MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

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

CALCULATION PACKAGE

January 27, 2021

Yen Design
7511 SE 76th St.

Mercer Island,
Washington

MULHERN & KULP STRUCTURAL ENGINEERING, INC.

Prepared By:

Riley J. Denis, E.I.T. *Staff Engineer*

Nicholas J. Martignetti, P.E. *Associate Owner + San Diego Office Director*

Signature, Seal & Date

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: 7511 SE 76TH ST
YEN DESIGN
M&K PROJECT #: 251-21001
ENGINEER: RJD
DATE: 18-JAN-21

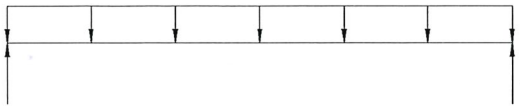
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: ROOF FRAMING - TYP. HDR

B1

PARAMETERS:

L = 5 FT
W = 0.53 KLF
P = - K



ANALYSIS:

R_{MAX} =	1.3 K	V_D =	- K	< V_{ALL} =	2.7 K	✓ ADEQUATE
M_{MAX} =	1.7 K-FT	< M_{ALL} =	2.0 K-FT			✓ ADEQUATE
Δ_{TL} =	0.1 IN.	L/	600	< L/240		✓ ADEQUATE

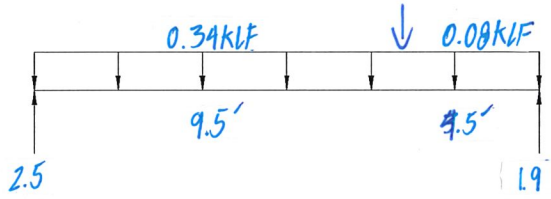
4x6 DF #2

BEAM DESCRIPTION: ROOF FRAMING - BM @ DEMOED BRG (LONG)

B2

PARAMETERS:

L = 14 FT
W = -? KLF
P = 0.78 K



ANALYSIS:

R_{MAX} =	2.5 K	V_D =	- K	< V_{ALL} =	11.7 K	✓ ADEQUATE
M_{MAX} =	9.2 K-FT	< M_{ALL} =	23.3 K-FT			✓ ADEQUATE
Δ_{TL} =	0.34 IN.	L/	500	< L/240		✓ ADEQUATE

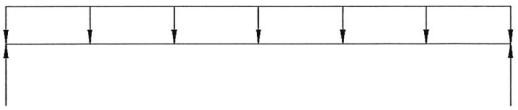
5½" x 10½" GLB

BEAM DESCRIPTION: ROOF FRAMING - BM @ DEMOED BRG (SHORT)

B3

PARAMETERS:

L = 6.25 FT
W = 0.25 KLF
P = - K



ANALYSIS:

R_{MAX} =	0.78 K	V_D =	- K	< V_{ALL} =	3.5 K	✓ ADEQUATE
M_{MAX} =	1.22 K-FT	< M_{ALL} =	3.4 K-FT			✓ ADEQUATE
Δ_{TL} =	0.08 IN.	L/	940	< L/240		✓ ADEQUATE

4x8 DF #2

MULHERN+KULP
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PROJECT NAME: 7511 SE 76TH ST
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ENGINEER: RJD
DATE: 18-JAN-21

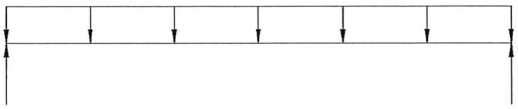
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: UPPER FLOOR FRAMING - TYP. HDR

B3

PARAMETERS:

L = 3 FT
W = 0.95 KLF
P = - K



ANALYSIS:

R_{MAX} =	1.4 K	V_D =	- K	< V_{ALL} =	2.7 K	✓	ADEQUATE
M_{MAX} =	1.1 K-FT	< M_{ALL} =	2.0 K-FT			✓	ADEQUATE
Δ_{TL} =	0.02 IN.	L/	1000+	< L/240		✓	ADEQUATE

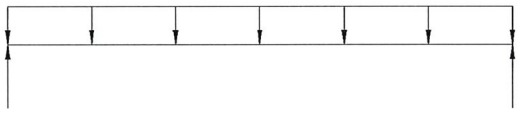
4x6 DF#2

BEAM DESCRIPTION: UPPER FLOOR FRAMING - BM @ BUMPOUT

B4

PARAMETERS:

L = 6 FT
W = 0.3 KLF
P = - K



ANALYSIS:

R_{MAX} =	0.9 K	V_D =	- K	< V_{ALL} =	2.7 K	✓	ADEQUATE
M_{MAX} =	1.4 K-FT	< M_{ALL} =	2.0 K-FT			✓	ADEQUATE
Δ_{TL} =	0.11 IN.	L/	655	< L/240		✓	ADEQUATE

4x6 DF#2

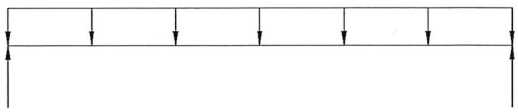
BEAM DESCRIPTION: UPPER FLOOR FRAMING - BM @ S.W. ABOVE

B9

PARAMETERS:

L = 6 FT
W = KLF
P = K

SEE ENERCALC OUTPUT



ANALYSIS:

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

(2) 1 3/4" x 11 7/8" LVL

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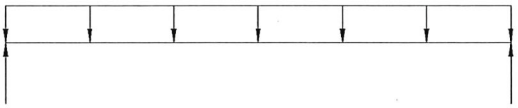
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: UPPER FLOOR FRAMING - EXISTING REAR KITCHEN DOOR HDR — B5

PARAMETERS:

L = 5 FT
W = 0.76 KLF
P = - K



ANALYSIS:

R_{MAX} =	1.9 K	V_D =	- K	< V_{ALL} =	16.2 K	✓	ADEQUATE
M_{MAX} =	2.4 K-FT	< M_{ALL} =	52.4 K-FT			✓	ADEQUATE
Δ_{TL} =	0.003 IN.	L/	1000+	< L/240		✓	ADEQUATE

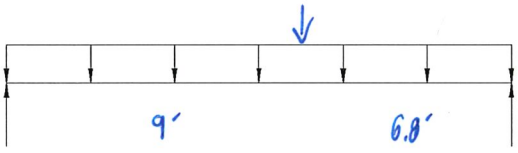
(E) 5¼" x 16" PSL

BEAM DESCRIPTION: UPPER FLOOR FRAMING - REAR PATIO BM (WORST) EXISTING — B6

PARAMETERS:

L = 15.8 FT
W = KLF
P = K

SEE ENERCALC OUTPUT



ANALYSIS:

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

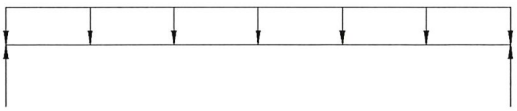
(E) 5⅛" x 12" GLB

BEAM DESCRIPTION: UPPER FLOOR FRAMING - REAR PATIO CANT'D BM — B7

PARAMETERS:

L = FT
W = KLF
P = K

SEE ENERCALC OUTPUT



ANALYSIS:

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

(4) 1¾" x 11⅞" LVL

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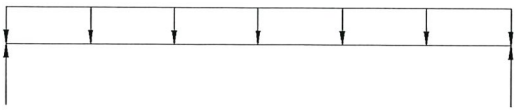
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: UPPER FLOOR FRAMING- FASCIA @ WALL ABOVE

B10

PARAMETERS:

L = 11.5 FT
W = 0.24 KLF
P = - K



ANALYSIS:

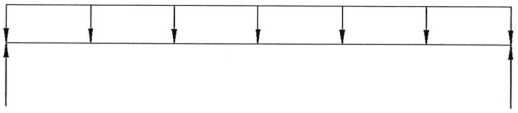
R_{MAX} =	1.4 K	V_D =	- K	< V_{ALL} =	4.5 K	✓	ADEQUATE
M_{MAX} =	3.9 K-FT	< M_{ALL} =	10.3 K-FT			✓	ADEQUATE
Δ_{TL} =	0.19 IN.	L/	730	< L/240		✓	ADEQUATE

1 3/4" x 11 7/8" LVL

BEAM DESCRIPTION:

PARAMETERS:

L = FT
W = KLF
P = K



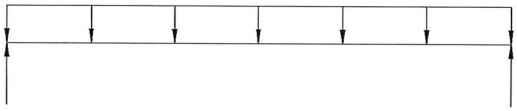
ANALYSIS:

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

BEAM DESCRIPTION:

PARAMETERS:

L = FT
W = KLF
P = K



ANALYSIS:

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

MULHERN+KULP
residential structural engineering

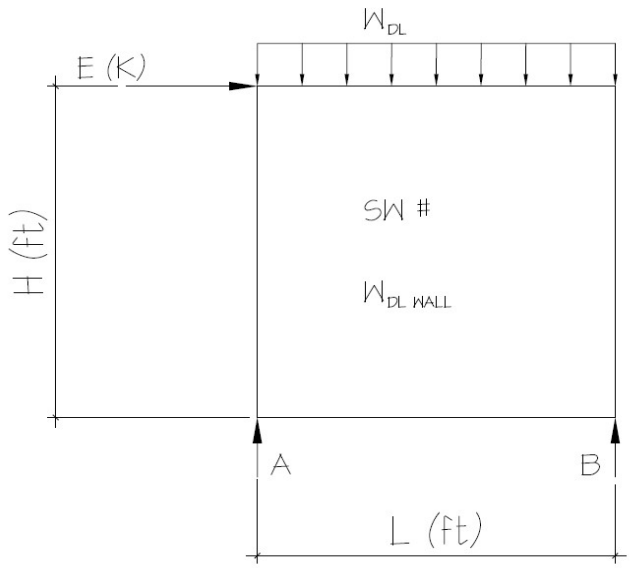
Project Name: Yen Design
7511 SE 76th St
M&K Project #: 251-21001
Engineer: RJD
Date: 19-Jan-21

Overstrength Calculations

Wall Description/SW #: 110

Parameters:

L =	9.0	ft
H =	10.0	ft
E =	0.350	k
W_{DLwall} =	0.100	klf
W_{DL} =	0.220	klf
Ω_0 =	2.5	(ASCE table 12.2.1 footnote g)
SDS =	0.979	



Analysis:

$E_{MH} = \Omega_0 * E$ =	0.88 k	$E_V = 0.2*SDS*DL$ =	0.564 k
$E_M = E_{MH} + E_V$		$E_M = E_{MH} + E_V$ =	1.439 k
$E_M = E_{MH} - E_V$		$E_M = E_{MH} - E_V$ =	0.311 k

