MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

7220 Trade Street, Suite 295, San Diego, CA 92121 ▸ p 619-650-0010 ▸ *mulhernkulp.com*

CALCULATION PACKAGE

August 31, 2023

JayMarc Homes
8446 SE 37th St
Dubey Residence

Mercer Island, Washington

MULHERN & KULP STRUCTURAL ENGINEERING, INC.

Prepared By:

John C. Leone, E.I.T.	*Staff Engineer*
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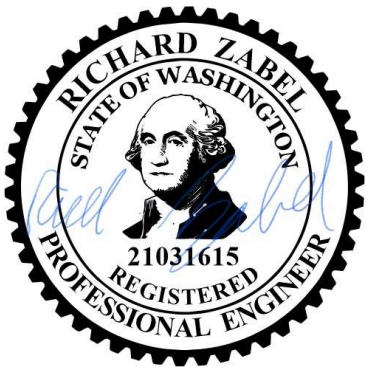


Signature, Seal & Date

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: 8434 SE 39th St
MERCER ISLAND, WA
M&K PROJECT #: 154-23001
ENGINEER: AJC
DATE: 03-MAY-23

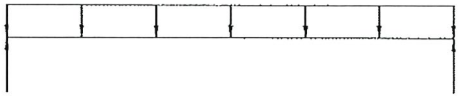
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: TYP EXT HDR — B1

PARAMETERS:

D=169
L=70
S=50

L = 9 FT
W = 0.336 KLF
P = — K



ANALYSIS:

R_{MAX} = 1.51 K V_D = [ ] K < V_{ALL} = 3.89 K ☑ ADEQUATE
M_{MAX} = 3.4 K-FT < M_{ALL} = 4.49 K-FT ☑ ADEQUATE
Δ_{TL} = 0.134 IN. L/ 805 < L/240 ☑ ADEQUATE

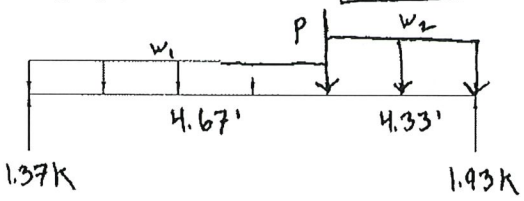
4 x 10 DF-L #2

BEAM DESCRIPTION: HDR @ PRIMARY REAR WINDOW - ROOF — B2

PARAMETERS:

D_1 = 44
S_1 = 64

L = 9 FT
W_1 = 0.108 KLF W_2 = 0.336
P = 1.34 K (G,T)



ANALYSIS:

D_2 = 136
S_2 = 200

R_{MAX} = 1.93 K V_D = [ ] K < V_{ALL} = 6.81 K ☑ ADEQUATE
M_{MAX} = 5.22 K-FT < M_{ALL} = 6.94 K-FT C_D = 1.15 ☑ ADEQUATE
Δ_{TL} = 0.149 IN. L/ 725 < L/240 ☑ ADEQUATE

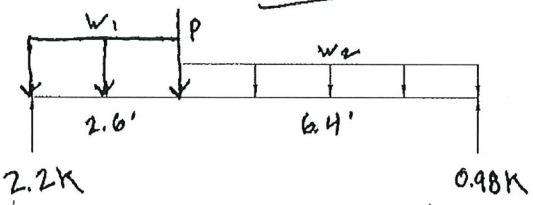
6 x 10 DF-L #2

BEAM DESCRIPTION: HDR @ BED 2 REAR WINDOW - ROOF — B3

PARAMETERS:

D_1 = 165
S_1 = 243

L = 9 FT
W_1 = 0.408 KLF W_2 = 0.092
P = 1.56 K (G,T)



ANALYSIS:

D_2 = 37
S_2 = 55

R_{MAX} = 2.23 K V_D = [ ] K < V_{ALL} = 4.47 K ☑ ADEQUATE
M_{MAX} = 4.41 K-FT < M_{ALL} = 5.17 K-FT C_D = 1.15 ☑ ADEQUATE
Δ_{TL} = 0.174 IN. L/ 621 < L/240 ☑ ADEQUATE

4 x 10 DF-L #2

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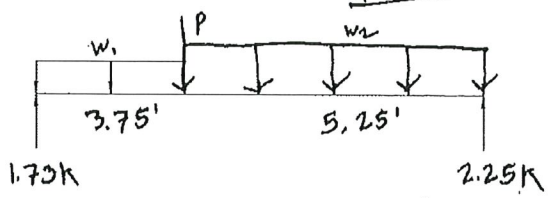
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: HDR @ W.I.C. FRONT WINDOW - ROOF — B4

PARAMETERS:

$D_1 = 52$
$S_1 = 76$

L = 9 FT
W_1 = 0.128 KLF $W_2 = 0.452$
P = 1.13 K (HIP G.T)



ANALYSIS:

$D_2 = 183$
$S_2 = 269$

R_{MAX} =	2.25 K	V_D =	K	< V_{ALL} =	6.81 K	✓ ADEQUATE
M_{MAX} =	5.60 K-FT	< M_{ALL} =	6.94 K-FT	$C_D = 1.15$		✓ ADEQUATE
Δ_{TL} =	0.160 IN.	L/	675	< L/240		✓ ADEQUATE

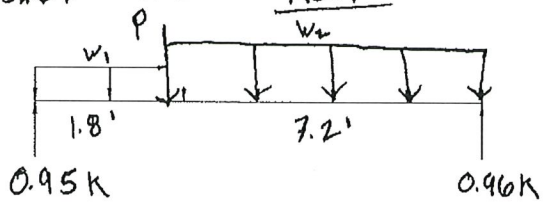
6 x 10 DF-L #2

BEAM DESCRIPTION: HDR @ STAIR SIDE WINDOW - ROOF — B5

PARAMETERS:

$D_1 = 35$
$S_1 = 51$

L = 9 FT
W_1 = 0.086 KLF $W_2 = 0.207$
P = 0.27 K (G.T)



ANALYSIS:

$D_2 = 84$
$S_2 = 123$

R_{MAX} =	0.96 K	V_D =	K	< V_{ALL} =	4.47 K	✓ ADEQUATE
M_{MAX} =	2.23 K-FT	< M_{ALL} =	5.17 K-FT	$C_D = 1.15$		✓ ADEQUATE
Δ_{TL} =	0.088 IN.	L/	999+	< L/240		✓ ADEQUATE

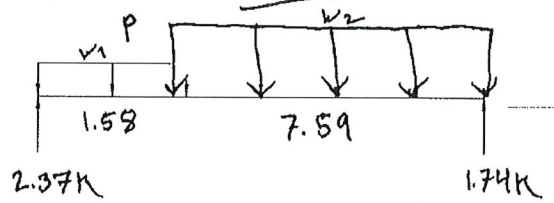
4 x 10 DF-L #2

BEAM DESCRIPTION: HDR @ COVERED DECK SGD - ROOF — B6

PARAMETERS:

$D_1 = 57$
$S_1 = 84$

L = 9.17 FT
W = 0.141 KLF $W_2 = 0.336$
P = 1.34 K (G.T)



ANALYSIS:

$D_2 = 136$
$S_2 = 200$

R_{MAX} =	2.37 K	V_D =	K	< V_{ALL} =	4.47 K	✓ ADEQUATE
M_{MAX} =	4.51 K-FT	< M_{ALL} =	5.17 K-FT	$C_D = 1.15$		✓ ADEQUATE
Δ_{TL} =	0.185 IN.	L/	595	< L/240		✓ ADEQUATE

4 x 10 DF-L #2

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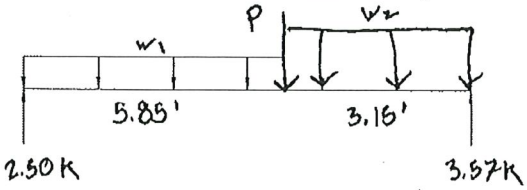
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: HDR @ GARAGE REAR WINDOW – UPPER B7

PARAMETERS:

$D_1 = 217$
$L_1 = 233$
$D_2 = 353$
$L_2 = 233$
$S_2 = 200$

L = 9 FT
W_1 = 0.392 KLF $W_2 = 0.678$
P = 1.93 K (B2)



ANALYSIS:

R_{MAX} =	3.57 K	V_D =	K	< V_{ALL} =	8.24 K	✓ ADEQUATE
M_{MAX} =	7.92 K-FT	< M_{ALL} =	10.16 K-FT	$C_D = 1.15$		✓ ADEQUATE
Δ_{TL} =	0.127 IN.	L/	850	< L/240		✓ ADEQUATE

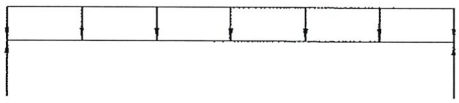
6 x 12 DF-L # 2

BEAM DESCRIPTION: FLUSH BM. @ PRIMARY COVERED DECK – UPPER B8

PARAMETERS:

$D = 229$
$S = 153$

L = 5.5 FT
W = 0.382 KLF
P = — K



ANALYSIS:

R_{MAX} =	1.05 K	V_D =	K	< V_{ALL} =	12.91 K	✓ ADEQUATE
M_{MAX} =	1.44 K-FT	< M_{ALL} =	27.84 K-FT	$C_D = 1.15$		✓ ADEQUATE
Δ_{TL} =	0.002 IN.	L/	999+	< L/240		✓ ADEQUATE

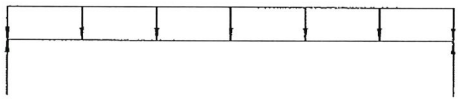
5 1/4"x11 1/4" LVL

BEAM DESCRIPTION: TYP. DECK JOIST @ CURD. DECK – UPPER B9

PARAMETERS:

$D = 33$
$L = 80$

L = 5.5 FT
W = — KLF
P = — K



ANALYSIS:

R_{MAX} =	0.31 K	V_D =	K	< V_{ALL} =	1.39 K	✓ ADEQUATE
M_{MAX} =	0.43 K-FT	< M_{ALL} =	1.92 K-FT	$C_r = 1.15$		✓ ADEQUATE
Δ_{TL} =	0.018 IN.	L/	999 +	< L/240		✓ ADEQUATE

2 x 12 HF #2 @ 16" o.c. (9½" MIN. DEPTH)

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BEAM & HEADER CALCULATIONS

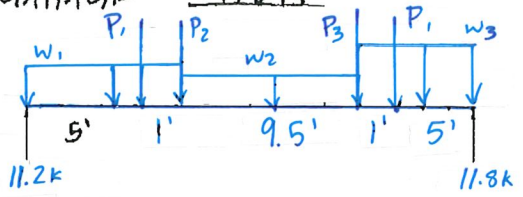
BEAM DESCRIPTION: FLUSH BM. @ GARAGE - UPPER — B10

PARAMETERS:

L = 21.5 FT

W_1 = 0.76 KLF (W_2 = 0.69, W_3 = 0.95)

P_1 = 1.05 K (P_2 = 2.4, P_3 = 1.7)



ANALYSIS:

R_{MAX} =	11.8 K	V_D =		K	< V_{ALL} =	25.14 K	✓ ADEQUATE
M_{MAX} =	61.1 K-FT	< M_{ALL} =	99.3	K-FT	(C_D=1.15, C_V=0.93)		✓ ADEQUATE
Δ_{TL} =	0.541 IN.	L/	477	< L/240			✓ ADEQUATE

5½ x 22½ GLB

BEAM DESCRIPTION: GARAGE DOOR HDR - UPPER — B11

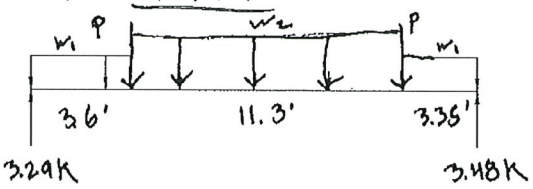
PARAMETERS:

D_1 = 47, L_1 = 83

L = 18.25 FT

W_1 = 0.109 KLF (W_2 = 0.364)

P = 1.05 K



ANALYSIS:

D_2 = 203, L_2 = 165, S_2 = 50

R_{MAX} =	3.48 K	V_D =		K	< V_{ALL} =	16.8 K	✓ ADEQUATE
M_{MAX} =	16.3 K-FT	< M_{ALL} =	46.7	K-FT	(C_D=1.15)		✓ ADEQUATE
Δ_{TL} =	0.351 IN.	L/	624	< L/240	(C_V=0.985)		✓ ADEQUATE

5½" x 15" GLB

BEAM DESCRIPTION: FLUSH BM. @ STAIR OPENING - UPPER — B12

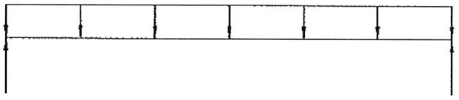
PARAMETERS:

D = 22, L = 44

L = 8.95 FT

W = 0.066 KLF

P = — K



ANALYSIS:

R_{MAX} =	0.30 K	V_D =		K	< V_{ALL} =	11.1 K	✓ ADEQUATE
M_{MAX} =	0.66 K-FT	< M_{ALL} =	37.8	K-FT			✓ ADEQUATE
Δ_{TL} =	0.003 IN.	L/	999+	< L/240			✓ ADEQUATE

3½" x 18" GLB

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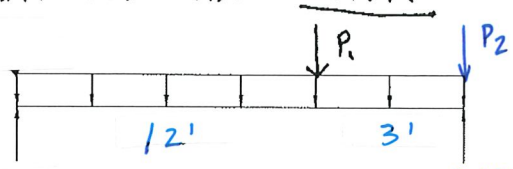
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: FLUSH BM. @ STAIR SIDE WALL - UPPER — B13

PARAMETERS:

L = 15 FT
W = 0.307 KLF
P_1 = 0.3 K (B12)
P_2 = 1.83 G.T.



ANALYSIS:

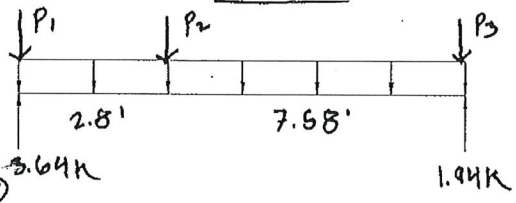
R_{MAX} =	4.4 K	V_D =	K	< V_{ALL} =	20.11 K	☑ ADEQUATE
M_{MAX} =	9.3 K-FT	< M_{ALL} =	67.36 K-FT	C_D = 1.15		☑ ADEQUATE
Δ_{TL} =	0.078 IN.	L/	999+	< L/240		☑ ADEQUATE

5 1/2" x 18" GLB

BEAM DESCRIPTION: FLUSH BM. @ STAIR SIDE - UPPER — B14

PARAMETERS:

L = 10.38 FT
W = 0.307 KLF
P_1 = 1.83 K (G.T.)
P_2 = 0.3 (B12) P_3 = 0.27 (G.T.)



ANALYSIS:

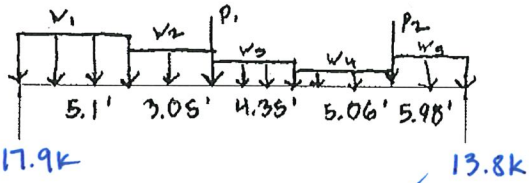
R_{MAX} =	3.64 K	V_D =	K	< V_{ALL} =	20.1 K	☑ ADEQUATE
M_{MAX} =	4.54 K-FT	< M_{ALL} =	68.3 K-FT	C_D = 1.15		☑ ADEQUATE
Δ_{TL} =	0.018 IN.	L/	999+	< L/240		☑ ADEQUATE

5 1/2" x 18" GLB

BEAM DESCRIPTION: FLUSH BM @ ENTRY, GRT. RM. - UPPER — B15

PARAMETERS:

L = 23.64 FT (SEE ENERCALC OUTPUT)
W = KLF
P_1 = 2.81 K (B13)
P_2 = 3.64K (B14)



ANALYSIS:

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

W16x40

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BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: TYP LANDING JOIST - UPPER — B16

PARAMETERS:

D=13
L=40

L = 5 FT
W = 0.053 KLF
P = — K

ANALYSIS:

R_{MAX} = 0.13 K V_D = — K < V_{ALL} = 1.39 K ☑ ADEQUATE
M_{MAX} = 0.17 K-FT < M_{ALL} = 1.67 K-FT ☑ ADEQUATE
Δ_{TL} = 0.006 IN. L/ 999+ < L/240 ☑ ADEQUATE

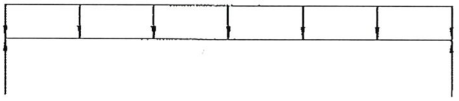
2 x 10 HF #2 @ 16" O.C.

BEAM DESCRIPTION: FLUSH BM. @ STAIR LANDING - UPPER — B17

PARAMETERS:

D=25
L=75

L = 8.58 FT
W = 0.100 KLF
P = — K



ANALYSIS:

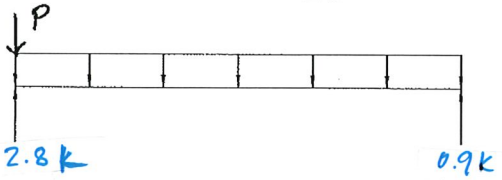
R_{MAX} = 0.43 K V_D = — K < V_{ALL} = 3.89 K ☑ ADEQUATE
M_{MAX} = 0.92 K-FT < M_{ALL} = 4.49 K-FT ☑ ADEQUATE
Δ_{TL} = 0.032 IN. L/ 999+ < L/240 ☑ ADEQUATE

4 x 10 DF-L #2

BEAM DESCRIPTION: FLUSH BM. @ JUNIOR SUITE - UPPER — B18

PARAMETERS:

L = 4 FT
W = 0.4 KLF
P = 2.1 K



ANALYSIS:

R_{MAX} = 2.8 K V_D = — K < V_{ALL} = 12.8 K ☑ ADEQUATE
M_{MAX} = 0.8 K-FT < M_{ALL} = 43.47 K-FT C_D = 1.15 ☑ ADEQUATE
Δ_{TL} = 0.001 IN. L/ 999+ < L/240 ☑ ADEQUATE

3 ½" x 18" GLB

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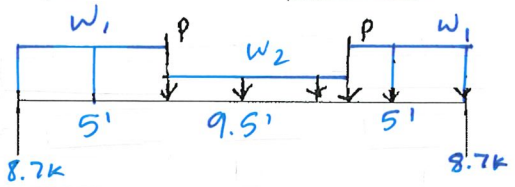
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: FLUSH BM. @ JUNIOR SUITE - UPPER — B19

PARAMETERS:

L =	19.5	FT
W_1 =	0.681	KLF (W_2 = 0.523)
P =	2.8	K



ANALYSIS:

R_{MAX} =	8.7	K	V_D =		K	< V_{ALL} = 20.11 K	☑ ADEQUATE
M_{MAX} =	40.84	K-FT	< M_{ALL} =	65.62	K-FT		☑ ADEQUATE
Δ_{TL} =	0.55	IN.	L/	428	< L/240		☑ ADEQUATE

5 1/2" x 18" GLB

BEAM DESCRIPTION: DROPPED BM. @ ENTRY LOW ROOF - UPPER — B20

PARAMETERS:

L =	5.75	FT
W =	0.326	KLF
P =	—	K

D=132
S=194

ANALYSIS:

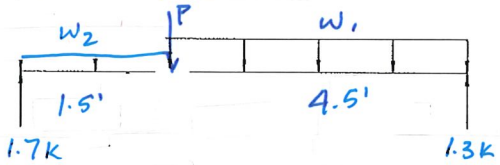
R_{MAX} =	0.94	K	V_D =		K	< V_{ALL} = 2.66 K	☑ ADEQUATE
M_{MAX} =	1.35	K-FT	< M_{ALL} =	1.98	K-FT	Cp=1.15	☑ ADEQUATE
Δ_{TL} =	0.103	IN.	L/	670	< L/240		☑ ADEQUATE

4x6 DF-L #2

BEAM DESCRIPTION: BATH 2 EXT HDR - ROOF — B21

PARAMETERS:

L =	6	FT
W_1 =	0.336	KLF (W_2 = 0.1)
P =	1.3	K



ANALYSIS:

R_{MAX} =	1.7	K	V_D =		K	< V_{ALL} = 4.47 K	☑ ADEQUATE
M_{MAX} =	2.5	K-FT	< M_{ALL} =	5.17	K-FT		☑ ADEQUATE
Δ_{TL} =	0.049	IN.	L/	999+	< L/240		☑ ADEQUATE

4x10

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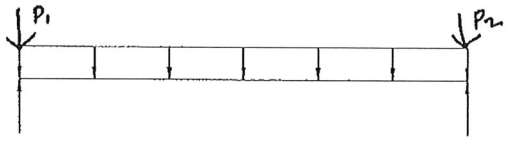
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: WINDOW HDR @ DINING - UPPER — B22

PARAMETERS:

D=242
L=285

L = 9 FT
W = 0.527 KLF
P_1 = 2.2K K (B3)
P_2 = 0.98 (B3)



ANALYSIS:

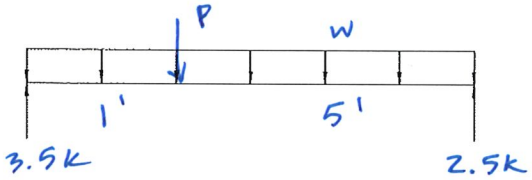
R_{MAX} = 4.57 K V_D = [ ] K < V_{ALL} = 5.92 K ☑ ADEQUATE
M_{MAX} = 5.34 K-FT < M_{ALL} = 6.03 K-FT ☑ ADEQUATE
Δ_{TL} = 0.152 IN. L/ 711 < L/240 ☑ ADEQUATE

6 x 10 DF-L #2

BEAM DESCRIPTION: WNDW HDR @ KITCHEN - UPPER — B23

PARAMETERS:

L = 6 FT
W = 0.762 KLF
P = 1.5 K



ANALYSIS:

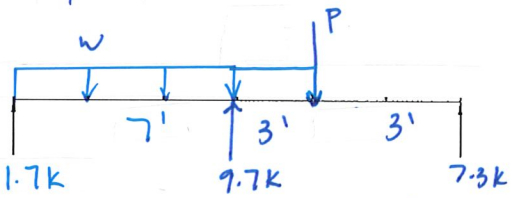
R_{MAX} = 3.5 K V_D = [ ] K < V_{ALL} = 3.89 K ☑ ADEQUATE
M_{MAX} = 3.3 K-FT < M_{ALL} = 4.49 K-FT ☑ ADEQUATE
Δ_{TL} = 0.058 IN. L/ 999+ < L/240 ☑ ADEQUATE

4x10

BEAM DESCRIPTION: FLUSH BM @ STUDY - MAIN — B24

PARAMETERS:

L = 13 FT
W = 0.48 KLF
P = 13.8 K



ANALYSIS:

R_{MAX} = 9.7 K V_D = 8.0 K < V_{ALL} = 20.11 K ☑ ADEQUATE
M_{MAX} = 21.9 K-FT < M_{ALL} = 68.31 K-FT ☑ ADEQUATE
Δ_{TL} = 0.022 IN. L/ 999+ < L/240 ☑ ADEQUATE

5 1/2 x 18 GLB

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: DUBEY RESIDENCE
JAYMARC HOMES
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 29-APR-23

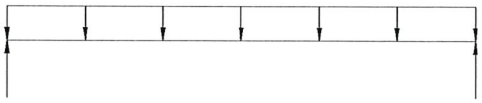
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: 1ST FLR FRMG - FLUSH BM @ STAIR LANDING

B25

PARAMETERS:

L = 8 FT
W = 0.2 KLF
P = — K



ANALYSIS:

R_{MAX} =	0.8 K	V_D =	K	< V_{ALL} =	11.13 K	☑ ADEQUATE
M_{MAX} =	1.6 K-FT	< M_{ALL} =	37.8 K-FT	(C_D=1.0)		☑ ADEQUATE
Δ_{TL} =	0.006 IN.	L/	999+	< L/240		☑ ADEQUATE

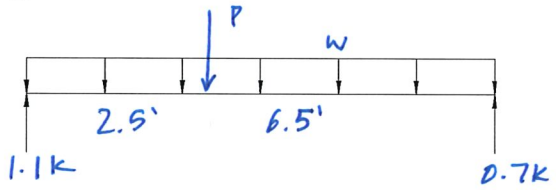
3 1/2 x 18 GLB

BEAM DESCRIPTION: 1ST FLR FRMG - FLUSH BM @ STAIRS

B26

PARAMETERS:

L = 9 FT
W = 0.11 KLF
P = 0.8 K



ANALYSIS:

R_{MAX} =	1.1 K	V_D =	K	< V_{ALL} =	11.13 K	☑ ADEQUATE
M_{MAX} =	2.3 K-FT	< M_{ALL} =	37.8 K-FT	(C_D=1.0)		☑ ADEQUATE
Δ_{TL} =	0.005 IN.	L/	999+	< L/240		☑ ADEQUATE

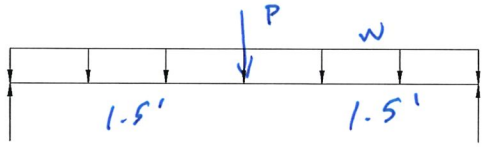
3 1/2 x 18 GLB

BEAM DESCRIPTION: FLR FRMG - WORST CASE INT HDR

B27

PARAMETERS:

L = 3 FT
W = 1.0 KLF
P = 0.7 K



ANALYSIS:

