Tepa ENGINEERING SERVICES

STRUCTURAL CALCULATIONS

DZUIK RESIDENCE

4403 Alta Mira Drive
La Mesa CA 91941

Revision 1

August 16, 2021

David B. Taquino, PE

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DESIGN CRITERIA

Tepa ENGINEERING SERVICES A TEPA COMPANY

Project: Alta Mira
Date: 07/28/23
By: PD

Scope of Work

The structure has been redesigned to account for the following changes made after permit received.

1. Roof/floor systems revised per arch. Gravity and lateral system modified as required.
2. Gravity columns removed per arch at each level. Beams, connections, and columns modified as required.
3. Shearwalls modified as required for revised lateral loads and architectural changes to walls and opening.
4. Retaining walls and slab on grade at pool level (bottom of slope) removed and (e) grade will remain with new post and beam deck. Pool will be constructed under separate contract.
5. Full height CMU walls at pool level modified to wood stud on CMU stem walls as required for existing grade.
6. All concrete retaining walls modified to CMU.
7. Driveway modified from slab on grade to steel beams and metal deck.
8. Trellis framing modified per arch revisions.
9. Connections modified to provide all hidden beam to beam and beam to column connections.

Applicable Design Codes Under Current Permit (2016 CBC)

CBC-16	*California Building Code*
ASCE 7-10	*Minimum Design Loads for Buildings and Other Structures*
ACI 318-14	*American Concrete Institute, Building Code Requirements for Structural Concrete and Commentary*
AISC 360-10	*Specifcation for American Institute for Steel Construction*
NDS 2015-15	*National Design Specification for Wood Construction*
SDPWS-15	*Special Design Provisions for Wind and Seismic*
TMS 402/602-13 Masonry	*Building Code Requirements and Specifications for Structures*

TAQUINO engineering
PO Box 2066
La Mesa, CA 91943-2066

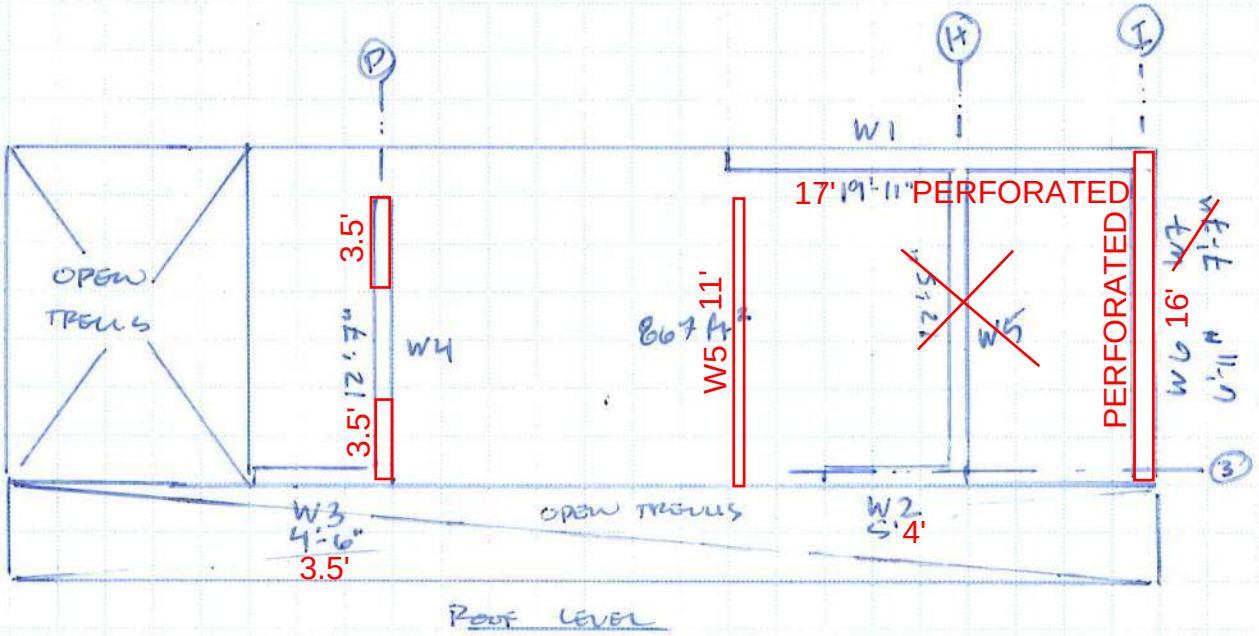
Project No:_____ Computed By:_____ Date:_____ Sheet:_____ Of _____

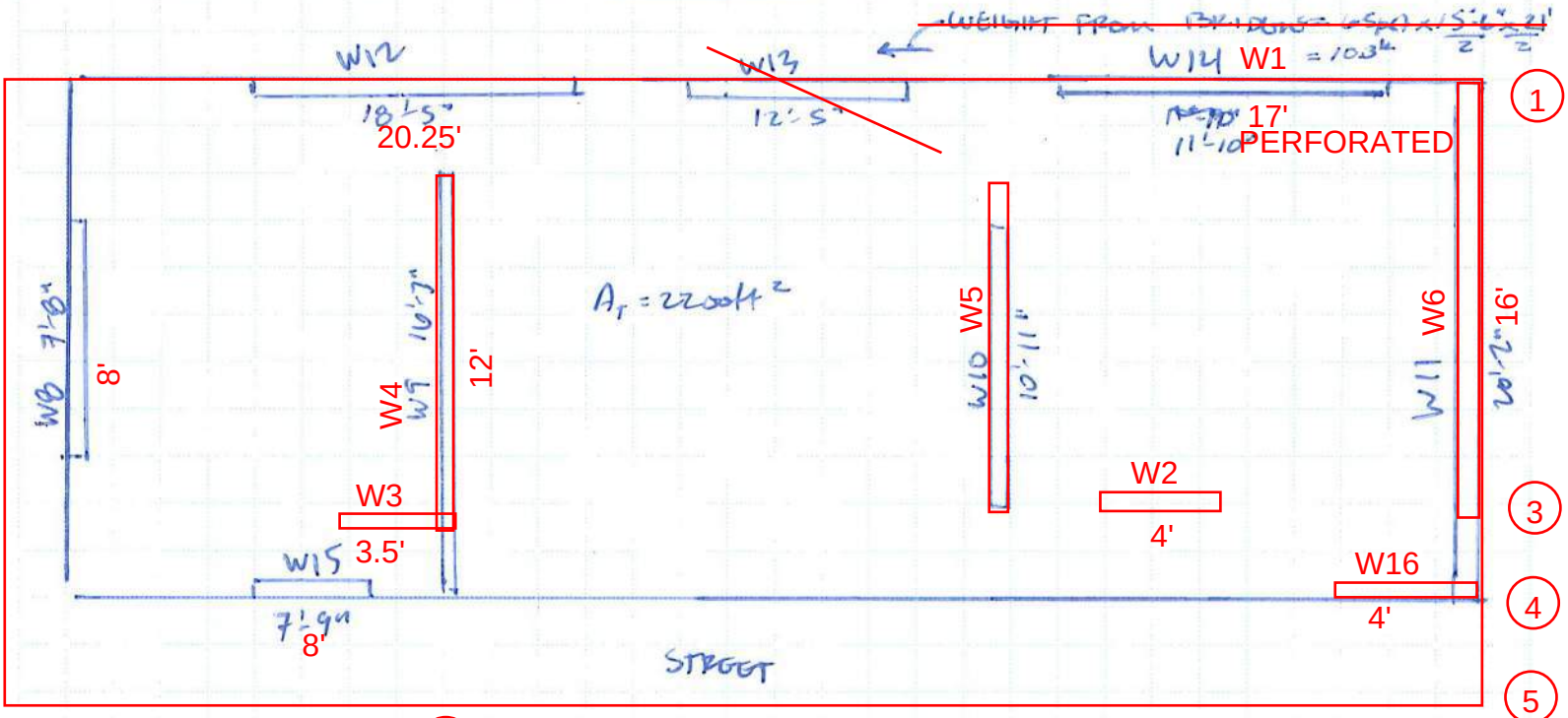
Project Name: _____ Subject BLUE LINES ARE FROM PERMIT CALCS.

REVISED SHEARWALL LOCATIONS

RED IS REVISED SHEARWALL LAYOUT BASED ON ARCH REVISIONS TO WALLS AND OPENINGS. ALL WALLS ARE DESIGNED TO STACK, NO VERTICAL OFFSETS IN SHEARWALLS.

SHEAR WALL : SEISMIC WEIGHT





A.5 D G I

~~WEIGHT FROM BELOW = 10.3k~~

SEISMIC MASS = 10.3k x 0.122 = 1250 lb ADDED TO SW13

Date

Project Alta Mira

Contact PD

Phone

Check for plan irregularities

Horizontal – (Table 12.3-1)

1a. Torsional Irregularity – assume doesn't apply and confirm with design

1b. Extreme Torsional Irregularity – assume doesn't apply and confirm with design

2. Reentrant corner – Not Applicable

3. Diaphragm discontinuity – opening in lower level diaphragm = (8' x 12') = 96'
gross diaphragm area = (28' x 78') = 2184'
∴ Not Applicable

4. Out of plane offset – Not Applicable

5. Non-parallel System – Not Applicable

Vertical – (Table 12.3-2)

1a. Stiffness – Soft Story – Not Applicable

1b. Extreme Soft Story – Not Applicable

2. Weight (Mass) Irregularity – Not Applicable

3. Vertical geometric Irregularity –
In transverse direction, width Street = $\frac{28'}{16}$ = 1.75
width Roof ≯1.33
In longitudinal direction, length Street = $\frac{78'}{52.5'}$ = 1.5
length Roof ≯1.33

∴ Vertical Irregularity type 3 EXISTS

4. In plane discontinuity, Not Applicable

5a. Weak Story, Not Applicable

5b. Extreme Weak Story, Not Applicable

use equivalent lateral force procedure per 12.8 since structure of light frame construction.

Tepa ENGINEERING SERVICES A TEPA COMPANY

Project: Alta Mira
Date: 07/28/23
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Dead Loads

Roof 'type A' (solar roof)
- 1/2" DENSDECK
- 2" LWIC (42 pcf)
- 11" rigid insulation (0.25 psf/in)
- 3/4" plywood
- 3x T&G decking
- 5.125x15 GLB @ 4'-0"oc
- solar panels and support
- misc/mep

$$DL_{solar} := \sum \begin{bmatrix} 2.0\ psf \\ 7.0\ psf \\ 2.8\ psf \\ 2.3\ psf \\ 7.0\ psf \\ 5.8\ psf \\ 5.0\ psf \\ 1.1\ psf \end{bmatrix} = 33\ psf$$

Roof 'type B' (green roof)
- 1/2" DENSDECK
- 4" Terenap Extensive System
- drainage board
- 2" LWIC (42 pcf)
- 11" rigid insulation (0.25 psf/in)
- 3/4" plywood
- 3x T&G decking
- 5.125x15 GLB @ 4'-0"oc
- misc/mep

$$DL_{green\_roof} := \sum \begin{bmatrix} 2.0\ psf \\ 25\ psf \\ 0.3\ psf \\ 7.0\ psf \\ 2.8\ psf \\ 2.3\ psf \\ 7.0\ psf \\ 5.8\ psf \\ 0.8\ psf \end{bmatrix} = 53\ psf$$

Roof 'type C' (carport)
- 2" concrete slab (150 pcf)
- 3/4" plywood
- 2x14 @ 16" oc
- 12" rigid insulation (0.25 psf/in)
- 3/4" plywood
- 3x T&G decking
- 5.125x15 GLB @ 4'-0"oc
- misc/mep

$$DL_{carport} := \sum \begin{bmatrix} 25\ psf \\ 2.3\ psf \\ 3.9\ psf \\ 3.0\ psf \\ 2.3\ psf \\ 7.0\ psf \\ 5.8\ psf \\ 0.7\ psf \end{bmatrix} = 50\ psf$$

Floor 'type B' (floor)
- flooring per arch (tile or wood)
- 2" gyp underlayment/radiant system
- 12.75" rigid insulation (0.25 psf/in)
- 3/4" plywood
- 3x T&G decking
- 5.125x15 GLB @ 4'-0"oc
- misc/mep

$$DL_{floor} := \sum \begin{bmatrix} 5.0\ psf \\ 19.0\ psf \\ 3.2\ psf \\ 2.3\ psf \\ 7.0\ psf \\ 5.8\ psf \\ 0.7\ psf \end{bmatrix} = 43\ psf$$

Roof 'type D' (terrace)
- BISON deck system
- 1/2" DENSDECK
- 2" LWIC (42 pcf)
- 10" rigid insulation (0.25 psf/in)
- 3/4" plywood
- 3x T&G decking
- 5.125x15 GLB @ 4'-0"oc
- misc/mep

$$DL_{terrace} := \sum \begin{bmatrix} 6.0\ psf \\ 2.0\ psf \\ 7.0\ psf \\ 2.8\ psf \\ 2.3\ psf \\ 7.0\ psf \\ 5.8\ psf \\ 1.1\ psf \end{bmatrix} = 34\ psf$$

Trellis
- 2x4 @ 4" oc
- 4.6 @ 3' oc
- 5.125x15 GLB @ 4'-0"oc
- misc

$$DL_{trellis} := \sum \begin{bmatrix} 4.2\ psf \\ 1.8\ psf \\ 5.8\ psf \\ 0.2\ psf \end{bmatrix} = 12\ psf$$

Exterior Deck
- Decking per arch
- 2x8 @ 16" oc
- misc

$$DL_{deck} := \sum \begin{bmatrix} 4.3\ psf \\ 2.0\ psf \\ 0.7\ psf \end{bmatrix} = 7\ psf$$

Interior Walls
- 5/8" gyp
- 2x6 @ 16"oc
- 5/8" gyp
- batt insulation
- misc

$$DL_{int\_wall} := \sum \begin{bmatrix} 2.8\ psf \\ 2.3\ psf \\ 2.8\ psf \\ 0.5\ psf \\ 1.6\ psf \end{bmatrix} = 10\ psf$$

Exterior Walls
- stucco
- 5/8" plywood
- 5/8" gyp
- 2x6@16"oc
- 5/8" gyp
- batt insulation
- misc

$$DL_{ext\_wall} := \sum \begin{bmatrix} 12\ psf \\ 1.8\ psf \\ 2.8\ psf \\ 1.7\ psf \\ 2.8\ psf \\ 0.9\ psf \end{bmatrix} = 22\ psf$$

Live Loads:

$LL_{roof} := 20\ psf$ Roof Live Load
$LL_{floor} := 40\ psf$ Floor Live Load (Floors, Carport, Terrace)
$LL_{deck} := 60\ psf$ Deck Live Load (Exterior Deck)

Seismic Design Loads

Ref: ASCE 7-10, *Minimum Design Loads for Buildings and Other Structures*

Risk Category II
Seismic Importance Factor $I_e := 1.0$
Site Class D
Minimum Analysis = Equivalent Lateral Force Procedure

Seismic Design Values from Geotechnical Report:

$S_{DS} := 0.611$ $S_S := 0.769$ $S_{MS} := 0.917$
$S_{D1} := 0.382$ $S_1 := 0.281$ $S_{M1} := 0.573$
Seismic Design Category D

Lateral Force Resisting System (either direction):
Wood Bearing Wall System with light framed wood shear walls (Table 12-2-1)

$R := 6.5$ Response Modification Factor
$\Omega := 2.5$ Overstrength Factor (note reduced by 0.5 for flexible diaphragms)
$C_d := 4$ Deflection Amplification Factor

Seismic Base Shear per ASCE Section 12.8 (Equivalent Lateral Force Procedure):

Determine the approximate fundamental period (12.8.2.1)

$C_t := 0.02$ (Table 12.8-2)
$x := 0.75$ (Table 12.8-2)
$h_n := 23.5$ vertical distance from base to average height of roof
$T_L := 8$ per ASCE 7 hazard tool for site address

$T_a := C_t \cdot h_n^{\,x} = 0.213$ (Eq. 12.8-7)

V = Cs W (Eq. 12.8-1)

$$C_s := \frac{S_{DS}}{\left(\frac{R}{I_e}\right)} = 0.094 \quad \text{(Eq 12.8-2)}$$

$$C_{smin} := \max\left(0.044 \cdot S_{DS} \cdot I_e, \frac{0.5\ S_1}{\left(\frac{R}{I_e}\right)}, 0.01\right) = 0.027 \quad \text{(Eq. 12.8-5)}$$

$$C_{smax} := \text{if}\left(T_a < T_L, \frac{S_{D1}}{T_a \cdot \left(\frac{R}{\langle I_e \rangle}\right)}, \frac{\langle S_{D1} \cdot T_L \rangle}{T_a^{\,2} \cdot \left(\frac{R}{I_e}\right)}\right) = 0.275 \quad \text{(Eq. 12.8-6)}$$

$C_s = 0.094$

Area A: Lateral Design

Determine Vertical Distribution Seismic Weight $W_B := W_{rB} = 50$ *kip*

$k := 1.0$ (eq. 12.8-12)

Base Shear $V_B := C_s \cdot W_B = 4.67$ *kip*

roof / floor $h_{xA} := \begin{bmatrix} 22 \\ 11.25 \end{bmatrix}$ *ft* $W_{xA} := \begin{bmatrix} W_{rA} \\ W_{fA} \end{bmatrix}$ $A := \overrightarrow{W_{xA} \cdot h_{xA}^{\,k}} = \begin{bmatrix} 995 \\ 1258 \end{bmatrix}$ *ft·kip* $C_{vA} := \dfrac{\overrightarrow{W_{xA} \cdot h_{xA}^{\,k}}}{\sum \left(\overrightarrow{W_{xA} \cdot h_{xA}^{\,k}} \right)} = \begin{bmatrix} 0.442 \\ 0.558 \end{bmatrix}$

$F_{xA} := C_{vA} \cdot V_A = \begin{bmatrix} 6.52 \\ 8.24 \end{bmatrix}$ *kip*

Determine Diaphragm Forces

$S_{DS} = 0.611$

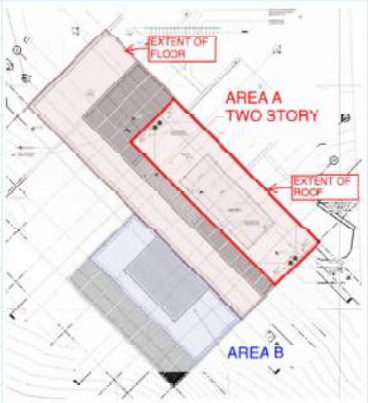
$I_e = 1$

roof / floor $h_{xA} := \begin{bmatrix} 22 \\ 11.25 \end{bmatrix}$ *ft* $W_{pxA} := \begin{bmatrix} W_{rA} \\ W_{fA} \end{bmatrix}$ $F_{pxA} := \dfrac{\left(\sum F_{xA} \right)}{\sum W_{xA}} \cdot W_{xA} = \begin{bmatrix} 4.25 \\ 10.51 \end{bmatrix}$ *kip*

$F_{p\_minA} := 0.2 \cdot S_{DS} \cdot I_e \cdot W_{pxA} = \begin{bmatrix} 5.53 \\ 13.67 \end{bmatrix}$ *kip*

$F_{p\_maxA} := 0.4 \cdot S_{DS} \cdot I_e \cdot W_{xA} = \begin{bmatrix} 11.05 \\ 27.33 \end{bmatrix}$ *kip*

Building Layout: Area A and Area B are designed separately since not connected at wall elevations



AREA A (2 Story Area)

Determine Seismic Weight

Roof Level
- Trellis
- Solar Roof
- Exterior Walls
- Interior Walls

$$A_{rA} := \begin{bmatrix} 480\ ft^2 \\ 840\ ft^2 \\ 456\ ft^2 \\ 171\ ft^2 \end{bmatrix} \quad DL_{rA} := \begin{bmatrix} DL_{trellis} \\ DL_{solar} \\ DL_{ext\_wall} \\ DL_{int\_wall} \end{bmatrix} = \begin{bmatrix} 12 \\ 33 \\ 22 \\ 10 \end{bmatrix} psf$$

$$W_{rA} := A_{rA} \cdot DL_{rA} = 45.222\ kip$$

Floor Level
- Green Roof
- Terrace
- Carport
- Floor
- Exterior Walls
- Interior Walls

$$A_{fA} := \begin{bmatrix} 456\ ft^2 \\ 360\ ft^2 \\ 450\ ft^2 \\ 510\ ft^2 \\ 1146\ ft^2 \\ 579\ ft^2 \end{bmatrix} \quad DL_{fA} := \begin{bmatrix} DL_{green\_roof} \\ DL_{terrace} \\ DL_{carport} \\ DL_{floor} \\ DL_{ext\_wall} \\ DL_{int\_wall} \end{bmatrix} = \begin{bmatrix} 53 \\ 34 \\ 50 \\ 43 \\ 22 \\ 10 \end{bmatrix} psf$$

$$W_{fA} := A_{fA} \cdot DL_{fA} = 111.84\ kip$$

Seismic Weight $$W_A := \sum \begin{bmatrix} W_{rA} \\ W_{fA} \end{bmatrix} = 157\ kip$$

Base Shear $$V_A := C_s \cdot W_A = 14.76\ kip$$

AREA B (1 Story Area)

Determine Seismic Weight of Area B

Roof Level
- Green Roof
- Terrace
- Deck
- Trellis
- Exterior Walls
- Interior Walls

$$A_{rB} := \begin{bmatrix} 433\ ft^2 \\ 360\ ft^2 \\ 240\ ft^2 \\ 312\ ft^2 \\ 336\ ft^2 \\ 170\ ft^2 \end{bmatrix} \quad DL_{rB} := \begin{bmatrix} DL_{green\_roof} \\ DL_{terrace} \\ DL_{deck} \\ DL_{trellis} \\ DL_{ext\_wall} \\ DL_{int\_wall} \end{bmatrix} = \begin{bmatrix} 53 \\ 34 \\ 7 \\ 12 \\ 22 \\ 10 \end{bmatrix} psf$$

$$W_{rB} := A_{rB} \cdot DL_{rB} = 49.71\ kip$$

Job: **Alta Mira Dziuk Residence** LRFD Lateral Force Analysis 2013 CBC

IBC 1609.6 ALTERNATIVE ALL-HEIGHTS METHOD

DESIGN WIND PRESSURE - MAIN WIND FORCE RESISTING SYSTEM

Exposure Category = B (CBC 1609.4.2)
Roof Pitch = 4.0 :12 ----------Angle = 18.4 °
Eave Height = 32.0 ft
Maximum Height = 35.0 ft
Mean Roof Height = 33.5 ft

N-S Dimension 40.0 ft
E-W Dimension 103.0 ft
Enclosure: Enclosed
Low Rise? YES

Main Wind Force:

V_{ult} = 110 mph (Figure 1609A)
V_{asd} = 85 mph
K_{zt} = 1.00 (ASCE 7 26.8)
I_w = 1.00 (ASCE 7 Table 1.5-2)

α = 7 (ASCE 7 Table 26.9.1)
z_g = 1200 (ASCE 7 Table 26.9.1)

WIND DISTRIBUTION ON NORTH-SOUTH ROOF

Level	z	K_z	Windward Roof C_{net}	Windward Roof P_{net}	Windward Roof Height	Leeward Roof C_{net}	Leeward Roof p_{net}	Leeward Roof Height	Parapet C_{net}	Parapet p_{net}	Parapet C_{net}	Parapet p_{net}	Parapet Height	F_{Total}
	(ft)	(27.3-1)		(psf)	(ft)		(psf)	(ft)		(psf)		(psf)	(ft)	(plf)
Roof	33.5	0.723	-0.72	-16.06	3.0	-0.66	-14.78	3.0	1.28	28.67	-0.85	-19	0.0	48.0

WIND DISTRIBUTION ON NORTH-SOUTH WALLS

Level	z	K_z	Windward Walls C_{net}	Windward Walls p_{net}	Windward Walls Height	Windward Walls F	Leeward Walls C_{net}	Leeward Walls p_{net}	Leeward Walls Height	Leeward Walls F	Total Wind Roof	Total Wind Walls	Total Wind Total
	(ft)	(27.3-1)		(psf)	(ft)	(plf)		(psf)	(ft)	(plf)	(plf)	(plf)	(plf)
Roof	20.5	0.701	0.43	9.335	4.6	43.2	-0.51	-11.1	4.6	-51.2	48.0	94.4	**142.4**
Street	11.3	0.701	0.43	9.335	10.3	95.7	-0.51	-11.1	10.3	-113.5	0.0	209.2	**209.2**
			0.43	######	5.6	######	-0.51	######	5.6	######	0.0	######	######

WIND DISTRIBUTION ON EAST-WEST ROOF

Level			Windward Roof			Leeward Roof			Parapet					
	z (ft)	K_z (27.3-1)	C_{net}	p_{net} (psf)	Height (ft)	C_{net}	p_{net} (psf)	Height (ft)	C_{net}	p_{net} (psf)	C_{net}	p_{net} (psf)	Height (ft)	F_{Total} (plf)
Roof	33.5	0.723	-0.72	-16.1	3.0	-0.66	-14.8	3.0	1.28	28.68	-0.85	-19	0.0	48.0

WIND DISTRIBUTION ON EAST-WEST WALLS

Level			Windward Walls				Leeward Walls				Total Wind		
	z (ft)	K_z (27.3-1)	C_{net}	p_{net} (psf)	Height (ft)	F (plf)	C_{net}	p_{net} (psf)	Height (ft)	F (plf)	Roof (plf)	Walls (plf)	Total (plf)
Roof	20.5	0.701	0.43	9.335	4.0	37.3	-0.51	-11.1	4.0	-44.3	48.0	81.6	**129.6**
Street	11.3	0.701	0.43	9.335	8.0	74.7	-0.51	-11.1	8.0	-88.6	0.0	163.3	**163.3**

Compare Wind and Seismic Design Values

Wind Loads to each level, see attached calcs

Roof
Floor

$$w_{wind\_x} := \begin{bmatrix} 129.6 \ plf \\ 163.3 \ plf \end{bmatrix} \qquad w_{wind\_y} := \begin{bmatrix} 142.4 \ plf \\ 209.2 \ plf \end{bmatrix}$$

Seismic Loads to each level, see above calcs

$B := \begin{bmatrix} 16 \ ft \\ 28 \ ft \end{bmatrix}$ Width of building in y direction $\qquad L := \begin{bmatrix} 52.5 \ ft \\ 78 \ ft \end{bmatrix}$ Length of building in x direction

Roof
Floor

$$w_{seismic\_x} := \frac{F_{xA}}{B} = \begin{bmatrix} 407.4 \\ 294.5 \end{bmatrix} plf \qquad w_{seismic\_y} := \frac{F_{xA}}{L} = \begin{bmatrix} 124.2 \\ 105.7 \end{bmatrix} plf$$

Convert to ASD to compare values and determine which governs,
Wind Factor = 0.6
Seismic Factor = 0.7

$$0.6 \cdot w_{wind\_x} = \begin{bmatrix} 77.76 \\ 97.98 \end{bmatrix} plf \qquad 0.6 \cdot w_{wind\_y} = \begin{bmatrix} 85.44 \\ 125.52 \end{bmatrix} plf$$

$$\left(\overrightarrow{0.6 \ w_{wind\_x} \cdot B}\right) = \begin{bmatrix} 1.24 \\ 2.74 \end{bmatrix} kip \qquad \left(\overrightarrow{0.6 \ w_{wind\_y} \cdot B}\right) = \begin{bmatrix} 1.37 \\ 3.51 \end{bmatrix} kip$$

$\rho := 1.3$ assume 1.3 for this stucture

$$0.7 \cdot \rho \cdot F_{xA} = \begin{bmatrix} 5.932 \\ 7.503 \end{bmatrix} kip$$

Seismic still governs for revised loading, design lateral system for seismic loads.

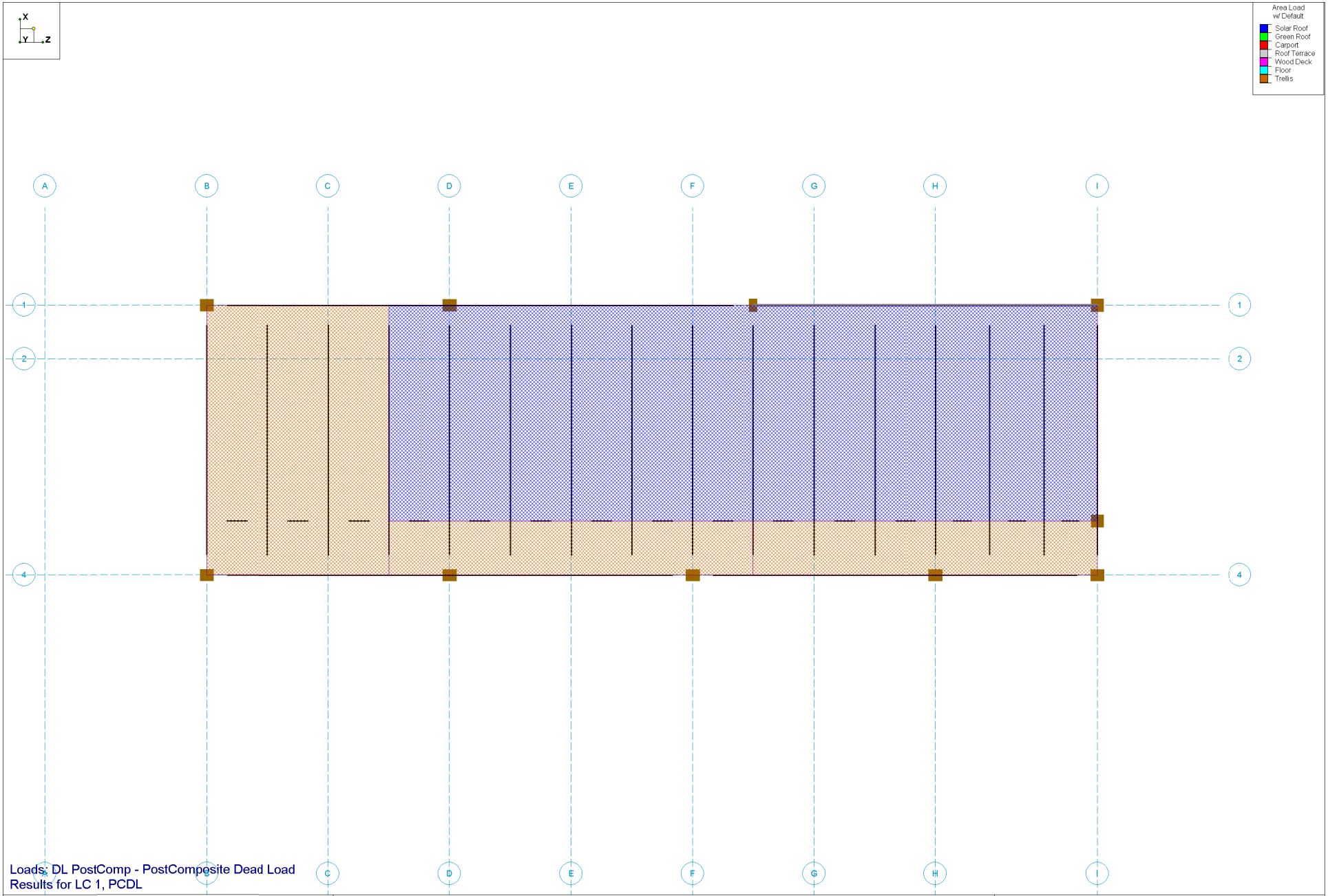
GRAVITY DESIGN

Design Deflection Parameters

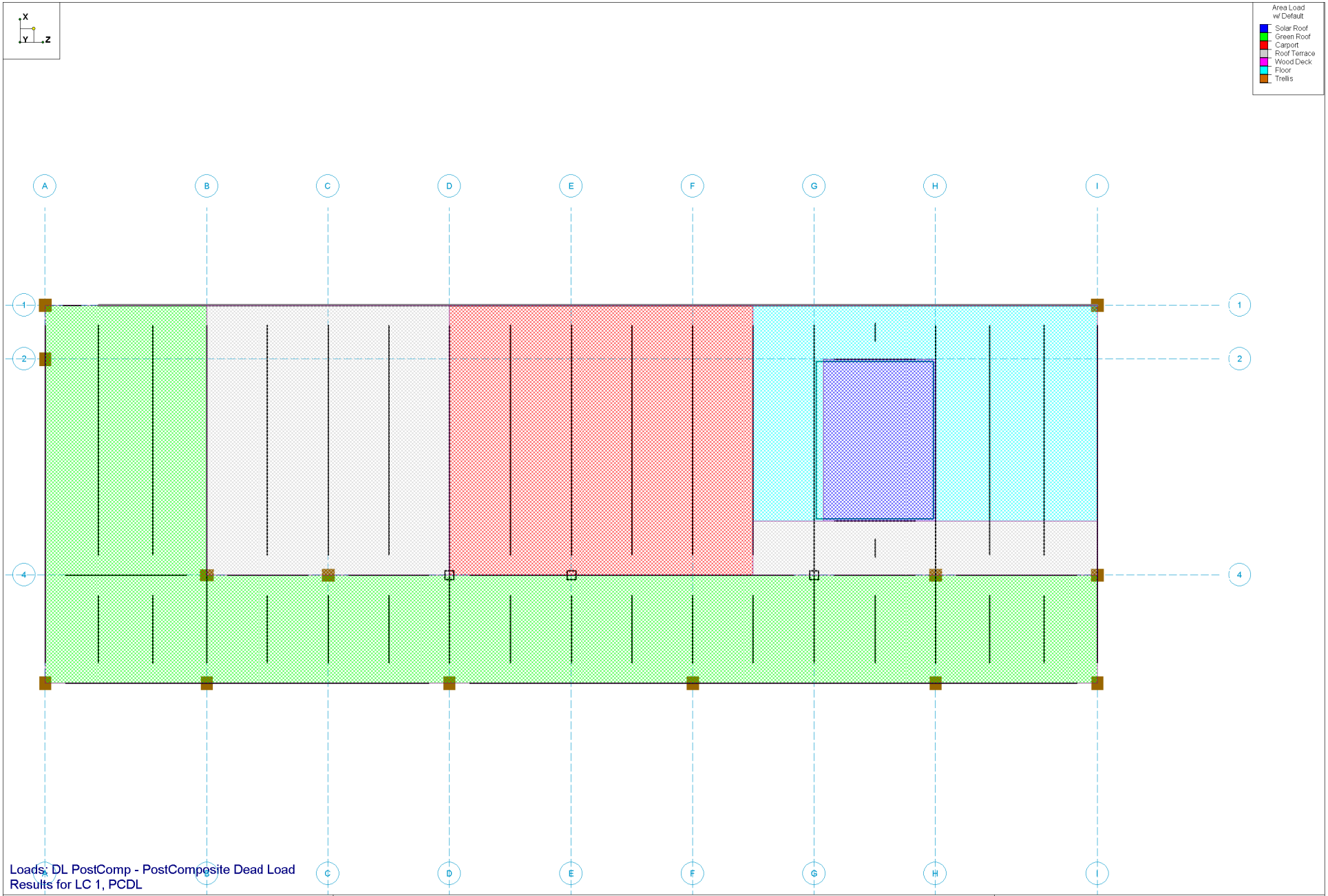
	Label	DL Defl[i...	DL Ratio	LL Defl[in]	LL Ratio	DL+LL ...	DL+LL ...	Category	Defl[in]	Ratio	Category	Defl[in]	Ratio
1	Typical		360		360		360	None		360	None		360
2	pool deck		180		240		180	None		360	None		360
3	R3	0.5	240	0.5	360	0.5	360	None		360	None		360
4	DR1		240		360			None			None		

Uniform Area Loads

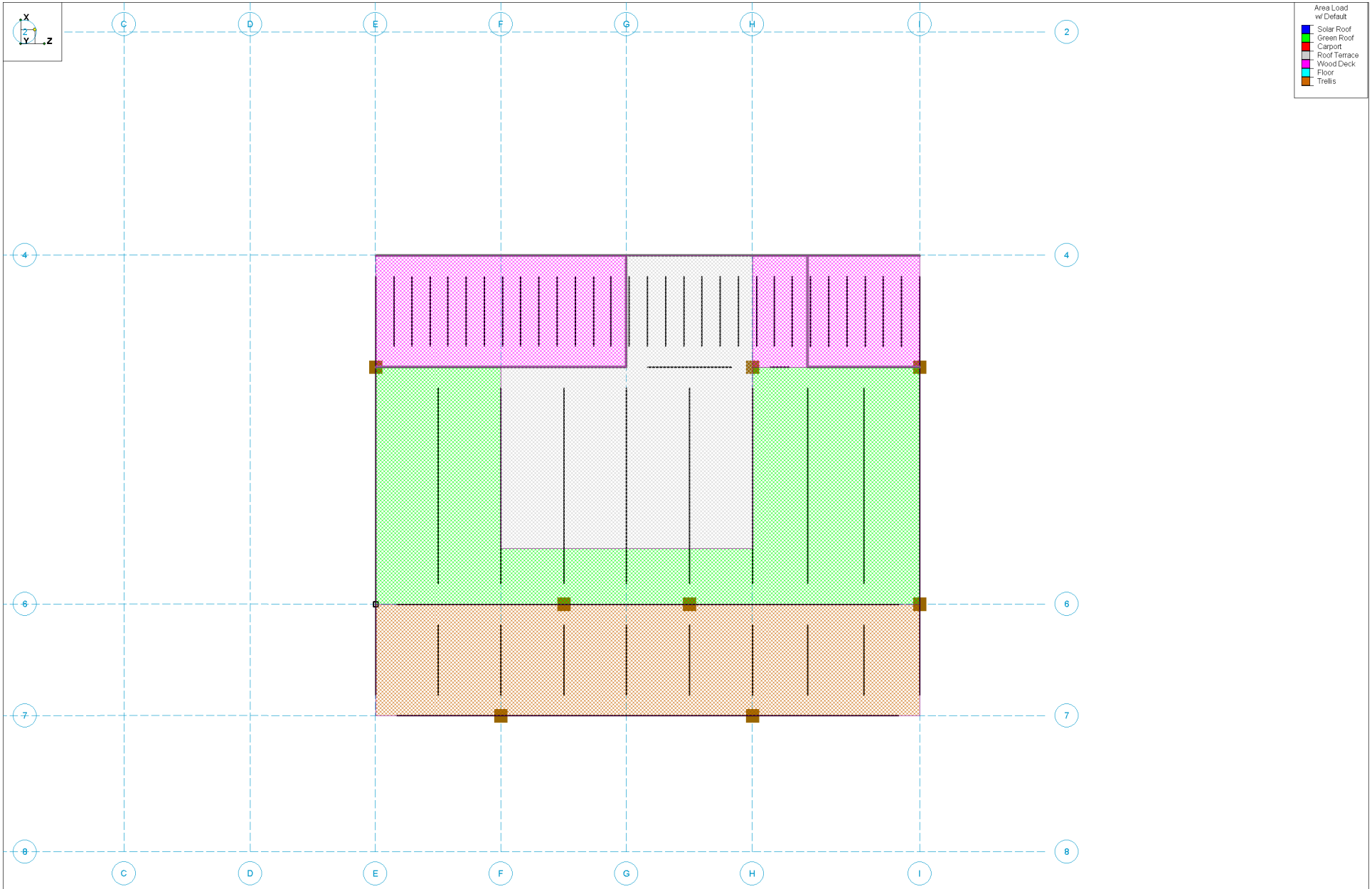
	Label	Additive	PreDL[ksf]	PostDL[ksf]	LL[ksf]	LL Type	VL[ksf]	Dyn Load[ksf]
1	Solar Roof			0.033	0.02	RLL-Reduce		
2	Green Roof			0.053	0.02	RLL-Reduce		
3	Carport			0.05	0.04	LL-Non		
4	Roof Terrace			0.034	0.06	LL-Reduce		
5	Wood Deck			0.007	0.06	LL-Reduce		
6	Floor			0.043	0.04	LL-Reduce		
7	Trellis			0.012	0.02	RLL-Reduce		



Tepa ES	Roof Level	
C Farrell	Alta Mira Infinity House	July 29, 2023 at 4:04 PM
	Roof Loading Diagram	Dziuk Structural Framing_Revised - walls.rfl

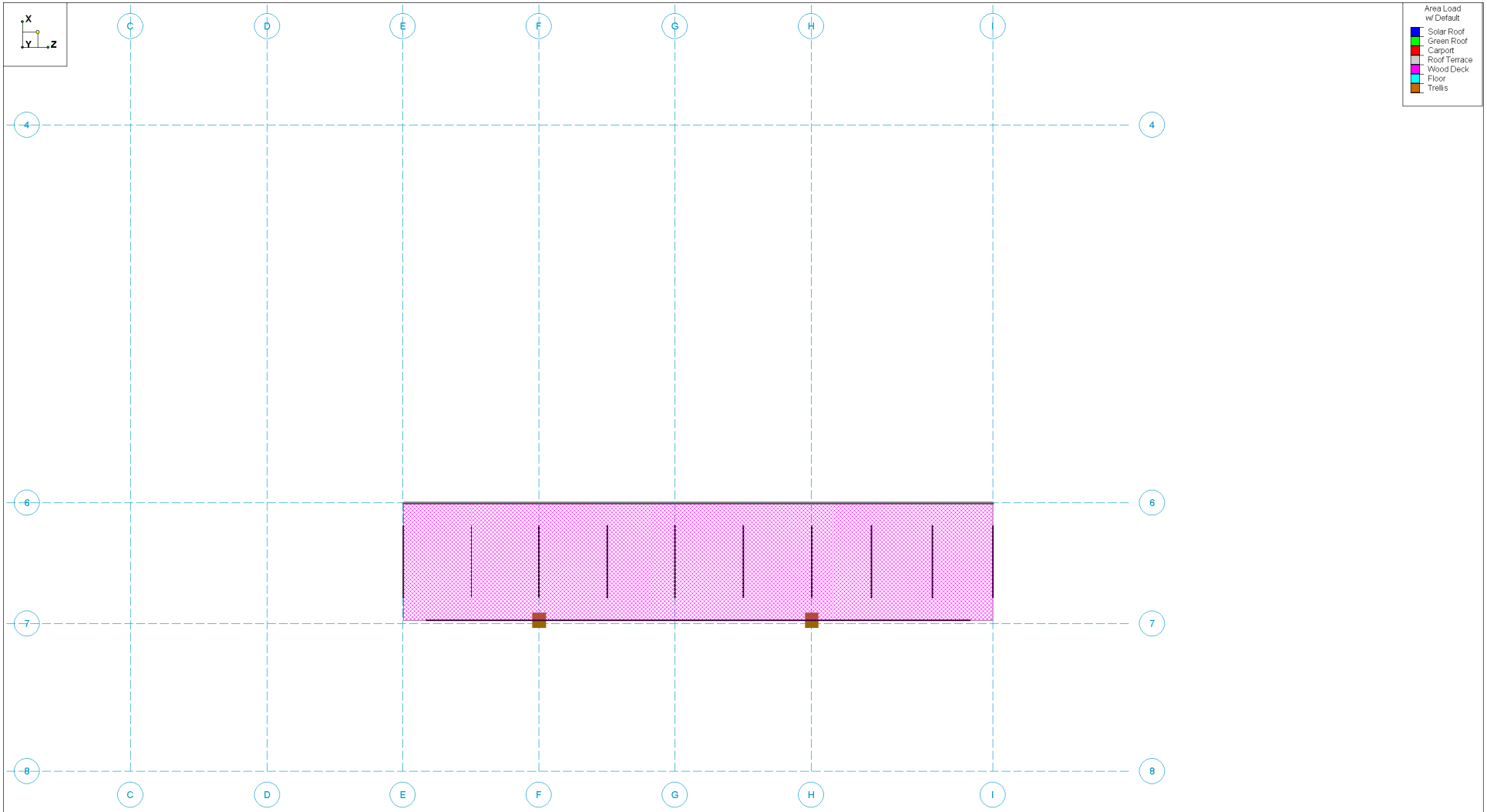


Tepa ES	Street Level	
C Farrell	Alta Mira Infinity House	July 29, 2023 at 4:04 PM
	Street Level Loading Diagram	Dziuk Structural Framing_Revised - walls.rfl



Loads: DL PostComp - PostComposite Dead Load
Results for LC 1, PCDL

Tepa ES	Lower Level	
C Farrell	Alta Mira Infinity House	July 29, 2023 at 4:05 PM
	Lower Level Loading Diagram	Dziuk Structural Framing_Revised - walls.rfl



Loads: DL PostComp - PostComposite Dead Load
Results for LC 1, PCDL

Tepa ES	Pool Terrace Level	
C Farrell	Alta Mira Infinity House	July 29, 2023 at 4:05 PM
	Pool Level Loading Diagram	Dziuk Structural Framing_Revised - walls.rfl

Beam Code Summary for Hot Rolled : Roof Level

	Label	Size	Exp..	Stu...	Ca...	Mat..	Ben...	Loc[ft]	LC	Defl ...	Loc[ft]	Cat	She...	Lo...	LC	Web Opening Unity Check	Web Ope...
No Data to Print ...																	

Beam Code Summary for Hot Rolled : Street Level

	Label	Size	Exp..	Stu...	Ca...	Mat..	Ben...	Loc[ft]	LC	Defl ...	Loc[ft]	Cat	She...	Lo...	LC	Web Opening Unity Check	Web Ope...
1	S41	W14X30	Yes		0	A992	0.894	18	5	0.631	8.438	D...	0.182	18	5		

Beam Code Summary for Hot Rolled : Lower Level

	Label	Size	Exp..	Stu...	Ca...	Mat..	Ben...	Loc[ft]	LC	Defl ...	Loc[ft]	Cat	She...	Lo...	LC	Web Opening Unity Check	Web Ope...
No Data to Print ...																	

Beam Code Summary for Hot Rolled : Pool Terrace Level

	Label	Size	Exp..	Stu...	Ca...	Mat..	Ben...	Loc[ft]	LC	Defl ...	Loc[ft]	Cat	She...	Lo...	LC	Web Opening Unity Check	Web Ope...
No Data to Print ...																	

Beam Code Summary for Wood : Roof Level

	Label	Size	Explicit	Material	Bending ...	Loc[ft]	LC	Defl Check	Loc[ft]	Cat	Shear Ch...	Loc[ft]	LC
1	R1	5.125X15FS	Yes	24F-1.8...	0.077	10	4	0.151	10	DL+LL	0.042	20	4
2	R2	5.125X15FS	Yes	24F-1.8...	0.057	3.958	4	0.06	12.917	DL+LL	0.059	4.167	4
3	R3	5.125X15FS	Yes	24F-1.8...	0.153	10	4	0.301	10	DL+LL	0.085	20	4
4	R4	5.125X15FS	Yes	24F-1.8...	0.246	10	4	0.48	10	DL+LL	0.138	20	4
5	R5	5.125X15FS	Yes	24F-1.8...	0.246	10	4	0.48	10	DL+LL	0.138	20	4
6	R6	5.125X15FS	Yes	24F-1.8...	0.246	10	4	0.48	10	DL+LL	0.138	20	4
7	R7	5.125X15FS	Yes	24F-1.8...	0.246	10	4	0.48	10	DL+LL	0.138	20	4
8	R8	5.125X15FS	Yes	24F-1.8...	0.232	10	4	0.454	10	DL+LL	0.131	20	4
9	R9	5.125X15FS	Yes	24F-1.8...	0.2	10	4	0.391	10	DL+LL	0.112	20	4
10	R10	5.125X15FS	Yes	24F-1.8...	0.246	10	4	0.48	10	DL+LL	0.138	20	4
11	R11	5.125X15FS	Yes	24F-1.8...	0.246	10	4	0.48	10	DL+LL	0.138	20	4
12	R12	5.125X15FS	Yes	24F-1.8...	0.246	10	4	0.48	10	DL+LL	0.138	20	4
13	R13	5.125X15FS	Yes	24F-1.8...	0.246	10	4	0.48	10	DL+LL	0.138	20	4
14	R14	5.125X15FS	Yes	24F-1.8...	0.153	10	4	0.301	10	DL+LL	0.085	20	4
15	R15	5.125X15FS	Yes	24F-1.8...	0.219	10	4	0.427	10	DL+LL	0.123	20	4
16	R16	5.125X15FS	Yes	24F-1.8...	0.219	10	4	0.427	10	DL+LL	0.123	20	4
17	R17	5.125X15FS	Yes	24F-1.8...	0	4.5	1	0.036	0	DL	0	4.5	1
18	R18	5.125X15FS	Yes	24F-1.8...	0	4.5	1	0.036	0	DL	0	4.5	1
19	R19	5.125X15FS	Yes	24F-1.8...	0	4.5	1	0.036	0	DL	0	4.5	1
20	R20	5.125X15FS	Yes	24F-1.8...	0	4.5	1	0.036	0	DL	0	4.5	1
21	R21	5.125X15FS	Yes	24F-1.8...	0	4.5	1	0.036	0	DL	0	4.5	1
22	R22	5.125X15FS	Yes	24F-1.8...	0	4.5	1	0.036	0	DL	0	4.5	1
23	R23	5.125X15FS	Yes	24F-1.8...	0	4.5	1	0.036	0	DL	0	4.5	1
24	R24	5.125X15FS	Yes	24F-1.8...	0	4.5	1	0.036	0	DL	0	4.5	1
25	R25	5.125X15FS	Yes	24F-1.8...	0	4.5	1	0.036	0	DL	0	4.5	1
26	R26	5.125X15FS	Yes	24F-1.8...	0	4.5	1	0.036	0	DL	0	4.5	1
27	R27	5.125X15FS	Yes	24F-1.8...	0	4.5	1	0.036	0	DL	0	4.5	1
28	R28	5.125X15FS	Yes	24F-1.8...	0	4.5	1	0.036	0	DL	0	4.5	1
29	R29	5.125X15FS	Yes	24F-1.8...	0	4	1	0.036	0	DL	0	4	1
30	R30	5.125X15FS	Yes	24F-1.8...	0	4	1	0.036	0	DL	0	4	1
31	R31	5.125X15FS	Yes	24F-1.8...	0	4	1	0.036	0	DL	0	4	1
32	R32	5.125X15FS	Yes	24F-1.8...	0.345	18	4	0.331	28.125	DL+LL	0.23	22.5	4
33	R33	5.125X15FS	Yes	24F-1.8...	0.285	18.125	4	0.165	8.125	LL	0.224	17.813	4
34	R34	5.125X15FS	Yes	24F-1.8...	0.535	18.141	4	0.913	30.375	DL+LL	0.338	22.359	4

Beam Code Summary for Wood : Street Level

	Label	Size	Explicit	Material	Bending ...	Loc[ft]	LC	Defl Check	Loc[ft]	Cat	Shear Ch...	Loc[ft]	LC
1	S2	5.125X15FS	Yes	24F-1.8...	0.525	19.833	2	0.767	18.083	DL+LL	0.331	3.792	2
2	S3	5.125X15FS	Yes	24F-1.8...	0.313	8.167	3	0.414	19.25	DL+LL	0.274	8.167	3
3	S4	5.125X15FS	Yes	24F-1.8...	0.563	10	3	0.88	10	DL+LL	0.311	20	3
4	S5	5.125X15FS	Yes	24F-1.8...	0.563	10	3	0.88	10	DL+LL	0.311	20	3
5	S6	5.125X15FS	Yes	24F-1.8...	0.563	10	3	0.88	10	DL+LL	0.311	20	3
6	S7	5.125X15FS	Yes	24F-1.8...	0.41	8.167	3	0.476	19.25	DL+LL	0.358	8.167	3
7	S8	5.125X15FS	Yes	24F-1.8...	0.539	10	3	0.843	10	DL+LL	0.298	20	3
8	S9	5.125X15FS	Yes	24F-1.8...	0.539	10	3	0.843	10	DL+LL	0.298	20	3
9	S10	5.125X15FS	Yes	24F-1.8...	0.539	10	3	0.843	10	DL+LL	0.298	20	3
10	S11	5.125X15FS	Yes	24F-1.8...	0.447	10	3	0.7	10	DL+LL	0.256	0	3
11	S12	5.125X15FS	Yes	24F-1.8...	0.447	10	3	0.7	10	DL+LL	0.256	0	3
12	S13	5.125X15FS	Yes	24F-1.8...	0.314	10	4	0.608	10	DL+LL	0.173	20	2
13	S14	5.125X15FS	Yes	24F-1.8...	0.314	10	4	0.608	10	DL+LL	0.173	20	2
14	S15	5.125X15FS	Yes	24F-1.8...	0.222	19.833	3	0.274	9.917	DL+LL	0.222	19.833	3
15	S17	5.125X15FS	Yes	24F-1.8...	0.521	10	3	0.818	10	DL+LL	0.293	0	3
16	S18	5.125X15FS	Yes	24F-1.8...	0.273	20.125	3	0.328	9.042	DL+LL	0.277	19.833	3
17	S19	5.125X15FS	Yes	24F-1.8...	0.252	19.833	3	0.282	9.042	DL+LL	0.255	19.833	3
18	S20	5.125X15FS	Yes	24F-1.8...	0.045	4.5	3	0.036	0	DL	0.03	0	3
19	S21	5.125X15FS	Yes	24F-1.8...	0.051	4.5	3	0.036	0	DL	0.033	0	3
20	S22	5.125X15FS	Yes	24F-1.8...	0.022	2	3	0.036	0	DL	0.062	4	3
21	S23	5.125X15FS	Yes	24F-1.8...	0.02	2	3	0.036	0	DL	0.055	4	3
22	S24	5.125X15FS	Yes	24F-1.8...	0.344	8	2	0.428	6	DL+LL	0.243	12	2
23	S25	5.125X15FS	Yes	24F-1.8...	0.452	8	3	0.487	6	DL+LL	0.319	12	3
24	S26	5.125X15FS	Yes	24F-1.8...	0.106	4.5	3	0.077	4.5	DL+LL	0.066	9	3
25	S27	5.125X15FS	Yes	24F-1.8...	0.305	4.5	3	0.198	4.5	DL+LL	0.191	9	3
26	S28	5.125X15FS	Yes	24F-1.8...	0.049	4	2	0.039	4	DL+LL	0.069	8	2
27	S29	5.125X15FS	Yes	24F-1.8...	0.049	4	2	0.039	4	DL+LL	0.069	8	2
28	S30	5.125X15FS	Yes	24F-1.8...	0.056	4	2	0.044	4	DL+LL	0.078	8	2
29	S31	5.125X15FS	Yes	24F-1.8...	0.056	4	2	0.044	4	DL+LL	0.078	8	2
30	S32	5.125X15FS	Yes	24F-1.8...	0.056	4	2	0.044	4	DL+LL	0.078	8	2
31	S33	5.125X15FS	Yes	24F-1.8...	0.056	4	2	0.044	4	DL+LL	0.078	8	2
32	S34	5.125X15FS	Yes	24F-1.8...	0.056	4	2	0.044	4	DL+LL	0.078	8	2
33	S35	5.125X15FS	Yes	24F-1.8...	0.056	4	2	0.044	4	DL+LL	0.078	8	2
34	S36	5.125X15FS	Yes	24F-1.8...	0.056	4	2	0.044	4	DL+LL	0.078	8	2
35	S37	5.125X15FS	Yes	24F-1.8...	0.056	4	2	0.044	4	DL+LL	0.078	8	2
36	S38	5.125X15FS	Yes	24F-1.8...	0.049	4	2	0.039	4	DL+LL	0.069	8	2
37	S39	5.125X15FS	Yes	24F-1.8...	0.049	4	2	0.039	4	DL+LL	0.069	8	2
38	S40	5.125X15FS	Yes	24F-1.8...	0.305	4.5	3	0.198	4.5	DL+LL	0.191	9	3
39	S42	5.125X15FS	Yes	24F-1.8...	0.539	10	3	0.843	10	DL+LL	0.298	20	3
40	S43	5.125X15FS	Yes	24F-1.8...	0.056	4	2	0.044	4	DL+LL	0.078	8	2
41	M44	5.125X15FS	Yes	24F-1.8...	0.183	11.875	2	0.25	21.563	DL+LL	0.145	16.25	2
42	M45	5.125X15FS	Yes	24F-1.8...	0.198	18	4	0.255	8.5	DL+LL	0.168	18	4
43	M46	5.125X15FS	Yes	24F-1.8...	0	4	1	0.036	0	DL	0	4	1

Beam Code Summary for Wood : Lower Level

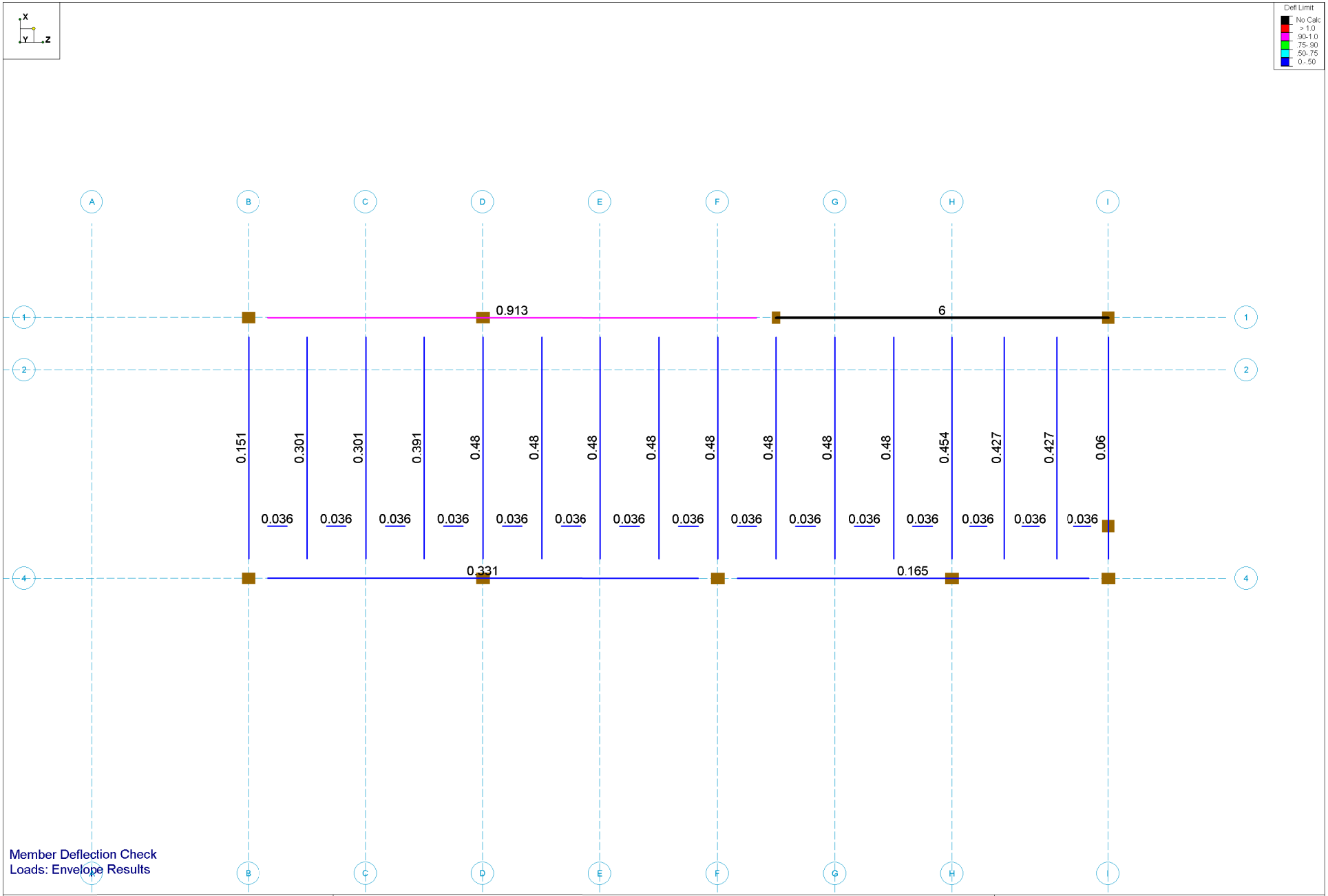
	Label	Size	Explicit	Material	Bending ...	Loc[ft]	LC	Defl Check	Loc[ft]	Cat	Shear Ch...	Loc[ft]	LC
1	L1	5.125X15FS	Yes	24F-1.8...	0.294	8.146	3	0.452	8.146	DL+LL	0.196	0	3
2	L2	5.125X15FS	Yes	24F-1.8...	0.075	7.906	2	0.089	16.5	DL+LL	0.085	8.25	2
3	L5	5.125X15FS	Yes	24F-1.8...	0.253	8.5	4	0.42	8.5	DL+LL	0.166	17	2
4	L6	5.125X15FS	Yes	24F-1.8...	0.307	8.854	3	0.475	8.854	DL+LL	0.204	17	3
5	L7	5.125X15FS	Yes	24F-1.8...	0.385	8.854	3	0.525	8.5	DL+LL	0.258	17	3
6	L8	5.125X15FS	Yes	24F-1.8...	0.385	8.854	3	0.525	8.5	DL+LL	0.258	17	3
7	L9	5.125X15FS	Yes	24F-1.8...	0.225	8.5	4	0.373	8.5	DL+LL	0.147	17	2
8	L10	5.125X15FS	Yes	24F-1.8...	0.225	8.5	4	0.373	8.5	DL+LL	0.147	17	2
9	L11	5.125X15FS	Yes	24F-1.8...	0.388	31.281	4	0.539	31.281	DL+LL	0.305	26.813	5
10	L12	2X8	Yes	24F-1.8...	0.275	4	3	0.351	4	DL+LL	0.181	8	3

Beam Code Summary for Wood : Lower Level (Continued)

	Label	Size	Explicit	Material	Bending ...	Loc[ft]	LC	Defl Check	Loc[ft]	Cat	Shear Ch...	Loc[ft]	LC
11	L13	2X8	Yes	24F-1.8...	0.275	4	3	0.351	4	DL+LL	0.181	8	3
12	L14	2X8	Yes	24F-1.8...	0.275	4	3	0.351	4	DL+LL	0.181	8	3
13	L15	2X8	Yes	24F-1.8...	0.275	4	3	0.351	4	DL+LL	0.181	8	3
14	L16	2X8	Yes	24F-1.8...	0.275	4	3	0.351	4	DL+LL	0.181	8	3
15	L17	2X8	Yes	24F-1.8...	0.275	4	3	0.351	4	DL+LL	0.181	8	3
16	L18	2X8	Yes	24F-1.8...	0.275	4	3	0.351	4	DL+LL	0.181	8	3
17	L19	2X8	Yes	24F-1.8...	0.275	4	3	0.351	4	DL+LL	0.181	8	3
18	L20	2X8	Yes	24F-1.8...	0.275	4	3	0.351	4	DL+LL	0.181	8	3
19	L21	2X8	Yes	24F-1.8...	0.275	4	3	0.351	4	DL+LL	0.181	8	3
20	L22	2X8	Yes	24F-1.8...	0.275	4	3	0.351	4	DL+LL	0.181	8	3
21	L23	2X8	Yes	24F-1.8...	0.275	4	3	0.351	4	DL+LL	0.181	8	3
22	L24	2X8	Yes	24F-1.8...	0.254	4	3	0.324	4	DL+LL	0.167	8	3
23	L25	2X8	Yes	24F-1.8...	0.223	4	3	0.284	4	DL+LL	0.147	8	3
24	L26	2X8	Yes	24F-1.8...	0.386	4	3	0.493	4	DL+LL	0.254	8	3
25	L27	2X8	Yes	24F-1.8...	0.386	4	3	0.493	4	DL+LL	0.254	8	3
26	L28	2X8	Yes	24F-1.8...	0.386	4	3	0.493	4	DL+LL	0.254	8	3
27	L29	2X8	Yes	24F-1.8...	0.386	4	3	0.493	4	DL+LL	0.254	8	3
28	L30	2X8	Yes	24F-1.8...	0.386	4	3	0.493	4	DL+LL	0.254	8	3
29	L31	2X8	Yes	24F-1.8...	0.383	4	3	0.489	4	DL+LL	0.252	8	3
30	L32	2X8	Yes	24F-1.8...	0.308	4	3	0.393	4	DL+LL	0.203	8	3
31	L33	2X8	Yes	24F-1.8...	0.275	4	3	0.351	4	DL+LL	0.181	8	3
32	L34	2X8	Yes	24F-1.8...	0.254	4	3	0.324	4	DL+LL	0.167	8	3
33	L35	2X8	Yes	24F-1.8...	0.159	4	3	0.203	4	DL+LL	0.105	8	3
34	L36	2X8	Yes	24F-1.8...	0.275	4	3	0.351	4	DL+LL	0.181	8	3
35	L37	2X8	Yes	24F-1.8...	0.275	4	3	0.351	4	DL+LL	0.181	8	3
36	L38	2X8	Yes	24F-1.8...	0.275	4	3	0.351	4	DL+LL	0.181	8	3
37	L39	2X8	Yes	24F-1.8...	0.275	4	3	0.351	4	DL+LL	0.181	8	3
38	L40	2X8	Yes	24F-1.8...	0.275	4	3	0.351	4	DL+LL	0.181	8	3
39	L41	5.125X15FS	Yes	24F-1.8...	0.083	25.094	4	0.105	33	LL	0.076	24.75	4
40	L42	5.125X15FS	Yes	24F-1.8...	0.082	11.781	4	0.083	21.125	DL+LL	0.058	16.25	4
41	L43	5.125X15FS	Yes	24F-1.8...	0.024	4	4	0.036	0	DL	0.034	8	4
42	L44	5.125X15FS	Yes	24F-1.8...	0.024	4	4	0.036	0	DL	0.034	8	4
43	L45	5.125X15FS	Yes	24F-1.8...	0.024	4	4	0.036	0	DL	0.034	8	4
44	L46	5.125X15FS	Yes	24F-1.8...	0.024	4	4	0.036	0	DL	0.034	8	4
45	L47	5.125X15FS	Yes	24F-1.8...	0.024	4	4	0.036	0	DL	0.034	8	4
46	L48	5.125X15FS	Yes	24F-1.8...	0.023	4	4	0.036	0	DL	0.032	8	4
47	L49	5.125X15FS	Yes	24F-1.8...	0.022	4	4	0.036	0	DL	0.03	8	4
48	L50	5.125X15FS	Yes	24F-1.8...	0.022	4	4	0.036	0	DL	0.03	8	4
49	L51	5.125X15FS	Yes	24F-1.8...	0.385	8.854	3	0.525	8.5	DL+LL	0.258	17	3
50	M51	5.125X15FS	Yes	24F-1.8...	0.303	4.5	3	0.201	4.5	DL+LL	0.251	0.188	3
51	M52	5.125X15FS	Yes	24F-1.8...	0.014	1.625	3	0.036	0	DL	0.048	0.292	3

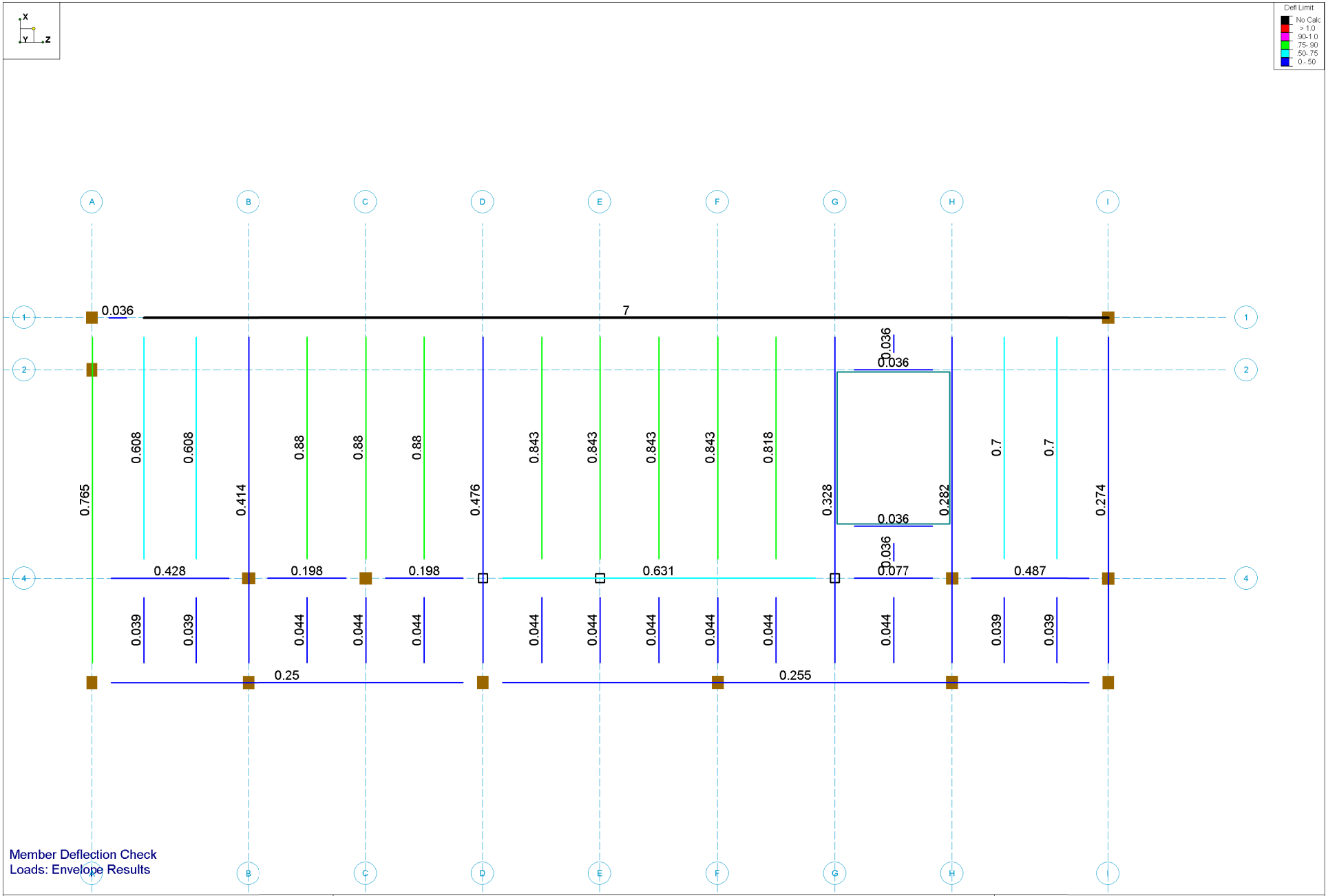
Beam Code Summary for Wood : Pool Terrace Level

	Label	Size	Explicit	Material	Bending ...	Loc[ft]	LC	Defl Check	Loc[ft]	Cat	Shear Ch...	Loc[ft]	LC
1	P1	8.75X15FS	Yes	24F-1.8...	0.318	26.813	3	0.708	39	LL	0.118	26.813	3
2	P2	5.125X15FS	Yes	24F-1.8...	0.03	3.875	3	0.036	0	DL	0.043	7.75	3
3	P3	5.125X15FS	Yes	24F-1.8...	0.026	3.875	3	0.036	0	DL	0.038	7.75	3
4	P4	5.125X15FS	Yes	24F-1.8...	0.059	3.875	3	0.037	3.875	DL+LL	0.086	7.75	3
5	P5	5.125X15FS	Yes	24F-1.8...	0.059	3.875	3	0.037	3.875	DL+LL	0.086	7.75	3
6	P6	5.125X15FS	Yes	24F-1.8...	0.056	3.875	3	0.036	0	DL	0.081	7.75	3
7	P7	5.125X15FS	Yes	24F-1.8...	0.059	3.875	3	0.037	3.875	DL+LL	0.086	7.75	3
8	P8	5.125X15FS	Yes	24F-1.8...	0.059	3.875	3	0.037	3.875	DL+LL	0.086	7.75	3
9	P9	5.125X15FS	Yes	24F-1.8...	0.059	3.875	3	0.037	3.875	DL+LL	0.086	7.75	3
10	P10	5.125X15FS	Yes	24F-1.8...	0.053	3.875	3	0.036	0	DL	0.076	7.75	3
11	P11	5.125X15FS	Yes	24F-1.8...	0.053	3.875	3	0.036	0	DL	0.076	7.75	3

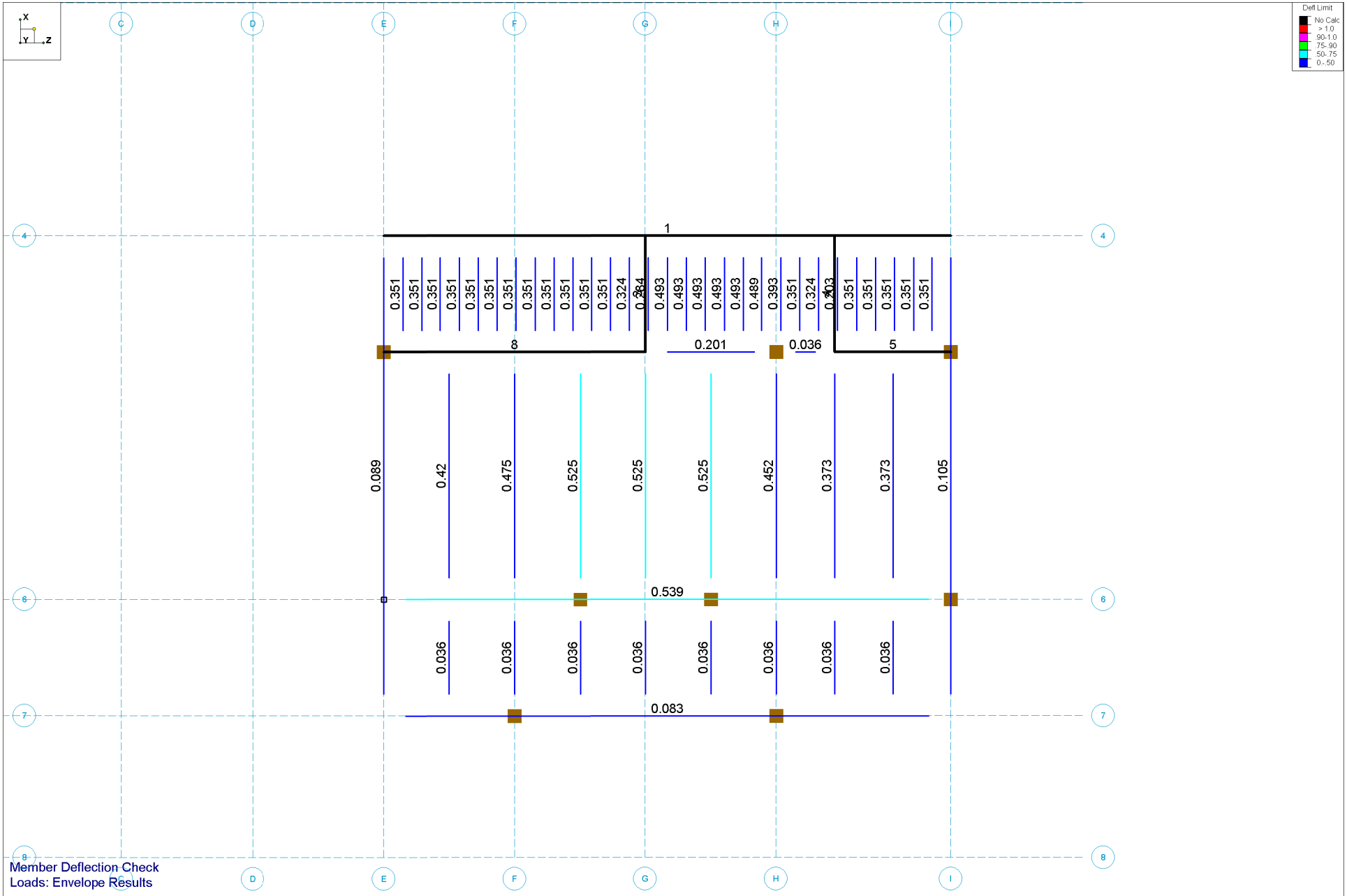


Member Deflection Check
Loads: Envelope Results

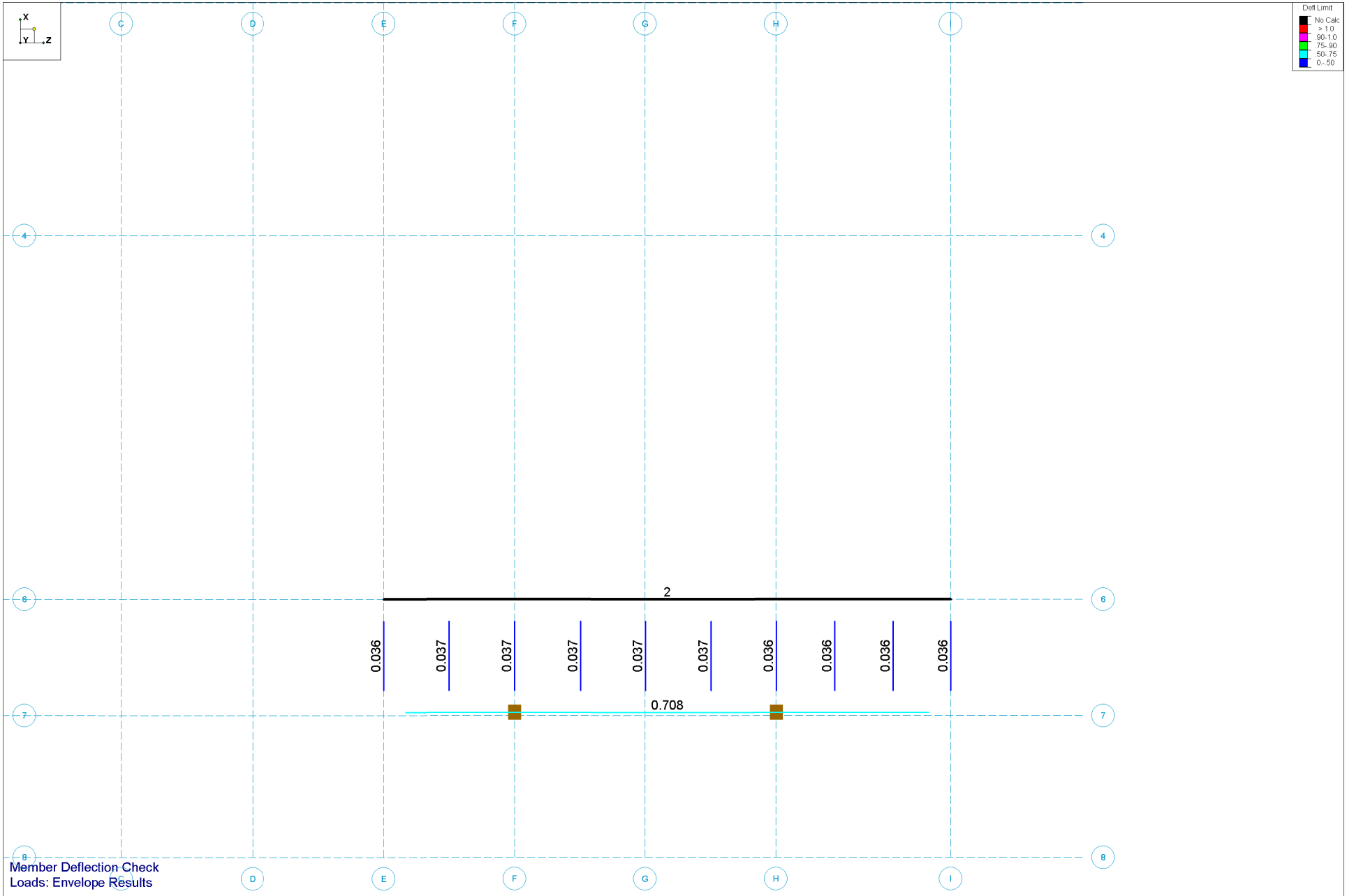
Tepa ES	Roof Level	
C Farrell	Alta Mira Infinity House	July 29, 2023 at 4:02 PM
	Shear Check - Roof	Dziuk Structural Framing_Revised - walls.rfl



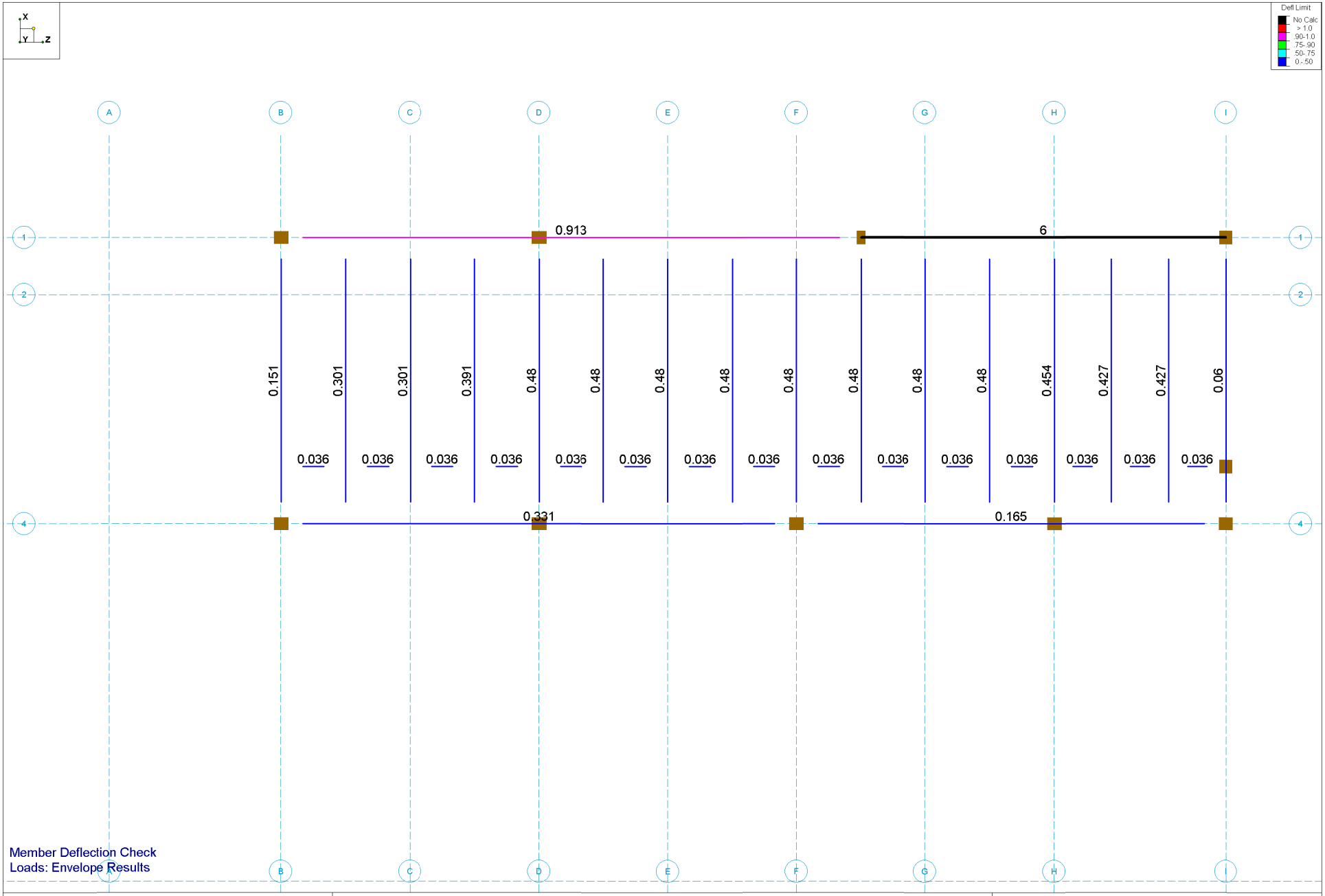
Tepa ES	Street Level	
C Farrell	Alta Mira Infinity House	July 29, 2023 at 4:01 PM
	Shear Check - Street Level	Dziuk Structural Framing_Revised - walls.rfl



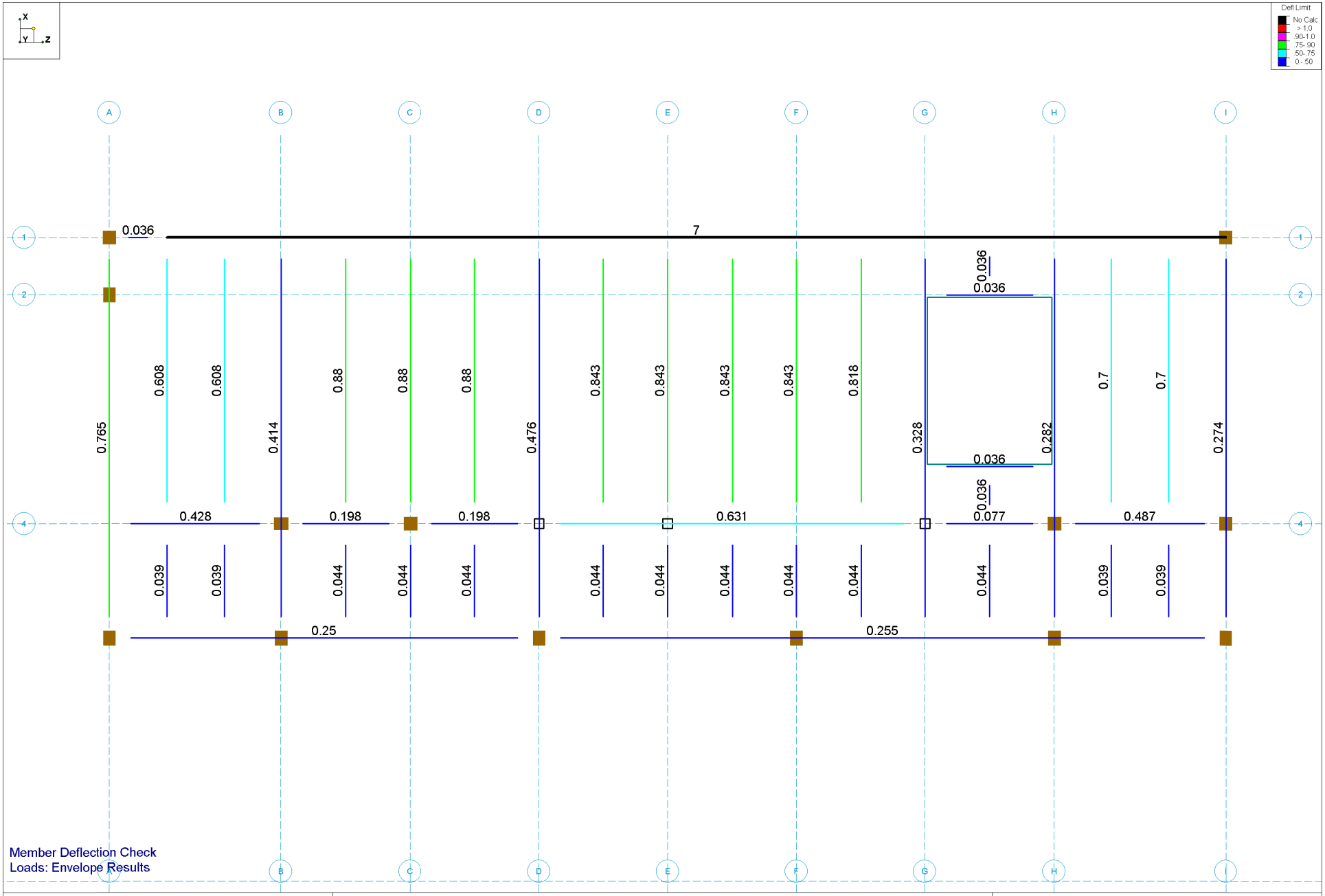
Tepa ES	Lower Level	
C Farrell	Alta Mira Infinity House	July 29, 2023 at 4:01 PM
	Shear Check - Lower Level	Dziuk Structural Framing_Revised - walls.rfl



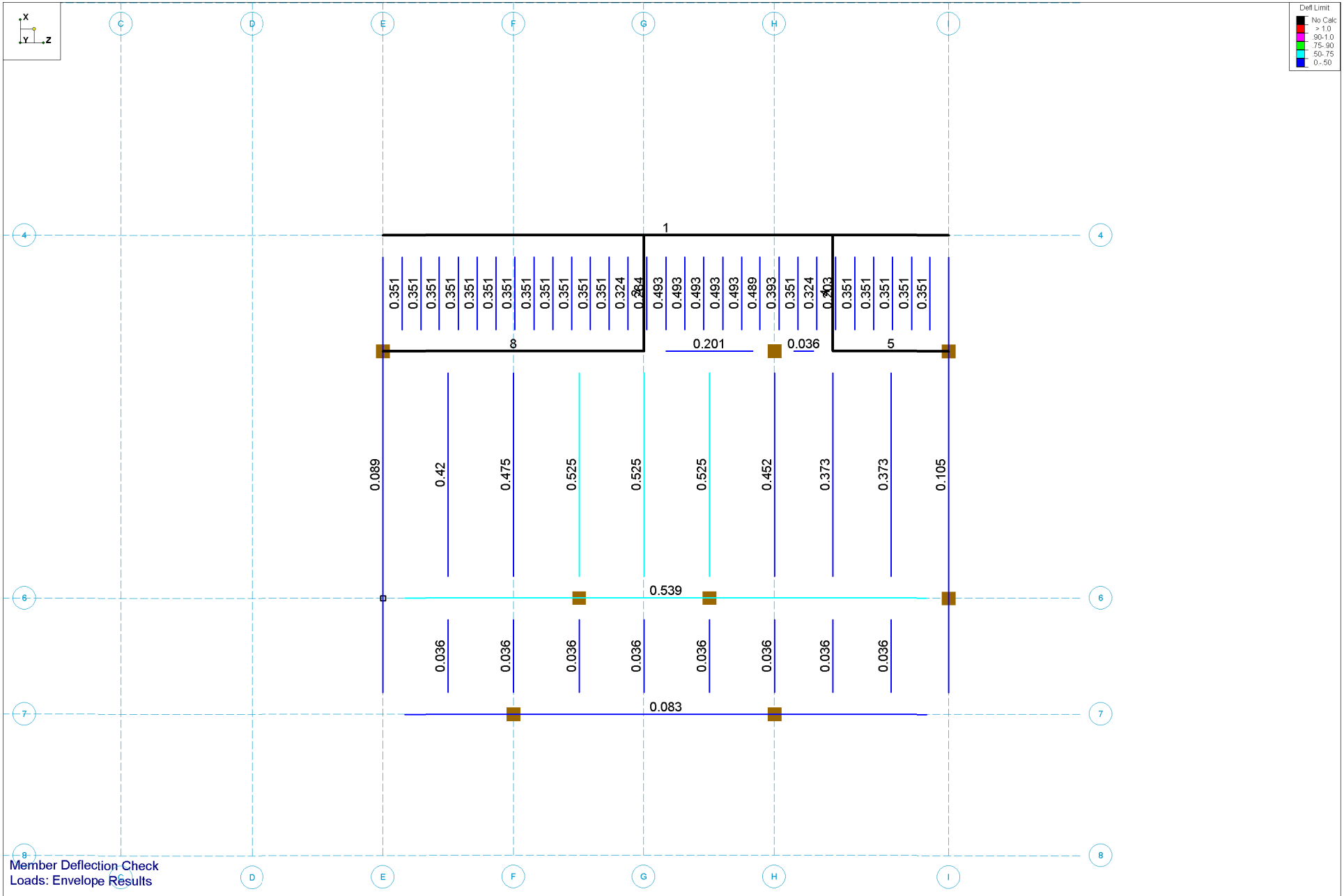
Tepa ES	Pool Terrace Level	
C Farrell	Alta Mira Infinity House	July 29, 2023 at 4:01 PM
	Shear Check - Pool Level	Dziuk Structural Framing_Revised - walls.rfl



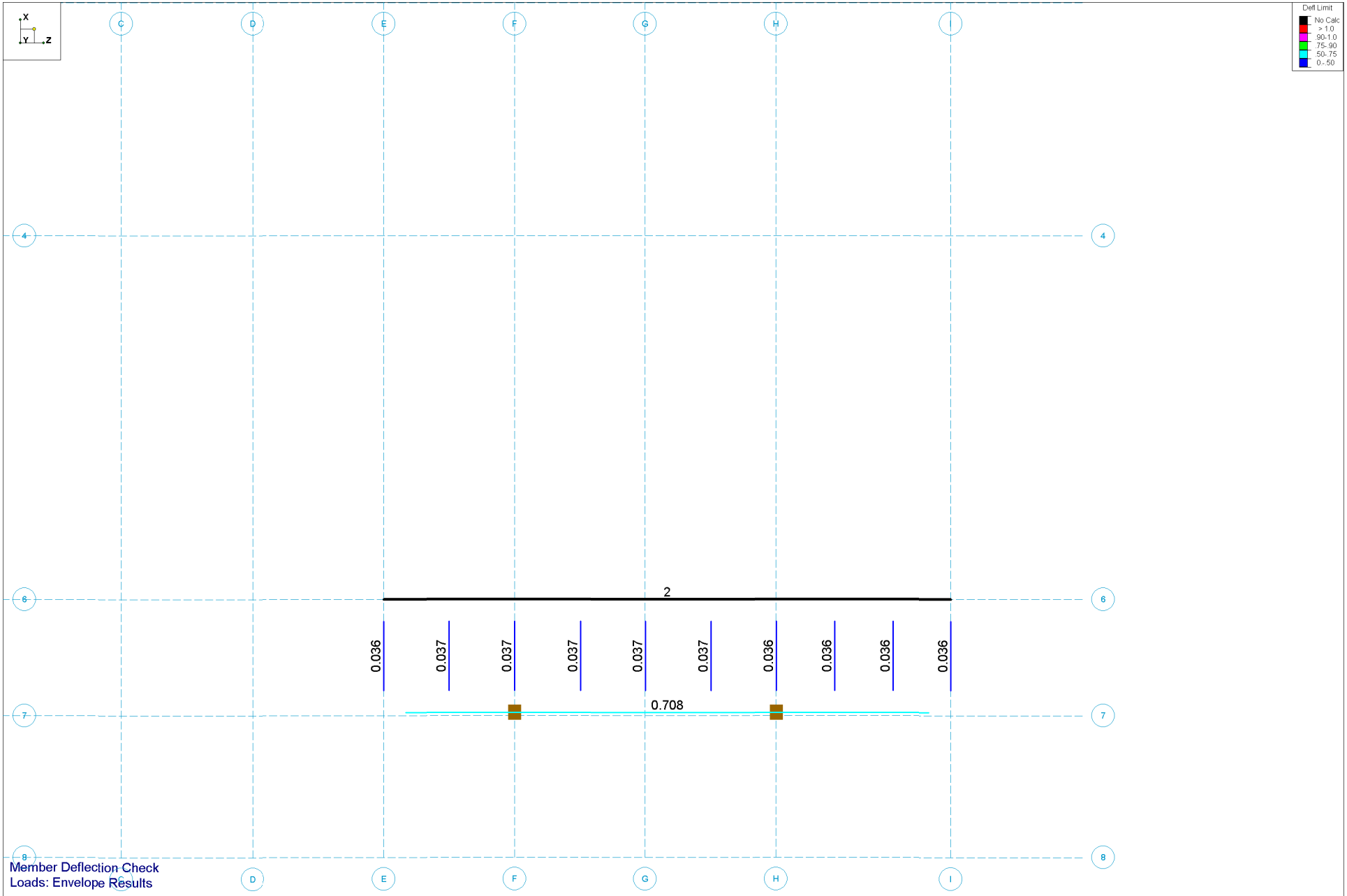
Tepa ES	Roof Level	
C Farrell	Alta Mira Infinity House	July 29, 2023 at 3:53 PM
	Deflection Check - Roof	Dziuk Structural Framing_Revised - walls.rfl



Tepa ES	Street Level	
C Farrell	Alta Mira Infinity House	July 29, 2023 at 3:59 PM
	Deflection Check - Street Level	Dziuk Structural Framing_Revised - walls.rfl



Tepa ES	Lower Level	
C Farrell	Alta Mira Infinity House	July 29, 2023 at 3:59 PM
	Deflection Check - Lower Level	Dziuk Structural Framing_Revised - walls.rfl



Tepa ES	Pool Terrace Level	
C Farrell	Alta Mira Infinity House	July 29, 2023 at 4:00 PM
	Deflection Check - Pool Level	Dziuk Structural Framing_Revised - walls.rfl

Rmax = 3.717k, therefore use CBH2.37x9.75 at all beam to beam connections where there is no column, Tall = 9175#.

Beam End Reactions : Roof Level

	Beam	End	PreDL[k]	DL[k]	LL[k]	LLS[k]	Roof[k]	Roof Cat	Max[k]	LC	Min[k]	LC
1	R1	Start	0	0.27	0	0	0.45	RLL	0.72	4	0	1
2		End	0	0.27	0	0	0.45	RLL	0.72	4	0	1
3	R2	Start	0	-0.371	0	0	-0.252	RLL	0	1	-0.624	4
4		End	0	0.423	0	0	0.257	RLL	0.68	4	0	1
5	R3	Start	0	0.54	0	0	0.9	RLL	1.44	4	0	1
6		End	0	0.54	0	0	0.9	RLL	1.44	4	0	1
7	R4	Start	0	1.145	0	0	0.9	RLL	2.045	4	0	1
8		End	0	1.447	0	0	0.9	RLL	2.347	4	0	1
9	R5	Start	0	1.145	0	0	0.9	RLL	2.045	4	0	1
10		End	0	1.447	0	0	0.9	RLL	2.347	4	0	1
11	R6	Start	0	1.145	0	0	0.9	RLL	2.045	4	0	1
12		End	0	1.447	0	0	0.9	RLL	2.347	4	0	1
13	R7	Start	0	1.145	0	0	0.9	RLL	2.045	4	0	1
14		End	0	1.447	0	0	0.9	RLL	2.347	4	0	1
15	R8	Start	0	1.081	0	0	0.85	RLL	1.931	4	0	1
16		End	0	1.367	0	0	0.85	RLL	2.217	4	0	1
17	R9	Start	0	0.842	0	0	0.9	RLL	1.742	4	0	1
18		End	0	0.994	0	0	0.9	RLL	1.894	4	0	1
19	R10	Start	0	1.145	0	0	0.9	RLL	2.045	4	0	1
20		End	0	1.447	0	0	0.9	RLL	2.347	4	0	1
21	R11	Start	0	1.145	0	0	0.9	RLL	2.045	4	0	1
22		End	0	1.447	0	0	0.9	RLL	2.347	4	0	1
23	R12	Start	0	1.145	0	0	0.9	RLL	2.045	4	0	1
24		End	0	1.447	0	0	0.9	RLL	2.347	4	0	1
25	R13	Start	0	1.145	0	0	0.9	RLL	2.045	4	0	1
26		End	0	1.447	0	0	0.9	RLL	2.347	4	0	1
27	R14	Start	0	0.54	0	0	0.9	RLL	1.44	4	0	1
28		End	0	0.54	0	0	0.9	RLL	1.44	4	0	1
29	R15	Start	0	1.018	0	0	0.8	RLL	1.818	4	0	1
30		End	0	1.286	0	0	0.8	RLL	2.086	4	0	1
31	R16	Start	0	1.018	0	0	0.8	RLL	1.818	4	0	1
32		End	0	1.286	0	0	0.8	RLL	2.086	4	0	1
33	R17	Start	0	0	0	0	0	RLL	0	5	0	5
34		End	0	0	0	0	0	RLL	0	5	0	5
35	R18	Start	0	0	0	0	0	RLL	0	5	0	5
36		End	0	0	0	0	0	RLL	0	5	0	5
37	R19	Start	0	0	0	0	0	RLL	0	5	0	5
38		End	0	0	0	0	0	RLL	0	5	0	5
39	R20	Start	0	0	0	0	0	RLL	0	5	0	5
40		End	0	0	0	0	0	RLL	0	5	0	5
41	R21	Start	0	0	0	0	0	RLL	0	5	0	5
42		End	0	0	0	0	0	RLL	0	5	0	5
43	R22	Start	0	0	0	0	0	RLL	0	5	0	5
44		End	0	0	0	0	0	RLL	0	5	0	5
45	R23	Start	0	0	0	0	0	RLL	0	5	0	5
46		End	0	0	0	0	0	RLL	0	5	0	5
47	R24	Start	0	0	0	0	0	RLL	0	5	0	5
48		End	0	0	0	0	0	RLL	0	5	0	5
49	R25	Start	0	0	0	0	0	RLL	0	5	0	5
50		End	0	0	0	0	0	RLL	0	5	0	5
51	R26	Start	0	0	0	0	0	RLL	0	5	0	5
52		End	0	0	0	0	0	RLL	0	5	0	5
53	R27	Start	0	0	0	0	0	RLL	0	5	0	5
54		End	0	0	0	0	0	RLL	0	5	0	5
55	R28	Start	0	0	0	0	0	RLL	0	5	0	5
56		End	0	0	0	0	0	RLL	0	5	0	5
57	R29	Start	0	0	0	0	0	RLL	0	5	0	5

Rmax at roof = 3.717k

Beam End Reactions : Roof Level (Continued)

	Beam	End	PreDL[k]	DL[k]	LL[k]	LLS[k]	Roof[k]	Roof Cat	Max[k]	LC	Min[k]	LC
58		End	0	0	0	0	0	RLL	0	5	0	5
59	R30	Start	0	0	0	0	0	RLL	0	5	0	5
60		End	0	0	0	0	0	RLL	0	5	0	5
61	R31	Start	0	0	0	0	0	RLL	0	5	0	5
62		End	0	0	0	0	0	RLL	0	5	0	5
63	R32	Start	0	0.467	0	0	0.93	RLL	1.397	4	0	1
64		End	0	1.299	0	0	0.93	RLL	2.229	4	0	1
65	R33	Start	0	1.307	0	0	1.028	RLL	2.335	4	0	1
66		End	0	0.402	0	0	0.316	RLL	0.719	4	0	1
67	R34	Start	0	0.177	0	0	1.014	RLL	1.191	4	-0.05	4
68		End	0	2.297	0	0	1.42	RLL	3.717	4	0	1

Rmax at street = 4.23k

Beam End Reactions : Street Level

	Beam	End	PreDL[k]	DL[k]	LL[k]	LLS[k]	Roof[k]	Roof Cat	Max[k]	LC	Min[k]	LC
1	S2	Start	0	-3.645	0	0	-1.451	RLL	0	1	-5.096	4
2		End	0	2.608	0	0	0.984	RLL	3.592	4	0	1
3	S3	Start	0	0.061	-0.567	0	0.312	RLL	0.373	4	-0.506	3
4		End	0	1.469	1.105	0	0.327	RLL	2.573	3	0	1
5	S4	Start	0	1.53	2.7	0	0	RLL	4.23	3	0	1
6		End	0	1.53	2.7	0	0	RLL	4.23	3	0	1
7	S5	Start	0	1.53	2.7	0	0	RLL	4.23	3	0	1
8		End	0	1.53	2.7	0	0	RLL	4.23	3	0	1
9	S6	Start	0	1.53	2.7	0	0	RLL	4.23	3	0	1
10		End	0	1.53	2.7	0	0	RLL	4.23	3	0	1
11	S7	Start	0	0.107	-0.908	0	0.328	RLL	0.435	4	-0.802	3
12		End	0	1.516	1.835	0	-0.009	RLL	3.352	3	0	1
13	S8	Start	0	2.25	1.8	0	0	RLL	4.05	3	0	1
14		End	0	2.25	1.8	0	0	RLL	4.05	3	0	1
15	S9	Start	0	2.25	1.8	0	0	RLL	4.05	3	0	1
16		End	0	2.25	1.8	0	0	RLL	4.05	3	0	1
17	S10	Start	0	2.25	1.8	0	0	RLL	4.05	3	0	1
18		End	0	2.25	1.8	0	0	RLL	4.05	3	0	1
19	S11	Start	0	1.59	1.888	0	0	RLL	3.478	3	0	1
20		End	0	1.706	1.632	0	0	RLL	3.338	3	0	1
21	S12	Start	0	1.59	1.888	0	0	RLL	3.478	3	0	1
22		End	0	1.706	1.632	0	0	RLL	3.338	3	0	1
23	S13	Start	0	2.12	0	0	0.8	RLL	2.92	4	0	1
24		End	0	2.12	0	0	0.8	RLL	2.92	4	0	1
25	S14	Start	0	2.12	0	0	0.8	RLL	2.92	4	0	1
26		End	0	2.12	0	0	0.8	RLL	2.92	4	0	1
27	S15	Start	0	0.796	0.662	0	0.069	RLL	1.458	3	0	1
28		End	0	-0.234	-0.362	0	-0.176	RLL	0	1	-0.638	5
29	S17	Start	0	2.02	1.962	0	0	RLL	3.982	3	0	1
30		End	0	2.084	1.818	0	0	RLL	3.902	3	0	1
31	S18	Start	0	1.316	1.299	0	-0.011	RLL	2.616	3	0	1
32		End	0	0.266	-0.594	0	0.301	RLL	0.567	4	-0.328	3
33	S19	Start	0	1.224	1.152	0	0.018	RLL	2.377	3	0	1
34		End	0	0.309	-0.552	0	0.301	RLL	0.61	4	-0.243	3
35	S20	Start	0	0.219	0.184	0	0.013	RLL	0.402	3	0	1
36		End	0	0.218	0.18	0	0.015	RLL	0.398	3	0	1
37	S21	Start	0	0.178	0.274	0	0.013	RLL	0.452	3	0	1
38		End	0	0.177	0.27	0	0.015	RLL	0.447	3	0	1
39	S22	Start	0	0.306	0.54	0	0	RLL	0.846	3	0	1
40		End	0	0.306	0.54	0	0	RLL	0.846	3	0	1
41	S23	Start	0	0.387	0.36	0	0	RLL	0.747	3	0	1
42		End	0	0.387	0.36	0	0	RLL	0.747	3	0	1

Beam End Reactions : Street Level (Continued)

	Beam	End	PreDL[k]	DL[k]	LL[k]	LLS[k]	Roof[k]	Roof Cat	Max[k]	LC	Min[k]	LC
43	S24	Start	0	2.968	0	0	1.12	RLL	4.088	4	0	1
44		End	0	2.968	0	0	1.12	RLL	4.088	4	0	1
45	S25	Start	0	2.438	1.888	0	0.32	RLL	4.326	3	0	1
46		End	0	2.438	1.888	0	0.32	RLL	4.326	3	0	1
47	S26	Start	0	0.63	0.27	0	0.18	RLL	0.967	5	0	1
48		End	0	0.63	0.27	0	0.18	RLL	0.968	5	0	1
49	S27	Start	0	1.242	1.35	0	0.18	RLL	2.592	3	0	1
50		End	0	1.242	1.35	0	0.18	RLL	2.592	3	0	1
51	S28	Start	0	0.848	0	0	0.32	RLL	1.168	4	0	1
52		End	0	0.848	0	0	0.32	RLL	1.168	4	0	1
53	S29	Start	0	0.848	0	0	0.32	RLL	1.168	4	0	1
54		End	0	0.848	0	0	0.32	RLL	1.168	4	0	1
55	S30	Start	0	0.954	0	0	0.36	RLL	1.314	4	0	1
56		End	0	0.954	0	0	0.36	RLL	1.314	4	0	1
57	S31	Start	0	0.954	0	0	0.36	RLL	1.314	4	0	1
58		End	0	0.954	0	0	0.36	RLL	1.314	4	0	1
59	S32	Start	0	0.954	0	0	0.36	RLL	1.314	4	0	1
60		End	0	0.954	0	0	0.36	RLL	1.314	4	0	1
61	S33	Start	0	0.954	0	0	0.36	RLL	1.314	4	0	1
62		End	0	0.954	0	0	0.36	RLL	1.314	4	0	1
63	S34	Start	0	0.954	0	0	0.36	RLL	1.314	4	0	1
64		End	0	0.954	0	0	0.36	RLL	1.314	4	0	1
65	S35	Start	0	0.954	0	0	0.36	RLL	1.314	4	0	1
66		End	0	0.954	0	0	0.36	RLL	1.314	4	0	1
67	S36	Start	0	0.954	0	0	0.36	RLL	1.314	4	0	1
68		End	0	0.954	0	0	0.36	RLL	1.314	4	0	1
69	S37	Start	0	0.954	0	0	0.36	RLL	1.314	4	0	1
70		End	0	0.954	0	0	0.36	RLL	1.314	4	0	1
71	S38	Start	0	0.848	0	0	0.32	RLL	1.168	4	0	1
72		End	0	0.848	0	0	0.32	RLL	1.168	4	0	1
73	S39	Start	0	0.848	0	0	0.32	RLL	1.168	4	0	1
74		End	0	0.848	0	0	0.32	RLL	1.168	4	0	1
75	S40	Start	0	1.242	1.35	0	0.18	RLL	2.592	3	0	1
76		End	0	1.242	1.35	0	0.18	RLL	2.592	3	0	1
77	S41	Start	0.221	5.22	2.144	0	1.416	RLL	7.89	5	0.221	1
78		End	0.036	-1.382	-1.105	0	-0.911	RLL	0.036	1	-2.894	5
79	S42	Start	0	2.25	1.8	0	0	RLL	4.05	3	0	1
80		End	0	2.25	1.8	0	0	RLL	4.05	3	0	1
81	S43	Start	0	0.954	0	0	0.36	RLL	1.314	4	0	1
82		End	0	0.954	0	0	0.36	RLL	1.314	4	0	1
83	M44	Start	0	0.335	0	0	0.278	RLL	0.613	4	0	1
84		End	0	1.089	0	0	0.439	RLL	1.529	4	0	1
85	M45	Start	0	1.09	0.042	0	0.442	RLL	1.533	4	0	1
86		End	0	0.602	0.081	0	0.287	RLL	0.889	4	0	1
87	M46	Start	0	0	0	0	0	RLL	0	5	0	5
88		End	0	0	0	0	0	RLL	0	5	0	5

Rmax = 3.671k

Beam End Reactions : Lower Level

	Beam	End	PreDL[k]	DL[k]	LL[k]	LLS[k]	Roof[k]	Roof Cat	Max[k]	LC	Min[k]	LC
1	L1	Start	0	1.571	1.084	0	0.361	RLL	2.655	3	0	1
2		End	0	1.702	0.671	0	0.499	RLL	2.58	5	0	1
3	L2	Start	0	-0.287	0.143	0	-0.089	RLL	0	1	-0.376	4
4		End	0	1.205	-0.009	0	0.761	RLL	1.966	4	0	1
5	L5	Start	0	2.027	0	0	0.765	RLL	2.792	4	0	1
6		End	0	2.027	0	0	0.765	RLL	2.792	4	0	1
7	L6	Start	0	1.815	0.671	0	0.541	RLL	2.724	5	0	1

Beam End Reactions : Lower Level (Continued)

	Beam	End	PreDL[k]	DL[k]	LL[k]	LLS[k]	Roof[k]	Roof Cat	Max[k]	LC	Min[k]	LC
8		End	0	1.684	1.084	0	0.404	RLL	2.8	5	0	1
9	L7	Start	0	1.602	1.342	0	0.318	RLL	2.944	3	0	1
10		End	0	1.341	2.168	0	0.042	RLL	3.509	3	0	1
11	L8	Start	0	1.602	1.342	0	0.318	RLL	2.944	3	0	1
12		End	0	1.341	2.168	0	0.042	RLL	3.509	3	0	1
13	L9	Start	0	1.802	0	0	0.68	RLL	2.482	4	0	1
14		End	0	1.802	0	0	0.68	RLL	2.482	4	0	1
15	L10	Start	0	1.802	0	0	0.68	RLL	2.482	4	0	1
16		End	0	1.802	0	0	0.68	RLL	2.482	4	0	1
17	L11	Start	0	1.804	0.124	0	0.894	RLL	2.698	4	0	1
18		End	0	2.451	0.086	0	1.22	RLL	3.671	4	0	1
19	L12	Start	0	0.036	0.312	0	0	RLL	0.348	3	0	1
20		End	0	0.036	0.312	0	0	RLL	0.348	3	0	1
21	L13	Start	0	0.036	0.312	0	0	RLL	0.348	3	0	1
22		End	0	0.036	0.312	0	0	RLL	0.348	3	0	1
23	L14	Start	0	0.036	0.312	0	0	RLL	0.348	3	0	1
24		End	0	0.036	0.312	0	0	RLL	0.348	3	0	1
25	L15	Start	0	0.036	0.312	0	0	RLL	0.348	3	0	1
26		End	0	0.036	0.312	0	0	RLL	0.348	3	0	1
27	L16	Start	0	0.036	0.312	0	0	RLL	0.348	3	0	1
28		End	0	0.036	0.312	0	0	RLL	0.348	3	0	1
29	L17	Start	0	0.036	0.312	0	0	RLL	0.348	3	0	1
30		End	0	0.036	0.312	0	0	RLL	0.348	3	0	1
31	L18	Start	0	0.036	0.312	0	0	RLL	0.348	3	0	1
32		End	0	0.036	0.312	0	0	RLL	0.348	3	0	1
33	L19	Start	0	0.036	0.312	0	0	RLL	0.348	3	0	1
34		End	0	0.036	0.312	0	0	RLL	0.348	3	0	1
35	L20	Start	0	0.036	0.312	0	0	RLL	0.348	3	0	1
36		End	0	0.036	0.312	0	0	RLL	0.348	3	0	1
37	L21	Start	0	0.036	0.312	0	0	RLL	0.348	3	0	1
38		End	0	0.036	0.312	0	0	RLL	0.348	3	0	1
39	L22	Start	0	0.036	0.312	0	0	RLL	0.348	3	0	1
40		End	0	0.036	0.312	0	0	RLL	0.348	3	0	1
41	L23	Start	0	0.036	0.312	0	0	RLL	0.348	3	0	1
42		End	0	0.036	0.312	0	0	RLL	0.348	3	0	1
43	L24	Start	0	0.034	0.288	0	0	RLL	0.322	3	0	1
44		End	0	0.034	0.288	0	0	RLL	0.322	3	0	1
45	L25	Start	0	0.102	0.18	0	0	RLL	0.282	3	0	1
46		End	0	0.102	0.18	0	0	RLL	0.282	3	0	1
47	L26	Start	0	0.177	0.312	0	0	RLL	0.489	3	0	1
48		End	0	0.177	0.312	0	0	RLL	0.489	3	0	1
49	L27	Start	0	0.177	0.312	0	0	RLL	0.489	3	0	1
50		End	0	0.177	0.312	0	0	RLL	0.489	3	0	1
51	L28	Start	0	0.177	0.312	0	0	RLL	0.489	3	0	1
52		End	0	0.177	0.312	0	0	RLL	0.489	3	0	1
53	L29	Start	0	0.177	0.312	0	0	RLL	0.489	3	0	1
54		End	0	0.177	0.312	0	0	RLL	0.489	3	0	1
55	L30	Start	0	0.177	0.312	0	0	RLL	0.489	3	0	1
56		End	0	0.177	0.312	0	0	RLL	0.489	3	0	1
57	L31	Start	0	0.173	0.312	0	0	RLL	0.485	3	0	1
58		End	0	0.173	0.312	0	0	RLL	0.485	3	0	1
59	L32	Start	0	0.078	0.312	0	0	RLL	0.39	3	0	1
60		End	0	0.078	0.312	0	0	RLL	0.39	3	0	1
61	L33	Start	0	0.036	0.312	0	0	RLL	0.348	3	0	1
62		End	0	0.036	0.312	0	0	RLL	0.348	3	0	1
63	L34	Start	0	0.034	0.288	0	0	RLL	0.322	3	0	1
64		End	0	0.034	0.288	0	0	RLL	0.322	3	0	1

Beam End Reactions : Lower Level (Continued)

	Beam	End	PreDL[k]	DL[k]	LL[k]	LLS[k]	Roof[k]	Roof Cat	Max[k]	LC	Min[k]	LC
65	L35	Start	0	0.021	0.18	0	0	RLL	0.201	3	0	1
66		End	0	0.021	0.18	0	0	RLL	0.201	3	0	1
67	L36	Start	0	0.036	0.312	0	0	RLL	0.348	3	0	1
68		End	0	0.036	0.312	0	0	RLL	0.348	3	0	1
69	L37	Start	0	0.036	0.312	0	0	RLL	0.348	3	0	1
70		End	0	0.036	0.312	0	0	RLL	0.348	3	0	1
71	L38	Start	0	0.036	0.312	0	0	RLL	0.348	3	0	1
72		End	0	0.036	0.312	0	0	RLL	0.348	3	0	1
73	L39	Start	0	0.036	0.312	0	0	RLL	0.348	3	0	1
74		End	0	0.036	0.312	0	0	RLL	0.348	3	0	1
75	L40	Start	0	0.036	0.312	0	0	RLL	0.348	3	0	1
76		End	0	0.036	0.312	0	0	RLL	0.348	3	0	1
77	L41	Start	0	-0.23	0.142	0	0.06	RLL	0	1	-0.267	4
78		End	0	1.135	-0.007	0	0.873	RLL	2.008	4	0	1
79	L42	Start	0	0.101	-0.001	0	0.22	RLL	0.321	4	-0.039	4
80		End	0	0.068	-0.002	0	-0.16	RLL	0.202	4	-0.091	4
81	L43	Start	0	0.216	0	0	0.36	RLL	0.576	4	0	1
82		End	0	0.216	0	0	0.36	RLL	0.576	4	0	1
83	L44	Start	0	0.216	0	0	0.36	RLL	0.576	4	0	1
84		End	0	0.216	0	0	0.36	RLL	0.576	4	0	1
85	L45	Start	0	0.216	0	0	0.36	RLL	0.576	4	0	1
86		End	0	0.216	0	0	0.36	RLL	0.576	4	0	1
87	L46	Start	0	0.216	0	0	0.36	RLL	0.576	4	0	1
88		End	0	0.216	0	0	0.36	RLL	0.576	4	0	1
89	L47	Start	0	0.216	0	0	0.36	RLL	0.576	4	0	1
90		End	0	0.216	0	0	0.36	RLL	0.576	4	0	1
91	L48	Start	0	0.204	0	0	0.34	RLL	0.544	4	0	1
92		End	0	0.204	0	0	0.34	RLL	0.544	4	0	1
93	L49	Start	0	0.192	0	0	0.32	RLL	0.512	4	0	1
94		End	0	0.192	0	0	0.32	RLL	0.512	4	0	1
95	L50	Start	0	0.192	0	0	0.32	RLL	0.512	4	0	1
96		End	0	0.192	0	0	0.32	RLL	0.512	4	0	1
97	L51	Start	0	1.602	1.342	0	0.318	RLL	2.944	3	0	1
98		End	0	1.341	2.168	0	0.042	RLL	3.509	3	0	1
99	M51	Start	0	1.271	2.144	0	0.021	RLL	3.415	3	0	1
100		End	0	1.229	2.076	0	0.021	RLL	3.305	3	0	1
101	M52	Start	0	0.103	0.555	0	0	RLL	0.658	3	0	1
102		End	0	0.045	0.357	0	0	RLL	0.402	3	0	1

Beam End Reactions : Pool Terrace Level

	Beam	End	PreDL[k]	DL[k]	LL[k]	LLS[k]	Roof[k]	Roof Cat	Max[k]	LC	Min[k]	LC
1	P1	Start	0	0.319	3.662	0	0	RLL	3.981	3		
2		End	0	0.502	4.824	0	0	RLL	5.326	3		
3	P2	Start	0	0.061	0.523	0	0	RLL	0.584	3	0	1
4		End	0	0.061	0.523	0	0	RLL	0.584	3	0	1
5	P3	Start	0	0.054	0.465	0	0	RLL	0.519	3	0	1
6		End	0	0.054	0.465	0	0	RLL	0.519	3	0	1
7	P4	Start	0	0.122	1.046	0	0	RLL	1.168	3	0	1
8		End	0	0.122	1.046	0	0	RLL	1.168	3	0	1
9	P5	Start	0	0.122	1.046	0	0	RLL	1.168	3	0	1
10		End	0	0.122	1.046	0	0	RLL	1.168	3	0	1
11	P6	Start	0	0.115	0.988	0	0	RLL	1.103	3	0	1
12		End	0	0.115	0.988	0	0	RLL	1.103	3	0	1
13	P7	Start	0	0.122	1.046	0	0	RLL	1.168	3	0	1
14		End	0	0.122	1.046	0	0	RLL	1.168	3	0	1
15	P8	Start	0	0.122	1.046	0	0	RLL	1.168	3	0	1

Rmax=1.168k AT BEAM TO BEAM CONNECTION, USE CBH TYP

Beam End Reactions : Pool Terrace Level (Continued)

	Beam	End	PreDL[k]	DL[k]	LL[k]	LLS[k]	Roof[k]	Roof Cat	Max[k]	LC	Min[k]	LC
16		End	0	0.122	1.046	0	0	RLL	1.168	3	0	1
17	P9	Start	0	0.122	1.046	0	0	RLL	1.168	3	0	1
18		End	0	0.122	1.046	0	0	RLL	1.168	3	0	1
19	P10	Start	0	0.108	0.93	0	0	RLL	1.038	3	0	1
20		End	0	0.108	0.93	0	0	RLL	1.038	3	0	1
21	P11	Start	0	0.108	0.93	0	0	RLL	1.038	3	0	1
22		End	0	0.108	0.93	0	0	RLL	1.038	3	0	1

Date

Project Alta Mira

Contact PD

Phone

Glulam Connections using Simpson 'CBH' hangars

Use 'CBH' for typical connections

per simpson table 1 CBH Joist to beam allowable loads

for CBH2.37x9.75B, Uplift = 555#
Floor = 8785#
Roof = 8785#

per RISA Floor beam reactions (see output)

@ Roof $R_{max} = 3^k$ ∴ use CBH at all Roof beam to beam connections

* CBH has no data/loading for combination with CBTZ column connection ∴ use CJT at all beam to beam connections at columns

@ Street Level, $R_{max} = 5^k$ ∴ use CBH @ all street beams to beams

@ lower level, $R_{max} = 3^k$ ∴ use CBH @ all lower level beam to beam connections

CBH

Concealed Beam Hanger

Computer modeling and CNC manufacturing enables glulam to be delivered to the job site in precise lengths and with preinstalled concealed hangers. The CBH concealed beam hanger is specifically designed for such applications, and is installed with readily available Simpson Strong-Tie® SDS Heavy-Duty Connector screws. The CBH hanger design provides for a +/– 1/32" beam length tolerance at each connector, making it easier to crane into place than other concealed hanger designs that use machined aluminum.

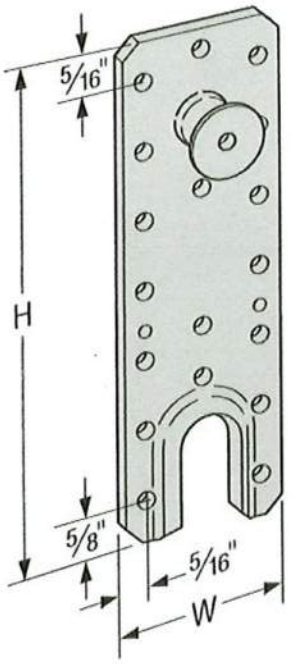
Material: 3 gauge

Finish: Galvanized

Installation:

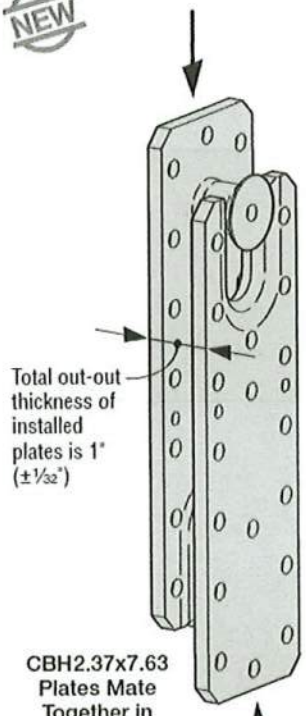
- Use all specified fasteners; see General Notes
- Rout carried and/or carrying member according to application needs
- Install CBH plates on carried and carrying members using all specified SDS fasteners
- Mate carried member to carrying member according to installation illustrations

Codes: Code report is pending



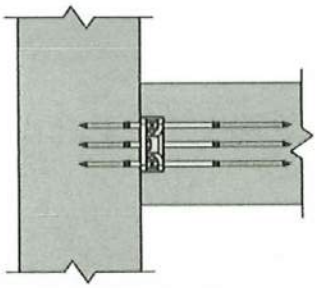
CBH2.37x7.63
(CBH2.37x5.5, CBH2.37x9.75 similar)

NEW

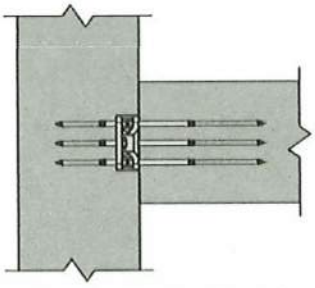


CBH2.37x7.63 Plates Mate Together in Direction of Arrows
(CBH2.37x5.5, CBH2.37x9.75 similar)

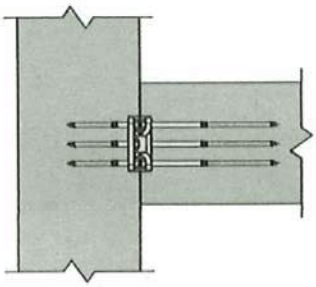
Plan View



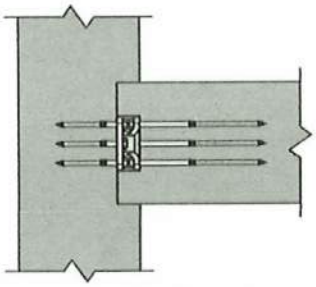
Carried Member Routed



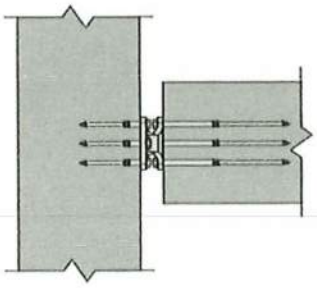
Carrying Member Routed



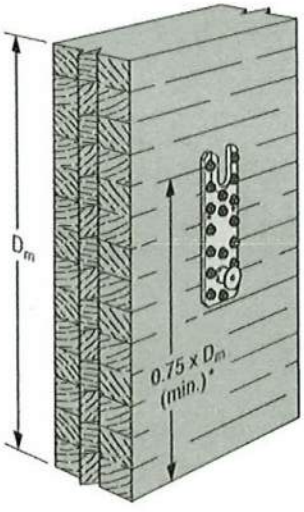
Carried Member and Carrying Member Routed (Option 1)



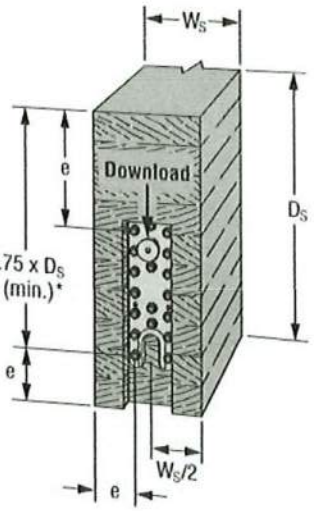
Carried Member and Carrying Member Routed (Option 2)



No Routing



Carrying Member



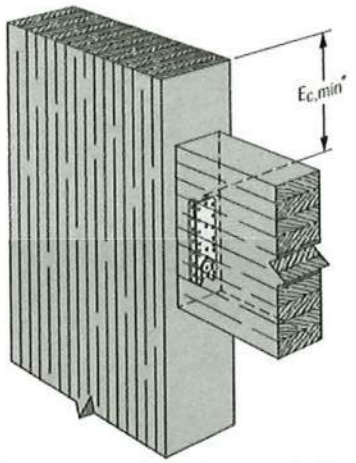
Carried Member

* Dimension line is to centerline of first row of fasteners
e = 1½" (min.)

CBH Placement Relative to Member Depth/Width

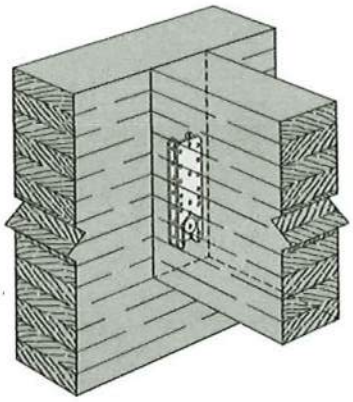
CBH

Concealed Beam Hanger (cont.)

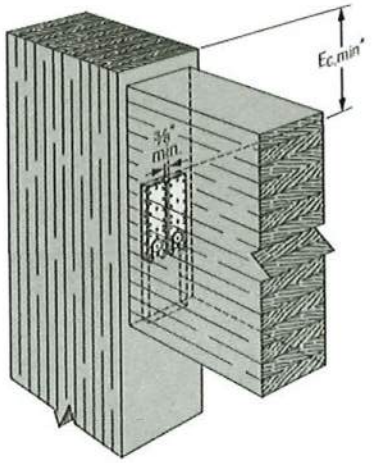


*Reference Simpson Strong-Tie engineering letter L-C-CBHDRIFT20 for guidance on CBH drift behavior at columns and $E_{c,min}$ requirement.

Typical CBH2.37x7.63 Installation at Column
(CBH2.37x5.5 and CBH2.37x9.5 similar)



Typical CBH2.37x7.63 Installation at Girder
(CBH2.37x5.5 and CBH2.37x9.5 similar)



*Reference Simpson Strong-Tie engineering letter L-C-CBHDRIFT20 for guidance on CBH drift behavior at columns and $E_{c,min}$ requirement.

Typical Double CBH2.37x7.63 Installation at Column
(CBH2.37x5.5 and CBH2.37x9.5 and installation at girder similar)

Table 1 — CBH Joist to Beam Allowable Loads

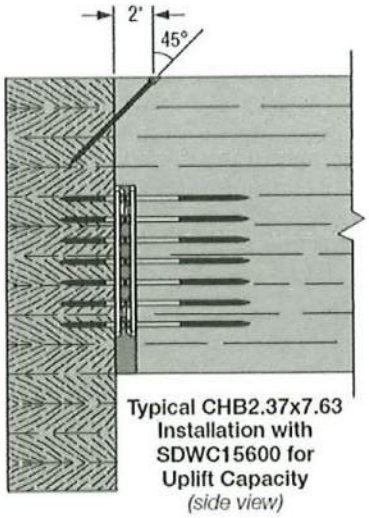
Model No.	Connector Dimension (in.)			Fasteners (SDS)		Allowable Downloads						Code Ref.
						DF/SP			SPF/HF			
	Width	Height	Route Depth	Joist	Beam	Uplift (160)	Floor (100)	Snow/Roof (115/125)	Uplift (160)	Floor (100)	Snow/Roof (115/125)	
CBH2.37x5.5B	2⅜	5½	1	(13) ¼" x 6"	(13) ¼" x 3"	555	4,830	4,830	485	3,900	4,135	—
CBH2.37x7.63B	2⅜	7⅝	1	(18) ¼" x 6"	(18) ¼" x 3"	555	6,510	6,510	485	5,400	5,570	
CBH2.37x9.75B	2⅜	9¾	1	(23) ¼" x 6"	(23) ¼" x 3"	555	8,785	8,785	485	6,900	7,525	

See footnotes below.

Table 2 — CBH Joist to Column Allowable Loads

Model No.	Connector Dimension (in.)			Fasteners (SDS)		Allowable Downloads						Code Ref.
						DF/SP			SPF/HF			
	Width	Height	Route Depth	Joist	Beam	Uplift (160)	Floor (100)	Snow/Roof (115/125)	Uplift (160)	Floor (100)	Snow/Roof (115/125)	
CBH2.37x5.5C	2⅜	5½	1	(13) ¼" x 6"	(13) ¼" x 6"	555	5,455	5,455	485	3,900	4,485	—
CBH2.37x7.63C	2⅜	7⅝	1	(18) ¼" x 6"	(18) ¼" x 6"	555	6,630	6,630	485	5,400	5,675	
CBH2.37x9.75C	2⅜	9¾	1	(23) ¼" x 6"	(23) ¼" x 6"	555	8,940	8,940	485	6,900	7,655	

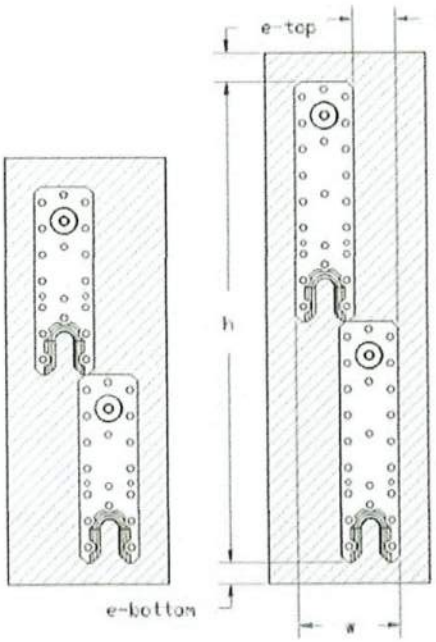
1. Member sizes based on minimum fastener edge distances will achieve tabulated allowable download, but do not consider required char edge distances for desired fire ratings. Member sizes required to achieve desired fire ratings shall be determined by the Engineer of Record.
2. Use Simpson Strong-Tie® Strong-Drive® SDWC15600 (6" length) to achieve table uplift capacities. Tabulated loads are for a single fastener. Use multiple screws for additional uplift.
3. Mmimum SDS edge distance 1½".



Typical CHB2.37x7.63 Installation with SDWC15600 for Uplift Capacity
(side view)

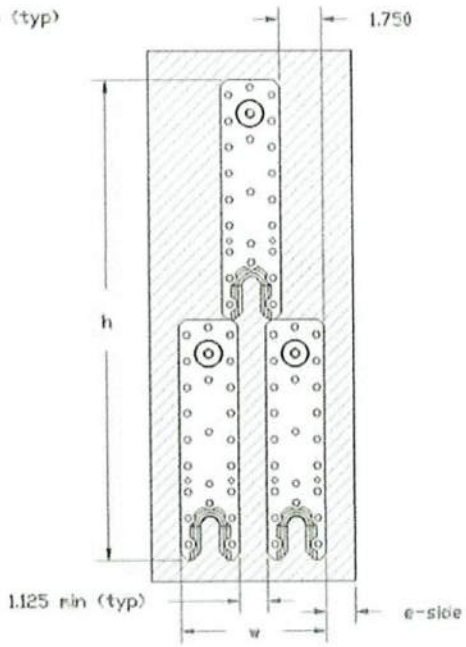
Ordering Information

Model No.	Application	Ordering SKU	Kit Contents		
			CBH Plates	Number of Screws	
				SDS25300	SDS25600
CBH2.37x5.5B	Joist to beam	CBH2.37x5.5B-KT	Each kit contains two backplates that make up one connection	13	13
CBH2.37x7.63B		CBH2.37x7.63B-KT		18	18
CBH2.37x9.75B		CBH2.37x9.75B-KT		23	23
CBH2.37x5.5C	Joist to column	CBH2.37x5.5C-KT		—	26
CBH2.37x7.63C		CBH2.37x7.63C-KT		—	36
CBH2.37x9.75C		CBH2.37x9.75C-KT		—	46



CBH2.37x7.63 CBH2.37x9.75

Figure 3 - Carried Member Double CBH Stacked



CBH2.37x9.75

Figure 4 - Carried Member Triple CBH Stacked

CBH Minimum Beam Sizes - Fastener Edge														
Condition	Min Carried Beam Size				e_{side}		w		e_{top}		h		e_{bottom}	
	Width		Depth											
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
Single CBH2.37x5.5 (Fig. 1)	4.750	121	7.563	192	1.188	30	2.375	60	1.188	30	5.500	140	0.875	22
Single CBH2.37x7.63 (Fig. 1)	4.750	121	9.688	246	1.188	30	2.375	60	1.188	30	7.625	194	0.875	22
Single CBH2.37x9.75 (Fig. 1)	4.750	121	11.813	300	1.188	30	2.375	60	1.188	30	9.750	248	0.875	22
Double CBH2.37x7.63 Lateral (Fig. 2)	7.500	191	9.688	246	1.188	30	5.125	130	1.188	30	7.625	194	0.875	22
Double CBH2.37x9.75 Lateral (Fig. 2)	7.500	191	11.813	300	1.188	30	5.125	130	1.188	30	9.750	248	0.875	22
Double CBH 2.37x7.63 Stacked (Fig. 3)	6.500	165	17.313	440	1.188	30	4.125	105	1.188	30	15.250	387	0.875	22
Double CBH 2.37x9.75 Stacked (Fig. 3)	6.500	165	21.563	548	1.188	30	4.125	105	1.188	30	19.500	495	0.875	22
Triple CBH2.37x9.75 Stacked (Fig. 4)	8.250	210	21.563	548	1.188	30	5.875	149	1.188	30	19.500	495	0.875	22

Note: When installing CBH configurations of 2 or more connectors, additional care must be taken to ensure mating CBH connectors fit appropriately together in the field. Confirmation that assemblies mate properly prior to field installation is strongly recommended. CBH assemblies of 4 or more connectors, although not shown in the table or figures above, are acceptable provided edge and spacing guidelines shown in the figures above are followed. Allowable loads for multiple CBH assemblies are equivalent to the published individual CBH allowable loads multiplied by the number of connectors.

The information contained in this letter is valid until **12/31/2023** when it will be re-evaluated by Simpson Strong-Tie. Please visit strongtie.com for additional pertinent information. If you have questions or need further assistance regarding this matter, please contact the Simpson Strong-Tie engineering Department at (800)-999-5099

Sincerely,

SIMPSON STRONG-TIE COMPANY INC.

January 1, 2023

Re: Simpson Strong-Tie® CBH Concealed Beam Hanger Minimum Carried Beam Sizes and Fastener Edge Distances

To Whom It May Concern:

To determine the CBH assembly minimum allowable carried beam dimensions based on minimum fastener edge distances, refer to the figures and attached table below. Dimensions shown below consider only fastener edge distances and do not consider required char edge distances for desired fire ratings. Refer to L-C-CBHCHAR22 for minimum required edge distances considering 1 hr and 2 hr fire resistance ratings per ASTM E119 testing.

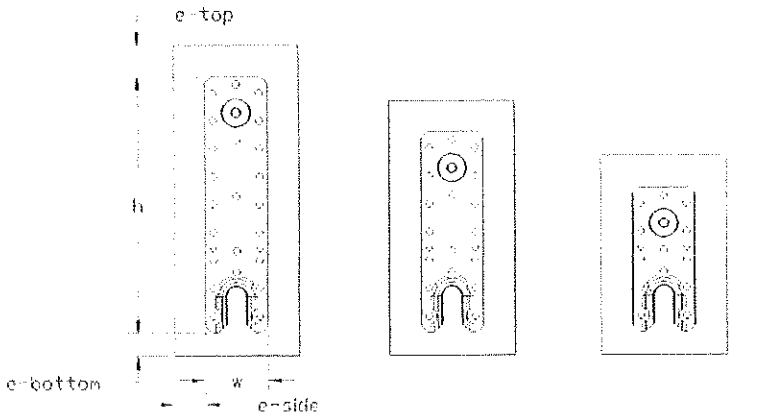


Figure 1 – Carried Member Single CBH Assemblies

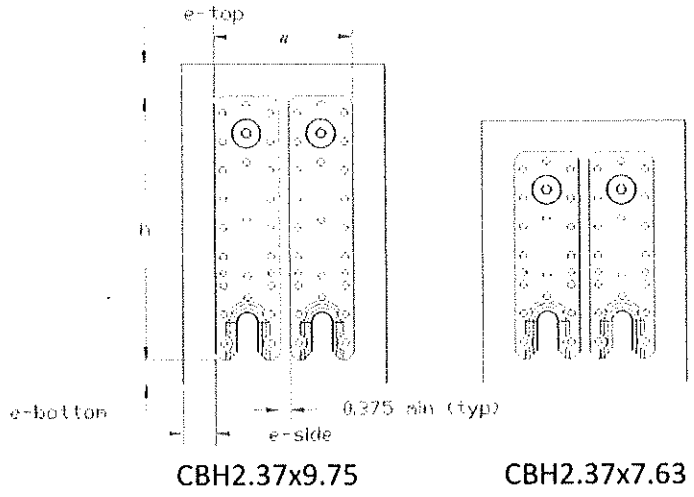


Figure 2 – Carried Member Double Lateral CBH Assemblies

Date

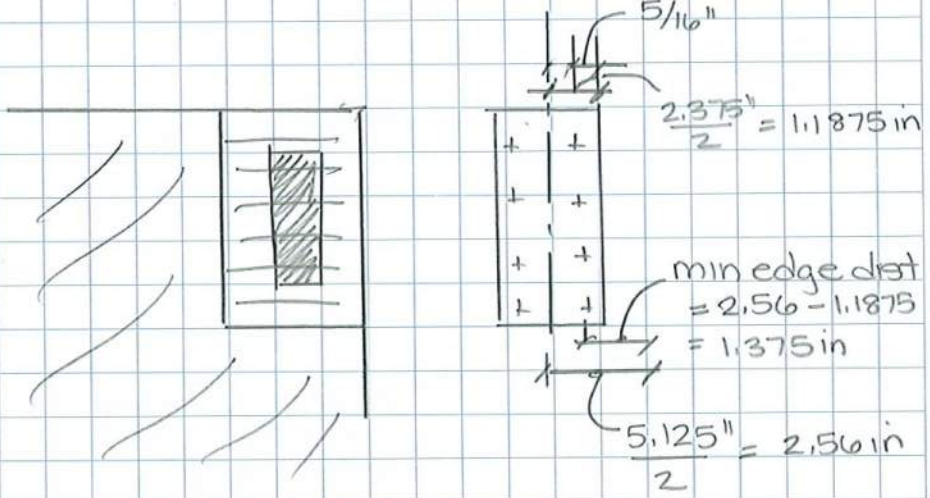
Project Alta Mira

Contact PD

Phone

@ grid E/I - glulam connection to CMU

per 'CBH' to CMU Engineering letter : L-C-CBHCONMUZZ (attached) - with reduced edge distances = 1.5 in



* if CBH centered on glulam
$e = 1\frac{3}{8}" < 1.5"$ ∴ need to offset

e_{min} for glulam = 1.188 in per engineering letter ⇒ L-C-CBHEDGE23

if shift to provide 1½" min edge distance
$e_{min} = 5.125in - 1.5in - 2(1.1875) = 1.25in$
> 1.188 in ∴ ok

reduce allowable loads
0.63(6510 #) = 4101 # ∴ ok to use w/ reduced loading beams act as deck joist - minimal loading

April 8, 2022

Re: Simpson Strong-Tie® CBH Concealed Beam Hanger Attached to Grout Filled CMU and Concrete

To Whom It May Concern:

Simpson Strong-Tie has evaluated the CBH Concealed Beam Hanger installed on grout filled CMU (GFCMU) and concrete carrying members. Table 1 provides allowable download capacities for the CBH attached to solid sawn or glulam carried joist using Strong-Drive SDS screws and to GFCMU or Concrete supporting members using Titen Turbo masonry screws.

Table 1 - CBH Joist to GFCMU and Concrete Allowable Loads

Model No.	Fasteners			Allowable Loads (DF/SP)		Allowable Loads (SPF/HF)	
	GFCMU Titen Turbo™	Concrete Titen Turbo™	Joist SDS	GFCMU	Concrete	GFCMU	Concrete
CBH2.37x5.5	(13)1/4 x 2 3/4	(13)1/4 x 2 1/4	(13)1/4 x 6	3680	4030	3680	3900
CBH2.37x7.63	(18)1/4 x 2 3/4	(18)1/4 x 2 1/4	(18)1/4 x 6	4505	4505	4505	4505
CBH2.37x9.75	(23)1/4 x 2 3/4	(23)1/4 x 2 1/4	(23)1/4 x 6	6510	6915	6510	6900

1. Concete shall have a minimum compressive strength of f'_c = 2,500 psi.
2. Grout-filled CMU (GFCMU) shall have a minimum compressive strength of f'_m = 1,500 psi.
3. Products shall be installed such that the Titen Turbo screws are not exposed to weather.
4. Titen Turbo screws are Simpson Strong-Tie concrete and masonry screws (hex head model required)
5. Installation on GFCMU - A minimum fastener side edge distance of 3 $^{7}/_{8}$" and a minimum top fastener end distance of 1 $^{1}/_{2}$" is required (refer to figure 1) for full table downloads. For a minimum fastener side edge distance of 1 $^{1}/_{2}$" and a minimum top fastener end distance of 1 $^{1}/_{2}$", allowable downloads are 0.63 of the table downloads.
6. Installation on Concrete - A minimum fastener side edge distance and top fastener end distance of 3" is required (refer to figure 1) for full table downloads. For a minimum fastener side edge distance of 3" and a minimum top fastener end distance of 1 $^{3}/_{4}$", allowable downloads are 0.95 of the table downloads. For a minimum fastener side edge distance and top fastener end distance of 1 $^{3}/_{4}$", allowable downloads are 0.60 of the table downloads.
7. Connections are not evaluated for uplift.

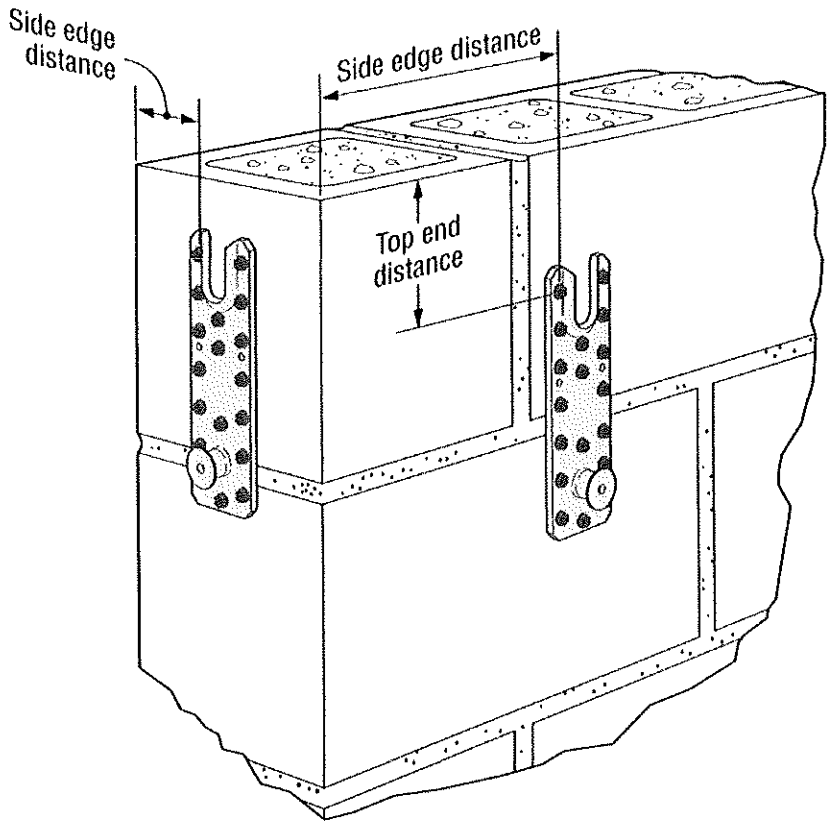


Figure 1 - View of CBH Installed on GFCMU Wall
(Concrete Installation Similar)

The information in this letter is valid until **12/31/23** when it will be re-evaluated by Simpson Strong-Tie. Please visit strongtie.com for additional pertinent information. If you have questions or need further assistance regarding this matter, please contact the Simpson Strong-Tie engineering department at 800.999.5099.

Sincerely,

SIMPSON STRONG-TIE COMPANY INC.

Date

Project Alta Mira

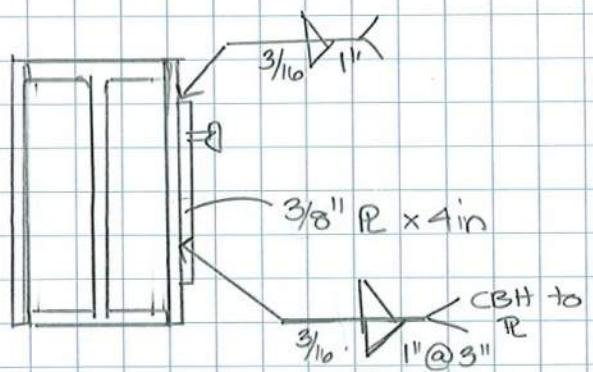
Contact PD

Phone

@ grid 4 - glulam connection to steel

per 'CBH' to steel engineering letter L-C-CBHSTEEL23

$R_{max} = 5^k$ ∴ CBH OK, $R_{all} = 9335\#$ ∴ OK



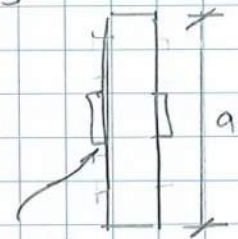
Length of weld req'd - 5^k total

for 3/16" fillet weld

$V_w = 0.3(70\,ksi)(0.707)(3/16)$

$= 2.78\ k/in$

$h = 9.75"$



use 2" weld ∴ $V = 2.78^k(2in)(2\ sides)$

$= 11.12\ k > 5k$

weld PL to beam, 4" PL so have 8" weld

use 1/4" weld -

January 1, 2023

Re: Simpson Strong-Tie® CBH Concealed Beam Hanger Attached to Structural Steel Members

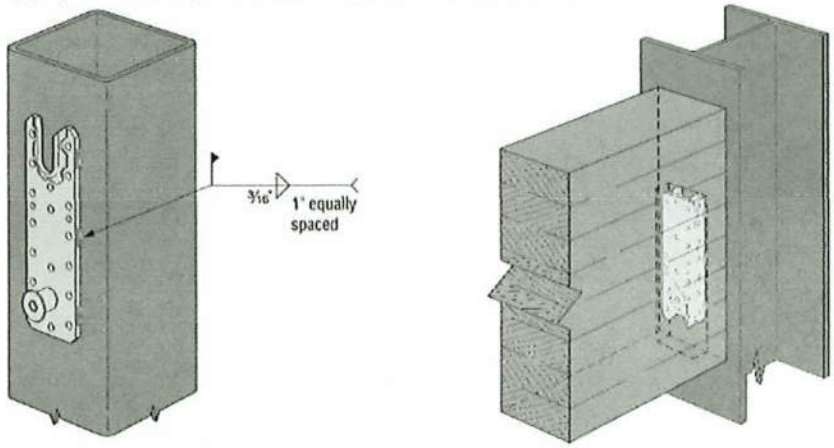
To Whom It May Concern:

Table 1 provides allowable download capacities for the Simpson Strong-Tie CBH attached to structural steel members. When welded, weld segments are fillet welds and are to be equally spaced top to bottom each side of the connector. When attached with self-drilling fasteners, use #14 fasteners as shown in the illustrations below, filling the round fastener holes indicated in the illustrations. Supporting structural steel member to be 3/16" minimum thickness.

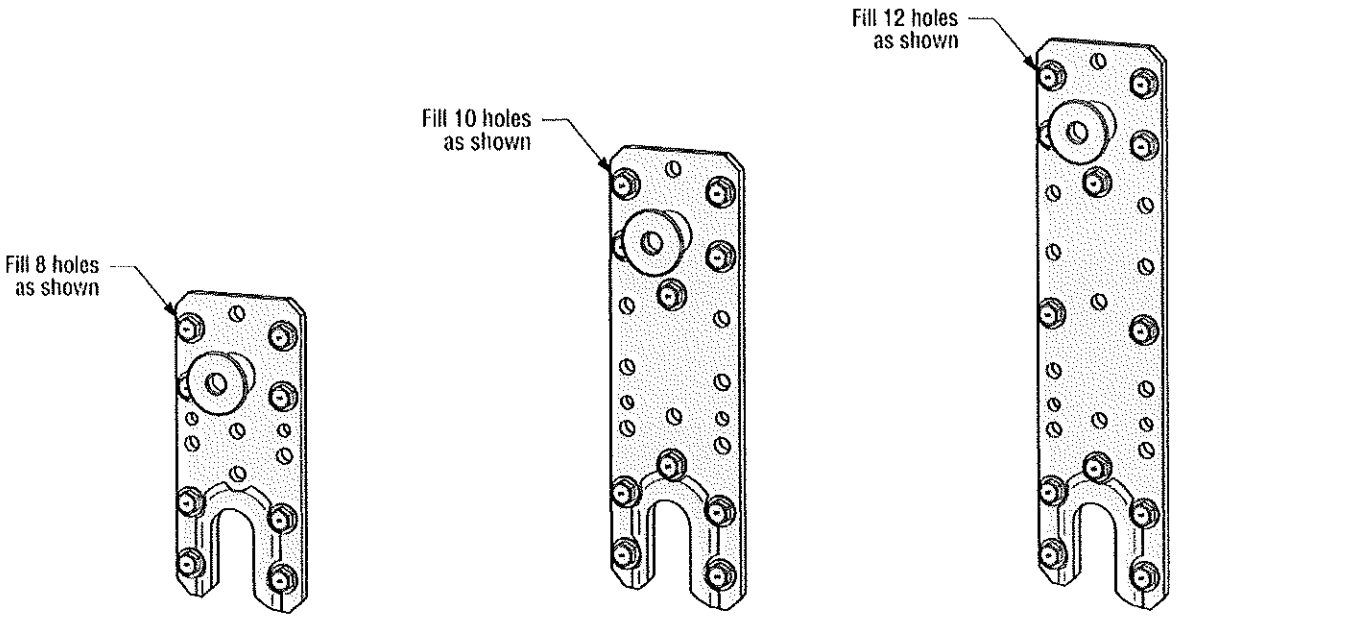
Table 1 - CBH Allowable Loads Attached to Structural Steel Members

Model No.	Connector Dimension (in.)			Joist Fasteners (SDS)	Supporting Member Weld Qty, Size & Length	Supporting Member Self-Drilling Screws to Steel	Allowable Downloads (lb.)			
							Joist DF/SP		Joist SPF/HF	
	Width	Height	Route Depth				Floor (100)	Snow/Roof (115/125)	Floor (100)	Snow/Roof (115/125)
CBH2.37x5.5	2 3/8	5 1/2	1	(13) 1/4"x6"	(4) 3/16" X 1"	(8) #14	5,460	5,700	3,900	4,485
CBH2.37x7.63	2 3/8	7 5/8	1	(18) 1/4"x6"	(4) 3/16" X 1"	(10) #14	6,925	6,925	5,400	5,930
CBH2.37x9.75	2 3/8	9 3/4	1	(23) 1/4"x6"	(6) 3/16" X 1"	(12) #14	9,335	9,335	6,900	7,935

1. Installation requires tabulated SDS screws to joist and either welds or self-drilling metal fasteners (not both) to the supporting member. Allowable loads are applicable to either installation.
2. Welded loads assume E-70XX weld material (e.g. E-70S-E).
3. Caution: Welding galvanized steel may produce harmful fumes; follow proper welding procedures and safety precautions. Welding should be in accordance with A.W.S. standards.
4. Welds must conform to the current A.W.S. D1.3 structural welding code for sheet steel.
5. Welded connections should only be performed by skilled, qualified welders.
6. Welded connections require a minimum of 2.75" wide flat surface area to accommodate the width of the connector and the welds.
7. Loads are based on attachment to structural steel with a minimum yield strength, Fy, of 33 ksi and a tensile strength, Fu, of 45 ksi.
8. Self-drilling metal fasteners shall be in compliance with ASTM C1513.
9. Self-drilling 1/4" diameter metal fasteners may be substituted for self-drilling #14 metal fasteners. Maximum thickness of framing member must not exceed the maximum total drilling thickness for the metal fasteners.
10. To insure proper installation of CBH connectors with self-drilling metal fasteners, head depth of screws must not exceed 0.250" and head diameter must not exceed 0.500".
11. Connections are not evaluated for uplift.
12. Minimum required fastener length is the greater of 3/4" and the minimum length required for the fastener to extend through the steel connection a minimum of (3) exposed threads per AISI S200-12 General Provisions Standard, Sect. D1.3.

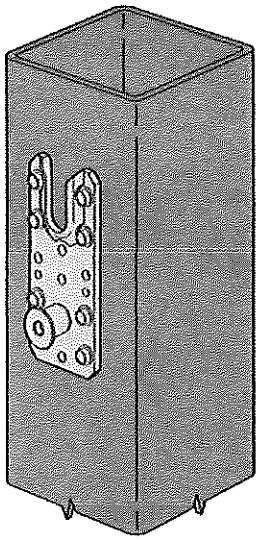


TYPICAL CBH WELDED INSTALLATIONS
6 Welds Shown (3 Per Side)



CBH2.37x5.5	CBH2.37x7.63	CBH2.37x9.75
8 FASTENERS REQUIRED	10 FASTENERS REQUIRED	12 FASTENERS REQUIRED

MINIMUM REQUIRED FASTENER LOCATIONS FOR INSTALLATION WITH SELF-DRILLING FASTENERS

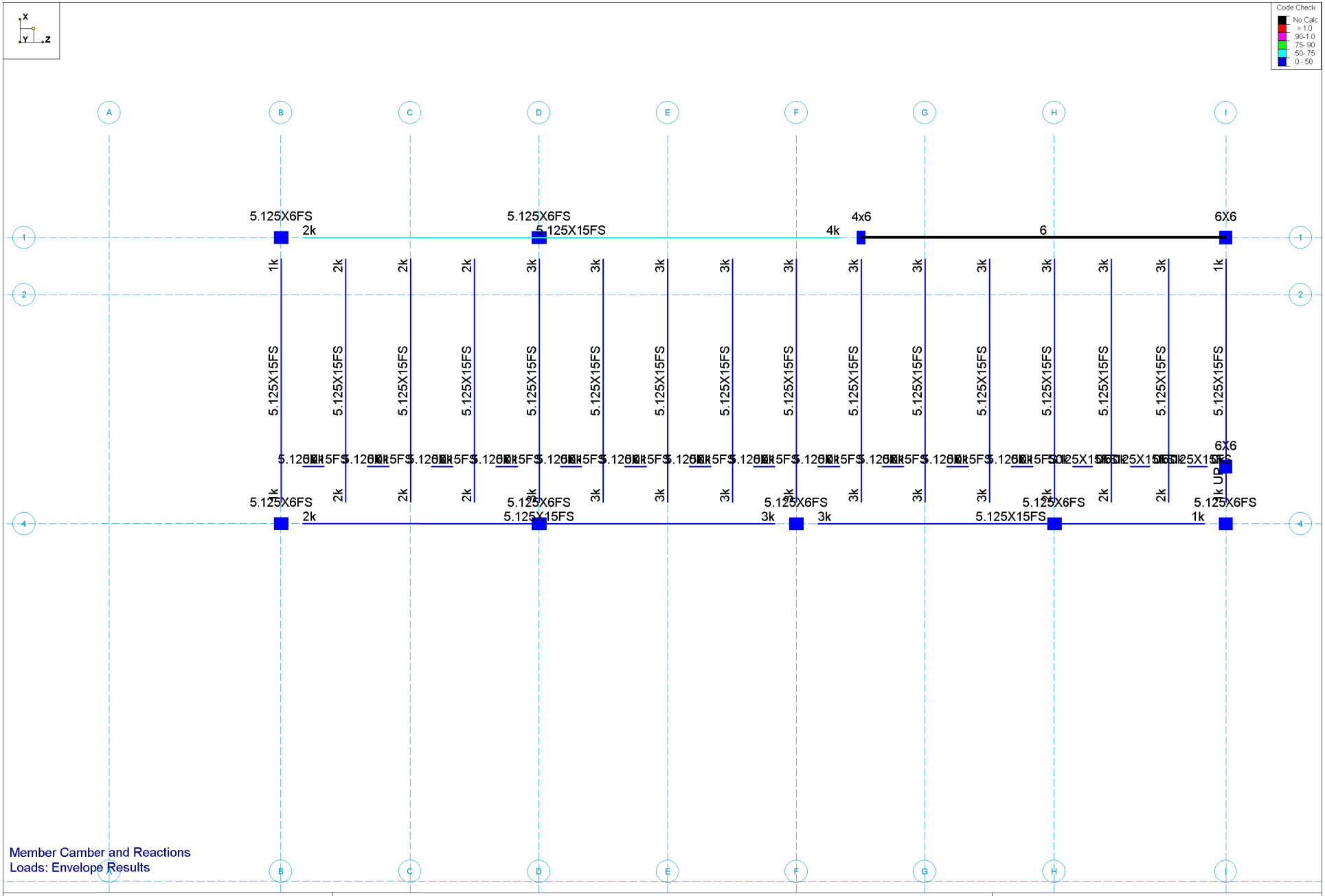


TYPICAL CBH2.37x5.5 INSTALLATION WITH SELF TAPPING SCREWS

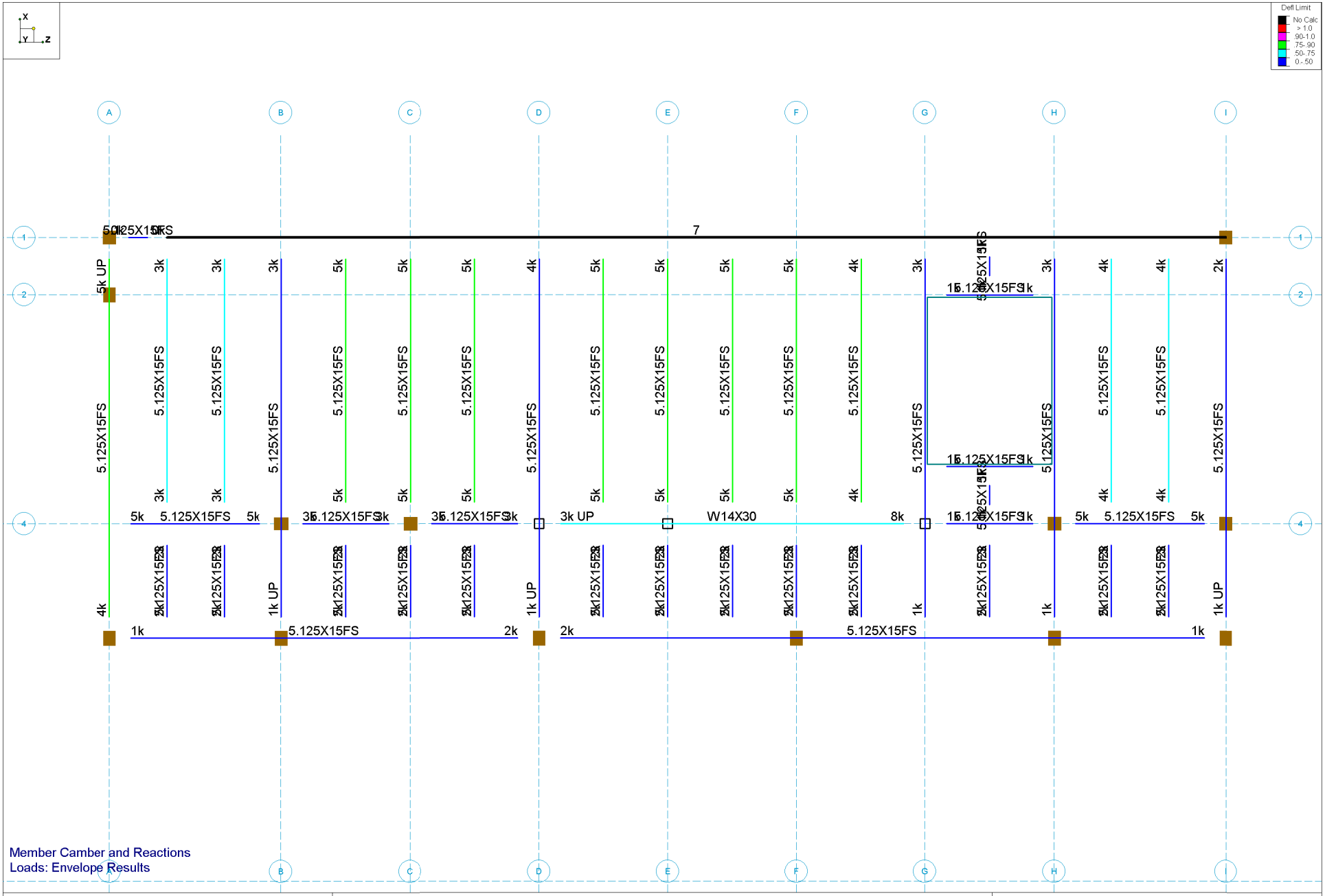
The information in this letter is valid until **12/31/2023** when it will be re-evaluated by Simpson Strong-Tie. Please visit strongtie.com for additional pertinent information. If you have questions or need further assistance regarding this matter, please contact the Simpson Strong-Tie engineering department at 800.999.5099.
SIMPSON STRONG-TIE COMPANY INC.

Sincerely,

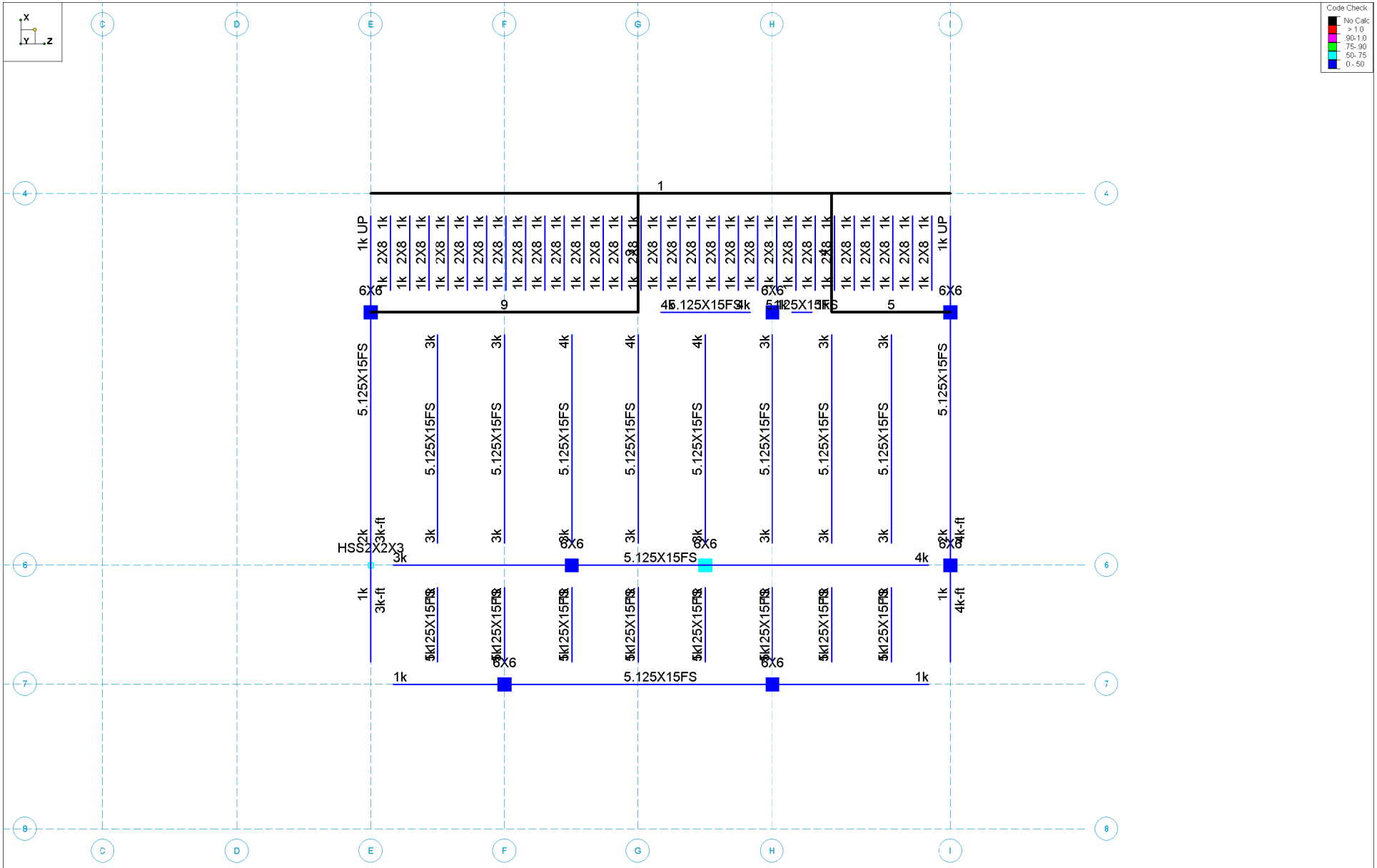
SIMPSON STRONG-TIE COMPANY INC.



Tepa ES	Roof Level	
C Farrell	Alta Mira Infinity House	July 29, 2023 at 3:52 PM
	Beam Reactions - Roof	Dziuk Structural Framing_Revised - walls.rfl

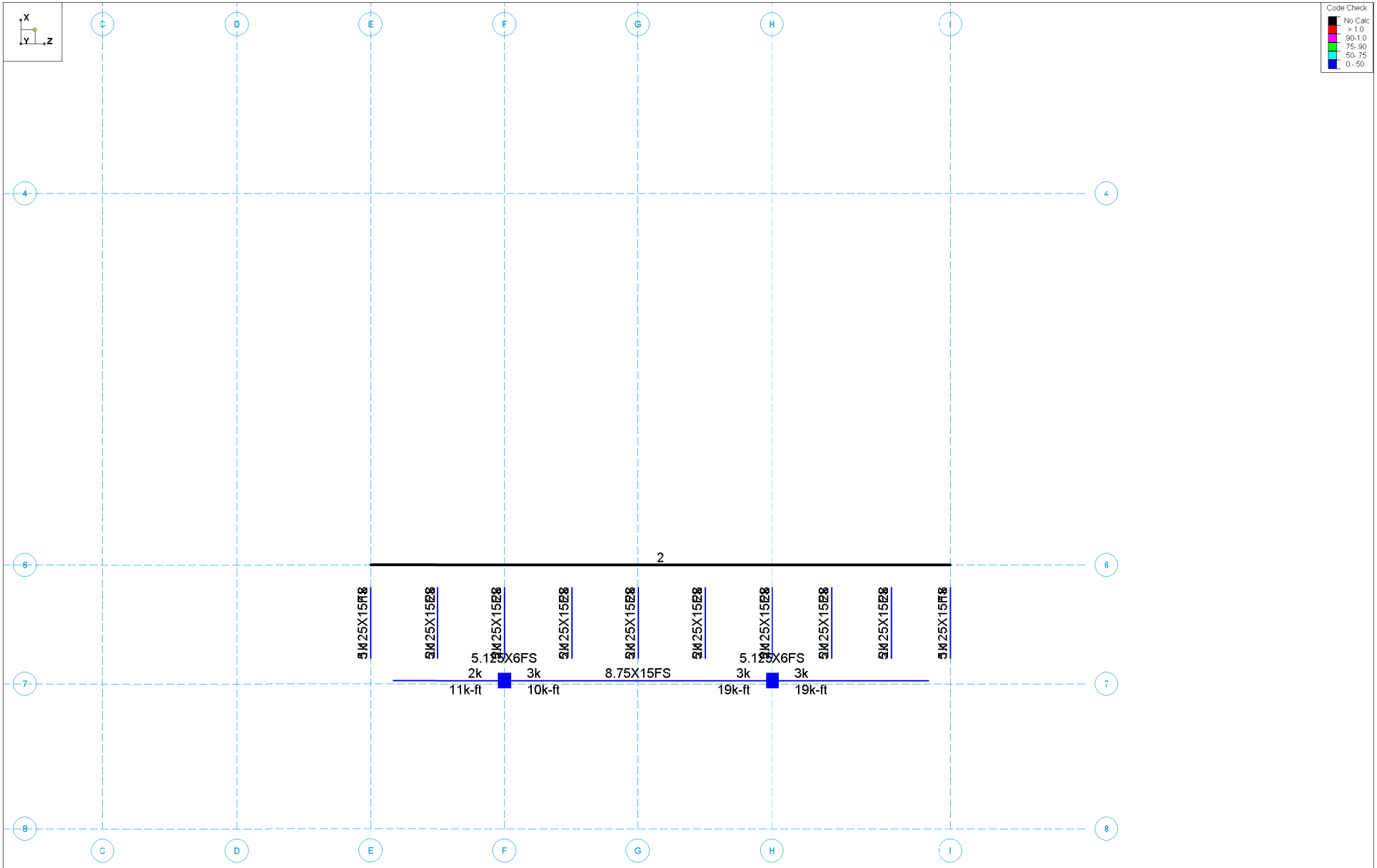


Tepa ES	Street Level	
C Farrell	Alta Mira Infinity House	July 29, 2023 at 3:57 PM
	Beam Reactions - Street Level	Dziuk Structural Framing_Revised - walls.rfl



Member Camber and Reactions
Loads: Envelope Results

Tepa ES	Lower Level	
C Farrell	Alta Mira Infinity House	July 29, 2023 at 3:51 PM
	Beam Reactions - Lower Level	Dziuk Structural Framing_Revised - walls.rfl



Member Camber and Reactions
Loads: Envelope Results

Tepa ES	Pool Terrace Level	
C Farrell	Alta Mira Infinity House	July 29, 2023 at 3:51 PM
	Beam Reactions - Pool Level	Dziuk Structural Framing_Revised - walls.rfl

Column Forces/Moments, Dead & Other Categories : Axial Force

	Column St...	Lift No.	Floor Label	Coordinate...	Max Base ...	Max Bas...	DLPre[k]	DL[k]	OL1[k]	OL2[k]	OL3[k]	OL4[k]
1	(7-F)	1	Pool Terrac...	11,-105	4.219	3	0	0.441	0	0	0	0
2	(7-H)	1	Pool Terrac...	29,-105	5.906	3	0	0.617	0	0	0	0
3	(F-7)	1	Lower Level	11,-105.25	1.872	4	0	0.647	0	0	0	0
4	(H-7)	1	Lower Level	29,-105.25	2.301	4	0	0.851	0	0	0	0
5	(H-5)	1	Lower Level	29,-80.25	8.224	5	0	5.217	0	0	0	0
6		2	Street Level				0	2.313	0	0	0	0
7	(E-6)	1	Lower Level	2,-97.25	4.747	4	0.044	3.085	0	0	0	0
8	(F.5-6)	1	Lower Level	15.5,-97.25	7.738	5	0	4.637	0	0	0	0
9	(G.5-6)	1	Lower Level	24.5,-97.25	10.582	5	0	6.731	0	0	0	0
10	(E-5)	1	Lower Level	2,-80.25	1.845	5	0	1.398	0	0	0	0
11	(I-5)	1	Lower Level	41,-80.25	1.992	4	0	1.566	0	0	0	0
12		2	Street Level				0	0.368	0	0	0	0
13	(I-6)	1	Lower Level	41,-97.25	5.717	4	0	3.614	0	0	0	0
14	(5-F)	1	Street Level	11,-80.25	5.606	4	0	3.99	0	0	0	0
15	(A-5)	1	Street Level	-37,-80.25	4.054	4	0	2.943	0	0	0	0
16	(B-5)	1	Street Level	-25,-80.25	4.521	4	0	3.194	0	0	0	0
17	(D-5)	1	Street Level	-7,-80.25	3.422	4	0	2.286	0	0	0	0
18	(B-4)	1	Street Level	-25,-72.25	13.483	5	0	8.87	0	0	0	0
19		2	Roof Level				0	0.737	0	0	0	0
20	(D-4)	1	Street Level	-7,-72.25	14.519	5	0.16	8.783	0	0	0	0
21		2	Roof Level				0	4.735	0	0	0	0
22	(H-4)	1	Street Level	29,-72.25	16.75	5	0	10.98	0	0	0	0
23		2	Roof Level				0	4.841	0	0	0	0
24	(G-4)	1	Street Level	20,-72.25	14.195	5	0.345	9.327	0	0	0	0
25	(A-1)	1	Street Level	-37,-52.25	-5.021	4	0	-3.645	0	0	0	0
26	(A-2)	1	Street Level	-37,-56.25	9.605	4	0	6.973	0	0	0	0
27	(C-4)	1	Street Level	-16,-72.25	9.926	3	0	4.968	0	0	0	0
28	(E-4)	1	Street Level	2,-72.25	24.985	5	0.679	16.64	0	0	0	0
29	(I-1)	1	Street Level	41,-52.25	1.956	5	0	1.219	0	0	0	0
30		2	Roof Level				0	0.423	0	0	0	0
31	(4-I)	1	Street Level	41,-72.25	8.8	5	0	5.504	0	0	0	0
32		2	Roof Level				0	0.031	0	0	0	0
33	(F-4)	1	Roof Level	11,-72.25	6.608	4	0	3.751	0	0	0	0
34	(D-1)	1	Roof Level	-7,-52.25	11.957	4	0.075	6.91	0	0	0	0
35	(B-1)	1	Roof Level	-25,-52.25	1.686	4	0	0.447	0	0	0	0
36	(I-3)	1	Roof Level	41,-68.25	1.821	4	0	1.1	0	0	0	0

Column Forces/Moments, Dead & Other Categories : Shear z-z

	Column St...	Lift No.	Floor Label	Coordinate...	Max Base ...	Max Bas...	DLPre[k]	DL[k]	OL1[k]	OL2[k]	OL3[k]	OL4[k]
1	(7-F)	1	Pool Terrac...	11,-105	0	1	0	0	0	0	0	0
2	(7-H)	1	Pool Terrac...	29,-105	0	1	0	0	0	0	0	0
3	(F-7)	1	Lower Level	11,-105.25	0	1	0	0	0	0	0	0
4	(H-7)	1	Lower Level	29,-105.25	0	1	0	0	0	0	0	0
5	(H-5)	1	Lower Level	29,-80.25	0	1	0	0	0	0	0	0
6		2	Street Level				0	0	0	0	0	0
7	(E-6)	1	Lower Level	2,-97.25	0	1	0	0	0	0	0	0
8	(F.5-6)	1	Lower Level	15.5,-97.25	0	1	0	0	0	0	0	0
9	(G.5-6)	1	Lower Level	24.5,-97.25	0	1	0	0	0	0	0	0
10	(E-5)	1	Lower Level	2,-80.25	0	1	0	0	0	0	0	0
11	(I-5)	1	Lower Level	41,-80.25	0	1	0	0	0	0	0	0
12		2	Street Level				0	0	0	0	0	0
13	(I-6)	1	Lower Level	41,-97.25	0	1	0	0	0	0	0	0
14	(5-F)	1	Street Level	11,-80.25	0	1	0	0	0	0	0	0
15	(A-5)	1	Street Level	-37,-80.25	0	1	0	0	0	0	0	0
16	(B-5)	1	Street Level	-25,-80.25	0	1	0	0	0	0	0	0
17	(D-5)	1	Street Level	-7,-80.25	0	1	0	0	0	0	0	0

Column Forces/Moments, Dead & Other Categories : Shear z-z (Continued)

	Column St...	Lift No.	Floor Label	Coordinate...	Max Base ...	Max Bas...	DLPre[k]	DL[k]	OL1[k]	OL2[k]	OL3[k]	OL4[k]
18	(B-4)	1	Street Level	-25,-72.25	0.034	3	0	0.02	0	0	0	0
19		2	Roof Level				0	0	0	0	0	0
20	(D-4)	1	Street Level	-7,-72.25	0.077	3	0	0.035	0	0	0	0
21		2	Roof Level				0	0	0	0	0	0
22	(H-4)	1	Street Level	29,-72.25	0	1	0	0	0	0	0	0
23		2	Roof Level				0	0	0	0	0	0
24	(G-4)	1	Street Level	20,-72.25	0	1	0	0	0	0	0	0
25	(A-1)	1	Street Level	-37,-52.25	0	1	0	0	0	0	0	0
26	(A-2)	1	Street Level	-37,-56.25	0	1	0	0	0	0	0	0
27	(C-4)	1	Street Level	-16,-72.25	0	1	0	0	0	0	0	0
28	(E-4)	1	Street Level	2,-72.25	0	1	0	0	0	0	0	0
29	(I-1)	1	Street Level	41,-52.25	0	1	0	0	0	0	0	0
30		2	Roof Level				0	0	0	0	0	0
31	(4-I)	1	Street Level	41,-72.25	0	1	0	0	0	0	0	0
32		2	Roof Level				0	0	0	0	0	0
33	(F-4)	1	Roof Level	11,-72.25	0	1	0	0	0	0	0	0
34	(D-1)	1	Roof Level	-7,-52.25	0	1	0	0	0	0	0	0
35	(B-1)	1	Roof Level	-25,-52.25	0	1	0	0	0	0	0	0
36	(I-3)	1	Roof Level	41,-68.25	0	1	0	0	0	0	0	0

Column Forces/Moments, Dead & Other Categories : Shear y-y

	Column St...	Lift No.	Floor Label	Coordinate...	Max Base ...	Max Bas...	DLPre[k]	DL[k]	OL1[k]	OL2[k]	OL3[k]	OL4[k]
1	(7-F)	1	Pool Terrac...	11,-105	0	1	0	0	0	0	0	0
2	(7-H)	1	Pool Terrac...	29,-105	0	1	0	0	0	0	0	0
3	(F-7)	1	Lower Level	11,-105.25	0	1	0	0	0	0	0	0
4	(H-7)	1	Lower Level	29,-105.25	0	1	0	0	0	0	0	0
5	(H-5)	1	Lower Level	29,-80.25	0	1	0	0	0	0	0	0
6		2	Street Level				0	0	0	0	0	0
7	(E-6)	1	Lower Level	2,-97.25	0	1	0	0	0	0	0	0
8	(F.5-6)	1	Lower Level	15.5,-97.25	0	1	0	0	0	0	0	0
9	(G.5-6)	1	Lower Level	24.5,-97.25	0	1	0	0	0	0	0	0
10	(E-5)	1	Lower Level	2,-80.25	0	1	0	0	0	0	0	0
11	(I-5)	1	Lower Level	41,-80.25	0.007	4	0	0.006	0	0	0	0
12		2	Street Level				0	0	0	0	0	0
13	(I-6)	1	Lower Level	41,-97.25	0	1	0	0	0	0	0	0
14	(5-F)	1	Street Level	11,-80.25	0	1	0	0	0	0	0	0
15	(A-5)	1	Street Level	-37,-80.25	0	1	0	0	0	0	0	0
16	(B-5)	1	Street Level	-25,-80.25	0	1	0	0	0	0	0	0
17	(D-5)	1	Street Level	-7,-80.25	0	1	0	0	0	0	0	0
18	(B-4)	1	Street Level	-25,-72.25	0	1	0	0	0	0	0	0
19		2	Roof Level				0	0	0	0	0	0
20	(D-4)	1	Street Level	-7,-72.25	0	1	0	0	0	0	0	0
21		2	Roof Level				0	0	0	0	0	0
22	(H-4)	1	Street Level	29,-72.25	-0.026	3	0	-0.013	0	0	0	0
23		2	Roof Level				0	0	0	0	0	0
24	(G-4)	1	Street Level	20,-72.25	0	1	0	0	0	0	0	0
25	(A-1)	1	Street Level	-37,-52.25	0	1	0	0	0	0	0	0
26	(A-2)	1	Street Level	-37,-56.25	0	1	0	0	0	0	0	0
27	(C-4)	1	Street Level	-16,-72.25	0	1	0	0	0	0	0	0
28	(E-4)	1	Street Level	2,-72.25	0	1	0	0	0	0	0	0
29	(I-1)	1	Street Level	41,-52.25	0	1	0	0	0	0	0	0
30		2	Roof Level				0	0	0	0	0	0
31	(4-I)	1	Street Level	41,-72.25	-0.022	5	0	-0.014	0	0	0	0
32		2	Roof Level				0	0	0	0	0	0
33	(F-4)	1	Roof Level	11,-72.25	0	1	0	0	0	0	0	0
34	(D-1)	1	Roof Level	-7,-52.25	0	1	0	0	0	0	0	0

Column Forces/Moments, Dead & Other Categories : Shear y-y (Continued)

	Column St...	Lift No.	Floor Label	Coordinate...	Max Base ...	Max Bas...	DLPre[k]	DL[k]	OL1[k]	OL2[k]	OL3[k]	OL4[k]
35	(B-1)	1	Roof Level	-25,-52.25	0	1	0	0	0	0	0	0
36	(I-3)	1	Roof Level	41,-68.25	0	1	0	0	0	0	0	0

Column Forces/Moments, Dead & Other Categories : Moment z-z (Top)

	Column St...	Lift No.	Floor Label	Coordinate...	Max Base ...	Max Bas...	DLPre[k-ft]	DL[k-ft]	OL1[k-ft]	OL2[k-ft]	OL3[k-ft]	OL4[k-ft]
1	(7-F)	1	Pool Terrac...	11,-105	0	1	0	0	0	0	0	0
2	(7-H)	1	Pool Terrac...	29,-105	0	1	0	0	0	0	0	0
3	(F-7)	1	Lower Level	11,-105.25	0	1	0	0	0	0	0	0
4	(H-7)	1	Lower Level	29,-105.25	0	1	0	0	0	0	0	0
5	(H-5)	1	Lower Level	29,-80.25	0	1	0	0	0	0	0	0
6		2	Street Level				0	0	0	0	0	0
7	(E-6)	1	Lower Level	2,-97.25	0	1	0	0	0	0	0	0
8	(F.5-6)	1	Lower Level	15.5,-97.25	0	1	0	0	0	0	0	0
9	(G.5-6)	1	Lower Level	24.5,-97.25	0	1	0	0	0	0	0	0
10	(E-5)	1	Lower Level	2,-80.25	0	1	0	0	0	0	0	0
11	(I-5)	1	Lower Level	41,-80.25	0	4	0	-0.061	0	0	0	0
12		2	Street Level				0	0	0	0	0	0
13	(I-6)	1	Lower Level	41,-97.25	0	1	0	0	0	0	0	0
14	(5-F)	1	Street Level	11,-80.25	0	1	0	0	0	0	0	0
15	(A-5)	1	Street Level	-37,-80.25	0	1	0	0	0	0	0	0
16	(B-5)	1	Street Level	-25,-80.25	0	1	0	0	0	0	0	0
17	(D-5)	1	Street Level	-7,-80.25	0	1	0	0	0	0	0	0
18	(B-4)	1	Street Level	-25,-72.25	0	1	0	0	0	0	0	0
19		2	Roof Level				0	0	0	0	0	0
20	(D-4)	1	Street Level	-7,-72.25	0	1	0	0	0	0	0	0
21		2	Roof Level				0	0	0	0	0	0
22	(H-4)	1	Street Level	29,-72.25	0	3	0	0.127	0	0	0	0
23		2	Roof Level				0	0	0	0	0	0
24	(G-4)	1	Street Level	20,-72.25	0	1	0	0	0	0	0	0
25	(A-1)	1	Street Level	-37,-52.25	0	1	0	0	0	0	0	0
26	(A-2)	1	Street Level	-37,-56.25	0	1	0	0	0	0	0	0
27	(C-4)	1	Street Level	-16,-72.25	0	1	0	0	0	0	0	0
28	(E-4)	1	Street Level	2,-72.25	0	1	0	0	0	0	0	0
29	(I-1)	1	Street Level	41,-52.25	0	1	0	0	0	0	0	0
30		2	Roof Level				0	0	0	0	0	0
31	(4-I)	1	Street Level	41,-72.25	0	5	0	0.138	0	0	0	0
32		2	Roof Level				0	0	0	0	0	0
33	(F-4)	1	Roof Level	11,-72.25	0	1	0	0	0	0	0	0
34	(D-1)	1	Roof Level	-7,-52.25	0	1	0	0	0	0	0	0
35	(B-1)	1	Roof Level	-25,-52.25	0	1	0	0	0	0	0	0
36	(I-3)	1	Roof Level	41,-68.25	0	1	0	0	0	0	0	0

Column Forces/Moments, Dead & Other Categories : Moment y-y (Top)

	Column St...	Lift No.	Floor Label	Coordinate...	Max Base ...	Max Bas...	DLPre[k-ft]	DL[k-ft]	OL1[k-ft]	OL2[k-ft]	OL3[k-ft]	OL4[k-ft]
1	(7-F)	1	Pool Terrac...	11,-105	0	1	0	0	0	0	0	0
2	(7-H)	1	Pool Terrac...	29,-105	0	1	0	0	0	0	0	0
3	(F-7)	1	Lower Level	11,-105.25	0	1	0	0	0	0	0	0
4	(H-7)	1	Lower Level	29,-105.25	0	1	0	0	0	0	0	0
5	(H-5)	1	Lower Level	29,-80.25	0	1	0	0	0	0	0	0
6		2	Street Level				0	0	0	0	0	0
7	(E-6)	1	Lower Level	2,-97.25	0	1	0	0	0	0	0	0
8	(F.5-6)	1	Lower Level	15.5,-97.25	0	1	0	0	0	0	0	0
9	(G.5-6)	1	Lower Level	24.5,-97.25	0	1	0	0	0	0	0	0
10	(E-5)	1	Lower Level	2,-80.25	0	1	0	0	0	0	0	0
11	(I-5)	1	Lower Level	41,-80.25	0	1	0	0	0	0	0	0
12		2	Street Level				0	0	0	0	0	0

Column Forces/Moments, Dead & Other Categories : Moment y-y (Top) (Continued)

	Column St...	Lift No.	Floor Label	Coordinate...	Max Base ...	Max Bas...	DLPre[k-ft]	DL[k-ft]	OL1[k-ft]	OL2[k-ft]	OL3[k-ft]	OL4[k-ft]
13	(I-6)	1	Lower Level	41,-97.25	0	1	0	0	0	0	0	0
14	(5-F)	1	Street Level	11,-80.25	0	1	0	0	0	0	0	0
15	(A-5)	1	Street Level	-37,-80.25	0	1	0	0	0	0	0	0
16	(B-5)	1	Street Level	-25,-80.25	0	1	0	0	0	0	0	0
17	(D-5)	1	Street Level	-7,-80.25	0	1	0	0	0	0	0	0
18	(B-4)	1	Street Level	-25,-72.25	0	3	0	0.201	0	0	0	0
19		2	Roof Level				0	0	0	0	0	0
20	(D-4)	1	Street Level	-7,-72.25	0	3	0	0.346	0	0	0	0
21		2	Roof Level				0	0	0	0	0	0
22	(H-4)	1	Street Level	29,-72.25	0	1	0	0	0	0	0	0
23		2	Roof Level				0	0	0	0	0	0
24	(G-4)	1	Street Level	20,-72.25	0	1	0	0	0	0	0	0
25	(A-1)	1	Street Level	-37,-52.25	0	1	0	0	0	0	0	0
26	(A-2)	1	Street Level	-37,-56.25	0	1	0	0	0	0	0	0
27	(C-4)	1	Street Level	-16,-72.25	0	1	0	0	0	0	0	0
28	(E-4)	1	Street Level	2,-72.25	0	1	0	0	0	0	0	0
29	(I-1)	1	Street Level	41,-52.25	0	1	0	0	0	0	0	0
30		2	Roof Level				0	0	0	0	0	0
31	(4-I)	1	Street Level	41,-72.25	0	1	0	0	0	0	0	0
32		2	Roof Level				0	0	0	0	0	0
33	(F-4)	1	Roof Level	11,-72.25	0	1	0	0	0	0	0	0
34	(D-1)	1	Roof Level	-7,-52.25	0	1	0	0	0	0	0	0
35	(B-1)	1	Roof Level	-25,-52.25	0	1	0	0	0	0	0	0
36	(I-3)	1	Roof Level	41,-68.25	0	1	0	0	0	0	0	0

Column Forces/Moments, Dead & Other Categories : Moment z-z (Bot)

	Column St...	Lift No.	Floor Label	Coordinate...	Max Base ...	Max Bas...	DLPre[k-ft]	DL[k-ft]	OL1[k-ft]	OL2[k-ft]	OL3[k-ft]	OL4[k-ft]
1	(7-F)	1	Pool Terrac...	11,-105	0	1	0	0	0	0	0	0
2	(7-H)	1	Pool Terrac...	29,-105	0	1	0	0	0	0	0	0
3	(F-7)	1	Lower Level	11,-105.25	0	1	0	0	0	0	0	0
4	(H-7)	1	Lower Level	29,-105.25	0	1	0	0	0	0	0	0
5	(H-5)	1	Lower Level	29,-80.25	0	1	0	0	0	0	0	0
6		2	Street Level				0	0	0	0	0	0
7	(E-6)	1	Lower Level	2,-97.25	0	1	0	0	0	0	0	0
8	(F.5-6)	1	Lower Level	15.5,-97.25	0	1	0	0	0	0	0	0
9	(G.5-6)	1	Lower Level	24.5,-97.25	0	1	0	0	0	0	0	0
10	(E-5)	1	Lower Level	2,-80.25	0	1	0	0	0	0	0	0
11	(I-5)	1	Lower Level	41,-80.25	0	4	0	0	0	0	0	0
12		2	Street Level				0	0	0	0	0	0
13	(I-6)	1	Lower Level	41,-97.25	0	1	0	0	0	0	0	0
14	(5-F)	1	Street Level	11,-80.25	0	1	0	0	0	0	0	0
15	(A-5)	1	Street Level	-37,-80.25	0	1	0	0	0	0	0	0
16	(B-5)	1	Street Level	-25,-80.25	0	1	0	0	0	0	0	0
17	(D-5)	1	Street Level	-7,-80.25	0	1	0	0	0	0	0	0
18	(B-4)	1	Street Level	-25,-72.25	0	1	0	0	0	0	0	0
19		2	Roof Level				0	0	0	0	0	0
20	(D-4)	1	Street Level	-7,-72.25	0	1	0	0	0	0	0	0
21		2	Roof Level				0	0	0	0	0	0
22	(H-4)	1	Street Level	29,-72.25	0	3	0	0	0	0	0	0
23		2	Roof Level				0	0	0	0	0	0
24	(G-4)	1	Street Level	20,-72.25	0	1	0	0	0	0	0	0
25	(A-1)	1	Street Level	-37,-52.25	0	1	0	0	0	0	0	0
26	(A-2)	1	Street Level	-37,-56.25	0	1	0	0	0	0	0	0
27	(C-4)	1	Street Level	-16,-72.25	0	1	0	0	0	0	0	0
28	(E-4)	1	Street Level	2,-72.25	0	1	0	0	0	0	0	0
29	(I-1)	1	Street Level	41,-52.25	0	1	0	0	0	0	0	0

Column Forces/Moments, Dead & Other Categories : Moment z-z (Bot) (Continued)

	Column St...	Lift No.	Floor Label	Coordinate...	Max Base ...	Max Bas...	DLPre[k-ft]	DL[k-ft]	OL1[k-ft]	OL2[k-ft]	OL3[k-ft]	OL4[k-ft]
30		2	Roof Level				0	0	0	0	0	0
31	(4-I)	1	Street Level	41,-72.25	0	5	0	0	0	0	0	0
32		2	Roof Level				0	0	0	0	0	0
33	(F-4)	1	Roof Level	11,-72.25	0	1	0	0	0	0	0	0
34	(D-1)	1	Roof Level	-7,-52.25	0	1	0	0	0	0	0	0
35	(B-1)	1	Roof Level	-25,-52.25	0	1	0	0	0	0	0	0
36	(I-3)	1	Roof Level	41,-68.25	0	1	0	0	0	0	0	0

Column Forces/Moments, Dead & Other Categories : Moment y-y (Bot)

	Column St...	Lift No.	Floor Label	Coordinate...	Max Base ...	Max Bas...	DLPre[k-ft]	DL[k-ft]	OL1[k-ft]	OL2[k-ft]	OL3[k-ft]	OL4[k-ft]
1	(7-F)	1	Pool Terrac...	11,-105	0	1	0	0	0	0	0	0
2	(7-H)	1	Pool Terrac...	29,-105	0	1	0	0	0	0	0	0
3	(F-7)	1	Lower Level	11,-105.25	0	1	0	0	0	0	0	0
4	(H-7)	1	Lower Level	29,-105.25	0	1	0	0	0	0	0	0
5	(H-5)	1	Lower Level	29,-80.25	0	1	0	0	0	0	0	0
6		2	Street Level				0	0	0	0	0	0
7	(E-6)	1	Lower Level	2,-97.25	0	1	0	0	0	0	0	0
8	(F.5-6)	1	Lower Level	15.5,-97.25	0	1	0	0	0	0	0	0
9	(G.5-6)	1	Lower Level	24.5,-97.25	0	1	0	0	0	0	0	0
10	(E-5)	1	Lower Level	2,-80.25	0	1	0	0	0	0	0	0
11	(I-5)	1	Lower Level	41,-80.25	0	1	0	0	0	0	0	0
12		2	Street Level				0	0	0	0	0	0
13	(I-6)	1	Lower Level	41,-97.25	0	1	0	0	0	0	0	0
14	(5-F)	1	Street Level	11,-80.25	0	1	0	0	0	0	0	0
15	(A-5)	1	Street Level	-37,-80.25	0	1	0	0	0	0	0	0
16	(B-5)	1	Street Level	-25,-80.25	0	1	0	0	0	0	0	0
17	(D-5)	1	Street Level	-7,-80.25	0	1	0	0	0	0	0	0
18	(B-4)	1	Street Level	-25,-72.25	0	3	0	0	0	0	0	0
19		2	Roof Level				0	0	0	0	0	0
20	(D-4)	1	Street Level	-7,-72.25	0	3	0	0	0	0	0	0
21		2	Roof Level				0	0	0	0	0	0
22	(H-4)	1	Street Level	29,-72.25	0	1	0	0	0	0	0	0
23		2	Roof Level				0	0	0	0	0	0
24	(G-4)	1	Street Level	20,-72.25	0	1	0	0	0	0	0	0
25	(A-1)	1	Street Level	-37,-52.25	0	1	0	0	0	0	0	0
26	(A-2)	1	Street Level	-37,-56.25	0	1	0	0	0	0	0	0
27	(C-4)	1	Street Level	-16,-72.25	0	1	0	0	0	0	0	0
28	(E-4)	1	Street Level	2,-72.25	0	1	0	0	0	0	0	0
29	(I-1)	1	Street Level	41,-52.25	0	1	0	0	0	0	0	0
30		2	Roof Level				0	0	0	0	0	0
31	(4-I)	1	Street Level	41,-72.25	0	1	0	0	0	0	0	0
32		2	Roof Level				0	0	0	0	0	0
33	(F-4)	1	Roof Level	11,-72.25	0	1	0	0	0	0	0	0
34	(D-1)	1	Roof Level	-7,-52.25	0	1	0	0	0	0	0	0
35	(B-1)	1	Roof Level	-25,-52.25	0	1	0	0	0	0	0	0
36	(I-3)	1	Roof Level	41,-68.25	0	1	0	0	0	0	0	0

Column Forces/Moments, Floor Live Load : Axial Force

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	LL Reduce	NonReduc...	LL[k] (unre...	LLS Redu...	NonReduc...	LLS[k] (un...
1	(7-F)	1	Pool Terrace...	11,-105	52.312	1	0	3.778	1	0	0
2	(7-H)	1	Pool Terrace...	29,-105	58.125	1	0	5.289	1	0	0
3	(F-7)	1	Lower Level	11,-105.25	54	1	0	0.002	1	0	0
4	(H-7)	1	Lower Level	29,-105.25	60	1	0	0.001	1	0	0
5	(H-5)	1	Lower Level	29,-80.25	141.033	0.882	0	2.773	0.882	0	0
6		2	Street Level		60	1	0	-0.942	1	0	0
7	(E-6)	1	Lower Level	2,-97.25	84.375	1	0	0.1	1	0	0

Column Forces/Moments, Floor Live Load : Axial Force (Continued)

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	LL Reduce	NonReduc..	LL[k] (unre..	LLS Redu...	NonReduc..	LLS[k] (un...
8	(F.5-6)	1	Lower Level	15.5,-97.25	140.625	0.882	0	2.555	1	0	0
9	(G.5-6)	1	Lower Level	24.5,-97.25	159.375	0.844	0	2.628	1	0	0
10	(E-5)	1	Lower Level	2,-80.25	21.725	1	0	0.176	1	0	0
11	(I-5)	1	Lower Level	41,-80.25	43.6	1	0	-0.105	1	0	0
12		2	Street Level		24	1	0	-0.281	1	0	0
13	(I-6)	1	Lower Level	41,-97.25	103.125	0.989	0	0.07	1	0	0
14	(5-F)	1	Street Level	11,-80.25	72	1	0	-0.327	1	0	0
15	(A-5)	1	Street Level	-37,-80.25	77.333	1	0	0	1	0	0
16	(B-5)	1	Street Level	-25,-80.25	60	1	0	-0.567	1	0	0
17	(D-5)	1	Street Level	-7,-80.25	72	1	-0.363	-0.503	1	0	0
18	(B-4)	1	Street Level	-25,-72.25	237	0.737	0	3.512	0.8	0	0
19		2	Roof Level		90	1	0	0	1	0	0
20	(D-4)	1	Street Level	-7,-72.25	261	0.714	1.262	3.332	0.8	0	0
21		2	Roof Level		180	0.809	0	0	1	0	0
22	(H-4)	1	Street Level	29,-72.25	271.722	0.705	0	4.668	0.8	0	0
23		2	Roof Level		150	0.862	0	0	1	0	0
24	(G-4)	1	Street Level	20,-72.25	203.097	0.776	1.491	3.697	1	0	0
25	(A-1)	1	Street Level	-37,-52.25	4	1	0	0	1	0	0
26	(A-2)	1	Street Level	-37,-56.25	46.667	1	0	0	1	0	0
27	(C-4)	1	Street Level	-16,-72.25	126	0.918	0	5.4	1	0	0
28	(E-4)	1	Street Level	2,-72.25	149.625	0.863	6.776	0.508	1	0	0
29	(I-1)	1	Street Level	41,-52.25	40	1	0	0.662	1	0	0
30		2	Roof Level		16	1	0	0	1	0	0
31	(4-I)	1	Street Level	41,-72.25	144	0.875	0	3.348	0.875	0	0
32		2	Roof Level		44	1	0	0	1	0	0
33	(F-4)	1	Roof Level	11,-72.25	180	0.809	0	0	1	0	0
34	(D-1)	1	Roof Level	-7,-52.25	202.5	0.777	0	0	1	0	0
35	(B-1)	1	Roof Level	-25,-52.25	90	1	0	0	1	0	0
36	(I-3)	1	Roof Level	41,-68.25	20	1	0	0	1	0	0

Column Forces/Moments, Floor Live Load : Shear z-z

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	LL Reduce	NonReduc..	LL[k] (unre..	LLS Redu...	NonReduc..	LLS[k] (un...
1	(7-F)	1	Pool Terrace...	11,-105	52.312	1	0	0	1	0	0
2	(7-H)	1	Pool Terrace...	29,-105	58.125	1	0	0	1	0	0
3	(F-7)	1	Lower Level	11,-105.25	54	1	0	0	1	0	0
4	(H-7)	1	Lower Level	29,-105.25	60	1	0	0	1	0	0
5	(H-5)	1	Lower Level	29,-80.25	141.033	0.882	0	0	0.882	0	0
6		2	Street Level		60	1	0	0	1	0	0
7	(E-6)	1	Lower Level	2,-97.25	84.375	1	0	0	1	0	0
8	(F.5-6)	1	Lower Level	15.5,-97.25	140.625	0.882	0	0	1	0	0
9	(G.5-6)	1	Lower Level	24.5,-97.25	159.375	0.844	0	0	1	0	0
10	(E-5)	1	Lower Level	2,-80.25	21.725	1	0	0	1	0	0
11	(I-5)	1	Lower Level	41,-80.25	43.6	1	0	0	1	0	0
12		2	Street Level		24	1	0	0	1	0	0
13	(I-6)	1	Lower Level	41,-97.25	103.125	0.989	0	0	1	0	0
14	(5-F)	1	Street Level	11,-80.25	72	1	0	0	1	0	0
15	(A-5)	1	Street Level	-37,-80.25	77.333	1	0	0	1	0	0
16	(B-5)	1	Street Level	-25,-80.25	60	1	0	0	1	0	0
17	(D-5)	1	Street Level	-7,-80.25	72	1	0	0	1	0	0
18	(B-4)	1	Street Level	-25,-72.25	237	0.737	0	0.019	0.8	0	0
19		2	Roof Level		90	1	0	0	1	0	0
20	(D-4)	1	Street Level	-7,-72.25	261	0.714	0.021	0.031	0.8	0	0
21		2	Roof Level		180	0.809	0	0	1	0	0
22	(H-4)	1	Street Level	29,-72.25	271.722	0.705	0	0	0.8	0	0
23		2	Roof Level		150	0.862	0	0	1	0	0
24	(G-4)	1	Street Level	20,-72.25	203.097	0.776	0	0	1	0	0

Column Forces/Moments, Floor Live Load : Shear z-z (Continued)

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	LL Reduce	NonReduc..	LL[k] (unre..	LLS Redu...	NonReduc..	LLS[k] (un...
25	(A-1)	1	Street Level	-37,-52.25	4	1	0	0	1	0	0
26	(A-2)	1	Street Level	-37,-56.25	46.667	1	0	0	1	0	0
27	(C-4)	1	Street Level	-16,-72.25	126	0.918	0	0	1	0	0
28	(E-4)	1	Street Level	2,-72.25	149.625	0.863	0	0	1	0	0
29	(I-1)	1	Street Level	41,-52.25	40	1	0	0	1	0	0
30		2	Roof Level		16	1	0	0	1	0	0
31	(4-I)	1	Street Level	41,-72.25	144	0.875	0	0	0.875	0	0
32		2	Roof Level		44	1	0	0	1	0	0
33	(F-4)	1	Roof Level	11,-72.25	180	0.809	0	0	1	0	0
34	(D-1)	1	Roof Level	-7,-52.25	202.5	0.777	0	0	1	0	0
35	(B-1)	1	Roof Level	-25,-52.25	90	1	0	0	1	0	0
36	(I-3)	1	Roof Level	41,-68.25	20	1	0	0	1	0	0

Column Forces/Moments, Floor Live Load : Shear y-y

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	LL Reduce	NonReduc..	LL[k] (unre..	LLS Redu...	NonReduc..	LLS[k] (un...
1	(7-F)	1	Pool Terrace...	11,-105	52.312	1	0	0	1	0	0
2	(7-H)	1	Pool Terrace...	29,-105	58.125	1	0	0	1	0	0
3	(F-7)	1	Lower Level	11,-105.25	54	1	0	0	1	0	0
4	(H-7)	1	Lower Level	29,-105.25	60	1	0	0	1	0	0
5	(H-5)	1	Lower Level	29,-80.25	141.033	0.882	0	0	0.882	0	0
6		2	Street Level		60	1	0	0	1	0	0
7	(E-6)	1	Lower Level	2,-97.25	84.375	1	0	0	1	0	0
8	(F.5-6)	1	Lower Level	15.5,-97.25	140.625	0.882	0	0	1	0	0
9	(G.5-6)	1	Lower Level	24.5,-97.25	159.375	0.844	0	0	1	0	0
10	(E-5)	1	Lower Level	2,-80.25	21.725	1	0	0	1	0	0
11	(I-5)	1	Lower Level	41,-80.25	43.6	1	0	-0.001	1	0	0
12		2	Street Level		24	1	0	0	1	0	0
13	(I-6)	1	Lower Level	41,-97.25	103.125	0.989	0	0	1	0	0
14	(5-F)	1	Street Level	11,-80.25	72	1	0	0	1	0	0
15	(A-5)	1	Street Level	-37,-80.25	77.333	1	0	0	1	0	0
16	(B-5)	1	Street Level	-25,-80.25	60	1	0	0	1	0	0
17	(D-5)	1	Street Level	-7,-80.25	72	1	0	0	1	0	0
18	(B-4)	1	Street Level	-25,-72.25	237	0.737	0	0	0.8	0	0
19		2	Roof Level		90	1	0	0	1	0	0
20	(D-4)	1	Street Level	-7,-72.25	261	0.714	0	0	0.8	0	0
21		2	Roof Level		180	0.809	0	0	1	0	0
22	(H-4)	1	Street Level	29,-72.25	271.722	0.705	0	-0.019	0.8	0	0
23		2	Roof Level		150	0.862	0	0	1	0	0
24	(G-4)	1	Street Level	20,-72.25	203.097	0.776	0	0	1	0	0
25	(A-1)	1	Street Level	-37,-52.25	4	1	0	0	1	0	0
26	(A-2)	1	Street Level	-37,-56.25	46.667	1	0	0	1	0	0
27	(C-4)	1	Street Level	-16,-72.25	126	0.918	0	0	1	0	0
28	(E-4)	1	Street Level	2,-72.25	149.625	0.863	0	0	1	0	0
29	(I-1)	1	Street Level	41,-52.25	40	1	0	0	1	0	0
30		2	Roof Level		16	1	0	0	1	0	0
31	(4-I)	1	Street Level	41,-72.25	144	0.875	0	-0.009	0.875	0	0
32		2	Roof Level		44	1	0	0	1	0	0
33	(F-4)	1	Roof Level	11,-72.25	180	0.809	0	0	1	0	0
34	(D-1)	1	Roof Level	-7,-52.25	202.5	0.777	0	0	1	0	0
35	(B-1)	1	Roof Level	-25,-52.25	90	1	0	0	1	0	0
36	(I-3)	1	Roof Level	41,-68.25	20	1	0	0	1	0	0

Column Forces/Moments, Floor Live Load : Moment z-z (Top)

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	LL Reduce	NonReduc..	LL[k-ft] (u...	LLS Redu...	NonReduc..	LLS[k-ft] (...
1	(7-F)	1	Pool Terrace...	11,-105	52.312	1	0	0	1	0	0
2	(7-H)	1	Pool Terrace...	29,-105	58.125	1	0	0	1	0	0
3	(F-7)	1	Lower Level	11,-105.25	54	1	0	0	1	0	0
4	(H-7)	1	Lower Level	29,-105.25	60	1	0	0	1	0	0
5	(H-5)	1	Lower Level	29,-80.25	141.033	0.882	0	0	0.882	0	0
6		2	Street Level		60	1	0	0	1	0	0
7	(E-6)	1	Lower Level	2,-97.25	84.375	1	0	0	1	0	0
8	(F.5-6)	1	Lower Level	15.5,-97.25	140.625	0.882	0	0	1	0	0
9	(G.5-6)	1	Lower Level	24.5,-97.25	159.375	0.844	0	0	1	0	0
10	(E-5)	1	Lower Level	2,-80.25	21.725	1	0	0	1	0	0
11	(I-5)	1	Lower Level	41,-80.25	43.6	1	0	0.006	1	0	0
12		2	Street Level		24	1	0	0	1	0	0
13	(I-6)	1	Lower Level	41,-97.25	103.125	0.989	0	0	1	0	0
14	(5-F)	1	Street Level	11,-80.25	72	1	0	0	1	0	0
15	(A-5)	1	Street Level	-37,-80.25	77.333	1	0	0	1	0	0
16	(B-5)	1	Street Level	-25,-80.25	60	1	0	0	1	0	0
17	(D-5)	1	Street Level	-7,-80.25	72	1	0	0	1	0	0
18	(B-4)	1	Street Level	-25,-72.25	237	0.737	0	0	0.8	0	0
19		2	Roof Level		90	1	0	0	1	0	0
20	(D-4)	1	Street Level	-7,-72.25	261	0.714	0	0	0.8	0	0
21		2	Roof Level		180	0.809	0	0	1	0	0
22	(H-4)	1	Street Level	29,-72.25	271.722	0.705	0	0.19	0.8	0	0
23		2	Roof Level		150	0.862	0	0	1	0	0
24	(G-4)	1	Street Level	20,-72.25	203.097	0.776	0	0	1	0	0
25	(A-1)	1	Street Level	-37,-52.25	4	1	0	0	1	0	0
26	(A-2)	1	Street Level	-37,-56.25	46.667	1	0	0	1	0	0
27	(C-4)	1	Street Level	-16,-72.25	126	0.918	0	0	1	0	0
28	(E-4)	1	Street Level	2,-72.25	149.625	0.863	0	0	1	0	0
29	(I-1)	1	Street Level	41,-52.25	40	1	0	0	1	0	0
30		2	Roof Level		16	1	0	0	1	0	0
31	(4-I)	1	Street Level	41,-72.25	144	0.875	0	0.09	0.875	0	0
32		2	Roof Level		44	1	0	0	1	0	0
33	(F-4)	1	Roof Level	11,-72.25	180	0.809	0	0	1	0	0
34	(D-1)	1	Roof Level	-7,-52.25	202.5	0.777	0	0	1	0	0
35	(B-1)	1	Roof Level	-25,-52.25	90	1	0	0	1	0	0
36	(I-3)	1	Roof Level	41,-68.25	20	1	0	0	1	0	0

Column Forces/Moments, Floor Live Load : Moment y-y (Top)

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	LL Reduce	NonReduc..	LL[k-ft] (u...	LLS Redu...	NonReduc..	LLS[k-ft] (...
1	(7-F)	1	Pool Terrace...	11,-105	52.312	1	0	0	1	0	0
2	(7-H)	1	Pool Terrace...	29,-105	58.125	1	0	0	1	0	0
3	(F-7)	1	Lower Level	11,-105.25	54	1	0	0	1	0	0
4	(H-7)	1	Lower Level	29,-105.25	60	1	0	0	1	0	0
5	(H-5)	1	Lower Level	29,-80.25	141.033	0.882	0	0	0.882	0	0
6		2	Street Level		60	1	0	0	1	0	0
7	(E-6)	1	Lower Level	2,-97.25	84.375	1	0	0	1	0	0
8	(F.5-6)	1	Lower Level	15.5,-97.25	140.625	0.882	0	0	1	0	0
9	(G.5-6)	1	Lower Level	24.5,-97.25	159.375	0.844	0	0	1	0	0
10	(E-5)	1	Lower Level	2,-80.25	21.725	1	0	0	1	0	0
11	(I-5)	1	Lower Level	41,-80.25	43.6	1	0	0	1	0	0
12		2	Street Level		24	1	0	0	1	0	0
13	(I-6)	1	Lower Level	41,-97.25	103.125	0.989	0	0	1	0	0
14	(5-F)	1	Street Level	11,-80.25	72	1	0	0	1	0	0
15	(A-5)	1	Street Level	-37,-80.25	77.333	1	0	0	1	0	0
16	(B-5)	1	Street Level	-25,-80.25	60	1	0	0	1	0	0
17	(D-5)	1	Street Level	-7,-80.25	72	1	0	0	1	0	0

Column Forces/Moments, Floor Live Load : Moment y-y (Top) (Continued)

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	LL Reduce	NonReduc..	LL[k-ft] (u...	LLS Redu...	NonReduc..	LLS[k-ft] (...
18	(B-4)	1	Street Level	-25,-72.25	237	0.737	0	0.186	0.8	0	0
19		2	Roof Level		90	1	0	0	1	0	0
20	(D-4)	1	Street Level	-7,-72.25	261	0.714	0.206	0.31	0.8	0	0
21		2	Roof Level		180	0.809	0	0	1	0	0
22	(H-4)	1	Street Level	29,-72.25	271.722	0.705	0	0	0.8	0	0
23		2	Roof Level		150	0.862	0	0	1	0	0
24	(G-4)	1	Street Level	20,-72.25	203.097	0.776	0	0	1	0	0
25	(A-1)	1	Street Level	-37,-52.25	4	1	0	0	1	0	0
26	(A-2)	1	Street Level	-37,-56.25	46.667	1	0	0	1	0	0
27	(C-4)	1	Street Level	-16,-72.25	126	0.918	0	0	1	0	0
28	(E-4)	1	Street Level	2,-72.25	149.625	0.863	0	0	1	0	0
29	(I-1)	1	Street Level	41,-52.25	40	1	0	0	1	0	0
30		2	Roof Level		16	1	0	0	1	0	0
31	(4-I)	1	Street Level	41,-72.25	144	0.875	0	0	0.875	0	0
32		2	Roof Level		44	1	0	0	1	0	0
33	(F-4)	1	Roof Level	11,-72.25	180	0.809	0	0	1	0	0
34	(D-1)	1	Roof Level	-7,-52.25	202.5	0.777	0	0	1	0	0
35	(B-1)	1	Roof Level	-25,-52.25	90	1	0	0	1	0	0
36	(I-3)	1	Roof Level	41,-68.25	20	1	0	0	1	0	0

Column Forces/Moments, Floor Live Load : Moment z-z (Bot)

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	LL Reduce	NonReduc..	LL[k-ft] (u...	LLS Redu...	NonReduc..	LLS[k-ft] (...
1	(7-F)	1	Pool Terrace...	11,-105	52.312	1	0	0	1	0	0
2	(7-H)	1	Pool Terrace...	29,-105	58.125	1	0	0	1	0	0
3	(F-7)	1	Lower Level	11,-105.25	54	1	0	0	1	0	0
4	(H-7)	1	Lower Level	29,-105.25	60	1	0	0	1	0	0
5	(H-5)	1	Lower Level	29,-80.25	141.033	0.882	0	0	0.882	0	0
6		2	Street Level		60	1	0	0	1	0	0
7	(E-6)	1	Lower Level	2,-97.25	84.375	1	0	0	1	0	0
8	(F.5-6)	1	Lower Level	15.5,-97.25	140.625	0.882	0	0	1	0	0
9	(G.5-6)	1	Lower Level	24.5,-97.25	159.375	0.844	0	0	1	0	0
10	(E-5)	1	Lower Level	2,-80.25	21.725	1	0	0	1	0	0
11	(I-5)	1	Lower Level	41,-80.25	43.6	1	0	0	1	0	0
12		2	Street Level		24	1	0	0	1	0	0
13	(I-6)	1	Lower Level	41,-97.25	103.125	0.989	0	0	1	0	0
14	(5-F)	1	Street Level	11,-80.25	72	1	0	0	1	0	0
15	(A-5)	1	Street Level	-37,-80.25	77.333	1	0	0	1	0	0
16	(B-5)	1	Street Level	-25,-80.25	60	1	0	0	1	0	0
17	(D-5)	1	Street Level	-7,-80.25	72	1	0	0	1	0	0
18	(B-4)	1	Street Level	-25,-72.25	237	0.737	0	0	0.8	0	0
19		2	Roof Level		90	1	0	0	1	0	0
20	(D-4)	1	Street Level	-7,-72.25	261	0.714	0	0	0.8	0	0
21		2	Roof Level		180	0.809	0	0	1	0	0
22	(H-4)	1	Street Level	29,-72.25	271.722	0.705	0	0	0.8	0	0
23		2	Roof Level		150	0.862	0	0	1	0	0
24	(G-4)	1	Street Level	20,-72.25	203.097	0.776	0	0	1	0	0
25	(A-1)	1	Street Level	-37,-52.25	4	1	0	0	1	0	0
26	(A-2)	1	Street Level	-37,-56.25	46.667	1	0	0	1	0	0
27	(C-4)	1	Street Level	-16,-72.25	126	0.918	0	0	1	0	0
28	(E-4)	1	Street Level	2,-72.25	149.625	0.863	0	0	1	0	0
29	(I-1)	1	Street Level	41,-52.25	40	1	0	0	1	0	0
30		2	Roof Level		16	1	0	0	1	0	0
31	(4-I)	1	Street Level	41,-72.25	144	0.875	0	0	0.875	0	0
32		2	Roof Level		44	1	0	0	1	0	0
33	(F-4)	1	Roof Level	11,-72.25	180	0.809	0	0	1	0	0
34	(D-1)	1	Roof Level	-7,-52.25	202.5	0.777	0	0	1	0	0

Column Forces/Moments, Floor Live Load : Moment z-z (Bot) (Continued)

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	LL Reduce	NonReduc..	LL[k-ft] (u...	LLS Redu...	NonReduc..	LLS[k-ft] (...
35	(B-1)	1	Roof Level	-25,-52.25	90	1	0	0	1	0	0
36	(I-3)	1	Roof Level	41,-68.25	20	1	0	0	1	0	0

Column Forces/Moments, Floor Live Load : Moment y-y (Bot)

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	LL Reduce	NonReduc..	LL[k-ft] (u...	LLS Redu...	NonReduc..	LLS[k-ft] (...
1	(7-F)	1	Pool Terrace...	11,-105	52.312	1	0	0	1	0	0
2	(7-H)	1	Pool Terrace...	29,-105	58.125	1	0	0	1	0	0
3	(F-7)	1	Lower Level	11,-105.25	54	1	0	0	1	0	0
4	(H-7)	1	Lower Level	29,-105.25	60	1	0	0	1	0	0
5	(H-5)	1	Lower Level	29,-80.25	141.033	0.882	0	0	0.882	0	0
6		2	Street Level		60	1	0	0	1	0	0
7	(E-6)	1	Lower Level	2,-97.25	84.375	1	0	0	1	0	0
8	(F.5-6)	1	Lower Level	15.5,-97.25	140.625	0.882	0	0	1	0	0
9	(G.5-6)	1	Lower Level	24.5,-97.25	159.375	0.844	0	0	1	0	0
10	(E-5)	1	Lower Level	2,-80.25	21.725	1	0	0	1	0	0
11	(I-5)	1	Lower Level	41,-80.25	43.6	1	0	0	1	0	0
12		2	Street Level		24	1	0	0	1	0	0
13	(I-6)	1	Lower Level	41,-97.25	103.125	0.989	0	0	1	0	0
14	(5-F)	1	Street Level	11,-80.25	72	1	0	0	1	0	0
15	(A-5)	1	Street Level	-37,-80.25	77.333	1	0	0	1	0	0
16	(B-5)	1	Street Level	-25,-80.25	60	1	0	0	1	0	0
17	(D-5)	1	Street Level	-7,-80.25	72	1	0	0	1	0	0
18	(B-4)	1	Street Level	-25,-72.25	237	0.737	0	0	0.8	0	0
19		2	Roof Level		90	1	0	0	1	0	0
20	(D-4)	1	Street Level	-7,-72.25	261	0.714	0	0	0.8	0	0
21		2	Roof Level		180	0.809	0	0	1	0	0
22	(H-4)	1	Street Level	29,-72.25	271.722	0.705	0	0	0.8	0	0
23		2	Roof Level		150	0.862	0	0	1	0	0
24	(G-4)	1	Street Level	20,-72.25	203.097	0.776	0	0	1	0	0
25	(A-1)	1	Street Level	-37,-52.25	4	1	0	0	1	0	0
26	(A-2)	1	Street Level	-37,-56.25	46.667	1	0	0	1	0	0
27	(C-4)	1	Street Level	-16,-72.25	126	0.918	0	0	1	0	0
28	(E-4)	1	Street Level	2,-72.25	149.625	0.863	0	0	1	0	0
29	(I-1)	1	Street Level	41,-52.25	40	1	0	0	1	0	0
30		2	Roof Level		16	1	0	0	1	0	0
31	(4-I)	1	Street Level	41,-72.25	144	0.875	0	0	0.875	0	0
32		2	Roof Level		44	1	0	0	1	0	0
33	(F-4)	1	Roof Level	11,-72.25	180	0.809	0	0	1	0	0
34	(D-1)	1	Roof Level	-7,-52.25	202.5	0.777	0	0	1	0	0
35	(B-1)	1	Roof Level	-25,-52.25	90	1	0	0	1	0	0
36	(I-3)	1	Roof Level	41,-68.25	20	1	0	0	1	0	0

Column Forces/Moments, Roof Load : Axial Force

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	RLL Redu...	NonReduc..	RLL[k] (un...	SL[k]	SLN[k]	RL[k]
1	(7-F)	1	Pool Terrace...	11,-105	52.312	1	0	0	0	0	0
2	(7-H)	1	Pool Terrace...	29,-105	58.125	1	0	0	0	0	0
3	(F-7)	1	Lower Level	11,-105.25	54	1	0	1.226	0	0	0
4	(H-7)	1	Lower Level	29,-105.25	60	1	0	1.45	0	0	0
5	(H-5)	1	Lower Level	29,-80.25	141.033	1	0	1.565	0	0	0
6		2	Street Level		60	1	0	1.183	0	0	0
7	(E-6)	1	Lower Level	2,-97.25	84.375	1	0	1.662	0	0	0
8	(F.5-6)	1	Lower Level	15.5,-97.25	140.625	1	0	1.88	0	0	0
9	(G.5-6)	1	Lower Level	24.5,-97.25	159.375	1	0	2.917	0	0	0
10	(E-5)	1	Lower Level	2,-80.25	21.725	1	0	0.419	0	0	0
11	(I-5)	1	Lower Level	41,-80.25	43.6	1	0	0.426	0	0	0
12		2	Street Level		24	1	0	0.171	0	0	0

Column Forces/Moments, Roof Load : Axial Force (Continued)

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	RLL Redu...	NonReduc...	RLL[k] (un...	SL[k]	SLN[k]	RL[k]
13	(I-6)	1	Lower Level	41,-97.25	103.125	1	0	2.103	0	0	0
14	(5-F)	1	Street Level	11,-80.25	72	1	0	1.616	0	0	0
15	(A-5)	1	Street Level	-37,-80.25	77.333	1	0	1.111	0	0	0
16	(B-5)	1	Street Level	-25,-80.25	60	1	0	1.327	0	0	0
17	(D-5)	1	Street Level	-7,-80.25	72	1	0	1.136	0	0	0
18	(B-4)	1	Street Level	-25,-72.25	237	0.963	0	3.698	0	0	0
19		2	Roof Level		90	1	0	1.38	0	0	0
20	(D-4)	1	Street Level	-7,-72.25	261	0.939	0	4.266	0	0	0
21		2	Roof Level		180	1	0	4.441	0	0	0
22	(H-4)	1	Street Level	29,-72.25	271.722	0.928	0	4.742	0	0	0
23		2	Roof Level		150	1	0	3.806	0	0	0
24	(G-4)	1	Street Level	20,-72.25	203.097	0.997	0	2.136	0	0	0
25	(A-1)	1	Street Level	-37,-52.25	4	1	0	-1.376	0	0	0
26	(A-2)	1	Street Level	-37,-56.25	46.667	1	0	2.631	0	0	0
27	(C-4)	1	Street Level	-16,-72.25	126	1	0	0.72	0	0	0
28	(E-4)	1	Street Level	2,-72.25	149.625	1	0	3.912	0	0	0
29	(I-1)	1	Street Level	41,-52.25	40	1	0	0.321	0	0	0
30		2	Roof Level		16	1	0	0.256	0	0	0
31	(4-I)	1	Street Level	41,-72.25	144	1	0	1.465	0	0	0
32		2	Roof Level		44	1	0	0.14	0	0	0
33	(F-4)	1	Roof Level	11,-72.25	180	1	0	2.857	0	0	0
34	(D-1)	1	Roof Level	-7,-52.25	202.5	0.998	0	5.06	0	0	0
35	(B-1)	1	Roof Level	-25,-52.25	90	1	0	1.239	0	0	0
36	(I-3)	1	Roof Level	41,-68.25	20	1	0	0.721	0	0	0

Column Forces/Moments, Roof Load : Shear z-z

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	RLL Redu...	NonReduc...	RLL[k] (un...	SL[k]	SLN[k]	RL[k]
1	(7-F)	1	Pool Terrace...	11,-105	52.312	1	0	0	0	0	0
2	(7-H)	1	Pool Terrace...	29,-105	58.125	1	0	0	0	0	0
3	(F-7)	1	Lower Level	11,-105.25	54	1	0	0	0	0	0
4	(H-7)	1	Lower Level	29,-105.25	60	1	0	0	0	0	0
5	(H-5)	1	Lower Level	29,-80.25	141.033	1	0	0	0	0	0
6		2	Street Level		60	1	0	0	0	0	0
7	(E-6)	1	Lower Level	2,-97.25	84.375	1	0	0	0	0	0
8	(F.5-6)	1	Lower Level	15.5,-97.25	140.625	1	0	0	0	0	0
9	(G.5-6)	1	Lower Level	24.5,-97.25	159.375	1	0	0	0	0	0
10	(E-5)	1	Lower Level	2,-80.25	21.725	1	0	0	0	0	0
11	(I-5)	1	Lower Level	41,-80.25	43.6	1	0	0	0	0	0
12		2	Street Level		24	1	0	0	0	0	0
13	(I-6)	1	Lower Level	41,-97.25	103.125	1	0	0	0	0	0
14	(5-F)	1	Street Level	11,-80.25	72	1	0	0	0	0	0
15	(A-5)	1	Street Level	-37,-80.25	77.333	1	0	0	0	0	0
16	(B-5)	1	Street Level	-25,-80.25	60	1	0	0	0	0	0
17	(D-5)	1	Street Level	-7,-80.25	72	1	0	0	0	0	0
18	(B-4)	1	Street Level	-25,-72.25	237	0.963	0	0.004	0	0	0
19		2	Roof Level		90	1	0	0	0	0	0
20	(D-4)	1	Street Level	-7,-72.25	261	0.939	0	-0.003	0	0	0
21		2	Roof Level		180	1	0	0	0	0	0
22	(H-4)	1	Street Level	29,-72.25	271.722	0.928	0	0	0	0	0
23		2	Roof Level		150	1	0	0	0	0	0
24	(G-4)	1	Street Level	20,-72.25	203.097	0.997	0	0	0	0	0
25	(A-1)	1	Street Level	-37,-52.25	4	1	0	0	0	0	0
26	(A-2)	1	Street Level	-37,-56.25	46.667	1	0	0	0	0	0
27	(C-4)	1	Street Level	-16,-72.25	126	1	0	0	0	0	0
28	(E-4)	1	Street Level	2,-72.25	149.625	1	0	0	0	0	0
29	(I-1)	1	Street Level	41,-52.25	40	1	0	0	0	0	0

Column Forces/Moments, Roof Load : Shear z-z (Continued)

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	RLL Redu...	NonReduc...	RLL[k] (un...	SL[k]	SLN[k]	RL[k]
30		2	Roof Level		16	1	0	0	0	0	0
31	(4-I)	1	Street Level	41,-72.25	144	1	0	0	0	0	0
32		2	Roof Level		44	1	0	0	0	0	0
33	(F-4)	1	Roof Level	11,-72.25	180	1	0	0	0	0	0
34	(D-1)	1	Roof Level	-7,-52.25	202.5	0.998	0	0	0	0	0
35	(B-1)	1	Roof Level	-25,-52.25	90	1	0	0	0	0	0
36	(I-3)	1	Roof Level	41,-68.25	20	1	0	0	0	0	0

Column Forces/Moments, Roof Load : Shear y-y

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	RLL Redu...	NonReduc...	RLL[k] (un...	SL[k]	SLN[k]	RL[k]
1	(7-F)	1	Pool Terrace...	11,-105	52.312	1	0	0	0	0	0
2	(7-H)	1	Pool Terrace...	29,-105	58.125	1	0	0	0	0	0
3	(F-7)	1	Lower Level	11,-105.25	54	1	0	0	0	0	0
4	(H-7)	1	Lower Level	29,-105.25	60	1	0	0	0	0	0
5	(H-5)	1	Lower Level	29,-80.25	141.033	1	0	0	0	0	0
6		2	Street Level		60	1	0	0	0	0	0
7	(E-6)	1	Lower Level	2,-97.25	84.375	1	0	0	0	0	0
8	(F.5-6)	1	Lower Level	15.5,-97.25	140.625	1	0	0	0	0	0
9	(G.5-6)	1	Lower Level	24.5,-97.25	159.375	1	0	0	0	0	0
10	(E-5)	1	Lower Level	2,-80.25	21.725	1	0	0	0	0	0
11	(I-5)	1	Lower Level	41,-80.25	43.6	1	0	0.001	0	0	0
12		2	Street Level		24	1	0	0	0	0	0
13	(I-6)	1	Lower Level	41,-97.25	103.125	1	0	0	0	0	0
14	(5-F)	1	Street Level	11,-80.25	72	1	0	0	0	0	0
15	(A-5)	1	Street Level	-37,-80.25	77.333	1	0	0	0	0	0
16	(B-5)	1	Street Level	-25,-80.25	60	1	0	0	0	0	0
17	(D-5)	1	Street Level	-7,-80.25	72	1	0	0	0	0	0
18	(B-4)	1	Street Level	-25,-72.25	237	0.963	0	0	0	0	0
19		2	Roof Level		90	1	0	0	0	0	0
20	(D-4)	1	Street Level	-7,-72.25	261	0.939	0	0	0	0	0
21		2	Roof Level		180	1	0	0	0	0	0
22	(H-4)	1	Street Level	29,-72.25	271.722	0.928	0	0.001	0	0	0
23		2	Roof Level		150	1	0	0	0	0	0
24	(G-4)	1	Street Level	20,-72.25	203.097	0.997	0	0	0	0	0
25	(A-1)	1	Street Level	-37,-52.25	4	1	0	0	0	0	0
26	(A-2)	1	Street Level	-37,-56.25	46.667	1	0	0	0	0	0
27	(C-4)	1	Street Level	-16,-72.25	126	1	0	0	0	0	0
28	(E-4)	1	Street Level	2,-72.25	149.625	1	0	0	0	0	0
29	(I-1)	1	Street Level	41,-52.25	40	1	0	0	0	0	0
30		2	Roof Level		16	1	0	0	0	0	0
31	(4-I)	1	Street Level	41,-72.25	144	1	0	-0.004	0	0	0
32		2	Roof Level		44	1	0	0	0	0	0
33	(F-4)	1	Roof Level	11,-72.25	180	1	0	0	0	0	0
34	(D-1)	1	Roof Level	-7,-52.25	202.5	0.998	0	0	0	0	0
35	(B-1)	1	Roof Level	-25,-52.25	90	1	0	0	0	0	0
36	(I-3)	1	Roof Level	41,-68.25	20	1	0	0	0	0	0

Column Forces/Moments, Roof Load : Moment z-z (Top)

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	RLL Redu...	NonReduc...	RLL[k-ft] (...	SL[k-ft]	SLN[k-ft]	RL[k-ft]
1	(7-F)	1	Pool Terrace...	11,-105	52.312	1	0	0	0	0	0
2	(7-H)	1	Pool Terrace...	29,-105	58.125	1	0	0	0	0	0
3	(F-7)	1	Lower Level	11,-105.25	54	1	0	0	0	0	0
4	(H-7)	1	Lower Level	29,-105.25	60	1	0	0	0	0	0
5	(H-5)	1	Lower Level	29,-80.25	141.033	1	0	0	0	0	0
6		2	Street Level		60	1	0	0	0	0	0
7	(E-6)	1	Lower Level	2,-97.25	84.375	1	0	0	0	0	0

Column Forces/Moments, Roof Load : Moment z-z (Top) (Continued)

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	RLL Redu...	NonReduc...	RLL[k-ft] (...	SL[k-ft]	SLN[k-ft]	RL[k-ft]
8	(F.5-6)	1	Lower Level	15.5,-97.25	140.625	1	0	0	0	0	0
9	(G.5-6)	1	Lower Level	24.5,-97.25	159.375	1	0	0	0	0	0
10	(E-5)	1	Lower Level	2,-80.25	21.725	1	0	0	0	0	0
11	(I-5)	1	Lower Level	41,-80.25	43.6	1	0	-0.007	0	0	0
12		2	Street Level		24	1	0	0	0	0	0
13	(I-6)	1	Lower Level	41,-97.25	103.125	1	0	0	0	0	0
14	(5-F)	1	Street Level	11,-80.25	72	1	0	0	0	0	0
15	(A-5)	1	Street Level	-37,-80.25	77.333	1	0	0	0	0	0
16	(B-5)	1	Street Level	-25,-80.25	60	1	0	0	0	0	0
17	(D-5)	1	Street Level	-7,-80.25	72	1	0	0	0	0	0
18	(B-4)	1	Street Level	-25,-72.25	237	0.963	0	0	0	0	0
19		2	Roof Level		90	1	0	0	0	0	0
20	(D-4)	1	Street Level	-7,-72.25	261	0.939	0	0	0	0	0
21		2	Roof Level		180	1	0	0	0	0	0
22	(H-4)	1	Street Level	29,-72.25	271.722	0.928	0	-0.014	0	0	0
23		2	Roof Level		150	1	0	0	0	0	0
24	(G-4)	1	Street Level	20,-72.25	203.097	0.997	0	0	0	0	0
25	(A-1)	1	Street Level	-37,-52.25	4	1	0	0	0	0	0
26	(A-2)	1	Street Level	-37,-56.25	46.667	1	0	0	0	0	0
27	(C-4)	1	Street Level	-16,-72.25	126	1	0	0	0	0	0
28	(E-4)	1	Street Level	2,-72.25	149.625	1	0	0	0	0	0
29	(I-1)	1	Street Level	41,-52.25	40	1	0	0	0	0	0
30		2	Roof Level		16	1	0	0	0	0	0
31	(4-I)	1	Street Level	41,-72.25	144	1	0	0.037	0	0	0
32		2	Roof Level		44	1	0	0	0	0	0
33	(F-4)	1	Roof Level	11,-72.25	180	1	0	0	0	0	0
34	(D-1)	1	Roof Level	-7,-52.25	202.5	0.998	0	0	0	0	0
35	(B-1)	1	Roof Level	-25,-52.25	90	1	0	0	0	0	0
36	(I-3)	1	Roof Level	41,-68.25	20	1	0	0	0	0	0

Column Forces/Moments, Roof Load : Moment y-y (Top)

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	RLL Redu...	NonReduc...	RLL[k-ft] (...	SL[k-ft]	SLN[k-ft]	RL[k-ft]
1	(7-F)	1	Pool Terrace...	11,-105	52.312	1	0	0	0	0	0
2	(7-H)	1	Pool Terrace...	29,-105	58.125	1	0	0	0	0	0
3	(F-7)	1	Lower Level	11,-105.25	54	1	0	0	0	0	0
4	(H-7)	1	Lower Level	29,-105.25	60	1	0	0	0	0	0
5	(H-5)	1	Lower Level	29,-80.25	141.033	1	0	0	0	0	0
6		2	Street Level		60	1	0	0	0	0	0
7	(E-6)	1	Lower Level	2,-97.25	84.375	1	0	0	0	0	0
8	(F.5-6)	1	Lower Level	15.5,-97.25	140.625	1	0	0	0	0	0
9	(G.5-6)	1	Lower Level	24.5,-97.25	159.375	1	0	0	0	0	0
10	(E-5)	1	Lower Level	2,-80.25	21.725	1	0	0	0	0	0
11	(I-5)	1	Lower Level	41,-80.25	43.6	1	0	0	0	0	0
12		2	Street Level		24	1	0	0	0	0	0
13	(I-6)	1	Lower Level	41,-97.25	103.125	1	0	0	0	0	0
14	(5-F)	1	Street Level	11,-80.25	72	1	0	0	0	0	0
15	(A-5)	1	Street Level	-37,-80.25	77.333	1	0	0	0	0	0
16	(B-5)	1	Street Level	-25,-80.25	60	1	0	0	0	0	0
17	(D-5)	1	Street Level	-7,-80.25	72	1	0	0	0	0	0
18	(B-4)	1	Street Level	-25,-72.25	237	0.963	0	0.036	0	0	0
19		2	Roof Level		90	1	0	0	0	0	0
20	(D-4)	1	Street Level	-7,-72.25	261	0.939	0	-0.033	0	0	0
21		2	Roof Level		180	1	0	0	0	0	0
22	(H-4)	1	Street Level	29,-72.25	271.722	0.928	0	0	0	0	0
23		2	Roof Level		150	1	0	0	0	0	0
24	(G-4)	1	Street Level	20,-72.25	203.097	0.997	0	0	0	0	0

Column Forces/Moments, Roof Load : Moment y-y (Top) (Continued)

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	RLL Redu...	NonReduc...	RLL[k-ft] (...	SL[k-ft]	SLN[k-ft]	RL[k-ft]
25	(A-1)	1	Street Level	-37,-52.25	4	1	0	0	0	0	0
26	(A-2)	1	Street Level	-37,-56.25	46.667	1	0	0	0	0	0
27	(C-4)	1	Street Level	-16,-72.25	126	1	0	0	0	0	0
28	(E-4)	1	Street Level	2,-72.25	149.625	1	0	0	0	0	0
29	(I-1)	1	Street Level	41,-52.25	40	1	0	0	0	0	0
30		2	Roof Level		16	1	0	0	0	0	0
31	(4-I)	1	Street Level	41,-72.25	144	1	0	0	0	0	0
32		2	Roof Level		44	1	0	0	0	0	0
33	(F-4)	1	Roof Level	11,-72.25	180	1	0	0	0	0	0
34	(D-1)	1	Roof Level	-7,-52.25	202.5	0.998	0	0	0	0	0
35	(B-1)	1	Roof Level	-25,-52.25	90	1	0	0	0	0	0
36	(I-3)	1	Roof Level	41,-68.25	20	1	0	0	0	0	0

Column Forces/Moments, Roof Load : Moment z-z (Bot)

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	RLL Redu...	NonReduc...	RLL[k-ft] (...	SL[k-ft]	SLN[k-ft]	RL[k-ft]
1	(7-F)	1	Pool Terrace...	11,-105	52.312	1	0	0	0	0	0
2	(7-H)	1	Pool Terrace...	29,-105	58.125	1	0	0	0	0	0
3	(F-7)	1	Lower Level	11,-105.25	54	1	0	0	0	0	0
4	(H-7)	1	Lower Level	29,-105.25	60	1	0	0	0	0	0
5	(H-5)	1	Lower Level	29,-80.25	141.033	1	0	0	0	0	0
6		2	Street Level		60	1	0	0	0	0	0
7	(E-6)	1	Lower Level	2,-97.25	84.375	1	0	0	0	0	0
8	(F.5-6)	1	Lower Level	15.5,-97.25	140.625	1	0	0	0	0	0
9	(G.5-6)	1	Lower Level	24.5,-97.25	159.375	1	0	0	0	0	0
10	(E-5)	1	Lower Level	2,-80.25	21.725	1	0	0	0	0	0
11	(I-5)	1	Lower Level	41,-80.25	43.6	1	0	0	0	0	0
12		2	Street Level		24	1	0	0	0	0	0
13	(I-6)	1	Lower Level	41,-97.25	103.125	1	0	0	0	0	0
14	(5-F)	1	Street Level	11,-80.25	72	1	0	0	0	0	0
15	(A-5)	1	Street Level	-37,-80.25	77.333	1	0	0	0	0	0
16	(B-5)	1	Street Level	-25,-80.25	60	1	0	0	0	0	0
17	(D-5)	1	Street Level	-7,-80.25	72	1	0	0	0	0	0
18	(B-4)	1	Street Level	-25,-72.25	237	0.963	0	0	0	0	0
19		2	Roof Level		90	1	0	0	0	0	0
20	(D-4)	1	Street Level	-7,-72.25	261	0.939	0	0	0	0	0
21		2	Roof Level		180	1	0	0	0	0	0
22	(H-4)	1	Street Level	29,-72.25	271.722	0.928	0	0	0	0	0
23		2	Roof Level		150	1	0	0	0	0	0
24	(G-4)	1	Street Level	20,-72.25	203.097	0.997	0	0	0	0	0
25	(A-1)	1	Street Level	-37,-52.25	4	1	0	0	0	0	0
26	(A-2)	1	Street Level	-37,-56.25	46.667	1	0	0	0	0	0
27	(C-4)	1	Street Level	-16,-72.25	126	1	0	0	0	0	0
28	(E-4)	1	Street Level	2,-72.25	149.625	1	0	0	0	0	0
29	(I-1)	1	Street Level	41,-52.25	40	1	0	0	0	0	0
30		2	Roof Level		16	1	0	0	0	0	0
31	(4-I)	1	Street Level	41,-72.25	144	1	0	0	0	0	0
32		2	Roof Level		44	1	0	0	0	0	0
33	(F-4)	1	Roof Level	11,-72.25	180	1	0	0	0	0	0
34	(D-1)	1	Roof Level	-7,-52.25	202.5	0.998	0	0	0	0	0
35	(B-1)	1	Roof Level	-25,-52.25	90	1	0	0	0	0	0
36	(I-3)	1	Roof Level	41,-68.25	20	1	0	0	0	0	0

Column Forces/Moments, Roof Load : Moment y-y (Bot)

	Column Stack	Lift No.	Floor Label	Coordinat...	Reducible ...	RLL Redu...	NonReduc...	RLL[k-ft] (...	SL[k-ft]	SLN[k-ft]	RL[k-ft]
1	(7-F)	1	Pool Terrace...	11,-105	52.312	1	0	0	0	0	0
2	(7-H)	1	Pool Terrace...	29,-105	58.125	1	0	0	0	0	0
3	(F-7)	1	Lower Level	11,-105.25	54	1	0	0	0	0	0
4	(H-7)	1	Lower Level	29,-105.25	60	1	0	0	0	0	0
5	(H-5)	1	Lower Level	29,-80.25	141.033	1	0	0	0	0	0
6		2	Street Level		60	1	0	0	0	0	0
7	(E-6)	1	Lower Level	2,-97.25	84.375	1	0	0	0	0	0
8	(F.5-6)	1	Lower Level	15.5,-97.25	140.625	1	0	0	0	0	0
9	(G.5-6)	1	Lower Level	24.5,-97.25	159.375	1	0	0	0	0	0
10	(E-5)	1	Lower Level	2,-80.25	21.725	1	0	0	0	0	0
11	(I-5)	1	Lower Level	41,-80.25	43.6	1	0	0	0	0	0
12		2	Street Level		24	1	0	0	0	0	0
13	(I-6)	1	Lower Level	41,-97.25	103.125	1	0	0	0	0	0
14	(5-F)	1	Street Level	11,-80.25	72	1	0	0	0	0	0
15	(A-5)	1	Street Level	-37,-80.25	77.333	1	0	0	0	0	0
16	(B-5)	1	Street Level	-25,-80.25	60	1	0	0	0	0	0
17	(D-5)	1	Street Level	-7,-80.25	72	1	0	0	0	0	0
18	(B-4)	1	Street Level	-25,-72.25	237	0.963	0	0	0	0	0
19		2	Roof Level		90	1	0	0	0	0	0
20	(D-4)	1	Street Level	-7,-72.25	261	0.939	0	0	0	0	0
21		2	Roof Level		180	1	0	0	0	0	0
22	(H-4)	1	Street Level	29,-72.25	271.722	0.928	0	0	0	0	0
23		2	Roof Level		150	1	0	0	0	0	0
24	(G-4)	1	Street Level	20,-72.25	203.097	0.997	0	0	0	0	0
25	(A-1)	1	Street Level	-37,-52.25	4	1	0	0	0	0	0
26	(A-2)	1	Street Level	-37,-56.25	46.667	1	0	0	0	0	0
27	(C-4)	1	Street Level	-16,-72.25	126	1	0	0	0	0	0
28	(E-4)	1	Street Level	2,-72.25	149.625	1	0	0	0	0	0
29	(I-1)	1	Street Level	41,-52.25	40	1	0	0	0	0	0
30		2	Roof Level		16	1	0	0	0	0	0
31	(4-I)	1	Street Level	41,-72.25	144	1	0	0	0	0	0
32		2	Roof Level		44	1	0	0	0	0	0
33	(F-4)	1	Roof Level	11,-72.25	180	1	0	0	0	0	0
34	(D-1)	1	Roof Level	-7,-52.25	202.5	0.998	0	0	0	0	0
35	(B-1)	1	Roof Level	-25,-52.25	90	1	0	0	0	0	0
36	(I-3)	1	Roof Level	41,-68.25	20	1	0	0	0	0	0

Hot Rolled Steel Column Code Checks

	Stack	Lift	Shape	Code Ch...	Elev[ft]	LC	Shear C...	Elev[ft]	Dir	LC	Pnc/om [...	Pnt/om [k]	Mnyy/o...	Mnzz/o...	Cb	AISC1...
1	(E-6)	1	HSS2X2X3	0.71	0	4	0	0		5	6.691	35.629	1.989	1.989	1	H1-1a*
2	(D-4)	1	HSS4X4X4	0.339	10	5	0.003	10		3	53.843	100.898	11.702	11.702	1	H1-1a
3	(G-4)	1	HSS4X4X4	0.222	10	5	0	10		5	64.021	100.898	11.702	11.702	1	H1-1a*
4	(E-4)	1	HSS4X4X4	0.39	10	5	0	10		5	64.021	100.898	11.702	11.702	1	H1-1a*

Wood Column Code Checks

	Stack	Lift	Shape	Code C...	Elev[ft]	LC	Shear C...	Elev[ft]	Dir	LC	Fc' [ksi]	Ft' [ksi]	Fb1' [ksi]	Fb2' [ksi]	Fv' [ksi]	Eqn
1	(7-F)	1	5.125X6FS	0.129	-10	3	0	-10	z	5	1.06	1.1	2.392	1.45	0.23	3.6.3
2	(7-H)	1	5.125X6FS	0.181	-10	3	0	-10	z	5	1.06	1.1	2.392	1.45	0.23	3.6.3
3	(F-7)	1	6X6	0.106	0	4	0	0	z	5	0.585	0.594	0.938	0.938	0.213	3.6.3
4	(H-7)	1	6X6	0.13	0	4	0	0	z	5	0.585	0.594	0.938	0.938	0.213	3.6.3
5	(H-5)	1	6X6	0.487	0	3	0	0	z	5	0.52	0.475	0.75	0.75	0.17	3.6.3
6		2	5.125X6FS	0.101	10	4	0	10	z	5	1.124	1.375	2.987	1.813	0.288	3.6.3
7	(F.5-6)	1	6X6	0.438	0	3	0	0	z	5	0.52	0.475	0.75	0.75	0.17	3.6.3
8	(G.5-6)	1	6X6	0.598	0	5	0	0	z	5	0.585	0.594	0.938	0.938	0.213	3.6.3
9	(E-5)	1	6X6	0.104	0	5	0	0	z	5	0.585	0.594	0.938	0.938	0.213	3.6.3
10	(I-5)	1	6X6	0.113	0	4	0.002	0	y	2	0.585	0.594	0.938	0.938	0.213	3.6.3

Wood Column Code Checks (Continued)

	Stack	Lift	Shape	Code C...	Elev[ft]	LC	Shear C...	Elev[ft]	Dir	LC	Fc' [ksi]	Ft' [ksi]	Fb1' [ksi]	Fb2' [ksi]	Fv' [ksi]	Eqn
11		2	5.125X6FS	0.017	10	5	0	10	z	5	1.124	1.375	2.987	1.813	0.288	3.6.3
12	(I-6)	1	6X6	0.323	0	4	0	0	z	5	0.585	0.594	0.938	0.938	0.213	3.6.3
13	(5-F)	1	5.125X6FS	0.162	10	4	0	10	z	5	1.124	1.375	2.987	1.813	0.288	3.6.3
14	(A-5)	1	5.125X6FS	0.117	10	4	0	10	z	5	1.124	1.375	2.987	1.813	0.288	3.6.3
15	(B-5)	1	5.125X6FS	0.131	10	4	0	10	z	5	1.124	1.375	2.987	1.813	0.288	3.6.3
16	(D-5)	1	5.125X6FS	0.099	10	4	0	10	z	5	1.124	1.375	2.987	1.813	0.288	3.6.3
17	(B-4)	1	5.25X6FS	0.35	10	5	0.008	10	z	3	1.223	1.375	2.988	1.813	0.288	3.6.3
18		2	5.125X6FS	0.061	20	4	0	20	z	5	1.124	1.375	2.987	1.813	0.288	3.6.3
19	(D-4)	2	5.125X6FS	0.266	20	4	0	20	z	5	1.124	1.375	2.987	1.813	0.288	3.6.3
20	(H-4)	1	6x6	0.369	10	5	0.006	10	y	3	1.502	1.375	3	1.813	0.331	3.6.3
21		2	5.125X6FS	0.25	20	4	0	20	z	5	1.124	1.375	2.987	1.813	0.288	3.6.3
22	(A-1)	1	6x6	0.282	10	2	0	10	z	5	0.487	0.428	0.675	0.675	0.153	3.9-1
23	(A-2)	1	4x6	0.758	10	4	0	10	z	5	0.659	0.934	1.453	1.463	0.225	3.6.3
24	(C-4)	1	6x6	0.631	10	3	0	10	z	5	0.52	0.475	0.75	0.75	0.17	3.6.3
25	(I-1)	1	6X6	0.12	10	3	0	10	z	5	0.52	0.475	0.75	0.75	0.17	3.6.3
26		2	6X6	0.038	20	4	0	20	z	5	0.585	0.594	0.938	0.938	0.213	3.6.3
27	(4-I)	1	6X6	0.536	10	3	0.007	10	y	3	0.52	0.475	0.75	0.75	0.17	3.6.3
28		2	5.125X6FS	0.01	20	4	0	20	z	5	1.124	1.375	2.987	1.813	0.288	3.6.3
29	(F-4)	1	5.125X6FS	0.191	20	4	0	20	z	5	1.124	1.375	2.987	1.813	0.288	3.6.3
30	(D-1)	1	5.125X6FS	0.259	20	4	0	20	z	5	1.502	1.375	2.987	1.813	0.288	3.6.3
31	(B-1)	1	5.125X6FS	0.049	20	4	0	20	z	5	1.124	1.375	2.987	1.813	0.288	3.6.3
32	(I-3)	1	6X6	0.103	20	4	0	20	z	5	0.585	0.594	0.938	0.938	0.213	3.6.3

Date

Project Alta Mira

Contact PD

Phone

Check CMU col under steel columns @ Grid 4

Grid 4/D

$P_D = 8.4^k$
$P_L = 4.6^k$
$P_{RL} = 4.3^k$

$P_D + P_L = 13^k$
$P_D + 0.75P_L + 0.75P_{RL} = 15.1^k$

grid 4/E

$P_D = 16.4^k$
$P_{LL} = 7.3^k$
$P_{RL} = 3.9^k$

$P_D + P_L = 23.7^k$
$P_D + 0.75(P_L + P_{RL}) = 24.8^k$

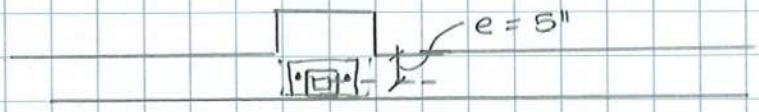
grid 4/G

$P_D = 9.2^k$
$P_L = 5.2^k$
$P_{RL} = 2.1^k$

$P_D + P_L = 14.4^k$
$P_D + 0.75P_{LL} + 0.75P_{RL} = 14.7^k$

Worst case column - $P = 24.8^k$

* check column for vertical loads only, retained soil resisted by continuous wall, with wall steel continuing through pilaster



per attached enercalc, use 16" x 16" pilaster w/ 4-#5 and #3 ties @ 8" oc

$A_{Ag}) = \frac{24.8^k}{4000\,psf} = 6.2\,ft^2$

use 2.5' sq ft w/ 3-#5 EW

Masonry Column

Project File: alta mira retaining walls.ec6

LIC# : KW-06015806, Build:20.23.05.25 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: masonry pilaster under HSS columns (grid 4)

Code References

Calculations per TMS 402-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

F'm	=	1,500.0 psi
Fr - Rupture	=	75.0 psi
Em = f'm *	=	900.0
Column Density	=	130.0 pcf
Rebar Grade	=	Grade 60
Fy - Yield	=	60000 psi
Fs - Allowable	=	32000 psi
E - Rebar	=	29,000.0 ksi

Column Data

Column width along X-X	=	15.625 in
Column depth along Y-Y	=	15.625 in
Longitudinal Bar Size	=	# 5.0
Bars per side at +Y & -Y	=	2
Bars per side at +X & -X	=	2
Cover from ties	=	3.0 in
Actual Edge to Bar Center	=	3.6875 in

Analysis Settings

Analysis Method	=	**Allowable Design**
End Fixity Condition	=	Top Pinned, Bottom Pinned
Overall Column Height	=	10.0 ft
Construction Type		Solid Grouted Hollow Concrete Masor
Tie Bar Size	=	# 3
Tie Bar Spacing	=	8.0 in

Brace condition for deflection (buckling) along columns :

X-X (width) axis : Fully braced against buckling ABOUT Y-Y Axis
Y-Y (depth) axis : Fully braced against buckling ABOUT X-X Axis

Applied Loads

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

Column self weight included : 2,204.05 lbs * Dead Load Factor
AXIAL LOADS . . .
column loads: Axial Load at 10.0 ft, Yecc = 5.0 in, D = 16.40, LR = 3.90, L = 7.30 k
BENDING LOADS . . .

DESIGN SUMMARY

Bending Check Results

PASS **Maximum Bending Stress Ratio** = **0.451** : 1
Load Combination +D+0.750Lr+0.750L
Location of max.above base 9.933 ft
At maximum location values are . . .
Axial - Applied 27.004 k
Axial - Allowable 59.893 k
Moment - Applied -10.264 k-ft
Moment - Allowable 22.734 k-ft

PASS **Reinforcing Area Check** *(TMS 402-16, Sec 5.3.1.3*
As : Actual Reinforcement 1.240
Min: 0.0025 * An 0.610
Max: 0.04 * An 9.766

Dimensional Checks
Min. Side Dim. >= 8" *(TMS 402-16, Sec. 5.3.1.*
PASS Governing K * Lu / Dimension <= *(TMS 402-16, Sec. 5.3.1.*

Maximum SERVICE Load Reactions . .
Top along X-X 1.033 k
Bottom along X-X 1.033 k

Maximum SERVICE Load Deflections . . .
Along x-x 0.017 in at 5.839 ft above base
for load combination : +D+0.750Lr+0.750L

Compressive Strength 116.880 k *(TMS 402-16, Sec. 9.3.4.*
Pa = (0.25 f'm An + 0.65 Ast Fs) * [1-(h/(140*r))^2]

PASS **Check Column Ties** *(TMS 402-16, Sec 5.3.1.4)*
Min. Tie Dia. = 1/4", # 3 bar provided
Max Tie Spacing = 10.00 in, Provided = 8.00 in

Load Combination Results

Load Combination	Maximum Bending Stress Ratios Stress Ratio	Status	Location	Maximum Axial Load Actual	Allow	Maximum Moments Actual	Allow
D Only	0.2960	PASS	9.933 ft	18.604 k	62.858 k	6.787 k-ft	22.917 k-ft
+D+L	0.4303	PASS	9.933 ft	25.904 k	60.214 k	9.809 k-ft	22.756 k-ft
+D+Lr	0.3679	PASS	9.933 ft	22.504 k	61.171 k	8.402 k-ft	22.837 k-ft
+D+0.750Lr+0.750L	0.4509	PASS	9.933 ft	27.004 k	59.893 k	10.264 k-ft	22.734 k-ft
+D+0.750L	0.3971	PASS	9.933 ft	24.079 k	60.640 k	9.053 k-ft	22.791 k-ft
+0.60D	0.1776	PASS	9.933 ft	11.162 k	62.858 k	4.072 k-ft	22.917 k-ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base
D Only	-0.683 k	0.683 k	18.604 k

Masonry Column

Project File: alta mira retaining walls.ec6

LIC# : KW-06015806, Build:20.23.05.25 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: masonry pilaster under HSS columns (grid 4)

Maximum Reactions

Note: Only non-zero reactions are listed.

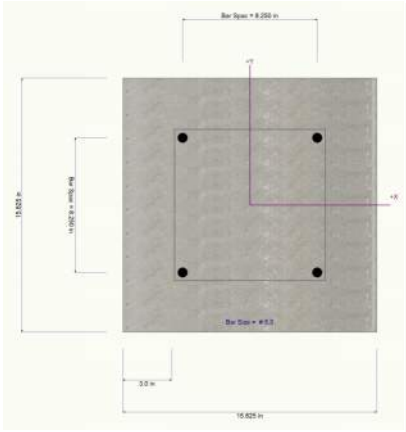
Load Combination	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base
+D+L	-0.988 k	0.988 k	25.904 k
+D+Lr	-0.846 k	0.846 k	22.504 k
+D+0.750Lr+0.750L	-1.033 k	1.033 k	27.004 k
+D+0.750L	-0.911 k	0.911 k	24.079 k
+0.60D	-0.410 k	0.410 k	11.162 k
Lr Only	-0.163 k	0.163 k	3.900 k
L Only	-0.304 k	0.304 k	7.300 k

max reaction at footing

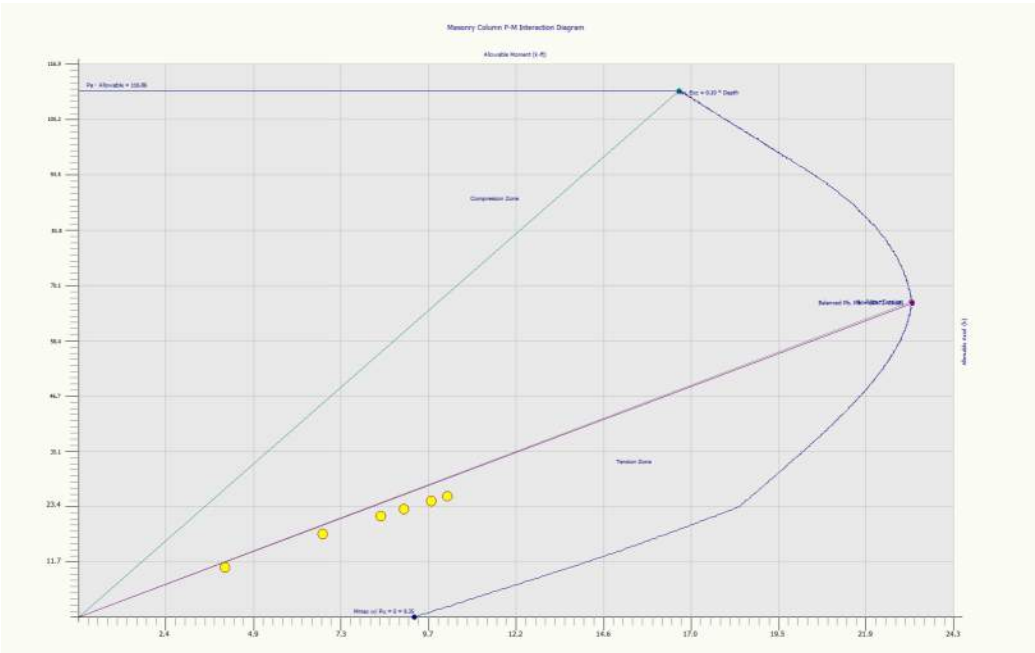
Maximum Deflections for Load Combinations

Load Combination	Max. Y-Y Deflection	Distance
D Only	0.0114 in	5.839 ft
+D+L	0.0165 in	5.839 ft
+D+Lr	0.0141 in	5.839 ft
+D+0.750Lr+0.750L	0.0172 in	5.839 ft
+D+0.750L	0.0152 in	5.839 ft
+0.60D	0.0068 in	5.839 ft
Lr Only	0.0027 in	5.839 ft
L Only	0.0051 in	5.839 ft

Cross Section



Interaction Diagram



PARAPET DESIGN

Date 4-27-2023

Project Dziuk Alta Mira

Contact C Farrell

Phone

Parapet Wind Load

C&C (ASCE 7-16 Fig 30.6-1) $V = 110$ mph, $h = 35$ ft

$p_1 = 21.8$
$p_2 = -62.3$
$p_3 = 21.4$
$p_4 = -29.1$

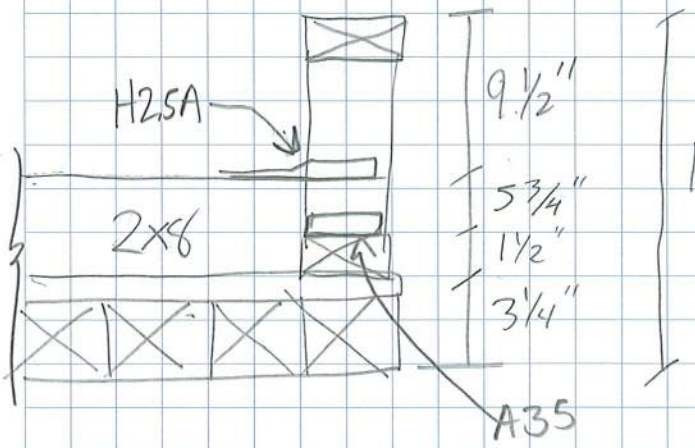
(Fig 30.4-1) ↓

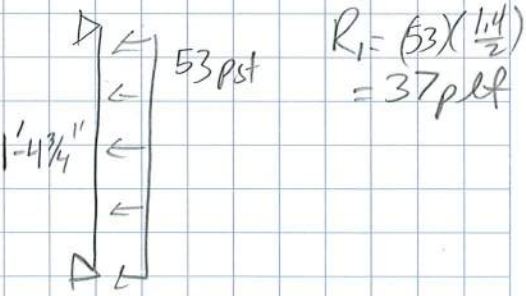
$\}$ $(84.1 \text{ psf})(1.05) = 88.3$ (height, λ)

$\}$ $(50.9 \text{ psf})(1.05) = 53.4$

ASD Parapet Load

$(0.6)(88.3) = 53$ psf





Try Straps @ 4'-0"

$P = (37)(4) = 148$ #

Moment to top of sill $= (148)(15.25") = 2257$ # in

T/C couple for strap to A35 = 5"

$T/C = \frac{2257}{5} = 451$ #

Simpson A35 (Connection 4) $F_1 = 650$ # ✓

Simpson H2.5A Uplift $= 700$ # ✓

STAIR DESIGN

Tepa ENGINEERING SERVICES

Dziuk Residence - Interior Steel Stair

DESIGN BASED ON CALIFORNIA BUILDING CODE 2016 C.F.

LOADING:

Stairways & Platforms:

Live Load:	Uniformly Distributed:	100.0 psf
Dead Load:	Uniformly Distributed:	20.0 psf

Material Properties of Components:

Structural Steel A36	f_y =	36.0 ksi
Steel Pipe A53B	f_y =	35.0 ksi
Steel Tube A500B	f_y =	46.0 ksi

CALCULATIONS:

I. STEEL STAIR COMPONENTS:

1. Stringer Design:

Stringer:	**C10x15.3**	Z = 15.9 in^3	**Material: Structural Steel A36**	
Depth of Section		d = 10 in		
Web Thickness		t_w = 0.24 in		
Moment of Inertia		I = 67.3 in^4		
Structural Steel A36		f_y = 36.0 ksi		
Uniformly Distributed:		DL + LL = 120 psf		
Stair Trib. Width		W = 3.00 ft		
Stringer Span		L = 11.50 ft		
Uniformly Distributed:		w = 0.180 klf		
Moment Req'd		M = 2.98 k-ft		*($M = WL^2/8$)*
		Z_{req} = 1.653 in^3	**< Z (OK)**	*($Z_{REQ} = M / .6 * F_y$)*
Shear Req'd		V = 1.04 k		*($V = WL/2$)*
		V_{req} = 34.56 k	**> V (OK)**	*($V = F_Y DT_W$)*
Check Deflection:		Δ = 0.036 in		*($\Delta = 5WL^4 / 384EI$)*
		L/360 = 0.383 in	**(OK)**	

USE:	**C10x15.3**	**GOOD**

5. Rear Header Beam Design:

Header Beam:	**C10x15.3**	Z= 15.9 in^3	**Material: Structural Steel A36**	
			0	
Section Depth		d = 10 in		
Web Thickness		t_w = 0.24 in		
Moment of Inertia		I = 67.3 in^4		
Structural Steel A36		f_y = 36.0 ksi		
Landing Loads:		DL + LL = 120 psf		
Landing Width		w = 3.0 ft		
Landing Span		L= 1.0 ft		
Header Span		L = 8.5 ft		
Landing Loads:				
		$V_{Landing}$ = 0.36 k		*(V = WL/2)*
		$M_{Landing}$ = 0.77 k-ft		*(M = PL/4)*
Stringer Span to Header		L_s = 11.5 ft		
2x Stringer Reaction		P = 2.07 k		
		$V_{Stringer}$ = 1.04 k		*(V = WL/2)*
		$M_{Stringer}$ = 4.40 k-ft		*(M = PL/4)*
End Shear		V= 2.43 k		*(V = P/2)*
Total Moment		M = 5.16 k-ft		*(M = PL/4)*
	(Additional moment due to exterior stringers, but ok by inspection)			
		Z_{req} = 2.87 in^3	**< S (OK)**	*($Z_{REQ} = M / .6 * F_y$)*
		V_{all} = 34.56 k	**> V (OK)**	*($V = F_Y DT_W$)*
Check Deflection:		$\Delta_{Landing}$ = 0.000 in		*($\Delta = 5WL^4 / 384EI$)*
		$\Delta_{Stringer}$ = 0.023 in		*($\Delta = PL^3 / 48EI$)*
		Δ_{Total}= 0.023 in		
		L/360 = 0.283 in	**(OK)**	

USE:	**C10x15.3**	**GOOD**

DRIVEWAY DESIGN

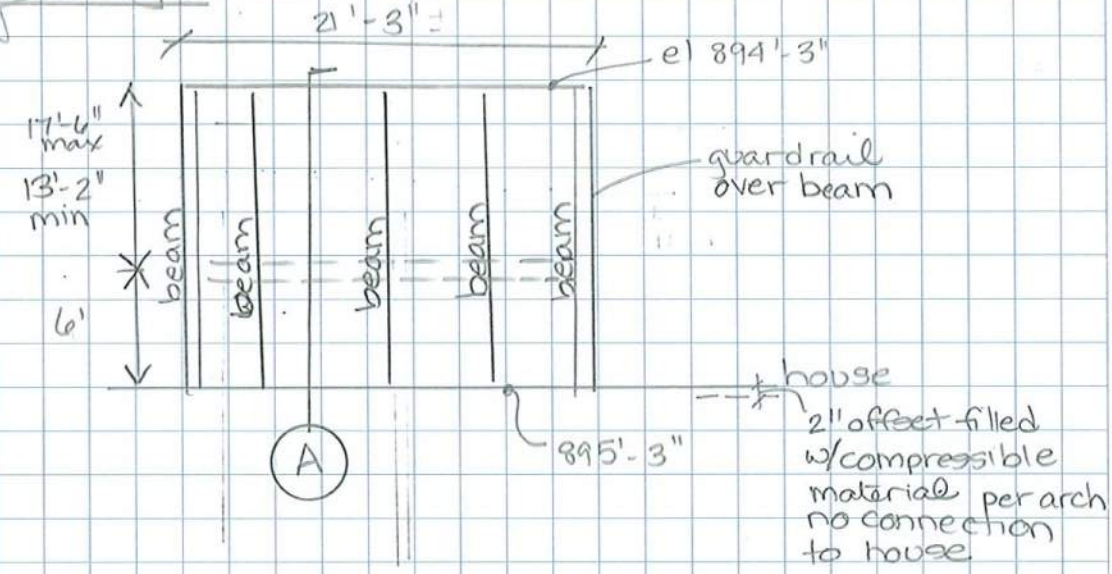
Date

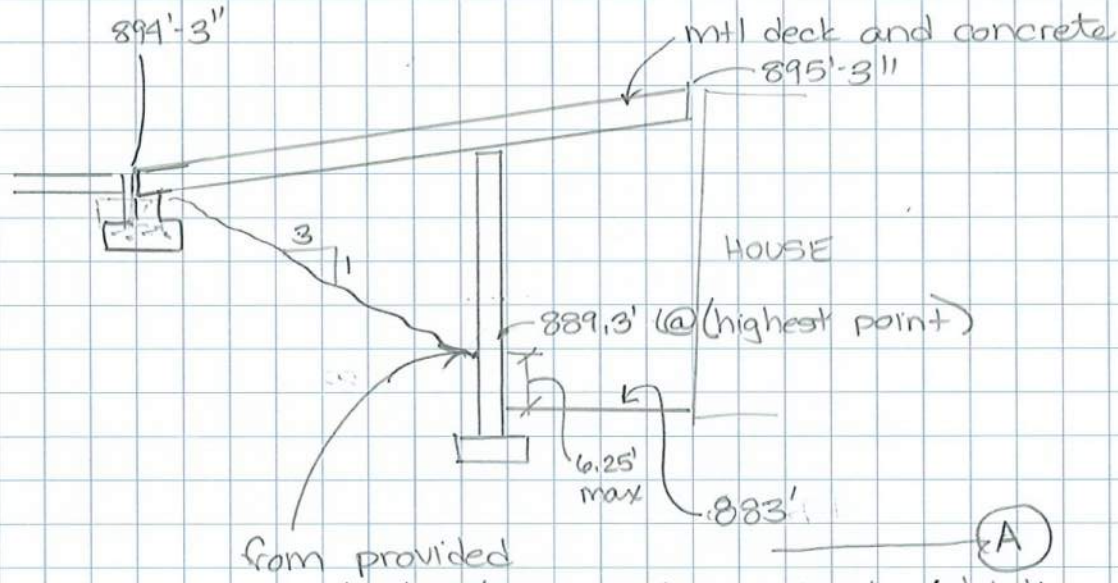
Project Alta Mira

Contact PD

Phone

Driveway Design





from provided spot elevations and using straight line interpolation

Date
Project Alta Mira
Contact PD
Phone

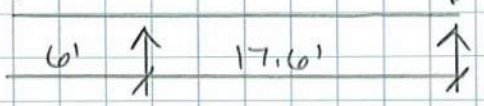
For metal deck - assume 4 equal spans
max span = 21.25'/4 = 5.3'

ASC STEEL ROOF DECK CATALOG (SEE ATTACHED) FOR B-36 ROOF DECK
OR using VERCO design calculator for
non-composite steel deck (B-36 deck)
w/ 3 1/2" total section, w/ 1/4" or #14 screw connections

deck to carry $w_{dl} = 30.16$ psf
$w_{ll} = 250$ psf (per ASCE table 4.3-1)

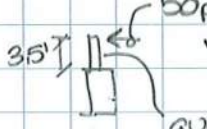
see attached - use 16g steel deck
2 span minimum
$w_{all} = 292$ psf > 280.16 psf
∴ ok
use 6x6x1.4x1.4 WWF
@ mid depth

Steel Beams
center beams (Wx) $w_{dl} = 30.16$ psf $w_{LL} = 250$ psf TW = 5.3'



per attached enercalc
use W12x19

end beams (HSS)



$w_{dl} = 30$ psf TW = 2.7'
$w_{LL} = 250$ psf
$M_{Torsion} = 50plf(4.5')(3.5')$

per attached enercalc
try HSS 12x16x1/2"

ASC STEEL DECK

DGB-36, B-36, BS-36 & BN-36 2.1

USE 16ga 2 SPAN MINIMUM, Fb/w = 303.25psf INTERPOLATING AT 5'-3"

Inward Allowable (f_b/Ω) and Factored (Φf_b) Distributed Load (lbs/ft²)

Gauge	Span	Limit Condition	Panel Span (Support Spacing)								
			4' - 0"	5' - 0"	6' - 0"	7' - 0"	8' - 0"	9' - 0"	10' - 0"	11' - 0"	12' - 0"
22	Single Span	f_b/Ω	218	140	97	71	55	43	35	29	24
		Φf_b	328	210	146	107	82	65	52	43	36
		L/360	117	60	35	22	15	10	7	6	4
		L/240	175	90	52	33	22	15	11	8	6
		L/180	234	120	69	44	29	21	15	11	9
		L/120	351	179	104	65	44	31	22	17	13
	Double Span	f_b/Ω	234	149	104	76	58	46	37	31	26
		Φf_b	351	225	156	115	88	69	56	46	39
		L/360	281	144	83	53	35	25	18	14	10
		L/240	422	216	125	79	53	37	27	20	16
		L/180	563	288	167	105	70	49	36	27	21
		L/120	844	432	250	158	106	74	54	41	31
	Triple Span	f_b/Ω	292	187	130	95	73	58	47	39	32
		Φf_b	439	281	195	143	110	87	70	58	49
		L/360	220	113	65	41	28	19	14	11	8
		L/240	331	169	98	62	41	29	21	16	12
		L/180	441	226	131	82	55	39	28	21	16
		L/120	661	339	196	123	83	58	42	32	24
20	Single Span	f_b/Ω	285	182	127	93	71	56	46	38	32
		Φf_b	428	274	190	140	107	85	69	57	48
		L/360	144	74	43	27	18	13	9	7	5
		L/240	216	111	64	40	27	19	14	10	8
		L/180	288	148	85	54	36	25	18	14	11
		L/120	432	221	128	81	54	38	28	21	16
	Double Span	f_b/Ω	295	189	131	96	74	58	47	39	33
		Φf_b	443	284	197	145	111	88	71	59	49
		L/360	347	178	103	65	43	30	22	17	13
		L/240	521	267	154	97	65	46	33	25	19
		L/180	695	356	206	130	87	61	44	33	26
		L/120	1042	533	309	194	130	91	67	50	39
	Triple Span	f_b/Ω	369	236	164	120	92	73	59	49	41
		Φf_b	554	355	246	181	138	109	89	73	62
		L/360	272	139	81	51	34	24	17	13	10
		L/240	408	209	121	76	51	36	26	20	15
		L/180	544	279	161	102	68	48	35	26	20
		L/120	816	418	242	152	102	72	52	39	30
18	Single Span	f_b/Ω	388	248	172	127	97	77	62	51	43
		Φf_b	583	373	259	190	146	115	93	77	65
		L/360	202	103	60	38	25	18	13	10	7
		L/240	303	155	90	56	38	27	19	15	11
		L/180	404	207	120	75	50	35	26	19	15
		L/120	605	310	179	113	76	53	39	29	22
	Double Span	f_b/Ω	411	263	183	134	103	81	66	54	46
		Φf_b	618	395	274	202	154	122	99	82	69
		L/360	486	249	144	91	61	43	31	23	18
		L/240	729	373	216	136	91	64	47	35	27
		L/180	972	498	288	181	122	85	62	47	36
		L/120	1459	747	432	272	182	128	93	70	54
	Triple Span	f_b/Ω	514	329	228	168	128	101	82	68	57
		Φf_b	772	494	343	252	193	152	124	102	86
		L/360	381	195	113	71	48	33	24	18	14
		L/240	571	293	169	107	71	50	37	27	21
		L/180	762	390	226	142	95	67	49	37	28
		L/120	1143	585	339	213	143	100	73	55	42
16	Single Span	f_b/Ω	489	313	217	160	122	97	78	65	54
		Φf_b	734	470	326	240	184	145	118	97	82
		L/360	259	132	77	48	32	23	17	12	10
		L/240	388	199	115	72	49	34	25	19	14
		L/180	517	265	153	97	65	45	33	25	19
		L/120	776	397	230	145	97	68	50	37	29
	Double Span	f_b/Ω	504	323	224	165	126	100	81	67	56
		Φf_b	758	485	337	248	190	150	121	100	84
		L/360	623	319	185	116	78	55	40	30	23
		L/240	935	479	277	174	117	82	60	45	35
		L/180	1246	638	369	233	156	109	80	60	46
		L/120	1870	957	554	349	234	164	120	90	69
	Triple Span	f_b/Ω	631	404	280	206	158	125	101	83	70
		Φf_b	948	607	421	309	237	187	152	125	105
		L/360	488	250	145	91	61	43	31	23	18
		L/240	732	375	217	137	92	64	47	35	27
		L/180	976	500	289	182	122	86	62	47	36
		L/120	1465	750	434	273	183	129	94	70	54

Steel Beam

Project File: alta mira driveway.ec6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

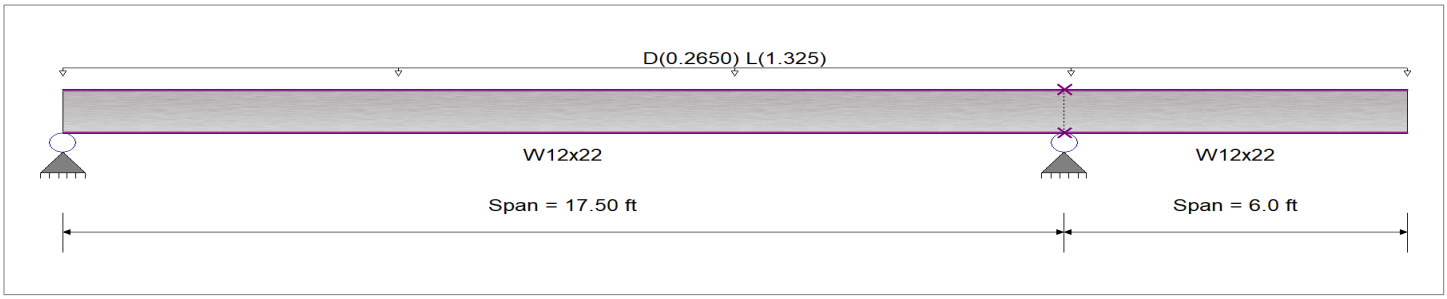
DESCRIPTION: Driveway Cantilevered Beam (W12x19)

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.050, L = 0.250 ksf, Tributary Width = 5.30 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.648 : 1	Maximum Shear Stress Ratio =	0.243 : 1
Section used for this span	W12x22	Section used for this span	W12x22
Ma : Applied	47.398 k-ft	Va : Applied	15.548 k
Mn / Omega : Allowable	73.104 k-ft	Vn/Omega : Allowable	63.960 k
Load Combination	+D+L	Load Combination	+D+L
		Location of maximum on span	17.500 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.448 in	Ratio =	468	>=360	Span: 2 : L Only
Max Upward Transient Deflection	-0.277 in	Ratio =	518	>=360	Span: 2 : L Only
Max Downward Total Deflection	0.538 in	Ratio =	390	>=240.	Span: 2 : +D+L
Max Upward Total Deflection	-0.333 in	Ratio =	432	>=240.	Span: 2 : +D+L

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.5378	8.330		0.0000	0.000
	2	0.0000	8.330	+D+L	-0.3330	6.000

Vertical Reactions

Support notation : Far left is #' Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	12.277	25.088	
Max Upward from Load Combinations	12.277	25.088	
Max Upward from Load Cases	10.231	20.907	
D Only	2.046	4.181	
+D+L	12.277	25.088	
+D+0.750L	9.719	19.861	
+0.60D	1.228	2.509	
L Only	10.231	20.907	

DESCRIPTION: Driveway Cantilevered Beam (W12x19)

Steel Section Properties : W12x22

Depth	=	12.300	in	I xx	=	156.00	in^4	J	= 0.293 in^4
Web Thick	=	0.260	in	S xx		25.40	in^3	Cw	= 164.00 in^6
Flange Width	=	4.030	in	R xx	=	4.910	in		
Flange Thick	=	0.425	in	Zx	=	29.300	in^3		
Area	=	6.480	in^2	I yy	=	4.660	in^4		
Weight	=	22.000	plf	S yy	=	2.310	in^3	Wno	= 12.000 in^2
Kdesign	=	0.725	in	R yy	=	0.848	in	Sw	= 5.120 in^4
K1	=	0.625	in	Zy	=	3.660	in^3	Qf	= 4.760 in^3
rts	=	1.040	in					Qw	= 14.400 in^3
Ycg	=	6.150	in						

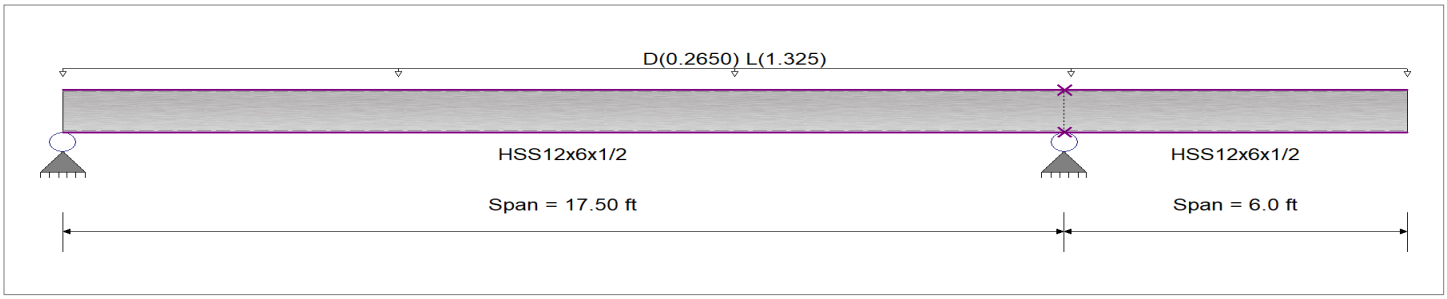
DESCRIPTION: Driveway Edge Cantilevered Beam (HSS12x6x3/8)

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Uniform Load on ALL spans : D = 0.050, L = 0.250 ksf, Tributary Width = 5.30 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.420 : 1	Maximum Shear Stress Ratio =	0.091 : 1
Section used for this span	HSS12x6x1/2	Section used for this span	HSS12x6x1/2
Ma : Applied	60.145 k-ft	Va : Applied	16.092 k
Mn / Omega : Allowable	143.214 k-ft	Vn/Omega : Allowable	177.173 k
Load Combination	+D+L+H, LL Comb Run (L*)	Load Combination	+D+L+H, LL Comb Run (LL)
		Location of maximum on span	17.500 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.358 in	Ratio =	586	>=360	Span: 2 : L Only, LL Comb Run (L*)
Max Upward Transient Deflection	-0.390 in	Ratio =	368	>=360	Span: 2 : L Only, LL Comb Run (L*)
Max Downward Total Deflection	0.420 in	Ratio =	500	>=240.	Span: 2 : +D+L+H, LL Comb Run (L*)
Max Upward Total Deflection	-0.429 in	Ratio =	336	>=240.	Span: 2 : +D+L+H, LL Comb Run (L*)

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.4203	8.750		0.0000	0.000
	2	0.0000	8.750	+D+L+H	-0.4290	6.000

Vertical Reactions

Support notation : Far left is #' Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	14.070	25.966	
Max Upward from Load Combinations	14.070	25.966	
Max Upward from Load Cases	11.594	20.907	
Max Downward from all Load Conditions (Resis	-1.363		
Max Downward from Load Cases (Resisting Up	-1.363		
+D+H	2.476	5.060	
+D+L+H, LL Comb Run (*L)	1.113	14.372	
+D+L+H, LL Comb Run (L*)	14.070	16.653	
+D+L+H, LL Comb Run (LL)	12.707	25.966	
+D+Lr+H, LL Comb Run (*L)	2.476	5.060	
+D+Lr+H, LL Comb Run (L*)	2.476	5.060	
+D+Lr+H, LL Comb Run (LL)	2.476	5.060	
+D+S+H	2.476	5.060	
+D+0.750Lr+0.750L+H, LL Comb Run (*L)	1.454	12.044	
+D+0.750Lr+0.750L+H, LL Comb Run (L*)	11.171	13.755	
+D+0.750Lr+0.750L+H, LL Comb Run (LL)	10.149	20.740	
+D+0.750L+0.750S+H, LL Comb Run (*L)	1.454	12.044	

Steel Beam

Project File: alta mira driveway.ec6

DESCRIPTION: Driveway Edge Cantilevered Beam (HSS12x6x3/8)

Vertical Reactions

Support notation : Far left is #' Values in KIPS

Load Combination	Support 1	Support 2	Support 3
+D+0.750L+0.750S+H, LL Comb Run (L*)	11.171	13.755	
+D+0.750L+0.750S+H, LL Comb Run (LL)	10.149	20.740	
+D+0.60W+H	2.476	5.060	
+D+0.70E+H	2.476	5.060	
+D+0.750Lr+0.750L+0.450W+H, LL Comb Rur	1.454	12.044	
+D+0.750Lr+0.750L+0.450W+H, LL Comb Rur	11.171	13.755	
+D+0.750Lr+0.750L+0.450W+H, LL Comb Rur	10.149	20.740	
+D+0.750L+0.750S+0.450W+H, LL Comb Run	1.454	12.044	
+D+0.750L+0.750S+0.450W+H, LL Comb Run	11.171	13.755	
+D+0.750L+0.750S+0.450W+H, LL Comb Run	10.149	20.740	
+D+0.750L+0.750S+0.5250E+H, LL Comb Rur	1.454	12.044	
+D+0.750L+0.750S+0.5250E+H, LL Comb Rur	11.171	13.755	
+D+0.750L+0.750S+0.5250E+H, LL Comb Rur	10.149	20.740	
+0.60D+0.60W+0.60H	1.486	3.036	
+0.60D+0.70E+0.60H	1.486	3.036	
D Only	2.476	5.060	
L Only, LL Comb Run (*L)	-1.363	9.313	
L Only, LL Comb Run (L*)	11.594	11.594	
L Only, LL Comb Run (LL)	10.231	20.907	
H Only			

Steel Section Properties : HSS12x6x1/2

Depth	=	12.000	in	I xx	=	271.00	in^4	J	=	227.000 in^4
				S xx		45.20	in^3	Cw	=	59.00 in^6
Width	=	6.000	in	R xx	=	4.210	in			
Wall Thick	=	0.465	in	Zx	=	57.400	in^3	C	=	0.000 in^3
Area	=	15.300	in^2	I yy	=	91.100	in^4			
Weight	=	55.660	plf	S yy	=	30.400	in^3			
				R yy	=	2.440	in			
				Zy	=	35.200	in^3			
Ycg	=	6.000	in							

Date

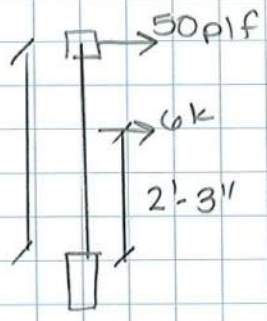
Project Alta Mira

Contact PD

Phone

Driveway Guardrail

Top rail



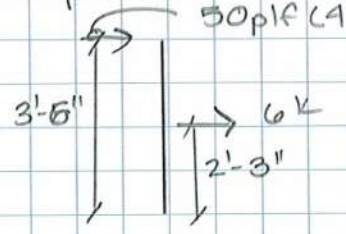
per ASCE 7 4.5.3
single 6000# applied horizontally 2'-3" above driveway

per ASCE 7 4.5.1
uniform load 50plf applied in any direction

assume max spacing = 4'-0"
* designed for full 6k load although not reqd per code

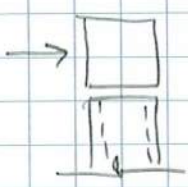
use HSS 5x5x3/16 per attached enercalc

Guardrail posts



per attached enercalc
use HSS 5x5x 5/16"

connection of toprail to post



Check weld HSS to HSS for shear

$V = 6000\#$

$L = \frac{6000\#}{(2\,weld)(5in)} = 600\#/in$

use 3/16" weld

$N_{all} = 2.78\ k/in$

Date

Project Alta Mira

Contact PD

Phone

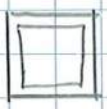
connection post to beam

from ènercalc for post

$M_a = 14.2\ k\cdot ft$

$V_a = 6.2\ k$

section properties of weld
use weld all around



$Z = bd + d^2/3$
$= (5)(5) + (5)^2/3$
$= 33.3\ in^3$

assume shear resisted only by parallel welds

$\therefore V = \frac{6.2^k}{2(5in)} = 620\#/in$

assume Moment resisted by full section $\therefore$

$T = \frac{M}{Z} = \frac{14.2\ k/ft(12)}{33.3\ in^3} = 5.11\ k/in$

$\text{resultant} = \sqrt{(5.11)^2 + (0.62)^2} = 5.15\ k/in$

use 5/16" fillet weld

$N_{all} = 6.6\ k/in$

$\therefore$ ok

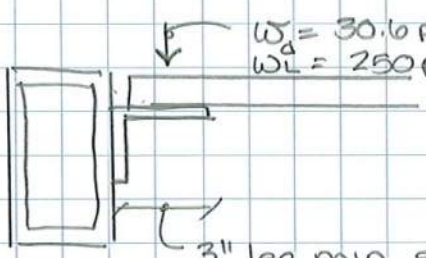
Date

Project Alta Mira

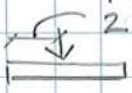
Contact PD

Phone

Check angle to HSS12x end beam



check angle thickness based on moment capacity of support leg



$M = (82 + 668)(2\text{in}) = 1500\ \#\cdot\text{in}$

$S = \frac{1}{6}(12\text{in})(t)^2 = 2t^2$

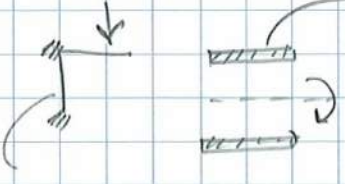
$F_b = \frac{0.75\,F_y}{\Omega} = \frac{0.75(36\text{ksi})}{1.67} = 16.2\text{ ksi}$

$\frac{M}{S} \leq F_b \quad \therefore \quad \frac{1500\#\text{in}}{2t^2} \leq 16.2\text{ksi}$

$t = 0.22$

use L3x3x 1/4" min

weld angle to HSS



$\frac{1500\#\cdot\text{in}}{4\text{in}} = 375\# \times 2\text{in} = 750\#/\text{ft}$

use 4" angle
>than req'd
∴ ok

assume 2:12 weld spacing
∴ use 3/16" weld
$w_{all} = 2.78\text{ k/in}$

Steel Beam

Project File: alta mira driveway.ec6

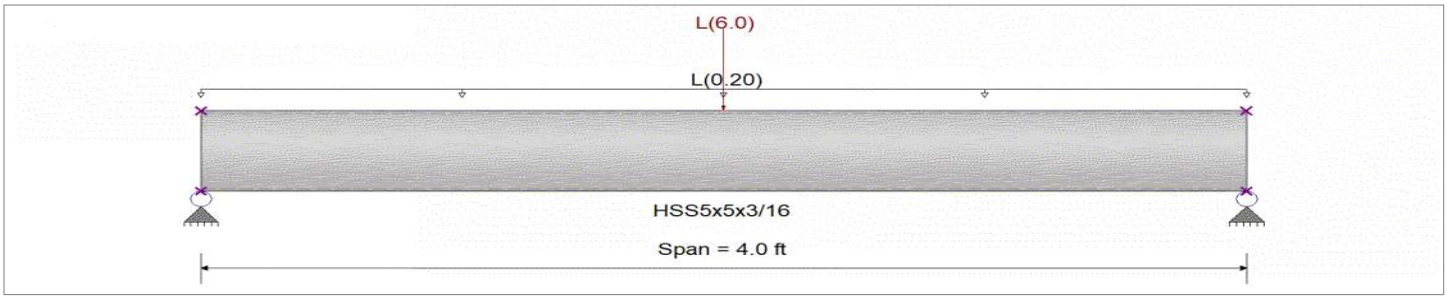
DESCRIPTION: Vehicle Barrier Top Rail

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : L = 0.050 ksf, Tributary Width = 4.0 ft, (uniform guardrail loading at top rail ASCE 4.5.1)

Point Load : L = 6.0 k @ 2.0 ft, (vehicle barrier load ASCE 4.5.3)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.437 : 1	Maximum Shear Stress Ratio =	0.122 : 1
Section used for this span	HSS5x5x3/16	Section used for this span	HSS5x5x3/16
Ma : Applied	6.424 k-ft	Va : Applied	3.424 k
Mn / Omega : Allowable	14.696 k-ft	Vn/Omega : Allowable	27.994 k
Load Combination	+D+L	Load Combination	+D+L
		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	0.041 in	Ratio =	1,166	>=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.041 in	Ratio =	1161	>=180	Span: 1 : +D+L
Max Upward Total Deflection	0 in	Ratio =	0	<180	n/a

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0414	2.011		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	3.424	3.424
Max Upward from Load Combinations	3.424	3.424
Max Upward from Load Cases	3.400	3.400
D Only	0.024	0.024
+D+L	3.424	3.424
+D+0.750L	2.574	2.574
+0.60D	0.014	0.014
L Only	3.400	3.400

Steel Beam

Project File: alta mira driveway.ec6

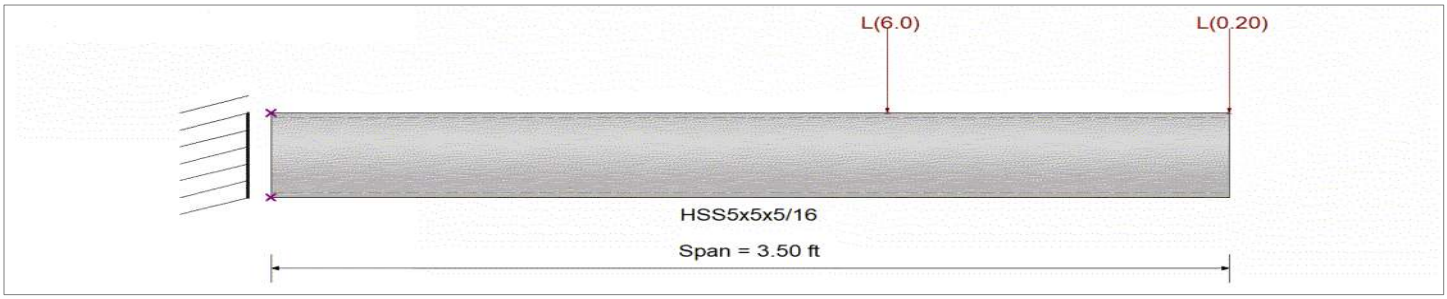
DESCRIPTION: Vehicle Barrier Post

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

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

Beam self weight NOT internally calculated and added
Load(s) for Span Number 1
Point Load : L = 6.0 k @ 2.250 ft

Point Load : L = 0.20 k @ 3.50 ft, (top rail loading)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.621 : 1	Maximum Shear Stress Ratio =	0.144 : 1
Section used for this span	HSS5x5x5/16	Section used for this span	HSS5x5x5/16
Ma : Applied	14.200 k-ft	Va : Applied	6.20 k
Mn / Omega : Allowable	22.854 k-ft	Vn/Omega : Allowable	43.148 k
Load Combination	L Only	Load Combination	L Only
		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 in	Ratio =	0	<360	n/a
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.140 in	Ratio =	601	>=180	Span: 1 : L Only
Max Upward Total Deflection	0 in	Ratio =	0	<180	n/a

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
L Only	1	0.1397	3.500		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	6.200	
Max Upward from Load Combinations	4.650	
Max Upward from Load Cases	6.200	
L Only	6.200	
+0.750L	4.650	

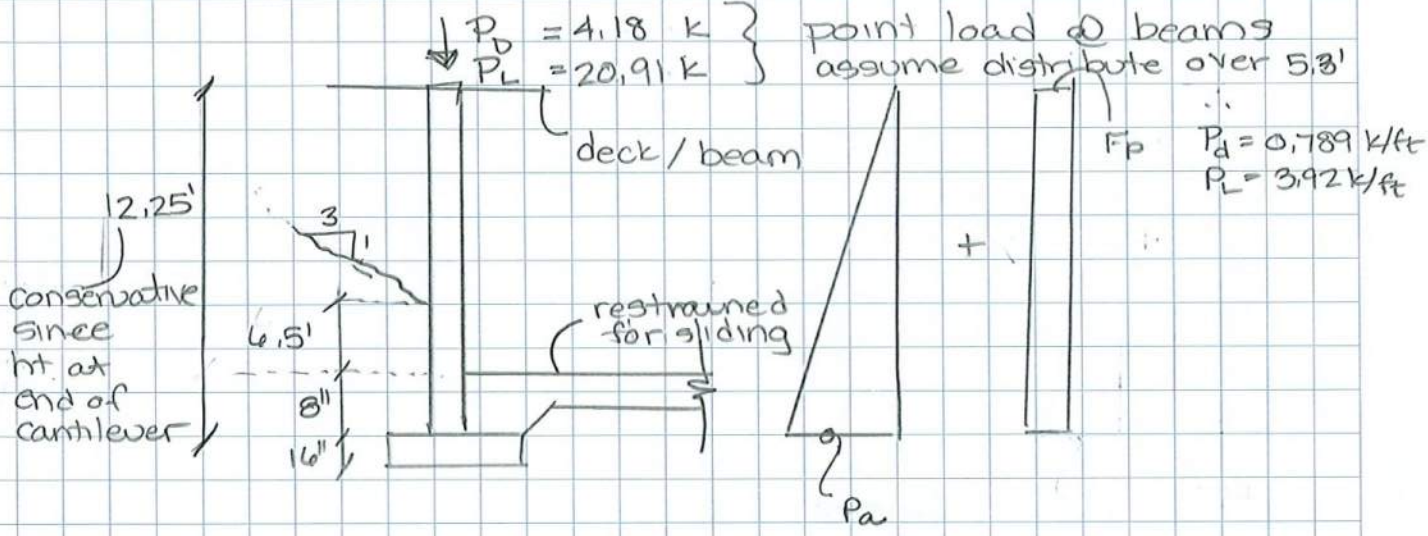
Date

Project Alta Mira

Contact PD

Phone

Retaining wall @ driveway



per soils report

P_a = 50 psf/ft for 3:1 slope
P_a = 60 psf/ft for 2:1 slope ← conservative
P_p = 300 psf/ft
add 20% for seismic loading ∴ P = 0.2 (60 psf)(12.25) = 147

BP = 4000 psf

$$F_p = \frac{S_{DS}}{R/I} W = \frac{0.611}{2/1.0} = 0.306 W$$

∴ for load at top of wall due to driveway
V = 0.306 (30.6 psf)(17.5'/2 + 6') = 138 plf

Date

Project Alta Mira

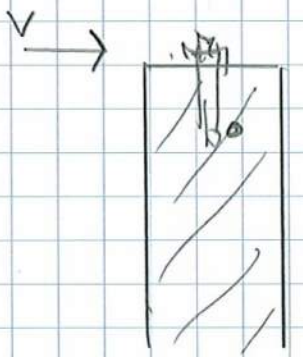
Contact PD

Phone

per attached enercalc

use 12" CMU wall
w/ #7 @ 8" oc
tension face
@ 6" x 16' footing
w/ #6 @ 12" oc
* horizontal deflection
= 0.06 in ∴ OK
w/ 2" gap

Connection beam to CMU wall



V = 138plf (5.25') = 725#

by inspection
use 2 - 5/8" ϕ headed
bolts embedded
12" min w/ (2) #5 cont
at top of wall

Cantilevered Retaining Wall

Project File: alta mira driveway.ec6

DESCRIPTION: Driveway CMU Wall

Code Reference

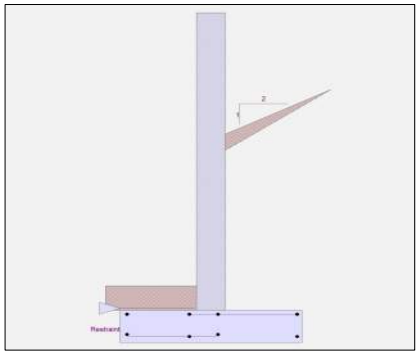
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	7.25 ft
Wall height above soil	=	5.00 ft
Slope Behind Wall	=	2.00
Height of Soil over Toe	=	12.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	60.0 psf/ft
	=	
Passive Pressure	=	300.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.350
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.6 lbs
Axial Live Load	=	2.6 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	138.0 #/ft
...Height to Top	=	12.25 ft
...Height to Bottom	=	12.25 ft
Load Type	=	Seismic (E) (Strength Level)
Wind on Exposed Stem (Service Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Earth Pressure Seismic Load

Method : Triangular

Load at bottom of Triangular Distribution . . . . . = 147.000 psf (Strength)

Total Strength-Level Seismic Load. . . . . = 728.875 lbs

Total Service-Level Seismic Load. . . . . = 510.213 lbs

Stem Weight Seismic Load

F_p / W_p Weight Multiplier = 0.305 g

Added seismic base force 347.8 lbs

Cantilevered Retaining Wall

Project File: alta mira driveway.ec6

DESCRIPTION: Driveway CMU Wall

Design Summary

Wall Stability Ratios

Overturning	=	1.52	OK
Slab Resists All Sliding !			
Global Stability	=	1.60	
Total Bearing Load	=	5,515 lbs	
...resultant ecc.	=	22.25 in	
Eccentricity outside middle third			
Soil Pressure @ Toe	=	2,802 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	4,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	3,922 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	38.7 psi	OK
Footing Shear @ Heel	=	20.9 psi	OK
Allowable	=	82.2 psi	

Sliding Calcs

Lateral Sliding Force	=	3,808.3 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Stem Construction

		Bottom		
		Stem OK		
Design Height Above Ftg	ft =	0.00		
Wall Material Above "Ht"	=	Masonry		
Design Method	=	ASD	SD	SD
Thickness	=	12.00		
Rebar Size	=	# 7		
Rebar Spacing	=	8.00		
Rebar Placed at	=	Edge		
Design Data				
fb/FB + fa/Fa	=	**0.899**		
Total Force @ Section				
Service Level	lbs =	2,374.8		
Strength Level	lbs =			
Moment....Actual				
Service Level	ft-# =	7,029.1		
Strength Level	ft-# =			
Moment.....Allowable	=	10,371.1		
Shear.....Actual				
Service Level	psi =	17.0		
Strength Level	psi =			
Shear.....Allowable	psi =	47.1		
Anet (Masonry)	in2 =	139.50		
Wall Weight	psf =	133.0		
Rebar Depth 'd'	in =	9.00		

Masonry Data

f'm	psi =	1,500
Fs	psi =	20,000
Solid Grouting	=	Yes
Modular Ratio 'n'	=	21.48
Equiv. Solid Thick.	in =	11.63
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	
Fy	psi =	

Cantilevered Retaining Wall

Project File: alta mira driveway.ec6

DESCRIPTION: Driveway CMU Wall

Footing Data

Toe Width	=	2.67 ft
Heel Width	=	3.67
Total Footing Width	=	6.33
Footing Thickness	=	16.00 in
Key Width	=	8.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	2.67 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	3,922	0 psf	
Mu' : Upward	=	10,797	3 ft-#	
Mu' : Downward	=	1,571	5,530 ft-#	
Mu: Design	=	9,226 OK	5,527 ft-#	OK
phiMn	=	35,574	27,687 ft-#	
Actual 1-Way Shear	=	38.72	20.93 psi	
Allow 1-Way Shear	=	82.16	82.16 psi	
Toe Reinforcing	=	# 6 @ 8.00 in		
Heel Reinforcing	=	# 5 @ 8.00 in		
Key Reinforcing	=	# 5 @ 18.00 in		
Footing Torsion, Tu	=	0.00 ft-lbs		
Footing Allow. Torsion, phi Tu	=	0.00 ft-lbs		

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 6.94 in, #5@ 10.76 in, #6@ 15.27 in, #7@ 20.83 in, #8@ 27.43 in, #9@ 34.72 in, #10@ 44.09 in

Heel: #4@ 6.94 in, #5@ 10.76 in, #6@ 15.27 in, #7@ 20.83 in, #8@ 27.43 in, #9@ 34.72 in, #10@ 44.09 in

Key: No key defined

Min footing T&S reinf Area	2.19	in2
Min footing T&S reinf Area per foot	0.35	in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 6.94 in	#4@ 13.89 in
#5@ 10.76 in	#5@ 21.53 in
#6@ 15.28 in	#6@ 30.56 in

