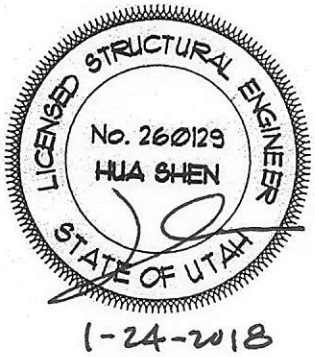
STRUCTURAL CALCULATIONS

ON

La Caille Restaurant Remodel
9565 S. Wasatch Blvd.
Sandy, Utah



SE Job No. 18042

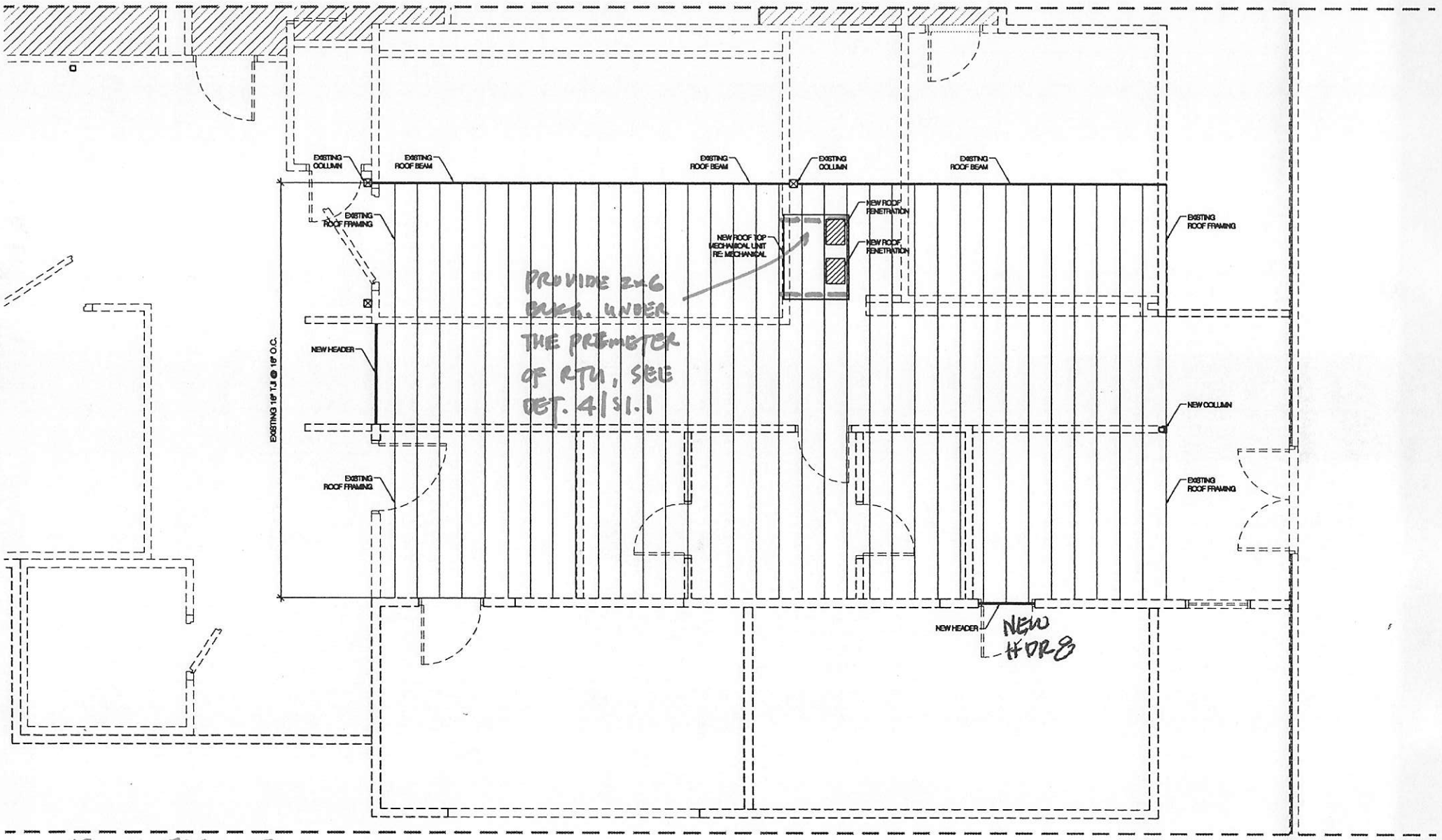
Jan., 2018

Shen Engineers, Inc.