E_M (max) $= \sum M_A = 0$ =	-4.087(9.1) - 0.121(16)(8) + R_B(16)	R_B =	.968DL + 2.32E
		R_A =	.968DL - 2.32E
E_M (min) $= \sum M_A = 0$ =	-3.363(9.1) - 0.121(16)(8) + R_B(16)	R_B =	.968DL + 1.91E
		R_A =	.968DL - 1.91E

Check beams for axial forces shown using load combos per section 12.4.3.1 (ASD)

Allowable stess permitted to be increased by 1.2

See following beam calcs for load application

MULHERN+KULP
residential structural engineering

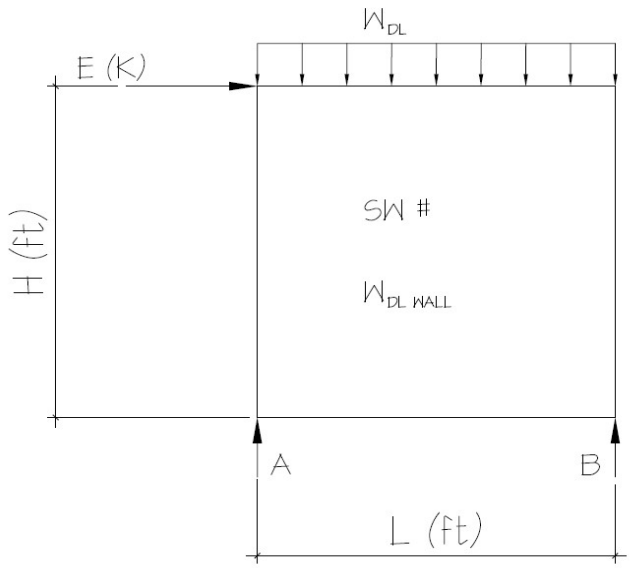
Project Name: Yen Design
7511 SE 76th
M&K Project #: 251-21001
Engineer: RJD
Date: 19-Jan-21

Overstrength Calculations

Wall Description/SW #: 202

Parameters:

L =	22.5	ft
H =	9.0	ft
E =	1.140	k
W_{DLwall} =	0.100	klf
W_{DL} =	0.200	klf
Ω_0 =	2.5	(ASCE table 12.2.1 footnote g)
SDS =	0.979	



Analysis:

$E_{MH} = \Omega_0 * E$ =	2.85 k	$E_V = 0.2*SDS*DL$ =	1.322 k
$E_M = E_{MH} + E_V$		$E_M = E_{MH} + E_V$ =	4.172 k
$E_M = E_{MH} - E_V$		$E_M = E_{MH} - E_V$ =	1.528 k

E_M (max) $= \sum M_A = 0$ =	-2.7(9.1) - 0.121(12.5)(6.25) + R_B(12.5)	R_B =	.756DL + 1.97E
		R_A =	.756DL - 1.97E
E_M (min) $= \sum M_A = 0$ =	-2.135(9.1) - 0.121(12.5)(6.25) + R_B(12.5)	R_B =	.756DL + 1.55E
		R_A =	.756DL - 1.55E

Check beams for axial forces shown using load combos per section 12.4.3.1 (ASD)

Allowable stess permitted to be increased by 1.2

See following beam calcs for load application

MULHERN+KULP
residential structural engineering

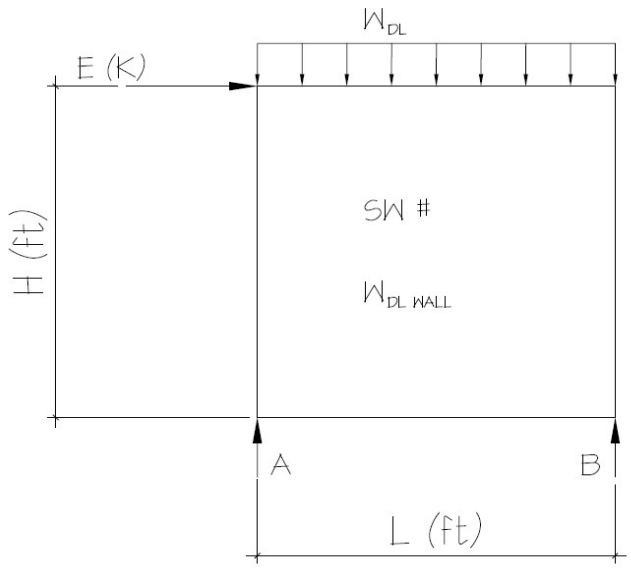
Project Name: Yen Design
7511 SE 76th St
M&K Project #: 251-21001
Engineer: RJD
Date: 19-Jan-21

Overstrength Calculations

Wall Description/SW #: 205

Parameters:

L =	14.0	ft
H =	9.0	ft
E =	1.200	k
W_{DLWALL} =	0.100	klf
W_{DL} =	0.035	klf
Ω_0 =	2.5	(ASCE Table 12.2.1 footnote g)
SDS =	0.979	



Analysis:

$E_{MH} = \Omega_0 * E$ =	3.00 k	$E_V = 0.2*SDS*DL$ =	0.370 k
$E_M = E_{MH} + E_V$		$E_M = E_{MH} + E_V$ =	3.370 k
$E_M = E_{MH} - E_V$		$E_M = E_{MH} - E_V$ =	2.630 k

E_M (max) $= \sum M_A = 0$ =	-4.087(9.1) - 0.121(16)(8) + R_B(16)	R_B =	.968DL + 2.32E
		R_A =	.968DL - 2.32E
E_M (min) $= \sum M_A = 0$ =	-3.363(9.1) - 0.121(16)(8) + R_B(16)	R_B =	.968DL + 1.91E
		R_A =	.968DL - 1.91E

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

ALLOWABLE STESS PERMITTED TO BE INCREASED BY 1.2

SEE FOLLOWING BEAM CALCS FOR LOAD APPLICATION

7511 SE 76th St
Yen Design
251-21001
RJD
18-Jan-21

Wood Beam

File: beam calcs with overstrength.ec6

Lic. # : KW-06004787
MULHERN & KULP STRUCTURAL ENGINEERING INC

DESCRIPTION: Existing Patio Bm (B6)

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-10

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-10

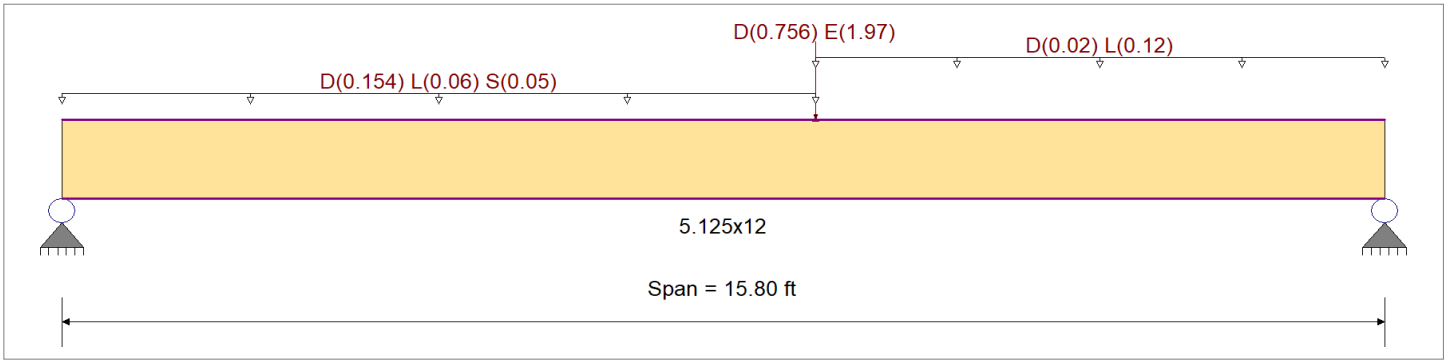
Wood Species : DF/DF
Wood Grade : 24F-V4

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

Fb +	2,400.0 psi
Fb -	1,850.0 psi
Fc - Prll	1,650.0 psi
Fc - Perp	650.0 psi
Fv	265.0 psi
Ft	1,100.0 psi

E : Modulus of Elasticity

Ebend- xx	1,800.0 ksi
Eminbend - xx	950.0 ksi
Ebend- yy	1,600.0 ksi
Eminbend - yy	850.0 ksi
Density	31.210 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Point Load : D = 0.7560, E = 1.970 k @ 9.0 ft, (SW)
Uniform Load : D = 0.1540, L = 0.060, S = 0.050 k/ft, Extent = 0.0 -->> 9.0 ft, Tributary Width = 1.0 ft
Uniform Load : D = 0.020, L = 0.120 k/ft, Extent = 9.0 -->> 15.80 ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.362 : 1	Maximum Shear Stress Ratio	=	0.165 : 1
Section used for this span		5.125x12	Section used for this span		5.125x12
fb: Actual	=	869.50 psi	fv: Actual	=	43.66 psi
Fb: Allowable	=	2,400.00 psi	Fv: Allowable	=	265.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	8.880 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.206 in	Ratio =	918 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.418 in	Ratio =	453 >=300
Max Upward Total Deflection	0.000 in	Ratio =	0 <300

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+1.090D+0.750L+0.750S+0.5250E	1	0.4181	8.015		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.690	2.412
Overall MINimum	0.848	1.122
D Only	1.451	1.037
+D+L	2.013	1.832
+D+Lr	1.451	1.037
+D+S	1.773	1.166
+D+0.750Lr+0.750L	1.873	1.633
+D+0.750L+0.750S	2.114	1.729

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Wood Beam

File: beam calcs with overstrength.ec6

Lic. # : KW-06004787
MULHERN & KULP STRUCTURAL ENGINEERING INC

DESCRIPTION: Existing Patio Bm (B6)

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
+D+0.60W	1.451	1.037
+1.126D+0.70E	2.228	1.954
+D+0.750Lr+0.750L+0.450W	1.873	1.633
+D+0.750L+0.750S+0.450W	2.114	1.729
+1.090D+0.750L+0.750S+0.5250E	2.690	2.412
+0.60D+0.60W	0.871	0.622
+0.470D+0.70E	1.276	1.273
D Only	1.451	1.037
L Only	0.562	0.794
S Only	0.322	0.128
E Only	0.848	1.122
H Only		

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Wood Beam

File: beam calcs with overstrength.ec6

Lic. # : KW-06004787
MULHERN & KULP STRUCTURAL ENGINEERING INC

DESCRIPTION: New Cant'd Beam (B7)

