Yu Residence Addition

Structural Calculations

9004 S.E. 60th Street
Mercer Island, WA 98040
King County

Sidesway Project No. 22076.01

Prepared By:

SIDESWAY ENGINEERING

09/14/22

TABLE OF CONTENTS

Project Description

Sidesway Engineering was retained by the homeowner to perform analysis and design as necessary to obtain a building permit for the proposed single-story addition to the existing single-family residence located at 9004 S.E. 60th Street on Mercer Island.

The addition converts the existing garage into livable space and adds an approximately 564ft^2 garage at the southwest corner of the residence. The roof will be conventionally wood framed with pre-manufactured trusses spanning between exterior stud walls. The walls bear atop a continuous exterior footing at frost depth with an interior slab on grade. The existing garage floor will be raised on furring strips and sheathed to create an 8' ceiling height. The lateral force resisting system consists of a sheathed roof diaphragm spanning to various wood stud shear walls around the perimeter of the house.

All existing framing and dimensions were provided to us from the PFW Architecture plans or were obtained during a site visit performed by our firm.

Scope of Work

Provide gravity and lateral calculations for the proposed garage addition as required to obtain a building permit. Redline structural framing requirements onto the architectural plan set and provide structural notes and typical framing details as necessary to obtain a building permit.

Design Criteria

2018 International Building Code (IBC)
2018 International Existing Building Code (IEBC)
ASCE 7-16 Minimum Design Loads for Buildings and Other Structures
Applicable Material Reference Standards (ACI, AISC, NDS)

This is a Risk Category II structure designed for the following loads:

Dead Loads:	12psf (roof), 9psf (exterior/interior walls)
Snow Load:	25psf
Wind Load:	100mph, Exposure 'B', K_{ZT} = 1.3 (refer to wind loads)
Seismic Load:	R = 6.5 (wood s.w.), Site Class D, SDC D (refer to seismic loads)

Project Summary

The proposed addition to the single-family residence as designed in the following calculations conforms to the 2018 IBC and IEBC. Refer to the calculations and the construction drawings for structural framing requirements.

Disclaimer

This calculation package is based on the documentation that was available to us. Sidesway Engineering did not perform a complete as-built to verify the accuracy of the provided data, and we should be contacted if there are any discrepancies with the assumptions contained within these calculations. We assume the structure has no known deterioration or damage that would adversely affect capacity.

DESIGN LOADS

DEAD: ROOF:

MEMBRANE	1.0
1/2" SHEATHING	2.0
FRAMING	3.0
INSULATION	1.0
MECH/ELEC	1.0
CEILING	2.8
MISC.	1.2
	12 PSF

EXT. WALLS 9 PSF

SNOW: 25 PSF

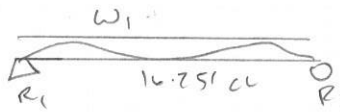
ALLOWABLE SOIL BEARING: 1500 PSF (ASSUMED)

SEISMIC DL (3692 FT²) * (12 PSF (ROOF) + 5 PSF (WALLS BELOW)) = 62764 # -OR- 17 PSF

SIDE SWAY ENGINEERING	Description: DESIGN LOADS	By: LFM	Project No.: 22076.01
		Date: 8-31-2022	
	Project: HU YU RESIDENCE	Checked:	Sheet No.: 1.01
		Date:	

FRAMING

GARAGE HDR (16.25')



$w = 4' * (12PSF\ DL + 25PSF\ SL)$

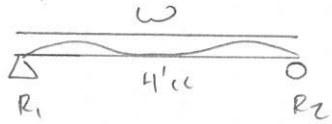
$R_1 = R_2 = 479\#DL + 838\#SL$

$\therefore$ USE 4x12 DF #2 $f_b/F_b' = 0.79$ $\Delta = L/433$

L_b (2)2x6 HF STUD $f_c/F_c' = 0.42$

$f_c/F_c^* = 0.09$

HDR $\leq$ 4'



INCLUDES 1.5' EAVE

$w = 13.25' * (12PSF\ DL + 25PSF\ SL)$

$\therefore$ USE 4x6 DF #2 $f_b/F_b' = 0.51$ $\Delta < L/999$

$R_1 = 338\#DL + 677\#SL$

CHECK GARAGE HDR OUT-OF-PLANE (WIND) ← C+C LOAD

0.42 * 19.82PSF PER IBC

$w = 8.3\ PSF * 4.5'$

$\therefore$ 4x12 DF #2 ADEQUATE ☑

$f_b/F_b' = 0.20$ $\Delta = L/392$

16PSF → $f_b/F_b' = 0.39$ ☑

FOUNDATION DESIGN

$\frac{(10"+6")*6"}{144in^2}$ (STEM) $+ \frac{16"*8"}{144in^2}$ (FTG) $= FDN = 1.55\ ft^2$

$P_{MAX} = 338\#DL + 677\#SL = 1015\#$ FACTORED

$w_{MAX} = 159\ PLF\ DL + 331\ PLF\ SL$ (TRUSSES)

$81\ PLF\ DL$ (WALLS)

$233\ PLF\ DL$

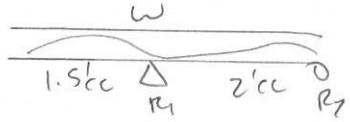
$804\ PLF < 2000\ PLF$ ☑

$P_{ALLOWABLE} = 1500PSF * \frac{16"}{12"} * \frac{12"}{12"} = 2000\#$ PER FOOT

$\therefore$ TYP 16" WIDE x 8" DEEP w/ (2) #4 @ BOT (CONTINUOUS) ADEQUATE

FRAMING (CONT'D)

