



**MULHERN+KULP**  
RESIDENTIAL STRUCTURAL ENGINEERING

7220 Trade Street, Suite 295, San Diego, CA 92121 ▶ p 619-650-0010 ▶ [mulhernkulp.com](http://mulhernkulp.com)

# CALCULATION PACKAGE

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August 30, 2024

## Architectural Innovations

Lee Remodel  
8448 N. Mercer Way,  
Mercer Island, Washington

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MULHERN & KULP STRUCTURAL ENGINEERING, INC.

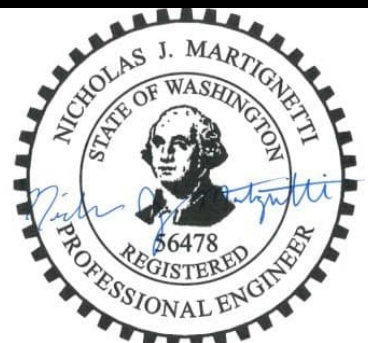
Prepared By:

**Matthew Mills, E.I.T.**

*Staff Engineer*

**Nicholas J. Martignetti, P.E.**

*Associate Owner + San Diego Office Director*



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*Signature, Seal & Date*

### Beam & Header Calculations

**Beam Description:**

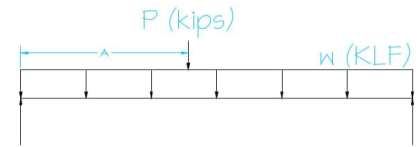
B1 - ROOF - MEDIA ROOM FRONT HDR (TYP. HDR)

Parameters:

L = 4.50 ft

W = 0.420 klf

P = [ ] k      A = [ ] ft



Analysis:

R<sub>max</sub> = 0.95 K      V<sub>d</sub> = [ ] K < V<sub>all</sub> = 3.50 K       Adequate

M<sub>max</sub> = 1.06 k-ft < M<sub>all</sub> = 3.40 k-ft       Adequate

Δ<sub>tl</sub> = 0.022 in.      L / 999+ < L/240       Adequate

4x8 DFL #2

**Beam Description:**

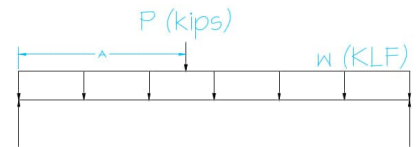
B2 - ROOF - SIDE DECK BEAM

Parameters:

L = 6.00 ft

W = 0.205 klf

P = [ ] k      A = [ ] ft



Analysis:

R<sub>max</sub> = 0.62 K      V<sub>d</sub> = [ ] K < V<sub>all</sub> = 3.50 K       Adequate

M<sub>max</sub> = 0.92 k-ft < M<sub>all</sub> = 3.40 k-ft       Adequate

Δ<sub>tl</sub> = 0.007 in.      L / 999+ < L/240       Adequate

4x8 DFL #2

**Beam Description:**

B3 - ROOF - REAR DECK BM

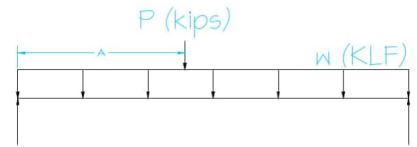
Parameters:

SEE ENERCALC

L = [ ] ft

W = [ ] klf

P = [ ] k      A = [ ] ft



Analysis:

R<sub>max</sub> = [ ] K      V<sub>d</sub> = [ ] K < V<sub>all</sub> = [ ] K       Adequate

M<sub>max</sub> = [ ] k-ft < M<sub>all</sub> = [ ] k-ft       Adequate

Δ<sub>tl</sub> = [ ] in.      L / [ ] < L/240       Adequate

5-1/2"x10-1/2" GLB



### Beam & Header Calculations

**Beam Description:**

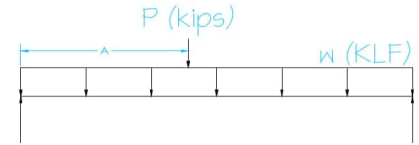
B4 - ROOF - MASTER BATH HDR

Parameters:

L = 8.00 ft

W = 0.553 kl f

P = [ ] k      A = [ ] ft



Analysis:

R<sub>max</sub> = 2.21 K      V<sub>d</sub> = [ ] K      < V<sub>all</sub> = 4.50 K       Adequate

M<sub>max</sub> = 4.42 k-ft      < M<sub>all</sub> = 5.20 k-ft       Adequate

Δ<sub>tl</sub> = 0.138 in.      L/ 696 < L/240       Adequate

4x10 DFL #2

**Beam Description:**

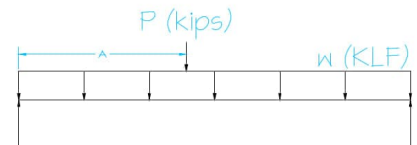
B5 - ROOF - NEW HDR @ EXISTING ROOF

Parameters:

L = 5.00 ft

W = 0.494 kl f

P = [ ] k      A = [ ] ft



Analysis:

R<sub>max</sub> = 1.24 K      V<sub>d</sub> = [ ] K      < V<sub>all</sub> = 3.50 K       Adequate

M<sub>max</sub> = 1.54 k-ft      < M<sub>all</sub> = 3.40 k-ft       Adequate

Δ<sub>tl</sub> = 0.039 in.      L/ 999+ < L/240       Adequate

4x8 DFL #2

**Beam Description:**

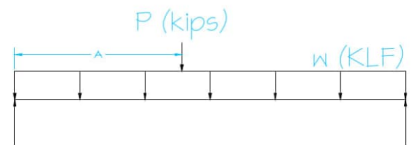
B6 - ROOF - FRONT HALLWAY WINDOW

Parameters:

L = 9.67 ft

W = 0.555 kl f

P = [ ] k      A = [ ] ft



Analysis:

R<sub>max</sub> = 2.68 K      V<sub>d</sub> = [ ] K      < V<sub>all</sub> = 5.40 K       Adequate

M<sub>max</sub> = 6.49 k-ft      < M<sub>all</sub> = 7.00 k-ft       Adequate

Δ<sub>tl</sub> = 0.164 in.      L/ 706 < L/240       Adequate

4x12 DFL #2



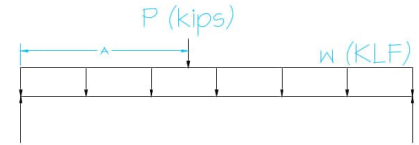
### Beam & Header Calculations

**Beam Description:**

B7 - ROOF - SITTING ROOM HDR @ G.T. ABOVE

Parameters:

L = 4.00 ft  
W = 0.175 klf  
P = 3.3 k    A = 2.3 ft



Analysis:

$R_{max} = 2.25$  K     $V_d =$     K     $< V_{all} = 4.50$  K     Adequate  
 $M_{max} = 3.56$  k-ft     $< M_{all} = 5.20$  k-ft     Adequate  
 $\Delta_{tl} = 0.028$  in.     $L/1729 < L/240$      Adequate

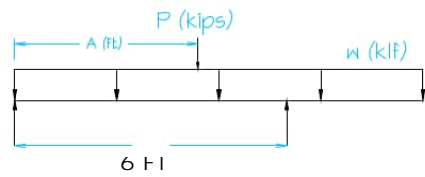
4x10 DFL #2

**Beam Description:**

B8 - UPPER FLOOR - DECK JOIST

Parameters:

L = 9.25 ft  
W = 0.093 klf  
P =    k    A =    ft



Analysis:

$R_{max} = 0.79$  K     $V_d =$     K     $< V_{all} = 2.00$  K     Adequate  
 $M_{max} = 0.76$  k-ft     $< M_{all} = 2.70$  k-ft     Adequate  
 $\Delta_{tl} = 0.011$  in.     $L/999+ < L/240$      Adequate

2x10 HF #2 @ 16

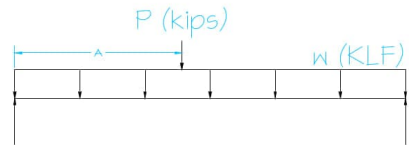
**Beam Description:**

B9 - UPPER FLOOR - FLUSH BM @ DECK

Parameters:

SEE ENERCALC

L =    ft  
W =    klf  
P =    k    A =    ft

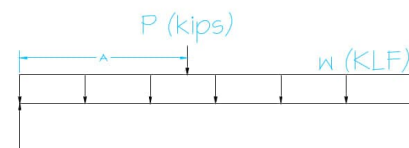
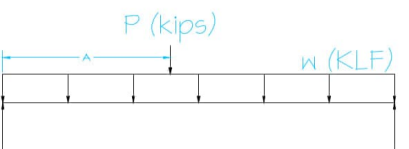


Analysis:

$R_{max} =$     K     $V_d =$     K     $< V_{all} =$     K     Adequate  
 $M_{max} =$     k-ft     $< M_{all} =$     k-ft     Adequate  
 $\Delta_{tl} =$     in.     $L/ < L/240$      Adequate

4x8 DFL #2

### Beam & Header Calculations

<b><u>Beam Description:</u></b>		B10 - UPPER FLOOR - FLUSH BM @ DECK	
Parameters:		<b>SEE ENERCALC</b>	
L =	<input type="text" value=""/>	ft	
W =	<input type="text" value=""/>	kl f	
P =	<input type="text" value=""/>	k	
Analysis:		A =	<input type="text" value=""/>
$R_{max}$ =	<input type="text" value=""/>	K	$V_d$ = <input type="text" value=""/>
$M_{max}$ =	<input type="text" value=""/>	k-ft	$< V_{all} =$ <input type="text" value=""/>
$\Delta_{tl}$ =	<input type="text" value=""/>	in.	$< M_{all} =$ <input type="text" value=""/>
		$L/$ <input type="text" value=""/>	$< L/240$
			<input checked="" type="checkbox"/> Adequate
			<input checked="" type="checkbox"/> Adequate
			<input checked="" type="checkbox"/> Adequate
<b>3-1/2"x18" GLB</b>			
<b><u>Beam Description:</u></b>		B11 - CANT BM AT DECK	
Parameters:		<b>SEE ENERCALC</b>	
L =	<input type="text" value=""/>	ft	
W =	<input type="text" value=""/>	kl f	
P =	<input type="text" value=""/>	k	
Analysis:		A =	<input type="text" value=""/>
$R_{max}$ =	<input type="text" value=""/>	K	$V_d$ = <input type="text" value=""/>
$M_{max}$ =	<input type="text" value=""/>	k-ft	$< V_{all} =$ <input type="text" value=""/>
$\Delta_{tl}$ =	<input type="text" value=""/>	in.	$< M_{all} =$ <input type="text" value=""/>
		$L/$ <input type="text" value=""/>	$< L/240$
			<input checked="" type="checkbox"/> Adequate
			<input checked="" type="checkbox"/> Adequate
			<input checked="" type="checkbox"/> Adequate
<b>6x12 DFL #2</b>			
<b><u>Beam Description:</u></b>		B12 - UPPER FLOOR - (E) HDR @ FAMILY ROOM DOOR	
Parameters:		<b>TYP. (E) HDR CHECK FOR UPPER FLOOR - U.N.O.</b>	
L =	<input type="text" value="5.33"/>	ft	
W =	<input type="text" value="0.971"/>	kl f	
P =	<input type="text" value=""/>	k	
Analysis:		A =	<input type="text" value=""/>
$R_{max}$ =	<input type="text" value="2.59"/>	K	$V_d$ = <input type="text" value=""/>
$M_{max}$ =	<input type="text" value="3.45"/>	k-ft	$< V_{all} =$ <input type="text" value="3.90"/>
$\Delta_{tl}$ =	<input type="text" value="0.048"/>	in.	$< M_{all} =$ <input type="text" value="4.50"/>
		$L/$ <input type="text" value="999+"/>	$< L/240$
			<input checked="" type="checkbox"/> Adequate
			<input checked="" type="checkbox"/> Adequate
			<input checked="" type="checkbox"/> Adequate
<b>4x10 DFL #2</b>			

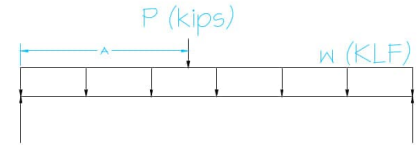
### Beam & Header Calculations

**Beam Description:**

B13 - UPPER FLOOR - HDR AT FIREPLACE

Parameters:

L = 6.00 ft  
W = 0.971 kl f  
P = [ ] k      A = [ ] ft



Analysis:

$R_{max} = 2.91$  K       $V_d = [ ]$  K       $< V_{all} = 3.90$  K       Adequate  
 $M_{max} = 4.37$  k-ft       $< M_{all} = 4.50$  k-ft       Adequate  
 $\Delta_{tl} = 0.077$  in.       $L/939 < L/240$        Adequate

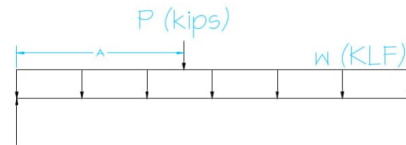
4x10 DFL #2

**Beam Description:**

B14 - UPPER FLOOR - KITCHEN HDR @ PATIO

Parameters:

L = 9.33 ft  
W = 0.760 kl f  
P = [ ] k      A = [ ] ft



Analysis:

$R_{max} = 3.55$  K       $V_d = [ ]$  K       $< V_{all} = 7.20$  K       Adequate  
 $M_{max} = 8.27$  k-ft       $< M_{all} = 8.80$  k-ft       Adequate  
 $\Delta_{tl} = 0.143$  in.       $L/783 < L/240$        Adequate

6x12 DFL #2

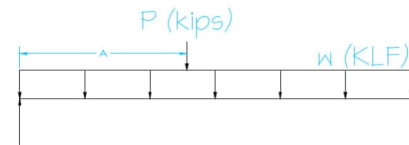
**Beam Description:**

B15 - UPPER FLOOR - COURTYARD ENTRY

TYP. UPPER FLOOR NEW HDR U.N.O.

Parameters:

L = 4.00 ft  
W = 0.437 kl f  
P = [ ] k      A = [ ] ft



Analysis:

$R_{max} = 0.87$  K       $V_d = [ ]$  K       $< V_{all} = 3.00$  K       Adequate  
 $M_{max} = 0.87$  k-ft       $< M_{all} = 3.00$  k-ft       Adequate  
 $\Delta_{tl} = 0.014$  in.       $L/999+ < L/240$        Adequate

4x8 DFL #2

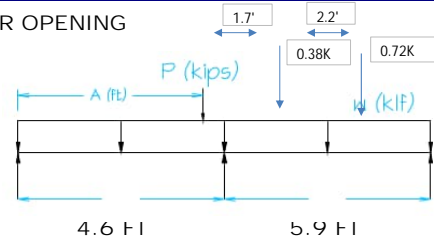
### Beam & Header Calculations

**Beam Description:**

B16 - UPPER FLOOR - STAIR OPENING

Parameters:

L = 10.50 ft  
W = 0.488 klf  
P = 0.0 k     A = 0.0 ft



Analysis:

$R_{max} = 2.60$  K      $V_d =$       $V_d < V_{all} = 8.50$  K      Adequate  
 $M_{max} = 2.13$  k-ft      $M_{max} < M_{all} = 19.30$  k-ft      Adequate  
 $\Delta_{tl} = 0.013$  in.      $L/999+$       $L/999+ < L/240$       Adequate

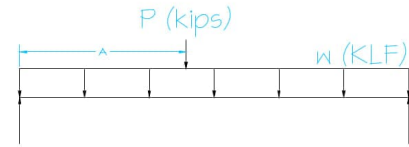
3-1/2"x12" GLB

**Beam Description:**

B17 - MAIN FLOOR - EXISTING BM SUPPORTING B24

Parameters:

L = 12.00 ft  
W = 0.988 klf  
P = 1.9 k     A = 0.3 ft



Analysis:

$R_{max} = 7.78$  K      $V_d =$       $V_d < V_{all} = 22.90$  K      Adequate  
 $M_{max} = 18.40$  k-ft      $M_{max} < M_{all} = 51.80$  k-ft      Adequate  
 $\Delta_{tl} = 0.273$  in.      $L/528$       $L/528 < L/240$       Adequate

(E)6 3/4"x12" GLB

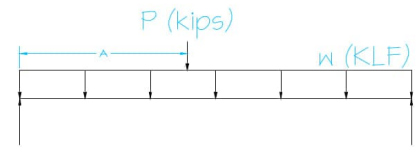
**Beam Description:**

B18 - UPPER FLOOR - BM @ STAIR OPENING

Parameters:

SEE ENERCALC

L =     ft  
W =     klf  
P =     k     A =     ft



Analysis:

$R_{max} =$      K      $V_d =$      K      $V_d < V_{all} =$      K      Adequate  
 $M_{max} =$      k-ft      $M_{max} < M_{all} =$      k-ft      Adequate  
 $\Delta_{tl} =$      in.      $L/$       $L/ < L/240$       Adequate

3-1/2"x12" GLB

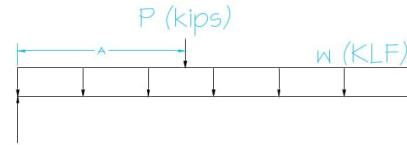
### Beam & Header Calculations

**Beam Description:**

B19 - UPPER FLOOR - HDR @ COURTYARD

Parameters:

L = 3.50 ft  
W = 0.311 kl f  
P = 0.570 k    A = 1.0 ft



Analysis:

$R_{max} = 0.95$  K     $V_d =$     K     $< V_{all} = 3.00$  K     Adequate  
 $M_{max} = 0.88$  k-ft     $< M_{all} = 3.00$  k-ft     Adequate  
 $\Delta_{tl} = 0.011$  in.     $L/999+$      $< L/240$      Adequate

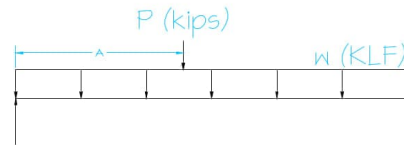
4x8 DFL #2

**Beam Description:**

B20 - UPPER FLOOR - DINING ROOM NEW DOOR

Parameters:

L = 3.00 ft  
W = 0.791 kl f  
P = 2.9 k    A = 2.0 ft



Analysis:

$R_{max} = 3.12$  K     $V_d =$     K     $< V_{all} = 3.50$  K     Adequate  
 $M_{max} = 2.82$  k-ft     $< M_{all} = 3.40$  k-ft     Adequate  
 $\Delta_{tl} = 0.026$  in.     $L/999+$      $< L/240$      Adequate

4x8 DFL #2

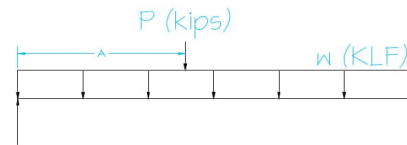
**Beam Description:**

B21 - UPPER FLOOR - BM UNDER SW 209

Parameters:

SEE ENERCALC

L =    ft  
W =    kl f  
P =    k    A =    ft



Analysis:

$R_{max} =$     K     $V_d =$     K     $< V_{all} =$     K     Adequate  
 $M_{max} =$     k-ft     $< M_{all} =$     k-ft     Adequate  
 $\Delta_{tl} =$     in.     $L/$      $< L/240$      Adequate

3-1/2"x18" GLB

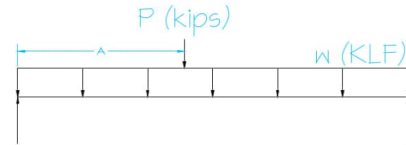
### Beam & Header Calculations

**Beam Description:**

B22 - MAIN FLOOR - (E) BEAM @ STUDY

Parameters:

L = 10.50 ft  
 W = 0.650 klf  
 P = 1.200 k    A = 6.7 ft



Analysis:

$R_{max} = 4.18$  K     $V_d =$     K <  $V_{all} = 15.20$  K     Adequate  
 $M_{max} = 11.87$  k-ft <  $M_{all} = 30.10$  k-ft     Adequate  
 $\Delta_{tl} = 0.265$  in.     $L/476 < L/240$      Adequate

(E) 5-1/8"x10-1/2" GLB

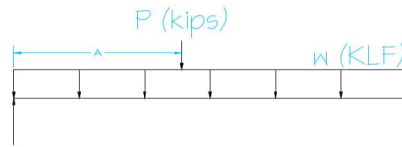
**Beam Description:**

B23 - MAIN FLOOR - (E) BM UNDER SW#108

Parameters:

SEE ENERCALC FOR OVERS

L = 23.00 ft  
 W = 0.073 klf  
 P = 4.0 k    A = 19.8 ft



Analysis:

$R_{max} = 4.27$  K     $V_d =$     K <  $V_{all} = 19.60$  K     Adequate  
 $M_{max} = 15.99$  k-ft <  $M_{all} = 49.80$  k-ft     Adequate  
 $\Delta_{tl} = 0.800$  in.     $L/343 < L/240$      Adequate

5-1/8x13-1/2" EXISTING GLB

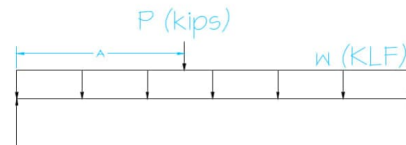
**Beam Description:**

B24 - MAIN FLOOR - (E) BM UNDER SW#109

Parameters:

SEE ENERCALC

L =    ft  
 W =    klf  
 P =    k    A =    ft



Analysis:

$R_{max} =$     K     $V_d =$     K <  $V_{all} =$     K     Adequate  
 $M_{max} =$     k-ft <  $M_{all} =$     k-ft     Adequate  
 $\Delta_{tl} =$     in.     $L/ < L/240$      Adequate

5-1/8x13-1/2" EXISTING GLB

### Beam & Header Calculations

**Beam Description:**

B25 - ROOF - HDR @ DECK

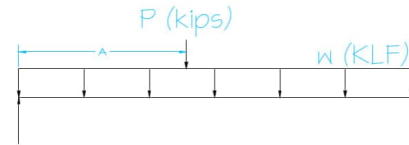
Parameters:

L = 12.00 ft

W = 0.084 kl f

P = 1.100 k

A = 6.0 ft



Analysis:

$R_{max} = 1.05$  K       $V_d =$  K       $< V_{all} = 4.50$  K       Adequate

$M_{max} = 4.81$  k-ft       $< M_{all} = 5.20$  k-ft       Adequate

$\Delta_{tl} = 0.338$  in.       $L/426 < L/240$        Adequate

4x10 DFL #2

**Beam Description:**

B26 - ROOF - INT. HDR AT DADU

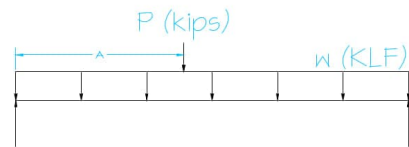
Parameters:

L = 2.50 ft

W = 0.168 kl f

P =

A = ft



Analysis:

$R_{max} = 0.21$  K       $V_d =$  K       $< V_{all} = 3.50$  K       Adequate

$M_{max} = 0.13$  k-ft       $< M_{all} = 3.40$  k-ft       Adequate

$\Delta_{tl} = 0.001$  in.       $L/999+ < L/240$        Adequate

4x8 DFL #2

**Beam Description:**

B27 - MAIN FLOOR - BM UNDER EXISTING WALL

Parameters:

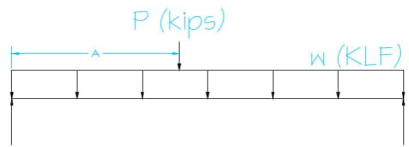
SEE ENERCALC

L = ft

W = kl f

P = k

A = ft



Analysis:

$R_{max} =$  K       $V_d =$  K       $< V_{all} =$  K       Adequate

$M_{max} =$  k-ft       $< M_{all} =$  k-ft       Adequate

$\Delta_{tl} =$  in.       $L/ < L/240$        Adequate

6x12 DFL #2

### Beam & Header Calculations

**Beam Description:**

B28 - UPPER FLOOR - CANT'D FLOOR JOISTS @ STAIRS

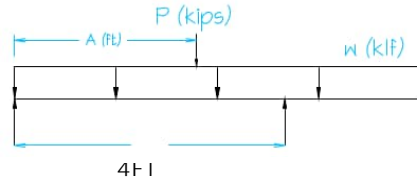
Parameters:

L = 6.00 ft

W = 0.067 klf

P = 0.250 k

A = 6.0 ft



Analysis:

R<sub>max</sub> = 0.69 K      V<sub>d</sub> =      K < V<sub>all</sub> = 0.80 K       Adequate

M<sub>max</sub> = -0.63 k-ft < M<sub>all</sub> = -0.80 k-ft       Adequate

Δ<sub>tl</sub> = 0.136 in.      2L/1056 < L/240       Adequate

2x6 HF#2 @ 12" o.c.

**Beam Description:**

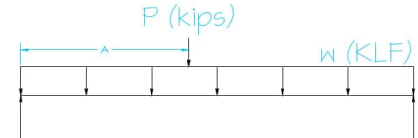
Parameters:

L =      ft

W =      klf

P =      k

A =      ft



Analysis:

R<sub>max</sub> =      K      V<sub>d</sub> =      K < V<sub>all</sub> =      K       Adequate

M<sub>max</sub> =      k-ft < M<sub>all</sub> =      k-ft       Adequate

Δ<sub>tl</sub> =      in.      L/      < L/240       Adequate

**Beam Description:**

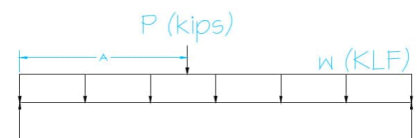
Parameters:

L =      ft

W =      klf

P =      k

A =      ft



Analysis:

R<sub>max</sub> =      K      V<sub>d</sub> =      K < V<sub>all</sub> =      K       Adequate

M<sub>max</sub> =      k-ft < M<sub>all</sub> =      k-ft       Adequate

Δ<sub>tl</sub> =      in.      L/      < L/240       Adequate

# Wood Beam

Project File: Beam Calcs.ec6

LIC# : KW-06017913, Build:20.24.02.27

MULHERN & KULP STRUCTURAL ENGINEERING INC

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## DESCRIPTION: B3 - ROOF - DECK BM

### CODE REFERENCES

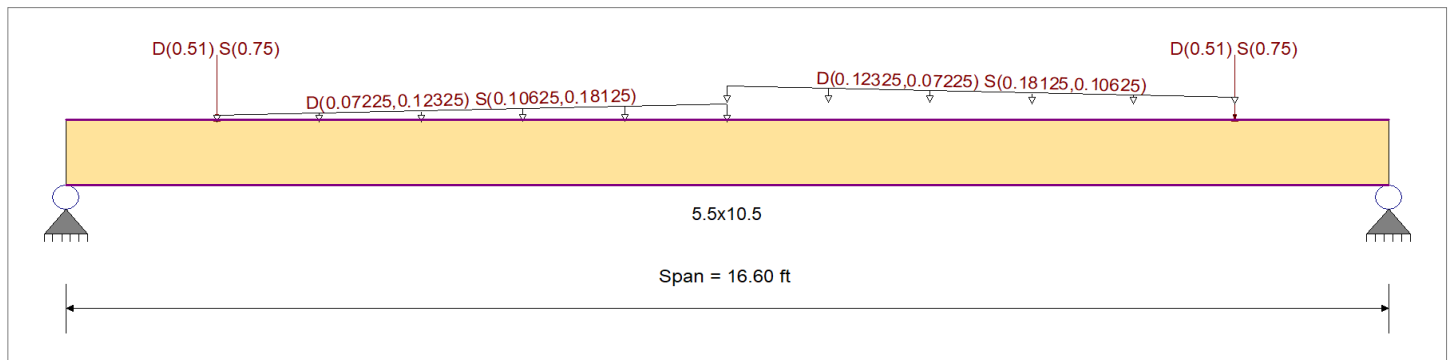
Calculations per NDS 2018, IBC 2021, ASCE 7-16

Load Combination Set : IBC 2021

### Material Properties

Analysis Method : Allowable Stress Design	Fb +	2,400.0 psi	E : Modulus of Elasticity
Load Combination : IBC 2021	Fb -	1,850.0 psi	Ebend- xx
	Fc - Prll	1,650.0 psi	Eminbend - xx
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy
Wood Grade : 24F-V4	Fv	265.0 psi	Eminbend - yy
	Ft	1,100.0 psi	Density
			31.210pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling



### Applied Loads

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

Beam self weight calculated and added to loading

Point Load : D = 0.510, S = 0.750 k @ 1.90 ft, (HIP BEAM)

Point Load : D = 0.510, S = 0.750 k @ 14.670 ft, (HIP BEAM)

Varying Uniform Load : D= 0.0170->0.0170, S= 0.0250->0.0250 ksf, Extent = 1.90 -->> 8.30 ft, Trib Width = 4.250->7.250 ft,

Varying Uniform Load : D= 0.0170->0.0170, S= 0.0250->0.0250 ksf, Extent = 8.30 -->> 14.670 ft, Trib Width = 7.250->4.250

### DESIGN SUMMARY

**Design OK**

Maximum Bending Stress Ratio	=	<b>0.480</b> : 1	Maximum Shear Stress Ratio	=	<b>0.247</b> : 1
Section used for this span		<b>5.5x10.5</b>	Section used for this span		<b>5.5x10.5</b>
fb: Actual	=	1,323.66psi	fv: Actual	=	75.33 psi
F'b	=	2,760.00psi	F'v	=	304.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	8.300ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
<b>Maximum Deflection</b>					
Max Downward Transient Deflection		0.340 in	Ratio =	<b>585</b> >=360	Span: 1 : S Only
Max Upward Transient Deflection		0 in	Ratio =	<b>0</b> <360	n/a
Max Downward Total Deflection		0.594 in	Ratio =	<b>335</b> >=240	Span: 1 : +D+S
Max Upward Total Deflection		0 in	Ratio =	<b>0</b> <240	n/a

### Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values				
			M	V	CD	CM	C <sub>t</sub>	CL <sub>x</sub>	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v	
D Only	Length = 16.60 ft	1	0.262	0.134	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.77	566.2	2,160.0	0.0	0.00	0.0	0.0
+D+S	Length = 16.60 ft	1	0.480	0.247	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	11.15	1,323.7	2,760.0	2.90	75.3	304.8	0.0
+D+0.750S	Length = 16.60 ft	1	0.411	0.212	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	9.55	1,134.3	2,760.0	2.48	64.5	304.8	0.0



# Wood Beam

Project File: Beam Calcs.ec6

LIC# : KW-06017913, Build:20.02.27

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

## DESCRIPTION: B10 - UPPER FLOOR - FLUSH BM @ DECK

### CODE REFERENCES

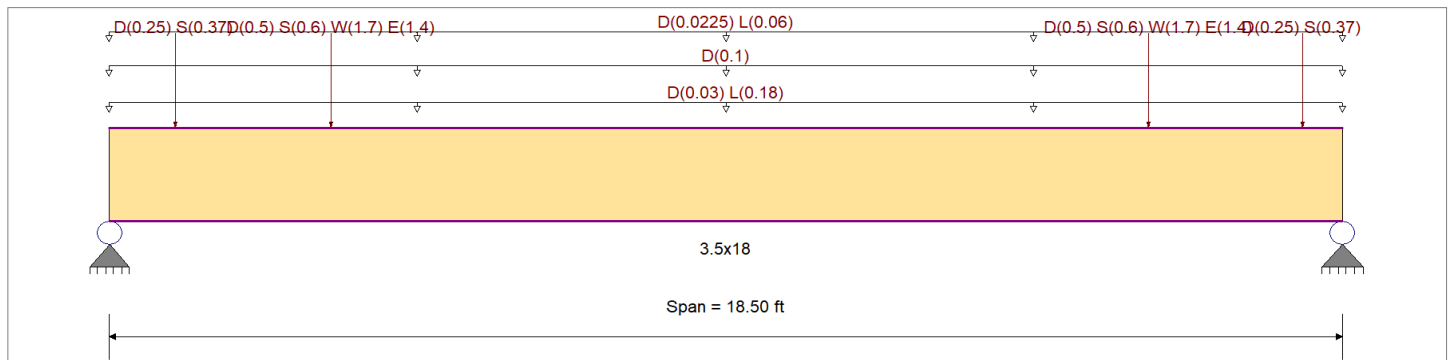
Calculations per NDS 2018, IBC 2021, ASCE 7-16

Load Combination Set : IBC 2021

### Material Properties

Analysis Method : Allowable Stress Design	Fb +	2,400.0 psi	E : Modulus of Elasticity
Load Combination : IBC 2021	Fb -	1,850.0 psi	Ebend- xx
	Fc - Prll	1,650.0 psi	Eminbend - xx
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy
Wood Grade : 24F - V4	Fv	265.0 psi	Eminbend - yy
	Ft	1,100.0 psi	Density
			31.210pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling



### Applied Loads

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

Beam self weight calculated and added to loading

Uniform Load : D = 0.010, L = 0.060 ksf, Tributary Width = 3.0 ft, (DECK)

Uniform Load : D = 0.10, Tributary Width = 1.0 ft, (WALL ABOVE)

Point Load : D = 0.250, S = 0.370 k @ 1.0 ft, (B2)

Point Load : D = 0.250, S = 0.370 k @ 17.90 ft, (B2)

Point Load : D = 0.50, S = 0.60, W = 1.70, E = 1.40 k @ 3.330 ft, (HDR ABOVE)

Point Load : D = 0.50, S = 0.60, W = 1.70, E = 1.40 k @ 15.60 ft, (HDR ABOVE)

Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 1.50 ft, (INT. FLOOR)

### DESIGN SUMMARY

**Design OK**

Maximum Bending Stress Ratio	=	<b>0.506</b> : 1	Maximum Shear Stress Ratio	=	<b>0.330</b> : 1
Section used for this span		<b>3.5x18</b>	Section used for this span		<b>3.5x18</b>
fb: Actual	=	1,214.83psi	fv: Actual	=	87.40 psi
F'b	=	2,400.00psi	F'v	=	265.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	9.182ft	Location of maximum on span	=	17.015 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
<b>Maximum Deflection</b>					
Max Downward Transient Deflection		0.208 in Ratio =	<b>1068</b> >=360	Span: 1 : L Only	
Max Upward Transient Deflection		-0.124 in Ratio =	<b>1794</b> >=360	Span: 1 : -W	
Max Downward Total Deflection		0.435 in Ratio =	<b>510</b> >=240	Span: 1 : +D+0.750L+0.750S+0.450W	
Max Upward Total Deflection		0 in Ratio =	<b>0</b> <240	n/a	

### Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values				
			M	V	CD	CM	C <sub>t</sub>	CL <sub>x</sub>	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v	
D Only																0.0	0.00	0.0	0.0
	Length = 18.50 ft	1	0.261	0.180	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	8.87	563.0	2,160.0	1.81	43.0	238.5	
+D+L																0.0	0.00	0.0	0.0
	Length = 18.50 ft	1	0.506	0.330	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	19.13	1,214.8	2,400.0	3.67	87.4	265.0	
+D+S																0.0	0.00	0.0	0.0

# Wood Beam

Project File: Beam Calcs.ec6

LIC# : KW-06017913, Build:20.24.02.27

MULHERN & KULP STRUCTURAL ENGINEERING INC

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## DESCRIPTION: B11 - UPPER FLOOR - CANT'D BM @ DECK

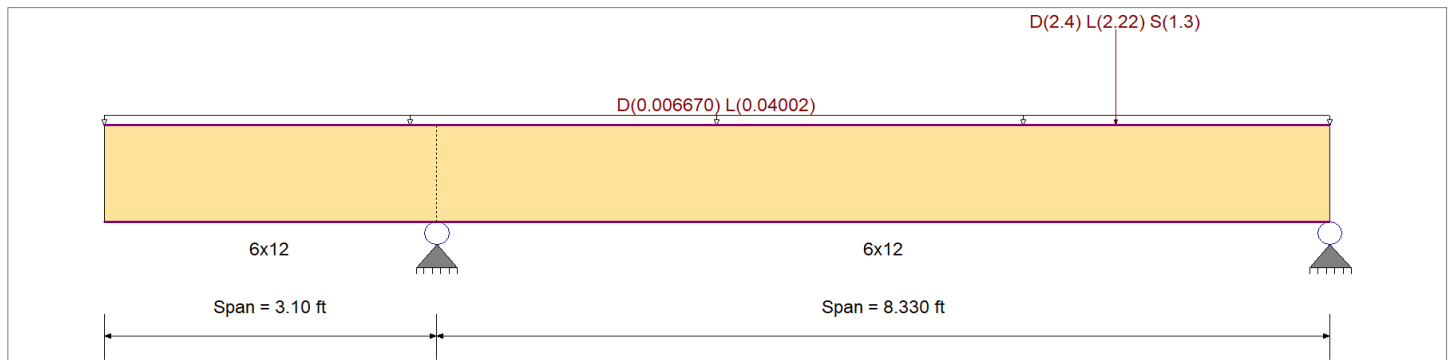
### CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16

Load Combination Set : IBC 2021

### Material Properties

Analysis Method :	Allowable Stress Design	Fb +	875 psi	E : Modulus of Elasticity	
Load Combination :	IBC 2021	Fb -	875 psi	Ebend- xx	1300ksi
		Fc - Prll	600 psi	Eminbend - xx	470ksi
Wood Species :	Douglas Fir - Larch	Fc - Perp	625 psi		
Wood Grade :	No.2	Fv	170 psi		
		Ft	425 psi	Density	31.21 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



### Applied Loads

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

Beam self weight calculated and added to loading

Loads on all spans...