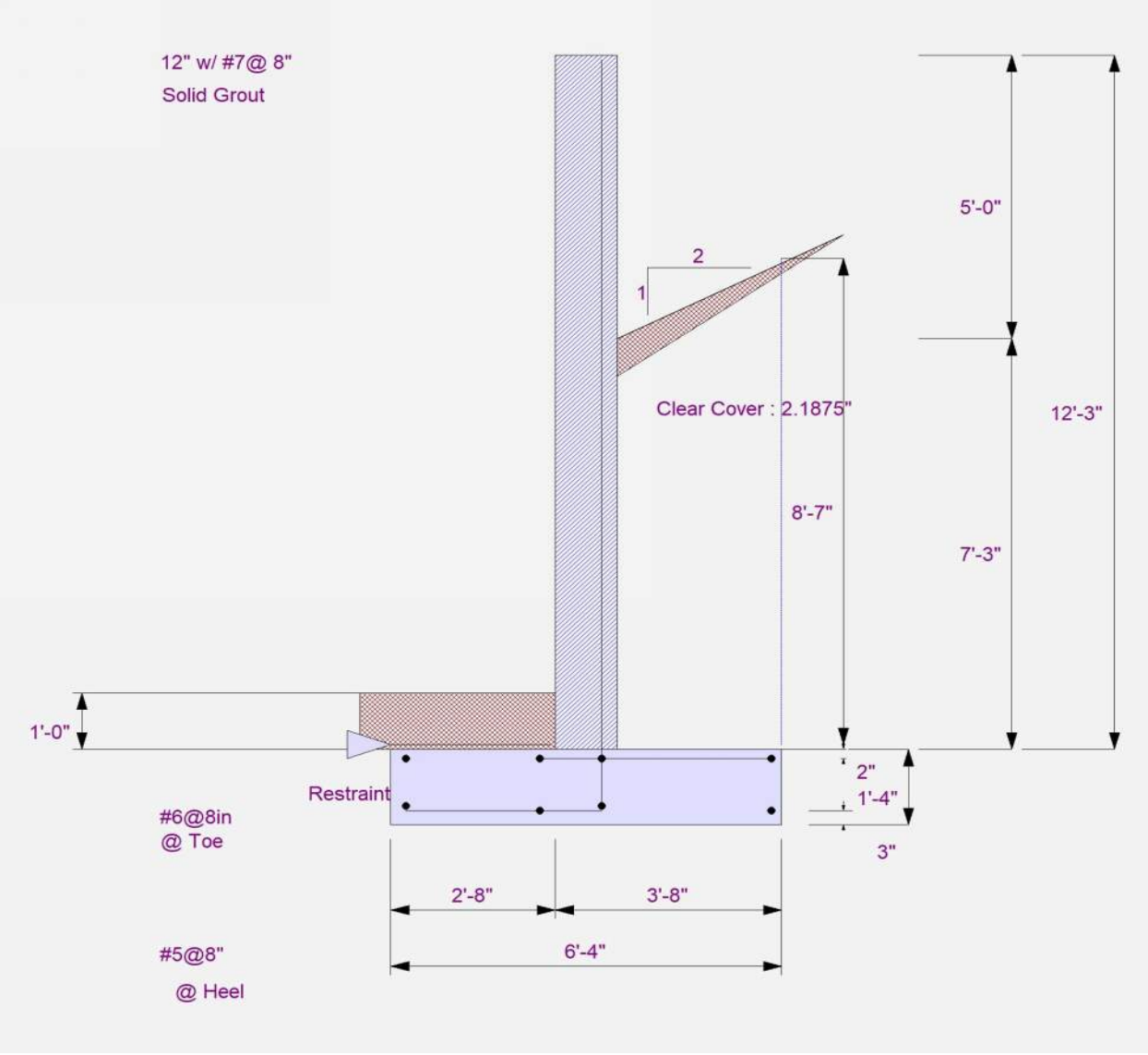
DESCRIPTION: Driveway CMU Wall

Rebar Lap & Embedment Lengths Information

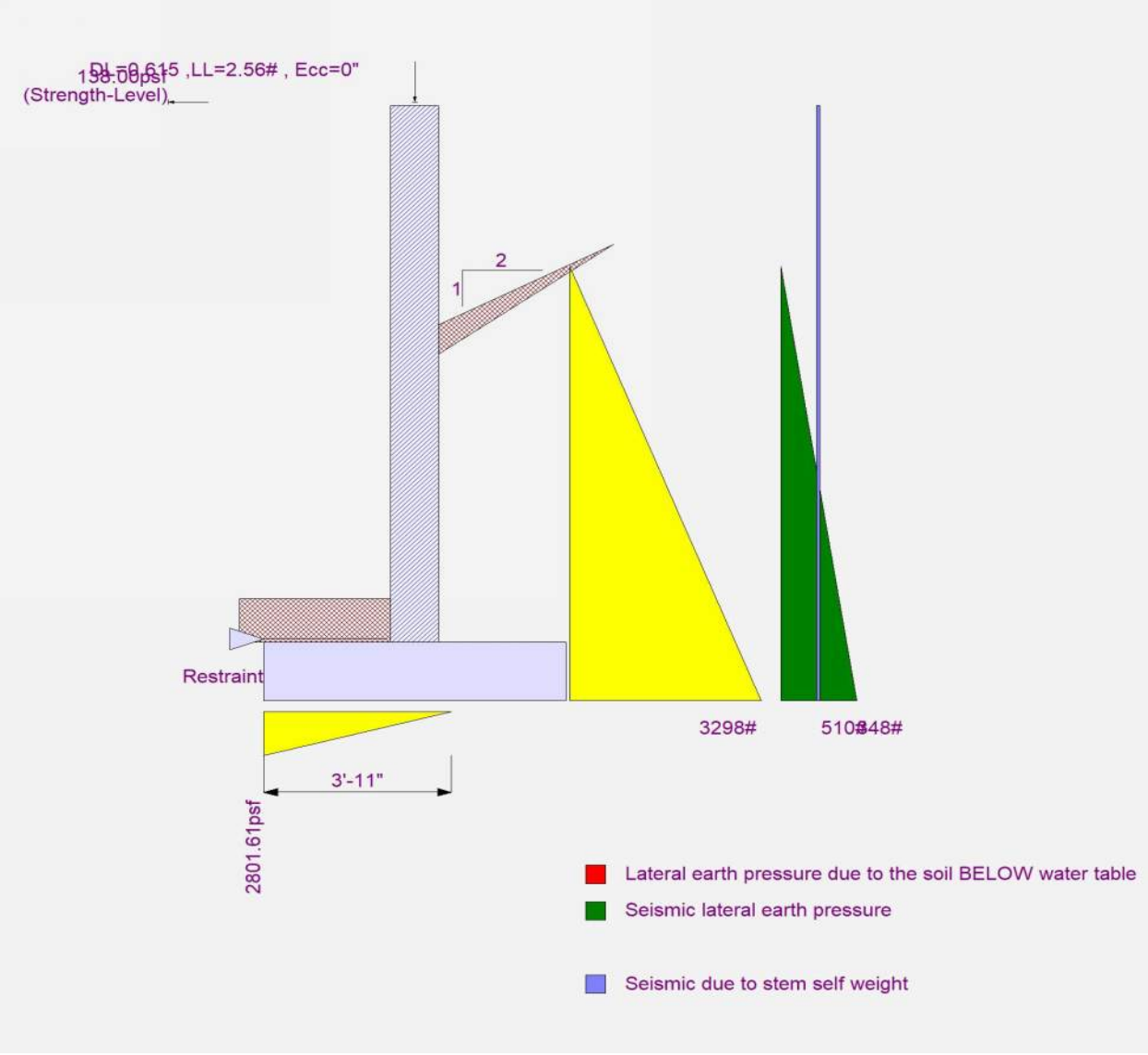
Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing
Calculated Rebar Stress, fs = 12229.73 psi

Lap Splice length for #7 bar specified in this stem design segment (25.4.2.3a) =	35.00 in
Development length for #7 bar specified in this stem design segment =	21.40 in
Hooked embedment length into footing for #7 bar specified in this stem design segment =	8.95 in
As Provided =	0.9000 in2/ft
As Required =	0.5309 in2/ft

DESCRIPTION: Driveway CMU Wall



DESCRIPTION: Driveway CMU Wall



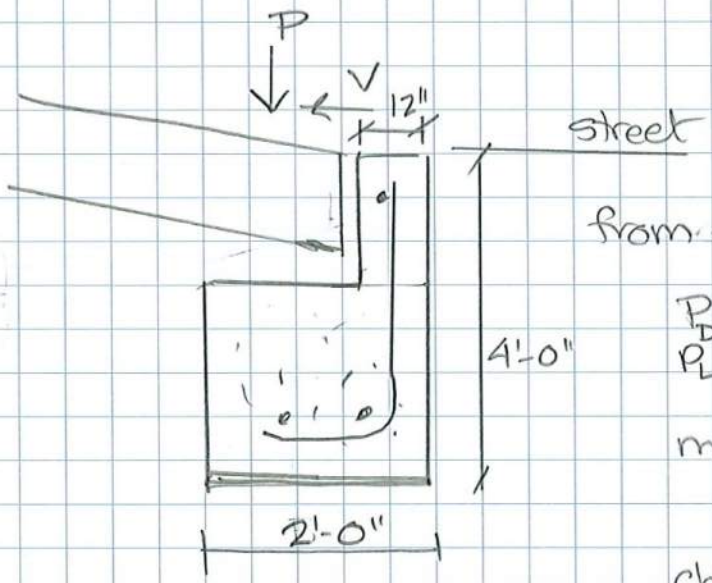
Date

Project Alta Mira

Contact PD

Phone

Conc ftg under steel beam at street



from beam design

P_D = 2,046
P_L = 10,231
} ∴

$$\text{min } A = \frac{12.27\text{k}}{2\text{ksf}} = 6.13$$

check ftg $3.5' \times 2' = 7 ft^2$

per attached encalc
use 2'-0" wide ftg
w/ 3-#6 cont
and #5 @ 16" oc

General Footing

Project File: alta mira driveway.ec6

DESCRIPTION: Footing under driveway beams at street

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : IBC 2021

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0	ksi
fy : Rebar Yield	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	2.0	ksf
Soil Density	=	110.0	pcf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	300.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=	2.0	ft
Allow press. increase per foot of depth	=		ksf
when footing base is below	=		ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth	=	ksf
when max. length or width is greater than	=	ft

Dimensions

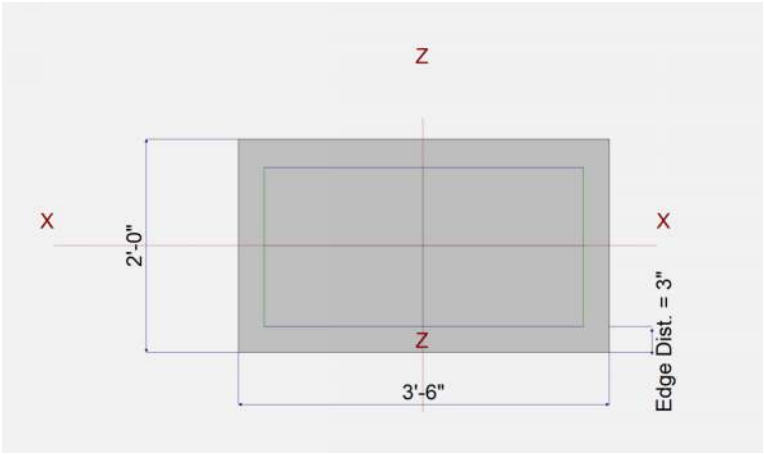
Width parallel to X-X Axis	=	3.50	ft
Length parallel to Z-Z Axis	=	2.0	ft
Footing Thickness	=	16.0	in

Pedestal dimensions...

px : parallel to X-X Axis	=		in
pz : parallel to Z-Z Axis	=		in
Height	=		in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0	in



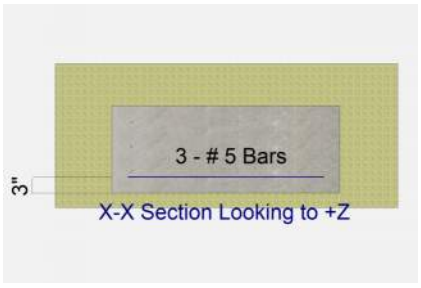
Reinforcing

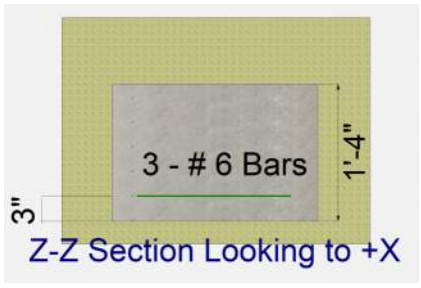
Bars parallel to X-X Axis			
Number of Bars	=		3
Reinforcing Bar Size	=	#	5
Bars parallel to Z-Z Axis			
Number of Bars	=		3
Reinforcing Bar Size	=	#	6

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation

	Bars along Z-Z Axis
# Bars required within zone	72.7 %
# Bars required on each side of zone	27.3 %





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=								k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=								k-ft
V-x	=								k
V-z	=								k

General Footing

Project File: alta mira driveway.ec6

DESCRIPTION: Footing under driveway beams at street

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.1334	Soil Bearing	0.2667 ksf	2.0 ksf	D Only about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.0	Z Flexure (+X)	0.0 k-ft/ft	26.249 k-ft/ft	+1.40D
PASS	0.0	Z Flexure (-X)	0.0 k-ft/ft	26.249 k-ft/ft	+1.40D
PASS	0.0	X Flexure (+Z)	0.0 k-ft/ft	21.435 k-ft/ft	+1.40D
PASS	0.0	X Flexure (-Z)	0.0 k-ft/ft	21.435 k-ft/ft	+1.40D
PASS	0.0	1-way Shear (+X)	0.0 psi	82.158 psi	+1.40D
PASS	0.0	1-way Shear (-X)	0.0 psi	82.158 psi	+1.40D
PASS	n/a	1-way Shear (+Z)	0.0 psi	82.158 psi	n/a
PASS	n/a	1-way Shear (-Z)	0.0 psi	82.158 psi	n/a
PASS	0.0	2-way Punching	0.0 psi	164.317 psi	+1.40D

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	2.0	n/a	0.0	0.2667	0.2667	n/a	n/a	0.133
X-X, +0.60D	2.0	n/a	0.0	0.160	0.160	n/a	n/a	0.080
Z-Z, D Only	2.0	0.0	n/a	n/a	n/a	0.2667	0.2667	0.133
Z-Z, +0.60D	2.0	0.0	n/a	n/a	n/a	0.160	0.160	0.080

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	0.0	+Z	Bottom	0.3456	AsMin	0.3771	21.435	OK
X-X, +1.40D	0.0	-Z	Bottom	0.3456	AsMin	0.3771	21.435	OK
X-X, +1.20D	0.0	+Z	Bottom	0.3456	AsMin	0.3771	21.435	OK
X-X, +1.20D	0.0	-Z	Bottom	0.3456	AsMin	0.3771	21.435	OK
X-X, +0.90D	0.0	+Z	Bottom	0.3456	AsMin	0.3771	21.435	OK
X-X, +0.90D	0.0	-Z	Bottom	0.3456	AsMin	0.3771	21.435	OK
Z-Z, +1.40D	0.0	-X	Bottom	0.3456	AsMin	0.4650	26.249	OK
Z-Z, +1.40D	0.0	+X	Bottom	0.3456	AsMin	0.4650	26.249	OK
Z-Z, +1.20D	0.0	-X	Bottom	0.3456	AsMin	0.4650	26.249	OK
Z-Z, +1.20D	0.0	+X	Bottom	0.3456	AsMin	0.4650	26.249	OK
Z-Z, +0.90D	0.0	-X	Bottom	0.3456	AsMin	0.4650	26.249	OK
Z-Z, +0.90D	0.0	+X	Bottom	0.3456	AsMin	0.4650	26.249	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	82.16 psi	0.00	OK
+1.20D	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	82.16 psi	0.00	OK
+0.90D	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	82.16 psi	0.00	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	0.00 psi	164.32 psi	0	OK
+1.20D	0.00 psi	164.32 psi	0	OK
+0.90D	0.00 psi	164.32 psi	0	OK

DESCRIPTION: Driveway CMU Wall

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		2,950.2	3.31	9,752.1	Soil Over HL (ab. water tbl)	2,126.7	5.00	10,633.3
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		5.00	10,633.3
Hydrostatic Force					Water Table			
Buoyant Force	=				Sloped Soil Over Heel	= 195.6	5.44	1,064.7
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	= 0.6	3.17	1.9
Added Lateral Load	=		13.58		* Axial Live Load on Stem	= 2.6	3.17	8.1
Load @ Stem Above Soil	=				Soil Over Toe	= 293.3	1.33	391.1
Seismic Earth Load	=	510.2	3.31	1,686.5	Surcharge Over Toe	=		
Seismic Stem Self Wt	=	347.8	7.46	2,594.3	Stem Weight(s)	= 1,629.3	3.17	5,159.3
					Earth @ Stem Transitions	=		
					Footing Weight	= 1,266.7	3.17	4,011.1
					Key Weight	=	3.00	
					Vert. Component	=		
Total	=	3,808.3	**O.T.M.** =	14,033.0	**Total =**	5,512.1 lbs	**R.M.=**	21,261.5

Resisting/Overturning Ratio = **1.52**

Vertical Loads used for Soil Pressure = 5,514.6 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

If seismic is included, the OTM and sliding ratios may be 1.1 per section 1807.2.3 of IBC.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.151	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

TRELLIS

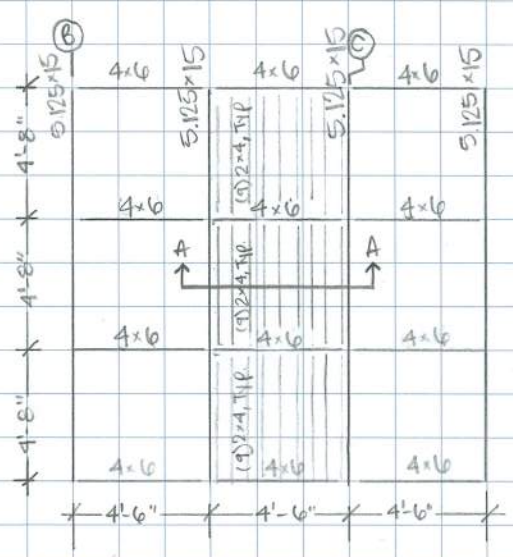
Date 08/09/23

Project W0103.00 ALTA MIRA

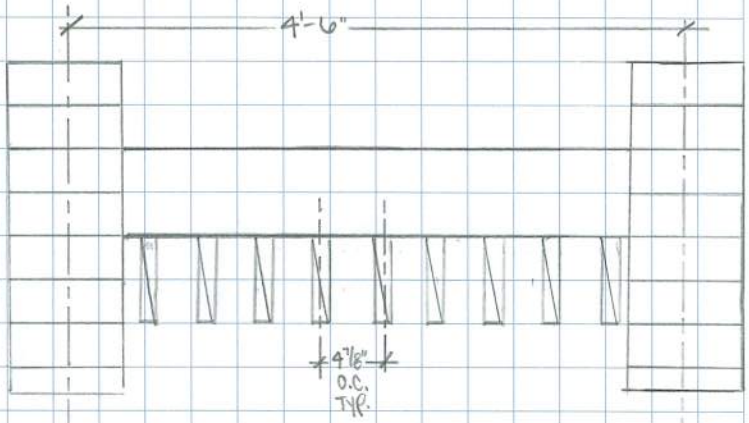
Contact PO/FR

Phone

TRELLIS AT ROOF LEVEL DESIGN & ANALYSIS



PARTIAL ROOF FRAMING PLAN



SECTION A-A N.T.S

- ASD DESIGN
- PER GENERAL NOTES, ALL WOOD MEMBERS SHALL BE DOUGLAS FIR/LARCH
  - 2x MEMBERS GRADE No.2
  - 4x MEMBERS GRADE No.1

1. CHECK 2x4'S

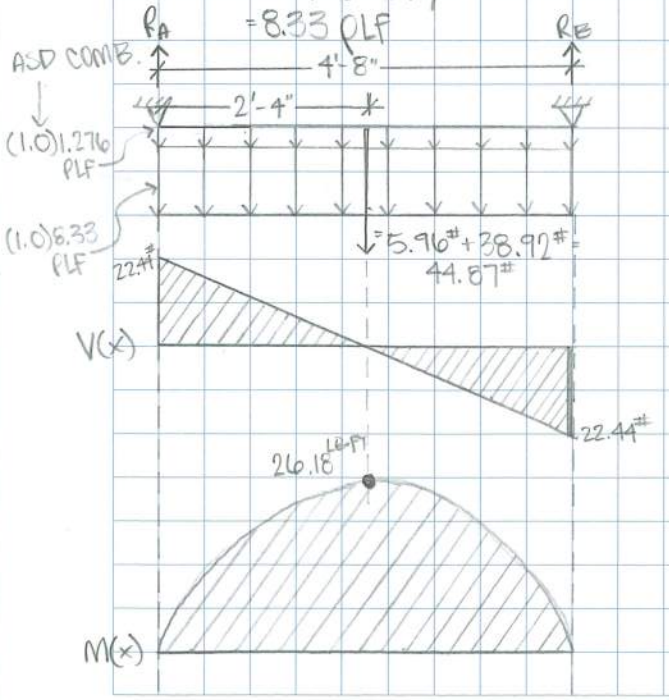
SPAN = 4'-8"

DL = SELF WEIGHT = 1.276 PLF

LL = 20 PSF

TRIBUTARY WIDTH = 5"

= 8.33 PLF



2x4 DOUGLAS FIR PROPERTIES: (No.2)

SW = 1.276 PLF — SELF-WEIGHT (NDS TABLE 1B)

DESIGN VALUES (NDS TABLE 4A)

f_b = 900 PSI

f_v = 180 PSI

E = 1,600,000 PSI

4x6 DOUGLAS FIR PROPERTIES: (No.1)

SW = 4.679 PLF — SELF-WEIGHT (NDS TABLE 1B)

DESIGN VALUES (NDS TABLE 4A)

f_b = 1000 PSI

f_v = 180 PSI

E = 1,700,000 PSI

$+\uparrow \sum F_y = 0;\ R_A - 44.87^{\#} + R_B = 0$

$\circlearrowleft \sum M_A = 0,\ -44.87^{\#}(2.33') + R_B(4.67') = 0$

R_B = 22.44 LBS

R_A = 22.44 LBS

Date _____

Project _____

Contact _____

Phone _____ 2/6

PER SHEAR & MOMENT DIAGRAM ON PREVIOUS PAGE:

$V_{MAX} = 22.44$ LBS

$M_{MAX} = 26.18$ LB·FT

-CHECK FOR BENDING:

$F'_b = F_b \cdot C_D \cdot C_M \cdot C_t \cdot C_L \cdot C_F \cdot C_{FU} \cdot C_i \cdot C_r$ (NDS TABLE 4.3.1)

WHERE:

$C_D = 0.9$	LOAD DURATION FACTOR	(TABLE 2.3.2)
$C_M = 0.85$	WET SERVICE FACTOR	(TABLE 4A)
$C_t = 1.0$	TEMPERATURE FACTOR	(SECTION 2.3.3)
$C_L = 1.0$	BEAM STABILITY FACTOR	(SECTION 3.3.3)
$C_F = 1.5$	SIZE FACTOR	(TABLE 4A)
$C_{FU} = 1.0$	FLAT USE FACTOR	(TABLE 4A)
$C_i = 1.0$	INCISION FACTOR	(TABLE 4.3.8)
$C_r = 1.15$	REPETITIVE FACTOR	(TABLE 4A)

$F'_b = (900\,psi)(0.9)(0.85)(1.0)(1.0)(1.5)(1.0)(1.0)(1.15) = 1187.66$ PSI

ALLOWABLE BENDING STRESS IN 2x4

-FIND DESIGN BENDING STRESS

$f_{DESIGN} = \frac{M_{MAX}}{S_x}$ WHERE: $S_x = 3.06\,in^3$ (TABLE 1B)

$= \frac{(26.18\ LB \cdot FT)(12''/1')}{3.06\,in^3} = 102$ PSI DESIGN BENDING STRESS (PSI)

$f_{DESIGN} < F'_b$ DESIGN O.K IN BENDING

-CHECK 2x4 FOR SHEAR: (SEE BENDING CALCS ABOVE FOR DEFINITIONS & REFERENCES)

$F'_v = F_v \cdot C_D \cdot C_M \cdot C_t \cdot C_i$ (NDS TABLE 4.3.1)

$F'_v = (180\,psi)(0.9)(0.97)(1.0)(1.0) = 157$ PSI ← ALLOWABLE SHEAR STRESS

FIND DESIGN SHEAR STRESS FOR 2×4

$F_{DESIGN} = \frac{2}{3} \cdot \frac{V_{MAX}}{A}$ WHERE: $A = 5.25\ IN^2$ AREA (TABLE 1B)

$= \frac{2}{3} \cdot \frac{(22.44\ LB)}{5.25\ IN^2} \Rightarrow 2.85\ PSI$ DESIGN SHEAR STRESS

$F_{DESIGN} < F'_V$ **DESIGN OK IN SHEAR**

2. CHECK 4×6 BEAMS

SPAN: 4'-6"

DL: •SELF-WEIGHT = 4.679 PLF

•WEIGHT OF (9) 2×4'S:

$W_{2\times4} = 1.28$ PLF

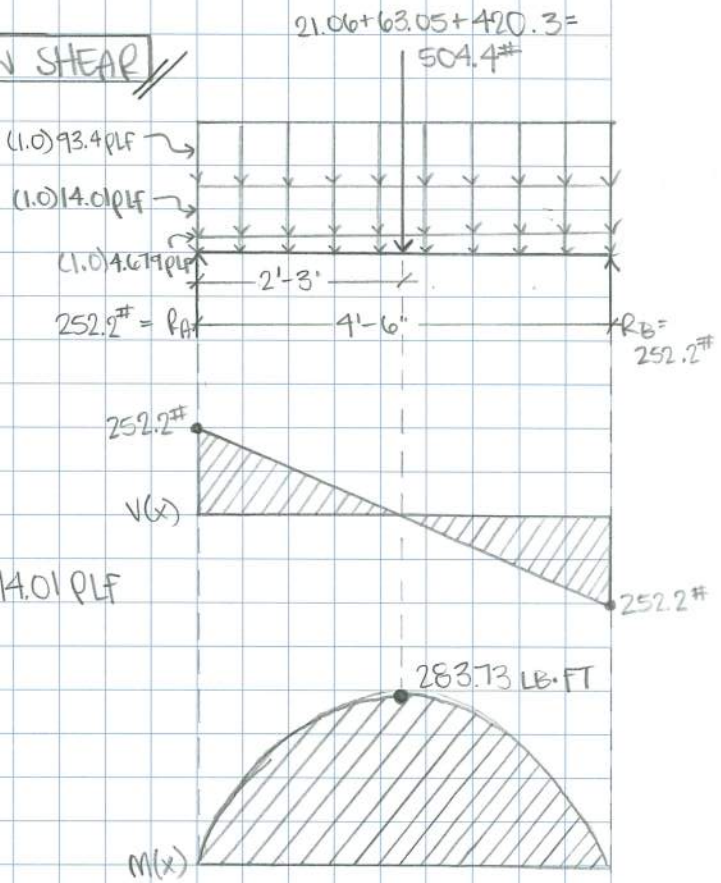
SPACING = 5" = 0.42'

AREA LOAD = $\frac{1.28\ PLF}{0.42'} = 3.0\ PSF$

TRIBUTARY WIDTH = 4.67 FT

UNIFORM LOAD = (3.0 PSF)(4.67 FT) = 14.01 PLF

LL = 20 PSF (4.67 FT) = 93.4 PLF



PER SHEAR & MOMENT DIAGRAMS:

$V_{MAX} = 252.2\ LB$

$M_{MAX} = 283.73\ LB \cdot FT$

- CHECK 4×6 FOR BENDING:

$F'_b = F_b \cdot C_D \cdot C_M \cdot C_t \cdot C_L \cdot C_F \cdot C_{fu} \cdot C_i \cdot C_r$ (NDS TABLE 4.3.1)

1000 PSI, 0.9, 0.85, 1.0, 1.0, 1.3, 1.0, 1.0, 1.0 ← *SEE PAGE 2 OF CALCS FOR DEFINITIONS AND REFERENCES

$F'_b = 994.5\ PSI$ ALLOWABLE BENDING STRESS IN 4×6

Date _____

Project _____

Contact _____

Phone _____ 4/6

- FIND DESIGN BENDING STRESS FOR 4×6

$$f_{DESIGN,BEND} = \frac{M_{MAX}}{S_x} \quad \text{WHERE: } S_x = 17.65\ in^3 \text{ SECTION MODULUS (TABLE 1B)}$$

$$= \frac{(283.73\ LB\text{-}FT)(12''/1')}{17.65\ in^3} = \underline{192.9\ PSI}$$ DESIGN BENDING STRESS FOR 4×6 (PSI)

$f_{DESIGN,BEND} < F'_b$ **DESIGN O.K. IN BENDING**

- CHECK 4×6 FOR SHEAR:

$F'_v = F_v \cdot C_D \cdot C_M \cdot C_t \cdot C_i$ (NDS TABLE 4.3.1)

F_v: 160 PSI, C_D: 0.9, C_M: 0.97, C_t: 1.0, C_i: 1.0 ← *SEE PAGE 2 OF CALCS FOR DEFINITIONS AND REFERENCES

$F'_v = \underline{157\ PSI}$ ALLOWABLE SHEAR STRESS IN 4×6

- FIND DESIGN SHEAR STRESS FOR 4×6:

$$f_{DESIGN,SHEAR} = \frac{2}{3} \cdot \frac{V_{MAX}}{A} \quad \text{WHERE } A = 19.25\ in^2 \text{ AREA (TABLE 1B)}$$

$$= \frac{2}{3} \cdot \frac{252.2\ LB}{19.25\ in^2} = \underline{8.73\ PSI}$$ DESIGN SHEAR STRESS IN 4×6

$f_{DESIGN,SHEAR} < F'_v$ **DESIGN O.K. IN SHEAR**

Date _____

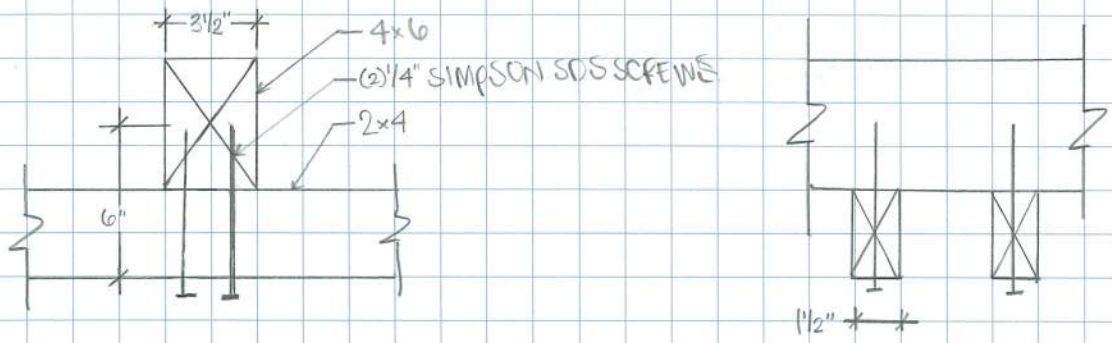
Project _____

Contact _____

Phone _____ 5/6

3. CHECK FASTENER CONNECTING THE 2×6 MEMBERS TO 4×6 MEMBER

- TRY (2) 1/4" SIMPSON SDS (L=6") SCREWS



-PER ESR-2236, TABLE 5 (ATTACHED)

F_W = 172 LB/IN WITHDRAWAL DESIGN VALUE (TENSION)

$F'_W = F'_T = F_W \cdot C_D \cdot C_M \cdot C_t \cdot C_i$ (NDS TABLE 4.3.1)

172 #/IN, C_D = 0.9, C_M = 1.0, C_t = 1.3, C_i = 1.0

F'_W = 201.2 #/IN

THREAD PENETRATION INTO MAIN MEMBER:

6"	SCREW LENGTH
− 3.5"	2×4 WIDTH
2.5"	THREAD PENETRATION INTO 4×6

F'_W = 201.2 #/IN (2.5") = 503.1 LBS ALLOWABLE WITHDRAWAL DESIGN VALUE IN SDS SCREW

$F_{DESIGN,W} = V_{MAX}$ = 22.44 LBS MAXIMUM SHEAR AT 2×4 TO 4×6 CONNECTION IS WITHDRAWAL DESIGN LOAD OF SDS SCREW (SEE CALCS ON PAGE 1 OF CALCS)

$f_{DESIGN,W} < F'_W$ DESIGN O.K FOR SDS SCREWS IN WITHDRAWAL

Date

Project

Contact

Phone

6/6

4. CHECK FASTENER CONNECTING 4×6 MEMBER TO 5 1/4"×15" GLULAM BEAM & TRY CJT3Z JOIST TIE

PER SIMPSON LOAD TABLE (ATTACHED)

$V_{ALLOW} = 1050$ LB — DESIGN SHEAR LOAD FOR CJT3Z JOIST TIE CONNECTING 4×6 BEAM TO 5 1/4"×15" GLULAM BM.

-FIND DESIGN SHEAR OF CONNECTION:

$V_{MAX} = 252.2$ LBS — MAX SHEAR AT CONNECTION (SEE 4×6 CALCS OF PAGE 3 OF CALCS)

$V_{MAX} < V_{ALLOW}$ DESIGN O.K. FOR CJT3Z JOIST TIE CONNECTION

TABLE 4—CONNECTION GEOMETRY

CONDITION[1]		MINIMUM DISTANCE OR SPACING (in.)
Edge distance	Perpendicular to grain loading (Loaded or unloaded edge)	$1^1/_2$
	Parallel to grain loading	1
End distance	Perpendicular to grain loading	4
	Parallel to grain loading (Loading toward or away from end)	3
Spacing (Loading parallel or perpendicular to grain)	Between fasteners in a row	3
	Between rows	3
	Between staggered rows	$1^1/_2$

For **SI:** 1 inch = 25.4 mm.

[1]Edge distances, end distances and spacing of the screws must be sufficient to prevent splitting of the wood, or as required by this table, whichever is the more restrictive.
[2] Values for spacing between staggered rows apply where screws in adjacent rows are offset by half of the spacing between screws in a row.

TABLE 5—REFERENCE WITHDRAWAL DESIGN VALUE FOR SDS SCREWS INSTALLED IN THE SIDE GRAIN OF A WOOD MAIN MEMBER

SDS WOOD SCREW DIMENSIONS (in.)		REFERENCE WITHDRAWAL DESIGN VALUE[2,3,4], *W* (lbs/inch)
Screw Length, *L1*	Thread Length[1], *T*	
$1^1/_2$	1	172
$1^3/_4$	$1^1/_4$	
2	$1^1/_4$	
$2^1/_2$	$1^1/_2$	
3	2	
$3^1/_2$	$2^1/_4$	
$4^1/_2$	$2^3/_4$	
5	$2^3/_4$	
6	$3^1/_4$	
8	$3^1/_4$	

For **SI:** 1 inch = 25.4 mm, 1 lbf/inch = 4.44 kPa.

[1]The tabulated reference withdrawal design value (*W* = 172 lbs/inch) is in pounds per inch of the thread penetration into the side grain of the main member.
[2]Tabulated reference withdrawal design values (*W* = 172 lbs/inch) must be multiplied by all applicable adjustment factors from the NDS as referenced in the IBC or IRC.
[3]Embedded thread length is that portion held in the main member including the screw tip.
[4]The tabulated withdrawal design value (W) is based on wood members having a minimum assigned specific gravity of 0.50, such as Douglas fir–larch. Values are also applicable for fasteners installed into the face of engineered wood described in Section 3.2.2.

TABLE 6—RECOGNIZED EXPOSURE CONDITIONS FOR SIMPSON STRONG-TIE SDS FASTENERS WITH DOUBLE BARRIER COATING

EXPOSURE CONDITION	TYPICAL APPLICATIONS	RECOGNITION LIMITATIONS
1	Treated Wood in dry use applications	Limited to use where equilibrium moisture content of the chemically treated wood meets the dry services condition as described in the NDS
3	General construction	Limited to freshwater and chemically treated wood exposure, e.g., no saltwater exposure

CJTZ/HCJTZ

Light and Heavy-Duty Concealed Joist Ties

The CJTZ/HCJTZ are concealed connectors. They can be installed three ways: with no routing of header/post or beam; a routed header/post, or a routed beam. It is part of a concealed connector system that includes the CPTZ and CBTZ.

The HCJTZ is a heavy concealed beam tie to be used with large glulam beams resisting heavy loads. The HCJTZ features a unique shape that allows installers to insert the connector into the end of the beam without a visible slot cut into the bottom of the beam.

Material: CJTZ —12 gauge; HCJTZ — 10 gauge

Finish: Galvanized

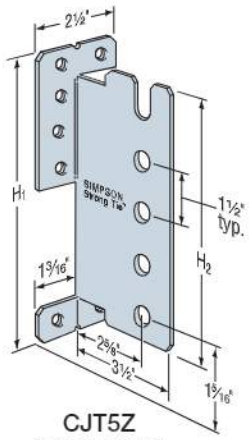
Installation:

- Use all specified fasteners; see General Notes.
- The CJTZ/HCJTZ is supplied with all dowels and screws required. Screws require a hex-head driver.
- Router end of beam for screw heads for flush installation.
- The carried member may be sloped up or down to 45° with full table loads.
- The CJTZ only is available with two dowel lengths. To order: specify short (e.g. CJT3ZS) or long dowels (e.g. CJT3ZL) (see footnote #1 below).

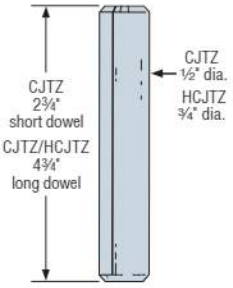
Options:

- See technical bulletin T-C-CJTZ at **strongtie.com**
- For additional concealed beam connections, see *Mass Timber Construction* catalog, pp. 188–191 at **strongtie.com**

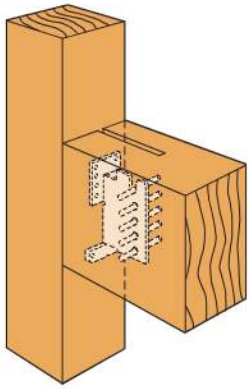
Codes: See p. 11 for Code Reference Key Chart



CJT5Z
(others similar)

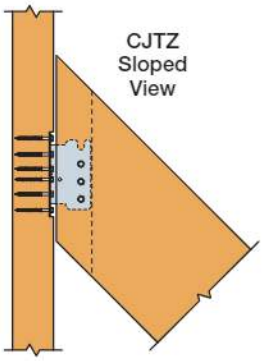


Chamfered Steel Dowel
(galvanized)



Typical CJTZ Installation
(dowels should be centered in beam; HCJTZ similar)

Warning: This connector requires special attention to ensure correct installation. The beam must be installed perpendicular to the support member. The connection's components may be damaged if the beam is rotated from its opposite end during or after installation. Damaged components may not be noticeable and may reduce the connector's load carrying capacity.

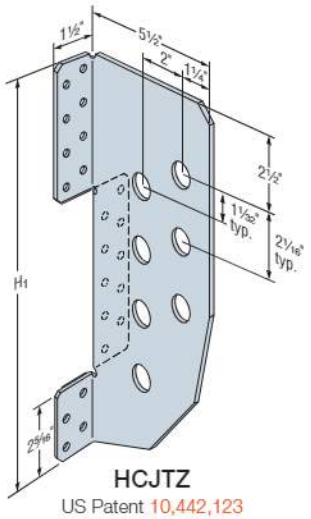


CJTZ Sloped View

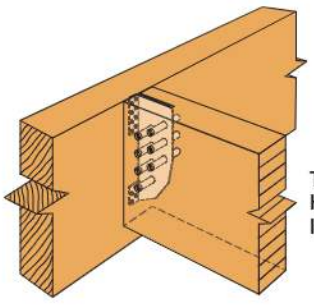
These products are available with additional corrosion protection. For more information, see p. 14.

Model No.	Min. Joist Size	Dimensions (in.)		Fasteners (Quantity – Type)		Allowable Loads				Code Ref.
		H_1	H_2	Header	Joist Pins (2¾" or 4¾")	Uplift (160)	Floor (100)	Snow (115)	Roof (125)	
Douglas Fir–Larch										
CJT3Z	4x6	5⁹⁄₁₆	4⅞	(6) ¼" x 3" SDS	(3) ½"	985	1,050	1,050	1,050	IBC, FL, LA
	4x8	5⁹⁄₁₆	4⅞	(6) ¼" x 3" SDS	(3) ½"	1,540	1,730	1,730	1,730	
CJT4Z	4x10	7	5¹⁵⁄₁₆	(8) ¼" x 3" SDS	(4) ½"	2,625	2,970	2,970	2,970	
CJT5Z	4x12	8⁹⁄₁₆	7⅞	(10) ¼" x 3" SDS	(5) ½"	3,160	3,935	4,520	4,580	
CJT6Z	4x12	10	8¹⁵⁄₁₆	(12) ¼" x 3" SDS	(6) ½"	4,305	4,220	4,220	4,220	
Glulam										
CJT3Z	3⅛" x 7½"	5⁹⁄₁₆	4⅞	(6) ¼" x 3" SDS	(3) ½"	1,540	1,835	1,835	1,835	IBC, FL, LA
CJT4Z	3⅛" x 9"	7	5¹⁵⁄₁₆	(8) ¼" x 3" SDS	(4) ½"	2,625	3,180	3,180	3,180	
CJT5Z	3⅛" x 10½"	8⁹⁄₁₆	7⅞	(10) ¼" x 3" SDS	(5) ½"	3,160	3,900	4,480	4,570	
CJT6Z	3⅛" x 12"	10	8¹⁵⁄₁₆	(12) ¼" x 3" SDS	(6) ½"	4,305	4,510	4,860	4,860	
HCJTZ	5⅛" x 15"	13⅛	13⅛	(22) ¼" x 3" SDS	(7) ¾"	9,210	8,465	8,465	8,465	
PSL										
CJT3Z	3½" x 9½"	5⁹⁄₁₆	4⅞	(6) ¼" x 3" SDS	(3) ½"	1,540	2,220	2,220	2,220	IBC, FL, LA
CJT4Z	3½" x 9½"	7	5¹⁵⁄₁₆	(8) ¼" x 3" SDS	(4) ½"	2,625	2,810	2,810	2,810	
CJT5Z	3½" x 9½"	8⁹⁄₁₆	7⅞	(10) ¼" x 3" SDS	(5) ½"	3,160	3,980	4,285	4,285	
CJT6Z	3½" x 11⅞"	10	8¹⁵⁄₁₆	(12) ¼" x 3" SDS	(6) ½"	4,305	4,640	4,640	4,640	
HCJTZ	5⅛" x 15"	13⅛	13⅛	(22) ¼" x 3" SDS	(7) ¾"	9,210	8,465	8,465	8,465	

1. Center dowel in beam. Short dowel (½" x 2¾") is for use with 3⅛" glulam beam, 4x sawn lumber, or 3½" wide PSL. Long dowel (½" x 4¾") is for use with 5⅛" glulam beam, 6x sawn lumber, or greater widths.
2. **Fasteners:** SDS screws are Simpson Strong-Tie® Strong-Drive® SDS Heavy-Duty Connector screws. See pp. 21–22 for fastener information.



HCJTZ
US Patent 10,442,123



Typical HCJTZ Installation

RETAINING WALLS AND FOUNDATION DESIGN

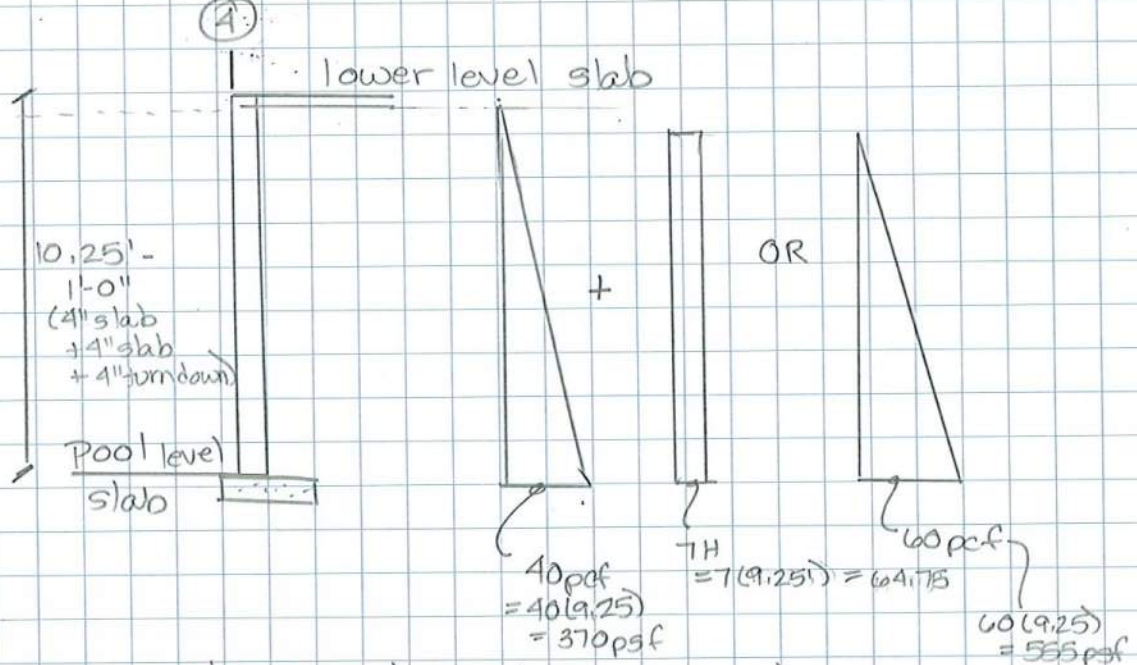
Date

Project Alta Mira

Contact PD

Phone

Basement Walls @ Grid A (per geotech report)



Option 1 $V = \frac{1}{2}(370\,psf)(9.25') + 64.75(9.25) = 2310\#$

Option 2 $= \frac{1}{2}(555\,psf)(9.25') = 2567\#$ ← governs

per attached enercalc, use 12" CMU wall
w/ #5@16" EF (V)
and 3'-0" ftg - per enercalc
need $A_s = 0.35\,in^2$ for temp
and shrinkage.

run 2x, one time for earth loads
one time for added seismic, since
geotech provides seismic loads
of 1.2 H, and enercalc doesn't
perform, rerun w/ increase of
H to 72 psf. use worst case

BASEMENT WALL AT TUNNEL
SEE DETAIL 9/S6.0

Restrained Retaining Wall

Project File: alta mira retaining walls (1).EC6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: Basement Wall L=10'-3"

Code References

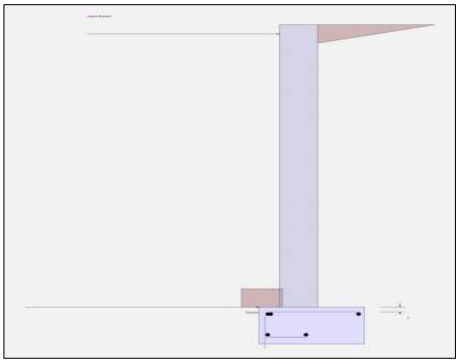
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	10.250 ft
Wall height above soil	=	ft
Total Wall Height	=	10.250 ft
Top Support Height	=	9.75 ft
Slope Behind Wall	=	0
Height of Soil over Toe	=	8.0 in

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
At-Rest Heel Pressure	=	72.0 psf/ft
	=	0.0 psf/ft
Passive Pressure	=	250.0 psf/ft
Soil Density	=	110 pcf
Footing||Soil Frictior	=	0.35 psf
Soil height to ignore for passive pressure	=	12 in



Surcharge Loads

Surcharge Over Heel	=	psf
>>>Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	542.0 lbs
Axial Live Load	=	280.0 lbs
Axial Load Eccentricity	=	in

Earth Pressure Seismic Load

Uniform Lateral Load Applied to Stem

Lateral Load	=	#/ft
...Height to Top	=	ft
...Height to Bottom	=	ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem	=	0.00 psf (Strength Level)

Wind acts left-to-right toward retention side.

Adjacent Footing Load

Adjacent Footing Load	=	lbs
Footing Width	=	ft
Eccentricity	=	in
Wall to Ftg CL Dist	=	ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	ft
Poisson's Ratio	=	0.3

K_h Soil Density Multiplier = 0.2 g Added seismic per unit area = 0.0 psf

Design Summary

Total Bearing Load	=	4,241.71 lbs	
...resultant ecc.	=	-1.426 in	
Soil Pressure @ Toe	=	1,077.76 psf	OK
Soil Pressure @ Heel	=	1,750.05 psf	OK
Allowable	=	psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,321.77 psf	
ACI Factored @ Heel	=	2,146.26 psf	
Footing Shear @ Toe	=	4.850 psi	OK
Footing Shear @ Heel	=	3.042 psi	OK
Allowable	=	82.158 psi	
Reaction at Top	=	1,322.94 lbs	
Reaction at Bottom	=	3,504.85 lbs	

Sliding Calcs
Lateral Sliding Force = 3,504.85 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Masonry Stem Construction

Thickness = 12.00 in
Wall Weight = 124.0 psf
Stem is FREE to rotate at top of footing

		@ Top Support	Mmax Between Top & Base	@ Base of Wall
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	=	9.75 ft	4.229 ft	0.00 ft
Rebar Size	=	# 5	# 6	# 5
Rebar Spacing	=	16.00 in	16.00 in	16.00 in
Rebar Placed at	=	Center	Edge	Center
Rebar Depth 'd'	=	5.750 in	9.0 in	5.750 in
Design Data				
fb/FB + fa/Fa	=	0.001	0.880	
Moment....Actual	=	1.50 ft-#	4,698.75 ft-#	0.0 ft-#
Moment.....Allowable	=	2,393.08 ft-#	5,340.89 ft-#	2,393.08 ft-#
Shear Force @ this height	=	1,316.40 lbs		2,456.85 lbs
Shear.....Actual	=	9.437 psi		17.612 psi
Shear.....Allowable	=	76.743 psi		77.710 psi

Restrained Retaining Wall

Project File: alta mira retaining walls (1).EC6

DESCRIPTION: Basement Wall L=10'-3"

Footing Strengths & Dimensions

Toe Width	=	0.670 ft
Heel Width	=	2.330
Total Footing Width	=	3.0
Footing Thickness	=	16.0 in
Key Width	=	in
Key Depth	=	in
Key Distance from Toe	=	ft

f'c = 3,000.0 psi Fy = 60000 psi
Footing Concrete Density = 150 pcf
Min. As % = 0.0018
Cover @ Top = 2 in @ Btm.= 3 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,321.77	2,146.26	psf
Mu' : Upward	=	595.04		ft-#
Mu' : Downward	=	138.810		ft-#
Mu: Design	=	456	-359	ft-#
Actual 1-Way Shear	=	4.850		psi
Allow 1-Way Shear	=	82.158	82.158	psi

Other Acceptable Sizes & Spacings:

Toe: # 5 @ 16.00 in	-or-	#4@ 6.94 in, #5@ 10.76 in, #6@ 15.27 in, #7@ 20.8
Heel: # 5 @ 16.00 in	-or-	#4@ 6.94 in, #5@ 10.76 in, #6@ 15.27 in, #7@ 20.8
Key: # 0 @ 0.00 in	-or-	No key defined

Min footing T&S reinf Area 1.04 in2
Min footing T&S reinf Area per foot 0.35 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 6.94 in	#4@ 13.89 in
#5@ 10.76 in	#5@ 21.53 in
#6@ 15.28 in	#6@ 30.56 in

Summary of Forces on Footing : Slab RESISTS sliding, stem is PINNED at footing

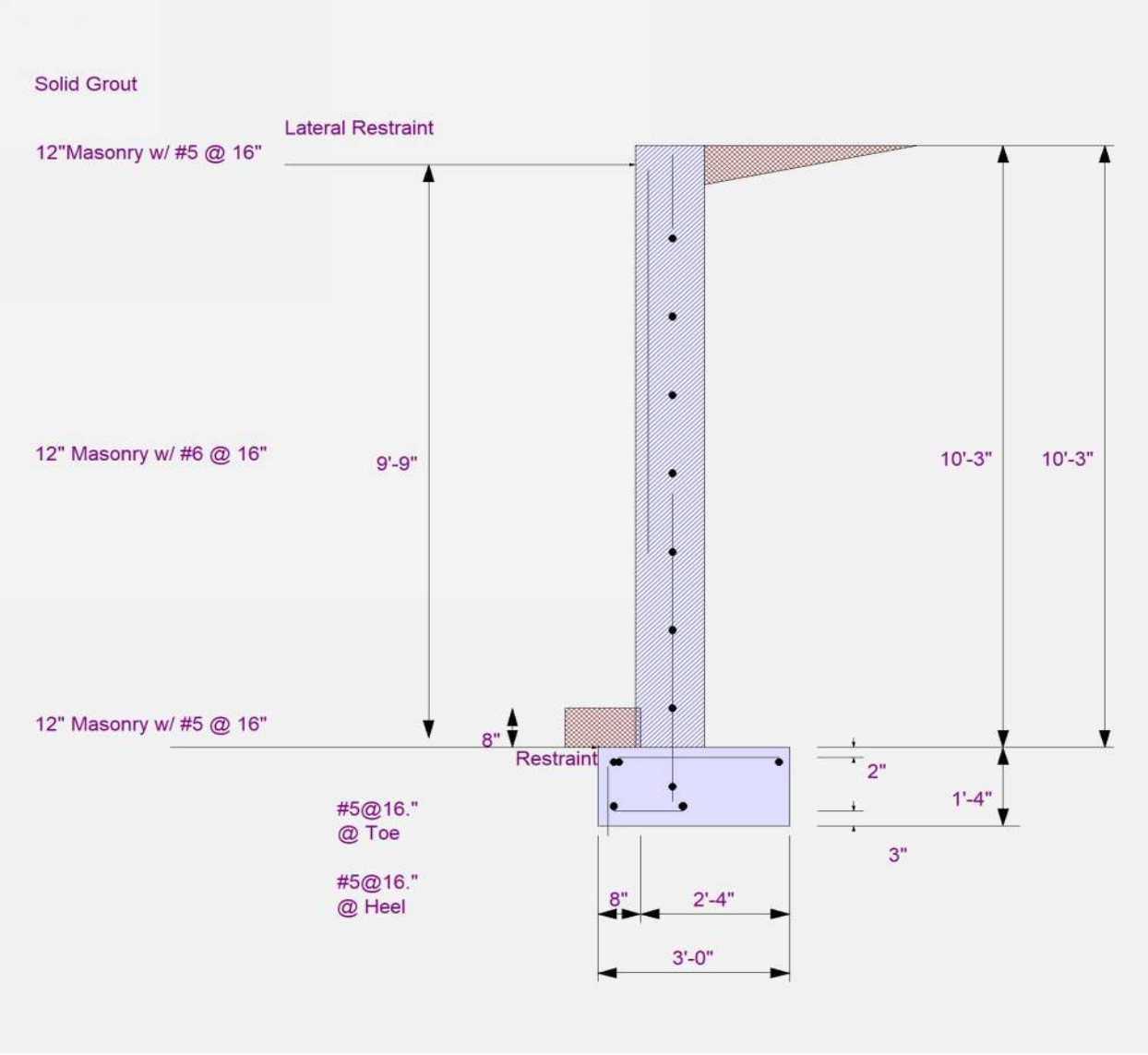
Forces acting on footing soil pressure

(taking moments about front of footing to find eccentricity)

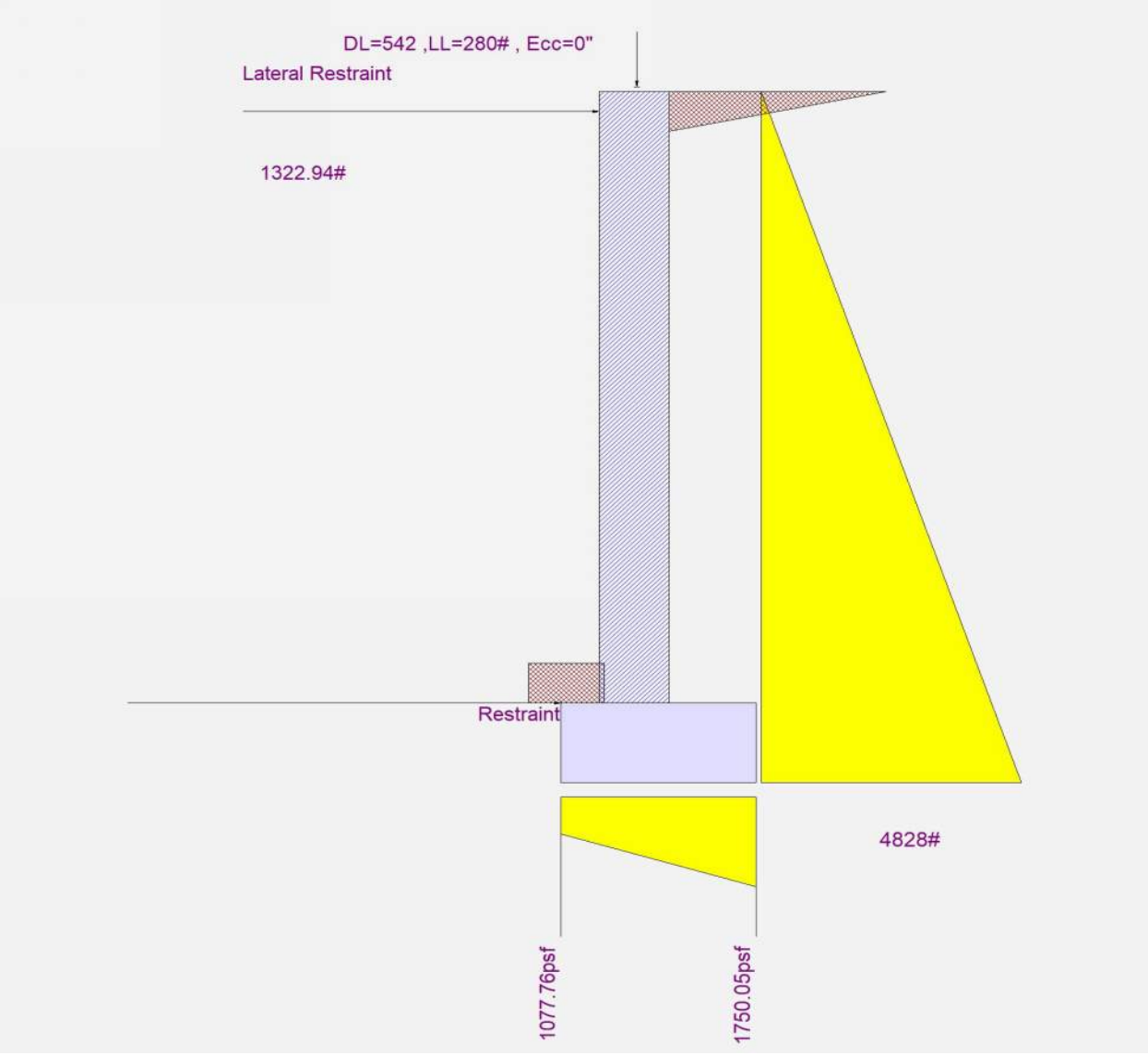
Surcharge Over Heel	=	0.0 lbs	0.0 ft	0.0 ft-#
Axial Dead Load on Stem	=	822.0 lbs	1.170 ft	961.74 ft-#
Soil Over Toe	=	49.133 lbs	0.3350 ft	16.460 ft-#
Adjacent Footing Load	=	0.0 lbs	0.0 ft	0.0 ft-#
Surcharge Over Toe	=	0.0 lbs	0.0 ft	0.0 ft-#
Stem Weight	=	1,271.0 lbs	1.170 ft	1,487.07 ft-#
Soil Over Heel	=	1,499.58 lbs	2.335 ft	3,501.51 ft-#
Footing Weight	=	600.0 lbs	1.50 ft	900.0 ft-#
Total Vertical Force	=	4,241.71 lbs	Moment =	6,866.78 ft-#

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

DESCRIPTION: Basement Wall L=10'-3"



DESCRIPTION: Basement Wall L=10'-3"



Date

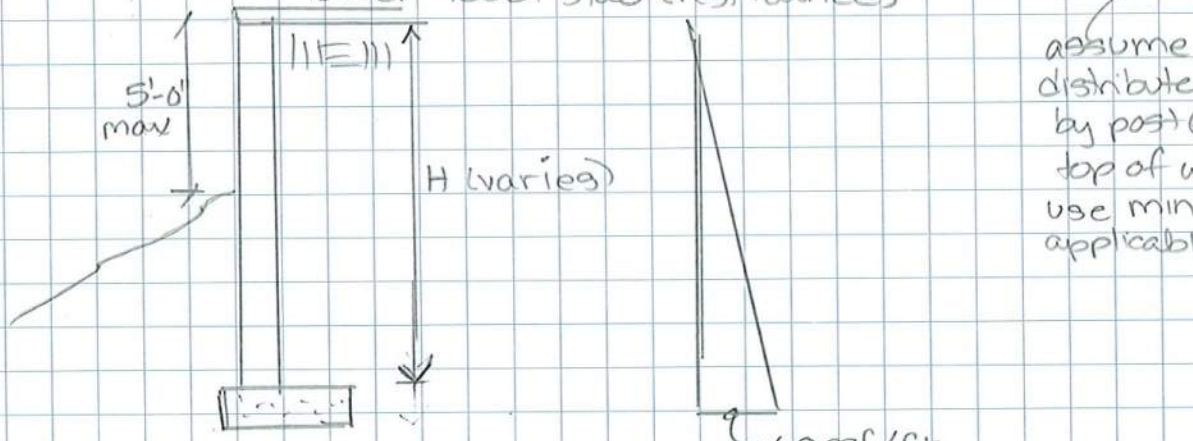
Project Alta Mira

Contact PD

Phone

Retaining Wall @ grid 4 (stepped wall)

DL = 33psf (20'/2) + 53psf (8'/2) = 542 plf
LL = 20psf (20'/2 + 8'/2) = 280plf
lower level slab (restrained)



assume distributed by post @ top of wall use min load applicable

H	wall	footing	notes
10'	10" CMU w/ #5@8 (V) TF	3'-6" ftg w/ #5@16"oc	show in table with all values as noted
8'	8" CMU w/ #5@8 (V) TF	4'-0" ftg w/ #5@16"oc	
6'	8" CMU w/ #8@16" (V) TF	3'-0" ftg w/ #5@16"oc	
4'	8" CMU w/ #8@16" (V) TF	2'-0" ftg w/ #5@16"oc	
2'	8" CMU w/ #8@16" (V) TF	2'-0" ftg w/ #5@16"oc	

LOWER LEVEL STEM WALL
SEE SCHEDULE 4/S6.0

Restrained Retaining Wall

Project File: alta mira retaining walls (1).EC6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: Stepped Retaining Wall at grid 4, max height 10'-0"

Code Reference

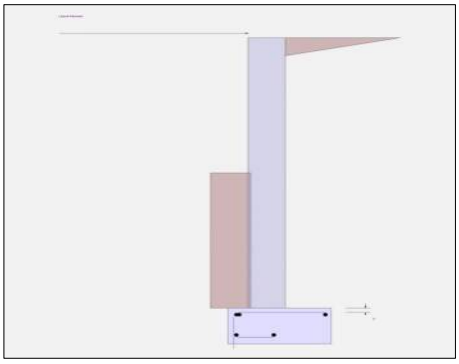
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	10.0 ft
Wall height above soil	=	ft
Total Wall Height	=	10.0 ft
Top Support Height	=	10.0 ft
Slope Behind Wall	=	0
Height of Soil over Toe	=	60.0 in

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
At-Rest Heel Pressure	=	72.0 psf/ft
	=	0.0 psf/ft
Passive Pressure	=	200.0 psf/ft
Soil Density	=	110 pcf
Footing||Soil Frictior	=	0.35 psf
Soil height to ignore for passive pressure	=	12 in



Surcharge Loads

Surcharge Over Heel	=	psf
>>>Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	542.0 lbs
Axial Live Load	=	280.0 lbs
Axial Load Eccentricity	=	in

Earth Pressure Seismic Load

Uniform Lateral Load Applied to Stem

Lateral Load	=	#/ft
...Height to Top	=	ft
...Height to Bottom	=	ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem	=	0.00 psf (Strength Level)

Wind acts left-to-right toward retention side.

Adjacent Footing Load

Adjacent Footing Load	=	lbs
Footing Width	=	ft
Eccentricity	=	in
Wall to Ftg CL Dist	=	ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	ft
Poisson's Ratio	=	0.3

K_h Soil Density Multiplier = 0.2 g Added seismic per unit area = 0.0 psf

Design Summary

Total Bearing Load	=	4,493.50 lbs	
...resultant ecc.	=	10.032 in	
Soil Pressure @ Toe	=	4,511.60 psf	NG
Soil Pressure @ Heel	=	0.0 psf	OK
Allowable	=	psf	
Soil Pressure Exceeds Allowable!			
ACI Factored @ Toe	=	5,526.37 psf	
ACI Factored @ Heel	=	0.0 psf	
Footing Shear @ Toe	=	16.513 psi	OK
Footing Shear @ Heel	=	-11.920 psi	OK
Allowable	=	82.158 psi	
Reaction at Top	=	1,198.94 lbs	
Reaction at Bottom	=	3,424.0 lbs	

Sliding Calcs
Lateral Sliding Force = 3,424.0 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Masonry Stem Construction

Thickness = 12.00 in
Wall Weight = 124.0 psf
Stem is FREE to rotate at top of footing

		@ Top Support	Mmax Between Top & Base	@ Base of Wall
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	=	10.0 ft	4.257 ft	0.00 ft
Rebar Size	=	# 5	# 6	# 5
Rebar Spacing	=	16.00 in	16.00 in	16.00 in
Rebar Placed at	=	Edge	Edge	Edge
Rebar Depth 'd'	=	9.0 in	9.0 in	9.0 in
Design Data				
fb/FB + fa/Fa	=		0.865	
Moment....Actual	=	0.0 ft-#	4,618.82 ft-#	0.0 ft-#
Moment.....Allowable	=	3,820.39 ft-#	5,340.89 ft-#	3,820.39 ft-#
Shear Force @ this height	=	1,200.0 lbs		2,400.0 lbs
Shear.....Actual	=	8.602 psi		17.204 psi
Shear.....Allowable	=	77.710 psi		77.710 psi

Restrained Retaining Wall

Project File: alta mira retaining walls (1).EC6

DESCRIPTION: Stepped Retaining Wall at grid 4, max height 10'-0"

Footing Strengths & Dimensions

Toe Width	=	0.670 ft
Heel Width	=	2.330
Total Footing Width	=	3.0
Footing Thickness	=	16.0 in
Key Width	=	in
Key Depth	=	in
Key Distance from Toe	=	ft

f'c = 3,000.0 psi Fy = 60000 psi
Footing Concrete Density = 150 pcf
Min. As % = 0.0018
Cover @ Top = 2 in @ Btm.= 3 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	5,526.37	0.0	psf
Mu' : Upward	=	1,978.71		ft-#
Mu' : Downward	=	380.880		ft-#
Mu: Design	=	1,598	1,861	ft-#
Actual 1-Way Shear	=	16.513		psi
Allow 1-Way Shear	=	82.158	82.158	psi

Other Acceptable Sizes & Spacings:

Toe: # 5 @ 18.00 in -or- phiMn = phi * 5 * lambda * sqrt(fc) * Sm
Heel: # 5 @ 16.00 in -or- #4@ 6.94 in, #5@ 10.76 in, #6@ 15.27 in, #7@ 20.8
Key: # 0 @ 0.00 in -or- No key defined

Min footing T&S reinf Area 1.04 in2
Min footing T&S reinf Area per foot 0.35 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 6.94 in	#4@ 13.89 in
#5@ 10.76 in	#5@ 21.53 in
#6@ 15.28 in	#6@ 30.56 in

Summary of Forces on Footing : Slab is NOT resisting sliding, stem is PINNED at footing

Forces acting on footing for overturning, sliding, & soil pressure

Overturning Moments...		Lateral lbs	Distance ft	Moment ft-#
Stem Shear @ Top of Footing	=	2,400.0	1.333	-3,200.0
Heel Active Pressure	=	1,024.0	0.6528	-668.44
Sliding Force	**=**	**3,424.0**		
		Overturning Moment =		-3,868.44

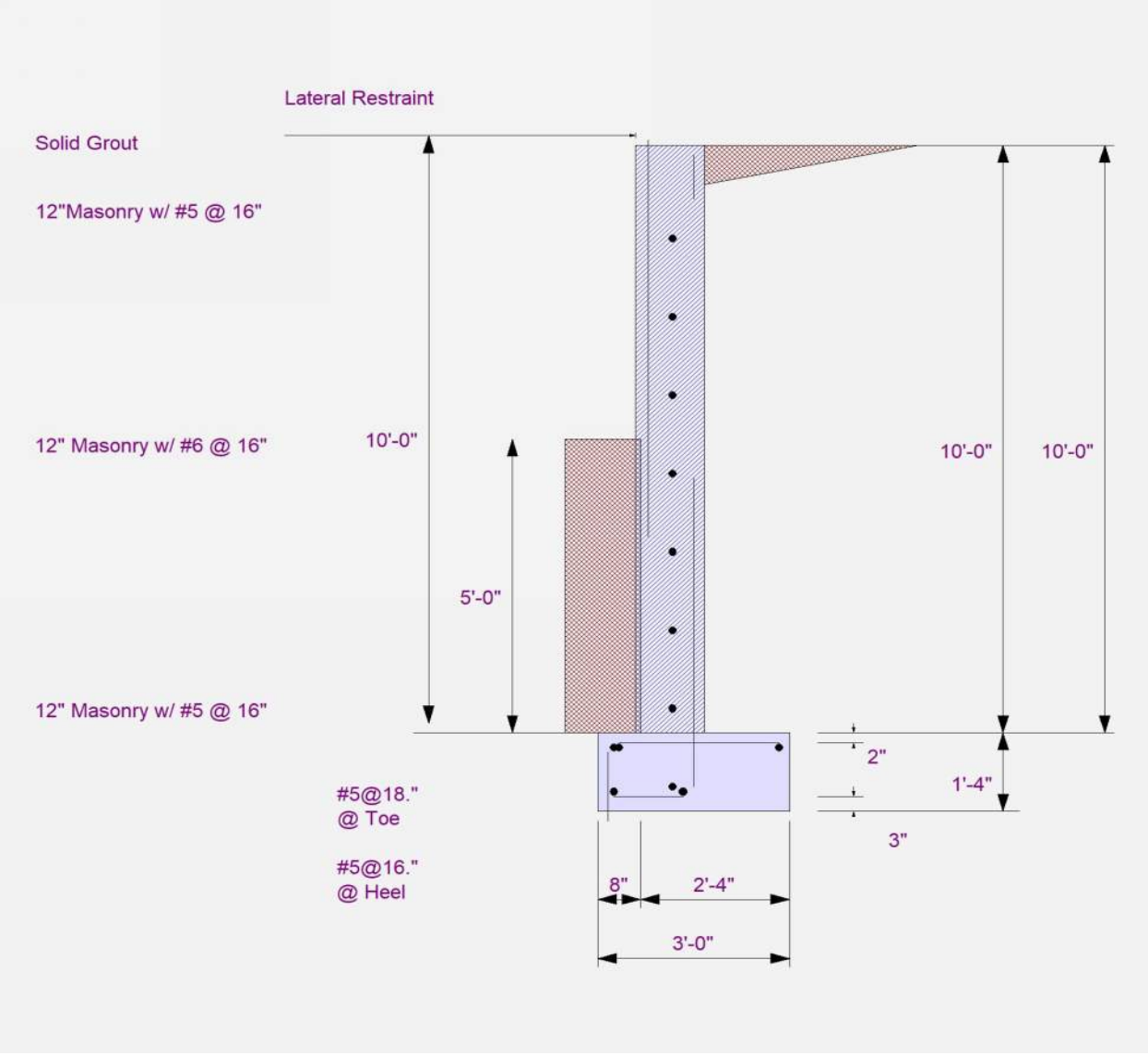
Footing Overturning Stability Ratio **1.771**

Net Moment Used For Soil Pressure Calculations **3,756.60 ft-#**

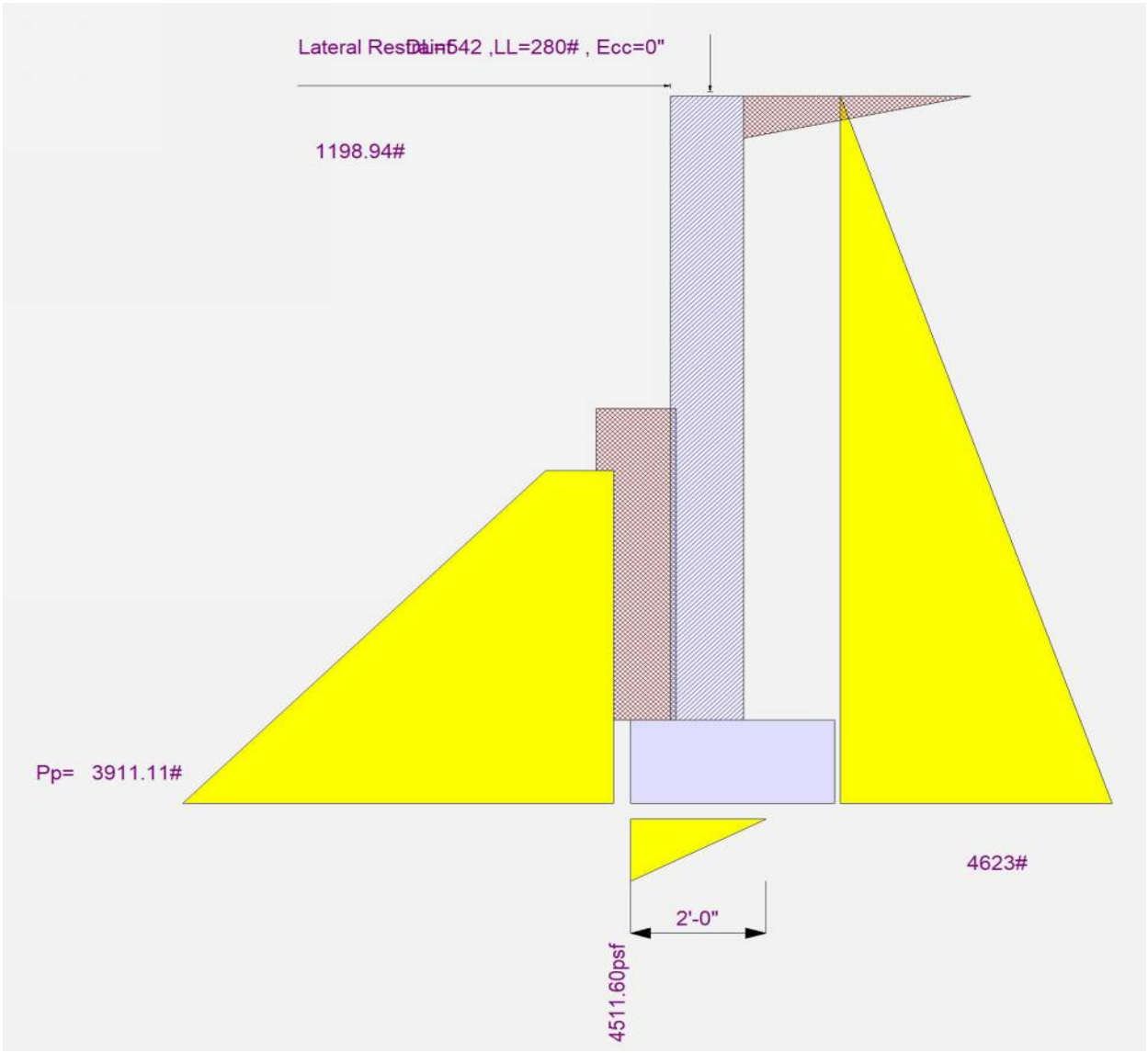
Resisting Moments...		Vertical lbs	Lateral lbs	Distance ft	Moment ft-#
Surcharge Over Heel	=	0.0		0.0	0.0
Adjacent Footing Load	=	0.0		0.0	0.0
Axial Dead Load on Stem	=	822.0		1.170	961.74
Soil Over Toe	=	368.50		0.3350	123.448
Stem Weight	=	1,240.0		0.0	0.0
Surcharge Over Toe	=	0.0		1.170	1,450.80
Soil Over Heel	=	1,463.0		2.335	3,416.11
Footing Weight	=	600.0		1.50	900.0
Total Vertical Force	=	4,493.50 lbs			
			Resisting Moment =		6,852.09

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

DESCRIPTION: Stepped Retaining Wall at grid 4, max height 10'-0"



DESCRIPTION: Stepped Retaining Wall at grid 4, max height 10'-0"



LOWER LEVEL STEM WALL
SEE SCHEDULE 4/S6.0

Restrained Retaining Wall

Project File: alta mira retaining walls (1).EC6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: Stepped Retaining Wall at grid 4, max height 8'-0"

Code Reference

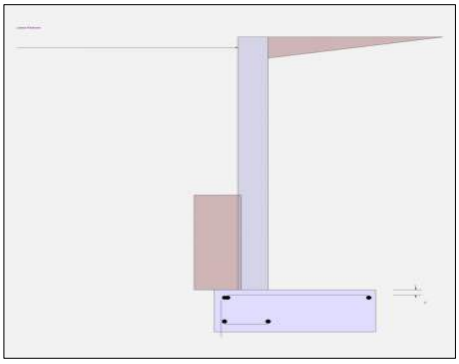
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	8.0 ft
Wall height above soil	=	ft
Total Wall Height	=	8.0 ft
Top Support Height	=	7.50 ft
Slope Behind Wall	=	0
Height of Soil over Toe	=	36.0 in

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
At-Rest Heel Pressure	=	72.0 psf/ft
	=	0.0 psf/ft
Passive Pressure	=	200.0 psf/ft
Soil Density	=	110 pcf
Footing||Soil Frictior	=	0.35 psf
Soil height to ignore for passive pressure	=	12 in



Surcharge Loads

Surcharge Over Heel	=	psf
>>>Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	542.0 lbs
Axial Live Load	=	280.0 lbs
Axial Load Eccentricity	=	in

Earth Pressure Seismic Load

Uniform Lateral Load Applied to Stem

Lateral Load	=	#/ft
...Height to Top	=	ft
...Height to Bottom	=	ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem	=	0.00 psf (Strength Level)

Wind acts left-to-right toward retention side.

