



UTAH OFFICES
Sandy
Layton
St. George

Project Number: L0133-001-171

April 21, 2017

Brighton Land Holdings
1275 East Fort Union Blvd. Ste 210
Cottonwood Heights, UT 84047

ATTENTION: Thomas Godfrey

REFERENCE: **Brighton Recovery Campus, Building D (4925 S 900 E, SLC, UT)
Interior Demolition, New Wall Openings & Roof Top Unit**

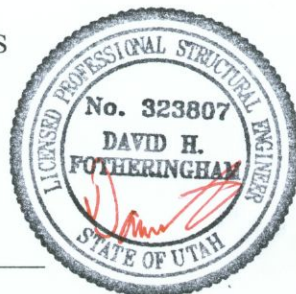
Mr. Godfrey:

Per your request, we have reviewed the architectural drawings for the above-referenced project. We also visited the above-referenced site on December 20, 2016. Please be advised as follows:

- 1) From our observation, the roof structure appeared to be manufactured wood roof trusses, bearing at the exterior perimeter walls and/or exterior overhang beams. In addition, there is an interior beam running the length of the building, supporting the roof trusses at or near their mid-span. See the enclosed "Demolition Plan," for approximate location of existing beams and posts. Interior partitions are non-bearing non-shear walls and can, therefore, be removed without adversely affecting the structure.
- 2) Three new openings may be constructed at exterior walls, as shown in the enclosed "Demolition Plan." The new headers, trimmers, and king studs are also specified on sheet 2. Supporting calculations are provided on sheets 5 and 6, enclosed. The contractor is responsible for shoring the existing roof framing during construction.
- 3) A new Make Up Air Unit and access platform may be placed on the existing roof, where indicated in the enclosed "Demolition Plan." See enclosed sheets 3 and 4 for details and sheets 7 and 8 for supporting calculations.

We hope this meets your needs. If you have any further questions regarding this matter, please call this office at your convenience.

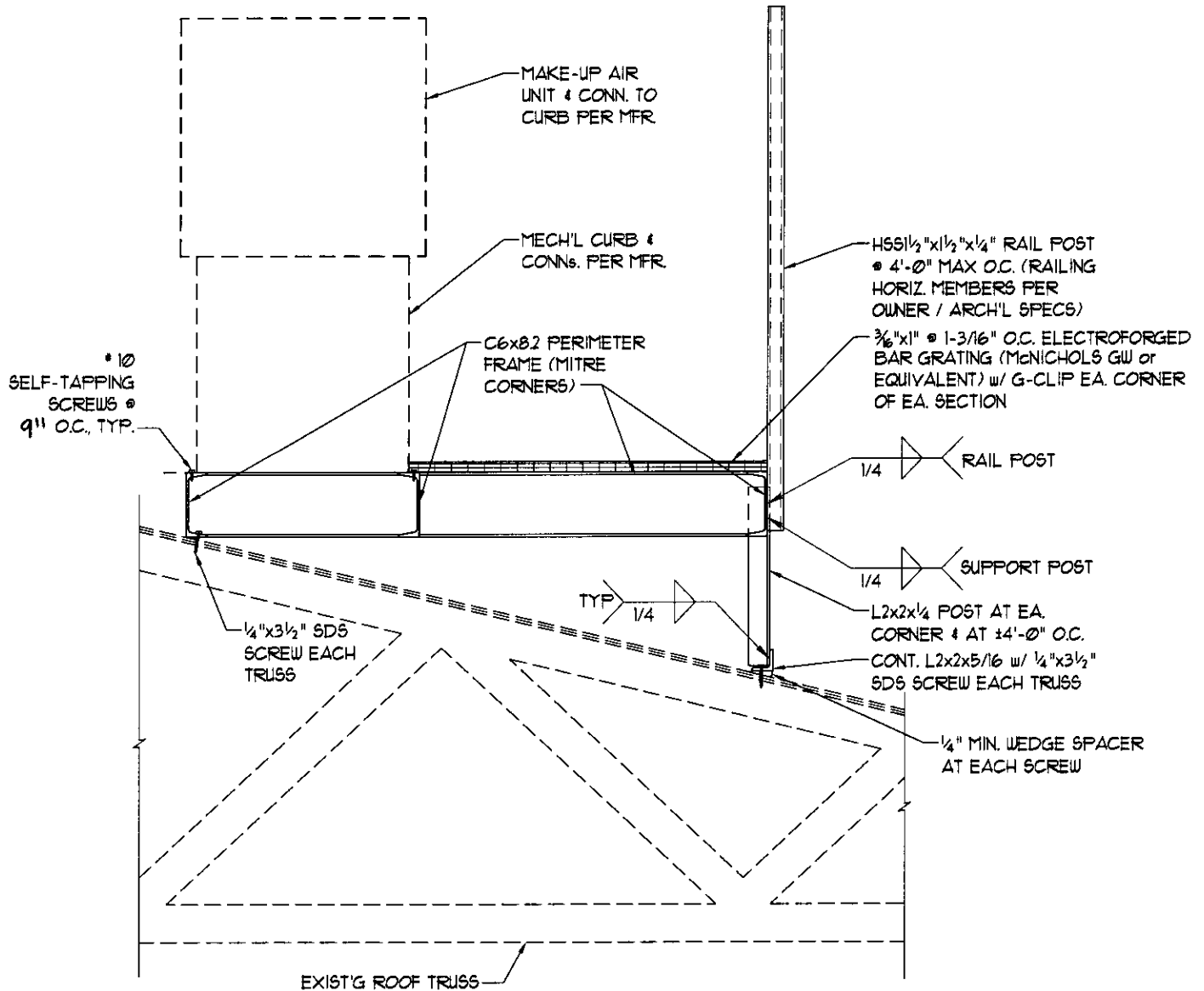
Very truly yours,
VECTOR STRUCTURAL ENGINEERS



