



MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

7220 Trade Street, Suite 350, San Diego, CA 92121 ▶ p 619-650-0010 ▶ mulhernkulp.com

CALCULATION PACKAGE

November 1, 2022

Yen Design, Inc.

Single Family Home Remodel
4029 97th Ave SE
Mercer Island, WA

MULHERN & KULP STRUCTURAL ENGINEERING, INC.

Prepared By:

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Associate Owner + San Diego Office Director



Exp: Oct. 6, 2024



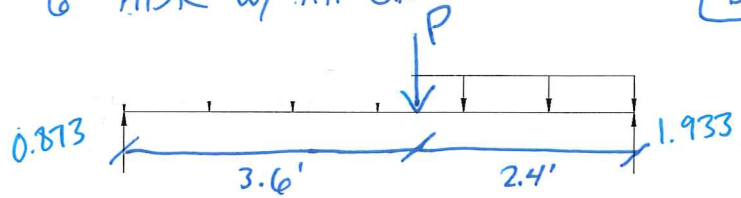
BEAM & HEADER CALCULATIONS

11
B1

BEAM DESCRIPTION: ROOF - TYP 6' HDR w/ HIP GT.

PARAMETERS:

L = FT
W = KLF
P = K



ANALYSIS:

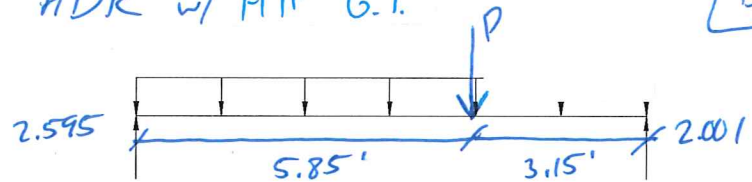
$R_{MAX} =$ K $V_D =$ K $< V_{ALL} =$ K ADEQUATE
 $M_{MAX} =$ K-FT $< M_{ALL} =$ K-FT ADEQUATE
 $\Delta_{TL} =$ IN. $L/$ $< L/240$ ADEQUATE

BEAM DESCRIPTION: ROOF - 9' HDR w/ HIP G.T.

B2

PARAMETERS:

L = FT
W = KLF
P = K



ANALYSIS:

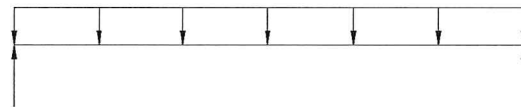
$R_{MAX} =$ K $V_D =$ K $< V_{ALL} =$ K ADEQUATE
 $M_{MAX} =$ K-FT $< M_{ALL} =$ K-FT ADEQUATE
 $\Delta_{TL} =$ IN. $L/$ $< L/240$ ADEQUATE

BEAM DESCRIPTION: ROOF - TYP 4' HDR

B3

PARAMETERS:

L = FT
W = KLF
P = K



ANALYSIS:

$R_{MAX} =$ K $V_D =$ K $< V_{ALL} =$ K ADEQUATE
 $M_{MAX} =$ K-FT $< M_{ALL} =$ K-FT ADEQUATE
 $\Delta_{TL} =$ IN. $L/$ $< L/240$ ADEQUATE



2/

BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: 2FF - FRONT DOOR HDR

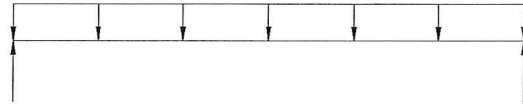
B4

PARAMETERS:

L = 4.6 FT

W = 1.1 KLF

P = — K



ANALYSIS:

R_{MAX} = 2.53 K

V_D = — K

< V_{ALL} = 3.19 K

ADEQUATE

M_{MAX} = 2.91 K-FT

< M_{ALL} = 3.83 K-FT

ADEQUATE

Δ_{TL} = 0.043 IN.

L/1000+ < L/240

ADEQUATE

(2) 2x10 HF#2

BEAM DESCRIPTION: 2FF - KITCHEN WINDOW HDR

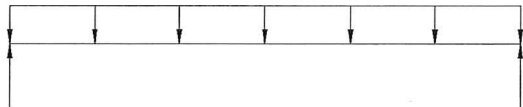
B5

PARAMETERS:

L = 3.8 FT

W = 1.1 KLF

P = — K



ANALYSIS:

R_{MAX} = 2.09 K

V_D = — K

< V_{ALL} = 2.50 K

ADEQUATE

M_{MAX} = 1.99 K-FT

< M_{ALL} = 2.57 K-FT

ADEQUATE

Δ_{TL} = 0.042 IN.

L/1000+ < L/240

ADEQUATE

(2) 2x8 HF#2

BEAM DESCRIPTION: 2FF - GARAGE HDR

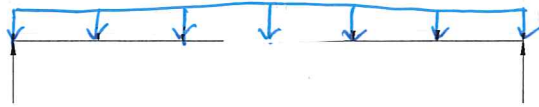
B6

PARAMETERS:

L = 16 FT

W = 0.100 KLF

P = — K



ANALYSIS:

R_{MAX} = 0.8 K

V_D = — K

< V_{ALL} = 5.4 K

ADEQUATE

M_{MAX} = 3.2 K-FT

< M_{ALL} = 7.0 K-FT

ADEQUATE

Δ_{TL} = 0.222 IN.

