



Trendstone Engineering Information

CONSTRUCTION INFORMATION

UN-REINFORCED GRAVITY WALLS (See Fig 1)

Heights listed below are for gravity walls with no reinforcement. Walls can be constructed up to several metres if fully engineered as a geo-grid reinforced wall, cantilevered wall incorporating steel reinforcing and concrete core infill or No Fines Concrete Wall. To comply with most council requirements, please seek specific engineering advice for walls over 1 metre high, terraced walls, fences above walls, walls carrying vehicle traffic and any other special application.

Maximum Wall Heights For Trendstone® Gravity Retaining Walls

Maximum Wall Height	Footing Type Option **	Surface Slope	Surcharge Load kPa	Drainage Type	Depth of Drainage (Area A)	Back Fill Material (Area B)
800mm	A	Level	2.5	Aggregate	150mm	150mm
800mm	A	1:4	2.5	Aggregate	300mm	200mm
1000mm	B	Level	Nil	Aggregate	250mm	250mm

**Footing Type

The wall shall be built on a bearing pad, not less than 150 mm thick, consisting of one of the following options:

Option A

Compacted crushed rock, well-graded and of low plasticity (without clay content), compacted by a plate vibrator; or cement stabilized crushed rock, with an additional 5% by mass of GP Portland cement thoroughly mixed, moistened & compacted by a plate vibrator; or

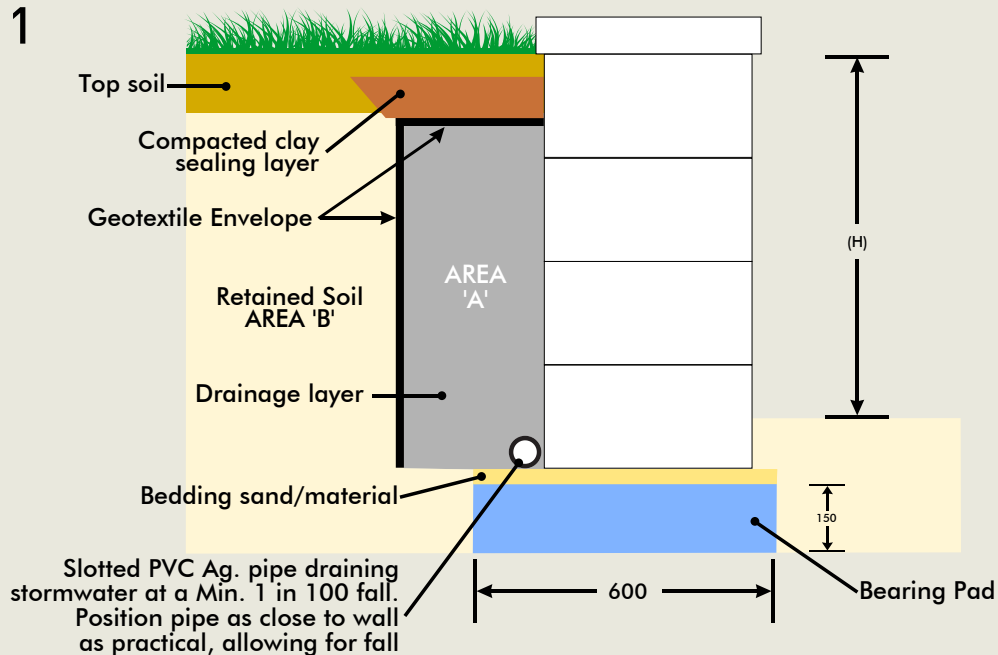
Option B

Lean-mix concrete with a compressive strength of not less than 15 MPa.

Construction Note:

1. Designed in accordance with AS4678 Structure Classification A and CMAA Manual MA 53 Appendix E.
2. The heights for landscaping walls shall not exceed the values given in the table above. If higher walls are required, they shall be designed by a qualified & experienced engineer using either the software package or the following detailed tables.

