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1. EXECUTIVE SUMMARY FROM TECHNICAL REPORT 1

The purpose of Technical Report 1 was to develop an understanding of the existing structural system of the Second & State Building, a five-story, 56,000 SF office building located in downtown Harrisburg, Pennsylvania.

The structural system consists of an ordinary, pin-connected steel superstructure supported by concrete caissons transferring building loads to bedrock. Floor and roof gravity loads are supported by a concrete slab on composite steel deck, resting on wide-flange beams and girders and transferred to the foundation by wide-flange columns. Lateral resistance is provided by a combination of perimeter moment connections and concentrically braced frames, with loads being collected and transferred via the floor diaphragm.

A typical 30’ x 36’ bay was analyzed in greater detail. Wide flange beams ranging from W21x44 to W24x84 span in the 36’ direction. Interior beams are supported by W24x76 and W24x84 girders spanning in the 30’ direction, and edge beams (and girders) are supported by W12x120 and W12x152 columns. Beam connections are pinned, with the exception of the edge beam-to-column connections, which are moment connections serving as part of the lateral load resisting system. Floor loads are transferred to the framing members through a 5” composite slab formed on 20 gage Vulcraft 1.5VLI steel deck oriented in the 30’ direction.

The Second & State Building was designed under the 2009 version of the Pennsylvania Uniform Construction Code (PUCC 2009), which adopts the 2009 International Building Code (IBC 2009), and, by reference, ASCE 7-05 for design loads, AISC 350-05 for steel design, and ACI 318-08 for concrete design.

Reduced plans for a typical floor, roof, mechanical penthouse, and typical braced frames are included in the appendix to Technical Report 1.

This report (Technical Report 2) contains research and calculations identifying and quantifying building loads for use in subsequent reports.
2. BUILDING DESCRIPTION & LOCATION

Constructed in 2012 and located one block from the State Capitol Complex, the Second & State Building is a five-story, steel frame structure housing retail on the ground level with four stories of office space above, for a total leasable area of approximately 56,000 square feet.

The Second & State Building was developed and is owned by WCI Partners of Harrisburg, PA. Architectural design services were provided by Bernardon Haber Holloway of Kennett Square, PA, with Baker, Ingram & Associates of Lancaster, PA completing structural design work. Warfel Construction of East Petersburg, PA provided construction management and served as the general contractor for the project.

FIGURE 1 SATELLITE IMAGE OF BUILDING SITE (RETRIEVED FROM GOOGLE MAPS 11 SEP 2013)
3. REFERENCED DOCUMENTS

Minimum Design Loads for Buildings and Other Structures (ASCE 7-05)


Structural Load Determination Under 2006 IBC and ASCE/SEI 7-05 (Design Guide)
4. GRAVITY LOADS

4.1 Roof Dead and Live Loads ................................................................. 7
4.2 Roof Snow Loads ........................................................................ 8
4.3 Floor Dead and Live Loads ............................................................ 11
4.4 Wall Dead Loads ......................................................................... 12
# Roof Loads

- **Sketch of Roof Assembly**
  - 60 mil TPO Membrane
  - R-25 Eave Insulation (4" thick)
  - VacCraft 20G 1.5 PSF Roof Deck
- **Roof Dead Loads**
  - 60 mil TPO Reflective Membrane: 0.31 PSF
  - R-25 Eave Insulation (4" thick, 1.5 PSF/ft)
  - VacCraft 20G 1.5 PSF Roof Deck: 3.54 PSF
  - Ceiling & Misc MEP: 15 PSF
  - **Total**: 24.8 PSF
- **Roof TYP Bay Framing Self-Weight**
  - W21 x 44 (6" x 36" - 0")
  - W24 x 84 (1" x 36" - 0")
  - W22 x 14 (1" x 6" - 0")
  - W21 x 76 (2" x 36" - 0")
  - A325 Bolts (approx. 150 @ 0.95#)
  - Misc: 250 #
  - **Total**: 1,790 #
  - **Area = 30'1" x 36'1" = 1080 SF --> 16.5 PSF**
- **Roof Live Load**
  - ASCE 7-05 Code Minimum: 20 PSF
  - Value Used in Design: 30 PSF
- **Flat-Roof Snow Load**
  - Calculated using ASCE 7-05 L Matches Value Used in Design: 21 PSF
Floor Loads