2225 East Murray Holladay Rd.
Suite 208
Holladay, Utah 84117
Tel. 801-277-2625

100 South Alameda St.
Suite 463
Los Angeles, CA 90012
Tel. 858-699-2275

LA CAILLE RESTAURANT REMODEL



ROOF FRAMING

C1 FOUNDATION & FRAMING PLAN

SCALE: 1/4"=1'-0"

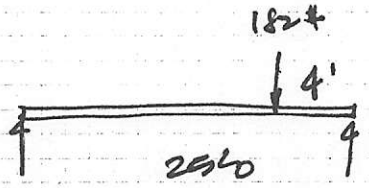
1/8"=1'-0

CHECK (E) ROOF W/ NEW RTU 1 550#. 4'x5'0

(E) ROOF JOISTS 16" TJI 360 @16"o.c. G.C. VERIFY

SPAN = 25'0

$P = \frac{550}{3} = 182\#$



(E) ROOF JOIST W/ NEW RTU1 OK.

DESIGN BLKG. 2x6. →

$w = \frac{550}{(4+5)2} = 31 plf$

2x6 @16" SPAN OK. w = 261 o

NEW HDR. SPAN = 4'0"

$w = 19 @ (\frac{20}{40}) = 1140$

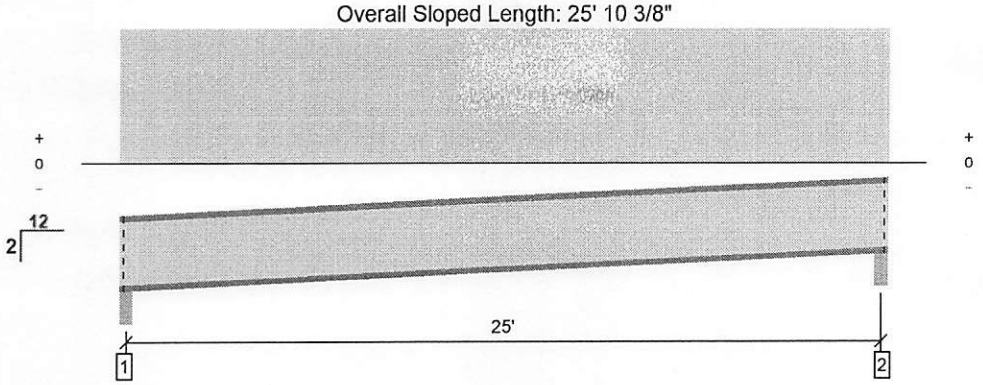
HDR8 GP w = 1430 OK

FORTE® MEMBER REPORT *Level, Roof: Joist* **PASSED**

1 piece(s) 16" TJI® 360 @ 16" OC

w/o PTY 3

Overall Sloped Length: 25' 10 3/8"



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)	931 @ 2 1/2"	1505 (3.50")	Passed (62%)	1.00	1.0 D + 1.0 S (All Spans)
Shear (lbs)	909 @ 3 1/2"	2190	Passed (42%)	1.00	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	5693 @ 12' 7 3/4"	8405	Passed (68%)	1.00	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.624 @ 12' 7 3/4"	0.841	Passed (L/485)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.861 @ 12' 7 3/4"	1.261	Passed (L/351)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2012
Design Methodology : ASD
Member Pitch: 2/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 4' 7" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 25' 8" o/c unless detailed otherwise.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Beveled Plate - SPF	3.50"	3.50"	1.75"	256	674	930	Blocking
2 - Beveled Plate - SPF	3.50"	3.50"	1.75"	256	674	930	Blocking