BARGE RAFTER @ GABLE END (FOR DRAG TRUSS OVER GARAGE DOOR)



$w = \frac{24"}{12"} * (15PSF\ DL + 25PSF\ SL)$

$R_1 = 100\#DL + 166\#SL$

$R_2 = 17\#DL + 28\#SL$

$\therefore$ 2x4 DF #2 @ 24" O.C. $f_b/F_b' = 0.23$ $\Delta < L/999$

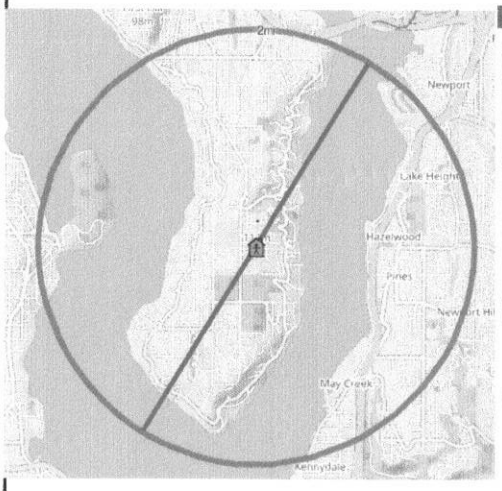
SIDE SWAY ENGINEERING	Description: FRAMING	By: LFM	Project No.: 22076.01
		Date: 8-31-2022	
	Project: HU YU RESIDENCE	Checked: JMD	Sheet No.: 1.02
		Date: 9/8/22	

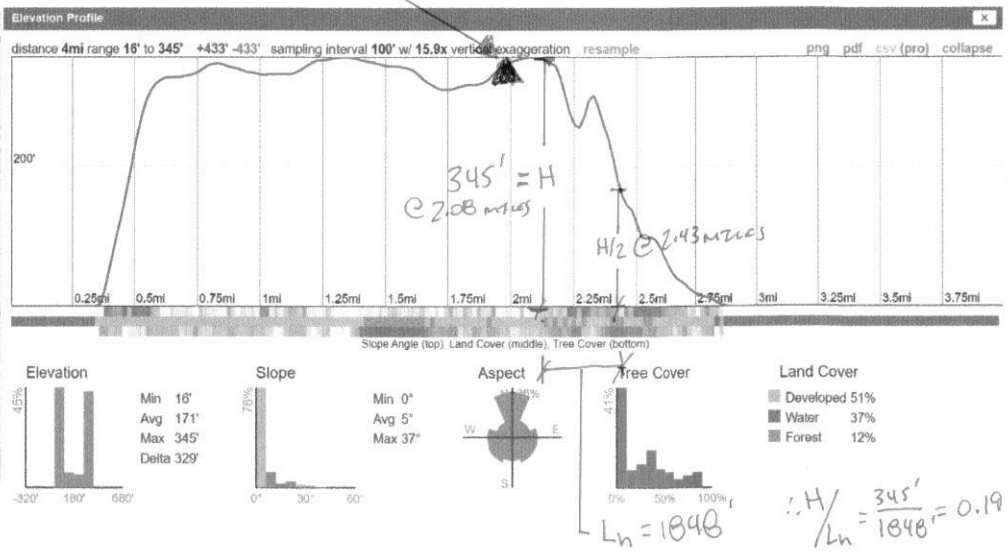
Wind Analysis (Kzt)

