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Technical Report 2 Amendment

Table of Contents

List of Documents Used in Preparation of this Report	2
Adjusted Gravity Load	3
Adjusted Wind Load	5
Adjusted Seismic Load	10

Documents Used in Preparation of this Report

- Building Code of New York State
 - 2002 BCNYS (IBC 2000 adopted)
- American Society of Civil Engineers
 - ASCE 7-98: Minimum Design Loads for Buildings and Other Structures
- Vulcraft Deck Catalog
- EFCO Corporation's Catalog
- Common Wealth Curb Appeal Bluestone Guide

Angela Mincemoyer	Adjusted Gravity Load	Tech Report 2	44
<u>Misc. & Superimposed:</u>			
sprinklers = 5 psf			
→ Total roof dead load = 43.2 psf (typical)			
→ Total floor dead load = 87.5 psf (typical)			

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Gravity Load

Tech Report 2
Amendment

EXTERIOR WALL LOADS:

Zinc Panels (EW-4)

from page 15 of Tech Report 2

→ total dead load = 13.9 psf

Aluminum Storefronts

EFCO Corporation's System 960 Wall

→ total dead load = 12.0 psf

Composite Aluminum Panel (EW-3)

Composite aluminum wall panel = 2 psf

weather barrier = 1 psf

$\frac{3}{4}$ " plywood sheathing = 2.4 psf (ASCE 7-10)

6" metal studs @ 16" o.c. = 4 psf

spray foam insulation = 1 psf

$\frac{5}{8}$ " gypsum board = 2.5 psf

→ total dead load = 12.9 psf

Limestone Panel (EW-2)

$1\frac{1}{4}$ " limestone panel = 15 psf

$\frac{3}{4}$ " extruded polystyrene insulation = 0.5 psf

weather barrier = 1 psf

$\frac{1}{2}$ " gypsum sheathing = 2 psf (ASCE 7-10)

stainless steel stone anchor = 2 psf

6" metal studs @ 16" o.c. = 4 psf

spray foam insulation = 1 psf

$\frac{5}{8}$ " gypsum board = 2.5 psf

→ total dead load = 28 psf

Blue Stone Veneer (EW-1)

5" blue stone veneer = $(160 \text{ pcf}) (\frac{5}{12}) = 67 \text{ psf}$

→ Common Weath Curb Appeal - Bluestone Guide

1" cavity drainage mat = 2 psf

3" extruded polystyrene insulation = 2 psf

8" concrete foundation wall = $(150 \text{ pcf}) (\frac{8}{12}) = 100 \text{ psf}$

$\frac{1}{2}$ " polyisocyanurate insulation = 2 psf

$\frac{5}{8}$ " gypsum board = 2.5 psf

sheet water proofing = 1 psf

→ total dead load = 176.5 psf

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Wind Loads

Tech Report 2
AmendmentAtrium:

Per ASCE 7-98 Section 6.3

 A_o = total area of openings in a wall that receives positive external pressure

- openings are defined as apertures or holes in the building envelope which allow air to flow through the building envelope...
- The only opening in my building is the atrium roof. Therefore, $A_o = 0$ for the PRWC.
 - thus classifying the building as enclosed
- In order to account for the atrium opening, I will calculate the wind pressure on the atrium wall above the roof using external pressure and internal suction. (using the GC_{pi} calculated on page 29)

$$p = qGC_p - q_i(GC_{pi})$$

North-South Direction - Atrium:

	q	* G	* C _p	) - (	q _i	* G _{C_{pi}}	) =	p (psf)	* Area (sf)	=	Force (k)
Garden Level	11.55	* 0.805	* 0.8	) - (	-	* -	) =	7.44	* 182	=	1.4
Level 1	12.01	* 0.805	* 0.8	) - (	-	* -	) =	7.73	* 280	=	2.2
Level 2	14.25	* 0.805	* 0.8	) - (	-	* -	) =	9.18	* 280	=	2.6
Level 3	15.79	* 0.805	* 0.8	) - (	-	* -	) =	10.17	* 455	=	4.6
Roof	18.04	* 0.805	* 0.8	) - (	18.04	* -0.18	) =	14.86	* 315	=	4.7
Garden Level	18.04	* 0.805	* -0.5	) - (	-	* -	) =	-7.26	* 182	=	-1.3
Level 1	18.04	* 0.805	* -0.5	) - (	-	* -	) =	-7.26	* 280	=	-2.0
Level 2	18.04	* 0.805	* -0.5	) - (	-	* -	) =	-7.26	* 280	=	-2.0
Level 3	18.04	* 0.805	* -0.5	) - (	-	* -	) =	-7.26	* 455	=	-3.3
Roof	18.04	* 0.805	* -0.5	) - (	18.04	* 0.18	) =	-10.51	* 315	=	-3.3