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-10

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-10

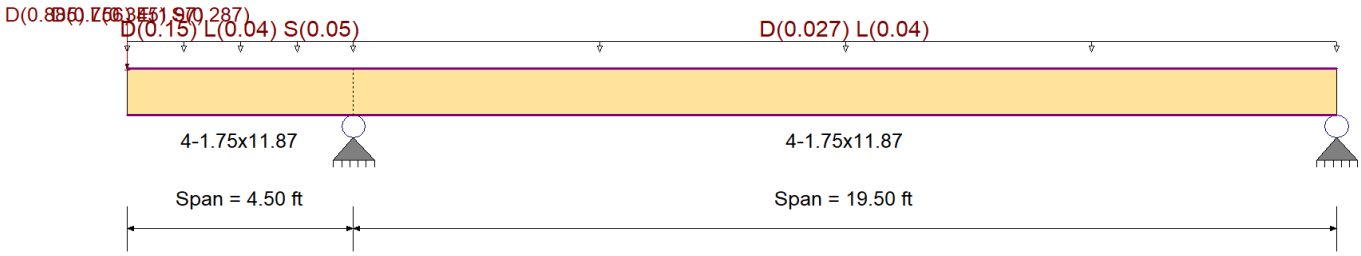
Wood Species : iLevel Truss Joist
Wood Grade : MicroLam LVL 2.0 E

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

Fb +	2600 psi
Fb -	2600 psi
Fc - Prll	2510 psi
Fc - Perp	750 psi
Fv	285 psi
Ft	1555 psi

E : Modulus of Elasticity

Ebend- xx	2000 ksi
Eminbend - xx	1016.535 ksi
Density	42.01 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1
- Uniform Load : D = 0.150, L = 0.040, S = 0.050 , Tributary Width = 1.0 ft
- Point Load : D = 0.7560, E = 1.970 k @ 0.0 ft, (From SW)
- Point Load : D = 0.8850, L = 0.3450, S = 0.2870 k @ 0.0 ft, (From Bm)

Load for Span Number 2
- Uniform Load : D = 0.0270, L = 0.040 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.312 : 1	Maximum Shear Stress Ratio	=	0.173 : 1
Section used for this span		4-1.75x11.87	Section used for this span		4-1.75x11.87
fb: Actual	=	810.10 psi	fv: Actual	=	49.44 psi
Fb: Allowable	=	2,600.00 psi	Fv: Allowable	=	285.00 psi
Load Combination		+D+L, LL Comb Run (LL)	Load Combination		+D+L, LL Comb Run (L*)
Location of maximum on span	=	4.500 ft	Location of maximum on span	=	3.520 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.062 in	Ratio =	1748 >=360
Max Upward Transient Deflection	-0.049 in	Ratio =	2194 >=360
Max Downward Total Deflection	0.315 in	Ratio =	342 >=300
Max Upward Total Deflection	-0.179 in	Ratio =	1303 >=300

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.450W, LL Comb	1	0.3146	0.000		0.0000	0.000
	2	0.0000	0.000	+D+0.750L+0.750S+0.450W, LL Comb	-0.1795	7.517

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		6.187	-0.455
Overall MINimum		2.425	-0.092
D Only		3.394	0.031
+D+L, LL Comb Run (*L)		3.784	0.421

7511 SE 76th St
Yen Design
251-21001
RJD
18-Jan-21

Wood Beam

File: beam calcs with overstrength.ec6

Lic. # : KW-06004787
MULHERN & KULP STRUCTURAL ENGINEERING INC

DESCRIPTION: New Cant'd Beam (B7)

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
+D+L, LL Comb Run (L*)		4.019	-0.070
+D+L, LL Comb Run (LL)		4.409	0.320
+D+Lr, LL Comb Run (*L)		3.394	0.031
+D+Lr, LL Comb Run (L*)		3.394	0.031
+D+Lr, LL Comb Run (LL)		3.394	0.031
+D+S		3.998	-0.062
+D+0.750Lr+0.750L, LL Comb Run (*L)		3.686	0.323
+D+0.750Lr+0.750L, LL Comb Run (L*)		3.863	-0.045
+D+0.750Lr+0.750L, LL Comb Run (LL)		4.156	0.248
+D+0.750L+0.750S, LL Comb Run (*L)		4.140	0.254
+D+0.750L+0.750S, LL Comb Run (L*)		4.316	-0.114
+D+0.750L+0.750S, LL Comb Run (LL)		4.609	0.179
+D+0.60W		3.394	0.031
+1.126D+0.70E		5.519	-0.284
+D+0.750Lr+0.750L+0.450W, LL Comb R		3.686	0.323
+D+0.750Lr+0.750L+0.450W, LL Comb R		3.863	-0.045
+D+0.750Lr+0.750L+0.450W, LL Comb R		4.156	0.248
+D+0.750L+0.750S+0.450W, LL Comb Ru		4.140	0.254
+D+0.750L+0.750S+0.450W, LL Comb Ru		4.316	-0.114
+D+0.750L+0.750S+0.450W, LL Comb Ru		4.609	0.179
+1.090D+0.750L+0.750S+0.5250E, LL C		5.718	0.018
+1.090D+0.750L+0.750S+0.5250E, LL C		5.895	-0.350
+1.090D+0.750L+0.750S+0.5250E, LL C		6.187	-0.057
+0.60D+0.60W		2.036	0.018
+0.470D+0.70E		3.292	-0.304
D Only		3.394	0.031
L Only, LL Comb Run (*L)		0.390	0.390
L Only, LL Comb Run (L*)		0.625	-0.100
L Only, LL Comb Run (LL)		1.015	0.290
S Only		0.604	-0.092
E Only		2.425	-0.455
H Only			

7511 SE 76th St
Yen Design
251-21001
RJD
18-Jan-21

Wood Beam

File: beam calcs with overstrength.ec6

Lic. # : KW-06004787
MULHERN & KULP STRUCTURAL ENGINEERING INC

DESCRIPTION: Beam @ SW Above (B9)

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-10

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-10

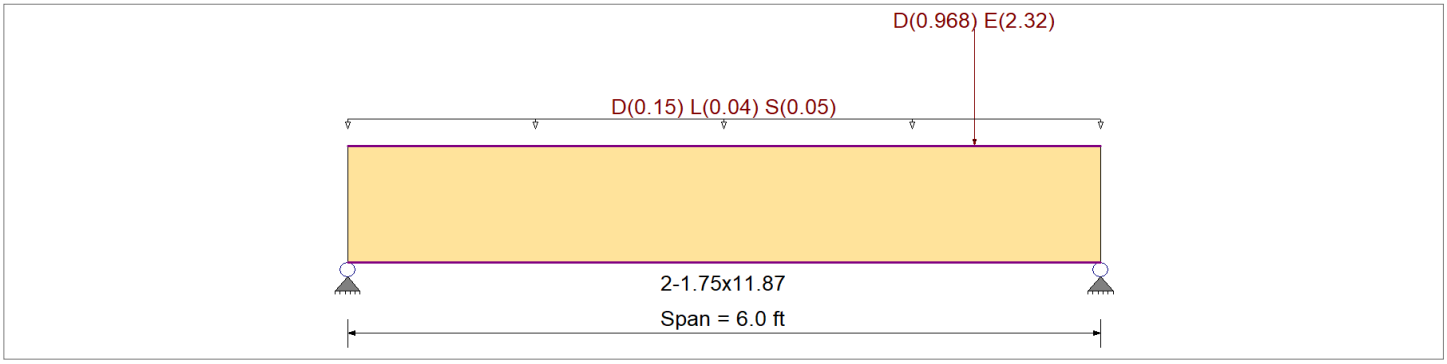
Wood Species : iLevel Truss Joist
Wood Grade : MicroLam LVL 2.0 E

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

Fb +	2600 psi
Fb -	2600 psi
Fc - Prll	2510 psi
Fc - Perp	750 psi
Fv	285 psi
Ft	1555 psi

E : Modulus of Elasticity

Ebend- xx	2000 ksi
Eminbend - xx	1016.535 ksi
Density	42.01 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.150, L = 0.040, S = 0.050 , Tributary Width = 1.0 ft
Point Load : D = 0.9680, E = 2.320 k @ 5.0 ft, (From SW)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.095 : 1	Maximum Shear Stress Ratio	=	0.208 : 1
Section used for this span		2-1.75x11.87	Section used for this span		2-1.75x11.87
fb: Actual	=	396.41 psi	fv: Actual	=	94.90 psi
Fb: Allowable	=	4,160.00 psi	Fv: Allowable	=	456.00 psi
Load Combination		+1.126D+0.70E	Load Combination		+1.126D+0.70E
Location of maximum on span	=	4.993 ft	Location of maximum on span	=	5.015 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.009 in	Ratio =	7886 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.016 in	Ratio =	4447 >=300
Max Upward Total Deflection	0.000 in	Ratio =	0 <300

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+1.090D+0.750L+0.750S+0.5250E	1	0.0162	3.241		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.112	2.809
Overall MINimum	0.387	1.933
D Only	0.648	1.293
+D+L	0.768	1.413
+D+Lr	0.648	1.293
+D+S	0.798	1.443
+D+0.750Lr+0.750L	0.738	1.383
+D+0.750L+0.750S	0.850	1.496
+D+0.60W	0.648	1.293

7511 SE 76th St
Yen Design
251-21001
RJD
18-Jan-21

Wood Beam

File: beam calcs with overstrength.ec6

Lic. # : KW-06004787

MULHERN & KULP STRUCTURAL ENGINEERING INC

DESCRIPTION: Beam @ SW Above (B9)

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
+1.126D+0.70E	1.000	2.809
+D+0.750Lr+0.750L+0.450W	0.738	1.383
+D+0.750L+0.750S+0.450W	0.850	1.496
+1.090D+0.750L+0.750S+0.5250E	1.112	2.627
+0.60D+0.60W	0.389	0.776
+0.470D+0.70E	0.575	1.961
D Only	0.648	1.293
L Only	0.120	0.120
S Only	0.150	0.150
E Only	0.387	1.933
H Only		

Yen Design

7511 SE 76th St

Mercer Island, WA

Shear Wall Calculations - Wind

Reviewed By: NJM

January 19, 2021

Parameters:

Single Family Home

Design Wind Speed: 110 MPH

wind Exposure Category: B/C

Seismic Design Category: D

Code & Design Standard: 2015 IBC Ch. 1609, ASCE 7-10 Ch. 26-30

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MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: 7511 SE 76TH ST
M&K PROJECT #: 251-21001
ENGINEER: RJD
DATE: 18-JAN-21

WIND DESIGN SUMMARY PER ASCE 7-10

PARAMETERS:

WIND SPEED	110
EXPOSURE CATEGORY	C
RISK CATEGORY	II
WIND DIRECTIONALITY FACTOR, K_D	0.85
TOPOGRAPHIC FACTOR, K_{ZT}	1.90
GUST FACTOR, G	0.85
DESIGN TYPE	ASD

ROOF GEOMETRY:

TRANS. ROOF PITCH	4	:12
LONG. ROOF PITCH	6	:12
MEAN ROOF HEIGHT, H	27.00	FT

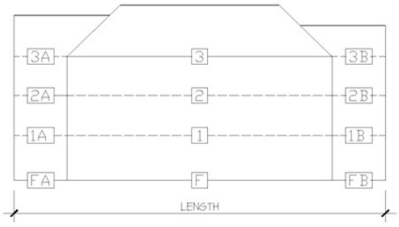
BUILDING GEOMETRY:

LENGTH	53	FT
WIDTH	36	FT
NUMBER OF STORIES	2	

TRANSVERSE DIRECTION (PERPENDICULAR TO MAIN RIDGE LINE)

TRIBUTARY DESIGN AREAS

DIAPHRAGM LEVEL	FLOOR-TO-FLOOR HEIGHT		SECTION A	SECTION O	SECTION B	
2	9 FT	Roof Surface	0	0	0	sq ft
		Wall surface	0	0	0	sq ft
1	10 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



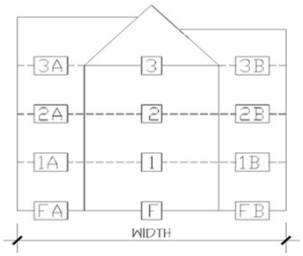
TRIBUTARY DESIGN LOADS: (0.6W)

	SECTION A	SECTION O	SECTION 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

LONGITUDINAL DIRECTION (PARALLEL TO MAIN RIDGE LINE)

TRIBUTARY DESIGN AREAS

DIAPHRAGM LEVEL	FLOOR-TO-FLOOR HEIGHT		SECTION A	SECTION O	SECTION B	
2	9 FT	Roof Surface	0	130	0	sq ft
		Wall surface	0	160	0	sq ft
1	10 FT	Roof Surface	0	115	0	sq ft
		Wall surface	0	325	0	sq ft
FND		Roof Surface	0	0	0	sq ft
		Wall surface	0	0	0	sq ft



TRIBUTARY DESIGN LOADS: (0.6W)

	SECTION A	SECTION O	SECTION B	
Story Shear	0.00	7.05	0.00	kips
Total Shear	0.00	7.05	0.00	kips
		7.05		kips
Story Shear	0.00	11.11	0.00	kips
Total Shear	0.00	18.16	0.00	kips
		18.16		kips
Story Shear	0.00	0.00	0.00	kips
Total Shear	0.00	18.16	0.00	kips
		18.16		kips

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: 7511 SE 76TH ST
M&K PROJECT #: 251-21001
ENGINEER: RJD
DATE: 18-JAN-21

WIND DESIGN SUMMARY PER ASCE 7-10

PARAMETERS:

WIND SPEED	110
EXPOSURE CATEGORY	B
RISK CATEGORY	II
WIND DIRECTIONALITY FACTOR, K_D	0.85
TOPOGRAPHIC FACTOR, K_{ZT}	1.90
GUST FACTOR, G	0.85
DESIGN TYPE	ASD

ROOF GEOMETRY:

TRANS. ROOF PITCH	4	:12
LONG. ROOF PITCH	6	:12
MEAN ROOF HEIGHT, H	27.00	FT

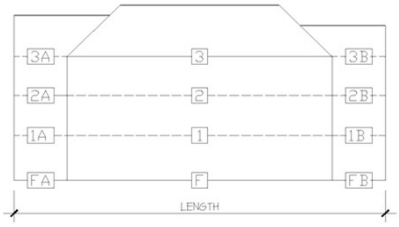
BUILDING GEOMETRY:

LENGTH	53	FT
WIDTH	36	FT
NUMBER OF STORIES	2	

TRANSVERSE DIRECTION (PERPENDICULAR TO MAIN RIDGE LINE)

TRIBUTARY DESIGN AREAS

DIAPHRAGM LEVEL	FLOOR-TO-FLOOR HEIGHT		SECTION A	SECTION O	SECTION B	
2	9 FT	Roof Surface	0	92	0	sq ft
		Wall surface	0	310	0	sq ft
1	10 FT	Roof Surface	0	2	0	sq ft
		Wall surface	0	515	0	sq ft
FND		Roof Surface	0	0	0	sq ft
		Wall surface	0	0	0	sq ft



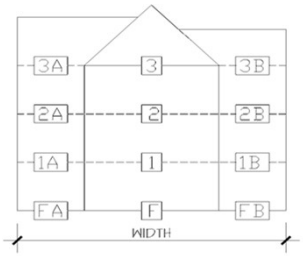
TRIBUTARY DESIGN LOADS: (0.6W)

	SECTION A	SECTION O	SECTION B	
Story Shear	0.00	7.50	0.00	kips
Total Shear	0.00	7.50	0.00	kips
		7.50		kips
Story Shear	0.00	10.53	0.00	kips
Total Shear	0.00	18.03	0.00	kips
		18.03		kips
Story Shear	0.00	0.00	0.00	kips
Total Shear	0.00	18.03	0.00	kips
		18.03		kips

LONGITUDINAL DIRECTION (PARALLEL TO MAIN RIDGE LINE)

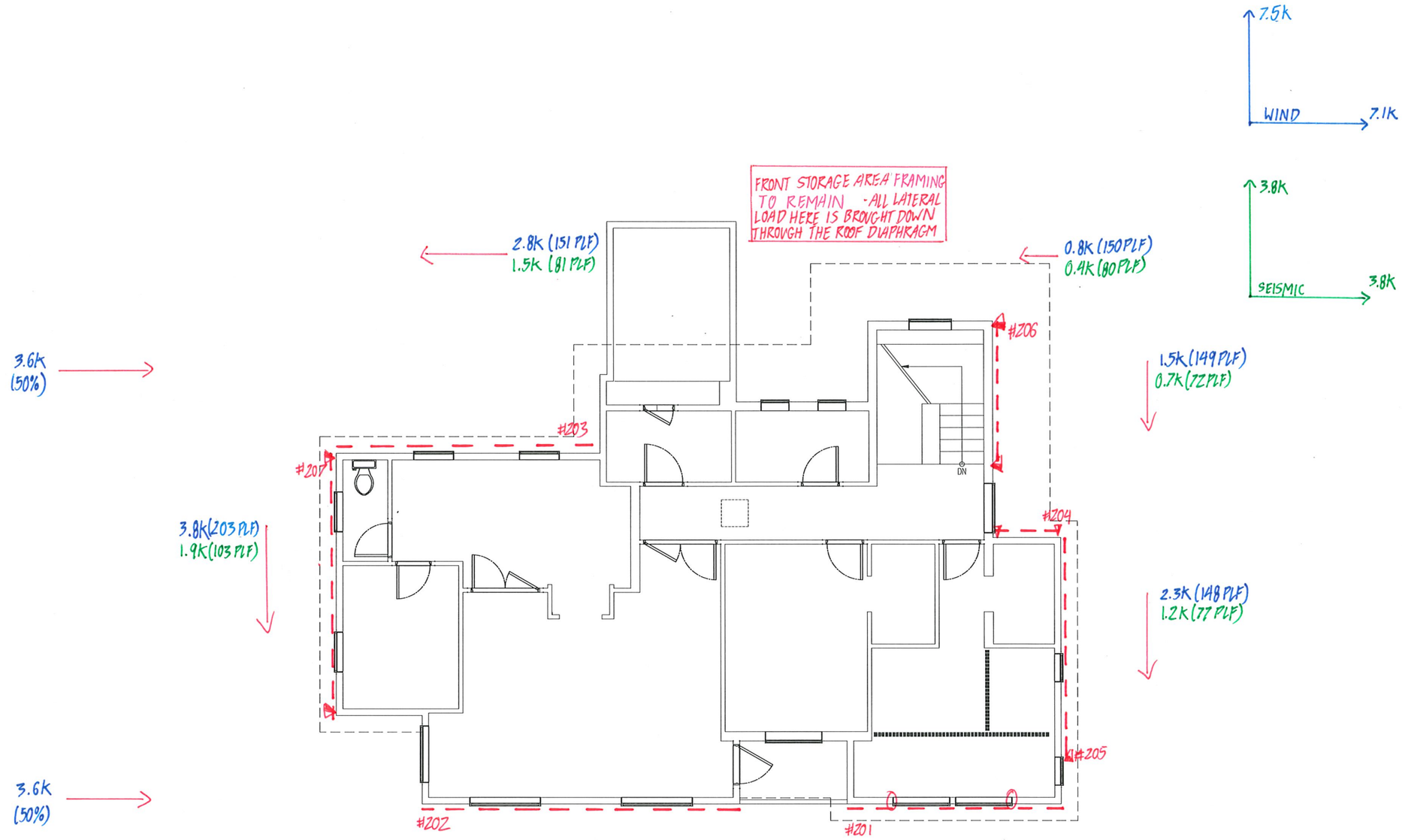
TRIBUTARY DESIGN AREAS

DIAPHRAGM LEVEL	FLOOR-TO-FLOOR HEIGHT		SECTION A	SECTION O	SECTION B	
2	9 FT	Roof Surface	0	0	0	sq ft
		Wall surface	0	0	0	sq ft
1	10 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 A	SECTION O	SECTION 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



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

* W/ EXISTING HOUSE ORIENTATION, SHORTEST DISTANCE FROM TRANSVERSE FACE TO LAKE (PERPENDICULAR) IS GREATER THAN 1500 FT.

