



Structural Calculations For:

6829 SE 32nd ST

Mercer Island – Masuda Remodel

Supplemental Calculations for Permit

Review – 5/28/21 Comments



Prepared for: Mercer Builders

Job #: 11641-2020-05

Date: June 4, 2021

Project Engineer: Scott Wible

ORIGINAL CALC, FOR REFERENCE.

LATERAL CALCS

ROOF DIAPH / UPPER WALLS

$F_{x \text{ ROOF}} = 8.7K \text{ ASD}$

TRIB AREA B_j % \Rightarrow

(2)

27%

$V = 2.35K$

$l_{wall} = (2) \times 2.67 \text{ Ft}$

$v = 0.44 \text{ pIF}$

$\frac{h}{b} = \frac{8.83'}{2.67} = 3.31 \text{ N.A.}$

$RED = 1.25 - 0.125 \times 3.31 = 0.836$

$WZ \text{ CAP} = 595 \text{ pIF} \times 0.836 = 497 \text{ pIF} > 391 \text{ pIF}$

USE WZ SHEAR WALLS / USE W6 ✓

O.T. $440 \text{ pIF} \times 8.83' = 3885 \#$

USE HDU4

(4)

46.9%

$4.08K \text{ IPS}$

22 Ft

186 pIF

N.A.

$186 \times 8.83 = 1642 \#$

DL RESIST:

$(4' \times 9' \times 10 \text{ pSF} + 9' \times 2' \times 15 \text{ pSF}) \times 0.6 = 378 \#$

$\rightarrow \text{NET UP } 1264 \# \text{ OK}$

UPPER DIAPH / MAIN WALLS

$F_{x \text{ UPPER}} = 6 \text{ KIPS}$

(2)

$V_{\text{ROOF}} = 2.35K$

$\% = 26\%$

$V = 2.35K + 0.26 \times 6 = 3.91 \text{ kIPS}$

$l_{\text{wall}} = 8.25 \text{ Ft}$

$v = 474 \text{ pIF}$

WZ CAPACITY:

$\frac{h}{b} = \frac{8.83'}{2.67} = 3.31$

$RED = 1.25 - 0.125 \times 3.31 = 0.84$

$WZ_c = 0.84 \times 595 = 498 \text{ pIF} \checkmark \text{ OK}$

USE WZ

O.T. REGULAR

$= 498 \times 8.83' = 4.4 \text{ kIPS}$

CHECK OT @ STACKED WALLS

$= 4.4 \text{ kIPS} + 3.9 \text{ kIPS}$

$= 8.3 \text{ kIPS}$

HDU 11 CAPACITY

$= 9.335K$
 $OCR = 0.9 \checkmark \text{ OK}$

(4)

$4.08K$

49%

$4.08K + 0.49 \times 6 = 7.02 \text{ kIPS}$

$= 16.5 \text{ Ft}$

425 pIF

W3 CAPACITY

$= 456 \text{ pIF} \checkmark \text{ OK}$

$OT = 425 \text{ pIF} \times 4.83' = 3.75 \text{ kIPS}$

(E) HDU 8 WAY GOOD



MASUDA CALCS

PROJECT

10/29/20

DATE

PROJ. # SLW

DESIGN

SHEET

2124 Third Ave, Suite 100, Seattle, WA 98121 | 206.443.6212
934 Broadway, Suite 100, Tacoma, WA 98402 | 253.284.9470

ssfengineers.com

SWENSON SAY FAGET

COMMENT ON PAGE 15:

GRID 2 LATERAL CALCULATIONS CONT'D

MAIN FLOOR DIAPHRAGM/WALLS @ FNDN

$$V_{\text{ABOVE}} = 3.91 \text{ kips}$$

$$V_{\text{THIS LEVEL}} = \frac{1.9 \text{ k}}{2} = 0.95 \text{ kips}$$

$$V_{\text{TOTAL}} = 3.91 \text{ k} + 0.95 \text{ k} = 4.86 \text{ kips}$$

$$L_{\text{wall}} = 3'-6" + 2'-8" + 2'-8" + 3'-11" = 12.75 \text{ ft}$$

$$V_a = \frac{4.86 \text{ kips} \times 1000 \text{ lbs/kip}}{12.75 \text{ ft}} = 381 \text{ plf}$$

$$W2 \text{ CAPACITY (REDUCED)} = 498 \text{ plf} > 381 \text{ plf} \checkmark \text{OK}$$

$$O.T. = 381 \text{ plf} \times 9.83 \text{ ft} = 3364 \text{ plf}$$

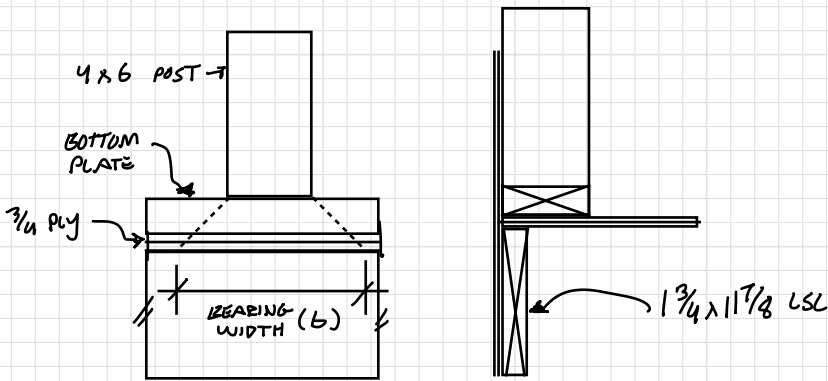
(E) HDU 11 OR BY INSP. $\checkmark \checkmark$ OK



MASUDA REMODEL
PROJECT

6/4/21
DATE
PROJ. #
DESIGN
SHEET

PAGE 17 COMMENT: How post is picked up:



$$b = 3\frac{1}{2} + 2 \times (1\frac{1}{2} + \frac{3}{4}) = 8''$$

$$\text{BEARING AREA} = 1\frac{3}{4}'' \times 8'' = 14 \text{ in}^2$$

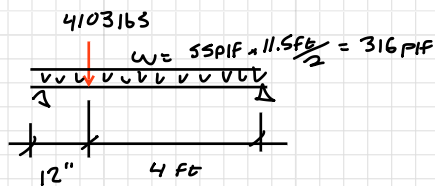
$$\text{POST TRIB AREA} = \left(\frac{11'-6''}{2} + 2'-0'' \right) \times \frac{26.5 \text{ SF}}{2} = 103 \text{ SF}$$

$$P_a = 40 \text{ psf (DL + SL)} \times 103 \text{ SF} = 4103 \text{ lbs}$$

$$F_{CL} = \frac{4103 \text{ lbs}}{14 \text{ in}^2} = 293 \text{ psi} \quad \checkmark \text{ OK}$$

CHECK RIM FOR BENDING / SHEAR

NOTE: THERE IS LIKELY A HEADER IN THE WALL BELOW,
BUT FOR SIMPLICITY ASSUME RIM SUPPORTS JOISTS
AS WELL



$$M = 3914 \text{ lb-ft}$$

$$V = 4072 \text{ lbs}$$

$$F_b = 1,142 \text{ psi} < 2325 \text{ psi} \quad \checkmark \text{ OK}$$

$$F_v = 271 \text{ psi} < 310 \text{ psi} \quad \checkmark \text{ OK}$$

1 3/4" x 11 7/8" RIM WORKS ✓