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

Loads	Location (Side)	Spacing	Dead (0.90)	Snow (1.00)	Comments
1 - Uniform (PSF)	0 to 25' 3 1/2"	16"	15.0	40.0	Roof

Weyerhaeuser Notes

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

Forte Software Operator	Job Notes
Hans Shen Shen Engineers (801) 865-8716 hshen801@gmail.com	

1/24/2018 1:00:00 PM
Forte v5.2, Design Engine: V6.6.0.14

FORTE® MEMBER REPORT *Level, Roof: Joist*

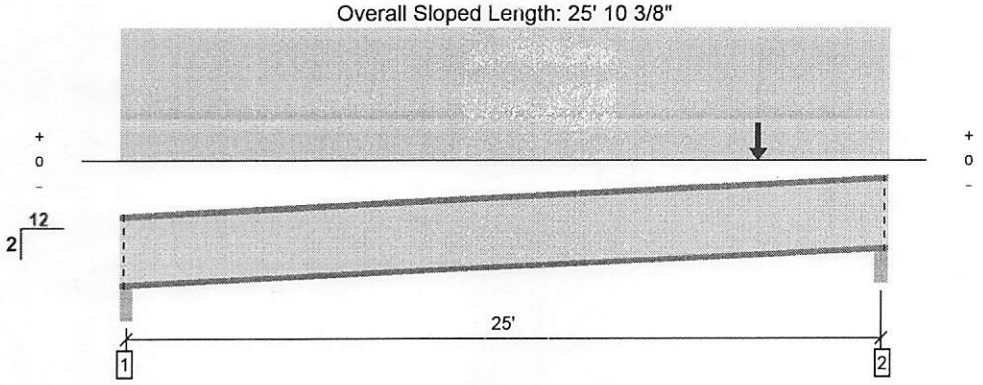
1 piece(s) 16" TJI® 360 @ 16" OC

PASSED

4

w/ RTU

Overall Sloped Length: 25' 10 3/8"



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)	1083 @ 25' 1"	1505 (3.50")	Passed (72%)	1.00	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1062 @ 25'	2190	Passed (48%)	1.00	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	6071 @ 13' 5/8"	8405	Passed (72%)	1.00	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.624 @ 12' 7 3/4"	0.841	Passed (L/485)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.925 @ 12' 9 1/8"	1.261	Passed (L/327)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2012
Design Methodology : ASD
Member Pitch: 2/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 4' 4" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 25' 8" o/c unless detailed otherwise.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Beveled Plate - SPF	3.50"	3.50"	1.75"	286	674	960	Blocking
2 - Beveled Plate - SPF	3.50"	3.50"	1.76"	409	674	1083	Blocking

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

Loads	Location (Side)	Spacing	Dead (0.90)	Snow (1.00)	Comments
1 - Uniform (PSF)	0 to 25' 3 1/2"	16"	15.0	40.0	Roof
2 - Point (lb)	21'	N/A	182	-	

Weyerhaeuser Notes

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

Forte Software Operator	Job Notes
Hans Shen Shen Engineers (801) 865-8716 hshen801@gmail.com	

1/24/2018 1:02:35 PM
Forte v5.2, Design Engine: V6.6.0.14

Project: La Caille

Seismic Bracing Design of the Mechanical Units.