Sketch of Floor Assembly

- 6x6 - 0.129 x 0.129 wood
- 3.5" non-structural topping (5" total depth)
- Nucraft 20G3 1.5x1.5 floor deck

Floor Dead Loads

- 5" nominal wt slab on 1.5x1.5 deck: 51 psf
- Nucraft 20G3 1.5x1.5 floor deck: 2.14 psf
- Carpet & pad: 2.0 psf
- Ceiling & misc. MEP: 15 psf
- Total: 70.2 psf

Floor Tip, Flat, Framing, Self Weight

- Same as roof, plus:
  - Studs (approx 200 @ 0.6 #) 120 #
  - Area = 30' x 36' = 1080 sq ft
  - Total: 127.8 psf

Floor Live Loads

<table>
<thead>
<tr>
<th>Category</th>
<th>ASCE Min.</th>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offices (floor only)</td>
<td>50 psf</td>
<td>80 psf</td>
</tr>
<tr>
<td>Partitions</td>
<td>15 psf</td>
<td>20 psf</td>
</tr>
<tr>
<td>Offices (floor + partition)</td>
<td>65 psf</td>
<td>100 psf</td>
</tr>
<tr>
<td>Corridors above 1st floor</td>
<td>80 psf</td>
<td>N/A</td>
</tr>
<tr>
<td>Stairs</td>
<td>100 psf</td>
<td>100 psf</td>
</tr>
<tr>
<td>Storage Areas (near elevators)</td>
<td>250 psf</td>
<td>250 psf</td>
</tr>
</tbody>
</table>
FLAT-ROOF SNOW LOAD

- DETERMINE GROUND SNOW LOAD ($P_g$)
  
  BY MAP, $P_g = 30$ PSF

- DETERMINE EXPOSURE FACTOR ($C_e$)
  
  URBAN AREA © SURFACE ROUGHNESS = "B"  
  (§ 6.5.6.2)  
  (TABLE 7-2)  
  $C_e = 1.0$

- DETERMINE THERMAL FACTOR ($C_t$)
  
  DOES NOT MEET EXCEPTIONS IN TABLE 7-3  
  $C_t = 1.0$  
  (TABLE 7-3)

- DETERMINE SNOW LOAD IMPORTANCE FACTOR (I)
  
  NON-ESSENTIAL OFFICE © CATEGORY II  
  (TABLE 1-1)  
  $I = 1.0$  
  (TABLE 7-4)

- CALCULATE ALTERNATIVE MINIMUM SNOW LOAD ($P_{1.0, min}$)
  
  $P_g = 30$ PSF > 20 PSF
  $P_{1.0, min} = 20 I = 20 (1.0) = 20$ PSF  
  (§ 7.3)

- CALCULATE FLAT-ROOF SNOW LOAD ($P_f$)
  
  $P_f = 0.17 C_e C_t P_g \geq P_{1.0, min}$
  
  $= 0.17 (1.0)(1.0)(30) \geq 20$
  
  $21 \geq 20 \text{ OK}$

  $P_f = 21$ PSF

- COMPARE TO EXISTING DESIGN

  CALCULATED FLAT-ROOF SNOW LOAD MATCHES VALUE LISTED IN STRUCTURAL NOTES. OK.
SNOW LOADS

\[ E/W: \]

\[ N/S: \]

\[ \text{Determine snow density (}\gamma\text{)} \]

\[ \gamma = 0.15P_g + 14 \leq 30 \text{ PCE} \]

\[ = (0.15)(30) + 14 = 17.9 \leq 30 \]

\[ \therefore \gamma = 17.9 \text{ PCE} \]

\[ \text{Determine height of balanced snow load (}\hat{h}_b\text{)} \]

\[ \hat{h}_b = \frac{\gamma}{\gamma} = \frac{21}{17.9} = 1.17' \]

\[ \text{Determine clear height above balanced snow load (}\hat{h}_c\text{)} \]

\[ \hat{h}_c = \text{height above} - \hat{h}_b \]

\[ = (12') - (11.17') \]

\[ \therefore \hat{h}_c = 10.83' \]

\[ \text{Determine snow drift heights (}\hat{h}_d\text{)} \]