R_{MAX} =	1.15 K	V_D =	K	< V_{ALL} =	3.89 K	☑ ADEQUATE
M_{MAX} =	1.73 K-FT	< M_{ALL} =	4.49 K-FT	(C_D=1.0)		☑ ADEQUATE
Δ_{TL} =	0.005 IN.	L/	999+	< L/240		☑ ADEQUATE

4x10

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: DUBEY RESIDENCE
JAYMARC HOMES
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 29-APR-23

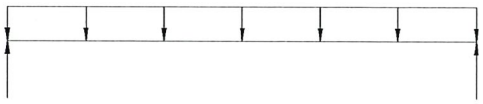
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: 1ST FLR FRMG - EXT WNDW HDR @ PLAY ROOM

B28

PARAMETERS:

L = 9 FT
W = 0.52 KLF
P = — K



ANALYSIS:

R_{MAX} =	2.34 K	V_D =	K	< V_{ALL} =	5.92 K	☑ ADEQUATE
M_{MAX} =	5.3 K-FT	< M_{ALL} =	6.03 K-FT	(C_D=1.0)		☑ ADEQUATE
Δ_{TL} =	0.151 IN.	L/	714	< L/240		☑ ADEQUATE

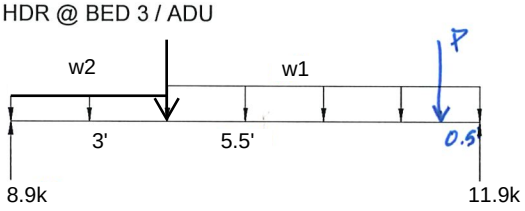
6 x 10

BEAM DESCRIPTION: 1ST FLR FRMG - EXT WNDW HDR @ BED 3 / ADU

B29

PARAMETERS:

L = 9 FT
w1= 1.7 KLF w2=1.2
P = 3.5 K



ANALYSIS:

R_{MAX} =	11.9 K	V_D =	K	< V_{ALL} =	13.41 K	☑ ADEQUATE
M_{MAX} =	22.3 K-FT	< M_{ALL} =	30.36 K-FT	(C_D=1.15)		☑ ADEQUATE
Δ_{TL} =	0.228 IN.	L/	475	< L/240		☑ ADEQUATE

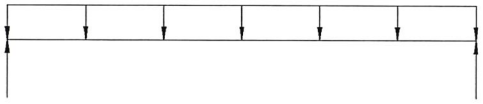
5 1/2 x 12 GLB

BEAM DESCRIPTION: 2ND FLR FRMG - DINING SGD HDR

B30

PARAMETERS:

L = 12.5 FT
W = 0.3 KLF
P = — K



ANALYSIS:

R_{MAX} =	1.9 K	V_D =	K	< V_{ALL} =	8.24 K	☑ ADEQUATE
M_{MAX} =	5.9 K-FT	< M_{ALL} =	10.16 K-FT	(C_D=1.15)		☑ ADEQUATE
Δ_{TL} =	0.183 IN.	L/	819	< L/240		☑ ADEQUATE

6 x 12

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: DUBEY RESIDENCE
JAYMARC HOMES
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 29-APR-23

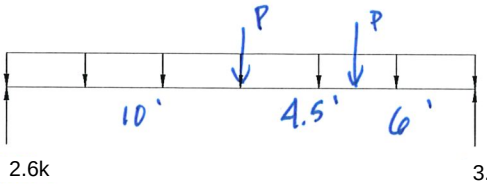
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: 1ST FLR FRMG - FLUSH BM @ STAIR LANDING

B31

PARAMETERS:

L = 20.5 FT
W = 0.173 KLF
P = 1.0 K



ANALYSIS:

R_{MAX} =	3.0 K	V_D =		K	< V_{ALL} =	17.5 K	☑ ADEQUATE
M_{MAX} =	17.35 K-FT	< M_{ALL} =	56.8	K-FT	(C_D=1.0)		☑ ADEQUATE
Δ_{TL} =	0.273 IN.	L/	902	< L/240			☑ ADEQUATE

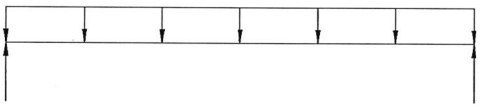
5 1/2 x 18 GLB

BEAM DESCRIPTION: TYP. DROPPED BM. - CRAWL

B32

PARAMETERS:

L = 6.4 FT
W = 0.389 KLF
P = - K



ANALYSIS:

R_{MAX} =	1.24 K	V_D =		K	< V_{ALL} =	3.89 K	☑ ADEQUATE
M_{MAX} =	1.99 K-FT	< M_{ALL} =	4.49	K-FT	(C_D=1.0)		☑ ADEQUATE
Δ_{TL} =	0.040 IN.	L/	999+	< L/240			☑ ADEQUATE

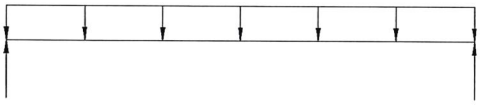
4x10 DF-L #2

BEAM DESCRIPTION:

B33

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	(C_D=)		☑ ADEQUATE
Δ_{TL} =	IN.	L/		< L/240			☑ ADEQUATE

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING
7220 Trade Street, Suite 295 ▸ San Diego, CA 92121
p 619-650-0010 ▸ mulhernkulp.com

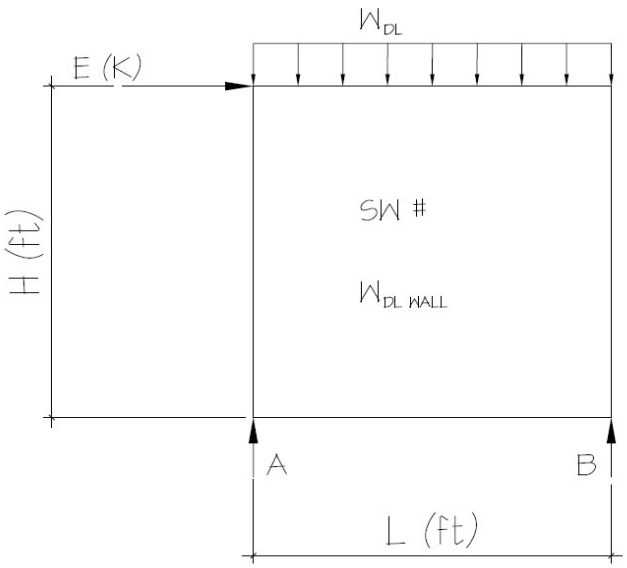
PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: AJC
DATE: 27-MAR-23

OVERSTRENGTH CALCULATIONS

WALL DESCRIPTION/SW #: 302

PARAMETERS:

L =	17.0	FT
H =	9.1	FT
E =	1.60	K
W_{DLWALL} =	0.10	KLF
W_{DL} =	0.108	KLF
Ω_0 =	2.5	(ASCE TABLE 12.2.1 FOOTNOTE G)
SDS =	1.126	



ANALYSIS:

$E_{MH} = \Omega_0 * E$ =	4.00 K	$E_V = 0.2*SDS*DL$ =	0.796 K
$E_M = E_{MH} + E_V$		$E_M = E_{MH} + E_V$ =	4.796 K
$E_M = E_{MH} - E_V$		$E_M = E_{MH} - E_V$ =	3.204 K

E_M (MAX) $= \sum M_A = 0$ =	4.80(9.1) + 0.208(17)(8.5) - R_B(17)	R_B =	1.8DL + 2.6E
		R_A =	1.8DL - 2.6E
E_M (MIN) $= \sum M_A = 0$ =	3.20(9.1) + 0.208(17)(8.5) - R_B(17)	R_B =	1.8DL + 1.7E
		R_A =	1.8DL - 1.7E

CHECK BEAMS FOR AXIAL FORCES SHOWN USING LOAD COMBOS PER SECTION 12.4.3.1 (ASD)

ALLOWABLE STESS PERMITTED TO BE INCREASED BY 1.2

SEE FOLLOWING BEAM CALCS FOR LOAD APPLICATION

Steel Beam

Project File: OVERSTRENGTH.ec6

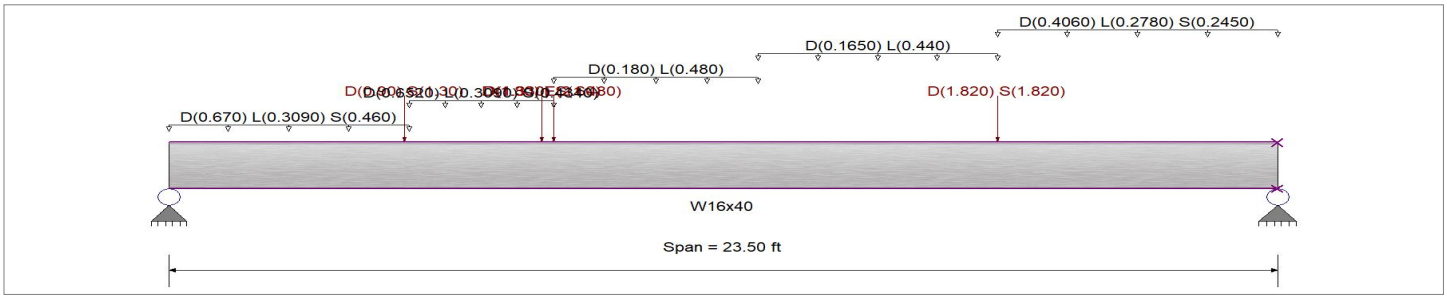
DESCRIPTION: B15 - 2ND FLR FRMG - FLUSH BM @ ENTRY / GREAT ROOM

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Load for Span Number 1

Uniform Load : D = 0.670, L = 0.3090, S = 0.460 k/ft, Extent = 0.0 -->> 5.10 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.6520, L = 0.3090, S = 0.4340 k/ft, Extent = 5.10 -->> 8.150 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.180, L = 0.480 k/ft, Extent = 8.150 -->> 12.50 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.1650, L = 0.440 k/ft, Extent = 12.50 -->> 17.560 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.4060, L = 0.2780, S = 0.2450 k/ft, Extent = 17.560 -->> 23.50 ft, Tributary Width = 1.0 ft

Point Load : D = 1.330, S = 1.480 k @ 8.150 ft

Point Load : D = 1.820, S = 1.820 k @ 17.560 ft

Point Load : D = 1.80, E = 2.60 k @ 7.90 ft, (SW#302 O.S.)

Point Load : D = 0.90, S = 1.30 k @ 5.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.525 : 1	Maximum Shear Stress Ratio =	0.183 : 1
Section used for this span	W16x40	Section used for this span	W16x40
Ma : Applied	95.640 k-ft	Va : Applied	17.899 k
Mn / Omega : Allowable	182.136 k-ft	Vn/Omega : Allowable	97.60 k
Load Combination	+1.090D+0.750L+0.750S+0.5250E	Load Combination	+1.090D+0.750L+0.750S+0.5250E
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.180 in	Ratio =	1,564	>=360	
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360	Span: 1 : L Only
Max Downward Total Deflection	0.625 in	Ratio =	451	>=180	Span: 1 : +1.090D+0.750L+0.750S+0.5250E
Max Upward Total Deflection	0.000 in	Ratio =	0	<180	

DESCRIPTION: B15 - 2ND FLR FRMG - FLUSH BM @ ENTRY / GREAT ROOM

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 23.50 ft	1	0.252	0.090	45.85		45.85	304.17	182.14	1.00	1.00	8.75	146.40	97.60
+D+L													
Dsgn. L = 23.50 ft	1	0.391	0.133	71.20		71.20	304.17	182.14	1.00	1.00	13.01	146.40	97.60
+D+Lr													
Dsgn. L = 23.50 ft	1	0.252	0.090	45.85		45.85	304.17	182.14	1.00	1.00	8.75	146.40	97.60
+D+S													
Dsgn. L = 23.50 ft	1	0.400	0.148	72.84		72.84	304.17	182.14	1.00	1.00	14.43	146.40	97.60
+D+0.750Lr+0.750L													
Dsgn. L = 23.50 ft	1	0.355	0.122	64.59		64.59	304.17	182.14	1.00	1.00	11.95	146.40	97.60
+D+0.750L+0.750S													
Dsgn. L = 23.50 ft	1	0.464	0.166	84.49		84.49	304.17	182.14	1.00	1.00	16.21	146.40	97.60
+D+0.60W													
Dsgn. L = 23.50 ft	1	0.252	0.090	45.85		45.85	304.17	182.14	1.00	1.00	8.75	146.40	97.60
+1.126D+0.70E													
Dsgn. L = 23.50 ft	1	0.335	0.113	61.04		61.04	304.17	182.14	1.00	1.00	11.06	146.40	97.60
+1.126D-0.70E													
Dsgn. L = 23.50 ft	1	0.232	0.089	42.25		42.25	304.17	182.14	1.00	1.00	8.65	146.40	97.60
+D+0.750Lr+0.750L+0.450W													
Dsgn. L = 23.50 ft	1	0.355	0.122	64.59		64.59	304.17	182.14	1.00	1.00	11.95	146.40	97.60
+D+0.750L+0.750S+0.450W													
Dsgn. L = 23.50 ft	1	0.464	0.166	84.49		84.49	304.17	182.14	1.00	1.00	16.21	146.40	97.60
+1.090D+0.750L+0.750S+0.5250I													
Dsgn. L = 23.50 ft	1	0.525	0.183	95.64		95.64	304.17	182.14	1.00	1.00	17.90	146.40	97.60
+1.090D+0.750L+0.750S-0.5250E													
Dsgn. L = 23.50 ft	1	0.449	0.165	81.75		81.75	304.17	182.14	1.00	1.00	16.09	146.40	97.60
+0.60D+0.60W													
Dsgn. L = 23.50 ft	1	0.151	0.054	27.51		27.51	304.17	182.14	1.00	1.00	5.25	146.40	97.60
+0.470D+0.70E													
Dsgn. L = 23.50 ft	1	0.170	0.055	31.01		31.01	304.17	182.14	1.00	1.00	5.32	146.40	97.60
+0.470D-0.70E													
Dsgn. L = 23.50 ft	1	0.070	0.030	12.66		12.66	304.17	182.14	1.00	1.00	2.90	146.40	97.60

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+1.090D+0.750L+0.750S+0.5250I	1	0.6252	11.414		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	17.899	13.783
Max Upward from Load Combinations	17.899	13.783
Max Upward from Load Cases	8.751	6.534
D Only	8.751	6.534
+D+L	13.014	10.755
+D+Lr	8.751	6.534
+D+S	14.427	10.583
+D+0.750Lr+0.750L	11.949	9.700
+D+0.750L+0.750S	16.206	12.736
+D+0.60W	8.751	6.534
+1.126D+0.70E	11.062	7.969
+D+0.750Lr+0.750L+0.450W	11.949	9.700
+D+0.750L+0.750S+0.450W	16.206	12.736
+1.090D+0.750L+0.750S+0.5250E	17.899	13.783
+0.60D+0.60W	5.251	3.920
+0.470D+0.70E	5.321	3.683
D Only	8.751	6.534
L Only	4.263	4.221
S Only	5.676	4.049
E Only	1.726	0.874
H Only		

Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 10' CANT'D WALL @ SLAB

Code Reference

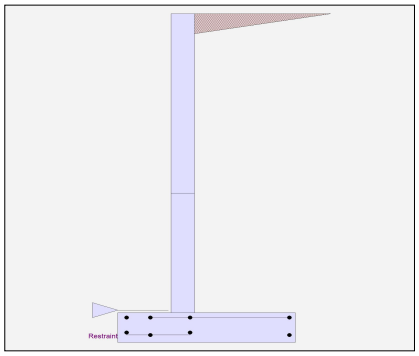
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	10.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	0.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	250.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Earth Pressure Seismic Load

Method : Uniform		
Multiplier Used	=	8.000
(Multiplier used on soil density)		
Uniform Seismic Force	=	88.000
Total Seismic Force	=	968.000

Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 10' CANT'D WALL @ SLAB

Design Summary

Wall Stability Ratios

Overturning	=	1.70	OK
Slab Resists All Sliding !			
Global Stability	=	1.55	
Total Bearing Load	=	5,801 lbs	
...resultant ecc.	=	10.13 in	
Eccentricity outside middle third			
Soil Pressure @ Toe	=	1,959 psf	NG
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	1,500 psf	
Soil Pressure Exceeds Allowable!			
ACI Factored @ Toe	=	2,743 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	18.2 psi	OK
Footing Shear @ Heel	=	31.4 psi	OK
Allowable	=	75.0 psi	

PLEASE NOTE 1/3 INCREASE UTILIZED IN SOIL BEARING DUE TO SEISMIC LOADING.

Sliding Calcs

Lateral Sliding Force	=	2,795.1 lbs

Vertical component of active lateral soil pressure IS considered in the calculation of soil bearing pressures.

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		2nd	Bottom		
		Stem OK	Stem OK		
Design Height Above Ftg	ft =	4.00	0.00		
Wall Material Above "Ht"	=	Concrete	Concrete		
Design Method	=	SD	SD	SD	SD
Thickness	=	8.00	8.00		
Rebar Size	=	# 5	# 5		
Rebar Spacing	=	12.00	6.00		
Rebar Placed at	=	6.5 in	6.5 in		
Design Data					
fb/FB + fa/Fa	=	**0.420**	**0.853**		
Total Force @ Section					
Service Level	lbs =				
Strength Level	lbs =	1,536.0	3,680.0		
Moment....Actual					
Service Level	ft-# =				
Strength Level	ft-# =	3,600.0	13,733.3		
Moment.....Allowable	ft-# =	8,557.2	16,093.8		
Shear.....Actual					
Service Level	psi =				
Strength Level	psi =	19.7	47.2		
Shear.....Allowable	psi =	75.0	75.0		
Anet (Masonry)	in2 =				
Wall Weight	psf =	100.0	100.0		
Rebar Depth 'd'	in =	6.50	6.50		

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	2,500.0	2,500.0
Fy	psi =	60,000.0	60,000.0

DESCRIPTION: 10' CANT'D WALL @ SLAB

Concrete Stem Rebar Area Details

2nd Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.1294 in2/ft		
(4/3) * As :	0.1726 in2/ft	Min Stem T&S Reinf Area 1.152 in2	
200bd/fy : 200(12)(6.5)/60000 :	0.26 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft	
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.1728 in2/ft	#4@ 12.50 in	#4@ 25.00 in
Provided Area :	0.31 in2/ft	#5@ 19.38 in	#5@ 38.75 in
Maximum Area :	0.8805 in2/ft	#6@ 27.50 in	#6@ 55.00 in

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.4937 in2/ft		
(4/3) * As :	0.6583 in2/ft	Min Stem T&S Reinf Area 0.768 in2	
200bd/fy : 200(12)(6.5)/60000 :	0.26 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft	
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.4937 in2/ft	#4@ 12.50 in	#4@ 25.00 in
Provided Area :	0.62 in2/ft	#5@ 19.38 in	#5@ 38.75 in
Maximum Area :	0.8805 in2/ft	#6@ 27.50 in	#6@ 55.00 in

Footing Data

Toe Width	=	1.50 ft
Heel Width	=	3.50
Total Footing Width	=	5.00
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe		Heel	
Factored Pressure	=	2,743		0 psf	
Mu' : Upward	=	2,775		2,023 ft-#	
Mu' : Downward	=	203		10,258 ft-#	
Mu: Design	=	2,573	OK	8,235 ft-#	OK
phiMn	=	22,203		13,005 ft-#	
Actual 1-Way Shear	=	18.20		31.40 psi	
Allow 1-Way Shear	=	75.00		75.00 psi	

Toe Reinforcing = # 5 @ 6.00 in
Heel Reinforcing = # 5 @ 12.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Heel: #4@ 9.03 in, #5@ 13.99 in, #6@ 19.86 in, #7@ 27.09 in, #8@ 35.66 in, #9@ 45.15 in, #10@ 57.34 in

Key: No key defined

Min footing T&S reinf Area 1.30 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 10' CANT'D WALL @ SLAB

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		2,117.5	3.67	7,764.2	Soil Over HL (ab. water tbl)	3,116.7	3.58	11,168.1
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		3.58	11,168.1
Hydrostatic Force					Water Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	=		
Added Lateral Load	=				* Axial Live Load on Stem	=		
Load @ Stem Above Soil	=				Soil Over Toe	=		
Seismic Earth Load	=	677.6	5.50	3,726.8	Surcharge Over Toe	=		
	=				Stem Weight(s)	=	1,000.0	1.83	1,833.3
					Earth @ Stem Transitions	=			
Total	=	2,795.1	**O.T.M.** =	11,491.0	Footing Weight	=	750.0	2.50	1,875.0
					Key Weight	=			
					Vert. Component	=	934.7	5.00	4,673.5
					Total =		5,801.4 lbs	**R.M.=**	19,549.9

Resisting/Overturning Ratio = **1.70**

Vertical Loads used for Soil Pressure = 5,801.4 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

If seismic is included, the OTM and sliding ratios may be 1.1 per section 1807.2.3 of IBC.

Vertical component of active lateral soil pressure IS considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.109	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

DESCRIPTION: 10' CANT'D WALL @ SLAB

Rebar Lap & Embedment Lengths Information

Stem Design Segment: 2nd
Stem Design Height: 4.00 ft above top of footing

Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	23.40 in
Development length for #5 bar specified in this stem design segment =	18.00 in

---

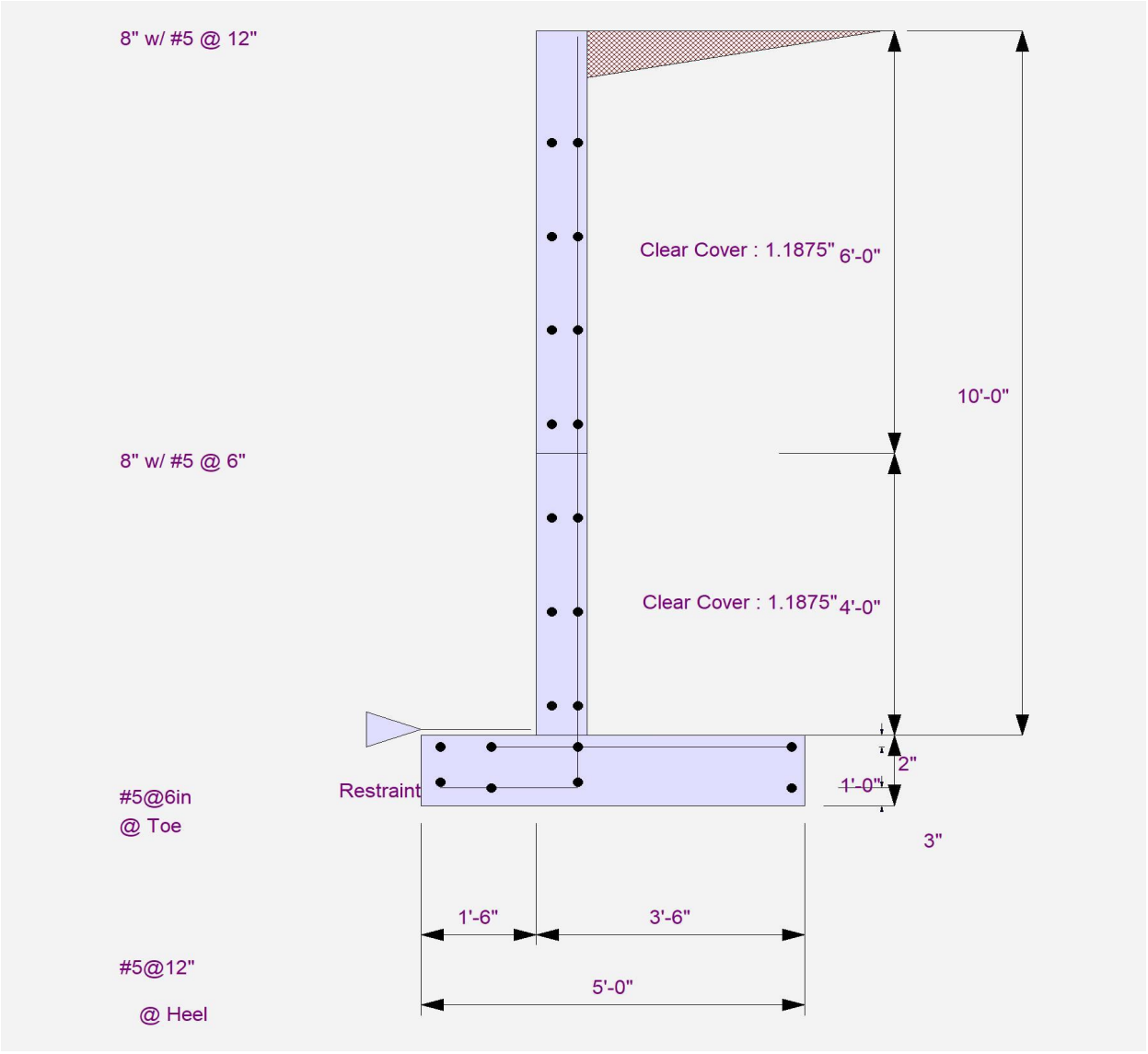
Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	23.40 in
Development length for #5 bar specified in this stem design segment =	18.00 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	8.36 in
As Provided =	0.6200 in2/ft
As Required =	0.4937 in2/ft