Site @ 338' Elevation

H=

H/2=





$\therefore H/L_h = \frac{345'}{1848'} = 0.19$

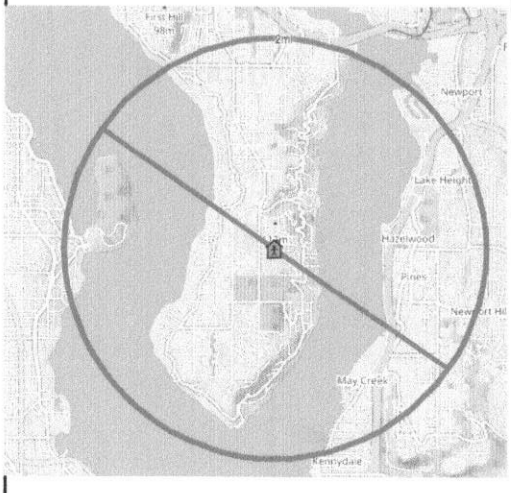
< 0.2

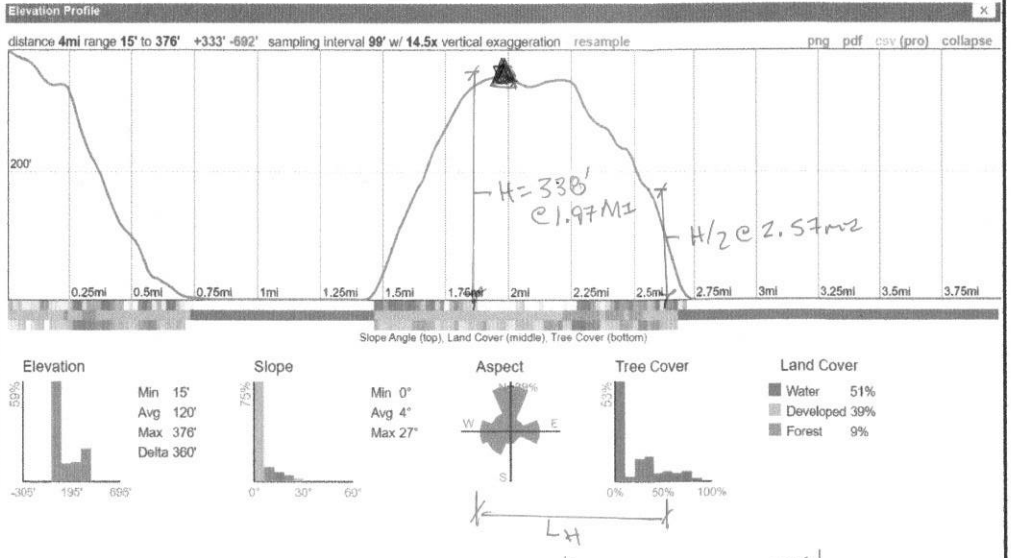
$\therefore K_{zt} = 1.0$

EXPOSURE 'B' (RESIDENTIAL/URBAN), ~~$K_{zt} = 1.0$~~

PER MERCER ISLAND WIND MAP,

$K_{zt} = 1.3$





$L_H = 3168'$ $\Rightarrow H/L_h = \frac{338'}{3168'} = 0.1 < 0.2$

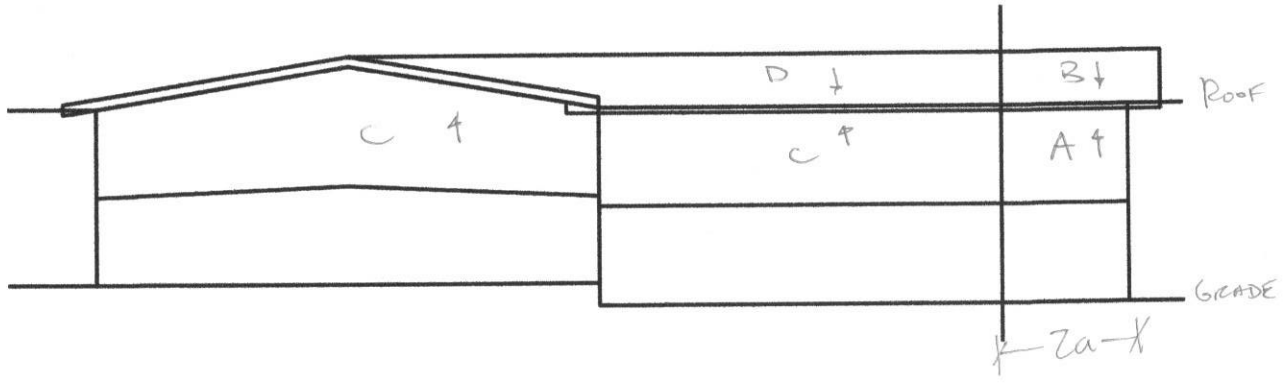
$\therefore K_{zt} = 1.0$

SIDE SWAY ENGINEERING	Description: Wind Analysis (Kzt)	By: LFM	Project No.: 22076.01
		Date: 8/31/2021	
	Project: Hu Yu Residence	Checked	Sheet No.: 2.01
		Date	

Wind Analysis

Wind Parameters:

Risk Category:	=	II	
Exposure Category:	=	B	
Height Adjustment Factor (λ):	=	1.0	
Topographic Factor (Kzt):	=	1.3	See Kzt figures.
Least Horizontal Dimension(x):	=	23.5	feet
Mean Roof Height (h):	=	10.0	feet
Basic Wind Speed (V):	=	100	mph, ASCE 7 Hazard Tool



2a Calculation:

0.1 * x	=	2.4	feet
0.4 * h	=	4.0	feet
min	=	2.4	feet

Check not less than max...

0.04 * x	=	0.9	feet
3 Feet	=	3.0	feet
max	=	3.0	feet

a (checked)	=	3.0	feet
2a	**=**	6	**feet**

Wind Areas and Loads

Roof

Factored ASCE 7-16 Ps30 Values, 100mph 2:12, (psf)

Ps30 A=	23.3	Ps30 B=	0
Ps30 C=	23.3	Ps30 D=	0

Roof Wind Areas (ft^2)

A=	25.3	B=	20.1
C=	191.6	D=	81.0

Roof Wind Area Loads (#)

Ps30 A * A=	589	Ps30 B * B=	0
Ps30 C * C=	2964	Ps30 D * D=	0

F (Roof)= 3553 # * 0.6 ⇒ **ASD** 2132 #

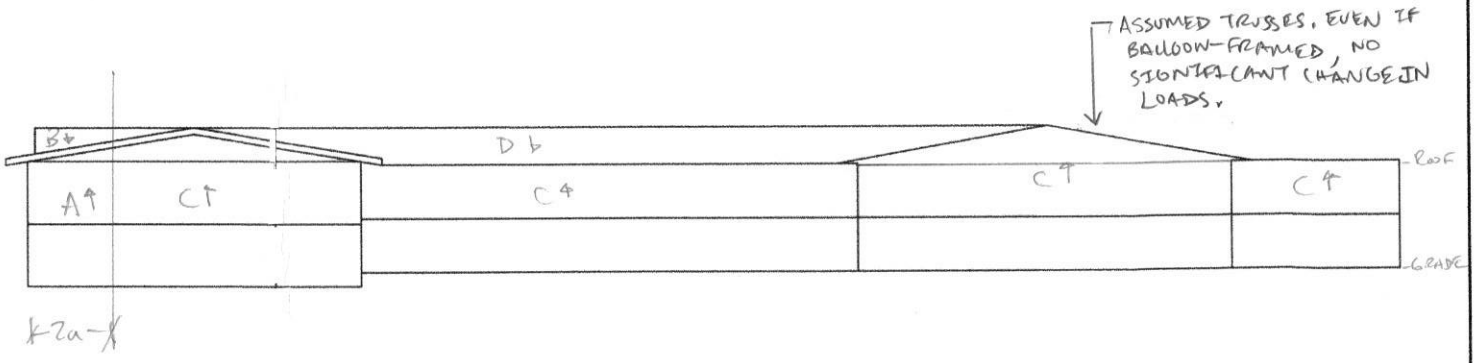
Fmin (Roof)= 4279 # * 0.6 ⇒ **ASD** 2568 # GOVERNS