L/865 < L/240

ADEQUATE

4x12 DF#2



BEAM & HEADER CALCULATIONS

3/

B7

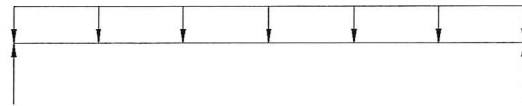
BEAM DESCRIPTION: 2FF - LIVING WINDOW HDR

PARAMETERS:

L = 10 FT

W = 1.04 KLF

P = — K



ANALYSIS:

R_{MAX} = 5.2 K

V_D = — K

< V_{ALL} = 7.47 K

ADEQUATE

M_{MAX} = 13 K-FT

< M_{ALL} = 14.79 K-FT

ADEQUATE

Δ_{TL} = $\frac{130}{I}$ 0.385 IN.

L/ 311 < L/240

ADEQUATE

I_{min} = 325

3 1/2" x 10 1/2" GLB

BEAM DESCRIPTION: 2FF - BED 3 WINDOW HDR

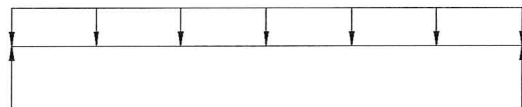
B8

PARAMETERS:

L = 5 FT

W = 1.04 KLF

P = — K



ANALYSIS:

R_{MAX} = 2.6 K

V_D = — K

< V_{ALL} = 3.19 K

ADEQUATE

M_{MAX} = 3.25 K-FT

< M_{ALL} = 3.83 K-FT

ADEQUATE

Δ_{TL} = 0.057 IN.

L/ 1000+ < L/240

ADEQUATE

(2) 2 x 10 HF #2

BEAM DESCRIPTION: 2FF - DEN FLUSH BEAM

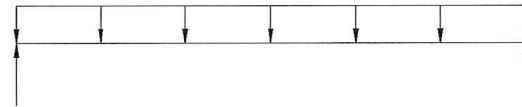
B9

PARAMETERS:

L = 9 FT

W = 0.950 KLF

P = — K



ANALYSIS:

R_{MAX} = 4.28 K

V_D = — K

< V_{ALL} = 5.32 K

ADEQUATE

M_{MAX} = 9.62 K-FT

< M_{ALL} = 15.55 K-FT

ADEQUATE

Δ_{TL} = 0.117 IN.

L/ 919 < L/240

ADEQUATE

1 3/4" x 16" LVL



BEAM & HEADER CALCULATIONS

51

BEAM DESCRIPTION:

2FF - FRONT MAIN BATH WINDOW HDR
(WORST CASE)

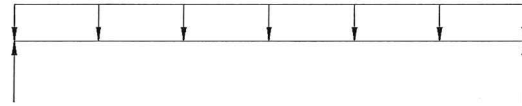
B13

PARAMETERS:

L = 3 FT

W = 1.00 KLF

P = — K



ANALYSIS:

R_{MAX} = 1.50 K

V_D = — K

< V_{ALL} = 1.90 K

ADEQUATE

M_{MAX} = 1.13 K-FT

< M_{ALL} = 1.60 K-FT

ADEQUATE

Δ_{TL} = 0.034 IN.

L/1000+ < L/240

ADEQUATE

(2) 2x6 HF #2

BEAM DESCRIPTION:

2FF - STAIR ⊥ FLUSH BEAM

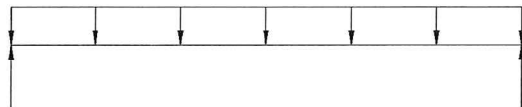
B14

PARAMETERS:

L = 4.5 FT

W = 0.340 KLF

P = — K



ANALYSIS:

R_{MAX} = 0.77 K

V_D = — K

< V_{ALL} = 10.64 K

ADEQUATE

M_{MAX} = 0.86 K-FT

< M_{ALL} = 31.1 K-FT

ADEQUATE

Δ_{TL} = 0.003 IN.

L/2000+ < L/240

ADEQUATE

(2) 1 3/4" x 16" LVL

BEAM DESCRIPTION:

2FF - STAIR // FLUSH BEAM

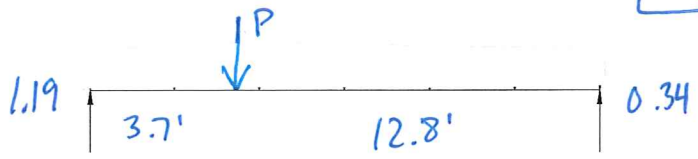
B15

PARAMETERS:

L = 16.5 FT

W = — KLF

P = 1.53 K



ANALYSIS:

R_{MAX} = 1.19 K

V_D = — K

< V_{ALL} = 5.32 K

ADEQUATE

M_{MAX} = 4.39 K-FT

< M_{ALL} = 15.55 K-FT

ADEQUATE

Δ_{TL} = 0.100 IN.

L/1000+ < L/240

ADEQUATE

1 3/4" x 16" LVL



BEAM & HEADER CALCULATIONS

6/

B16

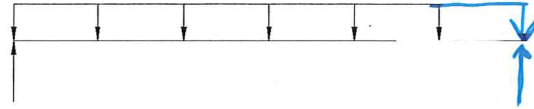
BEAM DESCRIPTION: 2FF - BED 2 FLUSH BEAM

PARAMETERS:

L = 12.3 FT

W = 0.340 KLF

P = — K



ANALYSIS:

R_{MAX} = 2.09 K

V_D = — K

< V_{ALL} = 5.32 K

ADEQUATE

M_{MAX} = 6.43 K-FT

< M_{ALL} = 15.55 K-FT

ADEQUATE

Δ_{TL} = 0.147 IN.