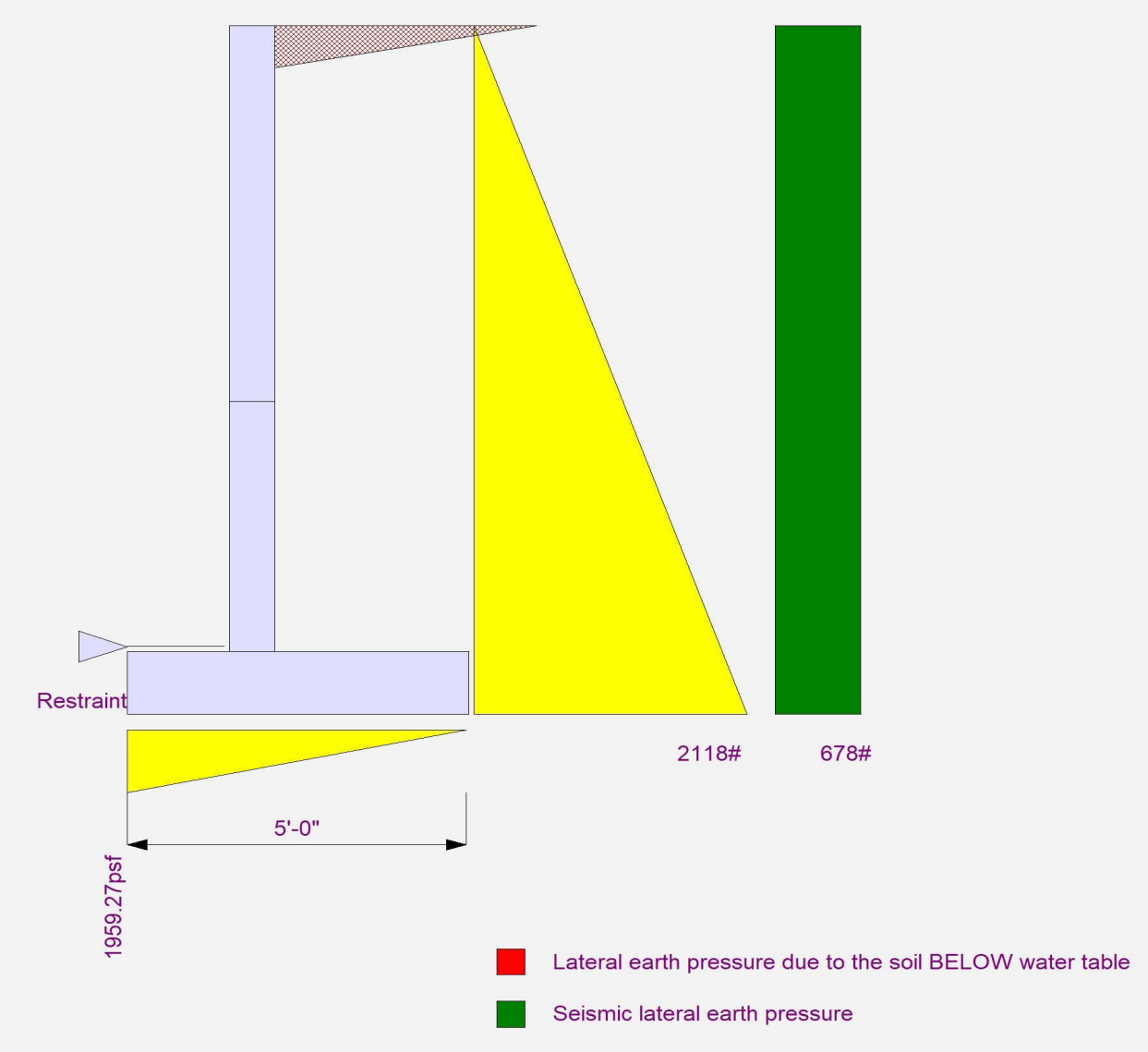
Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 10' CANT'D WALL @ SLAB



DESCRIPTION: 10' CANT'D WALL @ SLAB



Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 10.67' CANT'D WALL @ SLAB

Code Reference

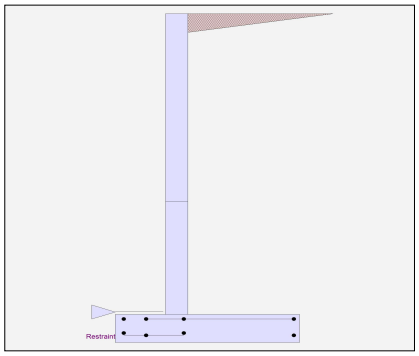
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	10.67 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	0.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	250.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Earth Pressure Seismic Load

Method : Uniform

Multiplier Used (Multiplier used on soil density)	=	8.000
Uniform Seismic Force	=	93.360
Total Seismic Force	=	1,089.511

Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 10.67' CANT'D WALL @ SLAB

Design Summary

Wall Stability Ratios

Overturning	=	1.82	OK
Slab Resists All Sliding !			
Global Stability	=	1.58	
Total Bearing Load	=	6,856 lbs	
...resultant ecc.	=	9.66 in	
Eccentricity within middle third			
Soil Pressure @ Toe	=	1,983 psf	NG
Soil Pressure @ Heel	=	128 psf	OK
Allowable	=	1,500 psf	
Soil Pressure Exceeds Allowable!			
ACI Factored @ Toe	=	2,776 psf	
ACI Factored @ Heel	=	179 psf	
Footing Shear @ Toe	=	18.7 psi	OK
Footing Shear @ Heel	=	33.0 psi	OK
Allowable	=	75.0 psi	

PLEASE NOTE 1/3 INCREASE UTILIZED IN SOIL BEARING DUE TO SEISMIC LOADING.

Sliding Calcs

Lateral Sliding Force	=	3,146.0 lbs

Vertical component of active lateral soil pressure IS considered in the calculation of soil bearing pressures.

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		2nd	Bottom		
		Stem OK	Stem OK		
Design Height Above Ftg	ft =	4.00	0.00		
Wall Material Above "Ht"	=	Concrete	Concrete		
Design Method	=	SD	SD	SD	SD
Thickness	=	8.00	8.00		
Rebar Size	=	# 5	# 6		
Rebar Spacing	=	12.00	6.00		
Rebar Placed at	=	6.5 in	6.5 in		
Design Data					
fb/FB + fa/Fa	=	**0.566**	**0.769**		
Total Force @ Section					
Service Level	lbs =				
Strength Level	lbs =	1,868.4	4,183.9		
Moment....Actual					
Service Level	ft-# =				
Strength Level	ft-# =	4,846.3	16,652.3		
Moment.....Allowable	ft-# =	8,557.2	21,627.9		
Shear.....Actual					
Service Level	psi =				
Strength Level	psi =	24.0	53.6		
Shear.....Allowable	psi =	75.0	75.0		
Anet (Masonry)	in2 =				
Wall Weight	psf =	100.0	100.0		
Rebar Depth 'd'	in =	6.50	6.50		

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	2,500.0	2,500.0
Fy	psi =	60,000.0	60,000.0

Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 10.67' CANT'D WALL @ SLAB

Concrete Stem Rebar Area Details

2nd Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.1742 in2/ft		
(4/3) * As :	0.2323 in2/ft	Min Stem T&S Reinf Area 1.281 in2	
200bd/fy : 200(12)(6.5)/60000 :	0.26 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft	
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.2323 in2/ft	#4@ 12.50 in	#4@ 25.00 in
Provided Area :	0.31 in2/ft	#5@ 19.38 in	#5@ 38.75 in
Maximum Area :	0.8805 in2/ft	#6@ 27.50 in	#6@ 55.00 in

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.5987 in2/ft		
(4/3) * As :	0.7982 in2/ft	Min Stem T&S Reinf Area 0.768 in2	
200bd/fy : 200(12)(6.5)/60000 :	0.26 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft	
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.5987 in2/ft	#4@ 12.50 in	#4@ 25.00 in
Provided Area :	0.88 in2/ft	#5@ 19.38 in	#5@ 38.75 in
Maximum Area :	0.8805 in2/ft	#6@ 27.50 in	#6@ 55.00 in

Footing Data

Toe Width	=	1.50 ft
Heel Width	=	4.00
Total Footing Width	=	5.50
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe		Heel	
Factored Pressure	=	2,776		179	psf
Mu' : Upward	=	2,857		3,910	ft-#
Mu' : Downward	=	203		14,436	ft-#
Mu: Design	=	2,654	OK	10,525	ft-# OK
phiMn	=	30,055		19,126	ft-#
Actual 1-Way Shear	=	18.70		32.96	psi
Allow 1-Way Shear	=	75.00		75.00	psi

Toe Reinforcing = # 6 @ 6.00 in
Heel Reinforcing = # 5 @ 8.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Heel: #4@ 7.06 in, #5@ 10.95 in, #6@ 15.54 in, #7@ 21.19 in, #8@ 27.90 in, #9@ 35.32 in, #10@ 44.86 in

Key: No key defined

Min footing T&S reinf Area 1.43 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 10.67' CANT'D WALL @ SLAB

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		2,383.3	3.89	9,271.1	Soil Over HL (ab. water tbl)	3,912.3	3.83	14,997.3
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		3.83	14,997.3
Hydrostatic Force					Water Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	=		
Added Lateral Load	=				* Axial Live Load on Stem	=		
Load @ Stem Above Soil	=				Soil Over Toe	=		
Seismic Earth Load	=	762.7	5.84	4,450.1	Surcharge Over Toe	=		
	=				Stem Weight(s)	=	1,067.0	1.83	1,956.2
					Earth @ Stem Transitions	=			
					Footing Weight	=	825.0	2.75	2,268.8
					Key Weight	=			
					Vert. Component	=	1,052.0	5.50	5,786.2
Total	=	3,146.0	**O.T.M.** =	13,721.2	**Total =**		6,856.4 lbs	**R.M.=**	25,008.4

Resisting/Overturning Ratio = **1.82**

Vertical Loads used for Soil Pressure = 6,856.4 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

If seismic is included, the OTM and sliding ratios may be 1.1 per section 1807.2.3 of IBC.

Vertical component of active lateral soil pressure IS considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.107	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

DESCRIPTION: 10.67' CANT'D WALL @ SLAB

Rebar Lap & Embedment Lengths Information

Stem Design Segment: 2nd
Stem Design Height: 4.00 ft above top of footing

Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	23.40 in
Development length for #5 bar specified in this stem design segment =	18.00 in

---

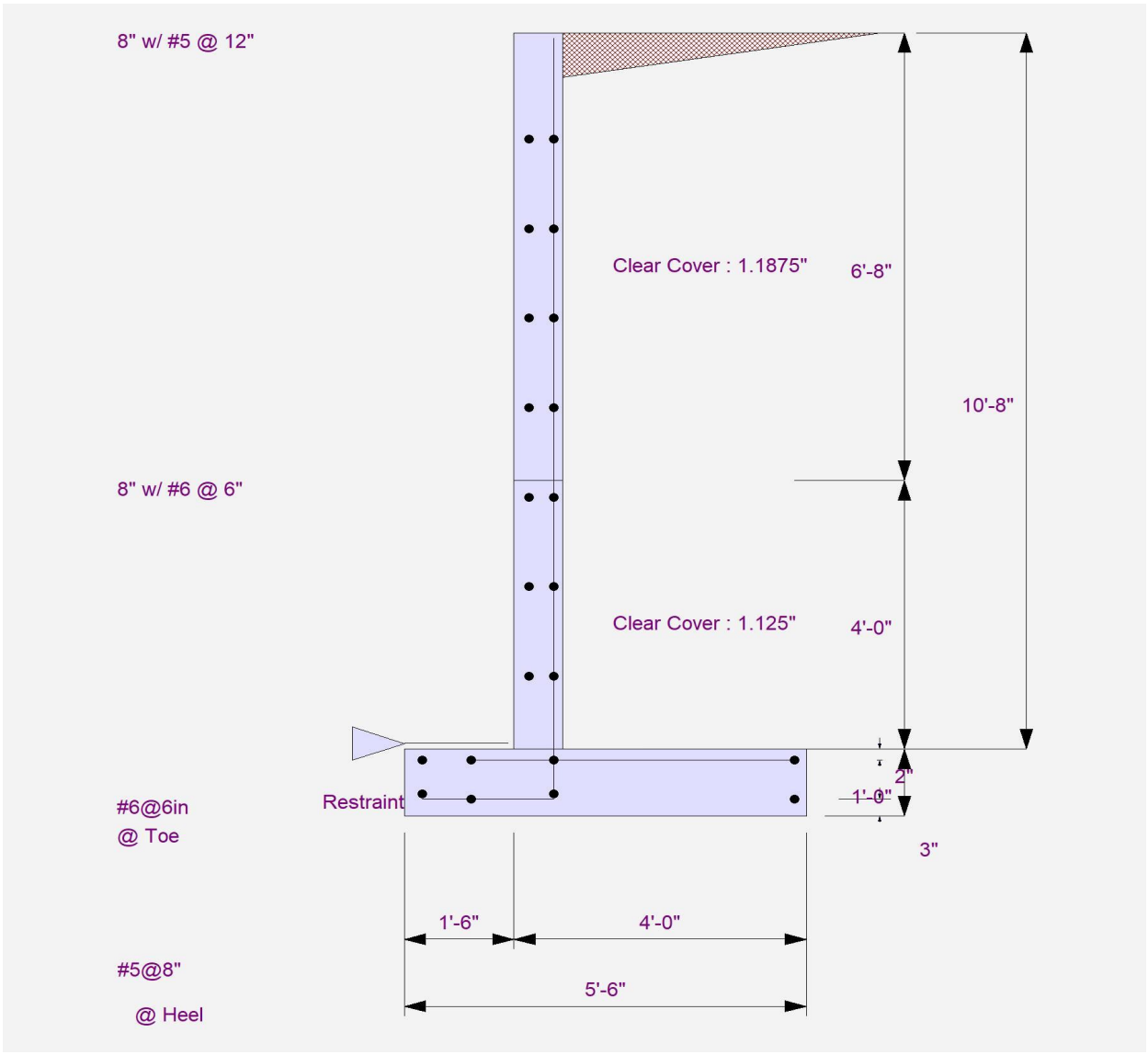
Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

Lap Splice length for #6 bar specified in this stem design segment (25.4.2.3a) =	28.08 in
Development length for #6 bar specified in this stem design segment =	21.60 in
Hooked embedment length into footing for #6 bar specified in this stem design segment =	8.57 in
As Provided =	0.8800 in2/ft
As Required =	0.5987 in2/ft

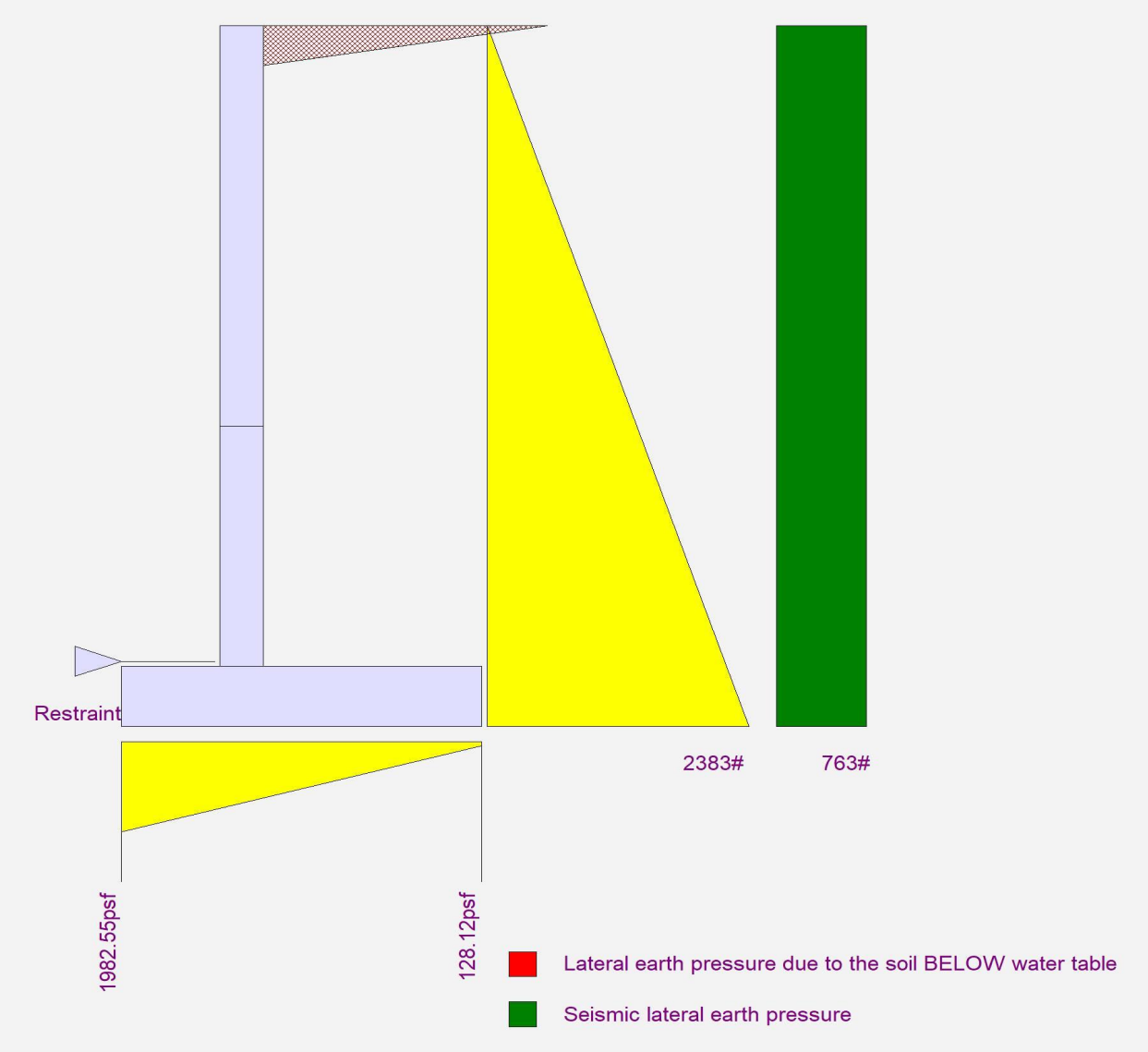
Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 10.67' CANT'D WALL @ SLAB



DESCRIPTION: 10.67' CANT'D WALL @ SLAB



Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 9' CANT'D WALL @ GRADE

Code Reference

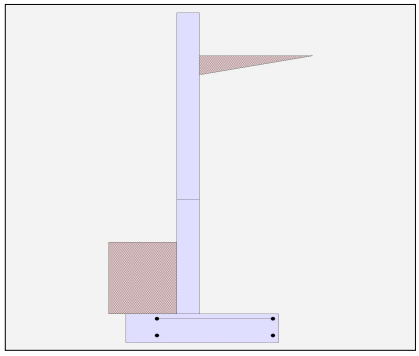
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	9.00 ft
Wall height above soil	=	1.50 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	30.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	250.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Earth Pressure Seismic Load

Method : Uniform		
Multiplier Used	=	8.000
(Multiplier used on soil density)		
Uniform Seismic Force	=	80.000
Total Seismic Force	=	800.000

Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 9' CANT'D WALL @ GRADE

Design Summary

Wall Stability Ratios

Overturning	=	1.73	OK
Sliding	=	1.51	OK
Global Stability	=	2.34	

PLEASE NOTE 1/3 INCREASE UTILIZED IN SOIL BEARING DUE TO SEISMIC LOADING.

Total Bearing Load	=	5,220 lbs	
...resultant ecc.	=	10.01 in	
Eccentricity outside middle third			
Soil Pressure @ Toe	=	2,094 psf	NG
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	1,500 psf	
Soil Pressure Exceeds Allowable!			
ACI Factored @ Toe	=	2,932 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	13.5 psi	OK
Footing Shear @ Heel	=	25.7 psi	OK
Allowable	=	75.0 psi	

Sliding Calcs

Lateral Sliding Force	=	2,310.0 lbs	
less 100% Passive Force	-	1,406.3 lbs	
less 100% Friction Force	-	2,088.0 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS considered in the calculation of soil bearing pressures.

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		2nd	Bottom		
		Stem OK	Stem OK		
Design Height Above Ftg	ft =	4.00	0.00		
Wall Material Above "Ht"	=	Concrete	Concrete		
Design Method	=	SD	SD	SD	SD
Thickness	=	8.00	8.00		
Rebar Size	=	# 5	# 5		
Rebar Spacing	=	16.00	8.00		
Rebar Placed at	=	6.5 in	6.5 in		
Design Data					
fb/FB + fa/Fa	=	**0.332**	**0.806**		
Total Force @ Section					
Service Level	lbs =				
Strength Level	lbs =	1,100.0	2,988.0		
Moment....Actual					
Service Level	ft-# =				
Strength Level	ft-# =	2,166.7	10,044.0		
Moment.....Allowable	ft-# =	6,513.6	12,453.1		
Shear.....Actual					
Service Level	psi =				
Strength Level	psi =	14.1	38.3		
Shear.....Allowable	psi =	75.0	75.0		
Anet (Masonry)	in2 =				
Wall Weight	psf =	100.0	100.0		
Rebar Depth 'd'	in =	6.50	6.50		

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	2,500.0	2,500.0
Fy	psi =	60,000.0	60,000.0

Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 9' CANT'D WALL @ GRADE

Concrete Stem Rebar Area Details

2nd Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.0779 in2/ft		
(4/3) * As :	0.1039 in2/ft	Min Stem T&S Reinf Area 1.248 in2	
200bd/fy : 200(12)(6.5)/60000 :	0.26 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft	
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.1728 in2/ft	#4@ 12.50 in	#4@ 25.00 in
Provided Area :	0.2325 in2/ft	#5@ 19.38 in	#5@ 38.75 in
Maximum Area :	0.8805 in2/ft	#6@ 27.50 in	#6@ 55.00 in

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.3611 in2/ft		
(4/3) * As :	0.4815 in2/ft	Min Stem T&S Reinf Area 0.768 in2	
200bd/fy : 200(12)(6.5)/60000 :	0.26 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft	
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.3611 in2/ft	#4@ 12.50 in	#4@ 25.00 in
Provided Area :	0.465 in2/ft	#5@ 19.38 in	#5@ 38.75 in
Maximum Area :	0.8805 in2/ft	#6@ 27.50 in	#6@ 55.00 in

Footing Data

Toe Width	=	1.50 ft
Heel Width	=	3.00
Total Footing Width	=	4.50
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	2,932	0	psf
Mu' : Upward	=	2,910	1,036	ft-#
Mu' : Downward	=	574	6,608	ft-#
Mu: Design	=	2,337 OK	5,572	ft-# OK
phiMn	=	2,500	13,005	ft-#
Actual 1-Way Shear	=	13.45	25.74	psi
Allow 1-Way Shear	=	40.00	75.00	psi

Toe Reinforcing = None Spec'd
Heel Reinforcing = # 5 @ 12.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: phiMn = phi*5*lambda*sqrt(fc)*Sm

Heel: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Key: No key defined

Min footing T&S reinf Area 1.17 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 9' CANT'D WALL @ GRADE

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		1,750.0	3.33	5,833.3	Soil Over HL (ab. water tbl)	2,310.0	3.33	7,700.0
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		3.33	7,700.0
Hydrostatic Force					Water Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	=		
Added Lateral Load	=				* Axial Live Load on Stem	=		
Load @ Stem Above Soil	=				Soil Over Toe	=	412.5	0.75	309.4
Seismic Earth Load	=	560.0	5.00	2,800.0	Surcharge Over Toe	=		
	=				Stem Weight(s)	=	1,050.0	1.83	1,925.0
Total	=	2,310.0	**O.T.M.** =	8,633.3	Earth @ Stem Transitions	=		
					Footing Weight	=	675.0	2.25	1,518.8
					Key Weight	=			
					Vert. Component	=	772.5	4.50	3,476.2
					Total =		5,220.0 lbs	**R.M.=**	14,929.3

Resisting/Overturning Ratio = **1.73**

Vertical Loads used for Soil Pressure = 5,220.0 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

If seismic is included, the OTM and sliding ratios may be 1.1 per section 1807.2.3 of IBC.