2015 IRC ASCE 7-10
110 MPH, KZT=1.9
EXP. C IN LONGITUDINAL
EXP. B IN TRANSVERSE *
MERCER ISLAND, WA

LEGEND

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

REFER TO S-0 FOR TYPICAL STRUCTURAL

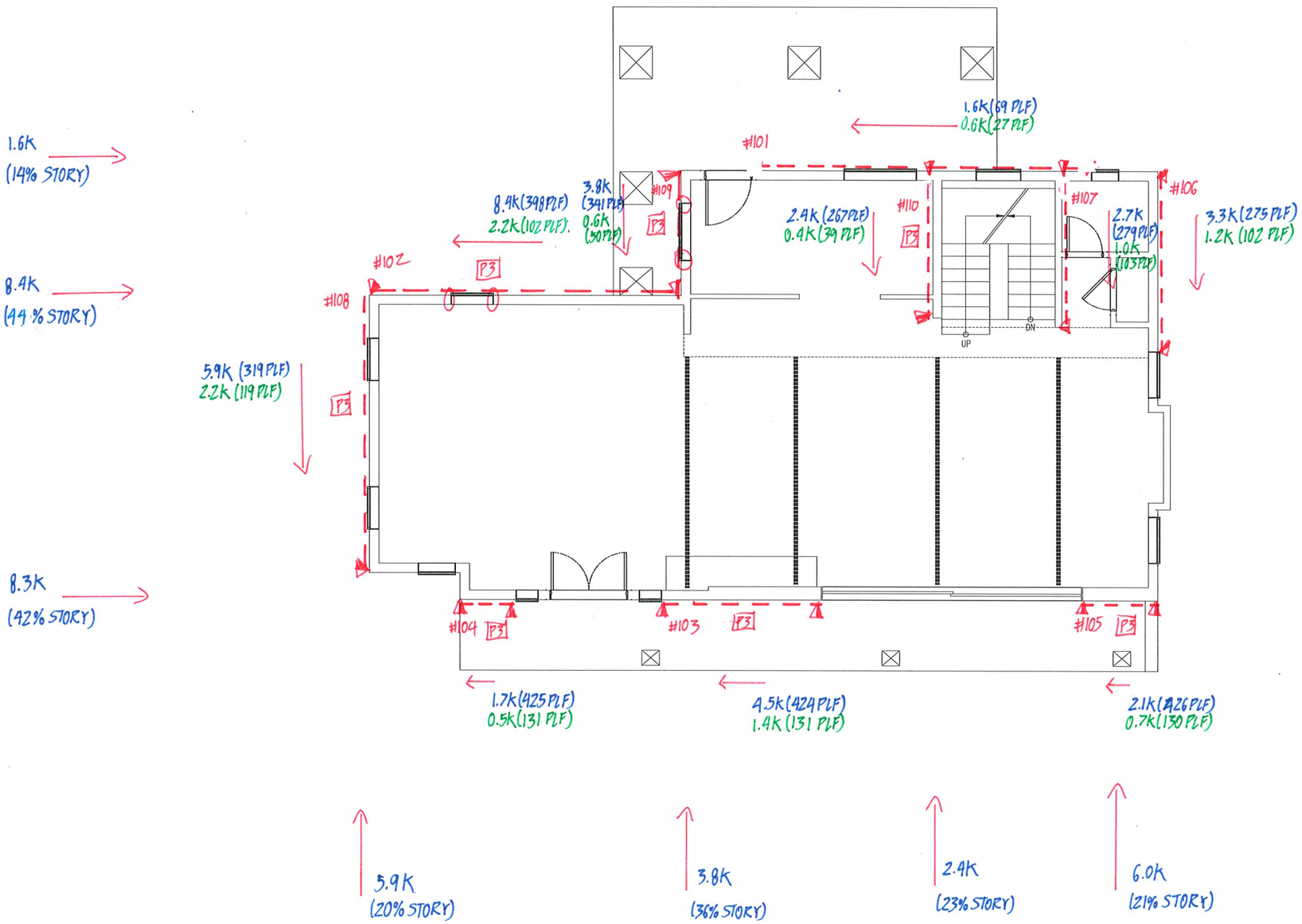
MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING
7220 Trade Street Suite 260 San Diego, CA 92121

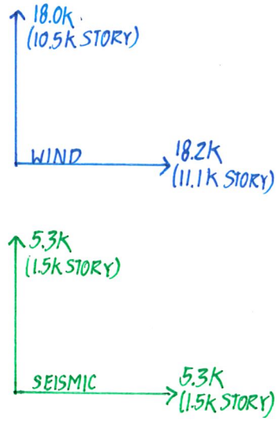
M&K project number: 251-2
project mgr:
drawn by:
issue date: 01-
REVISIONS:
date:

YEN DESIGN

ROOF FRAMING PLAN
7511 SE 76TH
MERCER ISLAND, WASHINGTON

sheet: S-2





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

LEGEND

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

REFER TO S-0 FOR TYPICAL STRUCTURAL

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING
7220 Trade Street Suite 250 San Diego, CA 92121

M&K project number: 251-2
project mgr:
drawn by:
issue date: 01-
REVISIONS:
date:

YEN DESIGN

2ND FLOOR FRAMING PLAN

7511 SE 76TH
MERCER ISLAND, WASHINGTON

sheet: S-2

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: YEN DESIGN
7511 SE 76TH ST
M&K PROJECT #: 251-21001
ENGINEER: RJD
DATE: 19-JAN-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 201: 2ND - REAR EXTERIOR BED 3

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.0	FT.	MAX WALL OPENING HT, H_c	6.0	FT.		
WALL LENGTH, L	15.0	FT.	QUALIFYING WALL LENGTH, L	6.8	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1420 LBS	<	2268 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	150	PLF	OVERTURNING MOMENT	12.8	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	300	LBS	RESISTIVE MOMENT	12.8	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 202: 2ND - REAR EXTERIOR MASTER SUITE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.0	FT.	MAX WALL OPENING HT, Hc	6.0	FT.		
WALL LENGTH, L	22.5	FT.	QUALIFYING WALL LENGTH, L	12.5	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2130 LBS	<	4200 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	305	PLF	OVERTURNING MOMENT	19.2	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	350	LBS	RESISTIVE MOMENT	51.0	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: YEN DESIGN
7511 SE 76TH ST
M&K PROJECT #: 251-21001
ENGINEER: RJD
DATE: 19-JAN-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 203: 2ND - FRONT EXTERIOR MASTER BATH

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.0	FT.	MAX WALL OPENING HT, H_c	3.0	FT.		
WALL LENGTH, L	18.5	FT.	QUALIFYING WALL LENGTH, L	13.0	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2800 LBS	<	4368 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	305	PLF	OVERTURNING MOMENT	25.2	K-FT	UPLIFT CONNECTOR DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	35.8	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 204: 2ND - FRONT EXTERIOR W.I.C.

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	5.0	FT.	QUALIFYING WALL LENGTH, L	5.0	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
750 LBS	<	1680 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	135	PLF	OVERTURNING MOMENT	6.8	K-FT	HOLD DOWN DESIGN LOAD	908	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	2.2	K-FT	HOLDOWN CAPACITY	1705	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Project Name: YEN DESIGN
7511 SE 76th St
M&K Project #: 251-21001
Engineer: RJD
Date: 19-Jan-21

Shearwall Design Summary

Shearwall XXX: - Not Used

Shearwall Properties:

Wall height, H	0.0	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	0.0	ft.	Qualifying Wall Length, L	0.0	ft.	Shearwall Assembly	P0

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
0 lbs	####	#DIV/0! lbs

Shearwall Assembly Specification

P0 - 1-side 7/16" OSB
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - UNBLOCKED
#DIV/0!

Overturning Evaluation:

Resistive DL	0	plf	Overturning Moment	#DIV/0!	k-ft	Uplift Connector Design Load	0	lbs
DL at ends of wall	0	lbs	Resistive Moment	0.0	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 205: 2nd - Side Exterior Bed 3

Shearwall Properties:

Wall height, H	9.0	ft.	Max wall opening ht, Hc	4.0	ft.		
Wall Length, L	14.0	ft.	Qualifying Wall Length, L	12.0	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
2300 lbs	<	4032 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	135	plf	Overturning Moment	20.7	k-ft	Hold Down Design Load	831	lbs
DL at ends of wall	135	lbs	Resistive Moment	9.1	k-ft	Holdown Capacity	1705	lbs

Hold-down Specification

SIMPSON CS16 STRAP TIE (14" END LENGTH)

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: YEN DESIGN
7511 SE 76TH ST
M&K PROJECT #: 251-21001
ENGINEER: RJD
DATE: 19-JAN-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 206: 2ND - SIDE EXTERIOR STAIRS

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.0	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	9.8	FT.	QUALIFYING WALL LENGTH, L	9.8	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1450 LBS	<	3276 LBS

SHEARWALL ASSEMBLY SPECIFICATION

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

OVERTURNING EVALUATION:

RESISTIVE DL	170	PLF	OVERTURNING MOMENT	13.1	K-FT	UPLIFT CONNECTOR DESIGN LOAD	781	LBS
DL AT ENDS OF WALL	100	LBS	RESISTIVE MOMENT	5.4	K-FT	HOLDOWN CAPACITY	3985	LBS

HOLD-DOWN SPECIFICATION

SIMPSON MSTC52 STRAP TIE

SHEARWALL 207: 2ND - SIDE EXTERIOR W.I.C. & MASTER BATH

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.0	FT.	MAX WALL OPENING HT, Hc	3.0	FT.		
WALL LENGTH, L	18.5	FT.	QUALIFYING WALL LENGTH, L	12.8	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
3750 LBS	<	4284 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	135	PLF	OVERTURNING MOMENT	33.8	K-FT	HOLD DOWN DESIGN LOAD	835	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	18.3	K-FT	HOLDOWN CAPACITY	1705	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: YEN DESIGN
7511 SE 76TH ST
M&K PROJECT #: 251-21001
ENGINEER: RJD
DATE: 19-JAN-21

SHEARWALL DESIGN SUMMARY

SHEARWALL XXX: - NOT USED

SHEARWALL PROPERTIES:

WALL HEIGHT, H	0.0	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	0.0	FT.	QUALIFYING WALL LENGTH, L	0.0	FT.	SHEARWALL ASSEMBLY	P0

CAPACITY EVALUATION:

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

SHEARWALL ASSEMBLY SPECIFICATION

P0 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - UNBLOCKED
#DIV/0!

