STRUCTURAL ENGINEERING CALCULATIONS

GARAGE PERMIT SUBMITTAL

FOR

PARAGON STAR NORTH VILLAGE
3200 NW PARAGON PKWY
LEE'S SUMMIT, MO 64081

PREPARED BY

CHRIS A BEVERLIN, P.E.

OF

BOB D. CAMPBELL & COMPANY, INC.
STRUCTURAL ENGINEERS
4338 BELLEVIEW
KANSAS CITY, MISSOURI 64111
(816) 531-4144

FOR

FINKLE + WILLIAMS ARCHITECTURE
8787 RENNER BLVD
SUITE 100
LENEXA, KANSAS 66219
913-498-1550

FEBRUARY 4, 2022

Hazards by Location

Search Information

Coordinates: 38.937763635387014, -94.44629573285171

Elevation: 814 ft

Timestamp: 2021-10-21T18:47:16.828Z

Hazard Type: Snow

ASCE 7-16

Ground Snow Load ..... 20 lb/sqft

ASCE 7-10

Ground Snow Load ..... 20 lb/sqft

ASCE 7-05

Ground Snow Load ..... 20 lb/sqft

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are interpolated from data provided in ASCE 7 and rounded up to the nearest whole integer.

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Hazards by Location

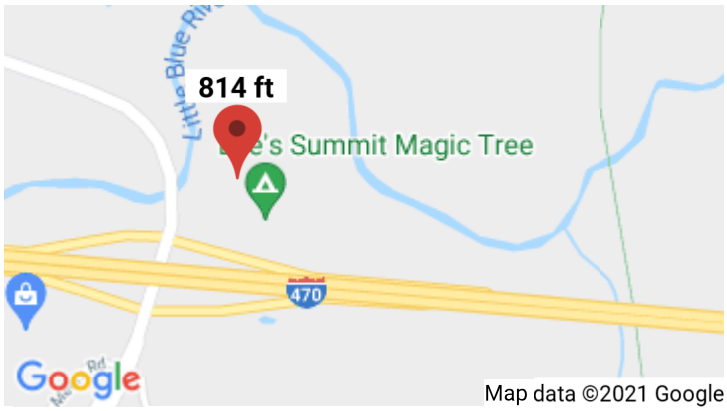
Search Information

Coordinates: 38.937763635387014, -94.44629573285171

Elevation: 814 ft

Timestamp: 2021-10-21T18:45:59.597Z

Hazard Type: Wind



ASCE 7-16		ASCE 7-10		ASCE 7-05	
MRI 10-Year	76 mph	MRI 10-Year	76 mph	ASCE 7-05 Wind Speed	90 mph
MRI 25-Year	83 mph	MRI 25-Year	84 mph		
MRI 50-Year	88 mph	MRI 50-Year	90 mph		
MRI 100-Year	94 mph	MRI 100-Year	96 mph		
Risk Category I	103 mph	Risk Category I	105 mph		
Risk Category II	109 mph	Risk Category II	115 mph		
Risk Category III	117 mph	Risk Category III-IV	120 mph		
Risk Category IV	122 mph				

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Hazard loads are interpolated from data provided in ASCE 7 and rounded up to the nearest whole integer. Per ASCE 7, islands and coastal areas outside the last contour should use the last wind speed contour of the coastal area – in some cases, this website will extrapolate past the last wind speed contour and therefore, provide a wind speed that is slightly higher. NOTE: For queries near wind-borne debris region boundaries, the resulting determination is sensitive to rounding which may affect whether or not it is considered to be within a wind-borne debris region.

Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

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Hazards by Location

Search Information

Coordinates: 38.937763635387014, -94.44629573285171

Elevation: 814 ft

Timestamp: 2021-10-21T18:48:15.397Z

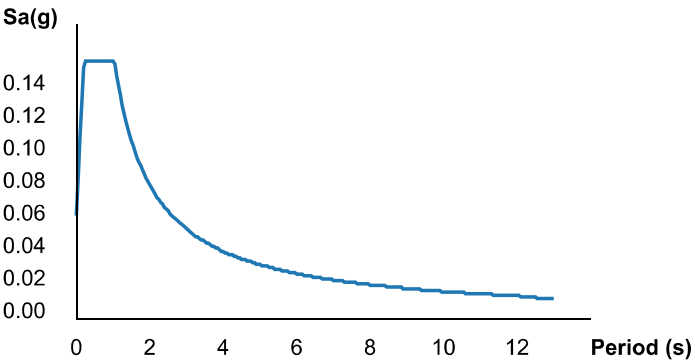
Hazard Type: Seismic

Reference Document: ASCE7-16

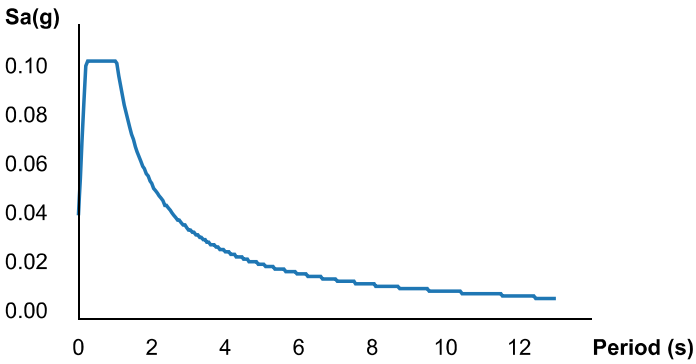
Risk Category: II

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	0.099	MCE_R ground motion (period=0.2s)
S_1	0.068	MCE_R ground motion (period=1.0s)
S_{MS}	0.158	Site-modified spectral acceleration value
S_{M1}	0.164	Site-modified spectral acceleration value
S_{DS}	0.105	Numeric seismic design value at 0.2s SA
S_{D1}	0.109	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	B	Seismic design category
F_a	1.6	Site amplification factor at 0.2s
F_v	2.4	Site amplification factor at 1.0s
CR_S	0.928	Coefficient of risk (0.2s)
CR_1	0.877	Coefficient of risk (1.0s)

PGA	0.047	MCE_G peak ground acceleration
F_{PGA}	1.6	Site amplification factor at PGA
PGA_M	0.075	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	0.099	Probabilistic risk-targeted ground motion (0.2s)
SsUH	0.106	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.5	Factored deterministic acceleration value (0.2s)
S1RT	0.068	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.078	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.6	Factored deterministic acceleration value (1.0s)
PGAd	0.5	Factored deterministic acceleration value (PGA)

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Disclaimer

Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

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Hazards by Location

Search Information

Coordinates: 38.937763635387014, -94.44629573285171

Elevation: 814 ft

Timestamp: 2021-10-21T18:47:28.628Z

Hazard Type: Tornado

ASCE 7-16

Wind Speed ..... ⚠ 250 mph

Sections 423.3 and 423.4 of the 2015 edition of the International Building Code (IBC) require that 911 call stations, emergency operations centers, fire, rescue, ambulance and police stations, and schools with an occupant load of 50 or more, to have an ICC 500 compliant tornado shelter in areas where the design wind speed is 250 mph. The 2018 editions of the IBC and the International Existing Buildings Code (IEBC) extend these tornado shelter requirements to also include additions to existing school campuses.

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Project Name: Paragon Star

Date: 6/24/2019

Snow Loads per ASCE 7-16 - Flat Roofs Section 7.3

Building Criteria:

Ground Snow Load:	p_g =	20	(psf)	(Figure 7-1)
Terrain Category:		B		(Section 26.7.3)
Exposure:		Partially Exposed		
Exposure Factor:	C_e =	1		(Table 7-2)
Thermal Factor:	C_t =	1.2		(Table 7-3)
Risk Category:		II		(Table 1.5-1)
Snow Importance Factor:	I_S =	1.0		(Table 1.5-2)
Roof Pitch (inches per foot):	r_p =	0.25	(in)	
Eave-to-Ridge Distance	W =	64	(ft)	

Balanced Roof Snow Calculations:

p_f= $0.7C_eC_tI_sp_g$ =	16.8	psf		(Flat Roof EQ. 7.3-1)
p_m= if(P_g<20, 20I_s, I_sP_g) =	20	psf		(Section 7.3.4)

Rain-On-Snow Calculations:

Roof Slope	θ =	1.19	(deg)	
	W/50 =	1.28		
p_r= if(and(p_g≤ 20 psf, θ<W/50),5 psf, 0 psf) =		5	psf	(Section 7.10)

Snow Load Cases

S_1= max(p_f, p_m ,p_f+p_r) = 21.8 psf

S_2= p_f + p_d = 16.8psf + Snow Drift

Snow Drift:

Y = if(0.13p_g + 14 pcf>30 pcf, 30 pcf, 0.13p_g + 14 pcf) = 16.6 pcf

h_b= p_f/g = 1.01 ft

Sample Drift Calculations for l_u of 100 ft:

Leeward:

h_{dl} = 0.43 x $(100)^{-3}$x$(p_g+10)^{-4}$-1.5 = 3.2 ft Note:

W_l = 4 x h_{dl} = 12.66 ft If h_c<h_d,w=4h_d^2/h_c

p_{dl} = h_{dl} x g = 53 psf

Windward:

h_{dW} = 0.75[0.43 x $(100)^{-3}$x$(p_g+10)^{-4}$-1.5]= 2.4 ft

W_W = 4 x h_{dl} = 9.49 ft

p_{dl} = h_{dl} x g = 40 psf

Parapet:

h_{dW} = 0.75[0.43 x $(100)^{-3}$x$(p_g+10)^{-4}$-1.5]= 2.4 ft

W_W = 4 x h_{dl} = 9.49 ft

p_{dl} = h_{dl} x g = 40 psf

l_u	h_d (ft)			W (ft)			p_d (psf)		
(ft)	leeward	windward	parapet	leeward	windward	parapet	leeward	windward	parapet
100	3.2	2.4	2.4	12.7	9.5	9.5	53	39	39
315	5.3	4.0	4.0	21.4	16.0	16.0	89	67	67
410	6.0	4.5	4.5	23.9	17.9	17.9	99	74	74
158	3.9	3.0	3.0	15.8	11.8	11.8	65	49	49
310	5.3	4.0	4.0	21.2	15.9	15.9	88	66	66
300	5.2	3.9	3.9	20.9	15.7	15.7	87	65	65
162	4.0	3.0	3.0	15.9	12.0	12.0	66	50	50
98	3.1	2.4	2.4	12.6	9.4	9.4	52	39	39
128	3.6	2.7	2.7	14.3	10.7	10.7	59	44	44
210	4.5	3.4	3.4	17.9	13.4	13.4	74	56	56
140	3.7	2.8	2.8	14.9	11.2	11.2	62	46	46

Paragon Star Garage

MFWRS Wind Pressures

Bob D. Campbell & Co.

				Roof Angle =	3°		
Kzt=	1.0	Leeward Kh=	**0.80**	Ridge Dirr. =	Flat (<10°)		
Kd=	0.85	G=	0.85	**Roof Coefficients**		Parapet GCp+=	1.5
V=	109 mph	Windward Cp=	0.8	Long. Windward	0.80	Parapet GCp-=	-1
I=	1.00	Leeward Cp=	-0.5	Long. Leeward	-0.50		
Exposure	B	Side Wall Cp=	-0.7	Trans. Windward	0.00	**Parapet Pres. =**	51.7
Roof Ht.	48	qh=	**20.7**	Trans. Leeward	0.00		

Height (ft.)	Kz	qz (psf)	Windward Pressure (psf)	Leeward Pressure (psf)	Total Pressure (psf)	Va = 0.6Vu	Side Wall Pressure (psf)
15	0.57	14.7	10.0	-8.8	18.8	11.3	-12.3
20	0.62	16.0	10.9	-8.8	19.7	11.8	-12.3
25	0.66	17.1	11.6	-8.8	20.4	12.2	-12.3
30	0.7	18.1	12.3	-8.8	21.1	12.7	-12.3
40	0.76	19.6	13.4	-8.8	22.2	13.3	-12.3
50	0.81	20.9	14.2	-8.8	23.0	13.8	-12.3
60	0.85	22.0	14.9	-8.8	23.7	14.2	-12.3
70	0.89	23.0	15.6	-8.8	24.4	14.7	-12.3
80	0.93	24.0	16.3	-8.8	25.1	15.1	-12.3
90	0.96	24.8	16.9	-8.8	25.7	15.4	-12.3
100	0.99	25.6	17.4	-8.8	26.2	15.7	-12.3
120	1.04	26.9	18.3	-8.8	27.1	16.2	-12.3
140	1.09	28.2	19.2	-8.8	28.0	16.8	-12.3
160	1.13	29.2	19.9	-8.8	28.7	17.2	-12.3
180	1.17	30.2	20.6	-8.8	29.4	17.6	-12.3

Ultimate Wind Load Per Floor

Floor	Elev.	TTL P.	Bldg Length	Load to FLR	Total Load	TTL P.	Bldg Width	Load to FLR	Total Load
5th	48	22.9	275	33 k	33 k	22.9	123	15 k	15 k
4th	37.42	21.9	275	64 k	97 k	21.9	123	29 k	43 k
3rd	26.76	20.6	275	61 k	158 k	20.6	123	27 k	71 k
2nd	16	19.0	275	70 k	228 k	19.0	123	31 k	102 k

Bob D. Campbell & Co.

Paragon Star Garage
Seismic Load Distribution

SDC = B

A.17 Ordinay Precast Shear Walls (N/S Direction)

R =	3
I =	1
Ta =	0.36
Sds =	0.105
Sd1 =	0.109
k =	1

Cs
0.035
0.100
0.035

Seismic Force Distribution

Floor	Height	Area	DL (psf)	Weight (k)	$WxHx^k$	Cvx	Fx
5th	48	33825	145	4904.63	235422	0.37	257.1 k
4th	37.42	33825	145	4904.63	183531.1	0.29	200.5 k
3rd	26.76	33825	145	4904.63	131247.8	0.21	143.4 k
2nd	16	33825	145	4904.63	78474	0.12	85.7 k
Total				19,619	628,675	1	687 k

Base V = 687 k

SDC = B

B.9 Ordinay Precast Shear Walls (E/W Direction)

R =	4
I =	1
Ta =	0.36
Sds =	0.105
Sd1 =	0.109
k =	1

Cs
0.026
0.075
0.026

Seismic Force Distribution

Floor	Height	Area	DL (psf)	Weight (k)	$WxHx^k$	Cvx	Fx
5th	48	33825	130	4397.25	211068	0.35	176.7 k
4th	37.42	33825	145	4904.63	183531.1	0.30	153.7 k
3rd	26.76	33825	145	4904.63	131247.8	0.22	109.9 k
2nd	16	33825	155	5242.88	83886	0.14	70.2 k
Total				19,449	609,733	1	511 k

Base V = 511 k

Bob D. Campbell & Co.

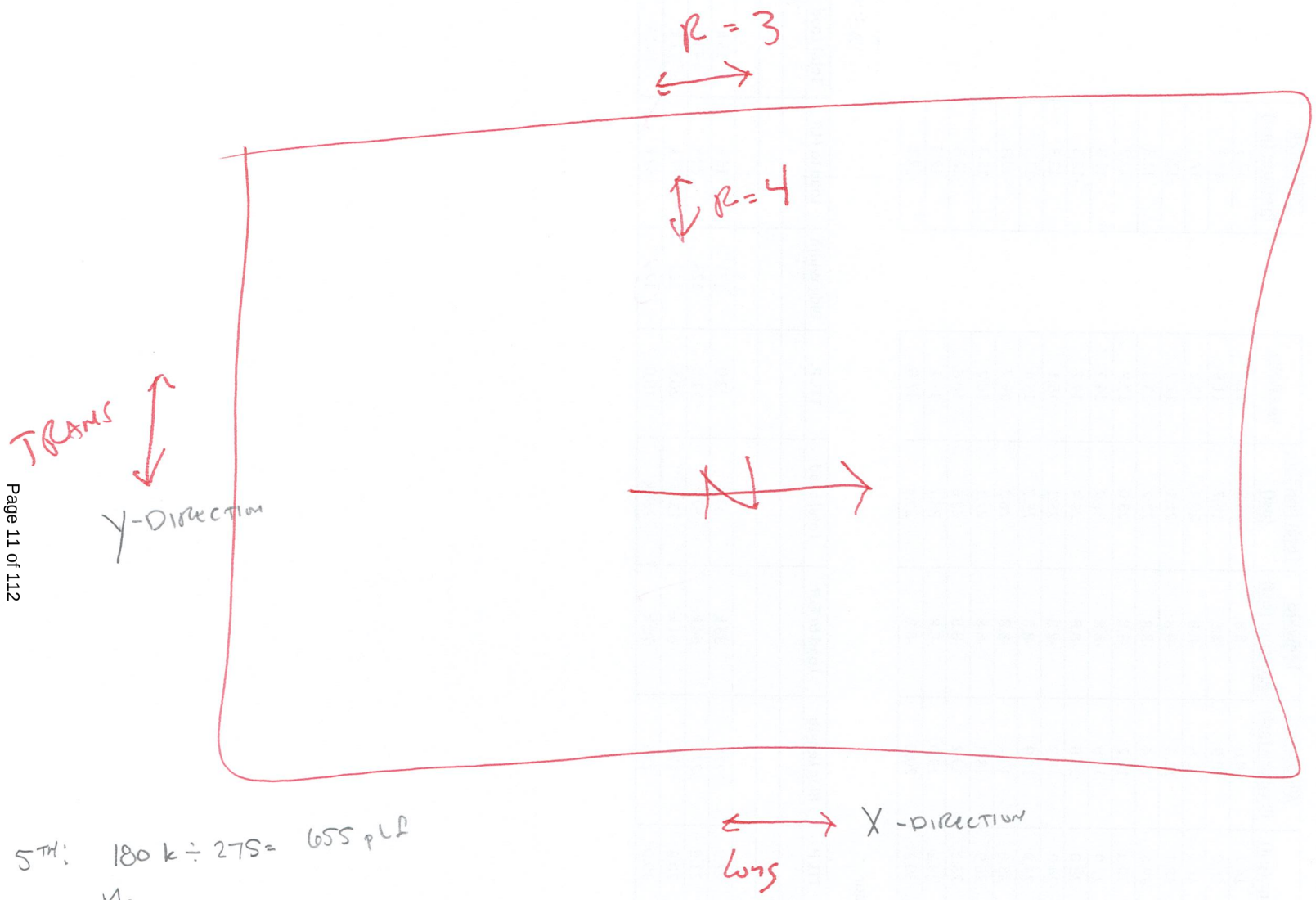
Paragon Star Garage
Controlling Lateral Forces

Transverse Lateral Loads

	Wind			Seismic (R=4)			
	Fx	**0.6 Fx**	**TTL Fx**	**Fx**	**0.7 Fx**	**TTL Fx**	
5th	33 k	20 k	20 k	176.73	124 k	124 k	
4th	64 k	38 k	38 k	153.68	108 k	108 k	Seismic Controls
3rd	61 k	36 k	75 k	109.9	77 k	185 k	Seismic Controls
2nd	70 k	42 k	117 k	70.24	49 k	234 k	Seismic Controls
	228 k	137 k		511 k	357 k		

Longitudinal Lateral Loads

	Wind			Seismic (R=3)			
	Fx	**0.6 Fx**	**TTL Fx**	**Fx**	**0.7 Fx**	**TTL Fx**	
5th	15 k	9 k	9 k	**257.13**	180 k	180 k	
4th	29 k	17 k	17 k	**200.46**	140 k	140 k	Seismic Controls
3rd	27 k	16 k	33 k	**143.35**	100 k	241 k	Seismic Controls
2nd	31 k	19 k	52 k	**85.71**	60 k	301 k	Seismic Controls
	102 k	61 k		687 k	481 k		



5TH: 180 k ÷ 275 = 655 plf

M=

Page 11 of 112

Transverse Direction (Seismic) (Y-Direction or E/W Walls) (R=4)

Seismic Dead Load at Roof Level 5 at 148'-0"						
Material	Weight		Length	Area	W	
	(plf)	(psf)	(ft)	(ft^2)	(kips)	
13.71DT28" + 15psf		91		33825	3079	
Columns	817		52.9		44	
Inverted Tee	1175		88		104	
Walls @ GA	1162		275		320	
Walls @ GB	1162		186		217	
Walls @ GC	1162		275		320	
Stair Wall - East	1162		13.75		16	
CMU Walls	502		120		61	
Spantrel Beam	730		60		44	
3" Wash	56		1408		80	Equivalent PSF
				$W_{Level\ 5}$=	4285	130

Seismic Dead Load at Level 4 at 137'-5"						
Material	Weight		Length	Area	W	
	(plf)	(psf)	(ft)	(ft^2)	(kips)	
13.71DT28" + 15psf		91		33825	3079	
Columns	817		106.25		87	
Inverted Tee	1175		88		104	
Walls @ GA	1829		275		503	
Walls @ GB	1829		186		341	
Walls @ GC	1829		275		503	
Stair Wall - East	1829		13.75		26	
CMU Walls	502		120		61	
3" Wash	56		1408		80	Equivalent PSF
				$W_{Level\ 4}$=	4784	145

Seismic Dead Load at Level 3 at 126'-9"						
Material	Weight		Length	Area	W	
	(plf)	(psf)	(ft)	(ft^2)	(kips)	
13.71DT28" + 15psf		91		33825	3079	
Columns	817		107.1		88	
Inverted Tee	1175		88		104	
Walls @ GA	1839		275		506	
Walls @ GB	1839		186		343	
Walls @ GC	1839		275		506	
Stair Wall - East	1839		13.75		26	
CMU Walls	502		120		61	
3" Wash	56		1408		80	Equivalent PSF
				$W_{Level\ 3}$=	4793	145

Transverse Direction (Seismic) (Y-Direction or E/W Walls) (R=4)

Seismic Dead Load at Level 2 at 116'-0"					
Material	Weight		Length	Area	W
	(plf)	(psf)	(ft)	(ft^2)	(kips)
13.71DT28" + 15psf		91		33825	3079
Columns	817		133.75		110
Inverted Tee	1175		88		104
Walls @ GA	2172		275		598
Walls @ GB	2172		186		404
Walls @ GC	2172		275		598
Stair Wall - East	2172		13.75		30
CMU Walls	502		120		61
2" Addt'l Top at Retail		25		5904	148
3" Wash	56		1408		80
				$W_{Level\ 2}$=	5212

Equivalent PSF: 155

Base Shear

$V_E=C_sW$ → 495.9 kips (Eq 12.8-1)

Where:

Cs= 0.026 (See Hand Calc)

W= 19074 kips

Direct Shear

Vertical Distribution of Seismic Forces				
Level	W_x	h_x^k	$W_xh_x^k$	F_x
	(kips)	(ft)	(kip-ft)	(kips)
Level 5	4285	48	205680	171.0
Level 4	4784	37.42	179017	148.9
Level 3	4793	26.76	128261	106.7
Level 2	5212	16	83392	69.3
Sum	19074		596350	495.9

(Eq 12.8-11 and 12)

Longitudnal Direction (Seismic) (X-Direction or N/S Walls) (R=3)

Seismic Dead Load at Roof Level 5 at 148'-0"						
Material	Weight		Length	Area	W	
	(plf)	(psf)	(ft)	(ft^2)	(kips)	
13.71DT28" + 15psf		91		33825	3079	
Columns	817		52.9		44	
Inverted Tee	1175		88		104	
Walls @ G1	1162		123		143	
Walls @ G6	1162		30		35	
Walls @ G8	1162		123		143	
Stair Wall - N&S	1162		36		42	
CMU Walls	502		120		61	
3" Wash	56		1408		80	Equivalent PSF
				$W_{Level\ 5}$=	3731	115

Seismic Dead Load at Level 4 at 137'-5"						
Material	Weight		Length	Area	W	
	(plf)	(psf)	(ft)	(ft^2)	(kips)	
13.71DT28" + 15psf		91		33825	3079	
Columns	817		106.25		87	
Inverted Tee	1175		88		104	
Walls @ G1	1829		123		225	
Walls @ G6	1829		30		55	
Walls @ G8	1829		123		225	
Stair Wall - N&S	1829		36		66	
CMU Walls	502		120		61	
3" Wash	56		1408		80	Equivalent PSF
				$W_{Level\ 4}$=	3982	120

Seismic Dead Load at Level 3 at 126'-9"						
Material	Weight		Length	Area	W	
	(plf)	(psf)	(ft)	(ft^2)	(kips)	
13.71DT28" + 15psf		91		33825	3079	
Columns	817		107.1		88	
Inverted Tee	1175		88		104	
Walls @ G1	1839		123		227	
Walls @ G6	1839		30		56	
Walls @ G8	1839		123		227	
Stair Wall - N&S	1839		36		67	
CMU Walls	502		120		61	
3" Wash	56		1408		80	Equivalent PSF
				$W_{Level\ 3}$=	3989	120

Longitudnal Direction (Seismic) (X-Direction or N/S Walls) (R=3)

Seismic Dead Load at Level 2					
Material	Weight		Length	Area	W
	(plf)	(psf)	(ft)	(ft^2)	(kips)
13.71DT28" + 15psf		91		33825	3079
Columns	817		133.75		110
Inverted Tee	1175		88		104
Walls @ G1	2172		123		268
Walls @ G6	2172		30		66
Walls @ G8	2172		123		268
Stair Wall - N&S	2172		36		79
CMU Walls	502		120		61
2" Addt'l Top at Retail		25		5904	148
3" Wash	56		1408		80
				$W_{Level\ 2}$=	4263

Equivalent PSF: 130

Base Shear

$V_E=C_sW$ → 558.8 kips (Eq 12.8-1)

Where:

Cs= 0.035 (See Hand Calc)

W= 15965 kips

Direct Shear

Vertical Distribution of Seismic Forces				
Level	W_x	h_x^k	$W_xh_x^k$	F_x
	(kips)	(ft)	(kip-ft)	(kips)
Level 5	3731	48	179088	198.9
Level 4	3982	37.42	149006	165.5
Level 3	3989	26.76	106746	118.6
Level 2	4263	16	68208	75.8
Sum	15965		503048	558.8

(Eq 12.8-11 and 12)

Torsional Analysis of Rigid Diaphragm

Lic. # : KW-06011403

Bob D. Campbell and Co., Inc.

DESCRIPTION: 5th Floor

General Information

IBC 2018, CBC 2019, ASCE 7-16

Applied Lateral Force in "X" DIrection	210.0 k	Center of Shear Application :	
Applied Lateral Force in "Y" DIrection	180.0 k	Distance from "X" datum point	137.340 ft
		Distance from "Y" datum point	61.340 ft
Note: These loads are resolved into X & Y components when applied to the system of elements at angular increments.		Accidental Torsion values per ASCE 7-05 12.8.4.2	
		Ecc. as % of Maximum Dimension	5.00 %
Load Orientation Angular Increment	15.0 deg		
Load Location Angular Increment	15.0 deg	Maximum Dimensions :	
		Along "X" Axis	274.670 ft
Center of Rigidity Location (calculated) . . .		Along "Y" Axis	122.670 ft
"X" dist. from Datum	209.538 ft		
"Y" dist. from Datum	61.774 ft		

Accidental Eccentricity +/- from "Y" Coord. of Center of Load Application : 13.734 ft

Accidental Eccentricity +/- from "X" Coord. of Center of Load Application : 6.134 ft

Wall Information

Label : G1		X Wall C.G. Location	274.25 ft	Length	122.67 ft
		Y Wall C.G. Location	61.33 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	90 deg	Thickness	10 in
Along Wall "y" Dir	8.7859E-006 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	1.9100E+002 in			E - Shear	1.2 Mpsi
Label : G6		X Wall C.G. Location	86.67 ft	Length	36 ft
		Y Wall C.G. Location	61.33 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	90 deg	Thickness	12 in
Along Wall "y" Dir	2.7592E-005 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	3.7739E+002 in			E - Shear	1.2 Mpsi
Label : GA		X Wall C.G. Location	180.17 ft	Length	189 ft
		Y Wall C.G. Location	122.25 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	0 deg	Thickness	10 in
Along Wall "y" Dir	5.6695E-006 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	1.2397E+002 in			E - Shear	1.2 Mpsi
Label : GB		X Wall C.G. Location	158.42 ft	Length	142.5 ft
		Y Wall C.G. Location	61.33 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	0 deg	Thickness	10 in
Along Wall "y" Dir	3.7718E-006 in	Wall Fixity	Fix-Pin	E - Bending	6 Mpsi
Along Wall "x" Dir	8.2211E+001 in			E - Shear	2.4 Mpsi
Label : GC		X Wall C.G. Location	180.25 ft	Length	188.83 ft
		Y Wall C.G. Location	0.42 ft	Height	10.63 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	0 deg	Thickness	10 in
Along Wall "y" Dir	5.6532E-006 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	1.2269E+002 in			E - Shear	1.2 Mpsi
Label : Stair - East Wall		X Wall C.G. Location	93.71 ft	Length	13.75 ft
		Y Wall C.G. Location	104.25 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	0 deg	Thickness	10 in
Along Wall "y" Dir	1.3991E-004 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	1.7040E+003 in			E - Shear	1.2 Mpsi
Label : Stair - North Wall		X Wall C.G. Location	100.17 ft	Length	18 ft
		Y Wall C.G. Location	112.83 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	90 deg	Thickness	12 in
Along Wall "y" Dir	7.2542E-005 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	7.5479E+002 in			E - Shear	1.2 Mpsi
Label : Stair - South Wall		X Wall C.G. Location	87.25 ft	Length	18 ft
		Y Wall C.G. Location	112.83 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	90 deg	Thickness	10 in
Along Wall "y" Dir	8.7050E-005 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	1.3017E+003 in			E - Shear	1.2 Mpsi

Torsional Analysis of Rigid Diaphragm

Lic. # : KW-06011403

Bob D. Campbell and Co., Inc.

DESCRIPTION: 5th Floor

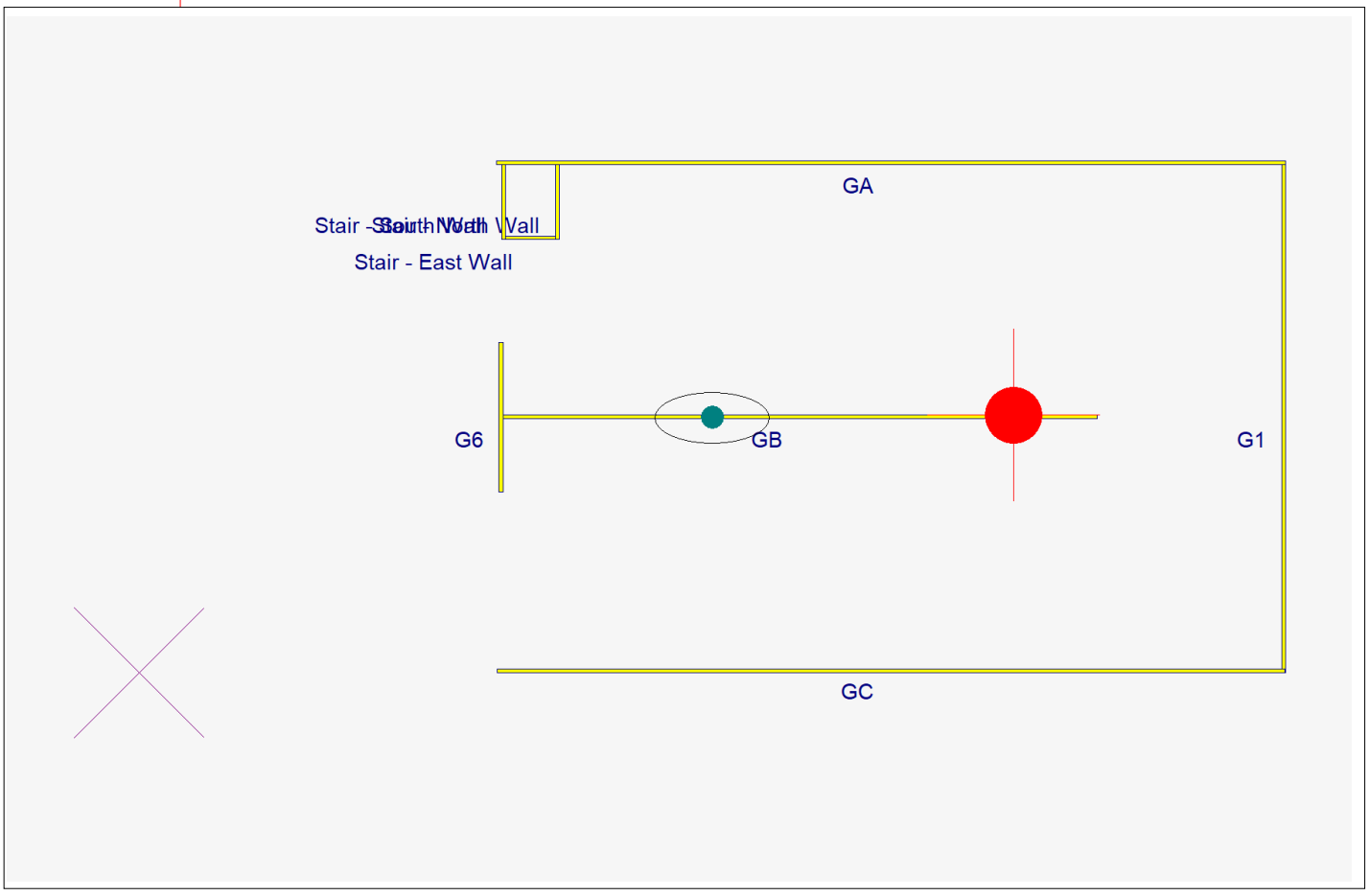
ANALYSIS SUMMARY

Maximum shear forces applied to resisting elements. Eccentricity with respect to Center of Rigidity

Resisting Element	Max Shear along Member Local "y-y" Axis				Max Shear along Member Local "x-x" Axis			
	Load Angle	X-Ecc (ft)	Y-Ecc (ft)	Shear Force (k)	Load Angle	X-Ecc (ft)	Y-Ecc (ft)	Shear Force (k)
G1	90	85.93	-0.43	159.289	0	85.93	-0.43	0.000
G6	90	68.64	5.49	57.704	0	85.93	-0.43	0.000
GA	225	84.09	2.63	85.955	90	85.93	-0.43	0.000
GB	0	72.20	-6.57	89.064	90	85.93	-0.43	0.000
GC	135	84.09	-3.50	87.365	90	85.93	-0.43	0.000
Stair - East Wall	30	81.91	3.90	2.992	90	85.93	-0.43	0.000
Stair - North Wall	90	68.64	5.49	21.092	0	85.93	-0.43	0.000
Stair - South Wall	90	68.64	5.49	18.259	0	85.93	-0.43	0.000

Layout of Resisting Elements

Legend : Defined Wall, X Datum, Center of Rigidity, Center of Mass, Accidental eccentricity application boundary



Torsional Analysis of Rigid Diaphragm

DESCRIPTION: 5th Floor

Analysis Notes

This program is designed to distribute an applied shear load to a set of resisting elements.

Each resisting element data entry specifies a deflection along a "major" and "minor" axis due to a 1,000 lb load. Each resisting element may be entered as a wall or a column (whereby the deflection is calculated), or as a generic resisting element with specified deflection. The deflections define the stiffness of each resisting element.

Each resisting element is defined at an (X,Y) location from a datum the user has previously defined. A counter-clockwise rotation of the element can be entered with respect to a traditional "+X" axis line.

A main "shear" load and an optional orthogonal shear load are specified for distribution to the system of resisting elements. In addition the maximum orthogonal dimensions of the structure and minimum accidental eccentricity percentage are specified.

From the entered loads the program calculates resultant force vectors for each angular orientation that is requested. The force is applied to the resisting elements in angular increments to generate a series of resulting direct and torsional shear loads on each element. This application of force is then repeated at angular intervals along an elliptical path defined by the minimum accidental eccentricity.

The end result is a table of direct shear and torsional shear values for each element from the iterated angles of load application and accidental eccentricity. These values are then searched to find the maximum major and minor axis shears applied to each resisting element.

Torsional Analysis of Rigid Diaphragm

DESCRIPTION: 4th Floor

General Information

IBC 2018, CBC 2019, ASCE 7-16

Applied Lateral Force in "X" DIrection	170.0 k	Center of Shear Application :	
Applied Lateral Force in "Y" DIrection	155.0 k	Distance from "X" datum point	137.340 ft
		Distance from "Y" datum point	61.340 ft
Note: These loads are resolved into X & Y components when applied to the system of elements at angular increments.		Accidental Torsion values per ASCE 7-05 12.8.4.2	
		Ecc. as % of Maximum Dimension	5.00 %
Load Orientation Angular Increment	15.0 deg		
Load Location Angular Increment	15.0 deg	Maximum Dimensions :	
		Along "X" Axis	274.670 ft
Center of Rigidity Location (calculated) . . .		Along "Y" Axis	122.670 ft
"X" dist. from Datum	209.538 ft		
"Y" dist. from Datum	61.774 ft		

Accidental Eccentricity +/- from "Y" Coord. of Center of Load Application : 13.734 ft

Accidental Eccentricity +/- from "X" Coord. of Center of Load Application : 6.134 ft

Wall Information

Label : G1		X Wall C.G. Location	274.25 ft	Length	122.67 ft
		Y Wall C.G. Location	61.33 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	90 deg	Thickness	10 in
Along Wall "y" Dir	8.7859E-006 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	1.9100E+002 in			E - Shear	1.2 Mpsi
Label : G6		X Wall C.G. Location	86.67 ft	Length	36 ft
		Y Wall C.G. Location	61.33 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	90 deg	Thickness	12 in
Along Wall "y" Dir	2.7592E-005 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	3.7739E+002 in			E - Shear	1.2 Mpsi
Label : GA		X Wall C.G. Location	180.17 ft	Length	189 ft
		Y Wall C.G. Location	122.25 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	0 deg	Thickness	10 in
Along Wall "y" Dir	5.6695E-006 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	1.2397E+002 in			E - Shear	1.2 Mpsi
Label : GB		X Wall C.G. Location	158.42 ft	Length	142.5 ft
		Y Wall C.G. Location	61.33 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	0 deg	Thickness	10 in
Along Wall "y" Dir	3.7718E-006 in	Wall Fixity	Fix-Pin	E - Bending	6 Mpsi
Along Wall "x" Dir	8.2211E+001 in			E - Shear	2.4 Mpsi
Label : GC		X Wall C.G. Location	180.25 ft	Length	188.83 ft
		Y Wall C.G. Location	0.42 ft	Height	10.63 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	0 deg	Thickness	10 in
Along Wall "y" Dir	5.6532E-006 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	1.2269E+002 in			E - Shear	1.2 Mpsi
Label : Stair - East Wall		X Wall C.G. Location	93.71 ft	Length	13.75 ft
		Y Wall C.G. Location	104.25 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	0 deg	Thickness	10 in
Along Wall "y" Dir	1.3991E-004 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	1.7040E+003 in			E - Shear	1.2 Mpsi
Label : Stair - North Wall		X Wall C.G. Location	100.17 ft	Length	18 ft
		Y Wall C.G. Location	112.83 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	90 deg	Thickness	12 in
Along Wall "y" Dir	7.2542E-005 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	7.5479E+002 in			E - Shear	1.2 Mpsi
Label : Stair - South Wall		X Wall C.G. Location	87.25 ft	Length	18 ft
		Y Wall C.G. Location	112.83 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	90 deg	Thickness	10 in
Along Wall "y" Dir	8.7050E-005 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	1.3017E+003 in			E - Shear	1.2 Mpsi

Torsional Analysis of Rigid Diaphragm

Lic. # : KW-06011403

Bob D. Campbell and Co., Inc.

DESCRIPTION: 4th Floor

ANALYSIS SUMMARY

Maximum shear forces applied to resisting elements. Eccentricity with respect to Center of Rigidity

Resisting Element	Max Shear along Member Local "y-y" Axis				Max Shear along Member Local "x-x" Axis			
	Load Angle	X-Ecc (ft)	Y-Ecc (ft)	Shear Force (k)	Load Angle	X-Ecc (ft)	Y-Ecc (ft)	Shear Force (k)
G1	90	85.93	-0.43	137.165	0	85.93	-0.43	0.000
G6	90	68.64	5.49	49.689	0	85.93	-0.43	0.000
GA	45	84.09	2.63	71.777	90	85.93	-0.43	0.000
GB	0	72.20	-6.57	72.099	90	85.93	-0.43	0.000
GC	315	84.09	-3.50	72.956	90	85.93	-0.43	0.000
Stair - East Wall	30	81.91	3.90	2.465	90	85.93	-0.43	0.000
Stair - North Wall	90	68.64	5.49	18.162	0	85.93	-0.43	0.000
Stair - South Wall	90	68.64	5.49	15.723	0	85.93	-0.43	0.000

Layout of Resisting Elements

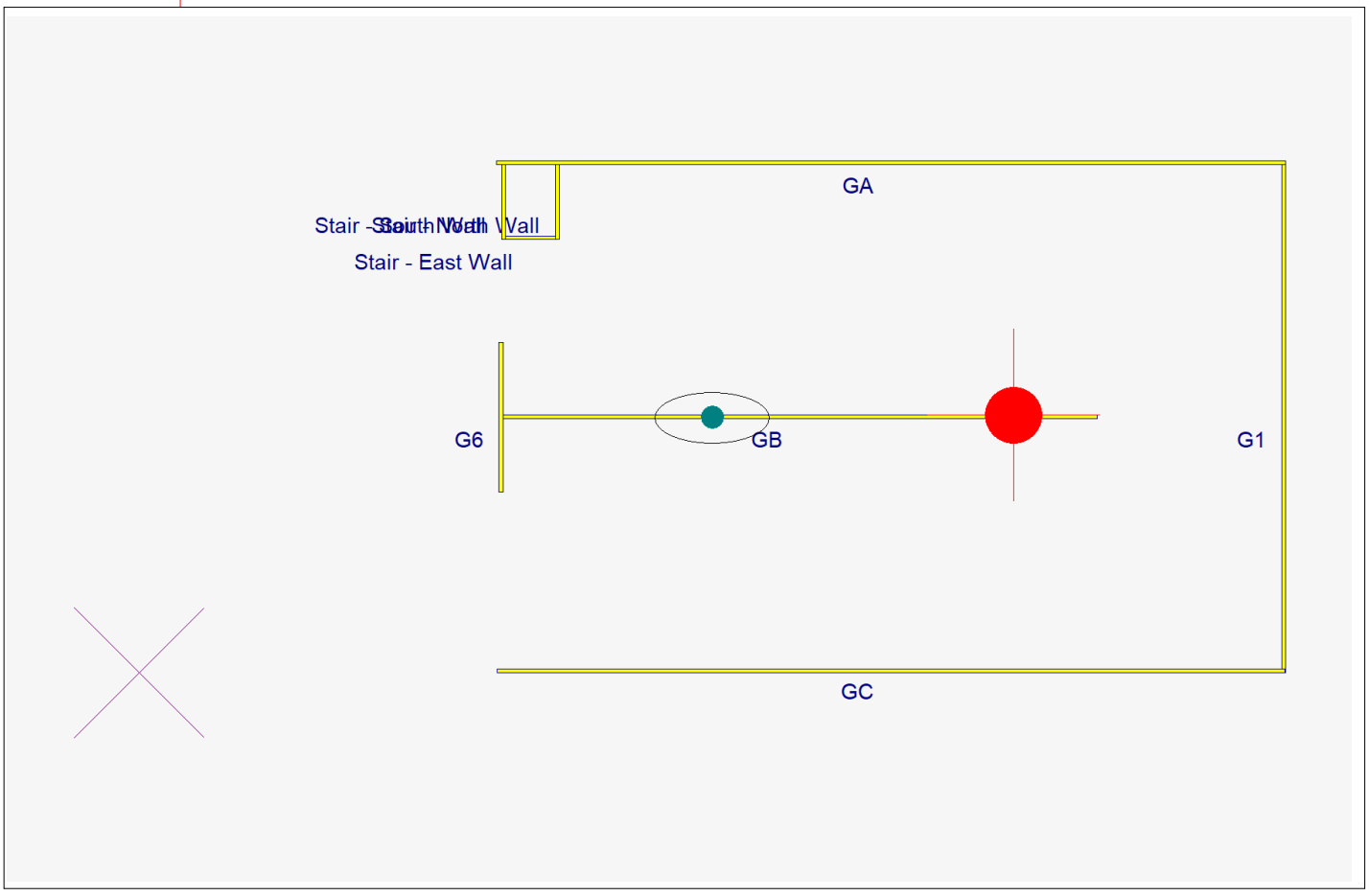
Legend : Defined Wall

X Datum

Center of Rigidity

Center of Mass

Accidental eccentricity application boundary



Torsional Analysis of Rigid Diaphragm

DESCRIPTION: 4th Floor

Analysis Notes

This program is designed to distribute an applied shear load to a set of resisting elements.

Each resisting element data entry specifies a deflection along a "major" and "minor" axis due to a 1,000 lb load. Each resisting element may be entered as a wall or a column (whereby the deflection is calculated), or as a generic resisting element with specified deflection. The deflections define the stiffness of each resisting element.

Each resisting element is defined at an (X,Y) location from a datum the user has previously defined. A counter-clockwise rotation of the element can be entered with respect to a traditional "+X" axis line.

A main "shear" load and an optional orthogonal shear load are specified for distribution to the system of resisting elements. In addition the maximum orthogonal dimensions of the structure and minimum accidental eccentricity percentage are specified.

From the entered loads the program calculates resultant force vectors for each angular orientation that is requested. The force is applied to the resisting elements in angular increments to generate a series of resulting direct and torsional shear loads on each element. This application of force is then repeated at angular intervals along an elliptical path defined by the minimum accidental eccentricity.

The end result is a table of direct shear and torsional shear values for each element from the iterated angles of load application and accidental eccentricity. These values are then searched to find the maximum major and minor axis shears applied to each resisting element.

Torsional Analysis of Rigid Diaphragm

Lic. # : KW-06011403

Bob D. Campbell and Co., Inc.

DESCRIPTION: 3rd Floor

General Information

IBC 2018, CBC 2019, ASCE 7-16

Applied Lateral Force in "X" DIrection	125.0 k	Center of Shear Application :	
Applied Lateral Force in "Y" DIrection	110.0 k	Distance from "X" datum point	137.340 ft
		Distance from "Y" datum point	61.340 ft
Note: These loads are resolved into X & Y components when applied to the system of elements at angular increments.		Accidental Torsion values per ASCE 7-05 12.8.4.2	
		Ecc. as % of Maximum Dimension	5.00 %
Load Orientation Angular Increment	15.0 deg		
Load Location Angular Increment	15.0 deg	Maximum Dimensions :	
		Along "X" Axis	274.670 ft
Center of Rigidity Location (calculated) . . .		Along "Y" Axis	122.670 ft
"X" dist. from Datum	209.538 ft		
"Y" dist. from Datum	61.774 ft		

Accidental Eccentricity +/- from "Y" Coord. of Center of Load Application : 13.734 ft

Accidental Eccentricity +/- from "X" Coord. of Center of Load Application : 6.134 ft

Wall Information

Label : G1		X Wall C.G. Location	274.25 ft	Length	122.67 ft
		Y Wall C.G. Location	61.33 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	90 deg	Thickness	10 in
Along Wall "y" Dir	8.7859E-006 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	1.9100E+002 in			E - Shear	1.2 Mpsi
Label : G6		X Wall C.G. Location	86.67 ft	Length	36 ft
		Y Wall C.G. Location	61.33 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	90 deg	Thickness	12 in
Along Wall "y" Dir	2.7592E-005 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	3.7739E+002 in			E - Shear	1.2 Mpsi
Label : GA		X Wall C.G. Location	180.17 ft	Length	189 ft
		Y Wall C.G. Location	122.25 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	0 deg	Thickness	10 in
Along Wall "y" Dir	5.6695E-006 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	1.2397E+002 in			E - Shear	1.2 Mpsi
Label : GB		X Wall C.G. Location	158.42 ft	Length	142.5 ft
		Y Wall C.G. Location	61.33 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	0 deg	Thickness	10 in
Along Wall "y" Dir	3.7718E-006 in	Wall Fixity	Fix-Pin	E - Bending	6 Mpsi
Along Wall "x" Dir	8.2211E+001 in			E - Shear	2.4 Mpsi
Label : GC		X Wall C.G. Location	180.25 ft	Length	188.83 ft
		Y Wall C.G. Location	0.42 ft	Height	10.63 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	0 deg	Thickness	10 in
Along Wall "y" Dir	5.6532E-006 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	1.2269E+002 in			E - Shear	1.2 Mpsi
Label : Stair - East Wall		X Wall C.G. Location	93.71 ft	Length	13.75 ft
		Y Wall C.G. Location	104.25 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	0 deg	Thickness	10 in
Along Wall "y" Dir	1.3991E-004 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	1.7040E+003 in			E - Shear	1.2 Mpsi
Label : Stair - North Wall		X Wall C.G. Location	100.17 ft	Length	18 ft
		Y Wall C.G. Location	112.83 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	90 deg	Thickness	12 in
Along Wall "y" Dir	7.2542E-005 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	7.5479E+002 in			E - Shear	1.2 Mpsi
Label : Stair - South Wall		X Wall C.G. Location	87.25 ft	Length	18 ft
		Y Wall C.G. Location	112.83 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	90 deg	Thickness	10 in
Along Wall "y" Dir	8.7050E-005 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	1.3017E+003 in			E - Shear	1.2 Mpsi

Torsional Analysis of Rigid Diaphragm

Lic. # : KW-06011403

Bob D. Campbell and Co., Inc.

DESCRIPTION: 3rd Floor

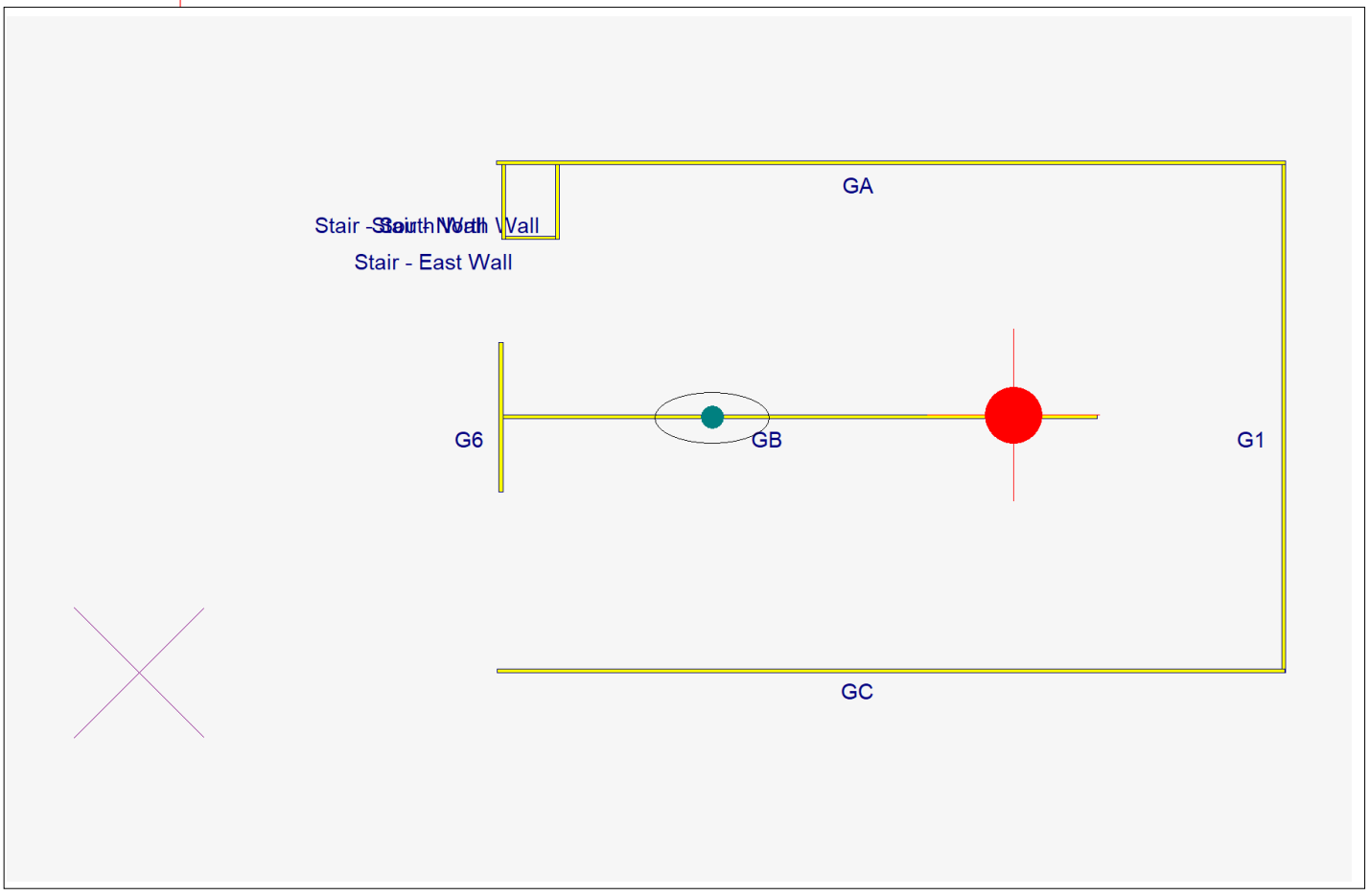
ANALYSIS SUMMARY

Maximum shear forces applied to resisting elements. Eccentricity with respect to Center of Rigidity

Resisting Element	Max Shear along Member Local "y-y" Axis				Max Shear along Member Local "x-x" Axis			
	Load Angle	X-Ecc (ft)	Y-Ecc (ft)	Shear Force (k)	Load Angle	X-Ecc (ft)	Y-Ecc (ft)	Shear Force (k)
G1	90	85.93	-0.43	97.343	0	85.93	-0.43	0.000
G6	90	68.64	5.49	35.263	0	85.93	-0.43	0.000
GA	45	84.09	2.63	51.839	90	85.93	-0.43	0.000
GB	0	72.20	-6.57	53.014	90	85.93	-0.43	0.000
GC	315	84.09	-3.50	52.690	90	85.93	-0.43	0.000
Stair - East Wall	30	81.91	3.90	1.794	90	85.93	-0.43	0.000
Stair - North Wall	90	68.64	5.49	12.889	0	85.93	-0.43	0.000
Stair - South Wall	90	68.64	5.49	11.159	0	85.93	-0.43	0.000

Layout of Resisting Elements

Legend : Defined Wall, X Datum, Center of Rigidity, Center of Mass, Accidental eccentricity application boundary



Torsional Analysis of Rigid Diaphragm

DESCRIPTION: 3rd Floor

Analysis Notes

This program is designed to distribute an applied shear load to a set of resisting elements.

Each resisting element data entry specifies a deflection along a "major" and "minor" axis due to a 1,000 lb load. Each resisting element may be entered as a wall or a column (whereby the deflection is calculated), or as a generic resisting element with specified deflection. The deflections define the stiffness of each resisting element.

Each resisting element is defined at an (X,Y) location from a datum the user has previously defined. A counter-clockwise rotation of the element can be entered with respect to a traditional "+X" axis line.

A main "shear" load and an optional orthogonal shear load are specified for distribution to the system of resisting elements. In addition the maximum orthogonal dimensions of the structure and minimum accidental eccentricity percentage are specified.

From the entered loads the program calculates resultant force vectors for each angular orientation that is requested. The force is applied to the resisting elements in angular increments to generate a series of resulting direct and torsional shear loads on each element. This application of force is then repeated at angular intervals along an elliptical path defined by the minimum accidental eccentricity.

The end result is a table of direct shear and torsional shear values for each element from the iterated angles of load application and accidental eccentricity. These values are then searched to find the maximum major and minor axis shears applied to each resisting element.

Torsional Analysis of Rigid Diaphragm

DESCRIPTION: 2nd Floor

General Information

IBC 2018, CBC 2019, ASCE 7-16

Applied Lateral Force in "X" DIrection	80.0 k	Center of Shear Application :	
Applied Lateral Force in "Y" DIrection	75.0 k	Distance from "X" datum point	137.340 ft
		Distance from "Y" datum point	61.340 ft
Note: These loads are resolved into X & Y components when applied to the system of elements at angular increments.		Accidental Torsion values per ASCE 7-05 12.8.4.2	
		Ecc. as % of Maximum Dimension	5.00 %
Load Orientation Angular Increment	15.0 deg		
Load Location Angular Increment	15.0 deg	Maximum Dimensions :	
		Along "X" Axis	274.670 ft
Center of Rigidity Location (calculated) . . .		Along "Y" Axis	122.670 ft
"X" dist. from Datum	209.538 ft		
"Y" dist. from Datum	61.774 ft		

Accidental Eccentricity +/- from "Y" Coord. of Center of Load Application : 13.734 ft

Accidental Eccentricity +/- from "X" Coord. of Center of Load Application : 6.134 ft

Wall Information

Label : G1		X Wall C.G. Location	274.25 ft	Length	122.67 ft
		Y Wall C.G. Location	61.33 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	90 deg	Thickness	10 in
Along Wall "y" Dir	8.7859E-006 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	1.9100E+002 in			E - Shear	1.2 Mpsi
Label : G6		X Wall C.G. Location	86.67 ft	Length	36 ft
		Y Wall C.G. Location	61.33 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	90 deg	Thickness	12 in
Along Wall "y" Dir	2.7592E-005 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	3.7739E+002 in			E - Shear	1.2 Mpsi
Label : GA		X Wall C.G. Location	180.17 ft	Length	189 ft
		Y Wall C.G. Location	122.25 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	0 deg	Thickness	10 in
Along Wall "y" Dir	5.6695E-006 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	1.2397E+002 in			E - Shear	1.2 Mpsi
Label : GB		X Wall C.G. Location	158.42 ft	Length	142.5 ft
		Y Wall C.G. Location	61.33 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	0 deg	Thickness	10 in
Along Wall "y" Dir	3.7718E-006 in	Wall Fixity	Fix-Pin	E - Bending	6 Mpsi
Along Wall "x" Dir	8.2211E+001 in			E - Shear	2.4 Mpsi
Label : GC		X Wall C.G. Location	180.25 ft	Length	188.83 ft
		Y Wall C.G. Location	0.42 ft	Height	10.63 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	0 deg	Thickness	10 in
Along Wall "y" Dir	5.6532E-006 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	1.2269E+002 in			E - Shear	1.2 Mpsi
Label : Stair - East Wall		X Wall C.G. Location	93.71 ft	Length	13.75 ft
		Y Wall C.G. Location	104.25 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	0 deg	Thickness	10 in
Along Wall "y" Dir	1.3991E-004 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	1.7040E+003 in			E - Shear	1.2 Mpsi
Label : Stair - North Wall		X Wall C.G. Location	100.17 ft	Length	18 ft
		Y Wall C.G. Location	112.83 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	90 deg	Thickness	12 in
Along Wall "y" Dir	7.2542E-005 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	7.5479E+002 in			E - Shear	1.2 Mpsi
Label : Stair - South Wall		X Wall C.G. Location	87.25 ft	Length	18 ft
		Y Wall C.G. Location	112.83 ft	Height	10.67 ft
Wall Deflections (Stiffness) for 1.0 kip load :		Wall Angle CCW	90 deg	Thickness	10 in
Along Wall "y" Dir	8.7050E-005 in	Wall Fixity	Fix-Pin	E - Bending	3 Mpsi
Along Wall "x" Dir	1.3017E+003 in			E - Shear	1.2 Mpsi

Torsional Analysis of Rigid Diaphragm

Lic. # : KW-06011403

Bob D. Campbell and Co., Inc.

DESCRIPTION: 2nd Floor

ANALYSIS SUMMARY

Maximum shear forces applied to resisting elements. Eccentricity with respect to Center of Rigidity

Resisting Element	Max Shear along Member Local "y-y" Axis				Max Shear along Member Local "x-x" Axis			
	Load Angle	X-Ecc (ft)	Y-Ecc (ft)	Shear Force (k)	Load Angle	X-Ecc (ft)	Y-Ecc (ft)	Shear Force (k)
G1	90	85.93	-0.43	66.370	0	85.93	-0.43	0.000
G6	90	68.64	5.49	24.043	0	85.93	-0.43	0.000
GA	45	84.09	2.63	34.264	90	85.93	-0.43	0.000
GB	0	72.20	-6.57	33.929	90	85.93	-0.43	0.000
GC	315	84.09	-3.50	34.827	90	85.93	-0.43	0.000
Stair - East Wall	30	81.91	3.90	1.170	90	85.93	-0.43	0.000
Stair - North Wall	90	68.64	5.49	8.788	0	85.93	-0.43	0.000
Stair - South Wall	90	68.64	5.49	7.608	0	85.93	-0.43	0.000

Layout of Resisting Elements

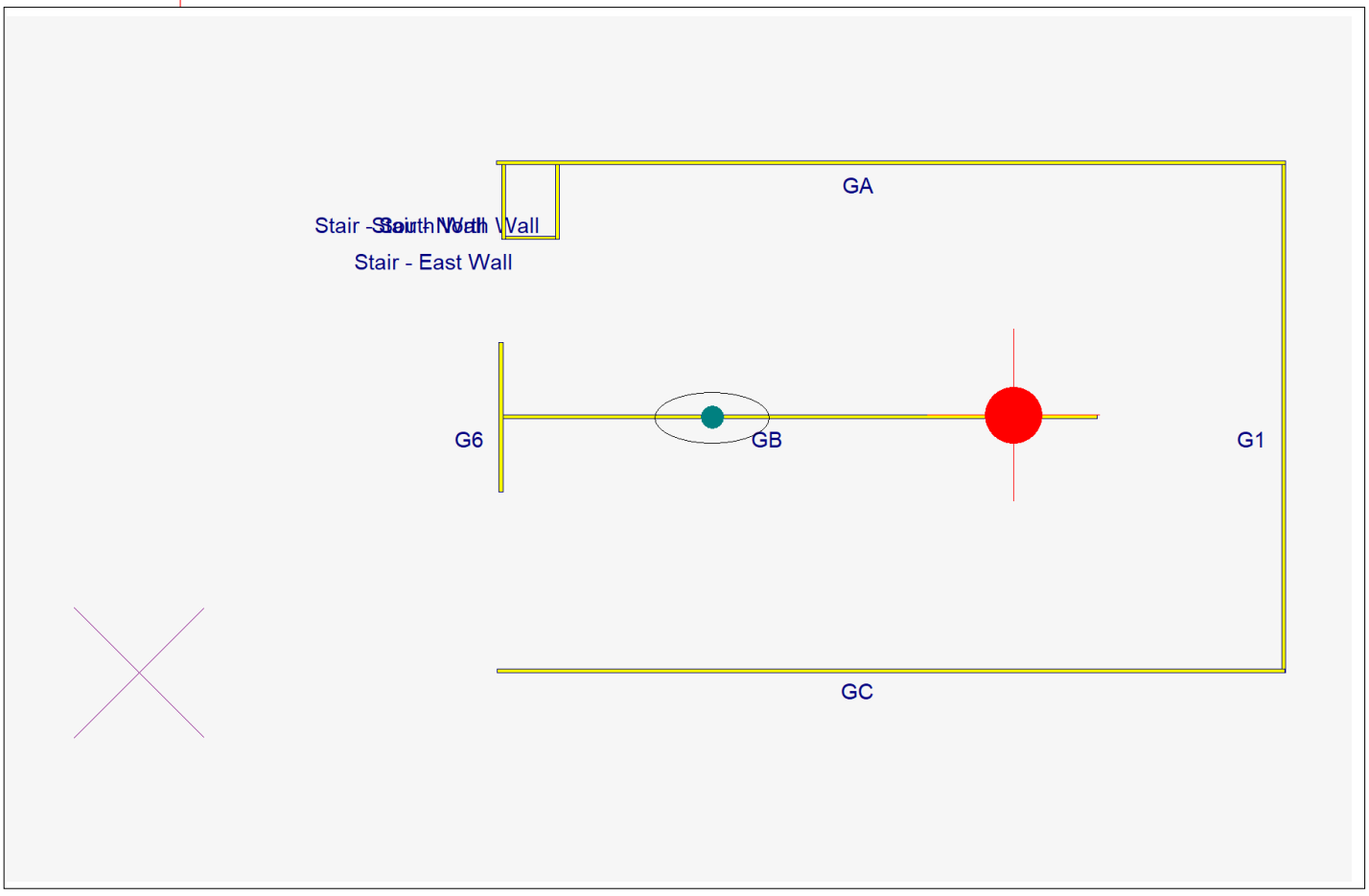
Legend : Defined Wall

X Datum

Center of Rigidity

Center of Mass

Accidental eccentricity application boundary



Torsional Analysis of Rigid Diaphragm

DESCRIPTION: 2nd Floor

Analysis Notes

This program is designed to distribute an applied shear load to a set of resisting elements.

Each resisting element data entry specifies a deflection along a "major" and "minor" axis due to a 1,000 lb load. Each resisting element may be entered as a wall or a column (whereby the deflection is calculated), or as a generic resisting element with specified deflection. The deflections define the stiffness of each resisting element.

Each resisting element is defined at an (X,Y) location from a datum the user has previously defined. A counter-clockwise rotation of the element can be entered with respect to a traditional "+X" axis line.

A main "shear" load and an optional orthogonal shear load are specified for distribution to the system of resisting elements. In addition the maximum orthogonal dimensions of the structure and minimum accidental eccentricity percentage are specified.

From the entered loads the program calculates resultant force vectors for each angular orientation that is requested. The force is applied to the resisting elements in angular increments to generate a series of resulting direct and torsional shear loads on each element. This application of force is then repeated at angular intervals along an elliptical path defined by the minimum accidental eccentricity.

The end result is a table of direct shear and torsional shear values for each element from the iterated angles of load application and accidental eccentricity. These values are then searched to find the maximum major and minor axis shears applied to each resisting element.

Concrete Beam

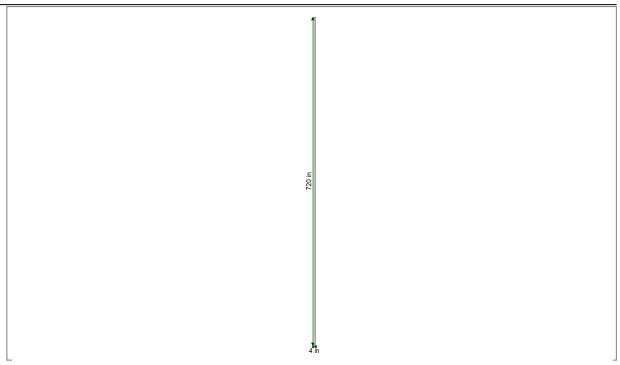
DESCRIPTION: Garage Diaphragm - 4th Floor - Chord Steel

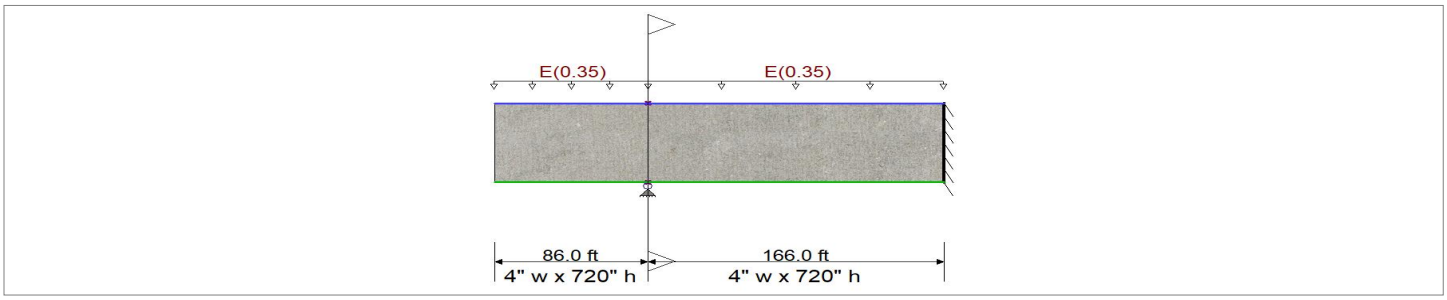
CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

f'c	=	6.0 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c$^{1/2}$ * 7.50	=	580.95 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.750
λ LtWt Factor	=	1.0			
Elastic Modulus	=	4,463.15 ksi	Fy - Stirrups		60.0 ksi
fy - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #		3
			Number of Resisting Legs Per Stirrup =		1.0





Cross Section & Reinforcing Details

Rectangular Section, Width = 4.0 in, Height = 720.0 in
Span #1 Reinforcing....
3-#4 at 3.0 in from Top, from 0.0 to 86.0 ft in this span
3-#4 at 3.0 in from Bottom, from 0.0 to 86.0 ft in this span
Span #2 Reinforcing....
3-#4 at 3.0 in from Top, from 0.0 to 166.0 ft in this span
3-#4 at 3.0 in from Bottom, from 0.0 to 166.0 ft in this span

Load for Span Number 1
Uniform Load : E = 0.350 k/ft, Tributary Width = 1.0 ft
Load for Span Number 2
Uniform Load : E = 0.350 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.669** : 1	Maximum Deflection		
Section used for this span		**Typical Section**	Max Downward Transient Deflection	0.013 in	Ratio = 160476 >=360.
Mu : Applied		-1,294.30 k-ft	Max Upward Transient Deflection	0.000 in	Ratio = 0 <360.0
Mn * Phi : Allowable		1,933.97 k-ft	Max Downward Total Deflection	0.013 in	Ratio = 160476 >=180.
Location of maximum on span		0.000 ft	Max Upward Total Deflection	0.000 in	Ratio = 0 <180.0
Span # where maximum occurs		Span # 2			

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		63.611	24.589
Overall MINimum		33.396	12.909
+D+0.70E+0.60H		44.528	17.212
+D+0.750L+0.750S+0.5250E+H		33.396	12.909
+0.60D+0.70E+H		44.528	17.212
E Only		63.611	24.589
H Only			

Concrete Beam

DESCRIPTION: Garage Diaphragm - 4th Floor - Chord Steel

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+0.90D+E+0.90H	1	0.00	717.00	-0.00	0.00	0.00	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	2.11	717.00	-0.74	0.74	0.78	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	4.21	717.00	-1.47	1.47	3.11	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	6.32	717.00	-2.21	2.21	6.99	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	8.42	717.00	-2.95	2.95	12.42	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	10.53	717.00	-3.69	3.69	19.41	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	12.64	717.00	-4.42	4.42	27.95	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	14.74	717.00	-5.16	5.16	38.04	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	16.85	717.00	-5.90	5.90	49.68	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	18.96	717.00	-6.63	6.63	62.88	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	21.06	717.00	-7.37	7.37	77.63	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	23.17	717.00	-8.11	8.11	93.93	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	25.27	717.00	-8.85	8.85	111.78	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	27.38	717.00	-9.58	9.58	131.19	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	29.49	717.00	-10.32	10.32	152.15	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	31.59	717.00	-11.06	11.06	174.66	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	33.70	717.00	-11.79	11.79	198.72	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	35.80	717.00	-12.53	12.53	224.34	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	37.91	717.00	-13.27	13.27	251.51	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	40.02	717.00	-14.01	14.01	280.23	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	42.12	717.00	-14.74	14.74	310.50	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	44.23	717.00	-15.48	15.48	342.33	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	46.33	717.00	-16.22	16.22	375.71	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	48.44	717.00	-16.95	16.95	410.64	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	50.55	717.00	-17.69	17.69	447.12	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	52.65	717.00	-18.43	18.43	485.16	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	54.76	717.00	-19.17	19.17	524.75	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	56.87	717.00	-19.90	19.90	565.89	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	58.97	717.00	-20.64	20.64	608.59	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	61.08	717.00	-21.38	21.38	652.83	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	63.18	717.00	-22.11	22.11	698.63	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	65.29	717.00	-22.85	22.85	745.98	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	67.40	717.00	-23.59	23.59	794.89	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	69.50	717.00	-24.33	24.33	845.34	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	71.61	717.00	-25.06	25.06	897.35	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	73.71	717.00	-25.80	25.80	950.91	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	75.82	717.00	-26.54	26.54	1,006.03	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	77.93	717.00	-27.27	27.27	1,062.70	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	80.03	717.00	-28.01	28.01	1,120.91	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	82.14	717.00	-28.75	28.75	1,180.69	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	84.24	717.00	-29.49	29.49	1,242.01	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	86.68	717.00	33.27	33.27	1,271.68	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	90.74	717.00	31.85	31.85	1,139.30	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	94.81	717.00	30.43	30.43	1,012.71	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	98.87	717.00	29.01	29.01	891.90	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	102.94	717.00	27.58	27.58	776.88	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	107.00	717.00	26.16	26.16	667.64	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	111.07	717.00	24.74	24.74	564.19	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	115.13	717.00	23.31	23.31	466.52	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	119.20	717.00	21.89	21.89	374.63	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	123.27	717.00	20.47	20.47	288.53	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	127.33	717.00	19.05	19.05	208.21	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	131.40	717.00	17.62	17.62	133.68	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	135.46	717.00	16.20	16.20	64.93	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0

Concrete Beam

DESCRIPTION: Garage Diaphragm - 4th Floor - Chord Steel

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+0.90D+E+0.90H	2	139.53	717.00	14.78	14.78	1.97	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	143.59	717.00	13.35	13.35	55.21	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	147.66	717.00	11.93	11.93	106.60	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	151.72	717.00	10.51	10.51	152.22	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	155.79	717.00	9.09	9.09	192.04	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	159.85	717.00	7.66	7.66	226.08	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	163.92	717.00	6.24	6.24	254.34	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	167.98	717.00	4.82	4.82	276.81	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	172.05	717.00	3.39	3.39	293.50	0.69	317.35	Vu < PhiVc/2	lot Reqd 9.6.	317.3	0.0	0.0
+0.90D+E+0.90H	2	176.11	717.00	1.97	1.97	304.41	0.39	317.01	Vu < PhiVc/2	lot Reqd 9.6.	317.0	0.0	0.0
+0.90D+E+0.90H	2	180.18	717.00	0.55	0.55	309.53	0.11	316.69	Vu < PhiVc/2	lot Reqd 9.6.	316.7	0.0	0.0
+0.90D+E+0.90H	2	184.24	717.00	-0.87	0.87	308.86	0.17	316.76	Vu < PhiVc/2	lot Reqd 9.6.	316.8	0.0	0.0
+0.90D+E+0.90H	2	188.31	717.00	-2.30	2.30	302.41	0.45	317.08	Vu < PhiVc/2	lot Reqd 9.6.	317.1	0.0	0.0
+0.90D+E+0.90H	2	192.38	717.00	-3.72	3.72	290.18	0.77	317.43	Vu < PhiVc/2	lot Reqd 9.6.	317.4	0.0	0.0
+0.90D+E+0.90H	2	196.44	717.00	-5.14	5.14	272.16	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	200.51	717.00	-6.57	6.57	248.36	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	204.57	717.00	-7.99	7.99	218.78	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	208.64	717.00	-9.41	9.41	183.41	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	212.70	717.00	-10.83	10.83	142.25	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	216.77	717.00	-12.26	12.26	95.31	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	220.83	717.00	-13.68	13.68	42.59	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	224.90	717.00	-15.10	15.10	15.92	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	228.96	717.00	-16.53	16.53	80.21	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	233.03	717.00	-17.95	17.95	150.29	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	237.09	717.00	-19.37	19.37	226.15	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	241.16	717.00	-20.79	20.79	307.79	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	245.22	717.00	-22.22	22.22	395.22	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	249.29	717.00	-23.64	23.64	488.44	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	86.000	-1,283.76	1,933.97	0.66
Span # 2	2	##.###	-1,294.30	1,933.97	0.67
+1.40D+1.60H					
Span # 1	1	86.000	-1,294.30	1,933.97	0.67
Span # 2	2	##.###	-1,294.30	1,933.97	0.67
+1.20D+0.50Lr+1.60L+1.60H					
Span # 1	1	86.000	-1,294.30	1,933.97	0.67
Span # 2	2	##.###	-1,294.30	1,933.97	0.67
+1.20D+1.60L+0.50S+1.60H					
Span # 1	1	86.000	-1,294.30	1,933.97	0.67
Span # 2	2	##.###	-1,294.30	1,933.97	0.67
+1.20D+1.60Lr+L+1.60H					
Span # 1	1	86.000	-1,294.30	1,933.97	0.67
Span # 2	2	##.###	-1,294.30	1,933.97	0.67
+1.20D+1.60Lr+0.50W+1.60H					
Span # 1	1	86.000	-1,294.30	1,933.97	0.67
Span # 2	2	##.###	-1,294.30	1,933.97	0.67
+1.20D+L+1.60S+1.60H					
Span # 1	1	86.000	-1,294.30	1,933.97	0.67
Span # 2	2	##.###	-1,294.30	1,933.97	0.67
+1.20D+1.60S+0.50W+1.60H					
Span # 1	1	86.000	-1,294.30	1,933.97	0.67
Span # 2	2	##.###	-1,294.30	1,933.97	0.67
+1.20D+0.50Lr+L+W+1.60H					
Span # 1	1	86.000	-1,294.30	1,933.97	0.67
Span # 2	2	##.###	-1,294.30	1,933.97	0.67
+1.20D+L+0.50S+W+1.60H					

Concrete Beam

DESCRIPTION: Garage Diaphragm - 4th Floor - Chord Steel

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 1	1	86.000	-1,294.30	1,933.97	0.67
Span # 2	2	##.###	-1,294.30	1,933.97	0.67
+0.90D+W+1.60H					
Span # 1	1	86.000	-1,294.30	1,933.97	0.67
Span # 2	2	##.###	-1,294.30	1,933.97	0.67
+1.20D+L+0.20S+E+1.60H					
Span # 1	1	86.000	-1,283.76	1,933.97	0.66
Span # 2	2	##.###	-1,294.30	1,933.97	0.67
+0.90D+E+0.90H					
Span # 1	1	86.000	-1,283.76	1,933.97	0.66
Span # 2	2	##.###	-1,294.30	1,933.97	0.67

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft)	Load Combination	Max. "+" Defl (in)	Location in Span (ft)
E Only	1	0.0129	0.000	E Only	-0.0001	88.371
E Only	2	0.0010	101.971	E Only	-0.0006	21.343

Concrete Beam

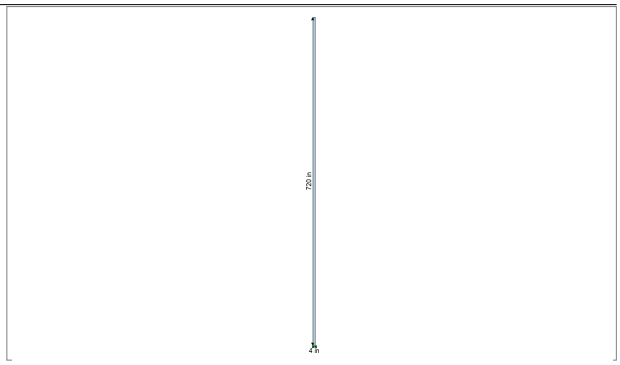
DESCRIPTION: Garage Diaphragm - 3rd Floor - Chord Steel

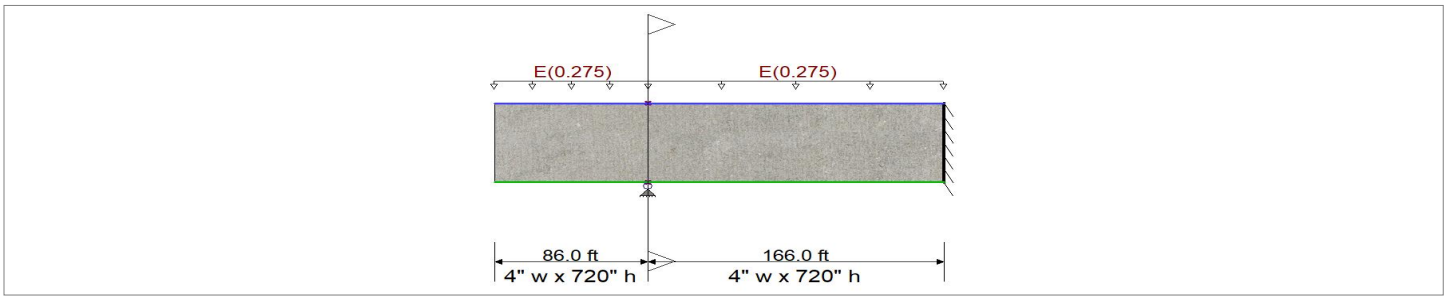
CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

f'c	=	6.0 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c$^{1/2}$ * 7.50	=	580.95 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.750
λ LtWt Factor	=	1.0			
Elastic Modulus	=	4,463.15 ksi	Fy - Stirrups		60.0 ksi
fy - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #		3
			Number of Resisting Legs Per Stirrup =		1.0





Cross Section & Reinforcing Details

Rectangular Section, Width = 4.0 in, Height = 720.0 in
Span #1 Reinforcing....
3-#4 at 3.0 in from Top, from 0.0 to 86.0 ft in this span
3-#4 at 3.0 in from Bottom, from 0.0 to 86.0 ft in this span
Span #2 Reinforcing....
3-#4 at 3.0 in from Top, from 0.0 to 166.0 ft in this span
3-#4 at 3.0 in from Bottom, from 0.0 to 166.0 ft in this span

Load for Span Number 1
Uniform Load : E = 0.2750 k/ft, Tributary Width = 1.0 ft
Load for Span Number 2
Uniform Load : E = 0.2750 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.526** : 1	Maximum Deflection		
Section used for this span		**Typical Section**	Max Downward Transient Deflection	0.010 in	Ratio = 204244 >=360.
Mu : Applied		-1,016.95 k-ft	Max Upward Transient Deflection	0.000 in	Ratio = 0 <360.0
Mn * Phi : Allowable		1,933.97 k-ft	Max Downward Total Deflection	0.010 in	Ratio = 204244 >=180.
Location of maximum on span		0.000 ft	Max Upward Total Deflection	0.000 in	Ratio = 0 <180.0
Span # where maximum occurs		Span # 2			

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		49.980	19.320
Overall MINimum		26.239	10.143
+D+0.70E+0.60H		34.986	13.524
+D+0.750L+0.750S+0.5250E+H		26.239	10.143
+0.60D+0.70E+H		34.986	13.524
E Only		49.980	19.320
H Only			

Concrete Beam

DESCRIPTION: Garage Diaphragm - 3rd Floor - Chord Steel

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+0.90D+E+0.90H	1	0.00	717.00	-0.00	0.00	0.00	0.20	316.80	Vu < PhiVc/2	lot Reqd 9.6.	316.8	0.0	0.0
+0.90D+E+0.90H	1	2.11	717.00	-0.58	0.58	0.61	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	4.21	717.00	-1.16	1.16	2.44	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	6.32	717.00	-1.74	1.74	5.49	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	8.42	717.00	-2.32	2.32	9.76	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	10.53	717.00	-2.90	2.90	15.25	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	12.64	717.00	-3.48	3.48	21.96	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	14.74	717.00	-4.05	4.05	29.89	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	16.85	717.00	-4.63	4.63	39.03	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	18.96	717.00	-5.21	5.21	49.40	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	21.06	717.00	-5.79	5.79	60.99	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	23.17	717.00	-6.37	6.37	73.80	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	25.27	717.00	-6.95	6.95	87.83	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	27.38	717.00	-7.53	7.53	103.08	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	29.49	717.00	-8.11	8.11	119.54	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	31.59	717.00	-8.69	8.69	137.23	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	33.70	717.00	-9.27	9.27	156.14	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	35.80	717.00	-9.85	9.85	176.27	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	37.91	717.00	-10.43	10.43	197.61	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	40.02	717.00	-11.00	11.00	220.18	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	42.12	717.00	-11.58	11.58	243.97	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	44.23	717.00	-12.16	12.16	268.97	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	46.33	717.00	-12.74	12.74	295.20	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	48.44	717.00	-13.32	13.32	322.65	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	50.55	717.00	-13.90	13.90	351.31	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	52.65	717.00	-14.48	14.48	381.20	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	54.76	717.00	-15.06	15.06	412.30	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	56.87	717.00	-15.64	15.64	444.63	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	58.97	717.00	-16.22	16.22	478.17	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	61.08	717.00	-16.80	16.80	512.94	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	63.18	717.00	-17.38	17.38	548.92	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	65.29	717.00	-17.95	17.95	586.13	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	67.40	717.00	-18.53	18.53	624.55	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	69.50	717.00	-19.11	19.11	664.20	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	71.61	717.00	-19.69	19.69	705.06	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	73.71	717.00	-20.27	20.27	747.15	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	75.82	717.00	-20.85	20.85	790.45	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	77.93	717.00	-21.43	21.43	834.97	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	80.03	717.00	-22.01	22.01	880.72	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	82.14	717.00	-22.59	22.59	927.68	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	84.24	717.00	-23.17	23.17	975.87	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	86.68	717.00	26.14	26.14	999.17	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	90.74	717.00	25.03	25.03	895.16	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	94.81	717.00	23.91	23.91	795.70	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	98.87	717.00	22.79	22.79	700.78	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	102.94	717.00	21.67	21.67	610.40	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	107.00	717.00	20.55	20.55	524.57	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	111.07	717.00	19.44	19.44	443.29	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	115.13	717.00	18.32	18.32	366.55	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	119.20	717.00	17.20	17.20	294.35	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	123.27	717.00	16.08	16.08	226.70	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	127.33	717.00	14.96	14.96	163.60	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	131.40	717.00	13.85	13.85	105.04	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	135.46	717.00	12.73	12.73	51.02	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0

Concrete Beam

DESCRIPTION: Garage Diaphragm - 3rd Floor - Chord Steel

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+0.90D+E+0.90H	2	139.53	717.00	11.61	11.61	1.55	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	143.59	717.00	10.49	10.49	43.38	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	147.66	717.00	9.37	9.37	83.76	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	151.72	717.00	8.26	8.26	119.60	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	155.79	717.00	7.14	7.14	150.89	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	159.85	717.00	6.02	6.02	177.64	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	163.92	717.00	4.90	4.90	199.84	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	167.98	717.00	3.78	3.78	217.50	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	172.05	717.00	2.67	2.67	230.61	0.69	317.35	Vu < PhiVc/2	lot Reqd 9.6.	317.3	0.0	0.0
+0.90D+E+0.90H	2	176.11	717.00	1.55	1.55	239.18	0.39	317.01	Vu < PhiVc/2	lot Reqd 9.6.	317.0	0.0	0.0
+0.90D+E+0.90H	2	180.18	717.00	0.43	0.43	243.20	0.11	316.69	Vu < PhiVc/2	lot Reqd 9.6.	316.7	0.0	0.0
+0.90D+E+0.90H	2	184.24	717.00	-0.69	0.69	242.68	0.17	316.76	Vu < PhiVc/2	lot Reqd 9.6.	316.8	0.0	0.0
+0.90D+E+0.90H	2	188.31	717.00	-1.81	1.81	237.61	0.45	317.08	Vu < PhiVc/2	lot Reqd 9.6.	317.1	0.0	0.0
+0.90D+E+0.90H	2	192.38	717.00	-2.92	2.92	228.00	0.77	317.43	Vu < PhiVc/2	lot Reqd 9.6.	317.4	0.0	0.0
+0.90D+E+0.90H	2	196.44	717.00	-4.04	4.04	213.84	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	200.51	717.00	-5.16	5.16	195.14	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	204.57	717.00	-6.28	6.28	171.90	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	208.64	717.00	-7.40	7.40	144.10	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	212.70	717.00	-8.51	8.51	111.77	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	216.77	717.00	-9.63	9.63	74.89	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	220.83	717.00	-10.75	10.75	33.46	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	224.90	717.00	-11.87	11.87	12.51	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	228.96	717.00	-12.98	12.98	63.02	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	233.03	717.00	-14.10	14.10	118.08	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	237.09	717.00	-15.22	15.22	177.69	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	241.16	717.00	-16.34	16.34	241.84	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	245.22	717.00	-17.46	17.46	310.53	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	249.29	717.00	-18.57	18.57	383.77	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	86.000	-1,008.67	1,933.97	0.52
Span # 2	2	##.###	-1,016.95	1,933.97	0.53
+1.40D+1.60H					
Span # 1	1	86.000	-1,016.95	1,933.97	0.53
Span # 2	2	##.###	-1,016.95	1,933.97	0.53
+1.20D+0.50Lr+1.60L+1.60H					
Span # 1	1	86.000	-1,016.95	1,933.97	0.53
Span # 2	2	##.###	-1,016.95	1,933.97	0.53
+1.20D+1.60L+0.50S+1.60H					
Span # 1	1	86.000	-1,016.95	1,933.97	0.53
Span # 2	2	##.###	-1,016.95	1,933.97	0.53
+1.20D+1.60Lr+L+1.60H					
Span # 1	1	86.000	-1,016.95	1,933.97	0.53
Span # 2	2	##.###	-1,016.95	1,933.97	0.53
+1.20D+1.60Lr+0.50W+1.60H					
Span # 1	1	86.000	-1,016.95	1,933.97	0.53
Span # 2	2	##.###	-1,016.95	1,933.97	0.53
+1.20D+L+1.60S+1.60H					
Span # 1	1	86.000	-1,016.95	1,933.97	0.53
Span # 2	2	##.###	-1,016.95	1,933.97	0.53
+1.20D+1.60S+0.50W+1.60H					
Span # 1	1	86.000	-1,016.95	1,933.97	0.53
Span # 2	2	##.###	-1,016.95	1,933.97	0.53
+1.20D+0.50Lr+L+W+1.60H					
Span # 1	1	86.000	-1,016.95	1,933.97	0.53
Span # 2	2	##.###	-1,016.95	1,933.97	0.53
+1.20D+L+0.50S+W+1.60H					

Concrete Beam

DESCRIPTION: Garage Diaphragm - 3rd Floor - Chord Steel

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 1	1	86.000	-1,016.95	1,933.97	0.53
Span # 2	2	##.###	-1,016.95	1,933.97	0.53
+0.90D+W+1.60H					
Span # 1	1	86.000	-1,016.95	1,933.97	0.53
Span # 2	2	##.###	-1,016.95	1,933.97	0.53
+1.20D+L+0.20S+E+1.60H					
Span # 1	1	86.000	-1,008.67	1,933.97	0.52
Span # 2	2	##.###	-1,016.95	1,933.97	0.53
+0.90D+E+0.90H					
Span # 1	1	86.000	-1,008.67	1,933.97	0.52
Span # 2	2	##.###	-1,016.95	1,933.97	0.53

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft)	Load Combination	Max. "+" Defl (in)	Location in Span (ft)
E Only	1	0.0101	0.000	E Only	-0.0001	88.371
E Only	2	0.0008	101.971	E Only	-0.0005	21.343

Concrete Beam

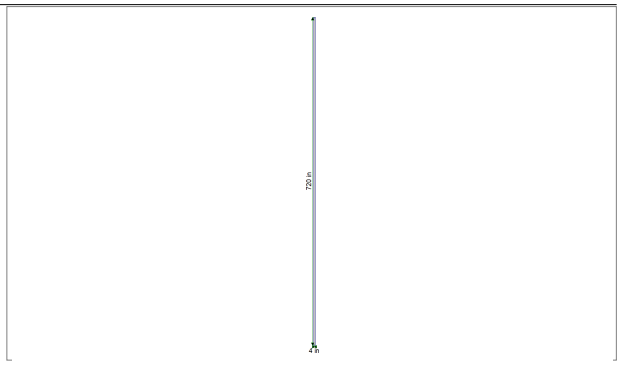
DESCRIPTION: Garage Diaphragm - 2nd Floor - Chord Steel

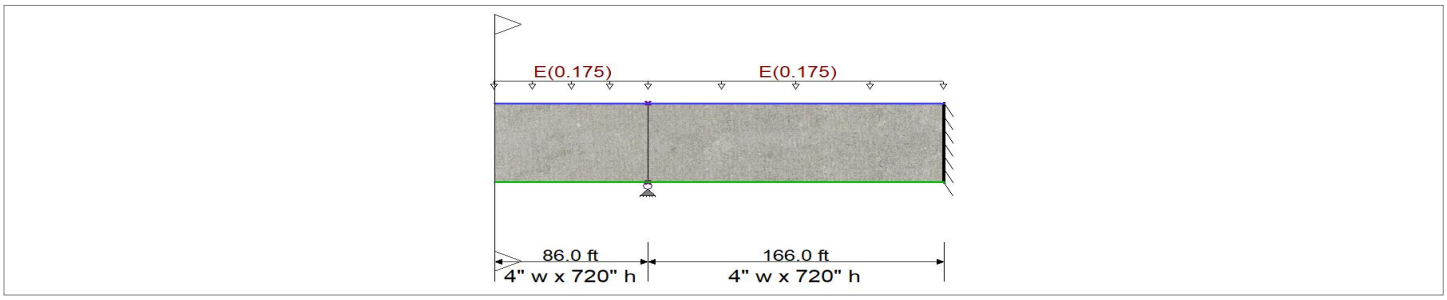
CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

f'c	=	6.0 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c$^{1/2}$ * 7.50	=	580.95 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.750
λ LtWt Factor	=	1.0			
Elastic Modulus	=	4,463.15 ksi	Fy - Stirrups		60.0 ksi
fy - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #		3
			Number of Resisting Legs Per Stirrup =		1.0