FIGURE 1



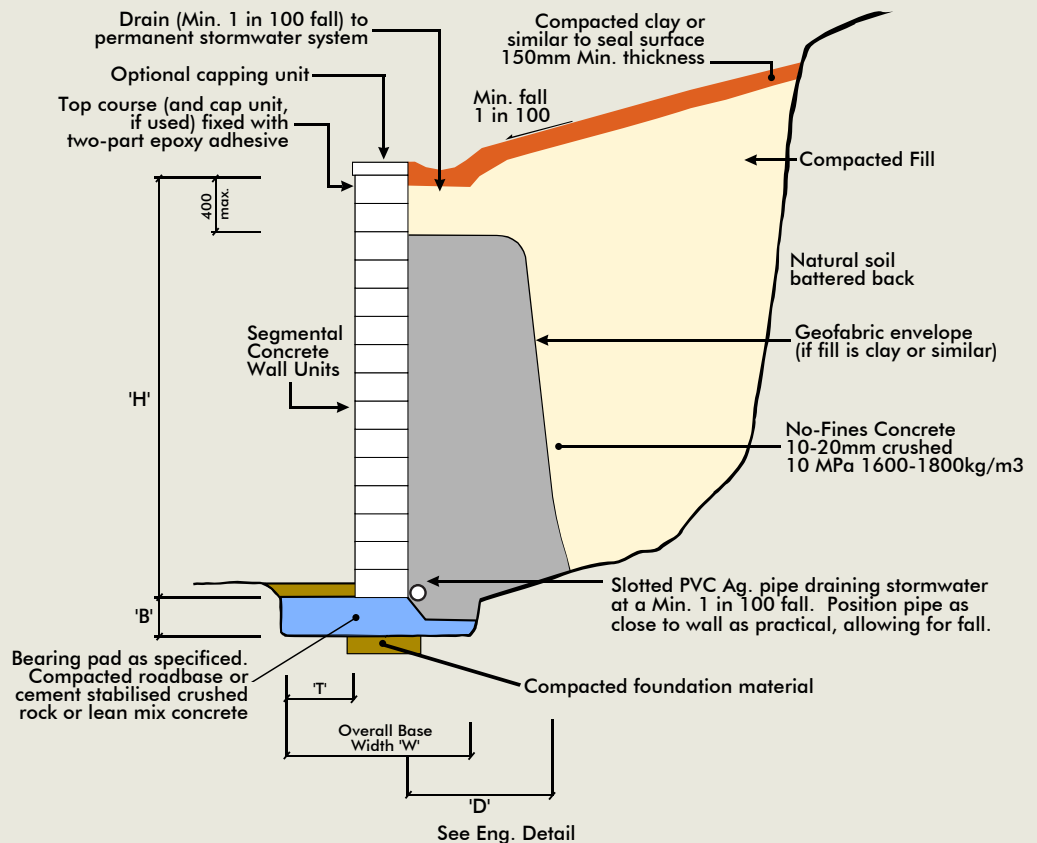
Disclaimer: Apex Masonry takes no responsibility for any walls constructed outside parameters of engineering specifications supplied. Walls exceeding max. heights shown will need to be designed & certified by a qualified engineer. Apex Masonry have extensive information available for use by qualified engineers certifying walls over the maximum heights shown in this brochure. The authors, publishers & distributors of these tables don't accept any responsibility for incorrect, inappropriate or incomplete use of this information; or for inadequate site investigation, design & specification.

NO-FINES CONCRETE BACKED WALLS (See Figure 2)

SOIL TYPE 1							
Height (H) (mm)	Footing Type	Surface Slope	Surcharge Load kPa	No Fines Concrete ('D') (mm)	Base (Footing Details)		
					Base Thickness ('B')	Base Width ('W')	Base Toe ('T')
1000	Compacted road base or cement stabilised crushed rock or lean mix concrete.	Level/1:4	2.5	250	150	550	300
1200		Level/1:4	2.5	350	150	600	300
1400		Level/1:4	2.5	400	200	650	400
1600		Level/1:4	5	650	200	900	400
1800		Level/1:4	5	750	250	1000	500
2000		Level/1:4	5	800	250	1050	500
2200		Level/1:4	5	900	300	1150	600
2400		Level/1:4	5	1000	300	1250	600
2600		Level/1:4	5	1100	300	1350	600
2800		Level/1:4	5	1150	350	1400	700
3000		Level/1:4	5	1250	350	1500	700

NFC = No Fines Concrete: Sharp drainage gravel approx 15-20mm mixed with cement 5:1 ratio min. water (no fines or sand).

