

Structural Checksheet Response

Permit #: 13-137435-000-00-CO

Date: 19 JUNE 2013

Customer name and phone number: STEVE FOSLER 503 241-9335

Note: Please number each change in the '# column. Use as many lines as necessary to describe your changes. Indicate which reviewer's checksheet you are responding to and the item your change addresses. If the item is not in response to a checksheet, write **customer** in the last column.

#	Description of changes, revisions, additions, etc.	Checksheet and item #
C	see attached 4 sheets (8 1/2 x 11)	

(for office use only)

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Miklos Ugka;

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Vancouver Apartments

Structural Checksheet/Plan Review Response

June 19th, 2013

Miklos Ugrai
City of Portland
Bureau of Development Services
1900 SW Fourth Avenue, Suite 5000
Portland, Oregon 97201

Re: Vancouver Apartments – 3724 N. Vancouver Avenue
Permit # 13-137435-000-00-CO
Second Checksheet

Dear: Mr. Ugrai,

The following is our responses to your Structural Checksheet dated June 18, 2013:

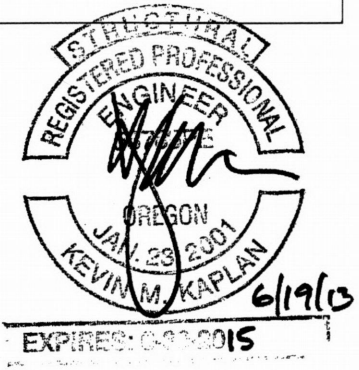
<u>Item</u>	<u>Reference</u>	<u>Response</u>
6	Sheet S1.2 & Detail 13/S4.0	The joist hanger located along grid "I" and detailed in detail 13/S4.0 of the design drawings is a Simpson 'HHUS410". Each hanger's bottom is down some 2" ± from the top of the double top plate. See attached calculations to the adequate capacity of the hanger in lieu of these 2 inches and of the wall stud's capacity.

If you have any further questions, please feel free to call.

Submitted by:

VLMK Consulting Engineers

Jim Riemenschneider, P.E.
Senior Project Engineer

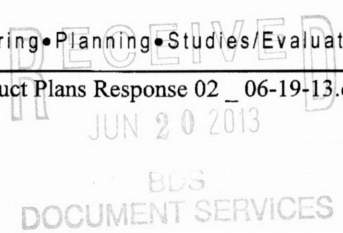


Kevin Kaplan, P.E., S.E.
Principal

Attachments:

- Additional calculations, PR-1-2, PR-2-2, and PR3-2.

Structural Engineering • Civil Engineering • Industrial Engineering • Planning • Studies/Evaluations • Entitlement



13-137435-00

ITEM (G) JUNE 18, 2013 PLANS REVIEW 13-137435-00-00-00

PLANS RESPONSE - 3 1/2 x 11 7/8" LSL @ 16" O.C.
@ GRID 'I' CONNECTION
REVIEW

DL + SL MAX

$$R_{\text{EACH GREEN ROOF JOIST 16" O.C.}} = 3.01 \text{ K (PER SHEET 'E-3' OF CALCULATIONS)}$$

(2.61^{DL} K, .137^{LL} K, 0.4^{SL} K)

$$R_{\text{EACH STUD FROM ROOF 16" O.C.}} \approx \left[\left(\frac{12.67}{2} \right) \times (25 + 15) + (.6 \times 1/2 \times 9.5 \times 4 \text{ (PSF)}) \right] \times \frac{16}{12}$$
$$= [0.253 \text{ K} + .12 \text{ K}] \times 1.33$$
$$= 0.49 \text{ K (}.127 \text{ K}^{\text{LL}}, .363 \text{ K}^{\text{SL}})$$

$$R_{\text{EACH FLR JOIST}} = \left[(12.67/2) \times (80 \text{ CORRIDOR} + 15) \right] \times 16/12 = 0.60 \text{ K} \times 1.33$$
$$= 0.80 \text{ K (.127 K}^{\text{DL}}, .676 \text{ K}^{\text{LL}})$$

$$\text{MAX.} = \text{DL} + \text{SL} \quad [\text{NOT DL} + .75(\text{SL} + \text{LL})]$$
$$= 3.63 \text{ KIPS EVERY 16"}$$
$$= 2720 \text{ PLF}$$

SEE NEXT SHEET FOR 2x STUD CAPACITY VERIFICATION - OK

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Job Vancouver Apmts
Job No. 20130048
Date June, 2013
Sheet No. PR-2-2

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Wood Stud Wall Design - Interior Stud on Grid "I" supporting green roof.