Adjacent Footing Load

Adjacent Footing Load	=	lbs
Footing Width	=	ft
Eccentricity	=	in
Wall to Ftg CL Dist	=	ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	ft
Poisson's Ratio	=	0.3

K_h Soil Density Multiplier = 0.2 g Added seismic per unit area = 0.0 psf

Design Summary

Total Bearing Load	=	4,810.83 lbs	
...resultant ecc.	=	6.892 in	
Soil Pressure @ Toe	=	2,238.87 psf	OK
Soil Pressure @ Heel	=	166.548 psf	OK
Allowable	=	psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	2,738.77 psf	
ACI Factored @ Heel	=	203.735 psf	
Footing Shear @ Toe	=	8.444 psi	OK
Footing Shear @ Heel	=	-4.082 psi	OK
Allowable	=	82.158 psi	
Reaction at Top	=	817.08 lbs	
Reaction at Bottom	=	2,316.80 lbs	

Sliding Calcs
Lateral Sliding Force = 2,316.80 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Masonry Stem Construction

Thickness = 8.00 in
Wall Weight = 78.0 psf
Stem is FREE to rotate at top of footing

		@ Top Support	Mmax Between Top & Base	@ Base of Wall
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	=	7.50 ft	3.253 ft	0.00 ft
Rebar Size	=	# 5	# 6	# 5
Rebar Spacing	=	16.00 in	16.00 in	16.00 in
Rebar Placed at	=	Edge	Edge	Edge
Rebar Depth 'd'	=	5.250 in	5.250 in	5.250 in
Design Data				
fb/FB + fa/Fa	=	0.001	0.724	
Moment....Actual	=	1.50 ft-#	2,195.62 ft-#	0.0 ft-#
Moment.....Allowable	=	2,175.38 ft-#	3,031.84 ft-#	2,175.38 ft-#
Shear Force @ this height	=	810.20 lbs		1,484.80 lbs
Shear.....Actual	=	8.855 psi		16.227 psi
Shear.....Allowable	=	75.989 psi		77.710 psi

Restrained Retaining Wall

Project File: alta mira retaining walls (1).EC6

DESCRIPTION: Stepped Retaining Wall at grid 4, max height 8'-0"

Footing Strengths & Dimensions

Toe Width	=	0.670 ft
Heel Width	=	3.330
Total Footing Width	=	4.0
Footing Thickness	=	16.0 in
Key Width	=	in
Key Depth	=	in
Key Distance from Toe	=	ft

f'c = 3,000.0 psi Fy = 60000 psi
Footing Concrete Density = 150 pcf
Min. As % = 0.0018
Cover @ Top = 2 in @ Btm.= 3 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	2,738.77	203.735	psf
Mu' : Upward	=	896.72		ft-#
Mu' : Downward	=	222.604		ft-#
Mu: Design	=	674	1,980	ft-#
Actual 1-Way Shear	=	8.444		psi
Allow 1-Way Shear	=	82.158	82.158	psi

Other Acceptable Sizes & Spacings:

Toe: # 5 @ 16.00 in -or- #4@ 6.94 in, #5@ 10.76 in, #6@ 15.27 in, #7@ 20.8
Heel: # 5 @ 16.00 in -or- #4@ 6.94 in, #5@ 10.76 in, #6@ 15.27 in, #7@ 20.8
Key: # 0 @ 0.00 in -or- No key defined

Min footing T&S reinf Area 1.38 in2
Min footing T&S reinf Area per foot 0.35 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 6.94 in	#4@ 13.89 in
#5@ 10.76 in	#5@ 21.53 in
#6@ 15.28 in	#6@ 30.56 in

Summary of Forces on Footing : Slab is NOT resisting sliding, stem is PINNED at footing

Forces acting on footing for overturning, sliding, & soil pressure

Overturning Moments...		Lateral lbs	Distance ft	Moment ft-#
Stem Shear @ Top of Footing	=	1,484.80	1.333	-1,979.73
Heel Active Pressure	=	832.0	0.6496	-540.44
Sliding Force	**=**	**2,316.80**		
		Overturning Moment	=	-2,520.18

Footing Overturning Stability Ratio **3.721**

Net Moment Used For Soil Pressure Calculations **2,763.09 ft-#**

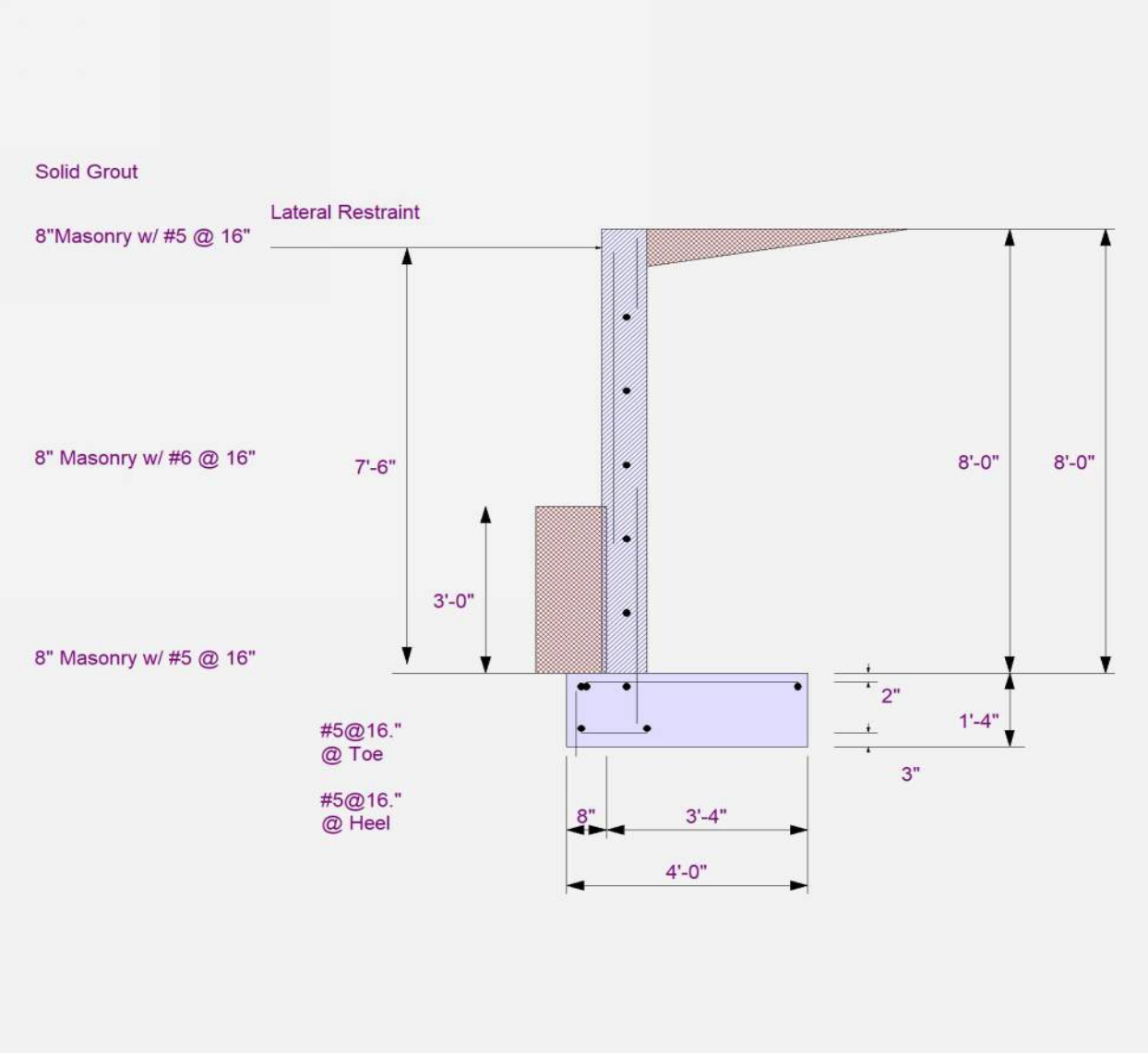
Resisting Moments...		Vertical lbs	Lateral lbs	Distance ft	Moment ft-#
Surcharge Over Heel	=	0.0		0.0	0.0
Adjacent Footing Load	=	0.0		0.0	0.0
Axial Dead Load on Stem	=	822.0		1.003	824.74
Soil Over Toe	=	221.10		0.3350	74.069
Stem Weight	=	624.0		0.0	0.0
Surcharge Over Toe	=	0.0		1.003	626.08
Soil Over Heel	=	2,343.73		2.668	6,253.86
Footing Weight	=	800.0		2.0	1,600.0
Total Vertical Force	=	4,810.83 lbs			
			Resisting Moment	=	9,378.75

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

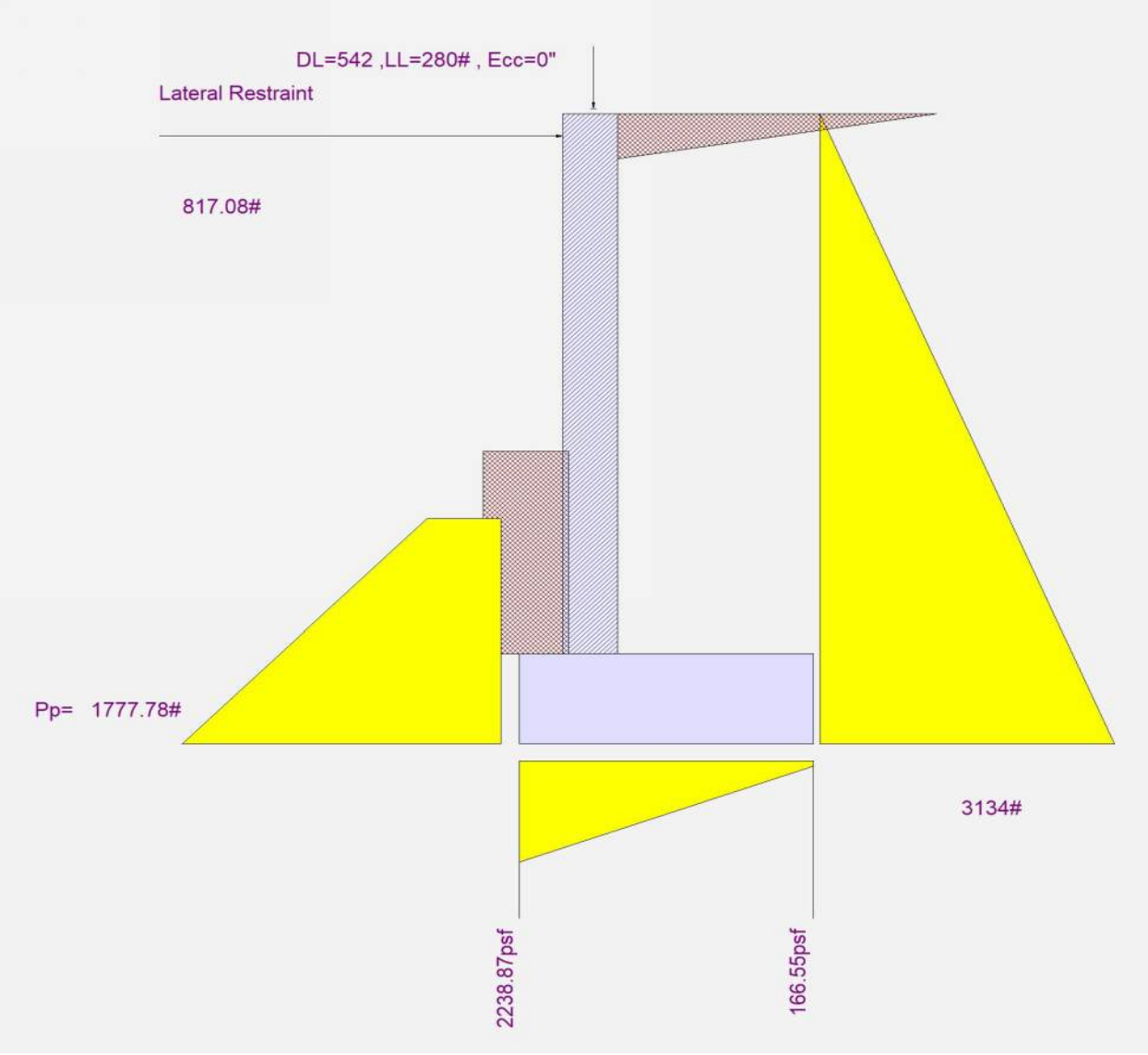
DESCRIPTION: Stepped Retaining Wall at grid 4, max height 8'-0"

Rebar Lap & Embedment Lengths Information

DESCRIPTION: Stepped Retaining Wall at grid 4, max height 8'-0"



DESCRIPTION: Stepped Retaining Wall at grid 4, max height 8'-0"



LOWER LEVEL STEM WALL
SEE SCHEDULE 4/S6.0

Restrained Retaining Wall

Project File: alta mira retaining walls (1).EC6

DESCRIPTION: Stepped Retaining Wall at grid 4, max height 6'-0"

Code Reference

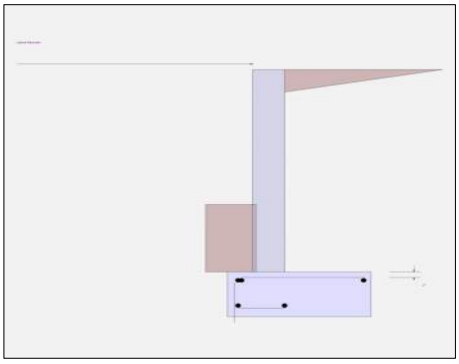
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	6.0 ft
Wall height above soil	=	ft
Total Wall Height	=	6.0 ft
Top Support Height	=	6 ft
Slope Behind Wall	=	0
Height of Soil over Toe	=	24.0 in

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
At-Rest Heel Pressure	=	72.0 psf/ft
	=	0.0 psf/ft
Passive Pressure	=	200.0 psf/ft
Soil Density	=	110 pcf
Footing||Soil Frictior	=	0.35 psf
Soil height to ignore for passive pressure	=	12 in



Surcharge Loads

Surcharge Over Heel	=	psf
>>>Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	542.0 lbs
Axial Live Load	=	280.0 lbs
Axial Load Eccentricity	=	in

Earth Pressure Seismic Load

Uniform Lateral Load Applied to Stem

Lateral Load	=	#/ft
...Height to Top	=	ft
...Height to Bottom	=	ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem	=	0.00 psf (Strength Level)

Wind acts left-to-right toward retention side.

Adjacent Footing Load

Adjacent Footing Load	=	lbs
Footing Width	=	ft
Eccentricity	=	in
Wall to Ftg CL Dist	=	ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	ft
Poisson's Ratio	=	0.3

K_h Soil Density Multiplier = 0.2 g Added seismic per unit area = 0.0 psf

Design Summary

Total Bearing Load	=	3,427.60 lbs	
...resultant ecc.	=	6.083 in	
Soil Pressure @ Toe	=	1,960.76 psf	OK
Soil Pressure @ Heel	=	91.691 psf	OK
Allowable	=	psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	2,416.99 psf	
ACI Factored @ Heel	=	113.025 psf	
Footing Shear @ Toe	=	7.512 psi	OK
Footing Shear @ Heel	=	-2.820 psi	OK
Allowable	=	82.158 psi	
Reaction at Top	=	430.979 lbs	
Reaction at Bottom	=	1,504.0 lbs	

Sliding Calcs

Lateral Sliding Force	=	1,504.0 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Masonry Stem Construction

Thickness = 8.00 in
Wall Weight = 78.0 psf
Stem is FREE to rotate at top of footing

		@ Top Support	Mmax Between Top & Base	@ Base of Wall
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	=	6 ft	2.554 ft	0.00 ft
Rebar Size	=	# 5	# 5	# 5
Rebar Spacing	=	16.00 in	16.00 in	16.00 in
Rebar Placed at	=	Edge	Edge	Edge
Rebar Depth 'd'	=	5.250 in	5.250 in	5.250 in
Design Data				
fb/FB + fa/Fa	=		0.459	
Moment....Actual	=	0.0 ft-#	997.67 ft-#	0.0 ft-#
Moment.....Allowable	=	2,175.38 ft-#	2,175.38 ft-#	2,175.38 ft-#
Shear Force @ this height	=	432.0 lbs		864.0 lbs
Shear.....Actual	=	4.721 psi		9.443 psi
Shear.....Allowable	=	77.710 psi		77.710 psi

Restrained Retaining Wall

Project File: alta mira retaining walls (1).EC6

DESCRIPTION: Stepped Retaining Wall at grid 4, max height 6'-0"

Footing Strengths & Dimensions

Toe Width	=	0.670 ft
Heel Width	=	2.670
Total Footing Width	=	3.340
Footing Thickness	=	16.0 in
Key Width	=	in
Key Depth	=	in
Key Distance from Toe	=	ft

f'c = 3,000.0 psi Fy = 60000 psi
Footing Concrete Density = 150 pcf
Min. As % = 0.0018
Cover @ Top = 2 in @ Btm.= 3 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	2,416.99	113.025	psf
Mu' : Upward	=	778.62		ft-#
Mu' : Downward	=	176.403		ft-#
Mu: Design	=	602	989	ft-#
Actual 1-Way Shear	=	7.512		psi
Allow 1-Way Shear	=	82.158	82.158	psi

Other Acceptable Sizes & Spacings:

Toe: # 5 @ 16.00 in -or- #4@ 6.94 in, #5@ 10.76 in, #6@ 15.27 in, #7@ 20.8
Heel: # 5 @ 16.00 in -or- #4@ 6.94 in, #5@ 10.76 in, #6@ 15.27 in, #7@ 20.8
Key: # 0 @ 0.00 in -or- No key defined

Min footing T&S reinf Area 1.15 in2
Min footing T&S reinf Area per foot 0.35 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 6.94 in	#4@ 13.89 in
#5@ 10.76 in	#5@ 21.53 in
#6@ 15.28 in	#6@ 30.56 in

Summary of Forces on Footing : Slab is NOT resisting sliding, stem is PINNED at footing

Forces acting on footing for overturning, sliding, & soil pressure

Overturning Moments...		Lateral lbs	Distance ft	Moment ft-#
Stem Shear @ Top of Footing	=	864.0	1.333	-1,152.0
Heel Active Pressure	=	640.0	0.6444	-412.444
Sliding Force	**=**	**1,504.0**		
		Overturning Moment =		-1,564.44

Footing Overturning Stability Ratio **3.548**

Net Moment Used For Soil Pressure Calculations **1,737.55 ft-#**

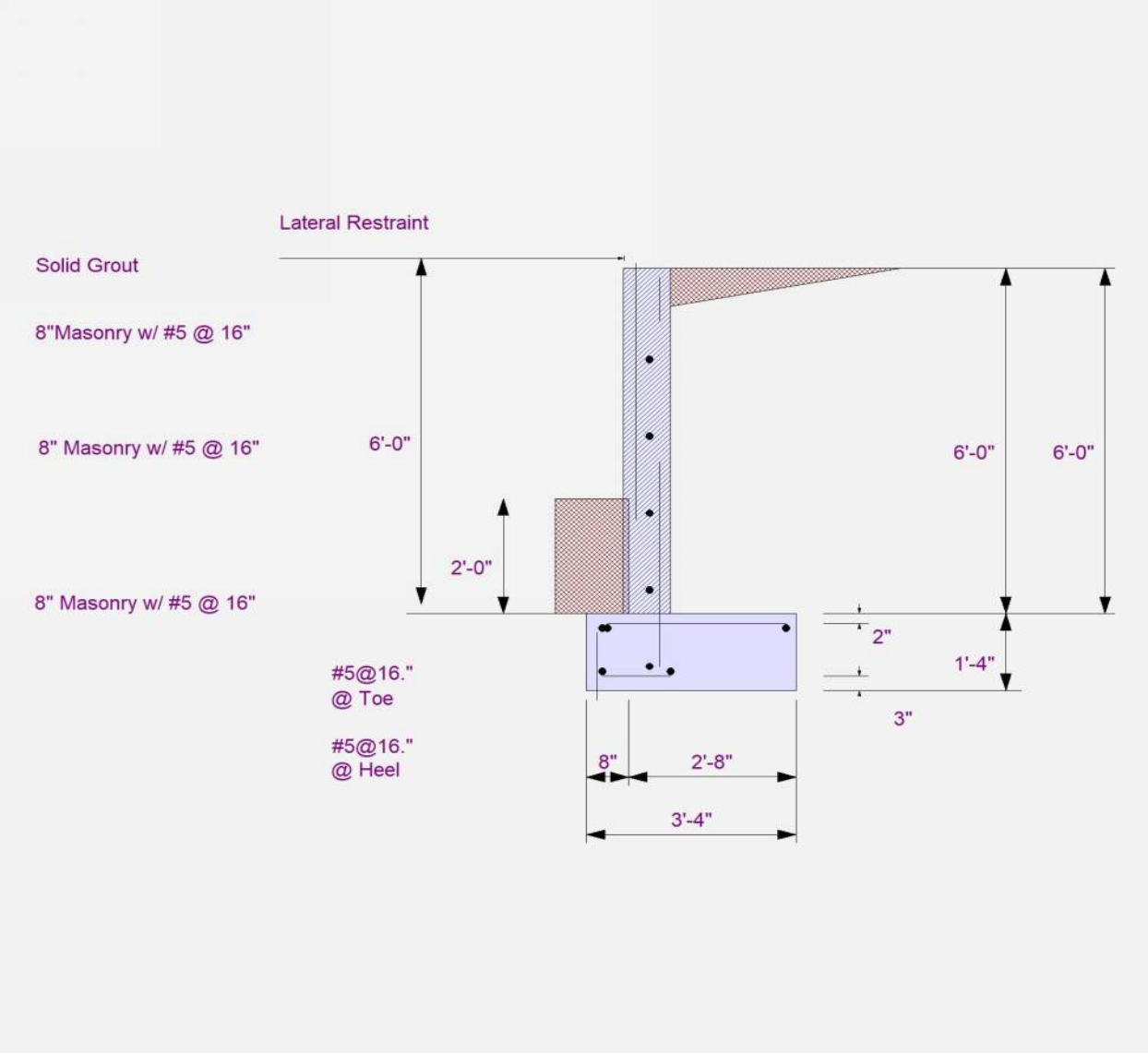
Resisting Moments...		Vertical lbs	Lateral lbs	Distance ft	Moment ft-#
Surcharge Over Heel	=	0.0		0.0	0.0
Adjacent Footing Load	=	0.0		0.0	0.0
Axial Dead Load on Stem	=	822.0		1.003	824.74
Soil Over Toe	=	147.40		0.3350	49.379
Stem Weight	=	468.0		0.0	0.0
Surcharge Over Toe	=	0.0		1.003	469.560
Soil Over Heel	=	1,322.20		2.338	3,091.74
Footing Weight	=	668.0		1.670	1,115.56
Total Vertical Force	=	3,427.60 lbs			
			Resisting Moment =		5,550.98

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

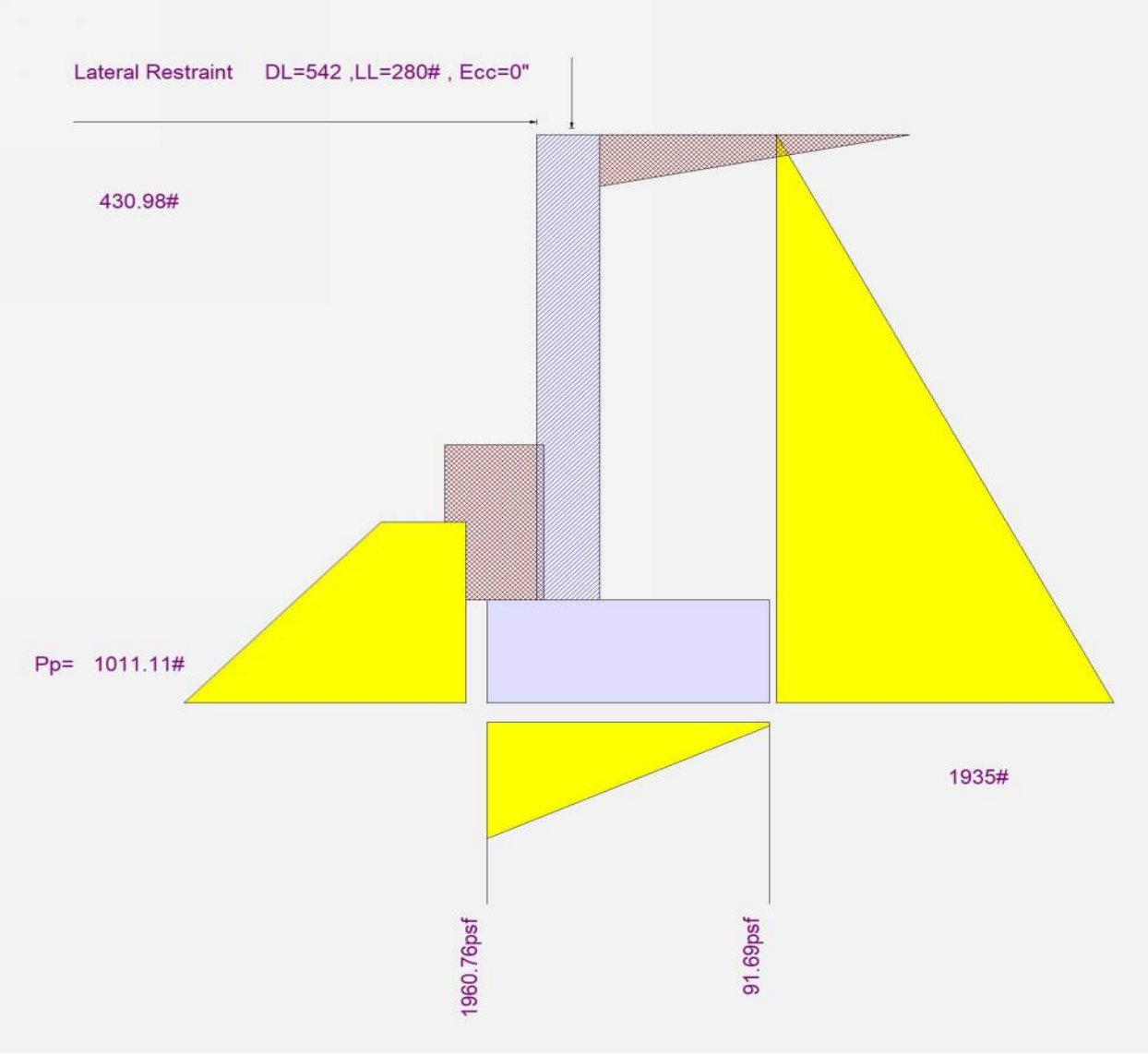
DESCRIPTION: Stepped Retaining Wall at grid 4, max height 6'-0"

Rebar Lap & Embedment Lengths Information

DESCRIPTION: Stepped Retaining Wall at grid 4, max height 6'-0"



DESCRIPTION: Stepped Retaining Wall at grid 4, max height 6'-0"



LOWER LEVEL STEM WALL
SEE SCHEDULE 4/S6.0

Restrained Retaining Wall

Project File: alta mira retaining walls (1).EC6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: Stepped Retaining Wall at grid 4, max height 4'-0"

Code Reference

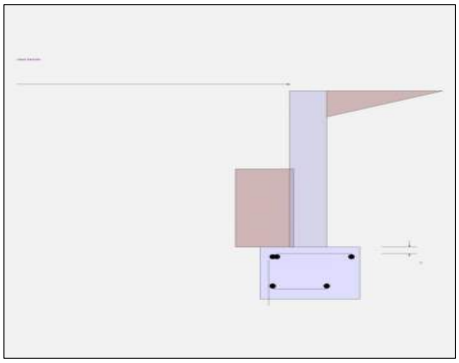
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	4.0 ft
Wall height above soil	=	ft
Total Wall Height	=	4.0 ft
Top Support Height	=	4 ft
Slope Behind Wall	=	0
Height of Soil over Toe	=	24.0 in

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
At-Rest Heel Pressure	=	72.0 psf/ft
	=	0.0 psf/ft
Passive Pressure	=	200.0 psf/ft
Soil Density	=	110 pcf
Footing||Soil Frictior	=	0.35 psf
Soil height to ignore for passive pressure	=	12 in



Surcharge Loads

Surcharge Over Heel	=	psf
>>>Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	lbs
Axial Live Load	=	lbs
Axial Load Eccentricity	=	in

Earth Pressure Seismic Load

Uniform Lateral Load Applied to Stem

Lateral Load	=	#/ft
...Height to Top	=	ft
...Height to Bottom	=	ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem	=	0.00 psf (Strength Level)

Wind acts left-to-right toward retention side.

Adjacent Footing Load

Adjacent Footing Load	=	lbs
Footing Width	=	ft
Eccentricity	=	in
Wall to Ftg CL Dist	=	ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	ft
Poisson's Ratio	=	0.3

K_h Soil Density Multiplier = 0.2 g Added seismic per unit area = 0.0 psf

Design Summary

Total Bearing Load	=	1,151.27 lbs	
...resultant ecc.	=	7.279 in	
Soil Pressure @ Toe	=	1,950.98 psf	OK
Soil Pressure @ Heel	=	0.0 psf	OK
Allowable	=	psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	2,341.18 psf	
ACI Factored @ Heel	=	0.0 psf	
Footing Shear @ Toe	=	5.238 psi	OK
Footing Shear @ Heel	=	-3.145 psi	OK
Allowable	=	82.158 psi	
Reaction at Top	=	190.991 lbs	
Reaction at Bottom	=	832.0 lbs	

Sliding Calcs
Lateral Sliding Force = 832.0 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Masonry Stem Construction

Thickness = 8.00 in
Wall Weight = 78.0 psf
Stem is FREE to rotate at top of footing

		@ Top Support	Mmax Between Top & Base	@ Base of Wall
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	=	4 ft	1.703 ft	0.00 ft
Rebar Size	=	# 5	# 5	# 5
Rebar Spacing	=	16.00 in	16.00 in	16.00 in
Rebar Placed at	=	Edge	Edge	Edge
Rebar Depth 'd'	=	5.250 in	5.250 in	5.250 in
Design Data				
fb/FB + fa/Fa	=		0.136	
Moment....Actual	=	0.0 ft-#	295.605 ft-#	0.0 ft-#
Moment.....Allowable	=	2,175.38 ft-#	2,175.38 ft-#	2,175.38 ft-#
Shear Force @ this height	=	192.0 lbs		384.0 lbs
Shear.....Actual	=	2.098 psi		4.197 psi
Shear.....Allowable	=	77.710 psi		77.710 psi

Restrained Retaining Wall

Project File: alta mira retaining walls (1).EC6

DESCRIPTION: Stepped Retaining Wall at grid 4, max height 4'-0"

Footing Strengths & Dimensions

Toe Width	=	0.670 ft
Heel Width	=	1.330
Total Footing Width	=	2.0
Footing Thickness	=	16.0 in
Key Width	=	in
Key Depth	=	in
Key Distance from Toe	=	ft

f'c = 3,000.0 psi Fy = 60000 psi
Footing Concrete Density = 150 pcf
Min. As % = 0.0018
Cover @ Top = 2 in @ Btm.= 3 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	2,341.18	0.0	psf
Mu' : Upward	=	625.79		ft-#
Mu' : Downward	=	176.403		ft-#
Mu: Design	=	449	265	ft-#
Actual 1-Way Shear	=	5.238		psi
Allow 1-Way Shear	=	82.158	82.158	psi

Other Acceptable Sizes & Spacings:

Toe: # 5 @ 16.00 in	-or-	#4@ 6.94 in, #5@ 10.76 in, #6@ 15.27 in, #7@ 20.8
Heel:# 5 @ 16.00 in	-or-	#4@ 6.94 in, #5@ 10.76 in, #6@ 15.27 in, #7@ 20.8
Key: # 0 @ 0.00 in	-or-	No key defined

Min footing T&S reinf Area 0.69 in2
Min footing T&S reinf Area per foot 0.35 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 6.94 in	#4@ 13.89 in
#5@ 10.76 in	#5@ 21.53 in
#6@ 15.28 in	#6@ 30.56 in

Summary of Forces on Footing : Slab is NOT resisting sliding, stem is PINNED at footing

Forces acting on footing for overturning, sliding, & soil pressure

Overturning Moments...		Lateral lbs	Distance ft	Moment ft-#
Stem Shear @ Top of Footing	=	384.0	1.333	-512.0
Heel Active Pressure	=	448.0	0.6349	-284.444
Sliding Force	**=**	**832.0**		
		Overturning Moment =		-796.44

Footing Overturning Stability Ratio **1.569**

Net Moment Used For Soil Pressure Calculations **698.36 ft-#**

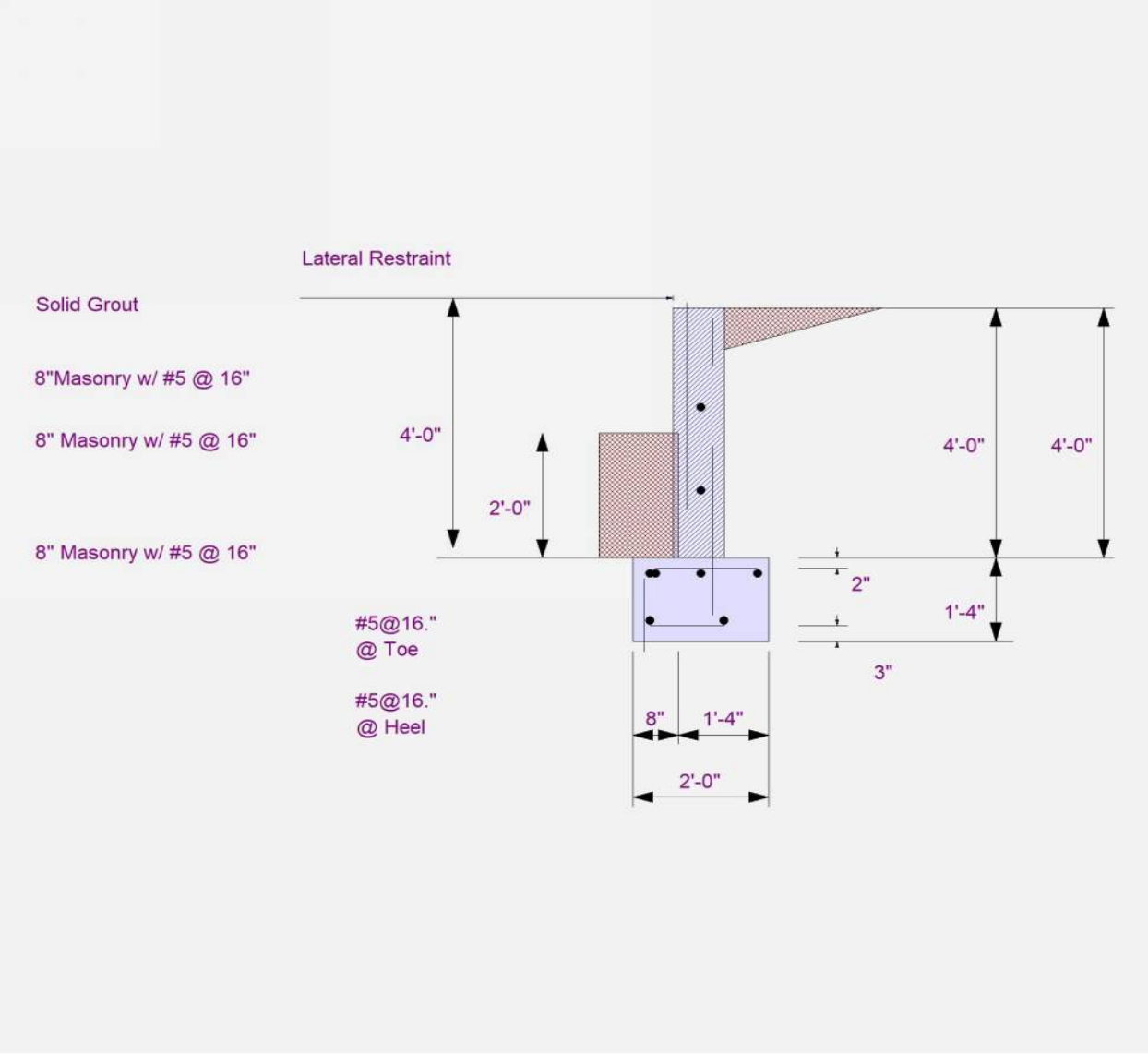
Resisting Moments...		Vertical lbs	Lateral lbs	Distance ft	Moment ft-#
Surcharge Over Heel	=	0.0		0.0	0.0
Adjacent Footing Load	=	0.0		0.0	0.0
Axial Dead Load on Stem	=	0.0		0.0	0.0
Soil Over Toe	=	147.40		0.3350	49.379
Stem Weight	=	312.0		0.0	0.0
Surcharge Over Toe	=	0.0		1.003	313.040
Soil Over Heel	=	291.867		1.668	486.931
Footing Weight	=	400.0		1.0	400.0
Total Vertical Force	=	1,151.27 lbs			
			Resisting Moment =		1,249.35

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

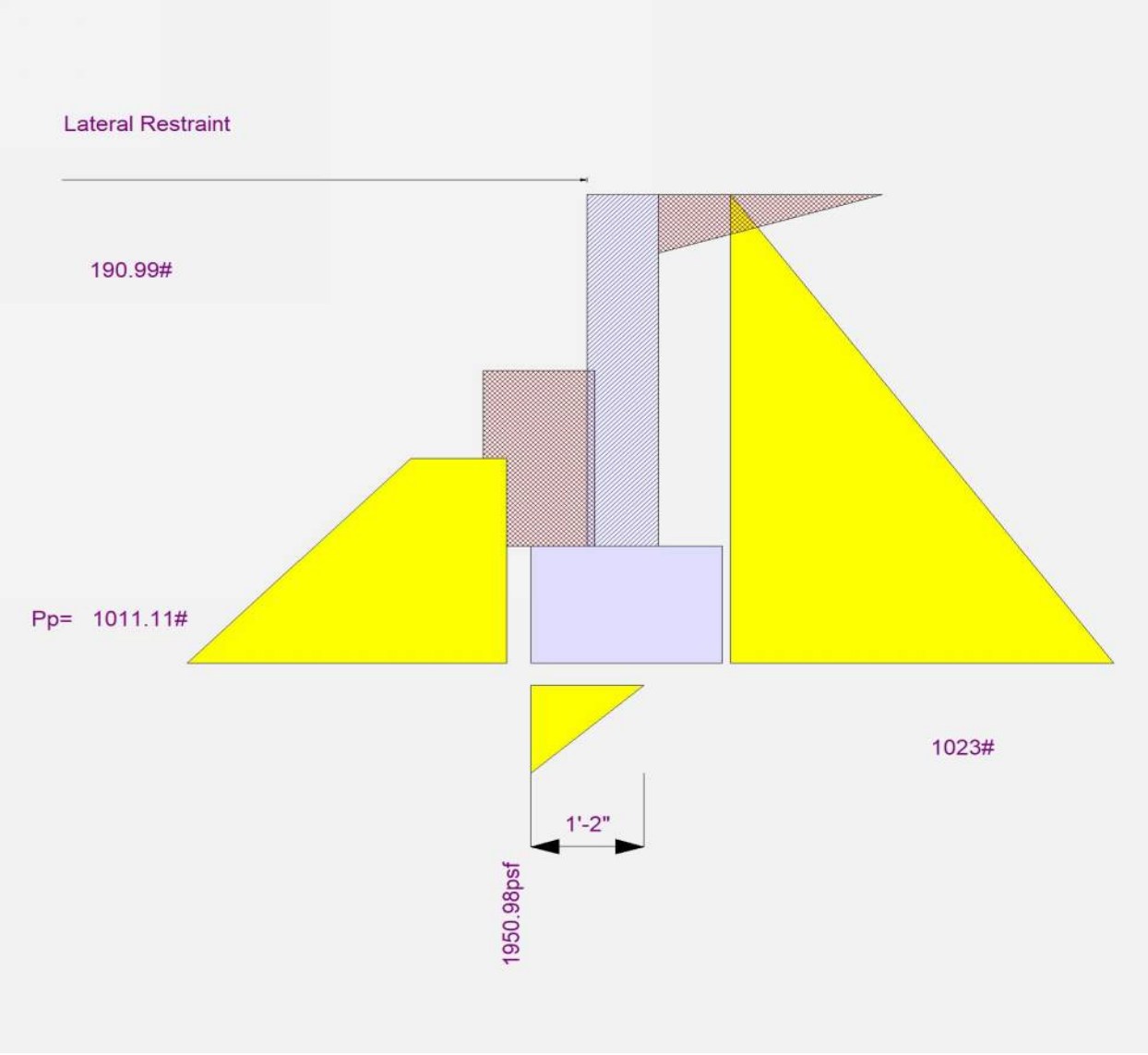
DESCRIPTION: Stepped Retaining Wall at grid 4, max height 4'-0"

Rebar Lap & Embedment Lengths Information

DESCRIPTION: Stepped Retaining Wall at grid 4, max height 4'-0"



DESCRIPTION: Stepped Retaining Wall at grid 4, max height 4'-0"



POOL TERRACE STEM WALL
SEE DETAIL 5/S6.0

Restrained Retaining Wall

Project File: alta mira retaining walls (1).EC6

DESCRIPTION: Stud Wall atop CMU Wall- CASE 1 @ GRID 6

Code Reference

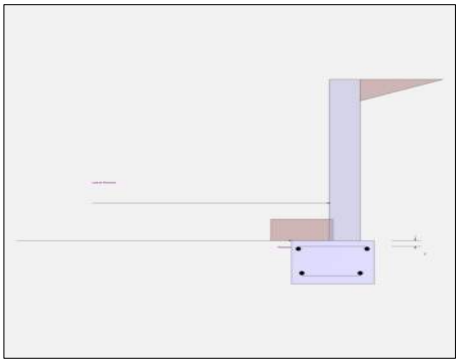
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	5.0 ft
Wall height above soil	=	ft
Total Wall Height	=	5.0 ft
Top Support Height	=	1.0 ft
Slope Behind Wall	=	0
Height of Soil over Toe	=	8.0 in

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
At-Rest Heel Pressure	=	40.0 psf/ft
	=	0.0 psf/ft
Passive Pressure	=	300.0 psf/ft
Soil Density	=	110 pcf
Footing||Soil Frictior	=	0.35 psf
Soil height to ignore for passive pressure	=	12 in



Surcharge Loads

Surcharge Over Heel	=	psf
>>>Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	451.0 lbs
Axial Live Load	=	170.0 lbs
Axial Load Eccentricity	=	-1.375 in

Earth Pressure Seismic Load

Uniform Lateral Load Applied to Stem

Lateral Load	=	#/ft
...Height to Top	=	ft
...Height to Bottom	=	ft
Load Type	=	Earth (H) (Service Level)
Wind on Exposed Stem	=	0.00 psf (Strength Level)

Wind acts left-to-right toward retention side.

Adjacent Footing Load

Adjacent Footing Load	=	lbs
Footing Width	=	ft
Eccentricity	=	in
Wall to Ftg CL Dist	=	ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	ft
Poisson's Ratio	=	0.3

K_h Soil Density Multiplier = 0.0580 g Added seismic per unit area = 28.285 psf

Design Summary

Total Bearing Load	=	1,667.67 lbs	
...resultant ecc.	=	-3.260 in	
Soil Pressure @ Toe	=	154.167 psf	OK
Soil Pressure @ Heel	=	1,513.50 psf	OK
Allowable	=	psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	191.286 psf	
ACI Factored @ Heel	=	1,877.91 psf	
Footing Shear @ Toe	=	1.90 psi	OK
Footing Shear @ Heel	=	1.723 psi	OK
Allowable	=	75.0 psi	
Reaction at Top	=	1,113.98 lbs	
Reaction at Bottom	=	776.53 lbs	

Sliding Calcs
Lateral Sliding Force = 776.53 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Masonry Stem Construction

Thickness = 8.00 in
Wall Weight = 78.0 psf
Stem is FREE to rotate at top of footing

		@ Top Support	Mmax Between Top & Base	@ Base of Wall
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	=	1.0 ft	1.0 ft	0.00 ft
Rebar Size	=	# 5	# 5	# 5
Rebar Spacing	=	16.00 in	16.00 in	24.00 in
Rebar Placed at	=	Center	Center	Center
Rebar Depth 'd'	=	3.750 in	3.750 in	3.750 in
Design Data				
fb/FB + fa/Fa	=	0.381	0.379	
Moment....Actual	=	581.79 ft-#	579.05 ft-#	0.0 ft-#
Moment.....Allowable	=	1,526.91 ft-#	1,526.91 ft-#	1,039.37 ft-#
Shear Force @ this height	=	682.60 lbs		474.312 lbs
Shear.....Actual	=	7.460 psi		5.184 psi
Shear.....Allowable	=	43.821 psi		77.710 psi

Restrained Retaining Wall

Project File: alta mira retaining walls (1).EC6

DESCRIPTION: Stud Wall atop CMU Wall- CASE 1 @ GRID 6

Footing Strengths & Dimensions

Toe Width	=	1.0 ft
Heel Width	=	1.0
Total Footing Width	=	2.0
Footing Thickness	=	16.0 in
Key Width	=	in
Key Depth	=	in
Key Distance from Toe	=	ft

f'c = 2500 psi Fy = 60000 psi
Footing Concrete Density = 150 pcf
Min. As % = 0.0018
Cover @ Top = 2 in @ Btm.= 3 in

USE 3-#5 LONG, As=0.93in^2

Footing Design Results

		Toe	Heel	
Factored Pressure	=	191.286	1,877.91	psf
Mu' : Upward	=	353.373		ft-#
Mu' : Downward	=	223.222		ft-#
Mu: Design	=	130	-152	ft-#
Actual 1-Way Shear	=	1.90		psi
Allow 1-Way Shear	=	75.0	75.0	psi

Other Acceptable Sizes & Spacings:

Toe: # 7 @ 18.00 in -or- #4@ 6.94 in, #5@ 10.76 in, #6@ 15.27 in, #7@ 20.8
Heel: # 6 @ 16.00 in -or- #4@ 6.94 in, #5@ 10.76 in, #6@ 15.27 in, #7@ 20.8
Key: # 0 @ 0.00 in -or- No key defined

Min footing T&S reinf Area 0.69 in2
Min footing T&S reinf Area per foot 0.35 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 6.94 in	#4@ 13.89 in
#5@ 10.76 in	#5@ 21.53 in
#6@ 15.28 in	#6@ 30.56 in

Summary of Forces on Footing : Slab RESISTS sliding, stem is PINNED at footing

Forces acting on footing soil pressure

(taking moments about front of footing to find eccentricity)

Surcharge Over Heel	=	0.0 lbs	0.0 ft	0.0 ft-#
Axial Dead Load on Stem	=	621.0 lbs	1.333 ft	828.0 ft-#
Soil Over Toe	=	73.333 lbs	0.50 ft	36.667 ft-#
Adjacent Footing Load	=	0.0 lbs	0.0 ft	0.0 ft-#
Surcharge Over Toe	=	0.0 lbs	0.0 ft	0.0 ft-#
Stem Weight	=	390.0 lbs	1.333 ft	520.0 ft-#
Soil Over Heel	=	183.333 lbs	1.833 ft	336.111 ft-#
Footing Weight	=	400.0 lbs	1.0 ft	400.0 ft-#
Total Vertical Force	=	1,667.67 lbs	Moment =	2,120.78 ft-#

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

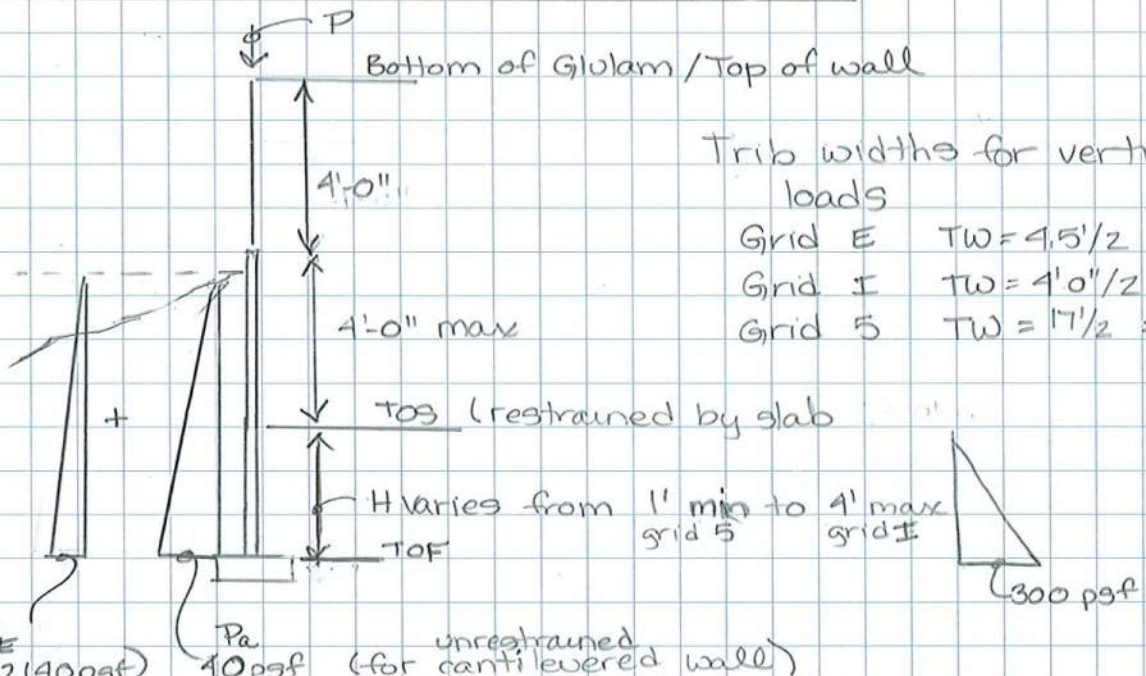
FOOTING REINFORCING:
#5 @ 16" TRANSVERSE, As= 3-#5 LONG

DESCRIPTION: Stud Wall atop CMU Wall- CASE 1 @ GRID 6

Date
Project Alta Mira
Contact PD
Phone

POOL TERRACE STEM WALL
SEE DETAIL 5/S6.0

CMU Stemwall at Pool Terrace Level



Trib widths for vertical loads

Grid E	TW = 4.5'/2	= 2.25'
Grid I	TW = 4'0"/2	= 2'
Grid 5	TW = 17'/2	= 8.5'

(for unrestrained cantilevered wall)
w/ level backfill - actual backfill sloping away from wall so will be less ∴ conservative

check 2 - conditions

1 - grid line 6 H = 1', P_D = 53psf (8.5') = 451 plf
P_L = 20 psf (8.5') = 170 plf

based on allowed enercalc inputs -
and seismic load = 0.2(40psf)h, adjust K_h value to provide correct loading at base of wall (conservative since enercalc uses uniform load distribution, not triangular distribution
@ grid 6 → E = 0.2(40)(5') = 40 psf
@ grid I → E = 0.2(40)(8) = 64 psf

2 grid line I H = 4', P_D = 53 psf (2') = 106 plf
P_L = 20 psf (2') = 40 plf

Date

Project Alta Mira

Contact PD

Phone

per attached enercalc

use 8" CMU w/ #5@16" oc
@ wall ℄

use 2'-0" ~~fg~~ w/ #5 @ 12" oc

$A_{s,min}$ governs =
$0.0018(12in)(16in) = 0.35in^2$
dowels have #5@16"
so add bot bars
w/ #5@ 16" ∴ ok

POOL TERRACE STEM WALL
SEE DETAIL 5/S6.0

Restrained Retaining Wall

Project File: alta mira retaining walls (1).EC6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: Stud Wall atop CMU Wall- CASE 2 @ GRID I

Code Reference

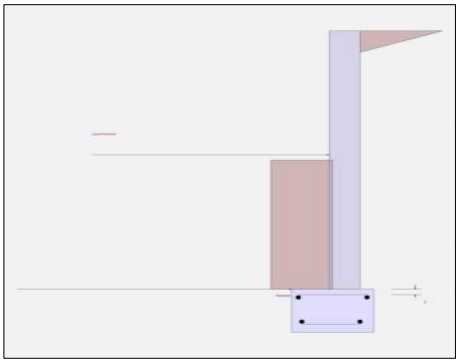
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	8.0 ft
Wall height above soil	=	ft
Total Wall Height	=	8.0 ft
Top Support Height	=	4.0 ft
Slope Behind Wall	=	0
Height of Soil over Toe	=	48.0 in

Soil Data

Allow Soil Bearing	=	4,000.0 psf
Equivalent Fluid Pressure Method		
At-Rest Heel Pressure	=	40.0 psf/ft
	=	0.0 psf/ft
Passive Pressure	=	300.0 psf/ft
Soil Density	=	110 pcf
Footing||Soil Frictior	=	0.35 psf
Soil height to ignore for passive pressure	=	12 in



Surcharge Loads

Surcharge Over Heel	=	psf
>>>Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	psf
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	106.0 lbs
Axial Live Load	=	40.0 lbs
Axial Load Eccentricity	=	-1.375 in

Earth Pressure Seismic Load

Uniform Lateral Load Applied to Stem

Lateral Load	=	#/ft
...Height to Top	=	ft
...Height to Bottom	=	ft
Load Type	=	Earth (H) (Service Level)
Wind on Exposed Stem	=	0.00 psf (Strength Level)

Wind acts left-to-right toward retention side.

Adjacent Footing Load

Adjacent Footing Load	=	lbs
Footing Width	=	ft
Eccentricity	=	in
Wall to Ftg CL Dist	=	ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	ft
Poisson's Ratio	=	0.3

K_h Soil Density Multiplier = 0.0630 g Added seismic per unit area = 45.276 psf

Design Summary

Total Bearing Load	=	1,903.33 lbs	
...resultant ecc.	=	-1.772 in	
Soil Pressure @ Toe	=	530.0 psf	OK
Soil Pressure @ Heel	=	1,373.33 psf	OK
Allowable	=	psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	640.46 psf	
ACI Factored @ Heel	=	1,659.55 psf	
Footing Shear @ Toe	=	0.8482 psi	OK
Footing Shear @ Heel	=	0.5733 psi	OK
Allowable	=	75.0 psi	
Reaction at Top	=	1,207.06 lbs	
Reaction at Bottom	=	893.07 lbs	

Sliding Calcs
Lateral Sliding Force = 893.07 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Masonry Stem Construction

Thickness = 8.00 in
Wall Weight = 78.0 psf
Stem is FREE to rotate at top of footing

		@ Top Support	Mmax Between Top & Base	@ Base of Wall
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	=	4.0 ft	4.0 ft	0.00 ft
Rebar Size	=	# 5	# 5	# 5
Rebar Spacing	=	16.00 in	16.00 in	24.00 in
Rebar Placed at	=	Center	Center	Center
Rebar Depth 'd'	=	3.750 in	3.750 in	3.750 in
Design Data				
fb/FB + fa/Fa	=	0.506	0.498	
Moment....Actual	=	772.15 ft-#	760.76 ft-#	0.0 ft-#
Moment.....Allowable	=	1,526.91 ft-#	1,526.91 ft-#	1,039.37 ft-#
Shear Force @ this height	=	710.26 lbs		430.849 lbs
Shear.....Actual	=	7.762 psi		4.709 psi
Shear.....Allowable	=	43.821 psi		77.710 psi

Restrained Retaining Wall

Project File: alta mira retaining walls (1).EC6

DESCRIPTION: Stud Wall atop CMU Wall- CASE 2 @ GRID I

Footing Strengths & Dimensions

Toe Width	=	1.0 ft
Heel Width	=	1.0
Total Footing Width	=	2.0
Footing Thickness	=	16.0 in
Key Width	=	in
Key Depth	=	in
Key Distance from Toe	=	ft

f'c = 2500 psi Fy = 60000 psi
Footing Concrete Density = 150 pcf
Min. As % = 0.0018
Cover @ Top = 2 in @ Btm.= 3 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	640.46	1,659.55	psf
Mu' : Upward	=	570.72		ft-#
Mu' : Downward	=	522.67		ft-#
Mu: Design	=	48	-63	ft-#
Actual 1-Way Shear	=	0.8482		psi
Allow 1-Way Shear	=	75.0	75.0	psi

Other Acceptable Sizes & Spacings:

Toe: # 7 @ 18.00 in	-or-	#4@ 6.94 in, #5@ 10.76 in, #6@ 15.27 in, #7@ 20.8
Heel: # 6 @ 16.00 in	-or-	#4@ 6.94 in, #5@ 10.76 in, #6@ 15.27 in, #7@ 20.8
Key: # 0 @ 0.00 in	-or-	No key defined

Min footing T&S reinf Area 0.69 in2
Min footing T&S reinf Area per foot 0.35 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 6.94 in	#4@ 13.89 in
#5@ 10.76 in	#5@ 21.53 in
#6@ 15.28 in	#6@ 30.56 in

Summary of Forces on Footing : Slab RESISTS sliding, stem is PINNED at footing

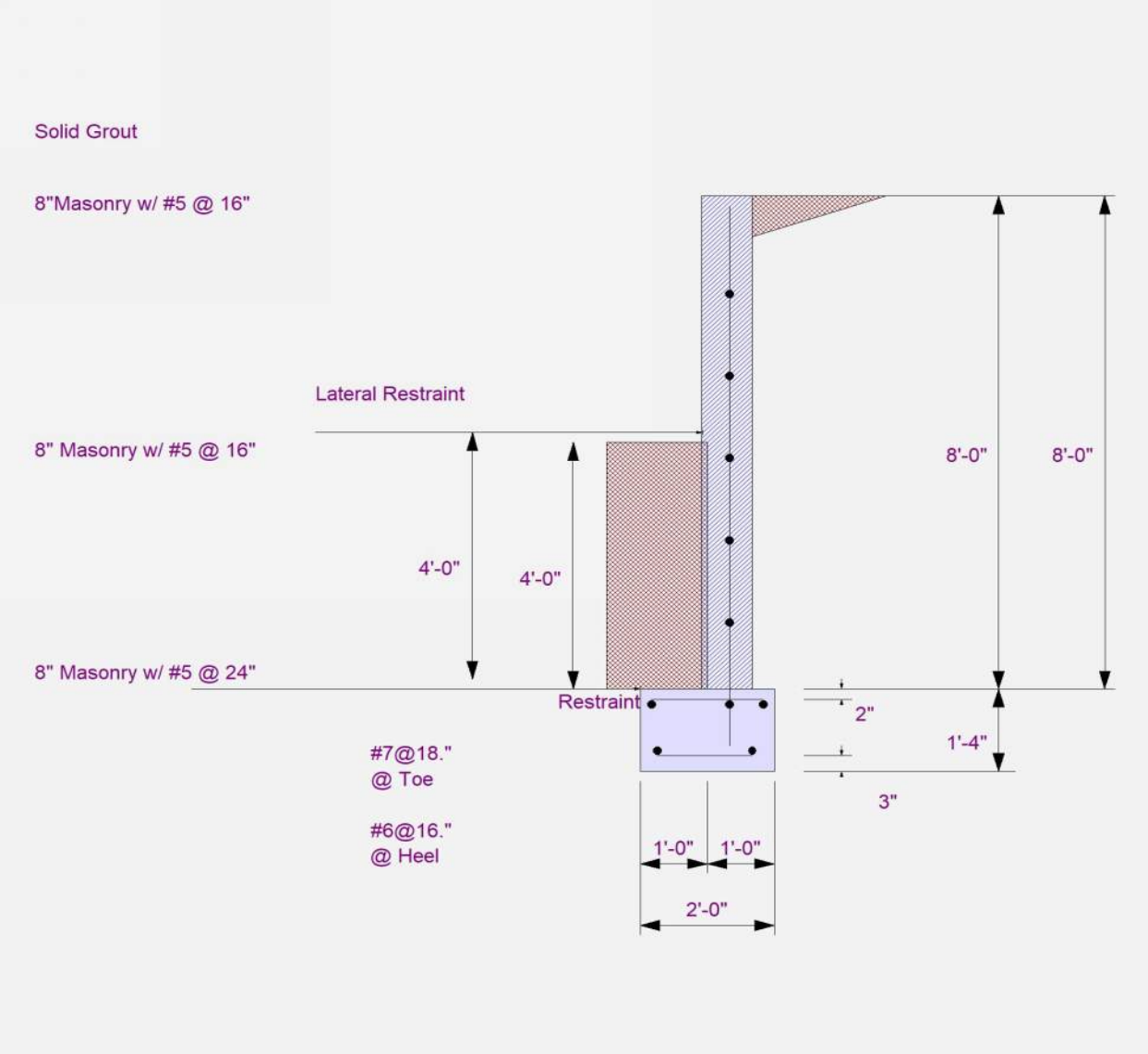
Forces acting on footing soil pressure

(taking moments about front of footing to find eccentricity)

Surcharge Over Heel	=	0.0 lbs	0.0 ft	0.0 ft-#
Axial Dead Load on Stem	=	146.0 lbs	1.333 ft	194.667 ft-#
Soil Over Toe	=	440.0 lbs	0.50 ft	220.0 ft-#
Adjacent Footing Load	=	0.0 lbs	0.0 ft	0.0 ft-#
Surcharge Over Toe	=	0.0 lbs	0.0 ft	0.0 ft-#
Stem Weight	=	624.0 lbs	1.333 ft	832.0 ft-#
Soil Over Heel	=	293.333 lbs	1.833 ft	537.78 ft-#
Footing Weight	=	400.0 lbs	1.0 ft	400.0 ft-#
Total Vertical Force	=	1,903.33 lbs	Moment =	2,184.44 ft-#

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

DESCRIPTION: Stud Wall atop CMU Wall- CASE 2 @ GRID I



DESCRIPTION: Stud Wall atop CMU Wall- CASE 2 @ GRID I

GUARDRAILS

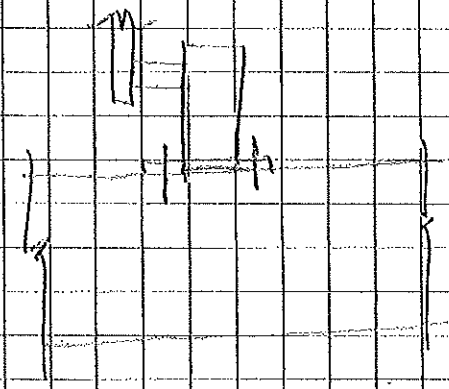
Date 4-28-2023

Project Dzuik Alta Mira

Contact C. Farrell

Phone

Guardrail Attachment - Perpendicular to Beam



V = (50)(4.5) = 225 # (Posts @ 4'-6")

Ma = 1012.5 ft-# = 12150 #in

Same PP Configuration as Previous Calc

12150 #in / 6" = 2025 #

(2025 x 1/2) = 3037.5 #in

S = 0.206 in³

fb = 3037.5 / 0.206 = 14603 psi < 36,000 psi ✓

Lag Screw Check

M = 12150 #in , a = 6"

T = 2025 / 2 anchors = 1012.5 #

Withdrawal 1725 #/in

Previously Calculated anchorage is sufficient. ✓

1/2" ø x 9" Lag Screws

Date 4-27-2023

Project Dzuik Alta Mira

Contact C Farrell

Phone

Guardrail Attachment – Parallel With Beam

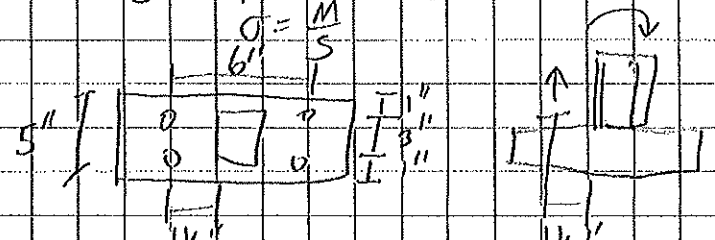
V = 200 # (Psg @ 4'-0")

M_u = 200 # (1.5' + 3.5') = 1000 #ft = 12000 #in

(Max rail height)

Base Plate Stress

$\sigma = \frac{M}{S}$



12000 #/½/6" = 2000 #

M = (2000 #)(1½") = 3000 #in

$S = \frac{bd^2}{6} = \frac{(5")(½")^2}{6} = 0.208 in^3$

$f_b = \frac{3000 \#in}{0.208 in^2} = 14,420 psi$

< 36,000 psi ✓

Lag Screw Check

M = 12000 #in

T = 12000 #in / 3" / 2 anchors = 2000 #

½"ϕ Anchors Minimum Edge Distance = 0.75" ✓ NDS Table 12.5.1E

Minimum Spacing = 2" ✓

G = 0.5 (DF GLB)

Withdrawal = (378 #/in)(C_D)(1.25) = 472.5 #/in

Threaded Embed Required = 2000/472.5 = 4.23" → Per Table L2 in NDS Appendix, need 9" long ½"ϕ Screw

T-E = 4.69"

LATERAL SYSTEM

LATERAL DESIGN
AREA A

SHEARWALLS

Date

Project Alta Mira

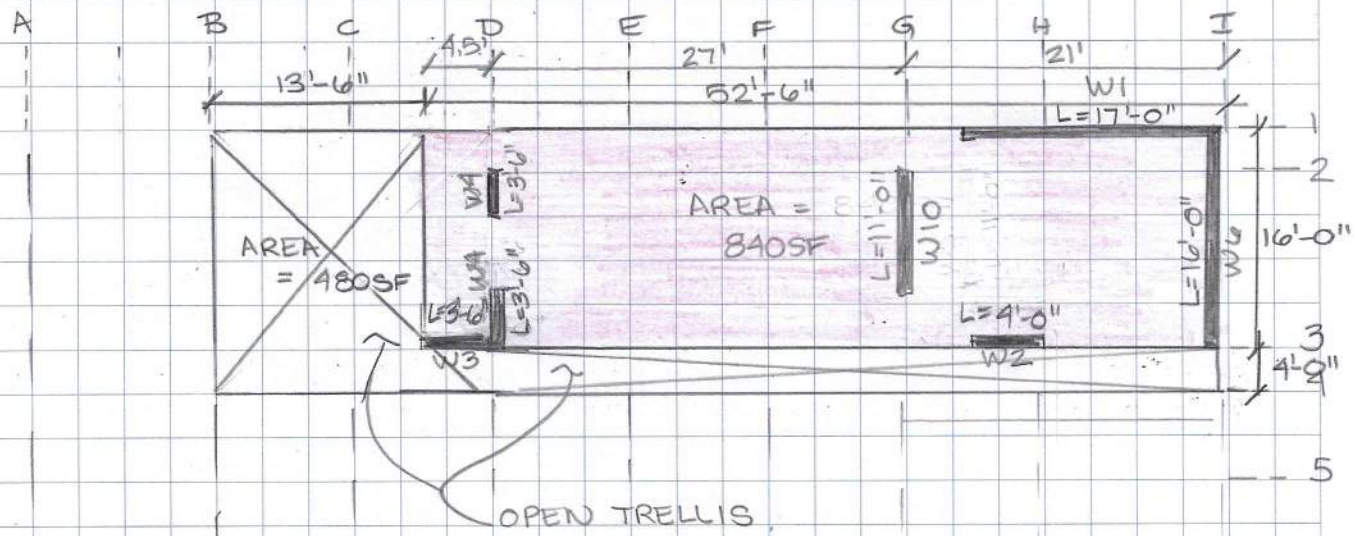
Contact PD

Phone

2-Story House (PART A)

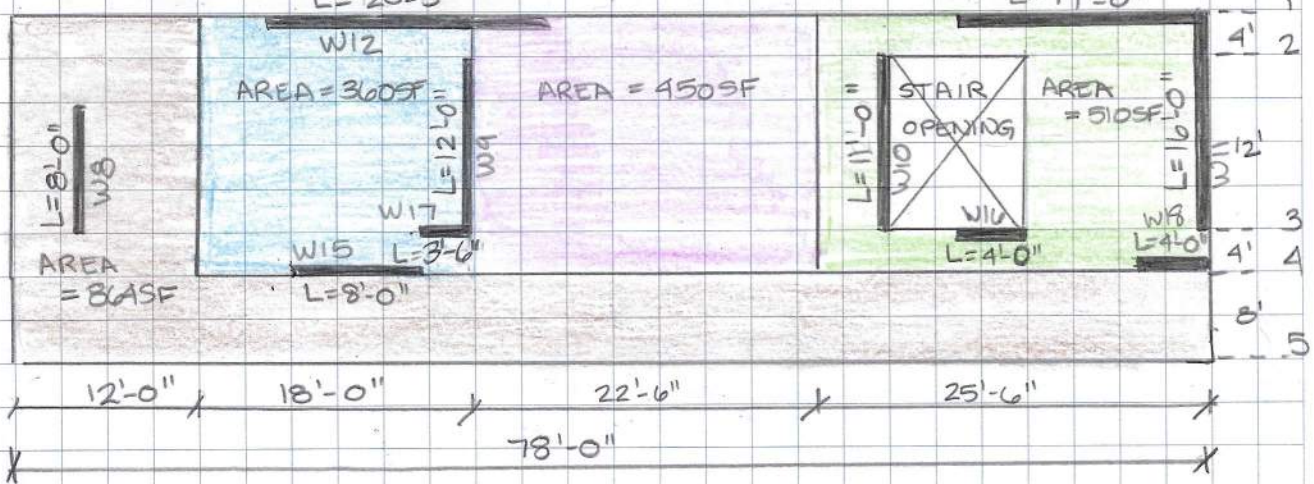
Roof Level (h_{wall} = 9.25')

9' FF to BOG + 2¼" floor



Street Level (h_{wall} = 10'-9")

BOG to BOG (actual ht of wall = 9'-6") since floor above glulam



Per previous calcs V_R = 6520 # } strength level
V_F = 8240 # }

@roof (strength)
v_x = 407.4 plf
v_y = 124.2 plf

@floor (strength)
v_x = 294.5 plf
v_y = 105.7 plf

Date

Project Alta Mira

Contact PD

Phone

Check for plan irregularities

Horizontal – (Table 12.3-1)

1a. Torsional Irregularity – assume doesn't apply and confirm with design

1b. Extreme Torsional Irregularity – assume doesn't apply and confirm with design

2. Reentrant corner – Not Applicable

3. Diaphragm discontinuity – opening in lower level diaphragm = (8' × 12') = 96'
gross diaphragm area = (28' × 78') = 2184'
∴ Not Applicable

4. Out of plane offset – Not Applicable

5. Non-parallel System – Not Applicable

Vertical – (Table 12.3-2)

1a. Stiffness – Soft Story – Not Applicable

1b. Extreme Soft Story – Not Applicable

2. Weight (Mass) Irregularity – Not Applicable

3. Vertical geometric Irregularity –
In transverse direction, width Street = $\frac{28'}{16}$ = 1.75 ≥ width Roof 1.33
In longitudinal direction, length Street = $\frac{78'}{52.5'}$ = 1.5 ≥ length Roof 1.33

∴ Vertical Irregularity type 3 EXISTS

4. In plane discontinuity, Not Applicable

5a. Weak Story, Not Applicable

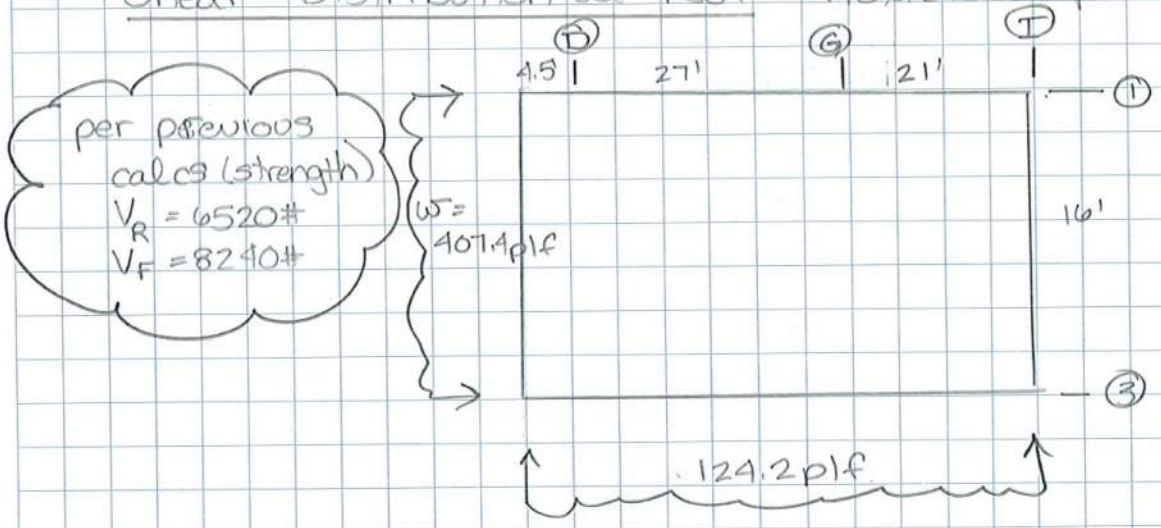
5b. Extreme Weak Story, Not Applicable

use equivalent lateral force procedure per 12.8 since structure of light frame construction.