Vertical component of active lateral soil pressure IS considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.136	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

DESCRIPTION: 9' CANT'D WALL @ GRADE

Rebar Lap & Embedment Lengths Information

Stem Design Segment: 2nd
Stem Design Height: 4.00 ft above top of footing

Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	23.40 in
Development length for #5 bar specified in this stem design segment =	18.00 in

---

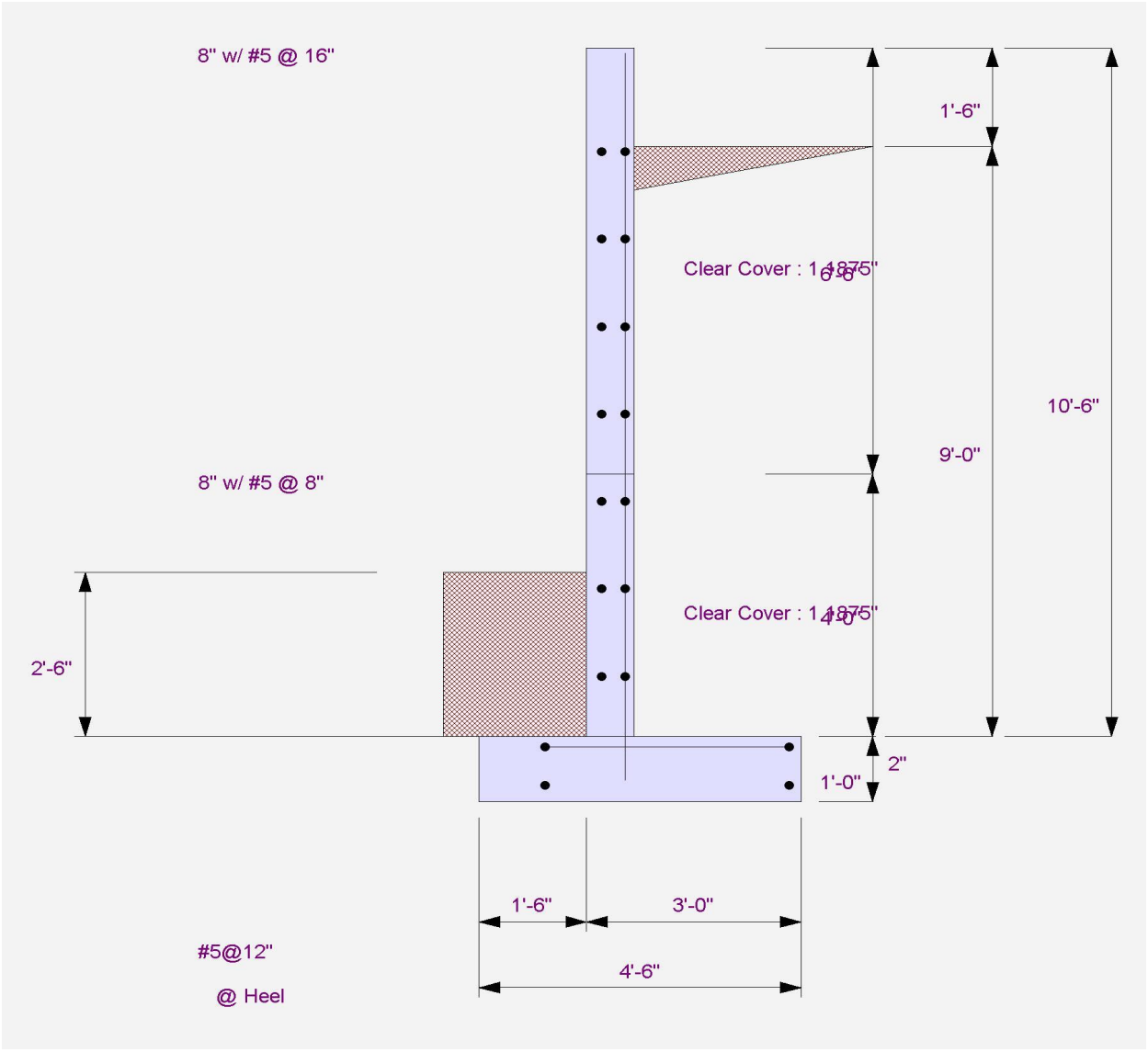
Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	23.40 in
Development length for #5 bar specified in this stem design segment =	18.00 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	8.15 in
As Provided =	0.4650 in2/ft
As Required =	0.3611 in2/ft

Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 9' CANT'D WALL @ GRADE

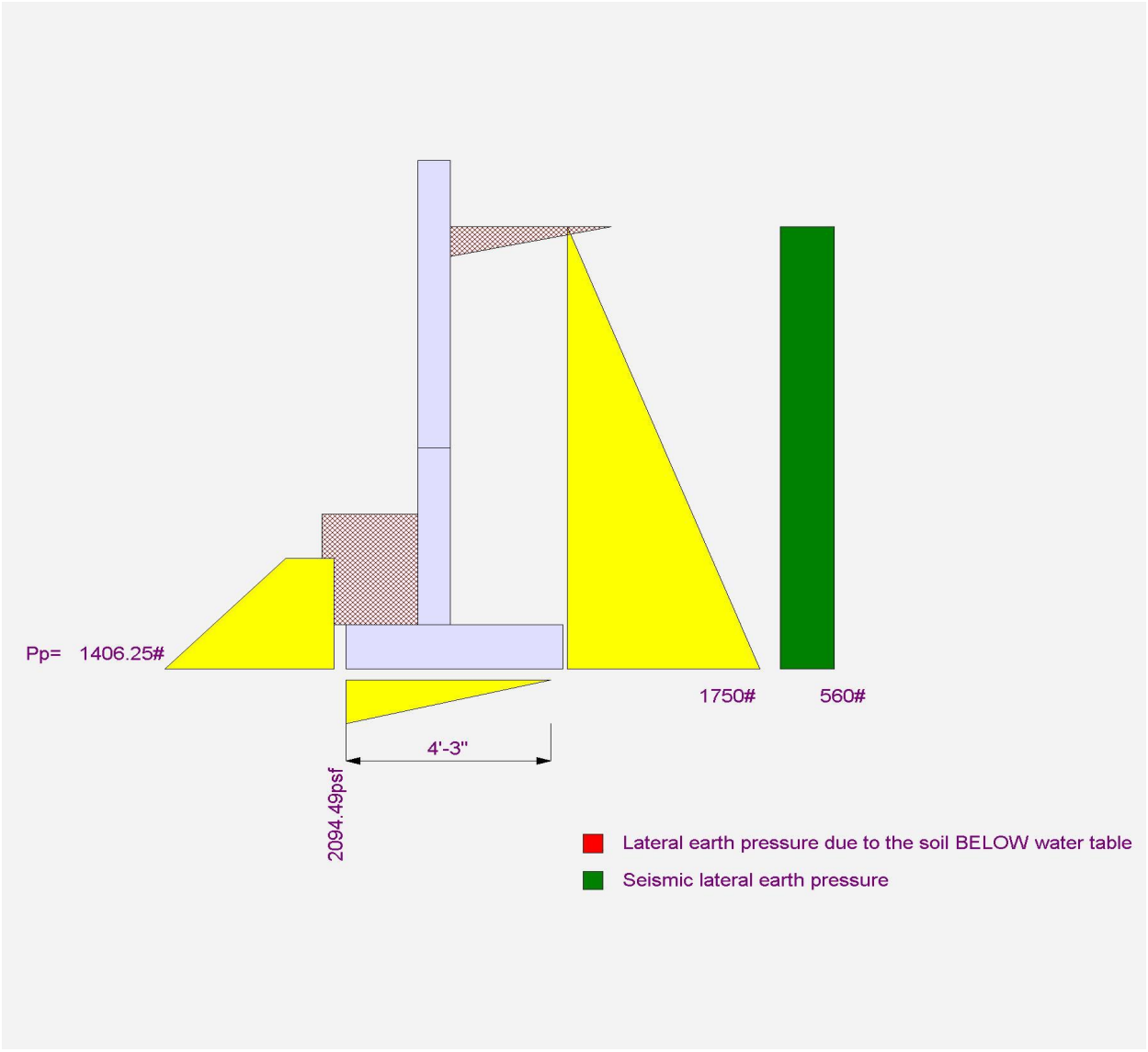


Cantilevered Retaining Wall

Project File: fnd.ec6

LIC# : KW-06017913, Build:20.23.04.05 MULHERN & KULP STRUCTURAL ENGINEERING INC (c) ENERCALC INC 1983-2023

DESCRIPTION: 9' CANT'D WALL @ GRADE



Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 9' CANT'D WALL @ SLAB

Code Reference

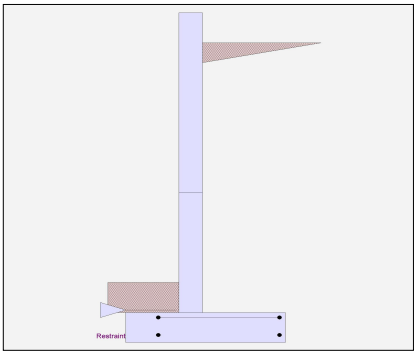
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	9.00 ft
Wall height above soil	=	1.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	12.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	250.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Earth Pressure Seismic Load

Method : Uniform		
Multiplier Used	=	8.000
(Multiplier used on soil density)		
Uniform Seismic Force	=	80.000
Total Seismic Force	=	800.000

Cantilevered Retaining Wall

Project File: fnd.ec6

LIC# : KW-06017913, Build:20.23.04.05 MULHERN & KULP STRUCTURAL ENGINEERING INC

DESCRIPTION: 9' CANT'D WALL @ SLAB

Design Summary

Wall Stability Ratios

Overturning	=	1.70	OK
Slab Resists All Sliding !			
Global Stability	=	1.85	
Total Bearing Load	=	4,922 lbs	
...resultant ecc.	=	9.60 in	
Eccentricity outside middle third			
Soil Pressure @ Toe	=	1,908 psf	NG
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	1,500 psf	
Soil Pressure Exceeds Allowable!			
ACI Factored @ Toe	=	2,671 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	13.7 psi	OK
Footing Shear @ Heel	=	26.0 psi	OK
Allowable	=	75.0 psi	

PLEASE NOTE 1/3 INCREASE UTILIZED IN SOIL BEARING DUE TO SEISMIC LOADING.

Sliding Calcs

Lateral Sliding Force	=	2,310.0 lbs

Vertical component of active lateral soil pressure IS considered in the calculation of soil bearing pressures.

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		2nd	Bottom		
		Stem OK	Stem OK		
Design Height Above Ftg	ft =	4.00	0.00		
Wall Material Above "Ht"	=	Concrete	Concrete		
Design Method	=	SD	SD	SD	SD
Thickness	=	8.00	8.00		
Rebar Size	=	# 5	# 5		
Rebar Spacing	=	16.00	8.00		
Rebar Placed at	=	6.5 in	6.5 in		
Design Data					
fb/FB + fa/Fa	=	**0.332**	**0.806**		
Total Force @ Section					
Service Level	lbs =				
Strength Level	lbs =	1,100.0	2,988.0		
Moment....Actual					
Service Level	ft-# =				
Strength Level	ft-# =	2,166.7	10,044.0		
Moment.....Allowable	ft-# =	6,513.6	12,453.1		
Shear.....Actual					
Service Level	psi =				
Strength Level	psi =	14.1	38.3		
Shear.....Allowable	psi =	75.0	75.0		
Anet (Masonry)	in2 =				
Wall Weight	psf =	100.0	100.0		
Rebar Depth 'd'	in =	6.50	6.50		

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	2,500.0	2,500.0
Fy	psi =	60,000.0	60,000.0

Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 9' CANT'D WALL @ SLAB

Concrete Stem Rebar Area Details

2nd Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.0779 in2/ft		
(4/3) * As :	0.1039 in2/ft	Min Stem T&S Reinf Area 1.152 in2	
200bd/fy : 200(12)(6.5)/60000 :	0.26 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft	
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.1728 in2/ft	#4@ 12.50 in	#4@ 25.00 in
Provided Area :	0.2325 in2/ft	#5@ 19.38 in	#5@ 38.75 in
Maximum Area :	0.8805 in2/ft	#6@ 27.50 in	#6@ 55.00 in

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.3611 in2/ft		
(4/3) * As :	0.4815 in2/ft	Min Stem T&S Reinf Area 0.768 in2	
200bd/fy : 200(12)(6.5)/60000 :	0.26 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft	
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.3611 in2/ft	#4@ 12.50 in	#4@ 25.00 in
Provided Area :	0.465 in2/ft	#5@ 19.38 in	#5@ 38.75 in
Maximum Area :	0.8805 in2/ft	#6@ 27.50 in	#6@ 55.00 in

Footing Data

Toe Width	=	1.50 ft
Heel Width	=	3.00
Total Footing Width	=	4.50
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	2,671	0	psf
Mu' : Upward	=	2,659	1,066	ft-#
Mu' : Downward	=	351	6,608	ft-#
Mu: Design	=	2,308 OK	5,542	ft-# OK
phiMn	=	2,500	13,005	ft-#
Actual 1-Way Shear	=	13.67	26.00	psi
Allow 1-Way Shear	=	40.00	75.00	psi

Toe Reinforcing = None Spec'd
Heel Reinforcing = # 5 @ 12.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: phiMn = phi*5*lambda*sqrt(fc)*Sm

Heel: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Key: No key defined

Min footing T&S reinf Area 1.17 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 9' CANT'D WALL @ SLAB

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		1,750.0	3.33	5,833.3	Soil Over HL (ab. water tbl)	2,310.0	3.33	7,700.0
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		3.33	7,700.0
Hydrostatic Force					Water Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	=		
Added Lateral Load	=				* Axial Live Load on Stem	=		
Load @ Stem Above Soil	=				Soil Over Toe	=	165.0	0.75	123.8
Seismic Earth Load	=	560.0	5.00	2,800.0	Surcharge Over Toe	=		
	=				Stem Weight(s)	=	1,000.0	1.83	1,833.3
					Earth @ Stem Transitions	=			
Total	=	2,310.0	**O.T.M.** =	8,633.3	Footing Weight	=	675.0	2.25	1,518.8
					Key Weight	=			
					Vert. Component	=	772.5	4.50	3,476.2
					Total =		4,922.5 lbs	**R.M.=**	14,652.0

Resisting/Overturning Ratio = **1.70**

Vertical Loads used for Soil Pressure = 4,922.5 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

If seismic is included, the OTM and sliding ratios may be 1.1 per section 1807.2.3 of IBC.

Vertical component of active lateral soil pressure IS considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.118	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

DESCRIPTION: 9' CANT'D WALL @ SLAB

Rebar Lap & Embedment Lengths Information

Stem Design Segment: 2nd
Stem Design Height: 4.00 ft above top of footing

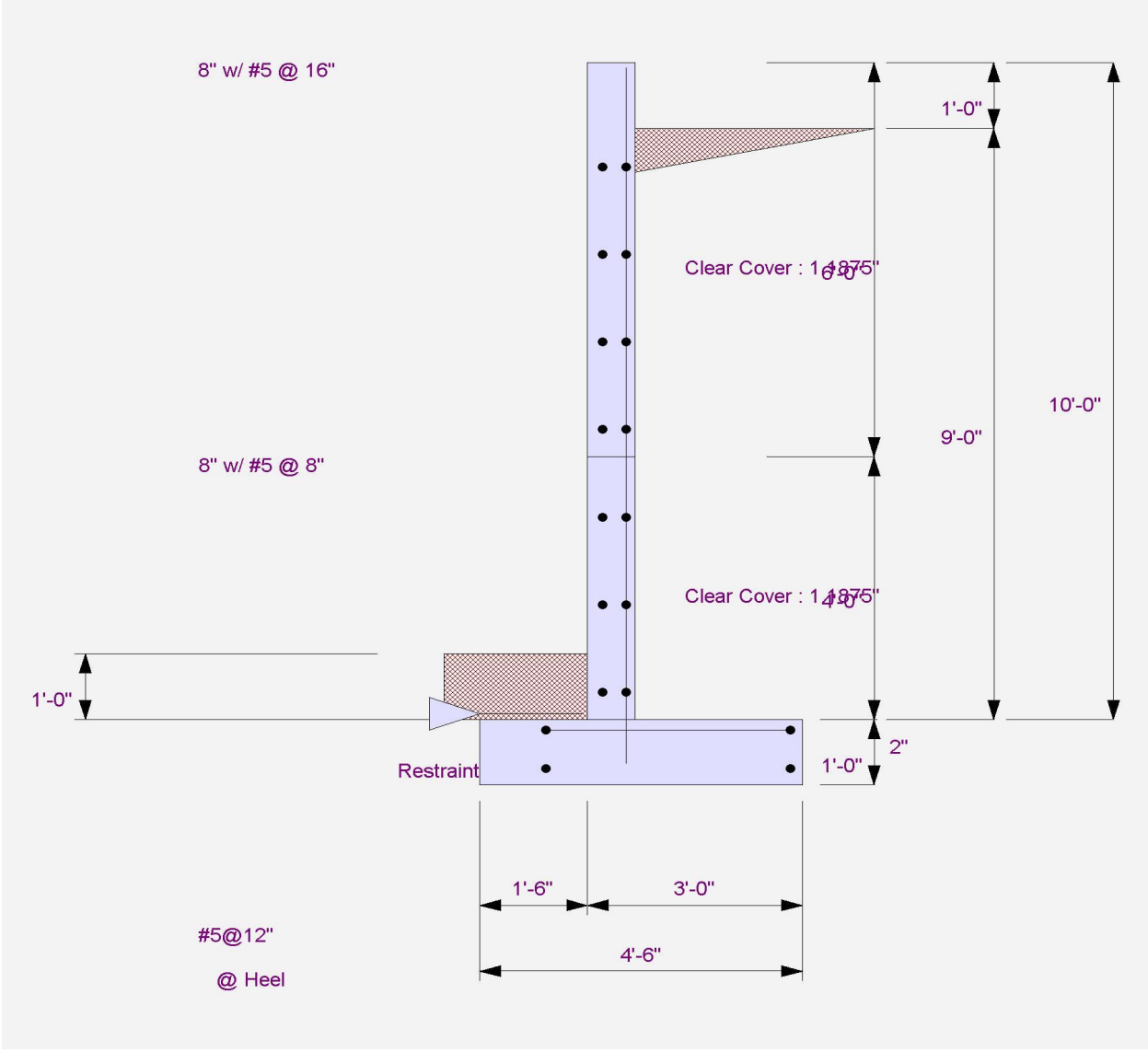
Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	23.40 in
Development length for #5 bar specified in this stem design segment =	18.00 in

---

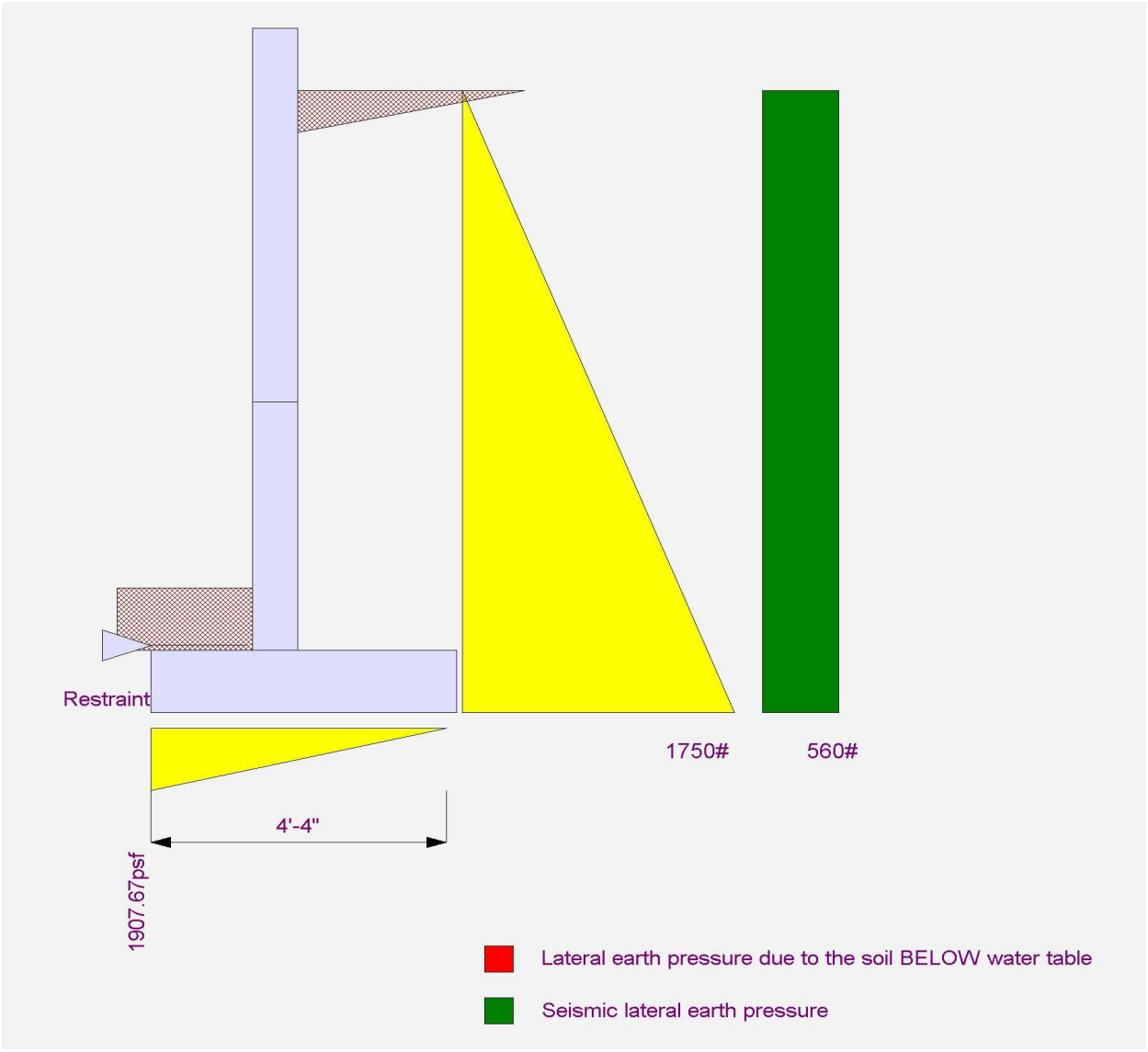
Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	23.40 in
Development length for #5 bar specified in this stem design segment =	18.00 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	8.15 in
As Provided =	0.4650 in2/ft
As Required =	0.3611 in2/ft

DESCRIPTION: 9' CANT'D WALL @ SLAB



DESCRIPTION: 9' CANT'D WALL @ SLAB



Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 8' CANT'D WALL @ GARAGE

Code Reference

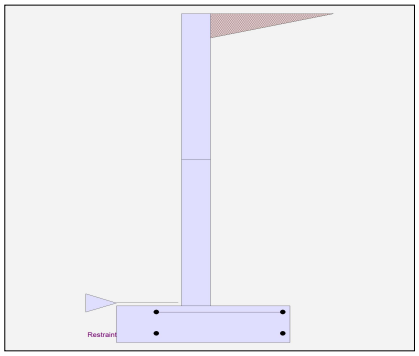
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	8.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	0.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	250.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Earth Pressure Seismic Load

Method : Uniform		
Multiplier Used	=	8.000
(Multiplier used on soil density)		
Uniform Seismic Force	=	72.000
Total Seismic Force	=	648.000

Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 8' CANT'D WALL @ GARAGE

Design Summary

Wall Stability Ratios

Overturning	=	1.61	OK
Slab Resists All Sliding !			
Global Stability	=	1.56	
Total Bearing Load	=	3,639	lbs
...resultant ecc.	=	8.67	in
Eccentricity outside middle third			
Soil Pressure @ Toe	=	1,572	psf NG
Soil Pressure @ Heel	=	0	psf OK
Allowable	=	1,500	psf
Soil Pressure Exceeds Allowable!			
ACI Factored @ Toe	=	2,201	psf
ACI Factored @ Heel	=	0	psf
Footing Shear @ Toe	=	11.8	psi OK
Footing Shear @ Heel	=	21.7	psi OK
Allowable	=	75.0	psi

PLEASE NOTE 1/3 INCREASE UTILIZED IN SOIL BEARING DUE TO SEISMIC LOADING.

Sliding Calcs

Lateral Sliding Force	=	1,871.1 lbs

Vertical component of active lateral soil pressure IS considered in the calculation of soil bearing pressures.

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		2nd	Bottom		
		Stem OK	Stem OK		
Design Height Above Ftg	ft =	4.00	0.00		
Wall Material Above "Ht"	=	Concrete	Concrete		
Design Method	=	SD	SD	SD	SD
Thickness	=	8.00	8.00		
Rebar Size	=	# 5	# 5		
Rebar Spacing	=	16.00	8.00		
Rebar Placed at	=	6.5 in	6.5 in		
Design Data					
fb/FB + fa/Fa	=	**0.180**	**0.568**		
Total Force @ Section					
Service Level	lbs =				
Strength Level	lbs =	736.0	2,368.0		
Moment....Actual					
Service Level	ft-# =				
Strength Level	ft-# =	1,173.3	7,082.7		
Moment.....Allowable	ft-# =	6,513.6	12,453.1		
Shear.....Actual					
Service Level	psi =				
Strength Level	psi =	9.4	30.4		
Shear.....Allowable	psi =	75.0	75.0		
Anet (Masonry)	in2 =				
Wall Weight	psf =	100.0	100.0		
Rebar Depth 'd'	in =	6.50	6.50		

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	2,500.0	2,500.0
Fy	psi =	60,000.0	60,000.0

Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 8' CANT'D WALL @ GARAGE

Concrete Stem Rebar Area Details

2nd Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.0422 in2/ft		
(4/3) * As :	0.0562 in2/ft	Min Stem T&S Reinf Area 0.768 in2	
200bd/fy : 200(12)(6.5)/60000 :	0.26 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft	
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.1728 in2/ft	#4@ 12.50 in	#4@ 25.00 in
Provided Area :	0.2325 in2/ft	#5@ 19.38 in	#5@ 38.75 in
Maximum Area :	0.8805 in2/ft	#6@ 27.50 in	#6@ 55.00 in

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.2546 in2/ft		
(4/3) * As :	0.3395 in2/ft	Min Stem T&S Reinf Area 0.768 in2	
200bd/fy : 200(12)(6.5)/60000 :	0.26 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft	
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.26 in2/ft	#4@ 12.50 in	#4@ 25.00 in
Provided Area :	0.465 in2/ft	#5@ 19.38 in	#5@ 38.75 in
Maximum Area :	0.8805 in2/ft	#6@ 27.50 in	#6@ 55.00 in

Footing Data

Toe Width	=	1.50 ft
Heel Width	=	2.50
Total Footing Width	=	4.00
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe		Heel	
Factored Pressure	=	2,201		0	psf
Mu' : Upward	=	2,153		443	ft-#
Mu' : Downward	=	203		3,913	ft-#
Mu: Design	=	1,951	OK	3,470	ft-# OK
phiMn	=	2,500		13,005	ft-#
Actual 1-Way Shear	=	11.83		21.66	psi
Allow 1-Way Shear	=	40.00		75.00	psi

Toe Reinforcing = None Spec'd
Heel Reinforcing = # 5 @ 12.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: phiMn = phi*5*lambda*sqrt(fc)*Sm

Heel: #4@ 9.25 in, #5@ 14.35 in, #6@ 20.37 in, #7@ 27.77 in, #8@ 36.57 in, #9@ 46.29 in, #10@ 58.79 in

Key: No key defined

Min footing T&S reinf Area 1.04 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 8' CANT'D WALL @ GARAGE

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		1,417.5	3.00	4,252.5	Soil Over HL (ab. water tbl)	1,613.3	3.08	4,974.4
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		3.08	4,974.4
Hydrostatic Force					Water Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	=		
Added Lateral Load	=				* Axial Live Load on Stem	=		
Load @ Stem Above Soil	=				Soil Over Toe	=		
Seismic Earth Load	=	453.6	4.50	2,041.2	Surcharge Over Toe	=		
	=				Stem Weight(s)	=	800.0	1.83	1,466.7
					Earth @ Stem Transitions	=			
					Footing Weight	=	600.0	2.00	1,200.0
					Key Weight	=			
					Vert. Component	=	625.7	4.00	2,502.8
Total	=	1,871.1	**O.T.M.** =	6,293.7	**Total =**		3,639.0 lbs	**R.M.=**	10,144.0

Resisting/Overturning Ratio = **1.61**

Vertical Loads used for Soil Pressure = 3,639.0 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

If seismic is included, the OTM and sliding ratios may be 1.1 per section 1807.2.3 of IBC.