L/1000 < L/240

ADEQUATE

1 3/4" x 16" LVL

BEAM DESCRIPTION: 2FF - PORCH DROPPED BEAM

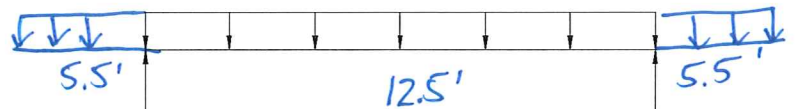
B18

PARAMETERS:

L = 12.5 FT

W = 0.126 KLF

P = — K



ANALYSIS:

R_{MAX} = 1.481 K

V_D = — K

< V_{ALL} = 3.19 K

ADEQUATE

M_{MAX} = 1.91 K-FT

< M_{ALL} = 3.83 K-FT

ADEQUATE

Δ_{TL} = 0.060 IN.

L/2000+ < L/240

ADEQUATE

(2) 2x10 HF#2



7/

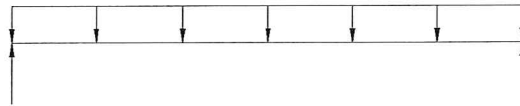
BEAM & HEADER CALCULATIONS

B19

BEAM DESCRIPTION: 2FF - STAIR DROPPED BEAM

PARAMETERS:

L = 5.5 FT
W = 0.200 KLF
P = — K



ANALYSIS:

$R_{MAX} = 0.55$ K $V_D = —$ K $< V_{ALL} = 2.18$ K ADEQUATE
 $M_{MAX} = 0.756$ K-FT $< M_{ALL} = 2.23$ K-FT ADEQUATE
 $\Delta_{TL} = 0.033$ IN. $L/1000+$ $< L/240$ ADEQUATE

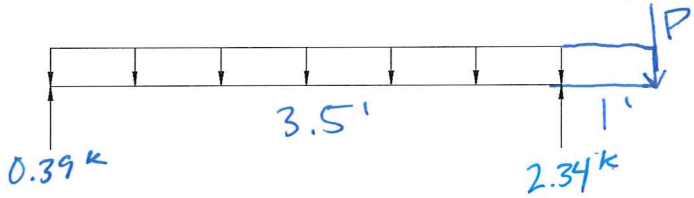
(2) 2x8 HF #2

BEAM DESCRIPTION: 2FF - STAIR + CANT'D BEAM

B20

PARAMETERS:

L = SHOWN FT
W = 0.340 KLF
P = 1.19 K



ANALYSIS:

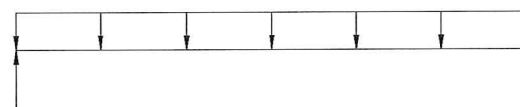
$R_{MAX} = 2.34$ K $V_D = —$ K $< V_{ALL} = 5.32$ K ADEQUATE
 $M_{MAX} = 1.36$ K-FT $< M_{ALL} = 15.55$ K-FT ADEQUATE
 $\Delta_{TL} = 0.002$ IN. $L/11000$ $< L/240$ ADEQUATE

1 3/4" x 16" LVL

BEAM DESCRIPTION:

PARAMETERS:

L = FT
W = KLF
P = K



ANALYSIS:

$R_{MAX} =$ K $V_D =$ K $< V_{ALL} =$ K ADEQUATE
 $M_{MAX} =$ K-FT $< M_{ALL} =$ K-FT ADEQUATE
 $\Delta_{TL} =$ IN. $L/$ $< L/240$ ADEQUATE

YEN DESIGN
4029 97TH AVE SE

MERCER ISLAND, WA

SHEAR WALL CALCULATIONS - WIND

REVIEWED BY: NJM

OCTOBER 14, 2022

PARAMETERS:

SINGLE FAMILY HOME

DESIGN WIND SPEED: 100 MPH

WIND EXPOSURE CATEGORY: B

SEISMIC DESIGN CATEGORY: D

CODE & DESIGN STANDARD: 2018 IBC CH. 1609, ASCE 7-16 CH. 26-30



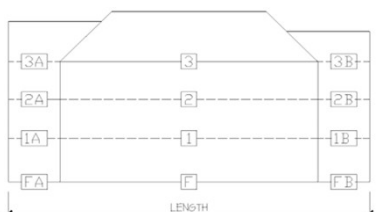
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WIND DESIGN SUMMARY PER ASCE 7-16

PARAMETERS:		ROOF GEOMETRY:		BUILDING GEOMETRY:	
WIND SPEED	100	TRANS. ROOF PITCH	4.0 :12	LENGTH	63 FT
EXPOSURE CATEGORY	B	LONG. ROOF PITCH	4.0 :12	WIDTH	46 FT
RISK CATEGORY	II	MEAN ROOF HEIGHT, H	25.58 FT	NUMBER OF STORIES	2
WIND DIRECTIONALITY FACTOR, K_D	0.85				
TOPOGRAPHIC FACTOR, K_{ZT}	1.30				
GUST FACTOR, G	0.85				
GROUND ELEV. ABOVE SEA LEVEL (FT)	192				
DESIGN TYPE	ASD 0.60				

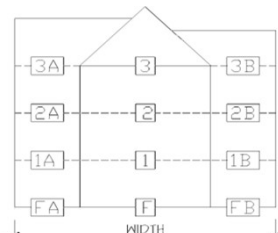
TRANSVERSE DIRECTION (PERPENDICULAR TO MAIN RIDGE LINE)						
DIAPHRAGM LEVEL	FLOOR-TO-FLOOR HEIGHT	SURFACE	SECTION			sq ft
			A	O	B	
2	11.1 FT	Roof Surface	0	158	0	sq ft
		Wall surface	0	253	0	sq ft
1	11.1 FT	Roof Surface	0	0	0	sq ft
		Wall surface	0	675	0	sq ft
FND		Roof Surface	0	0	0	sq ft
		Wall surface	0	346	0	sq ft

TRIBUTARY DESIGN LOADS: (0.6W)						
DIAPHRAGM LEVEL	FLOOR-TO-FLOOR HEIGHT	SECTION			kips	
		A	O	B		
2	11.1 FT	Story Shear	0.00	3.93	0.00	kips
		Total Shear	0.00	3.93	0.00	kips
1	11.1 FT	Story Shear	0.00	7.68	0.00	kips
		Total Shear	0.00	11.62	0.00	kips
FND		Story Shear	0.00	3.94	0.00	kips
		Total Shear	0.00	15.55	0.00	kips



LONGITUDINAL DIRECTION (PARALLEL TO MAIN RIDGE LINE)						
DIAPHRAGM LEVEL	FLOOR-TO-FLOOR HEIGHT	SURFACE	SECTION			sq ft
			A	O	B	
2	11.1 FT	Roof Surface	0	64	0	sq ft
		Wall surface	0	139	0	sq ft
1	11.1 FT	Roof Surface	0	59	0	sq ft
		Wall surface	0	432	0	sq ft
FND		Roof Surface	0	0	0	sq ft
		Wall surface	0	253	0	sq ft

TRIBUTARY DESIGN LOADS: (0.6W)						
DIAPHRAGM LEVEL	FLOOR-TO-FLOOR HEIGHT	SECTION			kips	
		A	O	B		
2	11.1 FT	Story Shear	0.00	1.96	0.00	kips
		Total Shear	0.00	1.96	0.00	kips
1	11.1 FT	Story Shear	0.00	4.95	0.00	kips
		Total Shear	0.00	6.92	0.00	kips
FND		Story Shear	0.00	2.70	0.00	kips
		Total Shear	0.00	9.62	0.00	kips





SHEARWALL DESIGN SUMMARY

SHEARWALL 201: 2ND - MASTER/BATH/B4 FRONT EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="11.1"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="6.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="45.0"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="22.4"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="980"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="7118"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="310"/>	PLF	OVERTURNING MOMENT	<input type="text" value="10.9"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="0"/>	LBS	RESISTIVE MOMENT	<input type="text" value="282.5"/>	K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 202: 2ND - BED 5 REAR EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="11.1"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="6.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="15.7"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="9.7"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="980"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="3209"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="310"/>	PLF	OVERTURNING MOMENT	<input type="text" value="10.9"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="0"/>	LBS	RESISTIVE MOMENT	<input type="text" value="34.4"/>	K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

SHEARWALL 203: 2ND - MASTER/STAIR SIDE EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H FT. MAX WALL OPENING HT, H_c FT.
WALL LENGTH, L FT. QUALIFYING WALL LENGTH, L FT. SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 204: 2ND - B4/B5 SIDE EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H FT. MAX WALL OPENING HT, H_c FT.
WALL LENGTH, L FT. QUALIFYING WALL LENGTH, L FT. SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

SHEARWALL XXX: - NOT USED

SHEARWALL PROPERTIES:

WALL HEIGHT, H FT. MAX WALL OPENING HT, H_c FT.
WALL LENGTH, L FT. QUALIFYING WALL LENGTH, L FT. SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS ALLOWABLE SHEARWALL CAPACITY LBS
#DIV/0!

SHEARWALL ASSEMBLY SPECIFICATION

PO - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - UNBLOCKED
#DIV/0!

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 101: 1ST - LIVING REAR EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H FT. MAX WALL OPENING HT, H_c FT.
WALL LENGTH, L FT. QUALIFYING WALL LENGTH, L FT. SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

SHEARWALL 102: 1ST - LIVING SIDE EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H FT. MAX WALL OPENING HT, H_c FT.
WALL LENGTH, L FT. QUALIFYING WALL LENGTH, L FT. SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 103: 1ST - DEN OUTER SIDE EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H FT. MAX WALL OPENING HT, H_c FT.
WALL LENGTH, L FT. QUALIFYING WALL LENGTH, L FT. SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

SHEARWALL 104: 1ST - DEN INNER SIDE EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H FT. MAX WALL OPENING HT, H_c FT.
WALL LENGTH, L FT. QUALIFYING WALL LENGTH, L FT. SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 105: 1ST - GARAGE INNER SIDE EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H FT. MAX WALL OPENING HT, H_c FT.
WALL LENGTH, L FT. QUALIFYING WALL LENGTH, L FT. SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

SHEARWALL 106: 1ST - GARAGE OUTER SIDE EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="11.1"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="2.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="45.5"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="41.5"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="2670"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="13936"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="205"/>	PLF	OVERTURNING MOMENT	<input type="text" value="29.6"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="0"/>	LBS	RESISTIVE MOMENT	<input type="text" value="191.0"/>	K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 107: 1ST - PANTRY/KITCHEN FRONT EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="11.1"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="2.8"/>	FT.		
WALL LENGTH, L	<input type="text" value="10.3"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="6.5"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1400"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2166"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="435"/>	PLF	OVERTURNING MOMENT	<input type="text" value="15.5"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="0"/>	LBS	RESISTIVE MOMENT	<input type="text" value="20.8"/>	K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

SHEARWALL 108: 1ST - MAIN BATH FRONT EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="11.1"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="2.8"/>	FT.		
WALL LENGTH, L	<input type="text" value="10.9"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="4.9"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1000"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1652"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="435"/>	PLF	OVERTURNING MOMENT	<input type="text" value="11.1"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="0"/>	LBS	RESISTIVE MOMENT	<input type="text" value="23.3"/>	K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 109: 1ST - REAR GARAGE INT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="11.8"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="8.2"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="8.2"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1060"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2754"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="100"/>	PLF	OVERTURNING MOMENT	<input type="text" value="12.5"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="1156"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="0"/>	LBS	RESISTIVE MOMENT	<input type="text" value="3.0"/>	K-FT	HOLD DOWN CAPACITY	<input type="text" value="4935"/>	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN



SHEARWALL DESIGN SUMMARY

SHEARWALL 110: 1ST - DEN FRONT EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="11.9"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="8.7"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="8.7"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="134"/>	PLF	OVERTURNING MOMENT	<input type="text" value="4.5"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="0"/>	LBS	RESISTIVE MOMENT	<input type="text" value="4.6"/>	K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 111: 1ST - GARAGE FRONT EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="13.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="7.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="20.9"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="4.9"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="100"/>	PLF	OVERTURNING MOMENT	<input type="text" value="11.2"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="0"/>	LBS	RESISTIVE MOMENT	<input type="text" value="19.7"/>	K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

YEN DESIGN
4029 97TH AVE SE

MERCER ISLAND, WA

SHEAR WALL CALCULATIONS - SEISMIC

REVIEWED BY: NJM

OCTOBER 14, 2022

PARAMETERS:

SINGLE FAMILY HOME

DESIGN WIND SPEED: 100 MPH

WIND EXPOSURE CATEGORY: B

SEISMIC DESIGN CATEGORY: D

CODE & DESIGN STANDARD: 2018 IBC CH. 1609, ASCE 7-16 CH. 26-30



MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

SEISMIC CALCULATION - ASCE 7-16

SEISMIC DESIGN CATEGORY:

USER INPUTS:

SITE CLASS	D
SPECTRAL RESPONSE ACCELERATION 0.2 SEC, S_s	1.406
SPECTRAL RESPONSE ACCELERATION 1.0 SEC, S₁	0.489
OCCUPANCY CATEGORY	II

VARIABLES:

SITE COEFFICIENT, F _A	1.20
SITE COEFFICIENT, F _V	1.81

CALCULATED VALUES:

MAXIMUM SPECTRAL RESPONSE ACCELERATION, S_{MS}	1.687
MAXIMUM SPECTRAL RESPONSE ACCELERATION, S_{M1}	0.886
DESIGN SPECTRAL RESPONSE ACCELERATION, S_{DS}	1.125
DESIGN SPECTRAL RESPONSE ACCELERATION, S_{D1}	0.590
SEISMIC DESIGN CATEGORY (SHORT TERM)	D
SEISMIC DESIGN CATEGORY (1.0 SECOND TERM)	D

BUILDING PERIOD DETERMINATION:

USER INPUTS:

BUILDING PERIOD COEFFICIENT, C _T	0.020
LONG-PERIOD TRANS PERIOD, T _L (SEC)	6
HT. ABV BASE TO HIGHEST LEVEL, h _N	22

CALCULATED VALUES:

APPROXIMATE FUNDAMENTAL PERIOD, T _A	0.205
T ₀	0.105
T _B	0.525
SPECTRAL RESPONSE ACC., S _A (g)	1.125

SITE CLASS ASSUMPTION

YES PER ASCE 7-16 SECTION 11.4.3 THE SITE CLASS MAY BE ASSUMED TO BE D

EQUIVALENT LATERAL FORCE PROCEDURE

DEAD LOAD CALCULATION:

LEVEL	STORY HT. (FT.)	AREA (FT ²)	DEAD LOAD (PSF)	DL OF EXT WALL TRIB. TO LEVEL (KIPS)	TOTAL LEVEL DL
1	11.1	2251	10	12.6	35 K
2	11.1	1113	17	9.0	28 K
3	0.0	0	0	0.0	0 K
4	0.0	0	0	0.0	0 K
5	0.0	0	0	0.0	0 K
6	0.0	0	0	0.0	0 K
7	0.0	0	0	0.0	0 K
8	0.0	0	0	0.0	0 K
9	0.0	0	0	0.0	0 K
10	0.0	0	0	0.0	0 K
11	0.0	0	0	0.0	0 K
12	0.0	0	0	0.0	0 K
13	0.0	0	0	0.0	0 K
14	0.0	0	0	0.0	0 K
15	0.0	0	0	0.0	0 K
16	0.0	0	0	0.0	0 K
17	0.0	0	0	0.0	0 K
18	0.0	0	0	0.0	0 K
19	0.0	0	0	0.0	0 K
20	0.0	0	0	0.0	0 K

TOTAL DEAD LOAD OF STRUCTURE 63 KIPS

SEISMIC RESPONSE COEFFICIENT:

	TRANSVERSE	LONGITUDINAL
RESPONSE MODIFICATION FACTOR, R	6.5	6.5
OCCUPANCY IMPORTANCE FACTOR, I _e	1.00	1.00
SEISMIC RESPONSE COEFFICIENT, C _s	0.173	0.173

BASE SHEARS:

ULTIMATE LOADS

x 0.7 =

ALLOWABLE LOADS

TRANSVERSE	LONGITUDINAL	TRANSVERSE	LONGITUDINAL
11 K	11 K	7.6 K	7.6 K

STORY SHEAR CALCULATION:

DISTRIBUTION EXPONENT, **1.00**

ULTIMATE LOADS

x 0.7 =

ALLOWABLE LOADS

LEVEL	VERT. DIST. FACTOR, C _{vk}	TRANSVERSE		LONGITUDINAL		TRANSVERSE		LONGITUDINAL	
		STORY SHEAR, F _v	STORY SHEAR, F _v	STORY SHEAR, F _v	STORY SHEAR, F _v	STORY SHEAR, F _v	STORY SHEAR, F _v		
1	0.386	4.2 K	4.2 K	2.9 K	7.6 K	2.9 K	7.6 K		
2	0.614	6.7 K	6.7 K	4.7 K	4.7 K	4.7 K	4.7 K		
3	0.000	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K		
4	0.000	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K		
5	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K		
6	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K		
7	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K		
8	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K		
9	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K		
10	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K		
11	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K		
12	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K		
13	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K		
14	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K		
15	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K		
16	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K		
17	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K		
18	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K		
19	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K		
20	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K		



SHEARWALL DESIGN SUMMARY

SHEARWALL 201: 2ND - MASTER/BATH/B4 FRONT EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H FT. MAX WALL OPENING HT, H_c FT.
WALL LENGTH, L FT. QUALIFYING WALL LENGTH, L FT. SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 202: 2ND - BED 5 REAR EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H FT. MAX WALL OPENING HT, H_c FT.
WALL LENGTH, L FT. QUALIFYING WALL LENGTH, L FT. SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

SHEARWALL 203: 2ND - MASTER/STAIR SIDE EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H FT. MAX WALL OPENING HT, H_c FT.
WALL LENGTH, L FT. QUALIFYING WALL LENGTH, L FT. SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 204: 2ND - B4/B5 SIDE EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H FT. MAX WALL OPENING HT, H_c FT.
WALL LENGTH, L FT. QUALIFYING WALL LENGTH, L FT. SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

SHEARWALL XXX: - NOT USED

SHEARWALL PROPERTIES:

WALL HEIGHT, H FT. MAX WALL OPENING HT, H_c FT.
WALL LENGTH, L FT. QUALIFYING WALL LENGTH, L FT. SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS ALLOWABLE SHEARWALL CAPACITY LBS
 ###

SHEARWALL ASSEMBLY SPECIFICATION

PO - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - UNBLOCKED
#DIV/0!

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 101: 1ST - LIVING REAR EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H FT. MAX WALL OPENING HT, H_c FT.
WALL LENGTH, L FT. QUALIFYING WALL LENGTH, L FT. SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS ALLOWABLE SHEARWALL CAPACITY LBS
 <

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

SHEARWALL 102: 1ST - LIVING SIDE EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H FT. MAX WALL OPENING HT, H_c FT.
WALL LENGTH, L FT. QUALIFYING WALL LENGTH, L FT. SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 103: 1ST - DEN OUTER SIDE EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H FT. MAX WALL OPENING HT, H_c FT.
WALL LENGTH, L FT. QUALIFYING WALL LENGTH, L FT. SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

SHEARWALL 104: 1ST - DEN INNER SIDE EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H FT. MAX WALL OPENING HT, H_c FT.
WALL LENGTH, L FT. QUALIFYING WALL LENGTH, L FT. SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 105: 1ST - GARAGE INNER SIDE EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H FT. MAX WALL OPENING HT, H_c FT.
WALL LENGTH, L FT. QUALIFYING WALL LENGTH, L FT. SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

SHEARWALL 106: 1ST - GARAGE OUTER SIDE EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H FT. MAX WALL OPENING HT, H_c FT.
WALL LENGTH, L FT. QUALIFYING WALL LENGTH, L FT. SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 107: 1ST - PANTRY/KITCHEN FRONT EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H FT. MAX WALL OPENING HT, H_c FT.
WALL LENGTH, L FT. QUALIFYING WALL LENGTH, L FT. SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL LBS < ALLOWABLE SHEARWALL CAPACITY LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL PLF OVERTURNING MOMENT K-FT HOLD DOWN DESIGN LOAD LBS
DL AT ENDS OF WALL LBS RESISTIVE MOMENT K-FT HOLDOWN CAPACITY LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

SHEARWALL 108: 1ST - MAIN BATH FRONT EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="11.1"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="2.8"/>	FT.		
WALL LENGTH, L	<input type="text" value="10.9"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="4.9"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1100"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1180"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="435"/>	PLF	OVERTURNING MOMENT	<input type="text" value="12.2"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="0"/>	LBS	RESISTIVE MOMENT	<input type="text" value="23.3"/>	K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 109: 1ST - REAR GARAGE INT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="11.8"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="8.2"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="8.2"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="1200"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1967"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="100"/>	PLF	OVERTURNING MOMENT	<input type="text" value="14.2"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="1358"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="0"/>	LBS	RESISTIVE MOMENT	<input type="text" value="3.0"/>	K-FT	HOLD DOWN CAPACITY	<input type="text" value="3695"/>	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN



SHEARWALL DESIGN SUMMARY

SHEARWALL 110: 1ST - DEN FRONT EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="11.9"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="0.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="8.7"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="8.7"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="250"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="2087"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="134"/>	PLF	OVERTURNING MOMENT	<input type="text" value="3.0"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="0"/>	LBS	RESISTIVE MOMENT	<input type="text" value="4.6"/>	K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 111: 1ST - GARAGE FRONT EXT. WALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	<input type="text" value="13.0"/>	FT.	MAX WALL OPENING HT, H _c	<input type="text" value="7.0"/>	FT.		
WALL LENGTH, L	<input type="text" value="20.9"/>	FT.	QUALIFYING WALL LENGTH, L	<input type="text" value="4.9"/>	FT.	SHEARWALL ASSEMBLY	<input type="text" value="P1"/>

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	<input type="text" value="550"/>	LBS	<	ALLOWABLE SHEARWALL CAPACITY	<input type="text" value="1055"/>	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

