Snow Drift Load Calculations

General

- Ground snow load: p_g = 30 psf
- Design snow load: p_s = 30 psf
- Snow density: $\gamma = 0.13 \cdot p_g + 14$ = 17.9 pcf
- Height of balanced snow load: $h_b = p_s \cdot \gamma$ = 1.6 ft

Existing Area

- Height from top of balanced snow load to roof: h_c = 10.5 ft
- $h_c / h_b > 0.2$ -> snow drift applicable

Windward

- Length of lower roof: S_{LR} = 26.9 ft
- Windward drift height: $h_d = 0.75 \cdot (0.43 \cdot S_{LR}^{1/3} \cdot (p_g + 10)^{1/4} - 1.5)$ = 1.3 ft
- Width of snow drift load: $w = 4 \cdot h_d$ = 5.2 ft
- Snow drift load: $p_d = h_d \cdot \gamma$ = 23.3 psf

Leeward

Not considered as upper roof has a parapet

Service Area

- Height from top of balanced snow load to roof: h_c = 6.8 ft
- $h_c / h_b < 0.2$ -> snow drift applicable

Windward - governing

- Length of lower roof: S_{LR} = 72.9 ft
- Windward drift height: $h_d = 0.75 \cdot (0.43 \cdot S_{LR}^{1/3} \cdot (p_g + 10)^{1/4} - 1.5)$ = 2.3 ft
- Width of snow drift load: $w = 4 \cdot h_d$ = 9.2 ft
- Snow drift load: $p_d = h_d \cdot \gamma$ = 41.2 psf

Leeward - not governing

- Length of upper roof: S_{UR} = 29.7 ft
- Leeward drift height: $h_d = (0.43 \cdot S_{LU}^{1/3} \cdot (p_g + 10)^{1/4} - 1.5)$ = 1.9 ft

Mezzanine

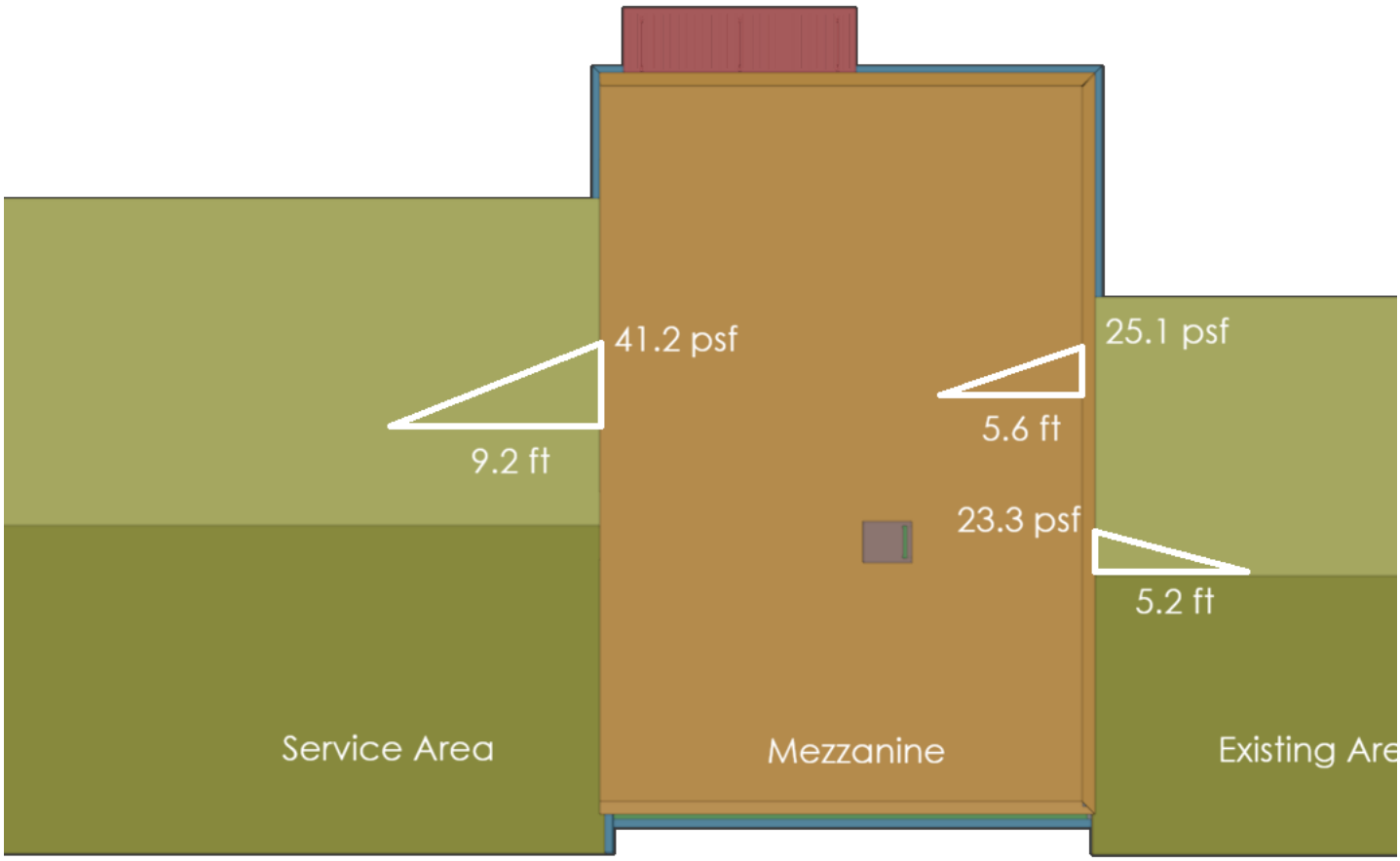
- Height from top of balanced snow load to roof: h_c = 3.4 ft
- $h_c / h_b < 0.2$ -> snow drift applicable

Windward

- Length of lower roof: S_{LR} = 29.7 ft
- Windward drift height: $h_d = 0.75 \cdot (0.43 \cdot S_{LR}^{1/3} \cdot (p_g + 10)^{1/4} - 1.5)$ = 1.4 ft
- Width of snow drift load: $w = 4 \cdot h_d$ = 5.6 ft
- Snow drift load: $p_d = h_d \cdot \gamma$ = 25.1 psf

Leeward

No upper roof exists


41.2 psf
9.2 ft
25.1 psf
5.6 ft
23.3 psf
5.2 ft
Service Area
Mezzanine
Existing Are