MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

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

CALCULATION PACKAGE

November 12, 2025

McCullough Architects

Sears Plat – Lot 4
7414 78th Ave SE
Mercer Island, Washington

MULHERN & KULP STRUCTURAL ENGINEERING, INC.

Prepared By:

Adam J. Cervantes, E.I.T. *Staff Engineer II*

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

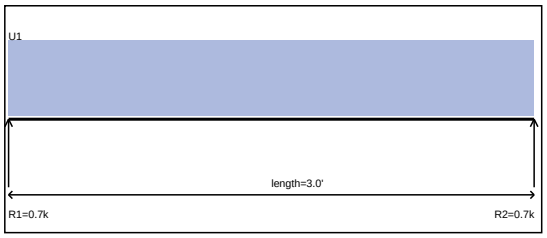
Signature, Seal & Date

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

BEAM & HEADER CALCULATIONS

M+K PROJECT #: 244-25022-T01 - Sears Plat - Lot 4
ENGINEER: Adam Cervantes
Date: 11/11/2025

Description - Roof Framing Plan - H3-1 - Header



Uniform 1 = 0.47 klf (0.0'-3.0')

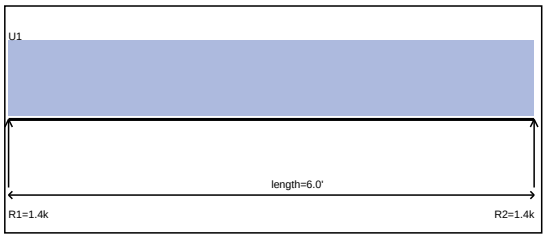
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.70k	Vall = 3.50k	Ratio = 0.20
M = 0.53k-ft	Mall = 3.44k-ft	Ratio = 0.15

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Roof Framing Plan - H3-2 - Header



Uniform 1 = 0.47 klf (0.0'-6.0')

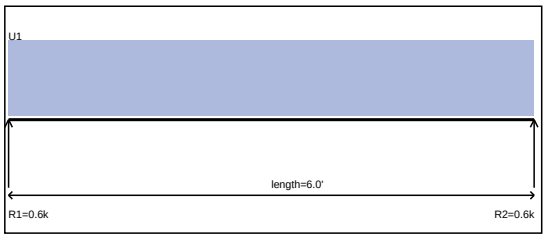
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 1.40k	Vall = 3.50k	Ratio = 0.40
M = 2.10k-ft	Mall = 3.44k-ft	Ratio = 0.61

Deflection
TL = 0.08" L/941 > L/240 min
DL = 0.03"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Roof Framing Plan - H3-3 - Header



Uniform 1 = 0.19 klf (0.0'-6.0')

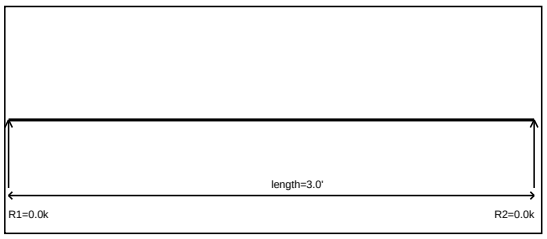
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.58k	Vall = 3.50k	Ratio = 0.17
M = 0.87k-ft	Mall = 3.44k-ft	Ratio = 0.25

Deflection
TL = 0.03" L/999+ > L/240 min
DL = 0.01"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Roof Framing Plan - H3-4 - Header



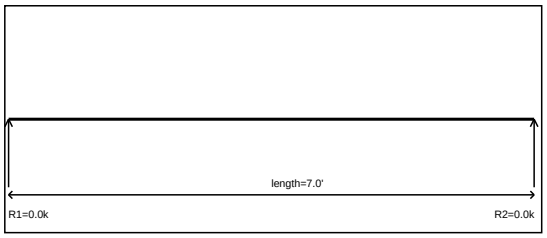
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0

Deflection
TL = 0 " L/ NA > L/240 min
DL = 0 "
L = 0 " L/ NA > L/360 min

4x8 DF #2

Description - Roof Framing Plan - H3-5 - Header



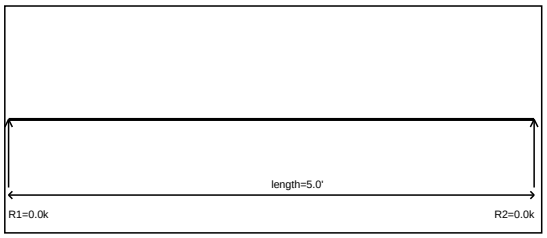
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0

Deflection
TL = 0 " L/ NA > L/240 min
DL = 0 "
L = 0 " L/ NA > L/360 min

4x8 DF #2

Description - Roof Framing Plan - H3-6 - Header



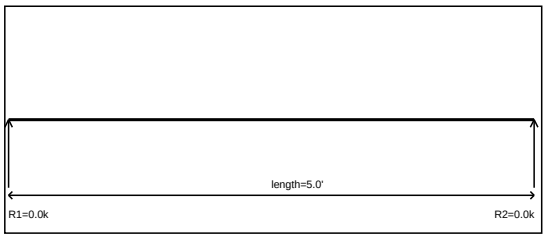
Controlling Load Combination/ Cd
V = NA Cd= NA
M = NA Cd= NA
△ = NA

V = 0 k	Vall = 0 k	Ratio = 0
M = 0 k-ft	Mall = 0 k-ft	Ratio = 0

Deflection
TL = 0 " L/ NA > L/240 min
DL = 0 "
L = 0 " L/ NA > L/360 min

4x8 DF #2

Description - Roof Framing Plan - H3-7 - Header



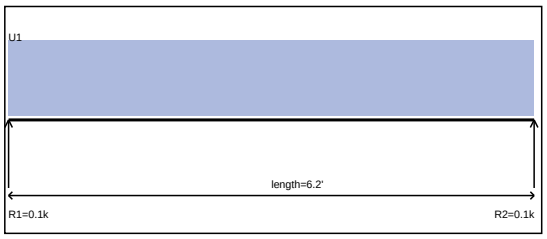
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0

Deflection
TL = 0 " L/ NA > L/240 min
DL = 0 "
L = 0 " L/ NA > L/360 min

4x8 DF #2

Description - Roof Framing Plan - H3-8 - Header



Uniform 1 = 0.03 klf (0.0'-6.2')

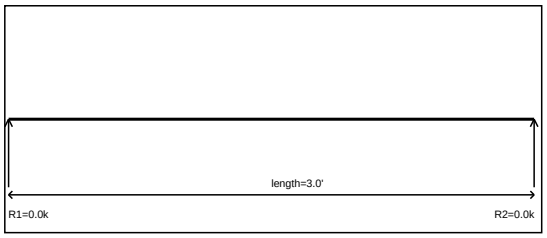
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.08k	Vall = 5.38k	Ratio = 0.01
M = 0.12k-ft	Mall = 3.71k-ft	Ratio = 0.03

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

6x8 DF #2

Description - Roof Framing Plan - H3-9 - Header



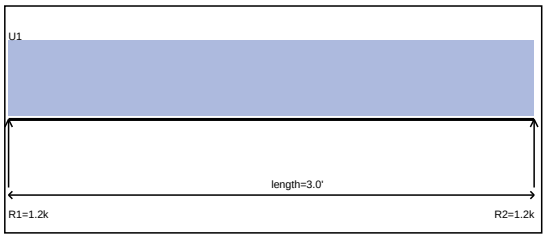
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0

Deflection
TL = 0 " L/ NA > L/240 min
DL = 0 "
L = 0 " L/ NA > L/360 min

4x8 DF #2

Description - Roof Framing Plan - H3-10 - Header



Uniform 1 = 0.76 klf (0.0'-3.0')

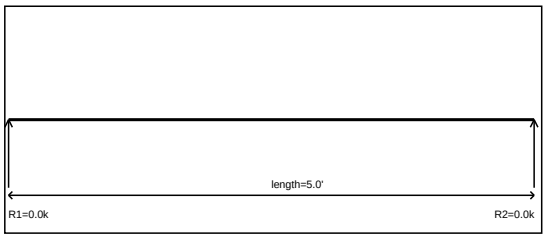
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 1.14k	Vall = 3.50k	Ratio = 0.33
M = 0.85k-ft	Mall = 3.44k-ft	Ratio = 0.25

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Roof Framing Plan - H3-11 - Header



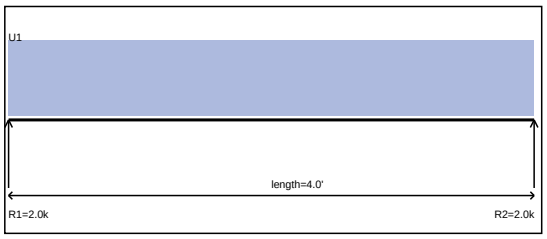
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0

Deflection
TL = 0 " L/ NA > L/240 min
DL = 0 "
L = 0 " L/ NA > L/360 min

4x8 DF #2

Description - Roof Framing Plan - H3-12 - Header



Uniform 1 = 0.99 klf (0.0'-4.0')

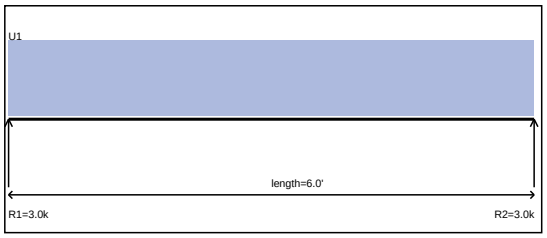
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 1.97k	Vall = 4.27k	Ratio = 0.46
M = 1.97k-ft	Mall = 4.83k-ft	Ratio = 0.41

Deflection
TL = 0.05" L/958 > L/240 min
DL = 0.02"
L = 0.00" L/999+ > L/360 min

3-1/2x6 GLB

Description - Roof Framing Plan - H3-13 - Header



Uniform 1 = 0.99 klf (0.0'-6.0')

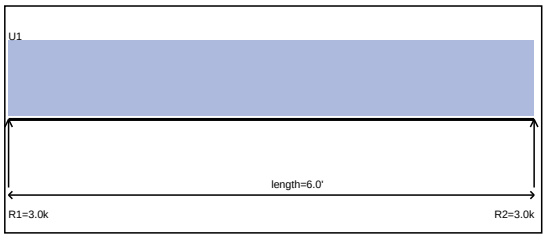
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 2.96k	Vall = 4.47k	Ratio = 0.66
M = 4.44k-ft	Mall = 5.17k-ft	Ratio = 0.86

Deflection
TL = 0.08" L/925 > L/240 min
DL = 0.03"
L = 0.00" L/999+ > L/360 min

4x10 DF #2

Description - Roof Framing Plan - H3-14 - Header



Uniform 1 = 0.99 klf (0.0'-6.0')

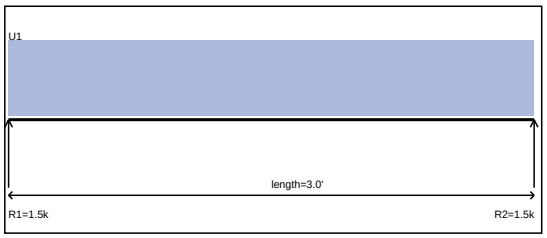
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 2.96k	Vall = 6.70k	Ratio = 0.44
M = 4.44k-ft	Mall = 7.59k-ft	Ratio = 0.58

Deflection
TL = 0.16" L/446 > L/240 min
DL = 0.07"
L = 0.00" L/999+ > L/360 min

5-1/2x6 GLB

Description - Roof Framing Plan - H3-15 - Header



Uniform 1 = 0.99 klf (0.0'-3.0')

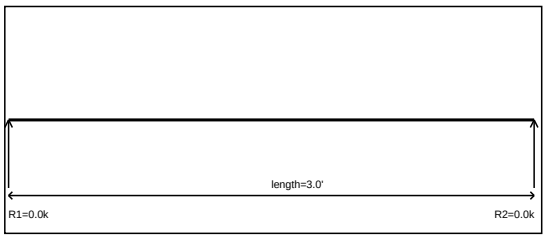
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 1.48k	Vall = 4.47k	Ratio = 0.33
M = 1.11k-ft	Mall = 5.17k-ft	Ratio = 0.21

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

4x10 DF #2

Description - Roof Framing Plan - H3-16 - Header



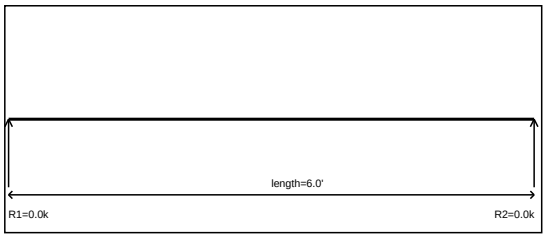
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0

Deflection
TL = 0 " L/ NA > L/240 min
DL = 0 "
L = 0 " L/ NA > L/360 min

4x8 DF #2

Description - Roof Framing Plan - H3-17 - Header



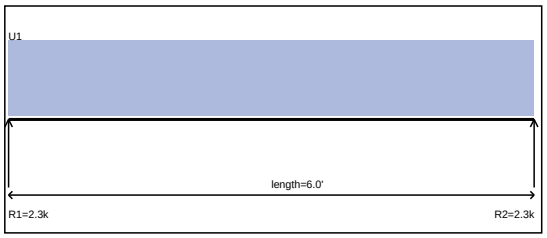
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0

Deflection
TL = 0 " L/ NA > L/240 min
DL = 0 "
L = 0 " L/ NA > L/360 min

4x8 DF #2

Description - Roof Framing Plan - H3-18 - Header



Uniform 1 = 0.76 klf (0.0'-6.0')

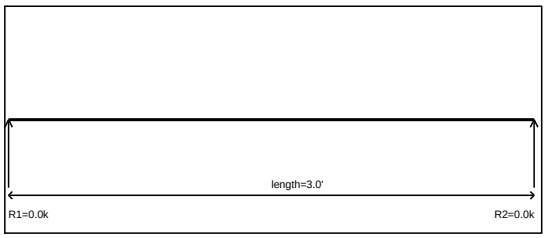
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 2.28k	Vall = 4.47k	Ratio = 0.51
M = 3.42k-ft	Mall = 5.17k-ft	Ratio = 0.66

Deflection
TL = 0.06" L/999+ > L/240 min
DL = 0.02"
L = 0.00" L/999+ > L/360 min

4x10 DF #2

Description - Roof Framing Plan - H3-19 - Header



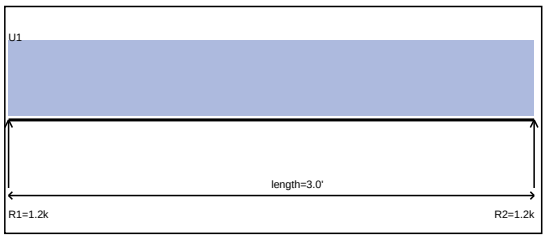
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0

Deflection
TL = 0 " L/ NA > L/240 min
DL = 0 "
L = 0 " L/ NA > L/360 min

4x8 DF #2

Description - Roof Framing Plan - H3-20 - Header



Uniform 1 = 0.76 klf (0.0'-3.0')

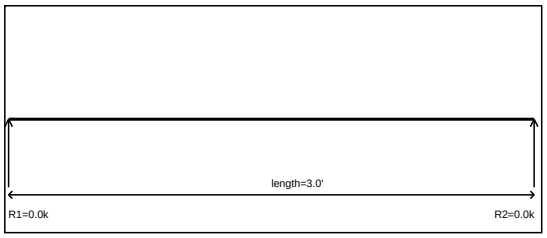
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 1.14k	Vall = 4.47k	Ratio = 0.26
M = 0.85k-ft	Mall = 5.17k-ft	Ratio = 0.17

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

4x10 DF #2

Description - Roof Framing Plan - H3-21 - Header



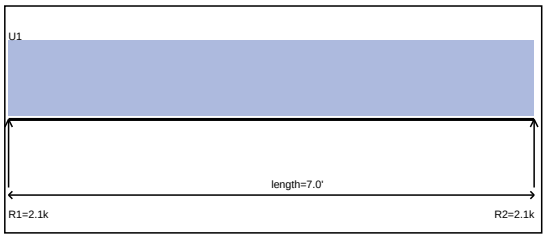
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0

Deflection
TL = 0 " L/ NA > L/240 min
DL = 0 "
L = 0 " L/ NA > L/360 min

4x8 DF #2

Description - Roof Framing Plan - H3-22 - Header



Uniform 1 = 0.58 klf (0.0'-7.0')

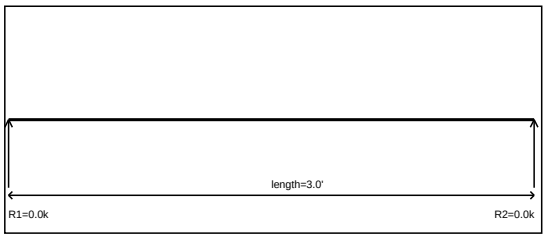
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 2.03k	Vall = 4.47k	Ratio = 0.45
M = 3.55k-ft	Mall = 5.17k-ft	Ratio = 0.69

Deflection
TL = 0.08" L/992 > L/240 min
DL = 0.03"
L = 0.00" L/999+ > L/360 min

4x10 DF #2

Description - Roof Framing Plan - H3-23 - Header



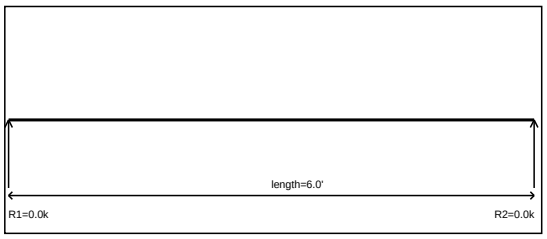
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0

Deflection
TL = 0 " L/ NA > L/240 min
DL = 0 "
L = 0 " L/ NA > L/360 min

4x8 DF #2

Description - Roof Framing Plan - H3-24 - Header



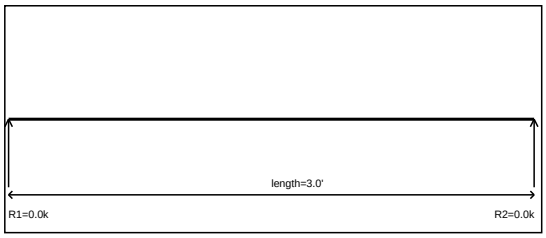
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0

Deflection
TL = 0 " L/ NA > L/240 min
DL = 0 "
L = 0 " L/ NA > L/360 min

4x8 DF #2

Description - Roof Framing Plan - H3-25 - Header



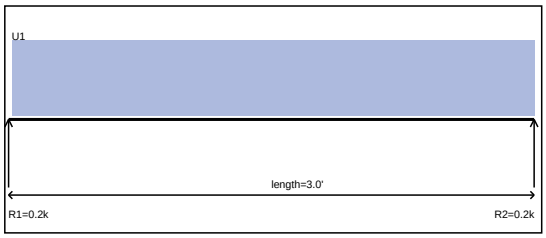
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 3.04k	Ratio = 0
M = 0.00k-ft	Mall = 2.99k-ft	Ratio = 0

Deflection
TL = 0 " L/ NA > L/240 min
DL = 0 "
L = 0 " L/ NA > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - H2-1 - Header



Uniform 1 = 0.09 klf (0.0'-3.0')

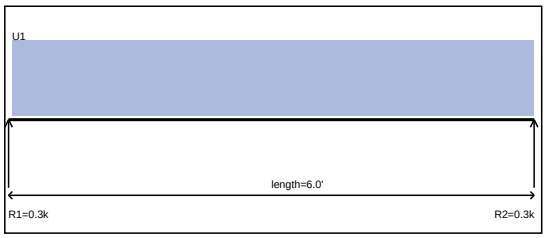
Controlling Load Combination/ Cd
V = D Cd=0.9
M = D Cd=0.9
△ = D

V = 0.14k	Vall = 2.74k	Ratio = 0.05
M = 0.10k-ft	Mall = 2.69k-ft	Ratio = 0.04

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - H2-2 - Header



Uniform 1 = 0.09 klf (0.0'-6.0')

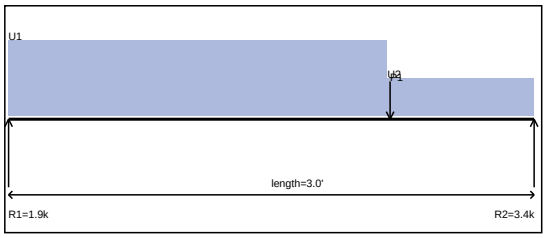
Controlling Load Combination/ Cd
V = D Cd=0.9
M = D Cd=0.9
△ = D

V = 0.27k	Vall = 2.74k	Ratio = 0.10
M = 0.41k-ft	Mall = 2.69k-ft	Ratio = 0.15

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.01"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - H2-3 - Header



Uniform 1 = 0.56 klf (0.0'-2.2') P1 = 3.78 K (2.2')

Uniform 2 = 0.28 klf (2.2'-3.0')

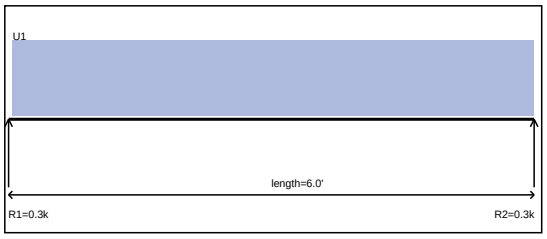
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 3.38k	Vall = 3.50k	Ratio = 0.97
M = 2.68k-ft	Mall = 3.44k-ft	Ratio = 0.78

Deflection
TL = 0.02" L/999+ > L/240 min
DL = 0.01"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - H2-4 - Header



Uniform 1 = 0.09 klf (0.0'-6.0')

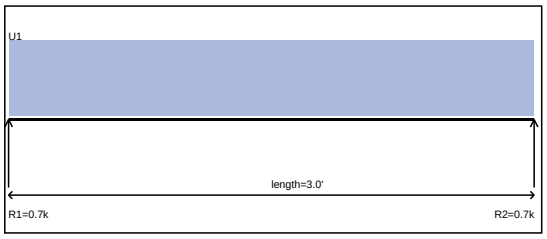
Controlling Load Combination/ Cd
V = D Cd=0.9
M = D Cd=0.9
△ = D

V = 0.27k	Vall = 2.74k	Ratio = 0.10
M = 0.41k-ft	Mall = 2.69k-ft	Ratio = 0.15

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.01"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - H2-5 - Header



Uniform 1 = 0.45 klf (0.0'-3.0')

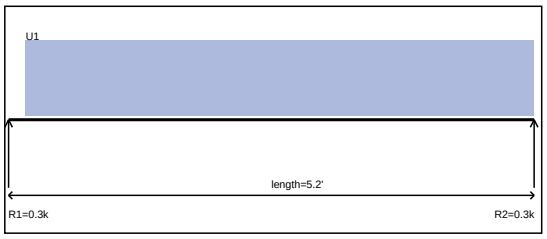
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 0.67k	Vall = 3.04k	Ratio = 0.22
M = 0.51k-ft	Mall = 2.99k-ft	Ratio = 0.17

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - H2-6 - Header



Uniform 1 = 0.09 klf (0.2'-5.2')

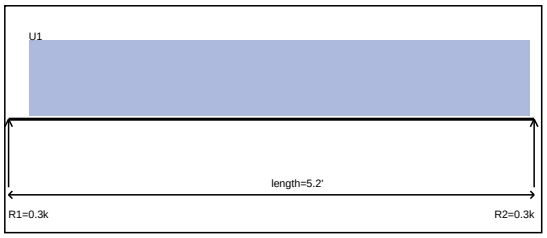
Controlling Load Combination/ Cd
V = D Cd=0.9
M = D Cd=0.9
△ = D

V = 0.23k	Vall = 2.74k	Ratio = 0.09
M = 0.30k-ft	Mall = 2.69k-ft	Ratio = 0.11

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.01"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - H2-7 - Header



Uniform 1 = 0.09 klf (0.2'-5.2')