SIDE SWAY ENGINEERING	Description: Wind Analysis	By: LFM	Project No.: 22076.01
		Date: 9/2/2022	
	Project: Hu Yu Residence	Checked	Sheet No.: 2.02
		Date	

Wind Analysis

Wind Parameters:

Risk Category:	=	II	
Exposure Category:	=	B	
Height Adjustment Factor (λ):	=	1.0	
Topographic Factor (Kzt):	=	1.3	See Kzt figures.
Least Horizontal Dimension(x):	=	73.5	feet
Mean Roof Height (h):	=	10.0	feet
Basic Wind Speed (V):	=	10.0	mph, ASCE 7 Hazard Tool



2a Calculation:

0.1 * x	=		feet
0.4 * h	=		feet
min	=		feet
a (checked)	=		feet
2a	=	6.0	**feet** SEE SHT 2.03

Check not less than max...

0.04 * x	=	feet
3 Feet	=	feet
max	=	feet

Wind Areas and Loads

Roof

Factored ASCE 7-16 Ps30 Values, 100mph 2:12, (psf)

Ps30 A= 23.3	Ps30 B= 0
Ps30 C= 15.5	Ps30 D= 0

Roof Wind Areas (ft^2)

A= 33.5	B= 7.8
C= 437	D= 124.0

Roof Wind Area Loads (#)

Ps30 A * A= 780	Ps30 B * B= 0
Ps30 C * C= 6760	Ps30 D * D= 0

F (Roof)= 7540 # * 0.6 ⇒ **ASD** 4524 #

Fmin (Roof)= 9582 # * 0.6 ⇒ **ASD** 5149 # GOVERNS

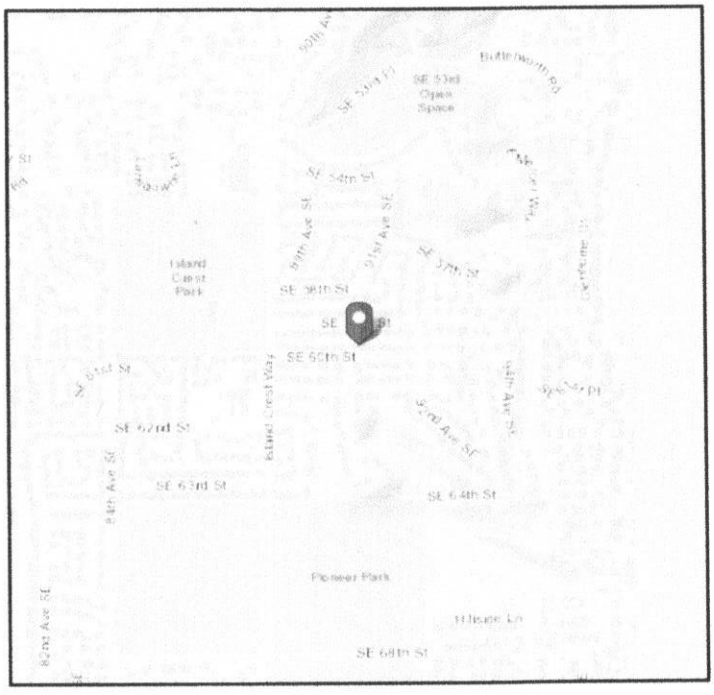
SIDE SWAY ENGINEERING	Description: Wind Analysis	By: LFM	Project No.: 22076.01
		Date: 9/2/2022	
	Project: Hu Yu Residence	Checked:	Sheet No.: 2.03
		Date:	

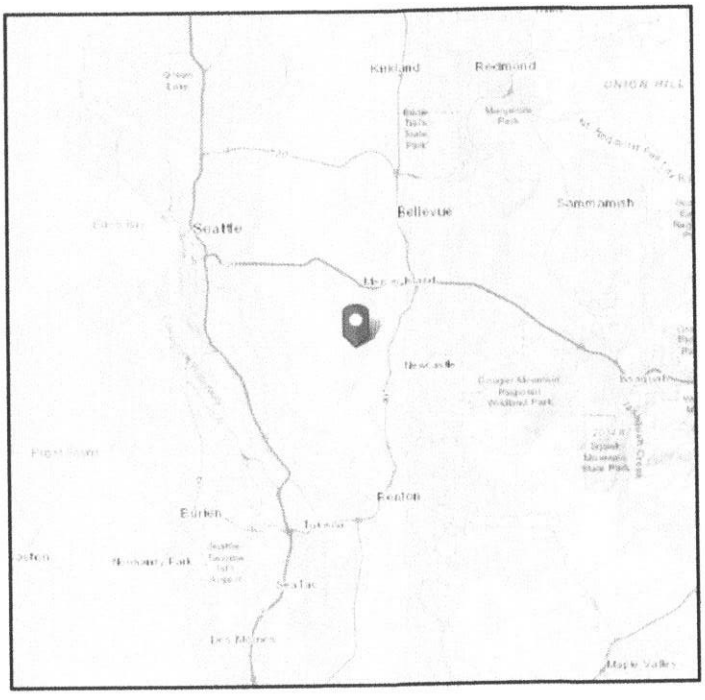
ASCE 7 Hazards Report

Address:
9004 SE 60th St
Mercer Island, Washington
98040

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see Section 11.4.3)

Elevation: 336.35 ft (NAVD 88)
Latitude: 47.549411
Longitude: -122.218576





Seismic

Site Soil Class: D - Default (see Section 11.4.3)

Results:

S_S :	1.455	S_{D1} :	N/A
S_1 :	0.505	T_L :	6
F_a :	1.2	PGA :	0.623
F_v :	N/A	PGA_M :	0.748
S_{MS} :	1.746	F_{PGA} :	1.2
S_{M1} :	N/A	I_e :	1
S_{DS} :	1.164	C_v :	1.391

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Thu Sep 01 2022

Date Source: USGS Seismic Design Maps

SIDE SWAY ENGINEERING	Description: ASCE 7 Hazard Tool Design Values	By: LFM	Project No.: 22085.01
		Date: 10/12/22	
	Project:	Checked	Sheet No.: 2.04
		Date	

MSFRS Seismic Loads

Seismic Parameters:

Latitude/Longitude	=	47.549411, -122.218576	
Risk Category	=	II	(ASCE 7-16, Table 1.5-1)
Importance Factor, $\mathbf{I_e}$	=	1.00	(ASCE 7-16, Table 1.5-2)
Soils Site Class	=	D	(Per geotech, else per 11.4.3)
$\mathbf{S_{DS}}$	=	1.164	(SEAC)
$\mathbf{S_1}$	=	0.505	
$\mathbf{F_v}$	=	1.795	
$\mathbf{S_{D1}}$	=	0.6043	
Seismic Design Category	=	D	(ASCE 7-16, Table 11.6-1, -2)

Building Properties:

Response Modification Coefficient, **R**	=	6.5	(ASCE 7-16, Table 12.2-1)
Overstrength Factor, $\mathbf{\Omega_0}$	=	2.5	(ASCE 7-16, Table 12.2-1)
Deflection Amplification Factor, $\mathbf{C_d}$	=	4.0	(ASCE 7-16, Table 12.2-1)
Fundamental Period, $\mathbf{T_a}$	=	$C_t h_n^x$ Ct = 0.02	(ASCE 7-16,
	=	0.104 x= 0.75	Table 12.8-2)
	k =	1	(ASCE 7-16, Section 12.8.3)
$\mathbf{1.5*T_s}$	=	0.778759	(If 1.5Ts < Ta, see 11.4.8)

Seismic Response Coefficient, C_s:

$V = 0.044 S_{DS} I$ (Minimum)	=	0.051	W	
$V = (S_{DS} I W)/R$	=	0.179	W	GOVERNS
$V = (S_{D1} I)/RT_a$ (Maximum)	=	0.895	W	

Vertical Distribution of Seismic Forces:

Diaphragm Level	DL (psf)	Area (ft²)	w_{DL} (kips)	Story Ht. (ft)	$w_i h_i^k$ (k-ft)	$w_x h_x^k$ / $\Sigma w_i h_i^k$	Force F_x (kips)	Sum F_x
Roof Framing	17	3692	62.8	9	565	1.00	**7.87**	7.87
2nd Framing	0	0	0.0	0	0	0.00	**0.00**	7.87
		Σ =	62.8		565	1.00	**7.87**	