OVERTURNING EVALUATION:

RESISTIVE DL	0	PLF	OVERTURNING MOMENT	#DIV/0!	K-FT	UPLIFT CONNECTOR DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	0	LBS	RESISTIVE MOMENT	0.0	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 101: 1ST - FRONT EXTERIOR FOYER

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	3.5	FT.		
WALL LENGTH, L	22.5	FT.	QUALIFYING WALL LENGTH, L	14.8	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1550 LBS	<	4956 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	200	PLF	OVERTURNING MOMENT	15.5	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	300	LBS	RESISTIVE MOMENT	34.4	K-FT	HOLDOWN CAPACITY	2590	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: YEN DESIGN
7511 SE 76TH ST
M&K PROJECT #: 251-21001
ENGINEER: RJD
DATE: 19-JAN-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 102: 1ST - FRONT EXTERIOR KITCHEN

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, H_c	5.0	FT.		
WALL LENGTH, L	21.0	FT.	QUALIFYING WALL LENGTH, L	18.0	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
8350 LBS	<	11340 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	500	PLF	OVERTURNING MOMENT	112.1	K-FT	UPLIFT CONNECTOR DESIGN LOAD	1708	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	76.2	K-FT	HOLDOWN CAPACITY	2590	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD8 HOLDOWN

SHEARWALL 103: 1ST - REAR EXTERIOR DINING

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	10.5	FT.	QUALIFYING WALL LENGTH, L	10.5	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
4450 LBS	<	6615 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	255	PLF	OVERTURNING MOMENT	44.5	K-FT	HOLD DOWN DESIGN LOAD	3195	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	11.0	K-FT	HOLDOWN CAPACITY	5850	LBS

HOLD-DOWN SPECIFICATION

SIMPSON MSTC66 STRAP TIE (24" END LENGTH)

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: YEN DESIGN
7511 SE 76TH ST
M&K PROJECT #: 251-21001
ENGINEER: RJD
DATE: 19-JAN-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 104: 1ST - REAR EXTERIOR KITCHEN

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	4.0	FT.	QUALIFYING WALL LENGTH, L	4.0	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1700 LBS	<	2363 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	500	PLF	OVERTURNING MOMENT	17.0	K-FT	UPLIFT CONNECTOR DESIGN LOAD	3410	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	3.4	K-FT	HOLDOWN CAPACITY	4935	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN

SHEARWALL 105: 1ST - REAR EXTERIOR LIVING

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	5.0	FT.	QUALIFYING WALL LENGTH, L	5.0	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2130 LBS	<	3150 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	255	PLF	OVERTURNING MOMENT	21.3	K-FT	HOLD DOWN DESIGN LOAD	3398	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	4.3	K-FT	HOLDOWN CAPACITY	3985	LBS

HOLD-DOWN SPECIFICATION

SIMPSON MSTC52 STRAP TIE

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Project Name: YEN DESIGN
7511 SE 76th St
M&K Project #: 251-21001
Engineer: RJD
Date: 19-Jan-21

Shearwall Design Summary

Shearwall XXX: - Not Used

Shearwall Properties:

Wall height, H	0.0	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	0.0	ft.	Qualifying Wall Length, L	0.0	ft.	Shearwall Assembly	P0

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
0 lbs	####	#DIV/0! lbs

Shearwall Assembly Specification

P0 - 1-side 7/16" OSB
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - UNBLOCKED
#DIV/0!

Overturning Evaluation:

Resistive DL	0	plf	Overturning Moment	#DIV/0!	k-ft	Uplift Connector Design Load	0	lbs
DL at ends of wall	0	lbs	Resistive Moment	0.0	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 106: 1st - Side Exterior Bath

Shearwall Properties:

Wall height, H	10.0	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	12.0	ft.	Qualifying Wall Length, L	12.0	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
3300 lbs	<	4032 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	150	plf	Overturning Moment	33.0	k-ft	Hold Down Design Load	2075	lbs
DL at ends of wall	225	lbs	Resistive Moment	8.1	k-ft	Holdown Capacity	2590	lbs

Hold-down Specification

SIMPSON STHD8 HOLDOWN

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: YEN DESIGN
7511 SE 76TH ST
M&K PROJECT #: 251-21001
ENGINEER: RJD
DATE: 19-JAN-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 107: 1ST - SIDE INTERIOR BATH

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	9.5	FT.	QUALIFYING WALL LENGTH, L	9.5	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2650 LBS	<	3192 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	320	PLF	OVERTURNING MOMENT	39.2	K-FT	UPLIFT CONNECTOR DESIGN LOAD	3215	LBS
DL AT ENDS OF WALL	0	LBS	RESISTIVE MOMENT	8.7	K-FT	HOLDOWN CAPACITY	5850	LBS

HOLD-DOWN SPECIFICATION

SIMPSON MSTC66 STRAP TIE (24" END LENGTH)

SHEARWALL 108: 1ST - SIDE EXTERIOR KITCHEN

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	3.0	FT.		
WALL LENGTH, L	18.5	FT.	QUALIFYING WALL LENGTH, L	12.8	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
5900 LBS	<	8033 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	330	PLF	OVERTURNING MOMENT	92.7	K-FT	HOLD DOWN DESIGN LOAD	2582	LBS
DL AT ENDS OF WALL	1000	LBS	RESISTIVE MOMENT	45.0	K-FT	HOLDOWN CAPACITY	2590	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD8 HOLDOWN

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: YEN DESIGN
7511 SE 76TH ST
M&K PROJECT #: 251-21001
ENGINEER: RJD
DATE: 19-JAN-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 109: 1ST - SIDE EXTERIOR FOYER

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, H_o	4.5	FT.		
WALL LENGTH, L	11.0	FT.	QUALIFYING WALL LENGTH, L	7.0	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
3750 LBS	<	4371 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	300	PLF	OVERTURNING MOMENT	37.5	K-FT	UPLIFT CONNECTOR DESIGN LOAD	1939	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	16.2	K-FT	HOLDOWN CAPACITY	2590	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD8 HOLDOWN

SHEARWALL 110: 1ST - SIDE INTERIOR FOYER

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	9.0	FT.	QUALIFYING WALL LENGTH, L	9.0	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2400 LBS	<	5670 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	320	PLF	OVERTURNING MOMENT	24.0	K-FT	HOLD DOWN DESIGN LOAD	1803	LBS
DL AT ENDS OF WALL	0	LBS	RESISTIVE MOMENT	7.8	K-FT	HOLDOWN CAPACITY	3985	LBS

HOLD-DOWN SPECIFICATION

SIMPSON MSTC52 STRAP TIE

Yen Design

7511 SE 76th St

Mercer Island, WA

Shear Wall Calculations - Seismic

Reviewed By: NJM

January 19, 2021

Parameters:

Single Family Home

Design Wind Speed: 110 MPH

wind Exposure Category: B/C

Seismic Design Category: D

Code & Design Standard: 2015 IBC Ch. 1609, ASCE 7-10 Ch. 26-30

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: 7511 SE 76TH ST
YEN DESIGN
M&K PROJECT #: 251-21001
ENGINEER: RJD
DATE: 18-JAN-21

SEISMIC CALCULATION - ASCE 7-10

SEISMIC DESIGN CATEGORY:

USER INPUTS:

SITE CLASS	D
SPECTRAL RESPONSE ACCELERATION 0.2 SEC, **Ss**	1.469
SPECTRAL RESPONSE ACCELERATION 1.0 SEC, **S1**	0.561
OCCUPANCY CATEGORY	II

VARIABLES:

SITE COEFFICIENT, Fa	1.00
SITE COEFFICIENT, Fv	1.50

CALCULATED VALUES:

MAXIMUM SPECTRAL RESPONSE ACCELERATION, S_{MS}	1.469
MAXIMUM SPECTRAL RESPONSE ACCELERATION, S_{M1}	0.842
DESIGN SPECTRAL RESPONSE ACCELERATION, S_{DS}	0.979
DESIGN SPECTRAL RESPONSE ACCELERATION, S_{D1}	0.561
SEISMIC DESIGN CATEGORY (SHORT TERM)	D
SEISMIC DESIGN CATEGORY (1.0 SECOND TERM)	D

BUILDING PERIOD DETERMINATION:

USER INPUTS:

BUILDING PERIOD COEFFICIENT, C_T	0.020
LONG-PERIOD TRANS PERIOD, T_L (SEC)	6
HT. ABV BASE TO HIGHEST LEVEL, h_N	19

CALCULATED VALUES:

APPROXIMATE FUNDAMENTAL PERIOD, T_A, T	0.182
T_0	0.115
T_S	0.573
SPECTRAL RESPONSE ACCELERATION, S_A (G)	0.979

EQUIVALENT LATERAL FORCE PROCEDURE

DEAD LOAD CALCULATION:

LEVEL	STORY HT. (FT.)	AREA (FT^2)	DEAD LOAD (PSF)	DL OF EXT WALL TRIBUTARY TO LEVEL (KIPS)	TOTAL LEVEL DL
1	10.0	1195	10	10.6	23 K
2	9.0	1355	17	5.1	28 K
3	0.0	0	0	0.0	0 K
4	0.0	0	0	0.0	0 K
5	0.0	0	0	0.0	0 K
6	0.0	0	0	0.0	0 K
7	0.0	0	0	0.0	0 K
8	0.0	0	0	0.0	0 K
9	0.0	0	0	0.0	0 K
10	0.0	0	0	0.0	0 K

TOTAL DEAD LOAD OF STRUCTURE 51 KIPS

SEISMIC RESPONSE COEFFICIENT:

	TRANSVERSE	LONGITUDINAL
RESPONSE MODIFICATION FACTOR, **R**	6.5	6.5
OCCUPANCY IMPORTANCE FACTOR, I_E	1.00	1.00
SEISMIC RESPONSE COEFFICIENT, C_s	0.151	0.151