RTU	1	Dimensions			Weight
		Length(ft)	Width(ft)	Height(ft)	Pounds
		5	4	4	550
		X-dir.	Y-dir.		
Wind:	26 psf	Seismic:	0.4 W		

Vx=	416 #	Mx=	832 #.ft
Vy=	520 #	My=	1040 #.ft

Seismic:

Vx=	220 #	Mx=	590 #.ft
Vy=	220 #	My=	590 #.ft

V & M Governs:

Vx=	416 #	Mx=	832 #.ft
Vy=	520 #	My=	1040 #.ft

Check Anchorage:

Tx=	0.1 #/each screw
Fvx=	23.1 #/each screw

Stress Check on each #8 Screws(@ 6" o.c.) 0.21 (VS 1.33) OK

Ty=	9.5 #/each screw
Fvy=	28.9 #/each screw

Stress Check on each #8 Screws(@ 6" o.c.) 0.35 (VS 1.33) OK

If the RTU to Curb connection is different from what we assumed.
Please inform Engineer-801.277.2625 for re-check or re-design

Project: La Caille

Roof Structure Gravity Design of the Mechanical Units.

RTU	1	Dimensions			Weight
		Length(ft)	Width(ft)	Height(ft)	Pounds
		5	4	4	550

Information of (e)Roof Structure

Joist Span	=	25	ft
Joist Space	=	1.33	ft
Roof DL	=	20	psf
Roof LL	=	40	psf

Total Joist Load w/o RTU = 1995 Pound

Space of RTU to (e)joists = 3

RTU Load on Each Joist = 183.3333 #

Percentage of RTU to Total Joist Load 9.19% see print out OK Since the unit is close to brg.

Design L-Angle: Span of L angle 1.33 W= 137.8446 plf

M= 0.030 K.FT S= 0.01524 in^3

I= 0.0050 in^4

L4x4x1/4	s=	1.05	in^3	Ok
	I=	3.04	in^4	
L5x3x1/4 LLV	s=	1.53	in^3	Ok
	I=	5.11	in^4	
L5x5x5/16	s=	2.04	in^3	Ok
	I=	7.42	in^4	
L6x4x5/16 LLV	s=	2.79	in^3	Ok
	I=	11.4	in^4	

P.T. Joists for Deck 2x6 DF#1 1 1/2 x 5 1/2

Allowable Uniform Loads (plf)

Fb= 920 psi Fv= 144 psi E= 1615 ksi Delta(TL)= L/ 240

Cd= 1 Cd= 1.15 Cd= 1.25 Delta(LL)= L/ 360

Cr= Cr= Cr=

Span(ft)	1.00	1.15	1.00	1.15	1.00	1.15	Max. Uniform Live Load
1.333	2610	3002	3002	3452	3263	3752	21008
5.5	153	176	176	203	192	220	299
6	129	148	148	170	161	185	230
7	95	109	109	125	118	136	145
8	72	83	83	96	91	104	97
9	57	66	66	76	72	82	68
10	46	53	53	61	58	67	50
11	38	44	44	51	48	55	37
12	32	37	37	43	40	43	29
13	27	32	32	34	34	34	23
14	24	27	27	27	27	27	18
15	21	22	22	22	22	22	15
16	18	18	18	18	18	18	12
17	15	15	15	15	15	15	10
18	13	13	13	13	13	13	9
19	11	11	11	11	11	11	7
20	9	9	9	9	9	9	6
21	8	8	8	8	8	8	5
22	7	7	7	7	7	7	5
23	6	6	6	6	6	6	4
24	5	5	5	5	5	5	4
25	5	5	5	5	5	5	3
26	4	4	4	4	4	4	3
27	4	4	4	4	4	4	3
28	3	3	3	3	3	3	2
29	3	3	3	3	3	3	2
30	3	3	3	3	3	3	2
31	3	3	3	3	3	3	2
32	2	2	2	2	2	2	2

Note: 1. Cr(Repetitive factor) is used only on Fb.

