CHRIS OLIVEIRA AND ASSOC.

2201 Francisco Dr
Suite 140-119
El Dorado Hills, CA 95762
(916) 835-6073
(916) 933-4731 fax
chris0602@sbcglobal.net

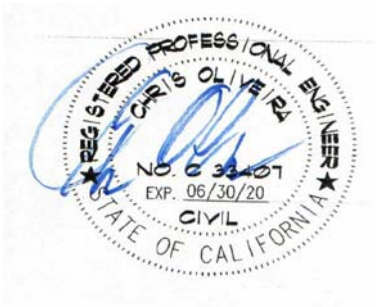
rce 33407- CA.
22119- AZ.
007595-NV.
2202-UT.
35908- WA

STRUCTURAL CALCULATIONS

STUESSER RESIDENCE

5374 FILBERT ST - PARADISE

PC 1



FEB. 26, 2020

2015 IBC 2016 CBC
ASCE 7 - 10
WIND EXPOSURE C
110 MPH
SDC - D
SITE CLASS D

CHRIS
OLIVEIRA
AND
ASSOCIATES

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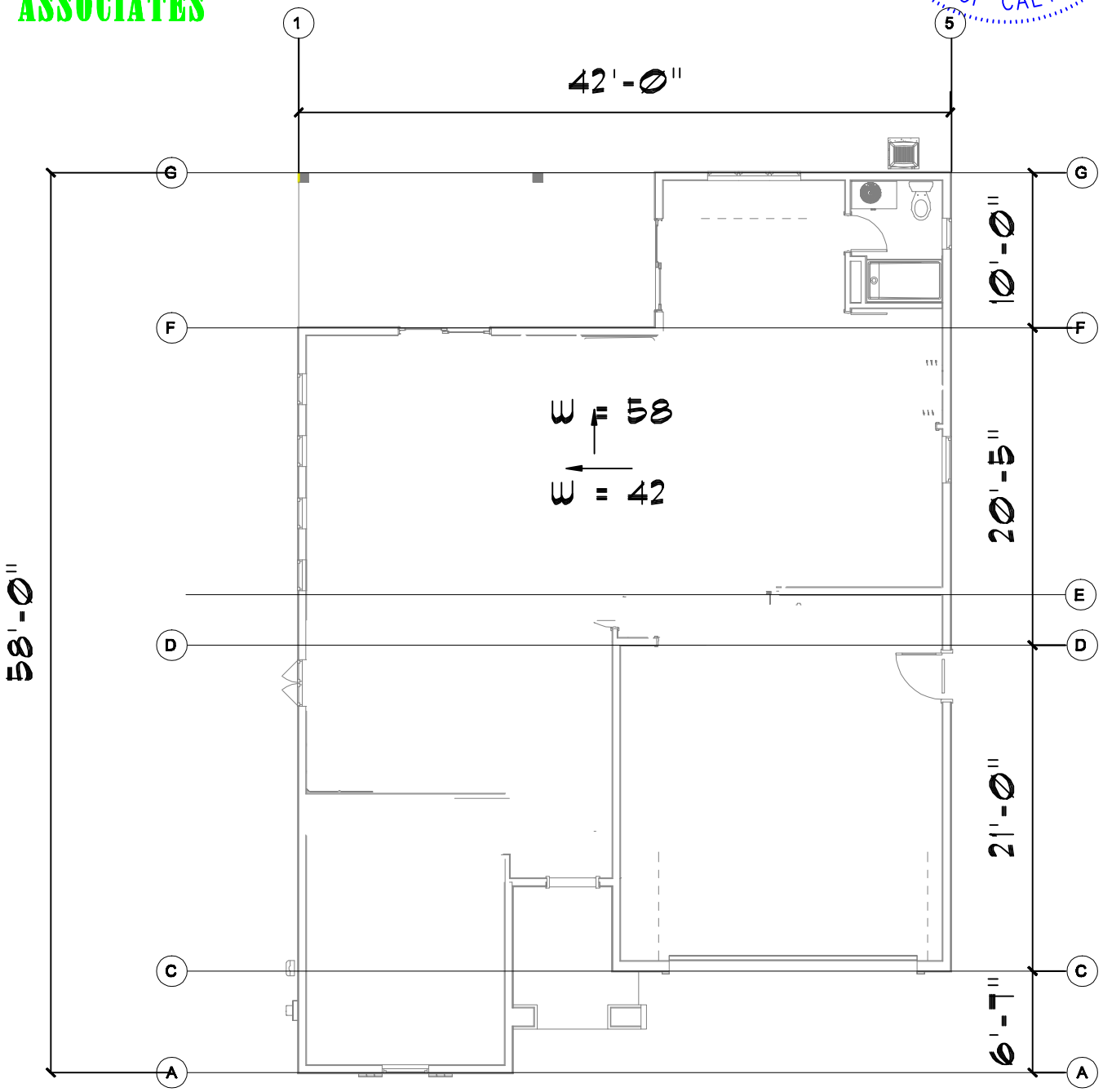
SUITE 140-119
EL DORADO HILLS, CA 95762
Ph (916) 835-6073
Fax (916) 933-4731

REGISTERED PROFESSIONAL ENGINEER
CHRIS OLIVEIRA
NO. C 33407
EXP. 06/30/20
CIVIL
STATE OF CALIFORNIA



LAYOUT

PAGE 1

No Scale	8/6/19	C.O.