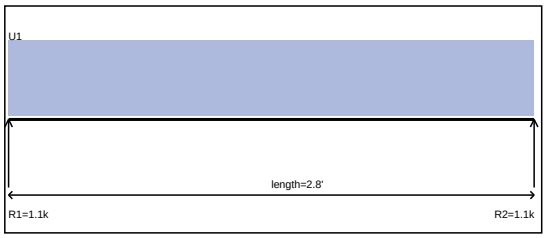
Controlling Load Combination/ Cd
V = D Cd=0.9
M = D Cd=0.9
△ = D

V = 0.23k	Vall = 2.74k	Ratio = 0.09
M = 0.31k-ft	Mall = 2.69k-ft	Ratio = 0.12

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.01"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - H2-8 - Header



Uniform 1 = 0.79 klf (0.0'-2.8')

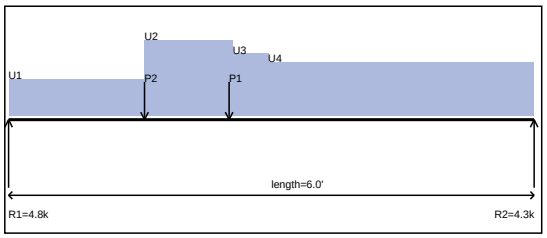
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.08k	Vall = 3.04k	Ratio = 0.36
M = 0.74k-ft	Mall = 2.99k-ft	Ratio = 0.25

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - H2-9 - Header



Uniform 1 = 0.72 klf (0.0'-1.6')

Uniform 2 = 1.48 klf (1.6'-2.6')

Uniform 3 = 1.22 klf (2.6'-3.0')

Uniform 4 = 1.05 klf (3.0'-6.0')

P1 = 1.56 K (2.5')

P2 = 1.14 K (1.6')

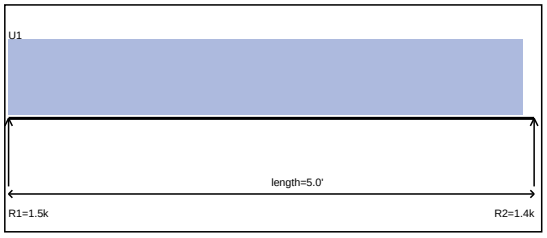
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + 0.75 * (L + S)) Cd=1.15
△ = (D + 0.75 * (L + S))

V = 3.54k	Vall = 7.29k	Ratio = 0.49
M = 7.02k-ft	Mall = 11.86k-ft	Ratio = 0.59

Deflection
TL = 0.13" L/552 > L/240 min
DL = 0.06"
L = 0.05" L/999+ > L/360 min

5-1/2x7-1/2 GLB

Description - Upper Floor Framing Plan - H2-10 - Header



Uniform 1 = 0.57 klf (0.0'-4.9')

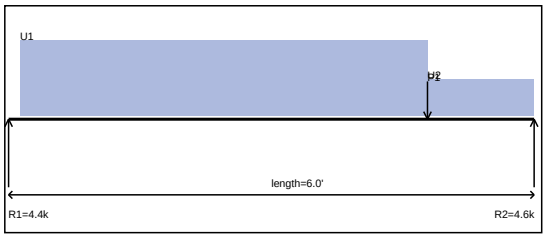
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.24k	Vall = 3.04k	Ratio = 0.41
M = 1.55k-ft	Mall = 2.99k-ft	Ratio = 0.52

Deflection
TL = 0.04" L/999+ > L/240 min
DL = 0.02"
L = 0.02" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - H2-11 - Header



Uniform 1 = 1.48 klf (0.1'-4.8') P1 = 1.14 K (4.8')

Uniform 2 = 0.72 klf (4.8'-6.0')

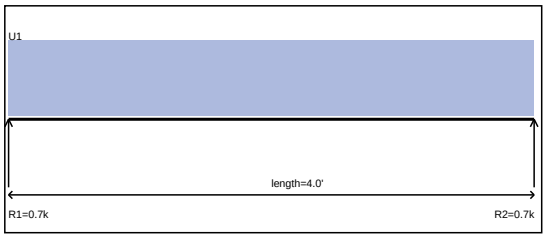
Controlling Load Combination/ Cd
V = (D + 0.75 * (L + S)) Cd=1.15
M = (D + 0.75 * (L + S)) Cd=1.15
△ = (D + 0.75 * (L + S))

V = 3.83k	Vall = 8.38k	Ratio = 0.46
M = 6.00k-ft	Mall = 11.86k-ft	Ratio = 0.51

Deflection
TL = 0.11" L/645 > L/240 min
DL = 0.05"
L = 0.04" L/999+ > L/360 min

5-1/2x7-1/2 GLB

Description - Upper Floor Framing Plan - H2-12 - Header



Uniform 1 = 0.30 klf (0.0'-4.0')

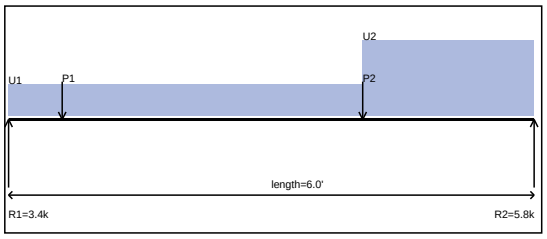
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.61k	Vall = 3.50k	Ratio = 0.17
M = 0.61k-ft	Mall = 3.44k-ft	Ratio = 0.18

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.01"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - H2-13 - Header



Uniform 1 = 0.72 klf (0.0'-4.0') P1 = -0.12 K (0.6')

Uniform 2 = 1.71 klf (4.0'-6.0') P2 = 2.96 K (4.0')

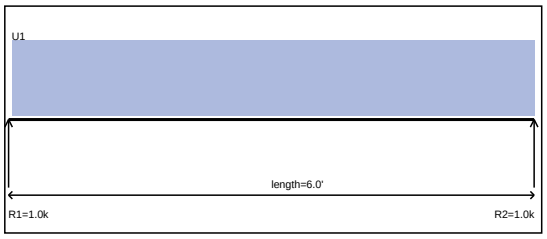
Controlling Load Combination/ Cd
V = (D + 0.75 * (L + S)) Cd=1.15
M = (D + 0.75 * (L + S)) Cd=1.15
△ = (D + 0.75 * (L + S))

V = 4.89k	Vall = 8.38k	Ratio = 0.58
M = 6.79k-ft	Mall = 11.86k-ft	Ratio = 0.57

Deflection
TL = 0.13" L/570 > L/240 min
DL = 0.06"
L = 0.04" L/999+ > L/360 min

5-1/2x7-1/2 GLB

Description - Upper Floor Framing Plan - H2-14 - Header



Uniform 1 = 0.30 klf (0.0'-6.0')

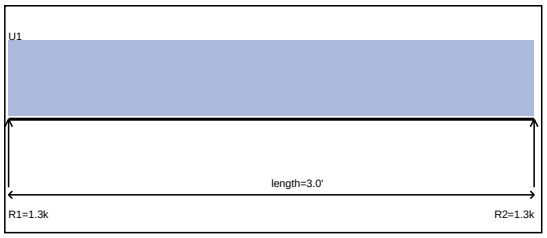
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.91k	Vall = 3.50k	Ratio = 0.26
M = 1.37k-ft	Mall = 3.44k-ft	Ratio = 0.40

Deflection
TL = 0.05" L/999+ > L/240 min
DL = 0.03"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - H2-15 - Header



Uniform 1 = 0.81 klf (0.0'-3.0')

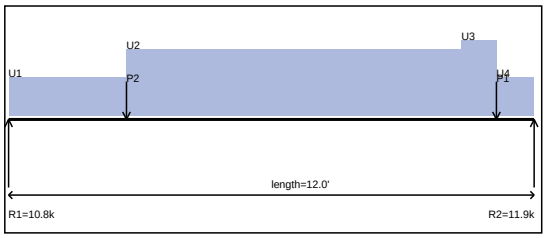
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.21k	Vall = 3.04k	Ratio = 0.40
M = 0.91k-ft	Mall = 2.99k-ft	Ratio = 0.30

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.00"
L = 0.01" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - H2-16 - Header



Uniform 1 = 1.02 klf (0.0'-2.7')
Uniform 2 = 1.77 klf (2.7'-10.4')
Uniform 3 = 2.00 klf (10.3'-11.1')
Uniform 4 = 1.02 klf (11.1'-12.0')

P1 = 1.48 K (11.1')
P2 = 2.28 K (2.7')

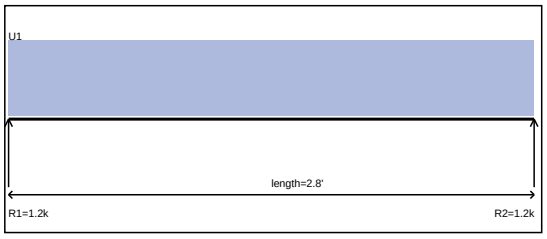
Controlling Load Combination/ Cd
V = (D + 0.75 * (L + S)) Cd= NA
M = (D + 0.75 * (L + S)) Cd= NA
△ = (D + 0.75 * (L + S))

V = 10.06k	Vall = 51.00k	Ratio = 0.20
M = 29.06k-ft	Mall = 53.90k-ft	Ratio = 0.54

Deflection
TL = 0.27" L/534 > L/240 min
DL = 0.12"
L = 0.08" L/999+ > L/360 min

W10x19 Steel

Description - Upper Floor Framing Plan - H2-17 - Header



Uniform 1 = 0.81 klf (0.0'-2.8')

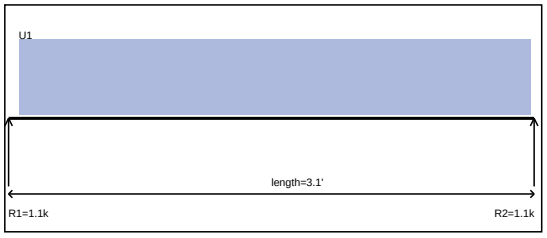
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.11k	Vall = 3.04k	Ratio = 0.37
M = 0.77k-ft	Mall = 2.99k-ft	Ratio = 0.26

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - H2-18 - Header



Uniform 1 = 0.72 klf (0.1'-3.1')

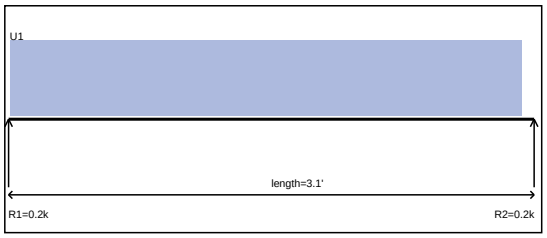
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.10k	Vall = 3.04k	Ratio = 0.36
M = 0.86k-ft	Mall = 2.99k-ft	Ratio = 0.29

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.00"
L = 0.01" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - H2-19 - Header



Uniform 1 = 0.09 klf (0.0'-3.0')

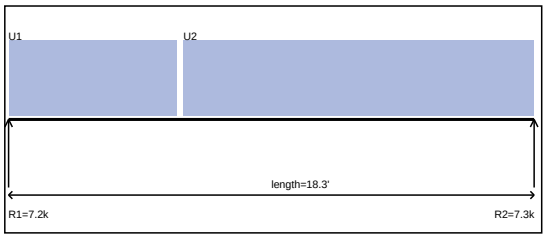
Controlling Load Combination/ Cd
V = D Cd=0.9
M = D Cd=0.9
△ = D

V = 0.14k	Vall = 2.74k	Ratio = 0.05
M = 0.11k-ft	Mall = 2.69k-ft	Ratio = 0.04

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - H2-20 - Header



Uniform 1 = 0.80 klf (0.0'-5.8')

Uniform 2 = 0.80 klf (6.1'-18.3')

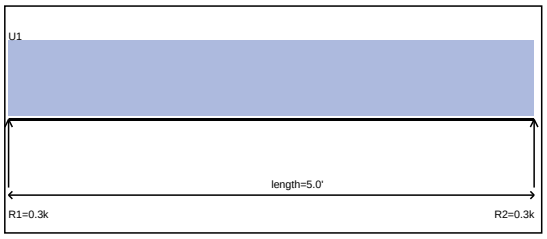
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 6.68k	Vall = 16.03k	Ratio = 0.42
M = 30.20k-ft	Mall = 48.69k-ft	Ratio = 0.62

Deflection
TL = 0.49" L/449 > L/240 min
DL = 0.20"
L = 0.29" L/750 > L/360 min

5-1/2x16-1/2 GLB

Description - Upper Floor Framing Plan - H2-21 - Header



Uniform 1 = 0.09 klf (0.0'-5.0')

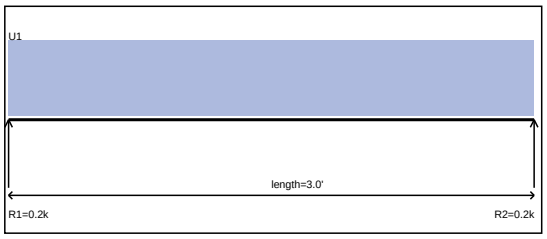
Controlling Load Combination/ Cd
V = D Cd=0.9
M = D Cd=0.9
△ = D

V = 0.23k	Vall = 2.74k	Ratio = 0.08
M = 0.28k-ft	Mall = 2.69k-ft	Ratio = 0.11

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.01"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - H2-22 - Header



Uniform 1 = 0.09 klf (0.0'-3.0')

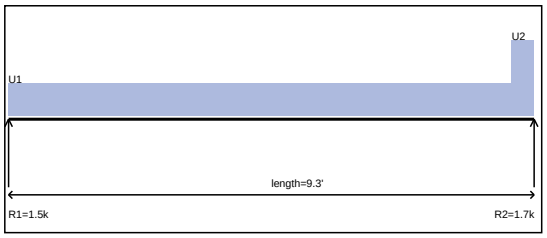
Controlling Load Combination/ Cd
V = D Cd=0.9
M = D Cd=0.9
△ = D

V = 0.14k	Vall = 2.74k	Ratio = 0.05
M = 0.10k-ft	Mall = 2.69k-ft	Ratio = 0.04

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - H2-23 - Header



Uniform 1 = 0.32 klf (0.0'-8.9')

Uniform 2 = 0.74 klf (8.9'-9.3')

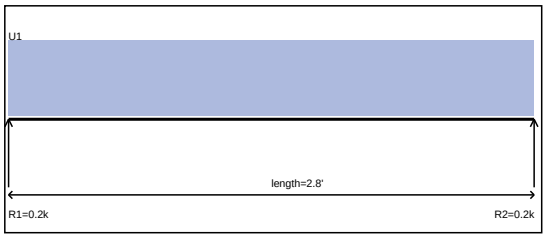
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 1.53k	Vall = 8.24k	Ratio = 0.19
M = 3.43k-ft	Mall = 10.17k-ft	Ratio = 0.34

Deflection
TL = 0.06" L/999+ > L/240 min
DL = 0.02"
L = 0.00" L/999+ > L/360 min

6x12 DF #2

Description - Upper Floor Framing Plan - H2-24 - Header



Uniform 1 = 0.12 klf (0.0'-2.8')

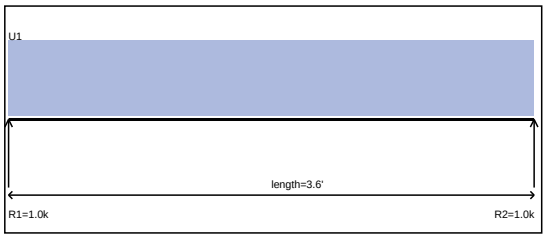
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.17k	Vall = 3.50k	Ratio = 0.05
M = 0.12k-ft	Mall = 3.44k-ft	Ratio = 0.03

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - H2-25 - Header



Uniform 1 = 0.56 klf (0.0'-3.6')

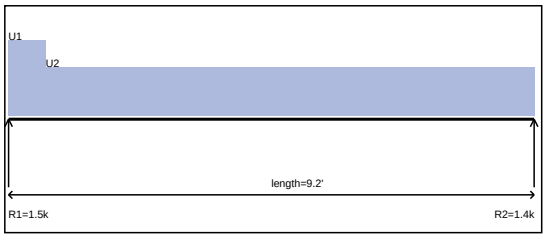
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 1.00k	Vall = 3.50k	Ratio = 0.29
M = 0.89k-ft	Mall = 3.44k-ft	Ratio = 0.26

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.01"
L = 0.00" L/999+ > L/360 min

4x8 DF #2

Description - Upper Floor Framing Plan - B2-1 - Flush



Uniform 1 = 0.45 klf (0.0'-0.7')

Uniform 2 = 0.29 klf (0.7'-9.2')

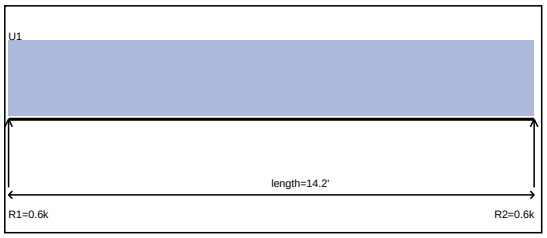
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.46k	Vall = 11.13k	Ratio = 0.13
M = 3.14k-ft	Mall = 37.80k-ft	Ratio = 0.08

Deflection
TL = 0.02" L/999+ > L/240 min
DL = 0.00"
L = 0.01" L/999+ > L/360 min

3-1/2x18 GLB

Description - Upper Floor Framing Plan - B2-2 - Flush



Uniform 1 = 0.07 klf (0.0'-14.2')

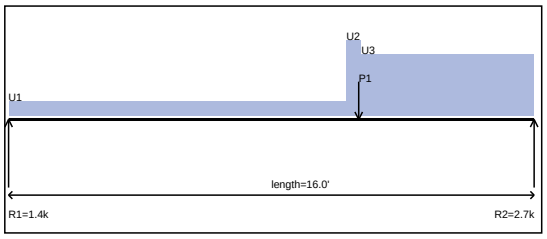
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 0.52k	Vall = 11.13k	Ratio = 0.05
M = 1.84k-ft	Mall = 37.80k-ft	Ratio = 0.05

Deflection
TL = 0.02" L/999+ > L/240 min
DL = 0.01"
L = 0.02" L/999+ > L/360 min

3-1/2x18 GLB

Description - Upper Floor Framing Plan - B2-3 - Flush



Uniform 1 = 0.07 klf (0.0'-10.3')

P1 = 1.46 K (10.7')

Uniform 2 = 0.37 klf (10.3'-10.7')

Uniform 3 = 0.30 klf (10.7'-16.0')

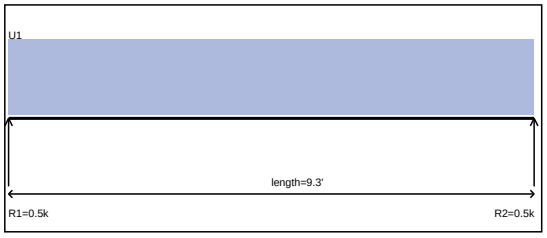
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 2.63k	Vall = 11.13k	Ratio = 0.24
M = 9.80k-ft	Mall = 37.80k-ft	Ratio = 0.26

Deflection
TL = 0.15" L/999+ > L/240 min
DL = 0.05"
L = 0.10" L/999+ > L/360 min

3-1/2x18 GLB

Description - Upper Floor Framing Plan - B2-4 - Dropped



Uniform 1 = 0.09 klf (0.0'-9.3')

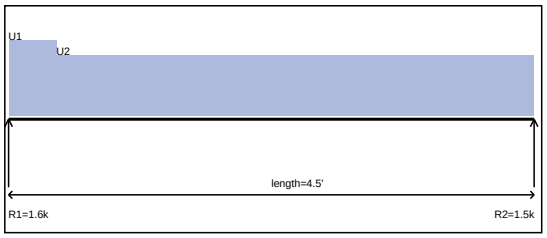
Controlling Load Combination/ Cd
V = D Cd=0.9
M = D Cd=0.9
△ = D

V = 0.42k	Vall = 4.25k	Ratio = 0.10
M = 0.99k-ft	Mall = 5.48k-ft	Ratio = 0.18

Deflection
TL = 0.02" L/999+ > L/240 min
DL = 0.02"
L = 0.00" L/999+ > L/360 min

4x12 DF #2

Description - Upper Floor Framing Plan - B2-5 - Flush



Uniform 1 = 0.83 klf (0.0'-0.4')

Uniform 2 = 0.66 klf (0.4'-4.5')

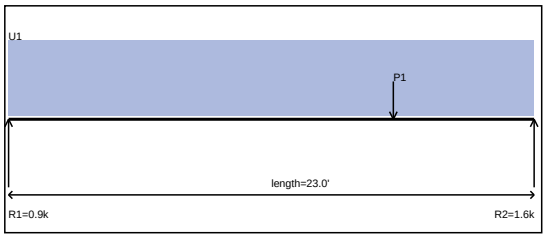
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.55k	Vall = 11.13k	Ratio = 0.14
M = 1.66k-ft	Mall = 37.80k-ft	Ratio = 0.04

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

3-1/2x18 GLB

Description - Upper Floor Framing Plan - B2-6 - Flush



Uniform 1 = 0.04 klf (0.0'-23.0') P1 = 1.55 K (16.8')

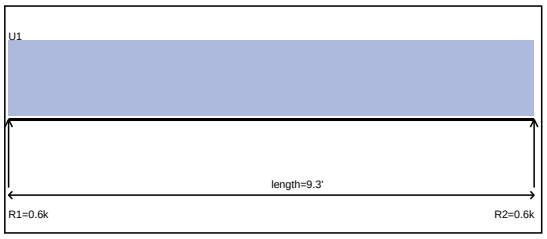
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.56k	Vall = 11.13k	Ratio = 0.14
M = 8.91k-ft	Mall = 37.37k-ft	Ratio = 0.24

Deflection
TL = 0.28" L/996 > L/240 min
DL = 0.08"
L = 0.19" L/999+ > L/360 min

3-1/2x18 GLB

Description - Upper Floor Framing Plan - B2-7 - Flush Bottom



Uniform 1 = 0.12 klf (0.0'-9.3')

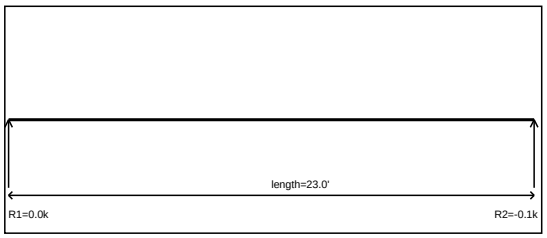
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.55k	Vall = 5.43k	Ratio = 0.10
M = 1.27k-ft	Mall = 7.00k-ft	Ratio = 0.18

Deflection
TL = 0.03" L/999+ > L/240 min
DL = 0.01"
L = 0.00" L/999+ > L/360 min

4x12 DF #2

Description - Upper Floor Framing Plan - B2-8 - Flush



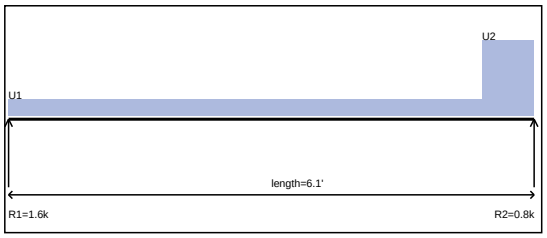
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 0 k	Ratio = 0
M = 0.00k-ft	Mall = 0 k-ft	Ratio = 0

Deflection
TL = NA L/ NA > L/240 min
DL = NA
L = NA L/ NA > L/360 min

Refer to External Design

Description - Upper Floor Framing Plan - B2-9 - Flush



Uniform 1 = 0.14 klf (0.0'-5.5')

Uniform 2 = 0.66 klf (5.5'-6.1')

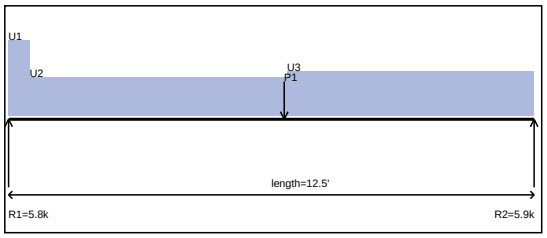
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = NA Cd= NA
△ = NA