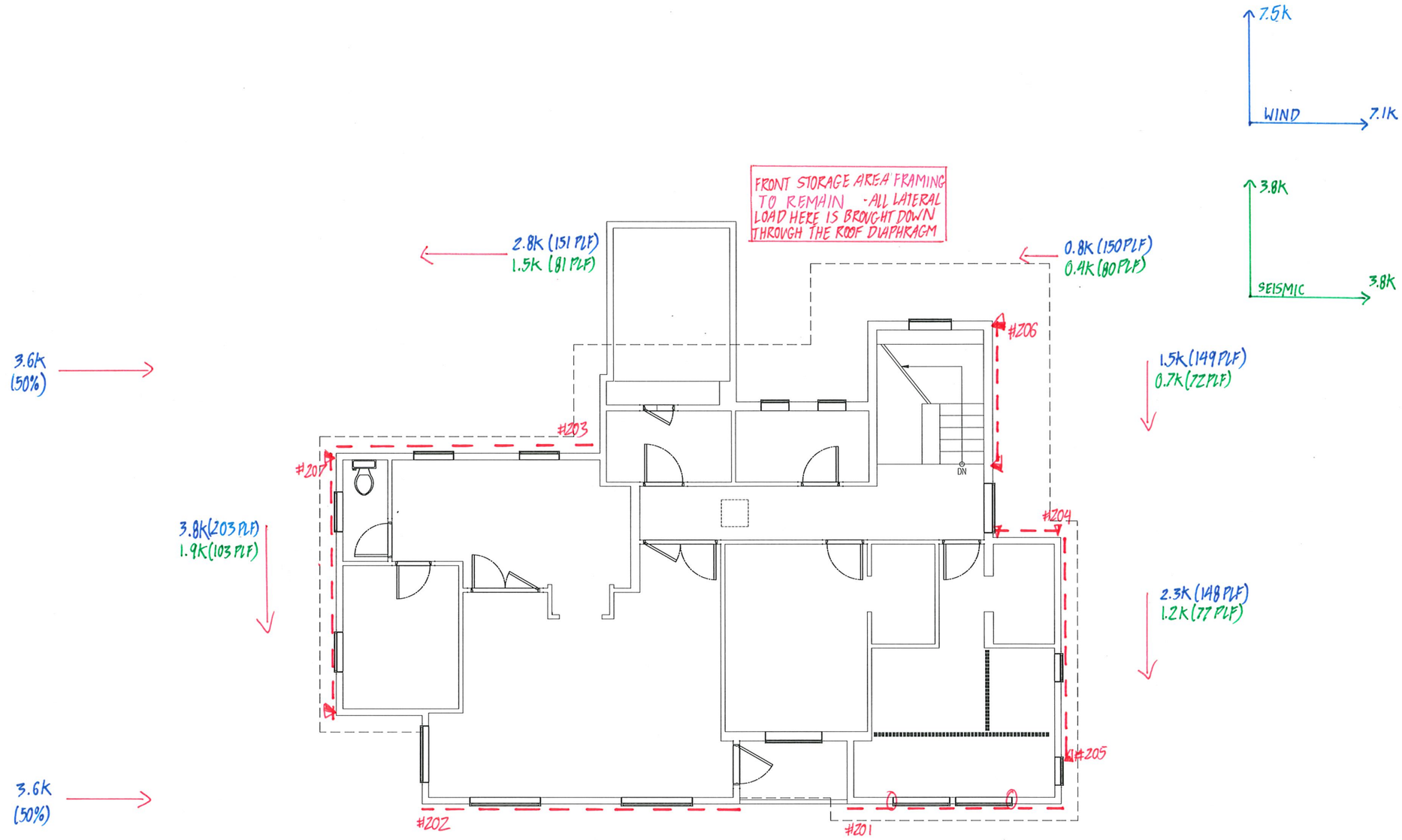
BASE SHEARS:

ULTIMATE LOADS				x 0.7 =	ALLOWABLE LOADS			
TRANSVERSE		LONGITUDINAL			TRANSVERSE		LONGITUDINAL	
8	K	8	K		5	K	5	K

STORY SHEAR CALCULATION:

DISTRIBUTION EXPONE 1.00

	LEVEL VERT. DIST. FACTOR, C_{VX}	ULTIMATE LOADS				x 0.7 =	ALLOWABLE LOADS					
		TRANSVERSE		LONGITUDINAL			TRANSVERSE			LONGITUDINAL		
		STORY SHEAR, F_x		STORY SHEAR, F_x			STORY SHEAR, F_x	Σ STORY SHEAR		STORY SHEAR, F_x	Σ STORY SHEAR	
1	0.297	2.3	K	2.3	K		1.6	K 5.3	K	1.6	K 5.3	K
2	0.703	5.4	K	5.4	K		3.8	K 3.8	K	3.8	K 3.8	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



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

* W/ EXISTING HOUSE ORIENTATION, SHORTEST DISTANCE FROM TRANSVERSE FACE TO LAKE (PERPENDICULAR) IS GREATER THAN 1500 FT.

2015 IRC ASCE 7-10
110 MPH, KZT=1.9
EXP. C IN LONGITUDINAL
EXP. B IN TRANSVERSE *
MERCER ISLAND, WA

LEGEND

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

REFER TO S-0 FOR TYPICAL STRUCTURAL

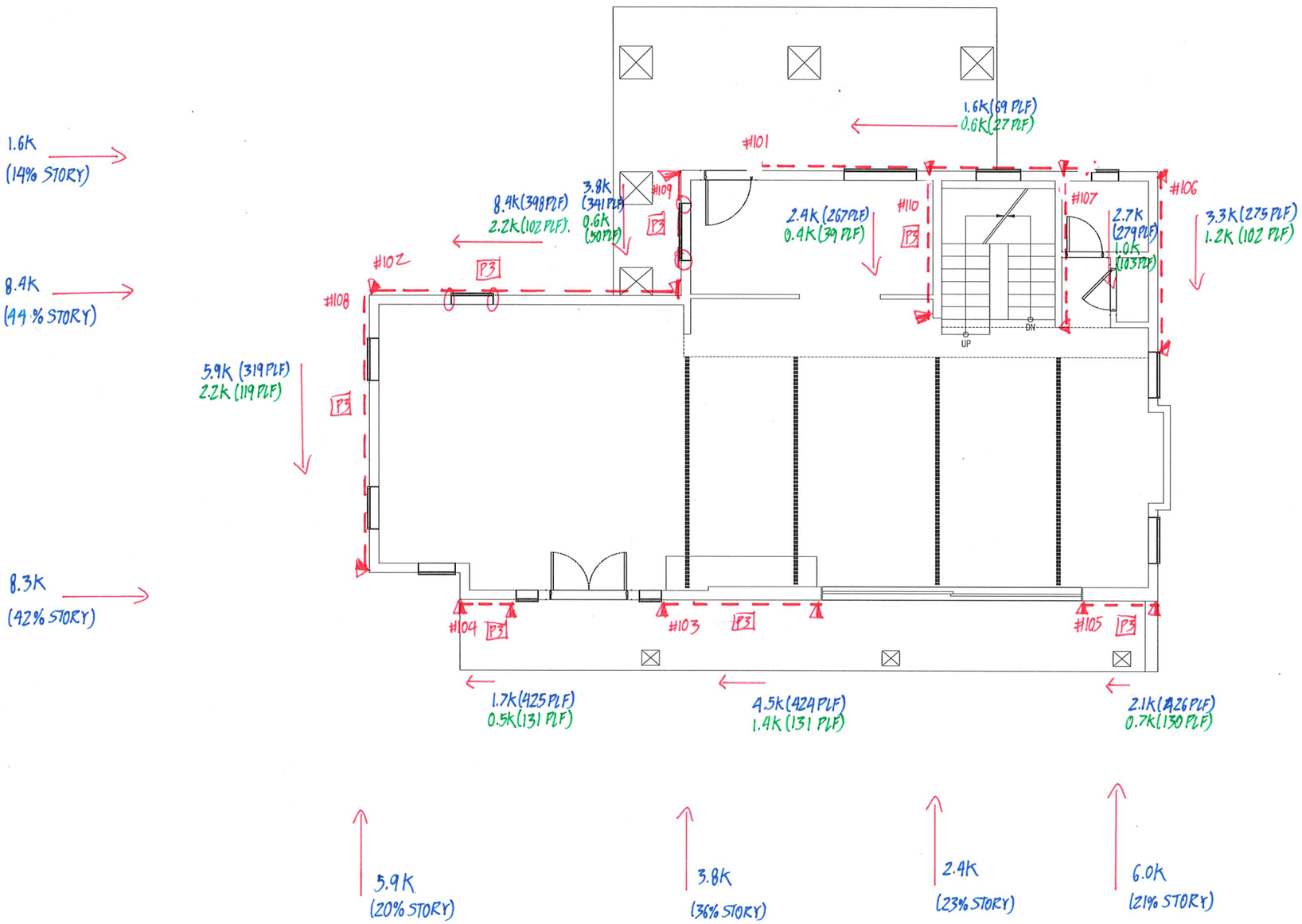
MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING
7220 Trade Street Suite 260 San Diego, CA 92121

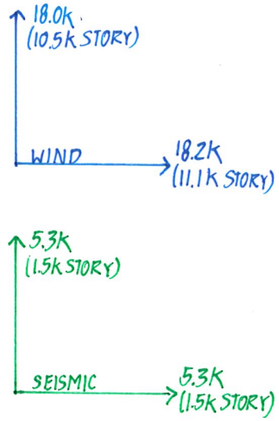
M&K project number: 251-2
project mgr:
drawn by:
issue date: 01-
REVISIONS:
date:

YEN DESIGN

ROOF FRAMING PLAN
7511 SE 76TH
MERCER ISLAND, WASHINGTON

sheet: S-2





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

LEGEND

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

REFER TO S-0 FOR TYPICAL STRUCTURAL

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING
7220 Trade Street Suite 250 San Diego, CA 92121

M&K project number: 251-2
project mgr:
drawn by:
issue date: 01-
REVISIONS:
date:

YEN DESIGN

2ND FLOOR FRAMING PLAN

7511 SE 76TH
MERCER ISLAND, WASHINGTON

sheet: S-2

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: YEN DESIGN
7511 SE 76TH ST
M&K PROJECT #: 251-21001
ENGINEER: RJD
DATE: 19-JAN-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 201: 2ND - REAR EXTERIOR BED 3

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.0	FT.	MAX WALL OPENING HT, H_c	6.0	FT.		
WALL LENGTH, L	15.0	FT.	QUALIFYING WALL LENGTH, L	6.8	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
760 LBS	<	1613 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	150	PLF	OVERTURNING MOMENT	6.8	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	300	LBS	RESISTIVE MOMENT	9.9	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 202: 2ND - REAR EXTERIOR MASTER SUITE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.0	FT.	MAX WALL OPENING HT, Hc	6.0	FT.		
WALL LENGTH, L	22.5	FT.	QUALIFYING WALL LENGTH, L	12.5	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1140 LBS	<	2988 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	305	PLF	OVERTURNING MOMENT	10.3	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	350	LBS	RESISTIVE MOMENT	39.4	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: YEN DESIGN
7511 SE 76TH ST
M&K PROJECT #: 251-21001
ENGINEER: RJD
DATE: 19-JAN-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 203: 2ND - FRONT EXTERIOR MASTER BATH

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.0	FT.	MAX WALL OPENING HT, H_c	3.0	FT.		
WALL LENGTH, L	18.5	FT.	QUALIFYING WALL LENGTH, L	13.0	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1500 LBS	<	3107 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	305	PLF	OVERTURNING MOMENT	13.5	K-FT	UPLIFT CONNECTOR DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	27.6	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 204: 2ND - FRONT EXTERIOR W.I.C.