Uniform Load on ALL spans : D = 0.010, L = 0.060 ksf, Tributary Width = 0.6670 ft

Load for Span Number 2

Point Load : D = 2.40, L = 2.220, S = 1.30 k @ 6.330 ft, (B10)

### DESIGN SUMMARY

**Design OK**

<b>Maximum Bending Stress Ratio</b>	=	<b>0.830</b> : 1	<b>Maximum Shear Stress Ratio</b>	=	<b>0.512</b> : 1
Section used for this span		<b>6x12</b>	Section used for this span		<b>6x12</b>
fb: Actual	=	725.87psi	fv: Actual	=	87.07 psi
F'b	=	875.00psi	F'v	=	170.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	6.329ft	Location of maximum on span	=	7.399 ft
Span # where maximum occurs	=	Span # 2	Span # where maximum occurs	=	Span # 2
<b>Maximum Deflection</b>					
Max Downward Transient Deflection		0.038 in Ratio =	2633 >=360	Span: 2 : L Only	
Max Upward Transient Deflection		-0.036 in Ratio =	2066 >=360	Span: 1 : L Only	
Max Downward Total Deflection		0.083 in Ratio =	1205 >=240	Span: 2 : +D+0.750L+0.750S	
Max Upward Total Deflection		-0.080 in Ratio =	928 >=240	Span: 1 : +D+0.750L+0.750S	

### Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values				
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>F</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v		
D Only																				
	Length = 3.10 ft	1	0.012	0.101	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.10	9.7	787.5	0.00	0.00	0.0	0.0	153.0
	Length = 8.330 ft	2	0.472	0.291	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.75	371.4	787.5	1.88	44.5	153.0		
+D+L																				
	Length = 3.10 ft	1	0.033	0.187	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.29	28.7	875.0	0.00	0.00	0.0	0.0	170.0
	Length = 8.330 ft	2	0.830	0.512	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.33	725.9	875.0	3.67	87.1	170.0		
+D+S																				
	Length = 3.10 ft	1	0.010	0.117	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.10	9.7	1,006.3	0.97	22.9	195.5		

# Wood Beam

Project File: Beam Calcs.ec6

LIC#: KW-06017913, Build:20.24.02.27

MULHERN & KULP STRUCTURAL ENGINEERING INC

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## DESCRIPTION: B18 - UPPER FLOOR - BM @ STAIR OPENING

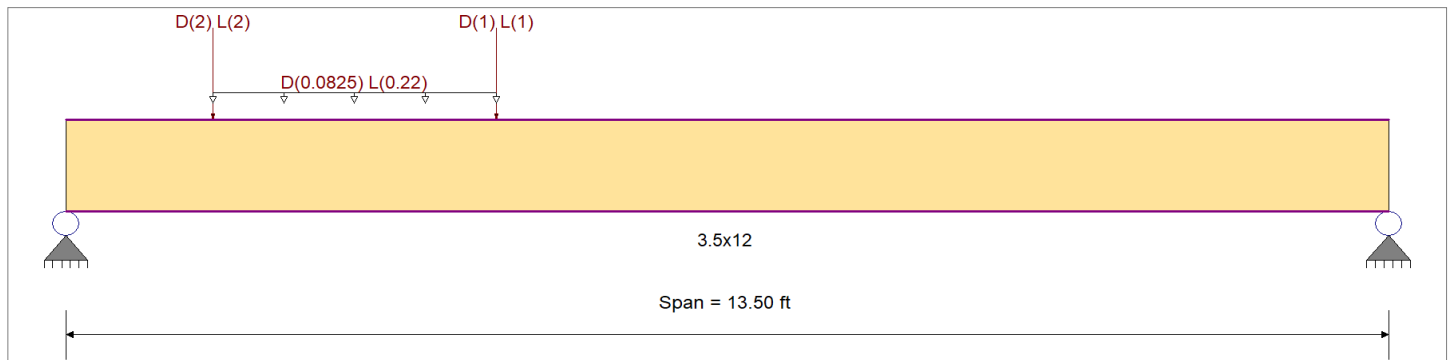
### CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16

Load Combination Set : IBC 2021

### Material Properties

Analysis Method :	Allowable Stress Design	Fb +	2,400.0 psi	E : Modulus of Elasticity	
Load Combination :	IBC 2021	Fb -	1,850.0 psi	Ebend- xx	1,800.0ksi
		Fc - Prll	1,650.0 psi	Eminbend - xx	950.0ksi
Wood Species :	DF/DF	Fc - Perp	650.0 psi	Ebend- yy	1,600.0ksi
Wood Grade :	24F - V4	Fv	265.0 psi	Eminbend - yy	850.0ksi
		Ft	1,100.0 psi	Density	31.210pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



### Applied Loads

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

Beam self weight calculated and added to loading

Point Load : D = 2.0, L = 2.0 k @ 1.50 ft, (F.G.T.)

Point Load : D = 1.0, L = 1.0 k @ 4.40 ft, (BM)

Uniform Load : D = 0.0150, L = 0.040 ksf, Extent = 1.50 --> 4.40 ft, Tributary Width = 5.50 ft

### DESIGN SUMMARY

**Design OK**

Maximum Bending Stress Ratio	=	<b>0.708</b> < 1	Maximum Shear Stress Ratio	=	<b>0.760</b> < 1
Section used for this span		<b>3.5x12</b>	Section used for this span		<b>3.5x12</b>
fb: Actual	=	1,698.85psi	fv: Actual	=	201.49 psi
F'b	=	2,400.00psi	F'v	=	265.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	4.385ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
<b>Maximum Deflection</b>					
Max Downward Transient Deflection		0.188 in	Ratio =	<b>862</b> >= 360	Span: 1 : L Only
Max Upward Transient Deflection		0 in	Ratio =	<b>0</b> < 360	n/a
Max Downward Total Deflection		0.359 in	Ratio =	<b>451</b> >= 240	Span: 1 : +D+L
Max Upward Total Deflection		0 in	Ratio =	<b>0</b> < 240	n/a

### Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values			
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v	
D Only																			
	Length = 13.451 ft	1	0.373	0.403	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	5.64	805.7	2,160.0	0.0	0.00	0.0	0.0
	Length = 0.04927 ft	1	0.002	0.403	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.03	4.7	2,160.0	0.65	96.1	238.5	238.5
+D+L																			
	Length = 13.451 ft	1	0.708	0.760	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	11.89	1,698.9	2,400.0	5.64	201.5	265.0	265.0
	Length = 0.04927 ft	1	0.004	0.760	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.07	9.5	2,400.0	1.34	201.5	265.0	265.0
+D+0.750L																			
	Length = 13.451 ft	1	0.492	0.529	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	10.33	1,475.6	3,000.0	4.90	175.1	331.3	331.3
	Length = 0.04927 ft	1	0.003	0.529	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.06	8.3	3,000.0	1.17	175.1	331.3	331.3



# Wood Beam

Project File: Beam Calcs.ec6

LIC#: KW-06017913, Build:20.24.05.02

MULHERN & KULP STRUCTURAL ENGINEERING INC

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**DESCRIPTION: B23 - MAIN FLOOR - (E) BM UNDER SW #108 (OVERSTRENGTH)**

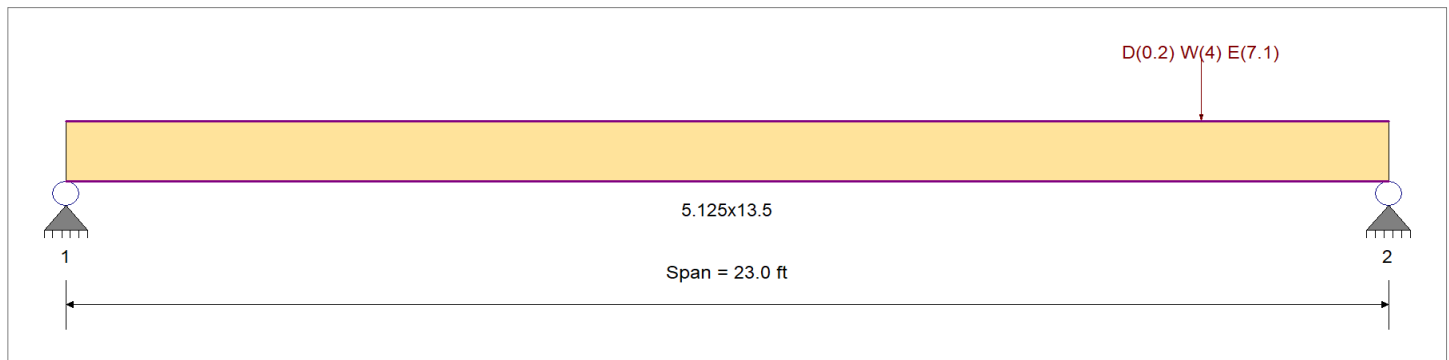
## CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16

Load Combination Set : IBC 2021

## Material Properties

Analysis Method :	Allowable Stress Design	Fb +	2,880.0 psi	E : Modulus of Elasticity	
Load Combination :	IBC 2021	Fb -	2,220.0 psi	Ebend- xx	2,160.0 ksi
		Fc - Prll	1,650.0 psi	Eminbend - xx	950.0 ksi
Wood Species :	DF/DF	Fc - Perp	650.0 psi	Ebend- yy	1,600.0 ksi
Wood Grade :	24F - V4	Fv	265.0 psi	Eminbend - yy	850.0 ksi
		Ft	1,100.0 psi	Density	31.210 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



## Applied Loads

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

Beam self weight calculated and added to loading

Point Load : D = 0.20, W = 4.0, E = 7.10 k @ 19.75 ft, (SW 108)

## DESIGN SUMMARY

**Design OK**

<b>Maximum Bending Stress Ratio</b>	=	<b>0.293</b> : 1	<b>Maximum Shear Stress Ratio</b>	=	<b>0.235</b> : 1
Section used for this span		<b>5.125x13.5</b>	Section used for this span		<b>5.125x13.5</b>
fb: Actual	=	1,019.72psi	fv: Actual	=	99.63 psi
F'b	=	3,478.62psi	F'v	=	424.00 psi
Load Combination	=	+0.60D-0.70E	Load Combination	=	+D+0.70E
Location of maximum on span	=	19.726ft	Location of maximum on span	=	21.909ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
<b>Maximum Deflection</b>					
Max Downward Transient Deflection		0.581 in Ratio = 474 >=360	Span: 1 : E Only		
Max Upward Transient Deflection		-0.581 in Ratio = 474 >=360	Span: 1 : E Only * -1.0		
Max Downward Total Deflection		0.464 in Ratio = 594 >=240	Span: 1 : +D+0.70E		
Max Upward Total Deflection		-0.373 in Ratio = 740 >=240	Span: 1 : +0.60D-0.70E		

## Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values				
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v	
D Only																			
Length = 23.0 ft	1	0.041	0.030	0.90	1.00	1.00	1.00	0.979	1.00	1.00	1.00	1.34	103.5	2,538.5	0.00	0.00	0.0	0.0	238.5
+D+L																			
Length = 23.0 ft	1	0.037	0.027	1.00	1.00	1.00	1.00	0.979	1.00	1.00	1.00	1.34	103.5	2,820.5	0.00	0.00	0.0	0.0	265.0
+D+0.750L																			
Length = 23.0 ft	1	0.029	0.021	1.25	1.00	1.00	1.00	0.979	1.00	1.00	1.00	1.34	103.5	3,525.6	0.00	0.00	0.0	0.0	331.3
+D+0.60W																			
Length = 23.0 ft	1	0.132	0.122	1.60	1.00	1.00	1.00	0.979	1.00	1.00	1.00	7.73	596.0	4,512.8	2.39	51.8	424.0	424.0	
+D-0.60W																			
Length = 23.0 ft	1	0.125	0.090	1.60	1.00	1.00	1.00	0.979	1.00	1.00	1.00	5.65	435.4	3,478.6	1.76	38.3	424.0	424.0	

# Wood Beam

Project File: Beam Calcs.ec6

LIC# : KW-06017913, Build:20.24.02.27

MULHERN & KULP STRUCTURAL ENGINEERING INC

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## DESCRIPTION: B24 - MAIN FLOOR - (E) BM UNDER SW #109

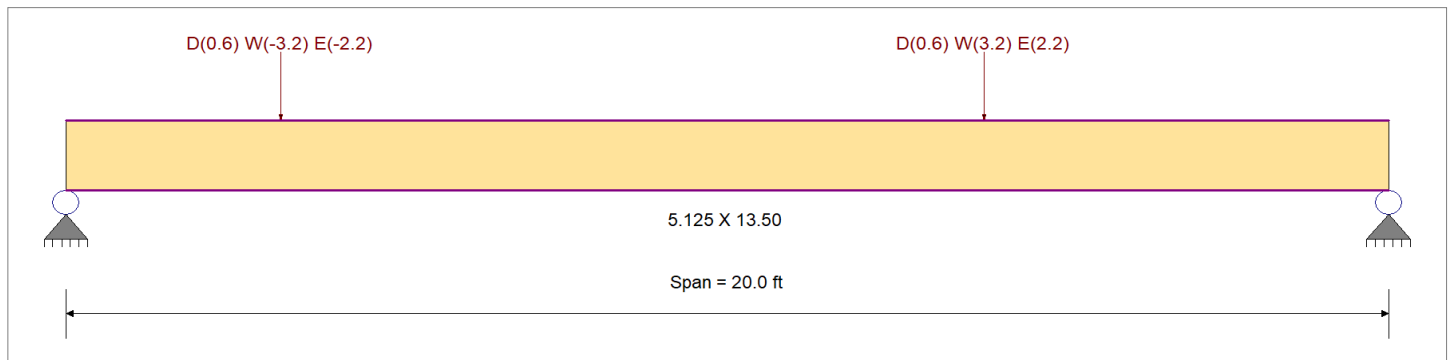
### CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16

Load Combination Set : IBC 2021

### Material Properties

Analysis Method : Allowable Stress Design	Fb +	2,880.0 psi	<i>E : Modulus of Elasticity</i>	
Load Combination : IBC 2021	Fb -	2,220.0 psi	Ebend- xx	2,160.0ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx	950.0ksi
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy	1,600.0ksi
Wood Grade : 24F - V4	Fv	265.0 psi	Eminbend - yy	850.0ksi
	Ft	1,100.0 psi	Density	31.210pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling				



### Applied Loads

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

Beam self weight calculated and added to loading

Point Load : D = 0.60, W = 3.20, E = 2.20 k @ 13.90 ft, (SW 108)

Point Load : D = 0.60, W = -3.20, E = -2.20 k @ 3.250 ft, (SW 108)

### DESIGN SUMMARY

**Design OK**

<b>Maximum Bending Stress Ratio</b>	=	<b>0.168</b> < 1	<b>Maximum Shear Stress Ratio</b>	=	<b>0.094</b> < 1
Section used for this span		<b>5.125 X 13.50</b>	Section used for this span		<b>5.125 X 13.50</b>
fb: Actual	=	769.45psi	fv: Actual	=	39.92 psi
F'b	=	4,576.32psi	F'v	=	424.00 psi
Load Combination		+D+0.60W	Load Combination		+D-0.60W
Location of maximum on span	=	13.869ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
<b>Maximum Deflection</b>					
Max Downward Transient Deflection		0.155 in Ratio = 1546 >=360	Span: 1 : W Only		
Max Upward Transient Deflection		-0.155 in Ratio = 1546 >=360	Span: 1 : -W		
Max Downward Total Deflection		0.209 in Ratio = 1147 >=240	Span: 1 : +D+0.60W		
Max Upward Total Deflection		-0.029 in Ratio = 8142 >=240	Span: 1 : +0.60D-0.60W		

### Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values					
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>v</sub>	Cfu	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v			
D Only																					
Length = 20.0 ft	1		0.113	0.074	0.90	1.00	1.00	1.00	0.993	1.00	1.00	1.00	3.77	290.9	2,574.2	0.82	17.8	238.5	0.00	0.0	0.0
+D+L																					
Length = 20.0 ft	1		0.102	0.067	1.00	1.00	1.00	1.00	0.993	1.00	1.00	1.00	3.77	290.9	2,860.2	0.82	17.8	265.0	0.00	0.0	0.0
+D+0.750L																					
Length = 20.0 ft	1		0.081	0.054	1.25	1.00	1.00	1.00	0.993	1.00	1.00	1.00	3.77	290.9	3,575.2	0.82	17.8	331.3	0.00	0.0	0.0
+D+0.60W																					
Length = 20.0 ft	1		0.168	0.085	1.60	1.00	1.00	1.00	0.993	1.00	1.00	1.00	9.98	769.4	4,576.3	1.67	36.2	424.0	0.00	0.0	0.0
+D-0.60W																					
Length = 20.0 ft	1					1.00	1.00	1.00	0.993	1.00	1.00	1.00			0.0	0.00	0.0	0.0	0.00	0.0	0.0

# Wood Beam

Project File: Beam Calcs.ec6

LIC# : KW-06017913, Build:20.24.05.02

MULHERN & KULP STRUCTURAL ENGINEERING INC

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**DESCRIPTION: B24 - MAIN FLOOR - (E) BM UNDER SW #109 (OVERSTRENGTH)**

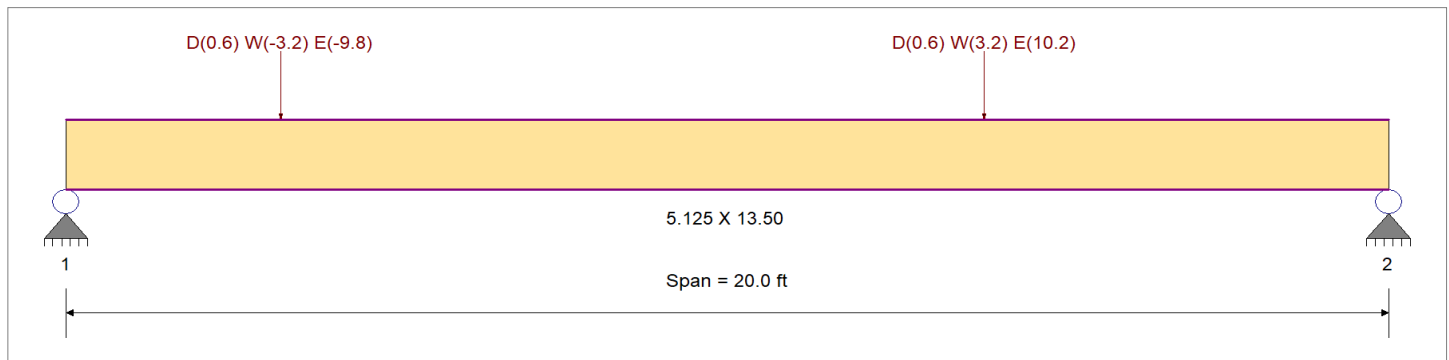
## CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16