V = 1.55k	Vall = 0 k	Ratio = 0
M = 0 k-ft	Mall = 0 k-ft	Ratio = 0

Deflection
TL = 0 " L/999+ > L/240 min
DL = 0 "
L = 0 " L/999+ > L/360 min

3-1/2x18 GLB

Description - Upper Floor Framing Plan - B2-10 - Dropped



Uniform 1 = 1.33 klf (0.0'-0.5') P1 = 2.31 K (6.6')

Uniform 2 = 0.68 klf (0.5'-6.6')

Uniform 3 = 0.78 klf (6.6'-12.5')

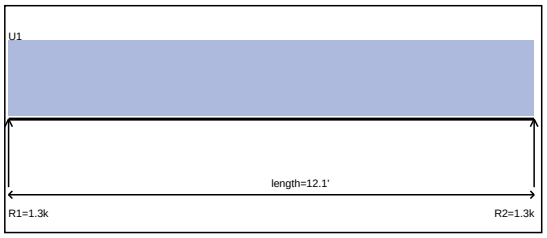
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 5.89k	Vall = 11.66k	Ratio = 0.50
M = 21.30k-ft	Mall = 26.40k-ft	Ratio = 0.81

Deflection
TL = 0.42" L/358 > L/240 min
DL = 0.13"
L = 0.29" L/510 > L/360 min

5-1/2x12 GLB

Description - Upper Floor Framing Plan - B2-11 - Flush Bottom



Uniform 1 = 0.21 klf (0.0'-12.1')

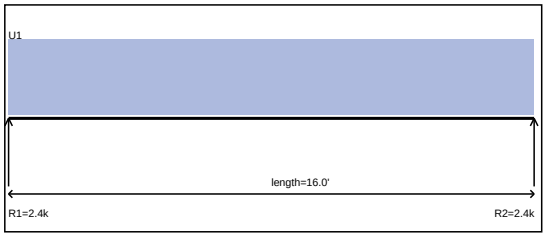
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 1.29k	Vall = 5.43k	Ratio = 0.24
M = 3.90k-ft	Mall = 7.00k-ft	Ratio = 0.56

Deflection
TL = 0.15" L/940 > L/240 min
DL = 0.06"
L = 0.00" L/999+ > L/360 min

4x12 DF #2

Description - Upper Floor Framing Plan - B2-12 - Flush Bottom



Uniform 1 = 0.29 klf (0.0'-16.0')

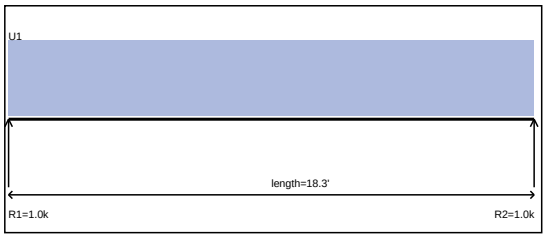
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 2.33k	Vall = 8.24k	Ratio = 0.28
M = 9.34k-ft	Mall = 10.17k-ft	Ratio = 0.92

Deflection
TL = 0.47" L/405 > L/240 min
DL = 0.19"
L = 0.00" L/999+ > L/360 min

6x12 DF #2

Description - Upper Floor Framing Plan - B2-13 - Flush Bottom



Uniform 1 = 0.10 klf (0.0'-18.3')

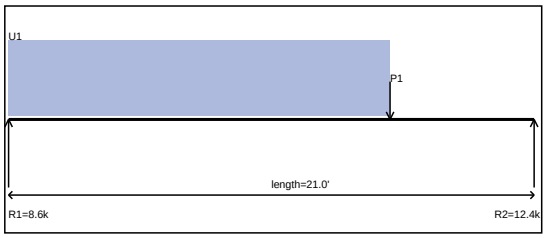
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 0.92k	Vall = 5.43k	Ratio = 0.17
M = 4.20k-ft	Mall = 7.00k-ft	Ratio = 0.60

Deflection
TL = 0.38" L/575 > L/240 min
DL = 0.15"
L = 0.00" L/999+ > L/360 min

4x12 DF #2

Description - Upper Floor Framing Plan - B2-14 - Flush Top



Uniform 1 = 0.51 klf (0.0'-15.2') P1 = 13.10 K (15.2')

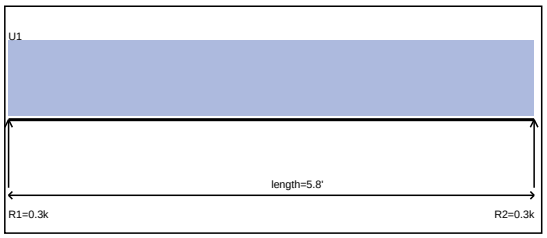
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 11.79k	Vall = 26.82k	Ratio = 0.44
M = 67.87k-ft	Mall = 112.51k-ft	Ratio = 0.60

Deflection
TL = 0.47" L/534 > L/240 min
DL = 0.22"
L = 0.02" L/999+ > L/360 min

5-1/2x24 GLB

Description - Upper Floor Framing Plan - B2-15 - Flush



Uniform 1 = 0.09 klf (0.0'-5.8')

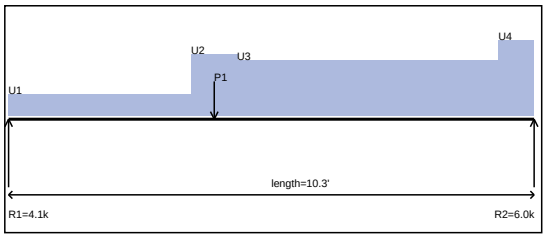
Controlling Load Combination/ Cd
V = D Cd=0.9
M = D Cd=0.9
△ = D

V = 0.26k	Vall = 10.02k	Ratio = 0.03
M = 0.38k-ft	Mall = 34.02k-ft	Ratio = 0.01

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

3-1/2x18 GLB

Description - Upper Floor Framing Plan - B2-16 - Flush



Uniform 1 = 0.44 klf (0.0'-3.6')

P1 = 0.26 K (4.0')

Uniform 2 = 1.27 klf (3.6'-4.5')

Uniform 3 = 1.15 klf (4.5'-9.6')

Uniform 4 = 1.57 klf (9.6'-10.3')

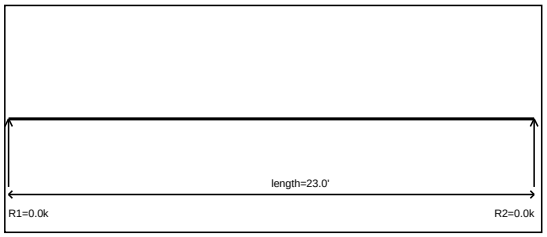
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 5.20k	Vall = 12.80k	Ratio = 0.41
M = 12.67k-ft	Mall = 43.47k-ft	Ratio = 0.29

Deflection
TL = 0.08" L/999+ > L/240 min
DL = 0.04"
L = 0.01" L/999+ > L/360 min

3-1/2x18 GLB

Description - Upper Floor Framing Plan - B2-17 - Refer to External Design



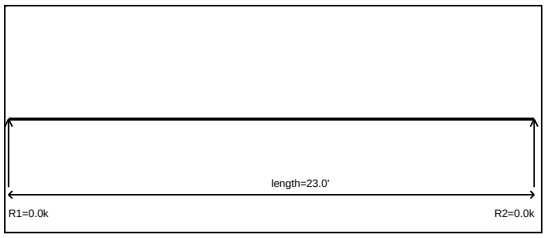
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 0 k	Ratio = 0
M = 0.00k-ft	Mall = 0 k-ft	Ratio = 0

Deflection
TL = NA L/ NA > L/240 min
DL = NA
L = NA L/ NA > L/360 min

Refer to External Design

Description - Upper Floor Framing Plan - B2-18 - Refer to External Design



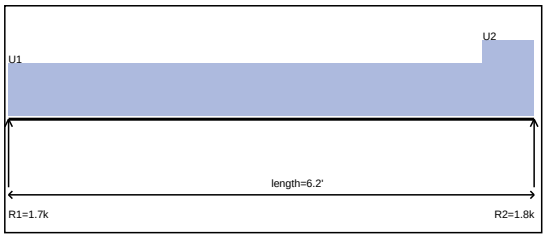
Controlling Load Combination/ Cd
V = NA Cd=1
M = NA Cd=1
△ = NA

V = 0.00k	Vall = 0 k	Ratio = 0
M = 0.00k-ft	Mall = 0 k-ft	Ratio = 0

Deflection
TL = NA L/ NA > L/240 min
DL = NA
L = NA L/ NA > L/360 min

Refer to External Design

Description - Main Floor Framing Plan - B1-1 - Dropped



Uniform 1 = 0.52 klf (0.0'-5.6')

Uniform 2 = 0.75 klf (5.6'-6.2')

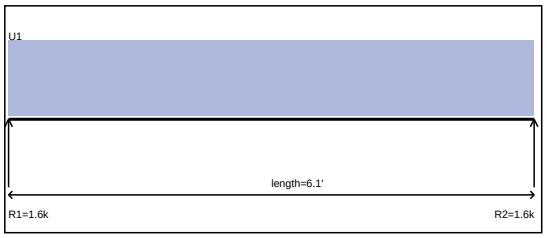
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.74k	Vall = 3.88k	Ratio = 0.45
M = 2.50k-ft	Mall = 4.49k-ft	Ratio = 0.56

Deflection
TL = 0.05" L/999+ > L/240 min
DL = 0.01"
L = 0.04" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-2 - Dropped



Uniform 1 = 0.52 klf (0.0'-6.1')

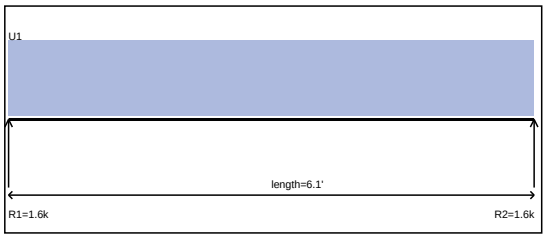
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.58k	Vall = 3.88k	Ratio = 0.41
M = 2.40k-ft	Mall = 4.49k-ft	Ratio = 0.53

Deflection
TL = 0.04" L/999+ > L/240 min
DL = 0.01"
L = 0.03" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-3 - Dropped



Uniform 1 = 0.52 klf (0.0'-6.1')

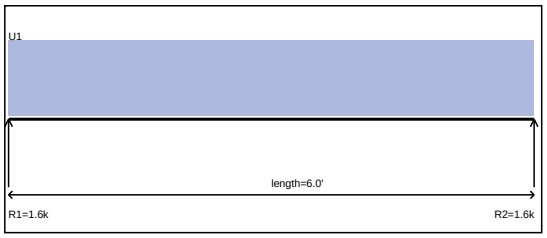
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.58k	Vall = 3.88k	Ratio = 0.41
M = 2.40k-ft	Mall = 4.49k-ft	Ratio = 0.53

Deflection
TL = 0.04" L/999+ > L/240 min
DL = 0.01"
L = 0.03" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-4 - Dropped



Uniform 1 = 0.52 klf (0.0'-6.0')

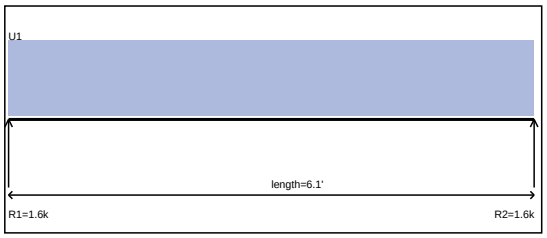
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.55k	Vall = 3.88k	Ratio = 0.40
M = 2.32k-ft	Mall = 4.49k-ft	Ratio = 0.52

Deflection
TL = 0.04" L/999+ > L/240 min
DL = 0.01"
L = 0.03" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-5 - Dropped



Uniform 1 = 0.52 klf (0.0'-6.1')

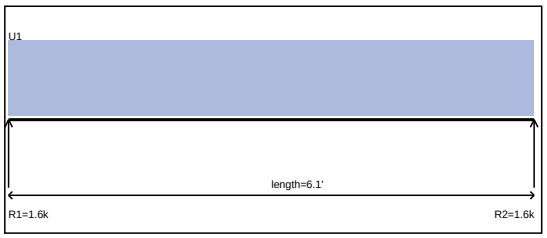
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.58k	Vall = 3.88k	Ratio = 0.41
M = 2.40k-ft	Mall = 4.49k-ft	Ratio = 0.53

Deflection
TL = 0.04" L/999+ > L/240 min
DL = 0.01"
L = 0.03" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-6 - Dropped



Uniform 1 = 0.52 klf (0.0'-6.1')

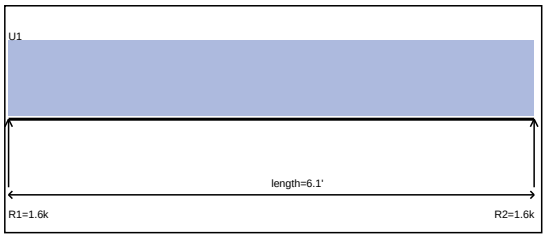
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.58k	Vall = 3.88k	Ratio = 0.41
M = 2.40k-ft	Mall = 4.49k-ft	Ratio = 0.53

Deflection
TL = 0.04" L/999+ > L/240 min
DL = 0.01"
L = 0.03" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-7 - Dropped



Uniform 1 = 0.52 klf (0.0'-6.1')

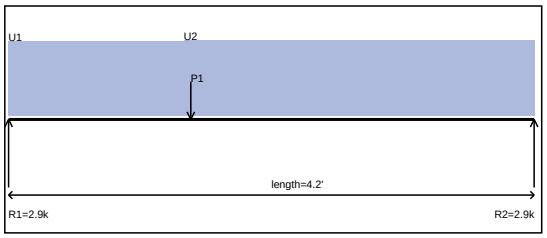
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.58k	Vall = 3.88k	Ratio = 0.41
M = 2.40k-ft	Mall = 4.49k-ft	Ratio = 0.53

Deflection
TL = 0.04" L/999+ > L/240 min
DL = 0.01"
L = 0.03" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-8 - Dropped



Uniform 1 = 1.28 klf (0.0'-1.4') P1 = 0.29 K (1.4')

Uniform 2 = 1.30 klf (1.4'-4.2')

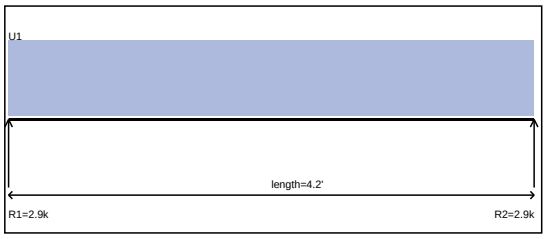
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 2.88k	Vall = 3.88k	Ratio = 0.74
M = 3.03k-ft	Mall = 4.49k-ft	Ratio = 0.67

Deflection
TL = 0.03" L/999+ > L/240 min
DL = 0.01"
L = 0.02" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-9 - Dropped



Uniform 1 = 1.38 klf (0.0'-4.2')

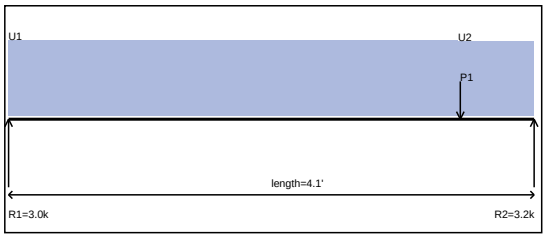
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 2.88k	Vall = 3.88k	Ratio = 0.74
M = 3.00k-ft	Mall = 4.49k-ft	Ratio = 0.67

Deflection
TL = 0.03" L/999+ > L/240 min
DL = 0.01"
L = 0.02" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-10 - Dropped



Uniform 1 = 1.43 klf (0.0'-3.5') P1 = 0.30 K (3.5')

Uniform 2 = 1.41 klf (3.5'-4.1')

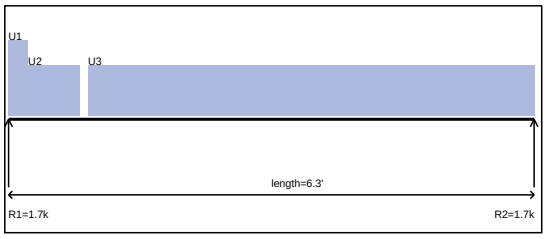
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 3.16k	Vall = 3.88k	Ratio = 0.81
M = 3.06k-ft	Mall = 4.49k-ft	Ratio = 0.68

Deflection
TL = 0.02" L/999+ > L/240 min
DL = 0.01"
L = 0.02" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-11 - Dropped



Uniform 1 = 0.79 klf (0.0'-0.2')

Uniform 2 = 0.53 klf (0.2'-0.8')

Uniform 3 = 0.53 klf (1.0'-6.3')

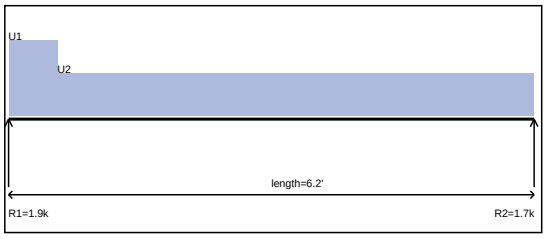
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.68k	Vall = 3.88k	Ratio = 0.43
M = 2.61k-ft	Mall = 4.49k-ft	Ratio = 0.58

Deflection
TL = 0.05" L/999+ > L/240 min
DL = 0.01"
L = 0.04" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-12 - Dropped



Uniform 1 = 0.95 klf (0.0'-0.6')

Uniform 2 = 0.53 klf (0.6'-6.2')

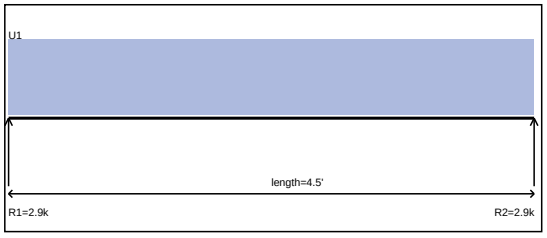
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.88k	Vall = 3.88k	Ratio = 0.48
M = 2.58k-ft	Mall = 4.49k-ft	Ratio = 0.57

Deflection
TL = 0.05" L/999+ > L/240 min
DL = 0.01"
L = 0.04" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-13 - Dropped



Uniform 1 = 1.26 klf (0.0'-4.5')

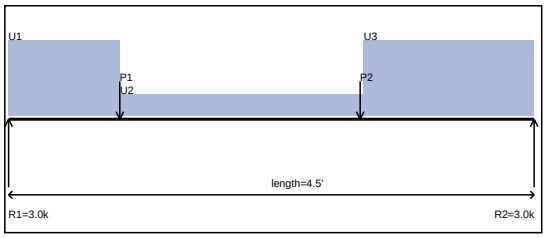
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 2.84k	Vall = 3.88k	Ratio = 0.73
M = 3.21k-ft	Mall = 4.49k-ft	Ratio = 0.72

Deflection
TL = 0.03" L/999+ > L/240 min
DL = 0.01"
L = 0.02" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-14 - Dropped



Uniform 1 = 1.26 klf (0.0'-1.0')

Uniform 2 = 0.36 klf (1.0'-3.0')

Uniform 3 = 1.26 klf (3.0'-4.5')

P1 = 1.08 K (1.0')

P2 = 1.08 K (3.0')

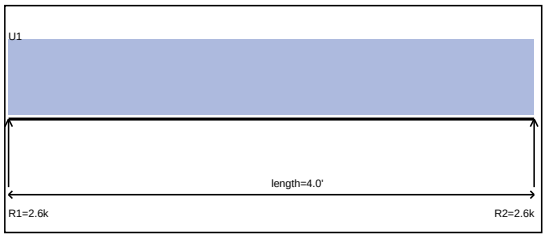
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 2.99k	Vall = 3.88k	Ratio = 0.77
M = 2.99k-ft	Mall = 4.49k-ft	Ratio = 0.67

Deflection
TL = 0.03" L/999+ > L/240 min
DL = 0.01"
L = 0.02" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-15 - Dropped



Uniform 1 = 1.26 klf (0.0'-4.0')

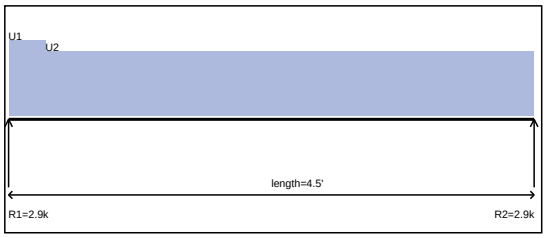
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 2.52k	Vall = 3.88k	Ratio = 0.65
M = 2.52k-ft	Mall = 4.49k-ft	Ratio = 0.56

Deflection
TL = 0.02" L/999+ > L/240 min
DL = 0.01"
L = 0.01" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-16 - Dropped



Uniform 1 = 1.48 klf (0.0'-0.3')

Uniform 2 = 1.26 klf (0.3'-4.5')

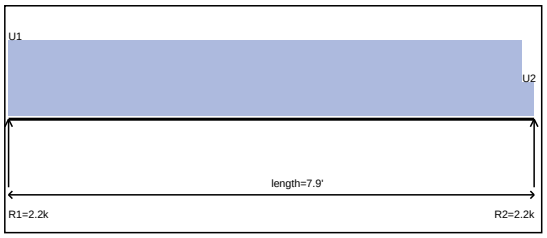
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 2.90k	Vall = 3.88k	Ratio = 0.75
M = 3.19k-ft	Mall = 4.49k-ft	Ratio = 0.71

Deflection
TL = 0.03" L/999+ > L/240 min
DL = 0.01"
L = 0.02" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-17 - Dropped



Uniform 1 = 0.54 klf (0.0'-7.7')

Uniform 2 = 0.24 klf (7.7'-7.9')

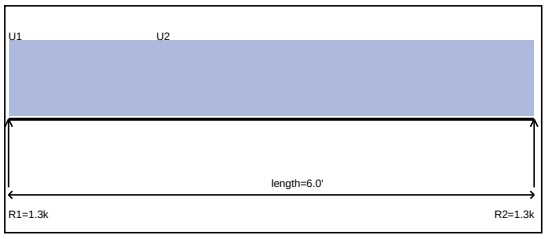
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 2.16k	Vall = 3.88k	Ratio = 0.55
M = 4.27k-ft	Mall = 4.49k-ft	Ratio = 0.95

Deflection
TL = 0.13" L/729 > L/240 min
DL = 0.03"
L = 0.10" L/911 > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-18 - Dropped



Uniform 1 = 0.41 klf (0.0'-1.7')

Uniform 2 = 0.41 klf (1.7'-6.0')

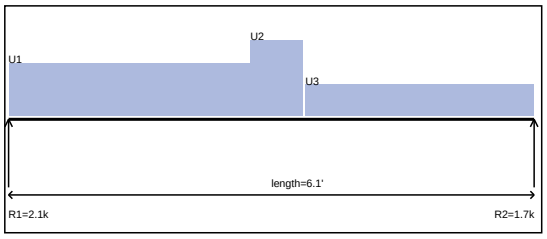
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.24k	Vall = 3.88k	Ratio = 0.32
M = 1.88k-ft	Mall = 4.49k-ft	Ratio = 0.42

Deflection
TL = 0.03" L/999+ > L/240 min
DL = 0.01"
L = 0.03" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-19 - Dropped



Uniform 1 = 0.70 klf (0.0'-2.8')

Uniform 2 = 1.00 klf (2.8'-3.4')

Uniform 3 = 0.41 klf (3.4'-6.1')

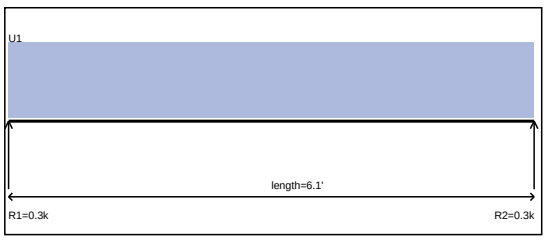
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 2.03k	Vall = 3.88k	Ratio = 0.52
M = 2.95k-ft	Mall = 4.49k-ft	Ratio = 0.66

Deflection
TL = 0.05" L/999+ > L/240 min
DL = 0.01"
L = 0.04" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-20 - Dropped



Uniform 1 = 0.08 klf (0.0'-6.1')

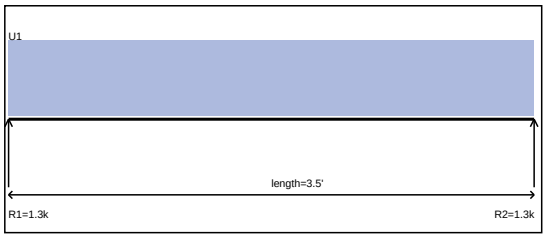
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 0.24k	Vall = 3.88k	Ratio = 0.06
M = 0.38k-ft	Mall = 4.49k-ft	Ratio = 0.08

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.00"
L = 0.01" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-21 - Dropped



Uniform 1 = 0.74 klf (0.0'-3.5')

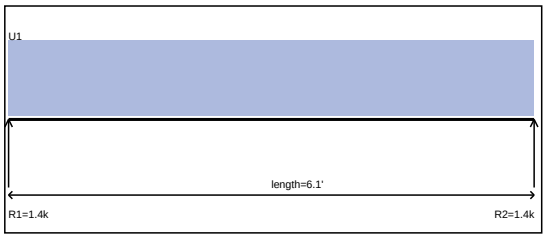
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.30k	Vall = 3.88k	Ratio = 0.33
M = 1.13k-ft	Mall = 4.49k-ft	Ratio = 0.25

Deflection
TL = 0.01" L/999+ > L/240 min
DL = 0.00"
L = 0.01" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-22 - Dropped



Uniform 1 = 0.46 klf (0.0'-6.1')

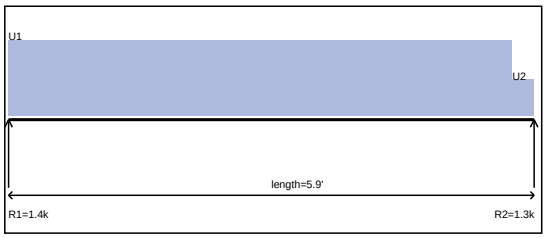
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.38k	Vall = 3.88k	Ratio = 0.36
M = 2.09k-ft	Mall = 4.49k-ft	Ratio = 0.46

Deflection
TL = 0.04" L/999+ > L/240 min
DL = 0.01"
L = 0.03" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-23 - Dropped



Uniform 1 = 0.46 klf (0.0'-5.6')

Uniform 2 = 0.22 klf (5.6'-5.9')

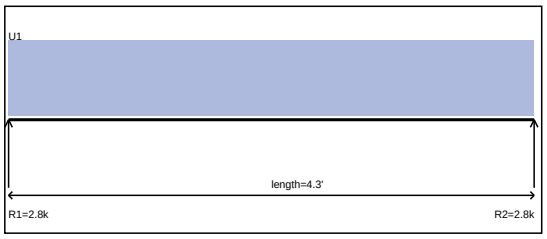
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.33k	Vall = 3.88k	Ratio = 0.34
M = 1.95k-ft	Mall = 4.49k-ft	Ratio = 0.43

Deflection
TL = 0.03" L/999+ > L/240 min
DL = 0.01"
L = 0.03" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-24 - Dropped



Uniform 1 = 1.28 klf (0.0'-4.3')

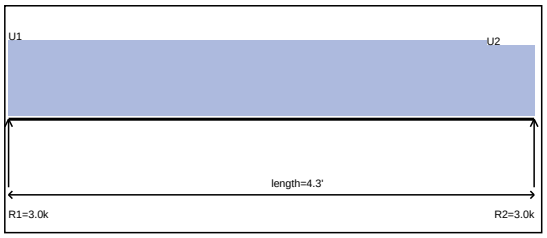
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 2.77k	Vall = 3.88k	Ratio = 0.71
M = 3.00k-ft	Mall = 4.49k-ft	Ratio = 0.67

Deflection
TL = 0.03" L/999+ > L/240 min
DL = 0.01"
L = 0.02" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-25 - Dropped



Uniform 1 = 1.38 klf (0.0'-3.9')

Uniform 2 = 1.28 klf (3.9'-4.3')

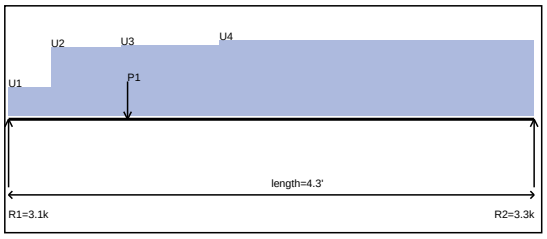
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 2.95k	Vall = 3.88k	Ratio = 0.76
M = 3.16k-ft	Mall = 4.49k-ft	Ratio = 0.70

Deflection
TL = 0.03" L/999+ > L/240 min
DL = 0.01"
L = 0.02" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-26 - Dropped



Uniform 1 = 0.58 klf (0.0'-0.3')

P1 = 0.33 K (1.0')

Uniform 2 = 1.37 klf (0.3'-0.9')

Uniform 3 = 1.42 klf (0.9'-1.7')

Uniform 4 = 1.52 klf (1.7'-4.3')

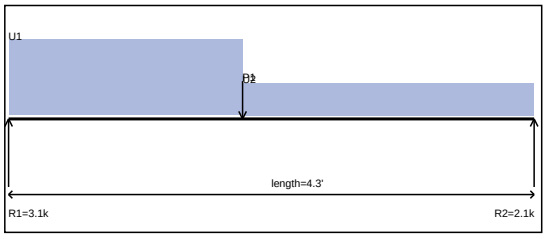
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 3.30k	Vall = 3.88k	Ratio = 0.85
M = 3.57k-ft	Mall = 4.49k-ft	Ratio = 0.80

Deflection
TL = 0.03" L/999+ > L/240 min
DL = 0.01"
L = 0.02" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-27 - Dropped



Uniform 1 = 1.37 klf (0.0'-1.9')

P1 = 1.08 K (1.9')

Uniform 2 = 0.58 klf (1.9'-4.3')

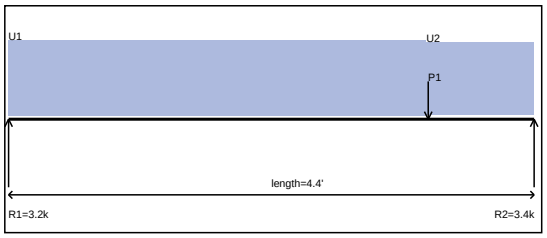
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 3.03k	Vall = 3.88k	Ratio = 0.78
M = 3.31k-ft	Mall = 4.49k-ft	Ratio = 0.74

Deflection
TL = 0.03" L/999+ > L/240 min
DL = 0.01"
L = 0.02" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-28 - Dropped



Uniform 1 = 1.42 klf (0.0'-3.5') P1 = 0.33 K (3.5')

Uniform 2 = 1.37 klf (3.5'-4.4')

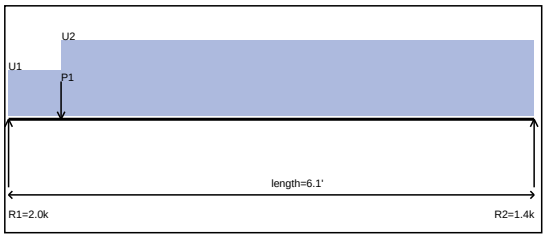
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 3.35k	Vall = 3.88k	Ratio = 0.86
M = 3.58k-ft	Mall = 4.49k-ft	Ratio = 0.80

Deflection
TL = 0.03" L/999+ > L/240 min
DL = 0.01"
L = 0.02" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-29 - Dropped



Uniform 1 = 0.25 klf (0.0'-0.6') P1 = 0.87 K (0.6')

Uniform 2 = 0.42 klf (0.6'-6.1')

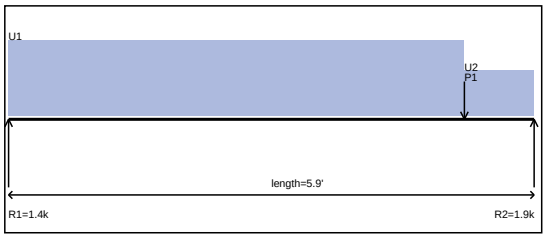
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.96k	Vall = 3.88k	Ratio = 0.50
M = 2.19k-ft	Mall = 4.49k-ft	Ratio = 0.49

Deflection
TL = 0.04" L/999+ > L/240 min
DL = 0.01"
L = 0.03" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-30 - Dropped



Uniform 1 = 0.42 klf (0.0'-5.1') P1 = 0.87 K (5.1')

Uniform 2 = 0.25 klf (5.1'-5.9')

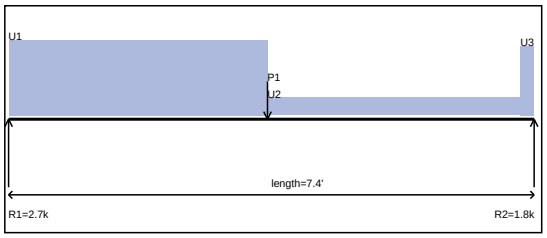
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.87k	Vall = 3.88k	Ratio = 0.48
M = 2.13k-ft	Mall = 4.49k-ft	Ratio = 0.47

Deflection
TL = 0.04" L/999+ > L/240 min
DL = 0.01"
L = 0.03" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing Plan - B1-31 - Flush



Uniform 1 = 0.72 klf (0.0'-3.7')

P1 = 1.00 K (3.7')

Uniform 2 = 0.17 klf (3.7'-7.4')

Uniform 3 = 0.66 klf (7.2'-7.4')

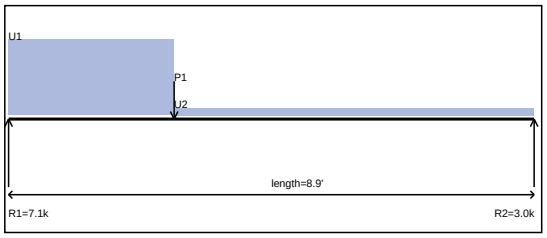
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 2.47k	Vall = 10.90k	Ratio = 0.23
M = 4.55k-ft	Mall = 19.68k-ft	Ratio = 0.23

Deflection
TL = 0.06" L/999+ > L/240 min
DL = 0.04"
L = 0.01" L/999+ > L/360 min

(3)1-3/4x9-1/2 LVL

Description - Main Floor Framing Plan - B1-32 - Flush



Uniform 1 = 0.72 klf (0.0'-2.8')

P1 = 7.64 K (2.8')

Uniform 2 = 0.07 klf (2.8'-8.9')

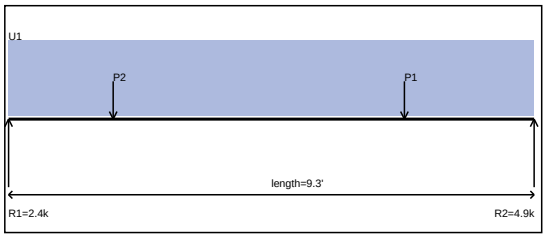
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
△ = (D + S)

V = 6.85k	Vall = 10.90k	Ratio = 0.63
M = 16.59k-ft	Mall = 19.68k-ft	Ratio = 0.84

Deflection
TL = 0.33" L/322 > L/240 min
DL = 0.14"
L = 0.01" L/999+ > L/360 min

(3)1-3/4x9-1/2 LVL

Description - Main Floor Framing Plan - B1-33 - Flush



Uniform 1 = 0.07 klf (0.0'-9.2')

P1 = 5.89 K (7.0')

P2 = 0.73 K (1.8')

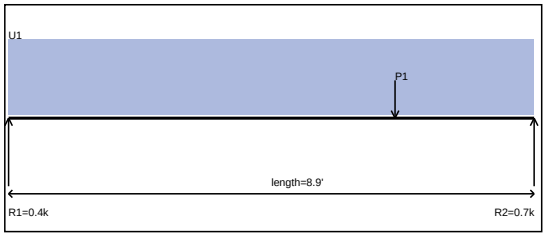
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 4.88k	Vall = 9.48k	Ratio = 0.52
M = 10.99k-ft	Mall = 17.11k-ft	Ratio = 0.64

Deflection
TL = 0.24" L/468 > L/240 min
DL = 0.07"
L = 0.17" L/653 > L/360 min

(3)1-3/4x9-1/2 LVL

Description - Main Floor Framing Plan - B1-34 - Flush



Uniform 1 = 0.03 klf (0.0'-8.9')

P1 = 0.69 K (6.6')

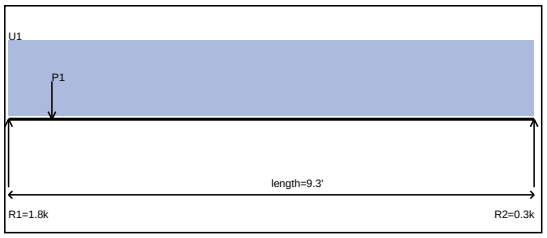
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 0.66k	Vall = 3.16k	Ratio = 0.21
M = 1.45k-ft	Mall = 5.70k-ft	Ratio = 0.25

Deflection
TL = 0.09" L/999+ > L/240 min
DL = 0.02"
L = 0.07" L/999+ > L/360 min

1-3/4x9-1/2 LVL

Description - Main Floor Framing Plan - B1-35 - Flush



Uniform 1 = 0.03 klf (0.0'-9.2') P1 = 1.70 K (0.8')

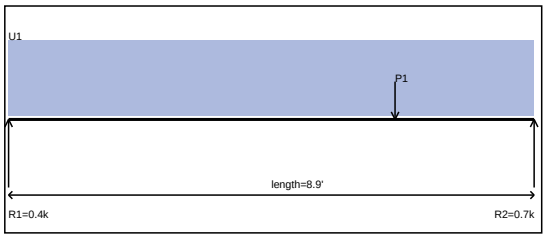
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.71k	Vall = 3.16k	Ratio = 0.54
M = 1.30k-ft	Mall = 5.70k-ft	Ratio = 0.23

Deflection
TL = 0.08" L/999+ > L/240 min
DL = 0.02"
L = 0.06" L/999+ > L/360 min

1-3/4x9-1/2 LVL

Description - Main Floor Framing Plan - B1-36 - Flush



Uniform 1 = 0.03 klf (0.0'-8.9') P1 = 0.69 K (6.6')

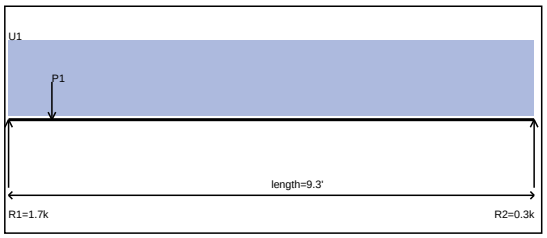
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 0.66k	Vall = 3.16k	Ratio = 0.21
M = 1.45k-ft	Mall = 5.70k-ft	Ratio = 0.25

Deflection
TL = 0.09" L/999+ > L/240 min
DL = 0.02"
L = 0.07" L/999+ > L/360 min

1-3/4x9-1/2 LVL

Description - Main Floor Framing Plan - B1-37 - Flush



Uniform 1 = 0.03 klf (0.0'-9.2') P1 = 1.60 K (0.8')

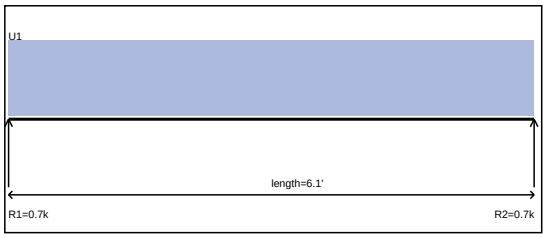
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.62k	Vall = 3.16k	Ratio = 0.51
M = 1.23k-ft	Mall = 5.70k-ft	Ratio = 0.22

Deflection
TL = 0.08" L/999+ > L/240 min
DL = 0.02"
L = 0.06" L/999+ > L/360 min

1-3/4x9-1/2 LVL

Description - Main Floor Framing Plan - B1-38 - Dropped



Uniform 1 = 0.22 klf (0.0'-6.1')

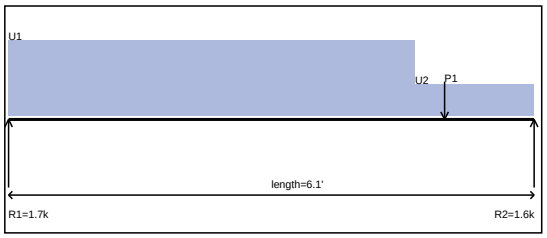
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 0.69k	Vall = 3.16k	Ratio = 0.22
M = 1.05k-ft	Mall = 5.70k-ft	Ratio = 0.18

Deflection
TL = 0.03" L/999+ > L/240 min
DL = 0.01"
L = 0.02" L/999+ > L/360 min

1-3/4x9-1/2 LVL

Description - Main Floor Framing Plan - B1-39 - Flush



Uniform 1 = 0.55 klf (0.0'-4.8')

P1 = 0.37 K (5.1')

Uniform 2 = 0.23 klf (4.8'-6.1')

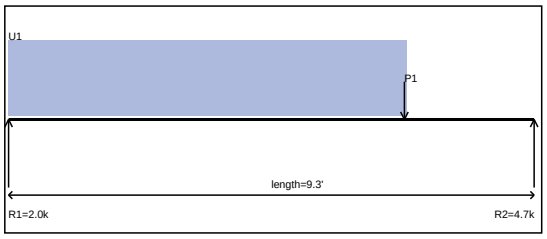
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.70k	Vall = 3.16k	Ratio = 0.54
M = 2.63k-ft	Mall = 5.70k-ft	Ratio = 0.46

Deflection
TL = 0.08" L/981 > L/240 min
DL = 0.02"
L = 0.05" L/999+ > L/360 min

1-3/4x9-1/2 LVL

Description - Main Floor Framing Plan - B1-40 - Flush



Uniform 1 = 0.11 klf (0.0'-7.0')

P1 = 5.79 K (7.0')

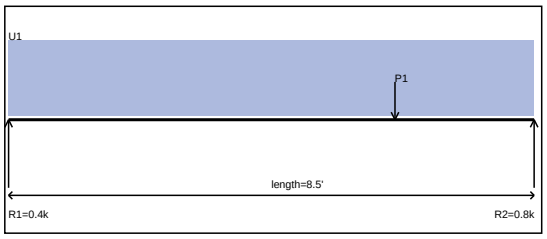
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 4.65k	Vall = 6.32k	Ratio = 0.74
M = 10.62k-ft	Mall = 11.41k-ft	Ratio = 0.93

Deflection
TL = 0.34" L/323 > L/240 min
DL = 0.11"
L = 0.23" L/483 > L/360 min

(2)1-3/4x9-1/2 LVL

Description - Main Floor Framing Plan - B1-41 - Flush



Uniform 1 = 0.03 klf (0.0'-8.5')

P1 = 0.84 K (6.3')

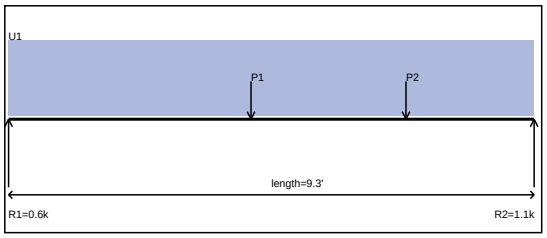
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 0.76k	Vall = 1.33k	Ratio = 0.57
M = 1.63k-ft	Mall = 3.00k-ft	Ratio = 0.54

Deflection
TL = 0.11" L/894 > L/240 min
DL = 0.03"
L = 0.08" L/999+ > L/360 min

9-1/2" TJI 210 I-Joists

Description - Main Floor Framing Plan - B1-42 - Flush



Uniform 1 = 0.03 klf (0.0'-9.2')

P1 = 0.19 K (4.3')

P2 = 1.10 K (7.0')

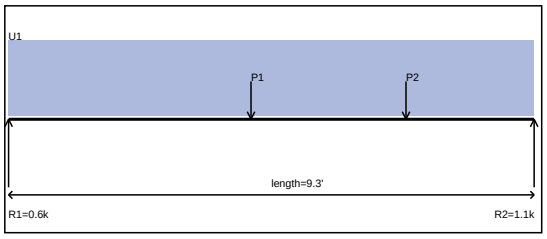
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.08k	Vall = 2.66k	Ratio = 0.41
M = 2.35k-ft	Mall = 6.00k-ft	Ratio = 0.39

Deflection
TL = 0.10" L/999+ > L/240 min
DL = 0.03"
L = 0.07" L/999+ > L/360 min

(2)9-1/2" TJI 210 I-Joists

Description - Main Floor Framing Plan - B1-43 - Flush



Uniform 1 = 0.03 klf (0.0'-9.2')

P1 = 0.19 K (4.3')

P2 = 1.10 K (7.0')

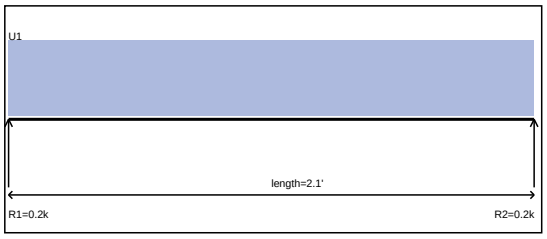
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.08k	Vall = 2.66k	Ratio = 0.41
M = 2.35k-ft	Mall = 6.00k-ft	Ratio = 0.39

Deflection
TL = 0.10" L/999+ > L/240 min
DL = 0.03"
L = 0.07" L/999+ > L/360 min

(2)9-1/2" TJI 210 I-Joists

Description - Main Floor Framing Plan - B1-44 - Flush



Uniform 1 = 0.18 klf (0.0'-2.1')

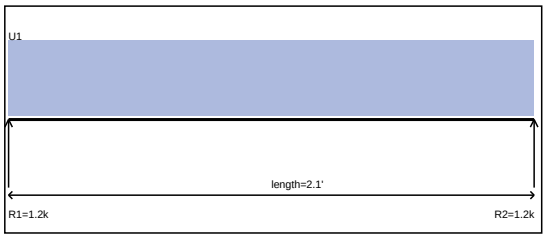
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 0.19k	Vall = 1.33k	Ratio = 0.14
M = 0.10k-ft	Mall = 3.00k-ft	Ratio = 0.03

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

9-1/2" TJI 210 I-Joists

Description - Main Floor Framing Plan - B1-45 - Flush



Uniform 1 = 1.06 klf (0.0'-2.1')

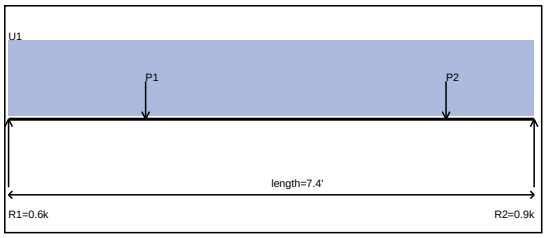
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 1.10k	Vall = 1.33k	Ratio = 0.83
M = 0.58k-ft	Mall = 3.00k-ft	Ratio = 0.19

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

9-1/2" TJI 210 I-Joists

Description - Main Floor Framing Plan - B1-46 - Flush



Uniform 1 = 0.07 klf (0.0'-7.4')

P1 = 0.32 K (1.9')

P2 = 0.65 K (6.2')