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	5.0	FT.	QUALIFYING WALL LENGTH, L	5.0	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
400 LBS	<	1195 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	135	PLF	OVERTURNING MOMENT	3.6	K-FT	HOLD DOWN DESIGN LOAD	379	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	1.7	K-FT	HOLDOWN CAPACITY	1705	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: YEN DESIGN
7511 SE 76TH ST
M&K PROJECT #: 251-21001
ENGINEER: RJD
DATE: 19-JAN-21

SHEARWALL DESIGN SUMMARY

SHEARWALL XXX: - NOT USED

SHEARWALL PROPERTIES:

WALL HEIGHT, H	0.0	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	0.0	FT.	QUALIFYING WALL LENGTH, L	0.0	FT.	SHEARWALL ASSEMBLY	P0

CAPACITY EVALUATION:

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

SHEARWALL ASSEMBLY SPECIFICATION

P0 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - UNBLOCKED
#DIV/0!

OVERTURNING EVALUATION:

RESISTIVE DL	0	PLF	OVERTURNING MOMENT	#DIV/0!	K-FT	UPLIFT CONNECTOR DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	0	LBS	RESISTIVE MOMENT	0.0	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 205: 2ND - SIDE EXTERIOR BED 3

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.0	FT.	MAX WALL OPENING HT, Hc	4.0	FT.		
WALL LENGTH, L	14.0	FT.	QUALIFYING WALL LENGTH, L	12.0	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1200 LBS	<	2868 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	135	PLF	OVERTURNING MOMENT	10.8	K-FT	HOLD DOWN DESIGN LOAD	271	LBS
DL AT ENDS OF WALL	135	LBS	RESISTIVE MOMENT	7.0	K-FT	HOLDOWN CAPACITY	1705	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: YEN DESIGN
7511 SE 76TH ST
M&K PROJECT #: 251-21001
ENGINEER: RJD
DATE: 19-JAN-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 206: 2ND - SIDE EXTERIOR STAIRS

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.0	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	9.8	FT.	QUALIFYING WALL LENGTH, L	9.8	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
700 LBS	<	2330 LBS

SHEARWALL ASSEMBLY SPECIFICATION

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

OVERTURNING EVALUATION:

RESISTIVE DL	170	PLF	OVERTURNING MOMENT	6.3	K-FT	UPLIFT CONNECTOR DESIGN LOAD	216	LBS
DL AT ENDS OF WALL	100	LBS	RESISTIVE MOMENT	4.2	K-FT	HOLDOWN CAPACITY	3985	LBS

HOLD-DOWN SPECIFICATION

SIMPSON MSTC52 STRAP TIE

SHEARWALL 207: 2ND - SIDE EXTERIOR W.I.C. & MASTER BATH

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.0	FT.	MAX WALL OPENING HT, Hc	3.0	FT.		
WALL LENGTH, L	18.5	FT.	QUALIFYING WALL LENGTH, L	12.8	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1900 LBS	<	3047 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	135	PLF	OVERTURNING MOMENT	17.1	K-FT	HOLD DOWN DESIGN LOAD	161	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	14.1	K-FT	HOLDOWN CAPACITY	1705	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: YEN DESIGN
7511 SE 76TH ST
M&K PROJECT #: 251-21001
ENGINEER: RJD
DATE: 19-JAN-21

SHEARWALL DESIGN SUMMARY

SHEARWALL XXX: - NOT USED

SHEARWALL PROPERTIES:

WALL HEIGHT, H	0.0	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	0.0	FT.	QUALIFYING WALL LENGTH, L	0.0	FT.	SHEARWALL ASSEMBLY	P0

CAPACITY EVALUATION:

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

SHEARWALL ASSEMBLY SPECIFICATION

P0 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - UNBLOCKED
#DIV/0!

OVERTURNING EVALUATION:

RESISTIVE DL	0	PLF	OVERTURNING MOMENT	#DIV/0!	K-FT	UPLIFT CONNECTOR DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	0	LBS	RESISTIVE MOMENT	0.0	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 101: 1ST - FRONT EXTERIOR FOYER

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	3.5	FT.		
WALL LENGTH, L	22.5	FT.	QUALIFYING WALL LENGTH, L	14.8	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
600 LBS	<	3525 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	200	PLF	OVERTURNING MOMENT	6.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	300	LBS	RESISTIVE MOMENT	26.6	K-FT	HOLDOWN CAPACITY	2125	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: YEN DESIGN
7511 SE 76TH ST
M&K PROJECT #: 251-21001
ENGINEER: RJD
DATE: 19-JAN-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 102: 1ST - FRONT EXTERIOR KITCHEN

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, H_c	5.0	FT.		
WALL LENGTH, L	21.0	FT.	QUALIFYING WALL LENGTH, L	18.0	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2150 LBS	<	8118 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	500	PLF	OVERTURNING MOMENT	36.8	K-FT	UPLIFT CONNECTOR DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	58.8	K-FT	HOLDOWN CAPACITY	2125	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 103: 1ST - REAR EXTERIOR DINING

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	10.5	FT.	QUALIFYING WALL LENGTH, L	10.5	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1375 LBS	<	4736 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	255	PLF	OVERTURNING MOMENT	13.8	K-FT	HOLD DOWN DESIGN LOAD	504	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	8.5	K-FT	HOLDOWN CAPACITY	5850	LBS

HOLD-DOWN SPECIFICATION

SIMPSON MSTC66 STRAP TIE (24" END LENGTH)

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Project Name: Yen Design
7511 SE 76th St
M&K Project #: 251-21001
Engineer: RJD
Date: 19-Jan-21

Shearwall Design Summary

Shearwall 104: 1st - Rear Exterior Kitchen

Shearwall Properties:

Wall height, H	10.0	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	4.0	ft.	Qualifying Wall Length, L	4.0	ft.	Shearwall Assembly	P3

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
525 lbs	<	1691 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	500	plf	Overturning Moment	5.3	k-ft	Uplift Connector Design Load	664	lbs
DL at ends of wall	400	lbs	Resistive Moment	2.6	k-ft	Holdown Capacity	3695	lbs

Hold-down Specification

SIMPSON STHD14RJ HOLDOWN

Shearwall 105: 1st - Rear Exterior Living

Shearwall Properties:

Wall height, H	10.0	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	5.0	ft.	Qualifying Wall Length, L	5.0	ft.	Shearwall Assembly	P3

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
650 lbs	<	2255 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	255	plf	Overturning Moment	6.5	k-ft	Hold Down Design Load	634	lbs
DL at ends of wall	800	lbs	Resistive Moment	3.3	k-ft	Holdown Capacity	3985	lbs

Hold-down Specification

SIMPSON MSTC52 STRAP TIE

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: YEN DESIGN
7511 SE 76TH ST
M&K PROJECT #: 251-21001
ENGINEER: RJD
DATE: 19-JAN-21

SHEARWALL DESIGN SUMMARY

SHEARWALL XXX: - NOT USED

SHEARWALL PROPERTIES:

WALL HEIGHT, H	0.0	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	0.0	FT.	QUALIFYING WALL LENGTH, L	0.0	FT.	SHEARWALL ASSEMBLY	P0

CAPACITY EVALUATION:

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

SHEARWALL ASSEMBLY SPECIFICATION

P0 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - UNBLOCKED
#DIV/0!

OVERTURNING EVALUATION:

RESISTIVE DL	0	PLF	OVERTURNING MOMENT	#DIV/0!	K-FT	UPLIFT CONNECTOR DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	0	LBS	RESISTIVE MOMENT	0.0	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 106: 1ST - SIDE EXTERIOR BATH

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	12.0	FT.	QUALIFYING WALL LENGTH, L	12.0	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1225 LBS	<	2868 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	150	PLF	OVERTURNING MOMENT	12.3	K-FT	HOLD DOWN DESIGN LOAD	500	LBS
DL AT ENDS OF WALL	225	LBS	RESISTIVE MOMENT	6.3	K-FT	HOLDOWN CAPACITY	2125	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD8 HOLDOWN

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: YEN DESIGN
7511 SE 76TH ST
M&K PROJECT #: 251-21001
ENGINEER: RJD
DATE: 19-JAN-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 107: 1ST - SIDE INTERIOR BATH

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	9.5	FT.	QUALIFYING WALL LENGTH, L	9.5	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
975 LBS	<	2271 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	320	PLF	OVERTURNING MOMENT	15.9	K-FT	UPLIFT CONNECTOR DESIGN LOAD	969	LBS
DL AT ENDS OF WALL	0	LBS	RESISTIVE MOMENT	6.7	K-FT	HOLDOWN CAPACITY	5850	LBS

HOLD-DOWN SPECIFICATION

SIMPSON MSTC66 STRAP TIE (24" END LENGTH)

SHEARWALL 108: 1ST - SIDE EXTERIOR KITCHEN

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	3.0	FT.		
WALL LENGTH, L	18.5	FT.	QUALIFYING WALL LENGTH, L	12.8	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2200 LBS	<	5750 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	330	PLF	OVERTURNING MOMENT	39.1	K-FT	HOLD DOWN DESIGN LOAD	237	LBS
DL AT ENDS OF WALL	1000	LBS	RESISTIVE MOMENT	34.7	K-FT	HOLDOWN CAPACITY	2125	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD8 HOLDOWN

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: YEN DESIGN
7511 SE 76TH ST
M&K PROJECT #: 251-21001
ENGINEER: RJD
DATE: 19-JAN-21

SHEARWALL DESIGN SUMMARY

SHEARWALL 109: 1ST - SIDE EXTERIOR FOYER

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, H_c	4.5	FT.		
WALL LENGTH, L	11.0	FT.	QUALIFYING WALL LENGTH, L	7.0	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
550 LBS	<	3129 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	300	PLF	OVERTURNING MOMENT	5.5	K-FT	UPLIFT CONNECTOR DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	12.5	K-FT	HOLDOWN CAPACITY	2125	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 110: 1ST - SIDE INTERIOR FOYER

SHEARWALL PROPERTIES:

WALL HEIGHT, H	10.0	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	9.0	FT.	QUALIFYING WALL LENGTH, L	9.0	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
350 LBS	<	4059 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	320	PLF	OVERTURNING MOMENT	3.5	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	0	LBS	RESISTIVE MOMENT	6.0	K-FT	HOLDOWN CAPACITY	3985	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED