



GRAVITY CALCULATIONS

Cha & Koo Remodel
3818 83rd AVE SE
MERCER ISLAND, WA 98040

Murar Engineering and Design, Incorporated
1501 N 13th St, Suite 202, Boise, Idaho 83702
Email: Contact@MurarEngineering.com
Phone: (208) 831-1111 Phone: (808) 300-0999

PROJECT DESCRIPTION

Cha & Koo Remodel
3818 83rd AVE SE

Code: IBC

GRAVITY LOADS

Roof Loads

Composite Asphalt 7 psf
Trusses 9 psf
Misc 4 psf
Dead Load Total = 20 psf

Live load unreduced= 20 psf
Slope 3 :12 F= 1.00
Live Load= 20 psf
Total Load = 40 psf

Floor Loads

Dead= 10 psf Floor

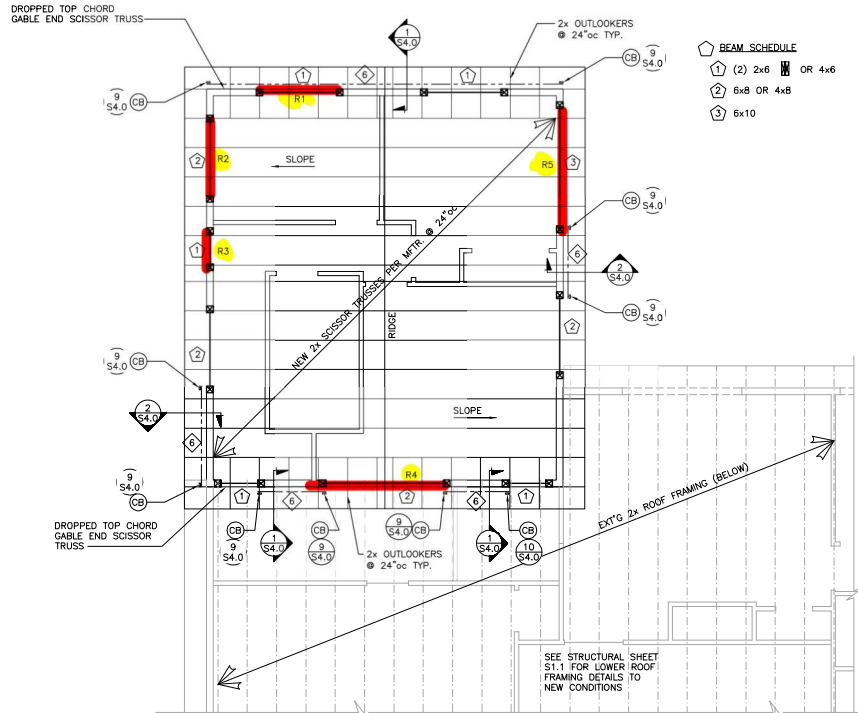
Live= 40 psf Floor
Total= 50 psf Floor

Snow Load

Flat roof Snow Load 25 psf
Soil Bearing= 1500 psf

MATERIAL PROPERTIES

Glu Lam Beam - 24F-V4 GLB Fv= 265 psi Fb= 2400 psi E= 1800000 psi		Microlam 2.0 E M=L 2.0E Fv= 285 psi Fb= 2600 psi E= 2000000 psi
Parallam P=L 2.2E Fv= 290 psi Fb= 2900 psi E= 2200000 psi		DF#2 Bms &Stringers B&S 6x, 8x DF#2 Fv= 170 psi Fb= 875 psi E= 1300000 psi
Doug Fir #2 2x,4x DF#2 Fv= 180 psi Fb= 900 psi E= 1600000 psi		6x 8x DF#2 Posts and Timbers P&T 6x, 8x DF#2 Fv= 170 psi Fb= 750 psi E= 1300000 psi



HOLD DOWN SCHEDULE

- CB = CMSTC16 TO BELOW. SEE DETAIL 9/S4.0
- CA = CMSTC16 ATTACHING DBL 2x STUDS ABOVE & DBL 2x STUDS BELOW RIM BOARD AT FLOOR ON THIS LEVEL. STRAP MAY TERMINATE AROUND BEAM. SEE PLAN. SEE TYPICAL STRAP CONN. DETAILS 9 & 10/S2.0
- D = DTT22 W/ CAST IN PLACE A.BOLT OR EPOXY SEE DETAILS 4 & 8/S2.0
- S = HDU3 W/ CAST IN PLACE A.BOLT OR EPOXY SEE DETAILS 4 & 8/S2.0
- MS = MSTM60 STRAP CONCRETE/2x WALL FRAMING. SEE DETAILS 1 & 2/S3.1

NOTE:
C.I.P. = CAST IN PLACE A.BOLTS
EPOXY = HOLD DOWN RODS ALLOWED TO BE EPOXYED SEE DETAILS 4 & 8/S2.0 FOR ADD'L SPECS.

FRAMING NOTES

1. SEE ARCH. FLOOR PLAN FOR PLATE HEIGHTS.
2. REFER TO LATERAL BRACING PRIOR TO FRAMING.
3. PROVIDE (2) STUDS UNDER ALL BEARING POINTS U.N.O. PROVIDE SOLID BLOCKING AT ALL POINT LOADS TO FOUNDATION. SOLID BLOCK BETWEEN ALL FLOOR CAVITIES, MATCHING COLUMN SIZE ABOVE.
4. UNLESS OTHERWISE NOTED, PROVIDE (1) KING STUD AND (1) TRIMMER AT EACH SIDE OF ALL OPENINGS.
5. TRUSS-TO-TRUSS CONNECTIONS PROVIDED BY TRUSS MFR. TRUSS MFR SHALL VERIFY ALL DIMENSIONS OFF OF FPN PLAN AND FLOOR PLAN PRIOR TO TRUSS FABRICATION AND NOTIFY ENGINEER OF ANY LAYOUT CHANGES.
6. PROVIDE ATTIC VENTILATIONS AS REQUIRED BY CODE.
7. CONTRACTOR SHALL INSTALL TRUSSES PER TRUSS MANUFACTURER'S SPECIFICATIONS, INCLUDING PROVIDING FASTENERS TO RESIST ANY UPLIFT.
8. ROOF SHEATHING: 19/32" APA RATED: SH7G WITH 10d NAILS AT 6" OC ALONG EDGES AND DIAPHRAGM BOUNDARIES AND 12" OC IN THE FIELD.
9. FLOOR SHEATHING: 3/4", APA RATED: SH7G, T&G WITH 10d NAILS @ 6" OC ALONG EDGES AND DIAPHRAGM BOUNDARIES AND 12" OC IN THE FIELD.
10. LIQUID NAILS BECK AND FLOOR ADHESIVE OR SIMILAR MAY BE APPLIED WITH #10 SCREWS AS AN ALTERNATIVE METHOD TO ATTACH SHEATHING TO JOIST MEMBERS.
11. EXTERIOR WALLS TO BE 2x DF NO. 2 STUDS AT 16" OC. INTERIOR WALLS TO BE PER PLAN @ 16" OC.
12. THE ENGINEER HAS PREPARED THIS DRAWING BASED ON THE DIMENSIONS, ELEVATIONS AND TOP OF CONCRETE PROVIDED BY THE ARCHITECT. IT REMAINS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL DIMENSIONS ELEVATIONS AND TOP OF CONCRETE PRIOR TO COMMENCING CONSTRUCTION.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL WORK, MATERIALS AND SAFETY IN CONFORMANCE WITH INTERNATIONAL BUILDING CODE (IBC) AND OSHA STANDARDS.
14. FRAMING CONDITIONS MAY DEVELOP DURING CONSTRUCTION FOR WHICH NO SPECIFIC DETAIL OR TYPICAL CONSTRUCTION APPLIES. NOTIFY ENGINEER PRIOR TO PROCEEDING IF UNCLEAR.
15. ALIGN HOLD DOWNS WITH END OF SHEARWALL STUDS ABOVE. ATTACH TO DOUBLE STUDS UNLESS NOTED OTHERWISE (UNO). USE HOLD DOWN EMBED AND PLACEMENT PER MANUFACTURER.
16. PRESERVATIVE TREATED OR PRESSURE TREATED (PT) LUMBER SHALL MEET THE U1 AND M4 STANDARDS SET BY THE AMERICAN WOOD PROTECTION ASSOCIATION (AWPA).
17. CONTRACTOR TO PROVIDE WOOD STAIR FRAMING/LANDING MEMBERS AND CONNECTIONS
18. SEE DRAWING SHEETS S2 SERIES FOR GENERAL DETAILS NOT CALLED OUT HERE.

ABBREVIATION LIST

- ' - DEGREE
- Ø - DIAMETER
- A.B. - ANCHOR BOLT
- ARCH - ARCHITECT
- APA - AMERICAN PLYWOOD ASSOCIATION
- BLK'G - BLOCKING
- BM - BEAM
- BOT - BOTTOM
- C.I.P. - CAST IN PLACE
- CLR - CLEAR
- COL - COLUMN
- CONT - CONTINUOUS
- D.F. - DOUGLAS FIR
- DIM - DIMENSION
- EA - EACH
- E.W. - EACH WAY
- EXT - EXTERIOR
- FDN - FOUNDATION
- FRMG - FRAMING
- FT - FOOT, FEET
- FTG - FOOTING
- FND - FOUNDATION
- OSB - OSBUM BOARD
- HD - HOLD DOWN
- HDR - HEADER
- HORIZ - HORIZONTAL
- INT - INTERIOR
- LVL - LAMINATED VENEER LUMBER
- MAX - MAXIMUM
- MFR - MANUFACTURER
- MIN - MINIMUM
- N.T.S. - NOT TO SCALE
- P.T. - PRESSURE TREATED
- PL - PLATE
- PSL - PARALLAM
- REINF - REINFORCED
- REQ'D - REQUIRED
- SCHED - SCHEDULE
- SHT - SHEET
- STD - STANDARD
- STRUCT - STRUCTURAL
- T&G - TONGUE AND GROOVE
- TRED - TREATED
- TYP - TYPICAL
- U.N.O. - UNLESS NOTED OTHERWISE
- VERT - VERTICAL
- w/ - WITH
- w/o - WITHOUT

SHEAR WALL SCHEDULE

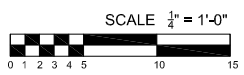
WHERE PANELS ARE APPLIED ON BOTH FACES OF A SHEAR WALL AND NAIL SPACING IS LESS THAN 6" OC ON EITHER SIDE, PANEL JOINTS SHALL BE OFFSET TO FALL ON DIFFERENT FRAMING MEMBERS. ALTERNATIVELY, THE WIDTH OF THE NAILED FACE OF FRAMING MEMBERS SHALL BE 3" NOMINAL OR GREATER AT ADJOINING PANEL EDGES AND NAILS AT ALL PANEL EDGES SHALL BE STAGGERED. SPACING OF ANCHOR BOLTS TO BE HALVED WHEN PANELS ARE APPLIED ON BOTH FACES OF A SHEAR WALL.

SHEAR WALL MARK	SHEATHING MATERIAL	FIELD NAILING ¹	EDGE NAILING ¹	BOTTOM PLATE	STUDS AT EDGE NAILING	ANCHOR BOLT ¹
6	1/2" SH7G	8d's @ 12"oc	8d's @ 6"oc	2x	2x	1/2"x10" @ 48"oc
4	1/2" SH7G	8d's @ 12"oc	8d's @ 4"oc	2x	3x	1/2"x10" @ 27"oc

NOTE

1. ALL SHEAR WALLS LISTED MAY NOT BE USED ON THIS PROJECT.
2. DOUBLE STUDS AND DOUBLE PLATES MAY BE SUBSTITUTED FOR 3x STUDS
 - A. WHEN 8d NAILS OR STAPLES ARE SPACED AT 3" OR LESS, EDGE & PANEL SPLICE MEMBERS TO BE 3x FRAMING MEMBERS OR DOUBLE STUDS.
3. NAILS OR STAPLES
 - A. 8d's = 2 1/2"x0.131" COMMON OR 2 1/2"x0.113" GALVANIZED BOX NAILS, 1/2" 16 GAUGE STAPLES
 - B. 1/2" 16 GAUGE STAPLES CAN BE SUBSTITUTED FOR 8d COMMONS OR 8d BOX NAILS WITH (3) STAPLES FOR EVERY (2) 8d's
 - C. STAPLES TO HAVE 3/16" MIN CROWN WIDTH AND INSTALLED WITH THEIR CROWNS PARALLEL TO THE LONG DIM OF THE FRAMING MEMBER.
4. ANCHOR BOLTS TO BE ASTM A307, 1/2" w/ 7" EMBED IN FOUNDATION WALLS @ 48" O.C. (MAX) U.N.O. (SEE FOUNDATION PLAN FOR REQUIREMENTS AT SHEAR WALL). BOLTS TO BE WITHIN 12" (MAX) & 4" (MIN) TO ENDS OF SILL PLATES (COORDINATE WITH GENERAL CONTRACTOR) MINIMUM OF TWO ANCHOR BOLTS PER SILL PLATE
 - A. 0.229"x3"x3" SQUARE STEEL PLATE WASHERS SHALL BE PLACED BETWEEN SILL PLATE AND NUT PER IBC 2308.3.1.1
 - B. 1/2" w/ 5" EMBED TITEN HD SCREW ANCHORS w/ SO PL 0.229"x3"x3" CAN BE SUBSTITUTED FOR ANCHOR BOLTS
 - C. THE EDGE OF THE SQ PL WASHER SHALL BE PLACED PARALLEL WITHIN 1/2" OF THE SHEATHING AT SHEAR WALLS.
 - D. SO PL WASHERS w/ 1 1/2"x1 1/2" MAXIMUM DIAGONAL SLOT MAY BE USED IF A STANDARD CUT PL WASHER IS PLACED BETWEEN THE NUT AND THE SQ PL WASHER.
5. STUDS AT ENDS OF SHEAR WALLS TO BE PER HOLD DOWN REQUIREMENTS.

UPPER ROOF FRAMING PLAN



NORTH

REVISION DATE

FOR PERMIT 2023JAN17

1601 N 13th St. STE 202
BOISE, IDAHO 83702
PHONE: 208-943-4125
FAX: 866-855-8379
EMAIL: CONTACT@MURARENGINEERING.COM

MURAR
ENGINEERING & DESIGN INC

UPPER ROOF FRAMING PLAN

CHA & KOO REMODEL
3818 83rd AVE SE
MERCER ISLAND, wa 98040

DATE/PROJECT
BY
FILE NAME
SCALE
SHEET

S1.2

BEAM CALCULATIONS - S1.2

R1 Typical Distributed load						
	3	x	5.5	2x,4x DF#2	Load Type= D+S=	
Length=	5.5 ft	Repetitive=	No	1 LDF for repetitive		
Fv=	180 psi	Fb=	900	psi E=	1600000 psi	Size Factor 1.30
Fv'=	207	Fb'=	1346	LDF=	1.15	LDF summation
Load #1	Load Type= Flat roof Snow Load	wdl=	20 psf	wll=	25 psf	
	Trib Back span= 2 ft	Trib Overhang=	2 ft	Trib=(b+o)2/(2xb)=	4.00 ft	
	wdl= 80 plf	w live load=	100 plf	Flat roof Snow Load		
Distributed load to beam	wdl= 80 plf	w ll floor=	0 plf	wll roof	0 plf	
	w snow= 100					
w for stress=	180 plf	D+S=		w defl= 180 plf for	D+S=	
Shear, Moment and Deflection	V= wl/2 495 lbs	LDF=	1.15	A=	16.5 in	
	M=wl^2/8 681 lb-ft			S=	15.125 in ²	
	$\Delta = 5wl^4*1728/384 EI =$	2 /l		I=	41.59375 in ³	
Stresses	fv= 45 psi		22%	$\Delta dl =$	0.02475 in = /l	2667
	fb= 540 psi		40%	$\Delta ll =$	0.030938 in = /l	2133
				$\Delta tl =$	0.1 in = /l	1185
Reactions	Rdl= 220 lbs	Overhang=	0 ft	Rdl OH=	220 lbs	
	Rll floor= 0 lbs	Trib=	3 ft	R ll floor OH=	0 lbs	
	Rll roof= 0 lbs			Rll roof OH=	0 lbs	
	Rll snow= 275 lbs			Rll snow OH=	275 lbs	
	Rxn Total= 495 lbs	D+S=		Rxn Total OH =	495 lbs	
R2 Typical Distributed load						
	5.5	x	7.5	P&T 6x, 8x DF#2	Load Type= D+S=	
Length=	5.5 ft	Repetitive=	No	1 LDF for repetitive		
Fv=	170 psi	Fb=	750	psi E=	1300000 psi	Size Factor 1.05
Fv'=	195.5	Fb'=	909	LDF=	1.15	LDF summation
Load #1	Load Type= Flat roof Snow Load	wdl=	20 psf	wll=	25 psf	
	Trib Back span= 24 ft	Trib Overhang=	2 ft	Trib=(b+o)2/(2xb)=	14.08 ft	
	wdl= 281.66667 plf	w live load=	352 plf	Flat roof Snow Load		
Distributed load to beam	wdl= 282 plf	w ll floor=	0 plf	wll roof	0 plf	
	w snow= 352					
w for stress=	634 plf	D+S=		w defl= 634 plf for	D+S=	
Shear, Moment and Deflection	V= wl/2 1743 lbs	LDF=	1.15	A=	41.25 in	
	M=wl^2/8 2396 lb-ft			S=	51.5625 in ²	
	$\Delta = 5wl^4*1728/384 EI =$	10 /l		I=	193.3594 in ³	
Stresses	fv= 63 psi		32%	$\Delta dl =$	0.023071 in = /l	2861
	fb= 558 psi		61%	$\Delta ll =$	0.028838 in = /l	2289
				$\Delta tl =$	0.1 in = /l	1271
Reactions	Rdl= 775 lbs	Overhang=	0 ft	Rdl OH=	774.5833 lbs	
	Rll floor= 0 lbs	Trib=	3 ft	R ll floor OH=	0 lbs	
	Rll roof= 0 lbs			Rll roof OH=	0 lbs	
	Rll snow= 968 lbs			Rll snow OH=	968.2292 lbs	
	Rxn Total= 1743 lbs	D+S=		Rxn Total OH =	1742.813 lbs	

