

Requirements for Unreinforced Masonry Foundation Walls				
Maximum Wall Height (ft.)	Max. Unbalanced Backfill Height ³ (ft.)	Plain Masonry ¹ Minimum Nominal Wall Thickness (in.)		
		Soil Classes ²		
		GW, GP, SW and SP	GM, GC, SM, SM-SC and ML	SC, MH, ML-CL and Inorganic CL
5	4	6 solid ⁴ or 8	6 solid ⁴ or 8	6 solid ⁴ or 8
	5	6 solid ⁴ or 8		
6	4	6 solid ⁴ or 8	6 solid ⁴ or 8	6 solid ⁴ or 8
	5	6 solid ⁴ or 8	8	10
	6	8	10	12
7	4	6 solid ⁴ or 8	8	8
	5	6 solid ⁴ or 8	10	10
	6	10	12	10 solid ⁴
	7	12	10 solid ⁴	12 solid ⁴
8	4	6 solid ⁴ or 8	6 solid ⁴ or 8	8
	5	6 solid ⁴ or 8	10	12
	6	10	12	12 solid ⁴
	7	12	12 solid ⁴	Note 6
	8	10 solid ⁴	12 solid ⁴	Note 6
9	4	6 solid ⁴ or 8	6 solid ⁴ or 8	8
	5	8	10	12
	6	10	12	12 solid ⁴
	7	12	12 solid ⁴	
	8	12 solid ⁴	Note 5	Note 5
	9	Note 5	Note 5	Note 5

- Notes: 1. Mortar shall be Type M or Type S and masonry shall be laid in running bond. UngROUTED hollow masonry units are permitted except where otherwise indicated.
2. Soil classes are in accordance with Unified Soil Classification System.
3. Unbalanced backfill height is the difference in height of the exterior and interior finish ground levels. Where an interior concrete slab is provided, the unbalanced backfill height shall be measured from the exterior finish ground level to the top of the interior concrete slab.
4. Solid grouted hollow units or solid masonry units (i.e. having core area less than 25%).
5. Wall construction shall be reinforced as required for Reinforced Masonry Foundation Walls.

Figure 13-8 Requirements for unreinforced masonry foundation walls. (From International Residential Code for One- and Two-Family Dwellings, 2003.)

13.3 RETAINING WALLS

Because retaining walls are often used in landscape applications and may not enclose habitable space, attention to design and detailing is often cursory. However, the walls are exposed to extremes of weather, are in contact with earth, are often saturated with moisture, and must resist significant lateral forces. Such severity of use and exposure demands careful attention to design and details.

13.3.1 Traditional Retaining Wall Types

There are four basic types of traditional masonry retaining walls (see Fig. 13-16). Reinforced cantilever walls offer the most economical design, and are most commonly used. The vertical stem is reinforced to resist tensile stress-

Minimum Vertical Reinforcement Size and Spacing ^{1,2} for 8-in. Nominal Masonry ³ Foundation Wall Thickness				
Maximum Wall Height (ft.)	Maximum Unbalanced Backfill Height ⁵ (ft.)	Soil Classes ⁴		
		GW, GP, SW, and SP	GM, GC, SM, SM-SC, and ML	SC, MH, ML-CL, and Inorganic CL
6	5	#4 @ 48" o.c.	#4 @ 48" o.c.	#4 @ 48" o.c.
	6	#4 @ 48" o.c.	#4 @ 40" o.c.	#5 @ 48" o.c.
7	4	#4 @ 48" o.c.	#4 @ 48" o.c.	#4 @ 48" o.c.
	5	#4 @ 48" o.c.	#4 @ 48" o.c.	#4 @ 40" o.c.
	6	#4 @ 48" o.c.	#5 @ 48" o.c.	#5 @ 40" o.c.
	7	#4 @ 40" o.c.	#5 @ 40" o.c.	#6 @ 48" o.c.
8	5	#4 @ 48" o.c.	#4 @ 48" o.c.	#4 @ 40" o.c.
	6	#4 @ 48" o.c.	#5 @ 48" o.c.	#5 @ 40" o.c.
	7	#5 @ 48" o.c.	#6 @ 48" o.c.	#6 @ 40" o.c.
	8	#5 @ 40" o.c.	#6 @ 40" o.c.	#6 @ 24" o.c.
9	5	#4 @ 48" o.c.	#4 @ 48" o.c.	#5 @ 48" o.c.
	6	#4 @ 48" o.c.	#5 @ 48" o.c.	#6 @ 48" o.c.
	7	#5 @ 48" o.c.	#6 @ 48" o.c.	#6 @ 32" o.c.
	8	#5 @ 40" o.c.	#6 @ 32" o.c.	#6 @ 24" o.c.
	9	#6 @ 40" o.c.	#6 @ 24" o.c.	#6 @ 16" o.c.

- Notes: 1. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall are permitted provided the spacing of the reinforcement does not exceed 72 in.
2. Vertical reinforcement must be Grade 60 minimum. The distance from the face of the soil side of the wall to the center of the vertical reinforcement must be at least 5 in.
3. Mortar shall be Type M or Type S and masonry shall be laid in running bond.
4. Soil classes are in accordance with Unified Soil Classification System.
5. Unbalanced backfill height is the difference in height of the exterior and interior finish ground levels. Where an interior concrete slab is provided, the unbalanced backfill height shall be measured from the exterior finish ground level to the top of the interior concrete slab.

Figure 13-9 Requirements for 8-in.-thick masonry foundation walls. (From International Residential Code for One- and Two-Family Dwellings, 2003.)

es. The concrete footing anchors the stem and resists overturning and sliding due to both vertical and lateral forces. Proprietary systems of interlocking concrete masonry units also offer economical and attractive solutions for unreinforced retaining wall applications of moderate height.

Some of the primary considerations in retaining wall design should be:

- A proper cap or coping to prevent water collecting or standing on top of the wall
- A waterproof coating on the back of the wall to prevent saturating the masonry
- Permeable backfill behind the wall to collect water and prevent soil saturation and increased hydrostatic pressure
- Weep holes or drain lines to drain moisture
- Expansion or control joints to permit longitudinal thermal and moisture movement