Date
Project Alta Mira
Contact PD
Phone

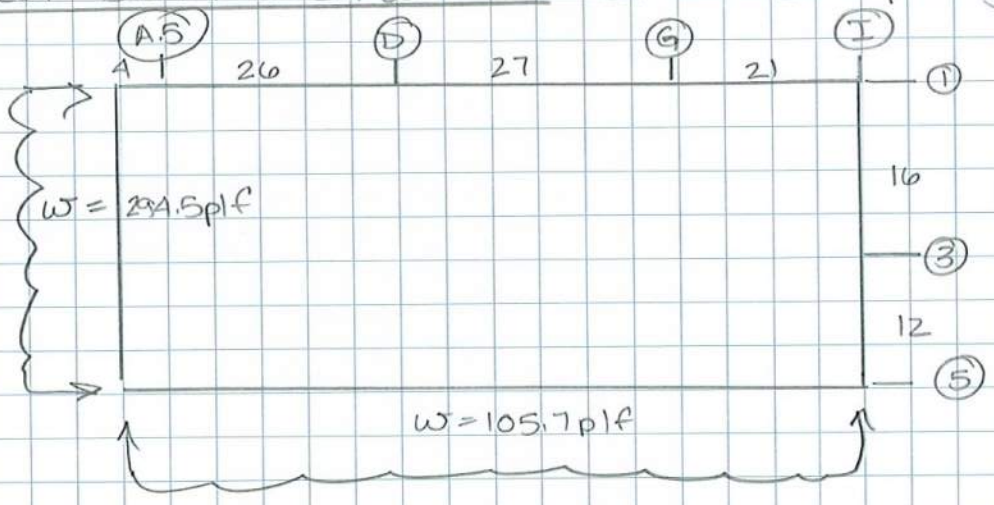
Shear Distribution at Roof (flexible diaphragm)

per previous calcs (strength)
V_R = 6520#
V_F = 8240#



$V_1 = V_3 = 407.4\,plf\,(16'/2) = 3260\#$
$V_D = 124.2\,plf\,(4.5 + 27/2) = 2236\#$
$V_G = 124.2\,plf\,(27' + 21')/2 = 2980\#$
$V_I = 124.2\,plf\,(21'/2) = 1304\#$

Shear Distribution at Floor (flexible diaphragm)



$V_1 = 294.5\,plf\,(16'/2) = 2356\#$
$V_3 = 294.5\,plf\,(16'/2 + 12) = 5890\#$

$V_{A.5} = 105.7\,(4 + 26/2) = 1797\#$
$V_D = 105.7\,(26 + 27)/2 = 2801\#$
$V_G = 105.7\,(27 + 21)/2 = 2537\#$
$V_I = 105.7\,(21'/2) = 1110\#$

Date

Project A Ha Mira

Contact PD

Phone

* note Rigid Diaphragm analysis req'd for floor in x-direction due to "open front" diaphragm between grids 4 and 5 per SDPWS

for initial analysis

① use wall capacities from flexible diaphragm analysis

$v = 0.7\rho V_T$ w/ $\rho = 1.3$

$V_{cap} \times L_i$

Grid	V_R	V_F	V_T	L	v	type	V
1	3260	2356	5616	37.25	137	6	126665
3/4	3260	5890	9150	19.5	427	4	9945
A.5		1797	1797	8	204	6	2720
D	2236	2801	5037	12	382	4	6120
G	2980	2537	5517	11	456	4	5610
I	1304	1110	2414	16	137	6	5440

② for this analysis treat grids 3 and 4 as separate lines of resistance

∴ Rigidies 3 510plf (7.5') = 3825#

" 4 510plf (12') = 6120#

see attached spreadsheet for CM / CR calcs and distribution to ea wall line, note calcs run for strength design, ok for relative rigidities

check walls for adequacy (allowable)

grid ① V = 6602# $v = 6602/37.25 = 177\text{plf} < 340$ ∴ ok

grid ③ V = 5028# $v = 5028/7.5 = 670\text{plf} \sim 665$ ∴ ok

grid ④ V = 3298# $v = 3298/12 = 275\text{plf} < 510$ ∴ ok

Date

Project Alta Mira

Contact PD

Phone

Seismic

Load to ea shearwall

Grid	L	Lgrid	L/Lgrid	V_R	V_F
1/W1	17	37.25	0.46	2966	1672
1/W12	20.25	37.25	0.54	—	1963
3/W3	3.5	7.5	0.47	1394	970
3/W2	4	7.5	0.53	1571	1093
4/W15	8	12	0.67	—	2199
4/W16	4	12	0.33	—	1088
A.5/W8	8		1	—	1635
D/W4	12		1	2035	2549
G/W5	11		1	2712	3209
I/W6	16		1	1187	1010

Gravity

Load to ea shearwall

Grid	L	Wall	RDL	FDL	depth to ftg
1	17'	W1	33x8 = 264	43x8 = 344	2 ft
1	20.25'	W12		33x8 = 264	2ft
3	3.5'	W3			10 ft
3	4'	W2			4 ft
4		W15			6 ft
4		W16			8ft
A.5		W8		53x4 = 212	4 ft
D		W4	33x4.5 = 149	34x4.5 = 153	4ft
G		W5			8f
I		W6	33x2 = 66	43 x 2 = 86	8ft

Tepa ENGINEERING SERVICES

Project: Alta Mira
Date: 05/18/23
By: PD

SHEAR DISTRIBUTION - FLOOR (x- direction) FOR ENVELOPE OF FLEXIBLE AND RIGID DIAPHRAGM ANALYSIS

F_{floor}= 8.24 kips (story shear at floor - assume roof loads are not redistributed)

7.50 kips ρ= 1.30 kips

Length of level, L_{floor} = 78 ft
Width of level, B_{floor} = 28 ft

Determine Center of Mass

Region	L (ft)	B (ft)	A (ft_2)	x (ft)	y (ft)	Ax	Ay
floor	78	28	2184	**39**	14	85176	30576
opening for stair	12	8	96	**61**	18	5856	1728
			2088			79320	28848

x_{CM}= **37.99 ft**
y_{CM}= **13.82 ft**

Determine Center of Rigidity

Wall Line	Wall Segment	R_x	R_y	y_r	x_r	xR_y	yR_x
1	1	12665		28			354620
3	1	4988		12			59856
4	3	6120		8			48960
A.5	1		2720		4	10880	
D	1		6120		30	183600	
G	1		5610		57	319770	
I	1		5440		78	424320	
		23773	19890			938570	463436

x_{CR}= **47.19 ft**
y_{CR}= **19.49 ft**

$e_{y)torsion}$= $_{CM}$-y_{CR} = **-5.68 ft**
$e_{y)accidental}$= **0.05B = 1.40 ft**
e_y = **7.08 ft**

M= Ve_y = 58.324 k-ft

Force to each wall line due to Rigid Diaphragam

Wall Line	Direct Shear		Roof Shear	Torsional Shear					Total Shear for Rigid		
	R_x/SR_x	$V_{DS)floor}$	V_{DSroof}	d	Rd	Rd^2	Rd/SRd^2x 1000	$V_{torsion}$	Floor	Roof	Total
1	0.53	3994.75	2966	-9	-107726	916292	-7.38	-431	3995	3260	**7255**
3	0.21	1573.30	2966	7	37381	280142	2.56	149	1723	3260	**4983**
4	0.26	1930.35		11	70345	808556	4.82	281	2212	0	**2212**
A.5				43	117471	5073361	8.05	470	470	0	**470**
D				17	105191	1808023	7.21	420	420	0	**420**
G				-10	-55045	540101	-3.77	-220	-220	0	**-220**
I				-31	-167617	5164612	-11.49	-670	-670	0	**-670**
	1	7498.4	5932		14591087	0	14591087				

Force to each wall due to Flexible Diaphragm

Wall Line	Length of Wall Line (ft)	Trib Width TW (ft)	V (lbs)	V_{roof} (lbs)	V_{total} (lbs) to wall line
1	37.25	8	2356	3260	**5616.00**
3/4	19.5	20	5890	3260	**9150.00**

* assume grid 3 and grid 4 act in line, offset =4' per IRC allowable offset brace lines

Tepa ENGINEERING SERVICES

Project: Alta Mira
Date: 05/18/23
By: PD

SUMMARY: Design Shear to each wall line									
Wall Line			**Flexible Diaphragm**	**Rigid Diaphragm**	**Strength Design Loads**		**Allowable Design Loads**		
	Wall #	Length	V_{floor}	V_{floor}	V_{floor}	V_{roof}	V_{floor}	V_{roof}	
1	W1	37.25	2356.00	3994.75	3994.75	3260.00	3635.22	2966.60	6601.82
3	W2	7.5	2265.38	1722.72	2265.38	3260.00	2061.50	2966.60	5028.1
4	W9	12	3624.62	2211.53	3624.62		3298.40		3298.4
A.5	W8	8	1797.00	469.56	1797.00		1635.27		1635.27
D	W4	12	2801	420.47	2801.00	2236.00	2548.91	2034.76	4583.67
G	W5	11	2537	-220.03	2537.00	2980.00	2308.67	2711.80	5020.47
I	W6	16.00	1110.00	-670.00	1110.00	1304.00	1010.10	1186.64	2196.74

Date

Project Alta Mira

Contact PD

Phone

Seismic

Load to ea shearwall

Grid	L	Lgrid	L/Lgrid	V_R	V_F
1	17	37.25	0.46	2966	1672
1	20.25	37.25	0.54	—	1963
3	3.5	7.5	0.47	1394	970
3	4	7.5	0.53	1571	1093
4	8	12	0.67	—	2199
4	4	12	0.33	—	1088
A.5	8		1	—	1635
D	12		1	2035	2549
G	11		1	2712	3209
I	16		1	1187	1010

Gravity

Load to ea shearwall

Grid	Wall	RDL	FDL	depth to ftg
1	W1	33x8 = 264	43x8 = 344	2 ft
1	W7			2ft
3	W2			10 ft
3	W3			4 ft
4	W9			6 ft
4	W10			8ft
A.5	W8		53x4 = 212	4 ft
D	W4	33x4.5 = 149	34x4.5 = 153	4ft
G	W5			8f
I	W6	33x2 = 66	43 x 2 = 86	8ft

Wood Shear Wall

Project File: Alta Mira.ec6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: Shearwall Grid 1 (W1) - L=17.0' (stacked)

General Information

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

Total Wall Length	17.0 ft
Number of Stories	2
Story #1 Height	9.0 ft
Story #2 Height	10.750 ft

Framing & Chord Material :

Wood Species :	Douglas Fir-Larch		
Wood Grade :	No.2		
Fc - Prll =	1,350.0 psi	Ft - Tension	575.0 psi
Fc - Perp =	625.0 psi	E	1,600.0 ksi
Specific Gravity =	.5002		
SDC : Seismic Design Category :	D		

Sheathing

Main Sheathing

SDPWS 2015 Construction Table : 4.3A

Wood Structural Panels, Struct I, 15/32" Thk, 1-1/2" Min Pen, 10d Fstnrs

Nominal Seismic Shear Capacities (plf) :

6" Spac.	680	3" Spac.	1330
4" Spac.	1020	2" Spac.	1740

Nominal Wind Shear Capacities (plf) :

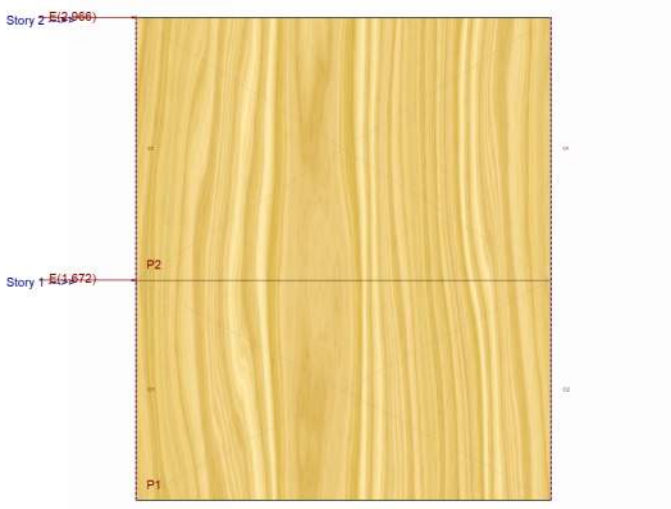
6" Spac.	950	3" Spac.	1860
4" Spac.	1430	2" Spac.	2435

Chord Data

Chord Member Size for each level : See Chord Summary Tables for number of Chords required at each panel end.

Level 1 Chord Size :	2x6	Chord Cf:	Comp:	1.0	Tens:	1.0	Max. Allow Stress Ratio : 1.0 : 1
			Chord Area =	8.250 in^2			
Level 2 Chord Size :	2x6	Chord Cf :	Comp:	1.0	Tens:	1.0	All chords treated as unbraced out-of-plane of wall for story height
			Chord Area =	8.250 in^2			

Opening ID	Dist to Left Edge	Opening Width	Dist to Bottom	Opening Height
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft



Wood Shear Wall

Project File: Alta Mira.ec6

DESCRIPTION: Shearwall Grid 1 (W1) - L=17.0' (stacked)

Applied Distributed Vertical Loads

Load Location (ft)			Load Magnitude (klf)					
Start Location	End Location	Height of Application	Dead	Roof Live	Live	Snow	Wind	Seismic
	17.0	9.0	0.3440		0.320			
	17.0	19.750	0.2640	0.080				

Applied Concentrated Lateral Loads

	Load Magnitude (kips)					
Load "Y" Location (ft)	Dead	Roof Live	Live	Snow	Wind	Seismic
9.0						1.672
19.750						2.966

Shear Panel Summary

Panel ID	Level #	Max Shear (kips)	Load Comb	# Sides Used	Shear Summary & Attachment Actual (plf)	Allow	Status	Attachment	Height/Width Ratio Actual	Allow	Notes
P1	1	4.221	+0.5145D+0.910E	1	248.3	340.0	OK	Use 6" at panel edges, 12" in field	0.53	3.50	Ratio OK
P2	2	2.699	+0.5145D+0.910E	1	158.8	340.0	OK	Use 6" at panel edges, 12" in field	0.63	3.50	Ratio OK

Chord Summary

Chord ID	Level #	Dist from Left (ft)	Force (kips)	Load Comb	CHORD DESIGN SUMMARY # Req'd @ Location	Member Size	Stress Ratio	Governs	Status
C1	1	0.00	0.0	+1.064D+0.750L-0.6825E	**2**	**2x6**	**0.78**	**Comp**	**OK**
Comp Values :	Max. Down :	12.5 k	Load Comb :	+1.064D+0.750L-0.6825E	Max fc =	757 psi	Allow F'c =	969 psi	
Tens Values :	Max. Uplift :	4.2 k	Load Comb :	+1.086D+0.910E	Max ft =	256 psi	Allow F't =	920 psi	
User-specified anchorage device :	HDU4								
C2	1	17.00	0.0	+1.064D+0.750L+0.6825E	**2**	**2x6**	**0.78**	**Comp**	**OK**
Comp Values :	Max. Down :	12.5 k	Load Comb :	+1.064D+0.750L+0.6825E	Max fc =	757 psi	Allow F'c =	969 psi	
Tens Values :	Max. Uplift :	4.2 k	Load Comb :	+1.086D-0.910E	Max ft =	256 psi	Allow F't =	920 psi	
User-specified anchorage device :	HDU4								
C3	2	0.00	0.0	+1.086D-0.910E	**1**	**2x6**	**0.87**	**Comp**	**OK**
Comp Values :	Max. Down :	5.1 k	Load Comb :	+1.086D-0.910E	Max fc =	622 psi	Allow F'c =	718 psi	
Tens Values :	Max. Uplift :	1.7 k	Load Comb :	+1.086D+0.910E	Max ft =	207 psi	Allow F't =	920 psi	
User-specified anchorage device :	HDU2								
C4	2	17.00	0.0	+1.086D+0.910E	**1**	**2x6**	**0.87**	**Comp**	**OK**
Comp Values :	Max. Down :	5.1 k	Load Comb :	+1.086D+0.910E	Max fc =	622 psi	Allow F'c =	718 psi	
Tens Values :	Max. Uplift :	1.7 k	Load Comb :	+1.086D-0.910E	Max ft =	207 psi	Allow F't =	920 psi	
User-specified anchorage device :	HDU2								

Chord Naming Informatio C : Item is a Chord L : Followed by level numbe # : Followed by chord number from left to ri
WL : Indicates Chord is on left edge of wall WR : Indicates Chord is on right edge of wall

Wood Shear Wall

Project File: Alta Mira.ec6

DESCRIPTION: Shearwall Grid 1 (W1) - L=17.0' (stacked)

Footing Information

Footing Dimensions

Dist. Left	1.0 ft	f'c	3.0	ksi	
Wall Length	17.0 ft	Fy	60.0	ksi	
Dist. Right	1.0 ft				
Total Ftg Length	19.0 ft				

Rebar Cover	3.0 in
Footing Thickness	16.0 in
Width	2.0 ft

(3) #5 CONT, A_s=0.93in^2

Max Factored Soil Pressures

@ Left Side of Footing 1,295.35 psf
.... governing load comb +1.20D+L-E

@ Right Side of Footing 1,295.35 psf
.... governing load comb +1.20D+L+E

Max UNfactored Soil Pressures

@ Left Side of Footing 928.88 psf
.... governing load comb +D+0.750L-0.5250E

@ Right Side of Footing 928.88 psf
.... governing load comb +D+0.750L+0.5250E

Footing One-Way Shear Check...

vu @ Left End of Footing	0.0 psi
vu @ Right End of Footing	0.0 psi
vn * phi : Allowable	93.113 psi

Overturning Stability...

	@ Left End of Ftg	@ Right End of Ftg
Overturning Moment	41.901 k-ft	41.901 k-ft
Resisting Moment	145.199 k-ft	145.199 k-ft
Stability Ratio	3.465 : 1	3.465 : 1
.... governing load comb	+0.60D+0.70E	+0.60D+0.70E

Footing Bending Design...

	@ Left End	@ Right End
Mu	1.278 k-ft	1.278 k-ft
Ru	4.201 psi	4.201 psi
As % Req'd	0.00180 in^2	0.00180 in^2
As Req'd in Footing Width	0.5616 in^2	0.5616 in^2

Wood Shear Wall

Project File: Alta Mira.ec6

DESCRIPTION: Shearwall Grid 1 (W12) - L=20.25' (single story)

General Information

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

Total Wall Length	20.250 ft
Number of Stories	1
Story #1 Height	9.0 ft

Framing & Chord Material :

Wood Species :	Douglas Fir-Larch		
Wood Grade :	No.2		
Fc - Prll =	1,350.0 psi	Ft - Tension	575.0 psi
Fc - Perp =	625.0 psi	E	1,600.0 ksi
Specific Gravity =	.5002		
SDC : Seismic Design Category :	D		

Sheathing

Main Sheathing

SDPWS 2015 Construction Table : 4.3A

Wood Structural Panels, Struct I, 15/32" Thk, 1-1/2" Min Pen, 10d Fstnrs

Nominal Seismic Shear Capacities (plf) :

6" Spac.	680	3" Spac.	1330
4" Spac.	1020	2" Spac.	1740

Nominal Wind Shear Capacities (plf) :

6" Spac.	950	3" Spac.	1860
4" Spac.	1430	2" Spac.	2435

Chord Data

Chord Member Size for each level :

See Chord Summary Tables for number of Chords required at each panel end.

Level 1 Chord Size : 2x6 Chord Cf: Comp: 1.0 Tens: 1.0 Max. Allow Stress Ratio : 1.0 : 1

Chord Area = 8.250 in^2

All chords treated as unbraced out-of-plane of wall for story height

Opening ID	Dist to Left Edge	Opening Width	Dist to Bottom	Opening Height
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft

Wood Shear Wall

Project File: Alta Mira.ec6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: Shearwall Grid 1 (W12) - L=20.25' (single story)

Applied Distributed Vertical Loads

Load Location (ft)			Load Magnitude (klf)					
Start Location	End Location	Height of Application	Dead	Roof Live	Live	Snow	Wind	Seismic
	20.250	9.0	0.2640		0.160			

Applied Concentrated Lateral Loads

	Load Magnitude (kips)					
Load "Y" Location (ft)	Dead	Roof Live	Live	Snow	Wind	Seismic
9.0						1.963

Shear Panel Summary

Panel ID	Level #	Max Shear (kips)	Load Comb	# Sides Used	Shear Summary & Attachment Actual (plf)	Allow	Status	Attachment	Height/Width Ratio Actual	Allow	Notes
P1	1	1.786	+0.5145D+0.910E	1	88.2	340.0	OK	Use 6" at panel edges, 12" in field	0.44	3.50	Ratio OK

Chord Summary

Chord ID	Level #	Dist from Left (ft)	Force (kips)	Load Comb	CHORD DESIGN SUMMARY # Req'd @ Location	Member Size	Stress Ratio	Governs	Status
C1	1	0.00	0.0	+1.064D+0.750L-0.6825E	**1**	**2x6**	**0.70**	**Comp**	**OK**

Comp Values : Max. Down : 5.6 k Load Comb : +1.064D+0.750L-0.6825E Max fc = 682 psi Allow F'c = 969 psi

Tens Values : Max. Uplift : 0.8 k Load Comb : +1.086D+0.910E Max ft = 96 psi Allow F't = 920 psi

User-specified anchorage device : HDU2

Chord ID	Level #	Dist from Left (ft)	Force (kips)	Load Comb	CHORD DESIGN SUMMARY # Req'd @ Location	Member Size	Stress Ratio	Governs	Status
C2	1	20.25	0.0	+1.064D+0.750L+0.6825E	**1**	**2x6**	**0.70**	**Comp**	**OK**

Comp Values : Max. Down : 5.6 k Load Comb : +1.064D+0.750L+0.6825E Max fc = 682 psi Allow F'c = 969 psi

Tens Values : Max. Uplift : 0.8 k Load Comb : +1.086D-0.910E Max ft = 96 psi Allow F't = 920 psi

User-specified anchorage device : HDU2

Chord Naming Informatio C : Item is a Chord L : Followed by level numbe # : Followed by chord number from left to ri

WL : Indicates Chord is on left edge of wall WR : Indicates Chord is on right edge of wall

Wood Shear Wall

Project File: Alta Mira.ec6

DESCRIPTION: Shearwall Grid 1 (W12) - L=20.25' (single story)

Footing Information

Footing Dimensions

Dist. Left	1.0 ft	f'c	3.0	ksi	
Wall Length	20.250 ft	Fy	60.0	ksi	
Dist. Right	1.0 ft				
Total Ftg Length	22.250 ft				

Rebar Cover	3.0 in
Footing Thickness	16.0 in
Width	2.0 ft

(3) #5 CONT, A_s=0.93in^2

Max Factored Soil Pressures

@ Left Side of Footing 590.12 psf
.... governing load comb +1.20D+L-E

@ Right Side of Footing 590.12 psf
.... governing load comb +1.20D+L+E

Max UNfactored Soil Pressures

@ Left Side of Footing 464.096 psf
.... governing load comb +D+0.750L-0.5250E

@ Right Side of Footing 464.096 psf
.... governing load comb +D+0.750L+0.5250E

Footing One-Way Shear Check...

vu @ Left End of Footing	0.0 psi
vu @ Right End of Footing	0.0 psi
vn * phi : Allowable	93.113 psi

Overturning Stability...

	@ Left End of Ftg	@ Right End of Ftg
Overturning Moment	10.649 k-ft	10.649 k-ft
Resisting Moment	172.605 k-ft	172.605 k-ft
Stability Ratio	16.208 : 1	16.208 : 1
.... governing load comb	+0.60D+0.70E	+0.60D+0.70E

Footing Bending Design...

	@ Left End	@ Right End
Mu	0.5874 k-ft	0.5874 k-ft
Ru	1.931 psi	1.931 psi
As % Req'd	0.00180 in^2	0.00180 in^2
As Req'd in Footing Width	0.5616 in^2	0.5616 in^2

Wood Shear Wall

Project File: Alta Mira.ec6

LIC# : KW-06015806, Build:20.23.07.20 Tepa

DESCRIPTION: Shearwall Grid 3 (W3) - L=3.5' (stacked)

General Information

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

Total Wall Length	3.50 ft
Number of Stories	2
Story #1 Height	9.0 ft
Story #2 Height	10.750 ft

Framing & Chord Material :

Wood Species :	Douglas Fir-Larch		
Wood Grade :	No.2		
Fc - Prll =	1,350.0 psi	Ft - Tension	575.0 psi
Fc - Perp =	625.0 psi	E	1,600.0 ksi
Specific Gravity =	.5002		
SDC : Seismic Design Category :	D		

Sheathing

Main Sheathing

SDPWS 2015 Construction Table : 4.3A

Wood Structural Panels, Struct I, 15/32" Thk, 1-1/2" Min Pen, 10d Fstnrs

Nominal Seismic Shear Capacities (plf) :

6" Spac.	680	3" Spac.	1330
4" Spac.	1020	2" Spac.	1740

Nominal Wind Shear Capacities (plf) :

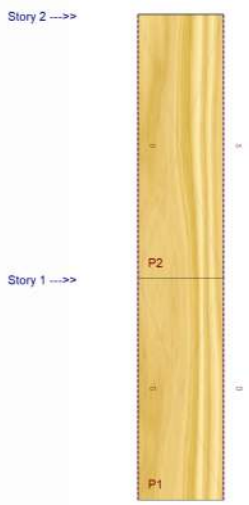
6" Spac.	950	3" Spac.	1860
4" Spac.	1430	2" Spac.	2435

Chord Data

Chord Member Size for each level : See Chord Summary Tables for number of Chords required at each panel end.

Level 1 Chord Size :	2x6	Chord Cf:	Comp:	1.0	Tens:	1.0	Max. Allow Stress Ratio : 1.0 : 1
			Chord Area =	8.250 in^2			
Level 2 Chord Size :	2x6	Chord Cf :	Comp:	1.0	Tens:	1.0	All chords treated as unbraced out-of-plane of wall for story height
			Chord Area =	8.250 in^2			

Opening ID	Dist to Left Edge	Opening Width	Dist to Bottom	Opening Height
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft



Wood Shear Wall

Project File: Alta Mira.ec6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: Shearwall Grid 3 (W3) - L=3.5' (stacked)

Applied Concentrated Lateral Loads

Load "Y" Location (ft)	Load Magnitude (kips) Dead	Roof Live	Live	Snow	Wind	Seismic
9.0						0.970
19.750						1.394

Shear Panel Summary

Panel ID	Level #	Max Shear (kips)	Load Comb	# Sides Used	Shear Summary & Attachment Actual (plf)	Allow	Status	Attachment	Height/Width Ratio Actual	Allow	Notes
P1	1	2.151	+0.5145D+0.910E	1	614.6	665.0	OK	Use 3" at panel edges, 12" in field	2.57	3.50	Ratio OK
P2	2	1.269	+0.5145D+0.910E	1	362.4	510.0	OK	Use 4" at panel edges, 12" in field	3.07	3.50	Ratio OK

Chord Summary

Chord ID	Level #	Dist from Left (ft)	Force (kips)	Load Comb	CHORD DESIGN SUMMARY # Req'd @ Location	Member Size	Stress Ratio	Governs	Status
C1	1	0.00	0.0	+1.086D-0.910E	**2**	**2x6**	**0.65**	**Comp**	**OK**
Comp Values :	Max. Down :	10.4 k	Load Comb :	+1.086D-0.910E		Max fc =	633 psi	Allow F'c =	969 psi
Tens Values :	Max. Uplift :	10.1 k	Load Comb :	+1.086D+0.910E		Max ft =	610 psi	Allow F't =	920 psi
User-specified anchorage device :	HDU14								
C2	1	3.50	0.0	+1.086D+0.910E	**2**	**2x6**	**0.65**	**Comp**	**OK**
Comp Values :	Max. Down :	10.4 k	Load Comb :	+1.086D+0.910E		Max fc =	633 psi	Allow F'c =	969 psi
Tens Values :	Max. Uplift :	10.1 k	Load Comb :	+1.086D-0.910E		Max ft =	610 psi	Allow F't =	920 psi
User-specified anchorage device :	HDU14								
C3	2	0.00	0.0	+1.086D-0.910E	**1**	**2x6**	**0.69**	**Comp**	**OK**
Comp Values :	Max. Down :	4.1 k	Load Comb :	+1.086D-0.910E		Max fc =	497 psi	Allow F'c =	718 psi
Tens Values :	Max. Uplift :	3.9 k	Load Comb :	+1.086D+0.910E		Max ft =	472 psi	Allow F't =	920 psi
User-specified anchorage device :	HDU4								
C4	2	3.50	0.0	+1.086D+0.910E	**1**	**2x6**	**0.69**	**Comp**	**OK**
Comp Values :	Max. Down :	4.1 k	Load Comb :	+1.086D+0.910E		Max fc =	497 psi	Allow F'c =	718 psi
Tens Values :	Max. Uplift :	3.9 k	Load Comb :	+1.086D-0.910E		Max ft =	472 psi	Allow F't =	920 psi
User-specified anchorage device :	HDU4								

Chord Naming Informatio C : Item is a Chord L : Followed by level numbe # : Followed by chord number from left to ri
WL : Indicates Chord is on left edge of wall WR : Indicates Chord is on right edge of wall

Wood Shear Wall

Project File: Alta Mira.ec6

DESCRIPTION: Shearwall Grid 3 (W3) - L=3.5' (stacked)

Footing Information

Footing Dimensions

Dist. Left	1.50 ft	f'c	3.0	ksi	
Wall Length	3.50 ft	Fy	60.0	ksi	
Dist. Right	1.50 ft				
Total Ftg Length	6.50 ft				

Rebar Cover	3.0 in
Footing Thickness	16.0 in
Width	2.50 ft

(3) #5 CONT, A_s=0.93in^2

Max Factored Soil Pressures

@ Left Side of Footing 322.538 psf
.... governing load comb +1.40D

@ Right Side of Footing 322.538 psf
.... governing load comb +1.40D

Max UNfactored Soil Pressures

@ Left Side of Footing 242.538 psf
.... governing load comb D Only

@ Right Side of Footing 242.538 psf
.... governing load comb D Only

Footing One-Way Shear Check...

vu @ Left End of Footing	1.014 psi
vu @ Right End of Footing	1.014 psi
vn * phi : Allowable	93.113 psi

Overturning Stability...

	@ Left End of Ftg	@ Right End of Ftg
Overturning Moment	20.692 k-ft	20.692 k-ft
Resisting Moment	25.114 k-ft	25.114 k-ft
Stability Ratio	1.214 : 1	1.214 : 1
.... governing load comb	+0.60D+0.70E	+0.60D+0.70E

Footing Bending Design...

	@ Left End	@ Right End
Mu	0.9071 k-ft	0.9071 k-ft
Ru	2.386 psi	2.386 psi
As % Req'd	0.00180 in^2	0.00180 in^2
As Req'd in Footing Width	0.7020 in^2	0.7020 in^2

Wood Shear Wall

Project File: Alta Mira.ec6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: Shearwall Grid 3 (W2) - L=4.0' (stacked)

General Information

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

Total Wall Length	4.0 ft
Number of Stories	2
Story #1 Height	9.0 ft
Story #2 Height	10.750 ft

Framing & Chord Material :

Wood Species :	Douglas Fir-Larch		
Wood Grade :	No.2		
Fc - Prll =	1,350.0 psi	Ft - Tension	575.0 psi
Fc - Perp =	625.0 psi	E	1,600.0 ksi
Specific Gravity =	.5002		
SDC : Seismic Design Category :	D		

Sheathing

Main Sheathing

SDPWS 2015 Construction Table : 4.3A

Wood Structural Panels, Struct I, 15/32" Thk, 1-1/2" Min Pen, 10d Fstnrs

Nominal Seismic Shear Capacities (plf) :

6" Spac.	680	3" Spac.	1330
4" Spac.	1020	2" Spac.	1740

Nominal Wind Shear Capacities (plf) :

6" Spac.	950	3" Spac.	1860
4" Spac.	1430	2" Spac.	2435

Chord Data

Chord Member Size for each level : See Chord Summary Tables for number of Chords required at each panel end.

Level 1 Chord Size : 2x6 Chord Cf: Comp: 1.0 Tens: 1.0 Max. Allow Stress Ratio : 1.0 : 1

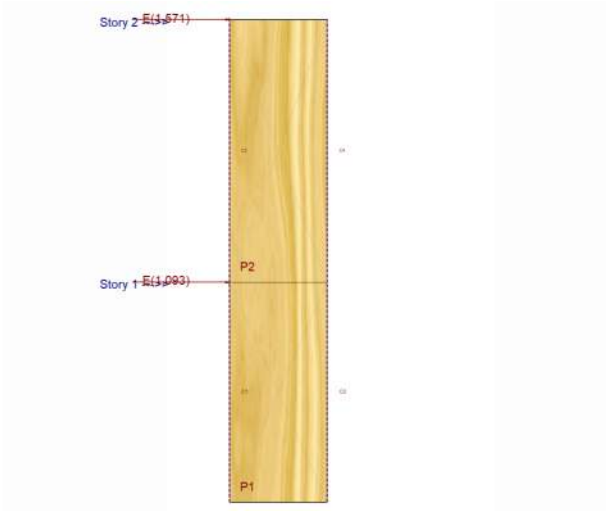
Chord Area = 8.250 in^2

Level 2 Chord Size : 2x6 Chord Cf : Comp: 1.0 Tens: 1.0

Chord Area = 8.250 in^2

All chords treated as unbraced out-of-plane of wall for story height

Opening ID	Dist to Left Edge	Opening Width	Dist to Bottom	Opening Height
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft



Wood Shear Wall

Project File: Alta Mira.ec6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: Shearwall Grid 3 (W2) - L=4.0' (stacked)

Applied Concentrated Lateral Loads

Load "Y" Location (ft)	Load Magnitude (kips) Dead	Roof Live	Live	Snow	Wind	Seismic
9.0						1.093
19.750						1.571

Shear Panel Summary

Panel ID	Level #	Max Shear (kips)	Load Comb	# Sides Used	Shear Summary & Attachment Actual (plf)	Allow	Status	Attachment	Height/Width Ratio Actual	Allow	Notes
P1	1	2.424	+0.5145D+0.910E	1	606.1	665.0	OK	Use 3" at panel edges, 12" in field	2.25	3.50	Ratio OK
P2	2	1.430	+0.5145D+0.910E	1	357.4	510.0	OK	Use 4" at panel edges, 12" in field	2.69	3.50	Ratio OK

Chord Summary

Chord ID	Level #	Dist from Left (ft)	Force (kips)	Load Comb	CHORD DESIGN SUMMARY # Req'd @ Location	Member Size	Stress Ratio	Governs	Status
C1	1	0.00	0.0	+1.086D-0.910E	**2**	**2x6**	**0.65**	**Comp**	**OK**
Comp Values :	Max. Down :	10.4 k	Load Comb :	+1.086D-0.910E		Max fc =	627 psi	Allow F'c =	969 psi
Tens Values :	Max. Uplift :	9.9 k	Load Comb :	+1.086D+0.910E		Max ft =	601 psi	Allow F't =	920 psi
User-specified anchorage device :	HDU14								
C2	1	4.00	0.0	+1.086D+0.910E	**2**	**2x6**	**0.65**	**Comp**	**OK**
Comp Values :	Max. Down :	10.4 k	Load Comb :	+1.086D+0.910E		Max fc =	627 psi	Allow F'c =	969 psi
Tens Values :	Max. Uplift :	9.9 k	Load Comb :	+1.086D-0.910E		Max ft =	601 psi	Allow F't =	920 psi
User-specified anchorage device :	HDU14								
C3	2	0.00	0.0	+1.086D-0.910E	**1**	**2x6**	**0.69**	**Comp**	**OK**
Comp Values :	Max. Down :	4.1 k	Load Comb :	+1.086D-0.910E		Max fc =	494 psi	Allow F'c =	718 psi
Tens Values :	Max. Uplift :	3.8 k	Load Comb :	+1.086D+0.910E		Max ft =	466 psi	Allow F't =	920 psi
User-specified anchorage device :	HDU4								
C4	2	4.00	0.0	+1.086D+0.910E	**1**	**2x6**	**0.69**	**Comp**	**OK**
Comp Values :	Max. Down :	4.1 k	Load Comb :	+1.086D+0.910E		Max fc =	494 psi	Allow F'c =	718 psi
Tens Values :	Max. Uplift :	3.8 k	Load Comb :	+1.086D-0.910E		Max ft =	466 psi	Allow F't =	920 psi
User-specified anchorage device :	HDU4								

Chord Naming Informatio C : Item is a Chord L : Followed by level numbe # : Followed by chord number from left to ri
WL : Indicates Chord is on left edge of wall WR : Indicates Chord is on right edge of wall

Wood Shear Wall

Project File: Alta Mira.ec6

DESCRIPTION: Shearwall Grid 3 (W2) - L=4.0' (stacked)

Footing Information

Footing Dimensions

Dist. Left	2.0 ft	f'c	3.0	ksi	
Wall Length	4.0 ft	Fy	60.0	ksi	
Dist. Right	0.330 ft				
Total Ftg Length	6.330 ft				

Rebar Cover	3.0 in
Footing Thickness	16.0 in
Width	2.50 ft

(3) #5 CONT, A_s=0.93in^2

Max Factored Soil Pressures

@ Left Side of Footing 290.410 psf
.... governing load comb +1.40D

@ Right Side of Footing 369.432 psf
.... governing load comb +1.40D

Max UNfactored Soil Pressures

@ Left Side of Footing 210.410 psf
.... governing load comb D Only

@ Right Side of Footing 289.432 psf
.... governing load comb D Only

Footing One-Way Shear Check...

vu @ Left End of Footing 2.047 psi
vu @ Right End of Footing 0.0 psi
vn * phi : Allowable 93.113 psi

Overturning Stability...

	@ Left End of Ftg	@ Right End of Ftg
Overturning Moment	23.319 k-ft	23.319 k-ft
Resisting Moment	24.039 k-ft	24.039 k-ft
Stability Ratio	1.031 : 1	1.031 : 1
.... governing load comb	+0.60D+0.70E	+0.60D+0.70E

Footing Bending Design...

	@ Left End	@ Right End
Mu	1.494 k-ft	0.05199 k-ft
Ru	3.928 psi	0.1367 psi
As % Req'd	0.00180 in^2	0.00180 in^2
As Req'd in Footing Width	0.7020 in^2	0.7020 in^2

Wood Shear Wall

Project File: Alta Mira.ec6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: Shearwall Grid 4 (W9) - L=8.0' (single story)

General Information

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

Total Wall Length	8.0 ft
Number of Stories	1
Story #1 Height	9.0 ft

Framing & Chord Material :

Wood Species :	Douglas Fir-Larch		
Wood Grade :	No.2		
Fc - Prll =	1,350.0 psi	Ft - Tension	575.0 psi
Fc - Perp =	625.0 psi	E	1,600.0 ksi
Specific Gravity =	.5002		
SDC : Seismic Design Category :	D		

Sheathing

Main Sheathing

SDPWS 2015 Construction Table : 4.3A

Wood Structural Panels, Struct I, 15/32" Thk, 1-1/2" Min Pen, 10d Fstnrs

Nominal Seismic Shear Capacities (plf) :

6" Spac.	680	3" Spac.	1330
4" Spac.	1020	2" Spac.	1740

Nominal Wind Shear Capacities (plf) :

6" Spac.	950	3" Spac.	1860
4" Spac.	1430	2" Spac.	2435

Chord Data

Chord Member Size for each level : See Chord Summary Tables for number of Chords required at each panel end.

Level 1 Chord Size : 2x6 Chord Cf: Comp: 1.0 Tens: 1.0 Max. Allow Stress Ratio : 1.0 : 1

Chord Area = 8.250 in^2

All chords treated as unbraced out-of-plane of wall for story height

Opening ID	Dist to Left Edge	Opening Width	Dist to Bottom	Opening Height
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft

Wood Shear Wall

Project File: Alta Mira.ec6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: Shearwall Grid 4 (W9) - L=8.0' (single story)

Applied Concentrated Lateral Loads

Load "Y" Location (ft)	Load Magnitude (kips) Dead	Roof Live	Live	Snow	Wind	Seismic
9.0	0.0	0.0	0.0	0.0	0.0	2.199

Shear Panel Summary

Panel ID	Level #	Max Shear (kips)	Load Comb	# Sides Used	Shear Summary & Attachment Actual (plf)	Allow	Status	Attachment	Height/Width Ratio Actual	Allow	Notes
P1	1	2.001	+0.5145D+0.910E	1	250.1	340.0	OK	Use 6" at panel edges, 12" in field	1.13	3.50	Ratio OK

Chord Summary

Chord ID	Level #	Dist from Left (ft)	Force (kips)	Load Comb	CHORD DESIGN SUMMARY # Req'd @ Location	Member Size	Stress Ratio	Governs	Status
C1	1	0.00	0.0	+1.086D-0.910E	**1**	**2x6**	**0.33**	**Comp**	**OK**
Comp Values :	Max. Down :	2.6 k	Load Comb :	+1.086D-0.910E		Max fc =	320 psi	Allow F'c =	969 psi
Tens Values :	Max. Uplift :	2.3 k	Load Comb :	+1.086D+0.910E		Max ft =	273 psi	Allow F't =	920 psi
User-specified anchorage device :	_____	HDU2	_____						
C2	1	8.00	0.0	+1.086D+0.910E	**1**	**2x6**	**0.33**	**Comp**	**OK**
Comp Values :	Max. Down :	2.6 k	Load Comb :	+1.086D+0.910E		Max fc =	320 psi	Allow F'c =	969 psi
Tens Values :	Max. Uplift :	2.3 k	Load Comb :	+1.086D-0.910E		Max ft =	273 psi	Allow F't =	920 psi
User-specified anchorage device :	_____	HDU2	_____						

Chord Naming Informatio C : Item is a Chord L : Followed by level numbe # : Followed by chord number from left to ri
WL : Indicates Chord is on left edge of wall WR : Indicates Chord is on right edge of wall

Footing Information

Footing Dimensions

Dist. Left	1.0 ft	f'c	3.0	ksi	
Wall Length	8.0 ft	Fy	60.0	ksi	
Dist. Right	1.0 ft				
Total Ftg Length	10.0 ft				

Rebar Cover	3.0 in
Footing Thickness	16.0 in
Width	2.0 ft

(3) #5 CONT, A_s=0.93in^2

Max Factored Soil Pressures

@ Left Side of Footing 1,364.88 psf
.... governing load comb +0.90D-E

@ Right Side of Footing 1,364.88 psf
.... governing load comb +0.90D+E

Max UNfactored Soil Pressures

@ Left Side of Footing 884.04 psf
.... governing load comb +0.60D-0.70E

@ Right Side of Footing 884.04 psf
.... governing load comb +0.60D+0.70E

Footing One-Way Shear Check...

vu @ Left End of Footing	0.0 psi
vu @ Right End of Footing	0.0 psi
vn * phi : Allowable	93.113 psi

Overturning Stability...

	@ Left End of Ftg	@ Right End of Ftg
Overturning Moment	11.930 k-ft	11.930 k-ft
Resisting Moment	53.760 k-ft	53.760 k-ft
Stability Ratio	4.506 : 1	4.506 : 1
.... governing load comb	+0.60D+0.70E	+0.60D+0.70E

Footing Bending Design...

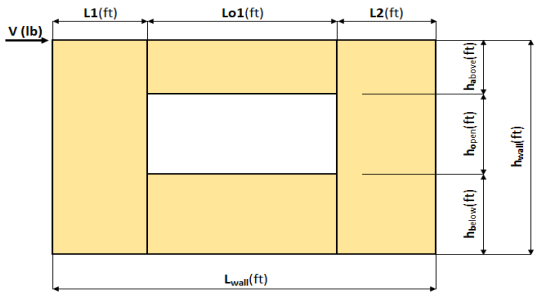
	@ Left End	@ Right End
Mu	1.221 k-ft	1.221 k-ft
Ru	4.014 psi	4.014 psi
As % Req'd	0.00180 in^2	0.00180 in^2
As Req'd in Footing Width	0.5616 in^2	0.5616 in^2

Force Transfer Around Openings Calculator

ONE OPENING

The force transfer around openings (FTAO) method of shear wall analysis is an approach that aims to reinforce the wall such that it performs as if there was no opening. This approach lends certain advantages over segmented shear walls: more versatility, because it allows for narrower wall segments while still meeting the height-to-width ratios and, often, fewer required hold-downs.

Project Information	CHECK OF 8'-0" WALL GRID 4, ARCH ADDED OPENING
Code:	
Designer:	
Client:	
Project:	
Wall Line:	



Shear Wall Calculation Variables

V	2199 lbf		Opening 1
L1	3.50 ft	h_a	5.67 ft
L2	2.00 ft	h_o	2.00 ft
h_{wall}	9.00 ft	h_b	1.33 ft
L_{wall}	8.00 ft	Lo1	2.50 ft

Adj. Factor Method = 1.25-0.125h/bs

Wall Pier Aspect Ratio		Adj. Factor
P1=h_o/L1=	0.57	N/A
P2=h_o/L2=	1.00	N/A

1. Hold-down forces: H = Vh_{wall}/L_{wall} 2474 lbf

2. Unit shear above + below opening

First opening: va1 = vb1 = H/(h_a+h_b) = 353 plf

3. Total boundary force above + below openings

First opening: O1 = va1 x (Lo1) = 884 lbf

4. Corner forces

F1 = O1(L1)/(L1+L2) = 562 lbf

F2 = O1(L2)/(L1+L2) = 321 lbf

5. Tributary length of openings

T1 = (L1*Lo1)/(L1+L2) = 1.59 ft

T2 = (L2*Lo1)/(L1+L2) = 0.91 ft

6. Unit shear beside opening

v1 = (V/L)(L1+T1)/L1 = 400 plf

v2 = (V/L)(T2+L2)/L2 = 400 plf

Check v1*L1+v2*L2=V? 2199 lbf **OK**

7. Resistance to corner forces

R1 = v1*L1 = 1399 lbf

R2 = v2*L2 = 800 lbf

8. Difference corner force + resistance

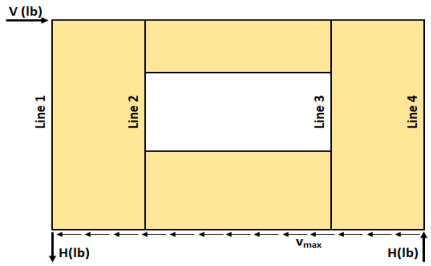
R1-F1 = 837 lbf

R2-F2 = 478 lbf

9. Unit shear in corner zones

vc1 = (R1-F1)/L1 = 239 plf

vc2 = (R2-F2)/L2 = 239 plf



Check Summary of Shear Values for One Opening

Line 1: vc1(h_a+h_b)+v1(h_o)=H?		1674	800	2474 lbf
Line 2: va1(h_a+h_b)-vc1(h_a+h_b)-v1(h_o)=0?	2474	1674	800	0
Line 3: va1(h_a+h_b)-vc2(h_a+h_b)-v1(h_o)=0?	2474	1674	800	0
Line 4: vc2(h_a+h_b)+v2(h_o)=H?		1674	800	2474 lbf

Design Summary*

Req. Sheathing Capacity	400 plf	**4-Term Deflection**	0.413 in.	**3-Term Deflection**	0.468 in.
Req. Strap Force	562 lbf	**4-Term Story Drift %**	0.015 %	**3-Term Story Drift %**	0.017 %
Req. HD Force (H)	2474 lbf				
Req. Shear Wall Anchorage Force (v_{max})	275 plf				

***The Design Summary assumes that the shear wall is designed as blocked.**

Project Information

Code: **Date:**

Designer:

Client:

Project:

Wall Line:

Shear Wall Deflection Calculation Variables

Unfactored Shear Load $V_{unfactored}$: 2199 (lbf)

Sheathing Type: 15/32 OSB

Grade: APA Structural 1

G_t Override:

G_a Override:

Wood End Post Values:

Species: DF

E: 1.60E+06 (psi)

Enter individual post sizes below.

C_d: 4.00

Nail Type: 10d common (penny weight)

	Pier 1	Pier 2	
Nail Spacing:	4	4	(in.)
HD Capacity:	3075	3075	(lbf)
HD Deflection:	0.088	0.088	(in.)

Four-Term Equation Deflection Check

$$\Delta = \frac{8vh^3}{EAb} + \frac{vh}{Gt} + 0.75he_n + d_a\frac{h}{b} \qquad \text{(Equation 23-2)}$$

	Pier 1-L	Pier 1-R	Pier 2-L	Pier 2-R	
$v_{unfactored}$:	400	400	400	400	(plf)
E:	1.60E+06	1.60E+06	1.60E+06	1.60E+06	(psi)
h:	9.00	7.67	7.67	9.00	(ft)
Qty:	2.00E+00	1.00E+00	1.00E+00	2.00E+00	
Stud Size:	2x6	2x6	2x6	2x6	
A Override:					($in.^2$)
A:	16.5	8.25	8.25	16.5	($in.^2$)
G_t:	83,500	83,500	83,500	83,500	(lbf/in.)
Nail Spacing:	4	4	4	4	(in.)
V_n:	133	133	133	133	(plf)
e_n:	0.0032	0.0032	0.0032	0.0032	(in.)
b:	3.50	3.50	2.00	2.00	(ft)
HD Capacity:	3075	3075	3075	3075	(lbf)
HD Defl:	0.088	0.088	0.088	0.088	(in.)

Sheathing Type: 15/32 OSB APA Structural 1

Nail Type: 10d common

Check Total Deflection of Wall System

Pier 1 (left)				Pier 1 (right)			
Term 1 Bending	Term 2 Shear	Term 3 Fastener	Term 4 HD-1	Term 1 Bending	Term 2 Shear	Term 3 Fastener	Term 4 HD-2
0.025	0.043	0.022	0.265	0.031	0.037	0.018	0.192
		Sum	0.355			Sum	0.279
Pier 2 (left)				Pier 2 (right)			
Term 1 Bending	Term 2 Shear	Term 3 Fastener	Term 4 HD-1	Term 1 Bending	Term 2 Shear	Term 3 Fastener	Term 4 HD-2
0.055	0.037	0.018	0.337	0.044	0.043	0.022	0.463
		Sum	0.446			Sum	0.572

Total Defl.	
0.413	(in.)
0.0153	%drift

Project Information

Code: **Date:**

Designer:

Client:

Project:

Wall Line:

Shear Wall Deflection Calculation Variables

Unfactored Shear Load $V_{unfactored}$: 2199 (lbf)

Wood End Post Values:

Sheathing Type: 15/32 OSB
Grade: APA Structural 1

Species: DF
E: 1.60E+06 (psi)

Nail Type: 10d common (penny weight)

G_t Override:
G_a Override:

C_d: 4.00

	Pier 1	Pier 2	
Nail Spacing:	4	4	(in.)
HD Capacity:	3075	3075	(lbf)
HD Deflection:	0.088	0.088	(in.)

Three-Term Equation Deflection Check

$$\delta_{sw} = \frac{8vh^3}{EAb} + \frac{vh}{1000G_a} + \frac{h\Delta_a}{b} \qquad (4.3\text{-}1)$$

	Pier 1-L	Pier 1-R	Pier 2-L	Pier 2-R	
$v_{unfactored}$:	400	400	400	400	(plf)
E:	1.60E+06	1.60E+06	1.60E+06	1.60E+06	(psi)
h:	9.00	7.67	7.67	9.00	(ft)
Qty:	2.00E+00	1.00E+00	1.00E+00	2.00E+00	
Stud Size:	2x6	2x6	2x6	2x6	
A Override:					($in.^2$)
A:	16.5	8.25	8.25	16.5	($in.^2$)
G_a:	29.0	29.0	29.0	29.0	(kips/in.)
b:	3.50	3.50	2.00	2.00	(ft)
HD Capacity:	3075	3075	3075	3075	(lbf)
HD Defl:	0.088	0.088	0.088	0.088	(in.)

Sheathing Type: 15/32 OSB APA Structural 1
Nail Type: 10d common

Check Total Deflection of Wall System

Pier 1 (left)			Pier 1 (right)		
Term 1 Bending	Term 2 Shear	Term 3 Fastener	Term 1 Bending	Term 2 Shear	Term 3 Fastener
0.025	0.124	0.265	0.031	0.106	0.192
	Sum	0.414		Sum	0.329
Pier 2 (left)			Pier 2 (right)		
Term 1 Bending	Term 2 Shear	Term 3 Fastener	Term 1 Bending	Term 2 Shear	Term 3 Fastener
0.055	0.106	0.337	0.044	0.124	0.463
	Sum	0.497		Sum	0.632

Total Defl.	
0.468	(in.)
0.0173	%drift

Comment: The 3-term equation is calibrated to be approximately equal to 4-term equation at 1.4*ASD capacity.

Wood Shear Wall

Project File: Alta Mira.ec6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: Shearwall Grid 4 (W10) - L=4.0' (single story)

General Information

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

Total Wall Length	4.0 ft
Number of Stories	1
Story #1 Height	9.0 ft

Framing & Chord Material :

Wood Species :	Douglas Fir-Larch		
Wood Grade :	No.2		
Fc - Prll =	1,350.0 psi	Ft - Tension	575.0 psi
Fc - Perp =	625.0 psi	E	1,600.0 ksi
Specific Gravity =	.5002		
SDC : Seismic Design Category :	D		

Sheathing

Main Sheathing

SDPWS 2015 Construction Table : 4.3A

Wood Structural Panels, Struct I, 15/32" Thk, 1-1/2" Min Pen, 10d Fstnrs

Nominal Seismic Shear Capacities (plf) :

6" Spac.	680	3" Spac.	1330
4" Spac.	1020	2" Spac.	1740

Nominal Wind Shear Capacities (plf) :

6" Spac.	950	3" Spac.	1860
4" Spac.	1430	2" Spac.	2435

Chord Data

Chord Member Size for each level : See Chord Summary Tables for number of Chords required at each panel end.

Level 1 Chord Size : 2x6 Chord Cf: Comp: 1.0 Tens: 1.0 Max. Allow Stress Ratio : 1.0 : 1

Chord Area = 8.250 in^2

All chords treated as unbraced out-of-plane of wall for story height

Opening ID	Dist to Left Edge	Opening Width	Dist to Bottom	Opening Height
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft

Wood Shear Wall

Project File: Alta Mira.ec6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: Shearwall Grid 4 (W10) - L=4.0' (single story)

Applied Concentrated Lateral Loads

Load "Y" Location (ft)	Load Magnitude (kips) Dead	Roof Live	Live	Snow	Wind	Seismic
9.0						1.088

Shear Panel Summary

Panel ID	Level #	Max Shear (kips)	Load Comb	# Sides Used	Shear Summary & Attachment Actual (plf)	Allow	Status	Attachment	Height/Width Ratio Actual	Allow	Notes
P1	1	0.990	+0.5145D+0.910E	1	247.5	340.0	OK	Use 6" at panel edges, 12" in field	2.25	3.50	Ratio OK

Chord Summary

Chord ID	Level #	Dist from Left (ft)	Force (kips)	Load Comb	CHORD DESIGN SUMMARY # Req'd @ Location	Member Size	Stress Ratio	Governs	Status
C1	1	0.00	0.0	+1.086D-0.910E	**1**	**2x6**	**0.30**	**Comp**	**OK**
Comp Values :	Max. Down :	2.4 k	Load Comb :	+1.086D-0.910E		Max fc =	294 psi	Allow F'c =	969 psi
Tens Values :	Max. Uplift :	2.2 k	Load Comb :	+1.086D+0.910E		Max ft =	270 psi	Allow F't =	920 psi
User-specified anchorage device :		HDU2							
C2	1	4.00	0.0	+1.086D+0.910E	**1**	**2x6**	**0.30**	**Comp**	**OK**
Comp Values :	Max. Down :	2.4 k	Load Comb :	+1.086D+0.910E		Max fc =	294 psi	Allow F'c =	969 psi
Tens Values :	Max. Uplift :	2.2 k	Load Comb :	+1.086D-0.910E		Max ft =	270 psi	Allow F't =	920 psi
User-specified anchorage device :		HDU2							

Chord Naming Informatio C : Item is a Chord L : Followed by level numbe # : Followed by chord number from left to ri
WL : Indicates Chord is on left edge of wall WR : Indicates Chord is on right edge of wall

Footing Information

Footing Dimensions

Dist. Left	1.0 ft	f'c	3.0	ksi
Wall Length	4.0 ft	Fy	60.0	ksi
Dist. Right	0.330 ft			
Total Ftg Length	5.330 ft			

Rebar Cover	3.0 in
Footing Thickness	16.0 in
Width	2.0 ft

(3) #5 CONT, A_s=0.93in^2

Max Factored Soil Pressures

@ Left Side of Footing 301.036 psf
.... governing load comb +1.40D

@ Right Side of Footing 326.507 psf
.... governing load comb +1.40D

Max UNfactored Soil Pressures

@ Left Side of Footing 2,408.74 psf
.... governing load comb +D-0.70E

@ Right Side of Footing 3,348.57 psf
.... governing load comb +D+0.70E

Footing One-Way Shear Check...

vu @ Left End of Footing 0.0 psi
vu @ Right End of Footing 0.0 psi
vn * phi : Allowable 93.113 psi

Overturning Stability...

	@ Left End of Ftg	@ Right End of Ftg
Overturning Moment	5.902 k-ft	5.902 k-ft
Resisting Moment	13.360 k-ft	13.360 k-ft
Stability Ratio	2.263 : 1	2.263 : 1
.... governing load comb	+0.60D+0.70E	+0.60D+0.70E

Footing Bending Design...

	@ Left End	@ Right End
Mu	0.3026 k-ft	0.03573 k-ft
Ru	0.9948 psi	0.1175 psi
As % Req'd	0.00180 in^2	0.00180 in^2
As Req'd in Footing Width	0.5616 in^2	0.5616 in^2

Wood Shear Wall

Project File: Alta Mira.ec6

DESCRIPTION: Shearwall Grid A.5 (W8) - L=8.0' (single story)

General Information

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

Total Wall Length	8.0 ft
Number of Stories	1
Story #1 Height	9.0 ft

Framing & Chord Material :

Wood Species :	Douglas Fir-Larch		
Wood Grade :	No.2		
Fc - Prll =	1,350.0 psi	Ft - Tension	575.0 psi
Fc - Perp =	625.0 psi	E	1,600.0 ksi
Specific Gravity =	.5002		
SDC : Seismic Design Category :	D		

Sheathing

Main Sheathing

SDPWS 2015 Construction Table : 4.3A

Wood Structural Panels, Struct I, 15/32" Thk, 1-1/2" Min Pen, 10d Fstnrs

Nominal Seismic Shear Capacities (plf) :

6" Spac.	680	3" Spac.	1330
4" Spac.	1020	2" Spac.	1740

Nominal Wind Shear Capacities (plf) :

6" Spac.	950	3" Spac.	1860
4" Spac.	1430	2" Spac.	2435

Chord Data

Chord Member Size for each level : See Chord Summary Tables for number of Chords required at each panel end.

Level 1 Chord Size : 2x6 Chord Cf: Comp: 1.0 Tens: 1.0 Max. Allow Stress Ratio : 1.0 : 1

Chord Area = 8.250 in^2

All chords treated as unbraced out-of-plane of wall for story height

Opening ID	Dist to Left Edge	Opening Width	Dist to Bottom	Opening Height
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft

Wood Shear Wall

Project File: Alta Mira.ec6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: Shearwall Grid A.5 (W8) - L=8.0' (single story)

Applied Distributed Vertical Loads

Load Location (ft)			Load Magnitude (klf)					
Start Location	End Location	Height of Application	Dead	Roof Live	Live	Snow	Wind	Seismic
		9.0	0.2120	0.080				

Applied Concentrated Lateral Loads

Load "Y" Location (ft)	Load Magnitude (kips)					
	Dead	Roof Live	Live	Snow	Wind	Seismic
9.0						1.635

Shear Panel Summary

Panel ID	Level #	Max Shear (kips)	Load Comb	# Sides Used	Shear Summary & Attachment Actual (plf)	Allow	Status	Attachment	Height/Width Ratio Actual	Allow	Notes
P1	1	1.488	+0.5145D+0.910E	1	186.0	340.0	OK	Use 6" at panel edges, 12" in field	1.13	3.50	Ratio OK

Chord Summary

Chord ID	Level #	Dist from Left (ft)	Force (kips)	Load Comb	CHORD DESIGN SUMMARY # Req'd @ Location	Member Size	Stress Ratio	Governs	Status
C1	1	0.00	0.0	+1.086D-0.910E	**1**	**2x6**	**0.26**	**Comp**	**OK**
Comp Values :	Max. Down :	2.1 k	Load Comb :	+1.086D-0.910E		Max fc =	250 psi	Allow F'c =	969 psi
Tens Values :	Max. Uplift :	1.7 k	Load Comb :	+1.086D+0.910E		Max ft =	203 psi	Allow F't =	920 psi
User-specified anchorage device : _____ HDU2 ____									
C2	1	8.00	0.0	+1.086D+0.910E	**1**	**2x6**	**0.26**	**Comp**	**OK**
Comp Values :	Max. Down :	2.1 k	Load Comb :	+1.086D+0.910E		Max fc =	250 psi	Allow F'c =	969 psi
Tens Values :	Max. Uplift :	1.7 k	Load Comb :	+1.086D-0.910E		Max ft =	203 psi	Allow F't =	920 psi
User-specified anchorage device : _____ HDU2 _____									

Chord Naming Informatio C : Item is a Chord L : Followed by level numbe # : Followed by chord number from left to ri

WL : Indicates Chord is on left edge of wall WR : Indicates Chord is on right edge of wall

Wood Shear Wall

Project File: Alta Mira.ec6

DESCRIPTION: Shearwall Grid A.5 (W8) - L=8.0' (single story)

Footing Information

Footing Dimensions

Dist. Left	1.0 ft	f'c	3.0	ksi	
Wall Length	8.0 ft	Fy	60.0	ksi	
Dist. Right	1.0 ft				
Total Ftg Length	10.0 ft				

Rebar Cover	3.0 in
Footing Thickness	16.0 in
Width	2.0 ft

(3) #5 CONT, A_s=0.93in^2

Max Factored Soil Pressures

@ Left Side of Footing 696.72 psf
.... governing load comb +0.90D-E

@ Right Side of Footing 696.72 psf
.... governing load comb +0.90D+E

Max UNfactored Soil Pressures

@ Left Side of Footing 504.15 psf
.... governing load comb +D-0.70E

@ Right Side of Footing 504.15 psf
.... governing load comb +D+0.70E

Footing One-Way Shear Check...

vu @ Left End of Footing	0.0 psi
vu @ Right End of Footing	0.0 psi
vn * phi : Allowable	93.113 psi

Overturning Stability...

	@ Left End of Ftg	@ Right End of Ftg
Overturning Moment	8.870 k-ft	8.870 k-ft
Resisting Moment	27.360 k-ft	27.360 k-ft
Stability Ratio	3.085 : 1	3.085 : 1
.... governing load comb	+0.60D+0.70E	+0.60D+0.70E

Footing Bending Design...

	@ Left End	@ Right End
Mu	0.6593 k-ft	0.6593 k-ft
Ru	2.167 psi	2.167 psi
As % Req'd	0.00180 in^2	0.00180 in^2
As Req'd in Footing Width	0.5616 in^2	0.5616 in^2

Wood Shear Wall

Project File: Alta Mira.ec6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: Shearwall Grid D (W4) - L=12.0' (stacked)

General Information

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

Total Wall Length	12.0 ft
Number of Stories	2
Story #1 Height	9.0 ft
Story #2 Height	10.750 ft

Framing & Chord Material :

Wood Species :	Douglas Fir-Larch		
Wood Grade :	No.2		
Fc - Prll =	1,350.0 psi	Ft - Tension	575.0 psi
Fc - Perp =	625.0 psi	E	1,600.0 ksi
Specific Gravity =	.5002		
SDC : Seismic Design Category :	D		

Sheathing

Main Sheathing

SDPWS 2015 Construction Table : 4.3A

Wood Structural Panels, Struct I, 15/32" Thk, 1-1/2" Min Pen, 10d Fstnrs

Nominal Seismic Shear Capacities (plf) :

6" Spac.	680	3" Spac.	1330
4" Spac.	1020	2" Spac.	1740

Nominal Wind Shear Capacities (plf) :

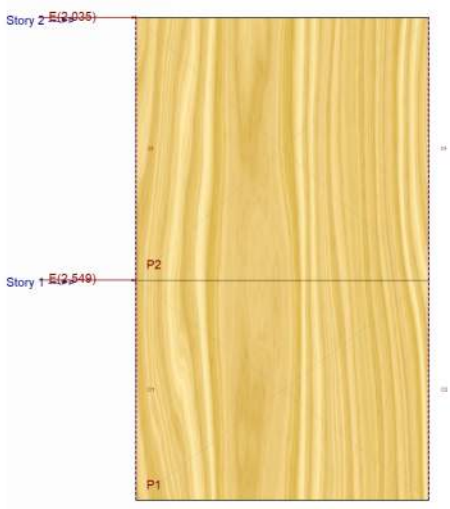
6" Spac.	950	3" Spac.	1860
4" Spac.	1430	2" Spac.	2435

Chord Data

Chord Member Size for each level : See Chord Summary Tables for number of Chords required at each panel end.

Level 1 Chord Size :	2x6	Chord Cf:	Comp:	1.0	Tens:	1.0	Max. Allow Stress Ratio : 1.0 : 1
			Chord Area =	8.250 in^2			
Level 2 Chord Size :	2x6	Chord Cf :	Comp:	1.0	Tens:	1.0	All chords treated as unbraced out-of-plane of wall for story height
			Chord Area =	8.250 in^2			

Opening ID	Dist to Left Edge	Opening Width	Dist to Bottom	Opening Height
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft



Wood Shear Wall

Project File: Alta Mira.ec6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: Shearwall Grid D (W4) - L=12.0' (stacked)

Applied Distributed Vertical Loads

Load Location (ft)			Load Magnitude (klf)					
Start Location	End Location	Height of Application	Dead	Roof Live	Live	Snow	Wind	Seismic
	12.0	19.750	0.1490	0.090				
	12.0	9.0	0.1530		0.090			

Applied Concentrated Lateral Loads

		Load Magnitude (kips)					
Load "Y" Location (ft)	Dead	Roof Live	Live	Snow	Wind	Seismic
9.0						2.549
19.750						2.035

Shear Panel Summary

Panel ID	Level #	Max Shear (kips)	Load Comb	# Sides Used	Shear Summary & Attachment Actual (plf)	Allow	Status	Attachment	Height/Width Ratio Actual	Allow	Notes
P1	1	4.171	+0.5145D+0.910E	1	347.6	510.0	OK	Use 4" at panel edges, 12" in field	0.75	3.50	Ratio OK
P2	2	1.852	+0.5145D+0.910E	1	154.3	340.0	OK	Use 6" at panel edges, 12" in field	0.90	3.50	Ratio OK

Chord Summary

Chord ID	Level #	Dist from Left (ft)	Force (kips)	Load Comb	CHORD DESIGN SUMMARY # Req'd @ Location	Member Size	Stress Ratio	Governs	Status
C1	1	0.00	0.0	+1.086D-0.910E	**2**	**2x6**	**0.52**	**Comp**	**OK**
Comp Values :	Max. Down :	8.3 k	Load Comb :	+1.086D-0.910E		Max fc =	504 psi	Allow F'c =	969 psi
Tens Values :	Max. Uplift :	5.1 k	Load Comb :	+1.086D+0.910E		Max ft =	307 psi	Allow F't =	920 psi
User-specified anchorage device :	_____ HDU5 _____								
C2	1	12.00	0.0	+1.086D+0.910E	**2**	**2x6**	**0.52**	**Comp**	**OK**
Comp Values :	Max. Down :	8.3 k	Load Comb :	+1.086D+0.910E		Max fc =	504 psi	Allow F'c =	969 psi
Tens Values :	Max. Uplift :	5.1 k	Load Comb :	+1.086D-0.910E		Max ft =	307 psi	Allow F't =	920 psi
User-specified anchorage device :	_____ HDU5 _____								
C3	2	0.00	0.0	+1.086D-0.910E	**1**	**2x6**	**0.56**	**Comp**	**OK**
Comp Values :	Max. Down :	3.3 k	Load Comb :	+1.086D-0.910E		Max fc =	404 psi	Allow F'c =	718 psi
Tens Values :	Max. Uplift :	1.7 k	Load Comb :	+1.086D+0.910E		Max ft =	201 psi	Allow F't =	920 psi
User-specified anchorage device :	_____								
C4	2	12.00	0.0	+1.086D+0.910E	**1**	**2x6**	**0.56**	**Comp**	**OK**
Comp Values :	Max. Down :	3.3 k	Load Comb :	+1.086D+0.910E		Max fc =	404 psi	Allow F'c =	718 psi
Tens Values :	Max. Uplift :	1.7 k	Load Comb :	+1.086D-0.910E		Max ft =	201 psi	Allow F't =	920 psi
User-specified anchorage device :	_____								

Chord Naming Informatio C : Item is a Chord L : Followed by level numbe # : Followed by chord number from left to ri
WL : Indicates Chord is on left edge of wall WR : Indicates Chord is on right edge of wall

SEE GRID D (W4) L=3.5' (2ND FLOOR) FOR DESIGN OF THESE SMALLER WALLS

Wood Shear Wall

Project File: Alta Mira.ec6

DESCRIPTION: Shearwall Grid D (W4) - L=12.0' (stacked)

Footing Information

Footing Dimensions

Dist. Left	1.0 ft	f'c	3.0	ksi	
Wall Length	12.0 ft	Fy	60.0	ksi	
Dist. Right	1.0 ft				
Total Ftg Length	14.0 ft				

Rebar Cover	3.0 in
Footing Thickness	16.0 in
Width	2.0 ft

(3) #5 CONT, A_s=0.93in^2

Max Factored Soil Pressures

@ Left Side of Footing 1,667.30 psf
.... governing load comb +0.90D-E

@ Right Side of Footing 1,667.30 psf
.... governing load comb +0.90D+E

Max UNfactored Soil Pressures

@ Left Side of Footing 1,097.43 psf
.... governing load comb +0.60D-0.70E

@ Right Side of Footing 1,097.43 psf
.... governing load comb +0.60D+0.70E

Footing One-Way Shear Check...

vu @ Left End of Footing	0.0 psi
vu @ Right End of Footing	0.0 psi
vn * phi : Allowable	93.113 psi

Overturning Stability...

	@ Left End of Ftg	@ Right End of Ftg
Overturning Moment	36.353 k-ft	36.353 k-ft
Resisting Moment	74.567 k-ft	74.567 k-ft
Stability Ratio	2.051 : 1	2.051 : 1
.... governing load comb	+0.60D+0.70E	+0.60D+0.70E

Footing Bending Design...

	@ Left End	@ Right End
Mu	1.580 k-ft	1.580 k-ft
Ru	5.195 psi	5.195 psi
As % Req'd	0.00180 in^2	0.00180 in^2
As Req'd in Footing Width	0.5616 in^2	0.5616 in^2

Wood Shear Wall

Project File: Alta Mira.ec6

DESCRIPTION: Shearwall Grid D (W4) - L=3.5" (2ND FLOOR LEVEL)

General Information

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

Total Wall Length	3.50 ft
Number of Stories	1
Story #1 Height	10.750 ft

Framing & Chord Material :

Wood Species :	Douglas Fir-Larch		
Wood Grade :	No.2		
Fc - Prll =	1,350.0 psi	Ft - Tension	575.0 psi
Fc - Perp =	625.0 psi	E	1,600.0 ksi
Specific Gravity =	.5002		
SDC : Seismic Design Category :	D		

Sheathing

Main Sheathing

SDPWS 2015 Construction Table : 4.3A

Wood Structural Panels, Struct I, 15/32" Thk, 1-1/2" Min Pen, 10d Fstnrs

Nominal Seismic Shear Capacities (plf) :

6" Spac.	680	3" Spac.	1330
4" Spac.	1020	2" Spac.	1740

Nominal Wind Shear Capacities (plf) :

6" Spac.	950	3" Spac.	1860
4" Spac.	1430	2" Spac.	2435

Chord Data

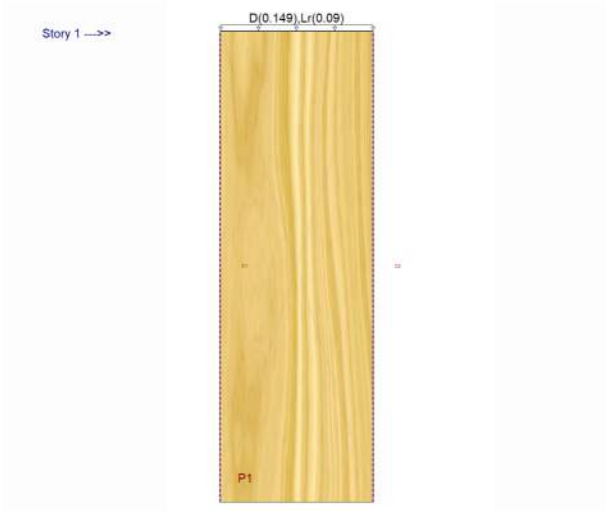
Chord Member Size for each level : See Chord Summary Tables for number of Chords required at each panel end.

Level 1 Chord Size : 2x6 Chord Cf: Comp: 1.0 Tens: 1.0 Max. Allow Stress Ratio : 1.0 : 1

Chord Area = 8.250 in^2

All chords treated as unbraced out-of-plane of wall for story height

Opening ID	Dist to Left Edge	Opening Width	Dist to Bottom	Opening Height
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft



Wood Shear Wall

Project File: Alta Mira.ec6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: Shearwall Grid D (W4) - L=3.5" (2ND FLOOR LEVEL)

Applied Distributed Vertical Loads

Load Location (ft)			Load Magnitude (klf)					
Start Location	End Location	Height of Application	Dead	Roof Live	Live	Snow	Wind	Seismic
0.0	3.50	10.750	0.1490	0.090	0.0	0.0	0.0	0.0

Applied Concentrated Lateral Loads

	Load Magnitude (kips)					
Load "Y" Location (ft)	Dead	Roof Live	Live	Snow	Wind	Seismic
10.750	0.0	0.0	0.0	0.0	0.0	1.017

Shear Panel Summary

Panel ID	Level #	Max Shear (kips)	Load Comb	# Sides Used	Shear Summary & Attachment Actual (plf)	Allow	Status	Attachment	Height/Width Ratio Actual	Allow	Notes
P1	1	0.925	+0.5145D+0.910E	1	264.4	340.0	OK	Use 6" at panel edges, 12" in field	3.07	3.50	Ratio OK

Chord Summary

Chord ID	Level #	Dist from Left (ft)	Force (kips)	Load Comb	CHORD DESIGN SUMMARY # Req'd @ Location	Member Size	Stress Ratio	Governs	Status
C1	1	0.00	0.0	+1.086D-0.910E	**1**	**2x6**	**0.56**	**Comp**	**OK**
Comp Values :	Max. Down :	3.3 k	Load Comb :	+1.086D-0.910E		Max fc =	404 psi	Allow F'c =	718 psi
Tens Values :	Max. Uplift :	2.8 k	Load Comb :	+1.086D+0.910E		Max ft =	345 psi	Allow F't =	920 psi
User-specified anchorage device : _____ HDU2 ____									
C2	1	3.50	0.0	+1.086D+0.910E	**1**	**2x6**	**0.56**	**Comp**	**OK**
Comp Values :	Max. Down :	3.3 k	Load Comb :	+1.086D+0.910E		Max fc =	404 psi	Allow F'c =	718 psi
Tens Values :	Max. Uplift :	2.8 k	Load Comb :	+1.086D-0.910E		Max ft =	345 psi	Allow F't =	920 psi
User-specified anchorage device : _____ HDU2 ____									

Chord Naming Informatio C : Item is a Chord L : Followed by level numbe # : Followed by chord number from left to ri
WL : Indicates Chord is on left edge of wall WR : Indicates Chord is on right edge of wall

Wood Shear Wall

Project File: Alta Mira.ec6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: Shearwall Grid G (W5) - L=11.0' (stacked)

General Information

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

Total Wall Length	11.0 ft
Number of Stories	2
Story #1 Height	9.0 ft
Story #2 Height	10.750 ft

Framing & Chord Material :

Wood Species :	Douglas Fir-Larch		
Wood Grade :	No.2		
Fc - Prll =	1,350.0 psi	Ft - Tension	575.0 psi
Fc - Perp =	625.0 psi	E	1,600.0 ksi
Specific Gravity =	.5002		
SDC : Seismic Design Category :	D		

Sheathing

Main Sheathing

SDPWS 2015 Construction Table : 4.3A

Wood Structural Panels, Struct I, 15/32" Thk, 1-1/2" Min Pen, 10d Fstnrs

Nominal Seismic Shear Capacities (plf) :

6" Spac.	680	3" Spac.	1330
4" Spac.	1020	2" Spac.	1740

Nominal Wind Shear Capacities (plf) :

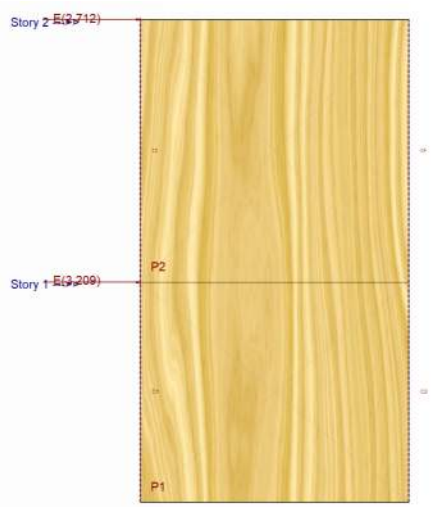
6" Spac.	950	3" Spac.	1860
4" Spac.	1430	2" Spac.	2435

Chord Data

Chord Member Size for each level : See Chord Summary Tables for number of Chords required at each panel end.

Level 1 Chord Size :	2x6	Chord Cf:	Comp:	1.0	Tens:	1.0	Max. Allow Stress Ratio : 1.0 : 1
			Chord Area =	8.250 in^2			
Level 2 Chord Size :	2x6	Chord Cf :	Comp:	1.0	Tens:	1.0	All chords treated as unbraced out-of-plane of wall for story height
			Chord Area =	8.250 in^2			

Opening ID	Dist to Left Edge	Opening Width	Dist to Bottom	Opening Height
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft



Wood Shear Wall

Project File: Alta Mira.ec6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: Shearwall Grid G (W5) - L=11.0' (stacked)

Applied Concentrated Lateral Loads

Load "Y" Location (ft)	Load Magnitude (kips) Dead	Roof Live	Live	Snow	Wind	Seismic
9.0						3.209
19.750						2.712

Shear Panel Summary

Panel ID	Level #	Max Shear (kips)	Load Comb	# Sides Used	Shear Summary & Attachment Actual (plf)	Allow	Status	Attachment	Height/Width Ratio Actual	Allow	Notes
P1	1	5.388	+0.5145D+0.910E	1	489.8	510.0	OK	Use 4" at panel edges, 12" in field	0.82	3.50	Ratio OK
P2	2	2.468	+0.5145D+0.910E	1	224.4	340.0	OK	Use 6" at panel edges, 12" in field	0.98	3.50	Ratio OK

Chord Summary

CHORD DESIGN SUMMARY

Chord ID	Level #	Dist from Left (ft)	Force (kips)	Load Comb	# Req'd @ Location	Member Size	Stress Ratio	Governs	Status
C1	1	0.00	0.0	+1.086D-0.910E	**2**	**2x6**	**0.52**	**Comp**	**OK**
Comp Values :	Max. Down :	8.4 k	Load Comb :	+1.086D-0.910E		Max fc =	509 psi	Allow F'c =	969 psi
Tens Values :	Max. Uplift :	7.2 k	Load Comb :	+1.086D+0.910E		Max ft =	437 psi	Allow F't =	920 psi
User-specified anchorage device : ___ HDU8 _____									
C2	1	11.00	0.0	+1.086D+0.910E	**2**	**2x6**	**0.52**	**Comp**	**OK**
Comp Values :	Max. Down :	8.4 k	Load Comb :	+1.086D+0.910E		Max fc =	509 psi	Allow F'c =	969 psi
Tens Values :	Max. Uplift :	7.2 k	Load Comb :	+1.086D-0.910E		Max ft =	437 psi	Allow F't =	920 psi
User-specified anchorage device : ___ HDU8 _____									
C3	2	0.00	0.0	+1.086D-0.910E	**1**	**2x6**	**0.52**	**Comp**	**OK**
Comp Values :	Max. Down :	3.1 k	Load Comb :	+1.086D-0.910E		Max fc =	370 psi	Allow F'c =	718 psi
Tens Values :	Max. Uplift :	2.4 k	Load Comb :	+1.086D+0.910E		Max ft =	292 psi	Allow F't =	920 psi
User-specified anchorage device : ___ HDU2 _____									
C4	2	11.00	0.0	+1.086D+0.910E	**1**	**2x6**	**0.52**	**Comp**	**OK**
Comp Values :	Max. Down :	3.1 k	Load Comb :	+1.086D+0.910E		Max fc =	370 psi	Allow F'c =	718 psi
Tens Values :	Max. Uplift :	2.4 k	Load Comb :	+1.086D-0.910E		Max ft =	292 psi	Allow F't =	920 psi
User-specified anchorage device : ___ HDU2 _____									

Chord Naming Informatio C : Item is a Chord L : Followed by level numbe # : Followed by chord number from left to ri
WL : Indicates Chord is on left edge of wall WR : Indicates Chord is on right edge of wall

Wood Shear Wall

Project File: Alta Mira.ec6

DESCRIPTION: Shearwall Grid G (W5) - L=11.0' (stacked)

Footing Information

Footing Dimensions

Dist. Left	1.0 ft	f'c	3.0	ksi	
Wall Length	11.0 ft	Fy	60.0	ksi	
Dist. Right	1.0 ft				
Total Ftg Length	13.0 ft				

Rebar Cover	3.0 in
Footing Thickness	16.0 in
Width	2.0 ft

(3) #5 CONT, A_s=0.93in^2

Max Factored Soil Pressures

@ Left Side of Footing 363.558 psf
.... governing load comb +1.40D

@ Right Side of Footing 363.558 psf
.... governing load comb +1.40D

Max UNfactored Soil Pressures

@ Left Side of Footing 36,677.8 psf
.... governing load comb +D-0.70E

@ Right Side of Footing 36,677.8 psf
.... governing load comb +D+0.70E

Footing One-Way Shear Check...

vu @ Left End of Footing	0.0 psi
vu @ Right End of Footing	0.0 psi
vn * phi : Allowable	93.113 psi

Overturning Stability...