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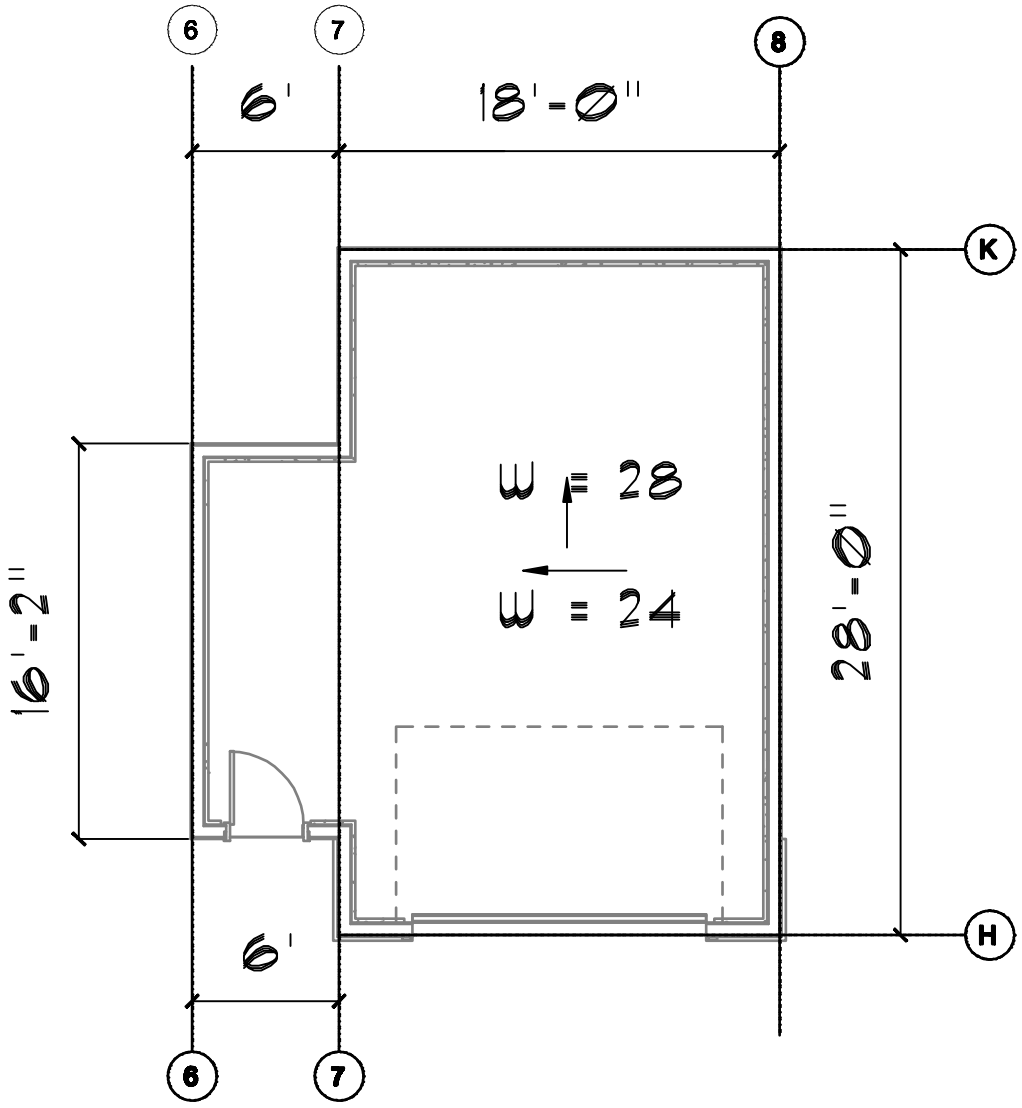


LAYOUT

PAGE 1

No Scale	8/6/19	C.O.

Steuser

residence

These calculations were prepared by Chris Oliveira

CalcSet Version 2.0 www.CalcSet.com

File: C:\calcset\Stueser 2 22 20H.xls February 26, 2020

CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
	by	CO	no.
	date	8/16/19	1

DESIGN LOADS

Roof Load

Roofing……..	10.8	
Sheathing…… ……..	1.6	
Framing…… ……..	4.3	
Insulation…… ……..	1.6	
Ceiling…….. ……..	2.2	
Miscellaneous…… ……..	2.2	
(DL has been factored for roof slope)		
DL	**22.7**	psf
SNOW	**30.0**	psf (5:12)

ASD

ON THE TENSION SIDE OF OVERTURNING, USE 12.4.3

E = rho Qe - (.6 - .14Sds)D

MODIFICATION FOR D = 0.50662

WHEN Vs GOVERNS

Wall Load

Ext Finish	10.0	
Int Finish	2.2	
Framing	1.7	
Insulation	0.5	
Misc	0.6	
DL	**15.0**	psf

CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
	by	CO	no.
	date	8/16/19	2

LATERAL

SEISMIC

V = Cs W *12.8.1.1 - page 71*

Cs = Sds / (R / Ie) X RHO

RHO = 1.3

Sds = 0.667 *FROM THE USGS WEBSITE*

R = 6.5

Ie = IMPORTANCE FACTOR - *TABLE 1.5-2 FOR RISK CATEGORY II = 1*

MULTIPLY BY 0.7 FOR ASD CONVERSION

Cs = 0.1334

*q = .00256 * Kz * K zt * K d * V squared* *eq 27.3-1 page 204*

Kd = wind directionality - 26.6 - table 26.6-1 *USE 0.85*

Kz - vel press coeff - table 27.3.1 *USE 0.9*

	B	C
20	0.62	0.9

K zt= 1 *NO TOPO EFFECTS*

CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
	by	CO	no.
	date	8/16/19	3

LATERAL

V = velocity = 110 V squared = 12100

qz = 23.6966 psf

p = q (G Cpf - Gcpi) PSF EQ 28.4-1 PAGE 240

G Cf - EXTERNAL PRESS COEFF 0.56 TABLE 28.4-1
ZONE 1
6:12 26.5

G Cpi - INTERNAL PRESSURE COEFF - TABLE 26.11-1 USE -0.18

MULTIPLY BY 0.6 FOR ASD CONVERSION

p = 17.5355 PSF

North / South

W(1): Wind = (17.5)(10')= 175 plf
Seismic = 0.1334[22.7(58')+15(4.5')(2)] = 194 plf

CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
	by	CO	no. 4
	date	8/16/19	

LATERAL

Line 1 :

Vw = (175plf)(21') = **3675** lb

Vs = (194plf)(21') = **4074** lb

Line 5 :

Vw = (175plf)(21') = **3675** lb

Vs = (194plf)(21') = **4074** lb

Line 1 :

V_{wind} = 3675 lb

$V_{seismic}$ = 4074 + 0.1334[(15 psf)(9')(8')] = 4218 lb

$$v_{walls} = \frac{4218}{8} = 527 \text{ plf}$$

3/8" CDX Plywood	
w / 8d @ 2"oc	(640 plf)

Use 1/2" values for 3/8" plywood [5/8 dia AB @ 16"oc (1116 plf)]

Uplift Analysis (8' Wall)

M_{OT} = (527plf)(8')(9') = 37944 ft-lb

M_{RES} = 2/3[(22.7psf)(4')+(15psf)(9')](8')(8'/2) = 4817 ft-lb

$$T_{up} = \frac{37944 - 4817}{8} = 4141 \text{ lb}$$

Simpson HDU4
(4565 lb)

CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
	by	CO	no.
	date	8/16/19	5

LATERAL

Line 5 :

V_{wind} = 3675 lb

$V_{seismic}$ = 4074 + 0.1334[(15 psf)(9')(8')] = 4218 lb

$$v_{walls} = \frac{4218}{8} = 527 \text{ plf}$$

3/8" CDX Plywood
w / 8d @ 2"oc (640 plf)

Use 1/2" values for 3/8" plywood [5/8 dia AB @ 32"oc (558 plf)]

Uplift Analysis (8' Wall)

M_{OT} = (527plf)(8')(9') = 37944 ft-lb

M_{RES} = 2/3[(22.7psf)(4')+(15psf)(9')](8')(8'/2) = 4817 ft-lb

$$T_{up} = \frac{37944 - 4817}{8} = 4141 \text{ lb}$$

Simpson HDU4
(4565 lb)

East / West

W(1): Wind = (17.5)(10')= 175 plf

Seismic = 0.1334[22.7(42')+15(4.5')(2)] = 145 plf

Line G :

Vw = (175plf)(5') = **875** lb

Vs = (145plf)(5') = **725** lb

Line F :

Vw = (175plf)(15') = **2625** lb

Vs = (145plf)(15') = **2175** lb

CHRIS OLIVEIRA AND ASSOCIATES	project	*Steuser residence*	
	by	*CO*	no.
	date	*8/16/19*	*6*

LATERAL

Line E :	*Vw = (175plf)(20.5') =*	***3588***	*lb*
	Vs = (145plf)(20.5') =	***2973***	*lb*
Line C :	*Vw = (175plf)(14') =*	***2450***	*lb*
	Vs = (145plf)(14') =	***2030***	*lb*
Line A :	*Vw = (175plf)(29') =*	***5075***	*lb*
	Vs = (145plf)(29') =	***4205***	*lb*
Line F :	*Vw = (175plf)(29') =*	***5075***	*lb*
	Vs = (145plf)(29') =	***4205***	*lb*

CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
	by	CO	no.
	date	8/16/19	7

LATERAL

Line G :

V_{wind} = 875 lb

$V_{seismic}$ = 725 + 0.1334[(15 psf)(9')(8')] = 869 lb

$$v_{walls} = \frac{875}{8} = 109 \text{ plf}$$

3/8" CDX Plywood
w / 8d @ 6"oc (260 plf)

Use 1/2" values for 3/8" plywood

[5/8 dia AB @ 48"oc (372 plf)]

Uplift Analysis (8' Wall)

M_{OT} = (109plf)(8')(9') = 7848 ft-lb

M_{RES} = 2/3[(22.7psf)(4')+(15psf)(9')](8')(8'/2) = 4817 ft-lb

$$T_{up} = \frac{7848 - 4817}{8} = 379 \text{ lb}$$

Simpson HDU2
(3075 lb)

Line F :

V_{wind} = 2625 lb

$V_{seismic}$ = 2175 + 0.1334[(15 psf)(9')(8')] = 2319 lb

$$v_{walls} = \frac{2625}{8} = 328 \text{ plf}$$

3/8" CDX Plywood
w / 8d @ 4"oc (380 plf)

Use 1/2" values for 3/8" plywood

[5/8 dia AB @ 48"oc (372 plf)]

Uplift Analysis (8' Wall)

M_{OT} = (328plf)(8')(9') = 23616 ft-lb

M_{RES} = 2/3[(22.7psf)(4')+(15psf)(9')](8')(8'/2) = 4817 ft-lb

$$T_{up} = \frac{23616 - 4817}{8} = 2350 \text{ lb}$$

Simpson HDU2
(3075 lb)

CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
	by	CO	no.
	date	8/16/19	8

LATERAL

Line E :

V_{wind} = 3588 lb

$V_{seismic}$ = 2973 + 0.1334[(15 psf)(9')(8')] = 3117 lb

$$v_{walls} = \frac{3588}{8} = 449 \text{ plf}$$

3/8" CDX Plywood
w / 8d @ 3"oc (490 plf)

Use 1/2" values for 3/8" plywood [5/8 dia AB @ 32"oc (558 plf)]

Uplift Analysis (8' Wall)

M_{OT} = (449plf)(8')(9') = 32328 ft-lb

M_{RES} = 2/3[(22.7psf)(4')+(15psf)(9')](8')(8'/2) = 4817 ft-lb

$$T_{up} = \frac{32328 - 4817}{8} = 3439 \text{ lb}$$

Simpson HDU4
(4565 lb)

REV 2/20/20

Line C :

V_{wind} = 2450 lb

$V_{seismic}$ = 2030 + 0.1334[(15 psf)(9')(4')] = 2102 lb

$$v_{walls} = \frac{2450}{4} = 613 \text{ plf}$$

3/8" CDX Plywood
w / 8d @ 2"oc (640 plf)

Use 1/2" values for 3/8" plywood [5/8 dia AB @ 24"oc (744 plf)]

Uplift Analysis (4' Wall)

M_{OT} = (613plf)(4')(9') = 22068 ft-lb

M_{RES} = 2/3[(22.7psf)(4')+(15psf)(9')](4')(4'/2) = 1204 ft-lb

$$T_{up} = \frac{22068 - 1204}{4} = 5216 \text{ lb}$$

Simpson HDU5
(5645 lb)

CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
	by	CO	no.
	date	8/16/19	9

LATERAL

Line A :

V_{wind} = 5075 lb

$V_{seismic}$ = 4205 + 0.1334[(15 psf)(9')(8')] = 4349 lb

$$v_{walls} = \frac{5075}{8} = 634 \text{ plf}$$

3/8" CDX Plywood
w / 8d @ 2"oc (640 plf)

Use 1/2" values for 3/8" plywood [5/8 dia AB @ 24"oc (744 plf)]

Uplift Analysis (8' Wall)

M_{OT} = (634plf)(8')(9') = 45648 ft-lb

M_{RES} = 2/3[(22.7psf)(4')+(15psf)(9')](8')(8'/2) = 4817 ft-lb

$$T_{up} = \frac{45648 - 4817}{8} = 5104 \text{ lb}$$

Simpson HDU5
(5645 lb)

Line F :

V_{wind} = 5075 lb

$V_{seismic}$ = 4205 + 0.1334[(15 psf)(9')(8')] = 4349 lb

$$v_{walls} = \frac{5075}{8} = 634 \text{ plf}$$

3/8" CDX Plywood
w / 8d @ 2"oc (640 plf)

Use 1/2" values for 3/8" plywood [5/8 dia AB @ 24"oc (744 plf)]

Uplift Analysis (8' Wall)

M_{OT} = (634plf)(8')(9') = 45648 ft-lb

M_{RES} = 2/3[(22.7psf)(4')+(15psf)(9')](8')(8'/2) = 4817 ft-lb

$$T_{up} = \frac{45648 - 4817}{8} = 5104 \text{ lb}$$

Simpson HDU5
(5645 lb)

CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
	by	CO	no.
	date	8/16/19	10

LATERAL

ROOF DIAPHRAGM

$w = 175$ plf

$$v_{diaph} = \frac{(175 \text{ plf})(42'/2)}{58'} = 63 \text{ plf}$$

1/2" CDX Plywood
w / 8d @ 6"oc (240 plf)
(Case 1 w / 2x Framing)

$$\frac{3675 \text{ lb} - 175 \text{ plf}(x)}{58'} = 0 \text{ plf}, \quad x = 21.0 \text{ ft}$$

$$F_{chord} = \frac{(175 \text{ plf})(42')^2}{8(58')} = 665 \text{ lb}$$

10 - 16d Plate Splice
(1050 lb)

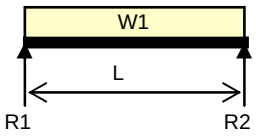
CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
	by	CO	no.
	date	8/16/19	11

VERTICAL

RB 1 L = 17.0 ft C(D) = 1.00 C(F) = 1.00

(0'-17') w_1 = (22.7D + 30L)(6') + 16 = **332** plf

R(L) = 2822 lb
R(R) = 2822 lb
M(Max) = 11994 ft-lb



Support Conditions: (Pinned - Pinned)

Check: V = 2822 lb M = 11994 ft-lb w_{eq} = 332 plf

$$A_{req} = \frac{1.5V}{F'_v} = 49.8 \text{ in}^2$$

$$S_{req} = \frac{M(12"/')}{F'_b} = 106.6 \text{ in}^3$$

$$I_{req} = \frac{5\ wL^4}{384\ E\Delta} = 688 \text{ in}^4$$

DF No. 1

F_v	= 85	F'_v	= 85
F_b	= 1350	F'_b	= 1350
E	= 1600000	Δ : L / 360	

6x12 DF No. 1
A = 63.3, S = 121.2, I = 697

CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
	by	CO	no.
	date	8/16/19	12

VERTICAL

RB 2 L = 8.0 ft C(D) = 1.00

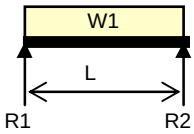
C(F) = 1.00

(0'-8') w_1 = (22.7D + 30L)(4') + 16 = **227** plf

R(L) = 908 lb

R(R) = 908 lb

M(Max) = 1816 ft-lb



Support Conditions: (Pinned - Pinned)

Check: V = 908 lb M = 1816 ft-lb w_{eq} = 227 plf

$$A_{req} = \frac{1.5V}{F'_v} = 16.0 \text{ in}^2$$

$$S_{req} = \frac{M(12"/')}{F'_b} = 16.1 \text{ in}^3$$

$$I_{req} = \frac{5\ wL^4}{384\ E\Delta} = 49 \text{ in}^4$$

DF No. 1

F_v	= 85	F'_v	= 85
F_b	= 1350	F'_b	= 1350
E	= 1600000	Δ : L /	360

6x12 DF No. 1
A = 63.3, S = 121.2, I = 697

CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
	by	CO	no.
	date	8/16/19	13

VERTICAL

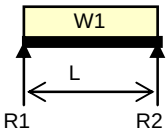
RB 3 $L =$ 4.0 ft $C(D) =$ 1.00 $C(F) =$ 1.00

(0'-4') $w_1 = (22.7D + 30L)(11') + 16 =$ **596** plf

$R(L) =$ 1192 lb

$R(R) =$ 1192 lb

$M(Max) =$ 1192 ft-lb



Support Conditions: (Pinned - Pinned)

Check Right Cantilever: $V =$ 1192 lb $M =$ 0 ft-lb $w_{eq} =$ #DIV/0! plf

$$A_{req} = \frac{1.5V}{F'_v} = 21.0 \text{ in}^2$$

$$S_{req} = \frac{M(12"/')}{F'_b} = 0.0 \text{ in}^3$$

$$I_{req} = \frac{1\ wL^4}{8\ E\Delta} = \text{\#DIV/0! in}^4$$

DF Sel Struct

F_v	85	F'_v	85
F_b	1600	F'_b	1600
E	1600000	Δ: L /	360

6x12 DF Sel Struct
A = 63.3, S = 121.2, I = 697

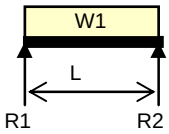
CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
	by	CO	no.
	date	8/16/19	14

VERTICAL

RB 4 L = 4.0 ft C(D) = 1.00 C(F) = 1.00

(0'-4') w_1 = (22.7D + 30L)(21') + 16 = **1123** plf

R(L) = 2246 lb
R(R) = 2246 lb
M(Max) = 2246 ft-lb



Support Conditions: (Pinned - Pinned)

Check: V = 2246 lb M = 2246 ft-lb w_{eq} = 1123 plf

$$A_{req} = \frac{1.5V}{F'_v} = 39.6 \text{ in}^2$$

$$S_{req} = \frac{M(12"/')}{F'_b} = 20.0 \text{ in}^3$$

$$I_{req} = \frac{5\ wL^4}{384\ E\Delta} = 30 \text{ in}^4$$

DF No. 1

F_v	= 85	F'_v	= 85
F_b	= 1350	F'_b	= 1350
E	= 1600000	Δ : L /	360

6x12 DF No. 1
A = 63.3, S = 121.2, I = 697

CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
	by	CO	no.
	date	8/16/19	15

VERTICAL

RB 5 L = 10.0 ft C(D) = 1.00 C(F) = 1.00

(0'-6') w_1 = (22.7D + 30L)(2') + 16 = **121** plf

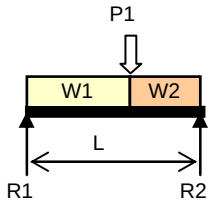
(6'-10') w_2 = (22.7D + 30L)(11') + 16 = **596** plf