\[ \#1 \text{ leeward (}\hat{l}_u = 71.5'\text{)} \]

\[ \hat{h}_d = 0.43 \frac{\gamma}{\gamma} P_g + 10 - 1.5 \]

\[ = 0.43 \frac{17.9}{17.9} \frac{4}{30} + 10 - 1.5 = 2.98' \]

\[ \text{windward (}\hat{l}_u = 42.5'\text{)} \]

\[ \hat{h}_d = \frac{1}{4} (0.43 \frac{\gamma}{\gamma} P_g + 10 - 1.5 \]

\[ = \frac{1}{4} (0.43 \frac{17.9}{17.9} \frac{4}{30} + 10 - 1.5 = 1.38' \]

\[ \text{leeeward controls} \rightarrow \hat{h}_{d1} = 2.98' \]
#2) LEWANDO (\(h_4 = 43.3\))
\[h_2 = 0.43 \cdot \frac{3.1}{\sqrt{30+10} - 1.5} = 2.30\]

WINDWARD (\(h_4 = 90\))
\[h_2 = \frac{9}{5} \cdot \frac{3.1}{\sqrt{30+10} - 1.5} = 1.86\]

LEWANDO CONTROLS \(h_2 = 2.30\)

#3) LEWANDO (\(h_4 = 43.3\))
\[h_2 = 0.43 \cdot \frac{3.1}{\sqrt{30+10} - 1.5} = 2.30\]

WINDWARD (\(h_4 = 90\))
\[h_2 = \frac{9}{5} \cdot \frac{3.1}{\sqrt{30+10} - 1.5} = 0.558\]

LEWANDO CONTROLS \(h_2 = 2.30\)

* DETERMINE SNOW DEPTH WIDTHS (\(w\))

In all cases, \(h_2 < h_4 = 1018.3\)

So \(w = 4h_2\)

#1) \(w = 4(2.30') = 9.20'\), \(h_2 = 2.30'\)

#2) \(w = 4(2.30') = 9.20'\), \(h_2 = 2.30'\)

#3) \(w = 4(2.30') = 9.20'\), \(h_2 = 2.30'\)
WALL LOADS

1. Sketch of Typical Exterior Wall Assembly
   - Metal Studs
   - 5/8" Glass Mat Sheathing
   - 30# Building Paper
   - R-15 Rigid Insulation (2"
   - Masonry Veneer (4" - 6"

2. Wall Dead Loads
   - Metal Studs @ 16" OC: 2 PSF
   - 5/8" Glass Mat Sheathing: 2.8 PSF
   - 30# Building Paper: 0.3 PSF
   - R-15 Rigid Insulation (2" @ 15 PSF/lin): 1.5 PSF
   - Masonry Veneer (avg. 5" @ 15 PSF/lin): 7.5 PSF
   - Misc. lintels, kickers, plates, etc: 10 PSF
   - Total: 94.6 PSF

3. Wall Dead Load Path
   - Steel Studs
   - Concrete Slab & Deck
   - Masonry Anchor @ 16"
5. WIND LOADS

5.1 Wind Load Calculations ............................................................................................................. 14

5.2 Wind Pressure vs Height Diagrams .......................................................................................... 19
NOTE: USE ANALYTICAL PROCEDURE OF ASCE 7-05 E 6.5

* FOR WIND FROM SOUTH:

\[ L(\text{ANG}) = \frac{83 + 102 + 92}{3} = 92.3' \]
\[ B = 130' \]
\[ h = 72' \]
\[ A = 9360 \text{ SF} \]

* FOR WIND FROM WEST:

\[ L(\text{ANG}) = \frac{130 + 19 + 71}{3} = 106.7' \]
\[ B = 102' \]
\[ h = 72' \]
\[ A = 7340 \text{ SF} \]
Determine basic wind speed (V)

\[ V = 90 \text{ MPH} \]

Determine Importance Factor (I)

Non-Essential Office, Category II

\[ V = 90 \text{ MPH} \quad I = 1.0 \]

Determine Exposure Category

Ocean Area, Surface Roughness = "B"  

\[ 8.6.3.1.2 \]

Roughness "B" continues for miles to West, but river is One Block (2600') to the South.

East = Exposure "B"

West = Exposure "B"

Determine Rigidity or Structure

Approximate Fundamental Frequency (\( f_i \))

Method 1:

\[ n_1 = \frac{16.2}{H_{50}} = 0.13 \text{ Hz} \] (Flexible)  

Equation (6-1)

Method 2:

\[ n_1 = \frac{100}{H} = 1.5 \text{ Hz} \] (Eligible)  

Equation (6-13)

\[ n_1 = \frac{32}{H} = 1.0 \text{ Hz} \] ("""

Equation (6-15)

Methods:

\[ n_1 = \frac{150}{H} = 2.0 \text{ Hz} \] (""

Equation (6-19)

\[ n_1 = \frac{16.2}{H} = 2.18 \text{ Hz} \] (""

Equation (6-21)

Rigid or Flexible? The more conservative methods from the Commentary (6-14) yield stiff results. I will classify the structure as "Rigid," as did the Project Engineers.

Determine Gust Effect Factor

Stiff Structure, \( G = 0.65 \)

Equation (6-1.1)

Determine Enclosure Classification

No operable windows or other openings

Enclosed Building

Equation (6.2)
Determine Topographic Factor ($k_{2b}$)

Site conditions do not meet E 6.5.7.1

$$k_{2b} = 1.0$$

Determine Wind Directionality Factor ($k_d$)

Building exposure $k_d = 0.85$  

Calculate Velocity Pressures ($q_{in}$)

**West (Exposure "B")**

$$\alpha = 7.0 \quad \frac{z}{c} = 1200$$

Example calculation at 2nd floor ($z = 16.5'$)

$$k_{16} = 2.01 \left[ 1 \right]^{2/4} = 2.01 \left[ \frac{16.5}{1200} \right]^{2/4} = 0.1591$$

$$q_{in} = 0.00256 \times k_2 \times k_{16} \times k_d \times V^2 \times I$$

$$= 0.00256 \times (0.591) \times (1.0) \times (0.85) \times (90)^2 \times (1.0)$$

$$= 10.4 \text{ PSF}$$

**South (Exposure "C")**

$$\alpha = 9.5 \quad \frac{z}{c} = 900$$

Example calculation at 2nd floor ($z = 16.5'$)

$$k_{16} = 2.01 \left[ 1 \right]^{2/4} = 2.01 \left[ \frac{16.5}{900} \right]^{2/4} = 0.1867$$

$$q_{in} = 0.00256 \times k_2 \times k_{16} \times k_d \times V^2 \times I$$

$$= 0.00256 \times (0.591) \times (1.0) \times (0.85) \times (90)^2 \times (1.0)$$

$$= 15.3 \text{ PSF}$$

Velocity pressures for subsequent levels are calculated using the same method and tabulated with other results at end.
## Wind Loads

* Determine internal pressure coefficient (\(G_{CP,i}\))

- Enclosed \(G_{CP,i} = 0.15 \text{ PSF}\)  
  \((\text{Fig. 6-5})\)

* Determine external pressure coefficients (\(G_P\))

<table>
<thead>
<tr>
<th></th>
<th>West</th>
<th>South</th>
</tr>
</thead>
<tbody>
<tr>
<td>L/B</td>
<td>1.05</td>
<td>0.71</td>
</tr>
<tr>
<td>Windowed Wall</td>
<td>0.80</td>
<td>0.80  ((\text{Fig. 6-6}))</td>
</tr>
<tr>
<td>Leeward Wall</td>
<td>-0.49</td>
<td>-0.50 ((\text{Fig. 6-6}))</td>
</tr>
<tr>
<td>Side</td>
<td>-0.70</td>
<td>-0.70 ((\text{Fig. 6-6}))</td>
</tr>
<tr>
<td>H/L</td>
<td>0.64</td>
<td>0.78</td>
</tr>
<tr>
<td>Roof (0 to (h/2))</td>
<td>-1.04</td>
<td>-1.12 ((\text{Fig. 6-6}))</td>
</tr>
<tr>
<td></td>
<td>(&gt; h/2)</td>
<td>-0.52 ((\text{Fig. 6-6}))</td>
</tr>
</tbody>
</table>

* Calculate design wind pressures (\(P_{de}\))

**West (Windowed)**

- Enclosed \(G_{CP} = 2.01 \left( \frac{\text{h}^2}{1000} \right) = 0.899\)

\(Q_{de} = 0.0105\sqrt{(0.099)(1.10)(0.65)(0.70)} = 15.8 \text{ PSF} = Q_i\)

**Example calculation at 2nd floor (\(z = 16.5'\))**

\[P_{de} = Q_i G_{CP} - Q_i (G_{CP,de})\]  
\[(\text{Eq. 6-17})\]

\[= (10.4)(0.95)(0.05) + (15.8)(0.15)\]

\[= 4.25 \text{ PSF}\]

**South (Windward)**

- Enclosed \(G_{CP} = 1.01 \left( \frac{\text{h}^2}{400} \right) = 1.18\)

\(Q_{de} = 0.0102\sqrt{(1.16)(1.10)(0.65)(0.70)} = 20.8 \text{ PSF} = Q_i\)

**Example calculation at 2nd floor (\(z = 16.5'\))**

\[P_{de} = (15.3)(0.95)(0.05) + (20.8)(0.15)\]

\[= 6.67 \text{ PSF}\]
### Wind Loads

<table>
<thead>
<tr>
<th>Location</th>
<th>Pressure (PSF)</th>
<th>B</th>
<th>F</th>
<th>M</th>
<th>Rotation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>West Facade</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1</td>
<td>0.0&quot; - 0.6&quot;</td>
<td>0.375</td>
<td>0.01</td>
<td>0.1</td>
<td>16.62</td>
</tr>
<tr>
<td>L2</td>
<td>1.6&quot; - 6.6&quot;</td>
<td>0.591</td>
<td>0.14</td>
<td>0.4</td>
<td>13.57</td>
</tr>
<tr>
<td>L3</td>
<td>7.6&quot; - 9.0&quot;</td>
<td>0.799</td>
<td>1.30</td>
<td>2.1</td>
<td>13.57</td>
</tr>
<tr>
<td>L4</td>
<td>10.6&quot; - 12.0&quot;</td>
<td>0.912</td>
<td>1.64</td>
<td>2.6</td>
<td>13.57</td>
</tr>
<tr>
<td>L5</td>
<td>13.0&quot; - 14.6&quot;</td>
<td>0.912</td>
<td>1.64</td>
<td>2.6</td>
<td>13.57</td>
</tr>
<tr>
<td>L6</td>
<td>14.6&quot; - 16.0&quot;</td>
<td>0.912</td>
<td>1.64</td>
<td>2.6</td>
<td>13.57</td>
</tr>
<tr>
<td>PH</td>
<td>16.0&quot; - 17.6&quot;</td>
<td>0.912</td>
<td>1.64</td>
<td>2.6</td>
<td>13.57</td>
</tr>
<tr>
<td><strong>South Facade</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1</td>
<td>0.0&quot; - 0.6&quot;</td>
<td>0.424</td>
<td>0.10</td>
<td>0.1</td>
<td>24.48</td>
</tr>
<tr>
<td>L2</td>
<td>1.6&quot; - 6.6&quot;</td>
<td>0.567</td>
<td>0.14</td>
<td>0.3</td>
<td>18.79</td>
</tr>
<tr>
<td>L3</td>
<td>7.6&quot; - 9.0&quot;</td>
<td>0.767</td>
<td>1.30</td>
<td>2.2</td>
<td>13.57</td>
</tr>
<tr>
<td>L4</td>
<td>10.6&quot; - 12.0&quot;</td>
<td>0.912</td>
<td>1.64</td>
<td>2.6</td>
<td>13.57</td>
</tr>
<tr>
<td>L5</td>
<td>13.0&quot; - 14.6&quot;</td>
<td>0.912</td>
<td>1.64</td>
<td>2.6</td>
<td>13.57</td>
</tr>
<tr>
<td>L6</td>
<td>14.6&quot; - 16.0&quot;</td>
<td>0.912</td>
<td>1.64</td>
<td>2.6</td>
<td>13.57</td>
</tr>
<tr>
<td>PH</td>
<td>16.0&quot; - 17.6&quot;</td>
<td>0.912</td>
<td>1.64</td>
<td>2.6</td>
<td>13.57</td>
</tr>
<tr>
<td><strong>Roof</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PH</td>
<td>20.0&quot; - 21.6&quot;</td>
<td>0.912</td>
<td>1.64</td>
<td>2.6</td>
<td>13.57</td>
</tr>
</tbody>
</table>