Vertical component of active lateral soil pressure IS considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.087	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

DESCRIPTION: 8' CANT'D WALL @ GARAGE

Rebar Lap & Embedment Lengths Information

Stem Design Segment: 2nd
Stem Design Height: 4.00 ft above top of footing

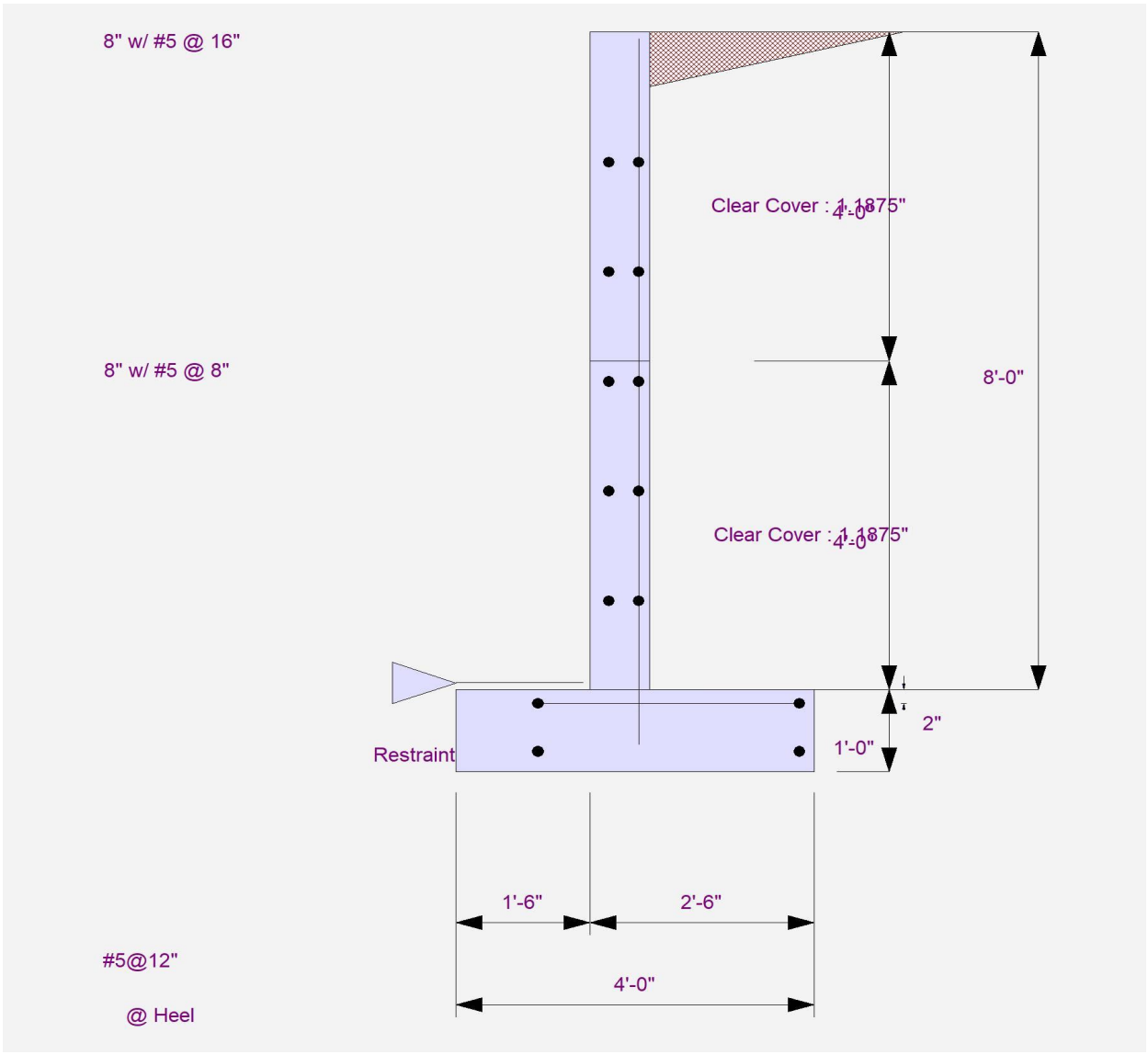
Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	23.40 in
Development length for #5 bar specified in this stem design segment =	18.00 in

---

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	23.40 in
Development length for #5 bar specified in this stem design segment =	18.00 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	6.00 in
As Provided =	0.4650 in2/ft
As Required =	0.2600 in2/ft

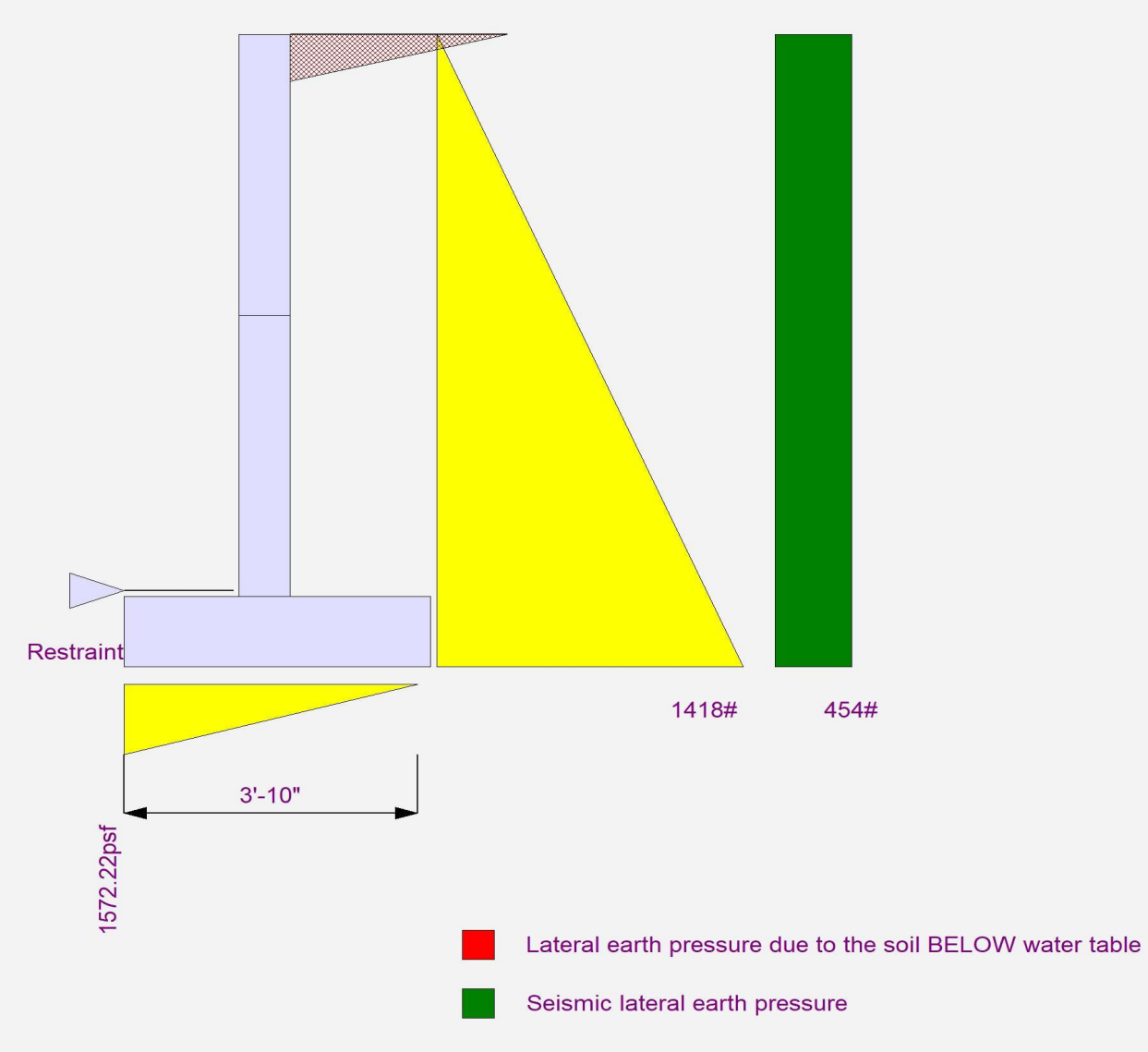
DESCRIPTION: 8' CANT'D WALL @ GARAGE



Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 8' CANT'D WALL @ GARAGE



Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 7' CANT'D WALL @ SLAB

Code Reference

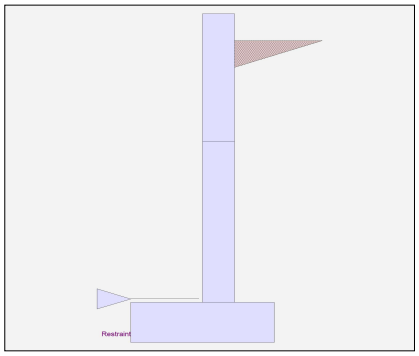
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	6.50 ft
Wall height above soil	=	0.67 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	0.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	250.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Earth Pressure Seismic Load

Method : Uniform		
Multiplier Used	=	8.000
(Multiplier used on soil density)		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf
Uniform Seismic Force	=	60.000
Total Seismic Force	=	450.000

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 7' CANT'D WALL @ SLAB

Design Summary

Wall Stability Ratios

Overturning	=	1.33	Ratio < 1.5!
Slab Resists All Sliding !			
Global Stability	=	1.51	

Total Bearing Load	=	2,197	lbs
...resultant ecc.	=	9.90	in
Eccentricity outside middle third			
Soil Pressure @ Toe	=	1,741	psf NG
Soil Pressure @ Heel	=	0	psf OK
Allowable	=	1,500	psf
Soil Pressure Exceeds Allowable!			
ACI Factored @ Toe	=	2,437	psf
ACI Factored @ Heel	=	0	psf
Footing Shear @ Toe	=	11.7	psi OK
Footing Shear @ Heel	=	13.0	psi OK
Allowable	=	75.0	psi

Sliding Calcs

Lateral Sliding Force	=	1,299.4	lbs

Vertical component of active lateral soil pressure IS considered in the calculation of soil bearing pressures.

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		2nd	Bottom		
		Stem OK	Stem OK		
Design Height Above Ftg	ft =	4.00	0.00		
Wall Material Above "Ht"	=	Concrete	Concrete		
Design Method	=	SD	SD	SD	SD
Thickness	=	8.00	8.00		
Rebar Size	=	# 5	# 5		
Rebar Spacing	=	16.00	16.00		
Rebar Placed at	=	6.5 in	6.5 in		
Design Data					
fb/FB + fa/Fa	=	**0.051**	**0.588**		
Total Force @ Section					
Service Level	lbs =				
Strength Level	lbs =	325.0	1,573.0		
Moment....Actual					
Service Level	ft-# =				
Strength Level	ft-# =	333.3	3,830.7		
Moment.....Allowable	ft-# =	6,513.6	6,513.6		
Shear.....Actual					
Service Level	psi =				
Strength Level	psi =	4.2	20.2		
Shear.....Allowable	psi =	75.0	75.0		
Anet (Masonry)	in2 =				
Wall Weight	psf =	100.0	100.0		
Rebar Depth 'd'	in =	6.50	6.50		

Masonry Data

f'm	psi =	
Fs	psi =	
Solid Grouting	=	
Modular Ratio 'n'	=	
Equiv. Solid Thick.	=	
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	2,500.0	2,500.0
Fy	psi =	60,000.0	60,000.0

Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 7' CANT'D WALL @ SLAB

Concrete Stem Rebar Area Details

2nd Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.012 in2/ft		
(4/3) * As :	0.016 in2/ft	Min Stem T&S Reinf Area 0.609 in2	
200bd/fy : 200(12)(6.5)/60000 :	0.26 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft	
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.1728 in2/ft	#4@ 12.50 in	#4@ 25.00 in
Provided Area :	0.2325 in2/ft	#5@ 19.38 in	#5@ 38.75 in
Maximum Area :	0.8805 in2/ft	#6@ 27.50 in	#6@ 55.00 in

Bottom Stem	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.1377 in2/ft		
(4/3) * As :	0.1836 in2/ft	Min Stem T&S Reinf Area 0.768 in2	
200bd/fy : 200(12)(6.5)/60000 :	0.26 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.192 in2/ft	
0.0018bh : 0.0018(12)(8) :	0.1728 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.1836 in2/ft	#4@ 12.50 in	#4@ 25.00 in
Provided Area :	0.2325 in2/ft	#5@ 19.38 in	#5@ 38.75 in
Maximum Area :	0.8805 in2/ft	#6@ 27.50 in	#6@ 55.00 in

Footing Data

Toe Width	=	1.50 ft
Heel Width	=	1.50
Total Footing Width	=	3.00
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 2,500 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe		Heel	
Factored Pressure	=	2,437		0	psf
Mu' : Upward	=	2,065		0	ft-#
Mu' : Downward	=	203		940	ft-#
Mu: Design	=	1,862	OK	940	ft-# OK
phiMn	=	2,500		2,500	ft-#
Actual 1-Way Shear	=	11.75		13.00	psi
Allow 1-Way Shear	=	40.00		40.00	psi
Toe Reinforcing	=	None Spec'd			
Heel Reinforcing	=	None Spec'd			
Key Reinforcing	=	None Spec'd			
Footing Torsion, Tu	=	0.00	ft-lbs		
Footing Allow. Torsion, phi Tu	=	0.00	ft-lbs		

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: phiMn = phi*5*lambda*sqrt(fc)*Sm

Heel: phiMn = phi*5*lambda*sqrt(fc)*Sm

Key: No key defined

Min footing T&S reinf Area	0.78	in2
Min footing T&S reinf Area per foot	0.26	in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Cantilevered Retaining Wall

Project File: fnd.ec6

DESCRIPTION: 7' CANT'D WALL @ SLAB

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		984.4	2.50	2,460.9	Soil Over HL (ab. water tbl)	595.8	2.58	1,539.2
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		2.58	1,539.2
Hydrostatic Force					Water Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	=		
Added Lateral Load	=				* Axial Live Load on Stem	=		
Load @ Stem Above Soil	=				Soil Over Toe	=		
Seismic Earth Load	=	315.0	3.75	1,181.3	Surcharge Over Toe	=		
	=				Stem Weight(s)	=	717.0	1.83	1,314.5
					Earth @ Stem Transitions	=		
Total	=	1,299.4	**O.T.M.** =	3,642.2	Footing Weight	=	450.0	1.50	675.0
					Key Weight	=			
					Vert. Component	=	434.5	3.00	1,303.6
					Total =		2,197.4 lbs	**R.M.=**	4,832.3

Resisting/Overturning Ratio = **1.33**

Vertical Loads used for Soil Pressure = 2,197.4 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

If seismic is included, the OTM and sliding ratios may be 1.1 per section 1807.2.3 of IBC.

Vertical component of active lateral soil pressure IS considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.116	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

DESCRIPTION: 7' CANT'D WALL @ SLAB

Rebar Lap & Embedment Lengths Information

Stem Design Segment: 2nd
Stem Design Height: 4.00 ft above top of footing

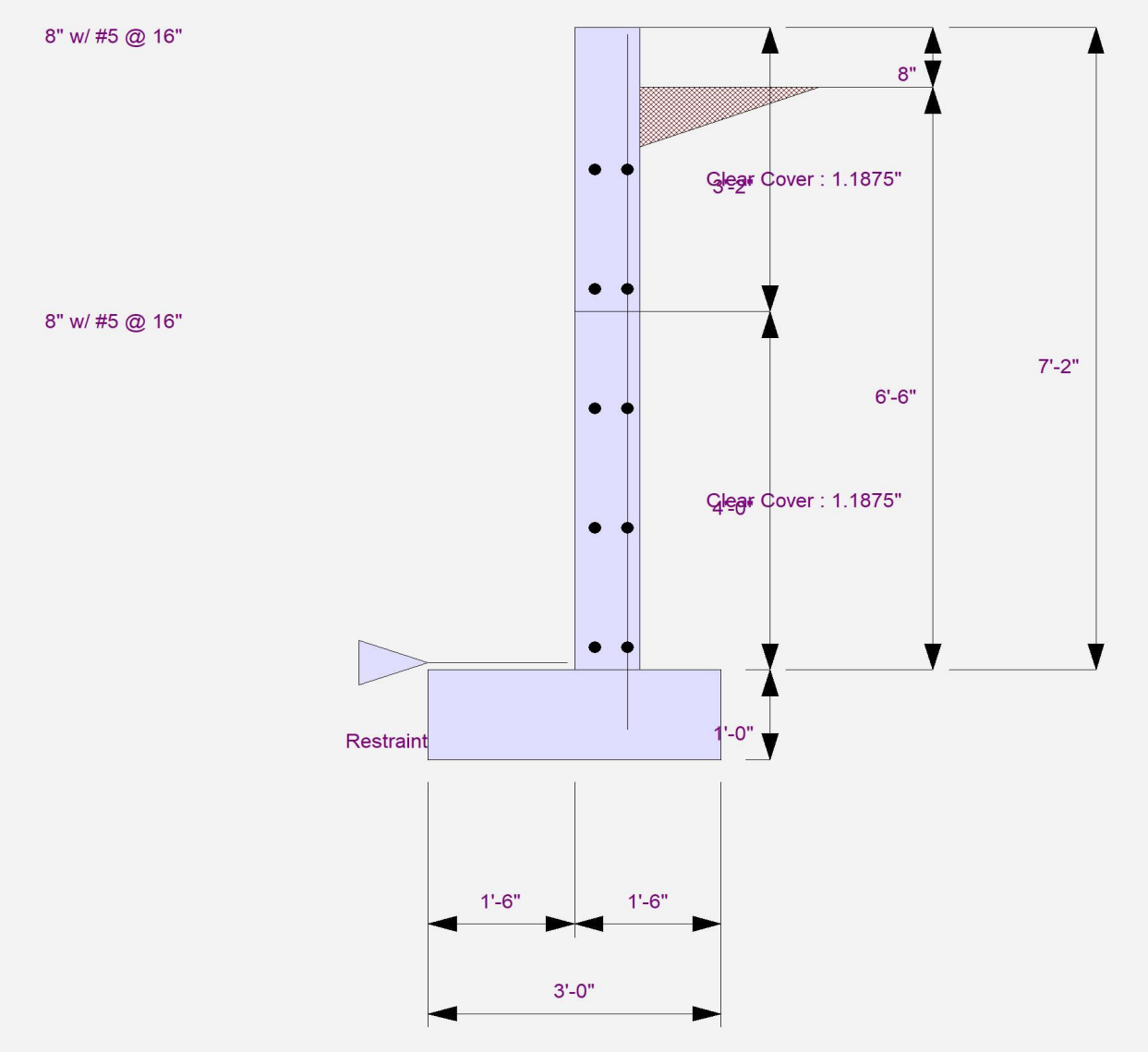
Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	23.40 in
Development length for #5 bar specified in this stem design segment =	18.00 in

---

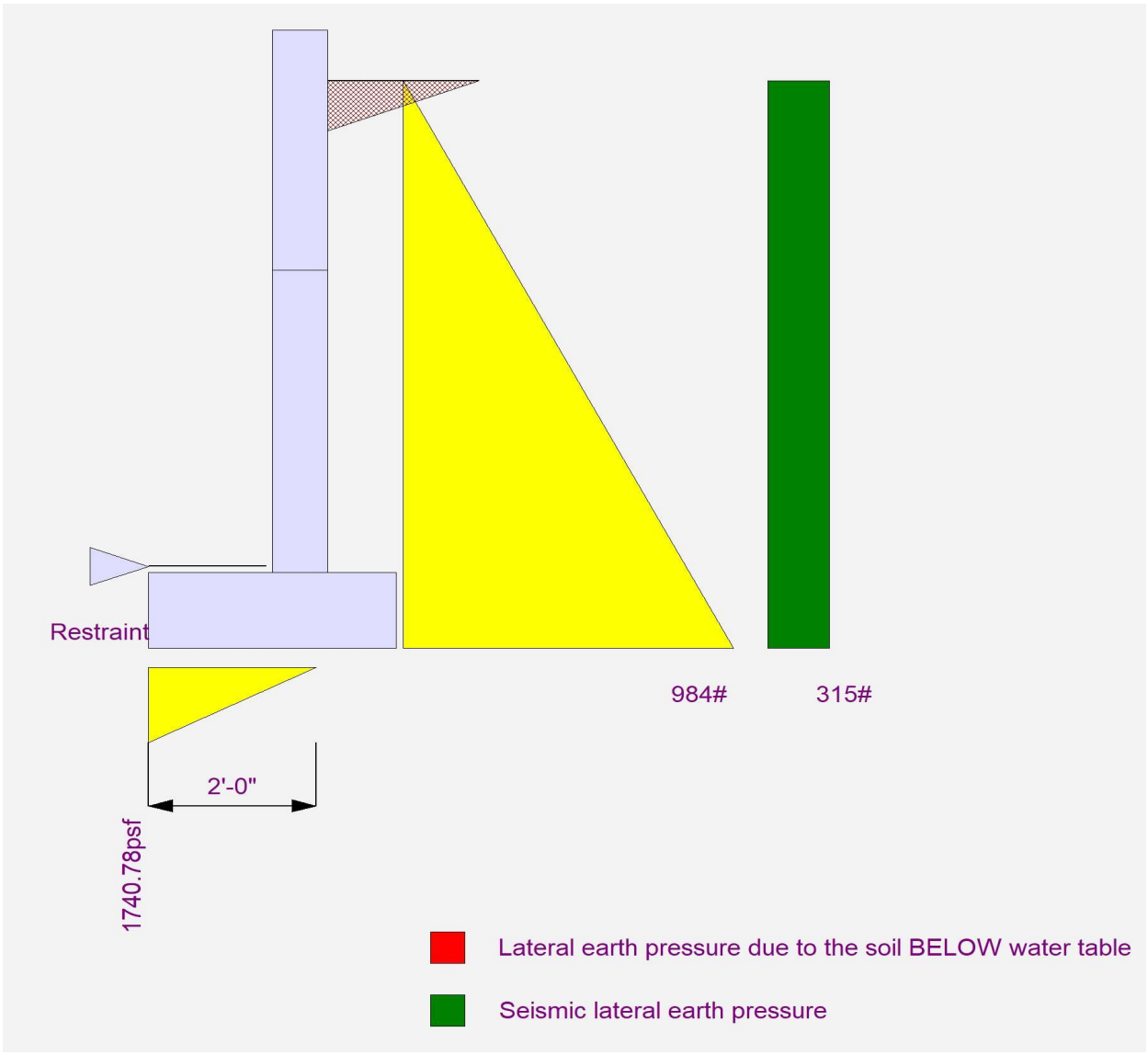
Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing

Lap Splice length for #5 bar specified in this stem design segment (25.4.2.3a) =	23.40 in
Development length for #5 bar specified in this stem design segment =	18.00 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	8.29 in
As Provided =	0.2325 in2/ft
As Required =	0.1836 in2/ft

DESCRIPTION: 7' CANT'D WALL @ SLAB



DESCRIPTION: 7' CANT'D WALL @ SLAB



JayMarc Homes

Dubey Residence

Mercer island, WA

Shear Wall Calculations - Wind

Reviewed By: RJZ

April 27, 2023

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

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: AJC
DATE: 02-MAY-23

WIND DESIGN SUMMARY PER ASCE 7-16

PARAMETERS:

WIND SPEED	100
EXPOSURE CATEGORY	B
RISK CATEGORY	II
WIND DIRECTIONALITY FACTOR, K_D	0.85
TOPOGRAPHIC FACTOR, K_{zt}	1.30
GUST FACTOR, G	0.85
GROUND ELEV. ABOVE SEA LEVEL [FT]	0
DESIGN TYPE	ASD

0.60

ROOF GEOMETRY:

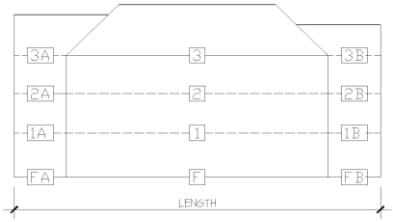
TRANS. ROOF PITCH	4.0	:12
LONG. ROOF PITCH	4.0	:12
MEAN ROOF HEIGHT, H	25.50	FT

BUILDING GEOMETRY:

LENGTH	75	FT
WIDTH	37	FT
NUMBER OF STORIES	3	

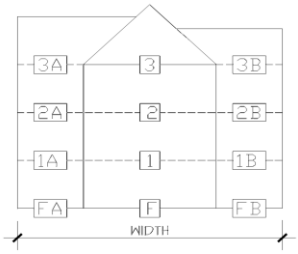
TRANSVERSE DIRECTION (PERPENDICULAR TO MAIN RIDGE LINE)

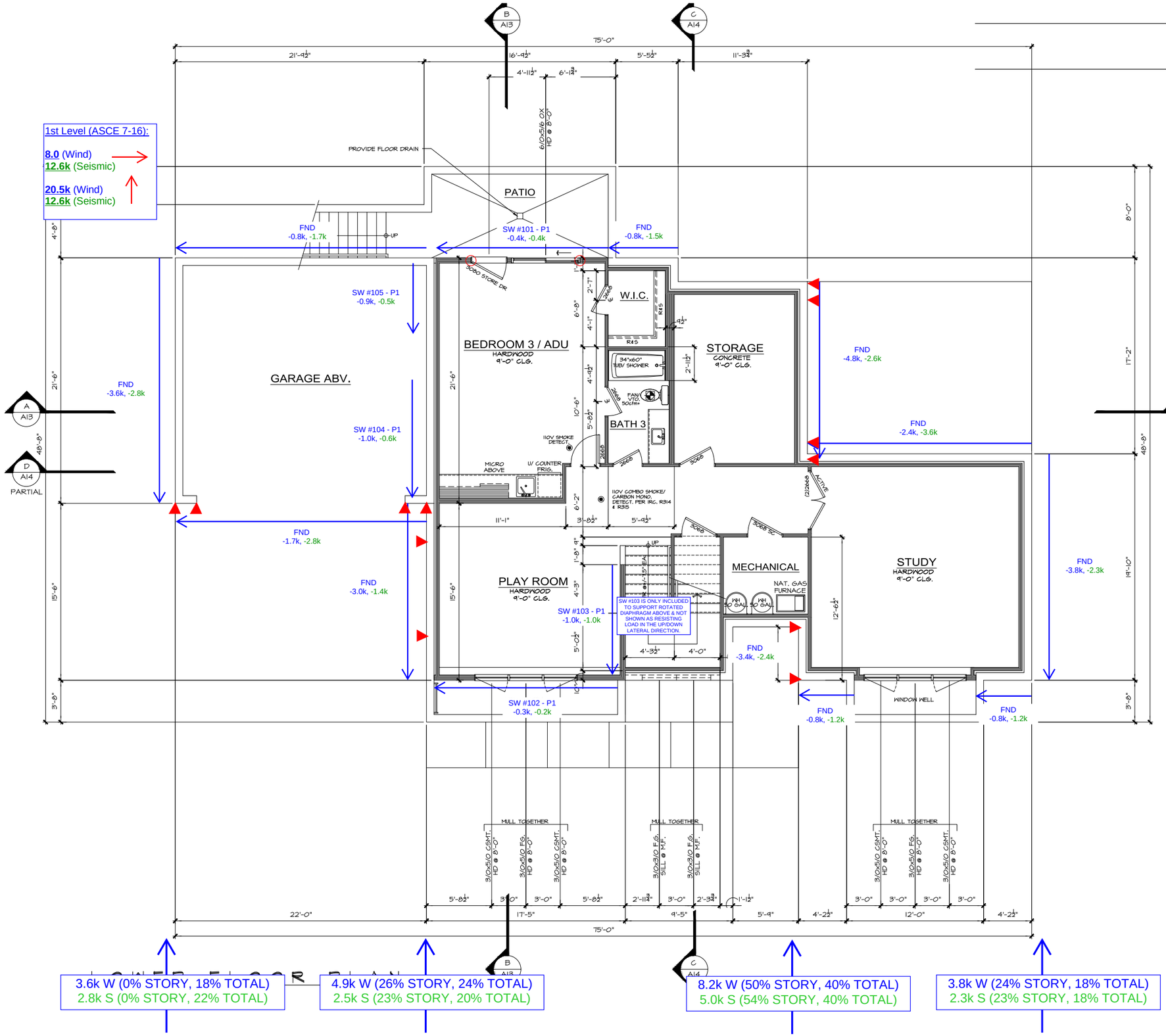
DIAPHRAGM LEVEL	FLOOR-TO-FLOOR HEIGHT		TRIBUTARY DESIGN AREAS: SECTION A	SECTION O	SECTION B		TRIBUTARY DESIGN LOADS: (0.6W) SECTION A	SECTION O	SECTION B	
3	9.1 FT	Roof Surface	0	181	0	sq ft	Story Shear	0.00	5.65	0.00 kips
		Wall surface	0	357	0	sq ft	Total Shear	0.00	5.65	0.00 kips
									5.65	kips
2	11.56 FT	Roof Surface	0	0	0	sq ft	Story Shear	0.00	10.21	0.00 kips
		Wall surface	0	834	0	sq ft	Total Shear	0.00	15.86	0.00 kips
									15.86	kips
1	10.66 FT	Roof Surface	0	0	0	sq ft	Story Shear	0.00	4.64	0.00 kips
		Wall surface	0	405	0	sq ft	Total Shear	0.00	20.50	0.00 kips
									20.50	kips
FND		Roof Surface	0	0	0	sq ft	Story Shear	0.00	0.00	0.00 kips
		Wall surface	0	0	0	sq ft	Total Shear	0.00	20.50	0.00 kips
									20.50	kips



LONGITUDINAL DIRECTION (PARALLEL TO MAIN RIDGE LINE)

DIAPHRAGM LEVEL	FLOOR-TO-FLOOR HEIGHT		TRIBUTARY DESIGN AREAS: SECTION A	SECTION O	SECTION B		TRIBUTARY DESIGN LOADS: (0.6W) SECTION A	SECTION O	SECTION B	
3	9.1 FT	Roof Surface	0	100	0	sq ft	Story Shear	0.00	2.31	0.00 kips
		Wall surface	0	153	0	sq ft	Total Shear	0.00	2.31	0.00 kips
									2.31	kips
2	11.56 FT	Roof Surface	0	31	0	sq ft	Story Shear	0.00	3.90	0.00 kips
		Wall surface	0	360	0	sq ft	Total Shear	0.00	6.21	0.00 kips
									6.21	kips
1	10.66 FT	Roof Surface	0	0	0	sq ft	Story Shear	0.00	1.84	0.00 kips
		Wall surface	0	192	0	sq ft	Total Shear	0.00	8.03	0.00 kips
									8.03	kips
FND		Roof Surface	0	0	0	sq ft	Story Shear	0.00	0.00	0.00 kips
		Wall surface	0	0	0	sq ft	Total Shear	0.00	8.03	0.00 kips
									8.03	kips





LOWER FLOOR PLAN NOTES

PLAN SPECIFIC 2015 WSEC, SECTION R06

R406.2 ADDITIONAL ENERGY EFFICIENCY REQUIREMENTS (MANDATORY).
THIS RESIDENTIAL DWELLING SHALL COMPLY w/SUFFICIENT OPTIONS FROM TABLE R406.2 TO ACHIEVE THE FOLLOWING MIN. NUMBER OF CREDITS:
3.5 FOR a 1,501sf to 4,999sf HOME.
CREDITS PROVIDED IN THIS HOME AS FOLLOWS:

EFFICIENT BUILDING ENVELOPE 1a: .05 CREDITS
PRESCRIPTIVE COMPLIANCE IS BASED ON TABLE R402.1.1 with FOLLOWING MODIFICATIONS:
VERTICAL FENESTRATION U = 0.28 WINDOWS
FLOORS TO BE R-38 and SLAB ON GRADE TO BE R-10 PERIMETER and UNDER ENTIRE SLAB BELOW GRADE.

HIGH EFFICIENC
GAS FURNA
EFFICIENT WATE
ALL SHOWE SHALL BE R IN THE HOUSE
ALL OTHER GPM or LESS.
EFFICIENT WATE
WATER HEA
GAS WATER HEATER WITH A MINIMUM EF OF 0.91

WHOLE HOUSE VENTILATION

PROVIDE WHOLE HOUSE VENTILIATION per 2015 IRC. M1507 and IMC R403.8 USING LAUNDRY ROOM EXHAUST FAN INTEGRATED INTO FORCED ARE SYSTEM (FAU.) PROVIDE OUTDOOR FRESH AIR w/DUCTS CONNECTED TO THE RETURN SIDE OF THE AIR HANDLER.

SYMBOL	LOCATION	MIN. FAN REQUIREMENTS (ALL FANS VENT TO OUTDIDE)
A 50cfm+	BATH & POWDER	Min. 50cfm. INTERMITTENT at .025wg per TABLE M1507.4
B 100cfm+	KITCHEN	Min. 100cfm. INTERMITTENT at .025wg per TBL. M1507.4
		RANGE HOOD or DOWN DRAFT EXHAUST FAN RATED at min. 100cfm, at 0.10wg MAY BE USED FOR EXHAUST FAN REQMT. EXHAUST HOODS IN EXCESS OF 400cfm, SHALL PROVIDE MAKE UP AIR per w/M1503.4
C 150cfm+ WHF	LAUNDRY	MIN. 150cfm. INTERMITTENT at .025wg TO FUNCTION

MECHANIC RATING TIMER per TABLE M150 RMS, TO OPERATE IN 07.3.3(2)
PROVIDE CO O CONTROLS THAT READS "INSTRUCTIONS"

SQUARE FOOTAGE SUMMARY

LOWER FLOOR AREA	1,401	S.F.
MAIN FLOOR AREA	1,580	S.F.
UPPER FLOOR AREA	1,451	S.F.
TOTAL CONDITIONED AREA	4432	S.F.
2 CAR GARAGE	467	S.F.
UNCOVD PATIO	296	S.F.
COVD PORCH	21	S.F.
TOTAL AREA UNDER ROOF	5,222	S.F.
OVERALL WIDTH	75'-0"	
OVERALL DEPTH	37'-0"	

Updated : 12.09.20

Method for Calculating Square Footage - ANSI Z765-2013 except: no separate distinction of 'above-grade or below-grade' areas and each level is measured to the outside of studs not the exterior finished surface.

Square footage calculations for this house were made based on plan dimensions only and may vary from the finished square footage of the house as built.

See Sheet "CODES" for additional Zoning required Area Calculations

JAYMARC HOMES
7525 SE 24th St., 487
Mercer Island, WA
98040
425.266.9100

△ Issue Issue Date By Description

8434 SE 39th ST.
Mercer Island, WA.
Job Number: --

plan name:
marketing name:
plan number: - - -
mark sys. number:

04.10.23
Submittal Date

Sheet Title/Description

JAYMARC HOMES
Design Firm

R.K.N.
Drawn by:

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Checked by:

Primary Scale

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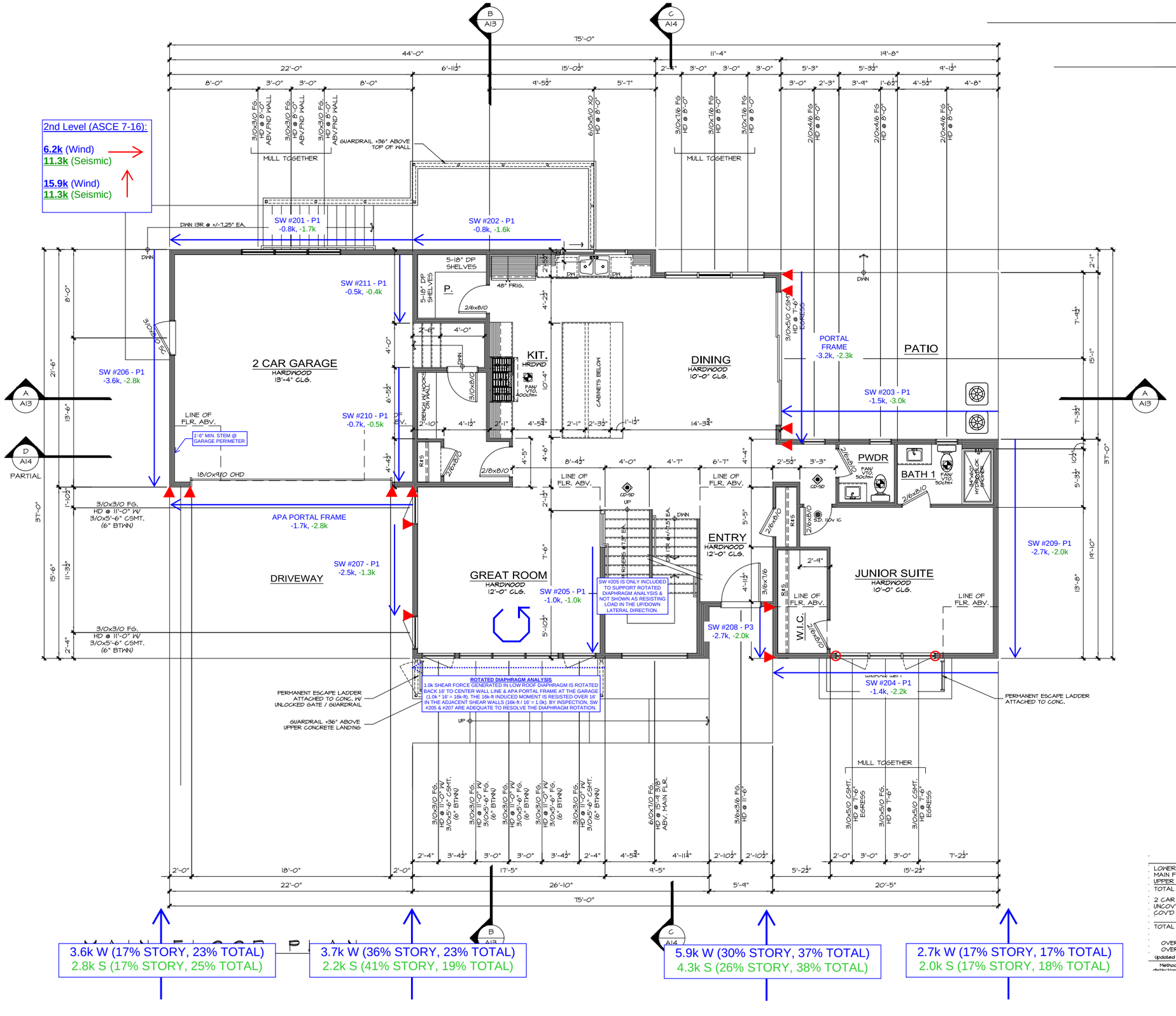
of: .

Sheet Title/Description



MAIN FLOOR PLAN NOTES

PLAN SPECIFIC 2015 WSEC, SECTION R06

R406.2 ADDITIONAL ENERGY EFFICIENCY REQUIREMENTS (MANDATORY).

THIS RESIDENTIAL DWELLING SHALL COMPLY W/SUFFICIENT OPTIONS FROM TABLE R406.2 TO ACHIEVE THE FOLLOWING MIN. NUMBER OF CREDITS:

3.5 FOR A 1501sf to 4,999sf HOME.

CREDITS PROVIDED IN THIS HOME AS FOLLOWS:

EFFICIENT BUILDING ENVELOPE 1a: .25 CREDITS

PRESCRIPTIVE COMPLIANCE IS BASED ON TABLE R402.1.1 with FOLLOWING MODIFICATIONS:

VERTICAL FENESTRATION U = 0.28 WINDOWS

FLOORS TO BE R-38 and SLAB ON GRADE TO BE R-10 PERIMETER and UNDER ENTIRE SLAB BELOW GRADE.

HIGH EFFICIENCY HVAC EQUIPMENT 3a: 1.0 CREDITS

GAS FURNACE WITH MINIMUM AFUE OF 94%

EFFICIENT WATER

ALL SHOWER SHALL BE RA … N THE HOUSE

ALL OTHER L… GPM or LESS.

EFFICIENT WATER

WATER HEATI… GAS WATER …

WHOLE HOUSE VENTILATION

PROVIDE WHOLE HOUSE VENTILATION per 2015 IRC, M1507 and IMC R403.8 USING LAUNDRY ROOM EXHAUST FAN INTEGRATED INTO FORCED AIRE SYSTEM (FAU) PROVIDE OUTDOOR FRESH AIR W/DUCTS CONNECTED TO THE RETURN SIDE OF THE AIR HANDLER.

SYMBOL	LOCATION	MIN. FAN REQUIREMENTS (ALL FANS VENT TO OUTDIDE)
FAN 50cfm+	BATH 4 POWDER	Min. 50cfm, INTERMITTENT at .025ang per TABLE M1507.4
	KITCHEN	Min. 100cfm, INTERMITTENT at .025ang per TBL. M1507.4
		RANGE HOOD or DOWN DRAFT EXHAUST FAN RATED at min. 100cfm, at 0.3DwG MAY BE USED FOR EXHAUST FAN RIGHT. EXHAUST HOODS IN EXCESS OF 400cfm. SHALL BE INTERLOCKED AND PROVIDE MAKE UP AIR per w/M1503.4
FAN 180cfm+ INTER.	LAUNDRY	MIN. 360cfm, INTERMITTENT at .025ang TO FUNCTION

MECHANICA… TABLE M1507.3 INTE… …ATING TIMER per …0HS, TO OPERATE …3.3(2)

PROVIDE CON… READS " …CONTROLS THAT …TRUCTIONS"

SQUARE FOOTAGE SUMMARY

LOWER FLOOR AREA	1,401	S.F.
MAIN FLOOR AREA	1,580	S.F.
UPPER FLOOR AREA	1,451	S.F.
TOTAL CONDITIONED AREA	4432	S.F.
2 CAR GARAGE	467	S.F.
UNCOV'D PATIO	296	S.F.
COV'D PORCH	27	S.F.
TOTAL AREA UNDER ROOF	5,222	S.F.
OVERALL WIDTH	75'-0"	
OVERALL DEPTH	37'-0"	

Updated - 12.09.20

Method for Calculating Square Footage - ANSI Z765-2013 except: no separate deduction of 'obscure voids or below grade' areas and each level is measured to the

JAYMARC HOMES
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98040
425.266.9100

Issue	Issue Date	By
Description		
△		

8434 SE 39th ST.
Mercer Island, WA.

Job Number: --

plan name: --
marketing name: --
plan number: --
mark sys. number: --

04.10.23
Submittal Date

Sheet Title/Description

JAYMARC HOMES
Design Firm

R.K.N.
Drawn by:

Checked by:

Primary Scale

Sheet Title/Description

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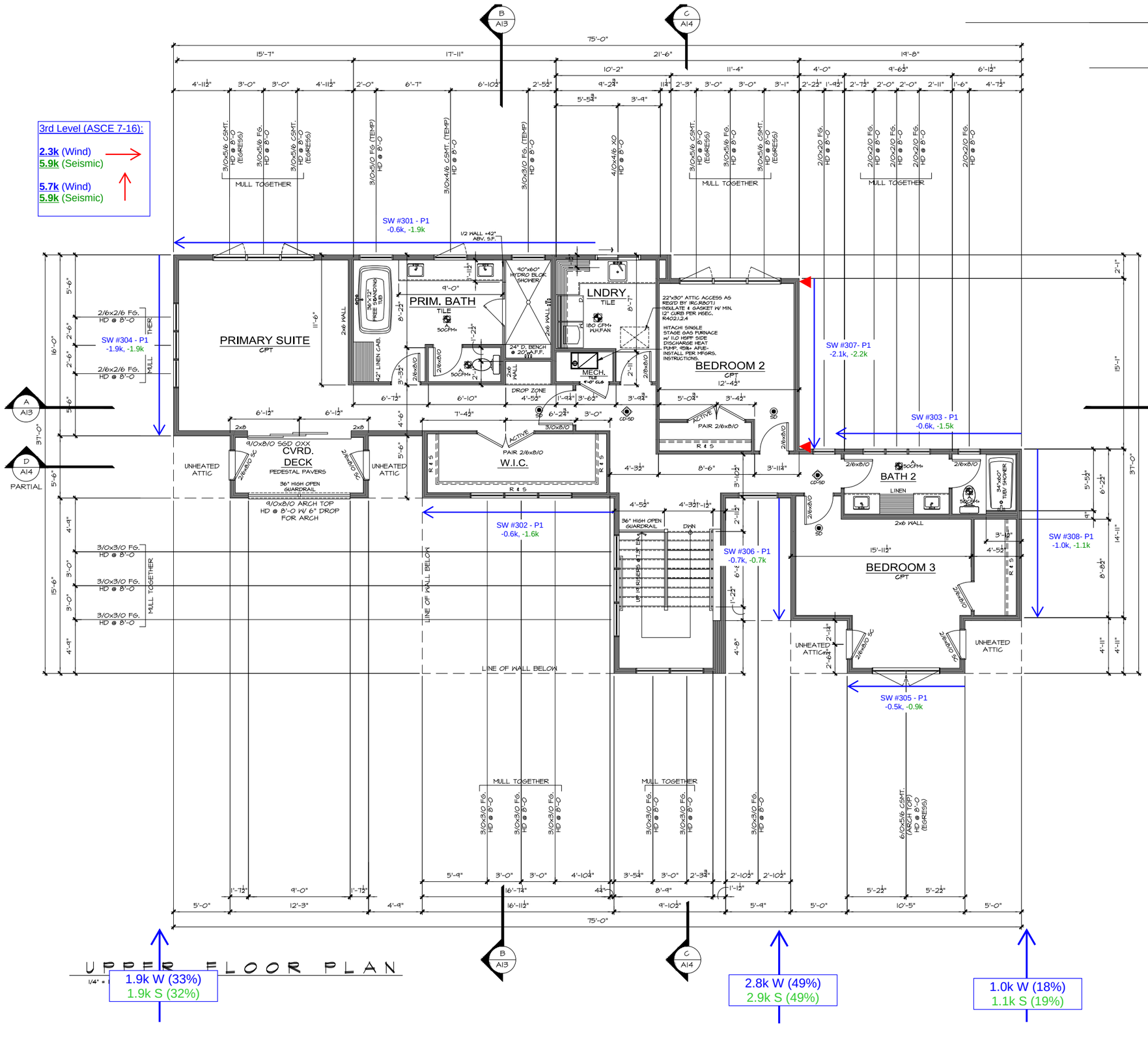

UPPER FLOOR PLAN

1/4" = 1'-0"

UPPER FLOOR PLAN NOTES:

PLAN SPECIFIC 2015 WSEC, SECTION R06

R406.2 ADDITIONAL ENERGY EFFICIENCY REQUIREMENTS (MANDATORY).

THIS RESIDENTIAL DWELLING SHALL COMPLY w/SUFFICIENT OPTIONS FROM TABLE R406.2 TO ACHIEVE THE FOLLOWING MIN. NUMBER OF CREDITS:

3.5 FOR A 1501sf to 4,999sf HOME.

CREDITS PROVIDED IN THIS HOME AS FOLLOWS:

EFFICIENT BUILDING ENVELOPE 1a: 0.5 CREDITS

PRESCRIPTIVE COMPLIANCE IS BASED ON TABLE R402.1.1 with FOLLOWING MODIFICATIONS:

VERTICAL FENESTRATION U = 0.28 WINDOWS

FLOORS TO BE R-38 and SLAB ON GRADE TO BE R-10 PERIMETER and UNDER ENTIRE SLAB BELOW GRADE.

HIGH EFFICIENCY HVAC EQUIPMENT 3a: 1.0 CREDITS

GAS FURNACE WITH MINIMUM AFUE OF 94%

EFFICIENT WATER HEATING 5a: 0.5 CREDITS

ALL SHOWERHEAD and KITCHEN SINK FAUCETS INSTALLED IN THE HOUSE SHALL BE RATED AT 1.75 GPM or LESS.

ALL OTHER LAVATORY FAUCETS SHALL BE RATED AT 1.0 GPM or LESS.

EFFICIENT WATER HEATING

WATER HEA
GAS WATER

WHOLE HOUSE VENTILATION

PROVIDE WHOLE HOUSE VENTILATION per 2015 IRC, M1507 and IMC R403.8 USING LAUNDRY ROOM EXHAUST FAN INTEGRATED INTO FORCED AIRE SYSTEM (FAU) PROVIDE OUTDOOR FRESH AIR w/DUCTS CONNECTED TO THE RETURN SIDE OF THE AIR HANDLER.