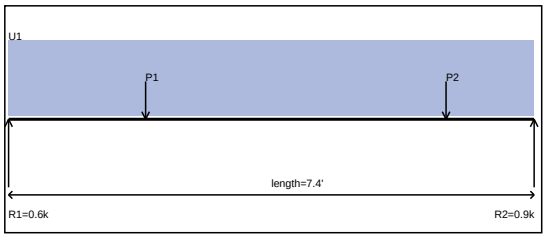
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 0.87k	Vall = 3.16k	Ratio = 0.27
M = 1.18k-ft	Mall = 5.70k-ft	Ratio = 0.21

Deflection
TL = 0.05" L/999+ > L/240 min
DL = 0.01"
L = 0.04" L/999+ > L/360 min

1-3/4x9-1/2 LVL

Description - Main Floor Framing Plan - B1-47 - Flush



Uniform 1 = 0.07 klf (0.0'-7.4')

P1 = 0.32 K (1.9')

P2 = 0.64 K (6.2')

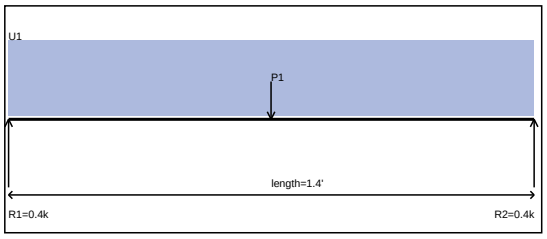
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 0.87k	Vall = 3.16k	Ratio = 0.27
M = 1.18k-ft	Mall = 5.70k-ft	Ratio = 0.21

Deflection
TL = 0.05" L/999+ > L/240 min
DL = 0.01"
L = 0.04" L/999+ > L/360 min

1-3/4x9-1/2 LVL

Description - Main Floor Framing Plan - B1-48 - Flush



Uniform 1 = 0.17 klf (0.0'-1.4')

P1 = 0.42 K (0.69')

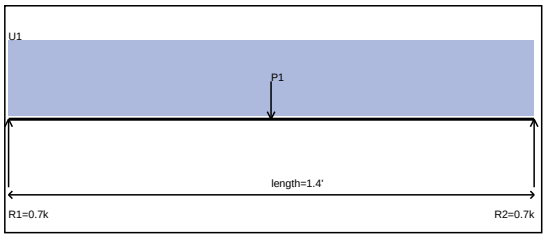
Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 0.32k	Vall = 9.48k	Ratio = 0.03
M = 0.18k-ft	Mall = 17.11k-ft	Ratio = 0.01

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

(3)1-3/4x9-1/2 LVL

Description - Main Floor Framing Plan - B1-49 - Flush



Uniform 1 = 0.14 klf (0.0'-1.4') P1 = 1.10 K (0.69')

Controlling Load Combination/ Cd
V = (D + L) Cd=1
M = (D + L) Cd=1
△ = (D + L)

V = 0.65k	Vall = 9.48k	Ratio = 0.07
M = 0.41k-ft	Mall = 17.11k-ft	Ratio = 0.02

Deflection
TL = 0.00" L/999+ > L/240 min
DL = 0.00"
L = 0.00" L/999+ > L/360 min

(3)1-3/4x9-1/2 LVL

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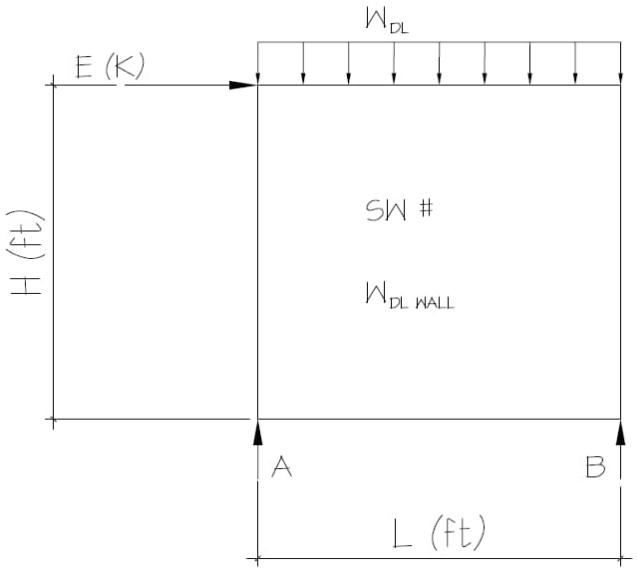
Project Name: Sears - Lot 4 McCullough
M&K Project #: 244-25022
Engineer: AJC
Date: 07-Nov-25

Overstrength Calculations

Wall Description/SW #: 201

Parameters:

L =	17.3	ft
H =	9.1	ft
E =	1.10	k
W_{DLWall} =	0.10	klf
W_{DL} =	0.170	klf
Ω_0 =	2.5	(ASCE TABLE 12.2.1 FOOTNOTE
SDS =	1.177	



analysis:

E (unfactored) = 1.57

$E_{mh} = \Omega 0 * E$ = 3.93 K

$E_v = 0.2*SDS*DL$ = 1.100 K

$E_m = E_{mh} + E_v$

$E_m = E_{mh} - E_v$

$E_m = E_{mh} + E_v$ = 5.028 K

$E_m = E_{mh} - E_v$ = 2.829 K

E_m (max) = $\sum M_A = 0$ = 5.03(9.1) - Rb(17.3)

R_B = 2.6E

Ra = - 2.6E

E_m (min) = $\sum M_A = 0$ = 2.83(9.1) - Rb(17.3)

R_B = 1.5E

Ra = - 1.5E

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

allowable stess permitted to be increased by 1.2

see following beam calcs for load application

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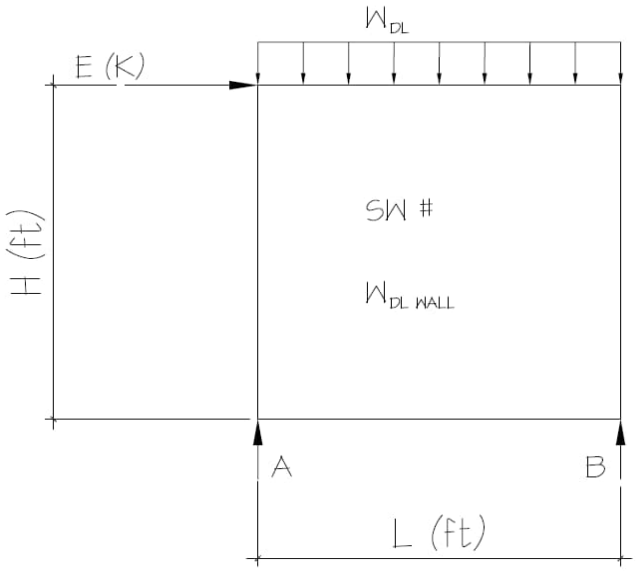
Project Name: Sears - Lot 4 McCullough
M&K Project #: 244-25022
Engineer: AJC
Date: 07-Nov-25

Overstrength Calculations

Wall Description/SW #: 208

Parameters:

L =	6.3	ft
H =	9.1	ft
E =	0.50	k
W_{DLWall} =	0.10	klf
W_{DL} =	0.224	klf
Ω_0 =	2.5	(ASCE TABLE 12.2.1 FOOTNOTE
SDS =	1.177	



analysis:

E (unfactored) = 0.71

$E_{mh} = \Omega 0 * E$ =	1.79	K	$E_v = 0.2*SDS*DL$ =	0.480 K
$E_m = E_{mh} + E_v$			$E_m = E_{mh} + E_v$ =	2.266 K
$E_m = E_{mh} - E_v$			$E_m = E_{mh} - E_v$ =	1.305 K

E_m (max) = $\sum M_A = 0$ =	2.27(9.1) - Rb(6.3)	R_B =	3.3E
		Ra =	- 3.3E
E_m (min) = $\sum M_A = 0$ =	1.31(9.1) - Rb(6.3)	R_B =	1.9E
		Ra =	- 1.9E

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

allowable stess permitted to be increased by 1.2

see following beam calcs for load application

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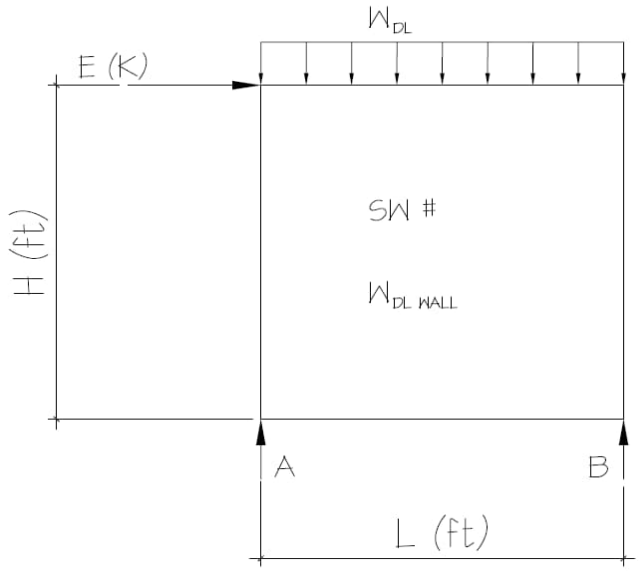
Project Name: Sears - Lot 4 McCullough
M&K Project #: 244-25022
Engineer: AJC
Date: 07-Nov-25

Overstrength Calculations

Wall Description/SW #: 211

Parameters:

L =	17.4	ft
H =	9.1	ft
E =	3.90	k
W_{DLWall} =	0.10	klf
W_{DL} =	0.000	klf
Ω_0 =	2.5	ASCE TABLE 12.2.1 FOOTNOTE
SDS =	1.177	



analysis:

E (unfactored) = 5.57

$E_{mh} = \Omega 0 * E$ = 13.93 K

$E_v = 0.2*SDS*DL$ = 0.410 K

$E_m = E_{mh} + E_v$

$E_m = E_{mh} - E_v$

$E_m = E_{mh} + E_v$ = 14.338 K

$E_m = E_{mh} - E_v$ = 13.519 K

E_m (max) = $\sum M_A = 0$ = 14.34(9.1) - Rb(17.4)

R_B = 7.5E

Ra = - 7.5E

E_m (min) = $\sum M_A = 0$ = 13.52(9.1) - Rb(17.4)

R_B = 7.1E

Ra = - 7.1E

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

allowable stess permitted to be increased by 1.2

see following beam calcs for load application

Wood Beam

Project File: Calcs.ec6

DESCRIPTION: B2-8 (No Overstrength)

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

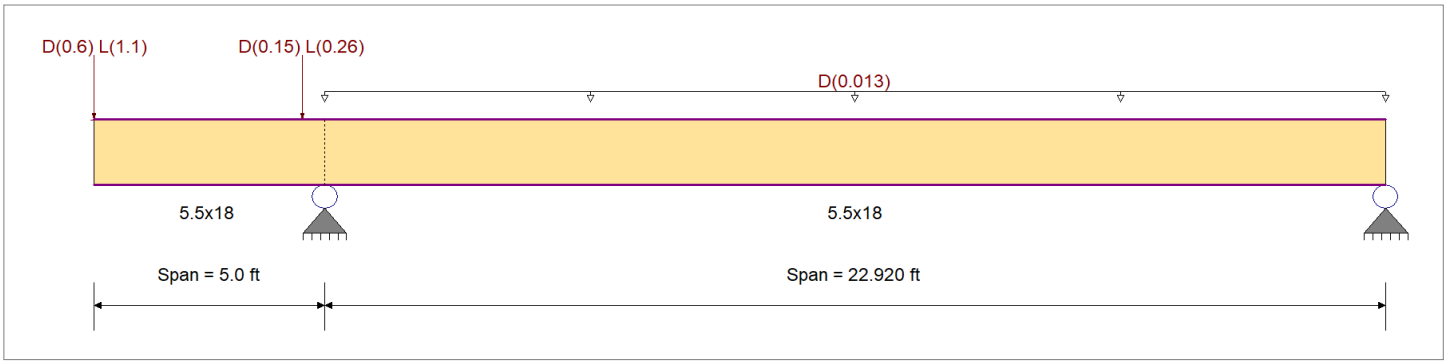
Wood Species : DF/DF
Wood Grade : 24F-V4

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

Fb +	2400 psi
Fb -	1850 psi
Fc - Prll	1650 psi
Fc - Perp	650 psi
Fv	265 psi
Ft	1100 psi

E : Modulus of Elasticity

Ebend- xx	1800 ksi
Eminbend - xx	950 ksi
Ebend- yy	1600 ksi
Eminbend - yy	850 ksi
Density	31.21 pcf



Applied Loads

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

Beam self weight calculated and added to loading
Load for Span Number 1
Point Load : D = 0.60, L = 1.10 k @ 0.0 ft
Point Load : D = 0.150, L = 0.260 k @ 4.50 ft
Load for Span Number 2
Uniform Load : D = 0.0130 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.207 : 1	Maximum Shear Stress Ratio	=	0.102 : 1
Section used for this span		5.5x18	Section used for this span		5.5x18
fb: Actual	=	362.55 psi	fv: Actual	=	26.90 psi
F'b	=	1,748.62 psi	F'v	=	265.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	0.000 ft	Location of maximum on span	=	3.520 ft
Span # where maximum occurs	=	Span # 2	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.094 in	Ratio =	1278 >=360	Span: 1 : L Only
Max Upward Transient Deflection	-0.069 in	Ratio =	3978 >=360	Span: 2 : L Only
Max Downward Total Deflection	0.118 in	Ratio =	1014 >=240	Span: 2 : D Only
Max Upward Total Deflection	-0.067 in	Ratio =	4075 >=240	Span: 2 : +D+L

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.081	0.043	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.34	135.1	1,665.0	0.68	10.2	238.5
Length = 22.920 ft	2	0.086	0.043	0.90	1.00	1.00	1.00	0.945	1.00	1.00	1.00	3.34	135.1	1,573.8	0.49	10.2	238.5
+D+L					1.00	1.00	1.00	0.945	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.196	0.102	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	8.97	362.6	1,850.0	1.78	26.9	265.0
Length = 22.920 ft	2	0.207	0.102	1.00	1.00	1.00	1.00	0.945	1.00	1.00	1.00	8.97	362.6	1,748.6	0.74	26.9	265.0
+D+0.750L					1.00	1.00	1.00	0.945	1.00	1.00	1.00			0.0	0.00	0.0	0.0

Wood Beam

Project File: Calcs.ec6

DESCRIPTION: B2-8 (No Overstrength)

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
Length = 5.0 ft	**1**	0.132	0.069	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.57	305.7	2,312.5	1.50	22.7	331.3
Length = 22.920 ft	**2**	0.140	0.069	1.25	1.00	1.00	1.00	0.945	1.00	1.00	1.00	7.57	305.7	2,185.8	0.68	22.7	331.3
+0.60D					1.00	1.00	1.00	0.945	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.0 ft	**1**	0.027	0.014	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.01	81.0	2,960.0	0.41	6.1	424.0
Length = 22.920 ft	**2**	0.029	0.014	1.60	1.00	1.00	1.00	0.945	1.00	1.00	1.00	2.01	81.0	2,797.8	0.30	6.1	424.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.1183	0.000		0.0000	0.000
	2	0.0000	0.000	L Only	-0.0691	9.731

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions		3.004	0.249
Max Upward from Load Combinations		3.004	0.149
Max Upward from Load Cases		1.606	0.249
Max Downward from all Load Conditio			-0.246
Max Downward from Load Cases (Resis			-0.246
D Only		1.398	0.249
+D+L		3.004	0.003
+D+0.750L		2.602	0.065
+0.60D		0.839	0.149
L Only		1.606	-0.246

Wood Beam

Project File: Calcs.ec6

DESCRIPTION: B2-14 (SW#201)

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

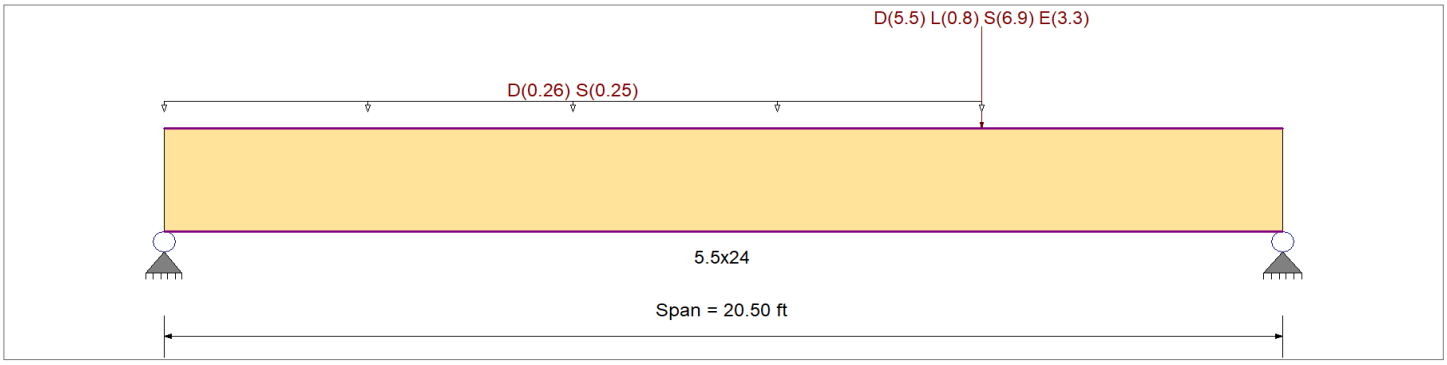
Wood Species : DF/DF
Wood Grade : 24F-V4

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

Fb +	2,880.0 psi
Fb -	2,220.0 psi
Fc - Prll	1,650.0 psi
Fc - Perp	650.0 psi
Fv	318.0 psi
Ft	1,100.0 psi

E : Modulus of Elasticity

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



Applied Loads

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

Beam self weight calculated and added to loading
Point Load : D = 5.50, L = 0.80, S = 6.90, E = 3.30 k @ 15.0 ft
Uniform Load : D = 0.260, S = 0.250 k/ft, Extent = 0.0 -->> 15.0 ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.491 : 1	Maximum Shear Stress Ratio	=	0.376 : 1
Section used for this span		5.5x24	Section used for this span		5.5x24
fb: Actual	=	1,510.48 psi	fv: Actual	=	137.61 psi
F'b	=	3,075.86 psi	F'v	=	365.70 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	14.964 ft	Location of maximum on span	=	18.555 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.211 in	Ratio =	1163	>=0	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0	>=0	n/a
Max Downward Total Deflection	0.408 in	Ratio =	603	>=240	Span: 1 : +D+S
Max Upward Total Deflection	0 in	Ratio =	0	<240	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 20.50 ft	1	0.294	0.226	0.90	1.00	1.00	1.00	0.929	1.00	1.00	1.00	31.17	708.5	2,407.2	5.69	64.6	286.2
+D+L					1.00	1.00	1.00	0.929	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 20.50 ft	1	0.292	0.224	1.00	1.00	1.00	1.00	0.929	1.00	1.00	1.00	34.38	781.3	2,674.7	6.27	71.3	318.0
+D+S					1.00	1.00	1.00	0.929	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 20.50 ft	1	0.491	0.376	1.15	1.00	1.00	1.00	0.929	1.00	1.00	1.00	66.46	1,510.5	3,075.9	12.11	137.6	365.7
+D+0.750L					1.00	1.00	1.00	0.929	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 20.50 ft	1	0.228	0.175	1.25	1.00	1.00	1.00	0.929	1.00	1.00	1.00	33.57	763.0	3,343.3	6.13	69.6	397.5
+D+0.750L+0.750S					1.00	1.00	1.00	0.929	1.00	1.00	1.00			0.0	0.00	0.0	0.0

Wood Beam

Project File: Calcs.ec6

DESCRIPTION: B2-14 (SW#201)

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 20.50 ft	**1**	0.444	0.340	1.15	1.00	1.00	1.00	0.929	1.00	1.00	1.00	60.05	1,364.7	3,075.9	10.94	124.4	365.7
+D+0.70E					1.00	1.00	1.00	0.929	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 20.50 ft	**1**	0.215	0.165	1.60	1.00	1.00	1.00	0.929	1.00	1.00	1.00	40.44	919.1	4,279.5	7.38	83.9	508.8
+D-0.70E					1.00	1.00	1.00	0.929	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 20.50 ft	**1**	0.121	0.089	1.60	1.00	1.00	1.00	0.929	1.00	1.00	1.00	22.73	516.6	4,279.5	4.00	45.4	508.8
+D+0.750L+0.750S+0.5250E					1.00	1.00	1.00	0.929	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 20.50 ft	**1**	0.356	0.273	1.60	1.00	1.00	1.00	0.929	1.00	1.00	1.00	67.00	1,522.8	4,279.5	12.21	138.8	508.8
+D+0.750L+0.750S-0.5250E					1.00	1.00	1.00	0.929	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 20.50 ft	**1**	0.282	0.216	1.60	1.00	1.00	1.00	0.929	1.00	1.00	1.00	53.09	1,206.6	4,279.5	9.68	110.0	508.8
+0.60D					1.00	1.00	1.00	0.929	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 20.50 ft	**1**	0.099	0.076	1.60	1.00	1.00	1.00	0.929	1.00	1.00	1.00	18.70	425.1	4,279.5	3.41	38.8	508.8
+0.60D+0.70E					1.00	1.00	1.00	0.929	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 20.50 ft	**1**	0.149	0.114	1.60	1.00	1.00	1.00	0.929	1.00	1.00	1.00	27.97	635.7	4,279.5	5.10	58.0	508.8
+0.60D-0.70E					1.00	1.00	1.00	0.929	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 20.50 ft	**1**	0.057	0.038	1.60	1.00	1.00	1.00	0.929	1.00	1.00	1.00	10.70	243.3	4,279.5	1.72	19.6	508.8

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.4076	10.923		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	8.471	12.267
Max Upward from Load Combinations	8.471	12.267
Max Upward from Load Cases	4.242	6.421
D Only	4.242	5.744
+D+L	4.457	6.330
+D+S	8.471	12.165
+D+0.750L	4.403	6.183
+D+0.750L+0.750S	7.575	10.999
+D+0.70E	4.862	7.435
+D+0.750L+0.750S+0.5250E	8.040	12.267
+0.60D	2.545	3.447
+0.60D+0.70E	3.165	5.137
L Only	0.215	0.585
S Only	4.229	6.421
E Only	0.885	2.415

Wood Beam

Project File: Calcs.ec6

DESCRIPTION: B2-16 (SW#208)

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

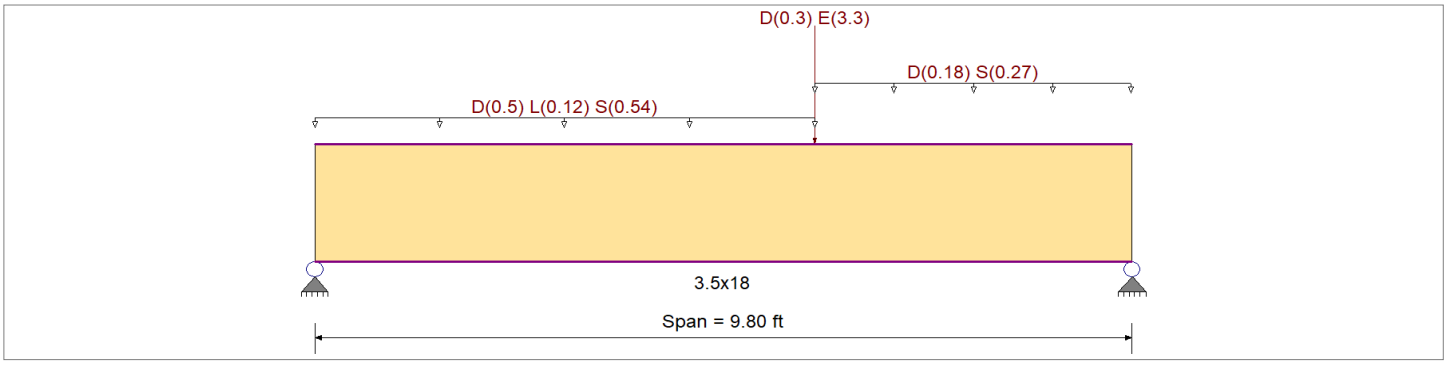
Wood Species : DF/DF
Wood Grade : 24F-V4