4-21-17

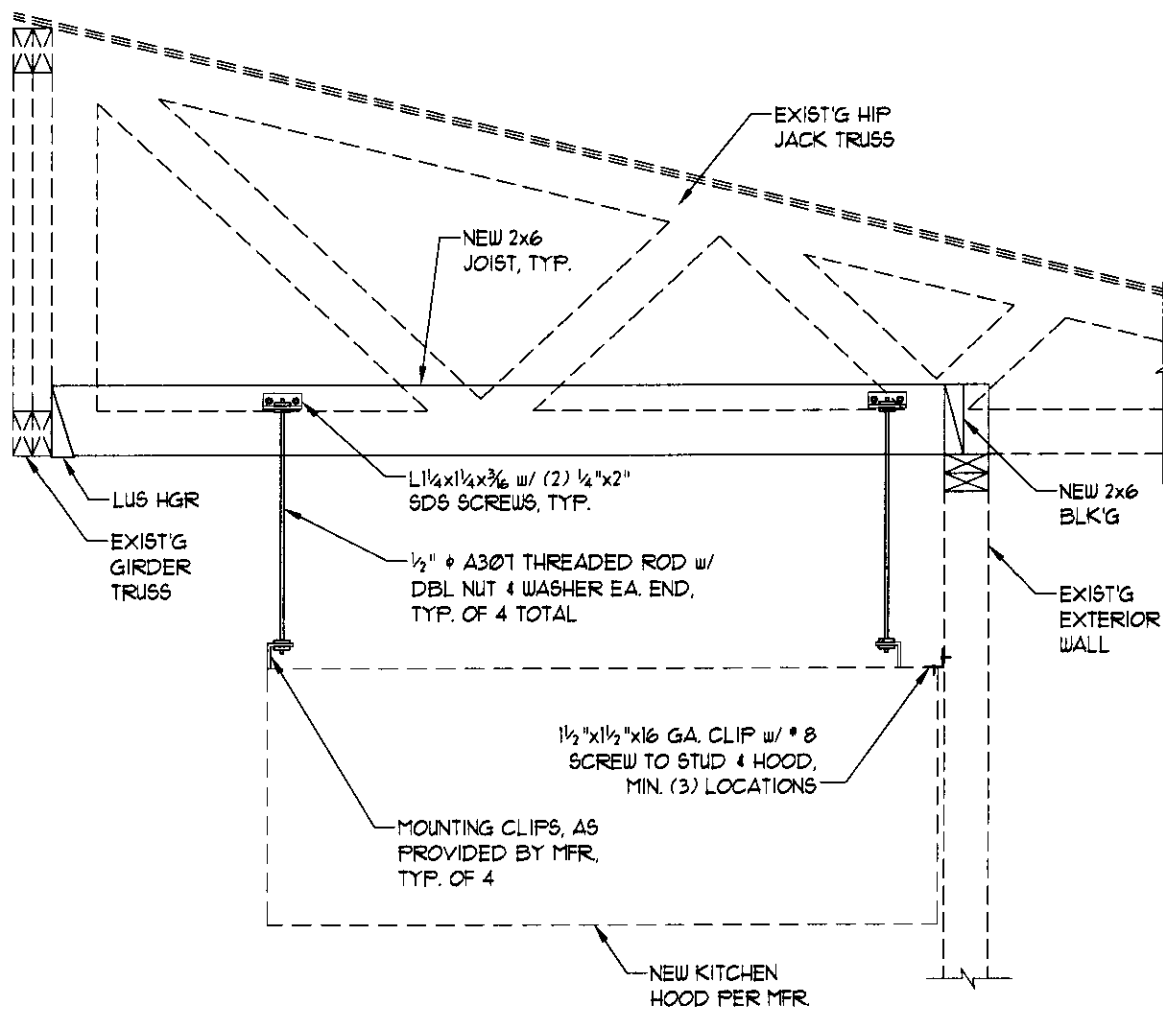
David H. Fotheringham, S.E.
Principal

Enclosures



(A) MAKE UP AIR SECTION

N.T.S.