**Wind from West**

- Pressure: 15.8 PSF; \( \frac{h}{2} = 3.6' \)
- Calculation: \( \frac{15.8 \times 0.85 \times 1.04}{1.2} = 15.8 \) PSF

**Wind from South**

- Pressure: 20.18 PSF; \( \frac{h}{2} = 3.6' \)
- Calculation: \( \frac{20.18 \times 0.85 \times 1.04}{1.2} = 20.18 \) PSF

---

*JADOT A MOOSMAN  STRUCTURAL OPTION*  
*FACULTY ADVISOR DR. THOMAS E. BOOTHBY*
6. SEISMIC LOADS

6.1 Seismic Factors and Calculations ................................................................. 21

6.2 Seismic Force vs Height Diagram ............................................................... 22
1. Site Classification & Location

Site Class = "E" (per Tech Geotech Report)
Occurrence Category = "III" (Non-Essential Office)
Location: 40.26 N, 76.88 W
Importance Factor = 1.0 (Table 11.6-1)

2. Spectral Response Accelerations/Coefficients

(USGS Values from USGS US Seismic Design Maps)

<table>
<thead>
<tr>
<th>USGS</th>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>0.1896</td>
</tr>
<tr>
<td>S2</td>
<td>0.0528</td>
</tr>
<tr>
<td>S1 = 2.15 S2</td>
<td>0.1888</td>
</tr>
<tr>
<td>S11 = 3.5 S1</td>
<td>0.0538</td>
</tr>
<tr>
<td>S3 = ( \frac{3}{2} S2 )</td>
<td>0.1268</td>
</tr>
<tr>
<td>S12 = ( \frac{3}{2} S1 )</td>
<td>0.0359</td>
</tr>
</tbody>
</table>

Note: USGS Values used in calculations

3. Determine Approximate Fundamental Period (\( T_a \))

\[ T_a = C_4 h_a^x \]

Where:
- \( C_4 = 0.028 \) (Steel Moment Frame) (Table 12.8-2)
- \( h_a = 84.4' \) (Penthouse Roof HT)
- \( x = 0.8 \) (Steel Moment Frame) (Table 12.8-2)

\[ T_a = (0.028)(84.4)^{0.8} = 0.938 \]

4. Determine Seismic Design Category

\[ S_1 = 0.053 \times 0.975 \]

Check: \( T_a < 0.873 \times 0.975 \times 0.8 \times \frac{0.053}{0.126} = 0.978 \times \text{No Good} \)

So, use Table 11.6-2. \( S_1 \) Category = "A"
### Seismic Loads

**Determine Dead Load & Force Per Level**

<table>
<thead>
<tr>
<th>Level</th>
<th>Height</th>
<th>Acreage</th>
<th>Acreages</th>
<th>Windloads</th>
<th>Forces</th>
<th>Moments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0-0&quot;</td>
<td>10076</td>
<td>10076</td>
<td>6683</td>
<td>1340</td>
<td>13.4</td>
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<tr>
<td>2</td>
<td>11-12&quot;</td>
<td>10076</td>
<td>5586</td>
<td>1217</td>
<td>12.2</td>
<td>200.8</td>
</tr>
<tr>
<td>3</td>
<td>20-10&quot;</td>
<td>10076</td>
<td>5386</td>
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<td>12.2</td>
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**Case**

FLOOR DL = 70.2 PSF
Roof DL = 24.8 PSF
WALL DL = 94.1 PSF

**Forces Per Acre** 7-05 § 11.7.2 (F<sub>x</sub> = 0.01 W<sub>x</sub>)

Calculated base shear (70.2 K) is substantially larger than design value (54 K), suggesting dead load values may be too conservative.

### Seismic Loading vs Height

- PH: 0 K
- LE: 7.1 K
- L1: 12.2 K
- L2: 12.2 K
- L3: 12.2 K
- L4: 12.2 K
- L5: 12.2 K
- L6: 12.2 K

Base shear = 70.2 K

G: Moment = 2383.5 ft-k