WINDWARD

LEEWARD

Wind Load Base Shear

	Force (k)
Garden Level	2.7
Level 1	4.2
Level 2	4.6
Level 3	7.9
Roof	8.0
Total	27.4

East-West Direction - Atrium:

	q	G	C _p		q _i	G _{C_{pi}}	p (psf)	Area (sf)	Force (k)
Garden Level	11.55	* 0.832	* 0.8	- (-)	-	*	7.69	* 67	= 0.5
Level 1	11.6	* 0.832	* 0.8	- (-)	-	*	7.72	* 133	= 1.0
Level 2	13.99	* 0.832	* 0.8	- (-)	-	*	9.31	* 133	= 1.2
Level 3	15.61	* 0.832	* 0.8	- (-)	-	*	10.39	* 217	= 2.3
Roof	17.8	* 0.832	* 0.8	- (17.8 * -0.18)	-	*	15.05	* 150	= 2.3
Garden Level	17.8	* 0.832	* -0.29	- (-)	-	*	-4.29	* 67	= -0.3
Level 1	17.8	* 0.832	* -0.29	- (-)	-	*	-4.29	* 133	= -0.6
Level 2	17.8	* 0.832	* -0.29	- (-)	-	*	-4.29	* 133	= -0.6
Level 3	17.8	* 0.832	* -0.29	- (-)	-	*	-4.29	* 217	= -0.9
Roof	17.8	* 0.832	* -0.29	- (17.8 * 0.18)	-	*	-7.50	* 150	= -1.1

WINDWARD

LEEWARD

Wind Load Base Shear

	Force (k)
Garden Level	0.8
Level 1	1.6
Level 2	1.8
Level 3	3.2
Roof	3.4
Total	10.8

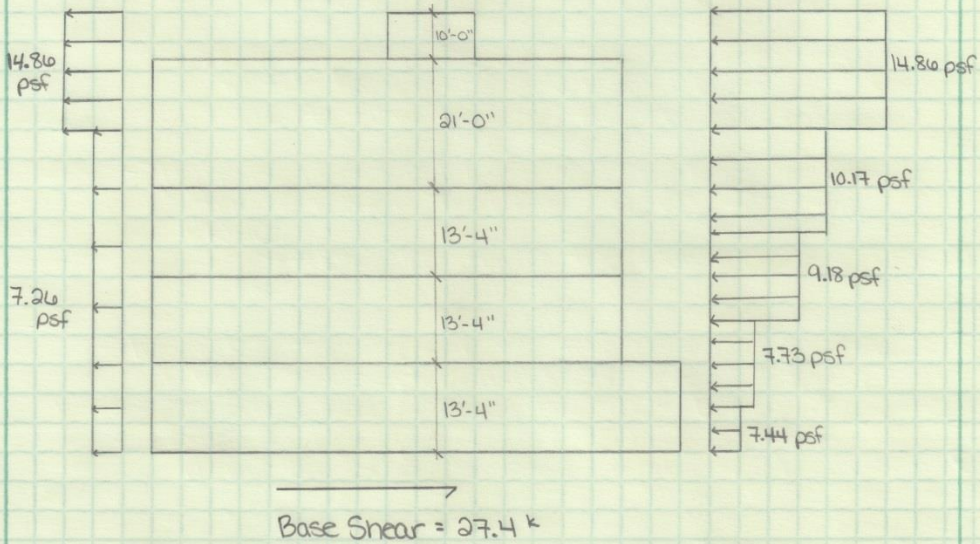
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Wind Load

Tech Report 2
Amendment

44 e

North-South Direction - Atrium:



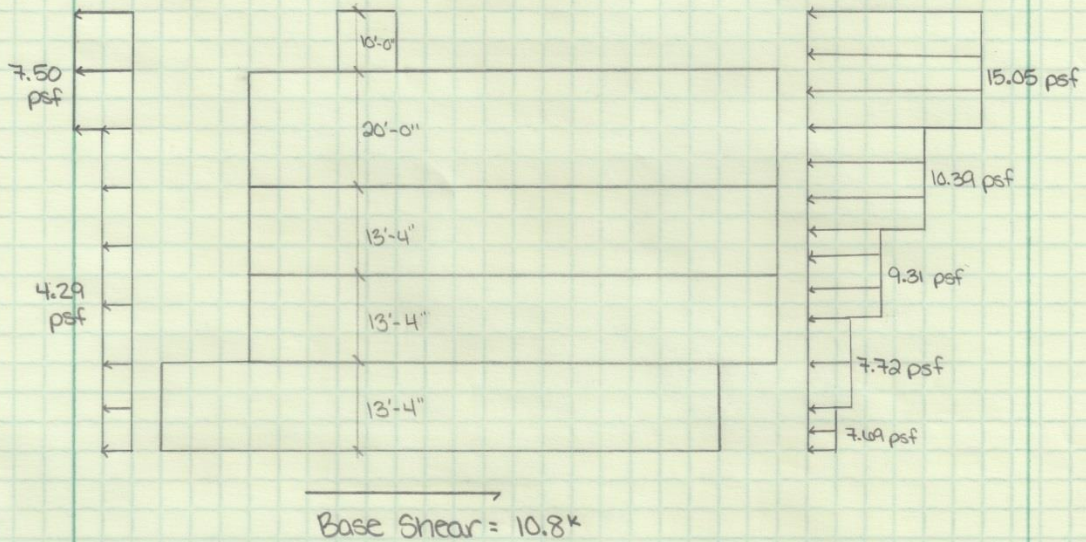
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Wind Load

Tech Report 2
Amendment

414

East-West Direction - Atrium:



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Seismic Load

Tech Report 2
Amendment

* continuation of table on page 42 *

$$F_x = 0.01 W_x$$

	W_x (k)	F_x (k)
Level 1		
typ Floor	1358	13.58
Green Roof	540	5.4
Deck	489	4.89
Level 2		
typ floor	1412	14.12
Level 3		
typ floor	1183	11.83
Green Roof	496	4.96
Roof		
typ Roof	769	7.69
Atrium		
typ Roof	10	0.10

$$W_1 = 13.58 + 5.4 + 4.89 \rightarrow W_1 = 23.87^k$$

$$W_2 = 14.12^k$$

$$W_3 = 11.83 + 4.96 \rightarrow W_3 = 16.79^k$$

$$W_R = 7.69^k$$

$$W_{\text{Atrium}} = 0.10^k$$

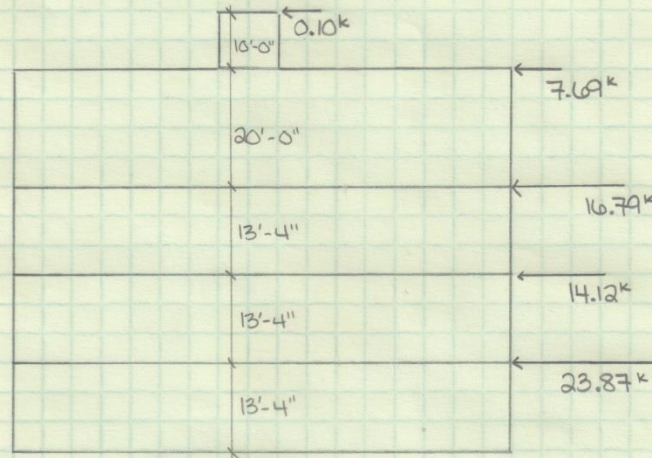
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Seismic Load

Tech Report 2
Amendment

4461

North-South and East-West Seismic Forces:



Base Shear = 62.59k

Seismic Forces Due to Exterior Walls

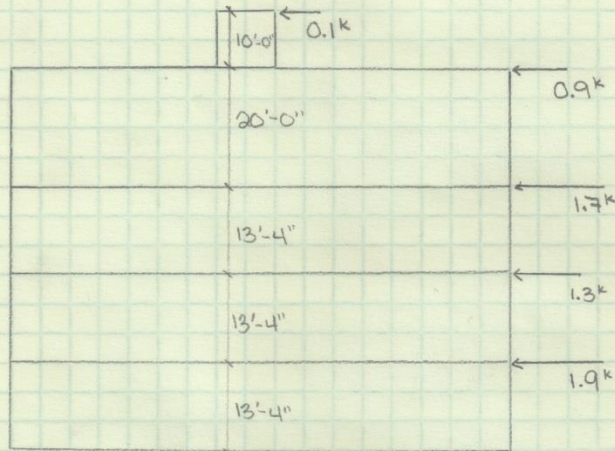
	Elevation	Zinc Panel Area (SF)	Aluminum Storefront Area (SF)	Aluminum Panel Area (SF)	Limestone Panel Area (SF)	Bluestone Veneer Area (SF)	Wx (kip)	Fx (kip)
Level 1								
	North	650.0	1766.0	674.8	0.0	32.5	44.7	0.447
	East	485.5	124.9	303.4	203.3	252.9	62.5	0.625
	South	538.7	634.2	307.2	454.3	85.0	46.8	0.468
	West	260.8	482.3	0.0	207.8	134.8	39.0	0.390
							$w_1 =$	1.9
Level 2								
	North	650.0	1569.2	371.9	490.8	0.0	46.4	0.5
	East	0.0	486.3	110.5	711.0	0.0	27.2	0.3
	South	502.1	1978.3	392.4	190.8	0.0	41.1	0.4
	West	271.0	482.3	0.0	342.6	0.0	19.1	0.2
							$w_2 =$	1.3
Level 3								
	North	791.9	1147.6	849.6	939.4	0.0	62.0	0.6
	East	0.0	658.4	0.0	924.2	0.0	33.8	0.3
	South	559.4	2503.5	144.9	489.1	0.0	53.4	0.5
	West	348.9	807.4	0.0	197.6	0.0	20.1	0.2
							$w_3 =$	1.7
Roof								
	North	1742.6	0.0	0.0	467.8	0.0	37.3	0.4
	East	597.1	0.0	0.0	177.2	0.0	13.3	0.1
	South	1749.8	159.4	0.0	21.9	0.0	26.8	0.3
	West	713.2	0.0	0.0	50.3	0.0	11.3	0.1
							$w_{roof} =$	0.9
Atrium								
	North	0.0	0.0	0.0	105.5	0.0	3.0	0.0
	East	0.0	0.0	0.0	42.0	0.0	1.2	0.0
	South	0.0	60.0	0.0	49.3	0.0	2.1	0.0
	West	0.0	0.0	0.0	50.3	0.0	1.4	0.0
							$w_{atrium} =$	0.1

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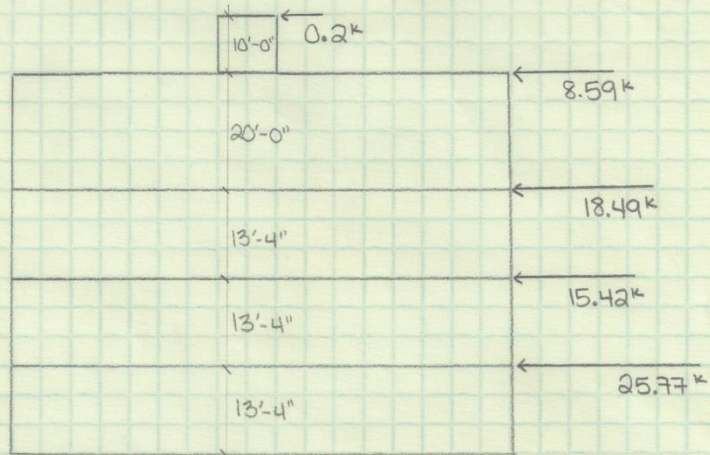
Seismic Load

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Seismic Forces Due to Exterior Walls:



Total Seismic Forces: Base Shear = 5.9k



Base Shear = 68.47k