B

KITCHEN HOOD SECTION

N.T.S.



JOB NO.: L0133-001-171

DATE: 3/17/2017

SHEET 5

DESIGNED: DHF

CHECKED: DHF

PROJECT: BRIGHTON RECOVERY CAMPUS

SUBJECT: GRAVITY LOADS

		Increase due to pitch	Original loading
ROOF			
ROOF PITCH/12	4		
ASPHALT SHINGLES	4.22	1.05	4.00
1/2" PLYWOOD	1.58	1.05	1.50
FRAMING	3.00		
INSULATION	2.00		
1/2" GYPSUM CLG.	2.20		
M, E & MISC	2.00		
	DL	15.00	
	LL	20.00	
	SNOW	30.00	
SNOW INCLUDED IN LATERAL		0.0	
2ND FLOOR (WHERE OCCURS)			
FLOOR COVERING	1.00		
3/4" T&G PLYWOOD	2.30		
MFG TRUSSES / FRAMING	2.00		
INSULATION	1.00		
1/2" GYPSUM CEILING	2.20		
PARTITION	2.00		
M, E & MISC.	1.50		
OTHER	0.00		
	DL	12.00	
	LL	40.00	
EXTERIOR WALLS			
STUCCO/SIDING	3.50		
2x FRAMING W/3 PLATES	1.30		
INSULATION	1.00		
1/2" GYPSUM	2.20		
1/2" PLYWOOD	1.50		
OTHER	0.50		
	DL	10.00	
OVERFILL			
ASPHALT SHINGLES	4.00		
1/2" PLYWOOD	1.50		
RAFTERS & MISC	3.50		
OTHER	0.00		
	DL	9.00	
	LL	20.00	

TYPICAL ROOF OVERBUILD MAX SPAN TABLE

Grade	Size	Spacing (ft)	L _{max} (ft)
DFL#2	2X4	2	5.80
DFL#2	2X6	2	8.80
DFL#2	2X8	2	10.80
DFL#2	2X10	2	13.20

C _r	C _D	C _{F,V}	M _{allow} (ft-lb)	V _{allow} (lb)	Ctrl'g factor
1.15	1.00	1.50	385	382	Moment
1.15	1.00	1.40	888	601	Moment
1.15	1.00	1.20	1322	792	Moment
1.15	1.00	1.10	1973	1011	Moment



JOB NO.: L0133-001-171
DATE: 3/17/2017

DESIGNED: DHF
CHECKED: DHF

PROJECT: BRIGHTON RECOVERY CAMPUS

SUBJECT: BEAMS

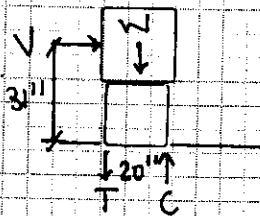
DESIGN LOADS:		Load Types: Snow ¹ , Live, Dead			
Label	Length 'L' (ft)	Roof Tribe (ft)	Floor Tribe (ft)	Wall Tribe (ft)	Add. 2'Sps to dead load? Yes 0.2287 = 2'Sps note: 'a' must be less than or equal to 'L/2'
EXISTG	27	37.5			
B1	3.5	8			
B2	5.5	8			
B4	4	8			

CRITERIA (L)			
A _{allow}			
D _{TL}	D _{LL}	D _{HL}	D _{DL}
240	360		
B	240	480	
C	600		800

Abbrev	GRADES	F _{base} (psi)	F _{top} (psi)	E _{ax} (psi)	θ (in/ft ³)
DFL#1	DFL#1		1,000	180	1,700,000
DFL#2	DFL#2		900	180	1,600,000
DFL#3	DFL#1 5X5 & LARGER		1,350	170	1,600,000
24F-V4	24F-V4		2,400	240	1,800,000
24F-V8	24F-V8		2,400	240	1,800,000
LVL (1.9)	LVL (1.9X108E)		2,600	285	1,900,000
LVL (2.0)	LVL (2.0X108E)		2,200	285	2,000,000
LSL	LSL (1.3X108E)		1,700	400	1,300,000
P8L	P8L (2.0X108E)		2,900	280	2,000,000
STL#6	GRADE 36 STEEL		21,600	14,400	29,000,000
STL#8	GRADE 48 STEEL		27,600	18,400	29,000,000
STL#50	GRADE 50 STEEL		30,000	20,000	29,000,000