Cross Section & Reinforcing Details

Rectangular Section, Width = 4.0 in, Height = 720.0 in
Span #1 Reinforcing....
3-#4 at 3.0 in from Top, from 0.0 to 86.0 ft in this span
3-#4 at 3.0 in from Bottom, from 0.0 to 86.0 ft in this span
Span #2 Reinforcing....
3-#4 at 3.0 in from Top, from 0.0 to 166.0 ft in this span
3-#4 at 3.0 in from Bottom, from 0.0 to 166.0 ft in this span

Load for Span Number 1
Uniform Load : E = 0.1750 k/ft, Tributary Width = 1.0 ft
Load for Span Number 2
Uniform Load : E = 0.1750 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.335** : 1	Maximum Deflection		
Section used for this span		**Typical Section**	Max Downward Transient Deflection	0.006 in	Ratio = 320954 >=360
Mu : Applied		-647.15 k-ft	Max Upward Transient Deflection	0.000 in	Ratio = 0 <360.0
Mn * Phi : Allowable		1,933.97 k-ft	Max Downward Total Deflection	0.006 in	Ratio = 320954 >=180
Location of maximum on span		0.000 ft	Max Upward Total Deflection	0.000 in	Ratio = 0 <180.0
Span # where maximum occurs		Span # 2			

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		31.805	12.295
Overall MINimum		16.698	6.455
+D+0.70E+0.60H		22.264	8.606
+D+0.750L+0.750S+0.5250E+H		16.698	6.455
+0.60D+0.70E+H		22.264	8.606
E Only		31.805	12.295
H Only			

Concrete Beam

DESCRIPTION: Garage Diaphragm - 2nd Floor - Chord Steel

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+0.90D+E+0.90H	1	0.00	717.00	-0.00	0.00	0.00	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	2.11	717.00	-0.37	0.37	0.39	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	4.21	717.00	-0.74	0.74	1.55	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	6.32	717.00	-1.11	1.11	3.49	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	8.42	717.00	-1.47	1.47	6.21	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	10.53	717.00	-1.84	1.84	9.70	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	12.64	717.00	-2.21	2.21	13.97	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	14.74	717.00	-2.58	2.58	19.02	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	16.85	717.00	-2.95	2.95	24.84	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	18.96	717.00	-3.32	3.32	31.44	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	21.06	717.00	-3.69	3.69	38.81	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	23.17	717.00	-4.05	4.05	46.96	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	25.27	717.00	-4.42	4.42	55.89	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	27.38	717.00	-4.79	4.79	65.59	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	29.49	717.00	-5.16	5.16	76.07	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	31.59	717.00	-5.53	5.53	87.33	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	33.70	717.00	-5.90	5.90	99.36	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	35.80	717.00	-6.27	6.27	112.17	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	37.91	717.00	-6.63	6.63	125.75	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	40.02	717.00	-7.00	7.00	140.11	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	42.12	717.00	-7.37	7.37	155.25	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	44.23	717.00	-7.74	7.74	171.16	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	46.33	717.00	-8.11	8.11	187.85	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	48.44	717.00	-8.48	8.48	205.32	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	50.55	717.00	-8.85	8.85	223.56	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	52.65	717.00	-9.21	9.21	242.58	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	54.76	717.00	-9.58	9.58	262.37	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	56.87	717.00	-9.95	9.95	282.95	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	58.97	717.00	-10.32	10.32	304.29	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	61.08	717.00	-10.69	10.69	326.42	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	63.18	717.00	-11.06	11.06	349.32	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	65.29	717.00	-11.43	11.43	372.99	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	67.40	717.00	-11.79	11.79	397.44	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	69.50	717.00	-12.16	12.16	422.67	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	71.61	717.00	-12.53	12.53	448.68	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	73.71	717.00	-12.90	12.90	475.46	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	75.82	717.00	-13.27	13.27	503.01	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	77.93	717.00	-13.64	13.64	531.35	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	80.03	717.00	-14.01	14.01	560.46	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	82.14	717.00	-14.37	14.37	590.34	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	1	84.24	717.00	-14.74	14.74	621.01	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	86.68	717.00	16.64	16.64	635.84	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	90.74	717.00	15.93	15.93	569.65	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	94.81	717.00	15.21	15.21	506.35	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	98.87	717.00	14.50	14.50	445.95	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	102.94	717.00	13.79	13.79	388.44	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	107.00	717.00	13.08	13.08	333.82	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	111.07	717.00	12.37	12.37	282.09	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	115.13	717.00	11.66	11.66	233.26	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	119.20	717.00	10.95	10.95	187.32	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	123.27	717.00	10.23	10.23	144.26	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	127.33	717.00	9.52	9.52	104.11	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	131.40	717.00	8.81	8.81	66.84	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	135.46	717.00	8.10	8.10	32.47	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0

Concrete Beam

DESCRIPTION: Garage Diaphragm - 2nd Floor - Chord Steel

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+0.90D+E+0.90H	2	139.53	717.00	7.39	7.39	0.98	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	143.59	717.00	6.68	6.68	27.60	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	147.66	717.00	5.97	5.97	53.30	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	151.72	717.00	5.25	5.25	76.11	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	155.79	717.00	4.54	4.54	96.02	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	159.85	717.00	3.83	3.83	113.04	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	163.92	717.00	3.12	3.12	127.17	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	167.98	717.00	2.41	2.41	138.41	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	172.05	717.00	1.70	1.70	146.75	0.69	317.35	Vu < PhiVc/2	lot Reqd 9.6.	317.3	0.0	0.0
+0.90D+E+0.90H	2	176.11	717.00	0.99	0.99	152.20	0.39	317.01	Vu < PhiVc/2	lot Reqd 9.6.	317.0	0.0	0.0
+0.90D+E+0.90H	2	180.18	717.00	0.27	0.27	154.76	0.11	316.69	Vu < PhiVc/2	lot Reqd 9.6.	316.7	0.0	0.0
+0.90D+E+0.90H	2	184.24	717.00	-0.44	0.44	154.43	0.17	316.76	Vu < PhiVc/2	lot Reqd 9.6.	316.8	0.0	0.0
+0.90D+E+0.90H	2	188.31	717.00	-1.15	1.15	151.21	0.45	317.08	Vu < PhiVc/2	lot Reqd 9.6.	317.1	0.0	0.0
+0.90D+E+0.90H	2	192.38	717.00	-1.86	1.86	145.09	0.77	317.43	Vu < PhiVc/2	lot Reqd 9.6.	317.4	0.0	0.0
+0.90D+E+0.90H	2	196.44	717.00	-2.57	2.57	136.08	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	200.51	717.00	-3.28	3.28	124.18	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	204.57	717.00	-3.99	3.99	109.39	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	208.64	717.00	-4.71	4.71	91.70	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	212.70	717.00	-5.42	5.42	71.13	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	216.77	717.00	-6.13	6.13	47.66	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	220.83	717.00	-6.84	6.84	21.29	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	224.90	717.00	-7.55	7.55	7.96	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	228.96	717.00	-8.26	8.26	40.11	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	233.03	717.00	-8.97	8.97	75.14	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	237.09	717.00	-9.69	9.69	113.07	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	241.16	717.00	-10.40	10.40	153.90	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	245.22	717.00	-11.11	11.11	197.61	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0
+0.90D+E+0.90H	2	249.29	717.00	-11.82	11.82	244.22	1.00	317.69	Vu < PhiVc/2	lot Reqd 9.6.	317.7	0.0	0.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	86.000	-641.88	1,933.97	0.33
Span # 2	2	##.###	-647.15	1,933.97	0.33
+1.40D+1.60H					
Span # 1	1	86.000	-647.15	1,933.97	0.33
Span # 2	2	##.###	-647.15	1,933.97	0.33
+1.20D+0.50Lr+1.60L+1.60H					
Span # 1	1	86.000	-647.15	1,933.97	0.33
Span # 2	2	##.###	-647.15	1,933.97	0.33
+1.20D+1.60L+0.50S+1.60H					
Span # 1	1	86.000	-647.15	1,933.97	0.33
Span # 2	2	##.###	-647.15	1,933.97	0.33
+1.20D+1.60Lr+L+1.60H					
Span # 1	1	86.000	-647.15	1,933.97	0.33
Span # 2	2	##.###	-647.15	1,933.97	0.33
+1.20D+1.60Lr+0.50W+1.60H					
Span # 1	1	86.000	-647.15	1,933.97	0.33
Span # 2	2	##.###	-647.15	1,933.97	0.33
+1.20D+L+1.60S+1.60H					
Span # 1	1	86.000	-647.15	1,933.97	0.33
Span # 2	2	##.###	-647.15	1,933.97	0.33
+1.20D+1.60S+0.50W+1.60H					
Span # 1	1	86.000	-647.15	1,933.97	0.33
Span # 2	2	##.###	-647.15	1,933.97	0.33
+1.20D+0.50Lr+L+W+1.60H					
Span # 1	1	86.000	-647.15	1,933.97	0.33
Span # 2	2	##.###	-647.15	1,933.97	0.33
+1.20D+L+0.50S+W+1.60H					

Concrete Beam

DESCRIPTION: Garage Diaphragm - 2nd Floor - Chord Steel

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 1	1	86.000	-647.15	1,933.97	0.33
Span # 2	2	##.###	-647.15	1,933.97	0.33
+0.90D+W+1.60H					
Span # 1	1	86.000	-647.15	1,933.97	0.33
Span # 2	2	##.###	-647.15	1,933.97	0.33
+1.20D+L+0.20S+E+1.60H					
Span # 1	1	86.000	-641.88	1,933.97	0.33
Span # 2	2	##.###	-647.15	1,933.97	0.33
+0.90D+E+0.90H					
Span # 1	1	86.000	-641.88	1,933.97	0.33
Span # 2	2	##.###	-647.15	1,933.97	0.33

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft)	Load Combination	Max. "+" Defl (in)	Location in Span (ft)
E Only	1	0.0064	0.000	E Only	-0.0001	88.371
E Only	2	0.0005	101.971	E Only	-0.0003	21.343

Masonry Slender Wall

Lic. # : KW-06011403

Bob D. Campbell and Co., Inc.

DESCRIPTION: Wall BTWN Garage and Retail - Grid G7.3

Code References

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

General Information

Calculations per TMS 402-16, IBC 2018, CBC 2019, ASCE 7-16

Construction Type : Grouted Hollow Concrete Masonry

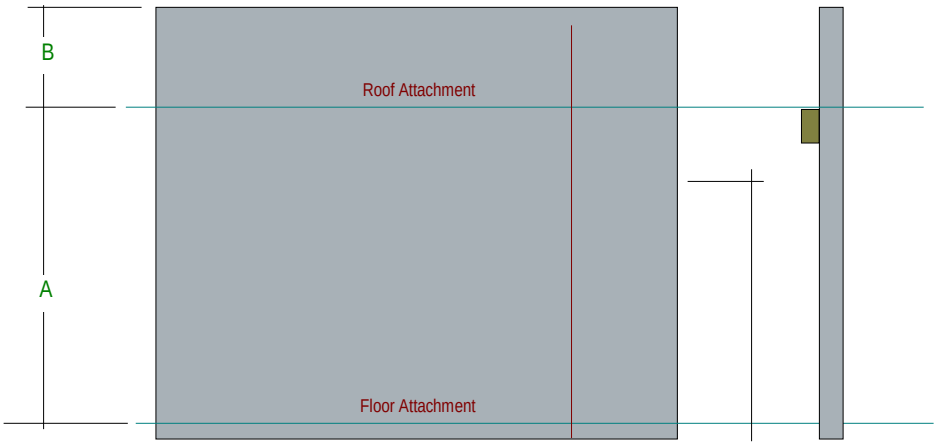
F'm	=	1.50 ksi	Nom. Wall Thickness	8 in	Temp Diff across thickness	=		deg F
Fy - Yield	=	60.0 ksi	Actual Thickness	7.625 in	Min Allow Out-of-plane Defl Ratio	=	0.0	
Fr - Rupture	=	61.0 psi	Rebar "d" distance	3.750 in				
Em = f'm *	=	900.0	Lower Level Rebar . . .		Minimum Vertical Steel %	=	0.0020	
Max % of ρ bal.	=	0.008909	Bar Size	# 5				
Grout Density	=	140 pcf	Bar Spacing	32 in				
Block Weight		Normal Weight						
Wall Weight	=	84.0 psf						

Wall is Solid Grouted

One-Story Wall Dimensions

A Clear Height = 16.0 ft
B Parapet height = ft

Wall Support Condition Top & Bottom Pinned



Lateral Loads

Wind Loads :
Full area WIND load 25.0 psf

Seismic Loads :
Wall Weight Seismic Load Input Method : Direct entry of Lateral Wall Weight
Seismic Wall Lateral Load 25.0 psf

Fp 1.0 = 25.0 psf

Masonry Slender Wall

DESCRIPTION: Wall BTWN Garage and Retail - Grid G7.3

DESIGN SUMMARY

Results reported for "Strip Width" of 12.0 in

	Governing Load Combination . . .	Actual Values . . .		Allowable Values . . .	
PASS	Moment Capacity Check +0.90D+W+1.60H	Maximum Bending Stress Ratio =	**0.4318**		
		Max Mu	0.8124 k-ft	Phi * Mn	1.881 k-ft
PASS	Service Deflection Check W Only	Actual Defl. Ratio L/	609	Allowable Defl. Ratio	150.0
		Max. Deflection	0.3151 in		
PASS	Axial Load Check +1.20D+0.50Lr+L+W+1.60H	Max Pu / Ag	9.432 psi	Max. Allow. Defl.	1.280 in
		Location	7.733 ft	0.2 * f'm	300.0 psi
PASS	Reinforcing Limit Check	Actual As/bd	0.00250	Max Allow As/bd	0.008909

Maximum Reactions . . .	*for Load Combination....*	
Top Horizontal	W Only	0.20 k
Base Horizontal	W Only	0.20 k
Vertical Reaction	+D+0.750Lr+0.750L+0.450W+H	1.344 k

Design Maximum Combinations - Moments

Results reported for "Strip Width" = 12 in.

Load Combination	Axial Load Pu k	Axial Load 0.2*f'm*b*t k	Mcr k-ft	Mu k-ft	Phi	Phi Mn k-ft	As in^2	As Ratio	0.6 * rho bal
	0.000	0.000	0.00	0.00	0.00	0.00	0.000	0.0000	0.0000
	0.000	0.000	0.00	0.00	0.00	0.00	0.000	0.0000	0.0000
	0.000	0.000	0.00	0.00	0.00	0.00	0.000	0.0000	0.0000
	0.000	0.000	0.00	0.00	0.00	0.00	0.000	0.0000	0.0000
+1.20D+1.60Lr+0.50W+1.60H at 7.47 to 8.00	0.860	27.360	0.59	0.40	0.90	1.95	0.116	0.0025	0.0086
	0.000	0.000	0.00	0.00	0.00	0.00	0.000	0.0000	0.0000
+1.20D+1.60S+0.50W+1.60H at 7.47 to 8.00	0.860	27.360	0.59	0.40	0.90	1.95	0.116	0.0025	0.0086
+1.20D+0.50Lr+L+W+1.60H at 7.47 to 8.00	0.860	27.360	0.59	0.82	0.90	1.95	0.116	0.0025	0.0086
+1.20D+L+0.50S+W+1.60H at 7.47 to 8.00	0.860	27.360	0.59	0.82	0.90	1.95	0.116	0.0025	0.0086
+0.90D+W+1.60H at 7.47 to 8.00	0.645	27.360	0.59	0.81	0.90	1.89	0.116	0.0025	0.0087
+1.20D+L+0.20S+E+1.60H at 7.47 to 8.00	0.860	27.360	0.59	0.82	0.90	1.95	0.116	0.0025	0.0086
+0.90D+E+0.90H at 7.47 to 8.00	0.645	27.360	0.59	0.81	0.90	1.89	0.116	0.0025	0.0087

Design Maximum Combinations - Deflections

Results reported for "Strip Width" = 12 in.

Load Combination	Axial Load Pu k	Moment Values Mcr k-ft	Moment Values Mactual k-ft	Stiffness I gross in^4	Stiffness I cracked in^4	Stiffness I effective in^4	Deflections Deflection in	Deflections Defl. Ratio
	0.000	0.00	0.00	0.00	0.00	0.000	0.000	0.0
	0.000	0.00	0.00	0.00	0.00	0.000	0.000	0.0
	0.000	0.00	0.00	0.00	0.00	0.000	0.000	0.0
	0.000	0.00	0.00	0.00	0.00	0.000	0.000	0.0
	0.000	0.00	0.00	0.00	0.00	0.000	0.000	0.0
	0.000	0.00	0.00	0.00	0.00	0.000	0.000	0.0
+D+0.60W+H at 7.47 to 8.00	0.717	0.59	0.48	443.30	26.52	443.300	0.037	5,184.5
+D+0.750Lr+0.750L+0.450W+H at 7.47 to 8.0	0.717	0.59	0.36	443.30	26.52	443.300	0.028	6,912.7
+D+0.750L+0.750S+0.450W+H at 7.47 to 8.00	0.717	0.59	0.36	443.30	26.52	443.300	0.028	6,912.7
+0.60D+0.60W+0.60H at 7.47 to 8.00	0.430	0.59	0.48	443.30	25.74	443.300	0.037	5,193.3
+D+0.70E+0.60H at 7.47 to 8.00	0.717	0.59	0.56	443.30	26.52	443.300	0.043	4,443.9
+D+0.750L+0.750S+0.5250E+H at 7.47 to 8.0	0.717	0.59	0.42	443.30	26.52	443.300	0.032	5,925.1
+0.60D+0.70E+H at 7.47 to 8.00	0.430	0.59	0.56	443.30	25.74	443.300	0.043	4,451.4
	0.000	0.00	0.00	0.00	0.00	0.000	0.000	0.0
	0.000	0.00	0.00	0.00	0.00	0.000	0.000	0.0

Masonry Slender Wall

DESCRIPTION: Wall BTWN Garage and Retail - Grid G7.3

	0.000	0.00	0.00	0.00	0.00	0.000	0.000	0.0
	0.000	0.00	0.00	0.00	0.00	0.000	0.000	0.0
W Only at 8.00 to 8.53	0.000	0.59	0.80	443.30	24.55	28.731	0.315	609.2
E Only at 8.00 to 8.53	0.000	0.59	0.80	443.30	24.55	28.731	0.315	609.2
	0.000	0.00	0.00	0.00	0.00	0.000	0.000	0.0

Reactions - Vertical & Horizontal

Load Combination	Base Horizontal	Top Horizontal	Vertical @ Wall Base
+D+H	0.0 k	0.00 k	1.344 k
+D+L+H	0.0 k	0.00 k	1.344 k
+D+Lr+H	0.0 k	0.00 k	1.344 k
+D+S+H	0.0 k	0.00 k	1.344 k
+D+0.750Lr+0.750L+H	0.0 k	0.00 k	1.344 k
+D+0.750L+0.750S+H	0.0 k	0.00 k	1.344 k
+D+0.60W+H	0.1 k	0.12 k	1.344 k

Masonry Slender Wall

DESCRIPTION: Wall BTWN Garage and Retail - Grid G7.3

Reactions - Vertical & Horizontal

Load Combination	Base Horizontal	Top Horizontal	Vertical @ Wall Base
+D+0.750Lr+0.750L+0.450W+H	0.1 k	0.09 k	1.344 k
+D+0.750L+0.750S+0.450W+H	0.1 k	0.09 k	1.344 k
+0.60D+0.60W+0.60H	0.1 k	0.12 k	0.806 k
+D+0.70E+0.60H	0.1 k	0.14 k	1.344 k
+D+0.750L+0.750S+0.5250E+H	0.1 k	0.11 k	1.344 k
+0.60D+0.70E+H	0.1 k	0.14 k	0.806 k
D Only	0.0 k	0.00 k	1.344 k
Lr Only	0.0 k	0.00 k	0.000 k
L Only	0.0 k	0.00 k	0.000 k
S Only	0.0 k	0.00 k	0.000 k
W Only	0.2 k	0.20 k	0.000 k
E Only	0.2 k	0.20 k	0.000 k
H Only	0.0 k	0.00 k	0.000 k

Steel Beam

Lic. # : KW-06011403 — Bob D. Campbell and Co., Inc.

DESCRIPTION: Beam Supporting Steel Stair - 4th Floor

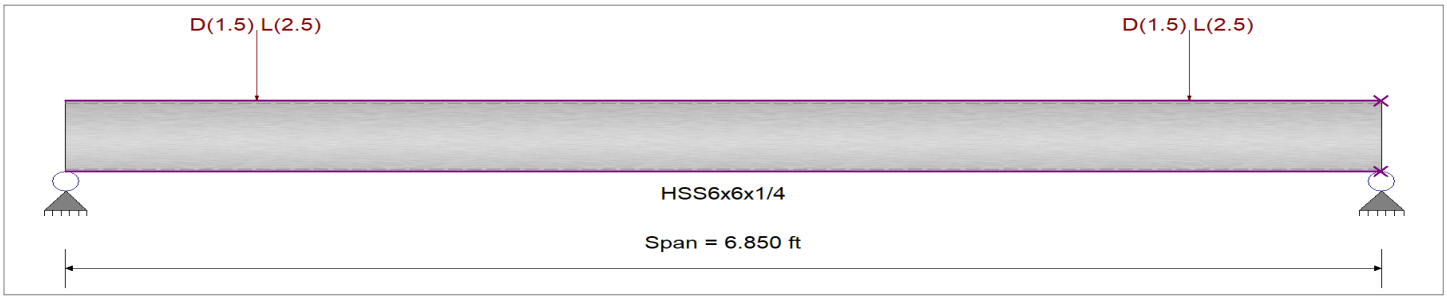
CODE REFERENCES

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

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Minor Axis Bending

Fy : Steel Yield : 46.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight calculated and added to loading
Load(s) for Span Number 1
Point Load : D = 1.50, L = 2.50 k @ 1.0 ft, (Stringer)

Point Load : D = 1.50, L = 2.50 k @ 5.850 ft, (Stringer)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.160 : 1	Maximum Shear Stress Ratio =	0.100 : 1
Section used for this span	HSS6x6x1/4	Section used for this span	HSS6x6x1/4
Ma : Applied	4.111 k-ft	Va : Applied	4.065 k
Mn / Omega : Allowable	25.709 k-ft	Vn/Omega : Allowable	40.826 k
Load Combination	+D+L+H	Load Combination	+D+L+H
Location of maximum on span	3.425 ft	Location of maximum on span	6.850 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.030 in	Ratio =	2,755 >=480.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <480.0
Max Downward Total Deflection	0.049 in	Ratio =	1682 >=360.
Max Upward Total Deflection	0.000 in	Ratio =	0 <360.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mny	Mny/Omega	Cb	Rm	Summary of Shear Values Va Max	Vny	Vny/Omega
+D+H													
Dsgn. L = 6.85 ft	1	0.063	0.038	1.61		1.61	42.93	25.71	1.00	1.00	1.57	68.18	40.83
+D+L+H													
Dsgn. L = 6.85 ft	1	0.160	0.100	4.11		4.11	42.93	25.71	1.00	1.00	4.07	68.18	40.83
+D+Lr+H													
Dsgn. L = 6.85 ft	1	0.063	0.038	1.61		1.61	42.93	25.71	1.00	1.00	1.57	68.18	40.83
+D+S+H													
Dsgn. L = 6.85 ft	1	0.063	0.038	1.61		1.61	42.93	25.71	1.00	1.00	1.57	68.18	40.83
+D+0.750Lr+0.750L+H													
Dsgn. L = 6.85 ft	1	0.136	0.084	3.49		3.49	42.93	25.71	1.00	1.00	3.44	68.18	40.83
+D+0.750L+0.750S+H													
Dsgn. L = 6.85 ft	1	0.136	0.084	3.49		3.49	42.93	25.71	1.00	1.00	3.44	68.18	40.83
+D+0.60W+H													
Dsgn. L = 6.85 ft	1	0.063	0.038	1.61		1.61	42.93	25.71	1.00	1.00	1.57	68.18	40.83
+D+0.750Lr+0.750L+0.450W+H													
Dsgn. L = 6.85 ft	1	0.136	0.084	3.49		3.49	42.93	25.71	1.00	1.00	3.44	68.18	40.83
+D+0.750L+0.750S+0.450W+H													
Dsgn. L = 6.85 ft	1	0.136	0.084	3.49		3.49	42.93	25.71	1.00	1.00	3.44	68.18	40.83
+0.60D+0.60W+0.60H													
Dsgn. L = 6.85 ft	1	0.038	0.023	0.97		0.97	42.93	25.71	1.00	1.00	0.94	68.18	40.83

Steel Beam

DESCRIPTION: Beam Supporting Steel Stair - 4th Floor

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
+D+0.70E+0.60H													
Dsgn. L = 6.85 ft	1	0.063	0.038	1.61		1.61	42.93	25.71	1.00	1.00	1.57	68.18	40.83
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 6.85 ft	1	0.136	0.084	3.49		3.49	42.93	25.71	1.00	1.00	3.44	68.18	40.83
+0.60D+0.70E+H													
Dsgn. L = 6.85 ft	1	0.038	0.023	0.97		0.97	42.93	25.71	1.00	1.00	0.94	68.18	40.83

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.0489	3.445		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	4.065	4.065
Overall MINimum	0.939	0.939
+D+H	1.565	1.565
+D+L+H	4.065	4.065
+D+Lr+H	1.565	1.565
+D+S+H	1.565	1.565
+D+0.750Lr+0.750L+H	3.440	3.440
+D+0.750L+0.750S+H	3.440	3.440
+D+0.60W+H	1.565	1.565
+D+0.750Lr+0.750L+0.450W+H	3.440	3.440
+D+0.750L+0.750S+0.450W+H	3.440	3.440
+0.60D+0.60W+0.60H	0.939	0.939
+D+0.70E+0.60H	1.565	1.565
+D+0.750L+0.750S+0.5250E+H	3.440	3.440
+0.60D+0.70E+H	0.939	0.939
D Only	1.565	1.565
L Only	2.500	2.500
H Only		

Steel Beam

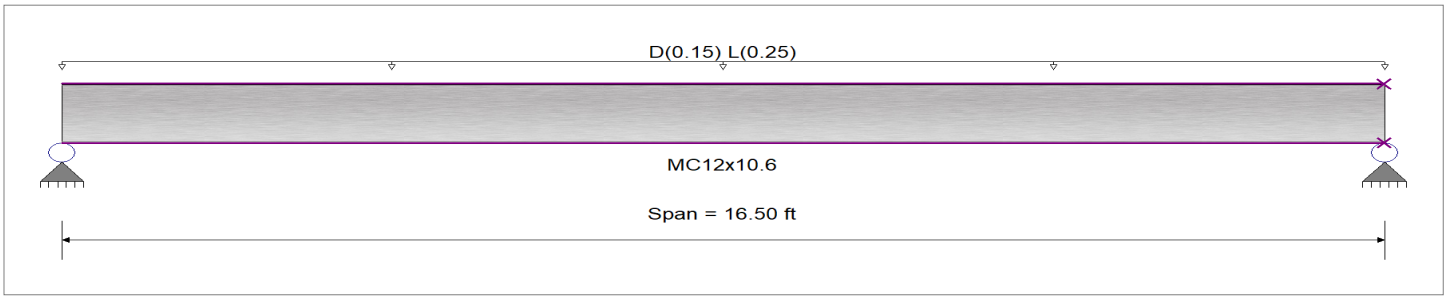
DESCRIPTION: Steel Stair Stringer - 4th-5th

CODE REFERENCES

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

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	36.0 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
Uniform Load : D = 0.060, L = 0.10 ksf, Tributary Width = 2.50 ft, (Stair Load)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.671 : 1	Maximum Shear Stress Ratio =	0.115 : 1
Section used for this span	MC12x10.6	Section used for this span	MC12x10.6
Ma : Applied	13.973 k-ft	Va : Applied	3.387 k
Mn / Omega : Allowable	20.838 k-ft	Vn/Omega : Allowable	29.490 k
Load Combination	+D+L+H	Load Combination	+D+L+H
Location of maximum on span	8.250 ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.261 in	Ratio =	758 >=480.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <480.0
Max Downward Total Deflection	0.429 in	Ratio =	462 >=360.
Max Upward Total Deflection	0.000 in	Ratio =	0 <360.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 16.50 ft	1	0.262	0.045	5.47		5.47	34.80	20.84	1.00	1.00	1.32	49.25	29.49
+D+L+H													
Dsgn. L = 16.50 ft	1	0.671	0.115	13.97		13.97	34.80	20.84	1.00	1.00	3.39	49.25	29.49
+D+Lr+H													
Dsgn. L = 16.50 ft	1	0.262	0.045	5.47		5.47	34.80	20.84	1.00	1.00	1.32	49.25	29.49
+D+S+H													
Dsgn. L = 16.50 ft	1	0.262	0.045	5.47		5.47	34.80	20.84	1.00	1.00	1.32	49.25	29.49
+D+0.750Lr+0.750L+H													
Dsgn. L = 16.50 ft	1	0.568	0.097	11.85		11.85	34.80	20.84	1.00	1.00	2.87	49.25	29.49
+D+0.750L+0.750S+H													
Dsgn. L = 16.50 ft	1	0.568	0.097	11.85		11.85	34.80	20.84	1.00	1.00	2.87	49.25	29.49
+D+0.60W+H													
Dsgn. L = 16.50 ft	1	0.262	0.045	5.47		5.47	34.80	20.84	1.00	1.00	1.32	49.25	29.49
+D+0.750Lr+0.750L+0.450W+H													
Dsgn. L = 16.50 ft	1	0.568	0.097	11.85		11.85	34.80	20.84	1.00	1.00	2.87	49.25	29.49
+D+0.750L+0.750S+0.450W+H													
Dsgn. L = 16.50 ft	1	0.568	0.097	11.85		11.85	34.80	20.84	1.00	1.00	2.87	49.25	29.49
+0.60D+0.60W+0.60H													
Dsgn. L = 16.50 ft	1	0.157	0.027	3.28		3.28	34.80	20.84	1.00	1.00	0.79	49.25	29.49
+D+0.70E+0.60H													
Dsgn. L = 16.50 ft	1	0.262	0.045	5.47		5.47	34.80	20.84	1.00	1.00	1.32	49.25	29.49
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 16.50 ft	1	0.568	0.097	11.85		11.85	34.80	20.84	1.00	1.00	2.87	49.25	29.49

Steel Beam

DESCRIPTION: Steel Stair Stringer - 4th-5th

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
+0.60D+0.70E+H													
Dsgn. L = 16.50 ft	1	0.157	0.027	3.28		3.28	34.80	20.84	1.00	1.00	0.79	49.25	29.49

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.4289	8.297		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.387	3.387
Overall MINimum	0.795	0.795
+D+H	1.325	1.325
+D+L+H	3.387	3.387
+D+Lr+H	1.325	1.325
+D+S+H	1.325	1.325
+D+0.750Lr+0.750L+H	2.872	2.872
+D+0.750L+0.750S+H	2.872	2.872
+D+0.60W+H	1.325	1.325
+D+0.750Lr+0.750L+0.450W+H	2.872	2.872
+D+0.750L+0.750S+0.450W+H	2.872	2.872
+0.60D+0.60W+0.60H	0.795	0.795
+D+0.70E+0.60H	1.325	1.325
+D+0.750L+0.750S+0.5250E+H	2.872	2.872
+0.60D+0.70E+H	0.795	0.795
D Only	1.325	1.325
L Only	2.063	2.063
H Only		

Concrete Beam

Lic. # : KW-06011403

Bob D. Campbell and Co., Inc.

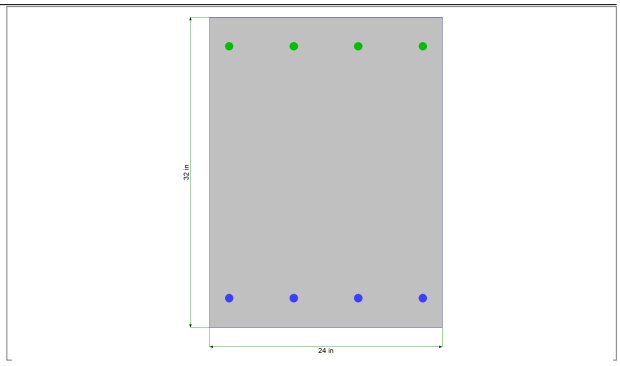
DESCRIPTION: GRBM - G1 - Under 10" PC Wall

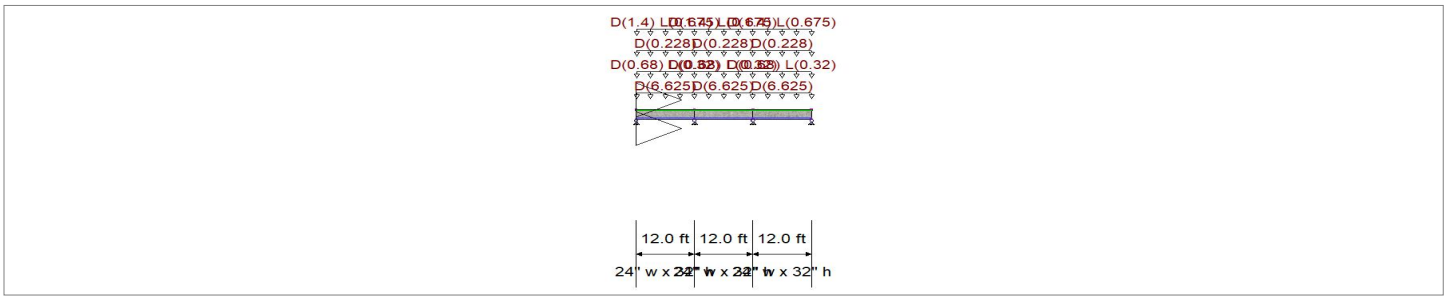
CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

f'c	=	3.50 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c$^{1/2}$ * 7.50	=	443.706 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups		60.0 ksi
fy - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #		4
			Number of Resisting Legs Per Stirrup =		2





Cross Section & Reinforcing Details

Rectangular Section, Width = 24.0 in, Height = 32.0 in

Span #1 Reinforcing....
- 4-#7 at 3.0 in from Bottom, from 0.0 to 12.0 ft in this span
- 4-#7 at 3.0 in from Top, from 0.0 to 12.0 ft in this span

Span #2 Reinforcing....
- 4-#7 at 3.0 in from Bottom, from 0.0 to 12.0 ft in this span
- 4-#7 at 3.0 in from Top, from 0.0 to 12.0 ft in this span

Span #3 Reinforcing....
- 4-#7 at 3.0 in from Bottom, from 0.0 to 12.0 ft in this span
- 4-#7 at 3.0 in from Top, from 0.0 to 12.0 ft in this span

Beam self weight calculated and added to loads

Load for Span Number 1
- Uniform Load : D = 0.1250 ksf, Tributary Width = 53.0 ft, (10" PC Wall - With Opngs)
- Uniform Load : D = 0.0850, L = 0.040 ksf, Tributary Width = 8.0 ft, (4-Floors)
- Uniform Load : D = 0.0570 ksf, Tributary Width = 4.0 ft, (Wash - 4-Floors)
- Uniform Load : D = 1.40, L = 0.6750 k/ft, Tributary Width = 1.0 ft, (Apartment)

Load for Span Number 2
- Uniform Load : D = 0.1250 ksf, Tributary Width = 53.0 ft, (10" PC Wall - With Opngs)
- Uniform Load : D = 0.0850, L = 0.040 ksf, Tributary Width = 8.0 ft, (4-Floors)
- Uniform Load : D = 0.0570 ksf, Tributary Width = 4.0 ft, (Wash - 4-Floors)
- Uniform Load : D = 1.40, L = 0.6750 k/ft, Tributary Width = 1.0 ft, (Apartment)

Load for Span Number 3
- Uniform Load : D = 0.1250 ksf, Tributary Width = 53.0 ft, (10" PC Wall - With Opngs)
- Uniform Load : D = 0.0850, L = 0.040 ksf, Tributary Width = 8.0 ft, (4-Floors)
- Uniform Load : D = 0.0570 ksf, Tributary Width = 4.0 ft, (Wash - 4-Floors)
- Uniform Load : D = 1.40, L = 0.6750 k/ft, Tributary Width = 1.0 ft, (Apartment)

Concrete Beam

Lic. # : KW-06011403

Bob D. Campbell and Co., Inc.

DESCRIPTION: GRBM - G1 - Under 10" PC Wall

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.644** : 1	Maximum Deflection	
Section used for this span	**Typical Section**	Max Downward Transient Deflection	0.002 in Ratio = 83655 >=360.
Mu : Applied	-195.680 k-ft	Max Upward Transient Deflection	-0.001 in Ratio = 132433 >=360.
Mn * Phi : Allowable	303.639 k-ft	Max Downward Total Deflection	0.013 in Ratio = 10759 >=180.
Location of maximum on span	0.000 ft	Max Upward Total Deflection	-0.001 in Ratio = 121211 >=180.
Span # where maximum occurs	Span # 3		

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	51.963	142.452	142.452	51.963
Overall MINimum	0.199	-1.194	-1.194	0.199
+D+H	46.590	128.124	128.124	46.590
+D+L+H, LL Comb Run (**L)	46.789	126.930	135.885	51.764
+D+L+H, LL Comb Run (*L*)	45.993	134.691	134.691	45.993
+D+L+H, LL Comb Run (*LL)	46.192	133.497	142.452	51.167
+D+L+H, LL Comb Run (L**)	51.764	135.885	126.930	46.789
+D+L+H, LL Comb Run (L*L)	51.963	134.691	134.691	51.963
+D+L+H, LL Comb Run (LL*)	51.167	142.452	133.497	46.192
+D+L+H, LL Comb Run (LLL)	51.366	141.258	141.258	51.366
+D+Lr+H, LL Comb Run (**L)	46.590	128.124	128.124	46.590
+D+Lr+H, LL Comb Run (*L*)	46.590	128.124	128.124	46.590
+D+Lr+H, LL Comb Run (*LL)	46.590	128.124	128.124	46.590
+D+Lr+H, LL Comb Run (L**)	46.590	128.124	128.124	46.590
+D+Lr+H, LL Comb Run (L*L)	46.590	128.124	128.124	46.590
+D+Lr+H, LL Comb Run (LL*)	46.590	128.124	128.124	46.590
+D+Lr+H, LL Comb Run (LLL)	46.590	128.124	128.124	46.590
+D+S+H	46.590	128.124	128.124	46.590
+D+0.750Lr+0.750L+H, LL Comb Run (	46.740	127.228	133.944	50.471
+D+0.750Lr+0.750L+H, LL Comb Run (	46.143	133.049	133.049	46.143
+D+0.750Lr+0.750L+H, LL Comb Run (	46.292	132.153	138.870	50.023
+D+0.750Lr+0.750L+H, LL Comb Run (	50.471	133.944	127.228	46.740
+D+0.750Lr+0.750L+H, LL Comb Run (	50.620	133.049	133.049	50.620
+D+0.750Lr+0.750L+H, LL Comb Run (	50.023	138.870	132.153	46.292
+D+0.750Lr+0.750L+H, LL Comb Run (	50.172	137.974	137.974	50.172
+D+0.750L+0.750S+H, LL Comb Run (*	46.740	127.228	133.944	50.471
+D+0.750L+0.750S+H, LL Comb Run (*	46.143	133.049	133.049	46.143
+D+0.750L+0.750S+H, LL Comb Run (*	46.292	132.153	138.870	50.023
+D+0.750L+0.750S+H, LL Comb Run (L	50.471	133.944	127.228	46.740
+D+0.750L+0.750S+H, LL Comb Run (L	50.620	133.049	133.049	50.620
+D+0.750L+0.750S+H, LL Comb Run (L	50.023	138.870	132.153	46.292
+D+0.750L+0.750S+H, LL Comb Run (L	50.172	137.974	137.974	50.172
+D+0.60W+H	46.590	128.124	128.124	46.590
+D+0.750Lr+0.750L+0.450W+H, LL Com	46.740	127.228	133.944	50.471
+D+0.750Lr+0.750L+0.450W+H, LL Com	46.143	133.049	133.049	46.143
+D+0.750Lr+0.750L+0.450W+H, LL Com	46.292	132.153	138.870	50.023
+D+0.750Lr+0.750L+0.450W+H, LL Com	50.471	133.944	127.228	46.740
+D+0.750Lr+0.750L+0.450W+H, LL Com	50.620	133.049	133.049	50.620
+D+0.750Lr+0.750L+0.450W+H, LL Com	50.023	138.870	132.153	46.292
+D+0.750Lr+0.750L+0.450W+H, LL Com	50.172	137.974	137.974	50.172
+D+0.750L+0.750S+0.450W+H, LL Comb	46.740	127.228	133.944	50.471
+D+0.750L+0.750S+0.450W+H, LL Comb	46.143	133.049	133.049	46.143
+D+0.750L+0.750S+0.450W+H, LL Comb	46.292	132.153	138.870	50.023
+D+0.750L+0.750S+0.450W+H, LL Comb	50.471	133.944	127.228	46.740
+D+0.750L+0.750S+0.450W+H, LL Comb	50.620	133.049	133.049	50.620
+D+0.750L+0.750S+0.450W+H, LL Comb	50.023	138.870	132.153	46.292
+D+0.750L+0.750S+0.450W+H, LL Comb	50.172	137.974	137.974	50.172
+0.60D+0.60W+0.60H	27.954	76.874	76.874	27.954
+D+0.70E+0.60H	46.590	128.124	128.124	46.590
+D+0.750L+0.750S+0.5250E+H, LL Com	46.740	127.228	133.944	50.471

Concrete Beam

Lic. # : KW-06011403

Bob D. Campbell and Co., Inc.