Load Combination Set : IBC 2021

## Material Properties

Analysis Method : Allowable Stress Design	Fb +	2,880.0 psi	E : Modulus of Elasticity	
Load Combination : IBC 2021	Fb -	2,220.0 psi	Ebend- xx	2,160.0ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx	950.0ksi
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy	1,600.0ksi
Wood Grade : 24F - V4	Fv	265.0 psi	Eminbend - yy	850.0ksi
	Ft	1,100.0 psi	Density	31.210pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling				



## Applied Loads

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

Beam self weight calculated and added to loading

Point Load : D = 0.60, W = 3.20, E = 10.20 k @ 13.90 ft, (SW 108)

Point Load : D = 0.60, W = -3.20, E = -9.80 k @ 3.250 ft, (SW 108)

## DESIGN SUMMARY

**Design OK**

Maximum Bending Stress Ratio	=	<b>0.457</b> : 1	Maximum Shear Stress Ratio	=	<b>0.230</b> : 1
Section used for this span		<b>5.125 X 13.50</b>	Section used for this span		<b>5.125 X 13.50</b>
fb: Actual	=	2,092.10psi	fv: Actual	=	97.47 psi
F'b	=	4,576.32psi	F'v	=	424.00 psi
Load Combination		+D+0.70E	Load Combination		+D+0.70E
Location of maximum on span	=	13.869ft	Location of maximum on span	=	18.905 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
<b>Maximum Deflection</b>					
Max Downward Transient Deflection		0.515 in Ratio = <b>1546</b> >=360	Span: 1 : E Only		
Max Upward Transient Deflection		-0.155 in Ratio = <b>466</b> >=360	Span: 1 : -W		
Max Downward Total Deflection		0.475 in Ratio = <b>505</b> >=240	Span: 1 : +D+0.70E		
Max Upward Total Deflection		-0.029 in Ratio = <b>8142</b> >=240	Span: 1 : +0.60D-0.60W		

## Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values					
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v		
D Only																				
Length = 20.0 ft	1	0.113	0.074	0.90	1.00	1.00	1.00	0.993	1.00	1.00	1.00	3.77	290.9	2,574.2	0.82	17.8	238.5	0.00	0.0	0.0
+D+L																				
Length = 20.0 ft	1	0.102	0.067	1.00	1.00	1.00	1.00	0.993	1.00	1.00	1.00	3.77	290.9	2,860.2	0.82	17.8	265.0	0.00	0.0	0.0
+D+0.750L																				
Length = 20.0 ft	1	0.081	0.054	1.25	1.00	1.00	1.00	0.993	1.00	1.00	1.00	3.77	290.9	3,575.2	0.82	17.8	331.3	0.00	0.0	0.0
+D+0.60W																				
Length = 20.0 ft	1	0.168	0.085	1.60	1.00	1.00	1.00	0.993	1.00	1.00	1.00	9.98	769.4	4,576.3	1.67	36.2	424.0	0.00	0.0	0.0
+D-0.60W																				
Length = 20.0 ft	1				1.00	1.00	1.00	0.993	1.00	1.00	1.00			0.0	0.00	0.0	0.0	0.00	0.0	0.0

# Wood Beam

Project File: Beam Calcs.ec6

LIC# : KW-06017913, Build:20.24.05.02

MULHERN & KULP STRUCTURAL ENGINEERING INC

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## DESCRIPTION: B27 - MAIN FLOOR - BEAM UNDER EXISTING WALL

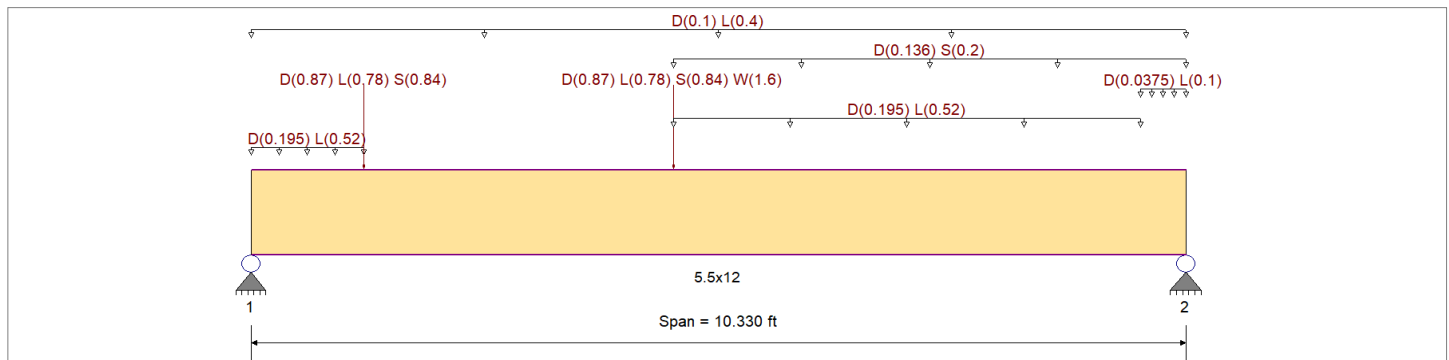
### CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16

Load Combination Set : IBC 2021

### Material Properties

Analysis Method :	Allowable Stress Design	Fb +	2,400.0 psi	E : Modulus of Elasticity	
Load Combination :	IBC 2021	Fb -	1,850.0 psi	Ebend- xx	1,800.0ksi
		Fc - Prll	1,650.0 psi	Eminbend - xx	950.0ksi
Wood Species :	DF/DF	Fc - Perp	650.0 psi	Ebend- yy	1,600.0ksi
Wood Grade :	24F-V4	Fv	265.0 psi	Eminbend - yy	850.0ksi
		Ft	1,100.0 psi	Density	31.210pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



### Applied Loads

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

Beam self weight calculated and added to loading

Load for Span Number 1

Uniform Load : D = 0.0150, L = 0.040 ksf, Extent = 0.0 --> 1.250 ft, Tributary Width = 13.0 ft, (UPPER FLOOR)

Point Load : D = 0.870, L = 0.780, S = 0.840 k @ 1.250 ft, (HDR ABOVE)

Point Load : D = 0.870, L = 0.780, S = 0.840, W = 1.60 k @ 4.667 ft, (HDR ABOVE)

Uniform Load : D = 0.0150, L = 0.040 ksf, Extent = 4.670 --> 9.830 ft, Tributary Width = 13.0 ft, (UPPER FLOOR)

Uniform Load : D = 0.0150, L = 0.040 ksf, Extent = 9.830 --> 10.330 ft, Tributary Width = 2.50 ft, (UPPER FLOOR)

Uniform Load : D = 0.0170, S = 0.0250 ksf, Extent = 4.670 --> 10.330 ft, Tributary Width = 8.0 ft, (ROOF)

Uniform Load : D = 0.010, L = 0.040 ksf, Tributary Width = 10.0 ft, (MAIN FLOOR)

### DESIGN SUMMARY

**Design OK**

Maximum Bending Stress Ratio	=	<b>0.708</b> : 1	Maximum Shear Stress Ratio	=	<b>0.511</b> : 1
Section used for this span		<b>5.5x12</b>	Section used for this span		<b>5.5x12</b>
fb: Actual	=	1,700.04psi	fv: Actual	=	135.42 psi
F'b	=	2,400.00psi	F'v	=	265.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	5.090ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
<b>Maximum Deflection</b>					
Max Downward Transient Deflection		0.159 in Ratio =	0 >=360	Span: 1 : L Only	
Max Upward Transient Deflection		0 in Ratio =	781 <360	n/a	
Max Downward Total Deflection		0.267 in Ratio =	464 >=240	Span: 1 : +D+0.750L+0.750S+0.450W	
Max Upward Total Deflection		0 in Ratio =	0 <240	n/a	

### Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values				
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v		
D Only																				
	Length = 10.330 ft	1	0.286	0.216	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.81	618.7	2,160.0	0.0	0.00	0.0	0.0	238.5
+D+L																				
	Length = 10.330 ft	1	0.708	0.511	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	18.70	1,700.0	2,400.0	5.96	135.4	265.0		

# Concrete Beam

Project File: Beam Calcs.ec6

LIC#: KW-06017913, Build:20.24.02.27

MULHERN & KULP STRUCTURAL ENGINEERING INC

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**DESCRIPTION:** New Grade Beam

## CODE REFERENCES

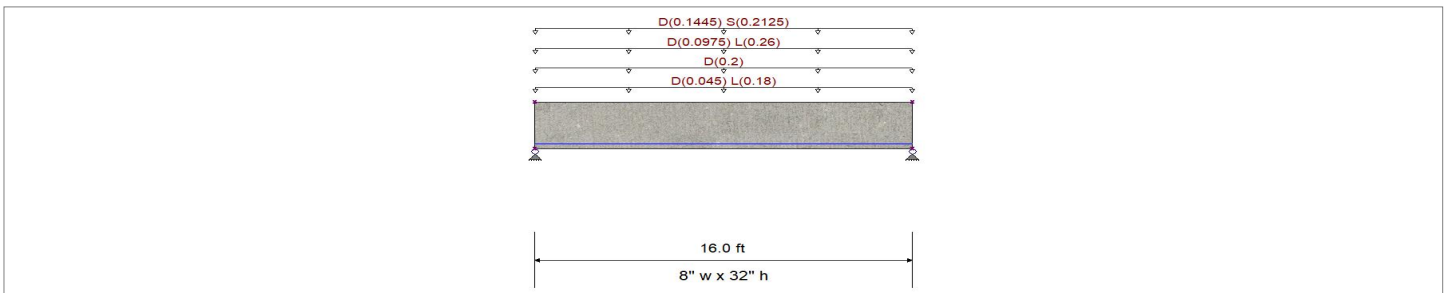
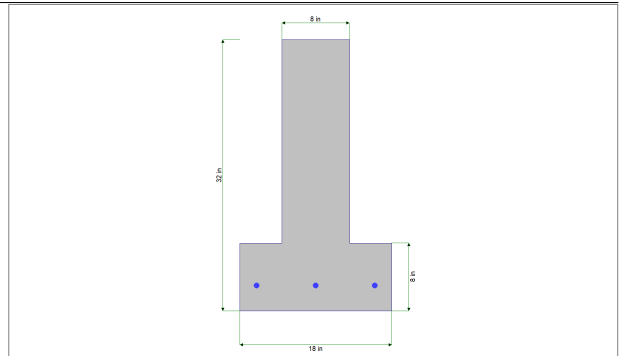
Calculations per ACI 318-19, IBC 2021, ASCE 7-16

Load Combination Set : IBC 2021

## General Information

$f'_c$	=	3.0 ksi	$\phi$ Phi Values	Flexure :	0.90
$f_r = f'_c^{1/2} * 7.50$	=	410.792 psi		Shear :	0.750
$\psi$ Density	=	145.0 pcf	$\beta_1$	=	0.850
$\lambda$ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups	=	40.0 ksi
$f_y$ - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #	=	3
			Number of Resisting Legs Per Stirrup =	=	2

Seismic Design Category = A



## Cross Section & Reinforcing Details

Inverted Tee Section, Stem Width = 8.0 in, Total Height = 32.0 in, Top Flange Width = 18.0 in, Flange Thickness = 8.0 in  
Span #1 Reinforcing....

3-#5 at 3.0 in from Bottom, from 0.0 to 16.0 ft in this span

## Beam self weight calculated and added to loads

### Load for Span Number 1

Uniform Load : D = 0.010, L = 0.040 ksf, Tributary Width = 4.50 ft

Uniform Load : D = 0.20 k/ft, Tributary Width = 1.0 ft, (wall above)

Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 6.50 ft, (upper floor)

Uniform Load : D = 0.0170, S = 0.0250 ksf, Tributary Width = 8.50 ft, (upper floor)

## DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	<b>0.498</b> : 1	
Section used for this span	<b>Typical Section</b>	
Mu : Applied	57.621	k-ft
Mn * Phi : Allowable	115.641	k-ft
Location of maximum on span	7.985	ft
Span # where maximum occurs	Span # 1	

### Maximum Deflection

Max Downward Transient Deflection	0.007 in	Ratio =	28695	>=360.0	S Only
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360.0	L Only
Max Downward Total Deflection	0.020 in	Ratio =	9603	>=240.0	Span: 1 : +D+0.750L+0.750S
Max Upward Total Deflection	0.000 in	Ratio =	0	<240.0	Span: 1 : +D+0.750L+0.750S

## Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	10.518	10.518
Max Upward from Load Combinations	10.518	10.518
Max Upward from Load Cases	6.603	6.603

## Masonry Slender Wall

Project File: Beam Calcs.ec6

LIC# : KW-06017913, Build:20.24.05.02

MULHERN &amp; KULP STRUCTURAL ENGINEERING INC

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**DESCRIPTION:** Fireplace

### Code References

Calculations per TMS 402-16, IBC 2021, ASCE 7-16

Load Combinations Used : IBC 2021

### General Information

Calculations per TMS 402-16, IBC 2021, ASCE 7-16

Construction Type : Grouted Hollow Concrete Masonry

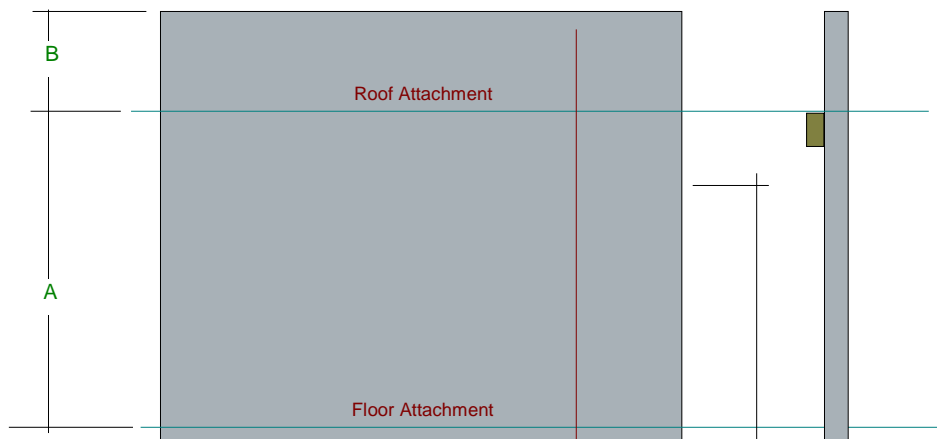
F'm	=	1.50 ksi	Nom. Wall Thickness	8 in	Temp Diff across thickness	=	deg F
Fy - Yield	=	60.0 ksi	Actual Thickness	7.625 in	Min Allow Out-of-plane Defl Rati	=	0.0
Fr - Rupture	=	61.0 psi	Rebar "d" distance	3.750 in	Minimum Vertical Steel %	=	0.0020
Em = f'm *	=	900.0	Lower Level Rebar . . .				
Max % of $\rho$ bal.	=	0.006851	Bar Size	# 4			
Grout Density	=	140 pcf	Bar Spacing	8 in			
Block Weight	=	Normal Weight					
Wall Weight	=	86.0 psf					

Wall is Solid Grouted

### One-Story Wall Dimensions

A Clear Height	=	10 ft
B Parapet height	=	10 ft

Wall Support Condition Top &amp; Bottom Pinned



### Lateral Loads

Wind Loads :

Full area WIND load = 15 psf

Seismic Loads :

Wall Weight Seismic Load Input Method : ASCE seismic factors entered

SDS Value per ASCE 12.11.1  $S_{DS} * I = 1.112$  $F_p = \text{Wall Wt.} * 0.4448 = 38.253 \text{ psf}$



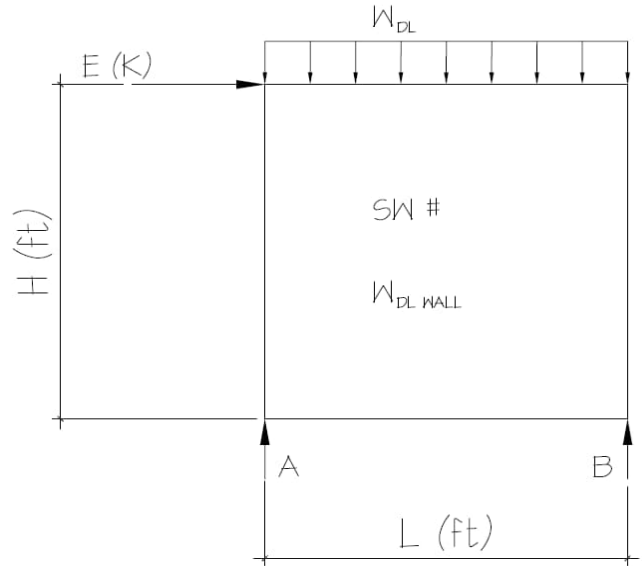
### Overstrength Calculations

Wall Description/SW #:

SW 110

Parameters:

- L = 3.3 ft
- H = 9.1 ft
- E = 0.70 k
- $W_{DLWall}$  = 0.10 klf
- $W_{DL}$  = 0.000 klf
- $\Omega_0$  = 2.5 (ASCE TABLE 12.2.1 FOOTNOTE)
- SDS = 1.112



analysis:

E (unfactored) = 1.00

$E_{mh} = \Omega_0 * E = 2.50$  K       $E_v = 0.2 * SDS * DL = 0.073$  K

$E_m = E_{mh} + E_v = 2.573$  K

$E_m = E_{mh} - E_v = 2.427$  K

$E_m$  (max) =  $\sum M_A = 0 = 2.57(9.1) + 0.1(3.3)(1.65) - R_b(3.3)$        $R_B = 0.2DL + 7.1E$

$R_a = 0.2DL - 7.1E$

$E_m$  (min) =  $\sum M_A = 0 = 2.43(9.1) + 0.1(3.3)(1.65) - R_b(3.3)$        $R_B = 0.2DL + 6.7E$

$R_a = 0.2DL - 6.7E$

check beams for axial forces shown using load combos per section 12.4.3.1 (asd)

allowable stress permitted to be increased by 1.2

see following beam calcs for load application



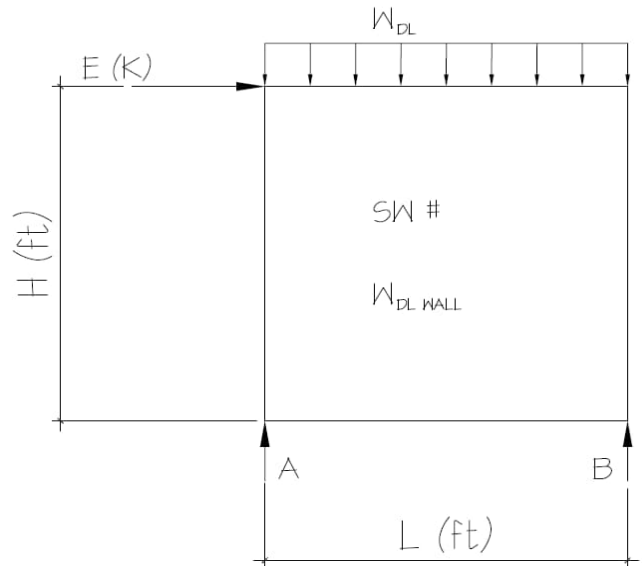
### Overstrength Calculations

Wall Description/SW #:

sw 111

Parameters:

- L = 11.0 ft
- H = 9.1 ft
- E = 3.40 k
- $W_{DLWall}$  = 0.10 klf
- $W_{DL}$  = 0.000 klf
- $\Omega_0$  = 2.5 (ASCE TABLE 12.2.1 FOOTNOTE)
- SDS = 1.112



analysis:

$E$  (unfactored) = 4.86

$E_{mh} = \Omega_0 * E = 12.14$  K       $E_v = 0.2 * SDS * DL = 0.245$  K

$E_m = E_{mh} + E_v = 12.387$  K

$E_m = E_{mh} - E_v = 11.898$  K

$E_m$  (max) =  $\sum M_A = 0 = 12.39(9.1) + 0.1(11)(5.5) - R_b(11)$        $R_B = 0.6DL + 10.2E$

$R_a = 0.6DL - 10.2E$

$E_m$  (min) =  $\sum M_A = 0 = 11.90(9.1) + 0.1(11)(5.5) - R_b(11)$        $R_B = 0.6DL + 9.8E$

$R_a = 0.6DL - 9.8E$

check beams for axial forces shown using load combos per section 12.4.3.1 (asd)

allowable stress permitted to be increased by 1.2

see following beam calcs for load application



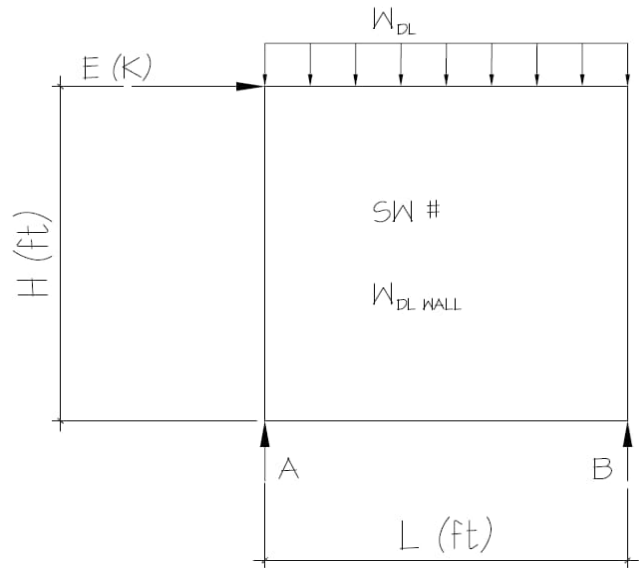
## Overstrength Calculations

### Wall Description/SW #:

SW 209

Parameters:

L = 18.0 ft  
 H = 9.1 ft  
 E = 2.40 k  
 W<sub>DLWall</sub> = 0.10 klf  
 W<sub>DL</sub> = 0.034 klf  
 Ω<sub>0</sub> = 2.5 (ASCE TABLE 12.2.1 FOOTNOTE)  
 SDS = 1.112



analysis:

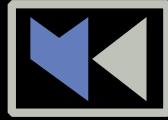
E (unfactored) = 3.43  
 E<sub>mh</sub> = Ω<sub>0</sub> \* E = 8.57 K      E<sub>v</sub> = 0.2 \* SDS \* DL = 0.536 K  
 E<sub>m</sub> = E<sub>mh</sub> + E<sub>v</sub> = 9.108 K  
 E<sub>m</sub> = E<sub>mh</sub> - E<sub>v</sub> = 8.035 K

E<sub>m</sub> (max) = ΣM<sub>A</sub> = 0 = 9.11(9.1) + 0.134(18)(9) - R<sub>b</sub>(18)      R<sub>B</sub> = 1.2DL + 4.6E  
 Ra = 1.2DL - 4.6E  
 E<sub>m</sub> (min) = ΣM<sub>A</sub> = 0 = 8.03(9.1) + 0.134(18)(9) - R<sub>b</sub>(18)      R<sub>B</sub> = 1.2DL + 4.1E  
 Ra = 1.2DL - 4.1E

check beams for axial forces shown using load combos per section 12.4.3.1 (asd)

allowable stress permitted to be increased by 1.2

see following beam calcs for load application



**MULHERN+KULP**  
RESIDENTIAL STRUCTURAL ENGINEERING

# Shear Wall Calculations

Architectural Innovations

## Lee Remodel

*Mercer Island, WA*

*Parameters:*

*Single Family Home*

*Design Wind Speed: 100 MPH*

*wind Exposure Category: B/C*

*Seismic Design Category: D*

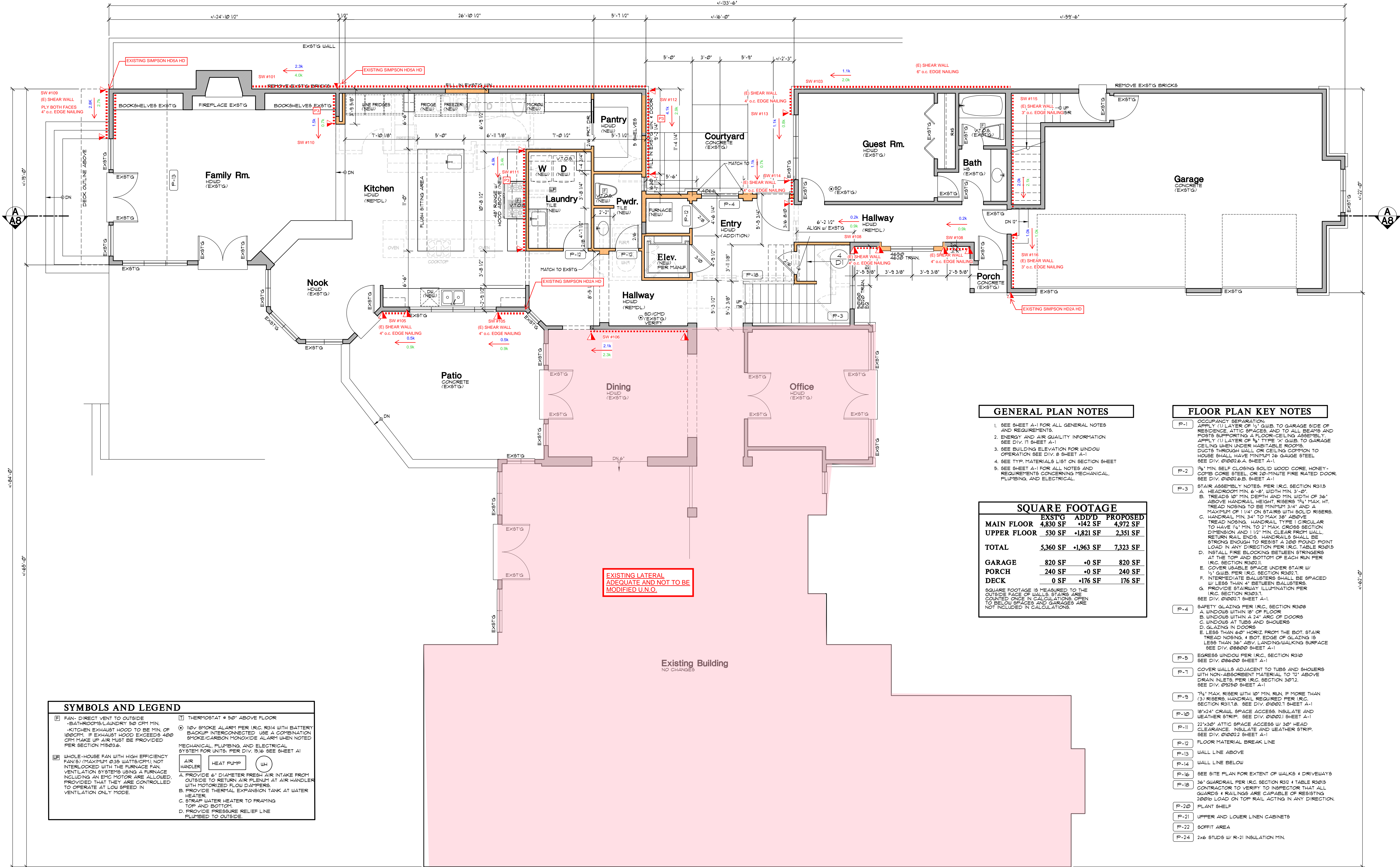
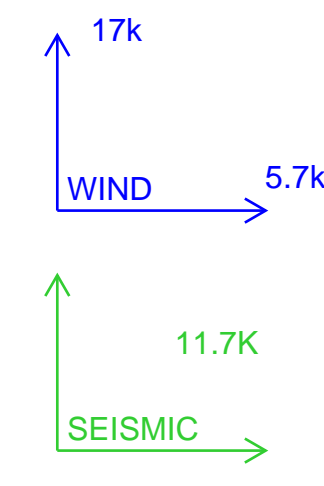
*Code & Design Standard: 2018 IBC Ch. 1609, ASCE 7-16 Ch. 26-30*

MULHERN & KULP STRUCTURAL ENGINEERING, INC.

0.0

Matthew Mills, Staff Engineer

Model No.	Allowable Tension Loads DFSP (133/165)					Allowable Tension Loads SPFH (133/165)					Holdover <sup>1</sup> Deflection at Highest Allowable Design Load	Holdover <sup>2</sup> Deflection at Highest Allowable Design Load	Code Ref.
	1 1/2"	2"	3"	4"	5"	1 1/2"	2"	3"	4"	5"			
H24	155	205	255	275	275	130	170	210	225	225	0.08	0.07	
H24	187	245	305	315	315	150	200	250	265	265	0.07	0.11	
H24	227	295	365	375	375	170	220	270	285	285	0.06	0.12	40, 105
H24	267	345	425	435	435	190	240	290	305	305	0.05	0.13	102
H24	307	395	485	495	495	210	260	310	325	325	0.04	0.14	
H24	347	445	545	555	555	230	280	330	345	345	0.03	0.15	
H24	387	495	595	605	605	250	300	350	365	365	0.02	0.16	
H24	427	545	645	655	655	270	320	370	385	385	0.01	0.17	
H24	467	595	695	705	705	290	340	390	405	405	0.01	0.18	
H24	507	645	745	755	755	310	360	410	425	425	0.01	0.19	
H24	547	695	795	805	805	330	380	430	445	445	0.01	0.20	
H24	587	745	845	855	855	350	400	450	465	465	0.01	0.21	
H24	627	795	895	905	905	370	420	470	485	485	0.01	0.22	
H24	667	845	945	955	955	390	440	490	505	505	0.01	0.23	
H24	707	895	995	1005	1005	410	460	510	525	525	0.01	0.24	
H24	747	945	1045	1055	1055	430	480	530	545	545	0.01	0.25	
H24	787	995	1095	1105	1105	450	500	550	565	565	0.01	0.26	
H24	827	1045	1145	1155	1155	470	520	570	585	585	0.01	0.27	
H24	867	1095	1195	1205	1205	490	540	590	605	605	0.01	0.28	
H24	907	1145	1245	1255	1255	510	560	610	625	625	0.01	0.29	
H24	947	1195	1295	1305	1305	530	580	630	645	645	0.01	0.30	



EXISTING LATERAL ADEQUATE AND NOT TO BE MODIFIED U.N.O.

**GENERAL PLAN NOTES**

- SEE SHEET A-1 FOR ALL GENERAL NOTES AND REQUIREMENTS.
- ENERGY AND AIR QUALITY INFORMATION SEE DIV. 11 SHEET A-1.
- SEE BUILDING ELEVATION FOR WINDOW OPERATION SEE DIV. 8 SHEET A-1.
- SEE TYP. MATERIALS LIST ON SECTION SHEET.
- SEE SHEET A-1 FOR ALL NOTES AND REQUIREMENTS CONCERNING MECHANICAL, PLUMBING, AND ELECTRICAL.

**SQUARE FOOTAGE**

	EXIST'G	ADD'D	PROPOSED
MAIN FLOOR	4,830 SF	+142 SF	4,972 SF
UPPER FLOOR	530 SF	+1,821 SF	2,351 SF
<b>TOTAL</b>	<b>5,360 SF</b>	<b>+1,963 SF</b>	<b>7,323 SF</b>
<b>GARAGE</b>	<b>820 SF</b>	<b>+0 SF</b>	<b>820 SF</b>
<b>PORCH</b>	<b>240 SF</b>	<b>+0 SF</b>	<b>240 SF</b>
<b>DECK</b>	<b>0 SF</b>	<b>+176 SF</b>	<b>176 SF</b>

SQUARE FOOTAGE IS MEASURED TO THE OUTSIDE FACE OF WALLS. STAIRS ARE COUNTED ONCE IN CALCULATIONS, OPEN TO BELOW SPACES AND GARAGES ARE NOT INCLUDED IN CALCULATIONS.

**FLOOR PLAN KEY NOTES**

- P-1 OCCUPANCY SEPARATION. APPLY 1" LAYER OF 1/2" G.I.B. TO GARAGE SIDE OF RESIDENCE, ATTIC SPACES, AND TO ALL BEAMS AND POSTS SUPPORTING A FLOOR-CEILING ASSEMBLY. APPLY 1" LAYER OF 1/2" G.I.B. TO GARAGE CEILING WHEN UNDER HABITABLE ROOF. DUCTS THROUGH WALL OR CEILING COMMON TO HOUSE SHALL HAVE MINIMUM 26 GAUGE STEEL. SEE DIV. 05020.A SHEET A-1.
- P-2 3/4" MIN. SOLID CLOSING SOLID WOOD CORE HONEY-COMB CORE STEEL OR 20-MINUTE FIRE RATED DOOR. SEE DIV. 05020.B SHEET A-1.
- P-3 STAIR ASSEMBLY NOTES: PER IRC SECTION R315. A. HEADROOM MIN. 6'-8" WITH MIN. 3'-0". B. TREADS 10" MIN. DEPTH AND MIN. WIDTH OF 36". TREAD NOSING TO BE MINIMUM 3/4" AND A MAXIMUM OF 1 1/4" ON STAIRS WITH SOLID RISERS. C. HANDRAIL MIN. 34" TO MAX. 38" ABOVE TREAD NOSING. HANDRAIL TYPE 1 CIRCULAR TO HAVE 1 1/4" MIN. TO 2" MAX. CROSS SECTION DIMENSION AND 1 1/2" MIN. CLEAR FROM WALL. RETURN RAIL ENDS. HANDRAILS SHALL BE STRONG ENOUGH TO RESIST A 200 POUND POINT LOAD IN ANY DIRECTION PER IRC TABLE R302.1. D. INSTALL FIRE BLOCKING BETWEEN STRINGERS AT THE TOP AND BOTTOM OF EACH RUN PER IRC SECTION R302.1. E. COVER USABLE SPACE UNDER STAIR W/ 1/2" G.I.B. PER IRC SECTION R302.1. F. INTERMEDIATE BALUSTERS SHALL BE SPACED W/ LESS THAN 4" BETWEEN BALUSTERS. G. PROVIDE STAIRWAY ILLUMINATION PER IRC SECTION R302.1. SEE DIV. 05021 SHEET A-1.
- P-4 SAFETY GLAZING PER IRC SECTION R308. A. WINDOWS WITHIN 18" OF FLOOR. B. WINDOWS WITHIN 24" ARC OF DOORS. C. WINDOWS AT TUBS AND SHOWERS. D. GLAZING IN DOORS. E. LESS THAN 60" HORIZ. FROM THE BOT. STAIR TREAD NOSING, 4" BOT. EDGE OF GLAZING IS LESS THAN 36" ABV. LAND/WALKING SURFACE. SEE DIV. 05800 SHEET A-1.
- P-5 EGRESS WINDOW PER IRC SECTION R310. SEE DIV. 05800 SHEET A-1.
- P-6 COVER WALLS ADJACENT TO TUBS AND SHOWERS WITH NON-ABSORBENT MATERIAL TO 12" ABOVE DRAIN INLETS. PER IRC SECTION 307.2. SEE DIV. 05800 SHEET A-1.
- P-9 1 1/2" MAX. RISER WITH 10" MIN. RUN IF MORE THAN (3) RISERS. HANDRAIL REQUIRED PER IRC SECTION R311.8. SEE DIV. 05021 SHEET A-1.
- P-10 8"x24" CRUISE SPACE ACCESS. INSULATE AND WEATHER STRIP. SEE DIV. 05021 SHEET A-1.
- P-11 22"x30" ATTIC SPACE ACCESS W/ 30" HEAD CLEARANCE. INSULATE AND WEATHER STRIP. SEE DIV. 05021 SHEET A-1.
- P-12 FLOOR MATERIAL BREAK LINE.
- P-13 WALL LINE ABOVE.
- P-14 WALL LINE BELOW.
- P-16 SEE SITE PLAN FOR EXTENT OF WALKS & DRIVEWAYS.
- P-18 36" GUARDRAIL PER IRC SECTION R312.4 TABLE R302.5. CONTRACTOR TO VERIFY TO INSPECTOR THAT ALL GUARDS & RAILINGS ARE CAPABLE OF RESISTING 200LB LOAD ON TOP RAIL ACTING IN ANY DIRECTION.
- P-20 PLANT SHELF.
- P-21 UPPER AND LOWER LINEN CABINETS.
- P-22 SOFFIT AREA.
- P-24 2x6 STUDS W/ R-21 INSULATION MIN.

**SYMBOLS AND LEGEND**

- FAN - DIRECT VENT TO OUTSIDE. - BATHROOMS/LAUNDRY 90 CFM MIN. - KITCHEN EXHAUST HOOD TO BE MIN. OF 100CFM. IF EXHAUST HOOD EXCEEDS 400 CFM MAKE UP AIR MUST BE PROVIDED PER SECTION M503.6.
- WHOLE-HOUSE FAN WITH HIGH EFFICIENCY FAN (5) (MAXIMUM 0.39 WATTS/CFM) NOT INTERLOCKED WITH THE FURNACE FAN. VENTILATION SYSTEMS USING A FURNACE INCLUDING AN EMC MOTOR ARE ALLOWED, PROVIDED THAT THEY ARE CONTROLLED TO OPERATE AT LOW SPEED IN VENTILATION ONLY MODE.
- THERMOSTAT # 50" ABOVE FLOOR.
- 10V SMOKE ALARM PER IRC R314 WITH BATTERY BACKUP INTERCONNECTED. USE A COMBINATION SMOKE/CARBON MONOXIDE ALARM WHEN NOTED PER SECTION M503.6.
- MECHANICAL, PLUMBING, AND ELECTRICAL SYSTEM FOR UNITS. PER DIV. 15.16 SEE SHEET A-1.
- AIR HANDLER.
- HEAT PUMP.
- WH.
- A. PROVIDE 6" DIAMETER FRESH AIR INTAKE FROM OUTSIDE TO RETURN AIR FLENUM AT AIR HANDLER WITH MOTORIZED FLOW DAMPERS.
- B. PROVIDE THERMAL EXPANSION TANK AT WATER HEATER.
- C. STRAP WATER HEATER TO FRAMING TOP AND BOTTOM.
- D. PROVIDE PRESSURE RELIEF LINE PLUMBED TO OUTSIDE.