FIGURE 2



Engineering – To comply with most council requirements, please seek specific engineering advise for walls over 1m high or for low walls carrying car traffic, etc.

GEOGRID REINFORCED WALLS (See Figure 3)

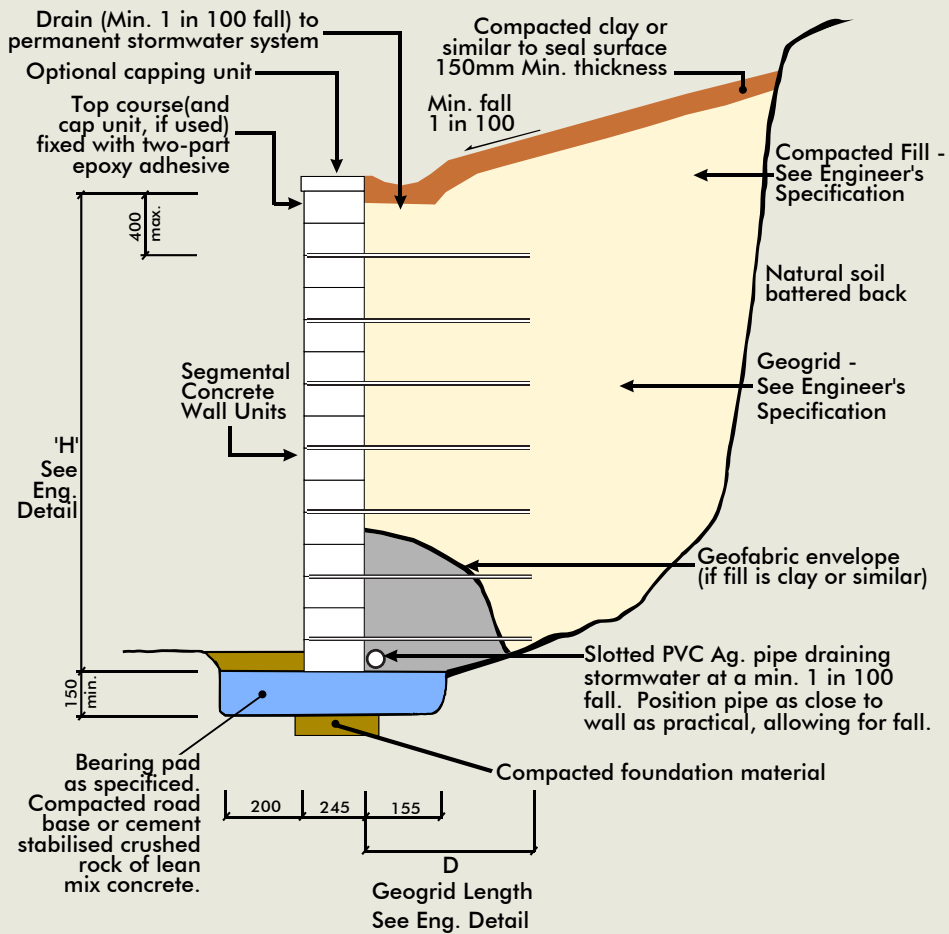
Height (H) (mm)	No. of Geogrid Layers	SOIL TYPE 1													
		Backfill Slope - Level							Backfill Slope - 1:4						
	Layers	1	2	3	4	5	6	7	1	2	3	4	5	6	7
1000	3	1000	1000	1000					1100	1100	1400				
1200	3	1000	1000	1400					1100	1100	1600				
1400	3	1000	1000	1400					1100	1100	1600				
1600	4	1100	1100	1300	1700				1200	1200	1500	1900			
1800	4	1300	1300	1400	1900				1800	1800	1800	2100			
2000	5	1400	1400	1400	1700	2200			1800	1800	1800	2000	2400		
2200	5	1400	1400	1400	1700	2200			1900	1900	1900	2100	2400		
2400	6	1700	1700	1700	1700	2000	2500		2100	2100	2100	2100	2300	2700	
2600	6	1800	1800	1800	1800	2000	2500		2200	2200	2200	2200	2200	2800	
2800	7	2000	2000	2000	2000	2000	2300	2800	2400	2400	2400	2400	2400	2600	3000
3000	7	2100	2100	2100	2100	2100	2200	2800	2500	2500	2500	2500	2500	2500	3100