DESCRIPTION: GRBM - G1 - Under 10" PC Wall

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3	Support 4
+D+0.750L+0.750S+0.5250E+H, LL Com	46.143	133.049	133.049	46.143
+D+0.750L+0.750S+0.5250E+H, LL Com	46.292	132.153	138.870	50.023
+D+0.750L+0.750S+0.5250E+H, LL Com	50.471	133.944	127.228	46.740
+D+0.750L+0.750S+0.5250E+H, LL Com	50.620	133.049	133.049	50.620
+D+0.750L+0.750S+0.5250E+H, LL Com	50.023	138.870	132.153	46.292
+D+0.750L+0.750S+0.5250E+H, LL Com	50.172	137.974	137.974	50.172
+0.60D+0.70E+H	27.954	76.874	76.874	27.954
D Only	46.590	128.124	128.124	46.590
L Only, LL Comb Run (**L)	0.199	-1.194	7.761	5.174
L Only, LL Comb Run (*L*)	-0.597	6.567	6.567	-0.597
L Only, LL Comb Run (*LL)	-0.398	5.373	14.328	4.577
L Only, LL Comb Run (L**)	5.174	7.761	-1.194	0.199
L Only, LL Comb Run (L*L)	5.373	6.567	6.567	5.373
L Only, LL Comb Run (LL*)	4.577	14.328	5.373	-0.398
L Only, LL Comb Run (LLL)	4.776	13.134	13.134	4.776
H Only				

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.40D+1.60H	1	0.00	29.00	65.23	65.23	0.00	1.00	63.18	PhiVc < Vu	2.051	100.5	14.5	14.0
+1.40D+1.60H	1	0.48	29.00	58.70	58.70	29.74	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.40D+1.60H	1	0.96	29.00	52.18	52.18	56.36	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.40D+1.60H	1	1.44	29.00	45.66	45.66	79.84	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.40D+1.60H	1	1.92	29.00	39.14	39.14	100.19	0.94	62.92	PhiVc/2 < Vu <=	Min 9.6.3.1	100.2	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	2.40	29.00	32.73	32.73	116.68	0.68	61.73	PhiVc/2 < Vu <=	Min 9.6.3.1	99.0	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	2.88	29.00	26.38	26.38	130.87	0.49	60.87	Vu < PhiVc/2	lot Reqd 9.6.	60.9	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	3.36	29.00	20.02	20.02	142.00	0.34	60.21	Vu < PhiVc/2	lot Reqd 9.6.	60.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	3.84	29.00	13.67	13.67	150.09	0.22	59.67	Vu < PhiVc/2	lot Reqd 9.6.	59.7	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	4.32	29.00	7.31	7.31	155.12	0.11	59.19	Vu < PhiVc/2	lot Reqd 9.6.	59.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	4.80	29.00	0.96	0.96	157.11	0.01	58.74	Vu < PhiVc/2	lot Reqd 9.6.	58.7	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	5.28	29.00	-6.67	6.67	149.31	0.11	59.16	Vu < PhiVc/2	lot Reqd 9.6.	59.2	0.0	0.0
+1.40D+1.60H	1	5.76	29.00	-13.05	13.05	150.28	0.21	59.62	Vu < PhiVc/2	lot Reqd 9.6.	59.6	0.0	0.0
+1.40D+1.60H	1	6.24	29.00	-19.57	19.57	142.45	0.33	60.17	Vu < PhiVc/2	lot Reqd 9.6.	60.2	0.0	0.0
+1.40D+1.60H	1	6.72	29.00	-26.09	26.09	131.50	0.48	60.83	Vu < PhiVc/2	lot Reqd 9.6.	60.8	0.0	0.0
+1.40D+1.60H	1	7.20	29.00	-32.61	32.61	117.41	0.67	61.70	PhiVc/2 < Vu <=	Min 9.6.3.1	99.0	14.5	14.0
+1.40D+1.60H	1	7.68	29.00	-39.14	39.14	100.19	0.94	62.92	PhiVc/2 < Vu <=	Min 9.6.3.1	100.2	14.5	14.0
+1.40D+1.60H	1	8.16	29.00	-45.66	45.66	79.84	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.40D+1.60H	1	8.64	29.00	-52.18	52.18	56.36	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.40D+1.60H	1	9.12	29.00	-58.70	58.70	29.74	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.40D+1.60H	1	9.60	29.00	-65.23	65.23	0.00	1.00	63.18	PhiVc < Vu	2.051	100.5	14.5	14.0
+1.40D+1.60H	1	10.08	29.00	-71.75	71.75	32.87	1.00	63.18	PhiVc < Vu	8.574	100.5	14.5	14.0
+1.40D+1.60H	1	10.56	29.00	-78.27	78.27	68.88	1.00	63.18	PhiVc < Vu	15.096	100.5	14.5	14.0
+1.40D+1.60H	1	11.04	29.00	-84.79	84.79	108.02	1.00	63.18	PhiVc < Vu	21.619	100.5	14.5	14.0
+1.40D+1.60H	1	11.52	29.00	-91.32	91.32	150.28	1.00	63.18	PhiVc < Vu	28.142	100.5	14.5	14.0
+1.40D+1.60H	2	12.00	29.00	81.53	81.53	195.68	1.00	63.18	PhiVc < Vu	18.358	100.5	14.5	14.0
+1.40D+1.60H	2	12.48	29.00	75.01	75.01	158.11	1.00	63.18	PhiVc < Vu	11.835	100.5	14.5	14.0
+1.40D+1.60H	2	12.96	29.00	68.49	68.49	123.67	1.00	63.18	PhiVc < Vu	5.312	100.5	14.5	14.0
+1.40D+1.60H	2	13.44	29.00	61.97	61.97	92.36	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	13.92	29.00	55.61	55.61	63.30	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	14.40	29.00	49.25	49.25	38.13	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	14.88	29.00	42.90	42.90	16.01	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	15.36	29.00	36.54	36.54	3.05	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	15.84	29.00	30.19	30.19	19.07	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	16.32	29.00	23.83	23.83	32.04	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	16.80	29.00	17.48	17.48	41.65	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	17.28	29.00	11.12	11.12	48.82	0.55	61.15	Vu < PhiVc/2	lot Reqd 9.6.	61.2	0.0	0.0

Concrete Beam

DESCRIPTION: GRBM - G1 - Under 10" PC Wall

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	17.76	29.00	4.77	4.77	52.63	0.22	59.66	Vu < PhiVc/2	lot Reqd 9.6.	59.7	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	18.24	29.00	-4.77	4.77	52.63	0.22	59.66	Vu < PhiVc/2	lot Reqd 9.6.	59.7	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	18.72	29.00	-11.12	11.12	48.82	0.55	61.15	Vu < PhiVc/2	lot Reqd 9.6.	61.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	19.20	29.00	-17.48	17.48	41.95	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	19.68	29.00	-23.83	23.83	32.04	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	20.16	29.00	-30.19	30.19	19.07	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	20.64	29.00	-36.54	36.54	3.05	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	21.12	29.00	-42.90	42.90	16.01	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	21.60	29.00	-49.25	49.25	38.13	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	22.08	29.00	-55.61	55.61	63.30	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.40D+1.60H	2	22.56	29.00	-61.97	61.97	92.36	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.40D+1.60H	2	23.04	29.00	-68.49	68.49	123.67	1.00	63.18	PhiVc < Vu	5.312	100.5	14.5	14.0
+1.40D+1.60H	2	23.52	29.00	-75.01	75.01	158.11	1.00	63.18	PhiVc < Vu	11.835	100.5	14.5	14.0
+1.40D+1.60H	3	24.00	29.00	97.84	97.84	195.68	1.00	63.18	PhiVc < Vu	34.664	100.5	14.5	14.0
+1.40D+1.60H	3	24.48	29.00	91.32	91.32	150.28	1.00	63.18	PhiVc < Vu	28.142	100.5	14.5	14.0
+1.40D+1.60H	3	24.96	29.00	84.79	84.79	108.02	1.00	63.18	PhiVc < Vu	21.619	100.5	14.5	14.0
+1.40D+1.60H	3	25.44	29.00	78.27	78.27	68.88	1.00	63.18	PhiVc < Vu	15.096	100.5	14.5	14.0
+1.40D+1.60H	3	25.92	29.00	71.75	71.75	32.87	1.00	63.18	PhiVc < Vu	8.574	100.5	14.5	14.0
+1.40D+1.60H	3	26.40	29.00	65.23	65.23	0.00	1.00	63.18	PhiVc < Vu	2.051	100.5	14.5	14.0
+1.40D+1.60H	3	26.88	29.00	58.70	58.70	29.74	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.40D+1.60H	3	27.36	29.00	52.18	52.18	56.36	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.40D+1.60H	3	27.84	29.00	45.66	45.66	79.84	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.40D+1.60H	3	28.32	29.00	39.14	39.14	100.19	0.94	62.92	PhiVc/2 < Vu <=	Min 9.6.3.1	100.2	14.5	14.0
+1.40D+1.60H	3	28.80	29.00	32.61	32.61	117.41	0.67	61.70	PhiVc/2 < Vu <=	Min 9.6.3.1	99.0	14.5	14.0
+1.40D+1.60H	3	29.28	29.00	26.09	26.09	131.50	0.48	60.83	Vu < PhiVc/2	lot Reqd 9.6.	60.8	0.0	0.0
+1.40D+1.60H	3	29.76	29.00	19.57	19.57	142.45	0.33	60.17	Vu < PhiVc/2	lot Reqd 9.6.	60.2	0.0	0.0
+1.40D+1.60H	3	30.24	29.00	13.05	13.05	150.28	0.21	59.62	Vu < PhiVc/2	lot Reqd 9.6.	59.6	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	30.72	29.00	6.67	6.67	149.31	0.11	59.16	Vu < PhiVc/2	lot Reqd 9.6.	59.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	31.20	29.00	-0.96	0.96	157.11	0.01	58.74	Vu < PhiVc/2	lot Reqd 9.6.	58.7	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	31.68	29.00	-7.31	7.31	155.12	0.11	59.19	Vu < PhiVc/2	lot Reqd 9.6.	59.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	32.16	29.00	-13.67	13.67	150.09	0.22	59.67	Vu < PhiVc/2	lot Reqd 9.6.	59.7	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	32.64	29.00	-20.02	20.02	142.00	0.34	60.21	Vu < PhiVc/2	lot Reqd 9.6.	60.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	33.12	29.00	-26.38	26.38	130.87	0.49	60.87	Vu < PhiVc/2	lot Reqd 9.6.	60.9	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	33.60	29.00	-32.73	32.73	116.68	0.68	61.73	PhiVc/2 < Vu <=	Min 9.6.3.1	99.0	14.5	14.0
+1.40D+1.60H	3	34.08	29.00	-39.14	39.14	100.19	0.94	62.92	PhiVc/2 < Vu <=	Min 9.6.3.1	100.2	14.5	14.0
+1.40D+1.60H	3	34.56	29.00	-45.66	45.66	79.84	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.40D+1.60H	3	35.04	29.00	-52.18	52.18	56.36	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.40D+1.60H	3	35.52	29.00	-58.70	58.70	29.74	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.40D+1.60H	3	36.00	29.00	-65.23	65.23	0.00	1.00	63.18	PhiVc < Vu	2.051	100.5	14.5	14.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	12.000	-187.90	303.64	0.62
Span # 2	2	12.000	-195.68	303.64	0.64
Span # 3	3	12.000	-195.68	303.64	0.64
+1.40D+1.60H					
Span # 1	1	12.000	-187.90	303.64	0.62
Span # 2	2	12.000	-195.68	303.64	0.64
Span # 3	3	12.000	-195.68	303.64	0.64
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (**L)					
Span # 1	1	12.000	-157.26	303.64	0.52
Span # 2	2	12.000	-177.33	303.64	0.58
Span # 3	3	12.000	-183.01	303.64	0.60
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (*L*)					
Span # 1	1	12.000	-172.44	303.64	0.57

Concrete Beam

DESCRIPTION: GRBM - G1 - Under 10" PC Wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 2	2	12.000	-179.19	303.64	0.59
Span # 3	3	12.000	-179.19	303.64	0.59
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (*LL)					
Span # 1	1	12.000	-168.64	303.64	0.56
Span # 2	2	12.000	-188.03	303.64	0.62
Span # 3	3	12.000	-194.47	303.64	0.64
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (L**)					
Span # 1	1	12.000	-175.48	303.64	0.58
Span # 2	2	12.000	-183.01	303.64	0.60
Span # 3	3	12.000	-163.90	303.64	0.54
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (L*L)					
Span # 1	1	12.000	-171.68	303.64	0.57
Span # 2	2	12.000	-179.19	303.64	0.59
Span # 3	3	12.000	-179.19	303.64	0.59
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LL*)					
Span # 1	1	12.000	-186.86	303.64	0.62
Span # 2	2	12.000	-194.47	303.64	0.64
Span # 3	3	12.000	-175.37	303.64	0.58
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LLL)					
Span # 1	1	12.000	-183.07	303.64	0.60
Span # 2	2	12.000	-190.65	303.64	0.63
Span # 3	3	12.000	-190.65	303.64	0.63
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (**L)					
Span # 1	1	12.000	-157.26	303.64	0.52
Span # 2	2	12.000	-177.33	303.64	0.58
Span # 3	3	12.000	-183.01	303.64	0.60
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (*L*)					
Span # 1	1	12.000	-172.44	303.64	0.57
Span # 2	2	12.000	-179.19	303.64	0.59
Span # 3	3	12.000	-179.19	303.64	0.59
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (*LL)					
Span # 1	1	12.000	-168.64	303.64	0.56
Span # 2	2	12.000	-188.03	303.64	0.62
Span # 3	3	12.000	-194.47	303.64	0.64
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (L**)					
Span # 1	1	12.000	-175.48	303.64	0.58
Span # 2	2	12.000	-183.01	303.64	0.60
Span # 3	3	12.000	-163.90	303.64	0.54
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (L*L)					
Span # 1	1	12.000	-171.68	303.64	0.57
Span # 2	2	12.000	-179.19	303.64	0.59
Span # 3	3	12.000	-179.19	303.64	0.59
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (LL*)					
Span # 1	1	12.000	-186.86	303.64	0.62
Span # 2	2	12.000	-194.47	303.64	0.64
Span # 3	3	12.000	-175.37	303.64	0.58
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (LLL)					
Span # 1	1	12.000	-183.07	303.64	0.60
Span # 2	2	12.000	-190.65	303.64	0.63
Span # 3	3	12.000	-190.65	303.64	0.63
+1.20D+1.60Lr+L+1.60H, LL Comb Run (**L)					
Span # 1	1	12.000	-158.68	303.64	0.52
Span # 2	2	12.000	-171.64	303.64	0.57
Span # 3	3	12.000	-177.28	303.64	0.58
+1.20D+1.60Lr+L+1.60H, LL Comb Run (*L*)					
Span # 1	1	12.000	-168.17	303.64	0.55
Span # 2	2	12.000	-174.89	303.64	0.58
Span # 3	3	12.000	-174.89	303.64	0.58
+1.20D+1.60Lr+L+1.60H, LL Comb Run (*LL)					
Span # 1	1	12.000	-165.80	303.64	0.55
Span # 2	2	12.000	-178.33	303.64	0.59
Span # 3	3	12.000	-184.44	303.64	0.61
+1.20D+1.60Lr+L+1.60H, LL Comb Run (L**)					
Span # 1	1	12.000	-170.07	303.64	0.56
Span # 2	2	12.000	-177.28	303.64	0.58
Span # 3	3	12.000	-165.34	303.64	0.54
+1.20D+1.60Lr+L+1.60H, LL Comb Run (L*L)					
Span # 1	1	12.000	-167.70	303.64	0.55
Span # 2	2	12.000	-174.89	303.64	0.58

Concrete Beam

DESCRIPTION: GRBM - G1 - Under 10" PC Wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 3	3	12.000	-174.89	303.64	0.58
+1.20D+1.60Lr+L+1.60H, LL Comb Run (LL*)					
Span # 1	1	12.000	-177.18	303.64	0.58
Span # 2	2	12.000	-184.44	303.64	0.61
Span # 3	3	12.000	-172.50	303.64	0.57
+1.20D+1.60Lr+L+1.60H, LL Comb Run (LLL)					
Span # 1	1	12.000	-174.81	303.64	0.58
Span # 2	2	12.000	-182.05	303.64	0.60
Span # 3	3	12.000	-182.05	303.64	0.60
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (**L)					
Span # 1	1	12.000	-161.05	303.64	0.53
Span # 2	2	12.000	-167.73	303.64	0.55
Span # 3	3	12.000	-167.73	303.64	0.55
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (*L*)					
Span # 1	1	12.000	-161.05	303.64	0.53
Span # 2	2	12.000	-167.73	303.64	0.55
Span # 3	3	12.000	-167.73	303.64	0.55
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (*LL)					
Span # 1	1	12.000	-161.05	303.64	0.53
Span # 2	2	12.000	-167.73	303.64	0.55
Span # 3	3	12.000	-167.73	303.64	0.55
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (L**)					
Span # 1	1	12.000	-161.05	303.64	0.53
Span # 2	2	12.000	-167.73	303.64	0.55
Span # 3	3	12.000	-167.73	303.64	0.55
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (L*L)					
Span # 1	1	12.000	-161.05	303.64	0.53
Span # 2	2	12.000	-167.73	303.64	0.55
Span # 3	3	12.000	-167.73	303.64	0.55
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (LL*)					
Span # 1	1	12.000	-161.05	303.64	0.53
Span # 2	2	12.000	-167.73	303.64	0.55
Span # 3	3	12.000	-167.73	303.64	0.55
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (LLL)					
Span # 1	1	12.000	-161.05	303.64	0.53
Span # 2	2	12.000	-167.73	303.64	0.55
Span # 3	3	12.000	-167.73	303.64	0.55
+1.20D+L+1.60S+1.60H, LL Comb Run (**L)					
Span # 1	1	12.000	-158.68	303.64	0.52
Span # 2	2	12.000	-171.64	303.64	0.57
Span # 3	3	12.000	-177.28	303.64	0.58
+1.20D+L+1.60S+1.60H, LL Comb Run (*L*)					
Span # 1	1	12.000	-168.17	303.64	0.55
Span # 2	2	12.000	-174.89	303.64	0.58
Span # 3	3	12.000	-174.89	303.64	0.58
+1.20D+L+1.60S+1.60H, LL Comb Run (*LL)					
Span # 1	1	12.000	-165.80	303.64	0.55
Span # 2	2	12.000	-178.33	303.64	0.59
Span # 3	3	12.000	-184.44	303.64	0.61
+1.20D+L+1.60S+1.60H, LL Comb Run (L**)					
Span # 1	1	12.000	-170.07	303.64	0.56
Span # 2	2	12.000	-177.28	303.64	0.58
Span # 3	3	12.000	-165.34	303.64	0.54
+1.20D+L+1.60S+1.60H, LL Comb Run (L*L)					
Span # 1	1	12.000	-167.70	303.64	0.55
Span # 2	2	12.000	-174.89	303.64	0.58
Span # 3	3	12.000	-174.89	303.64	0.58
+1.20D+L+1.60S+1.60H, LL Comb Run (LL*)					
Span # 1	1	12.000	-177.18	303.64	0.58
Span # 2	2	12.000	-184.44	303.64	0.61
Span # 3	3	12.000	-172.50	303.64	0.57
+1.20D+L+1.60S+1.60H, LL Comb Run (LLL)					
Span # 1	1	12.000	-174.81	303.64	0.58
Span # 2	2	12.000	-182.05	303.64	0.60
Span # 3	3	12.000	-182.05	303.64	0.60
+1.20D+1.60S+0.50W+1.60H					
Span # 1	1	12.000	-161.05	303.64	0.53
Span # 2	2	12.000	-167.73	303.64	0.55
Span # 3	3	12.000	-167.73	303.64	0.55

Concrete Beam

DESCRIPTION: GRBM - G1 - Under 10" PC Wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (**L)					
Span # 1	1	12.000	-158.68	303.64	0.52
Span # 2	2	12.000	-171.64	303.64	0.57
Span # 3	3	12.000	-177.28	303.64	0.58
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (*L*)					
Span # 1	1	12.000	-168.17	303.64	0.55
Span # 2	2	12.000	-174.89	303.64	0.58
Span # 3	3	12.000	-174.89	303.64	0.58
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (*LL)					
Span # 1	1	12.000	-165.80	303.64	0.55
Span # 2	2	12.000	-178.33	303.64	0.59
Span # 3	3	12.000	-184.44	303.64	0.61
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (L**)					
Span # 1	1	12.000	-170.07	303.64	0.56
Span # 2	2	12.000	-177.28	303.64	0.58
Span # 3	3	12.000	-165.34	303.64	0.54
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (L*L)					
Span # 1	1	12.000	-167.70	303.64	0.55
Span # 2	2	12.000	-174.89	303.64	0.58
Span # 3	3	12.000	-174.89	303.64	0.58
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (LL*)					
Span # 1	1	12.000	-177.18	303.64	0.58
Span # 2	2	12.000	-184.44	303.64	0.61
Span # 3	3	12.000	-172.50	303.64	0.57
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (LLL)					
Span # 1	1	12.000	-174.81	303.64	0.58
Span # 2	2	12.000	-182.05	303.64	0.60
Span # 3	3	12.000	-182.05	303.64	0.60
+1.20D+L+0.50S+W+1.60H, LL Comb Run (**L)					
Span # 1	1	12.000	-158.68	303.64	0.52
Span # 2	2	12.000	-171.64	303.64	0.57
Span # 3	3	12.000	-177.28	303.64	0.58
+1.20D+L+0.50S+W+1.60H, LL Comb Run (*L*)					
Span # 1	1	12.000	-168.17	303.64	0.55
Span # 2	2	12.000	-174.89	303.64	0.58
Span # 3	3	12.000	-174.89	303.64	0.58
+1.20D+L+0.50S+W+1.60H, LL Comb Run (*LL)					
Span # 1	1	12.000	-165.80	303.64	0.55
Span # 2	2	12.000	-178.33	303.64	0.59
Span # 3	3	12.000	-184.44	303.64	0.61
+1.20D+L+0.50S+W+1.60H, LL Comb Run (L**)					
Span # 1	1	12.000	-170.07	303.64	0.56
Span # 2	2	12.000	-177.28	303.64	0.58
Span # 3	3	12.000	-165.34	303.64	0.54
+1.20D+L+0.50S+W+1.60H, LL Comb Run (L*L)					
Span # 1	1	12.000	-167.70	303.64	0.55
Span # 2	2	12.000	-174.89	303.64	0.58
Span # 3	3	12.000	-174.89	303.64	0.58
+1.20D+L+0.50S+W+1.60H, LL Comb Run (LL*)					
Span # 1	1	12.000	-177.18	303.64	0.58
Span # 2	2	12.000	-184.44	303.64	0.61
Span # 3	3	12.000	-172.50	303.64	0.57
+1.20D+L+0.50S+W+1.60H, LL Comb Run (LLL)					
Span # 1	1	12.000	-174.81	303.64	0.58
Span # 2	2	12.000	-182.05	303.64	0.60
Span # 3	3	12.000	-182.05	303.64	0.60
+0.90D+W+1.60H					
Span # 1	1	12.000	-120.79	303.64	0.40
Span # 2	2	12.000	-125.79	303.64	0.41
Span # 3	3	12.000	-125.79	303.64	0.41
+1.20D+L+0.20S+E+1.60H, LL Comb Run (**L)					
Span # 1	1	12.000	-158.68	303.64	0.52
Span # 2	2	12.000	-171.64	303.64	0.57
Span # 3	3	12.000	-177.28	303.64	0.58
+1.20D+L+0.20S+E+1.60H, LL Comb Run (*L*)					
Span # 1	1	12.000	-168.17	303.64	0.55
Span # 2	2	12.000	-174.89	303.64	0.58
Span # 3	3	12.000	-174.89	303.64	0.58
+1.20D+L+0.20S+E+1.60H, LL Comb Run (*LL)					

Concrete Beam

DESCRIPTION: GRBM - G1 - Under 10" PC Wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 1	1	12.000	-165.80	303.64	0.55
Span # 2	2	12.000	-178.33	303.64	0.59
Span # 3	3	12.000	-184.44	303.64	0.61
+1.20D+L+0.20S+E+1.60H, LL Comb Run (L**)					
Span # 1	1	12.000	-170.07	303.64	0.56
Span # 2	2	12.000	-177.28	303.64	0.58
Span # 3	3	12.000	-165.34	303.64	0.54
+1.20D+L+0.20S+E+1.60H, LL Comb Run (L*L)					
Span # 1	1	12.000	-167.70	303.64	0.55
Span # 2	2	12.000	-174.89	303.64	0.58
Span # 3	3	12.000	-174.89	303.64	0.58
+1.20D+L+0.20S+E+1.60H, LL Comb Run (LL*)					
Span # 1	1	12.000	-177.18	303.64	0.58
Span # 2	2	12.000	-184.44	303.64	0.61
Span # 3	3	12.000	-172.50	303.64	0.57
+1.20D+L+0.20S+E+1.60H, LL Comb Run (LLL)					
Span # 1	1	12.000	-174.81	303.64	0.58
Span # 2	2	12.000	-182.05	303.64	0.60
Span # 3	3	12.000	-182.05	303.64	0.60
+0.90D+E+0.90H					
Span # 1	1	12.000	-120.79	303.64	0.40
Span # 2	2	12.000	-125.79	303.64	0.41
Span # 3	3	12.000	-125.79	303.64	0.41

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft)	Load Combination	Max. "+" Defl (in)	Location in Span (ft)
+D+L+H, LL Comb Run (L*L)	1	0.0134	5.520	+D+L+H, LL Comb Run (L*L)	-0.0003	12.240
+D+L+H, LL Comb Run (*L*)	2	0.0021	6.000	+D+L+H, LL Comb Run (L*L)	-0.0012	10.320
+D+L+H, LL Comb Run (L*L)	3	0.0134	6.480		0.0000	10.320

Concrete Beam

Lic. # : KW-06011403

Bob D. Campbell and Co., Inc.

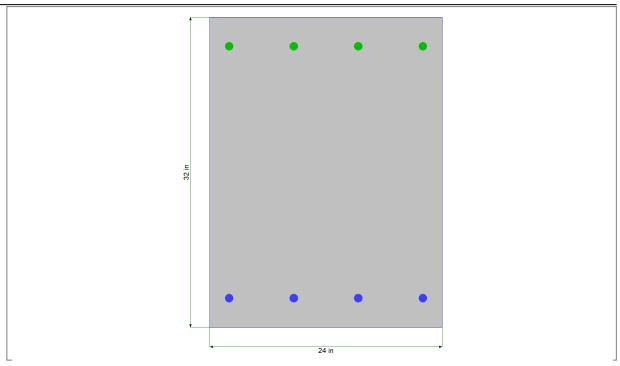
DESCRIPTION: GRBM - GA + GC - Under 10" PC Wall

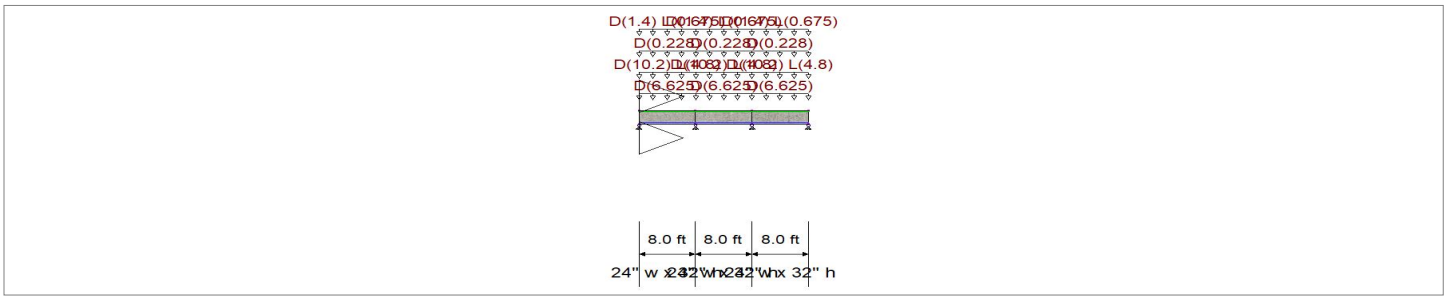
CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

f'c	=	3.50 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c$^{1/2}$ * 7.50	=	443.706 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups		60.0 ksi
fy - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #		4
			Number of Resisting Legs Per Stirrup	=	2





Cross Section & Reinforcing Details

Rectangular Section, Width = 24.0 in, Height = 32.0 in

Span #1 Reinforcing....
- 4-#7 at 3.0 in from Bottom, from 0.0 to 8.0 ft in this span
- 4-#7 at 3.0 in from Top, from 0.0 to 8.0 ft in this span

Span #2 Reinforcing....
- 4-#7 at 3.0 in from Bottom, from 0.0 to 8.0 ft in this span
- 4-#7 at 3.0 in from Top, from 0.0 to 8.0 ft in this span

Span #3 Reinforcing....
- 4-#7 at 3.0 in from Bottom, from 0.0 to 8.0 ft in this span
- 4-#7 at 3.0 in from Top, from 0.0 to 8.0 ft in this span

Beam self weight calculated and added to loads

Load for Span Number 1
- Uniform Load : D = 0.1250 ksf, Tributary Width = 53.0 ft, (10" PC Wall - With Opngs)
- Uniform Load : D = 0.0850, L = 0.040 ksf, Tributary Width = 120.0 ft, (4-Floors)
- Uniform Load : D = 0.0570 ksf, Tributary Width = 4.0 ft, (Wash - 4-Floors)
- Uniform Load : D = 1.40, L = 0.6750 k/ft, Tributary Width = 1.0 ft, (Apartment)

Load for Span Number 2
- Uniform Load : D = 0.1250 ksf, Tributary Width = 53.0 ft, (10" PC Wall - With Opngs)
- Uniform Load : D = 0.0850, L = 0.040 ksf, Tributary Width = 120.0 ft, (4-Floors)
- Uniform Load : D = 0.0570 ksf, Tributary Width = 4.0 ft, (Wash - 4-Floors)
- Uniform Load : D = 1.40, L = 0.6750 k/ft, Tributary Width = 1.0 ft, (Apartment)

Load for Span Number 3
- Uniform Load : D = 0.1250 ksf, Tributary Width = 53.0 ft, (10" PC Wall - With Opngs)
- Uniform Load : D = 0.0850, L = 0.040 ksf, Tributary Width = 120.0 ft, (4-Floors)
- Uniform Load : D = 0.0570 ksf, Tributary Width = 4.0 ft, (Wash - 4-Floors)
- Uniform Load : D = 1.40, L = 0.6750 k/ft, Tributary Width = 1.0 ft, (Apartment)

Concrete Beam

Lic. # : KW-06011403 — Bob D. Campbell and Co., Inc.

DESCRIPTION: GRBM - GA + GC - Under 10" PC Wall

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.702** : 1		Maximum Deflection			
Section used for this span	**Typical Section**		Max Downward Transient Deflection	0.002 in	Ratio =	51310 >=360.
Mu : Applied	-213.066 k-ft		Max Upward Transient Deflection	-0.001 in	Ratio =	81229 >=360.
Mn * Phi : Allowable	303.639 k-ft		Max Downward Total Deflection	0.006 in	Ratio =	14920 >=180.
Location of maximum on span	0.000 ft		Max Upward Total Deflection	0.000 in	Ratio =	0 <180.0
Span # where maximum occurs	Span # 3					

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	81.234	221.752	221.752	81.234
Overall MINimum	0.730	-4.380	-4.380	0.730
+D+H	61.524	169.192	169.192	61.524
+D+L+H, LL Comb Run (**L)	62.254	164.812	197.662	80.504
+D+L+H, LL Comb Run (*L*)	59.334	193.282	193.282	59.334
+D+L+H, LL Comb Run (*LL)	60.064	188.902	221.752	78.314
+D+L+H, LL Comb Run (L**)	80.504	197.662	164.812	62.254
+D+L+H, LL Comb Run (L*L)	81.234	193.282	193.282	81.234
+D+L+H, LL Comb Run (LL*)	78.314	221.752	188.902	60.064
+D+L+H, LL Comb Run (LLL)	79.044	217.372	217.372	79.044
+D+Lr+H, LL Comb Run (**L)	61.524	169.192	169.192	61.524
+D+Lr+H, LL Comb Run (*L*)	61.524	169.192	169.192	61.524
+D+Lr+H, LL Comb Run (*LL)	61.524	169.192	169.192	61.524
+D+Lr+H, LL Comb Run (L**)	61.524	169.192	169.192	61.524
+D+Lr+H, LL Comb Run (L*L)	61.524	169.192	169.192	61.524
+D+Lr+H, LL Comb Run (LL*)	61.524	169.192	169.192	61.524
+D+Lr+H, LL Comb Run (LLL)	61.524	169.192	169.192	61.524
+D+S+H	61.524	169.192	169.192	61.524
+D+0.750Lr+0.750L+H, LL Comb Run (	62.072	165.907	190.544	75.759
+D+0.750Lr+0.750L+H, LL Comb Run (	59.882	187.259	187.259	59.882
+D+0.750Lr+0.750L+H, LL Comb Run (	60.429	183.974	208.612	74.117
+D+0.750Lr+0.750L+H, LL Comb Run (	75.759	190.544	165.907	62.072
+D+0.750Lr+0.750L+H, LL Comb Run (	76.307	187.259	187.259	76.307
+D+0.750Lr+0.750L+H, LL Comb Run (	74.117	208.612	183.974	60.429
+D+0.750Lr+0.750L+H, LL Comb Run (	74.664	205.327	205.327	74.664
+D+0.750L+0.750S+H, LL Comb Run (*	62.072	165.907	190.544	75.759
+D+0.750L+0.750S+H, LL Comb Run (*	59.882	187.259	187.259	59.882
+D+0.750L+0.750S+H, LL Comb Run (*	60.429	183.974	208.612	74.117
+D+0.750L+0.750S+H, LL Comb Run (L	75.759	190.544	165.907	62.072
+D+0.750L+0.750S+H, LL Comb Run (L	76.307	187.259	187.259	76.307
+D+0.750L+0.750S+H, LL Comb Run (L	74.117	208.612	183.974	60.429
+D+0.750L+0.750S+H, LL Comb Run (L	74.664	205.327	205.327	74.664
+D+0.60W+H	61.524	169.192	169.192	61.524
+D+0.750Lr+0.750L+0.450W+H, LL Com	62.072	165.907	190.544	75.759
+D+0.750Lr+0.750L+0.450W+H, LL Com	59.882	187.259	187.259	59.882
+D+0.750Lr+0.750L+0.450W+H, LL Com	60.429	183.974	208.612	74.117
+D+0.750Lr+0.750L+0.450W+H, LL Com	75.759	190.544	165.907	62.072
+D+0.750Lr+0.750L+0.450W+H, LL Com	76.307	187.259	187.259	76.307
+D+0.750Lr+0.750L+0.450W+H, LL Com	74.117	208.612	183.974	60.429
+D+0.750Lr+0.750L+0.450W+H, LL Com	74.664	205.327	205.327	74.664
+D+0.750L+0.750S+0.450W+H, LL Comb	62.072	165.907	190.544	75.759
+D+0.750L+0.750S+0.450W+H, LL Comb	59.882	187.259	187.259	59.882
+D+0.750L+0.750S+0.450W+H, LL Comb	60.429	183.974	208.612	74.117
+D+0.750L+0.750S+0.450W+H, LL Comb	75.759	190.544	165.907	62.072
+D+0.750L+0.750S+0.450W+H, LL Comb	76.307	187.259	187.259	76.307
+D+0.750L+0.750S+0.450W+H, LL Comb	74.117	208.612	183.974	60.429
+D+0.750L+0.750S+0.450W+H, LL Comb	74.664	205.327	205.327	74.664
+0.60D+0.60W+0.60H	36.915	101.515	101.515	36.915
+D+0.70E+0.60H	61.524	169.192	169.192	61.524
+D+0.750L+0.750S+0.5250E+H, LL Com	62.072	165.907	190.544	75.759

Concrete Beam

Lic. # : KW-06011403

Bob D. Campbell and Co., Inc.

DESCRIPTION: GRBM - GA + GC - Under 10" PC Wall

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3	Support 4
+D+0.750L+0.750S+0.5250E+H, LL Com	59.882	187.259	187.259	59.882
+D+0.750L+0.750S+0.5250E+H, LL Com	60.429	183.974	208.612	74.117
+D+0.750L+0.750S+0.5250E+H, LL Com	75.759	190.544	165.907	62.072
+D+0.750L+0.750S+0.5250E+H, LL Com	76.307	187.259	187.259	76.307
+D+0.750L+0.750S+0.5250E+H, LL Com	74.117	208.612	183.974	60.429
+D+0.750L+0.750S+0.5250E+H, LL Com	74.664	205.327	205.327	74.664
+0.60D+0.70E+H	36.915	101.515	101.515	36.915
D Only	61.524	169.192	169.192	61.524
L Only, LL Comb Run (**L)	0.730	-4.380	28.470	18.980
L Only, LL Comb Run (*L*)	-2.190	24.090	24.090	-2.190
L Only, LL Comb Run (*LL)	-1.460	19.710	52.560	16.790
L Only, LL Comb Run (L**)	18.980	28.470	-4.380	0.730
L Only, LL Comb Run (L*L)	19.710	24.090	24.090	19.710
L Only, LL Comb Run (LL*)	16.790	52.560	19.710	-1.460
L Only, LL Comb Run (LLL)	17.520	48.180	48.180	17.520
H Only				

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.00	29.00	105.37	105.37	0.00	1.00	63.18	PhiVc < Vu	42.189	106.7	12.4	12.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.32	29.00	95.18	95.18	32.09	1.00	63.18	PhiVc < Vu	32.003	106.7	14.5	12.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.64	29.00	84.99	84.99	60.91	1.00	63.18	PhiVc < Vu	21.817	106.7	14.5	12.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.96	29.00	74.81	74.81	86.48	1.00	63.18	PhiVc < Vu	11.631	106.7	14.5	12.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	1.28	29.00	64.62	64.62	108.79	1.00	63.18	PhiVc < Vu	1.445	106.7	14.5	12.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	1.60	29.00	54.43	54.43	127.84	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	1.92	29.00	44.25	44.25	143.63	0.74	62.03	PhiVc/2 < Vu <=	Min 9.6.3.1	99.3	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	2.24	29.00	34.06	34.06	156.16	0.53	61.05	PhiVc/2 < Vu <=	Min 9.6.3.1	98.3	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	2.56	29.00	23.88	23.88	165.43	0.35	60.25	Vu < PhiVc/2	lot Reqd 9.6.	60.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	2.88	29.00	13.69	13.69	171.44	0.19	59.54	Vu < PhiVc/2	lot Reqd 9.6.	59.5	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	3.20	29.00	3.50	3.50	174.19	0.05	58.89	Vu < PhiVc/2	lot Reqd 9.6.	58.9	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	3.52	29.00	-11.35	11.35	157.24	0.17	59.46	Vu < PhiVc/2	lot Reqd 9.6.	59.5	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	3.84	29.00	-21.54	21.54	151.97	0.34	60.22	Vu < PhiVc/2	lot Reqd 9.6.	60.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	4.16	29.00	-31.73	31.73	143.45	0.53	61.08	PhiVc/2 < Vu <=	Min 9.6.3.1	98.4	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	4.48	29.00	-41.91	41.91	131.67	0.77	62.14	PhiVc/2 < Vu <=	Min 9.6.3.1	99.4	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	4.80	29.00	-52.10	52.10	116.63	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	5.12	29.00	-62.28	62.28	98.33	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	5.44	29.00	-72.47	72.47	76.76	1.00	63.18	PhiVc < Vu	9.295	167.6	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	5.76	29.00	-82.66	82.66	51.94	1.00	63.18	PhiVc < Vu	19.481	167.6	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	6.08	29.00	-92.84	92.84	23.86	1.00	63.18	PhiVc < Vu	29.667	167.6	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	6.40	29.00	-103.03	103.03	7.48	1.00	63.18	PhiVc < Vu	39.853	167.6	13.1	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	6.72	29.00	-113.22	113.22	42.07	1.00	63.18	PhiVc < Vu	50.040	167.6	10.4	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	7.04	29.00	-123.40	123.40	79.93	1.00	63.18	PhiVc < Vu	60.226	167.6	8.7	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	7.36	29.00	-133.59	133.59	121.05	1.00	63.18	PhiVc < Vu	70.412	167.6	7.4	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	7.68	29.00	-143.77	143.77	165.43	1.00	63.18	PhiVc < Vu	80.598	167.6	6.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	8.00	29.00	133.17	133.17	213.07	1.00	63.18	PhiVc < Vu	69.991	167.6	7.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	8.32	29.00	122.98	122.98	172.08	1.00	63.18	PhiVc < Vu	59.805	167.6	8.7	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	8.64	29.00	112.79	112.79	134.36	1.00	63.18	PhiVc < Vu	49.619	167.6	10.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	8.96	29.00	102.61	102.61	99.89	1.00	63.18	PhiVc < Vu	39.432	167.6	13.2	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	9.28	29.00	92.42	92.42	68.69	1.00	63.18	PhiVc < Vu	29.246	167.6	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	9.60	29.00	82.24	82.24	40.74	1.00	63.18	PhiVc < Vu	19.060	167.6	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	9.92	29.00	72.05	72.05	16.06	1.00	63.18	PhiVc < Vu	8.874	167.6	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	10.24	29.00	61.86	61.86	5.37	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	10.56	29.00	51.68	51.68	23.53	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	10.88	29.00	41.49	41.49	38.44	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	11.20	29.00	31.31	31.31	50.09	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	11.52	29.00	21.12	21.12	58.48	0.87	62.60	Vu < PhiVc/2	lot Reqd 9.6.	62.6	0.0	0.0

Concrete Beam

DESCRIPTION: GRBM - GA + GC - Under 10" PC Wall

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	11.84	29.00	10.93	10.93	63.60	0.42	60.54	Vu < PhiVc/2	lot Reqd 9.6.	60.5	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	12.16	29.00	-10.93	10.93	63.60	0.42	60.54	Vu < PhiVc/2	lot Reqd 9.6.	60.5	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	12.48	29.00	-21.12	21.12	58.48	0.87	62.60	Vu < PhiVc/2	lot Reqd 9.6.	62.6	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	12.80	29.00	-31.31	31.31	50.09	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	13.12	29.00	-41.49	41.49	38.44	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	13.44	29.00	-51.68	51.68	23.53	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	13.76	29.00	-61.86	61.86	5.37	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	14.08	29.00	-72.05	72.05	16.06	1.00	63.18	PhiVc < Vu	8.874	167.6	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	14.40	29.00	-82.24	82.24	40.74	1.00	63.18	PhiVc < Vu	19.060	167.6	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	14.72	29.00	-92.42	92.42	68.69	1.00	63.18	PhiVc < Vu	29.246	167.6	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	15.04	29.00	-102.61	102.61	99.89	1.00	63.18	PhiVc < Vu	39.432	167.6	13.2	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	15.36	29.00	-112.79	112.79	134.36	1.00	63.18	PhiVc < Vu	49.619	167.6	10.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	15.68	29.00	-122.98	122.98	172.08	1.00	63.18	PhiVc < Vu	59.805	167.6	8.7	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	16.00	29.00	153.96	153.96	213.07	1.00	63.18	PhiVc < Vu	90.784	167.6	5.7	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	16.32	29.00	143.77	143.77	165.43	1.00	63.18	PhiVc < Vu	80.598	167.6	6.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	16.64	29.00	133.59	133.59	121.05	1.00	63.18	PhiVc < Vu	70.412	167.6	7.4	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	16.96	29.00	123.40	123.40	79.93	1.00	63.18	PhiVc < Vu	60.226	167.6	8.7	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	17.28	29.00	113.22	113.22	42.07	1.00	63.18	PhiVc < Vu	50.040	167.6	10.4	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	17.60	29.00	103.03	103.03	7.48	1.00	63.18	PhiVc < Vu	39.853	167.6	13.1	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	17.92	29.00	92.84	92.84	23.86	1.00	63.18	PhiVc < Vu	29.667	167.6	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	18.24	29.00	82.66	82.66	51.94	1.00	63.18	PhiVc < Vu	19.481	167.6	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	18.56	29.00	72.47	72.47	76.76	1.00	63.18	PhiVc < Vu	9.295	167.6	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	18.88	29.00	62.28	62.28	98.33	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	19.20	29.00	52.10	52.10	116.63	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	19.52	29.00	41.91	41.91	131.67	0.77	62.14	PhiVc/2 < Vu <=	Min 9.6.3.1	99.4	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	19.84	29.00	31.73	31.73	143.45	0.53	61.08	PhiVc/2 < Vu <=	Min 9.6.3.1	98.4	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	20.16	29.00	21.54	21.54	151.97	0.34	60.22	Vu < PhiVc/2	lot Reqd 9.6.	60.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	20.48	29.00	11.35	11.35	157.24	0.17	59.46	Vu < PhiVc/2	lot Reqd 9.6.	59.5	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	20.80	29.00	-3.50	3.50	174.19	0.05	58.89	Vu < PhiVc/2	lot Reqd 9.6.	58.9	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	21.12	29.00	-13.69	13.69	171.44	0.19	59.54	Vu < PhiVc/2	lot Reqd 9.6.	59.5	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	21.44	29.00	-23.88	23.88	165.43	0.35	60.25	Vu < PhiVc/2	lot Reqd 9.6.	60.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	21.76	29.00	-34.06	34.06	156.16	0.53	61.05	PhiVc/2 < Vu <=	Min 9.6.3.1	98.3	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	22.08	29.00	-44.25	44.25	143.63	0.74	62.03	PhiVc/2 < Vu <=	Min 9.6.3.1	99.3	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	22.40	29.00	-54.43	54.43	127.84	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	22.72	29.00	-64.62	64.62	108.79	1.00	63.18	PhiVc < Vu	1.445	106.7	14.5	12.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	23.04	29.00	-74.81	74.81	86.48	1.00	63.18	PhiVc < Vu	11.631	106.7	14.5	12.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	23.36	29.00	-84.99	84.99	60.91	1.00	63.18	PhiVc < Vu	21.817	106.7	14.5	12.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	23.68	29.00	-95.18	95.18	32.09	1.00	63.18	PhiVc < Vu	32.003	106.7	14.5	12.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	24.00	29.00	-105.37	105.37	0.00	1.00	63.18	PhiVc < Vu	42.189	106.7	12.4	12.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	8.000	-204.90	303.64	0.67
Span # 2	2	8.000	-213.07	303.64	0.70
Span # 3	3	8.000	-213.07	303.64	0.70
+1.40D+1.60H					
Span # 1	1	8.000	-165.42	303.64	0.54
Span # 2	2	8.000	-172.27	303.64	0.57
Span # 3	3	8.000	-172.27	303.64	0.57
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (**L)					
Span # 1	1	8.000	-132.50	303.64	0.44
Span # 2	2	8.000	-179.83	303.64	0.59
Span # 3	3	8.000	-185.03	303.64	0.61
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (*L*)					
Span # 1	1	8.000	-169.63	303.64	0.56

DESCRIPTION: GRBM - GA + GC - Under 10" PC Wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 2	2	8.000	-175.69	303.64	0.58
Span # 3	3	8.000	-175.69	303.64	0.58
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (*LL)					
Span # 1	1	8.000	-160.35	303.64	0.53
Span # 2	2	8.000	-206.01	303.64	0.68
Span # 3	3	8.000	-213.07	303.64	0.70
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (L**)					
Span # 1	1	8.000	-177.06	303.64	0.58
Span # 2	2	8.000	-185.03	303.64	0.61
Span # 3	3	8.000	-138.31	303.64	0.46
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (L*L)					
Span # 1	1	8.000	174.38	303.64	0.57
Span # 2	2	8.000	-175.69	303.64	0.58
Span # 3	3	8.000	-175.69	303.64	0.58
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LL*)					
Span # 1	1	8.000	-204.90	303.64	0.67
Span # 2	2	8.000	-213.07	303.64	0.70
Span # 3	3	8.000	-166.35	303.64	0.55
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LLL)					
Span # 1	1	8.000	-195.62	303.64	0.64
Span # 2	2	8.000	-203.72	303.64	0.67
Span # 3	3	8.000	-203.72	303.64	0.67
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (**L)					
Span # 1	1	8.000	-132.50	303.64	0.44
Span # 2	2	8.000	-179.83	303.64	0.59
Span # 3	3	8.000	-185.03	303.64	0.61
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (*L*)					
Span # 1	1	8.000	-169.63	303.64	0.56
Span # 2	2	8.000	-175.69	303.64	0.58
Span # 3	3	8.000	-175.69	303.64	0.58
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (*LL)					
Span # 1	1	8.000	-160.35	303.64	0.53
Span # 2	2	8.000	-206.01	303.64	0.68
Span # 3	3	8.000	-213.07	303.64	0.70
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (L**)					
Span # 1	1	8.000	-177.06	303.64	0.58
Span # 2	2	8.000	-185.03	303.64	0.61
Span # 3	3	8.000	-138.31	303.64	0.46
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (L*L)					
Span # 1	1	8.000	174.38	303.64	0.57
Span # 2	2	8.000	-175.69	303.64	0.58
Span # 3	3	8.000	-175.69	303.64	0.58
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (LL*)					
Span # 1	1	8.000	-204.90	303.64	0.67
Span # 2	2	8.000	-213.07	303.64	0.70
Span # 3	3	8.000	-166.35	303.64	0.55
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (LLL)					
Span # 1	1	8.000	-195.62	303.64	0.64
Span # 2	2	8.000	-203.72	303.64	0.67
Span # 3	3	8.000	-203.72	303.64	0.67
+1.20D+1.60Lr+L+1.60H, LL Comb Run (**L)					
Span # 1	1	8.000	-135.98	303.64	0.45
Span # 2	2	8.000	-165.93	303.64	0.55
Span # 3	3	8.000	-171.02	303.64	0.56
+1.20D+1.60Lr+L+1.60H, LL Comb Run (*L*)					
Span # 1	1	8.000	-159.19	303.64	0.52
Span # 2	2	8.000	-165.18	303.64	0.54
Span # 3	3	8.000	-165.18	303.64	0.54
+1.20D+1.60Lr+L+1.60H, LL Comb Run (*LL)					
Span # 1	1	8.000	-153.39	303.64	0.51
Span # 2	2	8.000	-182.29	303.64	0.60
Span # 3	3	8.000	-188.54	303.64	0.62
+1.20D+1.60Lr+L+1.60H, LL Comb Run (L**)					
Span # 1	1	8.000	-163.83	303.64	0.54
Span # 2	2	8.000	-171.02	303.64	0.56
Span # 3	3	8.000	-141.82	303.64	0.47
+1.20D+1.60Lr+L+1.60H, LL Comb Run (L*L)					
Span # 1	1	8.000	-158.03	303.64	0.52
Span # 2	2	8.000	-165.18	303.64	0.54