R3 Typical Distributed load		3	x	5.5	2x,4x DF#2	Load Type= D+S=
Length=	3 ft	Repetitive=	No	1 LDF for repetitive		
Fv=	180 psi	Fb=	900	psi E=	1600000 psi	Size Factor 1.30
Fv'=	207	Fb'=	1346	LDF=	1.15 LDF summation	
Load #1	Load Type= Flat roof Snow Load	wdl=	20 psf	wll=	25 psf	
	Trib Back span= 24 ft	Trib Overhang=	2 ft	Trib=(b+o)2/(2xb)=	14.08 ft	
	wdl= 281.66667 plf	w live load=	352 plf	Flat roof Snow Load		
Distributed load to beam	wdl= 282 plf	w ll floor=	0 plf	wll roof	0 plf	
	w snow= 352					
w for stress=	634 plf	D+S=		w defl= 634 plf for	D+S=	
Shear, Moment and Deflection	V= w/2 951 lbs	LDF=	1.15	A=	16.5 in	
	M=w/2^2/8 713 lb-ft	S=		15.125 in ²		
	$\Delta = 5wl^4 \cdot 1728 / 384 E I =$	1 /I		I=	41.59375 in ³	
Stresses	fv= 86 psi	42%		$\Delta dl =$	0.007714 in = /	4667
	fb= 566 psi	42%		$\Delta ll =$	0.009642 in = /	3734
				$\Delta tl =$	0.0 in = /	2074
Reactions	Rdl= 423 lbs	Overhang=	0 ft	Rdl OH=	422.5 lbs	
	Rll floor= 0 lbs	Trib=	2 ft	R ll floor OH=	0 lbs	
	Rll roof= 0 lbs			Rll roof OH=	0 lbs	
	Rll snow= 528 lbs			Rll snow OH=	528.125 lbs	
	Rxn Total= 951 lbs	D+S=		Rxn Total OH =	950.625 lbs	
R4 Typical Distributed load						
		3.5	x	7.25	2x,4x DF#2	Load Type= D+S=
Length=	8.5 ft	Repetitive=	No	1 LDF for repetitive		
Fv=	180 psi	Fb=	900	psi E=	1600000 psi	Size Factor 1.30
Fv'=	207	Fb'=	1346	LDF=	1.15 LDF summation	
Load #1	Load Type= Flat roof Snow Load	wdl=	20 psf	wll=	25 psf	
	Trib Back span= 2 ft	Trib Overhang=	2 ft	Trib=(b+o)2/(2xb)=	4.00 ft	
	wdl= 80 plf	w live load=	100 plf	Flat roof Snow Load		
Distributed load to beam	wdl= 80 plf	w ll floor=	0 plf	wll roof	0 plf	
	w snow= 100					
w for stress=	180 plf	D+S=		w defl= 180 plf for	D+S=	
Shear, Moment and Deflection	V= w/2 765 lbs	LDF=	1.15	A=	25.375 in	
	M=w/2^2/8 1626 lb-ft	S=		30.66146 in ²		
	$\Delta = 5wl^4 \cdot 1728 / 384 E I =$	13 /I		I=	111.1478 in ³	
Stresses	fv= 45 psi	22%		$\Delta dl =$	0.052836 in = /	1931
	fb= 636 psi	47%		$\Delta ll =$	0.066045 in = /	1544
				$\Delta tl =$	0.1 in = /	858
Reactions	Rdl= 340 lbs	Overhang=	0 ft	Rdl OH=	340 lbs	
	Rll floor= 0 lbs	Trib=	4 ft	R ll floor OH=	0 lbs	
	Rll roof= 0 lbs			Rll roof OH=	0 lbs	
	Rll snow= 425 lbs			Rll snow OH=	425 lbs	
	Rxn Total= 765 lbs	D+S=		Rxn Total OH =	765 lbs	

R5 Typical Distributed load	5.5	x	9.5	B&S 6x, 8x DF#2	Load Type= D+S=
Length=	8.5 ft	Repetitive=	No	1 LDF for repetitive	
Fv=	170 psi	Fb=	875	psi E=	1300000 psi
Fv'=	195.5	Fb'=	1033	LDF=	1.15 LDF summation
Size Factor	1.03				
Load #1	Load Type= Flat roof Snow Load	w dl=	20 psf	w ll=	25 psf
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	w snow= 352				
w for stress=	634 plf	D+S=		w defl=	634 plf for D+S=
Shear, Moment and Deflection	V= w l/2	2693 lbs	LDF= 1.15	A=	52.25 in
	M= w l^2/8	5724 lb-ft		S=	82.72917 in ²
	$\Delta = 5w l^4 * 1728 / 384 E I =$	57 /I		I=	392.9635 in ³
Stresses	fv=	77 psi	40%	$\Delta dl =$	0.064759 in = / 1575
	fb=	830 psi	80%	$\Delta ll =$	0.080948 in = / 1260
				$\Delta tl =$	0.1 in = / 700
Reactions	R dl=	1197 lbs	Overhang=	0 ft	R dl OH= 1197.083 lbs
	R ll floor=	0 lbs	Trib=	4 ft	R ll floor OH= 0 lbs
	R ll roof=	0 lbs			R ll roof OH= 0 lbs
	R ll snow=	1496 lbs			R ll snow OH= 1496.354 lbs
Rxn Total=	2693 lbs	D+S=		Rxn Total OH =	2693.438 lbs



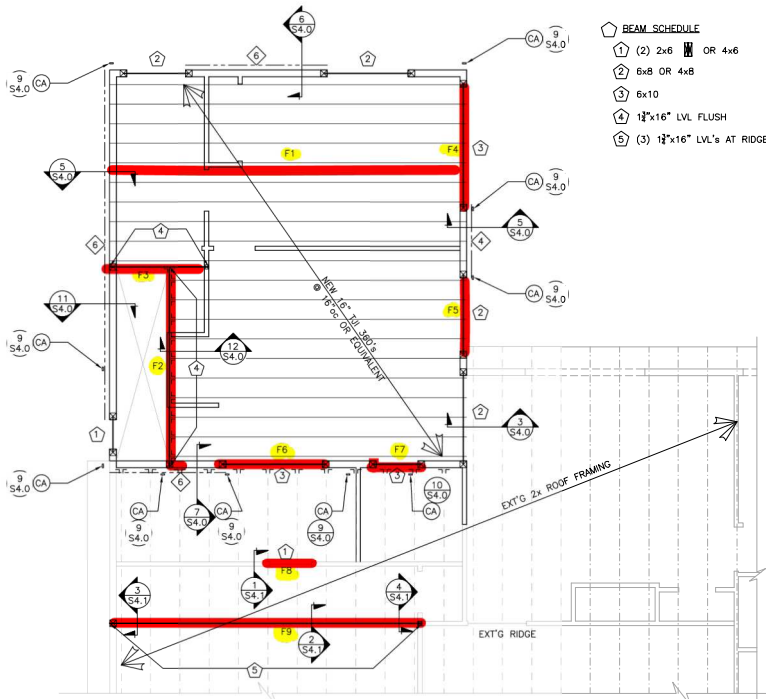
1501 N 13th St. STE 202
BOISE, IDAHO 83702
PHONE: 208-844-1225
FAX: 866-855-8379
EMAIL: CONTACT@MURARENGINEERING.COM



SECOND FLOOR & EXISTING ROOF FRAMING PLAN

CHA & KOO REMODEL
3818 83rd AVE SE
MERCER ISLAND, wa 98040

DATE PLOTTED	
BY	
FILE NAME	CL2023-01-08-2023-04-17
SHEET	
SCALE	
SHEET	S1.1



- BEAM SCHEDULE**
- ① (2) 2x8 OR 4x6
 - ② 6x8 OR 4x8
 - ③ 6x10
 - ④ 1 1/2"x16" LVL FLUSH
 - ⑤ (3) 1 1/2"x16" LVL's AT RIDGE

HOLD DOWN SCHEDULE

- Ⓢ = CMSTC16 TO BELOW. SEE DETAIL 9/S4.0
- Ⓒ = CMSTC16 ATTACHING DBL 2x STUDS ABOVE & DBL 2x STUDS BELOW RIM BOARD AT FLOOR ON THIS LEVEL. STRAP MAY TERMINATE AROUND BEAM. SEE PLAN. SEE TYPICAL STRAP CONN. DETAILS 9 & 10/S2.0
- Ⓛ = DTT22 W/ CAST IN PLACE A.BOLT OR EPOXY SEE DETAILS 4 & 8/S2.0
- Ⓜ = HDU23 W/ CAST IN PLACE A.BOLT OR EPOXY SEE DETAILS 4 & 8/S2.0
- Ⓝ = M5CM60 STRAP CONCRETE/2x WALL FRAMING. SEE DETAILS 1 & 2/S3.1

NOTE:
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11. EXTERIOR WALLS TO BE 2x DF NO. 2 STUDS AT 16" OC. INTERIOR WALLS TO BE PER PLAN @ 16" OC.
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- CLR - CLEAR
- COL - COLUMN
- CONT - CONTINUOUS
- D.F. - DOUGLAS FIR
- DIM - DIMENSION
- EA - EACH
- E.W. - EACH WAY
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- FRMG - FRAMING
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- MIN - MINIMUM
- N.T.S. - NOT TO SCALE
- P.T. - PRESSURE TREATED
- PL - PLATE
- PSL - PARALLAM
- REINF - REINFORCED
- REQ'D - REQUIRED
- SCHED - SCHEDULE
- SHT - SHEET
- STD - STANDARD
- STRUCT - STRUCTURAL
- T&G - TONGUE AND GROOVE
- TRTD - TREATED
- TYP - TYPICAL
- U.N.O. - UNLESS NOTED OTHERWISE
- VERT - VERTICAL
- w/ - WITH
- w/o - WITHOUT

SHEAR WALL SCHEDULE

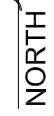
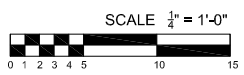
WHERE PANELS ARE APPLIED ON BOTH FACES OF A SHEAR WALL AND NAIL SPACING IS LESS THAN 6" OC ON EITHER SIDE, PANEL JOINTS SHALL BE OFFSET TO FALL ON DIFFERENT FRAMING MEMBERS. ALTERNATIVELY, THE WIDTH OF THE NAILED FACE OF FRAMING MEMBERS SHALL BE 3" NOMINAL OR GREATER AT ADJOINING PANEL EDGES AND NAILS AT ALL PANEL EDGES SHALL BE STAGGERED. SPACING OF ANCHOR BOLTS TO BE HALVED WHEN PANELS ARE APPLIED ON BOTH FACES OF A SHEAR WALL.

SHEAR WALL MARK	SHEATHING MATERIAL	FIELD NAILING ¹	EDGE NAILING ¹	BOTTOM PLATE	STUDS AT EDGE NAILING	ANCHOR BOLT ¹
Ⓢ	1/2" SHT'G	8d's @ 12" OC	8d's @ 6" OC	2x	2x	1/2"x10" @ 48" OC
Ⓜ	1/2" SHT'G	8d's @ 12" OC	8d's @ 4" OC	2x	3x	1/2"x10" @ 27" OC

NOTE

1. ALL SHEAR WALLS LISTED MAY NOT BE USED ON THIS PROJECT.
2. DOUBLE STUDS AND DOUBLE PLATES MAY BE SUBSTITUTED FOR 3x STUDS
 - A. WHEN 8d NAILS OR STAPLES ARE SPACED AT 3" OR LESS, EDGE & PANEL SPLICE MEMBERS TO BE 3x FRAMING MEMBERS OR DOUBLE STUDS.
3. NAILS OR STAPLES
 - A. 8d's = 2 1/2"x0.131" COMMON OR 2 1/2"x0.113" GALVANIZED BOX NAILS, 1/2" 16 GAUGE STAPLES
 - B. 1/2" 16 GAUGE STAPLES CAN BE SUBSTITUTED FOR 8d COMMONS OR 8d BOX NAILS WITH (3) STAPLES FOR EVERY (2) 8d's
 - C. STAPLES TO HAVE 3/16" MIN CROWN WIDTH AND INSTALLED WITH THEIR CROWNS PARALLEL TO THE LONG DIM OF THE FRAMING MEMBER.
4. ANCHOR BOLTS TO BE ASTM A307, 1/2" w/ 7" EMBED IN FOUNDATION WALLS @ 48" O.C. (MAX) U.N.O. (SEE FOUNDATION PLAN FOR REQUIREMENTS AT SHEAR WALL). BOLTS TO BE WITHIN 12" (MAX) & 4" (MIN) TO ENDS OF SILL PLATES (COORDINATE WITH GENERAL CONTRACTOR) MINIMUM OF TWO ANCHOR BOLTS PER SILL PLATE
 - A. 0.229"x3"x3" SQUARE STEEL PLATE WASHERS SHALL BE PLACED BETWEEN SILL PLATE AND NUT PER IBC 2308.3.1.1.
 - B. 1/2" w/ 5" EMBED TITEN HD SCREW ANCHORS w/ SQ PL 0.229"x3"x3" CAN BE SUBSTITUTED FOR ANCHOR BOLTS
 - C. THE EDGE OF THE SQ PL WASHER SHALL BE PLACED PARALLEL WITHIN 1/2" OF THE SHEATHING AT SHEAR WALLS.
 - D. SQ PL WASHERS w/ 1 1/2"x1 1/2" MAXIMUM DIAGONAL SLOT MAY BE USED IF A STANDARD CUT PL WASHER IS PLACED BETWEEN THE NUT AND THE SQ PL WASHER.
5. STUDS AT ENDS OF SHEAR WALLS TO BE PER HOLD DOWN REQUIREMENTS.

SECOND FLOOR & EXISTING ROOF FRAMING PLAN

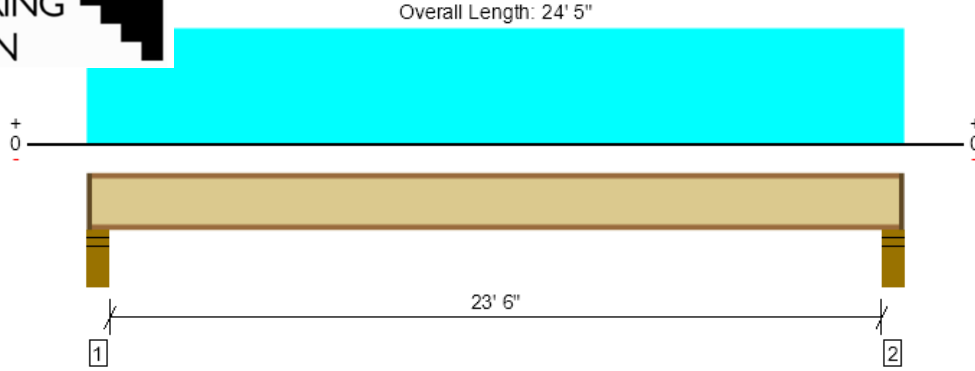


BEAM CALCULATIONS - S1.1

F1 Forte Joist						
		16" TJI 360 @ 16"oc				
<i>Span 1</i>		23.5 ft				
Load #1	Load Type=	Floor Loads	w/dl=	10 psf	w/ll=	40 psf
	Trib Back span=	2.66 ft	Trib Overhang=	0 ft	Trib=(b+o)2/(2xb)=	1.33 ft
	w dl plf at start=	13.3 plf	w ll plf=	53.2 plf at start		
	Start	0.00 ft	End=	23.50 ft		
Reactions #1	Rdl=	195 lbs	#2 Rdl=	195 lbs	#3 Rdl=	lbs
	Rll floor=	651 lbs	Rll floor=	651 lbs	Rll floor=	lbs
	Rll roof=	lbs	Rll roof=	lbs	Rll roof=	lbs
	Rll snow=	lbs	Rll snow=	lbs	Rll snow=	lbs
	Rxn Total=	846 lbs	Rxn Total=	846 lbs	Rxn Total=	0 lbs



Level, Floor: Joist F1
1 piece(s) 16" TJI® 360 @ 16" OC



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	839 @ 4 1/2"	1505 (3.50")	Passed (56%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	815 @ 5 1/2"	2190	Passed (37%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	4854 @ 12' 2 1/2"	8405	Passed (58%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.438 @ 12' 2 1/2"	0.592	Passed (L/648)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.570 @ 12' 2 1/2"	1.183	Passed (L/499)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	40	40	Passed	--	--

Member Length : 24' 2 1/2"
 System : Floor
 Member Type : Joist
 Building Use : Residential
 Building Code : IBC 2015
 Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: 1/2" Gypsum ceiling.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories	Details
	Total	Available	Required	Dead	Floor Live	Factored		
1 - Stud wall - DF	5.50"	4.25"	1.75"	195	651	846	1 1/4" Rim Board	A3
2 - Stud wall - DF	5.50"	4.25"	1.75"	195	651	846	1 1/4" Rim Board	A3

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' o/c	
Bottom Edge (Lu)	24' 3" o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- Maximum allowable bracing intervals based on applied load.

Vertical Load	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 24' 5"	16"	12.0	40.0	Default Load

Weyerhaeuser Notes

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
mike jones Murar Engineering (208) 409-1763 Mjones@murarengineering.com	



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 ForteWEB v3.9, Engine: V8.4.3.94, Data: V8.1.7.3

File Name: cha & koo
 10 of 42

F2 Typical Distributed load						
Length=	1.75	x	16	M=L 2.0E	Load Type= D+L floor	
Repetitive=	No			1 LDF for repetitive		
Fv=	285 psi	Fb=	2600	psi E=	2000000 psi	Size Factor 1.96
Fv'=	285	Fb'=	5100	LDF=	1 LDF summation	
Load #1	Load Type= Floor Loads	wdl=	10 psf	wll=	40 psf	
Trib Back span=	20 ft	Trib Overhang=	ft	Trib=(b+o)2/(2xb)=	10.00 ft	
wdl=	100 plf	w live load=	400 plf	Floor Loads		
Distributed load to beam	wdl= 100 plf	w ll floor=	400 plf	wll roof	0 plf	
w for stress=	500 plf	D+L floor	w defl=	500 plf for	D+L floor	
Shear, Moment and Deflection	V= wl/2	3415 lbs	LDF=	1	A=	28 in
	M=wl^2/8	##### lb-ft			S=	74.66667 in ²
	$\Delta = 5wl^4/384 EI$		196 /l		I=	597.3333 in ³
Stresses	fv=	183 psi	64%	$\Delta dl =$	0.065575 in = /l	2500
	fb=	1874 psi	37%	$\Delta ll =$	0.2623 in = /l	625
				$\Delta tl =$	0.3 in = /l	500
Reactions	Rdl=	683 lbs	Overhang=	0 ft	Rdl OH=	683 lbs
	Rll floor=	2732 lbs	Trib=	7 ft	R ll floor OH=	2732 lbs
	Rll roof=	0 lbs			Rll roof OH=	0 lbs
	Rll snow=	0 lbs			Rll snow OH=	0 lbs
	Rxn Total=	3415 lbs	D+L floor		Rxn Total OH =	3415 lbs
F3 Point Load						
Length=	1.75	x	16	M=L 2.0E	Load Type= D+L floor	
Repetitive=	No			1 LDF for repetitive		
Fv=	285 psi	Fb=	2600	psi E=	2000000 psi	Size Factor 1.96
Fv'=	285	Fb'=	5100	LDF=	1 total LDF for load type	
Load #1	Load Type= Floor Loads	Pdl=	683 lbs	P ll=	2732 lbs	
Point Load to beam	Pdl=	683 lbs	P ll floor=	2732 lbs	Pll roof	0 lbs
	P snow=	0 lbs				
P for stress=	3415 lbs	D+L floor	P defl=	3415 lbs for	D+L floor	
Shear, Moment and Deflection	distance a=	2.5 ft smaller	b=	4.25 ft	A=	28 in
	V= Pb/l	2150 lbs	LDF=	1	S=	74.66667 in ²
	M=Pab/l	5375 lb-ft			I=	597.3333 in ³
	$\Delta = Pab(a+2b)\sqrt{3a(a+2b)}/27EI$		17 /l			
Stresses	fv=	115 psi	40%	$\Delta dl =$	0.005754 in = /l	14076
	fb=	864 psi	17%	$\Delta ll =$	0.023018 in = /l	3519
				$\Delta tl =$	0.03 in = /l	2815
Reactions	Rdl max=	430 lbs	Rdl min=	253 lbs		
	Rll floor max=	1720 lbs	Rll floor min=	1012 lbs		
	Rll roof max=	0 lbs	Rll roof min=	0 lbs		
	Rll snow max=	0 lbs	Rll snow min=	0 lbs		
	Rxn Total max=	2150 lbs	D+L floor	Rxn Total min=	1265 lbs	