2. Cd(Duration factor) is used on both Fb and Fv.

HEADER DESIGN:

		4'-0"	5'-0"	6'-0"	7'-0"	8'-0"	10'-0"	12'-0"	14'-0"	16'-0"	18'-0"
HDR 1	(3)2x6	1017	688	478	351	270					
HDR 2	(3)2x8 / (3)1 3/4x5 1/2 LVL	1488	1092	766	562	431	276	168	105		
HDR 3	(3)2x10 / (3)1 3/4x7 1/4 LVL			1143		642	411	285	210	162	114
HDR 4	(3)2x12 / (3)1 3/4x9 1/2 LVL			1539		864	553	384	282	216	171
HDR 5	5 1/8x12 GLB / (3)1 3/4x11 7/8 LVL					3075	1968	1367	1004	721	506
HDR 6	(2)2x6	678	512	366	270	206					
HDR 7	(2)2x8 / (2)1 3/4x5 1/2 LVL	987	721	515	432	331	180	113	70		
HDR 8	(2)2x10 / (2)1 3/4x7 1/4 LVL	1430 ok		888		4926	3156	220	141	109	76
HDR 9	(2)2x12 / (2)1 3/4x9 1/2 LVL	2012		1026		664	424	294	216	145	115
HDR 10	3 1/8x12 / (2)1 3/4x11 7/8 LVL			2415		1583	1188	843	615	483	309

HEADER SCHEDULE

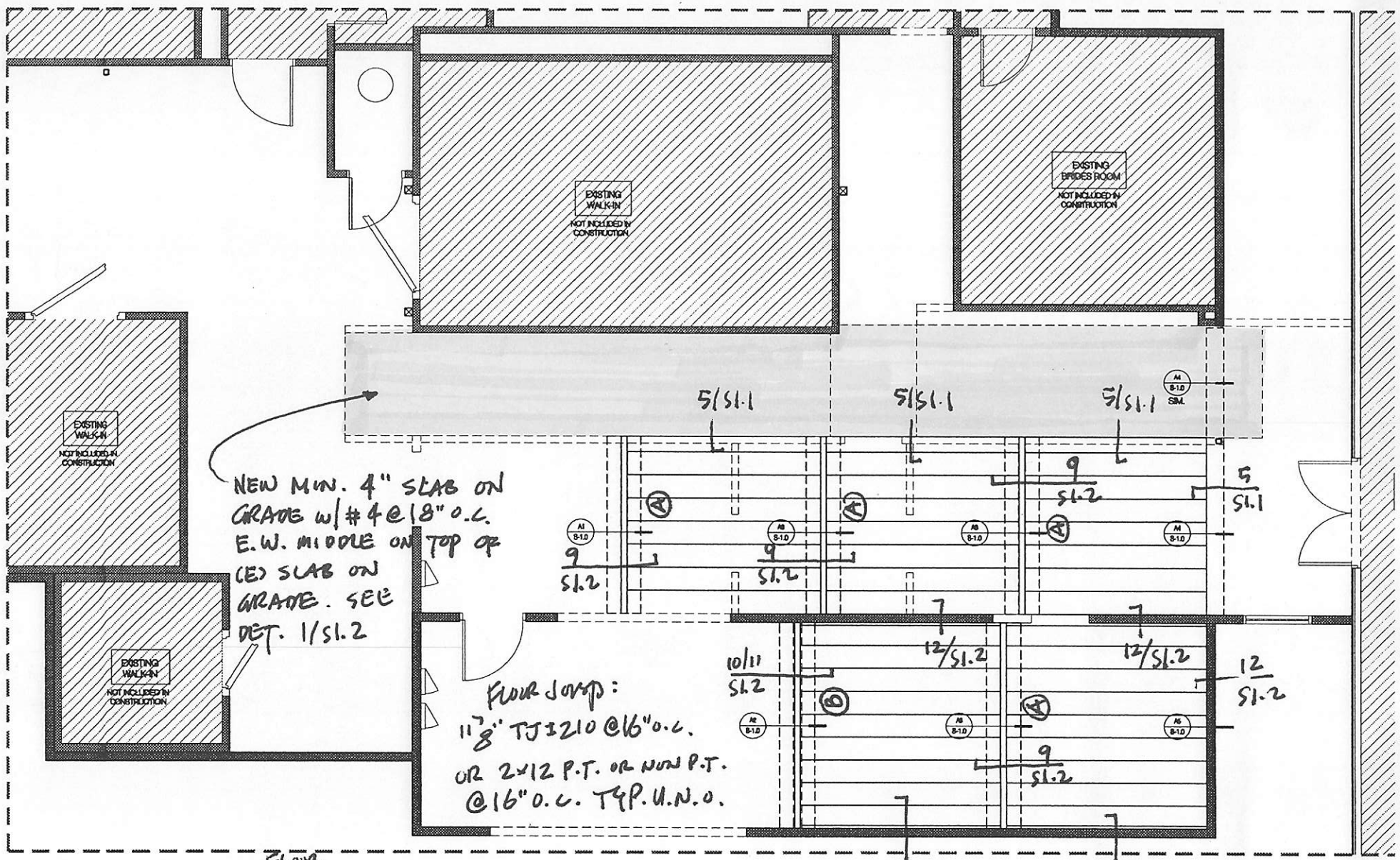
MARK	SIZE	END BRG.	REMARKS
HDR-1	(3)2x6	(2)2x6	
HDR2	(3)2x8	(2)2x6	or (3)1 3/4x5 1/2LVL
HDR-3	(3)2x10	(2)2x6	or (3)1 3/4x7 1/4LVL
HDR-4	(3)2x12	(3)2x6	or (3)1 3/4x9 1/2LVL
HDR-5	5 1/8x12 GLB	(3)2x6	or (3)1 3/4x11 7/8LVL
HDR-6	(2)2x6	(2)2x4	
HDR-7	(2)2x8	(2)2x4	or (2)1 3/4x5 1/2LVL
HDR-8	(2)2x10	(2)2x4	or (2)1 3/4x7 1/4LVL
HDR-9	(2)2x12	(3)2x4	or (2)1 3/4x9 1/2LVL
HDR-10	3 1/8x12 GLB	(3)2x4	or (2)1 3/4x11 7/8LVL