Based on the 2009 International Building Code and the 2005 NDS

Design Input

$l_u =$	9	ft	stud unbraced length	
$s =$	16	in	stud spacing	
	DF #2		stud wood grade	type = sawn lumber
	2 x 6		stud size	slenderness ratio, $K_e l_u / d = 20 \leq 50$ OK
	both sides		sheathing	(assumes pin-pin end conditions)
	HF #2		sill/sole plate wood grade	
$w =$	2720	plf	vertical load	Including Live, Snow or Const.? S $C_d = 1.15$
$e =$	1	in	eccentricity of vertical load (recommend 1/6 stud depth minimum)	
$P =$	5	psf	out-of-plane load	Wind, Earthquake or Live? L $C_d = 1.00$
$L /$	180		allowable deflection	

Design Values and Adjustment Factors (Note: $C_{fu} = C_i = 1.0$)

$C_M \times C_t = 1.00$

$F_b =$	900	psi	allowable bending stress	
$F_c =$	1,350	psi	allowable compressive stress parallel to grain	
$F_{c,perp} =$	405	psi	allowable compressive stress perpendicular to grain	
$E =$	1,600,000	psi	modulus of elasticity	
$E_{min} =$	580,000	psi	modulus of elasticity	
$C_D =$	1.15		load duration factor	NDS Table 2.3.2
$C_r =$	1.15		repetitive use factor	NDS Section 4.3.9
$C_{F,b} =$	1.30		size factor for bending	NDS Table 4A
$C_{F,c} =$	1.10		size factor for compression	NDS Table 4A
$C_V =$	1.00		N/A for sawn lumber	
$C_L =$	1.00		beam stability factor	NDS Equation 3.3-6
$C_p =$	0.57		column stability factor	NDS Equation 3.7-1
$C_b =$	1.25		bearing area factor	NDS Equation 3.10-2

Wood Stud Wall Design

Stud Compression

$f_c =$	440	psi	actual compressive stress	
$F'_c =$	976	psi	adjusted allowable compressive stress	OK

Out-of-Plane Stud Bending

$f_b =$	107	psi	actual bending stress	
$F'_b =$	1547	psi	adjusted allowable bending stress	OK

Interaction Equation (per NDS Section 15.4.1)

	0.20		compression term	
	0.63		bending term	
I.E. =	0.83	≤ 1.0		NDS Equation 15.4-1 OK

Out-of-Plane Stud Deflection (neglects sheathing)

$\Delta_1 =$	0.03	in	deflection due to out-of-plane load	$\Delta_1 = (5wL^4)/(384EI)$, where $w = P*s$
$\Delta_2 =$	0.08	in	deflection due to vertical load ecc.	$\Delta_2 = (3ML^2)/(48EI)$, where $M = P*e$
$\Delta_3 =$	0.01	in	deflection due to PA effects	$\Delta_3 = (3ML^2)/(48EI)$, where $M = P*\Delta_{1+2}$
$\Delta_{total} =$	0.12	in	total service deflection	
$\Delta_{allow} =$	0.60	in	allowable deflection	OK

Sill/Sole Plate Bearing

$f_{c,perp} =$	440	psi	actual compression stress perpendicular to grain	
$F'_{c,perp} =$	506	psi	adjusted allowable compressive stress perpendicular to grain	OK

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ITEM 6 (CONT)

□ HANGER CAPACITY (PER DESIGN DETAIL 13/SA.0)

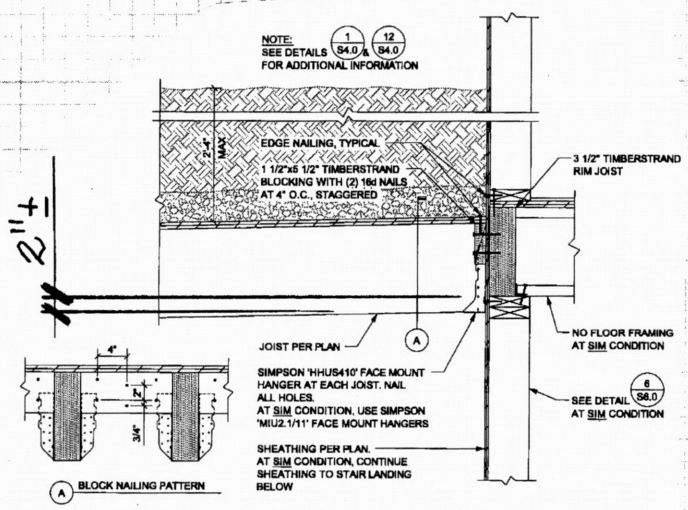
- SIMPSON 'HHUSA10'

□ MAX APPLIED LOAD = 3.01 K
 (F-3 OF ORIG. CALCULATIONS)

ICC ESR-2549

□ FULL CAPACITY OF HHUSA10, SNOW, = 6.385K w/c

30 NAILS TO HDR + 10 NAILS THRU JOIST TO HDR. - 9" TALL HANGER



13 SA.0 FLOOR FRAMING DETAIL AT DECK/PLANTER 1" = 1'-0"

→ ADJUSTED CAPACITY $\approx \frac{9"-2"}{9"} \times \text{FULL} \approx 77\% \text{ FULL}$

(OR)

$\approx \left(\frac{30-4}{30} + \frac{10-4}{10} \right) \left(\frac{1}{2} \right) \times \text{FULL} \approx 73\% \text{ FULL}$

CONSERVATIVE

ASSUME 50% FULL = 3.19K \geq MAX LOAD

∴ HANGER ACCEPTABLE

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