E
	15	40	15	5	ok	ok	ok	ok	49.00	2,686	4,620	2,578	2,063	35.70	36.94	1,30E+06	1,30E+06
	15	40	10	6	ok	ok	ok	ok	49.00	2,686	4,620	2,475	1,650	41.12	44.86	1,30E+06	1,30E+06
	15	40	6	7	ok	ok	ok	ok	49.00	2,686	4,620	2,021	1,155	39.18	42.74	1,30E+06	1,30E+06

Timberstrand LSL (1.3E)	DEAD LOAD	LIVE LOAD	TRIBUT L	MAX SPAN	chk M	chk V	DL/240	LL/360	I	Mallow	Vallow	M	V	I reqd	I reqd	E	E
	15	40	26	5	ok	ok	ok	ok	111	4,550	6,090	4,469	3,575	61.87	67.50	1,30E+06	1,30E+06
	15	40	18	6	ok	ok	ok	ok	111	4,550	6,090	4,455	2,970	74.02	80.75	1,30E+06	1,30E+06
	15	40	13	7	ok	ok	ok	ok	111	4,550	6,090	4,379	2,503	84.89	92.61	1,30E+06	1,30E+06
	15	40	7	9	ok	ok	ok	ok	111	4,550	6,090	3,898	1,733	97.15	105.98	1,30E+06	1,30E+06

Microlam LVL (1.9E)	DEAD LOAD	LIVE LOAD	TRIBUT L	MAX SPAN	chk M	chk V	DL/240	LL/360	I	Mallow	Vallow	M	V	I reqd	I reqd	E	E
	15	40	40	5	ok	ok	ok	ok	250	11,770	6,320	6,875	5,500	65.13	71.05	1,90E+06	1,90E+06
	15	40	38	6	ok	ok	ok	ok	250	11,770	6,320	9,405	6,270	106.92	116.64	1,90E+06	1,90E+06
	15	40	32	7	ok	ok	ok	ok	250	11,770	6,320	10,780	6,160	142.98	155.97	1,90E+06	1,90E+06
	15	40	26	8	ok	ok	ok	ok	250	11,770	6,320	11,440	5,720	173.41	189.17	1,90E+06	1,90E+06
	15	40	21	9	ok	ok	ok	ok	250	11,770	6,320	11,694	5,198	199.42	217.55	1,90E+06	1,90E+06
	15	40	17	10	ok	ok	ok	ok	250	11,770	6,320	11,688	4,675	221.45	241.58	1,90E+06	1,90E+06
	15	40	13	11	ok	ok	ok	ok	250	11,770	6,320	10,814	3,993	225.39	245.88	1,90E+06	1,90E+06
	15	40	10	12	ok	ok	ok	ok	250	11,770	6,320	9,900	3,300	225.09	245.56	1,90E+06	1,90E+06

BEAM	DEAD LOAD	LIVE LOAD	TRIBUT L	MAX SPAN	chk M	chk V	DL/240	LL/360	I	Mallow	Vallow	M	V	I reqd	I reqd	E	E
	15	40	25	10	ok	ok	ok	ok	488	17,850	7,900	17,188	6,875	325.66	355.26	1,90E+06	1,90E+06
	15	40	21	11	ok	ok	ok	ok	488	17,850	7,900	17,469	6,353	364.10	397.20	1,90E+06	1,90E+06
	15	40	18	12	ok	ok	ok	ok	488	17,850	7,900	17,820	5,940	405.17	442.00	1,90E+06	1,90E+06
	15	40	15	13	ok	ok	ok	ok	488	17,850	7,900	17,428	5,363	429.28	468.31	1,90E+06	1,90E+06
	15	40	12	14	ok	ok	ok	ok	488	17,850	7,900	16,170	4,620	428.93	467.92	1,90E+06	1,90E+06
	15	40	10	15	ok	ok	ok	ok	488	17,850	7,900	15,469	4,125	439.64	479.60	1,90E+06	1,90E+06
	15	40	8	16	ok	ok	ok	ok	488	17,850	7,900	14,080	3,520	426.84	465.65	1,90E+06	1,90E+06
	15	40	6	17	ok	ok	ok	ok	488	17,850	7,900	11,921	2,805	393.99	418.90	1,90E+06	1,90E+06
	15	40	5	18	ok	ok	ok	ok	488	17,850	7,900	11,138	2,475	379.85	414.38	1,90E+06	1,90E+06

BEAM	DEAD LOAD	LIVE LOAD	TRIBUT L	MAX SPAN	chk M	chk V	DL/240	LL/360	I	Mallow	Vallow	M	V	I reqd	I reqd	E	E
	15	40	13	17	ok	ok	ok	ok	976	35,700	15,800	25,829	6,078	831.97	907.61	1,90E+06	1,90E+06

SILVER PEAK ENGINEERING

Project: Fronk Residence, Lot 13 Cedar Cove Estates

Project No.: 1039

By: Josh Jensen

Plan Name: --

Date: 12/18/2012

Sheet: 12

Beam Description:		10'-6" upper floor beam					
	Callout	12	Design Forces			Check	
	No. Plys	3		M	20,465	lb-ft	
Loads	Dead Load (psf)	15	(plf)	V	7,796	lb	
	Live Load (psf)	40		405	Fb	1,990	psi
				1080	Fv	188	psi
Input	Cr =	1.00				ok	
	Cd =	1.00				ok	
	Tributary Length (ft)	27		Deflection			
	Beam Length (ft)	10.5		Total Load	0.29	in	
Beam Properties				Live Load	0.21	in	
Area	62.34	in ²	MIN L/360	LL/	594	ok	
Sx	123.39	in ³	MIN L/240	TL/	432	ok	
Ix	732.62	in ⁴					
E	1,900,000.00	psi	Use:	(3)	1-3/4" x 11-7/8" 1.9E Microllam LVL		
fb	2,603.71	psi					
fv	285.00	psi					

Beam Description:		20' beam over garage					
	Callout	91	Design Forces			Check	
	No. Plys	1		M	78,009	lb-ft	
Loads	Dead Load (psf)	15	(plf)	V	15,221	lb	
	Live Load (psf)	40		405	Fb	1,445	psi
				1080	Fv	141	psi
Input	Cr =	1.00				ok	
	Cd =	1.00				ok	
	Tributary Length (ft)	27		Deflection			
	Beam Length (ft)	20.5		Total Load	0.42	in	
Beam Properties				Live Load	0.31	in	
Area	162.00	in ²	MIN L/360	LL/	802	ok	
Sx	648.00	in ³	MIN L/240	TL/	583	ok	
Ix	7,776.00	in ⁴					
E	1,800,000.00	psi	Use:	(1)	6-3/4" x 24" Glulam		
fb	2,400.00	psi					
fv	165.00	psi					