(@ 6') P_1 = [(22.7D + 30L)(11')](4') = **2319** lb

R(L) = 1913 lb

R(R) = 3516 lb

M(Max) = 9298 ft-lb



Support Conditions: (Pinned - Pinned)

Check: V = 3516 lb M = 9298 ft-lb w_{eq} = 744 plf

$$A_{req} = \frac{1.5V}{F'_v} = 62.0 \text{ in}^2$$

$$S_{req} = \frac{M(12''/')}{F'_b} = 82.6 \text{ in}^3$$

$$I_{req} = \frac{5\ wL^4}{384\ E\Delta} = 314 \text{ in}^4$$

DF No. 1

F_v =	85	F'_v =	85
F_b =	1350	F'_b =	1350
E =	1600000	Δ: L /	360

6x12 DF No. 1
A = 63.3, S = 121.2, I = 697

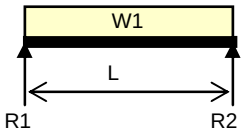
CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
	by	CO	no.
	date	8/16/19	16

VERTICAL

RB 6 L = 15.0 ft C(D) = 1.00 C(F) = 1.00

(0'-15') w_1 = (22.7D + 30L)(4') + 16 = **227** plf

R(L) = 1703 lb
R(R) = 1703 lb
M(Max) = 6384 ft-lb



Support Conditions: (Pinned - Pinned)

Check: V = 1703 lb M = 6384 ft-lb w_{eq} = 227 plf

$$A_{req} = \frac{1.5V}{F'_v} = 30.1 \text{ in}^2$$

$$S_{req} = \frac{M(12''/')}{F'_b} = 56.7 \text{ in}^3$$

$$I_{req} = \frac{5\ wL^4}{384\ E\Delta} = 323 \text{ in}^4$$

DF No. 1

F_v	= 85	F'_v	= 85
F_b	= 1350	F'_b	= 1350
E	= 1600000	Δ : L / 360	

6x12 DF No. 1
A = 63.3, S = 121.2, I = 697

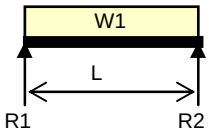
CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
	by	CO	no.
	date	8/16/19	17

VERTICAL

RB 7 L = 10.0 ft C(D) = 1.00 C(F) = 1.00

(0'-10') w_1 = (22.7D + 30L)(4') + 16 = **227** plf

R(L) = 1135 lb
R(R) = 1135 lb
M(Max) = 2838 ft-lb



Support Conditions: (Pinned - Pinned)

Check: V = 1135 lb M = 2838 ft-lb w_{eq} = 227 plf

$$A_{req} = \frac{1.5V}{F'_v} = 20.0 \text{ in}^2$$

$$S_{req} = \frac{M(12"/')}{F'_b} = 25.2 \text{ in}^3$$

$$I_{req} = \frac{5\ wL^4}{384\ E\Delta} = 96 \text{ in}^4$$

DF No. 1

F_v	= 85	F'_v	= 85
F_b	= 1350	F'_b	= 1350
E	= 1600000	Δ : L /	360

6x12 DF No. 1
A = 63.3, S = 121.2, I = 697

CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
	by	CO	no.
	date	8/16/19	18

VERTICAL

RB 8 $L =$ 6.0 ft $C(D) =$ 1.00 $C(F) =$ 1.00

(0'-3') $w_1 = (22.7D + 30L)(2') + 16 =$ **121** plf

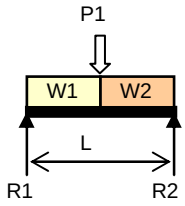
(3'-6') $w_2 = (22.7D + 30L)(15') + 16 =$ **807** plf

(@ 3') $P_1 = [(22.7D + 30L)(3')](15') =$ **2372** lb

$R(L) =$ 2064 lb

$R(R) =$ 3093 lb

$M(Max) =$ 5646 ft-lb



Support Conditions: (Pinned - Pinned)

Check: $V =$ 3093 lb $M =$ 5646 ft-lb $w_{eq} =$ 1255 plf

$$A_{req} = \frac{1.5V}{F'_v} = 54.6 \text{ in}^2$$

$$S_{req} = \frac{M(12''/')}{F'_b} = 50.2 \text{ in}^3$$

$$I_{req} = \frac{5\ wL^4}{384\ E\Delta} = 114 \text{ in}^4$$

DF No. 1

F_v	= 85	F'_v	= 85
F_b	= 1350	F'_b	= 1350
E	= 1600000	Δ: L / 360	

6x12 DF No. 1
A = 63.3, S = 121.2, I = 697

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VERTICAL

TRUSS A01 $L =$ 9.0 ft $C(D) =$ 1.00

Check 2 - 2x6 $C(F_c) =$ 1.10

$P =$ **4745** lb

$d =$ 5.50 in $A =$ 16.5 in^2 $E =$ 1.6E+6 psi

$F_c =$ 1300 psi $F_c^* = (F_c)(C_F)(C_D) =$ 1430 psi

$$F_{cE} = \frac{K_{cE} \times E}{(L/d)^2} = 1245 \text{ psi} \quad (K_{CE} = 0.30)$$

$$C_P = \frac{1 + F_{CE}/F'_C}{2c} - \sqrt{\left(\frac{1 + F_{CE}/F'_C}{2c}\right)^2 - \frac{F_{CE}/F'_C}{c}} = 0.641$$