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

Fb +	2,880.0 psi
Fb -	2,220.0 psi
Fc - Prll	1,650.0 psi
Fc - Perp	650.0 psi
Fv	318.0 psi
Ft	1,100.0 psi

E : Modulus of Elasticity

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



Applied Loads

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

Beam self weight calculated and added to loading
Point Load : D = 0.30, E = 3.30 k @ 6.0 ft
Uniform Load : D = 0.50, L = 0.120, S = 0.540 k/ft, Extent = 0.0 -->> 6.0 ft, Tributary Width = 1.0 ft
Uniform Load : D = 0.180, S = 0.270 k/ft, Extent = 6.0 -->> 9.80 ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.214 : 1	Maximum Shear Stress Ratio	=	0.215 : 1
Section used for this span		3.5x18	Section used for this span		3.5x18
fb: Actual	=	707.12 psi	fv: Actual	=	78.56 psi
F'b	=	3,312.00 psi	F'v	=	365.70 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	4.614 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.034 in	Ratio =	3426 >=0	Span: 1 : E Only
Max Upward Transient Deflection	0 in	Ratio =	0 >=0	n/a
Max Downward Total Deflection	0.076 in	Ratio =	1542 >=240	Span: 1 : +D+0.750L+0.750S+0.5250E
Max Upward Total Deflection	0 in	Ratio =	0 <240	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 9.80 ft	1	0.137	0.137	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	5.60	355.2	2,592.0	1.64	39.1	286.2
+D+L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 9.80 ft	1	0.146	0.147	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.62	420.5	2,880.0	1.97	46.9	318.0
+D+S					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 9.80 ft	1	0.214	0.215	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	11.14	707.1	3,312.0	3.30	78.6	365.7
+D+0.750L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 9.80 ft	1	0.112	0.113	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.37	404.1	3,600.0	1.89	44.9	397.5
+D+0.750L+0.750S					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0

Wood Beam

Project File: Calcs.ec6

LIC# : KW-06017913, Build:20.24.02.03 MULHERN & KULP STRUCTURAL ENGINEERING INC (c) ENERCALC INC 1983-2023

DESCRIPTION: B2-16 (SW#208)

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
Length = 9.80 ft	1	0.202	0.204	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	10.52	668.1	3,312.0	3.13	74.5	365.7
+D+0.70E					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 9.80 ft	1	0.145	0.133	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	10.51	667.1	4,608.0	2.85	67.9	508.8
+D-0.70E					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 9.80 ft	1	0.030	0.073	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.20	139.4	4,608.0	1.57	37.3	508.8
+D+0.750L+0.750S+0.5250E					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 9.80 ft	1	0.190	0.178	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	13.82	877.2	4,608.0	3.80	90.5	508.8
+D+0.750L+0.750S-0.5250E					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 9.80 ft	1	0.106	0.115	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.68	487.5	4,608.0	2.46	58.5	508.8
+0.60D					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 9.80 ft	1	0.046	0.046	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.36	213.1	4,608.0	0.99	23.5	508.8
+0.60D+0.70E					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 9.80 ft	1	0.116	0.107	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	8.44	536.2	4,608.0	2.28	54.2	508.8
+0.60D-0.70E					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 9.80 ft	1	0.041	0.061	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.28	145.0	3,552.0	1.30	30.9	508.8

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.5250E	1	0.0762	4.900		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	5.279	4.311
Max Upward from Load Combinations	5.279	4.311
Max Upward from Load Cases	2.447	2.020
D Only	2.397	1.720
+D+L	2.897	1.941
+D+S	4.845	3.539
+D+0.750L	2.772	1.886
+D+0.750L+0.750S	4.607	3.250
+D+0.70E	3.293	3.135
+D+0.750L+0.750S+0.5250E	5.279	4.311
+0.60D	1.438	1.032
+0.60D+0.70E	2.334	2.446
L Only	0.500	0.220
S Only	2.447	1.819
E Only	1.280	2.020

Wood Beam

Project File: Calcs.ec6

DESCRIPTION: B2-17 (SW#211)

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

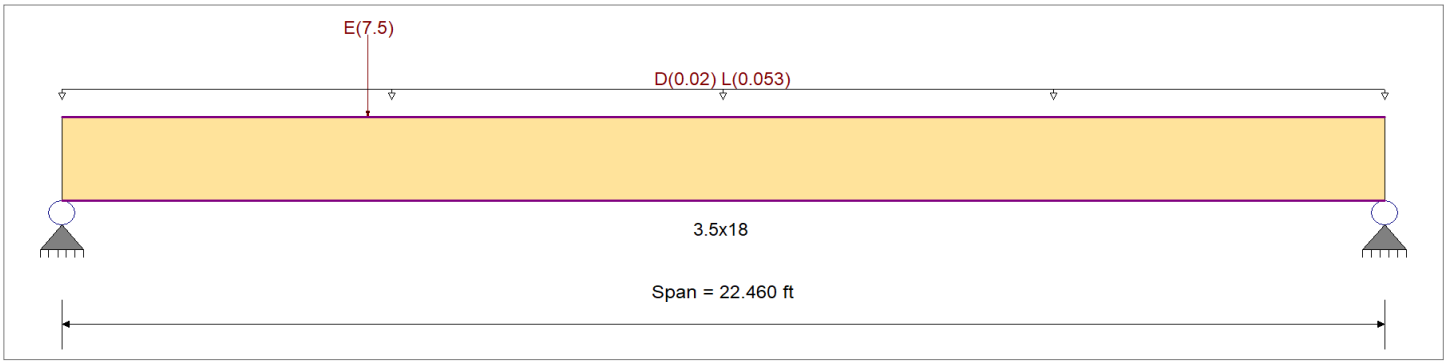
Wood Species : DF/DF
Wood Grade : 24F-V4

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

Fb +	2,880.0 psi
Fb -	2,220.0 psi
Fc - Prll	1,650.0 psi
Fc - Perp	650.0 psi
Fv	318.0 psi
Ft	1,100.0 psi

E : Modulus of Elasticity

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



Applied Loads

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

Beam self weight NOT internally calculated and added
Uniform Load : D = 0.020, L = 0.0530 , Tributary Width = 1.0 ft
Point Load : E = 7.50 k @ 5.20 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.368 : 1	Maximum Shear Stress Ratio	=	0.198 : 1
Section used for this span		3.5x18	Section used for this span		3.5x18
fb: Actual	=	1,294.06 psi	fv: Actual	=	100.70 psi
F'b	=	3,519.71 psi	F'v	=	508.80 psi
Load Combination		+0.60D-0.70E	Load Combination		+D+0.70E
Location of maximum on span	=	5.246 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.660 in	Ratio =	408	>=0	Span: 1 : E Only
Max Upward Transient Deflection	0 in	Ratio =	0	>=0	n/a
Max Downward Total Deflection	0.499 in	Ratio =	539	>=240	Span: 1 : +D+0.70E
Max Upward Total Deflection	0 in	Ratio =	0	<240	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 22.460 ft	1	0.031	0.016	0.90	1.00	1.00	1.00	0.991	1.00	1.00	1.00	1.26	80.1	2,568.4	0.20	4.6	286.2
+D+L					1.00	1.00	1.00	0.991	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 22.460 ft	1	0.102	0.053	1.00	1.00	1.00	1.00	0.991	1.00	1.00	1.00	4.60	292.3	2,853.8	0.71	17.0	318.0
+D+0.750L					1.00	1.00	1.00	0.991	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 22.460 ft	1	0.067	0.035	1.25	1.00	1.00	1.00	0.991	1.00	1.00	1.00	3.77	239.2	3,567.3	0.58	13.9	397.5
+D+0.70E					1.00	1.00	1.00	0.991	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 22.460 ft	1	0.303	0.198	1.60	1.00	1.00	1.00	0.991	1.00	1.00	1.00	21.83	1,385.8	4,566.1	4.23	100.7	508.8
+D-0.70E					1.00	1.00	1.00	0.991	1.00	1.00	1.00			0.0	0.00	0.0	0.0

Wood Beam

Project File: Calcs.ec6

DESCRIPTION: B2-17 (SW#211)

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 22.460 ft	**1**	0.361	0.183	1.60	1.00	1.00	1.00	0.991	1.00	1.00	1.00	20.02	1,271.1	3,519.7	3.91	93.2	508.8
+D+0.750L+0.5250E					1.00	1.00	1.00	0.991	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 22.460 ft	**1**	0.256	0.169	1.60	1.00	1.00	1.00	0.991	1.00	1.00	1.00	18.39	1,167.6	4,566.1	3.61	85.9	508.8
+D+0.750L-0.5250E					1.00	1.00	1.00	0.991	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 22.460 ft	**1**	0.234	0.125	1.60	1.00	1.00	1.00	0.991	1.00	1.00	1.00	12.99	825.1	3,519.7	2.66	63.4	508.8
+0.60D					1.00	1.00	1.00	0.991	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 22.460 ft	**1**	0.011	0.005	1.60	1.00	1.00	1.00	0.991	1.00	1.00	1.00	0.76	48.0	4,566.1	0.12	2.8	508.8
+0.60D+0.70E					1.00	1.00	1.00	0.991	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 22.460 ft	**1**	0.298	0.194	1.60	1.00	1.00	1.00	0.991	1.00	1.00	1.00	21.47	1,362.9	4,566.1	4.15	98.8	508.8
+0.60D-0.70E					1.00	1.00	1.00	0.991	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 22.460 ft	**1**	0.368	0.185	1.60	1.00	1.00	1.00	0.991	1.00	1.00	1.00	20.38	1,294.1	3,519.7	3.96	94.3	508.8

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
E Only	1	0.6604	9.918		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	5.764	1.736
Max Upward from Load Combinations	4.259	1.583
Max Upward from Load Cases	5.764	1.736
D Only	0.225	0.225
+D+L	0.820	0.820
+D+0.750L	0.671	0.671
+D+0.70E	4.259	1.440
+D+0.750L+0.5250E	3.697	1.583
+0.60D	0.135	0.135
+0.60D+0.70E	4.169	1.350
L Only	0.595	0.595
E Only	5.764	1.736

Wood Beam

Project File: Calcs.ec6

DESCRIPTION: B2-18 (SW#211)

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

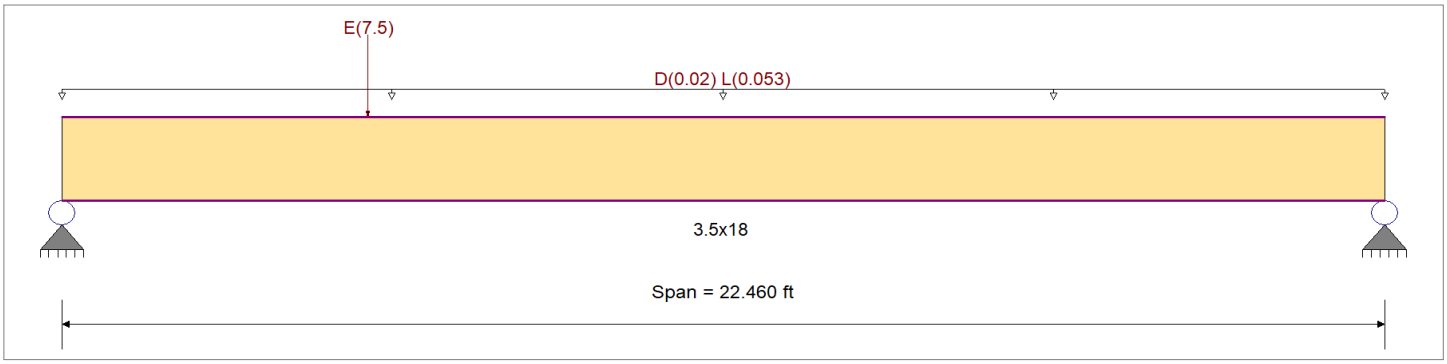
Wood Species : DF/DF
Wood Grade : 24F-V4

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

Fb +	2,880.0 psi
Fb -	2,220.0 psi
Fc - Prll	1,650.0 psi
Fc - Perp	650.0 psi
Fv	318.0 psi
Ft	1,100.0 psi

E : Modulus of Elasticity

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



Applied Loads

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

Beam self weight NOT internally calculated and added
Uniform Load : D = 0.020, L = 0.0530 , Tributary Width = 1.0 ft
Point Load : E = 7.50 k @ 5.20 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.368 : 1	Maximum Shear Stress Ratio	=	0.198 : 1
Section used for this span		3.5x18	Section used for this span		3.5x18
fb: Actual	=	1,294.06 psi	fv: Actual	=	100.70 psi
F'b	=	3,519.71 psi	F'v	=	508.80 psi
Load Combination		+0.60D-0.70E	Load Combination		+D+0.70E
Location of maximum on span	=	5.246 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.660 in	Ratio =	408	>=0	Span: 1 : E Only
Max Upward Transient Deflection	0 in	Ratio =	0	>=0	n/a
Max Downward Total Deflection	0.499 in	Ratio =	539	>=240	Span: 1 : +D+0.70E
Max Upward Total Deflection	0 in	Ratio =	0	<240	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 22.460 ft	1	0.031	0.016	0.90	1.00	1.00	1.00	0.991	1.00	1.00	1.00	1.26	80.1	2,568.4	0.20	4.6	286.2
+D+L					1.00	1.00	1.00	0.991	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 22.460 ft	1	0.102	0.053	1.00	1.00	1.00	1.00	0.991	1.00	1.00	1.00	4.60	292.3	2,853.8	0.71	17.0	318.0
+D+0.750L					1.00	1.00	1.00	0.991	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 22.460 ft	1	0.067	0.035	1.25	1.00	1.00	1.00	0.991	1.00	1.00	1.00	3.77	239.2	3,567.3	0.58	13.9	397.5
+D+0.70E					1.00	1.00	1.00	0.991	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 22.460 ft	1	0.303	0.198	1.60	1.00	1.00	1.00	0.991	1.00	1.00	1.00	21.83	1,385.8	4,566.1	4.23	100.7	508.8
+D-0.70E					1.00	1.00	1.00	0.991	1.00	1.00	1.00			0.0	0.00	0.0	0.0

Wood Beam

Project File: Calcs.ec6

DESCRIPTION: B2-18 (SW#211)

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_V	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 22.460 ft	**1**	0.361	0.183	1.60	1.00	1.00	1.00	0.991	1.00	1.00	1.00	20.02	1,271.1	3,519.7	3.91	93.2	508.8
+D+0.750L+0.5250E					1.00	1.00	1.00	0.991	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 22.460 ft	**1**	0.256	0.169	1.60	1.00	1.00	1.00	0.991	1.00	1.00	1.00	18.39	1,167.6	4,566.1	3.61	85.9	508.8
+D+0.750L-0.5250E					1.00	1.00	1.00	0.991	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 22.460 ft	**1**	0.234	0.125	1.60	1.00	1.00	1.00	0.991	1.00	1.00	1.00	12.99	825.1	3,519.7	2.66	63.4	508.8
+0.60D					1.00	1.00	1.00	0.991	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 22.460 ft	**1**	0.011	0.005	1.60	1.00	1.00	1.00	0.991	1.00	1.00	1.00	0.76	48.0	4,566.1	0.12	2.8	508.8
+0.60D+0.70E					1.00	1.00	1.00	0.991	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 22.460 ft	**1**	0.298	0.194	1.60	1.00	1.00	1.00	0.991	1.00	1.00	1.00	21.47	1,362.9	4,566.1	4.15	98.8	508.8
+0.60D-0.70E					1.00	1.00	1.00	0.991	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 22.460 ft	**1**	0.368	0.185	1.60	1.00	1.00	1.00	0.991	1.00	1.00	1.00	20.38	1,294.1	3,519.7	3.96	94.3	508.8

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Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
E Only	1	0.6604	9.918		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

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+0.60D	0.135	0.135
+0.60D+0.70E	4.169	1.350
L Only	0.595	0.595
E Only	5.764	1.736

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Seismic Shear Wall Calculations

McCullough Architects

7414 78th Ave SE - Lot 4

Mercer Island, WA

Parameters:

Single Family Home

Design Wind Speed: 100 MPH

Wind Exposure Category: B

Seismic Design Category: D

Code & Design Standard: 2021 IBC Ch. 1609, ASCE 7-16 Ch. 26-30

MULHERN & KULP STRUCTURAL ENGINEERING, INC.

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

Adam J. Cervantes, E.I.T. - Staff Engineer II

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Project Name: 7414 78th Ave SE
McCullough
M&K Project #: 244-25022
Engineer: AJC
Date: 26-Oct-25

SEISMIC CALCULATION - ASCE 7-16

Seismic Design Category:

User Inputs:

Site Class	D
Spectral Response Acceleration 0.2 sec, **Ss**	1.471
Spectral Response Acceleration 1.0 sec, **S1**	0.508
Occupancy Category	II

Variables:

Site coefficient, Fa	1.20
Site coefficient, Fv	1.79

Calculated Values:

Maximum spectral response acceleration, S_{ms}	1.765
Maximum spectral response acceleration, S_{m1}	0.910
Design spectral response acceleration, S_{ds}	1.177
Design spectral response acceleration, S_{d1}	0.607
Seismic Design Category (short term)	D
Seismic Design Category (1.0 second term)	D

Building period Determination:

User Inputs:

Building period coefficient, C_t	0.020
Long-Period Trans Period, T_L (sec)	6
Ht. abv base to highest level, h_n	22

Calculated Values:

Approximate Fundamental Period, T_a	0.201
T_0	0.103
T_s	0.516
Spectral Response Acc., S_a (g)	1.177

Site Class Assumption

Yes — Per ASCE 7-16 Section 11.4.3 the Site Class may be assumed to be D

Equivalent lateral force procedure

Dead Load Calculation:

Level	Story Ht. (ft.)	Area (ft^2)	Dead Load (psf)	DL of ext wall trib. to level (kips)	Total level DL
1	12.6	3350	15	12.6	63 k
2	9.1	2825	17	6.1	54 k
3	0.0	0	0	0.0	0 k
4	0.0	0	0	0.0	0 k
5	0.0	0	0	0.0	0 k
6	0.0	0	0	0.0	0 k
7	0.0	0	0	0.0	0 k
8	0.0	0	0	0.0	0 k
9	0.0	0	0	0.0	0 k
10	0.0	0	0	0.0	0 k
11	0.0	0	0	0.0	0 k
12	0.0	0	0	0.0	0 k
13	0.0	0	0	0.0	0 k
14	0.0	0	0	0.0	0 k
15	0.0	0	0	0.0	0 k
16	0.0	0	0	0.0	0 k
17	0.0	0	0	0.0	0 k
18	0.0	0	0	0.0	0 k
19	0.0	0	0	0.0	0 k
20	0.0	0	0	0.0	0 k

Total Dead Load Of Structure 117 Kips

Seismic Response Coefficient:

	Transverse	Longitudinal
Response modification factor, **R**	6.5	6.5
Occupancy Importance Factor, I_E	1.00	1.00
Seismic Response Coefficient, C_s	0.181	0.181

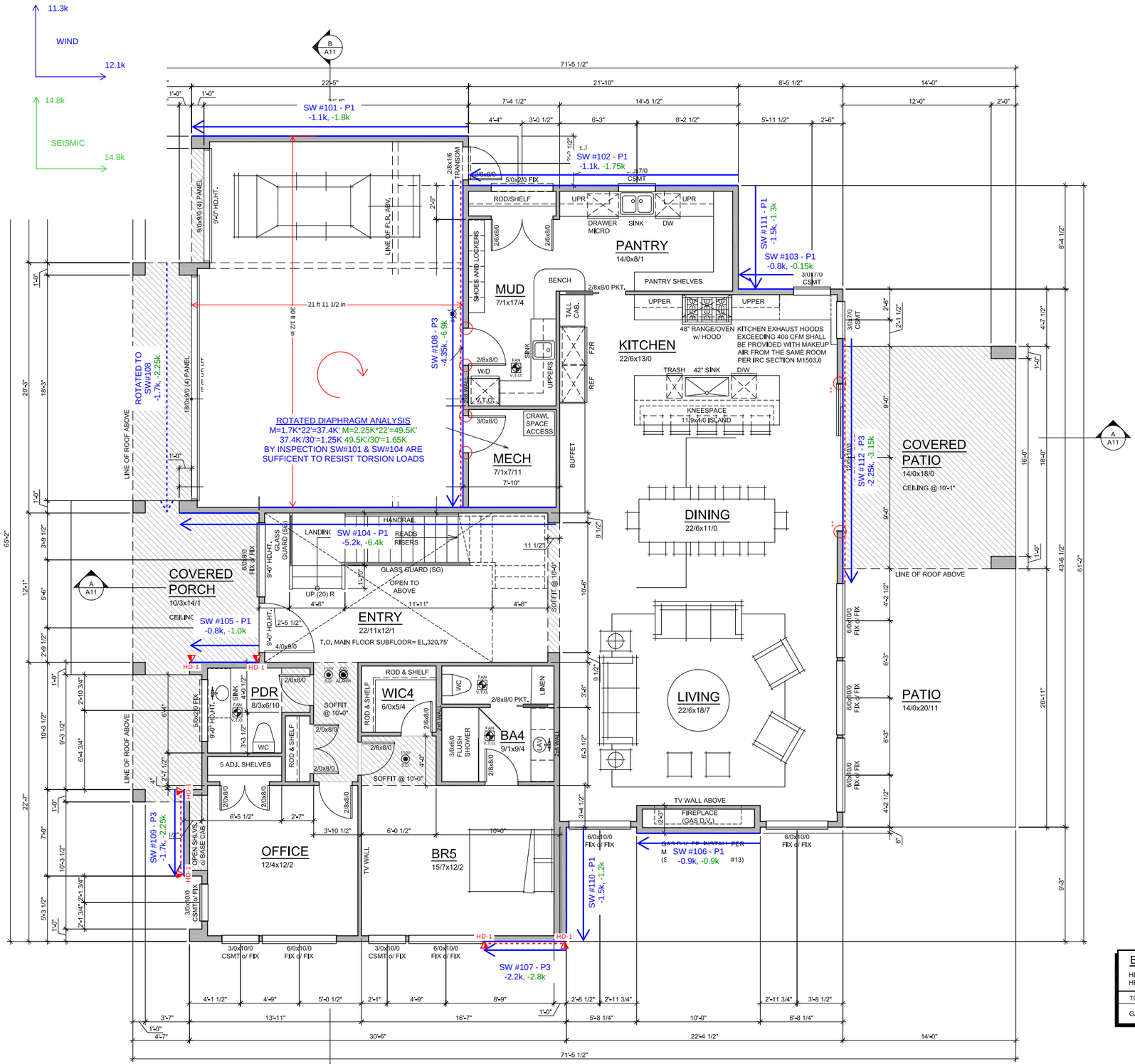
Base Shears:

Ultimate Loads				x 0.7 =	Allowable Loads			
Transverse		Longitudinal			Transverse		Longitudinal	
21	k	21	k		14.8	k	14.8	k

Story Shear Calculation:

Distribution exponent, 1.00

Level	Vert. Dist. Factor, C_{vx}	Ultimate Loads: Transverse *Story Shear, F_x*	Ultimate Loads: Longitudinal *Story Shear, F_x*	x 0.7 = Allowable Loads: Transverse *Story Shear, F_x*	Transverse *Σ Story Shear*	Longitudinal *Story Shear, F_x*	Longitudinal *Σ Story Shear*
1	0.402	8.5 k	8.5 k	6.0 k	14.8 k	6.0 k	14.8 k
2	0.598	12.7 k	12.7 k	8.9 k	8.9 k	8.9 k	8.9 k
3	0.000	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
4	0.000	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
5	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
6	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
7	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
8	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
9	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
10	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
11	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
12	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
13	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
14	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
15	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
16	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
17	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
18	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
19	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k
20	0.00	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k	0.0 k



MAIN FLOOR PLAN

SCALE: 1/4" = 1'-0"

GENERAL NOTES:

1. PLATE HEIGHT @ MAIN FLOOR IS 11'-0", U.N.O.
2. DIMENSION LINES ARE TO FACE OF STUD U.N.O.
3. WINDOW SIZES & ROUGH OPENINGS TO BE VERIFIED BY CONTRACTOR.
4. WINDOW HEAD HEIGHT AT MAIN FLOOR IS 10'-0" ABOVE SUBFLOOR, U.N.O. IF NOMINAL DOOR AND WINDOW HEIGHTS ARE SIMILAR, COORDINATE WITH DOOR AND WINDOW SPEC'S TO LOCATE FINAL ELEVATION OF THE HEAD HEIGHTS SO THAT ALL DOOR AND WINDOW TRIM ALIGN.
5. WINDOW AND DOOR SIZES ARE DIMENSIONED IN FEET AND INCHES (E.G, 2/8x2/8= 2'-8"W x 2'-8"H)
6. EXTERIOR WALLS TO BE 2x6 STUDS AT 16" o.c., INTERIOR WALLS TO BE 2x4 STUDS AT 16" o.c., U.N.O.
7. FIREBLOCK ALL PLUMBING PENETRATIONS AND STAIR RUNS PER I.R.C. SEC. R302.11.
8. SAFETY GLAZING PER I.R.C. SEC. R308.4.
9. ALL WOOD IN CONTACT WITH CONCRETE TO BE PRESSURE TREATED PER I.R.C. SEC. R317.1.
10. PER I.R.C. SEC R311.7.5. MAX. RISER HEIGHT SHALL BE 7-3/4". MIN. TREAD DEPTH SHALL BE 10". STAIR NOSINGS: 3/4" MIN., 1-1/4" MAX. RADIUS @ LEADING EDGE OF TREAD: 9/16" MAX.
11. PROVIDE HANDRAILS PER I.R.C. SEC. R311.7.8. TOP OF HANDRAIL SHALL BE NOT LASS THAN 34" OR MORE THAN 38" ABOVE THE TREAD NOSINGS. HANDRAILS SHALL BE CONTINUOUS THE FULL LENGTH OF THE FLIGHT PER R311.7.8.2. THE HANDRAIL GRIP-SIZE SHALL BE PROVIDED PER R311.7.8.3.
12. PROVIDE GUARDS (MIN. 36" HEIGHT) IN LOCATIONS PER I.R.C. SEC. R312.
13. FACTORY BUILT FIREPLACES & CHIMNEYS SHALL BE LISTED & LABELED AND SHALL BE INSTALLED & TERMINATED IN ACCORDANCE TO THE CONDITIONS OF THE LISTINGS. PROVIDE EXTERIOR AIR SUPPLY TO ANY FACTORY-BUILT FIREPLACE PER I.R.C. SEC R1006.
14. PROVIDE (1) LAYER OF 1/2" G.W.B. AT THE GARAGE SIDE OF ALL WALLS SEPARATING THE GARAGE FROM THE RESIDENCE, ALL WALLS SUPPORTING A FLOOR CEILING ASSEMBLY BETWEEN THE GARAGE AND RESIDENCE, AND BETWEEN THE GARAGE AND ITS ATTIC. PROVIDE (1) LAYER 5/8" TYPE 'X' G.W.B. TO GARAGE CEILING IF BELOW HABITABLE ROOMS.
15. HEAT ALARMS SHALL BE INSTALLED IN NEW GARAGES THAT ARE ATTACHED TO OR LOCATED UNDER NEW AND EXISTING DWELLINGS. HEAT ALARMS SHALL BE CONNECTED TO AN ALARM OR A SMOKE ALARM THAT IS INSTALLED IN THE DWELLING PER 2018 WASHINGTON STATE ADMENDMENTS IRC R314.2.3

PLAN KEY:

110V SDC — INDICATES 110V SMOKE DET. PER I.R.C. 313.4 INTERCONNECTED W/ EMERGENCY BATTERY BACKUP	S.G. — INDICATES SAFETY GLAZING REQUIRED PER IRC SEC. R308.4
CO — INDICATES CARBON MONOXIDE ALARM PER I.R.C. R315.1	FIX — INDICATES FIXED FRAME WINDOW
FAN V.T.O. — INDICATES EXHAUST VENTILATION FAN PER COVER SHEET.	CSMT — INDICATES CASEMENT WINDOW
HA — INDICATES HEAT ALARM ALARM PER IRC R314.2.3	AWN — INDICATES AWNING WINDOW
	V.T.O. — INDICATES "VENT TO OUTSIDE"

BUILDING AREA SUMMARY

HEATED MAIN LEVEL:	2,285 SF
HEATED UPPER LEVEL:	2,505 SF
TOTAL HEATED FLOOR AREA:	4,790 SF
GARAGE AREA:	654 S.F.

GROSS FLOOR AREA

STAIR:	260 SF
MAIN LEVEL:	2,702 SF
UPPER LEVEL:	2,516 SF
TOTAL PROPOSED:	5,488 SF
TOTAL ALLOWED: 15,924 G.S.F. (0.40)=	6,370 SF

MCCULLOUGH ARCHITECTS
5601 - 6th Ave South, #317
Seattle, WA. 98108
206.443.1181
mccullougharchitects.com

Revisions	Comment
-	-
-	-

Date: 09-26-2025
Job No: 24-008
Project No:
Drawn:
Approved:

Owner

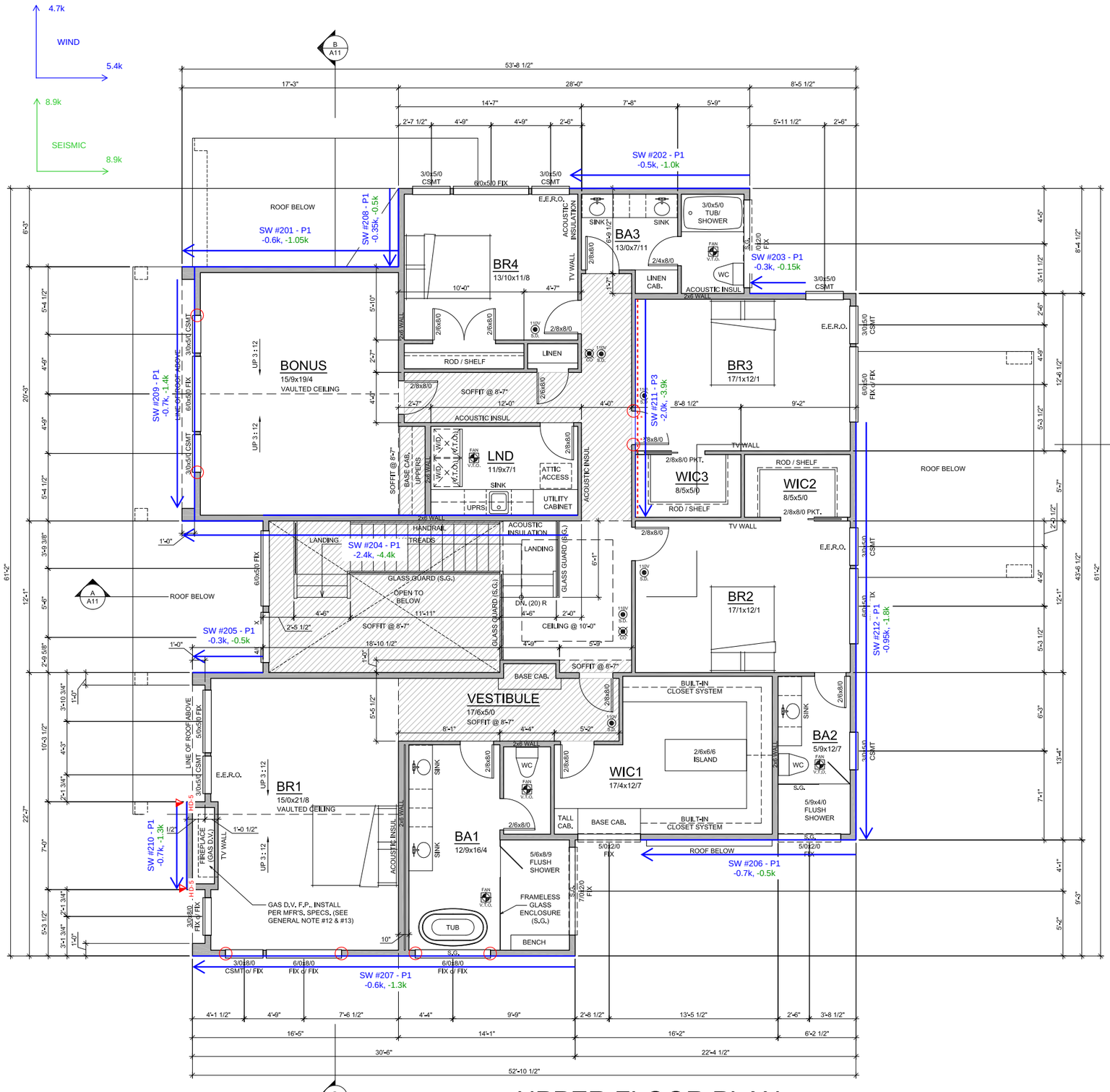
REGISTERED ARCHITECT PHILIP MCCULLOUGH STATE OF WASHINGTON 7806

SEARS PLAT - LOT 4
Mercer Island
Washington
98040

PRELIMINARY

Main Floor Plan

A5



GENERAL NOTES:

1. PLATE HEIGHT @ UPPER FLOOR IS 9'-1", U.N.O.
2. DIMENSION LINES ARE TO FACE OF STUD U.N.O.
3. WINDOW SIZES & ROUGH OPENINGS TO BE VERIFIED BY CONTRACTOR.
4. WINDOW HEAD HEIGHT AT UPPER FLOOR IS 8'-0" ABOVE SUBFLOOR, U.N.O. IF NOMINAL DOOR AND WINDOW HEIGHTS ARE SIMILAR, COORDINATE WITH DOOR AND WINDOW SPEC'S TO LOCATE FINAL ELEVATION OF THE HEAD HEIGHTS SO THAT ALL DOOR AND WINDOW TRIM ALIGN.
5. WINDOW AND DOOR SIZES ARE DIMENSIONED IN FEET AND INCHES (E.G. 2/8-2/8= 2'-8"W x 2'-8"H)
6. EXTERIOR WALLS TO BE 2x6 STUDS AT 16" o.c., INTERIOR WALLS TO BE 2x4 STUDS AT 16" o.c., U.N.O.
7. FIREBLOCK ALL PLUMBING PENETRATIONS AND STAIR RUNS PER I.R.C. SEC. R302.11.
8. PROVIDE SAFETY GLAZING AT HAZARDOUS LOCATIONS PER I.R.C. SEC. R308.4.
9. PER I.R.C. SEC R311.7.5, MAX. RISER HEIGHT SHALL BE 7-3/4". MIN. TREAD DEPTH SHALL BE 10". STAIR NOSINGS: 3/4" MIN., 1-1/4" MAX. RADIUS @ LEADING EDGE OF TREAD: 9/16" MAX.
10. PROVIDE HANDRAILS PER I.R.C. SEC. R311.7.8, TOP OF HANDRAIL SHALL BE NOT LASS THAN 34" OR MORE THAN 38" ABOVE THE TREAD NOSINGS. HANDRAILS SHALL BE CONTINUOUS THE FULL LENGTH OF THE FLIGHT PER R311.7.8.2. THE HANDRAIL GRIPSIZE SHALL BE PROVIDED PER R311.7.8.3.
11. PROVIDE GUARDS (MIN. 36" HEIGHT) IN LOCATIONS PER I.R.C. SEC. R312.
12. FACTORY BUILT FIREPLACES & CHIMNEYS SHALL BE LISTED & LABELED AND SHALL BE INSTALLED & TERMINATED IN ACCORDANCE TO THE CONDITIONS OF THE LISTINGS.
13. PROVIDE EXTERIOR AIR SUPPLY TO ANY FACTORY-BUILT FIREPLACE PER I.R.C. SEC R1006.

PLAN KEY:

110V S.D.	INDICATES 110V SMOKE DET. PER I.R.C. 313.4 INTERCONNECTED W/ EMERGENCY BATTERY BACKUP
CO	INDICATES CARBON MONOXIDE ALARM PER I.R.C. R315.1
FAN V.T.O.	INDICATES EXHAUST VENTILATION FAN PER COVER SHEET.
S.G.	INDICATES SAFETY GLAZING REQUIRED PER IRC SEC. R308.4
FIX	INDICATES FIXED FRAME WINDOW
CSMT	INDICATES CASEMENT WINDOW
AWN	INDICATES AWNING WINDOW
V.T.O.	INDICATES "VENT TO OUTSIDE"

MCCULLOUGH ARCHITECTS
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Seattle, WA. 98108
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Revisions - -

Comment - -

Date: 09-26-2025
Job No: 24-008
Project No:
Drawn:
Approved:

Owner ---

REGISTERED ARCHITECT PAUL A. MCCULLOUGH STATE OF WASHINGTON 7806

SEARS PLAT - LOT 4
Mercer Island
Washington
98040

PRELIMINARY

Upper Floor Plan

A7

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 201: 2nd - Side Ext. Wall @ Bonus

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	17.3	ft.	Qualifying Wall Length, L	17.3	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1100 lbs	<	4138 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	270	plf	Overturning Moment	10.0	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	721	lbs	Resistive Moment	34.3	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 202: 2nd - Side Ext. Wall @ BA3

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	14.4	ft.	Qualifying Wall Length, L	14.4	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1000 lbs	<	3447 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	134	plf	Overturning Moment	9.1	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	201	lbs	Resistive Moment	10.9	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 203: 2nd - Side Ext. Wall @ BR3

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	4.5	ft.	Qualifying Wall Length, L	4.5	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
100 lbs	<	1065 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	134	plf	Overturning Moment	0.9	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	201	lbs	Resistive Moment	1.5	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 204: 2nd - Side Ext./Int. Wall @ Bonus/LND

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	30.8	ft.	Qualifying Wall Length, L	30.8	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
4400 lbs	<	7385 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	270	plf	Overturning Moment	40.0	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	721	lbs	Resistive Moment	98.0	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 205: 2nd - Side Ext. Wall @ BR1

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	5.6	ft.	Qualifying Wall Length, L	5.6	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
500 lbs	<	1348 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	290	plf	Overturning Moment	4.5	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	523	lbs	Resistive Moment	4.9	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 206: 2nd - Side Ext. Wall @ WIC1/BA2

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, Hc	2.0	ft.		
Wall Length, L	17.2	ft.	Qualifying Wall Length, L	12.2	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
500 lbs	<	2919 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	134	plf	Overturning Moment	4.5	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	335	lbs	Resistive Moment	16.6	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 207: 2nd - Side Ext. Wall @ BR1/BA1

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, H_c	8.0	ft.		
Wall Length, L	30.5	ft.	Qualifying Wall Length, L	15.3	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1300 lbs	<	3576 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	235	plf	Overturning Moment	11.8	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	422	lbs	Resistive Moment	79.8	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 208: 2nd - Front Ext. Wall @ BR4

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	6.3	ft.	Qualifying Wall Length, L	6.3	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
500 lbs	<	1499 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	324	plf	Overturning Moment	4.5	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	352	lbs	Resistive Moment	5.6	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 209: 2nd - Front Ext. Wall @ Bonus

Shearwall Properties:

Wall height, H	10.3	ft.	Max wall opening ht, H_c	5.0	ft.		
Wall Length, L	20.3	ft.	Qualifying Wall Length, L	7.8	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1400 lbs	<	1859 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	134	plf	Overturning Moment	14.4	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	1080	lbs	Resistive Moment	32.2	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 210: 2nd - Front Ext. Wall @ BR1 Fireplace

Shearwall Properties:

Wall height, H	8.5	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	7.0	ft.	Qualifying Wall Length, L	7.0	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1300 lbs	<	1679 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	110	plf	Overturning Moment	11.1	k-ft	Hold Down Design Load	1109	lbs
DL at ends of wall	335	lbs	Resistive Moment	3.3	k-ft	Holdown Capacity	1705	lbs

Hold-down Specification

SIMPSON CS16 STRAP TIE (14" END LENGTH)

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 211: 2nd - Front Int. Wall @ BR3

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, H_c	8.0	ft.		
Wall Length, L	17.4	ft.	Qualifying Wall Length, L	14.7	ft.	Shearwall Assembly	P3

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
3900 lbs	<	6622 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	410	plf	Overturning Moment	35.4	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	320	lbs	Resistive Moment	44.1	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 212: 2nd - Rear Ext. Wall @ BR3/BR2/BA2

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, Hc	5.0	ft.		
Wall Length, L	33.3	ft.	Qualifying Wall Length, L	21.0	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1800 lbs	<	5047 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	405	plf	Overturning Moment	16.3	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	497	lbs	Resistive Moment	157.3	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 101: 1st - Side Ext. Wall @ Garage

Shearwall Properties:

Wall height, H	11.3	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	22.4	ft.	Qualifying Wall Length, L	22.4	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1800 lbs	<	5378 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	134	plf	Overturning Moment	20.4	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	700	lbs	Resistive Moment	32.2	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 102: 1st - Side Ext. Wall @ Mud/Pantry

Shearwall Properties:

Wall height, H	11.0	ft.	Max wall opening ht, Hc	7.0	ft.		
Wall Length, L	21.8	ft.	Qualifying Wall Length, L	13.8	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1750 lbs	<	3317 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	200	plf	Overturning Moment	33.0	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	1200	lbs	Resistive Moment	48.2	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 103: 1st - Side Ext. Wall @ Kitchen

Shearwall Properties:

Wall height, H	11.0	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	4.5	ft.	Qualifying Wall Length, L	4.5	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
150 lbs	<	1007 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	249	plf	Overturning Moment	2.6	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	375	lbs	Resistive Moment	2.7	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 104: 1st - Side Ext./Int. Wall @ Garage/Entry

Shearwall Properties:

Wall height, H	11.0	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	29.8	ft.	Qualifying Wall Length, L	29.8	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
6400 lbs	<	7155 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	300	plf	Overturning Moment	109.1	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	1200	lbs	Resistive Moment	110.5	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 105: 1st - Side Ext. Wall @ PDR

Shearwall Properties:

Wall height, H	11.0	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	5.6	ft.	Qualifying Wall Length, L	5.6	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1000 lbs	<	1350 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	380	plf	Overturning Moment	15.5	k-ft	Hold Down Design Load	1332	lbs
DL at ends of wall	1120	lbs	Resistive Moment	8.0	k-ft	Holdown Capacity	3695	lbs

Hold-down Specification

SIMPSON STHD14RJ HOLDOWN

Shearwall 106: 1st - Side Ext. Wall @ Living Fireplace

Shearwall Properties:

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

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
900 lbs	<	2399 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	120	plf	Overturning Moment	9.0	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	800	lbs	Resistive Moment	9.1	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 107: 1st - Side Ext. Wall @ BR5

Shearwall Properties:

Wall height, H	11.0	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	6.8	ft.	Qualifying Wall Length, L	6.8	ft.	Shearwall Assembly	P3

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
2800 lbs	<	3038 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	390	plf	Overturning Moment	33.4	k-ft	Hold Down Design Load	3568	lbs
DL at ends of wall	800	lbs	Resistive Moment	9.3	k-ft	Holdown Capacity	3695	lbs

Hold-down Specification

SIMPSON STHD14RJ HOLDOWN

Shearwall 108: 1st - Rear Int. Wall @ Garage

Shearwall Properties:

Wall height, H	11.0	ft.	Max wall opening ht, Hc	8.0	ft.		
Wall Length, L	26.5	ft.	Qualifying Wall Length, L	20.5	ft.	Shearwall Assembly	P3

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
6900 lbs	<	9228 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	320	plf	Overturning Moment	75.9	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	400	lbs	Resistive Moment	80.3	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 109: 1st - Front Ext. Wall @ Office

Shearwall Properties:

Wall height, H	11.0	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	7.0	ft.	Qualifying Wall Length, L	7.0	ft.	Shearwall Assembly	P3

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
2250 lbs	<	3151 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	540	plf	Overturning Moment	29.7	k-ft	Hold Down Design Load	2697	lbs
DL at ends of wall	484	lbs	Resistive Moment	10.8	k-ft	Holdown Capacity	3695	lbs

Hold-down Specification

SIMPSON STHD14RJ HOLDOWN

Shearwall 110: 1st - Rear Ext. Wall @ BR5

Shearwall Properties:

Wall height, H	11.0	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	9.3	ft.	Qualifying Wall Length, L	9.3	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1200 lbs	<	2219 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	249	plf	Overturning Moment	13.2	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	1200	lbs	Resistive Moment	14.2	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 111: 1st - Rear Ext. Wall @ Pantry

Shearwall Properties:

Wall height, H	11.0	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	8.4	ft.	Qualifying Wall Length, L	8.4	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1300 lbs	<	2010 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	360	plf	Overturning Moment	14.3	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	1200	lbs	Resistive Moment	14.8	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 112: Basement - Rear Ext. Wall @ Kitchen/Dining/Covered Patio

Shearwall Properties:

Wall height, H	11.0	ft.	Max wall opening ht, Hc	10.0	ft.		
Wall Length, L	19.8	ft.	Qualifying Wall Length, L	7.8	ft.	Shearwall Assembly	P3

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
3150 lbs	<	3189 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	640	plf	Overturning Moment	34.7	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	1200	lbs	Resistive Moment	97.7	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Wind Shear Wall Calculations

McCullough Architects

7414 78th Ave SE - Lot 4

Mercer Island, WA

Parameters:

Single Family Home

Design Wind Speed: 100 MPH

Wind Exposure Category: B

Seismic Design Category: D

Code & Design Standard: 2021 IBC Ch. 1609, ASCE 7-16 Ch. 26-30

MULHERN & KULP STRUCTURAL ENGINEERING, INC.