**MAIN FLOOR PLAN**

SCALE 1/4"=1'-0"

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 Bellevue, WA 98007  
 1-800-888-4517  
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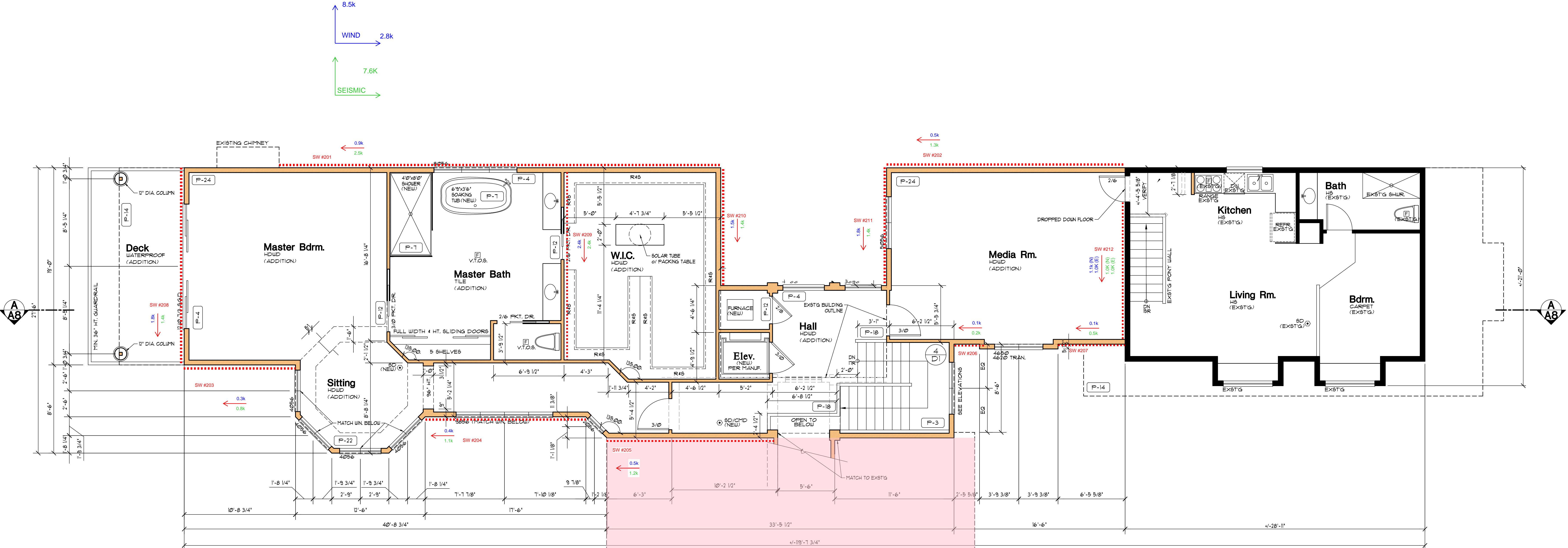
Lee Remodel  
 8448 N Mercer Way,  
 Mercer Island, WA  
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DATE: 7/2024  
 AG  
 PROCESS SET

TITLE

JOB NO.: 23050.05  
 STARTING NO.: 23050.03

SHEET  
**A3**



SYMBOLS AND LEGEND	
	FAN - DIRECT VENT TO OUTSIDE - BATHROOM/LAUNDRY 50 CFM MIN. - KITCHEN EXHAUST HOOD TO BE MIN. OF 100CFM. IF EXHAUST HOOD EXCEEDS 400 CFM MAKE UP AIR MUST BE PROVIDED PER SECTION M505.6.
	THERMOSTAT @ 50" ABOVE FLOOR
	110V SMOKE ALARM PER I.R.C. R314 WITH BATTERY BACKUP INTERCONNECTED. USE A COMBINATION SMOKE CARBON MONOXIDE ALARM WHEN NOTED PER SECTION M505.6.
	WHOLE-HOUSE FAN WITH HIGH EFFICIENCY FAN(S) (MAXIMUM 0.35 WATTS/CFM) NOT INTERLOCKED WITH THE FURNACE FAN. VENTILATION SYSTEMS USING A FURNACE INCLUDING AN EMC MOTOR ARE ALLOWED PROVIDED THAT THEY ARE CONTROLLED TO OPERATE AT LOW SPEED IN VENTILATION ONLY MODE.
	AIR HANDLER
	HEAT PUMP
	WH
A	PROVIDE 6" DIAMETER FRESH AIR INTAKE FROM OUTSIDE TO RETURN AIR FLEWHY AT AIR HANDLER WITH MOTORIZED FLOW DAMPERS.
B	PROVIDE THERMAL EXPANSION TANK AT WATER HEATER
C	STRAP WATER HEATER TO FRAMING TOP AND BOTTOM
D	PROVIDE PRESSURE RELIEF LINE PLUMBED TO OUTSIDE

EXISTING LATERAL ADEQUATE AND NOT TO BE MODIFIED U.N.O.

**GENERAL PLAN NOTES**

- SEE SHEET A-1 FOR ALL GENERAL NOTES AND REQUIREMENTS
- ENERGY AND AIR QUALITY INFORMATION SEE DIV. 11 SHEET A-1
- SEE BUILDING ELEVATION FOR WINDOW OPERATION SEE DIV. 8 SHEET A-1
- SEE TYP. MATERIALS LIST ON SECTION SHEET
- SEE SHEET A-1 FOR ALL NOTES AND REQUIREMENTS CONCERNING MECHANICAL, PLUMBING, AND ELECTRICAL.

**FLOOR PLAN KEY NOTES**

- F-1** OCCUPANCY SEPARATION: AFFLY (1) LAYER OF 1/2" GIBB TO GARAGE SIDE OF RESIDENCE. ATTIC SPACES AND TO ALL BEAMS AND POSTS SUPPORTING A FLOOR-CEILING ASSEMBLY. AFFLY (1) LAYER OF 1/2" TYPE 'X' GIBB TO GARAGE CEILING WHEN UNDER HABITABLE ROOMS. DUCTS THROUGH WALL OR CEILING OPTION TO HOUSE SHALL HAVE MINIMUM 26 GAUGE STEEL. SEE DIV. 0502.6.A. SHEET A-1.
- F-2** 1/4" MIN. SELF CLOSING SOLID WOOD CORE HONEY-COMB CORE STEEL OR 20-MINUTE FIRE RATED DOOR. SEE DIV. 0502.6.B. SHEET A-1.
- F-3** STAIR ASSEMBLY NOTES: PER I.R.C. SECTION R315  
A. HEADROOM MIN. 6'-8" WITHIN 3'-0".  
B. TREADS 10" MIN. DEPTH AND MIN. WIDTH OF 36" ABOVE HANDRAIL HEIGHT. RISERS 7 1/8" MAX. HT. TREAD NOSING TO BE MINIMUM 3/4" AND A MAXIMUM OF 1/4" ON STAIRS WITH SOLID RISERS.  
C. HANDRAIL MIN. 34" TO MAX. 38" ABOVE TREAD NOSING. HANDRAIL TYPE 1 CIRCULAR TO HAVE 1 1/4" MIN. TO 2" MAX. CROSS SECTION DIMENSION AND 1/2" MIN. CLEAR FROM WALL RETURN RAIL ENDS. HANDRAILS SHALL BE STRONG ENOUGH TO RESIST A 200 POUND POINT LOAD IN ANY DIRECTION PER I.R.C. TABLE R301.5  
D. INSTALL FIRE BLOCKING BETWEEN STRINGERS AT THE TOP AND BOTTOM OF EACH RUN PER I.R.C. SECTION R302.1.  
E. COVER USABLE SPACE UNDER STAIR W/ 1/2" GIBB PER I.R.C. SECTION R302.1.  
F. INTERMEDIATE BALUSTERS SHALL BE SPACED W/ LESS THAN 4" BETWEEN BALUSTERS.  
G. PROVIDE STAIRWAY ILLUMINATION PER I.R.C. SECTION R302.7.  
SEE DIV. 0902.1 SHEET A-1.
- F-4** SAFETY GLAZING PER I.R.C. SECTION R308  
A. WINDOWS WITHIN 18" OF FLOOR  
B. WINDOWS WITHIN 24" ARC OF DOORS  
C. WINDOWS AT TUBS AND SHOWERS  
D. GLAZING IN DOORS  
E. LESS THAN 60" HORIZ. FROM THE BOT. STAIR TREAD NOSING. 4 BOT. EDGE OF GLAZING IS LESS THAN 36" ABV. LANDING/WALKING SURFACE. SEE DIV. 0502.0 SHEET A-1.
- F-5** EGRESS WINDOW PER I.R.C. SECTION R310 SEE DIV. 0502.0 SHEET A-1
- F-7** COVER WALLS ADJACENT TO TUBS AND SHOWERS WITH NON-ABSORBENT MATERIAL TO 1" ABOVE DRAIN INLETS PER I.R.C. SECTION 307.2. SEE DIV. 0502.0 SHEET A-1
- F-9** 1/4" MAX. RISER WITH 10" MIN. RUN IF MORE THAN (3) RISERS. HANDRAIL REQUIRED PER I.R.C. SECTION R311.8. SEE DIV. 0502.1 SHEET A-1
- F-10** 18"x24" CRAWL SPACE ACCESS. INSULATE AND WEATHER STRIP. SEE DIV. 0502.1 SHEET A-1
- F-11** 22"x30" ATTIC SPACE ACCESS W/ 30" HEAD CLEARANCE. INSULATE AND WEATHER STRIP. SEE DIV. 0502.2 SHEET A-1
- F-12** FLOOR MATERIAL BREAK LINE
- F-13** WALL LINE ABOVE
- F-14** WALL LINE BELOW
- F-16** SEE SITE PLAN FOR EXTENT OF WALKS & DRIVEWAYS
- F-18** 36" GUARDRAIL PER I.R.C. SECTION R312 & TABLE R301.5 CONTRACTOR TO VERIFY TO INSPECTOR THAT ALL GUARDS & RAILINGS ARE CAPABLE OF RESISTING 200LB LOAD ON TOP RAIL ACTING IN ANY DIRECTION.
- F-20** PLANT SHELF
- F-21** UPPER AND LOWER LINEN CABINETS
- F-22** SOFFIT AREA
- F-24** 2x6 STUDS W/ R-21 INSULATION MIN.

**UPPER FLOOR PLAN**

SCALE 1/4"=1'-0"

**Lee Remodel**  
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Date: By: Description  
7/26/21 JAS PROGRESS SET

TITLE

JOB NO.: 230503  
STARTING NO.: 230503

SHEET

A4

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**SEISMIC CALCULATION - ASCE 7-16**

**Seismic Design Category:**

User Inputs:

Site Class	D
Spectral Response Accel. 0.2 sec, <b>S<sub>s</sub></b>	1.390
Spectral Response Accel. 1.0 sec, <b>S<sub>1</sub></b>	0.484
Occupancy Category	II

Variables:

Site coefficient, F <sub>a</sub>	1.20
Site coefficient, F <sub>v</sub>	1.82

Calculated Values:

Maximum spectral response acceleration, <b>S<sub>ms</sub></b>	1.668
Maximum spectral response acceleration, <b>S<sub>m1</sub></b>	0.879
Design spectral response acceleration, <b>S<sub>ds</sub></b>	1.112
Design spectral response acceleration, <b>S<sub>d1</sub></b>	0.586
Seismic Design Category (short term)	D
Seismic Design Category (1.0 second term)	D

**Building period Determination:**

User Inputs:

Building period coefficient, <b>C<sub>t</sub></b>	0.020
Long-Period Trans Period, <b>T<sub>L</sub></b> (sec)	6
Ht. abv base to highest level, h <sub>n</sub>	20

Calculated Values:

Approximate Fundamental Period, T <sub>a</sub>	0.187
T <sub>0</sub>	0.105
T <sub>s</sub>	0.527
Spectral Response Acc., S <sub>a</sub> (g)	1.112

**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 <sup>2</sup> )	Dead Load (psf)	DL of ext wall trib. to level (kips)	Total Level DL
1	10.6	2000	15	18.8	49 k
2	9.1	2360	17	9.0	49 k
3	0.0	0	0	0.0	0 k
4	0.0	0	0	0.0	0 k
5	0.0	0	0	0.0	0 k
6	0.0	0	0	0.0	0 k
7	0.0	0	0	0.0	0 k
8	0.0	0	0	0.0	0 k
9	0.0	0	0	0.0	0 k
10	0.0	0	0	0.0	0 k
11	0.0	0	0	0.0	0 k
12	0.0	0	0	0.0	0 k
13	0.0	0	0	0.0	0 k
14	0.0	0	0	0.0	0 k
15	0.0	0	0	0.0	0 k
16	0.0	0	0	0.0	0 k
17	0.0	0	0	0.0	0 k
18	0.0	0	0	0.0	0 k
19	0.0	0	0	0.0	0 k
20	0.0	0	0	0.0	0 k

**Total Dead Load Of Structure** = 98 Kips

Seismic Response Coefficient:

	Transverse	Longitudinal
Response modification factor, <b>R</b>	6.5	6.5
Occupancy Importance Factor, <b>I<sub>e</sub></b>	1.00	1.00
Seismic Response Coefficient, <b>C<sub>s</sub></b>	0.171	0.171

Base Shears:

Ultimate Loads		Allowable Loads	
Transverse	Longitudinal	Transverse	Longitudinal
17 k	17 k	11.7 k	11.7 k

Story Shear Calculation:

Level	Vert. Dist. Factor, <b>C<sub>vk</sub></b>	Ultimate Loads		Allowable Loads			
		Transverse Story Shear, F <sub>x</sub>	Longitudinal Story Shear, F <sub>y</sub>	Transverse Story Shear, F <sub>x</sub>	Σ Story Shear	Longitudinal Story Shear, F <sub>y</sub>	Σ Story Shear
1	0.348	5.8 k	5.8 k	4.1 k	11.7 k	4.1 k	11.7 k
2	0.652	10.9 k	10.9 k	7.6 k	7.6 k	7.6 k	7.6 k
3	0.000	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
4	0.000	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
5	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
6	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
7	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
8	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
9	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
10	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
11	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
12	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
13	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
14	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
15	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
16	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
17	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
18	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
19	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
20	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k



Shearwall Design Summary

M+K Project #: 203-24016

Engineer: MPM

Shearwall 201: 2nd - Mstr Bdrm Side Ext

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
 Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
 DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

Shearwall 202: 2nd - Media Room Side Ext

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
 Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
 DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**



**Shearwall 203:** 2nd - Mstr Bdrm Side Ext

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 204:** 2nd - Hallway Side Ext

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**



**Shearwall 205:** 2nd - Hallway Side Ext

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 206:** 2nd - Media Room Side Ext

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

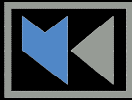
P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**



*Shearwall Design Summary*

M+K Project #: 203-24016  
Engineer: MPM

**Shearwall 207:** 2nd - Media Room Side Ext

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 208:** 2nd - Mstr Bdrm Side Ext

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**



*Shearwall Design Summary*

M+K Project #: 203-24016  
Engineer: MPM

**Shearwall 209:** 2nd - W.I.C. Int Wall

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 210:** 2nd - W.I.C. Ext Wall

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**



**Shearwall 211:** 2nd - Media Room Side Ext

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 212:** 2nd - Media Room Int @ Garage

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**



*Shearwall Design Summary*

M+K Project #: 203-24016  
Engineer: MPM

**Shearwall I** : Basement -

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs **###** Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

#N/A  
#N/A  
#VALUE!

**Overturning Evaluation:**

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

No Hold down Required

**Shearwall 101:** 1st - Kitchen Side Wall

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

**Overturning Evaluation:**

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

No Hold down Required



*Shearwall Design Summary*

M+K Project #: 203-24016  
Engineer: MPM

**Shearwall I** : Basement -

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs Allowable Shearwall Capacity  lbs  
###

**Shearwall Assembly Specification**

#N/A  
#N/A  
#VALUE!

**Overturning Evaluation:**

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

No Hold down Required

**Shearwall 103:** 1st - Guest Room Side Wall

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs Allowable Shearwall Capacity  lbs  
<

**Shearwall Assembly Specification**

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
ADEQUATE

**Overturning Evaluation:**

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

No Hold down Required



*Shearwall Design Summary*

M+K Project #: 203-24016  
Engineer: MPM

**Shearwall I** : Basement -

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs Allowable Shearwall Capacity  lbs  
###

**Shearwall Assembly Specification**

#N/A  
#N/A  
#VALUE!