$F'_c = (F_c^*)(C_P) =$ 917 psi $\frac{f_a}{F'_c} =$ 0.31 < 1.00 **O.K.**

$f_a = P/A =$ 287.6 psi

2 - 2x6 DF No. 2

TRUSS A08 $L =$ 9.0 ft $C(D) =$ 1.00

Check 2x6 $C(F_c) =$ 1.10

$P =$ **3973** lb

$d =$ 5.50 in $A =$ 8.3 in^2 $E =$ 1.6E+6 psi

$F_c =$ 1300 psi $F_c^* = (F_c)(C_F)(C_D) =$ 1430 psi

$$F_{cE} = \frac{K_{cE} \times E}{(L/d)^2} = 1245 \text{ psi} \quad (K_{CE} = 0.30)$$

$$C_P = \frac{1 + F_{CE}/F'_C}{2c} - \sqrt{\left(\frac{1 + F_{CE}/F'_C}{2c}\right)^2 - \frac{F_{CE}/F'_C}{c}} = 0.641$$

$F'_c = (F_c^*)(C_P) =$ 917 psi $\frac{f_a}{F'_c} =$ 0.52 < 1.00 **O.K.**

$f_a = P/A =$ 478.7 psi

2x6 DF No. 2

CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
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VERTICAL

TRUSS A06 $L =$ 9.0 ft $C(D) =$ 1.00

Check 2x6 $C(F_c) =$ 1.10

$P =$ **3898** lb

$d =$ 5.50 in $A =$ 8.3 in^2 $E =$ 1.6E+6 psi

$F_c =$ 1300 psi $F_c^* = (F_c)(C_F)(C_D) =$ 1430 psi

$$F_{cE} = \frac{K_{cE} \times E}{(L/d)^2} = 1245 \text{ psi} \quad (K_{CE} = 0.30)$$

$$C_P = \frac{1 + F_{CE}/F'_C}{2c} - \sqrt{\left(\frac{1 + F_{CE}/F'_C}{2c}\right)^2 - \frac{F_{CE}/F'_C}{c}} = 0.641$$

$F'_c = (F_c^*)(C_P) =$ 917 psi $\frac{f_a}{F'_c} =$ 0.51 < 1.00 **O.K.**

$f_a = P/A =$ 469.6 psi

2x6 DF No. 2

TRUSS E01 $L =$ 9.0 ft $C(D) =$ 1.00

Check 2 - 2x6 $C(F_c) =$ 1.10

$P =$ **4404** lb

$d =$ 5.50 in $A =$ 16.5 in^2 $E =$ 1.6E+6 psi

$F_c =$ 1300 psi $F_c^* = (F_c)(C_F)(C_D) =$ 1430 psi

$$F_{cE} = \frac{K_{cE} \times E}{(L/d)^2} = 1245 \text{ psi} \quad (K_{CE} = 0.30)$$

$$C_P = \frac{1 + F_{CE}/F'_C}{2c} - \sqrt{\left(\frac{1 + F_{CE}/F'_C}{2c}\right)^2 - \frac{F_{CE}/F'_C}{c}} = 0.641$$

$F'_c = (F_c^*)(C_P) =$ 917 psi $\frac{f_a}{F'_c} =$ 0.29 < 1.00 **O.K.**

$f_a = P/A =$ 266.9 psi

2 - 2x6 DF No. 2

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GARAGE

North / South

W(1): Wind = (13.2)(10')= 132 plf

Seismic = 0.1334[22.7(28')+15(4.5')(2)] = 103 plf

Line 6 : Vw = (132plf)(3') = **396** lb

Vs = (103plf)(3') = **309** lb

Line 7 : Vw = (132plf)(12') = **1584** lb

Vs = (103plf)(12') = **1236** lb

Line 8 : Vw = (132plf)(9') = **1188** lb

Vs = (103plf)(9') = **927** lb

Line 6 :

V_{wind} = 396 lb

$V_{seismic}$ = 309 + 0.1334[(15 psf)(9')(6')] = 417 lb

$$v_{walls} = \frac{417}{3+3} = 70 \text{ plf}$$

3/8" CDX Plywood	
w / 8d @ 6"oc	(260 plf)

Use 1/2" values for 3/8" plywood

[5/8 dia AB @ 60"oc (298 plf)]

Uplift Analysis (6' Wall)

M_{OT} = (70plf)(6')(9') = 3780 ft-lb

M_{RES} = 2/3[(22.7psf)(4')+(15psf)(9')](6')(6'/2) = 2710 ft-lb

$$T_{up} = \frac{3780 - 2710}{16} = 67 \text{ lb}$$

No Holdowns Reqd

PERFORATED WALL

CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
	by	CO	no.
	date	8/16/19	22

GARAGE

Line 7 :