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

Adam J. Cervantes, E.I.T. - Staff Engineer II

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Project Name: 7414 78th Ave SE
M&K Project #: McCullough
Engineer: AJC
date: 26-Oct-25

Wind Design Summary per ASCE 7-16

Parameters:

Wind Speed	100
Exposure Category	B
Risk Category	II
Wind Directionality Factor, K_d	0.85
Topographic Factor, K_{zt}	1.00
Gust Factor, G	0.85
Ground Elev. Above Sea Level [ft]	0
Design Type	ASD

0.60

Roof Geometry:

Trans. Roof Pitch	4.8	:12
Long. Roof Pitch	7.0	:12
Mean Roof Height, H	26.31	ft

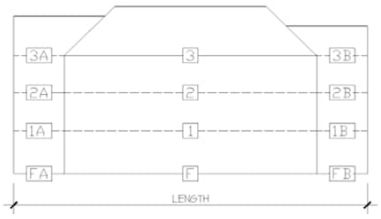
Building Geometry:

length	65	ft
Width	54	ft
Number of stories	2	

Transverse Direction (Perpendicular to Main Ridge Line)

Tributary Design Areas:

Diaphragm Level	Floor-to-Floor Height		Section A	Section O	Section B	
2	9.1 ft	Roof Surface	0	272	0	sq ft
		Wall surface	0	428	0	sq ft
1	12.56 ft	Roof Surface	0	100	0	sq ft
		Wall surface	0	647	0	sq ft
FND		Roof Surface	0	0	0	sq ft
		Wall surface	0	0	0	sq ft



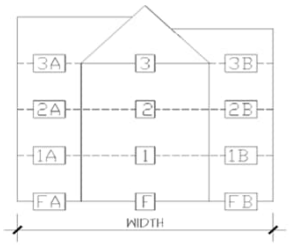
Tributary Design Loads: (0.6W)

	Section A	Section O	Section B	
2 Story Shear	0.00	5.43	0.00	kips
2 Total Shear	0.00	5.43	0.00	kips
		5.43		kips
1 Story Shear	0.00	6.69	0.00	kips
1 Total Shear	0.00	12.11	0.00	kips
		12.11		kips
FND Story Shear	0.00	0.00	0.00	kips
FND Total Shear	0.00	12.11	0.00	kips
		12.11		kips

Longitudinal Direction (Parallel to Main Ridge Line)

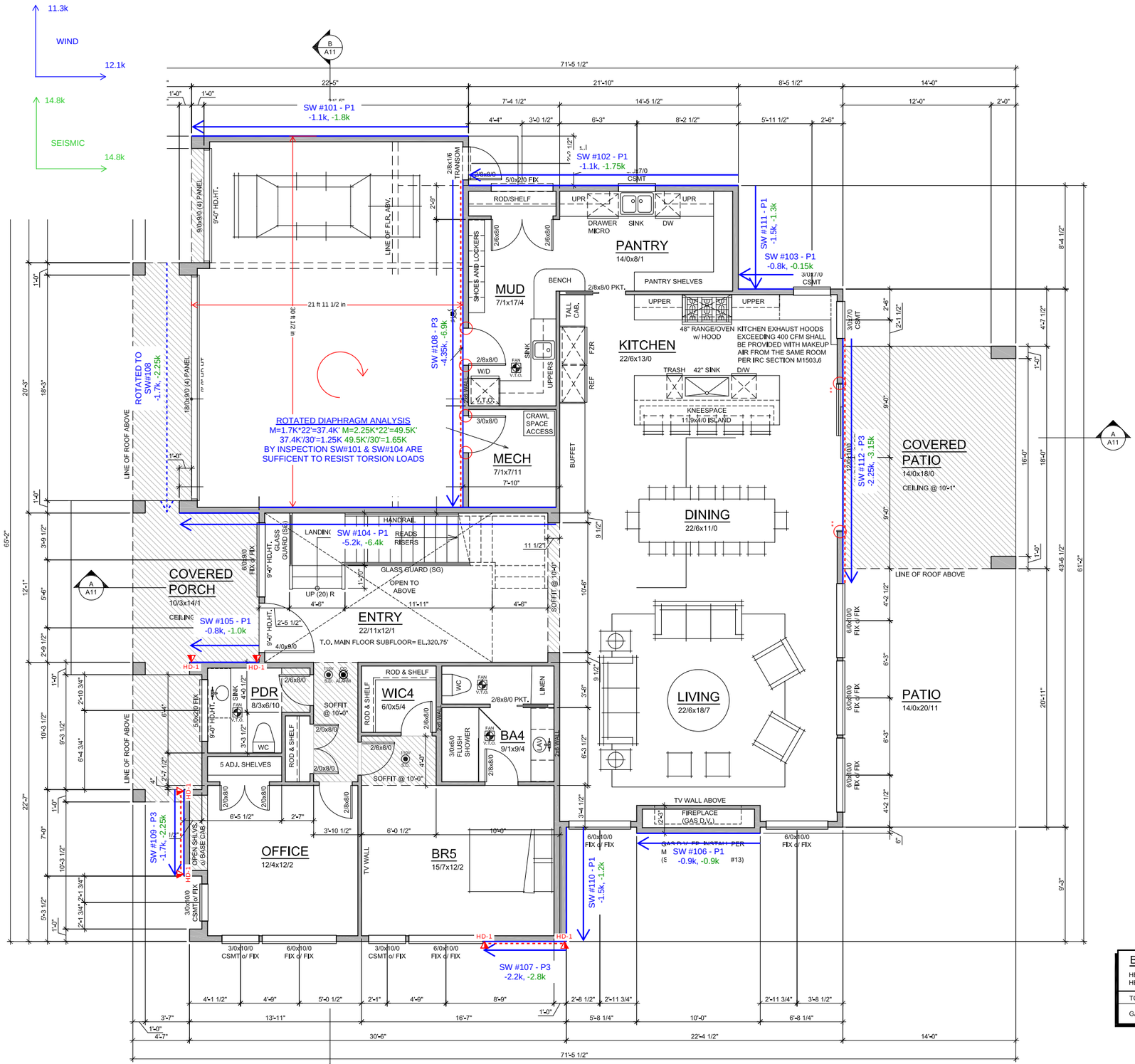
Tributary Design Areas:

Diaphragm Level	Floor-to-Floor Height		Section A	Section O	Section B	
2	9.1 ft	Roof Surface	0	171	0	sq ft
		Wall surface	0	394	0	sq ft
1	12.56 ft	Roof Surface	0	0	0	sq ft
		Wall surface	0	692	0	sq ft
FND		Roof Surface	0	0	0	sq ft
		Wall surface	0	0	0	sq ft



Tributary Design Loads: (0.6W)

	Section A	Section O	Section B	
2 Story Shear	0.00	4.66	0.00	kips
2 Total Shear	0.00	4.66	0.00	kips
		4.66		kips
1 Story Shear	0.00	6.64	0.00	kips
1 Total Shear	0.00	11.25	0.00	kips
		11.25		kips
FND Story Shear	0.00	0.00	0.00	kips
FND Total Shear	0.00	11.25	0.00	kips
		11.25		kips



MAIN FLOOR PLAN

SCALE: 1/4" = 1'-0"

GENERAL NOTES:

1. PLATE HEIGHT @ MAIN FLOOR IS 11'-0", U.N.O.
2. DIMENSION LINES ARE TO FACE OF STUD U.N.O.
3. WINDOW SIZES & ROUGH OPENINGS TO BE VERIFIED BY CONTRACTOR.
4. WINDOW HEAD HEIGHT AT MAIN FLOOR IS 10'-0" ABOVE SUBFLOOR, U.N.O. IF NOMINAL DOOR AND WINDOW HEIGHTS ARE SIMILAR, COORDINATE WITH DOOR AND WINDOW SPEC'S TO LOCATE FINAL ELEVATION OF THE HEAD HEIGHTS SO THAT ALL DOOR AND WINDOW TRIM ALIGN.
5. WINDOW AND DOOR SIZES ARE DIMENSIONED IN FEET AND INCHES (E.G, 2/8x2/8= 2'-8"W x 2'-8"H)
6. EXTERIOR WALLS TO BE 2x6 STUDS AT 16" o.c., INTERIOR WALLS TO BE 2x4 STUDS AT 16" o.c., U.N.O.
7. FIREBLOCK ALL PLUMBING PENETRATIONS AND STAIR RUNS PER I.R.C. SEC. R302.11.
8. SAFETY GLAZING PER I.R.C. SEC. R308.4.
9. ALL WOOD IN CONTACT WITH CONCRETE TO BE PRESSURE TREATED PER I.R.C. SEC. R317.1.
10. PER I.R.C. SEC R311.7.5. MAX. RISER HEIGHT SHALL BE 7-3/4". MIN. TREAD DEPTH SHALL BE 10". STAIR NOSINGS: 3/4" MIN., 1-1/4" MAX. RADIUS @ LEADING EDGE OF TREAD: 9/16" MAX.
11. PROVIDE HANDRAILS PER I.R.C. SEC. R311.7.8. TOP OF HANDRAIL SHALL BE NOT LASS THAN 34" OR MORE THAN 38" ABOVE THE TREAD NOSINGS. HANDRAILS SHALL BE CONTINUOUS THE FULL LENGTH OF THE FLIGHT PER R311.7.8.2. THE HANDRAIL GRIP-SIZE SHALL BE PROVIDED PER R311.7.8.3.
12. PROVIDE GUARDS (MIN. 36" HEIGHT) IN LOCATIONS PER I.R.C. SEC. R312.
13. FACTORY BUILT FIREPLACES & CHIMNEYS SHALL BE LISTED & LABELED AND SHALL BE INSTALLED & TERMINATED IN ACCORDANCE TO THE CONDITIONS OF THE LISTINGS. PROVIDE EXTERIOR AIR SUPPLY TO ANY FACTORY-BUILT FIREPLACE PER I.R.C. SEC R1006.
14. PROVIDE (1) LAYER OF 1/2" G.W.B. AT THE GARAGE SIDE OF ALL WALLS SEPARATING THE GARAGE FROM THE RESIDENCE, ALL WALLS SUPPORTING A FLOOR CEILING ASSEMBLY BETWEEN THE GARAGE AND RESIDENCE, AND BETWEEN THE GARAGE AND ITS ATTIC. PROVIDE (1) LAYER 5/8" TYPE 'X' G.W.B. TO GARAGE CEILING IF BELOW HABITABLE ROOMS.
15. HEAT ALARMS SHALL BE INSTALLED IN NEW GARAGES THAT ARE ATTACHED TO OR LOCATED UNDER NEW AND EXISTING DWELLINGS. HEAT ALARMS SHALL BE CONNECTED TO AN ALARM OR A SMOKE ALARM THAT IS INSTALLED IN THE DWELLING PER 2018 WASHINGTON STATE ADMENDMENTS IRC R314.2.3

PLAN KEY:

110V SDC — INDICATES 110V SMOKE DET. PER I.R.C. 313.4 INTERCONNECTED W/ EMERGENCY BATTERY BACKUP	S.G. — INDICATES SAFETY GLAZING REQUIRED PER IRC SEC. R308.4
CO — INDICATES CARBON MONOXIDE ALARM PER I.R.C. R315.1	FIX — INDICATES FIXED FRAME WINDOW
FAN V.T.O. — INDICATES EXHAUST VENTILATION FAN PER COVER SHEET.	CSMT — INDICATES CASEMENT WINDOW
HA — INDICATES HEAT ALARM ALARM PER IRC R314.2.3	AWN — INDICATES AWNING WINDOW
	V.T.O. — INDICATES "VENT TO OUTSIDE"

BUILDING AREA SUMMARY

HEATED MAIN LEVEL:	2,285 SF
HEATED UPPER LEVEL:	2,505 SF
TOTAL HEATED FLOOR AREA:	4,790 SF
GARAGE AREA:	654 S.F.

GROSS FLOOR AREA

STAIR:	260 SF
MAIN LEVEL:	2,702 SF
UPPER LEVEL:	2,516 SF
TOTAL PROPOSED:	5,488 SF
TOTAL ALLOWED: 15,924 G.S.F. (0.40)=	6,370 SF

MCCULLOUGH ARCHITECTS
5601 - 6th Ave South, #317
Seattle, WA. 98108
206.443.1181
mccullougharchitects.com

Revisions	Comment
-	-
-	-

Date: 09-26-2025
Job No: 24-008
Project No:
Drawn:
Approved:

Owner

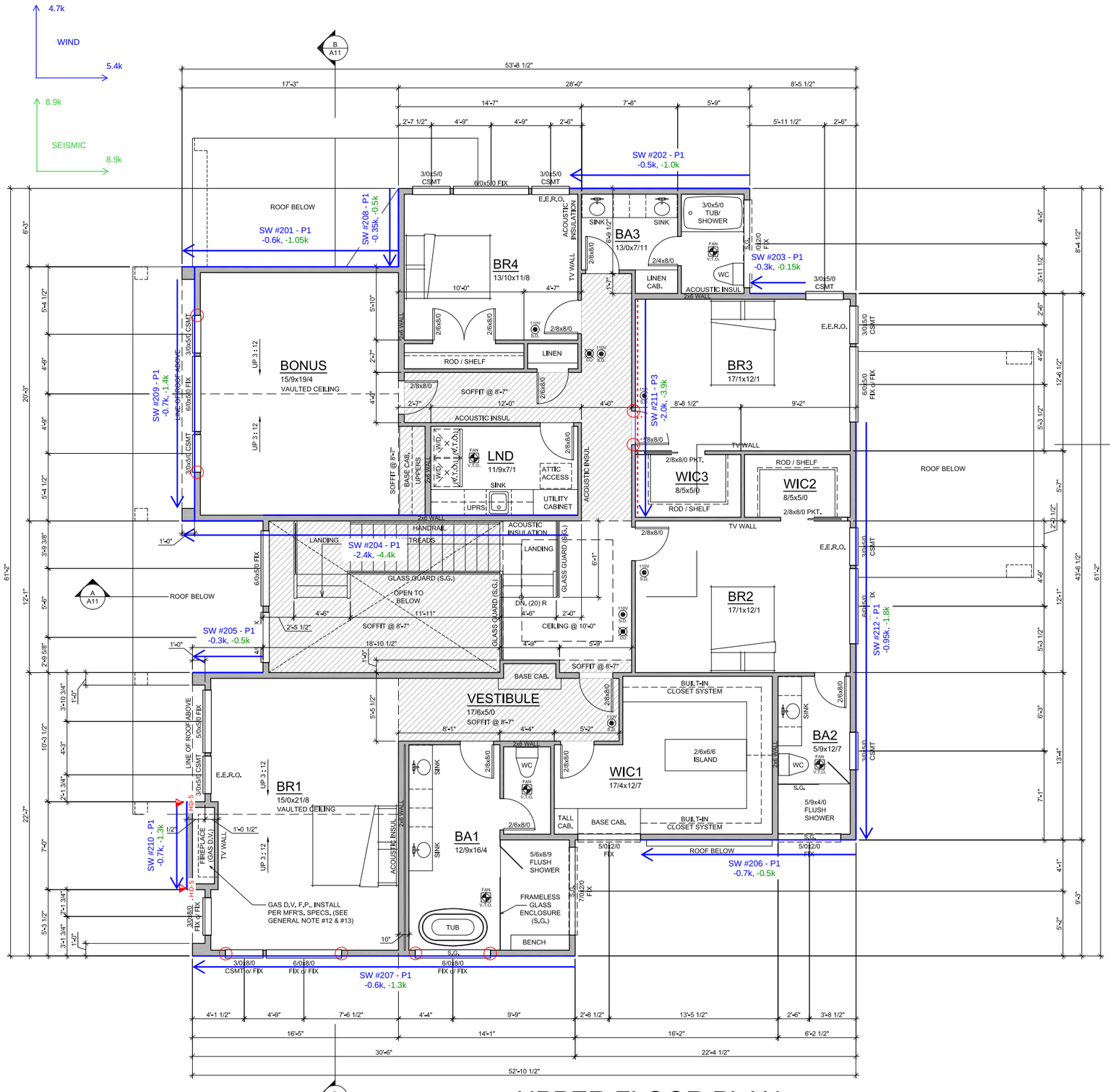
REGISTERED ARCHITECT PHILIP MCCULLOUGH STATE OF WASHINGTON 7806

SEARS PLAT - LOT 4
Mercer Island
Washington
98040

PRELIMINARY

Main Floor Plan

A5



GENERAL NOTES:

1. PLATE HEIGHT @ UPPER FLOOR IS 9'-1", U.N.O.
2. DIMENSION LINES ARE TO FACE OF STUD U.N.O.
3. WINDOW SIZES & ROUGH OPENINGS TO BE VERIFIED BY CONTRACTOR.
4. WINDOW HEAD HEIGHT AT UPPER FLOOR IS 8'-0" ABOVE SUBFLOOR, U.N.O. IF NOMINAL DOOR AND WINDOW HEIGHTS ARE SIMILAR, COORDINATE WITH DOOR AND WINDOW SPEC'S TO LOCATE FINAL ELEVATION OF THE HEAD HEIGHTS SO THAT ALL DOOR AND WINDOW TRIM ALIGN.
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7. FIREBLOCK ALL PLUMBING PENETRATIONS AND STAIR RUNS PER I.R.C. SEC. R302.11.
8. PROVIDE SAFETY GLAZING AT HAZARDOUS LOCATIONS PER I.R.C. SEC. R308.4.
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PLAN KEY:

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Revisions - -

Comment - -

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Owner ---

REGISTERED ARCHITECT PAUL A. MCCULLOUGH STATE OF WASHINGTON 7806

SEARS PLAT - LOT 4
Mercer Island
Washington
98040

PRELIMINARY

Upper Floor Plan

A7

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 201: 2nd - Side Ext. Wall @ Bonus

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	17.3	ft.	Qualifying Wall Length, L	17.3	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
700 lbs	<	5793 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	270	plf	Overturning Moment	6.4	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	721	lbs	Resistive Moment	47.3	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 202: 2nd - Side Ext. Wall @ BA3

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	14.4	ft.	Qualifying Wall Length, L	14.4	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
600 lbs	<	4825 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	134	plf	Overturning Moment	5.4	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	201	lbs	Resistive Moment	15.1	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 203: 2nd - Side Ext. Wall @ BR3

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	4.5	ft.	Qualifying Wall Length, L	4.5	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
100 lbs	<	1491 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	134	plf	Overturning Moment	0.9	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	201	lbs	Resistive Moment	2.0	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 204: 2nd - Side Ext./Int. Wall @ Bonus/LND

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	30.8	ft.	Qualifying Wall Length, L	30.8	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
2400 lbs	<	10339 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	270	plf	Overturning Moment	21.8	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	721	lbs	Resistive Moment	135.2	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 205: 2nd - Side Ext. Wall @ BR1

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	5.6	ft.	Qualifying Wall Length, L	5.6	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
300 lbs	<	1887 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	290	plf	Overturning Moment	2.7	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	523	lbs	Resistive Moment	6.8	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 206: 2nd - Side Ext. Wall @ WIC1/BA2

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, Hc	2.0	ft.		
Wall Length, L	17.2	ft.	Qualifying Wall Length, L	12.2	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
500 lbs	<	4087 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	134	plf	Overturning Moment	4.5	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	335	lbs	Resistive Moment	23.0	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 207: 2nd - Side Ext. Wall @ BR1/BA1

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, H_c	8.0	ft.		
Wall Length, L	30.5	ft.	Qualifying Wall Length, L	15.3	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
800 lbs	<	5006 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	235	plf	Overturning Moment	7.3	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	422	lbs	Resistive Moment	110.0	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 208: 2nd - Front Ext. Wall @ BR4

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	6.3	ft.	Qualifying Wall Length, L	6.3	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
350 lbs	<	2099 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	324	plf	Overturning Moment	3.2	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	352	lbs	Resistive Moment	7.7	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 209: 2nd - Front Ext. Wall @ Bonus

Shearwall Properties:

Wall height, H	10.3	ft.	Max wall opening ht, H_c	5.0	ft.		
Wall Length, L	20.3	ft.	Qualifying Wall Length, L	7.8	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
700 lbs	<	2602 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	134	plf	Overturning Moment	7.2	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	1080	lbs	Resistive Moment	44.4	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 210: 2nd - Front Ext. Wall @ BR1 Fireplace

Shearwall Properties:

Wall height, H	8.5	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	7.0	ft.	Qualifying Wall Length, L	7.0	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
700 lbs	<	2351 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	110	plf	Overturning Moment	6.0	k-ft	Hold Down Design Load	202	lbs
DL at ends of wall	335	lbs	Resistive Moment	4.5	k-ft	Holdown Capacity	1705	lbs

Hold-down Specification

SIMPSON CS16 STRAP TIE (14" END LENGTH)

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 211: 2nd - Front Int. Wall @ BR3

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, H_c	8.0	ft.		
Wall Length, L	17.4	ft.	Qualifying Wall Length, L	14.7	ft.	Shearwall Assembly	P3

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
2000 lbs	<	9270 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	410	plf	Overturning Moment	18.2	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	320	lbs	Resistive Moment	60.7	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 212: 2nd - Rear Ext. Wall @ BR3/BR2/BA2

Shearwall Properties:

Wall height, H	9.1	ft.	Max wall opening ht, Hc	5.0	ft.		
Wall Length, L	33.3	ft.	Qualifying Wall Length, L	21.0	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
950 lbs	<	7065 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	405	plf	Overturning Moment	8.6	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	497	lbs	Resistive Moment	216.9	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 101: 1st - Side Ext. Wall @ Garage

Shearwall Properties:

Wall height, H	11.3	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	22.4	ft.	Qualifying Wall Length, L	22.4	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1500 lbs	<	7529 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	134	plf	Overturning Moment	17.0	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	700	lbs	Resistive Moment	44.4	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 102: 1st - Side Ext. Wall @ Mud/Pantry

Shearwall Properties:

Wall height, H	11.0	ft.	Max wall opening ht, Hc	7.0	ft.		
Wall Length, L	21.8	ft.	Qualifying Wall Length, L	13.8	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1300 lbs	<	4644 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	200	plf	Overturning Moment	22.6	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	1200	lbs	Resistive Moment	66.5	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 103: 1st - Side Ext. Wall @ Kitchen

Shearwall Properties:

Wall height, H	11.0	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	4.5	ft.	Qualifying Wall Length, L	4.5	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
200 lbs	<	1410 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	249	plf	Overturning Moment	3.1	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	375	lbs	Resistive Moment	3.7	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 104: 1st - Side Ext./Int. Wall @ Garage/Entry

Shearwall Properties:

Wall height, H	11.0	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	29.8	ft.	Qualifying Wall Length, L	29.8	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
5200 lbs	<	10017 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	300	plf	Overturning Moment	78.3	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	1200	lbs	Resistive Moment	152.3	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 105: 1st - Side Ext. Wall @ PDR

Shearwall Properties:

Wall height, H	11.0	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	5.6	ft.	Qualifying Wall Length, L	5.6	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
800 lbs	<	1891 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	380	plf	Overturning Moment	11.5	k-ft	Hold Down Design Load	77	lbs
DL at ends of wall	1120	lbs	Resistive Moment	11.1	k-ft	Holdown Capacity	4935	lbs

Hold-down Specification

SIMPSON STHD14RJ HOLDOWN

Shearwall 106: 1st - Side Ext. Wall @ Living Fireplace

Shearwall Properties:

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

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
900 lbs	<	3358 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	120	plf	Overturning Moment	9.0	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	800	lbs	Resistive Moment	12.6	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 107: 1st - Side Ext. Wall @ BR5

Shearwall Properties:

Wall height, H	11.0	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	6.8	ft.	Qualifying Wall Length, L	6.8	ft.	Shearwall Assembly	P3

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
2200 lbs	<	4254 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	390	plf	Overturning Moment	25.8	k-ft	Hold Down Design Load	1919	lbs
DL at ends of wall	800	lbs	Resistive Moment	12.9	k-ft	Holdown Capacity	4935	lbs

Hold-down Specification

SIMPSON STHD14RJ HOLDOWN

Shearwall 108: 1st - Rear Int. Wall @ Garage

Shearwall Properties:

Wall height, H	11.0	ft.	Max wall opening ht, Hc	8.0	ft.		
Wall Length, L	26.5	ft.	Qualifying Wall Length, L	20.5	ft.	Shearwall Assembly	P3

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
4350 lbs	<	12919 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	320	plf	Overturning Moment	47.9	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	400	lbs	Resistive Moment	110.7	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 109: 1st - Front Ext. Wall @ Office

Shearwall Properties:

Wall height, H	11.0	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	7.0	ft.	Qualifying Wall Length, L	7.0	ft.	Shearwall Assembly	P3

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1700 lbs	<	4411 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	540	plf	Overturning Moment	21.2	k-ft	Hold Down Design Load	891	lbs
DL at ends of wall	484	lbs	Resistive Moment	15.0	k-ft	Holdown Capacity	4935	lbs

Hold-down Specification

SIMPSON STHD14RJ HOLDOWN

Shearwall 110: 1st - Rear Ext. Wall @ BR5

Shearwall Properties:

Wall height, H	11.0	ft.	Max wall opening ht, Hc	0.0	ft.		
Wall Length, L	9.3	ft.	Qualifying Wall Length, L	9.3	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1500 lbs	<	3106 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	249	plf	Overturning Moment	16.5	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	1200	lbs	Resistive Moment	19.6	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 244-25022
Engineer: AJC

Shearwall 111: 1st - Rear Ext. Wall @ Pantry

Shearwall Properties:

Wall height, H	11.0	ft.	Max wall opening ht, H_c	0.0	ft.		
Wall Length, L	8.4	ft.	Qualifying Wall Length, L	8.4	ft.	Shearwall Assembly	P1

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
1500 lbs	<	2814 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	360	plf	Overturning Moment	16.5	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	1200	lbs	Resistive Moment	20.4	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 112: Basement - Rear Ext. Wall @ Kitchen/Dining/Covered Patio

Shearwall Properties:

Wall height, H	11.0	ft.	Max wall opening ht, Hc	10.0	ft.		
Wall Length, L	19.8	ft.	Qualifying Wall Length, L	7.8	ft.	Shearwall Assembly	P3

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
2250 lbs	<	4464 lbs

Shearwall Assembly Specification

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

Overturning Evaluation:

Resistive DL	640	plf	Overturning Moment	24.8	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	1200	lbs	Resistive Moment	134.7	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required