NOTES:
1. GLULAM BEAMS SHALL BE COMBINATION SYMBOL 24F-V4 FOR REGULAR BEAM AND 24F-V8 FOR CANTILEVERED BEAM TYPICAL.
2. ALL GLULAM BEAMS TO BE ZERO CAMBER BEAMS U.N.O.
3. ALL MULTI-MEMBER BEAMS & STUDS SHALL BE NAILED TOGETHER w/(2) ROWS 16d @ 6" O.C. BOTH SIDES TYPICAL.

NUMBER OF KING STUDS:
ONE KING STUD FOR OPNG. 2'-0" TO 5'-0"
TWO KING STUDS FOR OPNG. 5'-0" TO 10'-0"
THREE KING STUDS FOR OPNG. 10'-0" TO 15'-0"
FOUR KING STUDS FOR OPNG. 15'-0" TO 20'-0"

(B) 2×4 P.T BASE PL. w/ 2×4 WOOD STUDS @16"o.c. TO BEAR FLOOR JOISTS w/ 8"×12" GRADE BEAM (USE FOUNDATION INSULATION TO PROTECT FROST) OR 8"×30" GRADE BEAM – SEE DETAIL

(A) 2×4 P.T. BASE PL. w/ 2×4 STUDS @16"o.c. TO BEAR FLOOR JOISTS w/ 16"×8"× CONT. FTG. w/ (2) #4 CONT.



C1 FOUNDATION & FRAMING PLAN

SCALE: 1/4"=1'-0" 1/8"=1'-0

Floor Joists

DL = 15 psf

LL = 100 psf (PUBLIC AREA)