F4 Typical Distributed load		5.5	x	9.5	B&S 6x, 8x DF#2	Load Type= D+L floor
Length=	8.5 ft	Repetitive=	No	1 LDF for repetitive		
Fv=	170 psi	Fb=	875	psi E=	1300000 psi	Size Factor 1.03
Fv'=	170	Fb'=	898	LDF=	1 LDF summation	
Load #1	Load Type= Floor Loads	wdl=	10 psf	wll=	40 psf	
Trib Back span=	24 ft	Trib Overhang=		Trib=(b+o)2/(2xb)=	12.00 ft	
wdl=	120 plf	w live load=	480 plf	Floor Loads		
Distributed load to beam	wdl= 120 plf	w ll floor=	480 plf	wll roof	0 plf	
	w snow= 0					
w for stress=	600 plf	D+L floor	w defl=	600 plf for	D+L floor	
Shear, Moment and Deflection	V= w/2	2550 lbs	LDF=	1	A=	52.25 in
	M=w/2/8	5419 lb-ft			S=	82.72917 in ²
	$\Delta = 5wl^4/1728/384 EI =$			54 /I	I=	392.9635 in ³
Stresses	fv=	73 psi		43%	$\Delta dl =$	0.02759 in = /I
	fb=	786 psi		88%	$\Delta ll =$	0.110358 in = /I
					$\Delta tl =$	0.1 in = /I
Reactions	Rdl=	510 lbs	Overhang=	0 ft	Rdl OH=	510 lbs
	Rll floor=	2040 lbs	Trib=	4 ft	R ll floor OH=	2040 lbs
	Rll roof=	0 lbs			Rll roof OH=	0 lbs
	Rll snow=	0 lbs			Rll snow OH=	0 lbs
	Rxn Total=	2550 lbs	D+L floor		Rxn Total OH =	2550 lbs
F5 Typical Distributed load						
		5.5	x	7.5	P&T 6x, 8x DF#2	Load Type= D+L floor
Length=	5.5 ft	Repetitive=	No	1 LDF for repetitive		
Fv=	170 psi	Fb=	750	psi E=	1300000 psi	Size Factor 1.05
Fv'=	170	Fb'=	790	LDF=	1 LDF summation	
Load #1	Load Type= Floor Loads	wdl=	10 psf	wll=	40 psf	
Trib Back span=	24 ft	Trib Overhang=		Trib=(b+o)2/(2xb)=	12.00 ft	
wdl=	120 plf	w live load=	480 plf	Floor Loads		
Distributed load to beam	wdl= 120 plf	w ll floor=	480 plf	wll roof	0 plf	
	w snow= 0					
w for stress=	600 plf	D+L floor	w defl=	600 plf for	D+L floor	
Shear, Moment and Deflection	V= w/2	1650 lbs	LDF=	1	A=	41.25 in
	M=w/2/8	2269 lb-ft			S=	51.5625 in ²
	$\Delta = 5wl^4/1728/384 EI =$			10 /I	I=	193.3594 in ³
Stresses	fv=	60 psi		35%	$\Delta dl =$	0.009829 in = /I
	fb=	528 psi		67%	$\Delta ll =$	0.039316 in = /I
					$\Delta tl =$	0.0 in = /I
Reactions	Rdl=	330 lbs	Overhang=	0 ft	Rdl OH=	330 lbs
	Rll floor=	1320 lbs	Trib=	3 ft	R ll floor OH=	1320 lbs
	Rll roof=	0 lbs			Rll roof OH=	0 lbs
	Rll snow=	0 lbs			Rll snow OH=	0 lbs
	Rxn Total=	1650 lbs	D+L floor		Rxn Total OH =	1650 lbs

F6 Typical Distributed load		5.5	x	9.5	B&S 6x, 8x DF#2	Load Type= D+S=
Length=	7 ft	Repetitive=	No	1 LDF for repetitive		
Fv=	170 psi	Fb=	875	psi E=	1300000 psi	Size Factor 1.03
Fv'=	195.5	Fb'=	1033	LDF=	1.15	LDF summation
Load #1	Load Type= Floor Loads	wdl=	10 psf	wll=	40 psf	
	Trib Back span= 2.66 ft	Trib Overhang=	ft	Trib=(b+o)2/(2xb)=	1.33 ft	
	wdl= 13.3 plf	w live load=	53 plf	Floor Loads		
Load #2	Load Type= Flat roof Snow Load	wdl=	20 psf	wll=	25 psf	
	Trib Back span= 29.5 ft	Trib Overhang=	ft	Trib=(b+o)2/(2xb)=	14.75 ft	
	wdl= 295 plf	w live load=	369 plf	Flat roof Snow Load		
Load #3	Load Type= Flat roof Snow Load	wdl=	20 psf	wll=	25 psf	
	Trib Back span= 2 ft	Trib Overhang=	2 ft	Trib=(b+o)2/(2xb)=	4.00 ft	
	wdl= 80 plf	w live load=	100 plf	Flat roof Snow Load		
Distributed load to beam		wdl= 388 plf	w ll floor=	53 plf	wll roof	0 plf
	w snow=	469				
	w for stress=	857 plf	D+S=	w defl=	857 plf for	D+S=
Shear, Moment and Deflection	V= wl/2	3000 lbs	LDF=	1.15	A=	52.25 in
	M=wl^2/8	5249 lb-ft			S=	82.72917 in ²
	$\Delta = 5wl^4 \cdot 1728 / 384 E I =$			36 /I	I=	392.9635 in ³
Stresses	fv=	86 psi		44%	$\Delta dl =$	0.041063 in = /I 2046
	fb=	761 psi		74%	$\Delta ll =$	0.04957 in = /I 1695
					$\Delta tl =$	0.1 in = /I 927
Reactions	Rdl=	1359 lbs	Overhang=	0 ft	Rdl OH=	1359.05 lbs
	Rll floor=	186 lbs	Trib=	4 ft	R ll floor OH=	186.2 lbs
	Rll roof=	0 lbs			Rll roof OH=	0 lbs
	Rll snow=	1641 lbs			Rll snow OH=	1640.625 lbs
	Rxn Total=	3000 lbs	D+S=		Rxn Total OH=	2999.675 lbs

F7 Typical Distributed load		5.5	x	7.5	P&T 6x, 8x DF#2	Load Type= D+S=
Length=	3.5 ft	Repetitive=	No	1 LDF for repetitive		
Fv=	170 psi	Fb=	750	psi E=	1300000 psi	Size Factor 1.05
Fv'=	195.5	Fb'=	909	LDF=	1.15 LDF summation	
Load #1	Load Type= Floor Loads	wdl=	10 psf	wll=	40 psf	
	Trib Back span= 2.66 ft	Trib Overhang=		Trib=(b+o)2/(2xb)=	1.33 ft	
	wdl= 13.3 plf	w live load=	53 plf	Floor Loads		
Load #2	Load Type= Flat roof Snow Load	wdl=	20 psf	wll=	25 psf	
	Trib Back span= 29.5 ft	Trib Overhang=		Trib=(b+o)2/(2xb)=	14.75 ft	
	wdl= 295 plf	w live load=	369 plf	Flat roof Snow Load		
Load #3	Load Type= Flat roof Snow Load	wdl=	20 psf	wll=	25 psf	
	Trib Back span= 2 ft	Trib Overhang=	2 ft	Trib=(b+o)2/(2xb)=	4.00 ft	
	wdl= 80 plf	w live load=	100 plf	Flat roof Snow Load		
Distributed load to beam		wdl= 388 plf	w ll floor=	53 plf	wll roof	0 plf
		w snow= 469				
w for stress=		857 plf	D+S=	w defl=	857 plf for	D+S=
Shear, Moment and Deflection	V= w/2	1500 lbs	LDF=	1.15	A=	41.25 in
	M=w/2	1312 lb-ft			S=	51.5625 in ²
	$\Delta = 5w/4 * 1728/384 E I =$			2 /l	I=	193.3594 in ³
Stresses	fv=	55 psi	28%	$\Delta dl =$	0.005216 in = /l	8053
	fb=	305 psi	34%	$\Delta ll =$	0.006296 in = /l	6671
				$\Delta tl =$	0.0 in = /l	3648
Reactions	Rdl=	680 lbs	Overhang=	0 ft	Rdl OH=	679.525 lbs
	Rll floor=	93 lbs	Trib=	2 ft	R ll floor OH=	93.1 lbs
	Rll roof=	0 lbs			Rll roof OH=	0 lbs
	Rll snow=	820 lbs			Rll snow OH=	820.3125 lbs
	Rxn Total=	1500 lbs	D+S=		Rxn Total OH =	1499.838 lbs
F8 Typical Distributed load						
		3	x	5.5	2x,4x DF#2	Load Type= D+S=
Length=	3 ft	Repetitive=	No	1 LDF for repetitive		
Fv=	180 psi	Fb=	900	psi E=	1600000 psi	Size Factor 1.30
Fv'=	207	Fb'=	1346	LDF=	1.15 LDF summation	
Load #1	Load Type= Flat roof Snow Load	wdl=	20 psf	wll=	25 psf	
	Trib Back span= 11 ft	Trib Overhang=		Trib=(b+o)2/(2xb)=	5.50 ft	
	wdl= 110 plf	w live load=	138 plf	Flat roof Snow Load		
Distributed load to beam		wdl= 110 plf	w ll floor=	0 plf	wll roof	0 plf
		w snow= 138				
w for stress=		248 plf	D+S=	w defl=	248 plf for	D+S=
Shear, Moment and Deflection	V= w/2	371 lbs	LDF=	1.15	A=	16.5 in
	M=w/2	278 lb-ft			S=	15.125 in ²
	$\Delta = 5w/4 * 1728/384 E I =$			0 /l	I=	41.59375 in ³
Stresses	fv=	34 psi	16%	$\Delta dl =$	0.003012 in = /l	11951
	fb=	221 psi	16%	$\Delta ll =$	0.003765 in = /l	9560
				$\Delta tl =$	0.0 in = /l	5311
Reactions	Rdl=	165 lbs	Overhang=	0 ft	Rdl OH=	165 lbs
	Rll floor=	0 lbs	Trib=	2 ft	R ll floor OH=	0 lbs
	Rll roof=	0 lbs			Rll roof OH=	0 lbs
	Rll snow=	206 lbs			Rll snow OH=	206.25 lbs
	Rxn Total=	371 lbs	D+S=		Rxn Total OH =	371.25 lbs

F9 Typical Distributed load		5.25	x	16	M=L 2.0E	Load Type= D+S=
Length=	21 ft	Repetitive=	No	1 LDF for repetitive		
Fv=	285 psi	Fb=	2600	psi E=	2000000 psi	Size Factor 0.96
Fv'=	327.75	Fb'=	2875	LDF=	1.15	LDF summation
Load #1	Load Type= Flat roof Snow Load	wdl=	20 psf	wll=	25 psf	
	Trib Back span= 21.5 ft	Trib Overhang=	ft	Trib=(b+o)2/(2xb)=	10.75 ft	
	wdl= 215 plf	w live load=	269 plf	Flat roof Snow Load		
Distributed load to beam	wdl= 215 plf	w ll floor=	0 plf	wll roof	0 plf	
	w snow= 269					
w for stress=	484 plf	D+S=		w defl=	484 plf for	D+S=
Shear, Moment and Deflection	V= w/2 5079 lbs	LDF=	1.15	A=	84 in	
	M=w/2/8 ##### lb-ft			S=	224 in ²	
	$\Delta = 5wl^4/1728/384 E I =$	1058 /I		I=	1792 in ³	
Stresses	fv= 91 psi	28%		$\Delta dl =$	0.262501 in = /	960
	fb= 1429 psi	50%		$\Delta ll =$	0.328126 in = /	768
				$\Delta tl =$	0.6 in = /	427
Reactions	Rdl= 2258 lbs	Overhang=	0 ft	Rdl OH=	2257.5 lbs	
	Rll floor= 0 lbs	Trib=	11 ft	R ll floor OH=	0 lbs	
	Rll roof= 0 lbs			Rll roof OH=	0 lbs	
	Rll snow= 2822 lbs			Rll snow OH=	2821.875 lbs	
	Rxn Total= 5079 lbs	D+S=		Rxn Total OH =	5079.375 lbs	

REVISION	DATE



1501 N 13th St. STE 202
BOISE IDAHO 83702
PHONE: 208-943-4225
FAX: 866-855-8379
EMAIL: CONTACT@MURARENGINEERING.COM

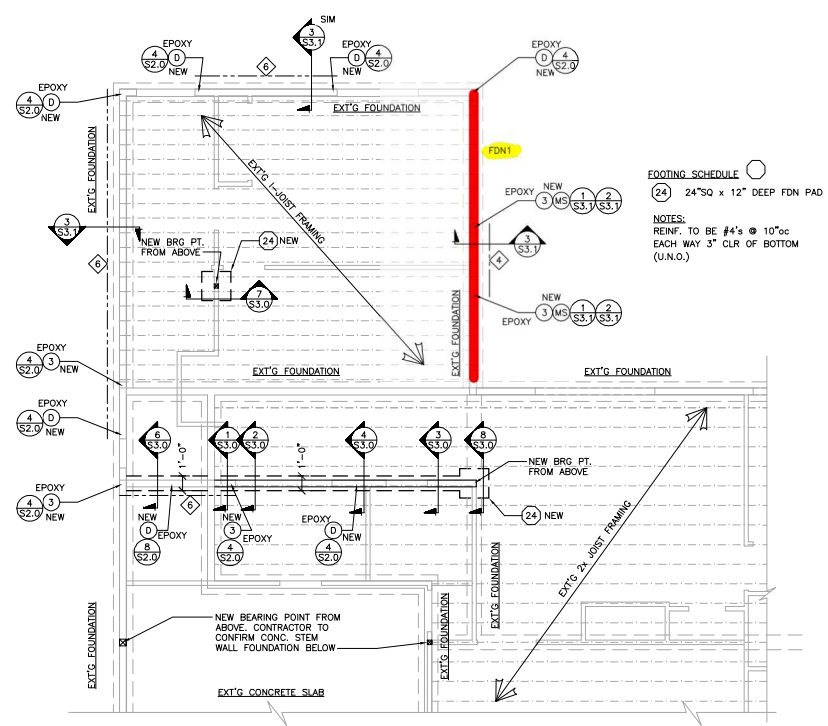
MURAR
ENGINEERING
& DESIGN INC

**NEW & EXISTING
FOUNDATION PLAN**

CHA & KOO REMODEL
3818 83rd AVE SE
MERCER ISLAND, wa 98040

DATE PLOTTED	
BY	
FILE NAME	
SCALE	
SHEET	

S1.0



FOOTING SCHEDULE

(24) 24"SQ x 12" DEEP FDN PAD

NOTES:
REINF. TO BE #4's @ 10"oc
EACH WAY 3" CLR OF BOTTOM
(U.N.O.)

HOLD DOWN SCHEDULE

- (CB) = CMSTC16 TO BELOW. SEE DETAIL 9/S4.0
 - (CA) = CMSTC16 ATTACHING DBL 2x STUDS ABOVE & DBL 2x STUDS BELOW RM BOARD AT FLOOR ON THIS LEVEL. STRAP MAY TERMINATE AROUND BEAM. SEE PLAN. SEE TYPICAL STRAP CONN. DETAILS 9 & 10/S2.0
 - (D) = DTT22 W/ CAST IN PLACE A.BOLT OR EPOXY SEE DETAILS 4 & 8/S2.0
 - (3) = HDU3 W/ CAST IN PLACE A.BOLT OR EPOXY SEE DETAILS 4 & 8/S2.0
 - (MS) = MSTM60 STRAP CONCRETE/2x WALL FRAMING. SEE DETAILS 1 & 2/S3.1
- NOTE:**
C.I.P. = CAST IN PLACE A.BOLTS
EPOXY = HOLD DOWN RODS ALLOWED TO BE EPOXIED SEE DETAILS 4 & 8/S2.0 FOR ADD'L SPECS.

FOUNDATION NOTES

- THE ENGINEER HAS PREPARED THIS DRAWING BASED ON THE DIMENSIONS, ELEVATIONS AND TOP OF CONCRETE PROVIDED BY THE ARCHITECT/DESIGNER. IT REMAINS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL DIMENSIONS ELEVATIONS AND TOP OF CONCRETE PRIOR TO COMMENCING CONSTRUCTION.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL WORK MATERIALS AND SAFETY IN CONFORMANCE WITH INTERNATIONAL BUILDING CODE (IBC) AND OSHA STANDARDS.
- FRAMING CONDITIONS MAY DEVELOP DURING CONSTRUCTION FOR WHICH NO SPECIFIC DETAIL OR TYPICAL CONSTRUCTION APPLIES. NOTIFY ENGINEER PRIOR TO PROCEEDING IF UNCLEAR.
- ALIGN HOLD DOWNS WITH END OF SHEARWALL STUDS ABOVE. ATTACH TO DOUBLE STUDS UNLESS NOTED OTHERWISE (UNO). USE HOLD DOWN EMBED AND PLACEMENT PER MANUFACTURER.
- DO NOT BACKFILL WALL UNTIL FLOOR IS FRAMED AND SHEATHED AND CONCRETE HAS CURED 7 DAYS (MINIMUM).
- ANCHOR BOLTS (1/2" EMBED 7") SHALL BE PLACED A MAXIMUM SPACING OF 48"oc ANCHOR BOLTS TO BE INSTALLED 12" FROM ENDS. TWO ANCHOR BOLTS MINIMUM ARE REQUIRED PER SILL. ANCHOR BOLTS AT SHEAR WALLS PER SHEAR WALL SCHEDULE.
- 1/2" w/ 5" EMBED TITEN HD SCREW ANCHORS CAN BE SUBSTITUTED FOR ANCHOR BOLTS
- ALL WOOD IN DIRECT CONTACT WITH CONCRETE SHALL BE PRESSURE TREATED FIR.
- ALL POSTS FROM THE UPPER LEVELS MUST BE ALIGNED WITH, AND MATCH THE POSTING BELOW TO THE FOUNDATION UNLESS TRANSFERRED.
- SEE DRAWING SHEETS S2 SERIES FOR GENERAL DETAILS NOT CALLED OUT HERE.

ABBREVIATION LIST

- ' - DEGREE
- Ø - DIAMETER
- A.B. - ANCHOR BOLT
- ARCH - ARCHITECT
- APA - AMERICAN PLYWOOD ASSOCIATION
- BLK'G - BLOCKING
- BM - BEAM
- BOT - BOTTOM
- C.I.P. - CAST IN PLACE
- CLR - CLEAR
- COL - COLUMN
- CONT - CONTINUOUS
- D.F. - DOUGLAS FIR
- DIM - DIMENSION
- EA - EACH
- E.W. - EACH WAY
- EXT - EXTERIOR
- FDN - FOUNDATION
- FRMG - FRAMING
- FT - FOOT, FEET
- FTG - FOOTING
- FND - FOUNDATION
- OSB - OSBUM BOARD
- HD - HOLD DOWN
- HDR - HEADER
- HORIZ - HORIZONTAL
- INT - INTERIOR
- LVL - LAMINATED VENEER LUMBER
- MAX - MAXIMUM
- MFR - MANUFACTURER
- MIN - MINIMUM
- N.T.S. - NOT TO SCALE
- P.T. - PRESSURE TREATED
- PL - PLATE
- PSL - PARALLAM
- REINF - REINFORCED
- REQ'D - REQUIRED
- SCHED - SCHEDULE
- SHT - SHEET
- STD - STANDARD
- STRUCT - STRUCTURAL
- T&G - TONGUE AND GROOVE
- TRTD - TREATED
- TYP - TYPICAL
- U.N.O. - UNLESS NOTED OTHERWISE
- VERT - VERTICAL
- w/ - WITH
- w/o - WITHOUT

SHEAR WALL SCHEDULE

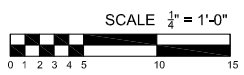
WHERE PANELS ARE APPLIED ON BOTH FACES OF A SHEAR WALL AND NAIL SPACING IS LESS THAN 6"oc ON EITHER SIDE, PANEL JOINTS SHALL BE OFFSET TO FALL ON DIFFERENT FRAMING MEMBERS. ALTERNATIVELY, THE WIDTH OF THE NAILED FACE OF FRAMING MEMBERS SHALL BE 3" NOMINAL OR GREATER AT ADJOINING PANEL EDGES AND NAILS AT ALL PANEL EDGES SHALL BE STAGGERED. SPACING OF ANCHOR BOLTS TO BE HALVED WHEN PANELS ARE APPLIED ON BOTH FACES OF A SHEAR WALL.

SHEAR WALL MARK	SHEATHING MATERIAL	FIELD NAILING ¹	EDGE NAILING ¹	BOTTOM PLATE	STUDS AT EDGE NAILING	ANCHOR BOLT ¹
⬠	1/2" SHT'G	8d's @ 12"oc	8d's @ 6"oc	2x	2x	1/2"x10" @ 48"oc
⬠	1/2" SHT'G	8d's @ 12"oc	8d's @ 4"oc	2x	3x	1/2"x10" @ 27"oc

NOTE

- ALL SHEAR WALLS LISTED MAY NOT BE USED ON THIS PROJECT.
- DOUBLE STUDS AND DOUBLE PLATES MAY BE SUBSTITUTED FOR 3x STUDS
 - A. WHEN 8d NAILS OR STAPLES ARE SPACED AT 3" OR LESS, EDGE & PANEL SPLICE MEMBERS TO BE 3x FRAMING MEMBERS OR DOUBLE STUDS.
3. NAILS OR STAPLES
 - A. 8d's = 2 1/2"x0.131" COMMON OR 2 1/2"x0.113" GALVANIZED BOX NAILS, 1/2" 16 GAUGE STAPLES
 - B. 1/2" 16 GAUGE STAPLES CAN BE SUBSTITUTED FOR 8d COMMONS OR 8d BOX NAILS WITH (3) STAPLES FOR EVERY (2) 8d's.
 - C. STAPLES TO HAVE 3/16" MIN CROWN WIDTH AND INSTALLED WITH THEIR CROWNS PARALLEL TO THE LONG DIM OF THE FRAMING MEMBER.
4. ANCHOR BOLTS TO BE ASTM A307, 1/2" w/ 7" EMBED IN FOUNDATION WALLS @ 48" O.C. (MAX) U.N.O. (SEE FOUNDATION PLAN FOR REQUIREMENTS AT SHEAR WALL). BOLTS TO BE WITHIN 12" (MAX) & 4" (MIN) TO ENDS OF SILL PLATES (COORDINATE WITH GENERAL CONTRACTOR) MINIMUM OF TWO ANCHOR BOLTS PER SILL PLATE
 - A. 0.229"x3"x3" SQUARE STEEL PLATE WASHERS SHALL BE PLACED BETWEEN SILL PLATE AND NUT PER IBC 2308.3.1.1
 - B. 1/2" w/ 5" EMBED TITEN HD SCREW ANCHORS w/ SO PL 0.229"x3"x3" CAN BE SUBSTITUTED FOR ANCHOR BOLTS
 - C. THE EDGE OF THE SQ PL WASHER SHALL BE PLACED PARALLEL WITHIN 1/2" OF THE SHEATHING AT SHEAR WALLS.
 - D. SQ PL WASHERS w/ 1/16"x1 1/2" MAXIMUM DIAGONAL SLOT MAY BE USED IF A STANDARD CUT PL WASHER IS PLACED BETWEEN THE NUT AND THE SQ PL WASHER.
5. STUDS AT ENDS OF SHEAR WALLS TO BE PER HOLD DOWN REQUIREMENTS.

NEW & EXISTING FOUNDATION PLAN



NORTH

BEAM CALCULATIONS - S1.0

FDN1 Enercalc Beam					
Span 1		10 ft			
Load #1	Load Type=	Flat roof Snow Loa	w dl=	20 psf	w ll= 25 psf
	Trib Back span=	24 ft	Trib Overhang=	1.5 ft	Trib=(b+o)2/(2xb)= 13.55 ft
	w dl plf at start=	270.9375 plf	w ll plf=	338.6719 plf at start	
	Start	0.00 ft	End=	10.00 ft	
Load #2	Load Type=	Floor Loads	w dl=	10 psf	w ll= 40 psf
	Trib Back span=	24 ft	Trib Overhang=	0 ft	Trib=(b+o)2/(2xb)= 12.00 ft
	w dl plf at start=	120 plf	w ll plf=	480 plf at start	
	Start	0.00 ft	End=	10.00 ft	
Foundation Bearing Capac		1500 psf	stem width=	6 in	
Applied Soil Pressure=		1264 psf	footing thick=	8 in	
			footing width=	12 in	
			reinf.=	(2) #4's cont at bott	

Beam on Elastic Foundation

Project File: Cha & Koo Residence - 2025-07July-8.ec6

LIC#: KW-06014228, Build:20.24.12.17

MURAR ENGINEERING & DESIGN

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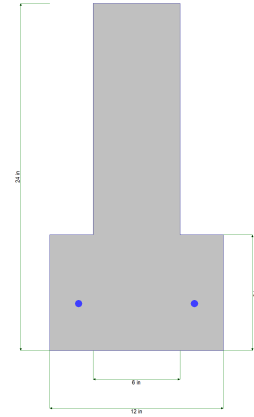
DESCRIPTION: FDN1 -

CODE REFERENCES

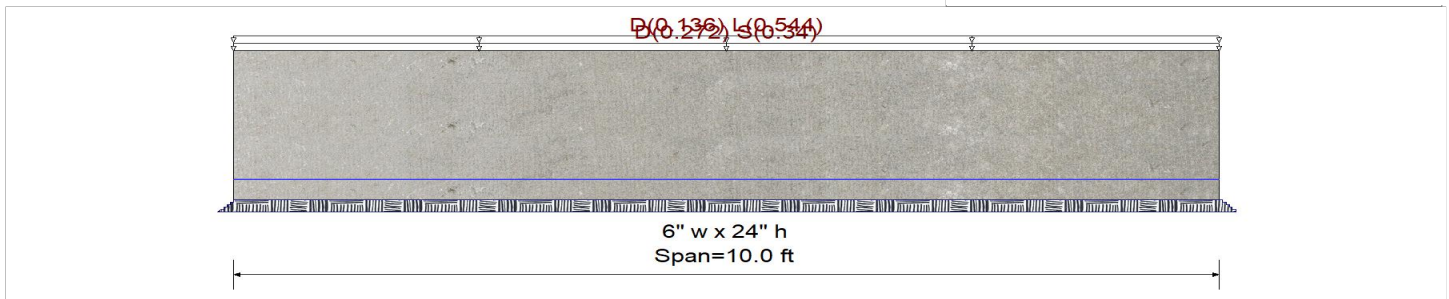
Calculations per ACI 318-19, IBC 2021
Load Combinations Used : IBC 2021

Material Properties

f'_c	=	2.50 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = f'_c^{1/2} \cdot 7.50$	=	375.0 psi		Shear :	0.750
Ψ Density	=	145.0 pcf	β_1	=	
λ Lt Wt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi			
Soil Subgrade Modulus	=	250.0 psi / (inch deflection)			
Load Combination	IBC 2021				
f_y - Main Rebar	=	60.0 ksi	Fy - Stirrups	=	40.0 ksi
E - Main Rebar	=	29,000.0 ksi	E - Stirrups	=	29,000.0 ksi
			Stirrup Bar Size #	=	# 3
			Number of Resisting Legs Per Stirrup	=	2



Beam is supported on an elastic foundation.



Cross Section & Reinforcing Details

Inverted Tee Section, Stem Width = 6.0 in, Total Height = 24.0 in, Top Flange Width = 12.0 in, Flange Thickness = 8.0 in
Span #1 Reinforcing....
2-#4 at 3.250 in from Bottom, from 0.0 to 10.0 ft in this span

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 = 0.020, S = 0.0250 ksf, Tributary Width = 13.60 ft, (load #1)

Uniform Load : D = 0.010, L = 0.040 ksf, Tributary Width = 13.60 ft, (load #2)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.000 : 1	Maximum Deflection	
Section used for this span	Typical Section	Max Downward L+Lr+S Deflection	0.000 in
Mu : Applied	-0.000105 k-ft	Max Upward L+Lr+S Deflection	0.000 in
Mn * Phi : Allowable	35.656 k-ft	Max Downward Total Deflection	0.035 in
Load Combination	+1.20D+1.60L+0.50S	Max Upward Total Deflection	0.005 in
Location of maximum on span	5.059 ft		
Span # where maximum occurs	Span # 1		

Maximum Soil Pressure = **1.264** ksf at 5.00 ft LdComb: +D+0.750L+0.750S
Allowable Soil Pressure = **1.50** ksf **OK**

Shear Stirrup Requirements

Entire Beam Span Length : $V_u < \phi V_c/2$, Req'd Vs = Not Req'd, use stirrups spaced at 0.000 in

Maximum Forces & Stresses for Load Combination

Load Combination	Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft)		
				Mu : Max	Phi*Mnx	Stress Ratio
MAXimum Bending Envelope						
+1.40D	Span # 1	1	9.882	-0.00	35.66	0.00
	Span # 1	1	9.882	-0.00	35.66	0.00



SEISMIC CALCULATIONS

Cha & Koo Remodel
3818 83rd AVE SE
MERCER ISLAND, WA 98040

Murar Engineering and Design, Incorporated

1501 N 13th St, Suite 202, Boise, Idaho 83702

Email: Contact@MurarEngineering.com

Phone: (208) 831-1111 Phone:(808)300-0999



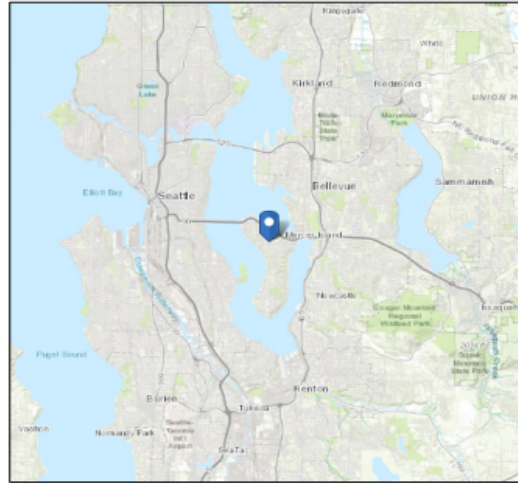
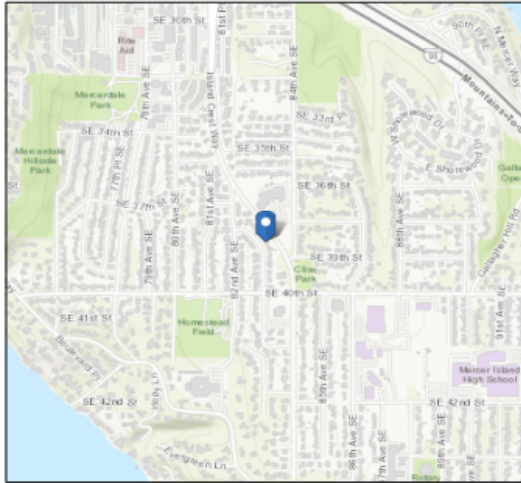
ASCE Hazards Report



Address:
3818 83rd Ave SE
Mercer Island, Washington
98040

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

Latitude: 47.576281
Longitude: -122.228203
Elevation: 288.7584248012929 ft (NAVD 88)



Seismic

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

Results:

S_s :	1.41	S_{D1} :	N/A
S_1 :	0.491	T_L :	6
F_a :	1.2	PGA :	0.604
F_v :	N/A	PGA _M :	0.724
S_{MS} :	1.692	F_{PGA} :	1.2
S_{M1} :	N/A	I_e :	1
S_{DS} :	1.128	C_v :	1.382

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

Data Accessed: Mon Jul 07 2025

Date Source: [USGS Seismic Design Maps](#)

SEISMIC INPUT per ASCE 7-16 and IBC		LIGHT FRAMED WOOD	
Project:	Cha & Koo Remodel		
Seismic Use Group =	I or II-Normal	ASCE 7-16 Table 1.5-1	
Soil Class	D Stiff Soil	ASCE 7-16 Table 20.3.1	
$S_s =$	1.410	From ASCE 7-16 Hazard Tool	
$S_1 =$	0.491	From ASCE 7-16 Hazard Tool	
$F_a =$	1.200	From ASCE 7-16 Hazard Tool	
$F_v =$	1.809	Calculated from S_1 per ASCE 7-16 Table 11.4.2	
$T_L =$	6.00 Sec	From ASCE 7-16 Hazard Tool	
$S_{ms} = F_a S_s =$	1.692		
$S_{m1} = F_v S_1 =$	0.888		
BASE SHEAR			
$R =$	6.50	ASCE 7 - 16 Table 12.2-1	
Conc/Masonry Shear Wall	N	ASCE 7 - 16 Section 12.8.2.1	
$C_d =$ Defl Amplification	4	ASCE 7 - 16 Table 12.2-1	
$I_e =$ Importance Factor=	1.00	ASCE 7 - 16 Table 1.5-2	
$C_w =$ Masonry Factor	1.00	ASCE 7-16 Calculate per Eq 12.8-10	
Resisting Element Type	All Others Including Wood Bearing walls		
$C_t =$ Period Parameter	0.020	ASCE 7 -16 Table 12.8-2	
$\alpha =$ Period Parameter	0.75	ASCE 7 -16 Table 12.8-2	
$h_n =$ Height of Building	19.00 ft		
$T_a = C_t h_n^\alpha$	0.18 s	ASCE 7 -16 eq 12.8-7	
COMPONENTS			
$R_p =$	3	ASCE 7 -16 Table 13.5-1	
$a_p =$	1	ASCE 7 -16 Table 13.5-1	
$I_p =$	1.00	ASCE 7 -16 Section 13.1.3	
$z =$	14	Height to Component above ground	
OUTPUT			
Seismic Category	D		
Building Meets exceptions for redundancy per ASCE 7 12.3.4.2 a.	Yes		
$\rho =$	1.0 per section 12.3.4		
Strength Design (Factored)		Allowable Stress Design	
BASE Shear $C_s \times \rho =$	0.17 g	BASE Shear $C_s =$	0.12 g
Vertical Force $\times \rho =$	0.23 g	Vertical Force =	0.16 g
Component Shear $\times \rho =$	0.37 g	Component Shear =	0.27 g

CALCULATIONS AND EQUATIONS		
$T_a = C_t h_n^x =$	0.18 s	ASCE 7 -16 eq 12.8-7
$T_s = S_{D1} / S_{DS} =$	0.52 s	ASCE 7 -16 SECTION 11.4.6
$S_{ds} = 2/3 S_{ms} =$	1.13 s	ASCE 7 Equation 11.4-3
$S_{d1} = 2/3 S_{m1} =$	0.59 s	ASCE 7 Equation 11.4-3
Seismic Design Category Based on Short Period Response Acceleration Parameter		
Seismic Category =	D	ASCE 7 Table 11.6-1 Based on S_{ds}
Seismic Category =	D	Section 11.6 if the $S_1 > 0.75$ or Risk Category IV
Seismic Design Category Based on 1-S Period Response Acceleration Parameter		
Seismic Category	D	ASCE 7 Table 11.6-2
Seismic Category	D	Section 11.6 if the $S_1 > 0.75$ or Risk Category IV
Seismic Category	D	Greater of Table ASCE table 11.6-1 and 11.6-2
$C_s = S_{ds} / (R/I) =$	0.17	ASCE 7 -16 eq 12.8-2
$C_s = S_{d1} / (T (R/I) =$	0.50	ASCE 7-16 Eq 12.8-3 But not greater than this Eq
$C_s = .044 S_{ds} I =$	0.05	ASCE 7-16 Eq 12.8-5 Nor less than this Eq
$C_s = 0.5 S_1 / (R/I) =$	0.00	ASCE 7-16 Eq 12-8-6 if $S_1 > 0.6g$
Base Shear $C_s =$	0.17 g	
Vertical Component = $0.2S_{ds}$	0.23 g	
$F_p = (.4 a_p S_{ds}/R_p/I)(1+2z/h)$	0.37	Eq 13.3-1
$F_p = 1.6 S_{ds} I_p$	1.80	Eq 13.3-2 Not Greater than this Eq
$F_p = .3 S_{ds} I_p$	0.34	Eq 13.3-3 But not less than this eqn
$F_p =$	0.37	W_p



WIND CALCULATIONS

Cha & Koo Remodel

3818 83rd AVE SE
MERCER ISLAND, WA 98040

Murar Engineering and Design, Incorporated

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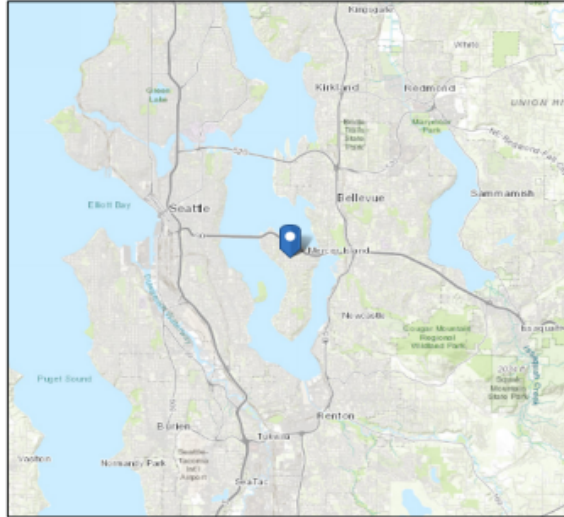
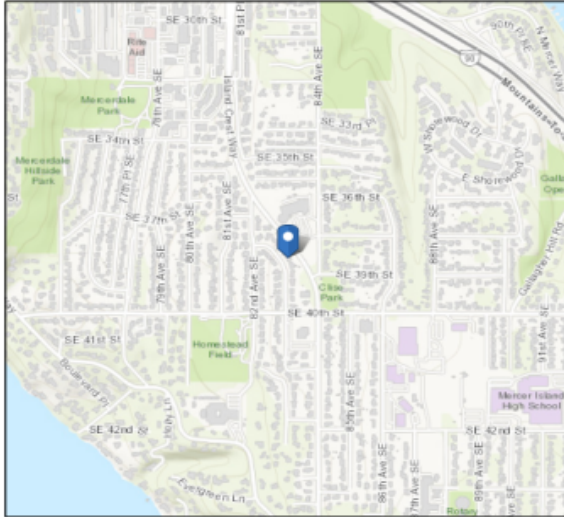
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Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see Section 11.4.3)

Latitude: 47.576281
Longitude: -122.228203
Elevation: 288.7584248012929 ft (NAVD 88)



Wind

Results:

Wind Speed	98 Vmph
10-year MRI	67 Vmph
25-year MRI	74 Vmph
50-year MRI	78 Vmph
100-year MRI	83 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Mon Jul 07 2025

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

ASCE 7-16 Chapter 28 Wind Loads on Buildings - MWFRS Envelope

Location Mainland US Structure Type Main Wind Force Resisting System

Building Parameters

Mean Roof Height= 19 ft.
 Roof Angle 3 :12 = 14 degrees
 Least Horizontal Dim= 24.33 ft.10% or .4h= 2.43 ft min
 4% or 3ft max= 3 ft.
 a= 3 ft. 2a= 6 ft min
 See ASCE 7-16 Table 28.2-1 Steps to Determine Wind Loads on MWFRS Low Rise Buildings

Step 1 Risk Category II Normal

Step 2 Basic Wind Speed= 98 mph Per ASCE 7 -16 Hazard Tool Map included

Step 3 Structure Type

Wind Directionality Kd= 0.85 MWFRS and C&C Table 26.6-1
 Exposure C See ASCE 7-16 Section 26.7.3
 Topographic factor Kzt= 1.0 Per Hawaii Maps, Fig 26.5-2A thru 26.5-2D
 Enclosure Classification Enclosed
 Internal Press Gcp +/-= 0.18 ASCE 7-16 Section 26.12 and Table 26.13-1

Step 4 Determine velocity pressure exposure coefficient Kz or Kh Table 26.10-1

Height	EXP
ft	C
19	0.89

At mean roof height

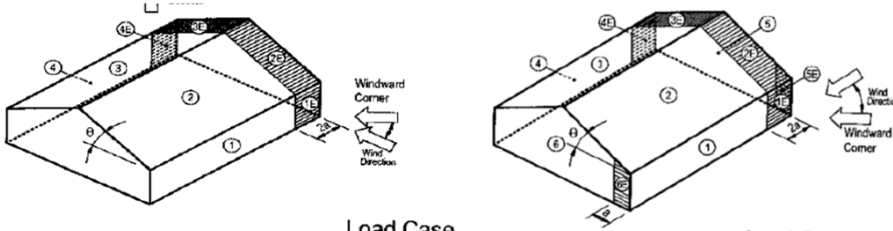
Step 5 Determine velocity pressure qz or qh Eq 28.3-1 $qz = 0.00256 K_z K_{zt} K_d V^2$ Eq 26.10-1

Height	
ft	qz psf
15	17.74 psf
20	18.85 psf
At Mean Roof Height	
qh=	18.65 psf

Step 6 Determine external Coefficient GCp using figures 28.3-1

Load Case A	GCpf	Zone							
Angle	1	2	3	4	1E	2E	3E	4E	
between 5 and 20	0.48	-0.69	-0.44	-0.37	0.72	-1.07	-0.63	-0.56	
between 20 and 30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
between 30 and 45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Between 45 and 90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Greater than 70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
14	0.48	-0.69	-0.44	-0.37	0.72	-1.07	-0.63	-0.56	

Load Case B	GCpf	Zone									
1	2	3	4	5	6	1E	2E	3E	4E	5E	6E
-0.45	-0.69	-0.37	-0.45	0.40	-0.29	-0.48	-1.07	-0.53	-0.48	0.61	-0.43



Load Case A

Load Case B

Horizontal Factor for Roof loads due to Roof angle of 14.00 deg = 0.24

GCpf-Gcpi										Walls		Roof	
Load Case A	1	2	3	4	1E	2E	3E	4E		1+4	1E+4E	2+3	2E+3E
Height	0.30	-0.87	-0.62	-0.55	0.54	-1.25	-0.81	-0.74		0.85	1.28	-0.06	-0.11
GCpf+Gcpi	1	2	3	4	1E	2E	3E	4E		1+4	1E+4E	2+3	2E+3E
	0.66	-0.51	-0.26	-0.19	0.90	-0.89	-0.45	-0.38		0.85	1.28	-0.06	-0.11

Load Case B

GCpf+Gcpi												
1	2	3	4	5	6	1E	2E	3E	4E	5E	6E	
-0.27	-0.51	-0.19	-0.27	0.58	-0.11	-0.30	-0.89	-0.35	-0.30	0.79	-0.25	
GCpf-Gcpi												
1	2	3	4	5	6	1E	2E	3E	4E	5E	6E	
-0.63	-0.87	-0.55	-0.63	0.22	-0.47	-0.66	-1.25	-0.71	-0.66	0.43	-0.61	

Load Case B addition of Walls GCpf+Gcpi

Walls GCpf-Gcpi

5+6	1E+4E
0.85	1.09
0.85	1.09

Step 7 Calculate Wind Pressure p from equation 28.4.1

For MWFRS the windward and leeward walls will combine pressures to impart a lateral force on the shear walls. In this case zones 1 and 4 will combine with the load perpendicular to the ridge and zone 5 and 6 will combine for winds parallel with the ridge. To be conservative the maximum combination of either zone 1 plus 4 or zone 5 plus 6 will be used for the overall wind load (and 1E,4E,5E,6E respectively)

The horizontal roof portion of the wind force will be broken down so that the wind on the roof can be accounted for in the calculations of the overall wind force. This is done by adding zone 2+3 and zones 2E+3E

Max Combined=	0.85	for interior zones	Max Combined=	-0.06	for interior zones
Walls	1.28	for edge zone in 2a	Roof	-0.11	for edge zone in 2a

	Walls		Roof	
Height	p=qz (GCpf - Gcpi)		p=qz (GCpf - Gcpi)	
ft	qz int	qz edge	qz int	qz edge
15	15.1	22.7 psf		
20	16.1	24.1 psf		
At Mean Roof Height	15.89	23.87 psf	-1.15	-2.01 psf

Summary of Strength Design (LRFD)

- 0.6 W= 15.89 psf for walls at interior zones 1 and 4, 5 and 6
- 23.87 psf for wall edge zones 1E and 4E, 5E and 6E
- 1.15 psf for roof at interior zones 2+3
- 2.01 psf for roof edge zones 2E+3E

For ASD multiply wind by 0.6 per Load Combinations in section 2.4.1

- 0.6 W= 9.532 psf for walls at interior zones 1 and 4, 5 and 6
- 14.32 psf for Wall edge zones 1E and 4E, 5E and 6E
- 0.689 psf for roof at interior zones 2+3
- 1.205 psf for roof edge zones 2E+3E

Summary

To simplify the calculations the greater off the addition of walls leeward and windward were used to determine the interior and edge pressures. The mean roof height was used to determine the overall wind pressure. Both off these are conservative since the pressure in one direction is typically less than the pressure in another direction, and the greater of the combination of these windward and leeward pressures were used. The wind pressures for the roof has been split up and will be used for the upper most level of the structure.

Edge Wind pressure= 23.87 psf for wall edge zones 1E and 4E, 5E and 6E

Interior Wind Pressure= 15.89 psf for walls at interior zones 1 and 4, 5 and 6

Roof Edge Pressure= -2.01 psf for roof at edge zones 2E+3E

Roof Interior Pressure= -1.15 psf for roof interior zones 2+3

Edge Distance 2a= 6 ft



SHEAR WALL CALCULATIONS

Cha & Koo Remodel
3818 83rd AVE SE
MERCER ISLAND, WA 98040

Murar Engineering and Design, Incorporated

1501 N 13th St, Suite 202, Boise, Idaho 83702

Email: Contact@MurarEngineering.com

Phone: (208) 831-1111 Phone:(808)300-0999

SHEAR WALLS - LRFD

Type of Sheathing **Ply**

Values used for Holdowns

Simpson Allowable ASD	x1.4 Seismic	x 1.6 Wind	Type	Hold Down	Δ_a
2145	3003	3432	D	DTT2Z	0.128
2570	3598	4112	L	LTTP2	0.12
3130	4382	5008	3B	HD3B	0.136
3790	5306	6064	3	HDUE3	Anchor Per Dtl 0.127
5375	7525	8600	5	HDUE5	0.146
7015	9821	11224	7	HDUE7	0.154
9390	13146	15024	9	HDUE9	0.134

Values used for Straps

Simpson Allowable ASD	x1.4 Seismic	x 1.6 Wind	Type	Strap	Δ_a
1705	2387	2728	CS	CS16	0.125
4690	6566	7504	C16	CMSTC16	0.125
6475	9065	10360	C14	CMSTC14	0.125
9215	12901	14744	C12	CMSTC12	0.125

Values used for Shear Walls

Tabulated Table 4.3A	x 0.8 Value		Wood Structural Panels rated Sheathing Exposure 1			G_a
	Seismic	Wind				
220	176	246	Type 7-	1/2 GWB 1 5/8" nails @ 4"oc edges & 5"oc field	6	
520	416	582	Type 6-	15/32 8d's @ 6"oc	10	
760	608	851	Type 4-	15/32 8d's @ 4"oc	13	
980	784	1098	Type 3-	15/32 8d's @ 3"oc	15	
1280	1024	1434	Type 2-	15/32 8d's @ 2"oc	20	

Deflection

$$\delta_{sw} = 8vh^3/EAb + vh/1000 G_a + h \Delta_a/b$$

- A= A of boundary element cross section, in². Assume (2) 2x6 = 16.5 in²
- b= Wall width, ft. For perf walls b= $\sum L_i$
- d_a= Deflection due to anchorage details, in.
- E= Modulus of Elasticity of boundary element, psi. E=1600000 psi
- e_n= Deformation of mechanically fastened connections, in. Assume 0.049
- G_a= Apparent shear wall stiffness from nail slip and panel shear deformation k/in
- h= Wall height, ft
- v= Maximum unit shear due to design loads at the top of the all, lb/ft.
For perf walls v = v_{max} = V/(C_o x $\sum L_i$)

PERFORATED WALL SEGMENT RATIO

Perforated Wall Segment Table		H/3	H/2	2H/3	5H/6	H
		2	3	4	5	6
Wall Height	8	2.67	4.00	5.33	6.67	8.00
Wall Height	9	3.00	4.50	6.00	7.50	9.00
Wall Height	10	3.33	5.00	6.67	8.33	10.00
Percentage of full ht		Shear adjustment factor				
	0.1	1.00	0.69	0.53	0.43	0.36
	0.2	1.00	0.71	0.56	0.45	0.38
	0.3	1.00	0.74	0.59	0.49	0.42
	0.4	1.00	0.77	0.63	0.53	0.45
	0.5	1.00	0.80	0.67	0.57	0.50
	0.6	1.00	0.83	0.71	0.63	0.56
	0.7	1.00	0.87	0.77	0.69	0.63
	0.8	1.00	0.91	0.83	0.77	0.71
	0.9	1.00	0.95	0.91	0.87	0.83
	1	1.00	1.00	1.00	1.00	1.00

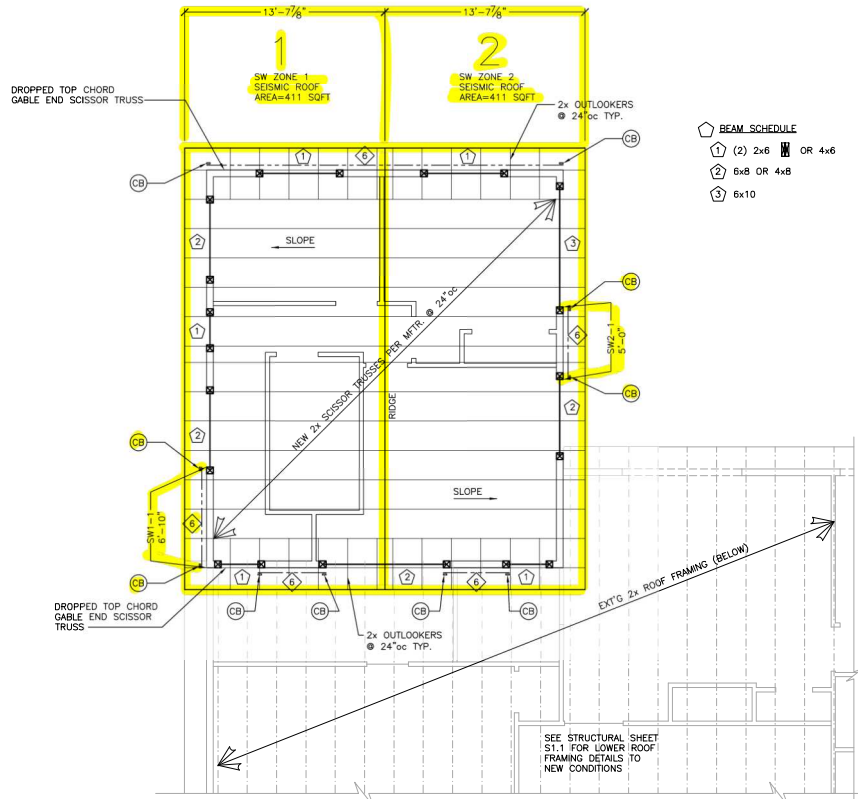
SEISMIC LOADS

Seismic Category = D

Snow included? yes Percentage of Snow included in Seismic Roof Dead Load= 35%
 Snow Load to include= 8.75 psf
 Roof DL without snow= 20 psf
 Roof DL for Seismic= 29 psf
 Floor DL= 10 psf
 Seismic Load= E 0.17 g strength Design, Factored R 6.50 C_d 4.00 Ω 3.00 ρ 1.00

WIND LOADS - Strength Design

Wind Edge dist 2a= 6.00 ft
 Wall Edge pressure= 23.87 psf Roof Edge pressure= -2.01 psf
 Wall Interior pressure= 15.89 psf Roof Interior pressure= -1.15 psf



FRAMING NOTES

- SEE ARCH. FLOOR PLAN FOR PLATE HEIGHTS.
- REFER TO LATERAL BRACING PRIOR TO FRAMING.
- PROVIDE (2) STUDS UNDER ALL BEARING POINTS U.N.O. PROVIDE SOLID BLOCKING AT ALL POINT LOADS TO FOUNDATION. SOLID BLOCK BETWEEN ALL FLOOR CAVITIES, MATCHING COLUMN SIZE ABOVE.
- UNLESS OTHERWISE NOTED, PROVIDE (1) KING STUD AND (1) TRIMMER AT EACH SIDE OF ALL OPENINGS.
- TRUSS-TO-TRUSS CONNECTIONS PROVIDED BY TRUSS MFR. TRUSS MFR SHALL VERIFY ALL DIMENSIONS OFF OF FPN PLAN AND FLOOR PLAN PRIOR TO TRUSS FABRICATION AND NOTIFY ENGINEER OF ANY LAYOUT CHANGES.
- PROVIDE ATTIC VENTILATIONS AS REQUIRED BY CODE.
- CONTRACTOR SHALL INSTALL TRUSSES PER TRUSS MANUFACTURER'S SPECIFICATIONS, INCLUDING PROVIDING FASTENERS TO RESIST ANY UPLIFT.
- ROOF SHEATHING: 19/32" APA RATED: SHT'G WITH 10d NAILS AT 6" OC ALONG EDGES AND DIAPHRAGM BOUNDARIES AND 12" OC IN THE FIELD.
- FLOOR SHEATHING: 3/4", APA RATED: SHT'G, T&G WITH 10d NAILS @ 6" OC ALONG EDGES AND DIAPHRAGM BOUNDARIES AND 12" OC IN THE FIELD.
- LIQUID NAILS BECK AND FLOOR ADHESIVE OR SIMILAR MAY BE APPLIED WITH #10 SCREWS AS AN ALTERNATIVE METHOD TO ATTACH SHEATHING TO JOIST MEMBERS.
- EXTERIOR WALLS TO BE 2x DF NO. 2 STUDS AT 16" OC. INTERIOR WALLS TO BE PER PLAN @ 16" OC.
- THE ENGINEER HAS PREPARED THIS DRAWING BASED ON THE DIMENSIONS, ELEVATIONS AND TOP OF CONCRETE PROVIDED BY THE ARCHITECT. IT REMAINS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL DIMENSIONS ELEVATIONS AND TOP OF CONCRETE PRIOR TO COMMENCING CONSTRUCTION.
- FRAMING CONDITIONS MAY DEVELOP DURING CONSTRUCTION FOR WHICH NO SPECIFIC DETAIL OR TYPICAL CONSTRUCTION APPLIES. NOTIFY ENGINEER PRIOR TO PROCEEDING IF UNCLEAR.
- ALIGN HOLD DOWNS WITH END OF SHEARWALL STUDS ABOVE. ATTACH TO DOUBLE STUDS UNLESS NOTED OTHERWISE (UNO). USE HOLD DOWN EMBED AND PLACEMENT PER MANUFACTURER.
- PRESERVATIVE TREATED OR PRESSURE TREATED (PT) LUMBER SHALL MEET THE U1 AND M4 STANDARDS SET BY THE AMERICAN WOOD PROTECTION ASSOCIATION (AWPA).
- CONTRACTOR TO PROVIDE WOOD STAIR FRAMING/LANDING MEMBERS AND CONNECTIONS
- SEE DRAWING SHEETS S2 SERIES FOR GENERAL DETAILS NOT CALLED OUT HERE.

ABBREVIATION LIST

- ' - DEGREE
- Ø - DIAMETER
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- BOT - BOTTOM
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- CLR - CLEAR
- COL - COLUMN
- CONT - CONTINUOUS
- D.F. - DOUGLAS FIR
- DIM - DIMENSION
- EA - EACH
- E.W. - EACH WAY
- EXT - EXTERIOR
- FDN - FOUNDATION
- FRMG - FRAMING
- FT - FOOT, FEET
- FTG - FOOTING
- FND - FOUNDATION
- GRB - GYPSUM BOARD
- HD - HOLD DOWN
- HDR - HEADER
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- REQ'D - REQUIRED
- SCHED - SCHEDULE
- SH - SHEET
- STD - STANDARD
- STRUCT - STRUCTURAL
- T&G - TONGUE AND GROOVE
- TRTD - TREATED
- TYP - TYPICAL
- U.N.O. - UNLESS NOTED OTHERWISE
- VERT - VERTICAL
- w/ - WITH
- w/o - WITHOUT

SHEAR WALL SCHEDULE

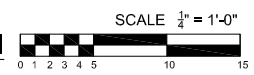
WHERE PANELS ARE APPLIED ON BOTH FACES OF A SHEAR WALL AND NAIL SPACING IS LESS THAN 6" OC ON EITHER SIDE, PANEL JOINTS SHALL BE OFFSET TO FALL ON DIFFERENT FRAMING MEMBERS. ALTERNATIVELY, THE WIDTH OF THE NAILED FACE OF FRAMING MEMBERS SHALL BE 3" NOMINAL OR GREATER AT ADJOINING PANEL EDGES AND NAILS AT ALL PANEL EDGES SHALL BE STAGGERED. SPACING OF ANCHOR BOLTS TO BE HALVED WHEN PANELS ARE APPLIED ON BOTH FACES OF A SHEAR WALL.

SHEAR WALL MARK	SHEATHING MATERIAL	FIELD NAILING ¹	EDGE NAILING ¹	BOTTOM PLATE	STUDS AT EDGE NAILING	ANCHOR BOLT ¹
◇	1/2" SHT'G	8d's @ 12" OC	8d's @ 6" OC	2x	2x	1/2"x10" @ 48" OC
◇ ²	1/2" SHT'G	8d's @ 12" OC	8d's @ 4" OC	2x	3x	1/2"x10" @ 27" OC

NOTE

- ALL SHEAR WALLS LISTED MAY NOT BE USED ON THIS PROJECT.
- DOUBLE STUDS AND DOUBLE PLATES MAY BE SUBSTITUTED FOR 3x STUDS
 - WHEN 8d NAILS OR STAPLES ARE SPACED AT 3" OR LESS, EDGE & PANEL SPLICE MEMBERS TO BE 3x FRAMING MEMBERS OR DOUBLE STUDS.
 - NAILS OR STAPLES
 - 8d's = 2 1/2"x0.131" COMMON OR 2 1/2"x0.113" GALVANIZED BOX NAILS, 1/2" 16 GAUGE STAPLES
 - 1/2" 16 GAUGE STAPLES CAN BE SUBSTITUTED FOR 8d COMMONS OR 8d BOX NAILS WITH (3) STAPLES FOR EVERY (2) 8d's
 - STAPLES TO HAVE 3/16" MIN CROWN WIDTH AND INSTALLED WITH THEIR CROWNS PARALLEL TO THE LONG DIM OF THE FRAMING MEMBER.
- ANCHOR BOLTS TO BE ASTM A307, 1/2" w/ 7" EMBED IN FOUNDATION WALLS @ 48" O.C. (MAX) U.N.O. (SEE FOUNDATION PLAN FOR REQUIREMENTS AT SHEAR WALL). BOLTS TO BE WITHIN 12" (MAX) & 4" (MIN) TO ENDS OF SILL PLATES (COORDINATE WITH GENERAL CONTRACTOR) MINIMUM OF TWO ANCHOR BOLTS PER SILL PLATE
 - 0.229"x3"x3" SQUARE STEEL PLATE WASHERS SHALL BE PLACED BETWEEN SILL PLATE AND NUT PER IRC 2308.3.1.1
 - 1/2" w/ 5" EMBED TITEN HD SCREW ANCHORS w/ SQ PL 0.229"x3"x3" CAN BE SUBSTITUTED FOR ANCHOR BOLTS
 - THE EDGE OF THE SQ PL WASHER SHALL BE PLACED PARALLEL WITHIN 1/2" OF THE SHEATHING AT SHEAR WALLS.
 - SQ PL WASHERS w/ 1 1/2"x1 1/2" MAXIMUM DIAGONAL SLOT MAY BE USED IF A STANDARD CUT PL WASHER IS PLACED BETWEEN THE NUT AND THE SQ PL WASHER.
- STUDS AT ENDS OF SHEAR WALLS TO BE PER HOLD DOWN REQUIREMENTS.

UPPER ROOF FRAMING PLAN



NORTH

REVISION DATE

FOR PERMIT 2023JAN17

1501 N 13th St. STE 202
BOISE, IDAHO 83702
PHONE: 208-842-1425
FAX: 866-855-8379
EMAIL: CONTACT@MURARENGINEERING.COM

MURAR
ENGINEERING & DESIGN INC

UPPER ROOF FRAMING PLAN

CHA & KOO REMODEL
3818 83rd AVE SE
MERCER ISLAND, wa 98040

DATE/ENTRY
BY
FILE NAME
CLUSTER/PROJECT/DATE
SCALE
SHEET

S1.2

V Up/Down Direction with Numerical Shear Zones - S1.2

SHEAR WALLS ALONG ZONE 1		Segmented: 2b/h Exception	
Seismic Calculation			
Seismic Zone =	1	Seismic Area =	411 SF roof 2051 lbs
V=Total Seismic Load=	2051 lbs factored Strength Design		Unfactored Eqk= 1465 lbs
Wind Calculation			
Wall Area Hgt =	6 ft	Roof Height=	0 ft
Wall Area Width=	12 ft	Roof Width=	0 ft
Edge Included?	Y Y or N	Edge Included?	Y Y or N
Edge Zone Width=	6 ft	Edge Zone Width=	0 ft
Interior Zone Width =	6 ft	Interior Zone Width=	0 ft
Edge SF=	36 SF	Edge SF=	0 SF
Interior SF=	36 SF	Interior SF=	0 SF
Vwall = Area x w=	1431 lbs	Vroof=A x w =	0 lbs
Check 16 psf Min Vwall=	1152 lbs	8psf Min (ASCE7 28.3.4)=	0 lbs
V=Total Wind Load=	1431 lbs per calc'd area		Unfactored Wind= 856.9 lbs
V=	2051 lbs Seismic Governs		

Shear Wall Calculations

Shear Wall Label	SW 1-1		
Wall Lengths = l= ft	6.83	Total=	6.8
hgt= ft	8	ft	
SW Ratio h/l=	1.2		
NAILING			
SW Panel Nailing	Type 6-		
SW Sht'g Both Sides?	No		
Ratio (2l/h) =	1.0		
Shear Distrib Ratio =	100.0%	100%	
Nom SW Seis Cap =	2841.28	lbs	
Adj SW Seis Cap =	2841	2841 lbs	
Seis Unit Load to SW =	300	plf	
Req'd Nailing: Seis	Type 6-		
Nom SW Wind Cap =	3977.792	lbs	
Adj SW Wind Cap =	3978	3978 lbs	
Wind Unit Load to SW =	210	plf	
Req'd Nailing: Wind	Type 7-		
ATTACH WALL TO DIAPHRAGM			
RBC's	25	Top Plate	
10d's	10	Btm Plate	
A.Bolt Spacing	59	in oc	
Holdown for Seismic	D		
Holdown for Wind	D		
Wind: $\delta_{sw} =$	0.18	in	
Wind: $\delta_{allow} = L/168 =$	0.57	in	
Deflection=	OK		

SHEAR WALLS ALONG ZONE 2 Segmented: 2b/h Exception

Seismic Calculation

Seismic Zone =	2	Seismic Area =	411 SF	roof	2051 lbs
V=Total Seismic Load=	2051 lbs factored Strength Design		Unfactored Eqk=	1465 lbs	

Wind Calculation

Wall Area Hgt =	6 ft	Roof Height=	0 ft	
Wall Area Width=	12 ft	Roof Width=	0 ft	
Edge Included?	Y Y or N	Edge Included?	Y Y or N	
Edge Zone Width=	6 ft	Edge Zone Width=	0 ft	
Interior Zone Width =	6 ft	Interior Zone Width=	0 ft	
Edge SF=	36 SF	Edge SF=	0 SF	
Interior SF=	36 SF	Interior SF=	0 SF	
Vwall = Area x w=	1431 lbs	Vroof=A x w =	0 lbs	
Check 16 psf Min Vwall=	1152 lbs	8psf Min (ASCE7 28.3.4)=	0 lbs	
V=Total Wind Load=	1431 lbs per calc'd area		Unfactored Wind=	856.9 lbs

V= 2051 lbs Seismic Governs

Shear Wall Calculations

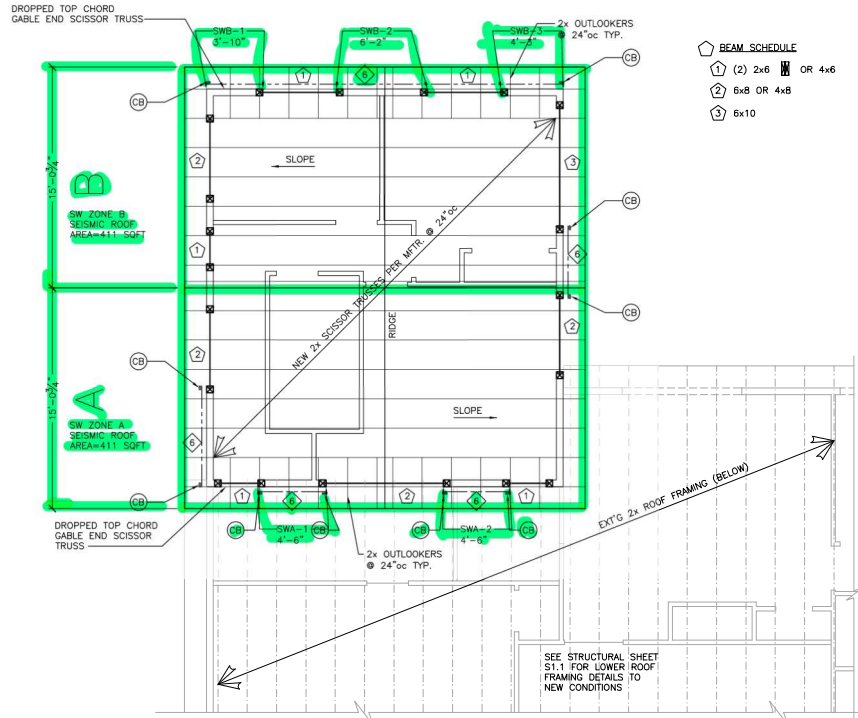
Shear Wall Label	SW 2-1		
Wall Lengths = l= ft	5	Total=	5.0
hgt= ft	8	ft	
SW Ratio h/l=	1.6		

NAILING

SW Panel Nailing	Type 6-		
SW Sht'g Both Sides?	No		
Ratio (2l/h) =	1.0		
Shear Distrib Ratio =	100.0%	100%	
Nom SW Seis Cap =	2080	lbs	
Adj SW Seis Cap =	2080	2080 lbs	
Seis Unit Load to SW =	410	plf	
Req'd Nailing: Seis	Type 6-		
Nom SW Wind Cap =	2912	lbs	
Adj SW Wind Cap =	2912	2912 lbs	
Wind Unit Load to SW =	286	plf	
Req'd Nailing: Wind	Type 6-		

ATTACH WALL TO DIAPHRAGM

RBC's	18	Top Plate	
10d's	7	Btm Plate	
A.Bolt Spacing	43	in oc	
Holdown for Seismic	3B		
Holdown for Wind	D		
Wind: $\delta_{sw} =$	0.30	in	
Wind: $\delta_{allow} = L/168 =$	0.57	in	
Deflection=	OK		



BEAM SCHEDULE

①	(2) 2x8	OR 4x6
②	6x8	OR 4x8
③	6x10	

HOLD DOWN SCHEDULE

- Ⓢ = CMSTC16 TO BELOW. SEE DETAIL 9/S4.0
- ⓈA = CMSTC16 ATTACHING DBL 2x STUDS ABOVE & DBL 2x STUDS BELOW RIM BOARD AT FLOOR ON THIS LEVEL. STRAP MAY TERMINATE AROUND BEAM. SEE PLAN. SEE TYPICAL STRAP CONN. DETAILS 9 & 10/S2.0
- ⓈD = DTT22 W/ CAST IN PLACE A.BOLT OR EPOXY SEE DETAILS 4 & 8/S2.0
- ⓈE = HDU3 W/ CAST IN PLACE A.BOLT OR EPOXY SEE DETAILS 4 & 8/S2.0
- ⓈG = MSTM60 STRAP CONCRETE/2x WALL FRAMING. SEE DETAILS 1 & 2/S3.1

NOTE:
 C.I.P. = CAST IN PLACE A.BOLTS
 EPOXY = HOLD DOWN RODS ALLOWED TO BE EPOXYED SEE DETAILS 4 & 8/S2.0 FOR ADD'L SPECS.

FRAMING NOTES

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- PROVIDE (2) STUDS UNDER ALL BEARING POINTS U.N.O. PROVIDE SOLID BLOCKING AT ALL POINT LOADS TO FOUNDATION. SOLID BLOCK BETWEEN ALL FLOOR CAVITIES, MATCHING COLUMN SIZE ABOVE.
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- TRUSS-TO-TRUSS CONNECTIONS PROVIDED BY TRUSS MFR. TRUSS MFR SHALL VERIFY ALL DIMENSIONS OFF OF FPN PLAN AND FLOOR PLAN PRIOR TO TRUSS FABRICATION AND NOTIFY ENGINEER OF ANY LAYOUT CHANGES.
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- LIQUID NAILS BECK AND FLOOR ADHESIVE OR SIMILAR MAY BE APPLIED WITH #10 SCREWS AS AN ALTERNATIVE METHOD TO ATTACH SHEATHING TO JOIST MEMBERS.
- EXTERIOR WALLS TO BE 2x DF NO. 2 STUDS AT 16" OC. INTERIOR WALLS TO BE PER PLAN @ 16" OC.
- THE ENGINEER HAS PREPARED THIS DRAWING BASED ON THE DIMENSIONS, ELEVATIONS AND TOP OF CONCRETE PROVIDED BY THE ARCHITECT. IT REMAINS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL DIMENSIONS ELEVATIONS AND TOP OF CONCRETE PRIOR TO COMMENCING CONSTRUCTION.
- FRAMING CONDITIONS MAY DEVELOP DURING CONSTRUCTION FOR WHICH NO SPECIFIC DETAIL OR TYPICAL CONSTRUCTION APPLIES. NOTIFY ENGINEER PRIOR TO PROCEEDING IF UNCLEAR.
- ALIGN HOLD DOWNS WITH END OF SHEARWALL STUDS ABOVE. ATTACH TO DOUBLE STUDS UNLESS NOTED OTHERWISE (UNO). USE HOLD DOWN EMBED AND PLACEMENT PER MANUFACTURER.
- PRESERVATIVE TREATED OR PRESSURE TREATED (PT) LUMBER SHALL MEET THE U1 AND M4 STANDARDS SET BY THE AMERICAN WOOD PROTECTION ASSOCIATION (AWPA).
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- REQ'D - REQUIRED
- SCHED - SCHEDULE
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- STD - STANDARD
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- U.N.O. - UNLESS NOTED OTHERWISE
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- w/ - WITH
- w/o - WITHOUT

SHEAR WALL SCHEDULE

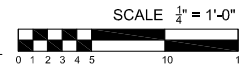
WHERE PANELS ARE APPLIED ON BOTH FACES OF A SHEAR WALL AND NAIL SPACING IS LESS THAN 6" OC ON EITHER SIDE, PANEL JOINTS SHALL BE OFFSET TO FALL ON DIFFERENT FRAMING MEMBERS. ALTERNATIVELY, THE WIDTH OF THE NAILED FACE OF FRAMING MEMBERS SHALL BE 3" NOMINAL OR GREATER AT ADJOINING PANEL EDGES AND NAILS AT ALL PANEL EDGES SHALL BE STAGGERED. SPACING OF ANCHOR BOLTS TO BE HALVED WHEN PANELS ARE APPLIED ON BOTH FACES OF A SHEAR WALL.

SHEAR WALL MARK	SHEATHING MATERIAL	FIELD NAILING ¹	EDGE NAILING ¹	BOTTOM PLATE	STUDS AT EDGE NAILING	ANCHOR BOLT ¹
Ⓢ	1/2" SHT'G	8d's @ 12" OC	8d's @ 6" OC	2x	2x	1/2"x10" @ 48" OC
ⓈA	1/2" SHT'G	8d's @ 12" OC	8d's @ 4" OC	2x	3x	1/2"x10" @ 27" OC

NOTE

- ALL SHEAR WALLS LISTED MAY NOT BE USED ON THIS PROJECT.
- DOUBLE STUDS AND DOUBLE PLATES MAY BE SUBSTITUTED FOR 3x STUDS
 - WHEN 8d NAILS OR STAPLES ARE SPACED AT 3" OR LESS, EDGE & PANEL SPLICE MEMBERS TO BE 3x FRAMING MEMBERS OR DOUBLE STUDS.
- NAILS OR STAPLES
 - 8d's = 2 1/2"x0.131" COMMON OR 2 1/2"x0.113" GALVANIZED BOX NAILS, 1/2" 16 GAUGE STAPLES
 - 1/2" 16 GAUGE STAPLES CAN BE SUBSTITUTED FOR 8d COMMONS OR 8d BOX NAILS WITH (3) STAPLES FOR EVERY (2) 8d's
 - STAPLES TO HAVE 3/16" MIN CROWN WIDTH AND INSTALLED WITH THEIR CROWNS PARALLEL TO THE LONG DIM OF THE FRAMING MEMBER.
- ANCHOR BOLTS TO BE ASTM A307, 1/2" w/ 7" EMBED IN FOUNDATION WALLS @ 48" O.C. (MAX) U.N.O. (SEE FOUNDATION PLAN FOR REQUIREMENTS AT SHEAR WALL). BOLTS TO BE WITHIN 12" (MAX) & 4" (MIN) TO ENDS OF SILL PLATES (COORDINATE WITH GENERAL CONTRACTOR) MINIMUM OF TWO ANCHOR BOLTS PER SILL PLATE
 - 0.229"x3"x3" SQUARE STEEL PLATE WASHERS SHALL BE PLACED BETWEEN SILL PLATE AND NUT PER IRC 2308.3.1.1
 - 1/2" w/ 5" EMBED TITEN HD SCREW ANCHORS w/ SO PL 0.229"x3"x3" CAN BE SUBSTITUTED FOR ANCHOR BOLTS
 - THE EDGE OF THE SQ PL WASHER SHALL BE PLACED PARALLEL WITHIN 1/2" OF THE SHEATHING AT SHEAR WALLS.
 - SO PL WASHERS w/ 1 1/2"x1 1/2" MAXIMUM DIAGONAL SLOT MAY BE USED IF A STANDARD CUT PL WASHER IS PLACED BETWEEN THE NUT AND THE SQ PL WASHER.
- STUDS AT ENDS OF SHEAR WALLS TO BE PER HOLD DOWN REQUIREMENTS.

UPPER ROOF FRAMING PLAN



NORTH



1601 N 13th St. STE 202
 BOISE, IDAHO 83702
 PHONE: 208-842-1425
 FAX: 866-855-8379
 EMAIL: CONTACT@MURARENGINEERING.COM

MURAR
 ENGINEERING
 & DESIGN INC

UPPER ROOF FRAMING PLAN

CHA & KOO REMODEL
 3818 83rd AVE SE
 MERCER ISLAND, wa 98040

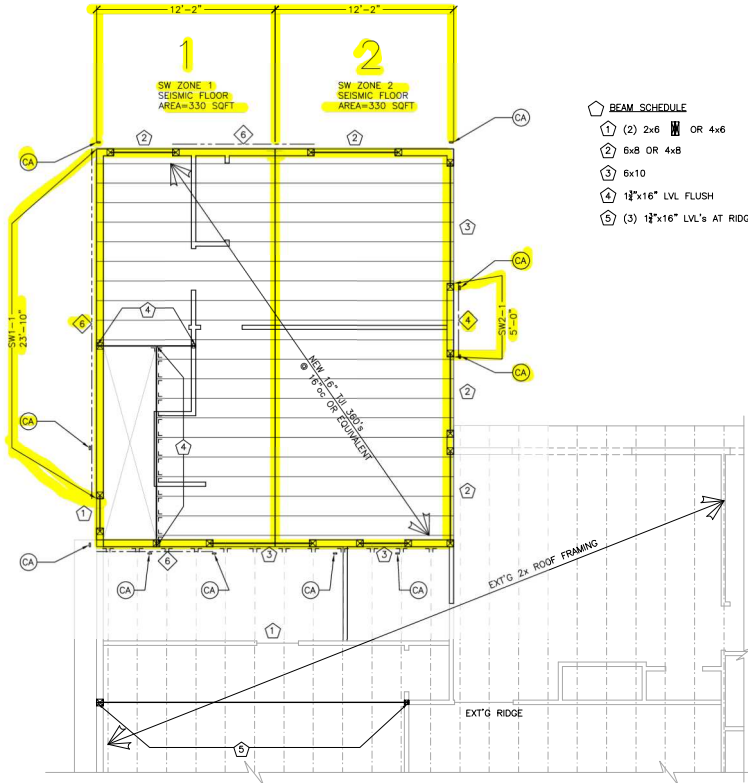
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S1.2

V Left/Right Direction with Alphabetical Shear Zones - S1.2

SHEAR WALLS ALONG ZONE A				Segmented: 2b/h Exception
Seismic Calculation				
Seismic Zone =	A	Seismic Area =	411 SF	roof 2051 lbs
V=Total Seismic Load=	2051 lbs factored	Strength Design	Unfactored Eqk=	1465 lbs
Wind Calculation				
Wall Area Hgt =	4 ft	Roof Height=	4 ft	
Wall Area Width=	13.5 ft	Roof Width=	15 ft	
Edge Included?	Y Y or N	Edge Included?	Y Y or N	
Edge Zone Width=	6 ft	Edge Zone Width=	6 ft	
Interior Zone Width =	7.5 ft	Interior Zone Width=	9 ft	
Edge SF=	24 SF	Edge SF=	24 SF	
Interior SF=	30 SF	Interior SF=	36 SF	
Vwall = Area x w=	1049 lbs	Vroof=A x w =	-90 lbs	
Check 16 psf Min Vwall=	864 lbs	8psf Min (ASCE7 28.3.4)=	480 lbs	
V=Total Wind Load=	1344 lbs for 8 psf min	Unfactored Wind=	804.8 lbs	
V=	2051 lbs	Seismic Governs		
Shear Wall Calculations				
Shear Wall Label	SW A-1	SW A-2		
Wall Lengths = l= ft	4.5	4.5	Total=	9.0
hgt= ft	8	8	ft	
SW Ratio h/l=	1.8	1.8		
NAILING				
SW Panel Nailing	Type 6-	Type 6-		
SW Sht'g Both Sides?	No	No		
Ratio (2l/h) =	1.0	1.0		
Shear Distrib Ratio =	50.0%	50.0%	100%	
Nom SW Seis Cap =	1872	1872	lbs	
Adj SW Seis Cap =	1872	1872	3744 lbs	
Seis Unit Load to SW =	228	228	plf	
Req'd Nailing: Seis	Type 6-	Type 6-		
Nom SW Wind Cap =	2620.8	2620.8	lbs	
Adj SW Wind Cap =	2621	2621	5242 lbs	
Wind Unit Load to SW =	149	149	plf	
Req'd Nailing: Wind	Type 7-	Type 7-		
ATTACH WALL TO DIAPHRAGM				
RBC's	33	33	Top Plate	
10d's	14	14	Btm Plate	
A.Bolt Spacing	78	78	in oc	
Holdown for Seismic	D	D		
Holdown for Wind	D	D		
Wind: $\delta_{sw} =$	0.16	0.16	in	
Wind: $\delta_{allow} = L/168 =$	0.57	0.57	in	
Deflection=	OK	OK		

SHEAR WALLS ALONG ZONE B										Perforated
Seismic Calculation										
Seismic Zone =	B			Seismic Area =	411 SF		roof	2051 lbs		
V=Total Seismic Load=	2051 lbs			Strength Design	Unfactored Seismic Load=		1465 lbs			
Wind Calculation										
Wall Area Hgt =	4 ft			Roof Height=	4 ft					
Wall Area Width=	13.5 ft			Roof Width=	15 ft					
Edge Included?	Y Y or N			Edge Included?	Y Y or N					
Edge Zone width=	6 ft			Edge Zone width=	6 ft					
Interior Zone width=	7.5 ft			Interior Zone width=	9 ft					
Edge SF=	24 SF			Edge SF=	24 SF					
Interior SF=	30 SF			Interior SF=	36 SF					
Vwall = Area x w=	1049 lbs			Vroof=A x w =	-90 lbs					
Check 16 psf Min Vwall=	864 lbs			8psf Min (ASCE7 28.3.4)=	480 lbs					
V wind roof + wall=	1344 lbs for 8 psf min			Unfactored Wind=	805 lbs					
V=	2051 lbs			Seismic Governs						
Shear Wall Calculations										
	Length	Width	Opening Height	Area	Wall Height =	8 ft				
Segment SW B-1=	3.83 ft				Ratio= 2.1	3.7 ft				
Segment SW B-2=	6.16 ft	5.5 ft	4 ft	22 sf	Ratio= 1.3	6.2 ft				
Segment SW B-3=	4.25 ft	5.5 ft	4 ft	22 sf	Ratio= 1.9	4.3 ft				
Overall Length of Wall=	25			A _o =	44 sf		ΣL _i =	14.08 ft		
SHEAR WALL NAILING AND HOLDOWN										
C _o =	0.83			r =	0.719061		Sht'd Each Side?	no		
	DL Resisting Force =			105 lbs		DL on Wall =		20 plf		
	Unit Load	Nailing	SW Capacity	Chord Tension	HD Abv	Total Tension	HD			
Seismic	146 plf	Type 6-	4834 lbs	1307 lbs	0 lbs	1307 lbs	D			
Wind	95 plf	Type 7-	2863 lbs	821 lbs	0 lbs	821 lbs	D			
CONNECTION TO DIAPHRAGM										
Top Plate:	Act Lgt of Top PI =			25 ft		RBC's	@ 93 in oc			
Bottom Plate General:	Act Lgt of Btm PI =			20 ft		10d's	@ 31 in oc			
Bottom plate at full hgt segments need to resist shear and uplift forces:						10d's	@ 6.646 in oc			
SEISMIC DEFLECTION										
V _{max} = V/C _o ΣL _i =	176 plf	Wall Studs =	2x4		10.5 si	0.025h =	2.4 in			
8vh ³ /Eab =	0.003 in	vh/1000G _a =	0.141 in		Δ _a (h/b) =	0.032 in	C _d δ _{sw} =	0.70 in		
WIND DEFLECTION										
V _{max} (ASD) = V/C _o ΣL _i =	69 plf	Wall Studs =	2x4		10.5 si	L/168 =	0.5714286 in			
8vh ³ /Eab =	0.001 in	vh/1000G _a =	0.093 in		Δ _a (h/b) =	0.017 in	C _d δ _{sw} =	0.11 in		



- BEAM SCHEDULE**
- ① (2) 2x8 OR 4x6
 - ② 6x8 OR 4x8
 - ③ 6x10
 - ④ 1 1/2"x16" LVL FLUSH
 - ⑤ (3) 1 1/2"x16" LVL's AT RIDGE

HOLD DOWN SCHEDULE

- CB = CMSTC16 TO BELOW. SEE DETAIL 9/S4.0
- CA = CMSTC16 ATTACHING DBL 2x STUDS ABOVE & DBL 2x STUDS BELOW RIM BOARD AT FLOOR ON THIS LEVEL. STRAP MAY TERMINATE AROUND BEAM. SEE PLAN. SEE TYPICAL STRAP CONN. DETAILS 9 & 10/S2.0
- D = DTT22 W/ CAST IN PLACE A.BOLT OR EPOXY SEE DETAILS 4 & 8/S2.0
- S = HDU3 W/ CAST IN PLACE A.BOLT OR EPOXY SEE DETAILS 4 & 8/S2.0
- MS = MSTM60 STRAP CONCRETE/2x WALL FRAMING. SEE DETAILS 1 & 2/S3.1

NOTE:
 C.I.P. = CAST IN PLACE A.BOLTS
 EPOXY = HOLD DOWN RODS ALLOWED TO BE EPOXYED SEE DETAILS 4 & 8/S2.0 FOR ADD'L SPECS.

FRAMING NOTES

1. SEE ARCH. FLOOR PLAN FOR PLATE HEIGHTS.
2. REFER TO LATERAL BRACING PRIOR TO FRAMING.
3. PROVIDE (2) STUDS UNDER ALL BEARING POINTS U.N.O. PROVIDE SOLID BLOCKING AT ALL POINT LOADS TO FOUNDATION. SOLID BLOCK BETWEEN ALL FLOOR CAVITIES, MATCHING COLUMN SIZE ABOVE.
4. UNLESS OTHERWISE NOTED, PROVIDE (1) KING STUD AND (1) TRIMMER AT EACH SIDE OF ALL OPENINGS.
5. TRUSS-TO-TRUSS CONNECTIONS PROVIDED BY TRUSS MFR. TRUSS MFR SHALL VERIFY ALL DIMENSIONS OFF OF FPN PLAN AND FLOOR PLAN PRIOR TO TRUSS FABRICATION AND NOTIFY ENGINEER OF ANY LAYOUT CHANGES.
6. PROVIDE ATTIC VENTILATIONS AS REQUIRED BY CODE.
7. CONTRACTOR SHALL INSTALL TRUSSES PER TRUSS MANUFACTURER'S SPECIFICATIONS, INCLUDING PROVIDING FASTENERS TO RESIST ANY UPLIFT.
8. ROOF SHEATHING: 19/32" APA RATED: SHT'G WITH 10d NAILS AT 6" OC ALONG EDGES AND DIAPHRAGM BOUNDARIES AND 12" OC IN THE FIELD.
9. FLOOR SHEATHING: 3/4", APA RATED: SHT'G, T&G WITH 10d NAILS @ 6" OC ALONG EDGES AND DIAPHRAGM BOUNDARIES AND 12" OC IN THE FIELD.
10. LIQUID NAILS BECK AND FLOOR ADHESIVE OR SIMILAR MAY BE APPLIED WITH #10 SCREWS AS AN ALTERNATIVE METHOD TO ATTACH SHEATHING TO JOIST MEMBERS.
11. EXTERIOR WALLS TO BE 2x DF NO. 2 STUDS AT 16" OC. INTERIOR WALLS TO BE PER PLAN @ 16" OC.
12. THE ENGINEER HAS PREPARED THIS DRAWING BASED ON THE DIMENSIONS, ELEVATIONS AND TOP OF CONCRETE PROVIDED BY THE ARCHITECT. IT REMAINS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL DIMENSIONS ELEVATIONS AND TOP OF CONCRETE PRIOR TO COMMENCING CONSTRUCTION.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL WORK, MATERIALS AND SAFETY IN CONFORMANCE WITH INTERNATIONAL BUILDING CODE (IBC) AND OSHA STANDARDS.
14. FRAMING CONDITIONS MAY DEVELOP DURING CONSTRUCTION FOR WHICH NO SPECIFIC DETAIL OR TYPICAL CONSTRUCTION APPLIES. NOTIFY ENGINEER PRIOR TO PROCEEDING IF UNCLEAR.
15. ALIGN HOLD DOWNS WITH END OF SHEARWALL STUDS ABOVE. ATTACH TO DOUBLE STUDS UNLESS NOTED OTHERWISE (UNO). USE HOLD DOWN EMBED AND PLACEMENT PER MANUFACTURER.
16. PRESERVATIVE TREATED OR PRESSURE TREATED (PT) LUMBER SHALL MEET THE U1 AND M4 STANDARDS SET BY THE AMERICAN WOOD PROTECTION ASSOCIATION (AWPA).
17. CONTRACTOR TO PROVIDE WOOD STAIR FRAMING/LANDING MEMBERS AND CONNECTIONS
18. SEE DRAWING SHEETS S2 SERIES FOR GENERAL DETAILS NOT CALLED OUT HERE.

ABBREVIATION LIST

- ' - DEGREE
- Ø - DIAMETER
- A.B. - ANCHOR BOLT
- ARCH - ARCHITECT
- APA - AMERICAN PLYWOOD ASSOCIATION
- BLK'G - BLOCKING
- BM - BEAM
- BOT - BOTTOM
- C.I.P. - CAST IN PLACE
- CLR - CLEAR
- COL - COLUMN
- CONT - CONTINUOUS
- D.F. - DOUGLAS FIR
- DIM - DIMENSION
- EA - EACH
- E.W. - EACH WAY
- EXT - EXTERIOR
- FDN - FOUNDATION
- FRMG - FRAMING
- FT - FOOT, FEET
- FTG - FOOTING
- FND - FOUNDATION
- OSB - OYFSUM BOARD
- HD - HOLD DOWN
- HDR - HEADER
- HORIZ - HORIZONTAL
- INT - INTERIOR
- LVL - LAMINATED VENEER LUMBER
- N.T.S. - NOT TO SCALE
- P.T. - PRESSURE TREATED
- PL - PLATE
- PSL - PARALLAM
- REINF - REINFORCED
- REQ'D - REQUIRED
- SCHED - SCHEDULE
- SHT - SHEET
- STD - STANDARD
- STRUCT - STRUCTURAL
- T&G - TONGUE AND GROOVE
- TRTD - TREATED
- TYP - TYPICAL
- U.N.O. - UNLESS NOTED OTHERWISE
- VERT - VERTICAL
- w/ - WITH
- w/o - WITHOUT

SHEAR WALL SCHEDULE

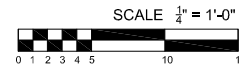
WHERE PANELS ARE APPLIED ON BOTH FACES OF A SHEAR WALL AND NAIL SPACING IS LESS THAN 6" OC ON EITHER SIDE, PANEL JOINTS SHALL BE OFFSET TO FALL ON DIFFERENT FRAMING MEMBERS. ALTERNATIVELY, THE WIDTH OF THE NAILED FACE OF FRAMING MEMBERS SHALL BE 3" NOMINAL OR GREATER AT ADJOINING PANEL EDGES AND NAILS AT ALL PANEL EDGES SHALL BE STAGGERED. SPACING OF ANCHOR BOLTS TO BE HALVED WHEN PANELS ARE APPLIED ON BOTH FACES OF A SHEAR WALL.

SHEAR WALL MARK	SHEATHING MATERIAL	FIELD NAILING ¹	EDGE NAILING ¹	BOTTOM PLATE	STUDS AT EDGE NAILING	ANCHOR BOLT ¹
⑥	1/2" SHT'G	8d's @ 12"oc	8d's @ 6"oc	2x	2x	1/2"x10" @ 48"oc
④	1/2" SHT'G	8d's @ 12"oc	8d's @ 4"oc	2x	3x	1/2"x10" @ 27"oc

NOTE

1. ALL SHEAR WALLS LISTED MAY NOT BE USED ON THIS PROJECT.
2. DOUBLE STUDS AND DOUBLE PLATES MAY BE SUBSTITUTED FOR 3x STUDS
 - A. WHEN 8d NAILS OR STAPLES ARE SPACED AT 3" OR LESS, EDGE & PANEL SPLICE MEMBERS TO BE 3x FRAMING MEMBERS OR DOUBLE STUDS.
3. NAILS OR STAPLES
 - A. 8d's = 2 1/2"x0.131" COMMON OR 2 1/2"x0.113" GALVANIZED BOX NAILS, 1/2" 16 GAUGE STAPLES
 - B. 1/2" 16 GAUGE STAPLES CAN BE SUBSTITUTED FOR 8d COMMONS OR 8d BOX NAILS WITH (3) STAPLES FOR EVERY (2) 8d's
 - C. STAPLES TO HAVE 3/16" MIN CROWN WIDTH AND INSTALLED WITH THEIR CROWNS PARALLEL TO THE LONG DIM OF THE FRAMING MEMBER.
4. ANCHOR BOLTS TO BE ASTM A307, 1/2" w/ 7" EMBED IN FOUNDATION WALLS @ 48" O.C. (MAX) U.N.O. (SEE FOUNDATION PLAN FOR REQUIREMENTS AT SHEAR WALL). BOLTS TO BE WITHIN 12" (MAX) & 4" (MIN) TO ENDS OF SILL PLATES (COORDINATE WITH GENERAL CONTRACTOR) MINIMUM OF TWO ANCHOR BOLTS PER SILL PLATE
 - A. 0.229"x3"x3" SQUARE STEEL PLATE WASHERS SHALL BE PLACED BETWEEN SILL PLATE AND NUT PER IBC 2308.3.1.1
 - B. 1/2" w/ 5" EMBED TITEN HD SCREW ANCHORS w/ SO PL 0.229"x3"x3" CAN BE SUBSTITUTED FOR ANCHOR BOLTS
 - C. THE EDGE OF THE SQ PL WASHER SHALL BE PLACED PARALLEL WITHIN 1/2" OF THE SHEATHING AT SHEAR WALLS.
 - D. SO PL WASHERS w/ 1 1/2"x1 1/2" MAXIMUM DIAGONAL SLOT MAY BE USED IF A STANDARD CUT PL WASHER IS PLACED BETWEEN THE NUT AND THE SQ PL WASHER.
5. STUDS AT ENDS OF SHEAR WALLS TO BE PER HOLD DOWN REQUIREMENTS.

SECOND FLOOR & EXISTING ROOF FRAMING PLAN



NORTH



1601 N 13th St. STE 202
 BOISE IDAHO 83702
 PHONE: 208-942-1425
 FAX: 866-855-8379
 EMAIL: CONTACT@MURARENGINEERING.COM

MURAR
 ENGINEERING
 & DESIGN INC

**SECOND FLOOR & EXISTING
 ROOF FRAMING PLAN**

CHA & KOO REMODEL
 3818 83rd AVE SE
 MERCER ISLAND, wa 98040

DATE/PROJECT
 DRW
 FILE NAME
 (C:\2020\PROJECTS\2020\)
 SHEET
 SHEET SCALE
 SHEET

S1.1

V Up/Down Direction with Numerical Shear Zones - S1.1

SHEAR WALLS ALONG ZONE 1 **Segmented: 2b/h Exception**

Seismic Calculation			
Seismic Zone =	1	Seismic Area =	330 SF floor 572.7 lbs
V=Total Seismic Load=	573 lbs factored	Strength Design	Unfactored Eqk= 409.1 lbs

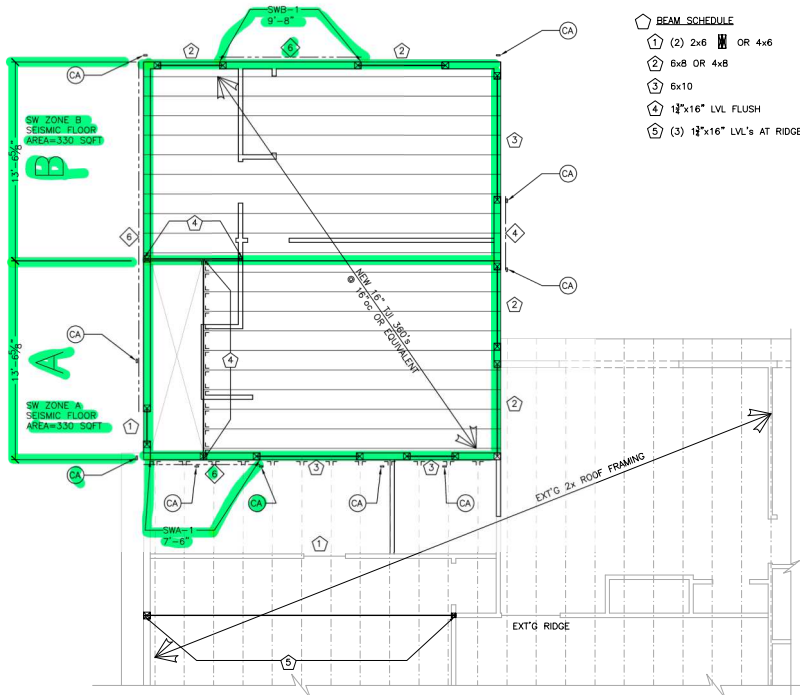
Wind Calculation			
Wall Area Hgt =	10 ft	Roof Height=	0 ft
Wall Area Width=	12.16 ft	Roof Width=	0 ft
Edge Included?	Y Y or N	Edge Included?	Y Y or N
Edge Zone Width=	6 ft	Edge Zone Width=	0 ft
Interior Zone Width =	6.16 ft	Interior Zone Width=	0 ft
Edge SF=	60 SF	Edge SF=	0 SF
Interior SF=	61.6 SF	Interior SF=	0 SF
Vwall = Area x w=	2411 lbs	Vroof=A x w =	0 lbs
Check 16 psf Min Vwall=	1946 lbs	8psf Min (ASCE7 28.3.4)=	0 lbs
V=Total Wind Load=	2411 lbs per calc'd area	Unfactored Wind=	1443 lbs

Loads from above	V SW1		
V _{wind above} =	1431 lbs	V _{wind total} (this level + above) =	3842 lbs
V _{seis above} =	2051 lbs	V _{seis total} (this level + above) =	2623 lbs
V=	3842 lbs	Wind Governs	

Shear Wall Calculations

Shear Wall Label	SW 1-1		
Wall Lengths = l= ft	23.83	Total=	23.8
hgt= ft	8	ft	
SW Ratio h/l=	0.3		
NAILING			
SW Panel Nailing	Type 6-		
SW Sht'g Both Sides?	No		
Ratio (2l/h) =	1.0		
Shear Distrib Ratio =	100.0%	100%	
Nom SW Seis Cap =	9913.28	lbs	
Adj SW Seis Cap =	9913	9913 lbs	
Seis Unit Load to SW =	110	plf	
Req'd Nailing: Seis	Type 7-		
Nom SW Wind Cap =	13878.59	lbs	
Adj SW Wind Cap =	13879	13879 lbs	
Wind Unit Load to SW =	161	plf	
Req'd Nailing: Wind	Type 7-		
ATTACH WALL TO DIAPHRAGM			
RBC's	55	Top Plate	
10d's	23	Btm Plate	
A.Bolt Spacing	129	in oc	
Holdown for Seismic	D		
Holdown for Wind	D		
Wind: δ_{sw} =	0.09	in	
Wind: $\delta_{allow} = L/168 =$	0.57	in	
Deflection=	OK		

SHEAR WALLS ALONG ZONE 2		Segmented: 2b/h Exception	
Seismic Calculation			
Seismic Zone =	2	Seismic Area =	330 SF floor 572.7 lbs
V=Total Seismic Load=	573 lbs factored	Strength Design	Unfactored Eqk= 409.1 lbs
Wind Calculation			
Wall Area Hgt =	10 ft	Roof Height=	0 ft
Wall Area Width=	12.16 ft	Roof Width=	0 ft
Edge Included?	Y Y or N	Edge Included?	Y Y or N
Edge Zone Width=	6 ft	Edge Zone Width=	0 ft
Interior Zone Width =	6.16 ft	Interior Zone Width=	0 ft
Edge SF=	60 SF	Edge SF=	0 SF
Interior SF=	61.6 SF	Interior SF=	0 SF
V _{wall} = Area x w=	2411 lbs	V _{roof} =A x w =	0 lbs
Check 16 psf Min V _{wall} =	1946 lbs	8psf Min (ASCE7_28.3.4)=	0 lbs
V=Total Wind Load=	2411 lbs per calc'd area	Unfactored Wind=	1443 lbs
Loads from above	V SW2		
V _{wind above} =	1431 lbs	V _{wind total} (this level + above) =	3842 lbs
V _{seis above} =	2051 lbs	V _{seis total} (this level + above) =	2623 lbs
V=	3842 lbs	Wind Governs	
Shear Wall Calculations			
Shear Wall Label	SW 2-1		
Wall Lengths = l= ft	5	Total=	5.0
hgt= ft	8	ft	
SW Ratio h/l=	1.6		
NAILING			
SW Panel Nailing	Type 4-		
SW Sht'g Both Sides?	No		
Ratio (2l/h) =	1.0		
Shear Distrib Ratio =	100.0%	100%	
Nom SW Seis Cap =	3040	lbs	
Adj SW Seis Cap =	3040	3040 lbs	
Seis Unit Load to SW =	525	plf	
Req'd Nailing: Seis	Type 4-		
Nom SW Wind Cap =	4256	lbs	
Adj SW Wind Cap =	4256	4256 lbs	
Wind Unit Load to SW =	768	plf	
Req'd Nailing: Wind	Type 4-		
ATTACH WALL TO DIAPHRAGM			
RBC's	11	Top Plate	
10d's	4	Btm Plate	
A.Bolt Spacing	27	in oc	
Holdown for Seismic	3		
Holdown for Wind	5		
Wind: δ_{sw} =	0.49	in	
Wind: $\delta_{allow} = L/168 =$	0.57	in	
Deflection=	OK		



FRAMING NOTES

1. SEE ARCH. FLOOR PLAN FOR PLATE HEIGHTS.
2. REFER TO LATERAL BRACING PRIOR TO FRAMING.
3. PROVIDE (2) STUDS UNDER ALL BEARING POINTS U.N.O. PROVIDE SOLID BLOCKING AT ALL POINT LOADS TO FOUNDATION. SOLID BLOCK BETWEEN ALL FLOOR CAVITIES, MATCHING COLUMN SIZE ABOVE.
4. UNLESS OTHERWISE NOTED, PROVIDE (1) KING STUD AND (1) TRIMMER AT EACH SIDE OF ALL OPENINGS.
5. TRUSS-TO-TRUSS CONNECTIONS PROVIDED BY TRUSS MFR. TRUSS MFR SHALL VERIFY ALL DIMENSIONS OFF OF FPN PLAN AND FLOOR PLAN PRIOR TO TRUSS FABRICATION AND NOTIFY ENGINEER OF ANY LAYOUT CHANGES.
6. PROVIDE ATTIC VENTILATIONS AS REQUIRED BY CODE.
7. CONTRACTOR SHALL INSTALL TRUSSES PER TRUSS MANUFACTURER'S SPECIFICATIONS, INCLUDING PROVIDING FASTENERS TO RESIST ANY UPLIFT.
8. ROOF SHEATHING: 19/32" APA RATED: SHT'G WITH 10d NAILS AT 6" OC ALONG EDGES AND DIAPHRAGM BOUNDARIES AND 12" OC IN THE FIELD.
9. FLOOR SHEATHING: 3/4", APA RATED: SHT'G, T&G WITH 10d NAILS @ 6" OC ALONG EDGES AND DIAPHRAGM BOUNDARIES AND 12" OC IN THE FIELD.
10. LIQUID NAILS BECK AND FLOOR ADHESIVE OR SIMILAR MAY BE APPLIED WITH #10 SCREWS AS AN ALTERNATIVE METHOD TO ATTACH SHEATHING TO JOIST MEMBERS.
11. EXTERIOR WALLS TO BE 2x DF NO. 2 STUDS AT 16" OC. INTERIOR WALLS TO BE PER PLAN @ 16" OC.
12. THE ENGINEER HAS PREPARED THIS DRAWING BASED ON THE DIMENSIONS, ELEVATIONS AND TOP OF CONCRETE PROVIDED BY THE ARCHITECT. IT REMAINS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL DIMENSIONS ELEVATIONS AND TOP OF CONCRETE PRIOR TO COMMENCING CONSTRUCTION.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL WORK, MATERIALS AND SAFETY IN CONFORMANCE WITH INTERNATIONAL BUILDING CODE (IBC) AND OSHA STANDARDS.
14. FRAMING CONDITIONS MAY DEVELOP DURING CONSTRUCTION FOR WHICH NO SPECIFIC DETAIL OR TYPICAL CONSTRUCTION APPLIES. NOTIFY ENGINEER PRIOR TO PROCEEDING IF UNCLEAR.
15. ALIGN HOLD DOWNS WITH END OF SHEARWALL STUDS ABOVE. ATTACH TO DOUBLE STUDS UNLESS NOTED OTHERWISE (UNO). USE HOLD DOWN EMBED AND PLACEMENT PER MANUFACTURER.
16. PRESERVATIVE TREATED OR PRESSURE TREATED (PT) LUMBER SHALL MEET THE U1 AND M4 STANDARDS SET BY THE AMERICAN WOOD PROTECTION ASSOCIATION (AWPA).
17. CONTRACTOR TO PROVIDE WOOD STAIR FRAMING/LANDING MEMBERS AND CONNECTIONS
18. SEE DRAWING SHEETS S2 SERIES FOR GENERAL DETAILS NOT CALLED OUT HERE.

ABBREVIATION LIST

- ° - DEGREE
- Ø - DIAMETER
- A.B. - ANCHOR BOLT
- ARCH - ARCHITECT
- APA - AMERICAN PLYWOOD ASSOCIATION
- BLK'G - BLOCKING
- BM - BEAM
- BOT - BOTTOM
- C.I.P. - CAST IN PLACE
- CLR - CLEAR
- COL - COLUMN
- CONT - CONTINUOUS
- D.F. - DOUGLAS FIR
- DM - DIMENSION
- EA - EACH
- E.W. - EACH WAY
- EXT - EXTERIOR
- FDN - FOUNDATION
- FRMG - FRAMING
- FT - FOOT, FEET
- FTG - FOOTING
- FND - FOUNDATION
- OSB - OSBUM BOARD
- HD - HOLD DOWN
- HDR - HEADER
- HORIZ - HORIZONTAL
- INT - INTERIOR
- LVL - LAMINATED VENEER LUMBER
- MAX - MAXIMUM
- MFR - MANUFACTURER
- MIN - MINIMUM
- N.T.S. - NOT TO SCALE
- P.T. - PRESSURE TREATED
- PL - PLATE
- PSL - PARALLAM
- REINF - REINFORCED
- REQ'D - REQUIRED
- SCHED - SCHEDULE
- SHT - SHEET
- STD - STANDARD
- STRUCT - STRUCTURAL
- T&G - TONGUE AND GROOVE
- TRTD - TREATED
- TYP - TYPICAL
- U.N.O. - UNLESS NOTED OTHERWISE
- VERT - VERTICAL
- w/ - WITH
- w/o - WITHOUT

SHEAR WALL SCHEDULE

WHERE PANELS ARE APPLIED ON BOTH FACES OF A SHEAR WALL AND NAIL SPACING IS LESS THAN 6" OC ON EITHER SIDE, PANEL JOINTS SHALL BE OFFSET TO FALL ON DIFFERENT FRAMING MEMBERS. ALTERNATIVELY, THE WIDTH OF THE NAILED FACE OF FRAMING MEMBERS SHALL BE 3" NOMINAL OR GREATER AT ADJOINING PANEL EDGES AND NAILS AT ALL PANEL EDGES SHALL BE STAGGERED. SPACING OF ANCHOR BOLTS TO BE HALVED WHEN PANELS ARE APPLIED ON BOTH FACES OF A SHEAR WALL.

SHEAR WALL MARK	SHEATHING MATERIAL	FIELD NAILING ¹	EDGE NAILING ¹	BOTTOM PLATE	STUDS AT EDGE NAILING	ANCHOR BOLT ¹
Ⓞ	1/2" SHT'G	8d's @ 12" OC	8d's @ 6" OC	2x	2x	1/2"x10" @ 48" OC
Ⓧ	1/2" SHT'G	8d's @ 12" OC	8d's @ 4" OC	2x	3x	1/2"x10" @ 27" OC

NOTE

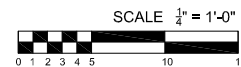
1. ALL SHEAR WALLS LISTED MAY NOT BE USED ON THIS PROJECT.
2. DOUBLE STUDS AND DOUBLE PLATES MAY BE SUBSTITUTED FOR 3x STUDS
 - A. WHEN 8d NAILS OR STAPLES ARE SPACED AT 3" OR LESS, EDGE & PANEL SPLICE MEMBERS TO BE 3x FRAMING MEMBERS OR DOUBLE STUDS.
3. NAILS OR STAPLES
 - A. 8d's = 2 1/2"x0.131" COMMON OR 2 1/2"x0.113" GALVANIZED BOX NAILS, 1/2" 16 GAUGE STAPLES
 - B. 1/2" 16 GAUGE STAPLES CAN BE SUBSTITUTED FOR 8d COMMONS OR 8d BOX NAILS WITH (3) STAPLES FOR EVERY (2) 8d's
 - C. STAPLES TO HAVE 3/16" MIN CROWN WIDTH AND INSTALLED WITH THEIR CROWNS PARALLEL TO THE LONG DIM OF THE FRAMING MEMBER.
4. ANCHOR BOLTS TO BE ASTM A307, 1/2" w/ 7" EMBED IN FOUNDATION WALLS @ 48" O.C. (MAX) U.N.O. (SEE FOUNDATION PLAN FOR REQUIREMENTS AT SHEAR WALL). BOLTS TO BE WITHIN 12" (MAX) & 4" (MIN) TO ENDS OF SILL PLATES (COORDINATE WITH GENERAL CONTRACTOR) MINIMUM OF TWO ANCHOR BOLTS PER SILL PLATE
 - A. 0.229"x3"x3" SQUARE STEEL PLATE WASHERS SHALL BE PLACED BETWEEN SILL PLATE AND NUT PER IBC 2308.3.1.1
 - B. 1/2" w/ 5" EMBED TITEN HD SCREW ANCHORS w/ SO PL 0.229"x3"x3" CAN BE SUBSTITUTED FOR ANCHOR BOLTS
 - C. THE EDGE OF THE SQ PL WASHER SHALL BE PLACED PARALLEL WITHIN 1/2" OF THE SHEATHING AT SHEAR WALLS.
 - D. SO PL WASHERS w/ 1 1/2"x1 1/2" MAXIMUM DIAGONAL SLOT MAY BE USED IF A STANDARD CUT PL WASHER IS PLACED BETWEEN THE NUT AND THE SQ PL WASHER.
5. STUDS AT ENDS OF SHEAR WALLS TO BE PER HOLD DOWN REQUIREMENTS.

HOLD DOWN SCHEDULE

- (CB) = CMSTC16 TO BELOW. SEE DETAIL 9/S4.0
- (CA) = CMSTC16 ATTACHING DBL 2x STUDS ABOVE & DBL 2x STUDS BELOW RIM BOARD AT FLOOR ON THIS LEVEL. STRAP MAY TERMINATE AROUND BEAM, SEE PLAN. SEE TYPICAL STRAP CONN. DETAILS 9 & 10/S2.0
- (D) = DTT22 W/ CAST IN PLACE A.BOLT OR EPOXY SEE DETAILS 4 & 8/S2.0
- (S) = HDU3 W/ CAST IN PLACE A.BOLT OR EPOXY SEE DETAILS 4 & 8/S2.0
- (MS) = MSTM60 STRAP CONCRETE/2x WALL FRAMING. SEE DETAILS 1 & 2/S3.1

NOTE:
C.I.P. = CAST IN PLACE A.BOLTS
EPOXY = HOLD DOWN RODS ALLOWED TO BE EPOXYED SEE DETAILS 4 & 8/S2.0 FOR ADD'L SPECS.

SECOND FLOOR & EXISTING ROOF FRAMING PLAN



NORTH

REVISION	DATE



1601 N 13th St. STE 202
BOISE IDAHO 83702
PHONE: 208-942-1225
FAX: 866-855-8379
EMAIL: CONTACT@MURARENGINEERING.COM

MURAR
ENGINEERING
& DESIGN INC

SECOND FLOOR & EXISTING ROOF FRAMING PLAN

CHA & KOO REMODEL
3818 83rd AVE SE
MERCER ISLAND, wa 98040

DATE PLOTTED	
BY	
FILE NAME	
SCALE	
SHEET	

S1.1

V Left/Right Direction with Alphabetical Shear Zones - S1.1

SHEAR WALLS ALONG ZONE A				Segmented: 2b/h Exception	
Seismic Calculation					
Seismic Zone =	A	Seismic Area =	330 SF	floor	572.7 lbs
V=Total Seismic Load=	573 lbs factored	Strength Design	Unfactored Eqk=	409.1 lbs	
Wind Calculation					
Wall Area Hgt =	10 ft	Roof Height=	0 ft		
Wall Area Width=	13.5 ft	Roof Width=	0 ft		
Edge Included?	Y	Y or N	Edge Included?	Y	Y or N
Edge Zone Width=	6 ft	Edge Zone Width=	0 ft		
Interior Zone Width =	7.5 ft	Interior Zone Width=	0 ft		
Edge SF=	60 SF	Edge SF=	0 SF		
Interior SF=	75 SF	Interior SF=	0 SF		
Vwall = Area x w=	2623 lbs	Vroof=A x w =	0 lbs		
Check 16 psf Min Vwall=	2160 lbs	8psf Min (ASCE7 28.3.4)=	0 lbs		
V=Total Wind Load=	2623 lbs per calc'd area	Unfactored Wind=	1571 lbs		
Loads from above	V SWA				
V _{wind above} =	1344 lbs	V _{wind total} (this level + above) =	3967 lbs		
V _{seis above} =	2051 lbs	V _{seis total} (this level + above) =	2623 lbs		
V=	3967 lbs	Wind Governs			

Shear Wall Calculations

Shear Wall Label	SW A-1		
Wall Lengths = l= ft	7.5	Total=	7.5
hgt= ft	8	ft	
SW Ratio h/l=	1.1		
NAILING			
SW Panel Nailing	Type 6-		
SW Sht'g Both Sides?	No		
Ratio (2l/h) =	1.0		
Shear Distrib Ratio =	100.0%	100%	
Nom SW Seis Cap =	3120	lbs	
Adj SW Seis Cap =	3120	3120 lbs	
Seis Unit Load to SW =	350	plf	
Req'd Nailing: Seis	Type 6-		
Nom SW Wind Cap =	4368	lbs	
Adj SW Wind Cap =	4368	4368 lbs	
Wind Unit Load to SW =	529	plf	
Req'd Nailing: Wind	Type 6-		
ATTACH WALL TO DIAPHRAGM			
RBC's	16	Top Plate	
10d's	7	Btm Plate	
A.Bolt Spacing	39	in oc	
Holdown for Seismic	D		
Holdown for Wind	3B		
Wind: δ_{sw} =	0.39	in	
Wind: $\delta_{allow} = L/168 =$	0.57	in	
Deflection=	OK		

SHEAR WALLS ALONG ZONE B		Segmented: 2b/h Exception	
Seismic Calculation			
Seismic Zone =	B	Seismic Area =	330 SF floor 572.7 lbs
V=Total Seismic Load=	573 lbs factored Strength Design	Unfactored Eqk=	409.1 lbs
Wind Calculation			
Wall Area Hgt =	10 ft	Roof Height=	0 ft
Wall Area Width=	13.5 ft	Roof Width=	0 ft
Edge Included?	Y Y or N	Edge Included?	Y Y or N
Edge Zone Width=	6 ft	Edge Zone Width=	0 ft
Interior Zone Width =	7.5 ft	Interior Zone Width=	0 ft
Edge SF=	60 SF	Edge SF=	0 SF
Interior SF=	75 SF	Interior SF=	0 SF
V _{wall} = Area x w=	2623 lbs	V _{roof} =A x w =	0 lbs
Check 16 psf Min V _{wall} =	2160 lbs	8psf Min (ASCE7_28.3.4)=	0 lbs
V=Total Wind Load=	2623 lbs per calc'd area	Unfactored Wind=	1571 lbs
Loads from above	V SWB		
V _{wind above} =	1344 lbs	V _{wind total} (this level + above) =	3967 lbs
V _{seis above} =	2051 lbs	V _{seis total} (this level + above) =	2623 lbs
V=	3967 lbs	Wind Governs	
Shear Wall Calculations			
Shear Wall Label	SW B-1		
Wall Lengths = l= ft	9.66	Total=	9.7
hgt= ft	8	ft	
SW Ratio h/l=	0.8		
NAILING			
SW Panel Nailing	Type 6-		
SW Sht'g Both Sides?	No		
Ratio (2l/h) =	1.0		
Shear Distrib Ratio =	100.0%	100%	
Nom SW Seis Cap =	4018.56	lbs	
Adj SW Seis Cap =	4019	4019 lbs	
Seis Unit Load to SW =	272	plf	
Req'd Nailing: Seis	Type 6-		
Nom SW Wind Cap =	5625.984	lbs	
Adj SW Wind Cap =	5626	5626 lbs	
Wind Unit Load to SW =	411	plf	
Req'd Nailing: Wind	Type 6-		
ATTACH WALL TO DIAPHRAGM			
RBC's	21	Top Plate	
10d's	9	Btm Plate	
A.Bolt Spacing	50	in oc	
Holdown for Seismic	D		
Holdown for Wind	D		
Wind: δ_{sw} =	0.31	in	
Wind: $\delta_{allow} = L/168 =$	0.57	in	
Deflection=	OK		