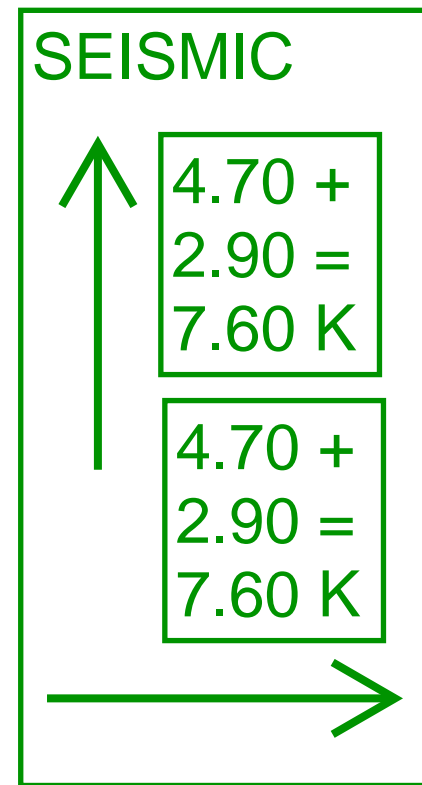
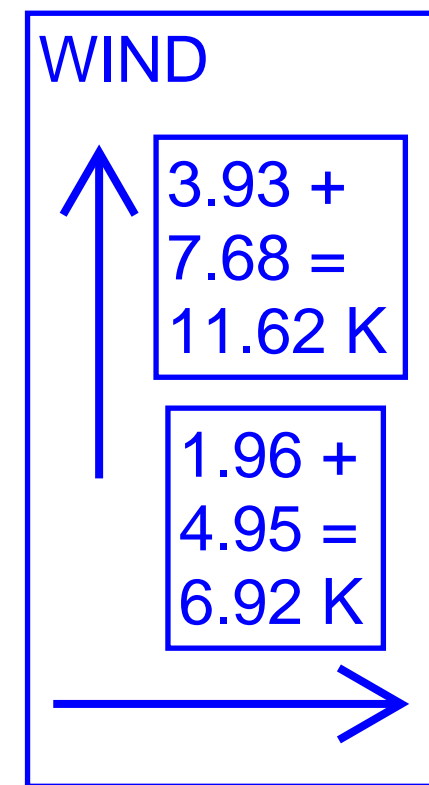
P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	<input type="text" value="100"/>	PLF	OVERTURNING MOMENT	<input type="text" value="7.2"/>	K-FT	HOLD DOWN DESIGN LOAD	<input type="text" value="0"/>	LBS
DL AT ENDS OF WALL	<input type="text" value="0"/>	LBS	RESISTIVE MOMENT	<input type="text" value="19.7"/>	K-FT	HOLD DOWN CAPACITY	<input type="text" value="0"/>	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SW #103
1.28 K
0.48 K
P1

SW #110
0.38 K
0.25 K
P1

SW #104
2.56 K
0.97 K
P1

SW #105
3.14 K
2.15 K
P1

SW #111
0.86 K
0.55 K
P1

SW #106
2.67 K
1.65 K
P1

SW #107
1.40 K
1.50 K
P1

SW #108
1.00 K
1.10 K
P1

SW #109
1.06 K
1.20 K
P1 - HD1

SW #102
1.97 K
2.35 K
P1

SW #101
2.22 K
3.00 K
P1

LEGEND

- ▬ INTERIOR BEARING WALL
- ▬ BEARING WALL ABOVE (B/A), OR SHEARWALL ABOVE (S/A)
- ▬ BEAM / HEADER
- ▬ INTERIOR SHEAR WALL PANEL OR EXTERIOR SHEAR WALL w/ 3" o.c. EDGE NAILING
- ⋯ INDICATES AREA OF ROOF OVERFRAMING
- JL METAL HANGER
- * INDICATES POST ABOVE. PROVIDE SOLID BLOCKING UNDER POST OR JAMB ABOVE.
- ▴ INDICATES HOLD-DOWN.

REFER TO S-0.0 FOR TYPICAL STRUCTURAL NOTES & SCHEDULES

HOLD-DOWN SCHEDULE

SYMBOL	SPECIFICATION
▴	HD-1 SIMPSON 5THD14 HOLD-DOWN



MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING
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p 619-660-0010 • mulhern+kulp.com

M&K project number: 251-22033
project mgr: NJM
drawn by: SAS
issue date: 10-14-22

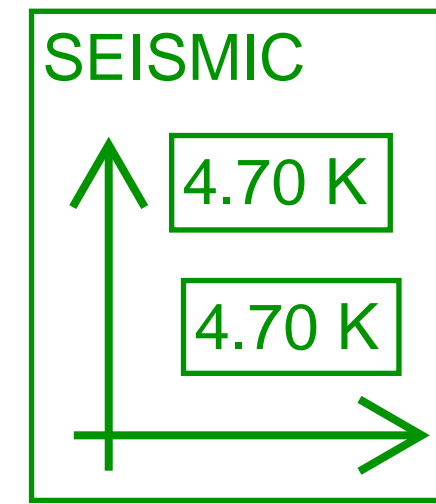
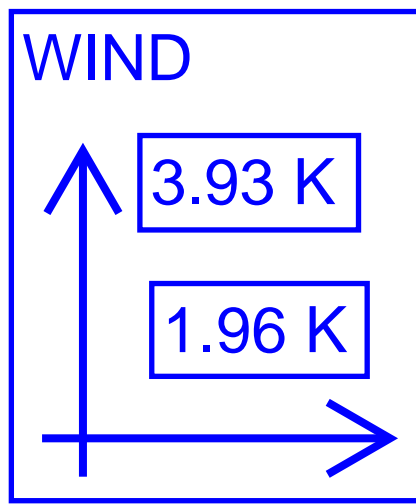
REVISIONS:
date: initial:

YEN DESIGN

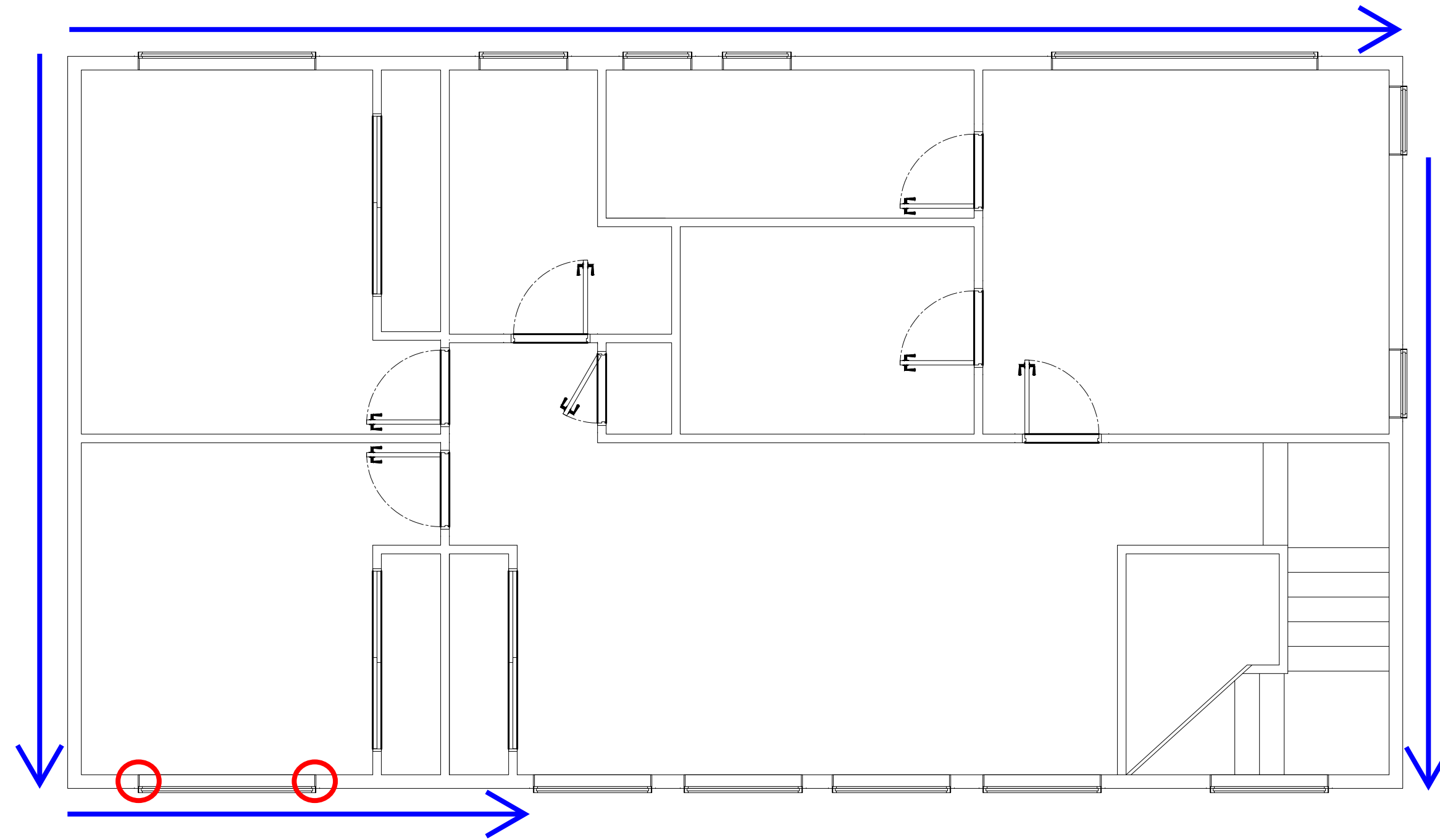
2ND FLOOR FRAMING PLAN
4029 97TH AVE SE
MERCER ISLAND, WA

sheet: **S-2.0**

2ND FLOOR FRAMING PLAN
SCALE: 1/4"=1'-0"



SW #204
1.97 K
2.35 K
P1



SW #201
0.98 K
2.42 K
P1

SW #203
1.96 K
2.35 K
P1

SW #202
0.98 K
2.28 K
P1

1 ROOF FRAMING PLAN
SCALE: 1/4"=1'-0"

LEGEND	
▬	INTERIOR BEARING WALL
▬	BEARING WALL ABOVE (B/A), OR SHEARWALL ABOVE (S/A)
▬	BEAM / HEADER
▬	INTERIOR SHEAR WALL PANEL OR EXTERIOR SHEAR WALL w/ 3" o.c. EDGE NAILING
⋯	INDICATES AREA OF ROOF OVERFRAMING
JL	METAL HANGER
*	INDICATES POST ABOVE. PROVIDE SOLID BLOCKING UNDER POST OR JAMB ABOVE.
▶	INDICATES HOLD-DOWN.

REFER TO S-0.0 FOR TYPICAL STRUCTURAL NOTES & SCHEDULES



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M&K project number:	251-22033
project mgr:	NJM
drawn by:	SAS
issue date:	10-14-22
REVISIONS:	
date:	initial:

YEN DESIGN

ROOF FRAMING PLAN
4029 97TH AVE SE
MERCER ISLAND, WA

sheet:
S-3.0