Concrete Beam

DESCRIPTION: GRBM - GA + GC - Under 10" PC Wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 3	3	8.000	-165.18	303.64	0.54
+1.20D+1.60Lr+L+1.60H, LL Comb Run (LL*)					
Span # 1	1	8.000	-181.23	303.64	0.60
Span # 2	2	8.000	-188.54	303.64	0.62
Span # 3	3	8.000	-159.34	303.64	0.52
+1.20D+1.60Lr+L+1.60H, LL Comb Run (LLL)					
Span # 1	1	8.000	-175.43	303.64	0.58
Span # 2	2	8.000	-182.70	303.64	0.60
Span # 3	3	8.000	-182.70	303.64	0.60
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (**L)					
Span # 1	1	8.000	-141.78	303.64	0.47
Span # 2	2	8.000	-147.66	303.64	0.49
Span # 3	3	8.000	-147.66	303.64	0.49
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (*L*)					
Span # 1	1	8.000	-141.78	303.64	0.47
Span # 2	2	8.000	-147.66	303.64	0.49
Span # 3	3	8.000	-147.66	303.64	0.49
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (*LL)					
Span # 1	1	8.000	-141.78	303.64	0.47
Span # 2	2	8.000	-147.66	303.64	0.49
Span # 3	3	8.000	-147.66	303.64	0.49
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (L**)					
Span # 1	1	8.000	-141.78	303.64	0.47
Span # 2	2	8.000	-147.66	303.64	0.49
Span # 3	3	8.000	-147.66	303.64	0.49
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (L*L)					
Span # 1	1	8.000	-141.78	303.64	0.47
Span # 2	2	8.000	-147.66	303.64	0.49
Span # 3	3	8.000	-147.66	303.64	0.49
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (LL*)					
Span # 1	1	8.000	-141.78	303.64	0.47
Span # 2	2	8.000	-147.66	303.64	0.49
Span # 3	3	8.000	-147.66	303.64	0.49
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (LLL)					
Span # 1	1	8.000	-141.78	303.64	0.47
Span # 2	2	8.000	-147.66	303.64	0.49
Span # 3	3	8.000	-147.66	303.64	0.49
+1.20D+L+1.60S+1.60H, LL Comb Run (**L)					
Span # 1	1	8.000	-135.98	303.64	0.45
Span # 2	2	8.000	-165.93	303.64	0.55
Span # 3	3	8.000	-171.02	303.64	0.56
+1.20D+L+1.60S+1.60H, LL Comb Run (*L*)					
Span # 1	1	8.000	-159.19	303.64	0.52
Span # 2	2	8.000	-165.18	303.64	0.54
Span # 3	3	8.000	-165.18	303.64	0.54
+1.20D+L+1.60S+1.60H, LL Comb Run (*LL)					
Span # 1	1	8.000	-153.39	303.64	0.51
Span # 2	2	8.000	-182.29	303.64	0.60
Span # 3	3	8.000	-188.54	303.64	0.62
+1.20D+L+1.60S+1.60H, LL Comb Run (L**)					
Span # 1	1	8.000	-163.83	303.64	0.54
Span # 2	2	8.000	-171.02	303.64	0.56
Span # 3	3	8.000	-141.82	303.64	0.47
+1.20D+L+1.60S+1.60H, LL Comb Run (L*L)					
Span # 1	1	8.000	-158.03	303.64	0.52
Span # 2	2	8.000	-165.18	303.64	0.54
Span # 3	3	8.000	-165.18	303.64	0.54
+1.20D+L+1.60S+1.60H, LL Comb Run (LL*)					
Span # 1	1	8.000	-181.23	303.64	0.60
Span # 2	2	8.000	-188.54	303.64	0.62
Span # 3	3	8.000	-159.34	303.64	0.52
+1.20D+L+1.60S+1.60H, LL Comb Run (LLL)					
Span # 1	1	8.000	-175.43	303.64	0.58
Span # 2	2	8.000	-182.70	303.64	0.60
Span # 3	3	8.000	-182.70	303.64	0.60
+1.20D+1.60S+0.50W+1.60H					
Span # 1	1	8.000	-141.78	303.64	0.47
Span # 2	2	8.000	-147.66	303.64	0.49
Span # 3	3	8.000	-147.66	303.64	0.49

Concrete Beam

DESCRIPTION: GRBM - GA + GC - Under 10" PC Wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (**L)					
Span # 1	1	8.000	-135.98	303.64	0.45
Span # 2	2	8.000	-165.93	303.64	0.55
Span # 3	3	8.000	-171.02	303.64	0.56
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (*L*)					
Span # 1	1	8.000	-159.19	303.64	0.52
Span # 2	2	8.000	-165.18	303.64	0.54
Span # 3	3	8.000	-165.18	303.64	0.54
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (*LL)					
Span # 1	1	8.000	-153.39	303.64	0.51
Span # 2	2	8.000	-182.29	303.64	0.60
Span # 3	3	8.000	-188.54	303.64	0.62
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (L**)					
Span # 1	1	8.000	-163.83	303.64	0.54
Span # 2	2	8.000	-171.02	303.64	0.56
Span # 3	3	8.000	-141.82	303.64	0.47
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (L*L)					
Span # 1	1	8.000	-158.03	303.64	0.52
Span # 2	2	8.000	-165.18	303.64	0.54
Span # 3	3	8.000	-165.18	303.64	0.54
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (LL*)					
Span # 1	1	8.000	-181.23	303.64	0.60
Span # 2	2	8.000	-188.54	303.64	0.62
Span # 3	3	8.000	-159.34	303.64	0.52
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (LLL)					
Span # 1	1	8.000	-175.43	303.64	0.58
Span # 2	2	8.000	-182.70	303.64	0.60
Span # 3	3	8.000	-182.70	303.64	0.60
+1.20D+L+0.50S+W+1.60H, LL Comb Run (**L)					
Span # 1	1	8.000	-135.98	303.64	0.45
Span # 2	2	8.000	-165.93	303.64	0.55
Span # 3	3	8.000	-171.02	303.64	0.56
+1.20D+L+0.50S+W+1.60H, LL Comb Run (*L*)					
Span # 1	1	8.000	-159.19	303.64	0.52
Span # 2	2	8.000	-165.18	303.64	0.54
Span # 3	3	8.000	-165.18	303.64	0.54
+1.20D+L+0.50S+W+1.60H, LL Comb Run (*LL)					
Span # 1	1	8.000	-153.39	303.64	0.51
Span # 2	2	8.000	-182.29	303.64	0.60
Span # 3	3	8.000	-188.54	303.64	0.62
+1.20D+L+0.50S+W+1.60H, LL Comb Run (L**)					
Span # 1	1	8.000	-163.83	303.64	0.54
Span # 2	2	8.000	-171.02	303.64	0.56
Span # 3	3	8.000	-141.82	303.64	0.47
+1.20D+L+0.50S+W+1.60H, LL Comb Run (L*L)					
Span # 1	1	8.000	-158.03	303.64	0.52
Span # 2	2	8.000	-165.18	303.64	0.54
Span # 3	3	8.000	-165.18	303.64	0.54
+1.20D+L+0.50S+W+1.60H, LL Comb Run (LL*)					
Span # 1	1	8.000	-181.23	303.64	0.60
Span # 2	2	8.000	-188.54	303.64	0.62
Span # 3	3	8.000	-159.34	303.64	0.52
+1.20D+L+0.50S+W+1.60H, LL Comb Run (LLL)					
Span # 1	1	8.000	-175.43	303.64	0.58
Span # 2	2	8.000	-182.70	303.64	0.60
Span # 3	3	8.000	-182.70	303.64	0.60
+0.90D+W+1.60H					
Span # 1	1	8.000	-106.34	303.64	0.35
Span # 2	2	8.000	-110.74	303.64	0.36
Span # 3	3	8.000	-110.74	303.64	0.36
+1.20D+L+0.20S+E+1.60H, LL Comb Run (**L)					
Span # 1	1	8.000	-135.98	303.64	0.45
Span # 2	2	8.000	-165.93	303.64	0.55
Span # 3	3	8.000	-171.02	303.64	0.56
+1.20D+L+0.20S+E+1.60H, LL Comb Run (*L*)					
Span # 1	1	8.000	-159.19	303.64	0.52
Span # 2	2	8.000	-165.18	303.64	0.54
Span # 3	3	8.000	-165.18	303.64	0.54
+1.20D+L+0.20S+E+1.60H, LL Comb Run (*LL)					

Concrete Beam

DESCRIPTION: GRBM - GA + GC - Under 10" PC Wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 1	1	8.000	-153.39	303.64	0.51
Span # 2	2	8.000	-182.29	303.64	0.60
Span # 3	3	8.000	-188.54	303.64	0.62
+1.20D+L+0.20S+E+1.60H, LL Comb Run (L**)					
Span # 1	1	8.000	-163.83	303.64	0.54
Span # 2	2	8.000	-171.02	303.64	0.56
Span # 3	3	8.000	-141.82	303.64	0.47
+1.20D+L+0.20S+E+1.60H, LL Comb Run (L*L)					
Span # 1	1	8.000	-158.03	303.64	0.52
Span # 2	2	8.000	-165.18	303.64	0.54
Span # 3	3	8.000	-165.18	303.64	0.54
+1.20D+L+0.20S+E+1.60H, LL Comb Run (LL*)					
Span # 1	1	8.000	-181.23	303.64	0.60
Span # 2	2	8.000	-188.54	303.64	0.62
Span # 3	3	8.000	-159.34	303.64	0.52
+1.20D+L+0.20S+E+1.60H, LL Comb Run (LLL)					
Span # 1	1	8.000	-175.43	303.64	0.58
Span # 2	2	8.000	-182.70	303.64	0.60
Span # 3	3	8.000	-182.70	303.64	0.60
+0.90D+E+0.90H					
Span # 1	1	8.000	-106.34	303.64	0.35
Span # 2	2	8.000	-110.74	303.64	0.36
Span # 3	3	8.000	-110.74	303.64	0.36

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft)	Load Combination	Max. "+" Defl (in)	Location in Span (ft)
+D+L+H, LL Comb Run (L*L)	1	0.0064	3.680	+D+L+H, LL Comb Run (L*L)	-0.0002	8.160
+D+L+H, LL Comb Run (*L*)	2	0.0016	4.000	+D+L+H, LL Comb Run (L*L)	-0.0009	5.920
+D+L+H, LL Comb Run (L*L)	3	0.0064	4.320		0.0000	5.920

Concrete Beam

Lic. # : KW-06011403

Bob D. Campbell and Co., Inc.

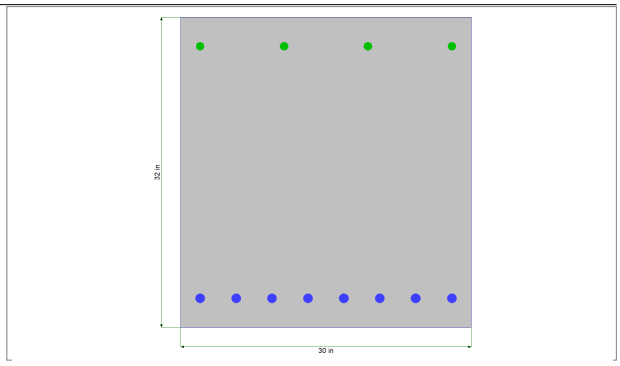
DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall

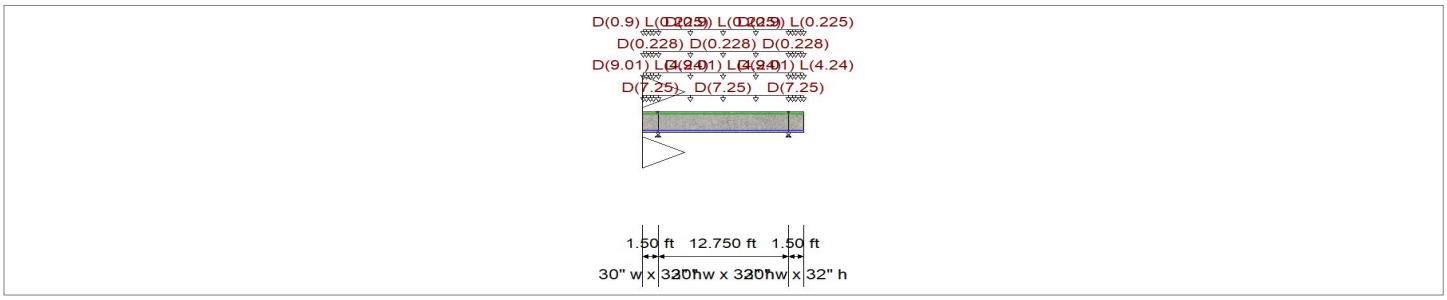
CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

f'c	=	3.50 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c$^{1/2}$ * 7.50	=	443.706 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups		60.0 ksi
fy - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #		4
			Number of Resisting Legs Per Stirrup	=	2





Cross Section & Reinforcing Details

Rectangular Section, Width = 30.0 in, Height = 32.0 in

Span #1 Reinforcing....
- 8-#8 at 3.0 in from Bottom, from 0.0 to 1.50 ft in this span
- 4-#7 at 3.0 in from Top, from 0.0 to 1.50 ft in this span

Span #2 Reinforcing....
- 8-#8 at 3.0 in from Bottom, from 0.0 to 12.750 ft in this span
- 4-#7 at 3.0 in from Top, from 0.0 to 12.750 ft in this span

Span #3 Reinforcing....
- 8-#8 at 3.0 in from Bottom, from 0.0 to 1.50 ft in this span
- 4-#7 at 3.0 in from Top, from 0.0 to 1.50 ft in this span

Beam self weight calculated and added to loads

Load for Span Number 1
- Uniform Load : D = 0.1250 ksf, Tributary Width = 58.0 ft, (10" PC Wall - With Opngs)
- Uniform Load : D = 0.0850, L = 0.040 ksf, Tributary Width = 106.0 ft, (4-Floors)
- Uniform Load : D = 0.0570 ksf, Tributary Width = 4.0 ft, (Wash - 4-Floors)
- Uniform Load : D = 0.10, L = 0.0250 ksf, Tributary Width = 9.0 ft, (8" Stair Roof)

Load for Span Number 2
- Uniform Load : D = 0.1250 ksf, Tributary Width = 58.0 ft, (10" PC Wall - With Opngs)
- Uniform Load : D = 0.0850, L = 0.040 ksf, Tributary Width = 106.0 ft, (4-Floors)
- Uniform Load : D = 0.0570 ksf, Tributary Width = 4.0 ft, (Wash - 4-Floors)
- Uniform Load : D = 0.10, L = 0.0250 ksf, Tributary Width = 9.0 ft, (8" Stair Roof)

Load for Span Number 3
- Uniform Load : D = 0.1250 ksf, Tributary Width = 58.0 ft, (10" PC Wall - With Opngs)
- Uniform Load : D = 0.0850, L = 0.040 ksf, Tributary Width = 106.0 ft, (4-Floors)
- Uniform Load : D = 0.0570 ksf, Tributary Width = 4.0 ft, (Wash - 4-Floors)
- Uniform Load : D = 0.10, L = 0.0250 ksf, Tributary Width = 9.0 ft, (8" Stair Roof)

Concrete Beam

Lic. # : KW-06011403 — Bob D. Campbell and Co., Inc.

DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.739** : 1	Maximum Deflection			
Section used for this span	**Typical Section**	Max Downward Transient Deflection	0.010 in	Ratio =	14767 >=360.
Mu : Applied	567.96 k-ft	Max Upward Transient Deflection	-0.004 in	Ratio =	9210 >=360.
Mn * Phi : Allowable	768.36 k-ft	Max Downward Total Deflection	0.116 in	Ratio =	1318 >=180.
Location of maximum on span	6.375 ft	Max Upward Total Deflection	-0.040 in	Ratio =	892 >=180.
Span # where maximum occurs	Span # 2				

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum		180.099	180.099	
Overall MINimum		-0.394	-0.394	
+D+H		144.543	144.543	
+D+L+H, LL Comb Run (**L)		144.149	151.634	
+D+L+H, LL Comb Run (*L*)		173.007	173.007	
+D+L+H, LL Comb Run (*LL)		172.613	180.099	
+D+L+H, LL Comb Run (L**)		151.634	144.149	
+D+L+H, LL Comb Run (L*L)		151.241	151.240	
+D+L+H, LL Comb Run (LL*)		180.099	172.613	
+D+L+H, LL Comb Run (LLL)		179.705	179.705	
+D+Lr+H, LL Comb Run (**L)		144.543	144.543	
+D+Lr+H, LL Comb Run (*L*)		144.543	144.543	
+D+Lr+H, LL Comb Run (*LL)		144.543	144.543	
+D+Lr+H, LL Comb Run (L**)		144.543	144.543	
+D+Lr+H, LL Comb Run (L*L)		144.543	144.543	
+D+Lr+H, LL Comb Run (LL*)		144.543	144.543	
+D+Lr+H, LL Comb Run (LLL)		144.543	144.543	
+D+S+H		144.543	144.543	
+D+0.750Lr+0.750L+H, LL Comb Run (		144.248	149.862	
+D+0.750Lr+0.750L+H, LL Comb Run (		165.891	165.891	
+D+0.750Lr+0.750L+H, LL Comb Run (		165.596	171.210	
+D+0.750Lr+0.750L+H, LL Comb Run (		149.862	144.248	
+D+0.750Lr+0.750L+H, LL Comb Run (		149.566	149.566	
+D+0.750Lr+0.750L+H, LL Comb Run (		171.210	165.596	
+D+0.750Lr+0.750L+H, LL Comb Run (		170.914	170.914	
+D+0.750L+0.750S+H, LL Comb Run (*		144.248	149.862	
+D+0.750L+0.750S+H, LL Comb Run (*		165.891	165.891	
+D+0.750L+0.750S+H, LL Comb Run (*		165.596	171.210	
+D+0.750L+0.750S+H, LL Comb Run (L		149.862	144.248	
+D+0.750L+0.750S+H, LL Comb Run (L		149.566	149.566	
+D+0.750L+0.750S+H, LL Comb Run (L		171.210	165.596	
+D+0.750L+0.750S+H, LL Comb Run (L		170.914	170.914	
+D+0.60W+H		144.543	144.543	
+D+0.750Lr+0.750L+0.450W+H, LL Com		144.248	149.862	
+D+0.750Lr+0.750L+0.450W+H, LL Com		165.891	165.891	
+D+0.750Lr+0.750L+0.450W+H, LL Com		165.596	171.210	
+D+0.750Lr+0.750L+0.450W+H, LL Com		149.862	144.248	
+D+0.750Lr+0.750L+0.450W+H, LL Com		149.566	149.566	
+D+0.750Lr+0.750L+0.450W+H, LL Com		171.210	165.596	
+D+0.750Lr+0.750L+0.450W+H, LL Com		170.914	170.914	
+D+0.750L+0.750S+0.450W+H, LL Comb		144.248	149.862	
+D+0.750L+0.750S+0.450W+H, LL Comb		165.891	165.891	
+D+0.750L+0.750S+0.450W+H, LL Comb		165.596	171.210	
+D+0.750L+0.750S+0.450W+H, LL Comb		149.862	144.248	
+D+0.750L+0.750S+0.450W+H, LL Comb		149.566	149.566	
+D+0.750L+0.750S+0.450W+H, LL Comb		171.210	165.596	
+D+0.750L+0.750S+0.450W+H, LL Comb		170.914	170.914	
+0.60D+0.60W+0.60H		86.726	86.726	
+D+0.70E+0.60H		144.543	144.543	
+D+0.750L+0.750S+0.5250E+H, LL Com		144.248	149.862	

Concrete Beam

DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3	Support 4
+D+0.750L+0.750S+0.5250E+H, LL Com		165.891	165.891	
+D+0.750L+0.750S+0.5250E+H, LL Com		165.596	171.210	
+D+0.750L+0.750S+0.5250E+H, LL Com		149.862	144.248	
+D+0.750L+0.750S+0.5250E+H, LL Com		149.566	149.566	
+D+0.750L+0.750S+0.5250E+H, LL Com		171.210	165.596	
+D+0.750L+0.750S+0.5250E+H, LL Com		170.914	170.914	
+0.60D+0.70E+H		86.726	86.726	
D Only		144.543	144.543	
L Only, LL Comb Run (**L)		-0.394	7.091	
L Only, LL Comb Run (*L*)		28.464	28.464	
L Only, LL Comb Run (*LL)		28.070	35.556	
L Only, LL Comb Run (L**)		7.091	-0.394	
L Only, LL Comb Run (L*L)		6.697	6.697	
L Only, LL Comb Run (LL*)		35.556	28.070	
L Only, LL Comb Run (LLL)		35.162	35.162	
H Only				

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.20D+1.60S+0.50W+1.60H	1	0.00	29.00	-0.00	0.00	0.00	1.00	85.19	Vu < PhiVc/2	lot Reqd 9.6.	85.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.06	29.00	-1.75	1.75	0.05	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.12	29.00	-3.50	3.50	0.21	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.18	29.00	-5.25	5.25	0.47	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.24	29.00	-7.00	7.00	0.84	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.30	29.00	-8.75	8.75	1.31	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.36	29.00	-10.50	10.50	1.89	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.42	29.00	-12.25	12.25	2.57	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.48	29.00	-14.00	14.00	3.36	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.54	29.00	-15.75	15.75	4.25	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.60	29.00	-17.50	17.50	5.25	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.66	29.00	-19.25	19.25	6.35	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.72	29.00	-21.00	21.00	7.56	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.78	29.00	-22.75	22.75	8.87	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.84	29.00	-24.50	24.50	10.29	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.90	29.00	-26.25	26.25	11.81	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.96	29.00	-28.00	28.00	13.44	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	1.02	29.00	-29.75	29.75	15.17	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	1.08	29.00	-31.50	31.50	17.01	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	1.14	29.00	-33.25	33.25	18.95	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	1.20	29.00	-35.00	35.00	21.00	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	1.26	29.00	-36.75	36.75	23.15	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	1.32	29.00	-38.50	38.50	25.41	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	1.38	29.00	-40.25	40.25	27.78	1.00	77.84	PhiVc/2 < Vu <=	Min 9.6.3.1	115.1	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	1.44	29.00	-42.00	42.00	30.24	1.00	77.84	PhiVc/2 < Vu <=	Min 9.6.3.1	115.1	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	1.50	29.00	186.59	186.59	32.82	1.00	77.84	PhiVc < Vu	108.742	208.3	4.8	4.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	2.01	29.00	171.71	171.71	58.55	1.00	85.19	PhiVc < Vu	86.515	215.7	6.0	4.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	2.52	29.00	156.83	156.83	142.33	1.00	85.19	PhiVc < Vu	71.639	215.7	7.3	4.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	3.03	29.00	141.96	141.96	218.52	1.00	85.19	PhiVc < Vu	56.762	215.7	9.2	4.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	3.54	29.00	127.08	127.08	287.12	1.00	85.19	PhiVc < Vu	41.886	215.7	12.5	4.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	4.05	29.00	112.20	112.20	348.14	0.78	82.57	PhiVc < Vu	29.630	213.1	14.5	4.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	4.56	29.00	97.33	97.33	401.57	0.59	80.29	PhiVc < Vu	17.042	210.8	14.5	4.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	5.07	29.00	82.45	82.45	447.42	0.45	78.62	PhiVc < Vu	3.829	209.1	14.5	4.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	5.58	29.00	67.57	67.57	485.67	0.34	77.33	PhiVc/2 < Vu <=	Min 9.6.3.1	114.6	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	6.09	29.00	52.70	52.70	516.34	0.25	76.27	PhiVc/2 < Vu <=	Min 9.6.3.1	113.6	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	6.60	29.00	37.82	37.82	530.12	0.17	75.35	PhiVc/2 < Vu <=	Min 9.6.3.1	112.6	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	7.11	29.00	22.95	22.95	554.92	0.10	74.53	Vu < PhiVc/2	lot Reqd 9.6.	74.5	0.0	0.0

Concrete Beam

DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	7.62	29.00	8.07	8.07	562.83	0.03	73.76	Vu < PhiVc/2	lot Reqd 9.6.	73.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	8.13	29.00	-8.07	8.07	562.83	0.03	73.76	Vu < PhiVc/2	lot Reqd 9.6.	73.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	8.64	29.00	-22.95	22.95	554.92	0.10	74.53	Vu < PhiVc/2	lot Reqd 9.6.	74.5	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	9.15	29.00	-37.82	37.82	539.42	0.17	75.35	PhiVc/2 < Vu <=	Min 9.6.3.1	112.6	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	9.66	29.00	-52.70	52.70	516.34	0.25	76.27	PhiVc/2 < Vu <=	Min 9.6.3.1	113.6	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	10.17	29.00	-67.57	67.57	485.67	0.34	77.33	PhiVc/2 < Vu <=	Min 9.6.3.1	114.6	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	10.68	29.00	-82.45	82.45	447.42	0.45	78.62	PhiVc < Vu	3.829	209.1	14.5	4.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	11.19	29.00	-97.33	97.33	401.57	0.59	80.29	PhiVc < Vu	17.042	210.8	14.5	4.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	11.70	29.00	-112.20	112.20	348.14	0.78	82.57	PhiVc < Vu	29.630	213.1	14.5	4.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	12.21	29.00	-127.08	127.08	287.12	1.00	85.19	PhiVc < Vu	41.886	215.7	12.5	4.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	12.72	29.00	-141.96	141.96	218.52	1.00	85.19	PhiVc < Vu	56.762	215.7	9.2	4.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	13.23	29.00	-156.83	156.83	142.33	1.00	85.19	PhiVc < Vu	71.639	215.7	7.3	4.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	13.74	29.00	-171.71	171.71	58.55	1.00	85.19	PhiVc < Vu	86.515	215.7	6.0	4.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	14.25	29.00	43.75	43.75	32.82	1.00	77.84	PhiVc/2 < Vu <=	Min 9.6.3.1	115.1	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	14.31	29.00	42.00	42.00	30.24	1.00	77.84	PhiVc/2 < Vu <=	Min 9.6.3.1	115.1	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	14.37	29.00	40.25	40.25	27.78	1.00	77.84	PhiVc/2 < Vu <=	Min 9.6.3.1	115.1	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	14.43	29.00	38.50	38.50	25.41	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	14.49	29.00	36.75	36.75	23.15	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	14.55	29.00	35.00	35.00	21.00	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	14.61	29.00	33.25	33.25	18.95	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	14.67	29.00	31.50	31.50	17.01	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	14.73	29.00	29.75	29.75	15.17	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	14.79	29.00	28.00	28.00	13.44	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	14.85	29.00	26.25	26.25	11.81	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	14.91	29.00	24.50	24.50	10.29	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	14.97	29.00	22.75	22.75	8.87	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	15.03	29.00	21.00	21.00	7.56	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	15.09	29.00	19.25	19.25	6.35	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	15.15	29.00	17.50	17.50	5.25	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	15.21	29.00	15.75	15.75	4.25	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	15.27	29.00	14.00	14.00	3.36	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	15.33	29.00	12.25	12.25	2.57	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	15.39	29.00	10.50	10.50	1.89	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	15.45	29.00	8.75	8.75	1.31	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	15.51	29.00	7.00	7.00	0.84	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	15.57	29.00	5.25	5.25	0.47	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	15.63	29.00	3.50	3.50	0.21	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	15.69	29.00	1.75	1.75	0.05	1.00	77.84	Vu < PhiVc/2	lot Reqd 9.6.	77.8	0.0	0.0
+1.20D+1.60S+0.50W+1.60H	3	15.75	29.00	0.00	0.00	0.00	1.00	85.19	Vu < PhiVc/2	lot Reqd 9.6.	85.2	0.0	0.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	1.500	-32.38	309.26	0.10
Span # 2	2	12.750	567.96	768.36	0.74
Span # 3	3	1.500	-32.82	309.26	0.11
+1.40D+1.60H					
Span # 1	1	1.500	-28.52	309.26	0.09
Span # 2	2	12.750	493.25	768.36	0.64
Span # 3	3	1.500	-28.91	309.26	0.09
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (**L)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	418.77	768.36	0.55
Span # 3	3	1.500	-32.82	309.26	0.11
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (*L*)					
Span # 1	1	1.500	-24.45	309.26	0.08

Concrete Beam

DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 2	2	12.750	567.96	768.36	0.74
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (*LL)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	563.94	768.36	0.73
Span # 3	3	1.500	-32.82	309.26	0.11
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (L**)					
Span # 1	1	1.500	-32.38	309.26	0.10
Span # 2	2	12.750	418.77	768.36	0.55
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (L*L)					
Span # 1	1	1.500	-32.38	309.26	0.10
Span # 2	2	12.750	414.75	768.36	0.54
Span # 3	3	1.500	-32.82	309.26	0.11
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LL*)					
Span # 1	1	1.500	-32.38	309.26	0.10
Span # 2	2	12.750	563.94	768.36	0.73
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LLL)					
Span # 1	1	1.500	-32.38	309.26	0.10
Span # 2	2	12.750	559.92	768.36	0.73
Span # 3	3	1.500	-32.82	309.26	0.11
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (**L)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	418.77	768.36	0.55
Span # 3	3	1.500	-32.82	309.26	0.11
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (*L*)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	567.96	768.36	0.74
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (*LL)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	563.94	768.36	0.73
Span # 3	3	1.500	-32.82	309.26	0.11
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (L**)					
Span # 1	1	1.500	-32.38	309.26	0.10
Span # 2	2	12.750	418.77	768.36	0.55
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (L*L)					
Span # 1	1	1.500	-32.38	309.26	0.10
Span # 2	2	12.750	414.75	768.36	0.54
Span # 3	3	1.500	-32.82	309.26	0.11
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (LL*)					
Span # 1	1	1.500	-32.38	309.26	0.10
Span # 2	2	12.750	563.94	768.36	0.73
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (LLL)					
Span # 1	1	1.500	-32.38	309.26	0.10
Span # 2	2	12.750	559.92	768.36	0.73
Span # 3	3	1.500	-32.82	309.26	0.11
+1.20D+1.60Lr+L+1.60H, LL Comb Run (**L)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	420.28	768.36	0.55
Span # 3	3	1.500	-29.80	309.26	0.10
+1.20D+1.60Lr+L+1.60H, LL Comb Run (*L*)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	513.52	768.36	0.67
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+1.60Lr+L+1.60H, LL Comb Run (*LL)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	511.01	768.36	0.67
Span # 3	3	1.500	-29.80	309.26	0.10
+1.20D+1.60Lr+L+1.60H, LL Comb Run (L**)					
Span # 1	1	1.500	-29.41	309.26	0.10
Span # 2	2	12.750	420.28	768.36	0.55
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+1.60Lr+L+1.60H, LL Comb Run (L*L)					
Span # 1	1	1.500	-29.41	309.26	0.10
Span # 2	2	12.750	417.77	768.36	0.54

Concrete Beam

DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 3	3	1.500	-29.80	309.26	0.10
+1.20D+1.60Lr+L+1.60H, LL Comb Run (LL*)					
Span # 1	1	1.500	-29.41	309.26	0.10
Span # 2	2	12.750	511.01	768.36	0.67
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+1.60Lr+L+1.60H, LL Comb Run (LLL)					
Span # 1	1	1.500	-29.41	309.26	0.10
Span # 2	2	12.750	508.50	768.36	0.66
Span # 3	3	1.500	-29.80	309.26	0.10
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (**L)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	422.79	768.36	0.55
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (*L*)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	422.79	768.36	0.55
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (*LL)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	422.79	768.36	0.55
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (L**)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	422.79	768.36	0.55
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (L*L)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	422.79	768.36	0.55
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (LL*)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	422.79	768.36	0.55
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (LLL)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	422.79	768.36	0.55
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+L+1.60S+1.60H, LL Comb Run (**L)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	420.28	768.36	0.55
Span # 3	3	1.500	-29.80	309.26	0.10
+1.20D+L+1.60S+1.60H, LL Comb Run (*L*)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	513.52	768.36	0.67
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+L+1.60S+1.60H, LL Comb Run (*LL)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	511.01	768.36	0.67
Span # 3	3	1.500	-29.80	309.26	0.10
+1.20D+L+1.60S+1.60H, LL Comb Run (L**)					
Span # 1	1	1.500	-29.41	309.26	0.10
Span # 2	2	12.750	420.28	768.36	0.55
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+L+1.60S+1.60H, LL Comb Run (L*L)					
Span # 1	1	1.500	-29.41	309.26	0.10
Span # 2	2	12.750	417.77	768.36	0.54
Span # 3	3	1.500	-29.80	309.26	0.10
+1.20D+L+1.60S+1.60H, LL Comb Run (LL*)					
Span # 1	1	1.500	-29.41	309.26	0.10
Span # 2	2	12.750	511.01	768.36	0.67
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+L+1.60S+1.60H, LL Comb Run (LLL)					
Span # 1	1	1.500	-29.41	309.26	0.10
Span # 2	2	12.750	508.50	768.36	0.66
Span # 3	3	1.500	-29.80	309.26	0.10
+1.20D+1.60S+0.50W+1.60H					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	422.79	768.36	0.55
Span # 3	3	1.500	-24.78	309.26	0.08

Concrete Beam

DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (**L)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	420.28	768.36	0.55
Span # 3	3	1.500	-29.80	309.26	0.10
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (*L*)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	513.52	768.36	0.67
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (*LL)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	511.01	768.36	0.67
Span # 3	3	1.500	-29.80	309.26	0.10
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (L**)					
Span # 1	1	1.500	-29.41	309.26	0.10
Span # 2	2	12.750	420.28	768.36	0.55
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (L*L)					
Span # 1	1	1.500	-29.41	309.26	0.10
Span # 2	2	12.750	417.77	768.36	0.54
Span # 3	3	1.500	-29.80	309.26	0.10
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (LL*)					
Span # 1	1	1.500	-29.41	309.26	0.10
Span # 2	2	12.750	511.01	768.36	0.67
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (LLL)					
Span # 1	1	1.500	-29.41	309.26	0.10
Span # 2	2	12.750	508.50	768.36	0.66
Span # 3	3	1.500	-29.80	309.26	0.10
+1.20D+L+0.50S+W+1.60H, LL Comb Run (**L)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	420.28	768.36	0.55
Span # 3	3	1.500	-29.80	309.26	0.10
+1.20D+L+0.50S+W+1.60H, LL Comb Run (*L*)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	513.52	768.36	0.67
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+L+0.50S+W+1.60H, LL Comb Run (*LL)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	511.01	768.36	0.67
Span # 3	3	1.500	-29.80	309.26	0.10
+1.20D+L+0.50S+W+1.60H, LL Comb Run (L**)					
Span # 1	1	1.500	-29.41	309.26	0.10
Span # 2	2	12.750	420.28	768.36	0.55
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+L+0.50S+W+1.60H, LL Comb Run (L*L)					
Span # 1	1	1.500	-29.41	309.26	0.10
Span # 2	2	12.750	417.77	768.36	0.54
Span # 3	3	1.500	-29.80	309.26	0.10
+1.20D+L+0.50S+W+1.60H, LL Comb Run (LL*)					
Span # 1	1	1.500	-29.41	309.26	0.10
Span # 2	2	12.750	511.01	768.36	0.67
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+L+0.50S+W+1.60H, LL Comb Run (LLL)					
Span # 1	1	1.500	-29.41	309.26	0.10
Span # 2	2	12.750	508.50	768.36	0.66
Span # 3	3	1.500	-29.80	309.26	0.10
+0.90D+W+1.60H					
Span # 1	1	1.500	-18.34	309.26	0.06
Span # 2	2	12.750	317.09	768.36	0.41
Span # 3	3	1.500	-18.58	309.26	0.06
+1.20D+L+0.20S+E+1.60H, LL Comb Run (**L)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	420.28	768.36	0.55
Span # 3	3	1.500	-29.80	309.26	0.10
+1.20D+L+0.20S+E+1.60H, LL Comb Run (*L*)					
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	513.52	768.36	0.67
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+L+0.20S+E+1.60H, LL Comb Run (*LL)					

Concrete Beam

DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 1	1	1.500	-24.45	309.26	0.08
Span # 2	2	12.750	511.01	768.36	0.67
Span # 3	3	1.500	-29.80	309.26	0.10
+1.20D+L+0.20S+E+1.60H, LL Comb Run (L**)					
Span # 1	1	1.500	-29.41	309.26	0.10
Span # 2	2	12.750	420.28	768.36	0.55
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+L+0.20S+E+1.60H, LL Comb Run (L*L)					
Span # 1	1	1.500	-29.41	309.26	0.10
Span # 2	2	12.750	417.77	768.36	0.54
Span # 3	3	1.500	-29.80	309.26	0.10
+1.20D+L+0.20S+E+1.60H, LL Comb Run (LL*)					
Span # 1	1	1.500	-29.41	309.26	0.10
Span # 2	2	12.750	511.01	768.36	0.67
Span # 3	3	1.500	-24.78	309.26	0.08
+1.20D+L+0.20S+E+1.60H, LL Comb Run (LLL)					
Span # 1	1	1.500	-29.41	309.26	0.10
Span # 2	2	12.750	508.50	768.36	0.66
Span # 3	3	1.500	-29.80	309.26	0.10
+0.90D+E+0.90H					
Span # 1	1	1.500	-18.34	309.26	0.06
Span # 2	2	12.750	317.09	768.36	0.41
Span # 3	3	1.500	-18.58	309.26	0.06

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft)	Load Combination	Max. "+" Defl (in)	Location in Span (ft)
+D+L+H, LL Comb Run (*L*)	1	0.0069	1.755	+D+L+H, LL Comb Run (*L*)	-0.0403	0.000
+D+L+H, LL Comb Run (*L*)	2	0.1160	6.375	+D+L+H, LL Comb Run (*L*)	-0.0008	12.780
	3	0.0000	6.375	+D+L+H, LL Comb Run (*L*)	-0.0403	1.500

Concrete Beam

Lic. # : KW-06011403

Bob D. Campbell and Co., Inc.

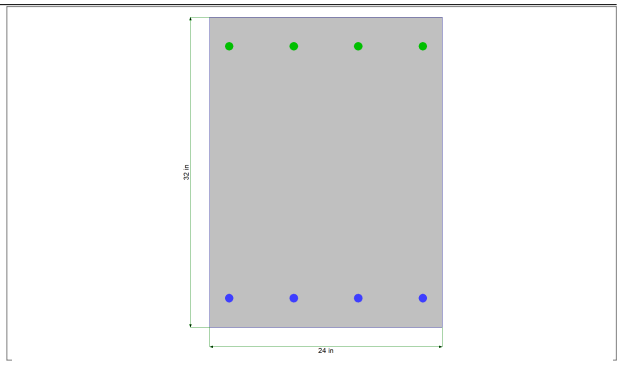
DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall - 3 Piles

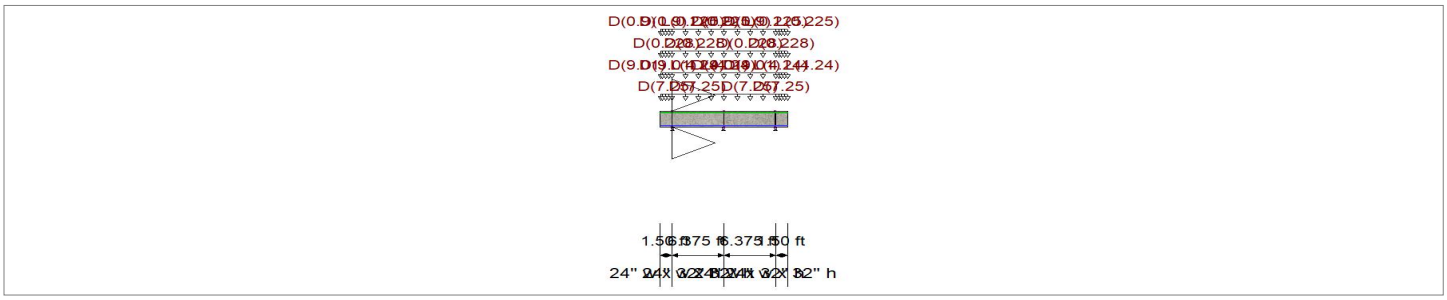
CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

f'c	=	3.50 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c$^{1/2}$ * 7.50	=	443.706 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups		60.0 ksi
fy - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #		4
			Number of Resisting Legs Per Stirrup =		2





Cross Section & Reinforcing Details

Rectangular Section, Width = 24.0 in, Height = 32.0 in

Span #1 Reinforcing....
- 4-#7 at 3.0 in from Bottom, from 0.0 to 1.50 ft in this span
- 4-#7 at 3.0 in from Top, from 0.0 to 1.50 ft in this span

Span #2 Reinforcing....
- 4-#7 at 3.0 in from Bottom, from 0.0 to 6.375 ft in this span
- 4-#7 at 3.0 in from Top, from 0.0 to 6.375 ft in this span

Span #3 Reinforcing....
- 4-#7 at 3.0 in from Bottom, from 0.0 to 6.375 ft in this span
- 4-#7 at 3.0 in from Top, from 0.0 to 6.375 ft in this span

Span #4 Reinforcing....
- 4-#7 at 3.0 in from Bottom, from 0.0 to 1.50 ft in this span
- 4-#7 at 3.0 in from Top, from 0.0 to 1.50 ft in this span

Beam self weight calculated and added to loads

Load for Span Number 1
- Uniform Load : D = 0.1250 ksf, Tributary Width = 58.0 ft, (10" PC Wall - With Opngs)
- Uniform Load : D = 0.0850, L = 0.040 ksf, Tributary Width = 106.0 ft, (4-Floors)
- Uniform Load : D = 0.0570 ksf, Tributary Width = 4.0 ft, (Wash - 4-Floors)
- Uniform Load : D = 0.10, L = 0.0250 ksf, Tributary Width = 9.0 ft, (8" Stair Roof)

Load for Span Number 2
- Uniform Load : D = 0.1250 ksf, Tributary Width = 58.0 ft, (10" PC Wall - With Opngs)
- Uniform Load : D = 0.0850, L = 0.040 ksf, Tributary Width = 106.0 ft, (4-Floors)
- Uniform Load : D = 0.0570 ksf, Tributary Width = 4.0 ft, (Wash - 4-Floors)
- Uniform Load : D = 0.10, L = 0.0250 ksf, Tributary Width = 9.0 ft, (8" Stair Roof)

Load for Span Number 3
- Uniform Load : D = 0.1250 ksf, Tributary Width = 58.0 ft, (10" PC Wall - With Opngs)
- Uniform Load : D = 0.0850, L = 0.040 ksf, Tributary Width = 106.0 ft, (4-Floors)
- Uniform Load : D = 0.0570 ksf, Tributary Width = 4.0 ft, (Wash - 4-Floors)
- Uniform Load : D = 0.10, L = 0.0250 ksf, Tributary Width = 9.0 ft, (8" Stair Roof)

Load for Span Number 4
- Uniform Load : D = 0.1250 ksf, Tributary Width = 58.0 ft, (10" PC Wall - With Opngs)

Concrete Beam

DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall - 3 Piles

Applied Loads

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

Uniform Load : D = 0.0850, L = 0.040 ksf, Tributary Width = 106.0 ft, (4-Floors)
Uniform Load : D = 0.0570 ksf, Tributary Width = 4.0 ft, (Wash - 4-Floors)
Uniform Load : D = 0.10, L = 0.0250 ksf, Tributary Width = 9.0 ft, (8" Stair Roof)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.444** : 1	Maximum Deflection	
Section used for this span	**Typical Section**	Max Downward Transient Deflection	0.000 in Ratio = 0 <360.0
Mu : Applied	-134.746 k-ft	Max Upward Transient Deflection	0.000 in Ratio = 0 <360.0
Mn * Phi : Allowable	303.639 k-ft	Max Downward Total Deflection	0.002 in Ratio = 44651 >=180.
Location of maximum on span	0.000 ft	Max Upward Total Deflection	-0.001 in Ratio = 29822 >=180.
Span # where maximum occurs	Span # 3		

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3	Support 4	Support 5
Overall MAXimum		95.799	170.689	95.799	
Overall MINimum		0.197	-1.182	0.197	
+D+H		75.466	135.108	75.466	
+D+L+H, LL Comb Run (***L)		75.663	133.926	83.149	
+D+L+H, LL Comb Run (**L*)		73.687	152.899	87.920	
+D+L+H, LL Comb Run (**LL)		73.884	151.717	95.602	
+D+L+H, LL Comb Run (*L**)		87.920	152.899	73.687	
+D+L+H, LL Comb Run (*L*L)		88.116	151.717	81.370	
+D+L+H, LL Comb Run (*LL*)		86.140	170.689	86.140	
+D+L+H, LL Comb Run (*LLL)		86.337	169.507	93.823	
+D+L+H, LL Comb Run (L***)		83.149	133.926	75.663	
+D+L+H, LL Comb Run (L**L)		83.346	132.744	83.346	
+D+L+H, LL Comb Run (L*L*)		81.370	151.717	88.116	
+D+L+H, LL Comb Run (L*LL)		81.567	150.535	95.799	
+D+L+H, LL Comb Run (LL**)		95.602	151.717	73.884	
+D+L+H, LL Comb Run (LL*L)		95.799	150.535	81.567	
+D+L+H, LL Comb Run (LLL*)		93.823	169.507	86.337	
+D+L+H, LL Comb Run (LLLL)		94.020	168.325	94.020	
+D+Lr+H, LL Comb Run (***L)		75.466	135.108	75.466	
+D+Lr+H, LL Comb Run (**L*)		75.466	135.108	75.466	
+D+Lr+H, LL Comb Run (**LL)		75.466	135.108	75.466	
+D+Lr+H, LL Comb Run (*L**)		75.466	135.108	75.466	
+D+Lr+H, LL Comb Run (*L*L)		75.466	135.108	75.466	
+D+Lr+H, LL Comb Run (*LL*)		75.466	135.108	75.466	
+D+Lr+H, LL Comb Run (*LLL)		75.466	135.108	75.466	
+D+Lr+H, LL Comb Run (L***)		75.466	135.108	75.466	
+D+Lr+H, LL Comb Run (L**L)		75.466	135.108	75.466	
+D+Lr+H, LL Comb Run (L*L*)		75.466	135.108	75.466	
+D+Lr+H, LL Comb Run (L*LL)		75.466	135.108	75.466	
+D+Lr+H, LL Comb Run (LL**)		75.466	135.108	75.466	
+D+Lr+H, LL Comb Run (LL*L)		75.466	135.108	75.466	
+D+Lr+H, LL Comb Run (LLL*)		75.466	135.108	75.466	
+D+Lr+H, LL Comb Run (LLLL)		75.466	135.108	75.466	
+D+S+H		75.466	135.108	75.466	
+D+0.750Lr+0.750L+H, LL Comb Run (		75.614	134.222	81.228	
+D+0.750Lr+0.750L+H, LL Comb Run (		74.132	148.451	84.806	
+D+0.750Lr+0.750L+H, LL Comb Run (		74.280	147.565	90.568	
+D+0.750Lr+0.750L+H, LL Comb Run (		84.806	148.451	74.132	
+D+0.750Lr+0.750L+H, LL Comb Run (		84.954	147.565	79.894	
+D+0.750Lr+0.750L+H, LL Comb Run (		83.472	161.794	83.472	
+D+0.750Lr+0.750L+H, LL Comb Run (		83.620	160.907	89.234	
+D+0.750Lr+0.750L+H, LL Comb Run (		81.228	134.222	75.614	
+D+0.750Lr+0.750L+H, LL Comb Run (		81.376	133.335	81.376	
+D+0.750Lr+0.750L+H, LL Comb Run (		79.894	147.565	84.954	
+D+0.750Lr+0.750L+H, LL Comb Run (		80.042	146.678	90.716	

Concrete Beam

DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall - 3 Piles

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3	Support 4	Support 5
+D+0.750Lr+0.750L+H, LL Comb Run (		90.568	147.565	74.280	
+D+0.750Lr+0.750L+H, LL Comb Run (		90.716	146.678	80.042	
+D+0.750Lr+0.750L+H, LL Comb Run (		89.234	160.907	83.620	
+D+0.750Lr+0.750L+H, LL Comb Run (		89.382	160.021	89.382	
+D+0.750L+0.750S+H, LL Comb Run (*		75.614	134.222	81.228	
+D+0.750L+0.750S+H, LL Comb Run (*		74.132	148.451	84.806	
+D+0.750L+0.750S+H, LL Comb Run (*		74.280	147.565	90.568	
+D+0.750L+0.750S+H, LL Comb Run (*		84.806	148.451	74.132	
+D+0.750L+0.750S+H, LL Comb Run (*		84.954	147.565	79.894	
+D+0.750L+0.750S+H, LL Comb Run (*		83.472	161.794	83.472	
+D+0.750L+0.750S+H, LL Comb Run (*		83.620	160.907	89.234	
+D+0.750L+0.750S+H, LL Comb Run (L		81.228	134.222	75.614	
+D+0.750L+0.750S+H, LL Comb Run (L		81.376	133.335	81.376	
+D+0.750L+0.750S+H, LL Comb Run (L		79.894	147.565	84.954	
+D+0.750L+0.750S+H, LL Comb Run (L		80.042	146.678	90.716	
+D+0.750L+0.750S+H, LL Comb Run (L		90.568	147.565	74.280	
+D+0.750L+0.750S+H, LL Comb Run (L		90.716	146.678	80.042	
+D+0.750L+0.750S+H, LL Comb Run (L		89.234	160.907	83.620	
+D+0.750L+0.750S+H, LL Comb Run (L		89.382	160.021	89.382	
+D+0.60W+H		75.466	135.108	75.466	
+D+0.750Lr+0.750L+0.450W+H, LL Com		75.614	134.222	81.228	
+D+0.750Lr+0.750L+0.450W+H, LL Com		74.132	148.451	84.806	
+D+0.750Lr+0.750L+0.450W+H, LL Com		74.280	147.565	90.568	
+D+0.750Lr+0.750L+0.450W+H, LL Com		84.806	148.451	74.132	
+D+0.750Lr+0.750L+0.450W+H, LL Com		84.954	147.565	79.894	
+D+0.750Lr+0.750L+0.450W+H, LL Com		83.472	161.794	83.472	
+D+0.750Lr+0.750L+0.450W+H, LL Com		83.620	160.907	89.234	
+D+0.750Lr+0.750L+0.450W+H, LL Com		81.228	134.222	75.614	
+D+0.750Lr+0.750L+0.450W+H, LL Com		81.376	133.335	81.376	
+D+0.750Lr+0.750L+0.450W+H, LL Com		79.894	147.565	84.954	
+D+0.750Lr+0.750L+0.450W+H, LL Com		80.042	146.678	90.716	
+D+0.750Lr+0.750L+0.450W+H, LL Com		90.568	147.565	74.280	
+D+0.750Lr+0.750L+0.450W+H, LL Com		90.716	146.678	80.042	
+D+0.750Lr+0.750L+0.450W+H, LL Com		89.234	160.907	83.620	
+D+0.750Lr+0.750L+0.450W+H, LL Com		89.382	160.021	89.382	
+D+0.750L+0.750S+0.450W+H, LL Comb		75.614	134.222	81.228	
+D+0.750L+0.750S+0.450W+H, LL Comb		74.132	148.451	84.806	
+D+0.750L+0.750S+0.450W+H, LL Comb		74.280	147.565	90.568	
+D+0.750L+0.750S+0.450W+H, LL Comb		84.806	148.451	74.132	
+D+0.750L+0.750S+0.450W+H, LL Comb		84.954	147.565	79.894	
+D+0.750L+0.750S+0.450W+H, LL Comb		83.472	161.794	83.472	
+D+0.750L+0.750S+0.450W+H, LL Comb		83.620	160.907	89.234	
+D+0.750L+0.750S+0.450W+H, LL Comb		81.228	134.222	75.614	
+D+0.750L+0.750S+0.450W+H, LL Comb		81.376	133.335	81.376	
+D+0.750L+0.750S+0.450W+H, LL Comb		79.894	147.565	84.954	
+D+0.750L+0.750S+0.450W+H, LL Comb		80.042	146.678	90.716	
+D+0.750L+0.750S+0.450W+H, LL Comb		90.568	147.565	74.280	
+D+0.750L+0.750S+0.450W+H, LL Comb		90.716	146.678	80.042	
+D+0.750L+0.750S+0.450W+H, LL Comb		89.234	160.907	83.620	
+D+0.750L+0.750S+0.450W+H, LL Comb		89.382	160.021	89.382	
+0.60D+0.60W+0.60H		45.280	81.065	45.280	
+D+0.70E+0.60H		75.466	135.108	75.466	
+D+0.750L+0.750S+0.5250E+H, LL Com		75.614	134.222	81.228	
+D+0.750L+0.750S+0.5250E+H, LL Com		74.132	148.451	84.806	
+D+0.750L+0.750S+0.5250E+H, LL Com		74.280	147.565	90.568	
+D+0.750L+0.750S+0.5250E+H, LL Com		84.806	148.451	74.132	
+D+0.750L+0.750S+0.5250E+H, LL Com		84.954	147.565	79.894	
+D+0.750L+0.750S+0.5250E+H, LL Com		83.472	161.794	83.472	
+D+0.750L+0.750S+0.5250E+H, LL Com		83.620	160.907	89.234	

Concrete Beam

Lic. # : KW-06011403

Bob D. Campbell and Co., Inc.

DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall - 3 Piles

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3	Support 4	Support 5
+D+0.750L+0.750S+0.5250E+H, LL Com		81.228	134.222	75.614	
+D+0.750L+0.750S+0.5250E+H, LL Com		81.376	133.335	81.376	
+D+0.750L+0.750S+0.5250E+H, LL Com		79.894	147.565	84.954	
+D+0.750L+0.750S+0.5250E+H, LL Com		80.042	146.678	90.716	
+D+0.750L+0.750S+0.5250E+H, LL Com		90.568	147.565	74.280	
+D+0.750L+0.750S+0.5250E+H, LL Com		90.716	146.678	80.042	
+D+0.750L+0.750S+0.5250E+H, LL Com		89.234	160.907	83.620	
+D+0.750L+0.750S+0.5250E+H, LL Com		89.382	160.021	89.382	
+0.60D+0.70E+H		45.280	81.065	45.280	
D Only		75.466	135.108	75.466	
L Only, LL Comb Run (***L)		0.197	-1.182	7.682	
L Only, LL Comb Run (**L*)		-1.779	17.790	12.453	
L Only, LL Comb Run (**LL)		-1.582	16.608	20.136	
L Only, LL Comb Run (*L**)		12.453	17.790	-1.779	
L Only, LL Comb Run (*L*L)		12.650	16.608	5.903	
L Only, LL Comb Run (*LL*)		10.674	35.580	10.674	
L Only, LL Comb Run (*LLL)		10.871	34.399	18.357	
L Only, LL Comb Run (L***)		7.682	-1.182	0.197	
L Only, LL Comb Run (L**L)		7.879	-2.364	7.879	
L Only, LL Comb Run (L*L*)		5.903	16.608	12.650	
L Only, LL Comb Run (L*LL)		6.100	15.426	20.333	
L Only, LL Comb Run (LL**)		20.136	16.608	-1.582	
L Only, LL Comb Run (LL*L)		20.333	15.426	6.100	
L Only, LL Comb Run (LLL*)		18.357	34.399	10.871	
L Only, LL Comb Run (LLLL)		18.554	33.217	18.554	
H Only					

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	0.00	29.00	-0.00	0.00	0.00	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.09	29.00	-2.74	2.74	0.13	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.19	29.00	-5.48	5.48	0.52	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.28	29.00	-8.22	8.22	1.17	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.38	29.00	-10.97	10.97	2.08	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.47	29.00	-13.71	13.71	3.25	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.57	29.00	-16.45	16.45	4.67	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.66	29.00	-19.19	19.19	6.36	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.76	29.00	-21.93	21.93	8.31	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.85	29.00	-24.67	24.67	10.52	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.95	29.00	-27.41	27.41	12.99	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	1.04	29.00	-30.16	30.16	15.71	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	1.14	29.00	-32.90	32.90	18.70	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	1.23	29.00	-35.64	35.64	21.95	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	1.33	29.00	-38.38	38.38	25.45	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	1.42	29.00	-41.12	41.12	29.22	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	1.57	29.00	77.74	77.74	27.27	1.00	63.18	PhiVc < Vu	14.568	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	1.97	29.00	66.09	66.09	1.68	1.00	63.18	PhiVc < Vu	2.917	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	2.37	29.00	54.44	54.44	25.95	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	2.78	29.00	42.79	42.79	45.52	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	3.18	29.00	31.14	31.14	60.41	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	3.58	29.00	19.49	19.49	70.60	0.67	61.68	Vu < PhiVc/2	lot Reqd 9.6.	61.7	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	3.98	29.00	7.84	7.84	76.10	0.25	59.80	Vu < PhiVc/2	lot Reqd 9.6.	59.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	4.39	29.00	-8.55	8.55	71.28	0.29	59.98	Vu < PhiVc/2	lot Reqd 9.6.	60.0	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	4.79	29.00	-20.20	20.20	65.49	0.75	62.03	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	5.19	29.00	-31.85	31.85	55.01	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	5.59	29.00	-43.51	43.51	39.83	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0

Concrete Beam

DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall - 3 Piles

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	6.00	29.00	-55.16	55.16	19.97	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	6.40	29.00	-66.81	66.81	4.58	1.00	63.18	PhiVc < Vu	3.633	110.6	14.5	11.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	6.80	29.00	-78.46	78.46	33.83	1.00	63.18	PhiVc < Vu	15.284	110.6	14.5	11.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	7.20	29.00	-90.11	90.11	67.76	1.00	63.18	PhiVc < Vu	26.935	110.6	14.5	11.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	7.61	29.00	-101.76	101.76	106.39	1.00	63.18	PhiVc < Vu	38.586	110.6	13.5	11.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	8.01	29.00	105.65	105.65	120.31	1.00	63.18	PhiVc < Vu	42.470	110.6	12.3	11.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	8.41	29.00	93.99	93.99	80.12	1.00	63.18	PhiVc < Vu	30.819	110.6	14.5	11.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	8.81	29.00	82.34	82.34	44.62	1.00	63.18	PhiVc < Vu	19.168	110.6	14.5	11.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	9.22	29.00	70.69	70.69	13.81	1.00	63.18	PhiVc < Vu	7.516	110.6	14.5	11.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	9.62	29.00	59.04	59.04	12.31	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	10.02	29.00	47.39	47.39	33.74	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	10.43	29.00	35.74	35.74	50.47	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	10.83	29.00	24.09	24.09	62.51	0.93	62.87	Vu < PhiVc/2	lot Reqd 9.6.	62.9	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	11.23	29.00	12.44	12.44	69.87	0.43	60.61	Vu < PhiVc/2	lot Reqd 9.6.	60.6	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	11.63	29.00	-3.95	3.95	76.89	0.12	59.23	Vu < PhiVc/2	lot Reqd 9.6.	59.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	12.04	29.00	-15.60	15.60	72.95	0.52	61.00	Vu < PhiVc/2	lot Reqd 9.6.	61.0	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	12.44	29.00	-27.25	27.25	64.32	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	12.84	29.00	-38.91	38.91	51.01	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	13.24	29.00	-50.56	50.56	32.99	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	13.65	29.00	-62.21	62.21	10.29	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	14.05	29.00	-73.86	73.86	17.10	1.00	63.18	PhiVc < Vu	10.684	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	4	14.30	29.00	42.04	42.04	30.53	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	4	14.39	29.00	39.29	39.29	26.68	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	4	14.49	29.00	36.55	36.55	23.09	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	4	14.58	29.00	33.81	33.81	19.75	1.00	63.18	PhiVc/2 < Vu <=	Min 9.6.3.1	100.5	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	4	14.68	29.00	31.07	31.07	16.68	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	4	14.77	29.00	28.33	28.33	13.87	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	4	14.87	29.00	25.59	25.59	11.31	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	4	14.96	29.00	22.85	22.85	9.02	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	4	15.06	29.00	20.10	20.10	6.98	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	4	15.15	29.00	17.36	17.36	5.21	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	4	15.24	29.00	14.62	14.62	3.69	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	4	15.34	29.00	11.88	11.88	2.44	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	4	15.43	29.00	9.14	9.14	1.44	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	4	15.53	29.00	6.40	6.40	0.71	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	4	15.62	29.00	3.66	3.66	0.23	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	4	15.72	29.00	0.91	0.91	0.01	1.00	63.18	Vu < PhiVc/2	lot Reqd 9.6.	63.2	0.0	0.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	1.500	-31.87	303.64	0.10
Span # 2	2	6.375	-127.46	303.64	0.42
Span # 3	3	6.375	-134.75	303.64	0.44
Span # 4	4	1.500	-32.55	303.64	0.11
+1.40D+1.60H					
Span # 1	1	1.500	-28.01	303.64	0.09
Span # 2	2	6.375	-108.57	303.64	0.36
Span # 3	3	6.375	-114.86	303.64	0.38
Span # 4	4	1.500	-28.60	303.64	0.09
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (***L)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-91.08	303.64	0.30
Span # 3	3	6.375	-96.45	303.64	0.32
Span # 4	4	1.500	-32.55	303.64	0.11
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (**L*)					
Span # 1	1	1.500	-24.00	303.64	0.08

Concrete Beam

DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall - 3 Piles

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 2	2	6.375	-111.02	303.64	0.37
Span # 3	3	6.375	-116.60	303.64	0.38
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (**LL)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-109.03	303.64	0.36
Span # 3	3	6.375	-114.59	303.64	0.38
Span # 4	4	1.500	-32.55	303.64	0.11
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (*L**)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-109.51	303.64	0.36
Span # 3	3	6.375	-116.60	303.64	0.38
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (*L*L)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-107.52	303.64	0.35
Span # 3	3	6.375	-114.59	303.64	0.38
Span # 4	4	1.500	-32.55	303.64	0.11
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (*LL*)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-127.46	303.64	0.42
Span # 3	3	6.375	-134.75	303.64	0.44
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (*LLL)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-125.47	303.64	0.41
Span # 3	3	6.375	-132.74	303.64	0.44
Span # 4	4	1.500	-32.55	303.64	0.11
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (L***)					
Span # 1	1	1.500	-31.87	303.64	0.10
Span # 2	2	6.375	-91.16	303.64	0.30
Span # 3	3	6.375	-96.45	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (L**L)					
Span # 1	1	1.500	-31.87	303.64	0.10
Span # 2	2	6.375	-89.17	303.64	0.29
Span # 3	3	6.375	-94.44	303.64	0.31
Span # 4	4	1.500	-32.55	303.64	0.11
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (L*L*)					
Span # 1	1	1.500	-31.87	303.64	0.10
Span # 2	2	6.375	-109.11	303.64	0.36
Span # 3	3	6.375	-114.59	303.64	0.38
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (L*LL)					
Span # 1	1	1.500	-31.87	303.64	0.10
Span # 2	2	6.375	-107.13	303.64	0.35
Span # 3	3	6.375	-112.58	303.64	0.37
Span # 4	4	1.500	-32.55	303.64	0.11
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LL**)					
Span # 1	1	1.500	-31.87	303.64	0.10
Span # 2	2	6.375	-107.60	303.64	0.35
Span # 3	3	6.375	-114.59	303.64	0.38
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LL*L)					
Span # 1	1	1.500	-31.87	303.64	0.10
Span # 2	2	6.375	-105.61	303.64	0.35
Span # 3	3	6.375	-112.58	303.64	0.37
Span # 4	4	1.500	-32.55	303.64	0.11
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LLL*)					
Span # 1	1	1.500	-31.87	303.64	0.10
Span # 2	2	6.375	-125.56	303.64	0.41
Span # 3	3	6.375	-132.74	303.64	0.44
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LLLL)					
Span # 1	1	1.500	-31.87	303.64	0.10
Span # 2	2	6.375	-123.57	303.64	0.41
Span # 3	3	6.375	-130.73	303.64	0.43
Span # 4	4	1.500	-32.55	303.64	0.11
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (***L)					

DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall - 3 Piles

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-91.08	303.64	0.30
Span # 3	3	6.375	-96.45	303.64	0.32
Span # 4	4	1.500	-32.55	303.64	0.11
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (**L*)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-111.02	303.64	0.37
Span # 3	3	6.375	-116.60	303.64	0.38
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (**LL)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-109.03	303.64	0.36
Span # 3	3	6.375	-114.59	303.64	0.38
Span # 4	4	1.500	-32.55	303.64	0.11
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (*L**)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-109.51	303.64	0.36
Span # 3	3	6.375	-116.60	303.64	0.38
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (*L*L)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-107.52	303.64	0.35
Span # 3	3	6.375	-114.59	303.64	0.38
Span # 4	4	1.500	-32.55	303.64	0.11
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (*LL*)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-127.46	303.64	0.42
Span # 3	3	6.375	-134.75	303.64	0.44
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (*LLL)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-125.47	303.64	0.41
Span # 3	3	6.375	-132.74	303.64	0.44
Span # 4	4	1.500	-32.55	303.64	0.11
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (L***)					
Span # 1	1	1.500	-31.87	303.64	0.10
Span # 2	2	6.375	-91.16	303.64	0.30
Span # 3	3	6.375	-96.45	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (L**L)					
Span # 1	1	1.500	-31.87	303.64	0.10
Span # 2	2	6.375	-89.17	303.64	0.29
Span # 3	3	6.375	-94.44	303.64	0.31
Span # 4	4	1.500	-32.55	303.64	0.11
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (L*L*)					
Span # 1	1	1.500	-31.87	303.64	0.10
Span # 2	2	6.375	-109.11	303.64	0.36
Span # 3	3	6.375	-114.59	303.64	0.38
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (L*LL)					
Span # 1	1	1.500	-31.87	303.64	0.10
Span # 2	2	6.375	-107.13	303.64	0.35
Span # 3	3	6.375	-112.58	303.64	0.37
Span # 4	4	1.500	-32.55	303.64	0.11
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (LL**)					
Span # 1	1	1.500	-31.87	303.64	0.10
Span # 2	2	6.375	-107.60	303.64	0.35
Span # 3	3	6.375	-114.59	303.64	0.38
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (LL*L)					
Span # 1	1	1.500	-31.87	303.64	0.10
Span # 2	2	6.375	-105.61	303.64	0.35
Span # 3	3	6.375	-112.58	303.64	0.37
Span # 4	4	1.500	-32.55	303.64	0.11
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (LLL*)					
Span # 1	1	1.500	-31.87	303.64	0.10
Span # 2	2	6.375	-125.56	303.64	0.41
Span # 3	3	6.375	-132.74	303.64	0.44
Span # 4	4	1.500	-24.52	303.64	0.08

Concrete Beam

DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall - 3 Piles

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (LLLL)					
Span # 1	1	1.500	-31.87	303.64	0.10
Span # 2	2	6.375	-123.57	303.64	0.41
Span # 3	3	6.375	-130.73	303.64	0.43
Span # 4	4	1.500	-32.55	303.64	0.11
+1.20D+1.60Lr+L+1.60H, LL Comb Run (***L)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-91.82	303.64	0.30
Span # 3	3	6.375	-97.20	303.64	0.32
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+1.60Lr+L+1.60H, LL Comb Run (**L*)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-104.29	303.64	0.34
Span # 3	3	6.375	-109.80	303.64	0.36
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60Lr+L+1.60H, LL Comb Run (**LL)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-103.04	303.64	0.34
Span # 3	3	6.375	-108.54	303.64	0.36
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+1.60Lr+L+1.60H, LL Comb Run (*L**)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-103.34	303.64	0.34
Span # 3	3	6.375	-109.80	303.64	0.36
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60Lr+L+1.60H, LL Comb Run (*L*L)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-102.10	303.64	0.34
Span # 3	3	6.375	-108.54	303.64	0.36
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+1.60Lr+L+1.60H, LL Comb Run (*LL*)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-114.56	303.64	0.38
Span # 3	3	6.375	-121.14	303.64	0.40
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60Lr+L+1.60H, LL Comb Run (*LLL)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-113.32	303.64	0.37
Span # 3	3	6.375	-119.88	303.64	0.39
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+1.60Lr+L+1.60H, LL Comb Run (L***)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-91.87	303.64	0.30
Span # 3	3	6.375	-97.20	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60Lr+L+1.60H, LL Comb Run (L**L)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-90.63	303.64	0.30
Span # 3	3	6.375	-95.94	303.64	0.32
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+1.60Lr+L+1.60H, LL Comb Run (L*L*)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-103.10	303.64	0.34
Span # 3	3	6.375	-108.54	303.64	0.36
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60Lr+L+1.60H, LL Comb Run (L*LL)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-101.85	303.64	0.34
Span # 3	3	6.375	-107.28	303.64	0.35
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+1.60Lr+L+1.60H, LL Comb Run (LL**)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-102.15	303.64	0.34
Span # 3	3	6.375	-108.54	303.64	0.36
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60Lr+L+1.60H, LL Comb Run (LL*L)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-100.91	303.64	0.33
Span # 3	3	6.375	-107.28	303.64	0.35

Concrete Beam

DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall - 3 Piles

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+1.60Lr+L+1.60H, LL Comb Run (LLL*)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-113.37	303.64	0.37
Span # 3	3	6.375	-119.88	303.64	0.39
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60Lr+L+1.60H, LL Comb Run (LLLL)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-112.13	303.64	0.37
Span # 3	3	6.375	-118.63	303.64	0.39
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (***L)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-93.06	303.64	0.31
Span # 3	3	6.375	-98.45	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (**L*)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-93.06	303.64	0.31
Span # 3	3	6.375	-98.45	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (**LL)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-93.06	303.64	0.31
Span # 3	3	6.375	-98.45	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (*L**)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-93.06	303.64	0.31
Span # 3	3	6.375	-98.45	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (*L*L)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-93.06	303.64	0.31
Span # 3	3	6.375	-98.45	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (*LL*)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-93.06	303.64	0.31
Span # 3	3	6.375	-98.45	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (*LLL)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-93.06	303.64	0.31
Span # 3	3	6.375	-98.45	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (L***)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-93.06	303.64	0.31
Span # 3	3	6.375	-98.45	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (L**L)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-93.06	303.64	0.31
Span # 3	3	6.375	-98.45	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (L*L*)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-93.06	303.64	0.31
Span # 3	3	6.375	-98.45	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (L*LL)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-93.06	303.64	0.31
Span # 3	3	6.375	-98.45	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (LL**)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-93.06	303.64	0.31

DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall - 3 Piles

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 3	3	6.375	-98.45	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (LL*L)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-93.06	303.64	0.31
Span # 3	3	6.375	-98.45	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (LLL*)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-93.06	303.64	0.31
Span # 3	3	6.375	-98.45	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (LLLL)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-93.06	303.64	0.31
Span # 3	3	6.375	-98.45	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+1.60S+1.60H, LL Comb Run (***L)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-91.82	303.64	0.30
Span # 3	3	6.375	-97.20	303.64	0.32
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+L+1.60S+1.60H, LL Comb Run (**L*)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-104.29	303.64	0.34
Span # 3	3	6.375	-109.80	303.64	0.36
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+1.60S+1.60H, LL Comb Run (**LL)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-103.04	303.64	0.34
Span # 3	3	6.375	-108.54	303.64	0.36
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+L+1.60S+1.60H, LL Comb Run (*L**)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-103.34	303.64	0.34
Span # 3	3	6.375	-109.80	303.64	0.36
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+1.60S+1.60H, LL Comb Run (*L*L)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-102.10	303.64	0.34
Span # 3	3	6.375	-108.54	303.64	0.36
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+L+1.60S+1.60H, LL Comb Run (*LL*)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-114.56	303.64	0.38
Span # 3	3	6.375	-121.14	303.64	0.40
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+1.60S+1.60H, LL Comb Run (*LLL)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-113.32	303.64	0.37
Span # 3	3	6.375	-119.88	303.64	0.39
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+L+1.60S+1.60H, LL Comb Run (L***)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-91.87	303.64	0.30
Span # 3	3	6.375	-97.20	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+1.60S+1.60H, LL Comb Run (L**L)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-90.63	303.64	0.30
Span # 3	3	6.375	-95.94	303.64	0.32
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+L+1.60S+1.60H, LL Comb Run (L*L*)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-103.10	303.64	0.34
Span # 3	3	6.375	-108.54	303.64	0.36
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+1.60S+1.60H, LL Comb Run (L*LL)					
Span # 1	1	1.500	-28.92	303.64	0.10

DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall - 3 Piles

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 2	2	6.375	-101.85	303.64	0.34
Span # 3	3	6.375	-107.28	303.64	0.35
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+L+1.60S+1.60H, LL Comb Run (LL**)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-102.15	303.64	0.34
Span # 3	3	6.375	-108.54	303.64	0.36
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+1.60S+1.60H, LL Comb Run (LL*L)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-100.91	303.64	0.33
Span # 3	3	6.375	-107.28	303.64	0.35
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+L+1.60S+1.60H, LL Comb Run (LLL*)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-113.37	303.64	0.37
Span # 3	3	6.375	-119.88	303.64	0.39
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+1.60S+1.60H, LL Comb Run (LLLL)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-112.13	303.64	0.37
Span # 3	3	6.375	-118.63	303.64	0.39
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+1.60S+0.50W+1.60H					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-93.06	303.64	0.31
Span # 3	3	6.375	-98.45	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (***L)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-91.82	303.64	0.30
Span # 3	3	6.375	-97.20	303.64	0.32
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (**L*)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-104.29	303.64	0.34
Span # 3	3	6.375	-109.80	303.64	0.36
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (**LL)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-103.04	303.64	0.34
Span # 3	3	6.375	-108.54	303.64	0.36
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (*L**)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-103.34	303.64	0.34
Span # 3	3	6.375	-109.80	303.64	0.36
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (*L*L)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-102.10	303.64	0.34
Span # 3	3	6.375	-108.54	303.64	0.36
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (*LL*)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-114.56	303.64	0.38
Span # 3	3	6.375	-121.14	303.64	0.40
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (*LLL)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-113.32	303.64	0.37
Span # 3	3	6.375	-119.88	303.64	0.39
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (L***)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-91.87	303.64	0.30
Span # 3	3	6.375	-97.20	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (L**L)					

Concrete Beam

DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall - 3 Piles

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-90.63	303.64	0.30
Span # 3	3	6.375	-95.94	303.64	0.32
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (L*L*)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-103.10	303.64	0.34
Span # 3	3	6.375	-108.54	303.64	0.36
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (L*LL)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-101.85	303.64	0.34
Span # 3	3	6.375	-107.28	303.64	0.35
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (LL**)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-102.15	303.64	0.34
Span # 3	3	6.375	-108.54	303.64	0.36
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (LL*L)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-100.91	303.64	0.33
Span # 3	3	6.375	-107.28	303.64	0.35
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (LLL*)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-113.37	303.64	0.37
Span # 3	3	6.375	-119.88	303.64	0.39
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (LLLL)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-112.13	303.64	0.37
Span # 3	3	6.375	-118.63	303.64	0.39
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+L+0.50S+W+1.60H, LL Comb Run (***L)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-91.82	303.64	0.30
Span # 3	3	6.375	-97.20	303.64	0.32
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+L+0.50S+W+1.60H, LL Comb Run (**L*)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-104.29	303.64	0.34
Span # 3	3	6.375	-109.80	303.64	0.36
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+0.50S+W+1.60H, LL Comb Run (**LL)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-103.04	303.64	0.34
Span # 3	3	6.375	-108.54	303.64	0.36
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+L+0.50S+W+1.60H, LL Comb Run (*L**)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-103.34	303.64	0.34
Span # 3	3	6.375	-109.80	303.64	0.36
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+0.50S+W+1.60H, LL Comb Run (*L*L)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-102.10	303.64	0.34
Span # 3	3	6.375	-108.54	303.64	0.36
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+L+0.50S+W+1.60H, LL Comb Run (*LL*)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-114.56	303.64	0.38
Span # 3	3	6.375	-121.14	303.64	0.40
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+0.50S+W+1.60H, LL Comb Run (*LLL)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-113.32	303.64	0.37
Span # 3	3	6.375	-119.88	303.64	0.39
Span # 4	4	1.500	-29.54	303.64	0.10

DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall - 3 Piles

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
+1.20D+L+0.50S+W+1.60H, LL Comb Run (L***)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-91.87	303.64	0.30
Span # 3	3	6.375	-97.20	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+0.50S+W+1.60H, LL Comb Run (L**L)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-90.63	303.64	0.30
Span # 3	3	6.375	-95.94	303.64	0.32
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+L+0.50S+W+1.60H, LL Comb Run (L*L*)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-103.10	303.64	0.34
Span # 3	3	6.375	-108.54	303.64	0.36
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+0.50S+W+1.60H, LL Comb Run (L*LL)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-101.85	303.64	0.34
Span # 3	3	6.375	-107.28	303.64	0.35
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+L+0.50S+W+1.60H, LL Comb Run (LL**)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-102.15	303.64	0.34
Span # 3	3	6.375	-108.54	303.64	0.36
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+0.50S+W+1.60H, LL Comb Run (LL*L)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-100.91	303.64	0.33
Span # 3	3	6.375	-107.28	303.64	0.35
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+L+0.50S+W+1.60H, LL Comb Run (LLL*)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-113.37	303.64	0.37
Span # 3	3	6.375	-119.88	303.64	0.39
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+0.50S+W+1.60H, LL Comb Run (LLLL)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-112.13	303.64	0.37
Span # 3	3	6.375	-118.63	303.64	0.39
Span # 4	4	1.500	-29.54	303.64	0.10
+0.90D+W+1.60H					
Span # 1	1	1.500	-18.00	303.64	0.06
Span # 2	2	6.375	-69.80	303.64	0.23
Span # 3	3	6.375	-73.84	303.64	0.24
Span # 4	4	1.500	-18.39	303.64	0.06
+1.20D+L+0.20S+E+1.60H, LL Comb Run (***L)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-91.82	303.64	0.30
Span # 3	3	6.375	-97.20	303.64	0.32
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+L+0.20S+E+1.60H, LL Comb Run (**L*)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-104.29	303.64	0.34
Span # 3	3	6.375	-109.80	303.64	0.36
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+0.20S+E+1.60H, LL Comb Run (**LL)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-103.04	303.64	0.34
Span # 3	3	6.375	-108.54	303.64	0.36
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+L+0.20S+E+1.60H, LL Comb Run (*L**)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-103.34	303.64	0.34
Span # 3	3	6.375	-109.80	303.64	0.36
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+0.20S+E+1.60H, LL Comb Run (*L*L)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-102.10	303.64	0.34
Span # 3	3	6.375	-108.54	303.64	0.36

Concrete Beam

DESCRIPTION: GRBM - GA.4 - at West Stair 10" wall - 3 Piles

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+L+0.20S+E+1.60H, LL Comb Run (*LL*)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-114.56	303.64	0.38
Span # 3	3	6.375	-121.14	303.64	0.40
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+0.20S+E+1.60H, LL Comb Run (*LLL)					
Span # 1	1	1.500	-24.00	303.64	0.08
Span # 2	2	6.375	-113.32	303.64	0.37
Span # 3	3	6.375	-119.88	303.64	0.39
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+L+0.20S+E+1.60H, LL Comb Run (L***)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-91.87	303.64	0.30
Span # 3	3	6.375	-97.20	303.64	0.32
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+0.20S+E+1.60H, LL Comb Run (L**L)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-90.63	303.64	0.30
Span # 3	3	6.375	-95.94	303.64	0.32
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+L+0.20S+E+1.60H, LL Comb Run (L*L*)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-103.10	303.64	0.34
Span # 3	3	6.375	-108.54	303.64	0.36
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+0.20S+E+1.60H, LL Comb Run (L*LL)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-101.85	303.64	0.34
Span # 3	3	6.375	-107.28	303.64	0.35
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+L+0.20S+E+1.60H, LL Comb Run (LL**)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-102.15	303.64	0.34
Span # 3	3	6.375	-108.54	303.64	0.36
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+0.20S+E+1.60H, LL Comb Run (LL*L)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-100.91	303.64	0.33
Span # 3	3	6.375	-107.28	303.64	0.35
Span # 4	4	1.500	-29.54	303.64	0.10
+1.20D+L+0.20S+E+1.60H, LL Comb Run (LLL*)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-113.37	303.64	0.37
Span # 3	3	6.375	-119.88	303.64	0.39
Span # 4	4	1.500	-24.52	303.64	0.08
+1.20D+L+0.20S+E+1.60H, LL Comb Run (LLLL)					
Span # 1	1	1.500	-28.92	303.64	0.10
Span # 2	2	6.375	-112.13	303.64	0.37
Span # 3	3	6.375	-118.63	303.64	0.39
Span # 4	4	1.500	-29.54	303.64	0.10
+0.90D+E+0.90H					
Span # 1	1	1.500	-18.00	303.64	0.06
Span # 2	2	6.375	-69.80	303.64	0.23
Span # 3	3	6.375	-73.84	303.64	0.24
Span # 4	4	1.500	-18.39	303.64	0.06

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft)	Load Combination	Max. "+" Defl (in)	Location in Span (ft)
+D+L+H, LL Comb Run (*L*L)	1	0.0001	1.668	+D+L+H, LL Comb Run (*L*L)	-0.0012	0.000
+D+L+H, LL Comb Run (*L*L)	2	0.0017	2.852		0.0000	0.000
+D+L+H, LL Comb Run (L*L*)	3	0.0017	3.523	+D+L+H, LL Comb Run (L*L*)	-0.0000	6.414
	4	0.0000	3.523	+D+L+H, LL Comb Run (L*L*)	-0.0012	1.500

Concrete Beam

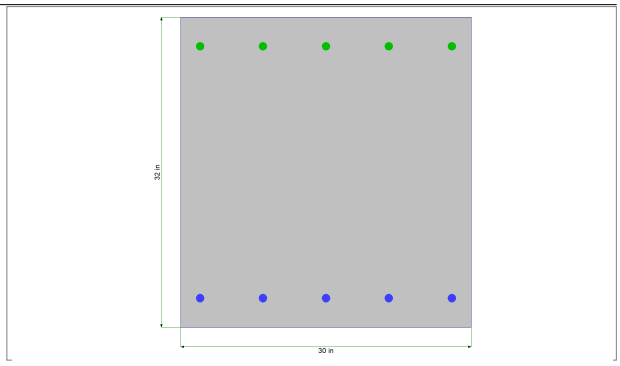
DESCRIPTION: GRBM - GB - Under LT Wall

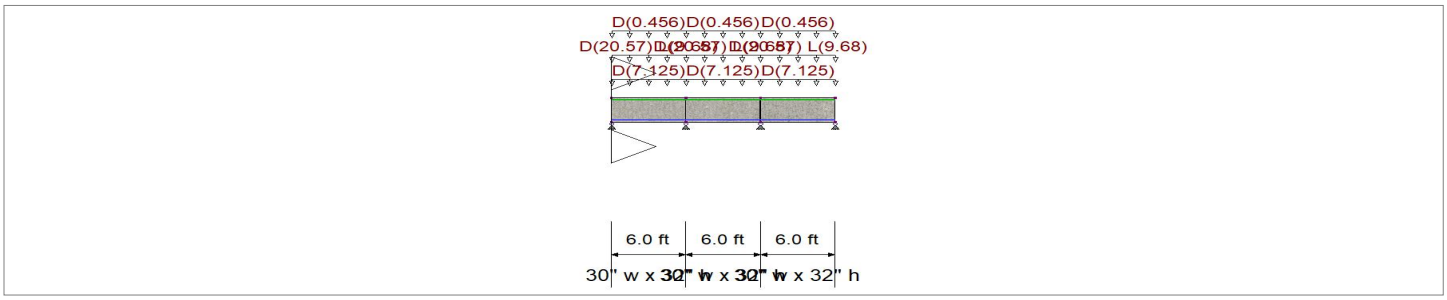
CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

f'c	=	3.50 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c$^{1/2}$ * 7.50	=	443.706 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups		60.0 ksi
fy - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #		4
			Number of Resisting Legs Per Stirrup =		2





Cross Section & Reinforcing Details

Rectangular Section, Width = 30.0 in, Height = 32.0 in

Span #1 Reinforcing....
- 5-#7 at 3.0 in from Bottom, from 0.0 to 6.0 ft in this span
- 5-#7 at 3.0 in from Top, from 0.0 to 6.0 ft in this span

Span #2 Reinforcing....
- 5-#7 at 3.0 in from Bottom, from 0.0 to 6.0 ft in this span
- 5-#7 at 3.0 in from Top, from 0.0 to 6.0 ft in this span

Span #3 Reinforcing....
- 5-#7 at 3.0 in from Bottom, from 0.0 to 6.0 ft in this span
- 5-#7 at 3.0 in from Top, from 0.0 to 6.0 ft in this span

Beam self weight calculated and added to loads

Load for Span Number 1
- Uniform Load : D = 0.1250 ksf, Tributary Width = 57.0 ft, (12" PC Wall - With Opngs)
- Uniform Load : D = 0.0850, L = 0.040 ksf, Tributary Width = 242.0 ft, (4-Floors)
- Uniform Load : D = 0.0570 ksf, Tributary Width = 8.0 ft, (Wash - 4-Floors)

Load for Span Number 2
- Uniform Load : D = 0.1250 ksf, Tributary Width = 57.0 ft, (12" PC Wall - With Opngs)
- Uniform Load : D = 0.0850, L = 0.040 ksf, Tributary Width = 242.0 ft, (4-Floors)
- Uniform Load : D = 0.0570 ksf, Tributary Width = 8.0 ft, (Wash - 4 Floors)

Load for Span Number 3
- Uniform Load : D = 0.1250 ksf, Tributary Width = 57.0 ft, (12" PC Wall - With Opngs)
- Uniform Load : D = 0.0850, L = 0.040 ksf, Tributary Width = 242.0 ft, (4-Floors)
- Uniform Load : D = 0.0570 ksf, Tributary Width = 8.0 ft, (Wash - 4 Floors)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.503** : 1	Maximum Deflection				
Section used for this span	**Typical Section**	Max Downward Transient Deflection	0.000 in	Ratio =	0	<360.0
Mu : Applied	-190.838 k-ft	Max Upward Transient Deflection	0.000 in	Ratio =	0	<360.0
Mn * Phi : Allowable	379.549 k-ft	Max Downward Total Deflection	0.003 in	Ratio =	27835	>=180.
Location of maximum on span	0.000 ft	Max Upward Total Deflection	0.000 in	Ratio =	0	<180.0
Span # where maximum occurs	Span # 3					

Concrete Beam

DESCRIPTION: GRBM - GB - Under LT Wall

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	96.018	261.873	261.873	96.018
Overall MINimum	0.968	-5.808	-5.808	0.968
+D+H	69.882	192.177	192.177	69.882
+D+L+H, LL Comb Run (**L)	70.850	186.369	229.929	95.050
+D+L+H, LL Comb Run (*L*)	66.978	224.121	224.121	66.978
+D+L+H, LL Comb Run (*LL)	67.946	218.313	261.873	92.146
+D+L+H, LL Comb Run (L**)	95.050	229.929	186.369	70.850
+D+L+H, LL Comb Run (L*L)	96.018	224.121	224.121	96.018
+D+L+H, LL Comb Run (LL*)	92.146	261.873	218.313	67.946
+D+L+H, LL Comb Run (LLL)	93.114	256.065	256.065	93.114
+D+Lr+H, LL Comb Run (**L)	69.882	192.177	192.177	69.882
+D+Lr+H, LL Comb Run (*L*)	69.882	192.177	192.177	69.882
+D+Lr+H, LL Comb Run (*LL)	69.882	192.177	192.177	69.882
+D+Lr+H, LL Comb Run (L**)	69.882	192.177	192.177	69.882
+D+Lr+H, LL Comb Run (L*L)	69.882	192.177	192.177	69.882
+D+Lr+H, LL Comb Run (LL*)	69.882	192.177	192.177	69.882
+D+Lr+H, LL Comb Run (LLL)	69.882	192.177	192.177	69.882
+D+S+H	69.882	192.177	192.177	69.882
+D+0.750Lr+0.750L+H, LL Comb Run (	70.608	187.821	220.491	88.758
+D+0.750Lr+0.750L+H, LL Comb Run (	67.704	216.135	216.135	67.704
+D+0.750Lr+0.750L+H, LL Comb Run (	68.430	211.779	244.449	86.580
+D+0.750Lr+0.750L+H, LL Comb Run (	88.758	220.491	187.821	70.608
+D+0.750Lr+0.750L+H, LL Comb Run (	89.484	216.135	216.135	89.484
+D+0.750Lr+0.750L+H, LL Comb Run (	86.580	244.449	211.779	68.430
+D+0.750Lr+0.750L+H, LL Comb Run (	87.306	240.093	240.093	87.306
+D+0.750L+0.750S+H, LL Comb Run (*	70.608	187.821	220.491	88.758
+D+0.750L+0.750S+H, LL Comb Run (*	67.704	216.135	216.135	67.704
+D+0.750L+0.750S+H, LL Comb Run (*	68.430	211.779	244.449	86.580
+D+0.750L+0.750S+H, LL Comb Run (L	88.758	220.491	187.821	70.608
+D+0.750L+0.750S+H, LL Comb Run (L	89.484	216.135	216.135	89.484
+D+0.750L+0.750S+H, LL Comb Run (L	86.580	244.449	211.779	68.430
+D+0.750L+0.750S+H, LL Comb Run (L	87.306	240.093	240.093	87.306
+D+0.60W+H	69.882	192.177	192.177	69.882
+D+0.750Lr+0.750L+0.450W+H, LL Com	70.608	187.821	220.491	88.758
+D+0.750Lr+0.750L+0.450W+H, LL Com	67.704	216.135	216.135	67.704
+D+0.750Lr+0.750L+0.450W+H, LL Com	68.430	211.779	244.449	86.580
+D+0.750Lr+0.750L+0.450W+H, LL Com	88.758	220.491	187.821	70.608
+D+0.750Lr+0.750L+0.450W+H, LL Com	89.484	216.135	216.135	89.484
+D+0.750Lr+0.750L+0.450W+H, LL Com	86.580	244.449	211.779	68.430
+D+0.750Lr+0.750L+0.450W+H, LL Com	87.306	240.093	240.093	87.306
+D+0.750L+0.750S+0.450W+H, LL Comb	70.608	187.821	220.491	88.758
+D+0.750L+0.750S+0.450W+H, LL Comb	67.704	216.135	216.135	67.704
+D+0.750L+0.750S+0.450W+H, LL Comb	68.430	211.779	244.449	86.580
+D+0.750L+0.750S+0.450W+H, LL Comb	88.758	220.491	187.821	70.608
+D+0.750L+0.750S+0.450W+H, LL Comb	89.484	216.135	216.135	89.484
+D+0.750L+0.750S+0.450W+H, LL Comb	86.580	244.449	211.779	68.430
+D+0.750L+0.750S+0.450W+H, LL Comb	87.306	240.093	240.093	87.306
+0.60D+0.60W+0.60H	41.929	115.306	115.306	41.929
+D+0.70E+0.60H	69.882	192.177	192.177	69.882
+D+0.750L+0.750S+0.5250E+H, LL Com	70.608	187.821	220.491	88.758
+D+0.750L+0.750S+0.5250E+H, LL Com	67.704	216.135	216.135	67.704
+D+0.750L+0.750S+0.5250E+H, LL Com	68.430	211.779	244.449	86.580
+D+0.750L+0.750S+0.5250E+H, LL Com	88.758	220.491	187.821	70.608
+D+0.750L+0.750S+0.5250E+H, LL Com	89.484	216.135	216.135	89.484
+D+0.750L+0.750S+0.5250E+H, LL Com	86.580	244.449	211.779	68.430
+D+0.750L+0.750S+0.5250E+H, LL Com	87.306	240.093	240.093	87.306
+0.60D+0.70E+H	41.929	115.306	115.306	41.929
D Only	69.882	192.177	192.177	69.882
L Only, LL Comb Run (**L)	0.968	-5.808	37.752	25.168

Concrete Beam

DESCRIPTION: GRBM - GB - Under LT Wall

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3	Support 4
L Only, LL Comb Run (*L*)	-2.904	31.944	31.944	-2.904
L Only, LL Comb Run (*LL)	-1.936	26.136	69.696	22.264
L Only, LL Comb Run (L**)	25.168	37.752	-5.808	0.968
L Only, LL Comb Run (L*L)	26.136	31.944	31.944	26.136
L Only, LL Comb Run (LL*)	22.264	69.696	26.136	-1.936
L Only, LL Comb Run (LLL)	23.232	63.888	63.888	23.232
H Only				