**Overturning Evaluation:**

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

No Hold down Required

**Shearwall 105:** 1st - Kitchen Wall @ Patio

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs Allowable Shearwall Capacity  lbs  
<

**Shearwall Assembly Specification**

P2 - 1-side 7/16" OSB  
fastened w/ 8d nails at 4"o.c. panel edges & 12"o.c. panel field - edges blocked  
ADEQUATE

**Overturning Evaluation:**

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

HD2A



*Shearwall Design Summary*

M+K Project #: 203-24016  
Engineer: MPM

**Shearwall 106:** 1st - Existing Wall @ Dining Room

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**SIMPSON MSTC40 STRAP TIE (12" END LENGTH)**

**Shearwall :** Basement -

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs **####** Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

#N/A  
#N/A  
**#VALUE!**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**



*Shearwall Design Summary*

M+K Project #: 203-24016  
Engineer: MPM

**Shearwall 108:** 1st - Hallway Side Ext

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

P2 - 1-side 7/16" OSB  
fastened w/ 8d nails at 4"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

**Overturning Evaluation:**

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**HTT5**

**Shearwall :** Basement -

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs **####** Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

**#N/A**  
**#N/A**  
**#VALUE!**

**Overturning Evaluation:**

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**No Hold down Required**



**Shearwall 109:** 1st - Family Room Ext Wall I

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

P2-BS - 2-sides 7/16" OSB  
fastened w/ 8d nails at 4"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

**Overturning Evaluation:**

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

HTT5

**Shearwall 110:** 1st - Family Room Int

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

**Overturning Evaluation:**

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

HD5A



**Shearwall 111:** 1st - Kitchen Int Wall

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

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  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**SIMPSON MSTC40 STRAP TIE (12" END LENGTH)**

**Shearwall 112:** 1st - Courtyard Ext wall

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

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  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**HTT5**



*Shearwall Design Summary*

M+K Project #: 203-24016  
Engineer: MPM

**Shearwall 113:** 1st - Courtyard Ext wall

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P2 - 1-side 7/16" OSB  
fastened w/ 8d nails at 4"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**HD2A**

**Shearwall 114:** 1st - Courtyard Ext wall

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P2 - 1-side 7/16" OSB  
fastened w/ 8d nails at 4"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**HTT5**



*Shearwall Design Summary*

M+K Project #: 203-24016  
Engineer: MPM

**Shearwall 115:** 1st - (E) Garage Shear Wall

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

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  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 116:** 1st - (E) Garage Shear Wall

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

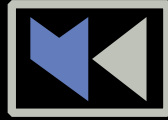
P3 - 1-side 7/16" OSB  
fastened w/ 8d nails at 3"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**SIMPSON HTT4 HOLDOWN**



**MULHERN+KULP**  
RESIDENTIAL STRUCTURAL ENGINEERING

# Shear Wall Calculations

Architectural Innovations

## Lee Remodel

*Mercer Island, WA*

*Parameters:*

*Single Family Home*

*Design Wind Speed: 100 MPH*

*wind Exposure Category: B/C*

*Seismic Design Category: D*

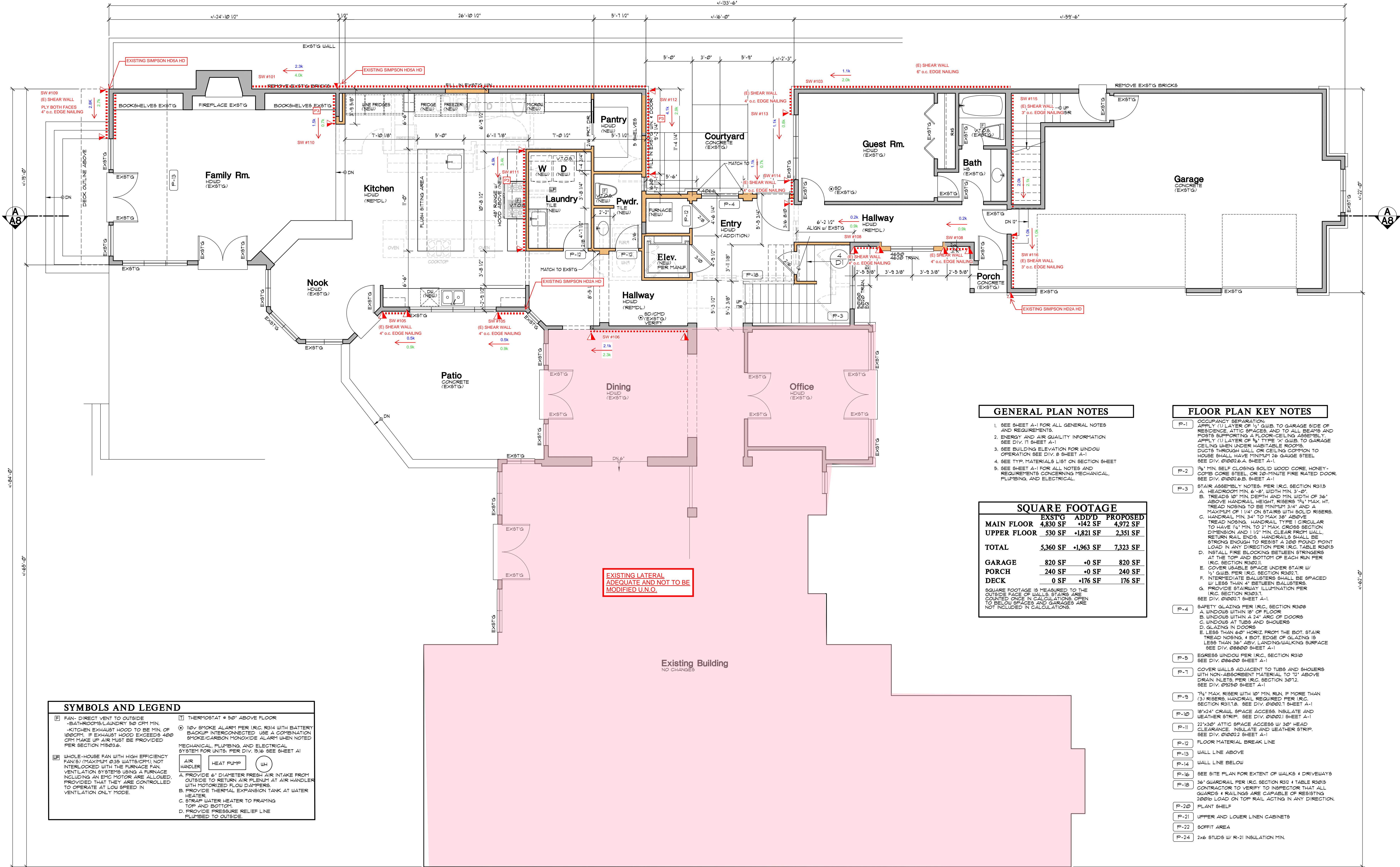
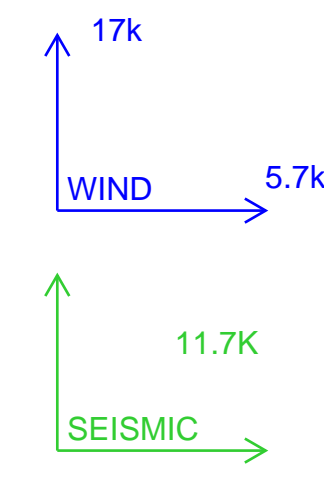
*Code & Design Standard: 2018 IBC Ch. 1609, ASCE 7-16 Ch. 26-30*

MULHERN & KULP STRUCTURAL ENGINEERING, INC.

0.0

Matthew Mills, Staff Engineer

Model No.	Allowable Tension Loads DFSP (133/165)					Allowable Tension Loads SPF/HF (133/165)					Holdover Deflection at Highest Allowable Design Load	Holdover Deflection at Highest Allowable Design Load	Code Ref.
	1 1/2"	2"	3"	4"	5"	1 1/2"	2"	3"	4"	5"			
H24	155	205	255	275	275	130	170	210	215	215	0.08	0.07	
H24	187	245	305	315	315	150	195	240	245	245	0.07	0.11	
H24	227	295	365	375	375	170	220	270	275	275	0.06	0.12	40, 105
H24	267	345	425	435	435	190	245	295	300	300	0.05	0.13	102
H24	307	395	485	495	495	210	270	320	325	325	0.04	0.14	
H24	347	445	545	555	555	230	295	350	355	355	0.03	0.15	
H24	387	495	595	605	605	250	315	370	375	375	0.02	0.16	
H24	427	545	645	655	655	270	335	390	395	395	0.01	0.17	
H24	467	595	695	705	705	290	355	410	415	415	0.01	0.18	
H24	507	645	745	755	755	310	375	430	435	435	0.01	0.19	
H24	547	695	795	805	805	330	395	450	455	455	0.01	0.20	
H24	587	745	845	855	855	350	415	470	475	475	0.01	0.21	
H24	627	795	895	905	905	370	435	490	495	495	0.01	0.22	
H24	667	845	945	955	955	390	455	510	515	515	0.01	0.23	
H24	707	895	995	1005	1005	410	475	530	535	535	0.01	0.24	
H24	747	945	1045	1055	1055	430	495	550	555	555	0.01	0.25	
H24	787	995	1095	1105	1105	450	515	570	575	575	0.01	0.26	
H24	827	1045	1145	1155	1155	470	535	590	595	595	0.01	0.27	
H24	867	1095	1195	1205	1205	490	555	610	615	615	0.01	0.28	
H24	907	1145	1245	1255	1255	510	575	630	635	635	0.01	0.29	
H24	947	1195	1295	1305	1305	530	595	650	655	655	0.01	0.30	



EXISTING LATERAL ADEQUATE AND NOT TO BE MODIFIED U.N.O.

**GENERAL PLAN NOTES**

- SEE SHEET A-1 FOR ALL GENERAL NOTES AND REQUIREMENTS.
- ENERGY AND AIR QUALITY INFORMATION SEE DIV. 11 SHEET A-1.
- SEE BUILDING ELEVATION FOR WINDOW OPERATION SEE DIV. 8 SHEET A-1.
- SEE TYP. MATERIALS LIST ON SECTION SHEET.
- SEE SHEET A-1 FOR ALL NOTES AND REQUIREMENTS CONCERNING MECHANICAL, PLUMBING, AND ELECTRICAL.

**SQUARE FOOTAGE**

	EXIST'G	ADD'D	PROPOSED
MAIN FLOOR	4,830 SF	+142 SF	4,972 SF
UPPER FLOOR	530 SF	+1,821 SF	2,351 SF
<b>TOTAL</b>	<b>5,360 SF</b>	<b>+1,963 SF</b>	<b>7,323 SF</b>
<b>GARAGE</b>	<b>820 SF</b>	<b>+0 SF</b>	<b>820 SF</b>
<b>PORCH</b>	<b>240 SF</b>	<b>+0 SF</b>	<b>240 SF</b>
<b>DECK</b>	<b>0 SF</b>	<b>+176 SF</b>	<b>176 SF</b>

SQUARE FOOTAGE IS MEASURED TO THE OUTSIDE FACE OF WALLS. STAIRS ARE COUNTED ONCE IN CALCULATIONS, OPEN TO BELOW SPACES AND GARAGES ARE NOT INCLUDED IN CALCULATIONS.

**FLOOR PLAN KEY NOTES**

- P-1 OCCUPANCY SEPARATION. APPLY 1" LAYER OF 1/2" GIBB TO GARAGE SIDE OF RESIDENCE, ATTIC SPACES, AND TO ALL BEAMS AND POSTS SUPPORTING A FLOOR-CEILING ASSEMBLY. APPLY 1" LAYER OF 1/2" GIBB TO GARAGE CEILING WHEN UNDER HABITABLE ROOF. DUCTS THROUGH WALL OR CEILING COMMON TO HOUSE SHALL HAVE MINIMUM 26 GAUGE STEEL. SEE DIV. 05020.A SHEET A-1.
- P-2 3/4" MIN. S&P CLOSING SOLID WOOD CORE HONEY-COMB CORE STEEL OR 20-MINUTE FIRE RATED DOOR. SEE DIV. 05020.B SHEET A-1.
- P-3 STAIR ASSEMBLY NOTES: PER IRC SECTION R315. A. HEADROOM MIN. 6'-8" WITH MIN. 3'-0". B. TREADS 10" MIN. DEPTH AND MIN. WIDTH OF 36". TREAD NOSING TO BE MINIMUM 3/4" AND A MAXIMUM OF 1 1/4" ON STAIRS WITH SOLID RISERS. C. HANDRAIL MIN. 34" TO MAX 38" ABOVE TREAD NOSING. HANDRAIL TYPE 1 CIRCULAR TO HAVE 1 1/4" MIN TO 2" MAX CROSS SECTION DIMENSION AND 1 1/2" MIN. CLEAR FROM WALL. RETURN RAIL ENDS. HANDRAILS SHALL BE STRONG ENOUGH TO RESIST A 200 POUND POINT LOAD IN ANY DIRECTION PER IRC TABLE R302.1. D. INSTALL FIRE BLOCKING BETWEEN STRINGERS AT THE TOP AND BOTTOM OF EACH RUN PER IRC SECTION R302.1. E. COVER USABLE SPACE UNDER STAIR W/ 1/2" GIBB. PER IRC SECTION R302.1. F. INTERMEDIATE BALUSTERS SHALL BE SPACED W/ LESS THAN 4" BETWEEN BALUSTERS. G. PROVIDE STAIRWAY ILLUMINATION PER IRC SECTION R302.1. SEE DIV. 09021 SHEET A-1.
- P-4 SAFETY GLAZING PER IRC SECTION R308. A. WINDOWS WITHIN 18" OF FLOOR. B. WINDOWS WITHIN 24" ARC OF DOORS. C. WINDOWS AT TUBS AND SHOWERS. D. GLAZING IN DOORS. E. LESS THAN 60" HORIZ. FROM THE BOT. STAIR TREAD NOSING, 4" BOT. EDGE OF GLAZING IS LESS THAN 36" ABV. LAND/WALKING SURFACE. SEE DIV. 08800 SHEET A-1.
- P-5 EGRESS WINDOW PER IRC SECTION R310. SEE DIV. 09600 SHEET A-1.
- P-6 COVER WALLS ADJACENT TO TUBS AND SHOWERS WITH NON-ABSORBENT MATERIAL TO 12" ABOVE DRAIN INLETS. PER IRC SECTION 307.2. SEE DIV. 09030 SHEET A-1.
- P-9 1 1/2" MAX. RISER WITH 10" MIN. RUN IF MORE THAN (3) RISERS. HANDRAIL REQUIRED PER IRC SECTION R311.8. SEE DIV. 09021 SHEET A-1.
- P-10 8"x24" CRUISE SPACE ACCESS. INSULATE AND WEATHER STRIP. SEE DIV. 05020 SHEET A-1.
- P-11 22"x30" ATTIC SPACE ACCESS W/ 30" HEAD CLEARANCE. INSULATE AND WEATHER STRIP. SEE DIV. 05020 SHEET A-1.
- P-12 FLOOR MATERIAL BREAK LINE.
- P-13 WALL LINE ABOVE.
- P-14 WALL LINE BELOW.
- P-16 SEE SITE PLAN FOR EXTENT OF WALKS & DRIVEWAYS.
- P-18 36" GUARDRAIL PER IRC SECTION R312 & TABLE R302.5. CONTRACTOR TO VERIFY TO INSPECTOR THAT ALL GUARDS & RAILINGS ARE CAPABLE OF RESISTING 200LB LOAD ON TOP RAIL ACTING IN ANY DIRECTION.
- P-20 PLANT SHELF.
- P-21 UPPER AND LOWER LINEN CABINETS.
- P-22 SOFFIT AREA.
- P-24 2x6 STUDS W/ R-21 INSULATION MIN.

**SYMBOLS AND LEGEND**

- FAN - DIRECT VENT TO OUTSIDE. - BATHROOMS/LAUNDRY 90 CFM MIN. - KITCHEN EXHAUST HOOD TO BE MIN. OF 100CFM. IF EXHAUST HOOD EXCEEDS 400 CFM MAKE UP AIR MUST BE PROVIDED PER SECTION M503.6.
- WHOLE-HOUSE FAN WITH HIGH EFFICIENCY FAN (5) (MAXIMUM 0.39 WATTS/CFM) NOT INTERLOCKED WITH THE FURNACE FAN. VENTILATION SYSTEMS USING A FURNACE INCLUDING AN EMC MOTOR ARE ALLOWED, PROVIDED THAT THEY ARE CONTROLLED TO OPERATE AT LOW SPEED IN VENTILATION ONLY MODE.
- THERMOSTAT # 50" ABOVE FLOOR.
- 10V SMOKE ALARM PER IRC R314 WITH BATTERY BACKUP INTERCONNECTED. USE A COMBINATION SMOKE/CARBON MONOXIDE ALARM WHEN NOTED PER SECTION M503.6.
- MECHANICAL, PLUMBING, AND ELECTRICAL SYSTEM FOR UNITS. PER DIV. 15.16 SEE SHEET A-1.
- AIR HANDLER.
- HEAT PUMP.
- WH.
- A. PROVIDE 6" DIAMETER FRESH AIR INTAKE FROM OUTSIDE TO RETURN AIR FLEWUP AT AIR HANDLER WITH MOTORIZED FLOW DAMPERS.
- B. PROVIDE THERMAL EXPANSION TANK AT WATER HEATER.
- C. STRAP WATER HEATER TO FRAMING TOP AND BOTTOM.
- D. PROVIDE PRESSURE RELIEF LINE PLUMBED TO OUTSIDE.

**MAIN FLOOR PLAN**

SCALE 1/4"=1'-0"

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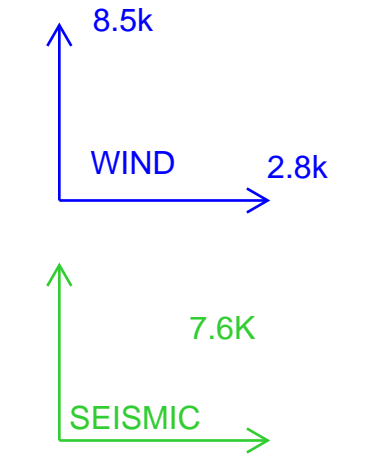
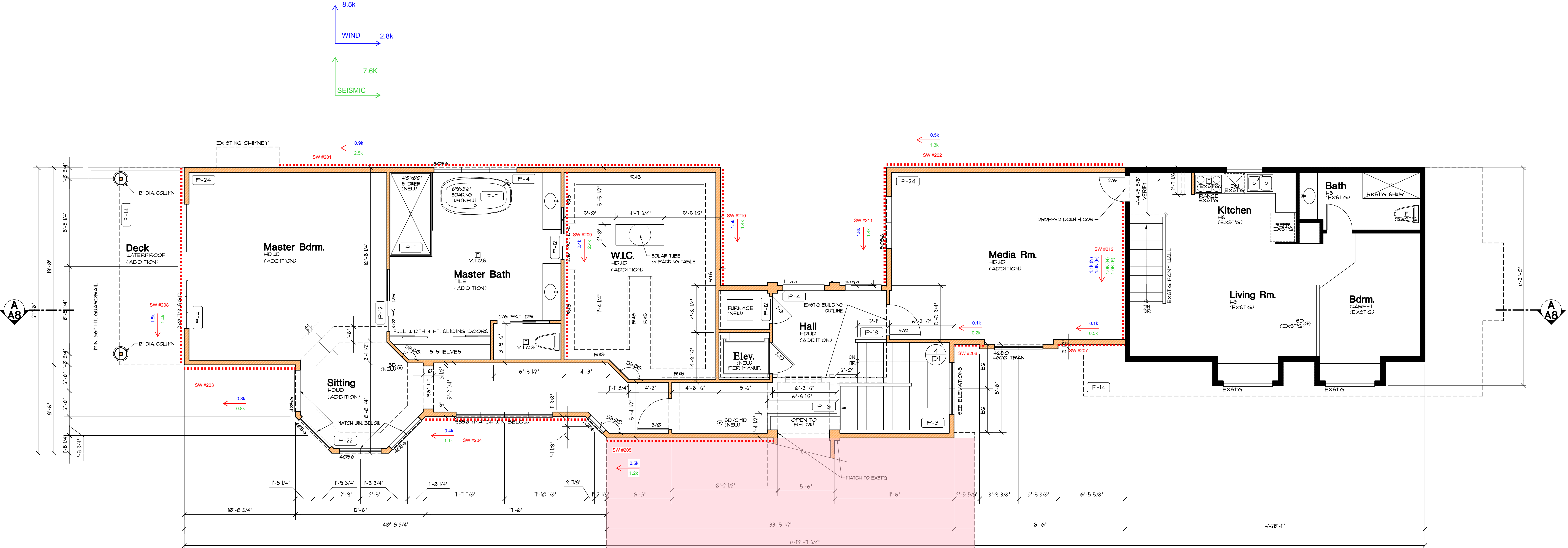
Lee Remodel  
8448 N Mercer Way,  
Mercer Island, WA  
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DATE: 7/2024  
AG  
PROCESS SET

TITLE

JOB NO.: 23050.05  
STARTING NO.: 23050.03

SHEET  
**A3**



SYMBOLS AND LEGEND	
FAN - DIRECT VENT TO OUTSIDE - BATHROOM/LAUNDRY 50 CFM MIN. - KITCHEN EXHAUST HOOD TO BE MIN. OF 100CFM. IF EXHAUST HOOD EXCEEDS 400 CFM MAKE UP AIR MUST BE PROVIDED PER SECTION M505.6.	THERMOSTAT @ 50" ABOVE FLOOR
WHOLE-HOUSE FAN WITH HIGH EFFICIENCY FAN(S) (MAXIMUM 0.35 WATTS/CFM) NOT INTERLOCKED WITH THE FURNACE FAN. VENTILATION SYSTEMS USING A FURNACE INCLUDING AN EMC MOTOR ARE ALLOWED PROVIDED THAT THEY ARE CONTROLLED TO OPERATE AT LOW SPEED IN VENTILATION ONLY MODE.	NOV. SMOKE ALARM PER I.R.C. R314 WITH BATTERY BACKUP INTERCONNECTED. USE A COMBINATION SMOKE CARBON MONOXIDE ALARM WHEN NOTED PER SECTION M505.6.
AIR HANDLER	HEAT PUMP
A. PROVIDE 6" DIAMETER FRESH AIR INTAKE FROM OUTSIDE TO RETURN AIR FLEWHY AT AIR HANDLER WITH MOTORIZED FLOW DAMPERS.	U.H.
B. PROVIDE THERMAL EXPANSION TANK AT WATER HEATER	
C. STRAP WATER HEATER TO FRAMING TOP AND BOTTOM	
D. PROVIDE PRESSURE RELIEF LINE PLUMBED TO OUTSIDE.	