Height (H) (mm)	No. of Geogrid Layers	SOIL TYPE 2													
		Backfill Slope - Level							Backfill Slope - 1:4						
	Layers	1	2	3	4	5	6	7	1	2	3	4	5	6	7
1000	3	1000	1000	1000					1200	1200	1400				
1200	3	1000	1000	1400					1200	1200	1600				
1400	3	1000	1000	1400					1200	1200	1600				
1600	4	1100	1100	1300	1700				1600	1600	1600	1900			
1800	4	1300	1300	1400	1900				1800	1800	1800	2100			
2000	5	1400	1400	1400	1700	2200			1900	1900	1900	1900	2400		
2200	5	1400	1400	1400	1700	2200			2000	2000	2000	2000	2400		
2400	6	1700	1700	1700	1700	2000	2500		2200	2200	2200	2200	2200	2700	
2600	6	1800	1800	1800	1800	2000	2500		2300	2300	2300	2300	2300	2800	
2800	7	2000	2000	2000	2000	2000	2300	2800	2500	2500	2500	2500	2500	2500	3000
3000	7	2100	2100	2100	2100	2100	2200	2800	2600	2600	2600	2600	2600	2600	3100

Height (H) (mm)	No. of Geogrid Layers	SOIL TYPE 3													
		Backfill Slope - Level							Backfill Slope - 1:4						
	Layers	1	2	3	4	5	6	7	1	2	3	4	5	6	7
1000	3	1000	1000	1000					1600	1600	1600				
1200	3	1000	1000	1400					1800	1800	1800				
1400	3	1100	1100	1400					2100	2100	2100				
1600	4	1500	1500	1500	1700				2400	2400	2400	2400			
1800	4	1700	1700	1700	1900				3700	3700	3700	3700			
2000	5	1700	1700	1700	1700	2200			3900	3900	3900	3900	3900		
2200	5	1800	1800	1800	1800	2200			4100	4100	4100	4100	4100		
2400	6	2000	2000	2000	2000	2000	2500		4500	4500	4500	4500	4500	4500	
2600	6	2100	2100	2100	2100	2100	2500		4700	4700	4700	4700	4700	4700	
2800	7	2300	2300	2300	2300	2300	2300	2800	5100	5100	5100	5100	5100	5100	5100
3000	7	2400	2400	2400	2400	2400	2400	2800	5300	5300	5300	5300	5300	5300	5300

Geogrid lengths shown above are shown in mm.

FIGURE 3



Soil Type Description		
Type 1 Soil	Type 2 Soil	Type 3 Soil
Friction Angle at least 35	Friction Angle at least 30	Friction Angle at least 25
Includes FCR, rock, sandstone & gravels	Includes stiff sandy clays & gravelly clays	Includes soft & firm clay, fine sands & silty clays

Construction Notes (Applies to NFC Backed Walls & Geogrid Reinforced Walls):

1. Designed in accordance with AS4678 Structure Classification A & B & CMAA Manual MA52 & MA53 as appropriate.
2. Retaining walls up to and including 1.5m high are designed for an imposed load (live load) of 2.5 kPa.
3. Retaining walls over 1.5m high designed for an imposed load (live load) of 5.0 kPa.
4. Footings should be 5% cement-stabilised crushed rock to dimensions shown.
5. Before the bottom course is positioned, the footing should be moistened to ensure bond between the block & footing.
6. For reinforced soil systems (incorporating polyester Geogrids), the minimum number of grids is three & the minimum length of grids is 1m.
7. Geogrid lengths from design tables above are measured from the back of the wall.
8. All Geogrids are Fortrac 35-20/equivalent. The spacing of Geogrids is 400mm (every second block) except at the base of the wall, where it is 200mm (one course).
9. These tables are a guide, all retaining walls over 1 metre in height need to be designed & certified by a qualified engineer.



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