SYMBOL	LOCATION	MIN. FAN REQUIREMENTS (ALL FANS VENT TO OUTDIDE)
A 50cfm	BATH & POWDER	Min. 50cfm, INTERMITTENT at .025wg per TABLE M1507.4
	KITCHEN	Min. 100cfm, INTERMITTENT at .025wg per TBL. M1507.4
B 100cfm	RANGE HOOD or DOWN DRAFT EXHAUST FAN RATED at min. 100cfm, at 0.0wg MAY BE USED FOR EXHAUST FAN REQ'T. EXHAUST HOODS IN EXCESS OF 400cfm, SHALL BE INTERLOCKED AND PROVIDE MAKE UP AIR per M1503.4	
C 150cfm WHF	LAUNDRY ROOM AS WHOLE HOUSE FAN (WHF.)	MIN. 150cfm, INTERMITTENT at .025wg TO FUNCTION

MECHANICAL CONTRACTOR TO SIZE WHF, FAN and SET OPERATING TIMER per TABLE M1507.3.3(1) FOR A 3,001-4,500sf. DWELLING w/4-5 BEDRMS. TO OPERATE INTERMITTENTLY and CONTINUOSLY per TABLE M1507.3.3(2)

PROVIDE CONTROLS FOR WHF, per M1507.3.2 AFFIX LABEL TO CONTROLS THAT READS "WHOLE HOUSE VENTILATION - SEE OPERATING INSTRUCTIONS"

SQUARE FOOTAGE SUMMARY

LOWER FLOOR AREA	1,401 S.F.
MAIN FLOOR AREA	1,580 S.F.
UPPER FLOOR AREA	1,451 S.F.
TOTAL CONDITIONED AREA	4432 S.F.
2 CAR GARAGE	467 S.F.
UNCVD PATIO	296 S.F.
COVD PORCH	27 S.F.
TOTAL AREA UNDER ROOF	5,222 S.F.
OVERALL WIDTH	75'-0"
OVERALL DEPTH	37'-0"

Updated : 12.09.20

Method for Calculating Square Footage - ANSI Z765-2013 excepts no separate deduction of "unusuable or habitable" areas and each level is measured to the

JAYMARC HOMES
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98040
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Issue	Issue Date	By	Description

8434 SE 39th ST.
Mercer Island, WA.

Job Number: --

plan name: --
marketing name: --
plan number: --
mark sys. number: --

04.10.23
Submittal Date

Sheet Title/Description

JAYMARC HOMES
Design Firm

R.K.N.
Drawn by:

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Checked by:

Primary Scale

A8
of: .

Sheet Title/Description

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 301: 3RD - REAR EXT. WALL @ PRIMARY, PRIMARY BATH, LAUNDRY

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H_c	5.5	FT.		
WALL LENGTH, L	38.3	FT.	QUALIFYING WALL LENGTH, L	19.7	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
600 LBS	<	6605 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	236	PLF	OVERTURNING MOMENT	5.5	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	113.2	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 302: 3RD - FRONT EXT. WALL @ W.I.C.

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, Hc	3.0	FT.		
WALL LENGTH, L	17.0	FT.	QUALIFYING WALL LENGTH, L	7.7	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
600 LBS	<	2582 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	208	PLF	OVERTURNING MOMENT	5.5	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	22.0	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 303: 3RD - REAR EXT. WALL @ BATH 2

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H_c	2.0	FT.		
WALL LENGTH, L	16.5	FT.	QUALIFYING WALL LENGTH, L	8.5	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
600 LBS	<	2854 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	189	PLF	OVERTURNING MOMENT	5.5	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	19.4	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 304: 3RD - SIDE EXT. WALL @ PRIMARY

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, Hc	2.5	FT.		
WALL LENGTH, L	16.0	FT.	QUALIFYING WALL LENGTH, L	8.5	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1900 LBS	<	2854 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	180	PLF	OVERTURNING MOMENT	17.2	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	1000	LBS	RESISTIVE MOMENT	23.4	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 305: 3RD - FRONT EXT. WALL @ BED 3

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H_c	5.5	FT.		
WALL LENGTH, L	10.4	FT.	QUALIFYING WALL LENGTH, L	4.4	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
500 LBS	<	1402 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	134	PLF	OVERTURNING MOMENT	4.6	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	1100	LBS	RESISTIVE MOMENT	11.3	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 306: 3RD - SIDE EXT. WALL @ BED 3 (LEFT)

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	10.8	FT.	QUALIFYING WALL LENGTH, L	10.8	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
700 LBS	<	3638 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	170	PLF	OVERTURNING MOMENT	6.3	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	8.6	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 307: 3RD - SIDE EXT. WALL @ BED 2

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H_o	0.0	FT.		
WALL LENGTH, L	15.1	FT.	QUALIFYING WALL LENGTH, L	15.1	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2100 LBS	<	5064 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	170	PLF	OVERTURNING MOMENT	19.1	K-FT	HOLD DOWN DESIGN LOAD	258	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	15.2	K-FT	HOLDOWN CAPACITY	1705	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)

SHEARWALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	#REF!	FT.	MAX WALL OPENING HT, Hc	#REF!	FT.		
WALL LENGTH, L	#REF!	FT.	QUALIFYING WALL LENGTH, L	#REF!	FT.	SHEARWALL ASSEMBLY	#REF!

CAPACITY EVALUATION:

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

SHEARWALL ASSEMBLY SPECIFICATION

#REF!
#REF!
#REF!

OVERTURNING EVALUATION:

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

HOLD-DOWN SPECIFICATION

#REF!

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL

SHEARWALL PROPERTIES:

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

CAPACITY EVALUATION:

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

SHEARWALL ASSEMBLY SPECIFICATION

#REF!
#REF!
#REF!

OVERTURNING EVALUATION:

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

HOLD-DOWN SPECIFICATION

#REF!

SHEARWALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	#REF!	FT.	MAX WALL OPENING HT, HC	#REF!	FT.		
WALL LENGTH, L	#REF!	FT.	QUALIFYING WALL LENGTH, L	#REF!	FT.	SHEARWALL ASSEMBLY	#REF!

CAPACITY EVALUATION:

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

SHEARWALL ASSEMBLY SPECIFICATION

#REF!
#REF!
#REF!

OVERTURNING EVALUATION:

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

HOLD-DOWN SPECIFICATION

#REF!

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Project Name: JayMarc Homes
Dubey Residence
M&K Project #: 154-23001
Engineer: JCL
Date: 27-Apr-23

Shearwall Design Summary

Shearwall

Shearwall Properties:

Wall height, H	#REF!	ft.	Max wall opening ht, H_c	#REF!	ft.		
Wall Length, L	#REF!	ft.	Qualifying Wall Length, L	#REF!	ft.	Shearwall Assembly	#REF!

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
#REF! lbs	#REF!	#REF! lbs

Shearwall Assembly Specification

#REF!
#REF!
#REF!

Overturning Evaluation:

Resistive DL	#REF!	plf	Overturning Moment	#REF!	k-ft	Hold Down Design Load	#REF!	lbs
DL at ends of wall	#REF!	lbs	Resistive Moment	#REF!	k-ft	Holdown Capacity	#REF!	lbs

Hold-down Specification

#REF!

Shearwall 308: 3rd - Side Ext. Wall @ Bed 3 (Right)

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	14.9	ft.	Qualifying Wall Length, L	14.9	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1000 lbs	<	5010 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	168	plf	Overturning Moment	9.1	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	400	lbs	Resistive Moment	14.8	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL

SHEARWALL PROPERTIES:

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

CAPACITY EVALUATION:

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

SHEARWALL ASSEMBLY SPECIFICATION

#REF!
#REF!
#REF!

OVERTURNING EVALUATION:

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

HOLD-DOWN SPECIFICATION

#REF!

SHEARWALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	#REF!	FT.	MAX WALL OPENING HT, HC	#REF!	FT.		
WALL LENGTH, L	#REF!	FT.	QUALIFYING WALL LENGTH, L	#REF!	FT.	SHEARWALL ASSEMBLY	#REF!

CAPACITY EVALUATION:

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

SHEARWALL ASSEMBLY SPECIFICATION

#REF!
#REF!
#REF!

OVERTURNING EVALUATION:

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

HOLD-DOWN SPECIFICATION

#REF!

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 201: 2ND - REAR EXT. WALL @ GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	12.0	FT.	MAX WALL OPENING HT, H_o	3.0	FT.		
WALL LENGTH, L	22.0	FT.	QUALIFYING WALL LENGTH, L	13.0	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
800 LBS	<	4365 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	483	PLF	OVERTURNING MOMENT	9.6	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	80.7	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 202: 2ND - REAR EXT. WALL @ KITCHEN

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	13.5	FT.	QUALIFYING WALL LENGTH, L	13.5	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
800 LBS	<	4533 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	494	PLF	OVERTURNING MOMENT	8.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	33.5	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 203: 2ND - REAR EXT. WALL @ POWDER, BATH 1

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, H_o	4.5	FT.		
WALL LENGTH, L	19.7	FT.	QUALIFYING WALL LENGTH, L	13.7	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1500 LBS	<	4569 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	403	PLF	OVERTURNING MOMENT	15.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	56.2	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 204: 2ND - FRONT EXT. WALL @ JUNIOR SUITE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	5.0	FT.		
WALL LENGTH, L	20.4	FT.	QUALIFYING WALL LENGTH, L	11.4	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1400 LBS	<	3835 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	269	PLF	OVERTURNING MOMENT	14.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	38.6	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 205: 2ND - SIDE INT. WALL @ GREAT RM.

SHEARWALL PROPERTIES:

WALL HEIGHT, H	12.0	FT.	MAX WALL OPENING HT, H_o	0.0	FT.		
WALL LENGTH, L	9.6	FT.	QUALIFYING WALL LENGTH, L	9.6	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1000 LBS	<	3234 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	350	PLF	OVERTURNING MOMENT	12.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	1200	LBS	RESISTIVE MOMENT	16.7	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 206: 2ND - SIDE EXT. WALL @ GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	12.0	FT.	MAX WALL OPENING HT, Hc	8.0	FT.		
WALL LENGTH, L	21.5	FT.	QUALIFYING WALL LENGTH, L	18.5	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
3600 LBS	<	6212 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	315	PLF	OVERTURNING MOMENT	43.2	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	1200	LBS	RESISTIVE MOMENT	59.2	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 207: 2ND - SIDE EXT. WALL @ GREAT RM.

SHEARWALL PROPERTIES:

WALL HEIGHT, H	12.0	FT.	MAX WALL OPENING HT, H_o	0.0	FT.		
WALL LENGTH, L	8.3	FT.	QUALIFYING WALL LENGTH, L	8.3	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2500 LBS	<	2784 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	160	PLF	OVERTURNING MOMENT	30.0	K-FT	HOLD DOWN DESIGN LOAD	2864	LBS
DL AT ENDS OF WALL	595	LBS	RESISTIVE MOMENT	6.3	K-FT	HOLDOWN CAPACITY	4935	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN

SHEARWALL 208: 2ND - SIDE EXT./INT. WALL @ ENTRY

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	4.7	FT.	QUALIFYING WALL LENGTH, L	4.7	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2700 LBS	<	2915 LBS

SHEARWALL ASSEMBLY SPECIFICATION

P3 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 3"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	332	PLF	OVERTURNING MOMENT	27.0	K-FT	HOLD DOWN DESIGN LOAD	4557	LBS
DL AT ENDS OF WALL	1200	LBS	RESISTIVE MOMENT	5.6	K-FT	HOLDOWN CAPACITY	4935	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 209: 2ND - SIDE EXT. WALL @ JUNIOR SUITE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, H_o	0.0	FT.		
WALL LENGTH, L	19.8	FT.	QUALIFYING WALL LENGTH, L	19.8	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2700 LBS	<	6659 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	264	PLF	OVERTURNING MOMENT	27.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	493	LBS	RESISTIVE MOMENT	37.0	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 210: 2ND - SIDE INT. WALL @ GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	10.4	FT.	QUALIFYING WALL LENGTH, L	10.4	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
700 LBS	<	3492 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	140	PLF	OVERTURNING MOMENT	7.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	7.0	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Project Name: JayMarc Homes
Dubey Residence
M&K Project #: 154-23001
Engineer: JCL
Date: 27-Apr-23

Shearwall Design Summary

Shearwall 101: 1st - Rear Ext. Wall @ Bed 3

Shearwall Properties:

Wall height, H	9.0	ft.	Max wall opening ht, H_c	8.0	ft.		
Wall Length, L	15.1	ft.	Qualifying Wall Length, L	5.6	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
400 lbs	<	1819 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	752	plf	Overturning Moment	3.6	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	1200	lbs	Resistive Moment	62.2	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 102: 1st - Front Ext Wall @ Play Rm.

Shearwall Properties:

Wall height, H	9.0	ft.	Max wall opening ht, Hc	5.0	ft.		
Wall Length, L	16.1	ft.	Qualifying Wall Length, L	7.1	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
300 lbs	<	2377 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	448	plf	Overturning Moment	2.7	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	1200	lbs	Resistive Moment	46.3	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 103: 1ST - SIDE INT WALL @ PLAY ROOM

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.0	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	9.7	FT.	QUALIFYING WALL LENGTH, L	9.7	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1000 LBS	<	3257 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	417	PLF	OVERTURNING MOMENT	9.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	1000	LBS	RESISTIVE MOMENT	17.6	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 211: 2ND - SIDE INT. WALL @ GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	6.3	FT.	QUALIFYING WALL LENGTH, L	6.3	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
500 LBS	<	2116 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	140	PLF	OVERTURNING MOMENT	5.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	1000	LBS	RESISTIVE MOMENT	5.4	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 104: 1ST - SIDE INT WALL @ GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	1.5	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	10.3	FT.	QUALIFYING WALL LENGTH, L	10.3	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1000 LBS	<	3459 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	250	PLF	OVERTURNING MOMENT	1.5	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	1000	LBS	RESISTIVE MOMENT	14.1	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 105: 1ST - SIDE INT WALL @ GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	1.5	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	6.3	FT.	QUALIFYING WALL LENGTH, L	6.3	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
900 LBS	<	2116 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	250	PLF	OVERTURNING MOMENT	1.4	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	1000	LBS	RESISTIVE MOMENT	6.8	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

JayMarc Homes

Dubey Residence

Mercer island, WA

Shear Wall Calculations - Seismic

Reviewed By: RJZ

April 27, 2023

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

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: DUBEY RESIDENCE
JAYMARC HOMES
M&K PROJECT #: 154-23001
ENGINEER: AJC
DATE: 02-MAY-23

SEISMIC CALCULATION - ASCE 7-16

SEISMIC DESIGN CATEGORY:

USER INPUTS:

Site Class	D
Spectral Response Acceleration 0.2 sec, S_S	1.407
Spectral Response Acceleration 1.0 sec, S_1	0.489
Occupancy Category	II

VARIABLES:

Site coefficient, Fa	1.20
Site coefficient, Fv	1.81

CALCULATED VALUES:

Maximum spectral response acceleration, S_{MS}	1.688
Maximum spectral response acceleration, S_{M1}	0.886
Design spectral response acceleration, S_{DS}	1.126
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	31

CALCULATED VALUES:

Approximate Fundamental Period, T_A	0.265
T_0	0.105
T_S	0.525
Spectral Response Acc., S_A (g)	1.126

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	10.7	1402	15	1.9	23 K
2	11.6	2013	15	15.0	45 K
3	9.1	1647	17	7.5	35 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 104 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

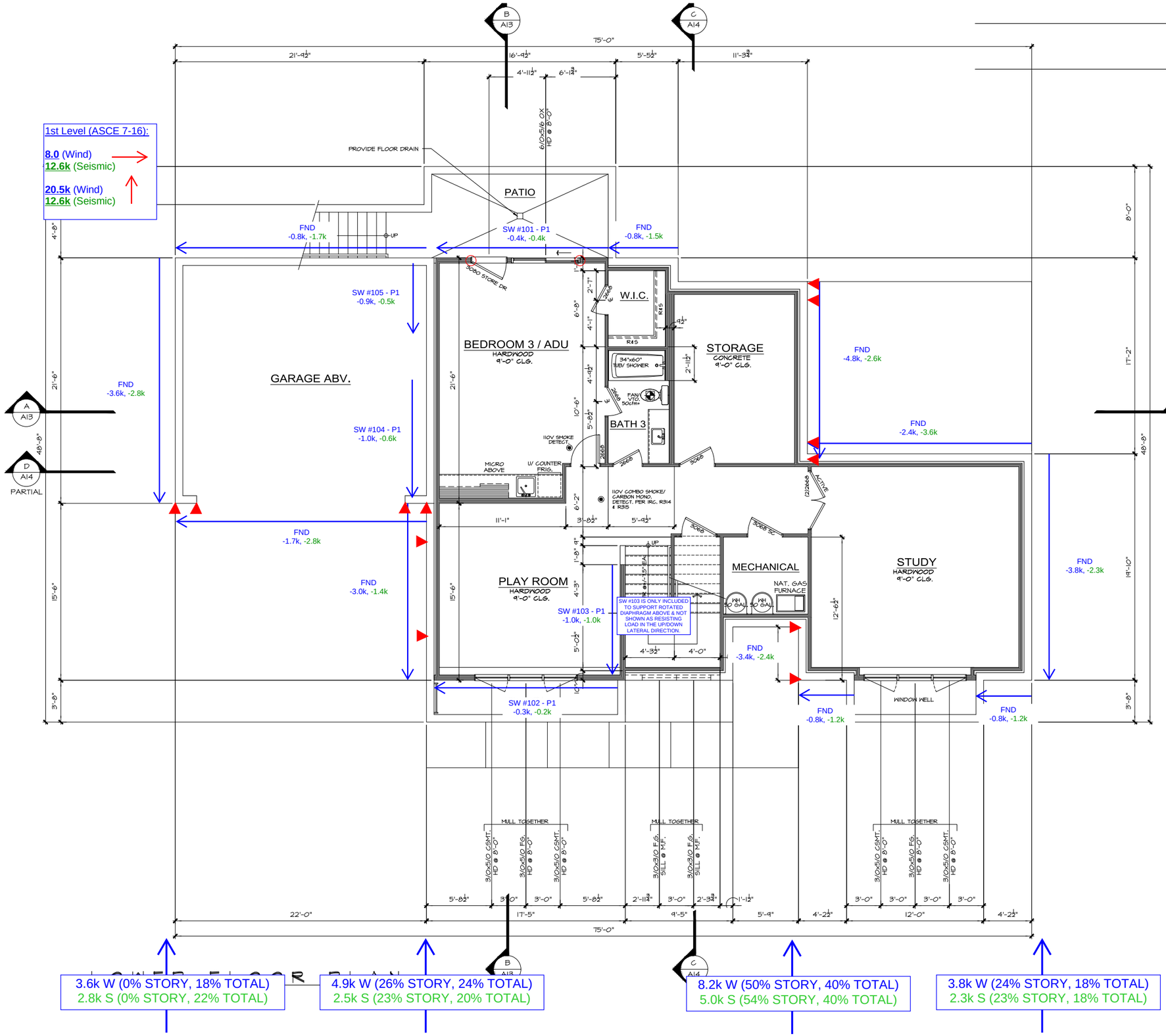
BASE SHEARS:

Ultimate Loads				x 0.7 =	Allowable Loads			
Transverse		Longitudinal			Transverse		Longitudinal	
18	K	18	K		12.6	K	12.6	K

STORY SHEAR CALCULATION:

Distribution exponent, k: 1.00

Level	Vert. Dist. Factor, C_{VX}	Ultimate Loads: Transverse Story Shear, F_x	Ultimate Loads: Longitudinal Story Shear, F_x	x 0.7 =	Allowable Loads: Transverse Story Shear, F_x	Allowable Loads: Transverse Σ Story Shear	Allowable Loads: Longitudinal Story Shear, F_x	Allowable Loads: Longitudinal Σ Story Shear
1	0.103	1.9 K	1.9 K		1.3 K	12.6 K	1.3 K	12.6 K
2	0.426	7.6 K	7.6 K		5.3 K	11.3 K	5.3 K	11.3 K
3	0.471	8.4 K	8.4 K		5.9 K	5.9 K	5.9 K	5.9 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



LOWER FLOOR PLAN NOTES

PLAN SPECIFIC 2015 WSEC, SECTION R06

R406.2 ADDITIONAL ENERGY EFFICIENCY REQUIREMENTS (MANDATORY).
THIS RESIDENTIAL DWELLING SHALL COMPLY w/SUFFICIENT OPTIONS FROM TABLE R406.2 TO ACHIEVE THE FOLLOWING MIN. NUMBER OF CREDITS:
3.5 FOR a 1,501sf to 4,999sf HOME.
CREDITS PROVIDED IN THIS HOME AS FOLLOWS:

EFFICIENT BUILDING ENVELOPE 1a: .05 CREDITS
PRESCRIPTIVE COMPLIANCE IS BASED ON TABLE R402.1.1 with FOLLOWING MODIFICATIONS:
VERTICAL FENESTRATION U = 0.28 WINDOWS
FLOORS TO BE R-38 and SLAB ON GRADE TO BE R-10 PERIMETER and UNDER ENTIRE SLAB BELOW GRADE.

HIGH EFFICIENC
GAS FURNA
EFFICIENT WATE
ALL SHOWE SHALL BE R IN THE HOUSE
ALL OTHER GPM or LESS.
EFFICIENT WATE
WATER HEA
GAS WATER HEATER WITH A MINIMUM EF OF 0.91

WHOLE HOUSE VENTILATION

PROVIDE WHOLE HOUSE VENTILIATION per 2015 IRC. M1507 and IMC R403.8 USING LAUNDRY ROOM EXHAUST FAN INTEGRATED INTO FORCED ARE SYSTEM (FAU.) PROVIDE OUTDOOR FRESH AIR w/DUCTS CONNECTED TO THE RETURN SIDE OF THE AIR HANDLER.

SYMBOL	LOCATION	MIN. FAN REQUIREMENTS (ALL FANS VENT TO OUTDIDE)
A 50cfm+	BATH & POWDER	Min. 50cfm. INTERMITTENT at .025wg per TABLE M1507.4
B 100cfm+	KITCHEN	Min. 100cfm. INTERMITTENT at .025wg per TBL. M1507.4
		RANGE HOOD or DOWN DRAFT EXHAUST FAN RATED at min. 100cfm, at 0.10wg MAY BE USED FOR EXHAUST FAN REQMT. EXHAUST HOODS IN EXCESS OF 400cfm, SHALL PROVIDE MAKE UP AIR per w/M1503.4
C 150cfm+ WHF	LAUNDRY	MIN. 150cfm. INTERMITTENT at .025wg TO FUNCTION

MECHANIC RATING TIMER per TABLE M150 RMS, TO OPERATE IN 07.3.3(2)
PROVIDE CO O CONTROLS THAT READS "INSTRUCTIONS"

SQUARE FOOTAGE SUMMARY

LOWER FLOOR AREA	1,401	S.F.
MAIN FLOOR AREA	1,580	S.F.
UPPER FLOOR AREA	1,451	S.F.
TOTAL CONDITIONED AREA	4432	S.F.
2 CAR GARAGE	467	S.F.
UNCOVD PATIO	296	S.F.
COVD PORCH	21	S.F.
TOTAL AREA UNDER ROOF	5,222	S.F.
OVERALL WIDTH	75'-0"	
OVERALL DEPTH	37'-0"	

Updated : 12.09.20

Method for Calculating Square Footage - ANSI Z765-2013 except: no separate distinction of 'above-grade or below-grade' areas and each level is measured to the outside of studs not the exterior finished surface.

Square footage calculations for this house were made based on plan dimensions only and may vary from the finished square footage of the house as built.

See Sheet "CODES" for additional Zoning required Area Calculations

JAYMARC HOMES
7525 SE 24th St., 487
Mercer Island, WA
98040
425.266.9100

△ Issue Issue Date By Description

8434 SE 39th ST.
Mercer Island, WA.
Job Number: --

plan name:
marketing name:
plan number: - - -
mark sys. number:

04.10.23
Submittal Date

Sheet Title/Description

JAYMARC HOMES
Design Firm

R.K.N.
Drawn by:

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Checked by:

Primary Scale

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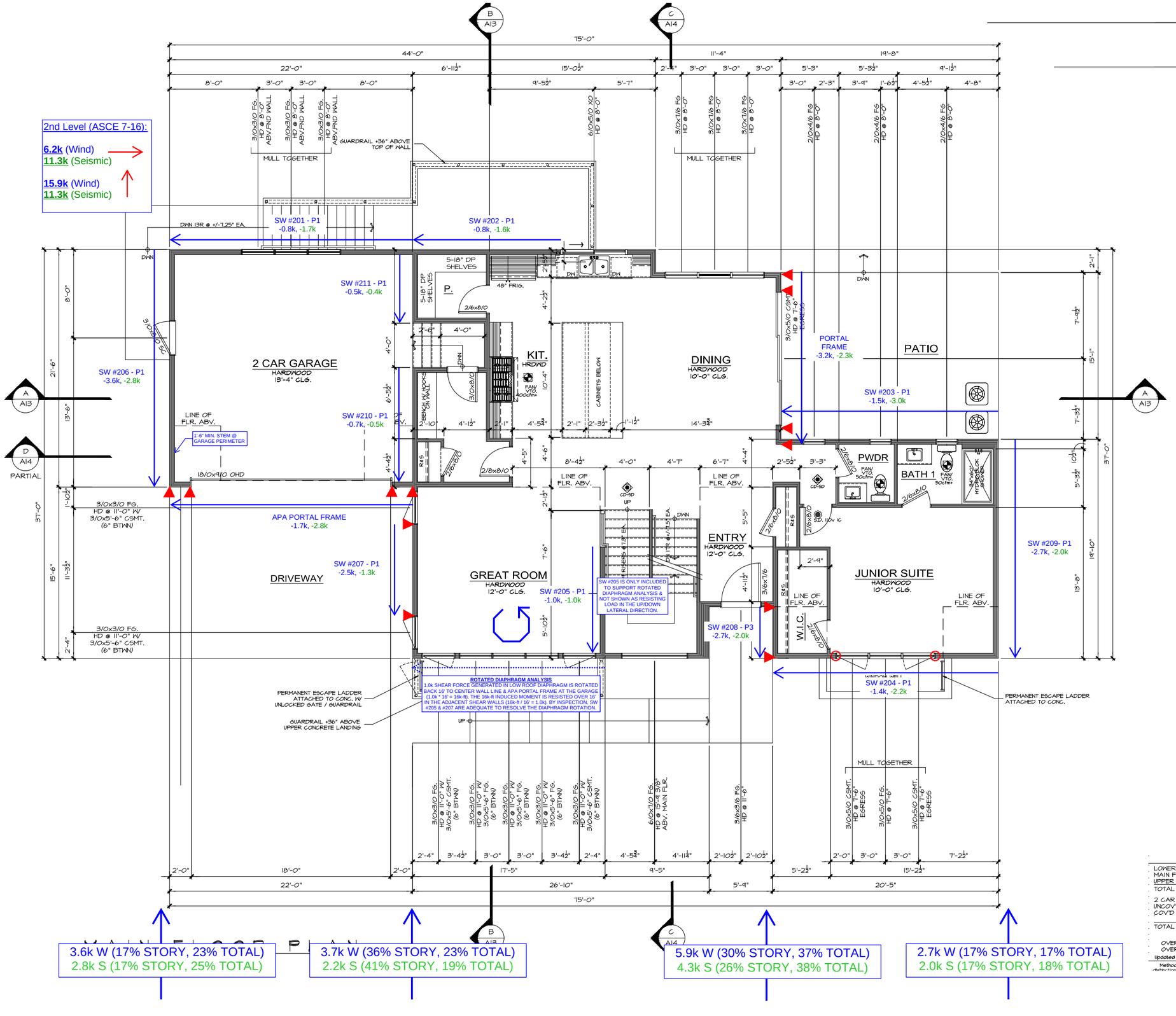
of: .