EXISTING LATERAL ADEQUATE AND NOT TO BE MODIFIED U.N.O.

**GENERAL PLAN NOTES**

- SEE SHEET A-1 FOR ALL GENERAL NOTES AND REQUIREMENTS
- ENERGY AND AIR QUALITY INFORMATION SEE DIV. 11 SHEET A-1
- SEE BUILDING ELEVATION FOR WINDOW OPERATION SEE DIV. 8 SHEET A-1
- SEE TYP. MATERIALS LIST ON SECTION SHEET
- SEE SHEET A-1 FOR ALL NOTES AND REQUIREMENTS CONCERNING MECHANICAL, PLUMBING, AND ELECTRICAL.

**FLOOR PLAN KEY NOTES**

- P-1 OCCUPANCY SEPARATION: AFFLY (1) LAYER OF 1/2" GIBB TO GARAGE SIDE OF RESIDENCE. ATTIC SPACES AND TO ALL BEAMS AND POSTS SUPPORTING A FLOOR-CEILING ASSEMBLY. AFFLY (1) LAYER OF 1/2" TYPE 'X' GIBB TO GARAGE CEILING WHEN UNDER HABITABLE ROOMS. DUCTS THROUGH WALL OR CEILING OPTION TO HOUSE SHALL HAVE MINIMUM 26 GAUGE STEEL. SEE DIV. 0502.6.A. SHEET A-1.
- P-2 1/4" MIN. SELF-CLOSING SOLID WOOD CORE, HONEY-COMB CORE STEEL OR 20-MINUTE FIRE RATED DOOR. SEE DIV. 0502.6.B. SHEET A-1.
- P-3 STAIR ASSEMBLY NOTES: PER I.R.C. SECTION R315  
A. HEADROOM MIN. 6'-8" WITHIN 3'-0".  
B. TREADS 10" MIN. DEPTH AND MIN. WIDTH OF 36" ABOVE HANDRAIL HEIGHT. RISERS 7 1/8" MAX. HT. TREAD NOSING TO BE MINIMUM 3/4" AND A MAXIMUM OF 1/4" ON STAIRS WITH SOLID RISERS.  
C. HANDRAIL MIN. 34" TO MAX. 38" ABOVE TREAD NOSING. HANDRAIL TYPE I CIRCULAR TO HAVE 1 1/4" MIN. TO 2" MAX. CROSS SECTION DIMENSION AND 1/2" MIN. CLEAR FROM WALL RETURN RAIL ENDS. HANDRAILS SHALL BE STRONG ENOUGH TO RESIST A 200 POUND POINT LOAD IN ANY DIRECTION PER I.R.C. TABLE R301.5  
D. INSTALL FIRE BLOCKING BETWEEN STRINGERS AT THE TOP AND BOTTOM OF EACH RUN PER I.R.C. SECTION R302.11.  
E. COVER USABLE SPACE UNDER STAIR W/ 1/2" GIBB PER I.R.C. SECTION R302.1.  
F. INTERMEDIATE BALUSTERS SHALL BE SPACED W/ LESS THAN 4" BETWEEN BALUSTERS.  
G. PROVIDE STAIRWAY ILLUMINATION PER I.R.C. SECTION R302.7.  
SEE DIV. 0902.1 SHEET A-1.
- P-4 SAFETY GLAZING PER I.R.C. SECTION R308  
A. WINDOWS WITHIN 18" OF FLOOR  
B. WINDOWS WITHIN 24" ARC OF DOORS  
C. WINDOWS AT TUBS AND SHOWERS  
D. GLAZING IN DOORS  
E. LESS THAN 60" HORIZ. FROM THE BOT. STAIR TREAD NOSING. 4 BOT. EDGE OF GLAZING IS LESS THAN 36" ABOV. LANDING/WALKING SURFACE. SEE DIV. 0502.0 SHEET A-1.
- P-5 EGRESS WINDOW PER I.R.C. SECTION R310 SEE DIV. 0502.0 SHEET A-1
- P-7 COVER WALLS ADJACENT TO TUBS AND SHOWERS WITH NON-ABSORBENT MATERIAL TO 1" ABOVE DRAIN INLETS PER I.R.C. SECTION 307.2. SEE DIV. 0502.0 SHEET A-1
- P-9 1/4" MAX. RISER WITH 10" MIN. RUN IF MORE THAN (3) RISERS. HANDRAIL REQUIRED PER I.R.C. SECTION R311.8. SEE DIV. 0502.1 SHEET A-1
- P-10 18"x24" CRAWL SPACE ACCESS. INSULATE AND WEATHER STRIP. SEE DIV. 0502.1 SHEET A-1
- P-11 22"x30" ATTIC SPACE ACCESS W/ 30" HEAD CLEARANCE. INSULATE AND WEATHER STRIP. SEE DIV. 0502.2 SHEET A-1
- P-12 FLOOR MATERIAL BREAK LINE
- P-13 WALL LINE ABOVE
- P-14 WALL LINE BELOW
- P-16 SEE SITE PLAN FOR EXTENT OF WALKS & DRIVEWAYS
- P-18 36" GUARDRAIL PER I.R.C. SECTION R312 & TABLE R301.5 CONTRACTOR TO VERIFY TO INSPECTOR THAT ALL GUARDS & RAILINGS ARE CAPABLE OF RESISTING 200LB LOAD ON TOP RAIL ACTING IN ANY DIRECTION.
- P-20 PLANT SHELF
- P-21 UPPER AND LOWER LINEN CABINETS
- P-22 SOFFIT AREA
- P-24 2x6 STUDS W/ R-21 INSULATION MIN.

**UPPER FLOOR PLAN**

SCALE 1/4"=1'-0"

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Date: By: Description  
7/26/21 JAS PROGRESS SET

TITLE

JOB NO.: 230503  
STARTING NO.: 230503

SHEET

A4

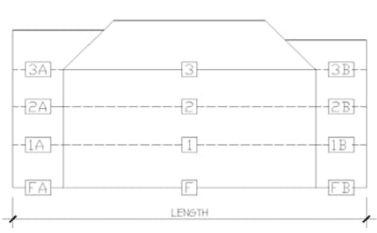
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### Wind Design Summary per ASCE 7-16

<b>Parameters:</b>			<b>Roof Geometry:</b>			<b>Building Geometry:</b>		
Wind Speed	100		Trans. Roof Pitch	10.0	:12	length	97	ft
Exposure Category	C		Long. Roof Pitch	10.0	:12	Width	25	ft
Risk Category	II		Mean Roof Height, H	24.00	ft	Number of stories	2	
Wind Directionality Factor, $K_d$	0.85							
Topographic Factor, $K_{zt}$	1.00							
Gust Factor, G	0.85							
Ground El. Above Sea Level [ft]	0							
Design Type	ASD	0.60						


  

<b>Transverse Direction (Perpendicular to Main Ridge Line)</b>											
<u>Diaphragm Level</u>	<u>Floor-to-Floor Height</u>		<u>Tributary Design Areas:</u>				<u>Tributary Design Loads: (0.6W)</u>				
			<u>Section</u>				<u>Section</u>				
			A	O	B		A	O	B		
2	9.1 ft	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	0.00	0.00	kips
			0.00					0.00			kips
1	10.6 ft	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	0.00	0.00	kips
			0.00					0.00			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	0.00	0.00	kips
			0.00					0.00			kips



<b>Longitudinal Direction (Parallel to Main Ridge Line)</b>											
<u>Diaphragm Level</u>	<u>Floor-to-Floor Height</u>		<u>Tributary Design Areas:</u>				<u>Tributary Design Loads: (0.6W)</u>				
			<u>Section</u>				<u>Section</u>				
			A	O	B		A	O	B		
2	9.1 ft	Roof Surface	0	166	0	sq ft	Story Shear	0.00	2.81	0.00	kips
		Wall surface	0	107	0	sq ft	Total Shear	0.00	2.81	0.00	kips
			0.00					2.81			kips
1	10.6 ft	Roof Surface	0	0	0	sq ft	Story Shear	0.00	2.87	0.00	kips
		Wall surface	0	297	0	sq ft	Total Shear	0.00	5.68	0.00	kips
			0.00					5.68			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	5.68	0.00	kips
			0.00					5.68			kips



### 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, $K_{zt}$	1.00
Gust Factor, $G$	0.85
Ground El. Above Sea Level [ft]	0
Design Type	ASD

 0.60

**Roof Geometry:**

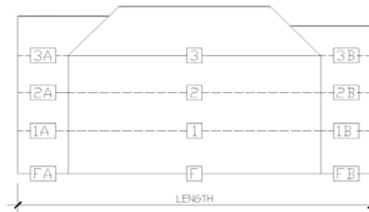
Trans. Roof Pitch	10.0	:12
Long. Roof Pitch	10.0	:12
Mean Roof Height, H	24.00	ft

**Building Geometry:**

length	97	ft
Width	25	ft
Number of stories	2	

#### Transverse Direction (Perpendicular to Main Ridge Line)

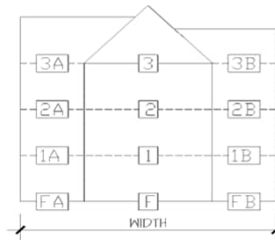
Diaphragm Level	Floor-to-Floor Height	Tributary Design Areas:	Section			sq ft
			A	O	B	
2	9.1 ft	Roof Surface	0	732	0	sq ft
		Wall surface	0	428	0	sq ft
1	10.6 ft	Roof Surface	0	0	0	sq ft
		Wall surface	0	976	0	sq ft
FND		Roof Surface	0	0	0	sq ft
		Wall surface	0	0	0	sq ft


**Tributary Design Loads: (0.6W)**

	Section			kips
	A	O	B	
Story Shear	0.00	8.50	0.00	kips
Total Shear	0.00	8.50	0.00	kips
	8.50			kips
Story Shear	0.00	9.37	0.00	kips
Total Shear	0.00	17.04	0.00	kips
	17.04			kips
Story Shear	0.00	0.00	0.00	kips
Total Shear	0.00	17.04	0.00	kips
	17.04			kips

#### Longitudinal Direction (Parallel to Main Ridge Line)

Diaphragm Level	Floor-to-Floor Height	Tributary Design Areas:	Section			sq ft
			A	O	B	
2	9.1 ft	Roof Surface	0	0	0	sq ft
		Wall surface	0	0	0	sq ft
1	10.6 ft	Roof Surface	0	0	0	sq ft
		Wall surface	0	0	0	sq ft
FND		Roof Surface	0	0	0	sq ft
		Wall surface	0	0	0	sq ft


**Tributary Design Loads: (0.6W)**

	Section			kips
	A	O	B	
Story Shear	0.00	0.00	0.00	kips
Total Shear	0.00	0.00	0.00	kips
	0.00			kips
Story Shear	0.00	0.00	0.00	kips
Total Shear	0.00	0.00	0.00	kips
	0.00			kips
Story Shear	0.00	0.00	0.00	kips
Total Shear	0.00	0.00	0.00	kips
	0.00			kips



Shearwall Design Summary

M+K Project #: 203-24016

Engineer: MPM

Shearwall 201: 2nd - Mstr Bdrm Side Ext

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
 Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
 DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

Shearwall 202: 2nd - Media Room Side Ext

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
 Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
 DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**



**Shearwall 203:** 2nd - Mstr Bdrm Side Ext

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 204:** 2nd - Hallway Side Ext

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**



**Shearwall 205:** 2nd - Hall way Side Ext

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 206:** 2nd - Media Room Side Ext

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

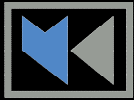
P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**



**Shearwall 207:** 2nd - Media Room Side Ext

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

**Overturning Evaluation:**

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**No Hold down Required**

**Shearwall 208:** 2nd - Mstr Bdrm Side Ext

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

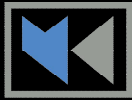
P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

**Overturning Evaluation:**

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**No Hold down Required**



*Shearwall Design Summary*

M+K Project #: 203-24016  
Engineer: MPM

**Shearwall 209:** 2nd - W.I.C. Int Wall

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 210:** 2nd - W.I.C. Ext Wall

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**



*Shearwall Design Summary*

M+K Project #: 203-24016  
Engineer: MPM

**Shearwall 211:** 2nd - Media Room Side Ext

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall 212:** 2nd - Media Room Int @ Garage

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**



*Shearwall Design Summary*

M+K Project #: 203-24016  
Engineer: MPM

**Shearwall I** : Basement -

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs Allowable Shearwall Capacity  lbs  
###

**Shearwall Assembly Specification**

#N/A  
#N/A  
#VALUE!

**Overturning Evaluation:**

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

No Hold down Required

**Shearwall 101:** 1st - Kitchen Side Wall

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs Allowable Shearwall Capacity  lbs  
<

**Shearwall Assembly Specification**

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
ADEQUATE

**Overturning Evaluation:**

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

No Hold down Required



*Shearwall Design Summary*

M+K Project #: 203-24016  
Engineer: MPM

**Shearwall I** : Basement -

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs Allowable Shearwall Capacity  lbs  
###

**Shearwall Assembly Specification**

#N/A  
#N/A  
#VALUE!

**Overturning Evaluation:**

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

No Hold down Required

**Shearwall 103:** 1st - Guest Room Side Wall

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs Allowable Shearwall Capacity  lbs  
<

**Shearwall Assembly Specification**

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
ADEQUATE

**Overturning Evaluation:**

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

No Hold down Required



*Shearwall Design Summary*

M+K Project #: 203-24016  
Engineer: MPM

**Shearwall I** : Basement -

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs **###** Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

#N/A  
#N/A  
#VALUE!

**Overturning Evaluation:**

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

No Hold down Required

**Shearwall 105:** 1st - Kitchen Wall @ Patio

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

P2 - 1-side 7/16" OSB  
fastened w/ 8d nails at 4"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

**Overturning Evaluation:**

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

SIMPSON STHD14RJ HOLDOWN



*Shearwall Design Summary*

M+K Project #: 203-24016  
Engineer: MPM

**Shearwall 106:** 1st - Existing Wall @ Dining Room

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

P1 - 1-side 7/16" OSB  
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

**Overturning Evaluation:**

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**SIMPSON CS16 STRAP TIE (14" END LENGTH)**

**Shearwall :** Basement -

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs **####** Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

#N/A  
#N/A  
**#VALUE!**

**Overturning Evaluation:**

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**No Hold down Required**



**Shearwall 108:** 1st - Hallway Side Ext

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P2 - 1-side 7/16" OSB  
fastened w/ 8d nails at 4"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**

**Shearwall :** Basement -

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs ### Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

#N/A  
#N/A  
#VALUE!

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**No Hold down Required**



**Shearwall 109:** 1st - Family Room Ext Wall

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P2-BS - 2-sides 7/16" OSB  
fastened w/ 8d nails at 4"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**HTT5**

**Shearwall 110:** 1st - Family Room Int

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

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  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**SIMPSON MSTC66 STRAP TIE (24" END LENGTH)**



**Shearwall 111:** 1st - Kitchen Int Wall

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

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  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**SIMPSON MSTC66 STRAP TIE (24" END LENGTH)**

**Shearwall 112:** 1st - Courtyard Ext wall

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

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  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**HTT5**



**Shearwall 113:** 1st - Courtyard Ext wall

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P2 - 1-side 7/16" OSB  
fastened w/ 8d nails at 4"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**HTT5**

**Shearwall 114:** 1st - Courtyard Ext wall

Shearwall Properties:

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

Capacity Evaluation:

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

Shearwall Assembly Specification

P2 - 1-side 7/16" OSB  
fastened w/ 8d nails at 4"o.c. panel edges & 12"o.c. panel field - edges blocked  
**ADEQUATE**

Overturning Evaluation:

Resistive DL  pl f Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

Hold-down Specification

**HTT5**



**Shearwall 115:** 1st - (E) Garage Shear Wall

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

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  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**No Hold down Required**

**Shearwall 116:** 1st - (E) Garage Shear Wall

**Shearwall Properties:**

Wall height, H  ft. Max wall opening ht, H<sub>c</sub>  ft.  
Wall Length, L  ft. Qualifying Wall Length, L  ft. Shearwall Assembly

**Capacity Evaluation:**

Total Shear Load on Wall  lbs < Allowable Shearwall Capacity  lbs

**Shearwall Assembly Specification**

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  plf Overturning Moment  k-ft Hold Down Design Load  lbs  
DL at ends of wall  lbs Resistive Moment  k-ft Hold down Capacity  lbs

**Hold-down Specification**

**SIMPSON HTT4 HOLDOWN**