Base Shear (ULT) = 11.24 kips
Base Shear (ASD) = **7.87 kips**

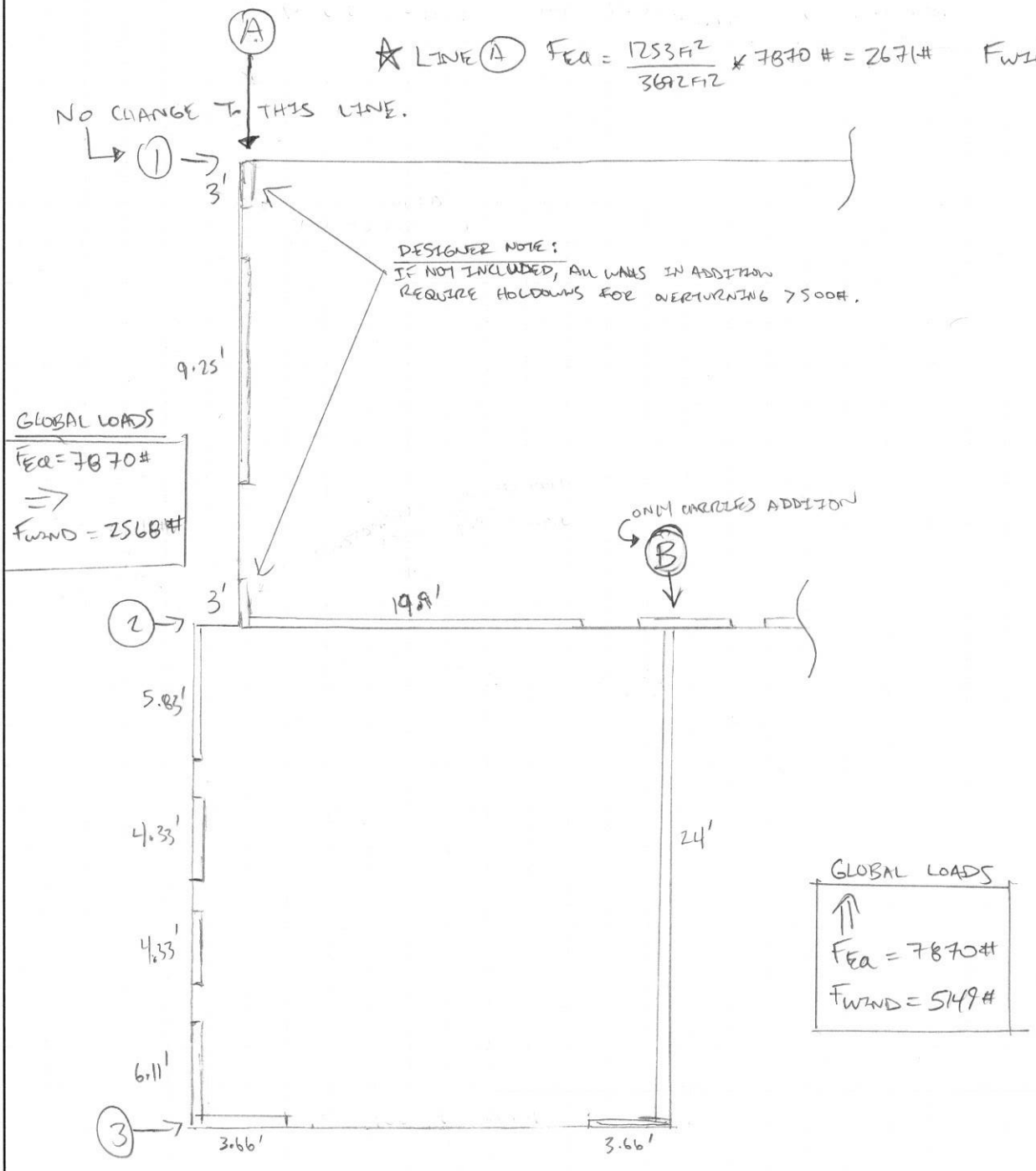
Diaphragm Design Forces:

Diaphragm Level	w_i (kips)	Σw_i (kips)	F_i (kips)	ΣF_i (kips)	$\Sigma F_i * w_{px} / \Sigma w_i$	F_{px} (Min) $0.2 S_{DS} I w_{px}$	F_{px} (Max) $0.4 S_{DS} I w_{px}$	F_{px} Govern
Roof Framing	62.8	62.8	7.9	7.9	7.9	10.23	20.46	**10.23**
2nd Framing	0.0	62.8	0.0	7.9	0.0	0.00	0.00	**0.00**

LATERAL LOAD DISTRIBUTION

★ LINE (2) $F_{EQ} = \frac{1576 FT^2}{3692 FT^2} * 7870\# = 3360\#$ $F_{WIND} = \frac{23.75'}{47.5'} * 1466\# = 3935\#$

★ LINE (A) $F_{EQ} = \frac{1253 FT^2}{3692 FT^2} * 7870\# = 2671\#$ $F_{WIND} = \frac{35'}{98'} * 5149\# = 1839\#$



GLOBAL LOADS

⇑

$F_{EQ} = 7870\#$

$F_{WIND} = 5149\#$

★ LINE (3) $F_{EQ} = \frac{287 FT^2}{3692 FT^2} * 7870\# = 612\#$ $F_{WIND} = \frac{12.2'}{47.5'} * 2568\# = 660\#$

★ LINE (B) $F_{EQ} = \frac{287 FT^2}{3692 FT^2} * 7870\# = 612\#$ $F_{WIND} = \frac{11.75'}{98'} * 5149\# = 617\#$

SIDE SWAY ENGINEERING	Description: LATERAL LOAD DISTRIBUTION	By: LFM	Project No.: 22076.01
		Date: 8-31-2022	
	Project: HU YU RESIDENCE	Checked	Sheet No.: 2.06
		Date	

SHEAR WALLS

LINE ③ $\Sigma l_{SW} = 3.66' + 3.66'$ $V = 83.6\ PLF\ EQ$ (2×3.66/9' = 103 PLF) -OR- $90\ PLF\ WIND$ (111 PLF) ∴ SW6 ADEQUATE

OVERTURNING: (90 PLF WIND)

$$\frac{83.6\ PLF \times 9' \times 3.66'}{3.66' - 0.5'} - 0.6 \times \frac{3.66'}{2} \times ((9\ PSF \times 9') + (12\ PSF \times 4\ PSF))$$

$= 872\# - 109\#\downarrow = 763\#\uparrow EQ$

$= 938\#\uparrow - 142\#\downarrow = 796\#\uparrow WIND$

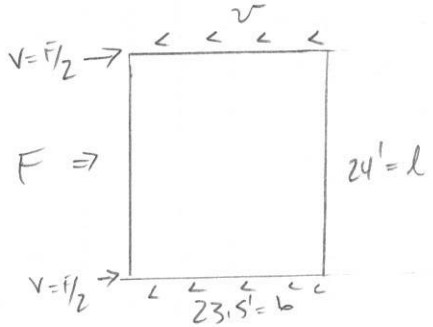
∴ DTTZZ REQ'D
NO COLLECTORS REQ'D.

LINE ⑧ $\Sigma l_{SW} = 24'$ $V = 26\ PLF\ EQ$ -OR- $26\ PLF\ WIND$ ∴ SW6 ADEQUATE.