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.00	29.00	125.68	125.68	0.00	1.00	78.97	PhiVc < Vu	46.707	126.4	11.2	11.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.24	29.00	113.57	113.57	28.71	1.00	78.97	PhiVc < Vu	34.604	126.4	14.5	11.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.48	29.00	101.47	101.47	54.52	1.00	78.97	PhiVc < Vu	22.501	126.4	14.5	11.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.72	29.00	89.37	89.37	77.42	1.00	78.97	PhiVc < Vu	10.398	126.4	14.5	11.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	0.96	29.00	77.26	77.26	97.41	1.00	78.97	PhiVc/2 < Vu <=	Min 9.6.3.1	116.3	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	1.20	29.00	65.16	65.16	114.50	1.00	78.97	PhiVc/2 < Vu <=	Min 9.6.3.1	116.3	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	1.44	29.00	53.06	53.06	128.69	1.00	78.95	PhiVc/2 < Vu <=	Min 9.6.3.1	116.2	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	1.68	29.00	40.96	40.96	139.97	0.71	77.32	PhiVc/2 < Vu <=	Min 9.6.3.1	114.6	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	1.92	29.00	28.85	28.85	148.35	0.47	75.99	Vu < PhiVc/2	lot Reqd 9.6.	76.0	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	2.16	29.00	16.75	16.75	153.82	0.26	74.82	Vu < PhiVc/2	lot Reqd 9.6.	74.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	2.40	29.00	4.65	4.65	156.39	0.07	73.75	Vu < PhiVc/2	lot Reqd 9.6.	73.7	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	2.64	29.00	-13.65	13.65	139.69	0.24	74.67	Vu < PhiVc/2	lot Reqd 9.6.	74.7	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	2.88	29.00	-25.75	25.75	134.97	0.46	75.94	Vu < PhiVc/2	lot Reqd 9.6.	75.9	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	3.12	29.00	-37.86	37.86	127.33	0.72	77.39	Vu < PhiVc/2	lot Reqd 9.6.	77.4	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	3.36	29.00	-49.96	49.96	116.79	1.00	78.97	PhiVc/2 < Vu <=	Min 9.6.3.1	116.3	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	3.60	29.00	-62.06	62.06	103.35	1.00	78.97	PhiVc/2 < Vu <=	Min 9.6.3.1	116.3	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	3.84	29.00	-74.17	74.17	87.00	1.00	78.97	PhiVc/2 < Vu <=	Min 9.6.3.1	116.3	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	4.08	29.00	-86.27	86.27	67.75	1.00	78.97	PhiVc < Vu	7.30	183.4	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	4.32	29.00	-98.37	98.37	45.59	1.00	78.97	PhiVc < Vu	19.403	183.4	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	4.56	29.00	-110.48	110.48	20.53	1.00	78.97	PhiVc < Vu	31.506	183.4	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	4.80	29.00	-122.58	122.58	7.43	1.00	78.97	PhiVc < Vu	43.609	183.4	12.0	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	5.04	29.00	-134.68	134.68	38.31	1.00	78.97	PhiVc < Vu	55.712	183.4	9.4	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	5.28	29.00	-146.78	146.78	72.08	1.00	78.97	PhiVc < Vu	67.815	183.4	7.7	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	5.52	29.00	-158.89	158.89	108.76	1.00	78.97	PhiVc < Vu	79.918	183.4	6.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	5.76	29.00	-170.99	170.99	148.35	1.00	78.97	PhiVc < Vu	92.021	183.4	5.7	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	6.00	29.00	159.03	159.03	190.84	1.00	78.97	PhiVc < Vu	80.062	183.4	6.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	6.24	29.00	146.93	146.93	154.12	1.00	78.97	PhiVc < Vu	67.959	183.4	7.7	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	6.48	29.00	134.83	134.83	120.31	1.00	78.97	PhiVc < Vu	55.856	183.4	9.3	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	6.72	29.00	122.72	122.72	89.41	1.00	78.97	PhiVc < Vu	43.753	183.4	11.9	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	6.96	29.00	110.62	110.62	61.41	1.00	78.97	PhiVc < Vu	31.650	183.4	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	7.20	29.00	98.52	98.52	36.31	1.00	78.97	PhiVc < Vu	19.547	183.4	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	7.44	29.00	86.41	86.41	14.12	1.00	78.97	PhiVc < Vu	7.444	183.4	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	7.68	29.00	74.31	74.31	5.17	1.00	78.97	PhiVc/2 < Vu <=	Min 9.6.3.1	116.3	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	7.92	29.00	62.21	62.21	21.55	1.00	78.97	PhiVc/2 < Vu <=	Min 9.6.3.1	116.3	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	8.16	29.00	50.10	50.10	35.03	1.00	78.97	PhiVc/2 < Vu <=	Min 9.6.3.1	116.3	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	8.40	29.00	38.00	38.00	45.60	1.00	78.97	Vu < PhiVc/2	lot Reqd 9.6.	79.0	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	8.64	29.00	25.90	25.90	53.27	1.00	78.97	Vu < PhiVc/2	lot Reqd 9.6.	79.0	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	8.88	29.00	13.80	13.80	58.03	0.57	76.58	Vu < PhiVc/2	lot Reqd 9.6.	76.6	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	9.12	29.00	-13.80	13.80	58.03	0.57	76.58	Vu < PhiVc/2	lot Reqd 9.6.	76.6	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	9.36	29.00	-25.90	25.90	53.27	1.00	78.97	Vu < PhiVc/2	lot Reqd 9.6.	79.0	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	9.60	29.00	-38.00	38.00	45.60	1.00	78.97	Vu < PhiVc/2	lot Reqd 9.6.	79.0	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	9.84	29.00	-50.10	50.10	35.03	1.00	78.97	PhiVc/2 < Vu <=	Min 9.6.3.1	116.3	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	10.08	29.00	-62.21	62.21	21.55	1.00	78.97	PhiVc/2 < Vu <=	Min 9.6.3.1	116.3	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	10.32	29.00	-74.31	74.31	5.17	1.00	78.97	PhiVc/2 < Vu <=	Min 9.6.3.1	116.3	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	10.56	29.00	-86.41	86.41	14.12	1.00	78.97	PhiVc < Vu	7.444	183.4	14.5	5.0

Concrete Beam

DESCRIPTION: GRBM - GB - Under LT Wall

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	10.80	29.00	-98.52	98.52	36.31	1.00	78.97	PhiVc < Vu	19.547	183.4	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	11.04	29.00	-110.62	110.62	61.41	1.00	78.97	PhiVc < Vu	31.650	183.4	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	11.28	29.00	-122.72	122.72	89.41	1.00	78.97	PhiVc < Vu	43.753	183.4	11.9	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	11.52	29.00	-134.83	134.83	120.31	1.00	78.97	PhiVc < Vu	55.856	183.4	9.3	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	11.76	29.00	-146.93	146.93	154.12	1.00	78.97	PhiVc < Vu	67.959	183.4	7.7	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	12.00	29.00	183.09	183.09	190.84	1.00	78.97	PhiVc < Vu	104.124	183.4	5.0	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	12.24	29.00	170.99	170.99	148.35	1.00	78.97	PhiVc < Vu	92.021	183.4	5.7	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	12.48	29.00	158.89	158.89	108.76	1.00	78.97	PhiVc < Vu	79.918	183.4	6.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	12.72	29.00	146.78	146.78	72.08	1.00	78.97	PhiVc < Vu	67.815	183.4	7.7	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	12.96	29.00	134.68	134.68	38.31	1.00	78.97	PhiVc < Vu	55.712	183.4	9.4	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	13.20	29.00	122.58	122.58	7.43	1.00	78.97	PhiVc < Vu	43.609	183.4	12.0	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	13.44	29.00	110.48	110.48	20.53	1.00	78.97	PhiVc < Vu	31.506	183.4	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	13.68	29.00	98.37	98.37	45.59	1.00	78.97	PhiVc < Vu	19.403	183.4	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	13.92	29.00	86.27	86.27	67.75	1.00	78.97	PhiVc < Vu	7.30	183.4	14.5	5.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	14.16	29.00	74.17	74.17	87.00	1.00	78.97	PhiVc/2 < Vu <=	Min 9.6.3.1	116.3	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	14.40	29.00	62.06	62.06	103.35	1.00	78.97	PhiVc/2 < Vu <=	Min 9.6.3.1	116.3	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	14.64	29.00	49.96	49.96	116.79	1.00	78.97	PhiVc/2 < Vu <=	Min 9.6.3.1	116.3	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	14.88	29.00	37.86	37.86	127.33	0.72	77.39	Vu < PhiVc/2	lot Reqd 9.6.	77.4	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	15.12	29.00	25.75	25.75	134.97	0.46	75.94	Vu < PhiVc/2	lot Reqd 9.6.	75.9	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	15.36	29.00	13.65	13.65	139.69	0.24	74.67	Vu < PhiVc/2	lot Reqd 9.6.	74.7	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	15.60	29.00	-4.65	4.65	156.39	0.07	73.75	Vu < PhiVc/2	lot Reqd 9.6.	73.7	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	15.84	29.00	-16.75	16.75	153.82	0.26	74.82	Vu < PhiVc/2	lot Reqd 9.6.	74.8	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	16.08	29.00	-28.85	28.85	148.35	0.47	75.99	Vu < PhiVc/2	lot Reqd 9.6.	76.0	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	16.32	29.00	-40.96	40.96	139.97	0.71	77.32	PhiVc/2 < Vu <=	Min 9.6.3.1	114.6	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	16.56	29.00	-53.06	53.06	128.69	1.00	78.95	PhiVc/2 < Vu <=	Min 9.6.3.1	116.2	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	16.80	29.00	-65.16	65.16	114.50	1.00	78.97	PhiVc/2 < Vu <=	Min 9.6.3.1	116.3	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	17.04	29.00	-77.26	77.26	97.41	1.00	78.97	PhiVc/2 < Vu <=	Min 9.6.3.1	116.3	14.5	14.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	17.28	29.00	-89.37	89.37	77.42	1.00	78.97	PhiVc < Vu	10.398	126.4	14.5	11.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	17.52	29.00	-101.47	101.47	54.52	1.00	78.97	PhiVc < Vu	22.501	126.4	14.5	11.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	17.76	29.00	-113.57	113.57	28.71	1.00	78.97	PhiVc < Vu	34.604	126.4	14.5	11.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	18.00	29.00	-125.68	125.68	0.00	1.00	78.97	PhiVc < Vu	46.707	126.4	11.2	11.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	6.000	-183.55	379.55	0.48
Span # 2	2	6.000	-190.84	379.55	0.50
Span # 3	3	6.000	-190.84	379.55	0.50
+1.40D+1.60H					
Span # 1	1	6.000	-140.92	379.55	0.37
Span # 2	2	6.000	-146.75	379.55	0.39
Span # 3	3	6.000	-146.75	379.55	0.39
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (**L)					
Span # 1	1	6.000	-111.55	379.55	0.29
Span # 2	2	6.000	-158.48	379.55	0.42
Span # 3	3	6.000	-162.96	379.55	0.43
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (*L*)					
Span # 1	1	6.000	-148.48	379.55	0.39
Span # 2	2	6.000	-153.67	379.55	0.40
Span # 3	3	6.000	-153.67	379.55	0.40
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (*LL)					
Span # 1	1	6.000	-139.25	379.55	0.37
Span # 2	2	6.000	-184.52	379.55	0.49
Span # 3	3	6.000	-190.84	379.55	0.50
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (L**)					
Span # 1	1	6.000	-155.86	379.55	0.41
Span # 2	2	6.000	-162.96	379.55	0.43
Span # 3	3	6.000	-116.50	379.55	0.31
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (L*L)					

DESCRIPTION: GRBM - GB - Under LT Wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 1	1	6.000	156.60	379.55	0.41
Span # 2	2	6.000	-153.67	379.55	0.40
Span # 3	3	6.000	156.60	379.55	0.41
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LL*)					
Span # 1	1	6.000	-183.55	379.55	0.48
Span # 2	2	6.000	-190.84	379.55	0.50
Span # 3	3	6.000	-144.37	379.55	0.38
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LLL)					
Span # 1	1	6.000	-174.32	379.55	0.46
Span # 2	2	6.000	-181.55	379.55	0.48
Span # 3	3	6.000	-181.55	379.55	0.48
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (**L)					
Span # 1	1	6.000	-111.55	379.55	0.29
Span # 2	2	6.000	-158.48	379.55	0.42
Span # 3	3	6.000	-162.96	379.55	0.43
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (*L*)					
Span # 1	1	6.000	-148.48	379.55	0.39
Span # 2	2	6.000	-153.67	379.55	0.40
Span # 3	3	6.000	-153.67	379.55	0.40
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (*LL)					
Span # 1	1	6.000	-139.25	379.55	0.37
Span # 2	2	6.000	-184.52	379.55	0.49
Span # 3	3	6.000	-190.84	379.55	0.50
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (L**)					
Span # 1	1	6.000	-155.86	379.55	0.41
Span # 2	2	6.000	-162.96	379.55	0.43
Span # 3	3	6.000	-116.50	379.55	0.31
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (L*L)					
Span # 1	1	6.000	156.60	379.55	0.41
Span # 2	2	6.000	-153.67	379.55	0.40
Span # 3	3	6.000	156.60	379.55	0.41
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (LL*)					
Span # 1	1	6.000	-183.55	379.55	0.48
Span # 2	2	6.000	-190.84	379.55	0.50
Span # 3	3	6.000	-144.37	379.55	0.38
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (LLL)					
Span # 1	1	6.000	-174.32	379.55	0.46
Span # 2	2	6.000	-181.55	379.55	0.48
Span # 3	3	6.000	-181.55	379.55	0.48
+1.20D+1.60Lr+L+1.60H, LL Comb Run (**L)					
Span # 1	1	6.000	-115.02	379.55	0.30
Span # 2	2	6.000	-144.66	379.55	0.38
Span # 3	3	6.000	-149.02	379.55	0.39
+1.20D+1.60Lr+L+1.60H, LL Comb Run (*L*)					
Span # 1	1	6.000	-138.09	379.55	0.36
Span # 2	2	6.000	-143.21	379.55	0.38
Span # 3	3	6.000	-143.21	379.55	0.38
+1.20D+1.60Lr+L+1.60H, LL Comb Run (*LL)					
Span # 1	1	6.000	-132.32	379.55	0.35
Span # 2	2	6.000	-160.93	379.55	0.42
Span # 3	3	6.000	-166.44	379.55	0.44
+1.20D+1.60Lr+L+1.60H, LL Comb Run (L**)					
Span # 1	1	6.000	-142.71	379.55	0.38
Span # 2	2	6.000	-149.02	379.55	0.39
Span # 3	3	6.000	-119.98	379.55	0.32
+1.20D+1.60Lr+L+1.60H, LL Comb Run (L*L)					
Span # 1	1	6.000	-136.94	379.55	0.36
Span # 2	2	6.000	-143.21	379.55	0.38
Span # 3	3	6.000	-143.21	379.55	0.38
+1.20D+1.60Lr+L+1.60H, LL Comb Run (LL*)					
Span # 1	1	6.000	-160.02	379.55	0.42
Span # 2	2	6.000	-166.44	379.55	0.44
Span # 3	3	6.000	-137.40	379.55	0.36
+1.20D+1.60Lr+L+1.60H, LL Comb Run (LLL)					
Span # 1	1	6.000	-154.25	379.55	0.41
Span # 2	2	6.000	-160.64	379.55	0.42
Span # 3	3	6.000	-160.64	379.55	0.42
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (**L)					
Span # 1	1	6.000	-120.78	379.55	0.32

DESCRIPTION: GRBM - GB - Under LT Wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 2	2	6.000	-125.79	379.55	0.33
Span # 3	3	6.000	-125.79	379.55	0.33
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (*L*)					
Span # 1	1	6.000	-120.78	379.55	0.32
Span # 2	2	6.000	-125.79	379.55	0.33
Span # 3	3	6.000	-125.79	379.55	0.33
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (*LL)					
Span # 1	1	6.000	-120.78	379.55	0.32
Span # 2	2	6.000	-125.79	379.55	0.33
Span # 3	3	6.000	-125.79	379.55	0.33
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (L**)					
Span # 1	1	6.000	-120.78	379.55	0.32
Span # 2	2	6.000	-125.79	379.55	0.33
Span # 3	3	6.000	-125.79	379.55	0.33
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (L*L)					
Span # 1	1	6.000	-120.78	379.55	0.32
Span # 2	2	6.000	-125.79	379.55	0.33
Span # 3	3	6.000	-125.79	379.55	0.33
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (LL*)					
Span # 1	1	6.000	-120.78	379.55	0.32
Span # 2	2	6.000	-125.79	379.55	0.33
Span # 3	3	6.000	-125.79	379.55	0.33
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (LLL)					
Span # 1	1	6.000	-120.78	379.55	0.32
Span # 2	2	6.000	-125.79	379.55	0.33
Span # 3	3	6.000	-125.79	379.55	0.33
+1.20D+L+1.60S+1.60H, LL Comb Run (**L)					
Span # 1	1	6.000	-115.02	379.55	0.30
Span # 2	2	6.000	-144.66	379.55	0.38
Span # 3	3	6.000	-149.02	379.55	0.39
+1.20D+L+1.60S+1.60H, LL Comb Run (*L*)					
Span # 1	1	6.000	-138.09	379.55	0.36
Span # 2	2	6.000	-143.21	379.55	0.38
Span # 3	3	6.000	-143.21	379.55	0.38
+1.20D+L+1.60S+1.60H, LL Comb Run (*LL)					
Span # 1	1	6.000	-132.32	379.55	0.35
Span # 2	2	6.000	-160.93	379.55	0.42
Span # 3	3	6.000	-166.44	379.55	0.44
+1.20D+L+1.60S+1.60H, LL Comb Run (L**)					
Span # 1	1	6.000	-142.71	379.55	0.38
Span # 2	2	6.000	-149.02	379.55	0.39
Span # 3	3	6.000	-119.98	379.55	0.32
+1.20D+L+1.60S+1.60H, LL Comb Run (L*L)					
Span # 1	1	6.000	-136.94	379.55	0.36
Span # 2	2	6.000	-143.21	379.55	0.38
Span # 3	3	6.000	-143.21	379.55	0.38
+1.20D+L+1.60S+1.60H, LL Comb Run (LL*)					
Span # 1	1	6.000	-160.02	379.55	0.42
Span # 2	2	6.000	-166.44	379.55	0.44
Span # 3	3	6.000	-137.40	379.55	0.36
+1.20D+L+1.60S+1.60H, LL Comb Run (LLL)					
Span # 1	1	6.000	-154.25	379.55	0.41
Span # 2	2	6.000	-160.64	379.55	0.42
Span # 3	3	6.000	-160.64	379.55	0.42
+1.20D+1.60S+0.50W+1.60H					
Span # 1	1	6.000	-120.78	379.55	0.32
Span # 2	2	6.000	-125.79	379.55	0.33
Span # 3	3	6.000	-125.79	379.55	0.33
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (**L)					
Span # 1	1	6.000	-115.02	379.55	0.30
Span # 2	2	6.000	-144.66	379.55	0.38
Span # 3	3	6.000	-149.02	379.55	0.39
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (*L*)					
Span # 1	1	6.000	-138.09	379.55	0.36
Span # 2	2	6.000	-143.21	379.55	0.38
Span # 3	3	6.000	-143.21	379.55	0.38
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (*LL)					
Span # 1	1	6.000	-132.32	379.55	0.35
Span # 2	2	6.000	-160.93	379.55	0.42

Concrete Beam

DESCRIPTION: GRBM - GB - Under LT Wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 3	3	6.000	-166.44	379.55	0.44
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (L**)					
Span # 1	1	6.000	-142.71	379.55	0.38
Span # 2	2	6.000	-149.02	379.55	0.39
Span # 3	3	6.000	-119.98	379.55	0.32
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (L*L)					
Span # 1	1	6.000	-136.94	379.55	0.36
Span # 2	2	6.000	-143.21	379.55	0.38
Span # 3	3	6.000	-143.21	379.55	0.38
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (LL*)					
Span # 1	1	6.000	-160.02	379.55	0.42
Span # 2	2	6.000	-166.44	379.55	0.44
Span # 3	3	6.000	-137.40	379.55	0.36
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (LLL)					
Span # 1	1	6.000	-154.25	379.55	0.41
Span # 2	2	6.000	-160.64	379.55	0.42
Span # 3	3	6.000	-160.64	379.55	0.42
+1.20D+L+0.50S+W+1.60H, LL Comb Run (**L)					
Span # 1	1	6.000	-115.02	379.55	0.30
Span # 2	2	6.000	-144.66	379.55	0.38
Span # 3	3	6.000	-149.02	379.55	0.39
+1.20D+L+0.50S+W+1.60H, LL Comb Run (*L*)					
Span # 1	1	6.000	-138.09	379.55	0.36
Span # 2	2	6.000	-143.21	379.55	0.38
Span # 3	3	6.000	-143.21	379.55	0.38
+1.20D+L+0.50S+W+1.60H, LL Comb Run (*LL)					
Span # 1	1	6.000	-132.32	379.55	0.35
Span # 2	2	6.000	-160.93	379.55	0.42
Span # 3	3	6.000	-166.44	379.55	0.44
+1.20D+L+0.50S+W+1.60H, LL Comb Run (L**)					
Span # 1	1	6.000	-142.71	379.55	0.38
Span # 2	2	6.000	-149.02	379.55	0.39
Span # 3	3	6.000	-119.98	379.55	0.32
+1.20D+L+0.50S+W+1.60H, LL Comb Run (L*L)					
Span # 1	1	6.000	-136.94	379.55	0.36
Span # 2	2	6.000	-143.21	379.55	0.38
Span # 3	3	6.000	-143.21	379.55	0.38
+1.20D+L+0.50S+W+1.60H, LL Comb Run (LL*)					
Span # 1	1	6.000	-160.02	379.55	0.42
Span # 2	2	6.000	-166.44	379.55	0.44
Span # 3	3	6.000	-137.40	379.55	0.36
+1.20D+L+0.50S+W+1.60H, LL Comb Run (LLL)					
Span # 1	1	6.000	-154.25	379.55	0.41
Span # 2	2	6.000	-160.64	379.55	0.42
Span # 3	3	6.000	-160.64	379.55	0.42
+0.90D+W+1.60H					
Span # 1	1	6.000	-90.59	379.55	0.24
Span # 2	2	6.000	-94.34	379.55	0.25
Span # 3	3	6.000	-94.34	379.55	0.25
+1.20D+L+0.20S+E+1.60H, LL Comb Run (**L)					
Span # 1	1	6.000	-115.02	379.55	0.30
Span # 2	2	6.000	-144.66	379.55	0.38
Span # 3	3	6.000	-149.02	379.55	0.39
+1.20D+L+0.20S+E+1.60H, LL Comb Run (*L*)					
Span # 1	1	6.000	-138.09	379.55	0.36
Span # 2	2	6.000	-143.21	379.55	0.38
Span # 3	3	6.000	-143.21	379.55	0.38
+1.20D+L+0.20S+E+1.60H, LL Comb Run (*LL)					
Span # 1	1	6.000	-132.32	379.55	0.35
Span # 2	2	6.000	-160.93	379.55	0.42
Span # 3	3	6.000	-166.44	379.55	0.44
+1.20D+L+0.20S+E+1.60H, LL Comb Run (L**)					
Span # 1	1	6.000	-142.71	379.55	0.38
Span # 2	2	6.000	-149.02	379.55	0.39
Span # 3	3	6.000	-119.98	379.55	0.32
+1.20D+L+0.20S+E+1.60H, LL Comb Run (L*L)					
Span # 1	1	6.000	-136.94	379.55	0.36
Span # 2	2	6.000	-143.21	379.55	0.38
Span # 3	3	6.000	-143.21	379.55	0.38

Concrete Beam

DESCRIPTION: GRBM - GB - Under LT Wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
+1.20D+L+0.20S+E+1.60H, LL Comb Run (LL*)					
Span # 1	1	6.000	-160.02	379.55	0.42
Span # 2	2	6.000	-166.44	379.55	0.44
Span # 3	3	6.000	-137.40	379.55	0.36
+1.20D+L+0.20S+E+1.60H, LL Comb Run (LLL)					
Span # 1	1	6.000	-154.25	379.55	0.41
Span # 2	2	6.000	-160.64	379.55	0.42
Span # 3	3	6.000	-160.64	379.55	0.42
+0.90D+E+0.90H					
Span # 1	1	6.000	-90.59	379.55	0.24
Span # 2	2	6.000	-94.34	379.55	0.25
Span # 3	3	6.000	-94.34	379.55	0.25

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft)	Load Combination	Max. "+" Defl (in)	Location in Span (ft)
+D+L+H, LL Comb Run (L*L)	1	0.0026	2.760	+D+L+H, LL Comb Run (L*L)	-0.0001	6.120
+D+L+H, LL Comb Run (*L*)	2	0.0007	3.000	+D+L+H, LL Comb Run (L*L)	-0.0004	4.440
+D+L+H, LL Comb Run (L*L)	3	0.0026	3.240		0.0000	4.440

Concrete Beam

Lic. # : KW-06011403 — Bob D. Campbell and Co., Inc.

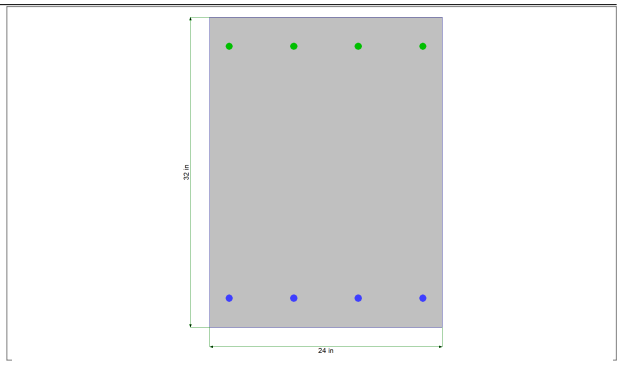
DESCRIPTION: GRBM - G3 - Under 10" PC Ramp End Wall

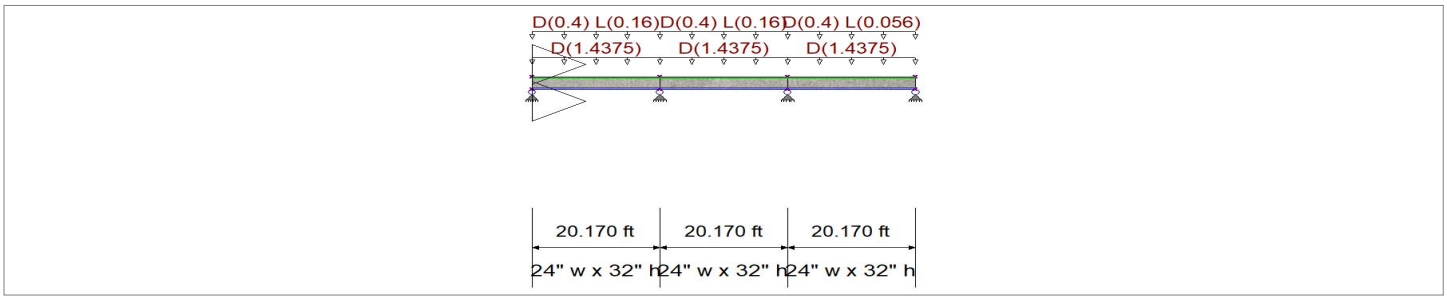
CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

f'c	=	3.50 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c$^{1/2}$ * 7.50	=	443.706 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups		60.0 ksi
fy - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #		4
			Number of Resisting Legs Per Stirrup =		2





Cross Section & Reinforcing Details

Rectangular Section, Width = 24.0 in, Height = 32.0 in

Span #1 Reinforcing....
- 4-#6 at 3.0 in from Bottom, from 0.0 to 20.170 ft in this span
- 4-#6 at 3.0 in from Top, from 0.0 to 20.170 ft in this span

Span #2 Reinforcing....
- 4-#6 at 3.0 in from Bottom, from 0.0 to 20.170 ft in this span
- 4-#6 at 3.0 in from Top, from 0.0 to 20.170 ft in this span

Span #3 Reinforcing....
- 4-#6 at 3.0 in from Bottom, from 0.0 to 20.170 ft in this span
- 4-#6 at 3.0 in from Top, from 0.0 to 20.170 ft in this span

Beam self weight calculated and added to loads

Load for Span Number 1
- Uniform Load : D = 0.1250 ksf, Tributary Width = 11.50 ft, (10" PC Wall)
- Uniform Load : D = 0.10, L = 0.040 ksf, Tributary Width = 4.0 ft, (Hinge Slab)

Load for Span Number 2
- Uniform Load : D = 0.1250 ksf, Tributary Width = 11.50 ft, (10" PC Wall)
- Uniform Load : D = 0.10, L = 0.040 ksf, Tributary Width = 4.0 ft, (Hinge Slab)

Load for Span Number 3
- Uniform Load : D = 0.1250 ksf, Tributary Width = 11.50 ft, (10" PC Wall)
- Uniform Load : D = 0.10, L = 0.0140 ksf, Tributary Width = 4.0 ft, (Hinge Slab)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.654** : 1	Maximum Deflection		
Section used for this span		**Typical Section**	Max Downward Transient Deflection	0.002 in	Ratio = 117316 >=360.
Mu : Applied		-148.703 k-ft	Max Upward Transient Deflection	0.000 in	Ratio = 0 <360.0
Mn * Phi : Allowable		227.495 k-ft	Max Downward Total Deflection	0.027 in	Ratio = 8930 >=180.
Location of maximum on span		0.000 ft	Max Upward Total Deflection	-0.002 in	Ratio = 122999 >=180.
Span # where maximum occurs		Span # 2			

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	22.481	61.799	60.436	21.607

DESCRIPTION: GRBM - G3 - Under 10" PC Ramp End Wall

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MINimum	0.019	-0.113	-0.323	0.054
+D+H	21.064	57.927	57.927	21.064
+D+L+H, LL Comb Run (**L)	21.083	57.814	58.661	21.554
+D+L+H, LL Comb Run (*L*)	20.903	59.702	59.702	20.903
+D+L+H, LL Comb Run (*LL)	20.922	59.589	60.436	21.392
+D+L+H, LL Comb Run (L**)	22.463	60.024	57.604	21.118
+D+L+H, LL Comb Run (L*L)	22.481	59.911	58.338	21.607
+D+L+H, LL Comb Run (LL*)	22.301	61.799	59.379	20.957
+D+L+H, LL Comb Run (LLL)	22.320	61.686	60.113	21.446
+D+Lr+H, LL Comb Run (**L)	21.064	57.927	57.927	21.064
+D+Lr+H, LL Comb Run (*L*)	21.064	57.927	57.927	21.064
+D+Lr+H, LL Comb Run (*LL)	21.064	57.927	57.927	21.064
+D+Lr+H, LL Comb Run (L**)	21.064	57.927	57.927	21.064
+D+Lr+H, LL Comb Run (L*L)	21.064	57.927	57.927	21.064
+D+Lr+H, LL Comb Run (LL*)	21.064	57.927	57.927	21.064
+D+Lr+H, LL Comb Run (LLL)	21.064	57.927	57.927	21.064
+D+S+H	21.064	57.927	57.927	21.064
+D+0.750Lr+0.750L+H, LL Comb Run (	21.078	57.842	58.477	21.431
+D+0.750Lr+0.750L+H, LL Comb Run (	20.943	59.258	59.258	20.943
+D+0.750Lr+0.750L+H, LL Comb Run (	20.957	59.173	59.808	21.310
+D+0.750Lr+0.750L+H, LL Comb Run (	22.113	59.500	57.685	21.105
+D+0.750Lr+0.750L+H, LL Comb Run (	22.127	59.415	58.235	21.472
+D+0.750Lr+0.750L+H, LL Comb Run (	21.992	60.831	59.016	20.984
+D+0.750Lr+0.750L+H, LL Comb Run (	22.006	60.746	59.566	21.351
+D+0.750L+0.750S+H, LL Comb Run (*	21.078	57.842	58.477	21.431
+D+0.750L+0.750S+H, LL Comb Run (*	20.943	59.258	59.258	20.943
+D+0.750L+0.750S+H, LL Comb Run (*	20.957	59.173	59.808	21.310
+D+0.750L+0.750S+H, LL Comb Run (L	22.113	59.500	57.685	21.105
+D+0.750L+0.750S+H, LL Comb Run (L	22.127	59.415	58.235	21.472
+D+0.750L+0.750S+H, LL Comb Run (L	21.992	60.831	59.016	20.984
+D+0.750L+0.750S+H, LL Comb Run (L	22.006	60.746	59.566	21.351
+D+0.60W+H	21.064	57.927	57.927	21.064
+D+0.750Lr+0.750L+0.450W+H, LL Com	21.078	57.842	58.477	21.431
+D+0.750Lr+0.750L+0.450W+H, LL Com	20.943	59.258	59.258	20.943
+D+0.750Lr+0.750L+0.450W+H, LL Com	20.957	59.173	59.808	21.310
+D+0.750Lr+0.750L+0.450W+H, LL Com	22.113	59.500	57.685	21.105
+D+0.750Lr+0.750L+0.450W+H, LL Com	22.127	59.415	58.235	21.472
+D+0.750Lr+0.750L+0.450W+H, LL Com	21.992	60.831	59.016	20.984
+D+0.750Lr+0.750L+0.450W+H, LL Com	22.006	60.746	59.566	21.351
+D+0.750L+0.750S+0.450W+H, LL Comb	21.078	57.842	58.477	21.431
+D+0.750L+0.750S+0.450W+H, LL Comb	20.943	59.258	59.258	20.943
+D+0.750L+0.750S+0.450W+H, LL Comb	20.957	59.173	59.808	21.310
+D+0.750L+0.750S+0.450W+H, LL Comb	22.113	59.500	57.685	21.105
+D+0.750L+0.750S+0.450W+H, LL Comb	22.127	59.415	58.235	21.472
+D+0.750L+0.750S+0.450W+H, LL Comb	21.992	60.831	59.016	20.984
+D+0.750L+0.750S+0.450W+H, LL Comb	22.006	60.746	59.566	21.351
+0.60D+0.60W+0.60H	12.639	34.756	34.756	12.639
+D+0.70E+0.60H	21.064	57.927	57.927	21.064
+D+0.750L+0.750S+0.5250E+H, LL Com	21.078	57.842	58.477	21.431
+D+0.750L+0.750S+0.5250E+H, LL Com	20.943	59.258	59.258	20.943
+D+0.750L+0.750S+0.5250E+H, LL Com	20.957	59.173	59.808	21.310
+D+0.750L+0.750S+0.5250E+H, LL Com	22.113	59.500	57.685	21.105
+D+0.750L+0.750S+0.5250E+H, LL Com	22.127	59.415	58.235	21.472
+D+0.750L+0.750S+0.5250E+H, LL Com	21.992	60.831	59.016	20.984
+D+0.750L+0.750S+0.5250E+H, LL Com	22.006	60.746	59.566	21.351
+0.60D+0.70E+H	12.639	34.756	34.756	12.639
D Only	21.064	57.927	57.927	21.064
L Only, LL Comb Run (**L)	0.019	-0.113	0.734	0.489
L Only, LL Comb Run (*L*)	-0.161	1.775	1.775	-0.161

Concrete Beam

DESCRIPTION: GRBM - G3 - Under 10" PC Ramp End Wall

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3	Support 4
L Only, LL Comb Run (*LL)	-0.143	1.662	2.509	0.328
L Only, LL Comb Run (L**)	1.398	2.098	-0.323	0.054
L Only, LL Comb Run (L*L)	1.417	1.985	0.411	0.543
L Only, LL Comb Run (LL*)	1.237	3.873	1.452	-0.108
L Only, LL Comb Run (LLL)	1.256	3.760	2.186	0.382
H Only				

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.40D+1.60H	1	0.00	29.00	29.49	29.49	0.00	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	1	0.81	29.00	26.54	26.54	22.60	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	1	1.61	29.00	23.59	23.59	42.83	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	1	2.42	29.00	20.64	20.64	60.67	0.82	61.39	Vu < PhiVc/2	lot Reqd 9.6.	61.4	0.0	0.0
+1.40D+1.60H	1	3.23	29.00	17.69	17.69	76.14	0.56	60.53	Vu < PhiVc/2	lot Reqd 9.6.	60.5	0.0	0.0
+1.40D+1.60H	1	4.03	29.00	14.74	14.74	89.22	0.40	59.99	Vu < PhiVc/2	lot Reqd 9.6.	60.0	0.0	0.0
+1.40D+1.60H	1	4.84	29.00	11.80	11.80	99.93	0.29	59.62	Vu < PhiVc/2	lot Reqd 9.6.	59.6	0.0	0.0
+1.40D+1.60H	1	5.65	29.00	8.85	8.85	108.26	0.20	59.33	Vu < PhiVc/2	lot Reqd 9.6.	59.3	0.0	0.0
+1.40D+1.60H	1	6.45	29.00	5.90	5.90	114.20	0.12	59.09	Vu < PhiVc/2	lot Reqd 9.6.	59.1	0.0	0.0
+1.40D+1.60H	1	7.26	29.00	2.95	2.95	117.77	0.06	58.88	Vu < PhiVc/2	lot Reqd 9.6.	58.9	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	1	8.07	29.00	-0.26	0.26	99.88	0.01	58.70	Vu < PhiVc/2	lot Reqd 9.6.	58.7	0.0	0.0
+1.40D+1.60H	1	8.87	29.00	-2.95	2.95	117.77	0.06	58.88	Vu < PhiVc/2	lot Reqd 9.6.	58.9	0.0	0.0
+1.40D+1.60H	1	9.68	29.00	-5.90	5.90	114.20	0.12	59.09	Vu < PhiVc/2	lot Reqd 9.6.	59.1	0.0	0.0
+1.40D+1.60H	1	10.49	29.00	-8.85	8.85	108.26	0.20	59.33	Vu < PhiVc/2	lot Reqd 9.6.	59.3	0.0	0.0
+1.40D+1.60H	1	11.30	29.00	-11.80	11.80	99.93	0.29	59.62	Vu < PhiVc/2	lot Reqd 9.6.	59.6	0.0	0.0
+1.40D+1.60H	1	12.10	29.00	-14.74	14.74	89.22	0.40	59.99	Vu < PhiVc/2	lot Reqd 9.6.	60.0	0.0	0.0
+1.40D+1.60H	1	12.91	29.00	-17.69	17.69	76.14	0.56	60.53	Vu < PhiVc/2	lot Reqd 9.6.	60.5	0.0	0.0
+1.40D+1.60H	1	13.72	29.00	-20.64	20.64	60.67	0.82	61.39	Vu < PhiVc/2	lot Reqd 9.6.	61.4	0.0	0.0
+1.40D+1.60H	1	14.52	29.00	-23.59	23.59	42.83	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	1	15.33	29.00	-26.54	26.54	22.60	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	1	16.14	29.00	-29.49	29.49	0.00	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	1	16.94	29.00	-32.44	32.44	24.98	1.00	61.98	PhiVc/2 < Vu <=	Min 9.6.3.1	99.3	14.5	14.0
+1.40D+1.60H	1	17.75	29.00	-35.39	35.39	52.34	1.00	61.98	PhiVc/2 < Vu <=	Min 9.6.3.1	99.3	14.5	14.0
+1.40D+1.60H	1	18.56	29.00	-38.34	38.34	82.08	1.00	61.98	PhiVc/2 < Vu <=	Min 9.6.3.1	99.3	14.5	14.0
+1.40D+1.60H	1	19.36	29.00	-41.29	41.29	114.20	0.87	61.56	PhiVc/2 < Vu <=	Min 9.6.3.1	98.8	14.5	14.0
+1.40D+1.60H	2	20.17	29.00	36.86	36.86	148.70	0.60	60.65	PhiVc/2 < Vu <=	Min 9.6.3.1	97.9	14.5	14.0
+1.40D+1.60H	2	20.98	29.00	33.91	33.91	120.15	0.68	60.93	PhiVc/2 < Vu <=	Min 9.6.3.1	98.2	14.5	14.0
+1.40D+1.60H	2	21.78	29.00	30.96	30.96	93.98	0.80	61.30	PhiVc/2 < Vu <=	Min 9.6.3.1	98.6	14.5	14.0
+1.40D+1.60H	2	22.59	29.00	28.02	28.02	70.19	0.96	61.86	Vu < PhiVc/2	lot Reqd 9.6.	61.9	0.0	0.0
+1.40D+1.60H	2	23.40	29.00	25.07	25.07	48.77	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	2	24.20	29.00	22.12	22.12	29.74	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	2	25.01	29.00	19.17	19.17	13.09	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	2	25.82	29.00	16.22	16.22	1.19	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	2	26.62	29.00	13.27	13.27	13.09	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	2	27.43	29.00	10.32	10.32	22.60	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	2	28.24	29.00	7.37	7.37	29.74	0.60	60.65	Vu < PhiVc/2	lot Reqd 9.6.	60.7	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	29.04	29.00	4.53	4.53	34.07	0.32	59.74	Vu < PhiVc/2	lot Reqd 9.6.	59.7	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	29.85	29.00	1.80	1.80	36.62	0.12	59.07	Vu < PhiVc/2	lot Reqd 9.6.	59.1	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	2	30.66	29.00	-1.52	1.52	38.43	0.10	58.99	Vu < PhiVc/2	lot Reqd 9.6.	59.0	0.0	0.0
+1.40D+1.60H	2	31.47	29.00	-4.42	4.42	34.50	0.31	59.70	Vu < PhiVc/2	lot Reqd 9.6.	59.7	0.0	0.0
+1.40D+1.60H	2	32.27	29.00	-7.37	7.37	29.74	0.60	60.65	Vu < PhiVc/2	lot Reqd 9.6.	60.7	0.0	0.0
+1.40D+1.60H	2	33.08	29.00	-10.32	10.32	22.60	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	2	33.89	29.00	-13.27	13.27	13.09	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	2	34.69	29.00	-16.22	16.22	1.19	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	2	35.50	29.00	-19.17	19.17	13.09	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	2	36.31	29.00	-22.12	22.12	29.74	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0

Concrete Beam

DESCRIPTION: GRBM - G3 - Under 10" PC Ramp End Wall

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.40D+1.60H	2	37.11	29.00	-25.07	25.07	48.77	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	2	37.92	29.00	-28.02	28.02	70.19	0.96	61.86	Vu < PhiVc/2	lot Reqd 9.6.	61.9	0.0	0.0
+1.40D+1.60H	2	38.73	29.00	-30.96	30.96	93.98	0.80	61.30	PhiVc/2 < Vu <=	Min 9.6.3.1	98.6	14.5	14.0
+1.40D+1.60H	2	39.53	29.00	-33.91	33.91	120.15	0.68	60.93	PhiVc/2 < Vu <=	Min 9.6.3.1	98.2	14.5	14.0
+1.40D+1.60H	3	40.34	29.00	44.23	44.23	148.70	0.72	61.05	PhiVc/2 < Vu <=	Min 9.6.3.1	98.3	14.5	14.0
+1.40D+1.60H	3	41.15	29.00	41.29	41.29	114.20	0.87	61.56	PhiVc/2 < Vu <=	Min 9.6.3.1	98.8	14.5	14.0
+1.40D+1.60H	3	41.95	29.00	38.34	38.34	82.08	1.00	61.98	PhiVc/2 < Vu <=	Min 9.6.3.1	99.3	14.5	14.0
+1.40D+1.60H	3	42.76	29.00	35.39	35.39	52.34	1.00	61.98	PhiVc/2 < Vu <=	Min 9.6.3.1	99.3	14.5	14.0
+1.40D+1.60H	3	43.57	29.00	32.44	32.44	24.98	1.00	61.98	PhiVc/2 < Vu <=	Min 9.6.3.1	99.3	14.5	14.0
+1.40D+1.60H	3	44.37	29.00	29.49	29.49	0.00	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	3	45.18	29.00	26.54	26.54	22.60	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	3	45.99	29.00	23.59	23.59	42.83	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	3	46.79	29.00	20.64	20.64	60.67	0.82	61.39	Vu < PhiVc/2	lot Reqd 9.6.	61.4	0.0	0.0
+1.40D+1.60H	3	47.60	29.00	17.69	17.69	76.14	0.56	60.53	Vu < PhiVc/2	lot Reqd 9.6.	60.5	0.0	0.0
+1.40D+1.60H	3	48.41	29.00	14.74	14.74	89.22	0.40	59.99	Vu < PhiVc/2	lot Reqd 9.6.	60.0	0.0	0.0
+1.40D+1.60H	3	49.21	29.00	11.80	11.80	99.93	0.29	59.62	Vu < PhiVc/2	lot Reqd 9.6.	59.6	0.0	0.0
+1.40D+1.60H	3	50.02	29.00	8.85	8.85	108.26	0.20	59.33	Vu < PhiVc/2	lot Reqd 9.6.	59.3	0.0	0.0
+1.40D+1.60H	3	50.83	29.00	5.90	5.90	114.20	0.12	59.09	Vu < PhiVc/2	lot Reqd 9.6.	59.1	0.0	0.0
+1.40D+1.60H	3	51.64	29.00	2.95	2.95	117.77	0.06	58.88	Vu < PhiVc/2	lot Reqd 9.6.	58.9	0.0	0.0
+1.20D+1.60L+0.50S+1.60H, LL Comb	3	52.44	29.00	0.26	0.26	99.88	0.01	58.70	Vu < PhiVc/2	lot Reqd 9.6.	58.7	0.0	0.0
+1.40D+1.60H	3	53.25	29.00	-2.95	2.95	117.77	0.06	58.88	Vu < PhiVc/2	lot Reqd 9.6.	58.9	0.0	0.0
+1.40D+1.60H	3	54.06	29.00	-5.90	5.90	114.20	0.12	59.09	Vu < PhiVc/2	lot Reqd 9.6.	59.1	0.0	0.0
+1.40D+1.60H	3	54.86	29.00	-8.85	8.85	108.26	0.20	59.33	Vu < PhiVc/2	lot Reqd 9.6.	59.3	0.0	0.0
+1.40D+1.60H	3	55.67	29.00	-11.80	11.80	99.93	0.29	59.62	Vu < PhiVc/2	lot Reqd 9.6.	59.6	0.0	0.0
+1.40D+1.60H	3	56.48	29.00	-14.74	14.74	89.22	0.40	59.99	Vu < PhiVc/2	lot Reqd 9.6.	60.0	0.0	0.0
+1.40D+1.60H	3	57.28	29.00	-17.69	17.69	76.14	0.56	60.53	Vu < PhiVc/2	lot Reqd 9.6.	60.5	0.0	0.0
+1.40D+1.60H	3	58.09	29.00	-20.64	20.64	60.67	0.82	61.39	Vu < PhiVc/2	lot Reqd 9.6.	61.4	0.0	0.0
+1.40D+1.60H	3	58.90	29.00	-23.59	23.59	42.83	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	3	59.70	29.00	-26.54	26.54	22.60	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0
+1.40D+1.60H	3	60.51	29.00	-29.49	29.49	0.00	1.00	61.98	Vu < PhiVc/2	lot Reqd 9.6.	62.0	0.0	0.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	20.170	-142.79	227.49	0.63
Span # 2	2	20.170	-148.70	227.49	0.65
Span # 3	3	20.170	-148.70	227.49	0.65
+1.40D+1.60H					
Span # 1	1	20.170	-142.79	227.49	0.63
Span # 2	2	20.170	-148.70	227.49	0.65
Span # 3	3	20.170	-148.70	227.49	0.65
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (**L)					
Span # 1	1	20.170	-121.79	227.49	0.54
Span # 2	2	20.170	-126.85	227.49	0.56
Span # 3	3	20.170	-129.89	227.49	0.57
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (*L*)					
Span # 1	1	20.170	-127.56	227.49	0.56
Span # 2	2	20.170	-132.67	227.49	0.58
Span # 3	3	20.170	-132.67	227.49	0.58
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (*LL)					
Span # 1	1	20.170	-126.96	227.49	0.56
Span # 2	2	20.170	-132.06	227.49	0.58
Span # 3	3	20.170	-135.10	227.49	0.59
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (L**)					
Span # 1	1	20.170	-128.94	227.49	0.57
Span # 2	2	20.170	-134.40	227.49	0.59
Span # 3	3	20.170	-125.72	227.49	0.55
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (L*L)					
Span # 1	1	20.170	-128.34	227.49	0.56

