



CIVIL ENGINEERING CONSULTANTS

1805 WATERS ROAD

HARRISONVILLE

MISSOURI

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June 6, 2022

Attn: Steve Froehlich
KC Custom Homes
322 NW Ambersham
Lee's Summit, MO 64081

RE: R.E.O. Project 20-002-53
MD2 Designs Plan SF-7014
Permit #: PRRES20204940
322 NW Ambersham Dr., Lee's Summit, MO
Inspection Items - roof, various

Dear Mr. Froehlich,

We are providing statement regarding the additional inspection items addressed in the comment letter for the above referenced property.

Rafter / CJ above front office. Provide 2x4x36 member parallel and at top of ceiling joist extending to bottom of roof sheathing directly adjacent to rafter to provide alternate heel joint connection. Provide 3 ~ 16d nails from extension to rafter and 4 ~ 16d from extension to top of ceiling joist.

Rafter ties over master bedroom. Provide 2x4x48 member parallel to discontinuous high ceiling joists above top of MB tray ceiling extending to roof deck at top of rafters.

Roof system on blocks. Throughout the structure, a modified tie-down method was used. In lieu of continuous straps from rafter to studs at 48 inches on center, straps were extended from wall stud to top of blocking plate with rafter clips from top plate to rafters. These were fastened with three to four 10d nails in each connection and installed at 16 inches on center. This method is acceptable for providing adequate tie-down with placement at 16 inches on center. Either method, as originally described straps (48 inches on center) or the above described method (16 inches on center) are adequate to tie-down the blocked roof system.

The master bath rafters supported by a small cripple wall with a 4-ply top plate shall be tied with 1-1/4"x40"x22ga straps at 16 inches on center extending from the top of the wall framing to approximately 12 inches below ceiling height along the main wall stud. The ceiling joist adjacent to the wall shall be removed and reinstalled to install straps flush with wall. Perpendicular blocking shall be provided from the top of the main wall (at the cripple wall) to the adjacent ceiling joist at 16 inches on center. Additional

framing directly below the ridge at this location shall be 3 ~ 2x10's. Plumb bracing to create a structural ridge in lieu of rafter ties shall be added at 48 inches on center to top of 3 ~ 2x10.

Spliced valley above front bedrooms. Valley member is spliced approximately 12 inches from a brace to bearing. Splice is gusseted with 3/4" sheathing each face and extending approximately 18 inches each side of splice and fastened with 9 ~ 10d nails each end, each face of spliced member. This connection provides adequate shear transfer of applied loads. At the ridge above the untied rafters above upstairs bedrooms, provide 2 ~ 2x4 tee bracing from the ridge to the bearing wall below at 48 inches on center. This provides for a structural ridge not requiring ties at the base of the rafters.

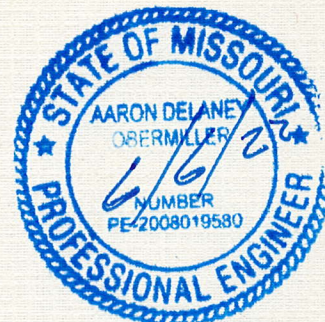
Portal framing at the rear wall has been addressed on a marked up set of plans indicating continuously sheathed wood structural panel at the prior location of portal frame call outs. As-built the framing length of 30 inches with 1/2 wood sheathing and fastened at six inches on the perimeter of panel edges is adequate for lateral bracing in lieu of portal framing.

Notches in the floor joists above the front entry have calculations attached with specific moment and shear values compared to remaining member capacity at those locations. Notches, though exceeding prescriptive design, are adequate with spans of the joists and applied loads to the joists.

Very Truly Yours,

R.E.O. ENGINEERING, P.C.

By: , President
Aaron D. Obermiller, P.E.



Project: 20-002-53

Location: FJ ABOVE FOYER

Floor Joist

[2018 International Residential Code(2018 NDS)]

1.5 IN x 9.25 IN x 10.25 FT @ 16 O.C.

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 131.8%

Controlling Factor: Moment

DEFLECTIONS		Center
Live Load	0.08	IN L/1470
Dead Load	0.02	in
Total Load	0.10	IN L/1176
Live Load Deflection Criteria: L/480 Total Load Deflection Criteria: L/360		

<u>REACTIONS</u>	<u>A</u>	<u>B</u>
Live Load	273 lb	273 lb
Dead Load	68 lb	68 lb
Total Load	341 lb	341 lb
Bearing Length	0.36 in	0.36 in

<u>SUPPORT LOADS</u>	A	B
Live Load	205 plf	205 plf
Dead Load	51 plf	51 plf
Total Load	256 plf	256 plf

MATERIAL PROPERTIES

#2 - Douglas-Fir-Larch

	Base Values	Adjusted
Bending Stress:	$F_b = 900$ psi	$F_b' = 1139$ psi
	$C_d = 1.00$ $C_F = 1.10$ $C_r = 1.15$	
Shear Stress:	$F_v = 180$ psi	$F_v' = 180$ psi
	$C_d = 1.00$	
Modulus of Elasticity:	$E = 1600$ ksi	$E' = 1600$ ksi
Comp. $\perp$ to Grain:	$F_c - \perp = 625$ psi	$F_c - \perp' = 625$ psi

Controlling Moment: 876 ft-lb
5.12 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

Controlling Shear: -342 lb
10.0 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

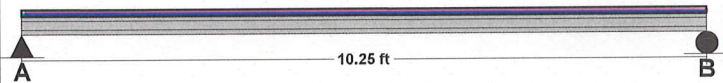
Comparisons with required sections:	Req'd	Provided
Section Modulus:	9.23 in ³	21.39 in ³
Area (Shear):	2.85 in ²	13.88 in ²
Moment of Inertia (deflection):	32.3 in ⁴	98.93 in ⁴
Moment:	876 ft-lb	2029 ft-lb
Shear:	-342 lb	1665 lb

R.E.O. ENGINEERING, P.C.



page
of

LOADING DIAGRAM



JOIST DATA

	Center
Span Length	10.25 ft
Unbraced Length-Top	0 ft
Unbraced Length-Bottom	0 ft
Floor sheathing applied to top of joists-top of joists fully braced.	
Floor Duration Factor	1.00

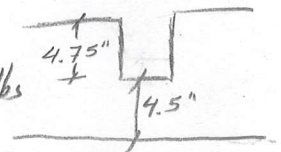
JOIST LOADING

Uniform Floor Loading	Center
Live Load	LL = 40 psf
Dead Load	DL = 10 psf
Total Load	TL = 50 psf
TL Adj. For Joist Spacing wT	66.7 plf



$4\frac{3}{4}$ " Notch @ 16" from end of joist:

Applied Loads @ 16" from end: $V = 253$ lbs; $M = 306$ ft-lbs $\Rightarrow 4,752$ in-lbs

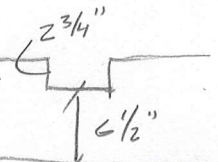


Capacity remaining: $S_{4\frac{3}{4}} = 5.1$ in³, $F_b' = 1139$; $M_{@16"} = 5,809$ in-lbs $> 4,752$ [OK]

$A_{4.5} = 6.75$ in², $F_v' = 180$; $V = 1215$ lbs > 253 [OK]

$2\frac{3}{4}$ " Notch @ 5'-8" from end of joist:

Applied loads @ 5'-8" from end: $V = 34$ lbs; $M = 867$ ft-lbs $\Rightarrow 10,404$ in-lbs



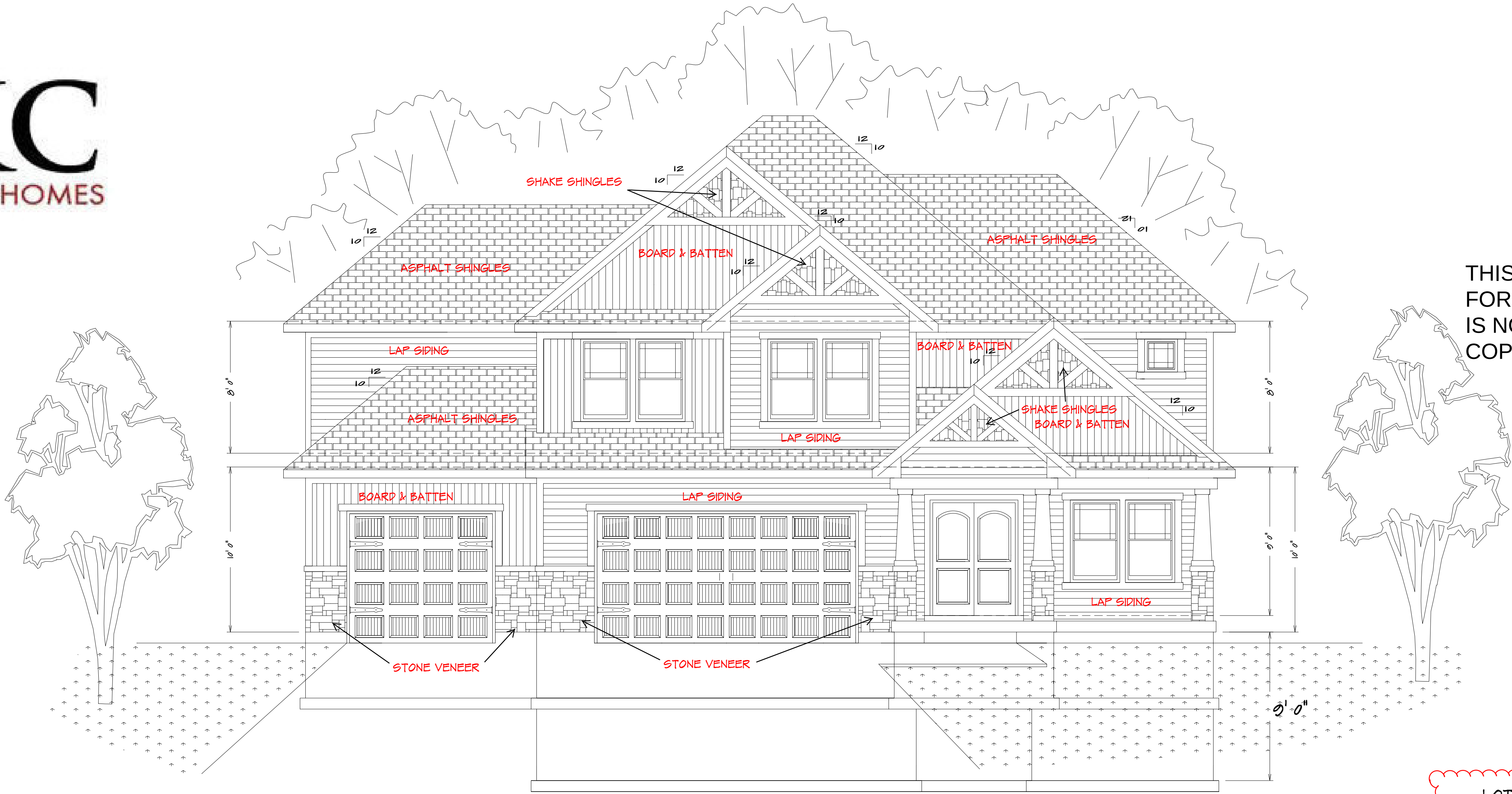
Capacity remaining: $S_{6.5} = 10.6$ in³; $F_b' = 1139$; $M_{@5.8'} = 12,073$ in-lbs $> 10,404$ [OK]

$A_{6.5} = 9.75$ in²; $F_v' = 180$; $V_{@5.8'} = 1755$ lbs > 34 lbs [OK]



THIS PLAN HAS BEEN ANNOTATED FOR A COMMENT RESPONSE AND IS NOT THE DIGITALLY SIGNED CITY COPY. REV 6-8-22

RELEASE FOR CONSTRUCTION AS NOTED ON PLANS REVIEW DEVELOPMENT SERVICES LEE'S SUMMIT, MISSOURI 01/26/2021



FRONT ELEVATION

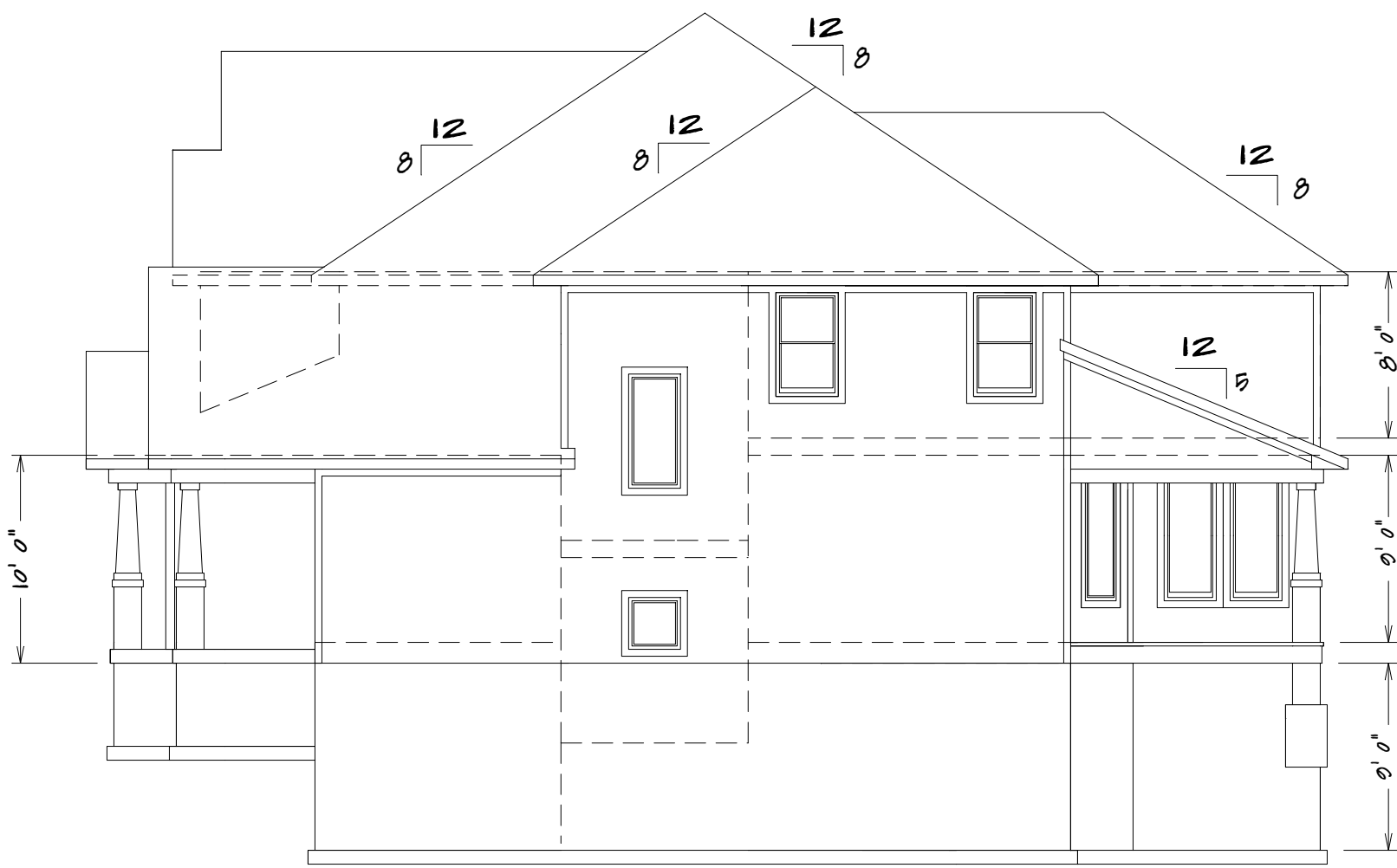
1/4" = 1'0"

ALL NOTES, SECTIONS, AND DRAWINGS ARE IN ACCORDANCE WITH THE 2018 IRC

NOTE: ACTUAL ELEVATIONS MAY VARY FROM ARCHITECTURAL DRAWINGS, DUE TO TERRAIN/BACKFILL PROCESS. FRONT ELEVATION IS ARCHITECTURAL DRAWING AND MAY VARY DUE TO MATERIALS AVAILABILITY.

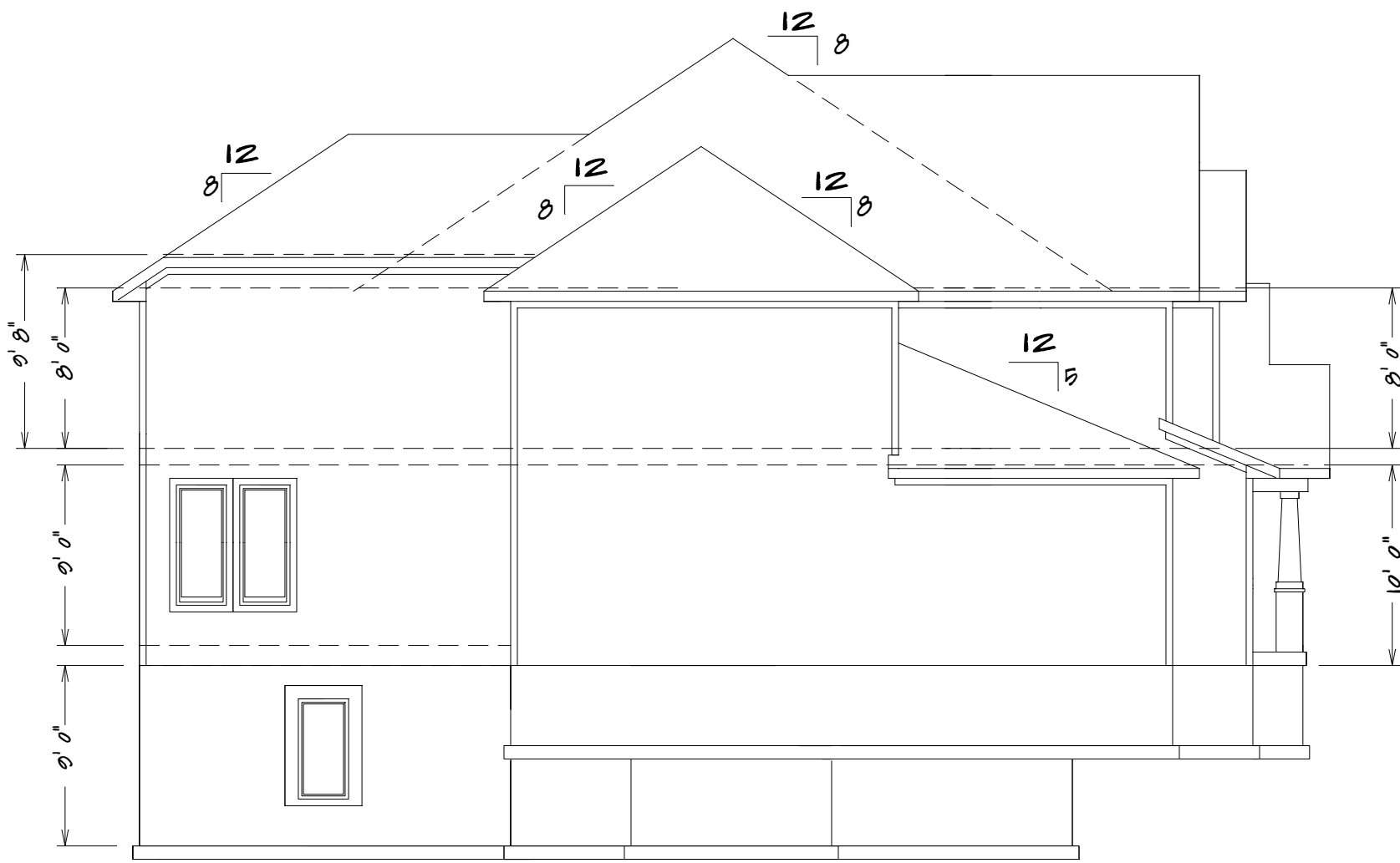
BUILDER/CONTRACTOR IS RESPONSIBLE TO CHECK ALL DIMENSIONS FOR ACCURACY BETWEEN FLOORS, FOUNDATION, AND ELEVATIONS. ALSO VERIFY ALL BEAM, HEADERS, PAD LOCATIONS, AND COLUMN SIZES.

LOT 85 WOODSIDE RIDGE 322 NW AMBERSHAM DR. LEES SUMMIT MO. 64081



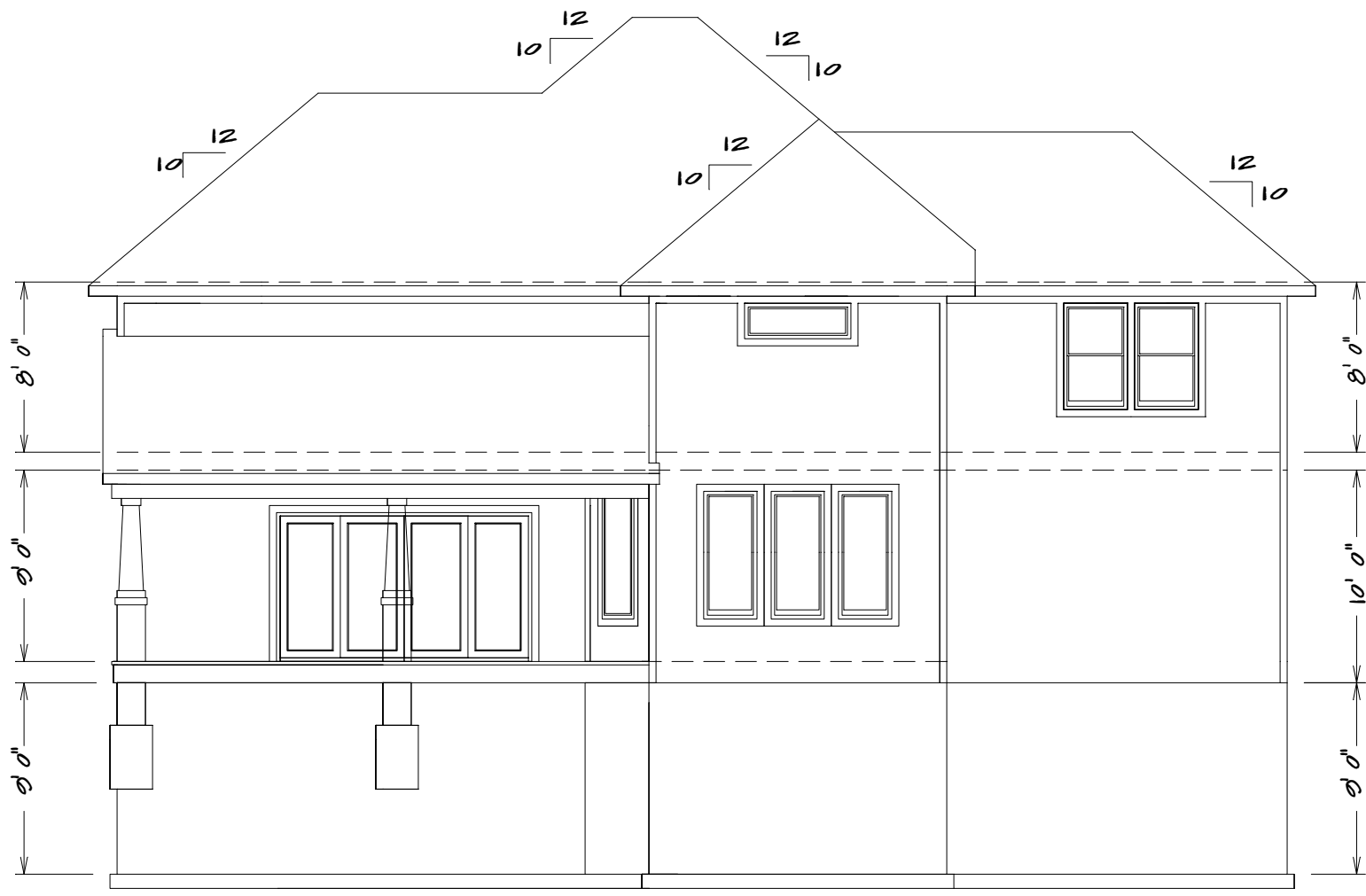
RIGHT ELEVATION

1/8" = 1'0"



LEFT ELEVATION

1/8" = 1'0"



REAR ELEVATION

1/8" = 1'0"



SQUARE FOOTAGE

LIVING AREA
FIRST FLOOR = 1529
SECOND FLOOR = 1794
COVERED REAR DECK = 299
OPTIONAL BASEMENT FINISH = 787
FRONT STOOD = 156
UNFINISHED AREA
STORAGE BASEMENT = 597
GARAGE (3-CAR) = 942

BUILDER/CONTRACTOR IS RESPONSIBLE TO CHECK ALL DIMENSIONS FOR ACCURACY BETWEEN FLOORS, FOUNDATION, AND ELEVATIONS. ALSO VERIFY ALL BEAM, HEADERS, PAD LOCATIONS, AND COLUMN SIZES. BUILDER/CONTRACTOR TO CHECK FOR CONFORMANCE WITH ALL CITY ORDINANCES, ZONING ORDINANCES, AND ALL APPLICABLE CODES. BUILDER/CONTRACTOR ACCEPTS ALL RESPONSIBILITY FOR LOT PLACEMENT, SETBACKS, AND PLANS. BUILDER/CONTRACTOR AND HOME OWNER ACCEPTS RESPONSIBILITY FOR ANY AND ALL COPYRIGHT INFRINGEMENTS OR RESEMBLANCES TO OTHER COPYRIGHTED PLANS. BUILDER/CONTRACTOR ACCEPTS RESPONSIBILITY FOR ANY ON SITE CHANGES MADE TO STRUCTURE.

HOME BUYER:	PHONE:	DATE DRAWN:	PLAN NO.	SHEET NO.
BUILDER:	PHONE:	DATE REVISED:	FILE NAME:	APPROX. SQ.FT.
SUB-DIVISION:	LOT NO.	DESIGNER:		



FRONT ELEVATION

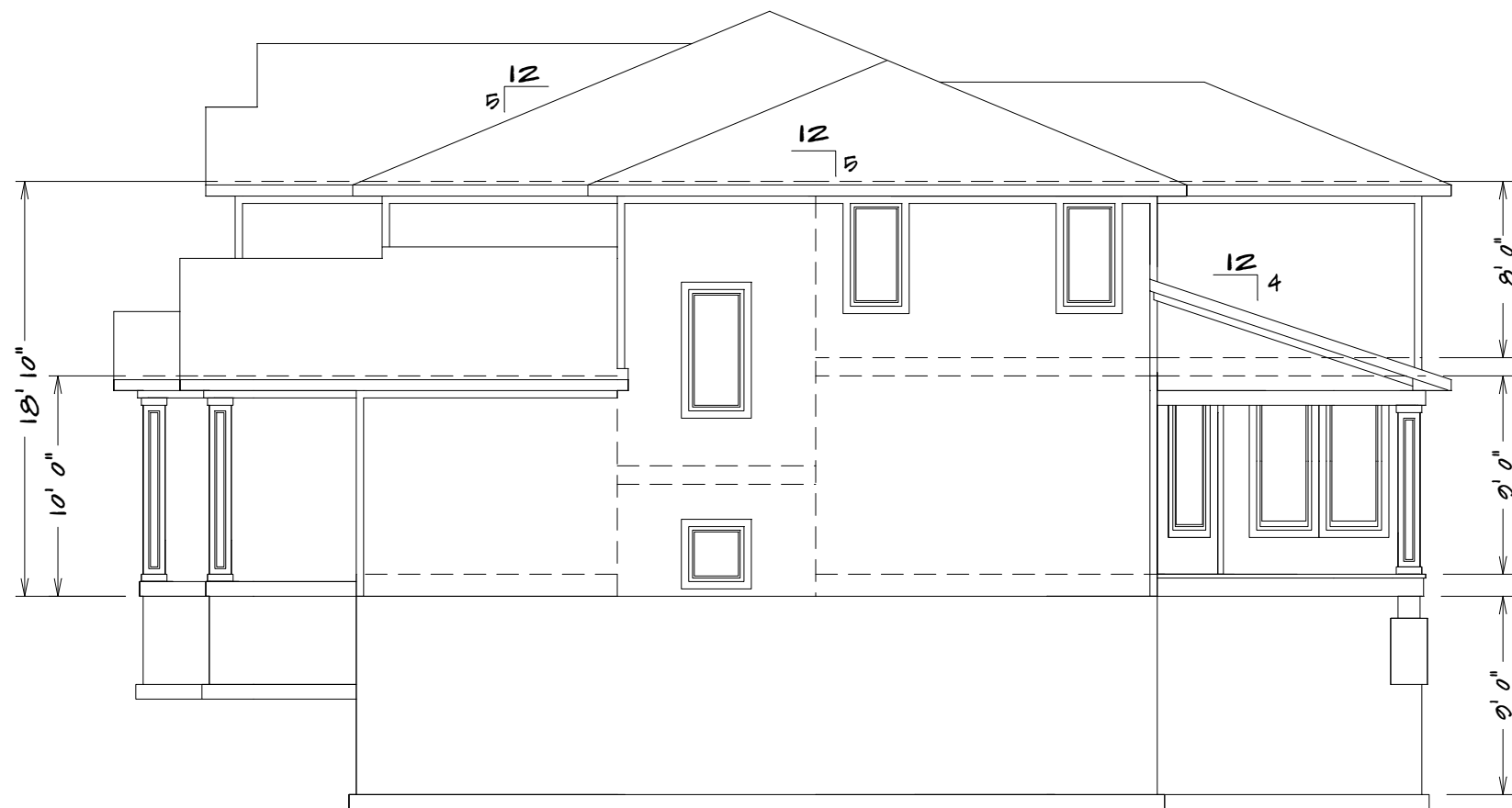
1/4" = 1'0"

ALL NOTES, SECTIONS, AND DRAWINGS
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NOTE:
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DRAWINGS, DUE TO TERRAIN/BACKFILL PROCESS
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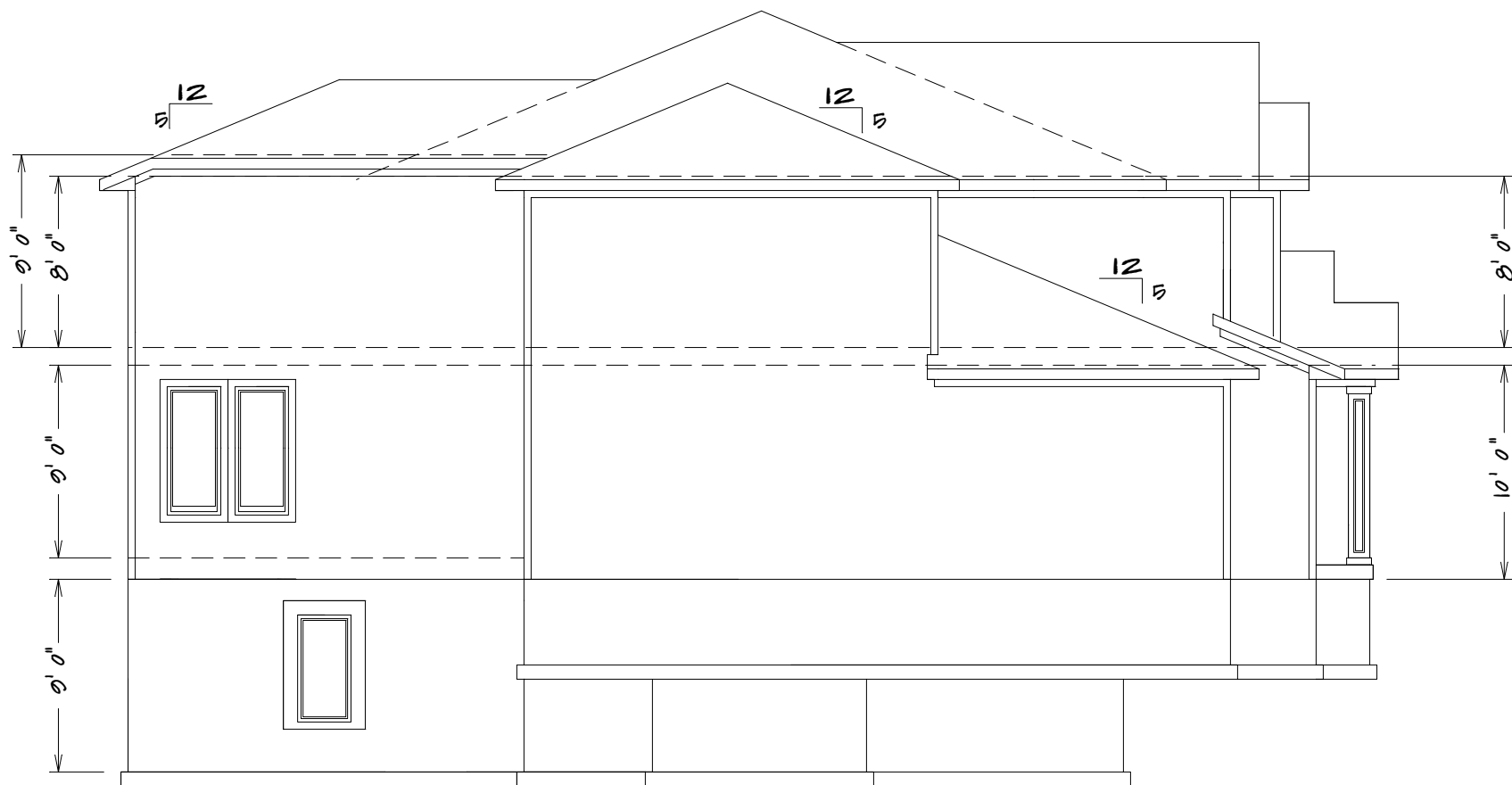
LOT 85 WOODSIDE RIDGE
322 NW AMBERSHAM DR.
LEES SUMMIT MO. 64081

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AND COLUMN SIZES.



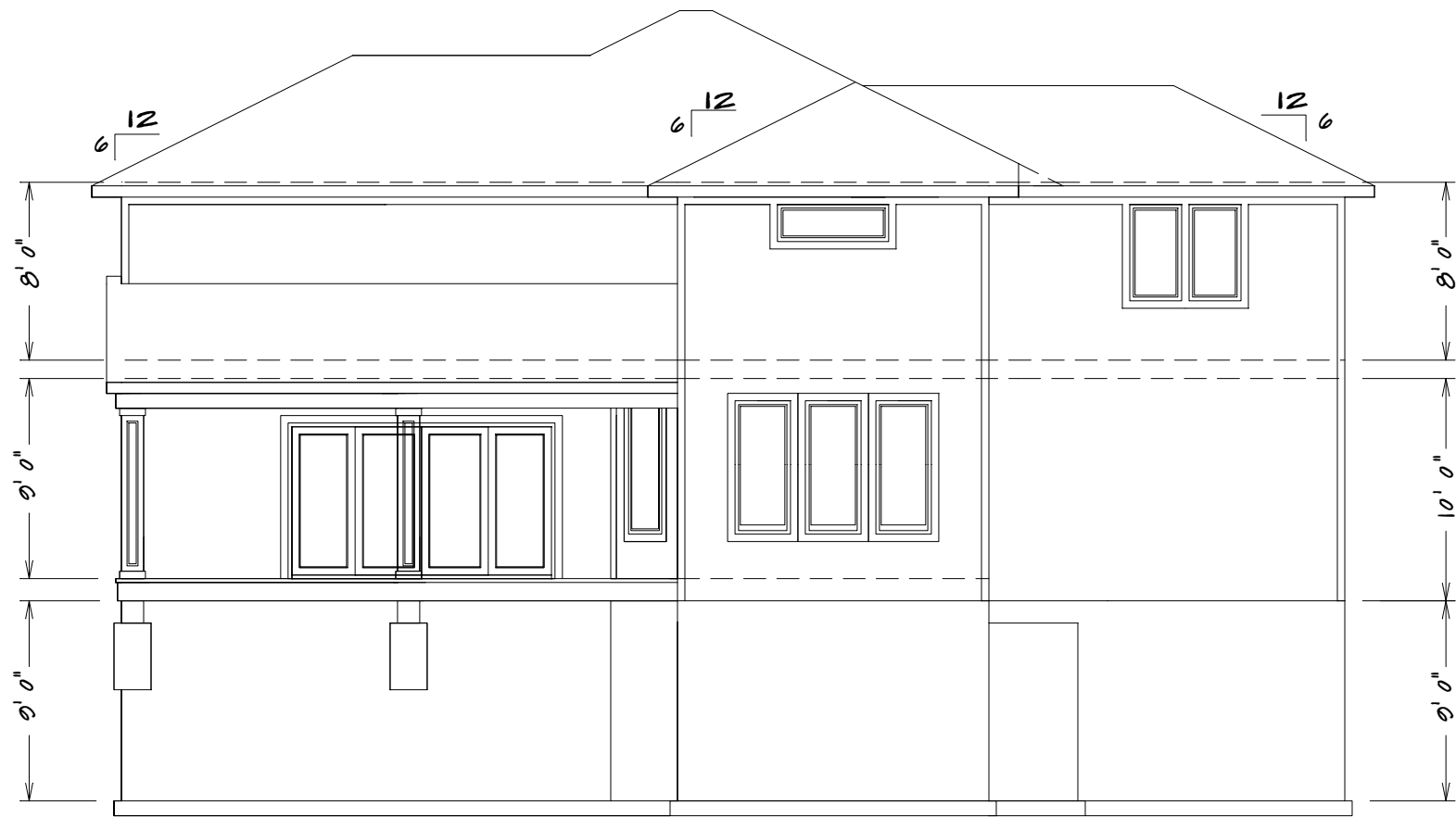
RIGHT ELEVATION

1/8" = 1'0"



LEFT ELEVATION

1/8" = 1'0"



REAR ELEVATION

1/8" = 1'0"

SQUARE FOOTAGE

LIVING AREA
FIRST FLOOR = 1828
SECOND FLOOR = 1794
COVERED REAR DECK = 288
OPTIONAL BASEMENT FINISH = 787
FRONT STOOP = 186
UNFINISHED AREA
STORAGE BASEMENT = 597
GARAGE (3-CAR) = 842

BUILDER/CONTRACTOR IS RESPONSIBLE TO CHECK ALL DIMENSIONS FOR ACCURACY
BETWEEN FLOORS, FOUNDATION, AND ELEVATIONS. ALSO VERIFY ALL BEAM, HEADERS,
PAD LOCATIONS, AND COLUMN SIZES. BUILDER/CONTRACTOR TO CHECK FOR
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ACCEPTS ALL RESPONSIBILITY FOR LOT PLACEMENT, SETBACKS, AND PLANS.
BUILDER/CONTRACTOR AND HOME OWNER ACCEPTS RESPONSIBILITY FOR ANY AND ALL
COPYRIGHT INFRINGEMENTS OR RESUBMISSIONS TO OTHER COPYRIGHTED PLANS.
BUILDER/CONTRACTOR ACCEPTS RESPONSIBILITY FOR ANY ON-SITE CHANGES MADE
TO STRUCTURE.

HOME BUYER:
BUILDER:
SUB-DIVISION:

DATE DRAWN:
DATE REVISED:
DESIGNER:

PHONE:
PHONE:
LOT NO.

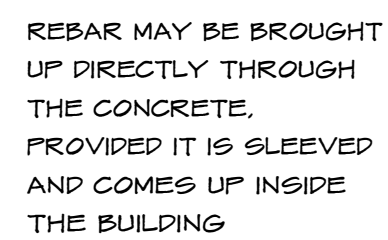
PLAN NO.
FILE NAME:

SHEET NO.
APPROX. SQ.FT.:

RELEASE FOR
CONSTRUCTION
AS NOTED ON PLANS REVIEW
DEVELOPMENT SERVICES
LEE'S SUMMIT, MISSOURI
01/26/2021

S.D.
M = SMOKE DETECTOR

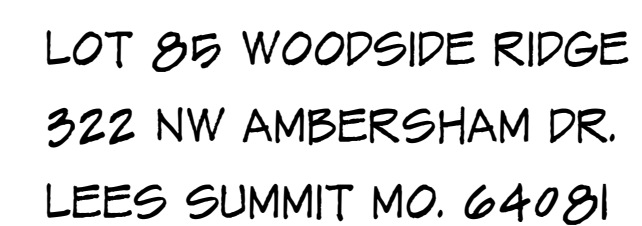
BUILDING HEIGHT	MINIMUM FOOTING	HORIZONTAL REBAR	LOCATION OF REBAR
1 OR 2 STY.	$8" \times 16" W$	2-#4	3" FROM BTM
3 STORY	$8" \times 24" W$	2-#4	3" FROM BTM
ACC. STR.	$8" \times 12" W$	2-#4	3" FROM BTM



1 Section 250.88 of the National Electrical Code requires that the concrete encased reinforcing steel be included in the grounding electrical system. This means that you must have "an electrode encased by at least 50 mm (2 in.) of concrete, located horizontally near the bottom or vertically, and within that portion of a concrete foundation or footing that is in direct contact with the earth, consisting of at least 60 m (20 ft) of one or more bare or zinc galvanized or other electrically conductive coated steel reinforcing bars or rods of not less than 19 mm (3/4 in.) in diameter, or consisting of at least 60 m (20 ft) of bare copper conductor not smaller than 4 AWG.

STEEL COLUMNS TO BE
3" DIAMETER SCHEDULE 40 PIPE MANUFACTURED
IN ACCORDANCE WITH ASTM A53 GRADE B OR
APPROVED EQUIVALENT UNLESS NOTED

TYPICAL DEAD-MAN SECTION

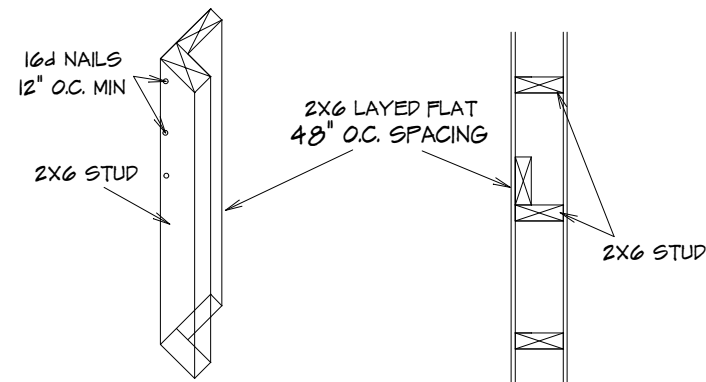


SF-7014

COMPLIANCE WITH CONTRACTS, CITY, AND NATIONAL CODES. BUILDER/CONTRACTOR ACCEPTS ALL RESPONSIBILITY FOR LOT PLACEMENT, SET BACKS, AND FLOOD PLANS. BUILDER/CONTRACTOR AND HOME OWNER ACCEPTS RESPONSIBILITY FOR ANY AND ALL CONVEYANCE INFRINGEMENTS OR RESEMBLANCES TO OTHER COPYRIGHTED PLANS. BUILDER/CONTRACTOR ACCEPTS RESPONSIBILITY FOR ANY ON SITE CHANGES MADE TO STRUCTURE.



 ^{S.D.} = SMOKE DETECTOR



10' TRU 18' TALL WALLS
TO BE CONSTRUCTED WITH UNINTERRUPTED
#2 2X6 STUDS 16" O.C. WITH
STIFF BACK EVERY 48" O.C.

REQUIRED AREAS NEEDING HEADERS:	HEADER DESCRIPTIONS:
WINDOWS/DOORS UP TO 2'8" R.O.	(2) #2 P-FIR 2X10'S
WINDOWS/DOORS 5'8" UP TO 7'2" R.O.	(2) #2 P-FIR 2X10'S W/1/2" GLUE FLY
WINDOWS/DOORS 7'2" UP TO 9'6" R.O.	(2) 3 1/2" LVL
8'0" GARAGE DOORS W/CEILING & ROOF LOAD	(2) 3 1/2" LVL
9'0" GARAGE DOORS W/CEILING & ROOF LOAD	(2) 3 1/2" LVL
10'0" GARAGE DOORS W/SECOND FLOOR	(2) 3 1/2" LVL
10'0" GARAGE DOORS W/SECOND FLOOR	(2) 11 7/8" LVL
16'0" GARAGE DOOR W/NO SECOND FLOOR	(2) 11 7/8" LVL
16'0" GARAGE DOORS W/SECOND FLOOR	(2) 14" LVL

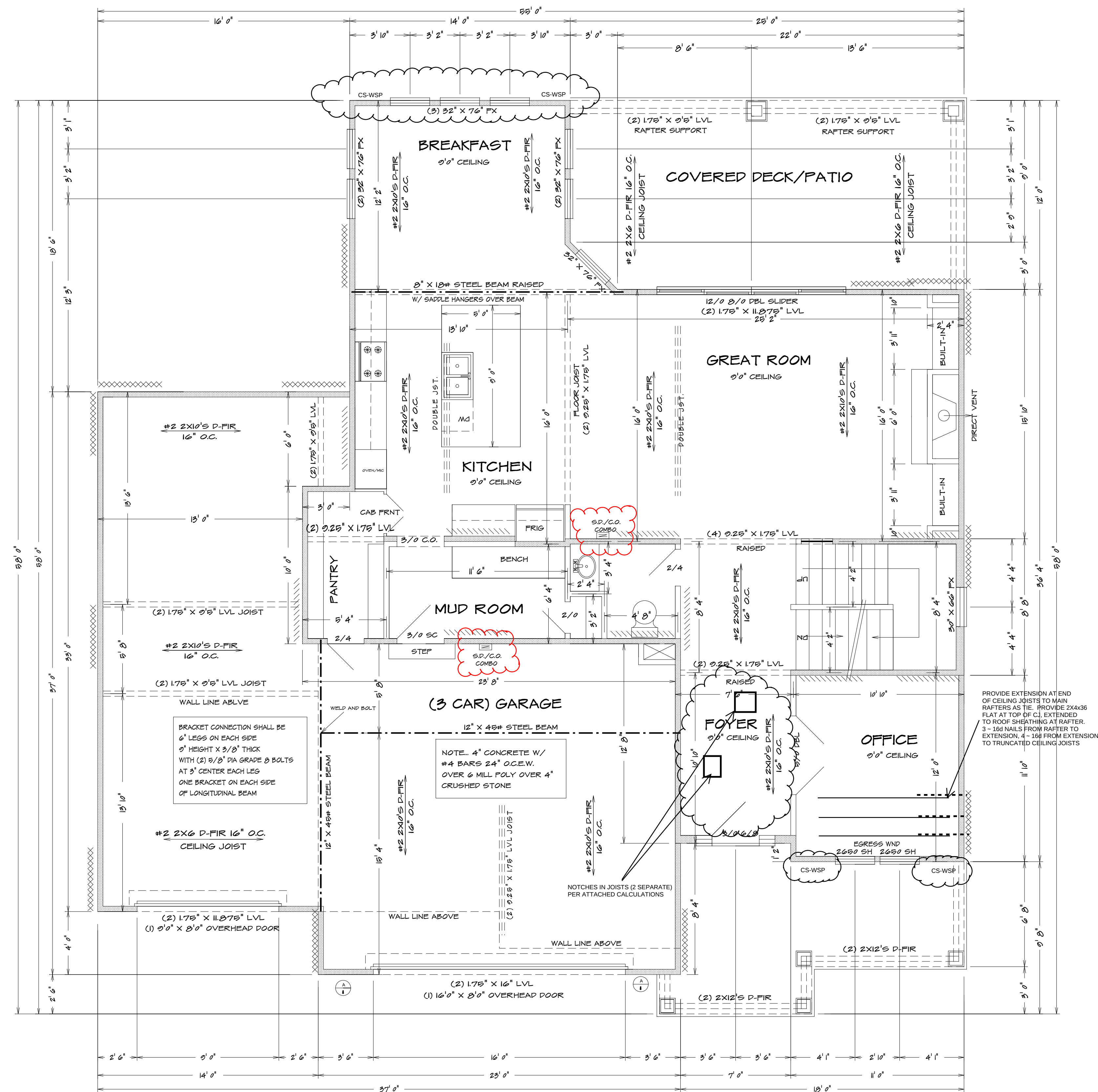
USE HEADERS FOR OPENINGS ABOVE UNLESS SPECIFIED OTHERWISE.

In dwelling units, where the opening of an operable window is located more than 72 inches (1829 mm) above the finished grade or surface below, the lowest part of the clear opening of the window shall be a minimum of 24 inches (610 mm) above the finished floor of the room in which the window is located. Operable sections of windows shall not permit openings that allow passage of a 4-inch-diameter (102 mm) sphere where such openings are located within 24 inches (610 mm) of the finished floor.

1. Windows whose openings will not allow a 4-inch-diameter (102 mm) sphere to pass through the opening when the opening is in its largest opened position.
2. Openings that are provided with window fall prevention devices that comply with ASTM F 2090.
3. Windows that are provided with window opening control devices that comply with Section R312.2.2.

Window opening control devices shall comply with ASTM F 2090. The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section R310.11.

Exhaust air from the space shall be exhausted directly to the outdoors.



BEARING WALL LINES

FIRST FLOOR PLAN

$1/4" = 1'0"$

LOT 85 WOODSIDE RIDGE
322 NW AMBERSHAM DR.
LEES SUMMIT MO. 64081



BETWEEN FLOORS, FOUNDATION, AND ELEVATIONS. ALSO VERIFY ALL BEAM, HEADERS, PAD LOCATIONS, AND COLUMN SIZES. BUILDER/CONTRACTOR TO CHECK FOR

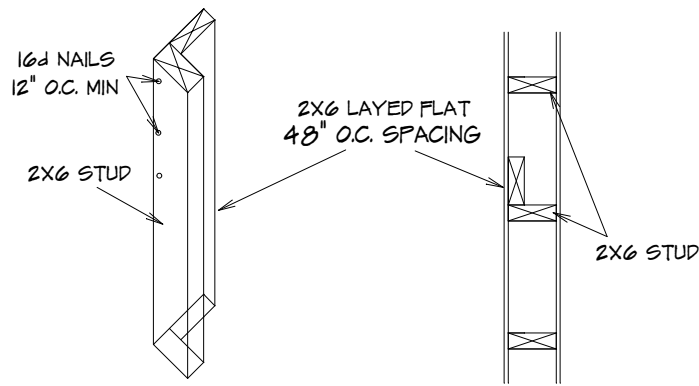
BUILDER CONTRACTOR AND HOME OWNER ACCEPTS RESPONSIBILITY FOR ANY AND ALL COPYRIGHT INFRINGEMENTS OR RESEMBLANCES TO OTHER COPYRIGHTED PLANS.

SEE ELEVATION FOR
WALL HEIGHTS

NOTE.. ELECTRICAL SERVICE
TO BE 200 AMP.

NOTE.. DOUBLE JOIST UNDER
ALL PARALLEL WALLS
ABOVE UNLESS NOTED

S.D.
= SMOKE DETECTOR



EXTERIOR TALL WALL SECTION

10' TRU 18' TALL WALLS
TO BE CONSTRUCTED WITH UNINTERRUPTED
#2 2X6 STUDS 16' O.C. WITH
STIFF BACK EVERY 48' O.C.

GENERAL HEADER SPECIFICATIONS:

REQUIRED AREAS NEEDING HEADERS:	HEADER DESCRIPTIONS:
WINDOWS/DOORS UP TO 38" R.O.	(2) #2 D-FIR 2X10'S
WINDOWS/DOORS 38" UP TO 72" R.O.	(2) #2 D-FIR 2X10'S W/1/2" GLUE FLY
WINDOWS/DOORS 72" UP TO 26" R.O.	(2) 2 1/2" LVL
8'0" GARAGE DOORS W/CEILING & ROOF LOAD	(2) 2 1/2" LVL
8'0" GARAGE DOORS W/CEILING & ROOF LOAD	(2) 2 1/2" LVL
8'0" GARAGE DOORS W/SECOND FLOOR	(2) 2 1/2" LVL
8'0" GARAGE DOORS W/SECOND FLOOR	(2) 11 7/8" LVL
16'0" GARAGE DOOR W/NO SECOND FLOOR	(2) 11 7/8" LVL
16'0" GARAGE DOORS W/SECOND FLOOR	(2) 14" LVL

USE HEADERS FOR OPENINGS ABOVE UNLESS SPECIFIED OTHERWISE

R312.2.1 Window sills.

In dwelling units, where the opening of an operable window is located more than 72 inches (1829 mm) above the finished grade or surface below, the lowest part of the clear opening of the window shall be a minimum of 24 inches (610 mm) above the finished floor of the room in which the window is located. Operable sections of windows shall not permit openings that allow passage of a 4-inch-diameter (102 mm) sphere where such openings are located within 24 inches (610 mm) of the finished floor.

Exceptions:

- Windows whose openings will not allow a 4-inch-diameter (102 mm) sphere to pass through the opening when the opening is in its largest opened position.
- Openings that are provided with window fall prevention devices that comply with ASTM F 2090.
- Windows that are provided with window opening control devices that comply with Section R312.2.2.

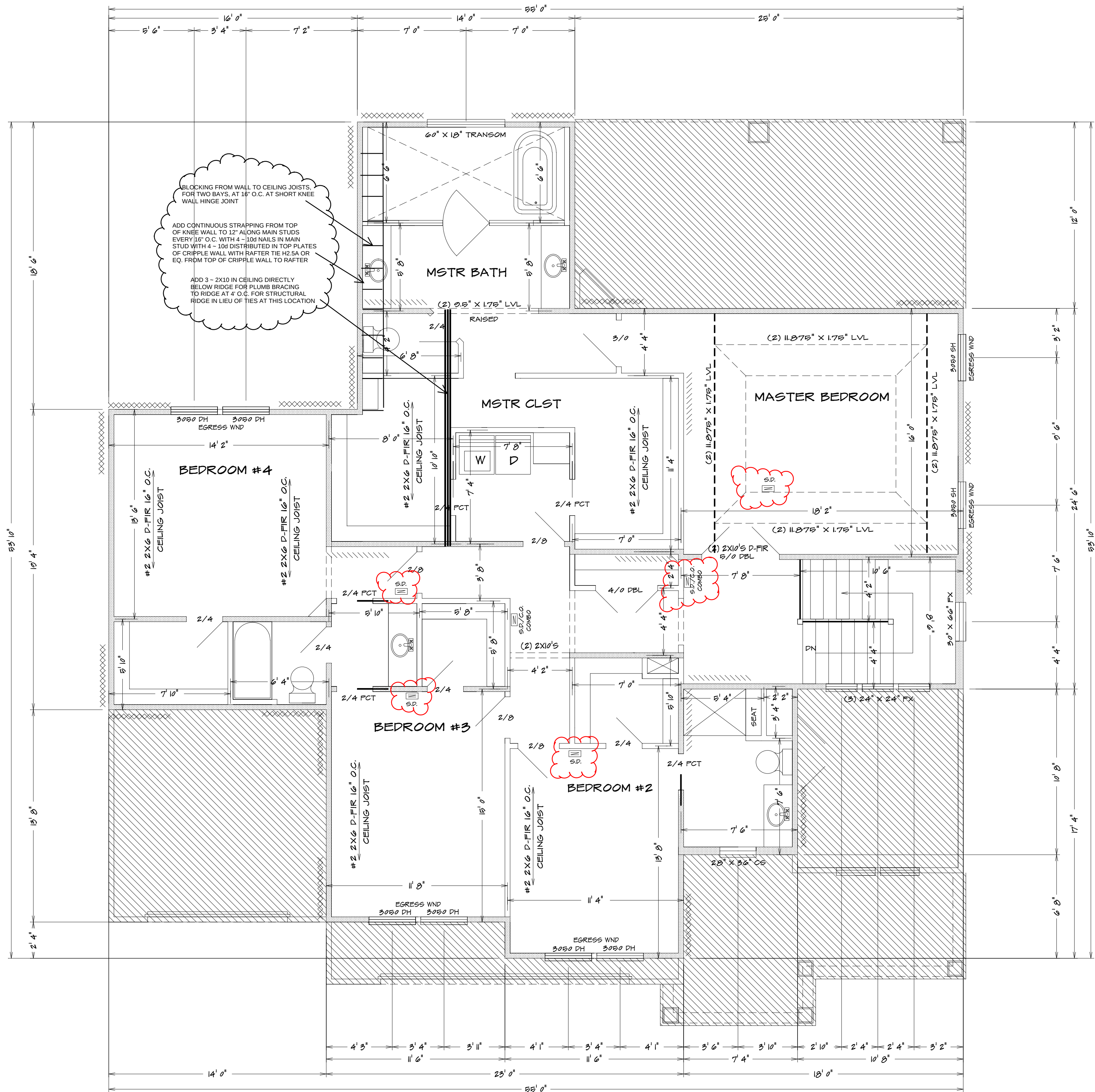
R312.2.2 Window opening control devices.

Window opening control devices shall comply with ASTM F 2090. The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section R310.1.1.

Bathrooms, water closet compartments and other similar rooms shall be provided with aggregate glazing area in windows of not less than 3 square feet, one-half of which must be operable.

Exception:

The glazed areas shall not be required where artificial light and a local exhaust system are provided. The minimum local exhaust rates shall be determined in accordance with Section M1507. Exhaust air from the space shall be exhausted directly to the outdoors.



ALL NOTES, SECTIONS, AND DRAWINGS
ARE IN ACCORDANCE WITH THE 2018 IRC

BEARING WALL LINES
SECOND FLOOR PLAN
1/4" = 1'0"

LOT 85 WOODSIDE RIDGE
322 NW AMBERSHAM DR.
LEES SUMMIT MO. 64081





NOTE..SEE SPECS FOR SPECIFIC APPLICATIONS.

1. ALL OUTLETS TO BE ARC FAULT CIRCUIT-INTERRUPTER OR GROUND FAULT CIRCUIT-INTERRUPTER PROTECTED EXCEPT: REFRIGERATOR, SINGLE OUTLET FOR SUMMER AND SINGLE OUTLET IN GARAGE FOR A FREEZER
2. ALL OUTLETS TO BE TAMPER RESISTANT

PLANS WERE DESIGNED AND
REVIEWED IN ACCORDANCE
WITH THE 2018 IRC

Foundation Wall Reinforcement Schedule - Table 2

Vertical reinforcement spacing 60 psf soil

Concrete strength/Grade	8 inch thick wall			10 inch thick wall		
Reinforcement #4 bar	8"	9"	10"	8"	9"	10"
3,000 psi / Grade 40	16	12	NP	24	16	12
3,500 psi / Grade 40	16	12	NP	24	24	12
3,000 psi / Grade 60	24	16	NP	24	20	16
3,500 psi / Grade 60	24	16	NP	24	24	16

Horizontal reinforcement – Minimum Grade 40 steel #4 bar

One bar 12" from top of wall; maximum spacing 24" o.c.	4-#4	5-#4	6-#4	4-#4	5-#4	6-#4
--	------	------	------	------	------	------

- Footnotes:
- 1) Wall height is measured from the top of the wall to the top of the floor slab.
 - 2) Vertical reinforcement for concrete walls that are not full height and for reinforcement spaced 24 inch on center may be placed in the middle of the wall. Other walls shall have vertical reinforcement place as follows:
 - a) 8-inch wall - Minimum 5 inches from the outside face.
 - b) 10-inch wall - Minimum 6.75 inches from the outside face.
 - c) Extend bars to within 8 inches of the top of the wall.
 - 3) Reinforcement clearances:
 - a) Concrete exposed to earth – minimum 1-1/2 inches.
 - b) Not exposed to weather (interior side of walls) – minimum 3/4 inch.
 - c) Concrete exposed to weather (top clearance in garage and driveway slabs)- 1-1/2 inches.
 - 4) Horizontal reinforcement:
 - a) One bar shall be placed within 12 inches of the top of the wall.
 - b) Other bars shall be equally spaced with spacing not to exceed 24 inches on center.
 - c) Horizontal bars should be as close to the tension face as possible (interior) and behind the vertical reinforcement (i.e.2" towards the inside).
 - d) Supplemental reinforcement at corners - Place 1 #4 bar 48 inches long at 45 degree angle at corners of openings per Figure 4a. Place reinforcement within 6" of the edge of inside corners
 - 5) Reinforcement shall be lapped a minimum 24 inches at ends, splices, and around corners.
 - 6) At masonry ledges the minimum wall thickness shall be 3-1/2 inches. Ledges shall not exceed a depth of more than 24 inches below the top of the wall. For wall thicknesses less than 4 inches provide #4 bars at maximum 24 inches on center to within 8 inches of the top of the wall.
 - 7) Straight walls more than 5 feet tall and more than 16 feet long shall be provided with exterior braced return walls. Wall length shall be measured using inside the shortest dimension between intersecting walls (See 7/52).

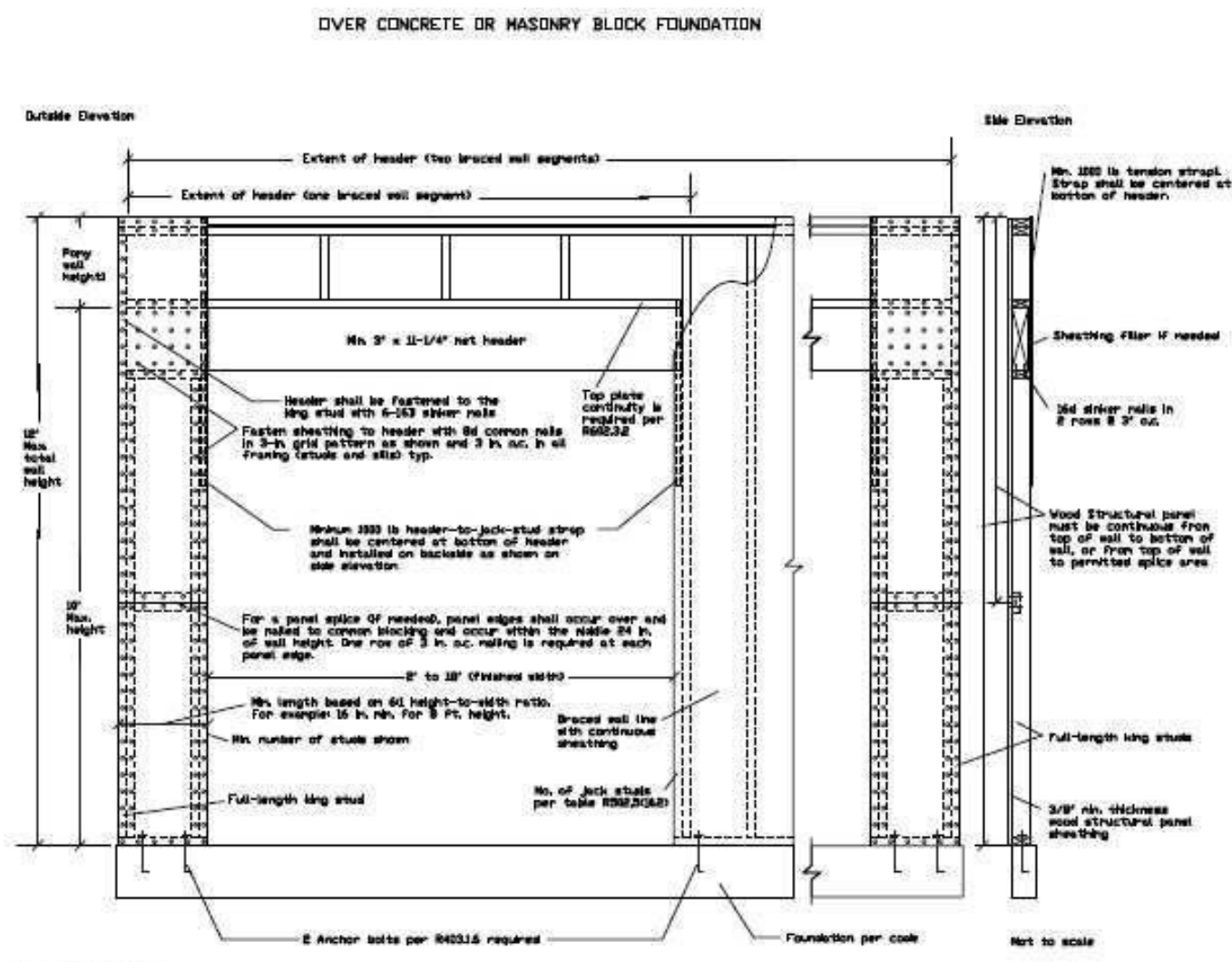
TABLE R902.3(1) FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENERS ^{a,b,c}	SPACING OF FASTENERS
Roof			
1	Blocking between joists or rafters to top plate, toe nail	3-8d (2 1/2" x 0.113")	—
2	Ceiling joists to plate, toe nail	3-8d (2 1/2" x 0.113")	—
3	Rafter or roof truss to plate, toe nail	3-10d (3" x 0.128")	—
4	Roof rafters to ridge, valley or hip rafters: toe nail face nail	3-16d box nails (3 1/2" x 0.135") or 3-10d common nails (3" x 0.148")	2 toe nails on one side and 1 toe nail on opposite side of each rafter or truss
5	Roof rafters to ridge, valley or hip rafters: toe nail face nail	4-16d (3 1/2" x 0.135") 3-16d (3 1/2" x 0.135")	—
Wall			
7	Built-up studs-face nail	10d (3" x 0.128")	24" o.c.
8	Abutting studs at intersecting wall corners, face nail	16d (3 1/2" x 0.135")	12" o.c.
9	Built-up header, two pieces with 1/2" spacer	16d (3 1/2" x 0.135")	16" o.c. along each edge
10	Continued header, two pieces	16d (3 1/2" x 0.135")	16" o.c. along each edge
11	Continuous header to stud, toe nail	4-8d (2 1/2" x 0.113")	—
12	Double studs, face nail	10d (3" x 0.128")	24" o.c.
13	Double top plates, face nail	10d (3" x 0.128")	24" o.c.
14	Double top plates, minimum 24-inch offset of end joints, face nail in lapped area	8-16d (3 1/2" x 0.135")	—
15	Sole plate to joist or blocking, face nail	16d (3 1/2" x 0.135")	16" o.c.
16	Sole plate to joist or blocking at braced wall panels	3-16d (3 1/2" x 0.135")	16" o.c.
17	Stud to sole plate, toe nail	3-8d (2 1/2" x 0.113") or 2-16d (3 1/2" x 0.135")	—
18	Top or sole plate to stud, end nail	2-16d (3 1/2" x 0.135")	—
19	Top plates, laps at corners and intersections, face nail	2-10d (3" x 0.128")	—
20	1" brace to each stud and plate, face nail	2-8d (2 1/2" x 0.113") 2 staples 1 3/4"	—
21	1" x 6" sheathing to each bearing, face nail	2-8d (2 1/2" x 0.113") 2 staples 1 3/4"	—
22	1" x 8" sheathing to each bearing, face nail	2-8d (2 1/2" x 0.113") 3 staples 1 3/4"	—
23	Wider than 1" x 8" sheathing to each bearing, face nail	3-8d (2 1/2" x 0.113") 4 staples 1 3/4"	—
Floor			
24	Joist to sill or girder, toe nail	3-8d (2 1/2" x 0.113")	—
25	Rim joist to top plate, toe nail (roof applications also)	8d (2 1/2" x 0.113")	6" o.c.
26	Rim joist or blocking to sill plate, toe nail	8d (2 1/2" x 0.113")	6" o.c.
27	1" x 6" subfloor or less to each joist, face nail	2-8d (2 1/2" x 0.113") 2 staples 1 3/4"	—
28	2" subfloor to joist or girder, blind and face nail	2-16d (3 1/2" x 0.135")	—
29	2" planks (plank & beam - floor & roof)	2-16d (3 1/2" x 0.135")	at each bearing
30	Built-up girders and beams, 2-inch lumber layers	10d (3" x 0.128")	Nail each layer as follows: 32" o.c. at top and bottom and staggered. Two nails at ends and at each splice.
31	Ledger strip supporting joists or rafters	3-16d (3 1/2" x 0.135")	At each joist or rafter

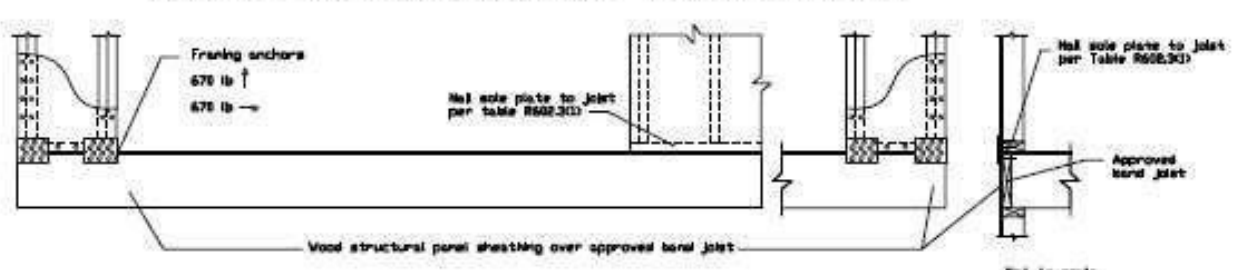
TABLE R902.3(1)—continued FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

ITEM	DESCRIPTION OF BUILDING MATERIALS	DESCRIPTION OF FASTENER ^{a,c,e}	SPACING OF FASTENERS	
			Edges (inches) ^f	Intermediate supports ^{c,e} (inches)
Wood structural panels, subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing				
32	3/8" - 1/2"	6d common (2" × 0.113") nail (subfloor wall) ^f 8d common (2 1/2" × 0.131") nail (roof) ^f	6	12"
33	1 1/2" - 1"	8d common nail (2 1/2" × 0.131")	6	12"
34	1 1/8" - 1 1/4"	10d common (3" × 0.148") nail or 8d (2 1/2" × 0.131") deformed nail	6	12
Other wall sheathing ^h				
35	1/2" structural cellulose fiberboard sheathing	1 1/2" galvanized roofing nail, 7/16" crown or 1" crown staple 16 ga., 1 1/4" long	3	6
36	25/32" structural cellulose fiberboard sheathing	3/4" galvanized roofing nail, 7/16" crown or 1" crown staple 16 ga., 1 1/2" long	3	6
37	1/2" gypsum sheathing ^d	1 1/2" galvanized roofing nail; staple galvanized, 1 1/2" long; 1 1/4" screws, Type W or S	7	7
38	5/8" gypsum sheathing ^d	1 1/2" galvanized roofing nail; staple galvanized, 1 5/8" long; 1 5/8" screws, Type W or S	7	7
Wood structural panels, combination subfloor underlayment to framing				
39	3/4" and less	6d deformed (2" × 0.120") nail or 8d common (2 1/2" × 0.131") nail	6	12
40	7/8" - 1"	8d common (2 1/2" × 0.131") nail or 8d deformed (2 1/2" × 0.120") nail	6	12
41	1 1/8" - 1 1/4"	10d common (3" × 0.148") nail or 8d deformed (2 1/2" × 0.120") nail	6	12

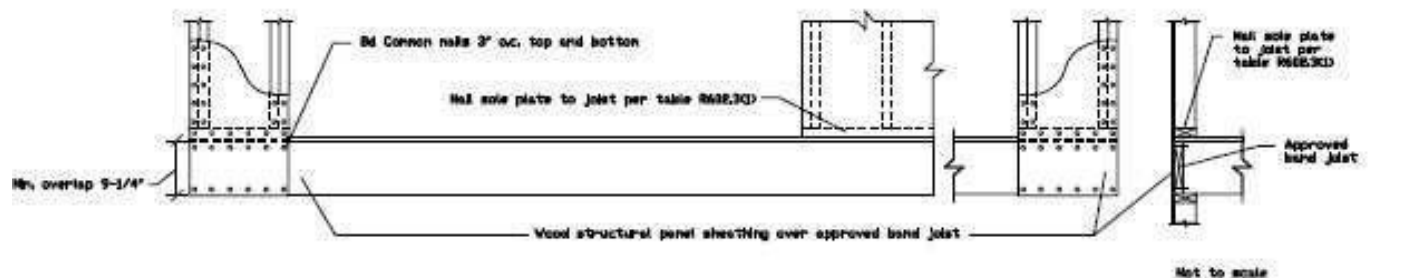
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s; 1 Ksi = 6.895 MPa.



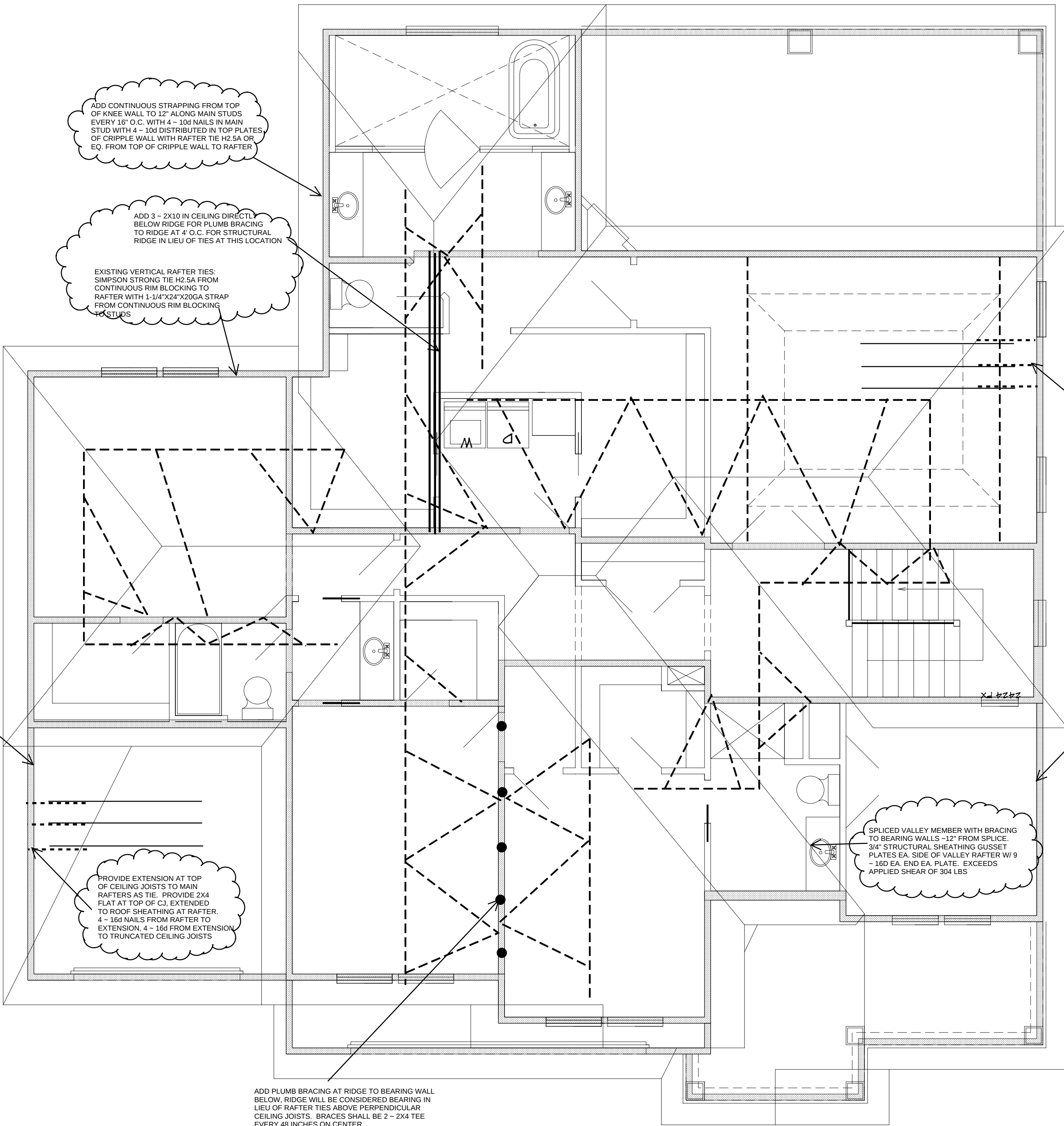
OVER RAISED WOOD FLOORS OR SECOND FLOOR - FRAMING ANCHOR OPTION



OVER RAISED WOOD FLOORS OR SECOND FLOOR - WOOD STRUCTURAL PANEL OVERLAP OPTION



CF-PF WALL BRACING SECTION



NOTE.. HIP RIDGE FOR THE MAIN ROOF AS:
2X8 FOR UNBRACED LENGTH UP TO 9'0"
2X10 FOR UNBRACED LENGTH UP TO 10'0"
2X12 FOR UNBRACED LENGTH UP TO 12'0"

ALL RAFTERS TO BE #2 2X6 D-FIR 16' O.C.
UNLESS OTHERWISE NOTED

PURLING RAFTERS TO BEARING WALL LINES

CONNECT RAFTERS TO CEILING JOIST W (4) 16d GALV. NAILS
CONNECT RAFTERS TO RIDGE, VALLEY, AND HIP RIDGE
WITH (4) 16d GALV. NAILS

VERT. RIDGE AND RAFTER SUPPORTS TO BE EQUAL TO OR GREATER
THAN THE DEPTH OF RAFTERS

LOT 85 WOODSIDE RIDGE
322 NW AMBERSHAM DR.
LEES SUMMIT MO. 64081

BEARING WALL LINES
ROOF ELEVATION
1/4" = 1'0"

ROOF DESIGNED WITH:
LIVE LOAD = 20 PSF
DEAD LOAD = 10 PSF

PLANS WERE DESIGNED AND
REVIEWED IN ACCORDANCE
WITH THE 2018 IRC



BUILDER/CONTRACTOR IS RESPONSIBLE TO CHECK ALL DIMENSIONS FOR ACCURACY
BETWEEN FLOORS, FOUNDATION AND ELEVATIONS. ALSO VERIFY ALL BEAM, HEADERS,
PURLING, JOISTS, AND COLUMN SIZES. BUILDER/CONTRACTOR IS TO CHECK FOR
CORRECTIONS AND REVISIONS. BUILDER/CONTRACTOR IS TO CHECK FOR
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TO STRUCTURE.

HOME BUYER:
BUILDER:
SUB-DIVISION:

PHONE:
PHONE:
LOT NO.

DATE DRAWN:
DATE REVISED:
DESIGNER:

PLAN NO.
SHEET NO.
FILE NAME:
APPROX. SQ.FT.

Foundation Wall Reinforcement Schedule - Table 2

Vertical reinforcement spacing 60 psf soil							
Concrete strength/Grade	8 inch thick wall			10 inch thick wall			
Reinforcement #4 bar	8'	9'	10'	8'	9'	10'	
3,000 psi / Grade 40	16	12	NP	24	16	12	
3,500 psi / Grade 40	16	12	NP	24	24	12	
3,000 psi / Grade 60	24	16	NP	24	20	16	
3,500 psi / Grade 60	24	16	NP	24	24	16	
Horizontal reinforcement – Minimum Grade 40 steel #4 bar							
One bar 12" from top of wall; maximum spacing 24" o.c.	4-#4	5-#4	6-#4	4-#4	5-#4	6-#4	

- Footnotes:
- 1) Wall height is measured from the top of the wall to the top of the floor slab.
 - 2) Vertical reinforcement for concrete walls that are not full height and for reinforcement spaced 24 inch on center may be placed in the middle of the wall. Other walls shall have vertical reinforcement place as follows:
 - a) 8-inch wall - Minimum 5 inches from the outside face.
 - b) 10-inch wall - Minimum 6.75 inches from the outside face.
 - c) Extend bars to within 8 inches of the top of the wall.
 - 3) Reinforcement clearances:
 - a) Concrete exposed to earth – minimum 1-1/2 inches.
 - b) Not exposed to weather (interior side of walls) – minimum 3/4 inch.
 - c) Concrete exposed to weather (top clearance in garage and driveway slabs)- 1-1/2 inches.
 - 4) Horizontal reinforcement:
 - a) One bar shall be placed within 12 inches of the top of the wall.
 - b) Other bars shall be equally spaced with spacing not to exceed 24 inches on center.
 - c) Horizontal bars should be as close to the tension face as possible (interior) and behind the vertical reinforcement (i.e.2" towards the inside).
 - d) Supplemental reinforcement at corners - Place 1 #4 bar 48 inches long at 45 degree angle at corners of openings per Figure 4a. Place reinforcement within 6" of the edge of inside corners
 - 5) Reinforcement shall be lapped a minimum 24 inches at ends, splices, and around corners.
 - 6) At masonry ledges the minimum wall thickness shall be 3-1/2 inches. Ledges shall not exceed a depth of more than 24 inches below the top of the wall. For wall thicknesses less than 4 inches provide #4 bars at maximum 24 inches on center to within 8 inches of the top of the wall.
 - 7) Straight walls more than 5 feet tall and more than 16 feet long shall be provided with exterior braced return walls. Wall length shall be measured using inside the shortest dimension between intersecting walls (See 7/S2).

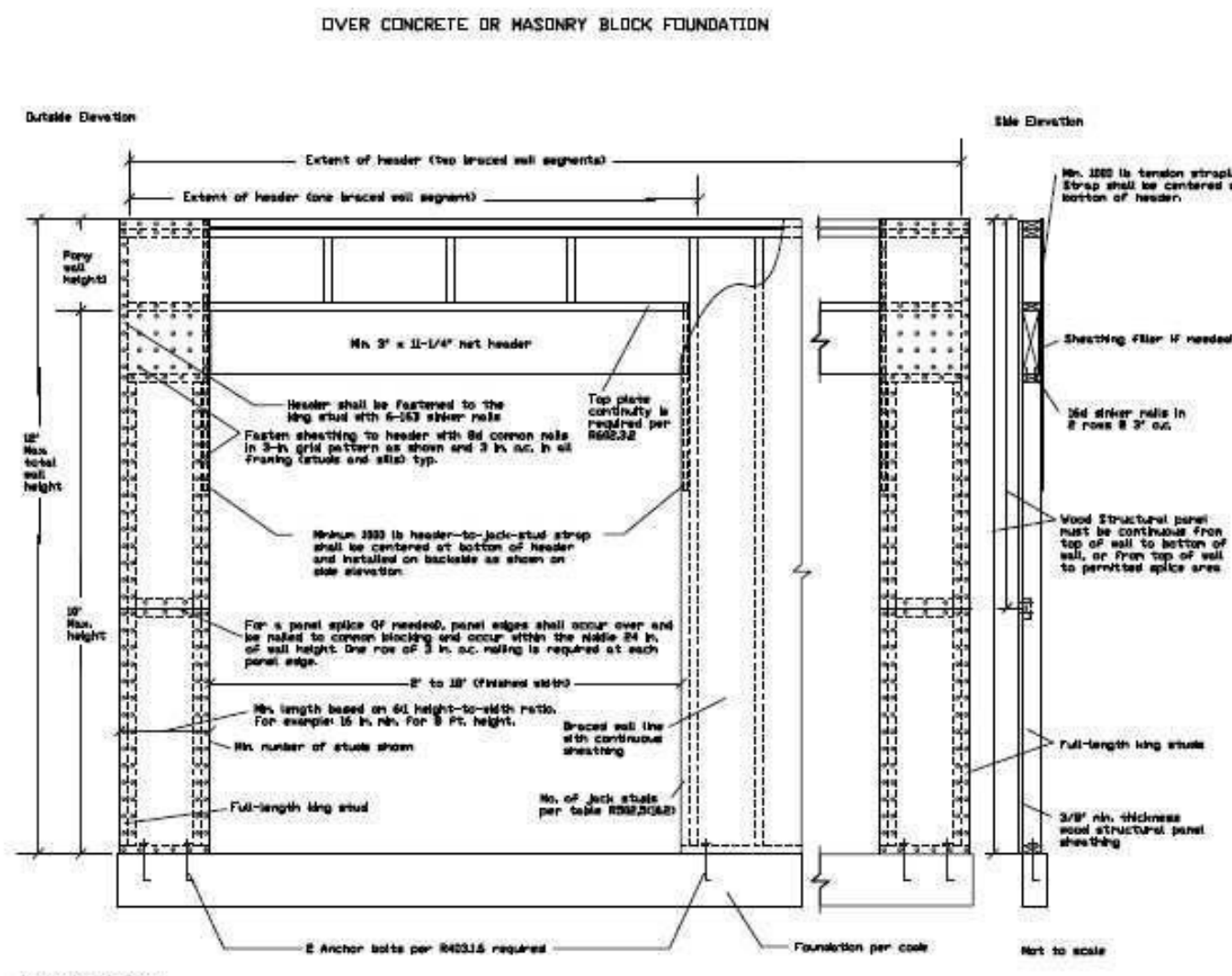
TABLE R602.3(1) FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENERS ^{a, b, c}	SPACING OF FASTENERS
Roof			
1	Blocking between joists or rafters to top plate, toe nail	3-8d (2 1/2" x 0.113")	—
2	Ceiling joists to plate, toe nail	3-8d (2 1/2" x 0.113")	—
3	Rafter or roof truss to plate, toe nail	3-10d (3" x 0.128")	—
4	Rafter or roof truss to plate, toe nail	3-16d box nails (3 1/2" x 0.135") or 3-10d common nails (3" x 0.148")	2 toe nails on one side and 1 toe nail on opposite side of each rafter or truss
5	Roof rafters to ridge, valley or hip rafters: toe nail face nail	4-16d (3 1/2" x 0.135") 3-16d (3 1/2" x 0.135")	—
Wall			
7	Built-up studs-face nail	10d (3" x 0.128")	24" o.c.
8	Abutting studs at intersecting wall corners, face nail	16d (3 1/2" x 0.135")	12" o.c.
9	Built-up header, two pieces with 1/2" spacer	16d (3 1/2" x 0.135")	16" o.c. along each edge
10	Continued header, two pieces	16d (3 1/2" x 0.135")	16" o.c. along each edge
11	Continuous header to stud, toe nail	4-8d (2 1/2" x 0.113")	—
12	Double studs, face nail	10d (3" x 0.128")	24" o.c.
13	Double top plates, face nail	10d (3" x 0.128")	24" o.c.
14	Double top plates, minimum 24-inch offset of end joints, face nail in lapped area	8-16d (3 1/2" x 0.135")	—
15	Sole plate to joist or blocking, face nail	16d (3 1/2" x 0.135")	16" o.c.
16	Sole plate to joist or blocking at braced wall panels	3-16d (3 1/2" x 0.135")	16" o.c.
17	Stud to sole plate, toe nail	3-8d (2 1/2" x 0.113") or 2-16d (3 1/2" x 0.135")	—
18	Top or sole plate to stud, end nail	2-16d (3 1/2" x 0.135")	—
19	Top plates, laps at corners and intersections, face nail	2-10d (3" x 0.128")	—
20	1" brace to each stud and plate, face nail	2-8d (2 1/2" x 0.113") 2 staples 1 3/4"	—
21	1" x 6" sheathing to each bearing, face nail	2-8d (2 1/2" x 0.113") 2 staples 1 3/4"	—
22	1" x 8" sheathing to each bearing, face nail	2-8d (2 1/2" x 0.113") 3 staples 1 7/4"	—
23	Wider than 1" x 8" sheathing to each bearing, face nail	3-8d (2 1/2" x 0.113") 4 staples 1 3/4"	—
Floor			
24	Joist to sill or girder, toe nail	3-8d (2 1/2" x 0.113")	—
25	Rim joist to top plate, toe nail (roof applications also)	8d (2 1/2" x 0.113")	6" o.c.
26	Rim joist or blocking to sill plate, toe nail	8d (2 1/2" x 0.113")	6" o.c.
27	1" x 6" subfloor or less to each joist, face nail	2-8d (2 1/2" x 0.113") 2 staples 1 3/4"	—
28	2" subfloor to joist or girder, blind and face nail	2-16d (3 1/2" x 0.135")	—
29	2" planks (plank & beam - floor & roof)	2-16d (3 1/2" x 0.135")	at each bearing
30	Built-up girders and beams, 2-inch lumber layers	10d (3" x 0.128")	Nail each layer as follows: 32" o.c. at top and bottom and staggered. Two nails at ends and at each splice.
31	Ledger strip supporting joists or rafters	3-16d (3 1/2" x 0.135")	At each joist or rafter

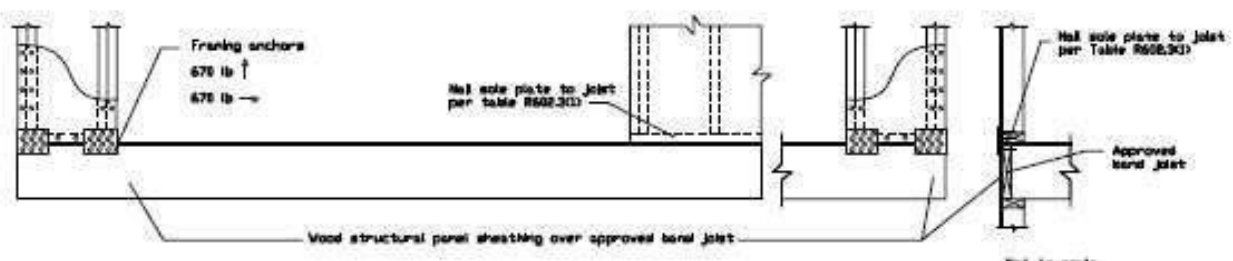
TABLE R602.3(1) —continued FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

ITEM	DESCRIPTION OF BUILDING MATERIALS	DESCRIPTION OF FASTENER ^{a, b, c}	SPACING OF FASTENERS	
			Edges (inches) ^d	Intermediate supports ^{e, f} (inches)
Wood structural panels, subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing				
32	3/8" - 1/2"	6d common (2" x 0.113") nail (subfloor wall) 8d common (2 1/2" x 0.131") nail (roof) ^f	6	12"
33	19/32" - 1"	8d common nail (2 1/2" x 0.131")	6	12"
34	1 1/8" - 1 1/4"	10d common (3" x 0.148") nail or 8d (2 1/2" x 0.131") deformed nail	6	12
Other wall sheathing ^h				
35	1/2" structural cellulose fiberboard sheathing	1 1/2" galvanized roofing nail, 7/16" crown or 1" crown staple 16 ga., 1 1/4" long	3	6
36	25/32" structural cellulose fiberboard sheathing	1 3/4" galvanized roofing nail, 7/16" crown or 1" crown staple 16 ga., 1 1/2" long	3	6
37	1/2" gypsum sheathing ^d	1 1/2" galvanized roofing nail; staple galvanized, 1 1/2" long; 1 1/4 screws, type W or S	7	7
38	5/8" gypsum sheathing ^d	1 3/4" galvanized roofing nail; staple galvanized, 1 5/8" long; 1 5/8" screws, type W or S	7	7
Wood structural panels, combination subfloor underlayment to framing				
39	3/4" and less	6d deformed (2" x 0.120") nail or 8d common (2 1/2" x 0.131") nail	6	12
40	7/8" - 1"	8d common (2 1/2" x 0.131") nail or 8d deformed (2 1/2" x 0.120") nail	6	12
41	1 1/8" - 1 1/4"	10d common (3" x 0.148") nail or 8d deformed (2 1/2" x 0.120") nail	6	12

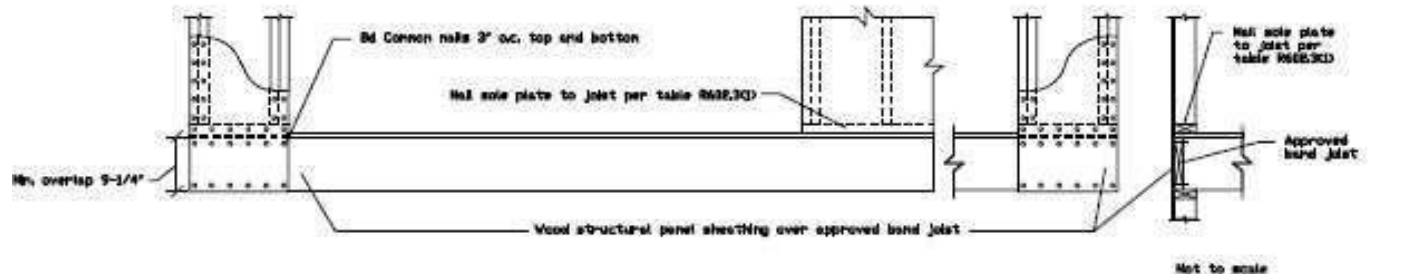
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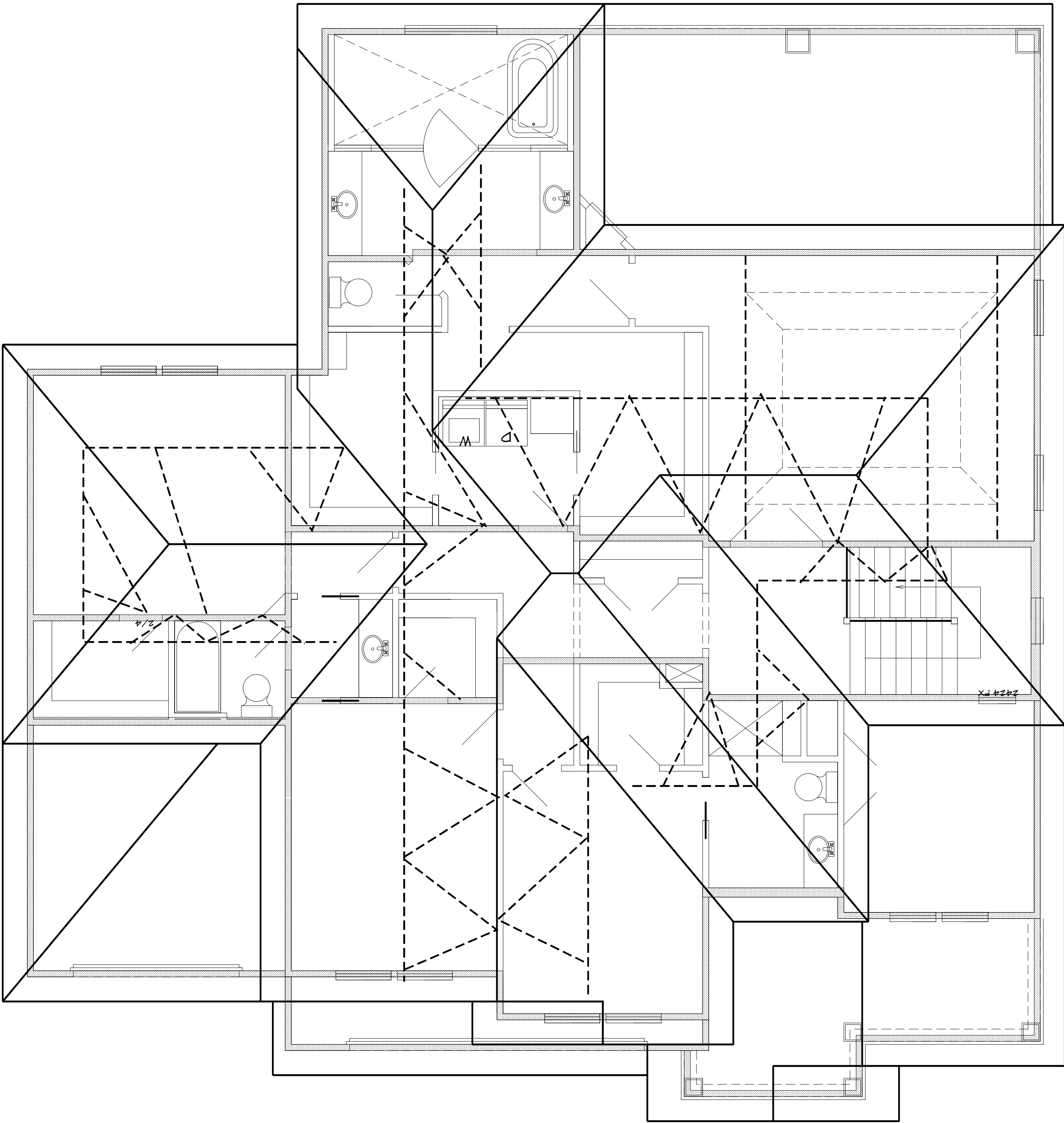
OVER RAISED WOOD FLOORS OR SECOND FLOOR - FRAMING ANCHOR OPTION



OVER RAISED WOOD FLOORS OR SECOND FLOOR - WOOD STRUCTURAL PANEL OVERLAP OPTION



CF-PF WALL BRACING SECTION



NOTE.. HIP RIDGE FOR THE MAIN ROOF AS:
2X8 FOR UNBRACED LENGTH UP TO 9'0"
2X10 FOR UNBRACED LENGTH UP TO 10'0"
2X12 FOR UNBRACED LENGTH UP TO 12'0"

ALL RAFTERS TO BE #2 2X6 D-FIR 16" O.C.
UNLESS OTHER WISE NOTED

PURLING RAFTERS TO BEARING WALL LINES

CONNECT RAFTERS TO CEILING JOIST W (4) 16d GALV. NAILS
CONNECT RAFTERS TO RIDGE, VALLEY, AND HIP RIDGE
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VERT. RIDGE AND RAFTER SUPPORTS TO BE EQUAL TO OR GREATER
THAN THE DEPTH OF RAFTERS

BEARING WALL LINES

ROOF ELEVATION
1/4" = 1'0"

ROOF DESIGNED WITH:
LIVE LOAD = 20 PSF
DEAD LOAD = 10 PSF

PLANS WERE DESIGNED AND
REVIEWED IN ACCORDANCE
WITH THE 2018 IRC

LOT 85 WOODSIDE RIDGE
322 NW AMBERSHAM DR.
LEES SUMMIT MO. 64081

HOME BUYER:	PHONE:	DATE DRAWN:	DATE REVISID:	SHEET NO.
	BUILDER:	DESIGNER:	FILE NAME:	APPROX. SQ.FT.
SUB-DIVISION:		LOT NO.		

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