V_{wind} = 1584 lb

$V_{seismic}$ = 1236 + 0.1334[(15 psf)(9')(12')] = 1452 lb

$$v_{walls} = \frac{1584}{4+8} = 132 \text{ plf}$$

3/8" CDX Plywood
w / 8d @ 6"oc (260 plf)

Use 1/2" values for 3/8" plywood

[5/8 dia AB @ 60"oc (298 plf)]

Uplift Analysis (4' Wall)

M_{OT} = (132plf)(4')(9') = 4752 ft-lb

M_{RES} = 2/3[(22.7psf)(4')+(15psf)(9')](4')(4'/2) = 1204 ft-lb

$$T_{up} = \frac{4752 - 1204}{4} = 887 \text{ lb}$$

Simpson HDU2
(3075 lb)

2000 LB IN THE DRAG TRUSS

Line 8 :

V_{wind} = 1188 lb

$V_{seismic}$ = 927 + 0.1334[(15 psf)(9')(8')] = 1071 lb

$$v_{walls} = \frac{1188}{8} = 149 \text{ plf}$$

3/8" CDX Plywood
w / 8d @ 6"oc (260 plf)

Use 1/2" values for 3/8" plywood

[5/8 dia AB @ 48"oc (372 plf)]

Uplift Analysis (8' Wall)

M_{OT} = (149plf)(8')(9') = 10728 ft-lb

M_{RES} = 2/3[(22.7psf)(4')+(15psf)(9')](8')(8'/2) = 4817 ft-lb

$$T_{up} = \frac{10728 - 4817}{8} = 739 \text{ lb}$$

Simpson HDU2
(3075 lb)

CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
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	date	8/16/19	23

GARAGE

East / West

W(1): Wind = (13.2)(9')= 119 plf

Seismic = 0.1334[22.7(24')+15(4.5')(2)] = 91 plf

Line K : Vw = (119plf)(14') = **1666** lb

Vs = (91plf)(14') = **1274** lb

Line H : Vw = (119plf)(14') = **1666** lb

Vs = (91plf)(14') = **1274** lb

Line K :

V_{wind} = 1666 lb

$V_{seismic}$ = 1274 + 0.1334[(15 psf)(9')(18')] = 1598 lb

$$v_{walls} = \frac{1666}{18} = 93 \text{ plf}$$

3/8" CDX Plywood	
w / 8d @ 6"oc	(260 plf)

Use 1/2" values for 3/8" plywood [5/8 dia AB @ 60"oc (298 plf)]

Uplift Analysis (18' Wall)

M_{OT} = (93plf)(18')(9') = 15066 ft-lb

M_{RES} = 2/3[(22.7psf)(4')+(15psf)(9')](18')(18'/2) = 24386 ft-lb

$$T_{up} = \frac{15066 - 24386}{18} = 0 \text{ lb}$$

No Holdowns Reqd

CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
	by	CO	no.
	date	8/16/19	24

GARAGE

Line H :

V_{wind} = 1666 lb

$V_{seismic}$ = 1274 + 0.1334[(15 psf)(9')(6')] = 1382 lb

$$v_{walls} = \frac{1666}{3+3} = 278 \text{ plf}$$

3/8" CDX Plywood
w / 8d @ 4"oc (380 plf)

Use 1/2" values for 3/8" plywood

[5/8 dia AB @ 48"oc (372 plf)]

Uplift Analysis (3' Wall)

M_{OT} = (278plf)(3')(9') = 7506 ft-lb

M_{RES} = 2/3[(22.7psf)(4')+(15psf)(9')](3')(3'/2) = 677 ft-lb

$$T_{up} = \frac{7506 - 677}{3} = 2276 \text{ lb}$$

Simpson HDU2
(3075 lb)

FOR RATIOS GREATER THAN 2:1: H = 9

Bs = 3

$$1.25 - 0.125 \times \frac{9}{3} = 0.875$$

ADJUSTED SHEARWALL = 0.875 X 380 = 332.5 > 278

CHRIS OLIVEIRA AND ASSOCIATES	project	Steuser residence	
	by	CO	no.
	date	8/16/19	25

GARAGE

RB 9 L = 13.0 ft C(D) = 1.00

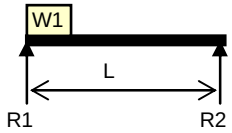
C(F) = 0.98

(0'-3') w_1 = (22.7D + 30L)(4') + 23 = **234** plf

R(L) = 621 lb

R(R) = 81 lb

M(Max) = 824 ft-lb



Support Conditions: (Pinned - Pinned)

Check: V = 621 lb M = 824 ft-lb w_{eq} = 39 plf

$$A_{req} = \frac{1.5V}{F'_v} = 3.2 \text{ in}^2$$

$$S_{req} = \frac{M(12"/')}{F'_b} = 3.5 \text{ in}^3$$

$$I_{req} = \frac{5\ wL^4}{384\ E\Delta} = 29 \text{ in}^4$$

Parallam

F_v	=	290	F'_v	=	290
F_b	=	2900	F'_b	=	2851
E	=	2000000	Δ: L / 360		

5 1/4" x 14" PSL Parallam
A = 73.5, S = 171.5, I = 1201