11 7/8" TJI 210 @ 16" o.c. ok FOR SPAN = 12'-0

2×12 @ 16" o.c. ok. FOR SPAN = 12'-0

FTG 1 W = 12@115 + 2@15 = 1410

16" × 8" FTG. G/F W = 150 × 1.33 = 200 # > 1410

2. W = 6@115 + 2@15 = 720 plf

8" GRADE BEAM G/F W = 0.67 × 1500 = 1000 plf > 720

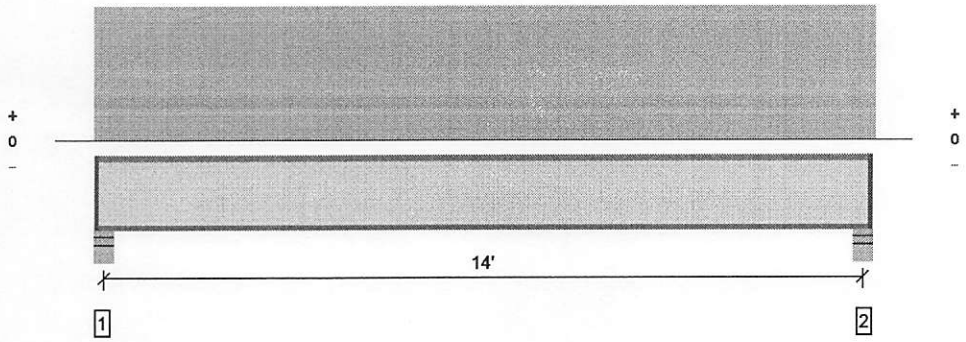
ok

FORTE® **MEMBER REPORT** *Level, Floor: Joist*

PASSED

1 piece(s) 11 7/8" TJI® 210 @ 16" OC

Overall Length: 14' 5 1/2"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1140 @ 4 1/2"	1460 (3.50")	Passed (78%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1083 @ 5 1/2"	1655	Passed (65%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	3758 @ 7' 2 3/4"	3795	Passed (99%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.330 @ 7' 2 3/4"	0.457	Passed (L/499)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.396 @ 7' 2 3/4"	0.685	Passed (L/416)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	52	40	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2012
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 3' 7" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 14' 3" o/c unless detailed otherwise.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	5.50"	4.25"	2.27"	193	964	1157	1 1/4" Rim Board
2 - Stud wall - SPF	5.50"	4.25"	2.27"	193	964	1157	1 1/4" Rim Board

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

Loads	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 14' 5 1/2"	16"	20.0	100.0	Residential - Living Areas

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

SUSTAINABLE FORESTRY INITIATIVE

Forte Software Operator	Job Notes
Hans Shen Shen Engineers (801) 865-8716 hshen801@gmail.com	

11/10/2017 12:40:03 PM
Forte v5.2, Design Engine: V6.6.0.14

2x12 DF#2 1 1/2 x 11 1/4

Allowable Uniform Loads (plf)

Fb= 850 psi Fv= 180 psi E= 1600 ksi Delta(TL)= L/ 600

Cd= 1 Cd= 1.15 Cd= 1.25 Delta(LL)= L/ 480

Cr= Cr= Cr=

Span(ft)	1.00	1.15	1.00	1.15	1.00	1.15	Max. Uniform Live Load
4	1121	1289	1289	1482	1401	1611	4944
5.5	593	682	682	784	741	852	1902
6	498	573	573	659	623	716	1465
7	366	421	421	484	457	526	922
8	280	322	322	371	350	403	618
9	221	255	255	293	277	318	434
10	179	206	206	237	224	253	316
11	148	170	170	190	185	190	238
12	125	143	143	146	146	146	183
13	106	115	115	115	115	115	144
14	91	92	92	92	92	92	115
15	75	75	75	75	75	75	94
16	62	62	62	62	62	62	77
17	52	52	52	52	52	52	64
18	43	43	43	43	43	43	54
19.5	34	34	34	34	34	34	43
20	32	32	32	32	32	32	40
21	27	27	27	27	27	27	34
22	24	24	24	24	24	24	30
23	21	21	21	21	21	21	26
24	18	18	18	18	18	18	23
25	16	16	16	16	16	16	20
26	14	14	14	14	14	14	18
27	13	13	13	13	13	13	16
28	12	12	12	12	12	12	14
29	10	10	10	10	10	10	13
30	9	9	9	9	9	9	12
31	8	8	8	8	8	8	11
32	8	8	8	8	8	8	10

Note: 1. Cr(Repetitive factor) is used only on Fb.

2. Cd(Duration factor) is used on both Fb and Fv.