	@ Left End of Ftg	@ Right End of Ftg
Overturning Moment	47.427 k-ft	47.427 k-ft
Resisting Moment	117.985 k-ft	117.985 k-ft
Stability Ratio	2.488 : 1	2.488 : 1
.... governing load comb	+0.60D+0.70E	+0.60D+0.70E

Footing Bending Design...

	@ Left End	@ Right End
Mu	0.3636 k-ft	0.3636 k-ft
Ru	1.195 psi	1.195 psi
As % Req'd	0.00180 in^2	0.00180 in^2
As Req'd in Footing Width	0.5616 in^2	0.5616 in^2

Wood Shear Wall

Project File: Alta Mira.ec6

LIC# : KW-06015806, Build:20.23.07.20 Tepa (c) ENERCALC INC 1983-2023

DESCRIPTION: Shearwall Grid I (W6) - L=16.0' (stacked)

General Information

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

Total Wall Length	8.0 ft
Number of Stories	2
Story #1 Height	9.0 ft
Story #2 Height	10.750 ft

Framing & Chord Material :

Wood Species :	Douglas Fir-Larch		
Wood Grade :	No.2		
Fc - Prll =	1,350.0 psi	Ft - Tension	575.0 psi
Fc - Perp =	625.0 psi	E	1,600.0 ksi
Specific Gravity =	.5002		
SDC : Seismic Design Category :	D		

Sheathing

Main Sheathing

SDPWS 2015 Construction Table : 4.3A

Wood Structural Panels, Struct I, 15/32" Thk, 1-1/2" Min Pen, 10d Fstnrs

Nominal Seismic Shear Capacities (plf) :

6" Spac.	680	3" Spac.	1330
4" Spac.	1020	2" Spac.	1740

Nominal Wind Shear Capacities (plf) :

6" Spac.	950	3" Spac.	1860
4" Spac.	1430	2" Spac.	2435

Chord Data

Chord Member Size for each level : See Chord Summary Tables for number of Chords required at each panel end.

Level 1 Chord Size : 4x6 Chord Cf: Comp: 1.0 Tens: 1.0 Max. Allow Stress Ratio : 1.0 : 1

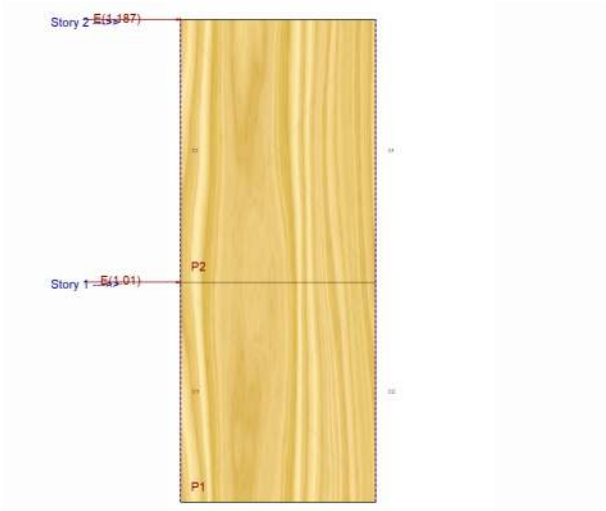
Chord Area = 19.250 in^2

Level 2 Chord Size : 2x6 Chord Cf : Comp: 1.0 Tens: 1.0

Chord Area = 8.250 in^2

All chords treated as unbraced out-of-plane of wall for story height

Opening ID	Dist to Left Edge	Opening Width	Dist to Bottom	Opening Height
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft
				ft



Wood Shear Wall

Project File: Alta Mira.ec6

DESCRIPTION: Shearwall Grid I (W6) - L=16.0' (stacked)

Applied Distributed Vertical Loads

Load Location (ft)			Load Magnitude (klf)					
Start Location	End Location	Height of Application	Dead	Roof Live	Live	Snow	Wind	Seismic
0.0	16.0	9.0	0.0860	0.0	0.080	0.0	0.0	0.0
0.0	16.0	19.750	0.0660	0.040	0.0	0.0	0.0	0.0

Applied Concentrated Lateral Loads

	Load Magnitude (kips)					
Load "Y" Location (ft)	Dead	Roof Live	Live	Snow	Wind	Seismic
9.0	0.0	0.0	0.0	0.0	0.0	1.010
19.750	0.0	0.0	0.0	0.0	0.0	1.187

Shear Panel Summary

Panel ID	Level #	Max Shear (kips)	Load Comb	# Sides Used	Shear Summary & Attachment Actual (plf)	Allow	Status	Attachment	Height/Width Ratio Actual	Allow	Notes
P1	1	1.999	+0.5145D+0.910E	1	249.9	340.0	OK	Use 6" at panel edges, 12" in field	1.13	3.50	Ratio OK
P2	2	1.080	+0.5145D+0.910E	1	135.0	340.0	OK	Use 6" at panel edges, 12" in field	1.34	3.50	Ratio OK

Chord Summary

Chord ID	Level #	Dist from Left (ft)	Force (kips)	Load Comb	CHORD DESIGN SUMMARY # Req'd @ Location	Member Size	Stress Ratio	Governs	Status
C1	1	0.00	0.0	+1.086D-0.910E	**1**	**4x6**	**0.29**	**Comp**	**OK**
Comp Values :	Max. Down :	5.5 k	Load Comb :	+1.086D-0.910E		Max fc =	283 psi	Allow F'c =	969 psi
Tens Values :	Max. Uplift :	3.9 k	Load Comb :	+1.086D+0.910E		Max ft =	205 psi	Allow F't =	920 psi
User-specified anchorage device : _____									
C2	1	8.00	0.0	+1.086D+0.910E	**1**	**4x6**	**0.29**	**Comp**	**OK**
Comp Values :	Max. Down :	5.5 k	Load Comb :	+1.086D+0.910E		Max fc =	283 psi	Allow F'c =	969 psi
Tens Values :	Max. Uplift :	3.9 k	Load Comb :	+1.086D-0.910E		Max ft =	205 psi	Allow F't =	920 psi
User-specified anchorage device : _____									
C3	2	0.00	0.0	+1.086D-0.910E	**1**	**2x6**	**0.37**	**Comp**	**OK**
Comp Values :	Max. Down :	2.2 k	Load Comb :	+1.086D-0.910E		Max fc =	267 psi	Allow F'c =	718 psi
Tens Values :	Max. Uplift :	1.5 k	Load Comb :	+1.086D+0.910E		Max ft =	176 psi	Allow F't =	920 psi
User-specified anchorage device : _____									
C4	2	8.00	0.0	+1.086D+0.910E	**1**	**2x6**	**0.37**	**Comp**	**OK**
Comp Values :	Max. Down :	2.2 k	Load Comb :	+1.086D+0.910E		Max fc =	267 psi	Allow F'c =	718 psi
Tens Values :	Max. Uplift :	1.5 k	Load Comb :	+1.086D-0.910E		Max ft =	176 psi	Allow F't =	920 psi
User-specified anchorage device : _____									

Chord Naming Informatio C : Item is a Chord L : Followed by level numbe # : Followed by chord number from left to ri
WL : Indicates Chord is on left edge of wall WR : Indicates Chord is on right edge of wall

Wood Shear Wall

Project File: Alta Mira.ec6

DESCRIPTION: Shearwall Grid I (W6) - L=16.0' (stacked)

Footing Information

Footing Dimensions

Dist. Left	1.0 ft	f'c	3.0 ksi			Rebar Cover	3.0 in
Wall Length	8.0 ft	Fy	60.0 ksi			Footing Thickness	16.0 in
Dist. Right	0.250 ft					Width	2.0 ft
Total Ftg Length	9.250 ft						

Max Factored Soil Pressures

@ Left Side of Footing 1,024.03 psf
.... governing load comb +0.90D-E

@ Right Side of Footing 20,441.7 psf
.... governing load comb +1.20D+L+E

Max UNfactored Soil Pressures

@ Left Side of Footing 726.97 psf
.... governing load comb +0.60D-0.70E

@ Right Side of Footing 3,407.73 psf
.... governing load comb +D+0.70E

Footing One-Way Shear Check...

vu @ Left End of Footing	0.0 psi
vu @ Right End of Footing	0.0 psi
vn * phi : Allowable	93.113 psi

Overturning Stability...

	@ Left End of Ftg	@ Right End of Ftg
Overturning Moment	18.618 k-ft	18.618 k-ft
Resisting Moment	39.079 k-ft	26.311 k-ft
Stability Ratio	2.099 : 1	1.413 : 1
.... governing load comb	+0.60D+0.70E	+0.60D+0.70E

Footing Bending Design...

	@ Left End	@ Right End
Mu	0.9748 k-ft	1.065 k-ft
Ru	3.204 psi	3.50 psi
As % Req'd	0.00180 in^2	0.00180 in^2
As Req'd in Footing Width	0.5616 in^2	0.5616 in^2

DIAPHRAGMS

Date
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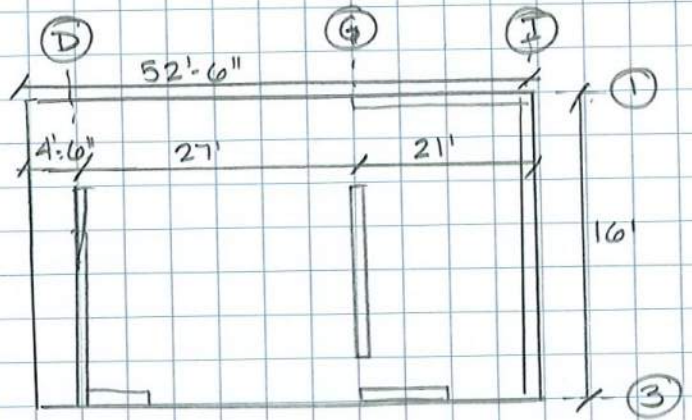
Diaphragm

At Roof

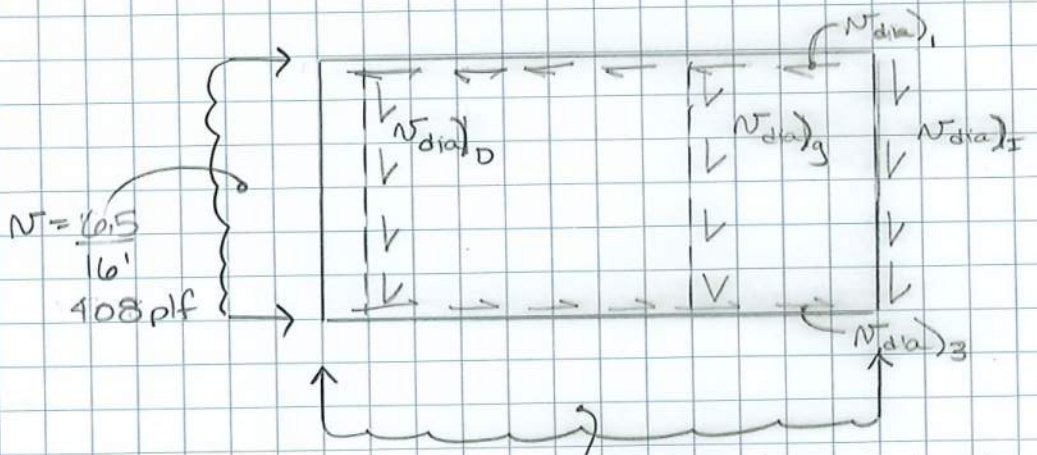
L/W = 52.5'/16'
= 3.3

per SDPWS 2015
table 4.2.4
max L/W = 4.0
for blocked diaphragms
∴ OK



requirements of 4.2.5.2 are not applicable since "wood diaphragm in open front structure in which diaphragm edge cantilevers no more than 6'-0" beyond nearest line of vertical support." and roof overhang = 4'-6"

per horizontal distribution, F_{px} = 6520# (governed by story shear)



diaphragm shears

$v_{dia})_D$ = 124 plf (4.0' + 27'/2)/16' = 140 plf (V_D = 2240#)
$v_{dia})_G$ = 124 plf (27'/2 + 21'/2)/16' = 186 plf (V_G = 2976#)
v_{dia-I} = 124 plf (21'/2)/16' = 81 plf (V_I = 1296#)

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$N_{(dia)_1}$ = 408plf (16'/2)/52.5' = 62.2plf V_1 = 3264

$N_{dia\,3}$ = 408plf (16'/2)/52.5' = 62.2plf V_3 = 3264

for diaphragm

15/32" structI ply w/ 10d@6"BN/EN

N_{nom} = 640plf for 2x framing

per SDPWS 4.2.3, $\frac{N_{nom}}{2.0} = N_{ASD} = \frac{640plf}{2} = 320plf$

$\therefore N_{ASD}$ = 186plf (0.7) = 130plf < 320plf (worst case)

∴ OK

use min 15/32" struct I ply w/ 10d@6" BN/EN 12"FN 1½" min embed into framing

Chord Forces

$CF_{D/I} = \frac{408plf\,(16')^2}{8(48')} = 272\#$

$CF_{1/3} = \frac{124plf\,(27ft)^2}{8(16')} = 706\#$

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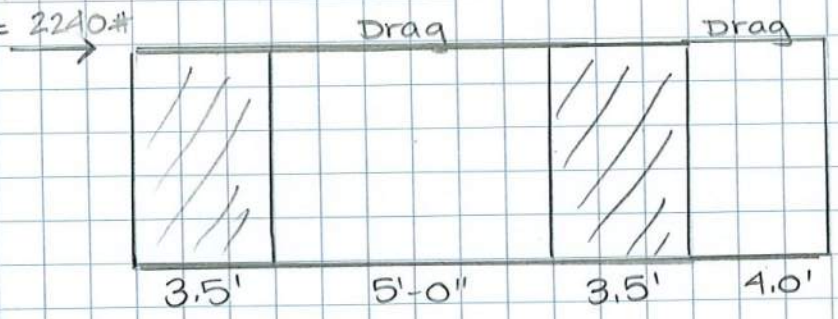
DF (collector) @ grid D

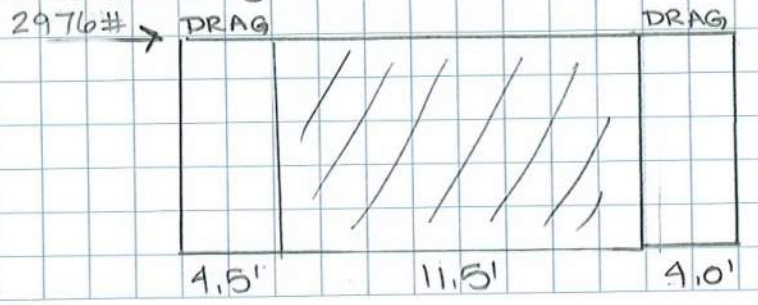


per 12.10.2.1 Exception: "In structures or portions thereof braced entirely by wood light-frame shear walls, collectors, and their connections, including connections to vertical elements" are not req'd to be designed using overstrength factor.

* continuous glulam over walls so no special attachment to wall, check glulam for axial load,

by inspection glb ok - per RISA Floor d/c = 0.24 so mimimal CF will be <1.0

DF (collector) @ grid G



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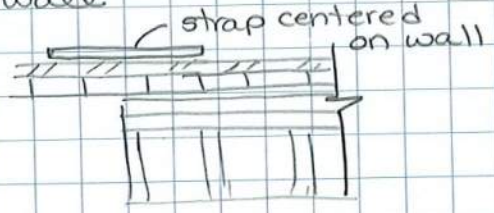
* @ grid 6 there is no continuous glulam over wall use straps to transfer diaphram/DF to top of wall

DF = 186 plf (4.5') (0.7) = 585 #, use MSTA9

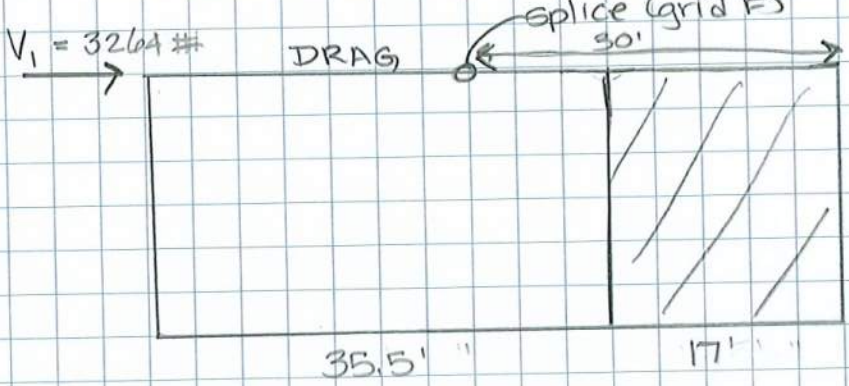
(worst case; 0.7 = ASD)

T_a = 750# > 585# ∴ ok

strap from top of ply diaphragm into top of wall



DF (collector) @ grid 1



* Glulam continuous @ grid 1 except for splice @ grid F ∴ no special connection req'd to wall, but required above splice. Per previous calcs, CF = 706 #

DF = 62.2 plf (36') = 2239 # ∴ DF governs

∴ need T = 0.7 (2239#) = 1567 # for ASD

use MSTA30 over splice, inboard of parapet over glulam beams, T_a = 2050 #

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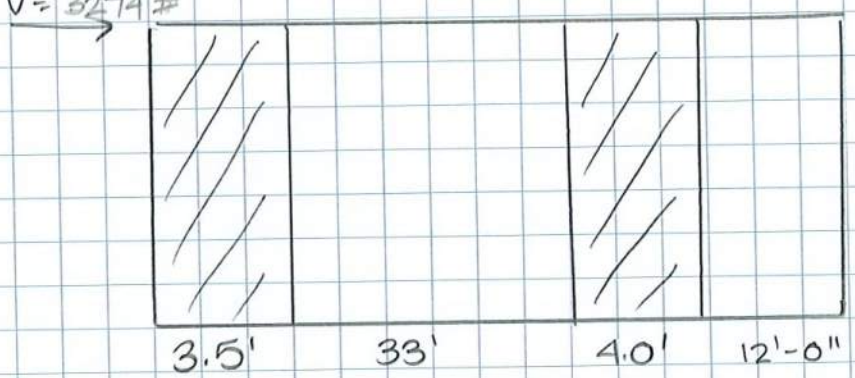
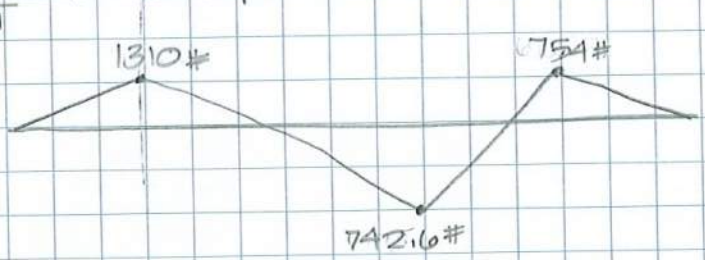
DF (collector @ grid 3)

V = 3274 #



$N_{gw} = \frac{3274\ \#}{7.5'} = 436.5\ plf$



* Glulams are not continuous at this grid, spliced at every bm (4.5' oc), ∴ need splice straps

DF = 0.7 (1082 #) = 1310 #, CF = 0.7 (706 #)

∴ use MSTA 30 over ea splice, T_a = 2050 #

<u>diaphragm deflections</u>

for deflection, the diaphragm loading used is the base shear vertical distribution instead of F_{px} because the shearwalls and diaphragm can then be directly added to calculate total structure's max displacement.

$$\delta_{dia} = \frac{5vL^3}{8EAW} + \frac{0.25vL}{1000G_a} + \frac{\Sigma(x\Delta_c)}{2W}$$

Date

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dia #	grids	v (plf)	L (ft)	W (ft)	$\frac{5vL^3}{8EAW}$ (in)	$\frac{0.25vL}{1000G_a}$ (in)	$\frac{\Sigma \times \Delta_c}{2W}$ (in)	δ_{dia} (in)
1	D/G	102	27	16	0.00057	0.091	0.005	0.047
2	G/I	102	21	16	0.00027	0.032	0.005	0.037
3	1/3	338	16	48	0.00013	0.080	0	0.080

for $5\frac{1}{8}$" x 15 glulam chords: $A = 5.125 \times 15 = 76.875 in^2$

$E = 1.8 \times 10^6$ psi

for 15/32" ply diaphragm w/ 10d @ 6" BN/EN; $G_a = 17$ k/in

$\Delta_c = 0$ where continuous chords @ D/I

$= 0.148$ in (dia of fastener in strap) - conservative dia hole is less than 2x dia of nail

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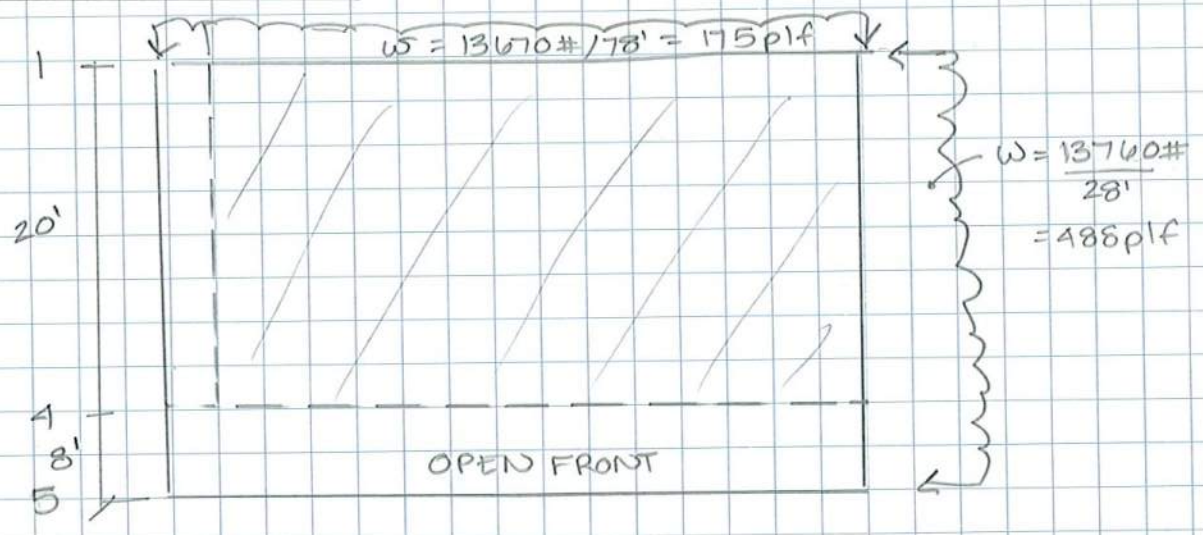
Diaphragm Design - Floor (F_{px} = 13670#)



per SDPWS 4.2.5 for open-front structures

1. Diaphragm is wood structural panel diaphragm (blocked) over lumber decking per 4.2.7.1
2. 4'/w' = 8'/78' = 0.10 < 1.5 ∴ OK
3. For loading ⊥ to open-front, diaphragm modeled as semi-rigid or idealized as rigid
4. cantilever length = 8' < 35'

* floor diaphragm must be checked as rigid diaphragm and flexible - envelope solution

diaphragm shears

A.5	175plf (4.5'+26'/2)/(28')	= 109 plf
D	175plf (26'+27')/2/(28')	= 165plf
G	175 plf (27'+21')/2/(28')	= 150plf
I	175 plf (21'/2)/(28')	= 65plf
1	486plf (16'/2)/78	= 50 plf
3/4	486plf (12'+16'/2)/78	= 125 plf

use 15/32" blocked w/ 10d @ 6/6/12

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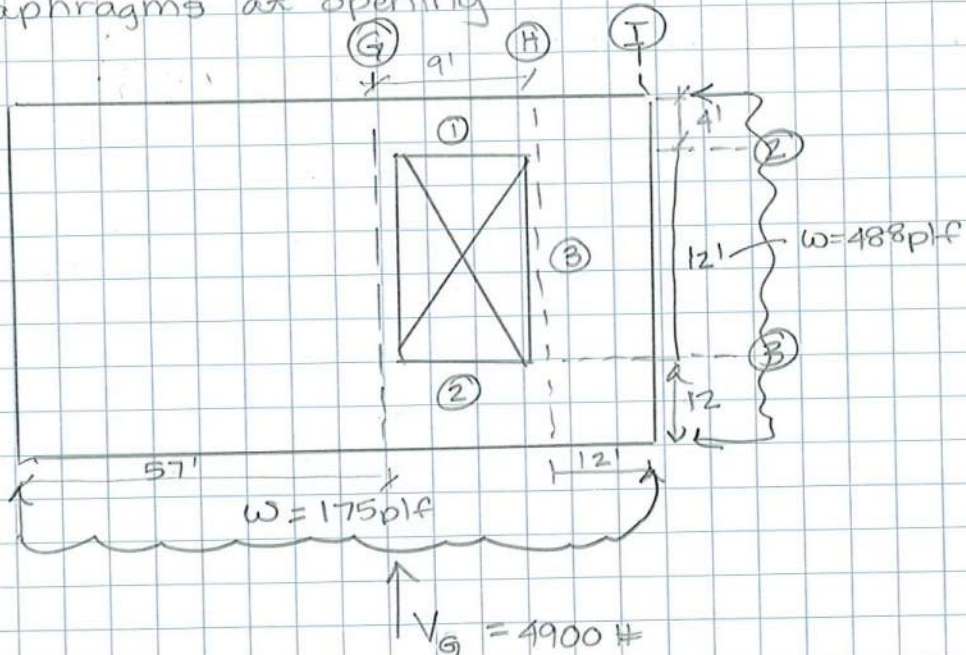
check diaphragms at opening



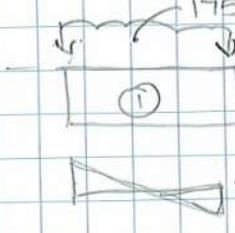
$V_G = 4900\#$

$N = \frac{4900\#}{4' + 12'} = 306\ plf < 320plf$

∴ ok for typ diaphragm nailing

for straps - apply full load (conservative)

$V_G = \frac{4900\#(12')}{28'} = 2100\#$



$T_{G/H}$

$V_{G/H} = 787\#$

$T_{2/3} = \frac{175plf(9')^2}{8(4')} = 443\#$

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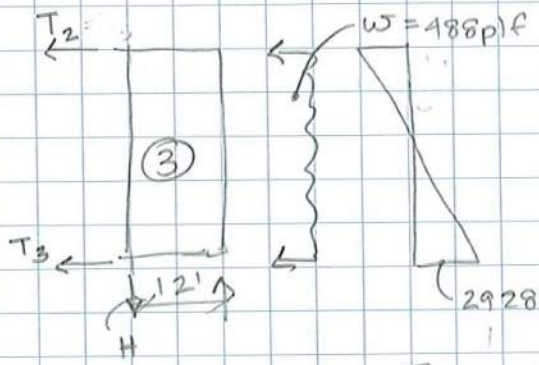
$V_3 = \frac{488\,plf\,(116'/2 + 12')}{69'} = \frac{9760\,\#}{69'} = 141\,plf$ < 320 ∴ OK

due to opening L = 78 − 9 = 69'



$T_H = \frac{488\,plf\,(12')^2}{8\,(12)} = 732\,\#$

$T_2 = T_3 = 2928\,\#$

combine forces

$T_2 = T_3 = 2928\,\# + 443\,\# = 3371\,\#\,(0.7) = 2359\,\#$

$T_G = T_H = 787\,\# + 732\,\# = 1519\,\#\,(0.7) = 1063\,\#$

use CS14

all sides of opening

$T_a = 2390\,\#$

LATERAL ANALYSIS
AREA B

Date

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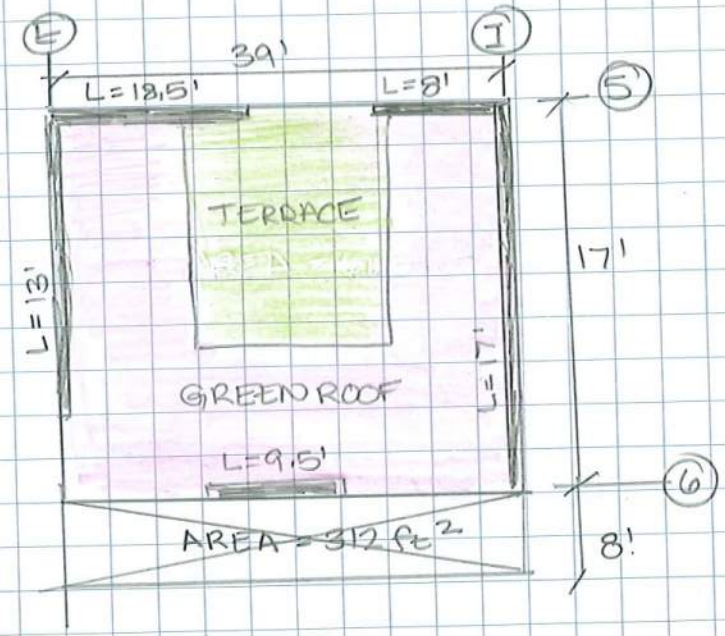
THIS LEVEL ONLY CHANGE WAS SHEARWALL TYPE AND LENGTHS. NO CHANGE TO DIAPHRAGM, PER PREVIOUSLY APPROVED DESIGN.

1-Story House (PART B)

$h_{wall} = 9.5'$

$V = 1.36(0.7)(4.67^k)$
$= 4.25^k$ ASD



$V_E = V_I = 4.25^k / 2 = 2.125^k$

$L = 13'$

$v = 2.125^k / 13' = 163 plf$

use type 6 wall
$v_a = 340 plf$

$OTM = 2125\#(10.25') = 21781\#$

$RM = [50\,psf(4.5'/2) + 22\,psf(10.25')](13')^2/2 = 28561\#'$

$T_{net} = \dfrac{21781\# - 0.5(28561\#')}{12.5'} = 577\#$

use HDU 2
$T_a = 3075\#$

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$V_5 = V_6 = 2125\#$

$L = 9.5'$

$v = 2125\#/9.5' = 223\ plf$

use type 6 wall
$v_a = 340 plf$

$OTM = 2125\#(10.25') = 21781\ \#'$

$RM = (34 psf(17\frac{1}{2}) + 22 psf(9.5'))(9.5')^2/2 = 22472\ \#'$

$T_{net} = \dfrac{21781\ \#' - 0.51(22472\ \#')}{9'} = 1146\ \#$

use HDU2
$T_a = 3075\#$

SUPPORTING DOCUMENTATION

Date

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Shear wall schedule per SDPWS 15 (seismic loads)

from table 4.3A for 15/32" struct I ply 10d common nails

EN	v_{nom} (plf)	v_{ASD} (plf)
6"	680	340
4"	1020	510
3"	1330	665
2"	1740	870

per 4.3.3, ASD allowable unit shear = $v_{nom}/2.0$

for given capacities req'd shear transfer

@ base, 5/8" ϕ AB, per NDS table 12.E
V_{all} = 930# for loads parallel
C_D = 1.6 to grain

∴ for v AB spacing

v	AB spacing
340	48" ← 930#(1.6)/340plf = 52"
510	32"
665	24"
870	16"

@ sill @ floor, use SDWS22800
L = 8"
V = 395#

length = 3.5" + 3/4" + 1.5 = 5.75" (deck + ply + sill)
embed = 2" ∴ need 8" long

for v	SDWS spacing
340	16" ← 395(1.6)/340 plf = 22"
510	12"
665	8"
870	8"

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@ top pl to glulam
use SDWS22600DB
L = 6"
V = 405 # ∴ use same spacing as SN

length = (1.5" x 2) = 3"
use 6" long (SDWS22600DB)

Table 4.3A Nominal Unit Shear Capacities for Wood-Frame Shear Walls[1,3,6,7]

Wood-based Panels[4]

Sheathing Material	Minimum Nominal Panel Thickness (in.)	Minimum Fastener Penetration in Framing Member or Blocking (in.)	Fastener Type & Size	A SEISMIC										B WIND			
				Panel Edge Fastener Spacing (in.)										Panel Edge Fastener Spacing (in.)			
				6			4			3			2				
				v_s (plf)	G_a (kips/in.)		v_s (plf)	G_a (kips/in.)		v_s (plf)	G_a (kips/in.)		v_s (plf)	G_a (kips/in.)		6 v_w (plf)	4 v_w (plf)	3 v_w (plf)	2 v_w (plf)
			Nail (common or galvanized box)		OSB	PLY		OSB	PLY		OSB	PLY		OSB	PLY				
Wood Structural Panels - Structural I[5]	5/16	1-1/4	6d	400	13	10	600	18	13	780	23	16	1020	35	22	560	840	1090	1430
	3/8 7/16 15/32	1-3/8	8d	460 510 560	19 16 14	14 13 11	720 790 860	24 21 18	17 16 14	920 1010 1100	30 27 24	20 19 17	1220 1340 1460	43 40 37	24 24 23	645 715 785	1010 1105 1205	1290 1415 1540	1710 1875 2045
	15/32	1-1/2	10d	680	22	16	1020	29	20	1330	36	22	1740	51	28	950	1430	1860	2435
Wood Structural Panels - Sheathing[4,5]	5/16 3/8	1-1/4	6d	360 400	13 11	9.5 8.5	540 600	18 15	12 11	700 780	24 20	14 13	900 1020	37 32	18 17	505 560	755 840	980 1090	1260 1430
	3/8 7/16 15/32	1-3/8	8d	440 480 520	17 15 13	12 11 10	640 700 760	25 22 19	15 14 13	820 900 980	31 28 25	17 17 15	1060 1170 1280	45 42 39	20 21 20	615 670 730	895 980 1065	1150 1260 1370	1485 1640 1790
	15/32 19/32	1-1/2	10d	620 680	22 19	14 13	920 1020	30 26	17 16	1200 1330	37 33	19 18	1540 1740	52 48	23 22	870 950	1290 1430	1680 1860	2155 2435
Plywood Siding	5/16 3/8	1-1/4 1-3/8	Nail (galvanized casing) 6d 8d	280 320	13 16		420 480	16 18		550 620	17 20		720 820	21 22		390 450	590 670	770 870	1010 1150
Particleboard Sheathing - (M-S "Exterior Glue" and M-2 "Exterior Glue")	3/8		Nail (common or galvanized box) 6d	240	15		360	17		460	19		600	22		335	505	645	840
	3/8 1/2		8d	260 280	18 18		380 420	20 20		480 540	21 22		630 700	23 24		365 390	530 590	670 755	880 980
	1/2 5/8		10d	370 400	21 21		550 610	23 23		720 790	24 24		920 1040	25 26		520 560	770 855	1010 1105	1290 1455
Structural Fiberboard Sheathing	1/2		Nail (galvanized roofing) 11 ga. galv. roofing nail (0.120" x 1-1/2" long x 7/16" head)				340	4.0		460	5.0		520	5.5			475	645	730
	25/32		11 ga. galv. roofing nail (0.120" x 1-3/4" long x 3/8" head)				340	4.0		460	5.0		520	5.5			475	645	730

1. Nominal unit shear capacities shall be adjusted in accordance with 4.3.3 to determine ASD allowable unit shear capacity and LRFD factored unit resistance. For general construction requirements see 4.3.6. For specific requirements, see 4.3.7.1 for wood structural panel shear walls, 4.3.7.2 for particleboard shear walls, and 4.3.7.3 for fiberboard shear walls. See Appendix A for common and box nail dimensions.
2. Shears are permitted to be increased to values shown for 15/32 inch (nominal) sheathing with same nailing provided (a) studs are spaced a maximum of 16 inches on center, or (b) panels are applied with long dimension across studs.
3. For species and grades of framing other than Douglas-Fir-Larch or Southern Pine, reduced nominal unit shear capacities shall be determined by multiplying the tabulated nominal unit shear capacity by the Specific Gravity Adjustment Factor = [1-(0.5-G)], where G = Specific Gravity of the framing lumber from the NDS (Table 12.3.3A). The Specific Gravity Adjustment Factor shall not be greater than 1.
4. Apparent shear stiffness values G_a are based on nail slip in framing with moisture content less than or equal to 19% at time of fabrication and panel stiffness values for shear walls constructed with either OSB or 3-ply plywood panels. When 4-ply or 5-ply plywood panels or composite panels are used, G_a values shall be permitted to be multiplied by 1.2.
5. Where moisture content of the framing is greater than 19% at time of fabrication, G_a values shall be multiplied by 0.5.
6. Where panels are applied on both faces of a shear wall and nail spacing is less than 6" on center on either side, panel joints shall be offset to fall on different framing members as shown below. Alternatively, the width of the nailed face of framing members shall be 3" nominal or greater at adjoining panel edges and nails at all panel edges shall be staggered.
7. Galvanized nails shall be hot-dipped or tumbled.

Structural and General Fastening

Strong-Drive®

SDWS TIMBER Screw (Exterior Grade)

Structural Wood-to-Wood Connections Including Ledgers, Indoor/Outdoor Projects

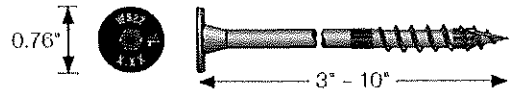
Designed to provide an easy-to-install, high-strength alternative to through-bolting and traditional lag screws. The Strong-Drive SDWS Timber screws are ideal for the contractor and do-it-yourselfer alike.

Double-barrier coating provides corrosion resistance equivalent to hot-dip galvanization, making it suitable for certain exterior and preservative-treated wood applications, as described in the evaluation report.

Codes/Standards: IAPMO UES ER-192, State of Florida FL13975

US Patent 9,523,383

For more information, see p. 59, C-F-2023 *Fastening Systems* catalog



SDWS Timber Screw — Allowable Shear Loads — Douglas Fir–Larch and Southern Pine Lumber

Length (in.)	Model No.	Thread Length (in.)	Reference DFL/SP Allowable Shear Loads (lb.)								
			Wood Side Member Thickness (in.)								
			1.5	2	2.5	3	3.5	4	4.5	6	8
3	SDWS22300DB	1½	255	—	—	—	—	—	—	—	—
4	SDWS22400DB	2⅜	405	405	305	—	—	—	—	—	—
5	SDWS22500DB	3	405	405	360	360	325	—	—	—	—
6	SDWS22600DB	3	405	405	405	405	365	365	355	—	—
8	SDWS22800DB	3	405	405	405	405	395	395	395	395	—
10	SDWS221000DB	3	405	405	405	405	395	395	395	395	395

See footnotes below.

SDWS Timber Screw — Allowable Shear Loads — Spruce-Pine-Fir and Hem-Fir Lumber

Length (in.)	Model No.	Thread Length (in.)	Reference SPF/HF Allowable Shear Loads (lb.)								
			Wood Side Member Thickness (in.)								
			1.5	2	2.5	3	3.5	4	4.5	6	8
3	SDWS22300DB	1½	190	—	—	—	—	—	—	—	—
4	SDWS22400DB	2⅜	385	285	215	—	—	—	—	—	—
5	SDWS22500DB	3	405	290	290	290	195	—	—	—	—
6	SDWS22600DB	3	405	365	365	365	310	310	210	—	—
8	SDWS22800DB	3	405	365	365	365	310	310	280	280	—
10	SDWS221000DB	3	405	365	365	365	310	310	280	280	280

1. All applications are based on full penetration into the main member. Full penetration is the screw length minus the side member thickness.
2. Allowable loads are shown at the wood load duration factor of C_D = 1.0. Loads may be increased for load duration per the building code up to a C_D = 1.6. Tabulated values must be multiplied by all applicable adjustment factors per the NDS.
3. For minimum fastener spacing requirements for both side and main members, see the Spacing Requirements Figure and Table on the next page.
4. For in-service moisture content greater than 19%, use C_M = 0.7.
5. Loads are based on installation into the side grain of the wood with the screw axis perpendicular to the face of the member.

Date

Project Alta Mira

Contact PD

Phone

Holddown Schedule

Type	Tail (#)	Min Post	AB ϕ	CMU wall AB. Tail	Lembed (in)	Governing Capacity
HDU2	3075	2-2x4	5/8	8136	12	3075
HDU4	4565	2-2x4	5/8	8136	12	4565
HDU5	5645	2-2x4	5/8	8136	12	5645
HDU8	7870	4x6	7/8	8615	12	7870
HDU11	9535	4x6	1	N/A	12	9535
HDU14	14445	6x6	1	N/A	12	14445

* for 1" anchors use concrete ftg

HDU/DTT

Holdowns

This product is preferable to similar connectors because of (a) easier installation, (b) higher loads, (c) lower installed cost, or a combination of these features.

HDU holdowns are pre-deflected during the manufacturing process, virtually eliminating deflection under load due to material stretch. They use Strong-Drive® SDS Heavy-Duty Connector screws which install easily, reduce fastener slip and provide a greater net section when compared to bolts.

The DTT tension ties are designed for lighter-duty holdown applications on single 2x posts. The DTT1Z is installed with nails or Strong-Drive SD Connector screws and the DTT2 installs easily with the Strong-Drive SDS Heavy-Duty Connector screws (included). The DTT1Z holdowns have been tested for use in designed shearwalls and prescriptive braced wall panels as well as prescriptive wood-deck applications (see p. 295 for deck applications).

For more information on holdown options, contact Simpson Strong-Tie.

HDU Features:

- Uses Strong-Drive SDS Heavy-Duty Connector screws which install easily, reduce fastener slip and provide a greater net section area of the post compared to bolts
- Strong-Drive SDS Heavy-Duty Connector screws are supplied with the holdowns to ensure proper fasteners are used
- No stud bolts to countersink at openings

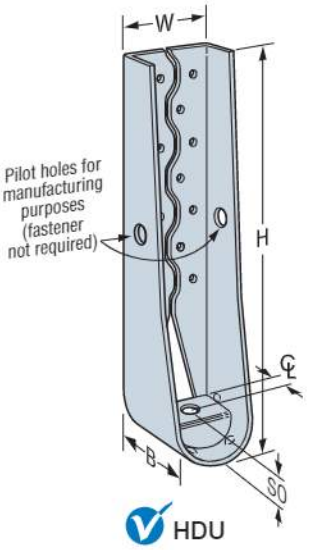
Material: See table

Finish: HDU — galvanized; DTT1Z and DTT2Z — ZMAX® coating; DTT2SS — stainless steel

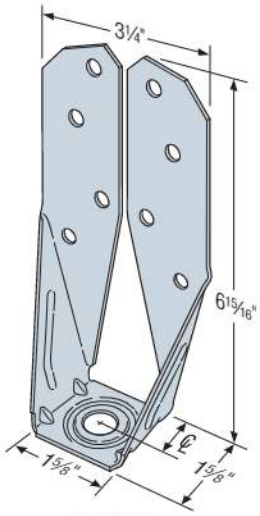
Installation:

- See Holdown and Tension Tie General Notes on pp. 49–50.
- The HDU requires no additional washer; the DTT requires a standard-cut washer (included) be installed between the nut and the seat.
- Strong-Drive SDS Heavy-Duty Connector screws install best with a low-speed high-torque drill with a ⅜" hex-head driver.
- Fasteners and crescent washer are included with the holdowns. For replacements, order part no. SDS25212-HDU__. (Fill in the size needed, e.g., HDU2.)

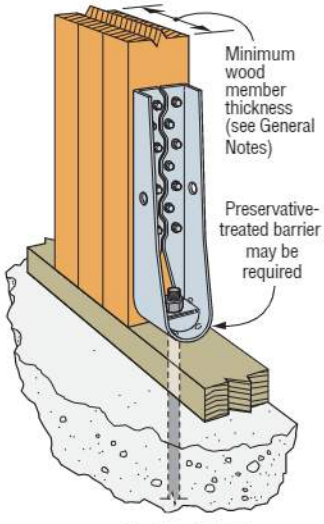
Codes: See p. 11 for Code Reference Key Chart



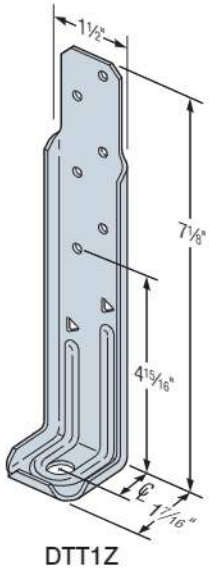
HDU



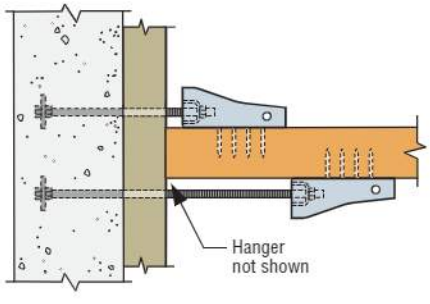
DTT2Z
US Patent 8,555,580



Vertical HDU Installation



DTT1Z
US Patent 10,865,558



Horizontal HDU Offset Installation
(plan view)
See Holdown and Tension Tie General Notes.

HDU/DTT

Holdowns (cont.)

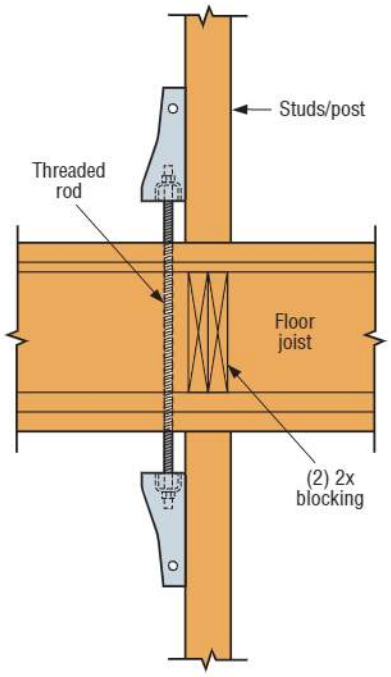
These products are available with additional corrosion protection. For more information, see p. 14.

SS For stainless-steel fasteners, see p. 21.

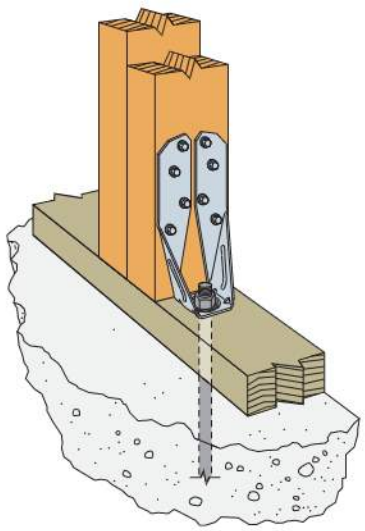
SD Many of these products are approved for installation with Strong-Drive® SD Connector screws. See pp. 348–352 for more information.

Model No.	Ga.	Dimensions (in.)					Fasteners (in.)		Minimum Wood Member Size (in.)	Allowable Tension Loads (160)			Code Ref.
		W	H	B	CL	SO	Anchor Bolt Dia. (in.)	Wood Fasteners		DF/SP	SPF/HF	Deflection at Allowable Load (in.)	
DTT1Z	14	1½	7⅛	1⁷⁄₁₆	¾	³⁄₁₆	⅜	(6) #9 x 1½" SD	1½ x 3½	840	840	0.17	
								(6) 0.148 x 1½		910	640	0.167	
								(8) 0.148 x 1½		910	850	0.167	
SS DTT2Z	14	3¼	6¹⁵⁄₁₆	1⅝	¹³⁄₁₆	³⁄₁₆	½	(8) ¼ x 1½ SDS	1½ x 3½	1,825	1,800	0.105	
								(8) ¼ x 1½ SDS	3 x 3½	2,145	1,835	0.128	
SS DTT2Z-SDS2.5								(8) ¼ x 2½ SDS	3 x 3½	2,145	2,105	0.128	
HDU2-SDS2.5	14	3	8¹⁄₁₆	3¼	1⁵⁄₁₆	1⅜	⅝	(6) ¼ x 2½ SDS	3 x 3½	3,075	2,215	0.088	IBC, FL, LA
HDU4-SDS2.5	14	3	10¹⁵⁄₁₆	3¼	1⁵⁄₁₆	1⅜	⅝	(10) ¼ x 2½ SDS	3 x 3½	4,565	3,285	0.114	
HDU5-SDS2.5	14	3	13³⁄₁₆	3¼	1⁵⁄₁₆	1⅜	⅝	(14) ¼ x 2½ SDS	3 x 3½	5,645	4,340	0.115	
HDU8-SDS2.5	10	3	16⅝	3½	1⅜	1½	⅞	(20) ¼ x 2½ SDS	3 x 3½	6,765	5,820	0.11	
									3½ x 3½	6,970	5,995	0.116	
									3½ x 4½	7,870	6,580	0.113	
HDU11-SDS2.5	10	3	22¼	3½	1⅜	1½	1	(30) ¼ x 2½ SDS	3½ x 5½	9,535	8,030	0.137	
									3½ x 7¼	11,175	9,610	0.137	
HDU14-SDS2.5	7	3	25¹¹⁄₁₆	3½	1⁹⁄₁₆	1⁹⁄₁₆	1	(36) ¼ x 2½ SDS	3½ x 5½	10,770	9,260	0.122	—
									3½ x 7¼	14,390	12,375	0.177	IBC, FL, LA
									5½ x 5½	14,445	12,425	0.172	

1. HDU14 requires heavy-hex anchor nut to achieve tabulated loads (supplied with holdown).
2. HDU14 loads on 4x6 post are applicable to installation on either the narrow or the wide face of the post.
3. **Fasteners:** Nail dimensions are listed diameter by length. SD and SDS screws are Simpson Strong-Tie® Strong-Drive SD Connector and SDS Heavy-Duty Connector screws. See pp. 21–22 for fastener information.



Typical HDU Tie Between Floors



Typical DTT2Z Installation

Date: 7/6/2023
(MM/DD/YYYY)

2013 MSJC Anchor Bolt Design
Allowable Stress Design

***user input indicated by blue cells

DATA INPUT AND SUMMARY OF DESIGN

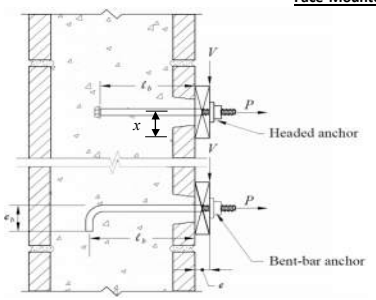
Propeties and Geometry

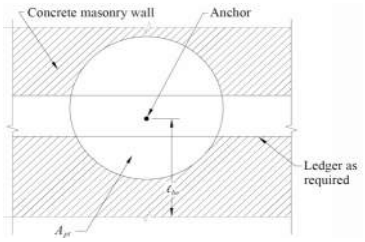
Weather or Soil Exposure	YES	
Top or Face Mount	Top	
**Assumed adequate spacing from adjacent anchors to allow no overlap of breakout cones		
Anchor Type =	headed	
Anchor Yield Strength =	60000	psi
Anchor Diameter, d_b =	7/8	in
Anchor Hook Length, e_b =	0.00	in
**For headed anchor set hook length equal to 0		
f'_m =	1500	psi
Wall thickness, t =	7.625	in
Edge Distance, l_{be} =	2.25	in
Net Anchor Area, A_b =	0.462	in^2
Effective Embed. Length, l_b =	12.00	in

Loading

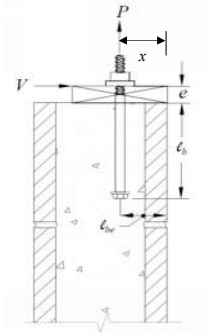
Shear Force, V_{total} =	0	lbs
Offset distance, e =	1.50	in
Dist. From C.L. of Bolt To Edge of Ledger, x =		in
Direct Tension Force, P_{total} =	3000	lbs

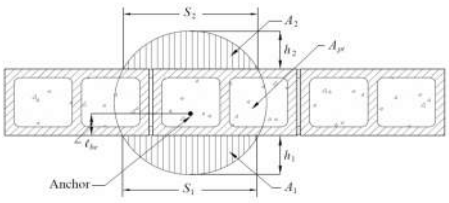
Face Mounted Anchor





Top Mounted Anchor





<<Anchor design is satisfactory. See detailed analysis>>

Detailed Analysis

Check minimum embed.

[TMS 402-13 §1.17.6] l_b= 12.00 in > l_{b_min} = min($4d_b$, 2 in) = 3.50 in ***<Satisfactory>***

Check minimum cover

[TMS 402-13 §1.16.4.1] $cover_{min}$= 2.00 in

$cover_{actual}$= (for top mounted) t - l_{eb} = 2.25 in ***<Satisfactory>***
(for face mounted) t - l_b =

Total Tension Force Considering Ecc., b_{af}

$$b_{af} = P_u + \frac{V_u e}{(\frac{5}{6})d} =$$ 3000 lbs ***assuming that moment arm is (5/6) of 'd'

Determine Tensile Capacity

h_1= 9.75 in s_1= 23.57 in A_1= 172.89 in^2

h_2= 6.63 in s_2= 21.46 in A_2= 101.55 in^2

$$A_{pt} = \pi {l_b}^2 =$$ 177.95 in^2

[TMS 402-13 Eqn. 8-1]	Masonry Tensile Breakout	$B_{ab} = 1.25A_{pt}\sqrt{f'_m} =$	8615	lbs		
[TMS 402-13 Eqn. 8-2]	Steel Tensile Yield	$B_{as} = 0.6A_b f_y =$	16632	lbs		
[TMS 402-13 Eqn. 8-4]	Anchor Pullout	$B_{ap} = (0.6{f'}_m e_b d_b + 120\pi(l_b + e_b + d_b)d_b) =$	N/A	lbs		
	Design Axial Strength	$B_a =$	8615	lbs	> b_{af}	***<Satisfactory>***

Governing Failure Mode: ***Breakout***

Determine Shear Capacity

$$A_{pv} = \frac{\pi {l_{be}}^2}{2} =$$ 7.95 in^2

[TMS 402-13 Eqn. 8-6]	Masonry Shear Breakout	$B_{vb} = 1.25A_{pv}\sqrt{f'_m} =$	385	lbs		
[TMS 402-13 Eqn. 8-7]	Masonry Crushing	$B_{vc} = 350\sqrt[4]{f'_m}A_b =$	1796	lbs		
[TMS 402-13 Eqn. 8-8]	Anchor Shear Pryout	$B_{vpry} = 2.0B_{ab} = 2.5A_{pt}\sqrt{f'_m} =$	17230	lbs		
[TMS 402-13 Eqn. 8-9]	Steel Shear Yielding	$B_{vs} = 0.36A_b f_y =$	9979	lbs		
	Design Shear Strength	$B_v =$	385	lbs	> b_{vf}	***<Satisfactory>***

Governing Failure Mode: ***Breakout***

Check Combined Tension and Shear Interaction

[TMS 402-13 Eqn. 8-10] $\frac{b_a}{B_a} + \frac{b_v}{B_v} =$ 0.348 < 1.000 ***<Satisfactory>***

NATIONAL NCMA CONCRETE MASONRY ASSOCIATION

NCMA TEK TECHNICAL SOLUTIONS

Revision Date: 03/19/2019

Date: 7/6/2023
(MM/DD/YYYY)

2013 MSJC Anchor Bolt Design
Allowable Stress Design

***user input indicated by blue cells

DATA INPUT AND SUMMARY OF DESIGN

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Offset distance, e =	1.50	in
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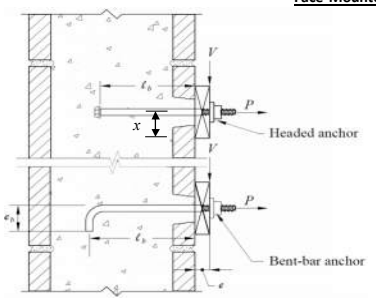
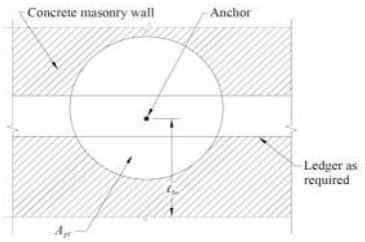
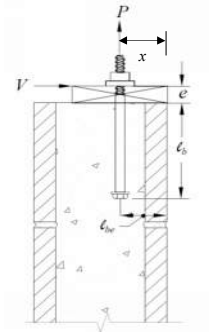
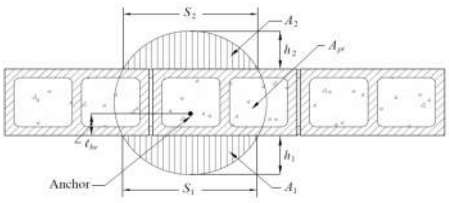
Face Mounted Anchor





Top Mounted Anchor





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Determine Tensile Capacity

h_1= 9.75 in s_1= 23.57 in A_1= 172.89 in^2

h_2= 6.63 in s_2= 21.46 in A_2= 101.55 in^2

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	Design Axial Strength	$B_a =$	8615	lbs	> b_{af}	***<Satisfactory>***

Governing Failure Mode: ***Breakout***

Determine Shear Capacity

$$A_{pv} = \frac{\pi {l_{be}}^2}{2} =$$ 7.95 in^2

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Governing Failure Mode: ***Breakout***

Check Combined Tension and Shear Interaction

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NATIONAL CONCRETE MASONRY ASSOCIATION
NCMA TEK TECHNICAL SOLUTIONS

Revision Date: 03/19/2019

siplast®

Teranap
Plaza Deck Waterproofing & Green Roofing **Systems**

The high performance solution for green roof and plaza deck applications.

New York's Jacob K. Javits Convention Center features a 5,000-square green roof assembly that includes Siplast NVS Lightweight Insulating Concrete, Paradiene 20 HV TG, Teranap, pavers, and Paraguard Coping.

Innovation

In Europe, use of urban spaces has been a key consideration in building design for decades, due to space constraints and centuries-old city layouts. Architectural designs incorporating plaza decks are often used to maximize space utilization and provide appealing pedestrian areas. In the 1970s, environmental awareness began to grow, and so did the use of green roof systems as a way to manage environmental impact. Of course, both plaza deck and green roof applications create significant waterproofing challenges.

That's why Siplast Research and Development took their pioneering SBS-modified bitumen technology and applied it to the design of a waterproofing membrane for plaza deck and green roof applications: Teranap.

Siplast Teranap was installed on this automobile manufacturing facility in Michigan, creating the largest green roof in North America.

Products

The torch-applied, two-ply Teranap System is based on our proven roof membrane design. The elastomeric base ply, Paradiene 20 TG, is engineered to retain its elasticity through the rigors of deck movement. The top ply, Teranap, consists of a nonwoven polyester mat impregnated and coated with SBS-modified bitumen.

Rolls of standard Teranap are 2 meters wide and 20 meters long. This coverage means a significant reduction in the number of seams as compared to projects using conventional modified bitumen waterproofing products. Teranap is also available in a 1-meter roll width for applications where a smaller roll is more practical and convenient, such as set-back roofs and high-rise projects. Because Teranap is torch-applied, no special kettle or unusual application equipment is required, and cold weather presents fewer application restrictions. Application of a Teranap system can be completed in phases, allowing greater scheduling flexibility.

Quality

Like all of Siplast's SBS-modified bitumen membranes, Teranap is produced to exacting standards. Our raw materials are consistent, our formulation is consistent, and our blending processes are consistent. That means our products are consistent – guaranteed.

At the Siplast North American roofing manufacturing facility, stringent quality control tests are performed on every lot of material we produce to ensure Siplast products meet specified criteria important to the performance of waterproofing products.

Application

Siplast Teranap Systems are installed exclusively by Siplast Select Contractors. These independent professionals have met the qualifications of the toughest contractor certification program in the industry – ours.

Their proven skill and dedication have demonstrated time and again that they regard themselves as members of a team dedicated to installing great waterproofing systems for their building owner customers.

Surfacing Options

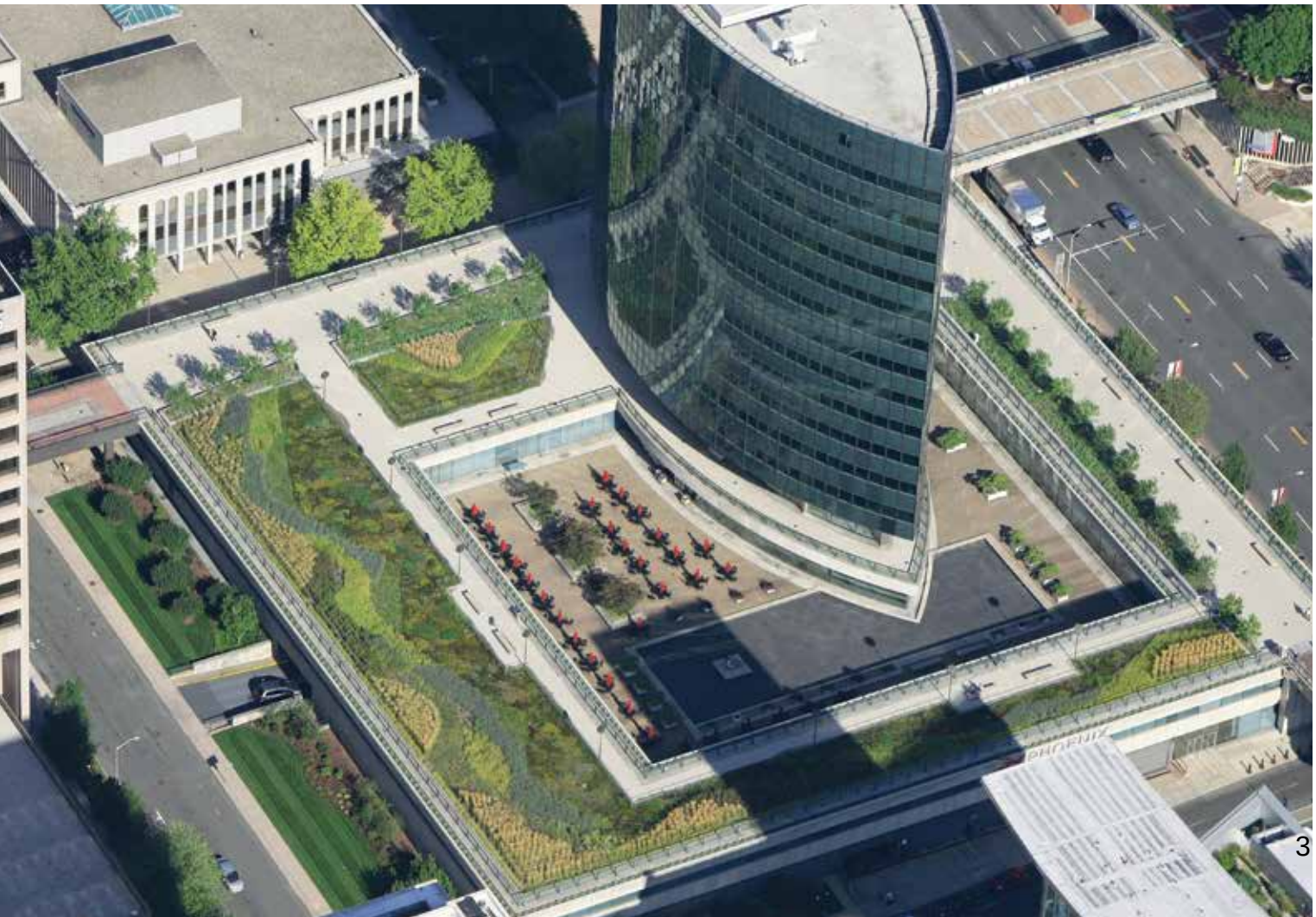
The Teranap Waterproofing System can be specified with surfacings for both plaza deck and green roof applications.

Teranap Plaza Deck

Teranap protects some of the world's most well-known plazas. It can be installed with a wide variety of overburdens, including pedestal/paver systems, poured concrete, paving asphalt, and mortar and pavers.

Siplast offers all of the components necessary to create a complete plaza deck system, including drainage mat, Insulperm Geofoam Extruded Polystyrene, and a full line of pedestals and decorative architectural pavers.

The green plaza deck of this Connecticut office building is protected by Siplast Teranap and pavers.



Siplast
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In Canada:
201 Bewicke Ave., Suite 208
North Vancouver, BC, Canada V7M 3M7
1.877.233.2338

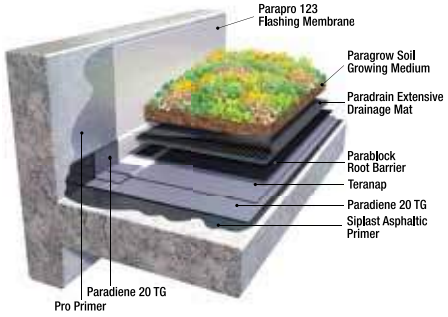
Customer Service in North America
1.800.922.8800

www.siplast.com

Teranap Green Roof

Teranap green roof applications can be specified with many landscape options, including both extensive green and intensive green assemblies. Teranap Extensive Green Roofs are characterized by low weight, low capital cost, and minimal maintenance. The growing medium is generally comprised of a mineral-based mix of sand, gravel, crushed brick, leica, and peat organic matter. In an extensive system, soil varies in depth from 2 to 6 inches, and typically weighs 13-18 lb/sq ft dry and 20-25 lb/sq ft saturated. Plant selections appropriate for extensive assemblies include sedum, grasses, wildflowers, and other low maintenance vegetation. Plants are watered and fertilized until they are established. At that point, minimal maintenance is required.

Teranap Extensive



Teranap Intensive Green Systems are used to waterproof elaborately designed roofscapes that are intended for pedestrian access. In an intensive system, soil depth starts at 8 inches. Therefore, a more diverse plant selection, including trees and shrubs, is possible. The wet weight of intensive systems typically starts at 50 lb/sq ft, so they must be engineered to conform to structural load requirements. Intensive green systems require regular maintenance and watering.

Siplast offers all of the components required for green roof installations, including filter fabric, drainage mat, soil, Insulperm Geofoam Extruded Polystyrene, and vegetated growing systems.

Teranap Intensive

Cover Photo:
Siplast Lightweight Insulating Concrete, Teranap, and pavers create a beautiful and functional plaza deck on this mixed use building in Florida.

SIP07/REV.01-18/01-18

www.siplast.com

For information on Siplast Roofing and Waterproofing Systems, scan our QR code.

USG Gypsum Solutions

USG LEVELROCK® BRAND 2500

FLOOR UNDERLAYMENT

Premium engineered cementitious underlayment

- Fast application, fast setting, allows for quick return of light trade traffic within hours
- Industry's most economical and highest compressive strength in class
- Ideal for wood-frame and multi-family construction
- Applied by USG Levelrock® authorized applicators
- GREENGUARD Gold Certification; qualifies as a low VOC emitting material (meets CA 01350)

DESCRIPTION

USG Levelrock® Brand 2500 Floor Underlayment is an economical, fast-applying engineered cementitious underlayment. It is formulated to provide typical compressive strengths from 2000 psi to 3200 psi at a 3/4 in. (19 mm) minimum thickness over plywood subfloors.

USG Levelrock 2500 Floor Underlayment is mixed with approved sand and potable water at the job site to yield a lightweight underlayment that weighs approximately 7.2 lbs./sq. ft. (35.2 kg/m²) at 3/4 in. (19 mm) thickness and has an approximate dry density of 115 lbs./cu. ft. (1,842 kg/m³).

7.2# /SF for 3/4" thick

we have

INTENDED FOR

- Light-commercial, residential, hotel/motel and rehab construction
- Concrete slabs, pre-stressed concrete, concrete planks, concrete repair/leveling, existing gypsum, radiant heat systems, OSB and plywood
- UL fire-rated assemblies with UL Designation Type LRK
- Floor systems with USG sound attenuation products
- Use with a variety of floor coverings, including vinyl, carpet, hardwood, and natural and man-made stone

LIMITATIONS

1. Do not use in exterior applications.
2. Do not over water or over sand.
3. Do not use as a wear surface.
4. Do not install where continuous exposure to moisture is a possibility.
5. For wood subfloors – install only on tongue-and-groove edge plywood or OSB, or square-edge wood subfloor with back-bracing.
6. Do not install in below-grade applications without a USG-approved moisture vapor reducer.
7. Do not pour over expansion or isolation joints. Continue all movement joints in the concrete slab up through the layer of underlayment. In areas where the expansion or isolation joints are not present in the floor or where the concrete slab has developed systematic cracks in response to slab movement, consult with an engineer on the project or request the services of a licensed structural engineer.
8. Structure shall be designed so that deflection does not exceed L/240 from combined dead and live loads and L/360 from live loads. Certain floor coverings such as marble, limestone, travertine and wood may have more restrictive deflection limits. Consult the appropriate floor covering manufacturer.
9. Adhere to the Radiant Panel Association (RPA) Guidelines for Hydronic Radiant Floor Heating regarding temperature and fluid temperatures. Fluid temperatures of radiant systems shall not exceed 140 °F (60 °C) at the exit of the heating device. To limit risk, floor temperatures shall not exceed 100 °F (38 °C) in general and shall be limited to 85 °F (29 °C) in areas of direct contact by building occupants. To minimize any potential of shocking the USG Levelrock 2500 Floor Underlayment, the radiant heat system should be ramped up slowly over several days until the underlayment is fully dry. Startup of radiant systems shall be in accordance with manufacturers' and RPA-recommended startup procedures.

TEST DATA

SOUND

USG Levelrock floor underlayments and systems have been tested in accordance with ASTM E90 and E492. See *USG Levelrock® & USG Durock™ Sound Systems Fire & Sound Rating Guide* (IG1685) for STC and IIC results or visit usg.com for further information on sound test results.

DURABILITY

Tested per ASTM C627 *Standard Test Method for Evaluating Ceramic Floor Tile Installation Systems Using the Robinson-Type Floor Tester.* Contact USG for further information.

UL DESIGNATION TYPE LRK

L501, L502, L503, L504, L505, L506, L507, L508, L509, L510, L511, L512, L513, L514, L515, L516, L517, L518, L519, L520, L521, L522, L523, L524, L525, L526, L527, L528, L529, L530, L532, L533, L534, L535, L536, L537, L538, L539, L540, L541, L542, L543, L545, L546, L547, L549, L550, L551, L552, L556, L557, L558, L559, L562, L563, L564, L565, L568, L569, L570, L571, L573, L574, L577, L579, L581, L583, L585, L587, L588, L589, L590, L592, L593, M500, M501, M502, M503, M504, M505, M506, M508, M510, M511, M513, M515, M517*, M521*, M522*.

For the most up-to-date UL Designation Type LRK, contact your USG representative.

Note *UL Design requires greater minimum pour depths and compressive strengths and/or additional requirements. See individual UL Designs for specifics.

EXTENDED WARRANTY

An extended warranty may apply when using USG Levelrock floor underlayments in a system application. Please contact USG for further details.

SUBMITTAL APPROVALS

Job Name	
Contractor	Date

PRODUCT INFORMATION
See usg.com for the most up-to-date product information.

GREENGUARD INFORMATION
GREENGUARD Certified products are certified to GREENGUARD standards for low chemical emissions into indoor air during product usage. For more information, visit ul.com/gg.

EPD & HPD INFORMATION
For Environmental and Health Product Declarations, visit usg.ecomedes.com

DANGER
Causes skin irritation. Causes serious eye damage. May cause an allergic skin reaction. May cause respiratory irritation. May cause cancer by inhalation of respirable crystalline silica. Do not handle until all safety precautions have been read and understood. Avoid breathing dust. Use only in a well-ventilated area; wear a NIOSH/MSHA-approved respirator. Wear protective gloves/protective clothing/eye protection. If swallowed, inhaled, or skin irritation occurs get medical attention. If on skin: Wash with plenty of water. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses and continue rinsing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse. Dispose of in accordance with local, state, and federal regulations. For more information call Product Safety: 1-800-507-8899 or see the SDS at usg.com
KEEP OUT OF REACH OF CHILDREN.

TRADEMARKS

NOTE
The information in this document is subject to change without notice. USG Corp. and/or its affiliates assume no responsibility for any errors that may inadvertently appear in this document. Consult your USG sales office or representative for information.

NOTICE
We shall not be liable for consequential, incidental or special damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to the replacement of defective goods or a refund of the purchase price, at USG's option, and does not include costs of labor, floor-covering materials, or any other costs associated with material replacement. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered. For all applicable terms and conditions, please refer to *USG Levelrock® Brand & USG Durock™ Brand Performance Flooring Products Two-Year Limited Warranty for USG Levelrock Applicators* (IG1727) located at usg.com.

SAFETY FIRST!
Follow good safety/industrial hygiene practices during installation. Wear appropriate personal protective equipment. Read applicable SDSs and literature before specification and installation.

800 USG.4YOU
800 (874.4968)
usg.com

Manufactured by
United States Gypsum Company
550 West Adams Street
Chicago, IL 60661

IG1450-USA-ENG/rev. 9-21

USG
IT'S YOUR WORLD. BUILD IT.®

INSULFOAM® XV

ROOF INSULATION SYSTEMS

HIGH-PERFORMANCE 60 PSI INSULATION

Description

InsulFoam XV is an engineered insulation consisting of a superior closed-cell, lightweight and resilient expanded polystyrene (EPS). InsulFoam XV meets or exceeds the requirements of ASTM C578, Type XV, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation. InsulFoam XV has a nominal density of 3.0 lb/ft^3. In addition, InsulFoam XV offers a long-term stable R-value and has excellent dimensional stability, compressive strength and water resistance properties.

Uses

InsulFoam XV is a high-performance roof insulation and is used in numerous roofing applications requiring an insulation or fill material with a high compressive strength.

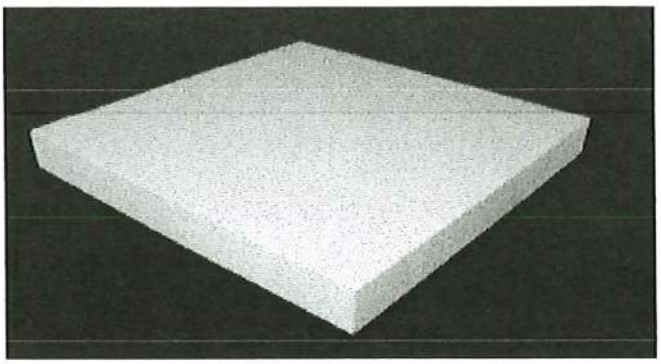
Roof Systems: InsulFoam XV is well suited for single-ply roof applications employing mechanically fastened or ballasted TPO, PVC, EPDM, inverted roof membrane assemblies (IRMA), roof gardens, plaza decks, and hot rubber systems. Low-sloped built-up, modified bitumen and fully adhered single-ply roofs incorporating a cover board or slip sheet, are also approved. InsulRoof XV can be provided in flat and tapered panels as well as a custom cut flute-fill piece. Please consult local building codes and membrane manufacturers for system requirements.

System Compatibility: Insulfoam insulations are compatible with both light- and dark-colored single-ply membranes, can be applied directly to metal decks, are available in higher compressive strengths, and can be manufactured with fire-rated facers and coverboards. Please contact Insulfoam for more details.

Advantages

- Environmentally Friendly. InsulFoam XV does not contain any blowing agents, may contain recycled material, and is 100% recyclable if ever removed or replaced.
- Stable R-value. The product's thermal properties will remain stable over its entire service life. There is no thermal drift, so the product is eligible for an Insulfoam 20-year thermal performance warranty.
- Proven Performance. EPS has been manufactured using the same chemistry since the mid-1950s, providing proven performance.
- Water Resistance. InsulFoam XV does not readily absorb moisture from the environment.
- Code Approvals. Insulfoam insulations are recognized by the International Code Council Evaluation Service (ICC-ES), and have numerous Underwriters Laboratory and Factory Mutual Approvals. Please contact your local Insulfoam representative for details. International Code Council Evaluation Service (ICC-ES), and have numerous Underwriters Laboratory and

PREDICTABLY **CONSISTENT** VALUE.



Factory Mutual Approvals. Please contact your local Insulfoam representative for details.

Sizes

InsulFoam XV is available in 4' x 4' and 4' x 8' standard sizes with thickness from ¼" to 40", and is readily available in custom lengths and widths with little to no impact on lead time. It is also available in tapered panels, with thickness from 0 (⅛" actual) to 40", and in any slope per foot.

3pcf

Typical Physical Properties

Property	Test Method	Value
Density (nom. pcf)	ASTM C303	3.0
C-Value (Conductance) - per inch BTU/(hr•ft²•°F) @ 25 °F @ 40 °F @ 75 °F	ASTM C518 or ASTM C177	0.196 0.198 0.217
R-value (Resistance) - per inch (hr•ft2•°F)/BTU @ 25 °F @ 40 °F @ 75 °F	ASTM C518 or ASTM C177	5.10 5.05 4.60
Compressive Strength (psi, 10% deformation)	ASTM D1621	60
Flexural Strength (min. psi)	ASTM C203	75
Dimensional Stability (maximum %)	ASTM D2126	2.0
Water Vapor Permeance (max. perm., 1 inch)	ASTM E96	2.5
Water Absorption (max. % vol.)	ASTM C272	2.0
Capillarity	–	none
Flame Spread	ASTM E84	< 20
Smoke Developed	ASTM E84	150-300

*Properties are based on data provided by resin manufacturers, independent test agencies and Insulfoam.

INSULATION ENGINEERED TO MAKE A DIFFERENCE.