Concrete Beam

DESCRIPTION: GRBM - G3 - Under 10" PC Ramp End Wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 2	2	20.170	-133.80	227.49	0.59
Span # 3	3	20.170	-128.15	227.49	0.56
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LL*)					
Span # 1	1	20.170	-134.11	227.49	0.59
Span # 2	2	20.170	-139.61	227.49	0.61
Span # 3	3	20.170	-130.93	227.49	0.58
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LLL)					
Span # 1	1	20.170	-133.51	227.49	0.59
Span # 2	2	20.170	-139.00	227.49	0.61
Span # 3	3	20.170	-133.36	227.49	0.59
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (**L)					
Span # 1	1	20.170	-121.79	227.49	0.54
Span # 2	2	20.170	-126.85	227.49	0.56
Span # 3	3	20.170	-129.89	227.49	0.57
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (*L*)					
Span # 1	1	20.170	-127.56	227.49	0.56
Span # 2	2	20.170	-132.67	227.49	0.58
Span # 3	3	20.170	-132.67	227.49	0.58
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (*LL)					
Span # 1	1	20.170	-126.96	227.49	0.56
Span # 2	2	20.170	-132.06	227.49	0.58
Span # 3	3	20.170	-135.10	227.49	0.59
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (L**)					
Span # 1	1	20.170	-128.94	227.49	0.57
Span # 2	2	20.170	-134.40	227.49	0.59
Span # 3	3	20.170	-125.72	227.49	0.55
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (L*L)					
Span # 1	1	20.170	-128.34	227.49	0.56
Span # 2	2	20.170	-133.80	227.49	0.59
Span # 3	3	20.170	-128.15	227.49	0.56
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (LL*)					
Span # 1	1	20.170	-134.11	227.49	0.59
Span # 2	2	20.170	-139.61	227.49	0.61
Span # 3	3	20.170	-130.93	227.49	0.58
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (LLL)					
Span # 1	1	20.170	-133.51	227.49	0.59
Span # 2	2	20.170	-139.00	227.49	0.61
Span # 3	3	20.170	-133.36	227.49	0.59
+1.20D+1.60Lr+L+1.60H, LL Comb Run (**L)					
Span # 1	1	20.170	-122.01	227.49	0.54
Span # 2	2	20.170	-127.08	227.49	0.56
Span # 3	3	20.170	-128.98	227.49	0.57
+1.20D+1.60Lr+L+1.60H, LL Comb Run (*L*)					
Span # 1	1	20.170	-125.62	227.49	0.55
Span # 2	2	20.170	-130.71	227.49	0.57
Span # 3	3	20.170	-130.71	227.49	0.57
+1.20D+1.60Lr+L+1.60H, LL Comb Run (*LL)					
Span # 1	1	20.170	-125.25	227.49	0.55
Span # 2	2	20.170	-130.33	227.49	0.57
Span # 3	3	20.170	-132.23	227.49	0.58
+1.20D+1.60Lr+L+1.60H, LL Comb Run (L**)					
Span # 1	1	20.170	-126.48	227.49	0.56
Span # 2	2	20.170	-131.80	227.49	0.58
Span # 3	3	20.170	-126.37	227.49	0.56
+1.20D+1.60Lr+L+1.60H, LL Comb Run (L*L)					
Span # 1	1	20.170	-126.11	227.49	0.55
Span # 2	2	20.170	-131.42	227.49	0.58
Span # 3	3	20.170	-127.89	227.49	0.56
+1.20D+1.60Lr+L+1.60H, LL Comb Run (LL*)					
Span # 1	1	20.170	-129.72	227.49	0.57
Span # 2	2	20.170	-135.05	227.49	0.59
Span # 3	3	20.170	-129.63	227.49	0.57
+1.20D+1.60Lr+L+1.60H, LL Comb Run (LLL)					
Span # 1	1	20.170	-129.34	227.49	0.57
Span # 2	2	20.170	-134.67	227.49	0.59
Span # 3	3	20.170	-131.15	227.49	0.58
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (**L)					
Span # 1	1	20.170	-122.39	227.49	0.54
Span # 2	2	20.170	-127.46	227.49	0.56

DESCRIPTION: GRBM - G3 - Under 10" PC Ramp End Wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 3	3	20.170	-127.46	227.49	0.56
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (*L*)					
Span # 1	1	20.170	-122.39	227.49	0.54
Span # 2	2	20.170	-127.46	227.49	0.56
Span # 3	3	20.170	-127.46	227.49	0.56
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (*LL)					
Span # 1	1	20.170	-122.39	227.49	0.54
Span # 2	2	20.170	-127.46	227.49	0.56
Span # 3	3	20.170	-127.46	227.49	0.56
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (L**)					
Span # 1	1	20.170	-122.39	227.49	0.54
Span # 2	2	20.170	-127.46	227.49	0.56
Span # 3	3	20.170	-127.46	227.49	0.56
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (L*L)					
Span # 1	1	20.170	-122.39	227.49	0.54
Span # 2	2	20.170	-127.46	227.49	0.56
Span # 3	3	20.170	-127.46	227.49	0.56
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (LL*)					
Span # 1	1	20.170	-122.39	227.49	0.54
Span # 2	2	20.170	-127.46	227.49	0.56
Span # 3	3	20.170	-127.46	227.49	0.56
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (LLL)					
Span # 1	1	20.170	-122.39	227.49	0.54
Span # 2	2	20.170	-127.46	227.49	0.56
Span # 3	3	20.170	-127.46	227.49	0.56
+1.20D+L+1.60S+1.60H, LL Comb Run (**L)					
Span # 1	1	20.170	-122.01	227.49	0.54
Span # 2	2	20.170	-127.08	227.49	0.56
Span # 3	3	20.170	-128.98	227.49	0.57
+1.20D+L+1.60S+1.60H, LL Comb Run (*L*)					
Span # 1	1	20.170	-125.62	227.49	0.55
Span # 2	2	20.170	-130.71	227.49	0.57
Span # 3	3	20.170	-130.71	227.49	0.57
+1.20D+L+1.60S+1.60H, LL Comb Run (*LL)					
Span # 1	1	20.170	-125.25	227.49	0.55
Span # 2	2	20.170	-130.33	227.49	0.57
Span # 3	3	20.170	-132.23	227.49	0.58
+1.20D+L+1.60S+1.60H, LL Comb Run (L**)					
Span # 1	1	20.170	-126.48	227.49	0.56
Span # 2	2	20.170	-131.80	227.49	0.58
Span # 3	3	20.170	-126.37	227.49	0.56
+1.20D+L+1.60S+1.60H, LL Comb Run (L*L)					
Span # 1	1	20.170	-126.11	227.49	0.55
Span # 2	2	20.170	-131.42	227.49	0.58
Span # 3	3	20.170	-127.89	227.49	0.56
+1.20D+L+1.60S+1.60H, LL Comb Run (LL*)					
Span # 1	1	20.170	-129.72	227.49	0.57
Span # 2	2	20.170	-135.05	227.49	0.59
Span # 3	3	20.170	-129.63	227.49	0.57
+1.20D+L+1.60S+1.60H, LL Comb Run (LLL)					
Span # 1	1	20.170	-129.34	227.49	0.57
Span # 2	2	20.170	-134.67	227.49	0.59
Span # 3	3	20.170	-131.15	227.49	0.58
+1.20D+1.60S+0.50W+1.60H					
Span # 1	1	20.170	-122.39	227.49	0.54
Span # 2	2	20.170	-127.46	227.49	0.56
Span # 3	3	20.170	-127.46	227.49	0.56
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (**L)					
Span # 1	1	20.170	-122.01	227.49	0.54
Span # 2	2	20.170	-127.08	227.49	0.56
Span # 3	3	20.170	-128.98	227.49	0.57
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (*L*)					
Span # 1	1	20.170	-125.62	227.49	0.55
Span # 2	2	20.170	-130.71	227.49	0.57
Span # 3	3	20.170	-130.71	227.49	0.57
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (*LL)					
Span # 1	1	20.170	-125.25	227.49	0.55
Span # 2	2	20.170	-130.33	227.49	0.57
Span # 3	3	20.170	-132.23	227.49	0.58

Concrete Beam

DESCRIPTION: GRBM - G3 - Under 10" PC Ramp End Wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (L**)					
Span # 1	1	20.170	-126.48	227.49	0.56
Span # 2	2	20.170	-131.80	227.49	0.58
Span # 3	3	20.170	-126.37	227.49	0.56
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (L*L)					
Span # 1	1	20.170	-126.11	227.49	0.55
Span # 2	2	20.170	-131.42	227.49	0.58
Span # 3	3	20.170	-127.89	227.49	0.56
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (LL*)					
Span # 1	1	20.170	-129.72	227.49	0.57
Span # 2	2	20.170	-135.05	227.49	0.59
Span # 3	3	20.170	-129.63	227.49	0.57
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (LLL)					
Span # 1	1	20.170	-129.34	227.49	0.57
Span # 2	2	20.170	-134.67	227.49	0.59
Span # 3	3	20.170	-131.15	227.49	0.58
+1.20D+L+0.50S+W+1.60H, LL Comb Run (**L)					
Span # 1	1	20.170	-122.01	227.49	0.54
Span # 2	2	20.170	-127.08	227.49	0.56
Span # 3	3	20.170	-128.98	227.49	0.57
+1.20D+L+0.50S+W+1.60H, LL Comb Run (*L*)					
Span # 1	1	20.170	-125.62	227.49	0.55
Span # 2	2	20.170	-130.71	227.49	0.57
Span # 3	3	20.170	-130.71	227.49	0.57
+1.20D+L+0.50S+W+1.60H, LL Comb Run (*LL)					
Span # 1	1	20.170	-125.25	227.49	0.55
Span # 2	2	20.170	-130.33	227.49	0.57
Span # 3	3	20.170	-132.23	227.49	0.58
+1.20D+L+0.50S+W+1.60H, LL Comb Run (L**)					
Span # 1	1	20.170	-126.48	227.49	0.56
Span # 2	2	20.170	-131.80	227.49	0.58
Span # 3	3	20.170	-126.37	227.49	0.56
+1.20D+L+0.50S+W+1.60H, LL Comb Run (L*L)					
Span # 1	1	20.170	-126.11	227.49	0.55
Span # 2	2	20.170	-131.42	227.49	0.58
Span # 3	3	20.170	-127.89	227.49	0.56
+1.20D+L+0.50S+W+1.60H, LL Comb Run (LL*)					
Span # 1	1	20.170	-129.72	227.49	0.57
Span # 2	2	20.170	-135.05	227.49	0.59
Span # 3	3	20.170	-129.63	227.49	0.57
+1.20D+L+0.50S+W+1.60H, LL Comb Run (LLL)					
Span # 1	1	20.170	-129.34	227.49	0.57
Span # 2	2	20.170	-134.67	227.49	0.59
Span # 3	3	20.170	-131.15	227.49	0.58
+0.90D+W+1.60H					
Span # 1	1	20.170	-91.79	227.49	0.40
Span # 2	2	20.170	-95.59	227.49	0.42
Span # 3	3	20.170	-95.59	227.49	0.42
+1.20D+L+0.20S+E+1.60H, LL Comb Run (**L)					
Span # 1	1	20.170	-122.01	227.49	0.54
Span # 2	2	20.170	-127.08	227.49	0.56
Span # 3	3	20.170	-128.98	227.49	0.57
+1.20D+L+0.20S+E+1.60H, LL Comb Run (*L*)					
Span # 1	1	20.170	-125.62	227.49	0.55
Span # 2	2	20.170	-130.71	227.49	0.57
Span # 3	3	20.170	-130.71	227.49	0.57
+1.20D+L+0.20S+E+1.60H, LL Comb Run (*LL)					
Span # 1	1	20.170	-125.25	227.49	0.55
Span # 2	2	20.170	-130.33	227.49	0.57
Span # 3	3	20.170	-132.23	227.49	0.58
+1.20D+L+0.20S+E+1.60H, LL Comb Run (L**)					
Span # 1	1	20.170	-126.48	227.49	0.56
Span # 2	2	20.170	-131.80	227.49	0.58
Span # 3	3	20.170	-126.37	227.49	0.56
+1.20D+L+0.20S+E+1.60H, LL Comb Run (L*L)					
Span # 1	1	20.170	-126.11	227.49	0.55
Span # 2	2	20.170	-131.42	227.49	0.58
Span # 3	3	20.170	-127.89	227.49	0.56
+1.20D+L+0.20S+E+1.60H, LL Comb Run (LL*)					

Concrete Beam

DESCRIPTION: GRBM - G3 - Under 10" PC Ramp End Wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 1	1	20.170	-129.72	227.49	0.57
Span # 2	2	20.170	-135.05	227.49	0.59
Span # 3	3	20.170	-129.63	227.49	0.57
+1.20D+L+0.20S+E+1.60H, LL Comb Run (LLL)					
Span # 1	1	20.170	-129.34	227.49	0.57
Span # 2	2	20.170	-134.67	227.49	0.59
Span # 3	3	20.170	-131.15	227.49	0.58
+0.90D+E+0.90H					
Span # 1	1	20.170	-91.79	227.49	0.40
Span # 2	2	20.170	-95.59	227.49	0.42
Span # 3	3	20.170	-95.59	227.49	0.42

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft)	Load Combination	Max. "+" Defl (in)	Location in Span (ft)
+D+L+H, LL Comb Run (L*L)	1	0.0271	9.278	+D+L+H, LL Comb Run (L*L)	-0.0006	20.573
+D+L+H, LL Comb Run (*L*)	2	0.0034	10.085	+D+L+H, LL Comb Run (L*L)	-0.0020	2.824
+D+L+H, LL Comb Run (L*L)	3	0.0260	10.892		0.0000	2.824

Concrete Beam

Lic. # : KW-06011403

Bob D. Campbell and Co., Inc.

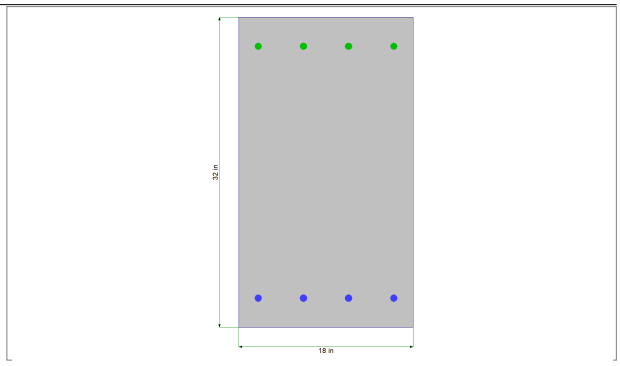
DESCRIPTION: GRBM - G7.3 - Under 8" Full Grouted CMU Wall

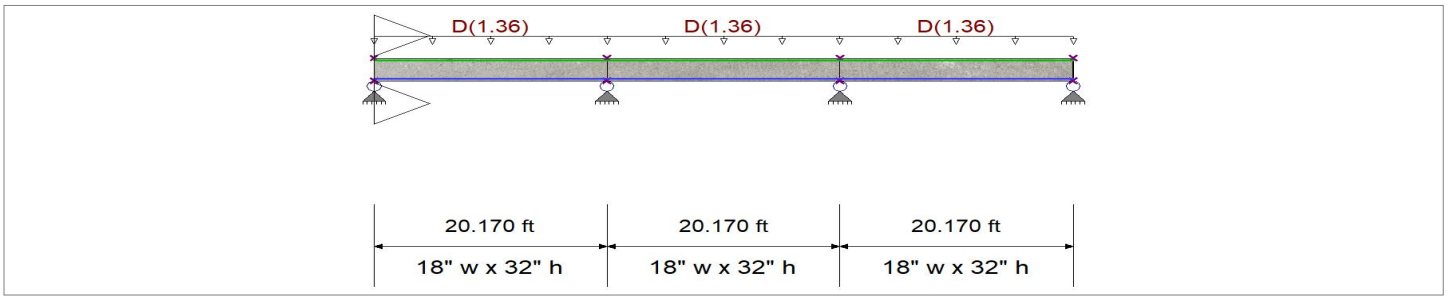
CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

f'c	=	3.50 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c$^{1/2}$ * 7.50	=	443.706 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups		60.0 ksi
fy - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #		4
			Number of Resisting Legs Per Stirrup =		2





Cross Section & Reinforcing Details

Rectangular Section, Width = 18.0 in, Height = 32.0 in

Span #1 Reinforcing....
4-#6 at 3.0 in from Bottom, from 0.0 to 20.170 ft in this span
4-#6 at 3.0 in from Top, from 0.0 to 20.170 ft in this span

Span #2 Reinforcing....
4-#6 at 3.0 in from Bottom, from 0.0 to 20.170 ft in this span
4-#6 at 3.0 in from Top, from 0.0 to 20.170 ft in this span

Span #3 Reinforcing....
4-#6 at 3.0 in from Bottom, from 0.0 to 20.170 ft in this span
4-#6 at 3.0 in from Top, from 0.0 to 20.170 ft in this span

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.0850 ksf, Tributary Width = 16.0 ft, (8" Full Grouted CMU)
Load for Span Number 2
Uniform Load : D = 0.0850 ksf, Tributary Width = 16.0 ft, (8" Full Grouted CMU)
Load for Span Number 3
Uniform Load : D = 0.0850 ksf, Tributary Width = 16.0 ft, (8" Full Grouted CMU)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.496** : 1	Maximum Deflection			
Section used for this span	**Typical Section**	Max Downward Transient Deflection	0.000 in	Ratio =	0 <360.0
Mu : Applied	-110.495 k-ft	Max Upward Transient Deflection	0.000 in	Ratio =	0 <360.0
Mn * Phi : Allowable	222.989 k-ft	Max Downward Total Deflection	0.025 in	Ratio =	9756 >=180.
Location of maximum on span	0.000 ft	Max Upward Total Deflection	-0.001 in	Ratio =	166730 >=180.
Span # where maximum occurs	Span # 3				

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	15.652	43.043	43.043	15.652
Overall MINimum	9.391	25.826	25.826	9.391
+D+H	15.652	43.043	43.043	15.652
+D+L+H, LL Comb Run (**L)	15.652	43.043	43.043	15.652

Concrete Beam

DESCRIPTION: GRBM - G7.3 - Under 8" Full Grouted CMU Wall

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3	Support 4
+D+L+H, LL Comb Run (*L*)	15.652	43.043	43.043	15.652
+D+L+H, LL Comb Run (*LL)	15.652	43.043	43.043	15.652
+D+L+H, LL Comb Run (L**)	15.652	43.043	43.043	15.652
+D+L+H, LL Comb Run (L*L)	15.652	43.043	43.043	15.652
+D+L+H, LL Comb Run (LL*)	15.652	43.043	43.043	15.652
+D+L+H, LL Comb Run (LLL)	15.652	43.043	43.043	15.652
+D+Lr+H, LL Comb Run (**L)	15.652	43.043	43.043	15.652
+D+Lr+H, LL Comb Run (*L*)	15.652	43.043	43.043	15.652
+D+Lr+H, LL Comb Run (*LL)	15.652	43.043	43.043	15.652
+D+Lr+H, LL Comb Run (L**)	15.652	43.043	43.043	15.652
+D+Lr+H, LL Comb Run (L*L)	15.652	43.043	43.043	15.652
+D+Lr+H, LL Comb Run (LL*)	15.652	43.043	43.043	15.652
+D+Lr+H, LL Comb Run (LLL)	15.652	43.043	43.043	15.652
+D+S+H	15.652	43.043	43.043	15.652
+D+0.750Lr+0.750L+H, LL Comb Run (	15.652	43.043	43.043	15.652
+D+0.750Lr+0.750L+H, LL Comb Run (	15.652	43.043	43.043	15.652
+D+0.750Lr+0.750L+H, LL Comb Run (	15.652	43.043	43.043	15.652
+D+0.750Lr+0.750L+H, LL Comb Run (	15.652	43.043	43.043	15.652
+D+0.750Lr+0.750L+H, LL Comb Run (	15.652	43.043	43.043	15.652
+D+0.750Lr+0.750L+H, LL Comb Run (	15.652	43.043	43.043	15.652
+D+0.750Lr+0.750L+H, LL Comb Run (	15.652	43.043	43.043	15.652
+D+0.750L+0.750S+H, LL Comb Run (*	15.652	43.043	43.043	15.652
+D+0.750L+0.750S+H, LL Comb Run (*	15.652	43.043	43.043	15.652
+D+0.750L+0.750S+H, LL Comb Run (*	15.652	43.043	43.043	15.652
+D+0.750L+0.750S+H, LL Comb Run (L	15.652	43.043	43.043	15.652
+D+0.750L+0.750S+H, LL Comb Run (L	15.652	43.043	43.043	15.652
+D+0.750L+0.750S+H, LL Comb Run (L	15.652	43.043	43.043	15.652
+D+0.750L+0.750S+H, LL Comb Run (L	15.652	43.043	43.043	15.652
+D+0.60W+H	15.652	43.043	43.043	15.652
+D+0.750Lr+0.750L+0.450W+H, LL Com	15.652	43.043	43.043	15.652
+D+0.750Lr+0.750L+0.450W+H, LL Com	15.652	43.043	43.043	15.652
+D+0.750Lr+0.750L+0.450W+H, LL Com	15.652	43.043	43.043	15.652
+D+0.750Lr+0.750L+0.450W+H, LL Com	15.652	43.043	43.043	15.652
+D+0.750Lr+0.750L+0.450W+H, LL Com	15.652	43.043	43.043	15.652
+D+0.750Lr+0.750L+0.450W+H, LL Com	15.652	43.043	43.043	15.652
+D+0.750Lr+0.750L+0.450W+H, LL Com	15.652	43.043	43.043	15.652
+D+0.750L+0.750S+0.450W+H, LL Comb	15.652	43.043	43.043	15.652
+D+0.750L+0.750S+0.450W+H, LL Comb	15.652	43.043	43.043	15.652
+D+0.750L+0.750S+0.450W+H, LL Comb	15.652	43.043	43.043	15.652
+D+0.750L+0.750S+0.450W+H, LL Comb	15.652	43.043	43.043	15.652
+D+0.750L+0.750S+0.450W+H, LL Comb	15.652	43.043	43.043	15.652
+D+0.750L+0.750S+0.450W+H, LL Comb	15.652	43.043	43.043	15.652
+D+0.750L+0.750S+0.450W+H, LL Comb	15.652	43.043	43.043	15.652
+0.60D+0.60W+0.60H	9.391	25.826	25.826	9.391
+D+0.70E+0.60H	15.652	43.043	43.043	15.652
+D+0.750L+0.750S+0.5250E+H, LL Com	15.652	43.043	43.043	15.652
+D+0.750L+0.750S+0.5250E+H, LL Com	15.652	43.043	43.043	15.652
+D+0.750L+0.750S+0.5250E+H, LL Com	15.652	43.043	43.043	15.652
+D+0.750L+0.750S+0.5250E+H, LL Com	15.652	43.043	43.043	15.652
+D+0.750L+0.750S+0.5250E+H, LL Com	15.652	43.043	43.043	15.652
+D+0.750L+0.750S+0.5250E+H, LL Com	15.652	43.043	43.043	15.652
+D+0.750L+0.750S+0.5250E+H, LL Com	15.652	43.043	43.043	15.652
+0.60D+0.70E+H	9.391	25.826	25.826	9.391
D Only	15.652	43.043	43.043	15.652
H Only				

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.40D+1.60H	1	0.00	29.00	21.91	21.91	0.00	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0

DESCRIPTION: GRBM - G7.3 - Under 8" Full Grouted CMU Wall

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.40D+1.60H	1	0.81	29.00	19.72	19.72	16.80	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	1	1.61	29.00	17.53	17.53	31.82	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	1	2.42	29.00	15.34	15.34	45.08	0.82	46.72	Vu < PhiVc/2	lot Reqd 9.6.	46.7	0.0	0.0
+1.40D+1.60H	1	3.23	29.00	13.15	13.15	56.57	0.56	45.86	Vu < PhiVc/2	lot Reqd 9.6.	45.9	0.0	0.0
+1.40D+1.60H	1	4.03	29.00	10.96	10.96	66.30	0.40	45.32	Vu < PhiVc/2	lot Reqd 9.6.	45.3	0.0	0.0
+1.40D+1.60H	1	4.84	29.00	8.77	8.77	74.25	0.29	44.95	Vu < PhiVc/2	lot Reqd 9.6.	44.9	0.0	0.0
+1.40D+1.60H	1	5.65	29.00	6.57	6.57	80.44	0.20	44.66	Vu < PhiVc/2	lot Reqd 9.6.	44.7	0.0	0.0
+1.40D+1.60H	1	6.45	29.00	4.38	4.38	84.86	0.12	44.42	Vu < PhiVc/2	lot Reqd 9.6.	44.4	0.0	0.0
+1.40D+1.60H	1	7.26	29.00	2.19	2.19	87.51	0.06	44.21	Vu < PhiVc/2	lot Reqd 9.6.	44.2	0.0	0.0
+1.40D+1.60H	1	8.07	29.00	0.00	0.00	88.40	0.00	44.01	Vu < PhiVc/2	lot Reqd 9.6.	44.0	0.0	0.0
+1.40D+1.60H	1	8.87	29.00	-2.19	2.19	87.51	0.06	44.21	Vu < PhiVc/2	lot Reqd 9.6.	44.2	0.0	0.0
+1.40D+1.60H	1	9.68	29.00	-4.38	4.38	84.86	0.12	44.42	Vu < PhiVc/2	lot Reqd 9.6.	44.4	0.0	0.0
+1.40D+1.60H	1	10.49	29.00	-6.57	6.57	80.44	0.20	44.66	Vu < PhiVc/2	lot Reqd 9.6.	44.7	0.0	0.0
+1.40D+1.60H	1	11.30	29.00	-8.77	8.77	74.25	0.29	44.95	Vu < PhiVc/2	lot Reqd 9.6.	44.9	0.0	0.0
+1.40D+1.60H	1	12.10	29.00	-10.96	10.96	66.30	0.40	45.32	Vu < PhiVc/2	lot Reqd 9.6.	45.3	0.0	0.0
+1.40D+1.60H	1	12.91	29.00	-13.15	13.15	56.57	0.56	45.86	Vu < PhiVc/2	lot Reqd 9.6.	45.9	0.0	0.0
+1.40D+1.60H	1	13.72	29.00	-15.34	15.34	45.08	0.82	46.72	Vu < PhiVc/2	lot Reqd 9.6.	46.7	0.0	0.0
+1.40D+1.60H	1	14.52	29.00	-17.53	17.53	31.82	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	1	15.33	29.00	-19.72	19.72	16.80	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	1	16.14	29.00	-21.91	21.91	0.00	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	1	16.94	29.00	-24.10	24.10	18.56	1.00	47.31	PhiVc/2 < Vu <=	Min 9.6.3.1	84.6	14.5	14.0
+1.40D+1.60H	1	17.75	29.00	-26.30	26.30	38.89	1.00	47.31	PhiVc/2 < Vu <=	Min 9.6.3.1	84.6	14.5	14.0
+1.40D+1.60H	1	18.56	29.00	-28.49	28.49	60.99	1.00	47.31	PhiVc/2 < Vu <=	Min 9.6.3.1	84.6	14.5	14.0
+1.40D+1.60H	1	19.36	29.00	-30.68	30.68	84.86	0.87	46.89	PhiVc/2 < Vu <=	Min 9.6.3.1	84.2	14.5	14.0
+1.40D+1.60H	2	20.17	29.00	27.39	27.39	110.49	0.60	45.98	PhiVc/2 < Vu <=	Min 9.6.3.1	83.3	14.5	14.0
+1.40D+1.60H	2	20.98	29.00	25.20	25.20	89.28	0.68	46.26	PhiVc/2 < Vu <=	Min 9.6.3.1	83.5	14.5	14.0
+1.40D+1.60H	2	21.78	29.00	23.01	23.01	69.83	0.80	46.63	Vu < PhiVc/2	lot Reqd 9.6.	46.6	0.0	0.0
+1.40D+1.60H	2	22.59	29.00	20.82	20.82	52.15	0.96	47.19	Vu < PhiVc/2	lot Reqd 9.6.	47.2	0.0	0.0
+1.40D+1.60H	2	23.40	29.00	18.63	18.63	36.24	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	2	24.20	29.00	16.43	16.43	22.10	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	2	25.01	29.00	14.24	14.24	9.72	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	2	25.82	29.00	12.05	12.05	0.88	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	2	26.62	29.00	9.86	9.86	9.72	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	2	27.43	29.00	7.67	7.67	16.80	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	2	28.24	29.00	5.48	5.48	22.10	0.60	45.98	Vu < PhiVc/2	lot Reqd 9.6.	46.0	0.0	0.0
+1.40D+1.60H	2	29.04	29.00	3.29	3.29	25.63	0.31	45.03	Vu < PhiVc/2	lot Reqd 9.6.	45.0	0.0	0.0
+1.40D+1.60H	2	29.85	29.00	1.10	1.10	27.40	0.10	44.33	Vu < PhiVc/2	lot Reqd 9.6.	44.3	0.0	0.0
+1.40D+1.60H	2	30.66	29.00	-1.10	1.10	27.40	0.10	44.33	Vu < PhiVc/2	lot Reqd 9.6.	44.3	0.0	0.0
+1.40D+1.60H	2	31.47	29.00	-3.29	3.29	25.63	0.31	45.03	Vu < PhiVc/2	lot Reqd 9.6.	45.0	0.0	0.0
+1.40D+1.60H	2	32.27	29.00	-5.48	5.48	22.10	0.60	45.98	Vu < PhiVc/2	lot Reqd 9.6.	46.0	0.0	0.0
+1.40D+1.60H	2	33.08	29.00	-7.67	7.67	16.80	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	2	33.89	29.00	-9.86	9.86	9.72	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	2	34.69	29.00	-12.05	12.05	0.88	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	2	35.50	29.00	-14.24	14.24	9.72	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	2	36.31	29.00	-16.43	16.43	22.10	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	2	37.11	29.00	-18.63	18.63	36.24	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	2	37.92	29.00	-20.82	20.82	52.15	0.96	47.19	Vu < PhiVc/2	lot Reqd 9.6.	47.2	0.0	0.0
+1.40D+1.60H	2	38.73	29.00	-23.01	23.01	69.83	0.80	46.63	Vu < PhiVc/2	lot Reqd 9.6.	46.6	0.0	0.0
+1.40D+1.60H	2	39.53	29.00	-25.20	25.20	89.28	0.68	46.26	PhiVc/2 < Vu <=	Min 9.6.3.1	83.5	14.5	14.0
+1.40D+1.60H	3	40.34	29.00	32.87	32.87	110.49	0.72	46.38	PhiVc/2 < Vu <=	Min 9.6.3.1	83.7	14.5	14.0
+1.40D+1.60H	3	41.15	29.00	30.68	30.68	84.86	0.87	46.89	PhiVc/2 < Vu <=	Min 9.6.3.1	84.2	14.5	14.0
+1.40D+1.60H	3	41.95	29.00	28.49	28.49	60.99	1.00	47.31	PhiVc/2 < Vu <=	Min 9.6.3.1	84.6	14.5	14.0
+1.40D+1.60H	3	42.76	29.00	26.30	26.30	38.89	1.00	47.31	PhiVc/2 < Vu <=	Min 9.6.3.1	84.6	14.5	14.0
+1.40D+1.60H	3	43.57	29.00	24.10	24.10	18.56	1.00	47.31	PhiVc/2 < Vu <=	Min 9.6.3.1	84.6	14.5	14.0

DESCRIPTION: GRBM - G7.3 - Under 8" Full Grouted CMU Wall

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.40D+1.60H	3	44.37	29.00	21.91	21.91	0.00	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	3	45.18	29.00	19.72	19.72	16.80	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	3	45.99	29.00	17.53	17.53	31.82	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	3	46.79	29.00	15.34	15.34	45.08	0.82	46.72	Vu < PhiVc/2	lot Reqd 9.6.	46.7	0.0	0.0
+1.40D+1.60H	3	47.60	29.00	13.15	13.15	56.57	0.56	45.86	Vu < PhiVc/2	lot Reqd 9.6.	45.9	0.0	0.0
+1.40D+1.60H	3	48.41	29.00	10.96	10.96	66.30	0.40	45.32	Vu < PhiVc/2	lot Reqd 9.6.	45.3	0.0	0.0
+1.40D+1.60H	3	49.21	29.00	8.77	8.77	74.25	0.29	44.95	Vu < PhiVc/2	lot Reqd 9.6.	44.9	0.0	0.0
+1.40D+1.60H	3	50.02	29.00	6.57	6.57	80.44	0.20	44.66	Vu < PhiVc/2	lot Reqd 9.6.	44.7	0.0	0.0
+1.40D+1.60H	3	50.83	29.00	4.38	4.38	84.86	0.12	44.42	Vu < PhiVc/2	lot Reqd 9.6.	44.4	0.0	0.0
+1.40D+1.60H	3	51.64	29.00	2.19	2.19	87.51	0.06	44.21	Vu < PhiVc/2	lot Reqd 9.6.	44.2	0.0	0.0
+1.40D+1.60H	3	52.44	29.00	-0.00	0.00	88.40	0.00	44.01	Vu < PhiVc/2	lot Reqd 9.6.	44.0	0.0	0.0
+1.40D+1.60H	3	53.25	29.00	-2.19	2.19	87.51	0.06	44.21	Vu < PhiVc/2	lot Reqd 9.6.	44.2	0.0	0.0
+1.40D+1.60H	3	54.06	29.00	-4.38	4.38	84.86	0.12	44.42	Vu < PhiVc/2	lot Reqd 9.6.	44.4	0.0	0.0
+1.40D+1.60H	3	54.86	29.00	-6.57	6.57	80.44	0.20	44.66	Vu < PhiVc/2	lot Reqd 9.6.	44.7	0.0	0.0
+1.40D+1.60H	3	55.67	29.00	-8.77	8.77	74.25	0.29	44.95	Vu < PhiVc/2	lot Reqd 9.6.	44.9	0.0	0.0
+1.40D+1.60H	3	56.48	29.00	-10.96	10.96	66.30	0.40	45.32	Vu < PhiVc/2	lot Reqd 9.6.	45.3	0.0	0.0
+1.40D+1.60H	3	57.28	29.00	-13.15	13.15	56.57	0.56	45.86	Vu < PhiVc/2	lot Reqd 9.6.	45.9	0.0	0.0
+1.40D+1.60H	3	58.09	29.00	-15.34	15.34	45.08	0.82	46.72	Vu < PhiVc/2	lot Reqd 9.6.	46.7	0.0	0.0
+1.40D+1.60H	3	58.90	29.00	-17.53	17.53	31.82	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	3	59.70	29.00	-19.72	19.72	16.80	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0
+1.40D+1.60H	3	60.51	29.00	-21.91	21.91	0.00	1.00	47.31	Vu < PhiVc/2	lot Reqd 9.6.	47.3	0.0	0.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					
Span # 1	1	20.170	-106.10	222.99	0.48
Span # 2	2	20.170	-110.49	222.99	0.50
Span # 3	3	20.170	-110.49	222.99	0.50
+1.40D+1.60H					
Span # 1	1	20.170	-106.10	222.99	0.48
Span # 2	2	20.170	-110.49	222.99	0.50
Span # 3	3	20.170	-110.49	222.99	0.50
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (**L)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (*L*)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (*LL)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (L**)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (L*L)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LL*)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LLL)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (**L)					

Concrete Beam

DESCRIPTION: GRBM - G7.3 - Under 8" Full Grouted CMU Wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (*L*)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (*LL)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (L**)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (L*L)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (LL*)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (LLL)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60Lr+L+1.60H, LL Comb Run (**L)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60Lr+L+1.60H, LL Comb Run (*L*)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60Lr+L+1.60H, LL Comb Run (*LL)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60Lr+L+1.60H, LL Comb Run (L**)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60Lr+L+1.60H, LL Comb Run (L*L)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60Lr+L+1.60H, LL Comb Run (LL*)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60Lr+L+1.60H, LL Comb Run (LLL)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (**L)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (*L*)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (*LL)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (L**)					
Span # 1	1	20.170	-90.94	222.99	0.41

DESCRIPTION: GRBM - G7.3 - Under 8" Full Grouted CMU Wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (L*L)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (LL*)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (LLL)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+L+1.60S+1.60H, LL Comb Run (**L)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+L+1.60S+1.60H, LL Comb Run (*L*)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+L+1.60S+1.60H, LL Comb Run (*LL)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+L+1.60S+1.60H, LL Comb Run (L**)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+L+1.60S+1.60H, LL Comb Run (L*L)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+L+1.60S+1.60H, LL Comb Run (LL*)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+L+1.60S+1.60H, LL Comb Run (LLL)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+1.60S+0.50W+1.60H					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (**L)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (*L*)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (*LL)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (L**)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (L*L)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (LL*)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42

Concrete Beam

DESCRIPTION: GRBM - G7.3 - Under 8" Full Grouted CMU Wall

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (LLL)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+L+0.50S+W+1.60H, LL Comb Run (**L)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+L+0.50S+W+1.60H, LL Comb Run (*L*)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+L+0.50S+W+1.60H, LL Comb Run (*LL)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+L+0.50S+W+1.60H, LL Comb Run (L**)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+L+0.50S+W+1.60H, LL Comb Run (L*L)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+L+0.50S+W+1.60H, LL Comb Run (LL*)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+L+0.50S+W+1.60H, LL Comb Run (LLL)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+0.90D+W+1.60H					
Span # 1	1	20.170	-68.21	222.99	0.31
Span # 2	2	20.170	-71.03	222.99	0.32
Span # 3	3	20.170	-71.03	222.99	0.32
+1.20D+L+0.20S+E+1.60H, LL Comb Run (**L)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+L+0.20S+E+1.60H, LL Comb Run (*L*)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+L+0.20S+E+1.60H, LL Comb Run (*LL)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+L+0.20S+E+1.60H, LL Comb Run (L**)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+L+0.20S+E+1.60H, LL Comb Run (L*L)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+L+0.20S+E+1.60H, LL Comb Run (LL*)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+1.20D+L+0.20S+E+1.60H, LL Comb Run (LLL)					
Span # 1	1	20.170	-90.94	222.99	0.41
Span # 2	2	20.170	-94.71	222.99	0.42
Span # 3	3	20.170	-94.71	222.99	0.42
+0.90D+E+0.90H					
Span # 1	1	20.170	-68.21	222.99	0.31
Span # 2	2	20.170	-71.03	222.99	0.32
Span # 3	3	20.170	-71.03	222.99	0.32

Concrete Beam

DESCRIPTION: GRBM - G7.3 - Under 8" Full Grouted CMU Wall

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft)	Load Combination	Max. "+" Defl (in)	Location in Span (ft)
D Only	1	0.0248	9.278	D Only	-0.0005	20.573
D Only	2	0.0019	10.085	D Only	-0.0015	18.153
D Only	3	0.0248	10.892		0.0000	18.153

ACP Loads

Paragon Garage

Dead Loads		
Item	Weight	
	(psf)	(plf)
13'x30" TT + 5psf	81	
24x24 Column		600
24x28 Column		699
28x28 Column		814
40IT30 + Wash		1075
40IT40 + Wash		1325
3" Wash		57
Grade Beam		1125
6" Topping (+4")	50	
10" Ext Wall	125	
12" Litewall	120	
Residential Flr	35	
Residential Wall	15	

Live Loads (psf)	
Floor	40
Roof	60
Stairs	100
Residential	40

Location	Tributarty Area	Floor Levels	Roof Levels	Column 24x24	Column 24x28	Column 28x28	40IT30	40IT40	3" Wash	Grade Beam	6" Topping	10" Ext Wall	12" Litewall	Residential Floor	Residential Wall	Pile Cap	DL	LL	TL	# of 18"Ø ACP	Spacing of ACP
	(ft^2)			(lf)	(lf)	(lf)	(lf)	(lf)	(lf)	(lf)	(ft^2)	(lf)	(lf) or (ft^2)	(ft^2)	(lf)	(lbs)				(#)	(ft)
GA Cont	31	3	1						4	1		56		14	50		19.48 klf	6.05 klf	25.53 klf		4.74
GB Cont	61	3	1						8	1			53				27.54 klf	10.89 klf	38.43 klf		3.15
GC Cont	31	3	1						4	1		56		14	50		19.48 klf	6.05 klf	25.53 klf		4.74
G1 Cont	1	3	1						4	1		56		14	50		9.92 klf	0.74 klf	10.66 klf		11.34
G4 Ramp	1	1	1						1	1	4	8					2.54 klf	0.10 klf	2.64 klf		45.72
GB/G1	514	1	0	56			9									63,563	147.95 k	20.57 k	752.17 k	7	
	1301	2	1					65									401.54 k	182.11 k			
GB/G2	1301	1	0	17			22									10,500	149.17 k	52.03 k	201.20 k	2	
GB/G3	787	1	0	56			13									63,563	174.84 k	31.46 k	789.95 k	7	
	1301	2	1					65									401.54 k	182.11			
GB/G6	1301	3	1										1580			82,031	693.07 k	234.14	927.21	8	
GB/G7	2602	3	1	56				22			1301		860			195,075	1268.29 k	468.27	1736.56	15	
GB/G8	0	3	1														0.00 k	0.00	0.00	0	
	0	3	1																		
	0	1																			
	0	3	1																		
	0	3	1																		
	0	3	1																		
	0	3	1																		
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	0	3	1																		
	0	3	1																		
	0	3	1																		
	0	3	1																		
	0	3	1																		

Paragon Star
Auger Cast Piles

40	ksf	Allowable End Bearing		
0.15	kcf	Weight of Concrete		
50	ft	Depth to Sandstone / Limestone (from 100'-0")		
0	psf	Skin Friction Bearing		
2160	psf	Skin Friction in Shale	(Equal to 15psi)	1440
720	psf	Skin Friction Uplift	(Equal to 5psi)	720

Pier Diameter	Bearing Area of Pier	Unreduced DL of Pier	Embedment Depth	Area for Skin Friction	Skin Friction Bearing	Skin Friction Uplift	End Bearing w/o Skin Friction	Allowable Bearing w/ Skin Friction	Allowable Uplift w/ Skin Friction 0.6D+Skin
(in)	(ft^2)	(kips)	(ft)	(ft^2)	(kips)	(kips)	(kips)	(kips)	(kips)
16	1.4	11	5	21	45	33	50	95	39
18	1.8	14	5	24	51	37	70	121	45
24	3.1	25	5	31	68	49	120	188	64
	0.0	0		0	0	0	0	0	0
	0.0	0		0	0	0	0	0	0
	0.0	0		0	0	0	0	0	0
	0.0	0		0	0	0	0	0	0
	0.0	0		0	0	0	0	0	0
	0.0	0		0	0	0	0	0	0
	0.0	0		0	0	0	0	0	0
	0.0	0		0	0	0	0	0	0
	0.0	0		0	0	0	0	0	0

Page 111 of 112

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4338 Belleview Ave. 816.531.4144
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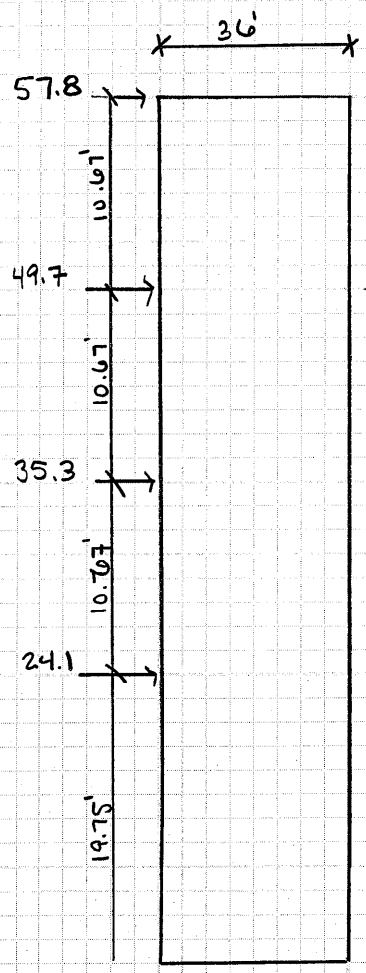
Project PARAGON GARAGE

Date _____ Page ___ of ___

GARAGE GRID G6 FDN

OVERTURNING MOMENT

M_{OT} = 24.1k (19.75)
35.1k (30.42)
49.7k (41.09)
+ 57.8k (51.76)
6577.62 k-ft



DEAD LOAD PANEL

12"/12 x 150 x 36' x 55' → 297k

DEAD LOAD SPANDREL SOUTH OF G6

12/12 x 150 x 4'-6" x 4 LEVELS x $\frac{41.67'}{2}$ → 56k

DEAD LOAD OF DBL TEES ON SPANDREL

4 LEVELS x $\frac{121'}{2}$ x $\frac{41.67}{2}$ x 76psf → 383k

RESISTING MOMENT

$0.6M_R$ = 0.6 (297 + 56 + 384) (36/2)
= 0.6 (13,266)
= 7959.6 k-ft

NO UPLIFT SINCE $0.6R_m > M_{OT}$