Sheet Title/Description



MAIN FLOOR PLAN NOTES

PLAN SPECIFIC 2015 WSEC, SECTION R06

R406.2 ADDITIONAL ENERGY EFFICIENCY REQUIREMENTS (MANDATORY).

THIS RESIDENTIAL DWELLING SHALL COMPLY W/SUFFICIENT OPTIONS FROM TABLE R406.2 TO ACHIEVE THE FOLLOWING MIN. NUMBER OF CREDITS:

3.5 FOR A 1501sf to 4,999sf HOME.

CREDITS PROVIDED IN THIS HOME AS FOLLOWS:

EFFICIENT BUILDING ENVELOPE 1a: .25 CREDITS

PRESCRIPTIVE COMPLIANCE IS BASED ON TABLE R402.1.1 with FOLLOWING MODIFICATIONS:

VERTICAL FENESTRATION U = 0.28 WINDOWS

FLOORS TO BE R-38 and SLAB ON GRADE TO BE R-10 PERIMETER and UNDER ENTIRE SLAB BELOW GRADE.

HIGH EFFICIENCY HVAC EQUIPMENT 3a: 1.0 CREDITS

GAS FURNACE WITH MINIMUM AFUE OF 94%

EFFICIENT WATER

ALL SHOWER SHALL BE RA … N THE HOUSE

ALL OTHER L… GPM or LESS.

EFFICIENT WATER

WATER HEATI… GAS WATER …

WHOLE HOUSE VENTILATION

PROVIDE WHOLE HOUSE VENTILATION per 2015 IRC, M1507 and IMC R403.8 USING LAUNDRY ROOM EXHAUST FAN INTEGRATED INTO FORCED AIRE SYSTEM (FAU) PROVIDE OUTDOOR FRESH AIR W/DUCTS CONNECTED TO THE RETURN SIDE OF THE AIR HANDLER.

SYMBOL	LOCATION	MIN. FAN REQUIREMENTS (ALL FANS VENT TO OUTDIDE)
FAN 50cfm+	BATH 4 POWDER	Min. 50cfm, INTERMITTENT at .025ang per TABLE M1507.4
	KITCHEN	Min. 100cfm, INTERMITTENT at .025ang per TBL. M1507.4
		RANGE HOOD or DOWN DRAFT EXHAUST FAN RATED at min. 100cfm, at 0.3DwG MAY BE USED FOR EXHAUST FAN RIGHT. EXHAUST HOODS IN EXCESS OF 400cfm. SHALL BE INTERLOCKED AND PROVIDE MAKE UP AIR per w/M1503.4
FAN 180cfm+ INTER.	LAUNDRY	MIN. 360cfm, INTERMITTENT at .025ang TO FUNCTION

MECHANICA… TABLE M1507.3 INTE… …ATING TIMER per …0HS, TO OPERATE …3.3(2)

PROVIDE CON… READS " …CONTROLS THAT …TRUCTIONS"

SQUARE FOOTAGE SUMMARY

LOWER FLOOR AREA	1,401	S.F.
MAIN FLOOR AREA	1,580	S.F.
UPPER FLOOR AREA	1,451	S.F.
TOTAL CONDITIONED AREA	4432	S.F.
2 CAR GARAGE	467	S.F.
UNCOV'D PATIO	296	S.F.
COV'D PORCH	27	S.F.
TOTAL AREA UNDER ROOF	5,222	S.F.
OVERALL WIDTH	75'-0"	
OVERALL DEPTH	37'-0"	

Updated - 12.09.20

Method for Calculating Square Footage - ANSI Z765-2013 except: no separate deduction of 'obscure voids or below grade' areas and each level is measured to the

JAYMARC HOMES
7525 SE 24th St., 487
Mercier Island, WA
98040
425.266.9100

Issue	Issue Date	By
Description		
△		

8434 SE 39th ST.
Mercer Island, WA.

Job Number: --

plan name: --
marketing name: --
plan number: --
mark sys. number: --

04.10.23
Submittal Date

Sheet Title/Description

JAYMARC HOMES
Design Firm

R.K.N.
Drawn by:

Checked by:

Primary Scale

Sheet Title/Description

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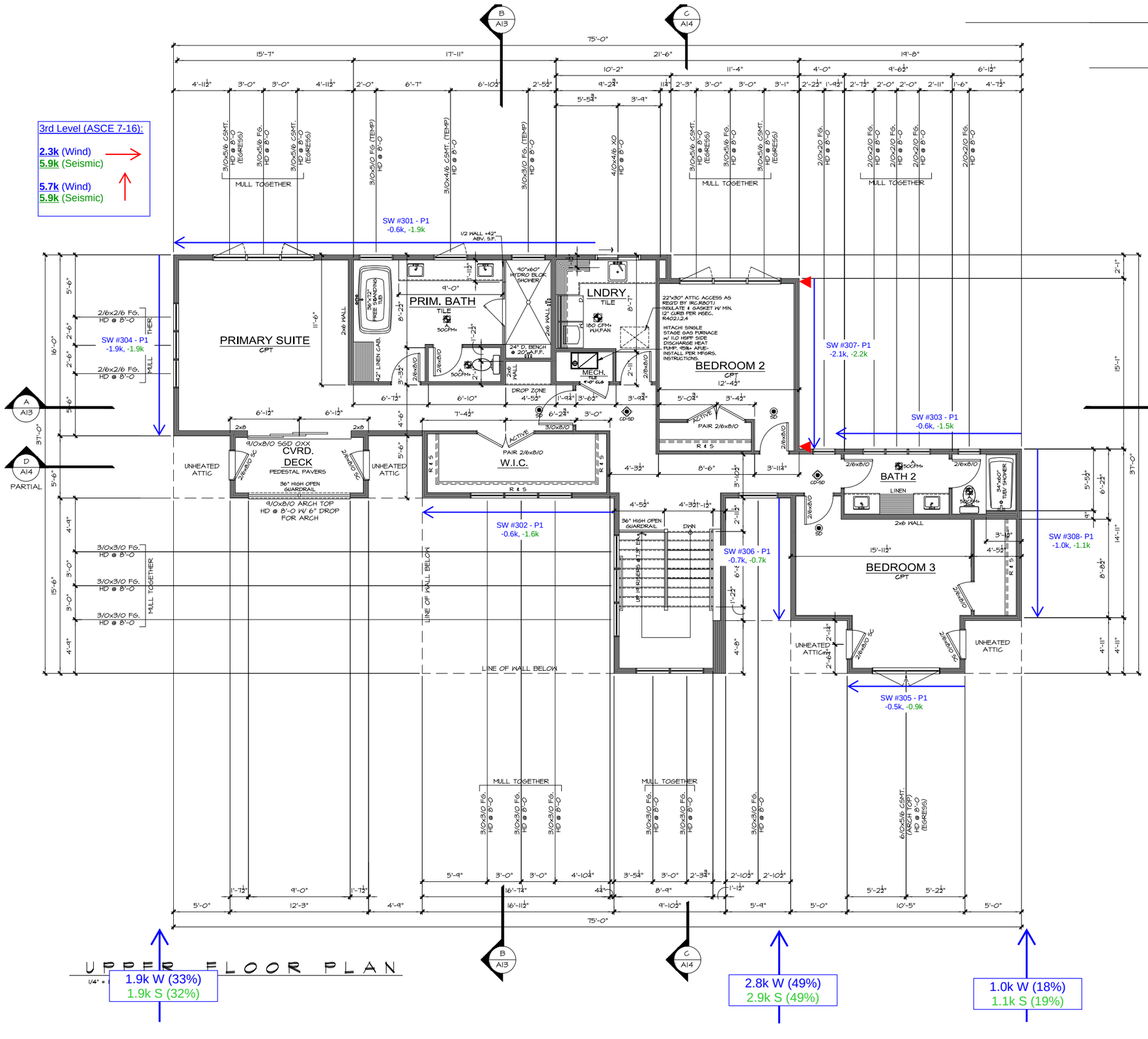
of: .



UPPER FLOOR PLAN

1/4" = 1'-0"

UPPER FLOOR PLAN NOTES:

PLAN SPECIFIC 2015 WSEC, SECTION R06

R406.2 ADDITIONAL ENERGY EFFICIENCY REQUIREMENTS (MANDATORY).

THIS RESIDENTIAL DWELLING SHALL COMPLY w/SUFFICIENT OPTIONS FROM TABLE R406.2 TO ACHIEVE THE FOLLOWING MIN. NUMBER OF CREDITS:

3.5 FOR A 1501sf to 4,999sf HOME.

CREDITS PROVIDED IN THIS HOME AS FOLLOWS:

EFFICIENT BUILDING ENVELOPE 1a: 0.5 CREDITS

PRESCRIPTIVE COMPLIANCE IS BASED ON TABLE R402.1.1 with FOLLOWING MODIFICATIONS:

VERTICAL FENESTRATION U = 0.28 WINDOWS

FLOORS TO BE R-38 and SLAB ON GRADE TO BE R-10 PERIMETER and UNDER ENTIRE SLAB BELOW GRADE.

HIGH EFFICIENCY HVAC EQUIPMENT 3a: 1.0 CREDITS

GAS FURNACE WITH MINIMUM AFUE OF 94%

EFFICIENT WATER HEATING 5a: 0.5 CREDITS

ALL SHOWERHEAD and KITCHEN SINK FAUCETS INSTALLED IN THE HOUSE SHALL BE RATED AT 1.75 GPM or LESS.

ALL OTHER LAVATORY FAUCETS SHALL BE RATED AT 1.0 GPM or LESS.

EFFICIENT WATER HEATING

WATER HEA
GAS WATER

WHOLE HOUSE VENTILATION

PROVIDE WHOLE HOUSE VENTILATION per 2015 IRC, M1507 and IMC R403.8 USING LAUNDRY ROOM EXHAUST FAN INTEGRATED INTO FORCED AIRE SYSTEM (FAU) PROVIDE OUTDOOR FRESH AIR w/DUCTS CONNECTED TO THE RETURN SIDE OF THE AIR HANDLER.

SYMBOL	LOCATION	MIN. FAN REQUIREMENTS (ALL FANS VENT TO OUTDIDE)
A 50cfm	BATH & POWDER	Min. 50cfm, INTERMITTENT at .025wg per TABLE M1507.4
	KITCHEN	Min. 100cfm, INTERMITTENT at .025wg per TBL. M1507.4
B 100cfm	RANGE HOOD or DOWN DRAFT EXHAUST FAN RATED at min. 100cfm, at 0.0wg MAY BE USED FOR EXHAUST FAN REQ'T. EXHAUST HOODS IN EXCESS OF 400cfm, SHALL BE INTERLOCKED AND PROVIDE MAKE UP AIR per M1503.4	
C 150cfm WHF	LAUNDRY ROOM AS WHOLE HOUSE FAN (WHF.)	MIN. 150cfm, INTERMITTENT at .025wg TO FUNCTION

MECHANICAL CONTRACTOR TO SIZE WHF, FAN and SET OPERATING TIMER per TABLE M1507.3.3(1) FOR A 3,001-4,500sf. DWELLING w/4-5 BEDRMS. TO OPERATE INTERMITTENTLY and CONTINUOSLY per TABLE M1507.3.3(2)

PROVIDE CONTROLS FOR WHF, per M1507.3.2 AFFIX LABEL TO CONTROLS THAT READS "WHOLE HOUSE VENTILATION - SEE OPERATING INSTRUCTIONS"

SQUARE FOOTAGE SUMMARY

LOWER FLOOR AREA	1,401 S.F.
MAIN FLOOR AREA	1,580 S.F.
UPPER FLOOR AREA	1,451 S.F.
TOTAL CONDITIONED AREA	4432 S.F.
2 CAR GARAGE	467 S.F.
UNCVD PATIO	296 S.F.
COVD PORCH	27 S.F.
TOTAL AREA UNDER ROOF	5,222 S.F.
OVERALL WIDTH	75'-0"
OVERALL DEPTH	37'-0"

Updated : 12.09.20

Method for Calculating Square Footage - ANSI Z765-2013 excepts no separate deduction of "unusuable or habitable" areas and each level is measured to the

JAYMARC HOMES
7525 SE 24th St., 487
Mercer Island, WA
98040
425.266.9100

Issue	Issue Date	By	Description

8434 SE 39th ST.
Mercer Island, WA.

Job Number: --

plan name: --
marketing name: --
plan number: --
mark sys. number: --

04.10.23
Submittal Date

Sheet Title/Description

JAYMARC HOMES
Design Firm

R.K.N.
Drawn by:

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Checked by:

Primary Scale

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of: .

Sheet Title/Description

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 301: 3RD - REAR EXT. WALL @ PRIMARY, PRIMARY BATH, LAUNDRY

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H_c	5.5	FT.		
WALL LENGTH, L	38.3	FT.	QUALIFYING WALL LENGTH, L	19.7	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1900 LBS	<	4718 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	236	PLF	OVERTURNING MOMENT	17.3	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	83.4	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 302: 3RD - FRONT EXT. WALL @ W.I.C.

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, Hc	3.0	FT.		
WALL LENGTH, L	17.0	FT.	QUALIFYING WALL LENGTH, L	7.7	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1600 LBS	<	1845 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	208	PLF	OVERTURNING MOMENT	14.6	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	16.2	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 303: 3RD - REAR EXT. WALL @ BATH 2

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H_c	2.0	FT.		
WALL LENGTH, L	16.5	FT.	QUALIFYING WALL LENGTH, L	8.5	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1500 LBS	<	2039 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	189	PLF	OVERTURNING MOMENT	13.7	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	14.3	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 304: 3RD - SIDE EXT. WALL @ PRIMARY

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, Hc	2.5	FT.		
WALL LENGTH, L	16.0	FT.	QUALIFYING WALL LENGTH, L	8.5	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1900 LBS	<	2039 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	180	PLF	OVERTURNING MOMENT	17.2	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	1000	LBS	RESISTIVE MOMENT	17.3	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 305: 3RD - FRONT EXT. WALL @ BED 3

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H_c	5.5	FT.		
WALL LENGTH, L	10.4	FT.	QUALIFYING WALL LENGTH, L	4.4	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
900 LBS	<	1001 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	134	PLF	OVERTURNING MOMENT	8.2	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	1100	LBS	RESISTIVE MOMENT	8.3	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 306: 3RD - SIDE EXT. WALL @ BED 3 (LEFT)

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	10.8	FT.	QUALIFYING WALL LENGTH, L	10.8	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
700 LBS	<	2599 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	170	PLF	OVERTURNING MOMENT	6.3	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	6.3	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 307: 3RD - SIDE EXT. WALL @ BED 2

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H_o	0.0	FT.		
WALL LENGTH, L	15.1	FT.	QUALIFYING WALL LENGTH, L	15.1	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2200 LBS	<	3617 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	170	PLF	OVERTURNING MOMENT	20.0	K-FT	HOLD DOWN DESIGN LOAD	584	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	11.2	K-FT	HOLDOWN CAPACITY	1705	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)

SHEARWALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	#REF!	FT.	MAX WALL OPENING HT, Hc	#REF!	FT.		
WALL LENGTH, L	#REF!	FT.	QUALIFYING WALL LENGTH, L	#REF!	FT.	SHEARWALL ASSEMBLY	#REF!

CAPACITY EVALUATION:

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

SHEARWALL ASSEMBLY SPECIFICATION

#REF!
#REF!
#REF!

OVERTURNING EVALUATION:

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

HOLD-DOWN SPECIFICATION

#REF!

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL

SHEARWALL PROPERTIES:

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

CAPACITY EVALUATION:

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

SHEARWALL ASSEMBLY SPECIFICATION

#REF!
#REF!
#REF!

OVERTURNING EVALUATION:

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

HOLD-DOWN SPECIFICATION

#REF!

SHEARWALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	#REF!	FT.	MAX WALL OPENING HT, HC	#REF!	FT.		
WALL LENGTH, L	#REF!	FT.	QUALIFYING WALL LENGTH, L	#REF!	FT.	SHEARWALL ASSEMBLY	#REF!

CAPACITY EVALUATION:

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

SHEARWALL ASSEMBLY SPECIFICATION

#REF!
#REF!
#REF!

OVERTURNING EVALUATION:

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

HOLD-DOWN SPECIFICATION

#REF!

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Project Name: JayMarc Homes
Dubey Residence
M&K Project #: 154-23001
Engineer: JCL
Date: 27-Apr-23

Shearwall Design Summary

Shearwall

Shearwall Properties:

Wall height, H	#REF!	ft.	Max wall opening ht, H_c	#REF!	ft.		
Wall Length, L	#REF!	ft.	Qualifying Wall Length, L	#REF!	ft.	Shearwall Assembly	#REF!

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
#REF! lbs	#REF!	#REF! lbs

Shearwall Assembly Specification

#REF!
#REF!
#REF!

Overturning Evaluation:

Resistive DL	#REF!	plf	Overturning Moment	#REF!	k-ft	Hold Down Design Load	#REF!	lbs
DL at ends of wall	#REF!	lbs	Resistive Moment	#REF!	k-ft	Holdown Capacity	#REF!	lbs

Hold-down Specification

#REF!

Shearwall 308: 3rd - Side Ext. Wall @ Bed 3 (Right)

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	14.9	ft.	Qualifying Wall Length, L	14.9	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1100 lbs	<	3579 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	168	plf	Overturning Moment	10.0	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	400	lbs	Resistive Moment	10.9	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL

SHEARWALL PROPERTIES:

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

CAPACITY EVALUATION:

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

SHEARWALL ASSEMBLY SPECIFICATION

#REF!
#REF!
#REF!

OVERTURNING EVALUATION:

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

HOLD-DOWN SPECIFICATION

#REF!

SHEARWALL

SHEARWALL PROPERTIES:

WALL HEIGHT, H	#REF!	FT.	MAX WALL OPENING HT, HC	#REF!	FT.		
WALL LENGTH, L	#REF!	FT.	QUALIFYING WALL LENGTH, L	#REF!	FT.	SHEARWALL ASSEMBLY	#REF!

CAPACITY EVALUATION:

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

SHEARWALL ASSEMBLY SPECIFICATION

#REF!
#REF!
#REF!

OVERTURNING EVALUATION:

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

HOLD-DOWN SPECIFICATION

#REF!

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 201: 2ND - REAR EXT. WALL @ GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	12.0	FT.	MAX WALL OPENING HT, H_o	3.0	FT.		
WALL LENGTH, L	22.0	FT.	QUALIFYING WALL LENGTH, L	13.0	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1700 LBS	<	3118 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	483	PLF	OVERTURNING MOMENT	20.4	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	59.4	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 202: 2ND - REAR EXT. WALL @ KITCHEN

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	13.5	FT.	QUALIFYING WALL LENGTH, L	13.5	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1600 LBS	<	3238 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	494	PLF	OVERTURNING MOMENT	16.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	24.7	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 203: 2ND - REAR EXT. WALL @ POWDER, BATH 1

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, H_c	4.5	FT.		
WALL LENGTH, L	19.7	FT.	QUALIFYING WALL LENGTH, L	13.7	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
3000 LBS	<	3264 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	403	PLF	OVERTURNING MOMENT	30.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	41.4	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 204: 2ND - FRONT EXT. WALL @ JUNIOR SUITE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	5.0	FT.		
WALL LENGTH, L	20.4	FT.	QUALIFYING WALL LENGTH, L	11.4	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2200 LBS	<	2739 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	269	PLF	OVERTURNING MOMENT	22.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	28.4	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 205: 2ND - SIDE INT. WALL @ GREAT RM.

SHEARWALL PROPERTIES:

WALL HEIGHT, H	12.0	FT.	MAX WALL OPENING HT, H_o	0.0	FT.		
WALL LENGTH, L	9.6	FT.	QUALIFYING WALL LENGTH, L	9.6	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1000 LBS	<	2310 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	350	PLF	OVERTURNING MOMENT	12.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	1200	LBS	RESISTIVE MOMENT	12.3	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 206: 2ND - SIDE EXT. WALL @ GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	12.0	FT.	MAX WALL OPENING HT, Hc	8.0	FT.		
WALL LENGTH, L	21.5	FT.	QUALIFYING WALL LENGTH, L	18.5	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2800 LBS	<	4437 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	315	PLF	OVERTURNING MOMENT	33.6	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	1200	LBS	RESISTIVE MOMENT	43.6	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 207: 2ND - SIDE EXT. WALL @ GREAT RM.

SHEARWALL PROPERTIES:

WALL HEIGHT, H	12.0	FT.	MAX WALL OPENING HT, H_o	0.0	FT.		
WALL LENGTH, L	8.3	FT.	QUALIFYING WALL LENGTH, L	8.3	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1300 LBS	<	1988 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	160	PLF	OVERTURNING MOMENT	15.6	K-FT	HOLD DOWN DESIGN LOAD	1326	LBS
DL AT ENDS OF WALL	595	LBS	RESISTIVE MOMENT	4.6	K-FT	HOLDOWN CAPACITY	3695	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN

SHEARWALL 208: 2ND - SIDE EXT./INT. WALL @ ENTRY

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	4.7	FT.	QUALIFYING WALL LENGTH, L	4.7	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2000 LBS	<	2082 LBS

SHEARWALL ASSEMBLY SPECIFICATION

P3 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 3"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	332	PLF	OVERTURNING MOMENT	20.0	K-FT	HOLD DOWN DESIGN LOAD	3380	LBS
DL AT ENDS OF WALL	1200	LBS	RESISTIVE MOMENT	4.1	K-FT	HOLDOWN CAPACITY	3695	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 209: 2ND - SIDE EXT. WALL @ JUNIOR SUITE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, H_o	0.0	FT.		
WALL LENGTH, L	19.8	FT.	QUALIFYING WALL LENGTH, L	19.8	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2000 LBS	<	4756 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	264	PLF	OVERTURNING MOMENT	20.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	493	LBS	RESISTIVE MOMENT	27.3	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 210: 2ND - SIDE INT. WALL @ GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	10.4	FT.	QUALIFYING WALL LENGTH, L	10.4	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
500 LBS	<	2495 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	140	PLF	OVERTURNING MOMENT	5.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	5.2	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 101: 1ST - REAR EXT. WALL @ BED 3

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.0	FT.	MAX WALL OPENING HT, H_c	8.0	FT.		
WALL LENGTH, L	15.1	FT.	QUALIFYING WALL LENGTH, L	5.6	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
400 LBS	<	1299 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	752	PLF	OVERTURNING MOMENT	3.6	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	1200	LBS	RESISTIVE MOMENT	45.8	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 102: 1ST - FRONT EXT WALL @ PLAY RM.

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.0	FT.	MAX WALL OPENING HT, Hc	5.0	FT.		
WALL LENGTH, L	16.1	FT.	QUALIFYING WALL LENGTH, L	7.1	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
200 LBS	<	1698 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	448	PLF	OVERTURNING MOMENT	1.8	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	1200	LBS	RESISTIVE MOMENT	34.1	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: JAYMARC HOMES
DUBEY RESIDENCE
M&K PROJECT #: 154-23001
ENGINEER: JCL
DATE: 27-APR-23

SHEARWALL DESIGN SUMMARY

SHEARWALL 103: 1ST - SIDE INT WALL @ PLAY ROOM

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.0	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	9.7	FT.	QUALIFYING WALL LENGTH, L	9.7	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1000 LBS	<	2327 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	417	PLF	OVERTURNING MOMENT	9.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	1000	LBS	RESISTIVE MOMENT	13.0	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 211: 2ND - SIDE INT. WALL @ GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	6.3	FT.	QUALIFYING WALL LENGTH, L	6.3	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
400 LBS	<	1511 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	140	PLF	OVERTURNING MOMENT	4.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	1000	LBS	RESISTIVE MOMENT	4.0	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Project Name: JayMarc Homes
Dubey Residence
M&K Project #: 154-23001
Engineer: JCL
Date: 27-Apr-23

Shearwall Design Summary

Shearwall 104: 1st - Side Int Wall @ Garage

Shearwall Properties:

Wall height, H	1.5	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	10.3	ft.	Qualifying Wall Length, L	10.3	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
600 lbs	<	2471 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	250	plf	Overturning Moment	0.9	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	1000	lbs	Resistive Moment	10.4	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 105: 1st - Side Int Wall @ Garage

Shearwall Properties:

Wall height, H	1.5	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	6.3	ft.	Qualifying Wall Length, L	6.3	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
500 lbs	<	1511 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	250	plf	Overturning Moment	0.8	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	1000	lbs	Resistive Moment	5.0	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required