∴ NO HD's REQ'D

GROSS UPLIFT < 500#, NEGLIGIBLE.

DIAPHRAGM



$F = \frac{24.5'}{1'} \times 256\ \#/' = 1325\#$ WIND -OR- $\frac{574\ FT^2}{3692\ FT^2} \times 7070\# = 1224\#$ EQ

$V = \frac{1325\#}{23.5'} = 56\ PLF < 167.4\ PLF$

∴ TYP 1/2" SHEATHING w/ 8d @ 6"/12" o.c. ADEQUATE

CHORD

$$T = C = \frac{wl^2}{8b} = \frac{\left(\frac{1325\#}{24'}\right) \times (24')^2}{8 \times 23.5'} = 169\#$$

∴ TYP DBL TOP PLT ADEQUATE

SHEAR WALLS (CONT'D)

LINE ② $\Sigma l_{SW} = 19.9'$ (IGNORE REST OF EXIST WALLS) $V = 168\ PLF\ EQ$ -OR- $198\ PLF\ WIND$

OVERTURNING:

$$198\ PLF \times 8' - 0.6 \times \frac{19.9}{2} \times \left(\left(9\ PSF \times 8'\right) + \left(12\ PSF \times \frac{23'}{2}\right)\right)$$

$= 1584\#^{\pm} - 1254\#\downarrow = 330\# < 500\#$, NEGLIGIBLE. ∴ NO HD's REQ'D

∴ SW6 ADEQUATE

LINE ③ $\Sigma l_{SW} = 35.85''$ $V = 74.5\ PLF\ EQ$ (2×3'/8 = 99 PLF) -OR- $51\ PLF\ WIND$

∴ SW6 ADEQUATE

OVERTURNING 3' WALLS):

$$\left(\frac{9' \times 74.5\ PLF \times 3'}{3' - 0.5'}\right) - 0.46 \times \frac{3'}{2} \times ((9' \times 9\ PSF) + (12\ PSF \times 4')) = 805\# - 89\#$$

$= 716\#$

∴ DTTZZ REQ'D

SIDE SWAY ENGINEERING	Description: SHEAR WALLS; CHORD + DIAPHRAGM ANALYSIS	By: LFM	Project No.: 22076.01
		Date: 9-5-2022	
	Project: HU YU RESIDENCE	Checked	Sheet No.: 2.07A
		Date	

SIMPSON Strong-Tie®

Anchor Designer™ Software

Version 3.0.7947.1

Company:	Sidesway Engineering	Date:	9/9/2022
Engineer:	LFM	Page:	1/5
Project:	Hu Yu Residence		
Address:			
Phone:			
E-mail:			

1.Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

General
Design method:ACI 318-11
Units: Imperial units

Anchor Information:
Anchor type: Bonded anchor
Material: F1554 Grade 36
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 10.000
Code report: ICC-ES ESR-2508
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 13.13
c_{ac} (inch): 17.58
C_{min} (inch): 1.75
S_{min} (inch): 3.00

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 36.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Hole condition: Dry concrete
Inspection: Continuous
Temperature range, Short/Long: 150/110°F
Ignore 6do requirement: Not applicable
Build-up grout pad: No

Recommended Anchor
Anchor Name: SET-XP® - SET-XP w/ 1/2"Ø F1554 Gr. 36
Code Report: ICC-ES ESR-2508

↳ For DTT27

2.078

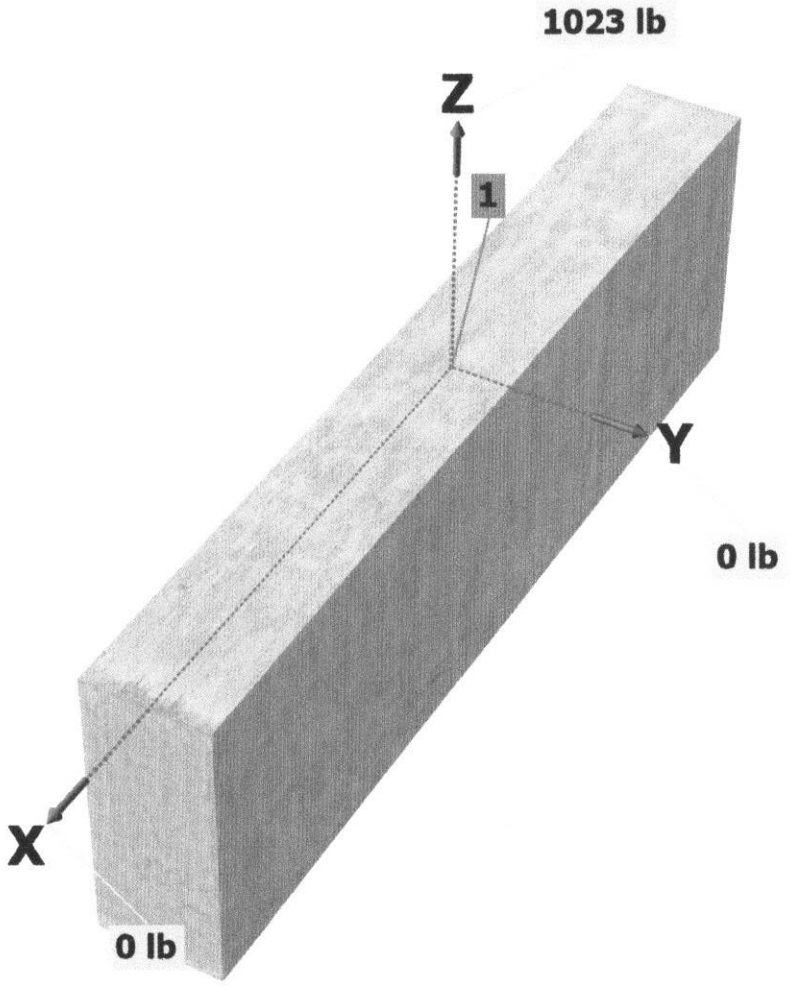
Company:	Sidesway Engineering	Date:	9/9/2022
Engineer:	LFM	Page:	2/5
Project:	Hu Yu Residence		
Address:			
Phone:			
E-mail:			