Label	Length 'L' (ft)	Roof Trib (ft)	Floor Trib (ft)	Wall Trib (ft)	Add'l Live Load (plf)	Add'l Dead Load (plf)	Point Load From	React (A,B)	Dist 'a' (ft)	Point Live Load 'P _{LL} ' (lb)	Point Dead Load 'P _D ' (lb)	# PLIES	Grade	Size	"BM/HDR"	D CRITERIA	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇	C ₈	C ₉	C ₁₀	R _a (lb)	R _b (lb)	M _{max} (ft-lb)	V _{max} (lb)	V _{allow} (lb)	D _N (in)	D _{N,allow} (in)	D _{LL} (in)	D _{LL,allow} (in)	1.5DL GLB	Camb	Check
EXISTG	27	37.5																1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	24501	24501	166381				1.350		D 503		
B1	3.5	8		2								(3)	DFL#2	2X6		H		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	730	730	639	538	2970	0.014	0.175	0.005	0.117		0.27 M
B2	5.5	8		2								(3)	DFL#2	2X6		H		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1147	1147	1578	2382	958	0.096	0.275	0.033	0.183		0.68 M
B4	4	8		2			EXISTG	A	2	15188	9313	(3)	LVL (1.9)	1-34X14	H			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	13115	13115	25385	37158	12811	0.026	0.200	0.016	0.133		0.90 V

MUA UNIT



$$F_p = \frac{0.4 a_p S_{as} W_p}{(R_p / I_p)} \left(1 + 2 \frac{z}{h}\right) = \frac{0.4 (2.5) 1.0 W_p}{(2.5 / 1.0)} (1 + 2)$$

$$V = F_p = 1.2 W_p$$

$$W = 750 \text{ lbs}$$

$$V = 1.2 (750 \text{ lbs}) = 900 \text{ lbs}$$

$$T = 31 \text{ in} (900 \text{ lbs}) - 0.6 \cdot 10 \text{ in} (750 \text{ lbs}) = 1170 \text{ lbs}$$

$$C = \frac{31 \text{ in} (900 \text{ lbs}) + 10 \text{ in} (750 \text{ lbs})}{20 \text{ in}} = 1770 \text{ lbs}$$

CURB CONNECTION:

$$t = 1170 \text{ lbs} \cdot \frac{75'}{9'} = 98 \text{ lbs per } 9'$$

SELECT #10 SCREW @ 9" O.C.

$$(T_{allow} = 109 \text{ lbs})$$

FRAME CONNECTION:

$$T = 1170 \text{ lbs} \left(\frac{20 \text{ in}}{48 \text{ in}} \right) = 490 \text{ lbs}$$

$$t = 490 \text{ lbs} \cdot \frac{24'}{9'} = 108 \text{ lbs per } 24'$$

SELECT 1/4" SDS SCREW @ 24" O.C.

PLATFORM RAIL: (WORST CASE)

$$\text{SPAN} = 14'$$

$$\text{LOAD} = 1770 \text{ lbs}$$

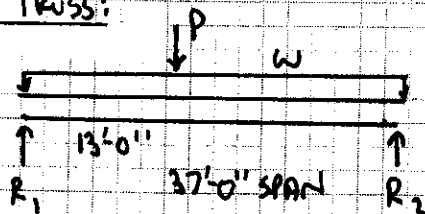
$$M = 1770 \text{ lbs} \left(\frac{14'}{4} \right) = 1770 \text{ ft} \cdot \text{lb} = 21,240 \text{ lb} \cdot \text{in}$$

$$S_{req'd} = \frac{21,240 \text{ lb} \cdot \text{in}}{0.6 (36,000 \text{ psi})} = 0.98 \text{ in}^3$$

SELECT C6x8.2 (S=4.38 in³)

EXIST'G ROOF TRUSSES

TYPICAL TRUSS:



ORIGINAL LOADING:

$$W = 2' (15 + 30) \text{ psf} = 90 \text{ plf}$$

$$M = \frac{1}{8} 90 \text{ plf} (37')^2 = 15401 \text{ ft}\cdot\text{lb}$$

ADOL LOADING:

$$P = 200 \text{ lbs} \left(\frac{2'}{14'} \right) + 750 \text{ lbs} \left(\frac{2'}{9'} \right) = 195 \text{ lbs}$$

$$R_1 = 195 \text{ lbs} \left(\frac{24'}{37'} \right) = 126 \text{ lbs}$$

$$M = 13' (126 \text{ lbs}) = 1644 \text{ ft}\cdot\text{lb}$$

$$\text{INCREASE} = \frac{1644}{15401} = 0.10$$

∴ 10% INCREASE OK