Load and Geometry
Load factor source: ACI 318 Section 9.2
Load combination: not set
Seismic design: Yes
Anchors subjected to sustained tension: No
Ductility section for tension: D.3.3.4.2 not applicable
Ductility section for shear: D.3.3.5.2 not applicable
Ω_0 factor: not set
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: Yes

Strength level loads:

N_{ua} [lb]: 1023 (ULTIMATE) FROM LINE ③ SHEAR WALLS (3' OVERRUNNING EXIST PIERS) SHT. 2.07A
V_{uax} [lb]: 0
V_{uay} [lb]: 0

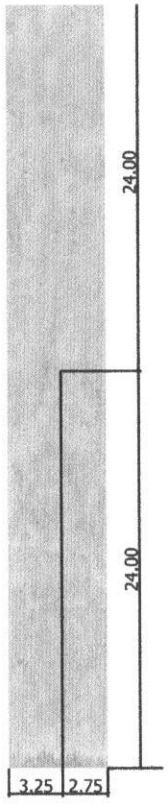
<Figure 1>



2.07C

Company:	Sidesway Engineering	Date:	9/9/2022
Engineer:	LFM	Page:	3/5
Project:	Hu Yu Residence		
Address:			
Phone:			
E-mail:			

<Figure 2>



6"-X
EXIST, NO REBAR ASSUMED.

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	1023.0	0.0	0.0	0.0
Sum	1023.0	0.0	0.0	0.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 1023
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00

4. Steel Strength of Anchor in Tension (Sec. D.5.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
8235	0.75	6176

5. Concrete Breakout Strength of Anchor in Tension (Sec. D.5.2)

$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5}$ (Eq. D-6)

k_c	λ_a	f'_c (psi)	h_{ef} (in)	N_b (lb)
17.0	1.00	2500	10.000	26879

$0.75\phi N_{cb} = 0.75\phi \, (A_{Nc} / A_{Nco}) \Psi_{ed,N} \Psi_{c,N} \Psi_{cp,N} N_b$ (Sec. D.4.1 & Eq. D-3)

A_{Nc} (in²)	A_{Nco} (in²	$c_{a,min}$ (in)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	$0.75\phi N_{cb}$ (lb)
180.00	900.00	2.75	0.755	1.00	1.000	26879	0.65	1979

6. Adhesive Strength of Anchor in Tension (Sec. D.5.5)

$\tau_{k,cr} = \tau_{k,cr} f_{short\text{-}term} K_{sat} \alpha_{N,seis}$

$\tau_{k,cr}$ (psi)	$f_{short\text{-}term}$	K_{sat}	$\alpha_{N,seis}$	$\tau_{k,cr}$ (psi)
510	1.72	1.00	1.00	877

$N_{ba} = \lambda_a \tau_{cr} \pi d_a h_{ef}$ (Eq. D-22)

λ_a	τ_{cr} (psi)	d_a (in)	h_{ef} (in)	N_{ba} (lb)
1.00	877	0.50	10.000	13779

$0.75\phi N_a = 0.75\phi \, (A_{Na} / A_{Na0}) \Psi_{ed,Na} \Psi_{cp,Na} N_{ba}$ (Sec. D.4.1 & Eq. D-18)

A_{Na} (in²)	A_{Na0} (in²)	c_{Na} (in)	$c_{a,min}$ (in)	$\Psi_{ed,Na}$	$\Psi_{p,Na}$	N_{a0} (lb)	ϕ	$0.75\phi N_a$ (lb)
80.46	179.82	6.70	2.75	0.823	1.000	13779	0.65	2474

2.07E

11. Results

11. Interaction of Tensile and Shear Forces (Sec. D.7)?

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	1023	6176	0.17	Pass
Concrete breakout	**1023**	**1979**	**0.52**	**Pass (Governs)**
Adhesive	1023	2474	0.41	Pass

SET-XP w/ 1/2"Ø F1554 Gr. 36 with hef = 10.000 inch meets the selected design criteria. => FOR POST-INSTALLED D1122.

12. Warnings

- When cracked concrete is selected, concrete compressive strength used in concrete breakout strength in tension, adhesive strength in tension and concrete pryout strength in shear for SET-XP adhesive anchor is limited to 2,500 psi per ICC-ES ESR-2508 Section 5.3.

- Per designer input, the tensile component of the strength-level earthquake force applied to anchors does not exceed 20 percent of the total factored anchor tensile force associated with the same load combination. Therefore the ductility requirements of ACI 318 D.3.3.4.3 for tension need not be satisfied – designer to verify.

- Per designer input, the shear component of the strength-level earthquake force applied to anchors does not exceed 20 percent of the total factored anchor shear force associated with the same load combination. Therefore the ductility requirements of ACI 318 D.3.3.5.3 for shear need not be satisfied – designer to verify.

- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer's product literature for hole cleaning and installation instructions.