You will need...

- Gloves to protect your hands Shovel
- Eye protection eg. goggles
- A spirit level to lay units level Drainage material eg.12-20mm clean, free draining granular material such as gravel or blue metal Stakes and string
- Agricultural drain eg. 100mm diameter subsoil pipe)
- Modernstone™ units
- Coarse sand or road base for the base levelling pad
- Hammer and bolster
- Small broom
- Mechanical plate compactor (optional)

Safety tips

1. Check your equipment.
2. Ensure that you read the operating manuals of all equipment including hired equipment such as plate compactors and cutting equipment.
3. Check the condition of hand tools such as hammers etc, to make sure that they are in a safe working order before use.
4. Always operate equipment according to the manufacturer's instructions and wear the appropriate safety clothing listed by the manufacturer.

1. Check with your local council

Please consult with your local council for design regulations prior to the construction of your wall. Most councils require walls over 1.0m to be designed and certified by a suitably qualified professional engineer. Consultation with a qualified engineer is also strongly recommended where significant groundwater or stormwater build up is anticipated, when a car or building is nearby, for walls in steep or unstable terrain, or when uncertain about ground conditions. Any of these factors will affect the structural performance of a retaining wall, irrespective of wall height. Each council has different requirements so it is important you check with your council before starting. National Masonry® shall have no responsibility for walls constructed other than in accordance with the specifications and recommendations contained in this guide.

2. Maximum heights

(Refer to Table 1) Modernstone™ should not be installed into cuttings where the base soil or backfill is not firm, or is of expansive clay. Never install where loads (eg buildings, driveways) will be located within 1.0 metre of the wall.

3. Locate your wall

Mark out the ground where your wall will be located (either by marking with stakes and a string line or by marking a line on the ground with spray paint).

Tip: Use 1800mm radius caps as the template to mark the footing for curved walls.

4. Calculate how many blocks are required

Measure the proposed wall length and height. Multiply your wall height by the wall length to get a m^2 measurement. Lastly multiply your m^2 measurement by the number of Modernstone™ units per m^2 (13.77 units per m^2).

Tip: Spend time on making sure the first row of units are level. Otherwise all ensuing courses and ultimately the entire wall will not be level.

Continue stacking units, placing drainage material and compacting backfill for each block height layer until your wall is complete. Alternatively, calculate the number of Modernstone™ units required course by course.

Tip: It is often worth adding some extra blocks to allow for any mishaps (usually adding an extra 5% will cover you).

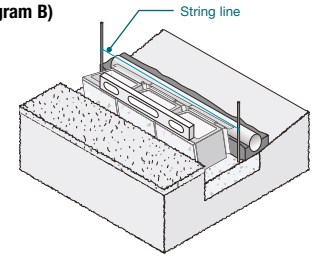
5. Prepare the site

(See typical wall cross section below (Diagram A)) Dig a shallow trench approximately 180mm (18cm) deep and 350mm (35cm) wide. Remove any roots and soft earth. Fill the trench with enough road base. (See Diagram A). Compact and level until it forms a 100mm (10cm) levelling pad.

6. Lay the first course

Place blocks side by side on the levelling pad using a string line along the back of the units for alignment.

(See Diagram B)

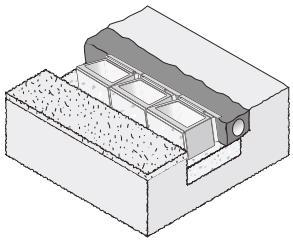


Level each unit side to side and front to back using your spirit level. Install the agricultural drain behind the first course and surround with gravel or to the manufacturer's specification.

7. Backfill and compact

Place drainage material (12-20mm sized gravel eg blue metal) to 150mm (15cm) wide behind your first course, and fill the cores/openings in the top of the blocks and between each block. (See Diagram C)
Shovel and compact your backfill (existing site soil) behind the drainage material. If the backfill is fine silt or soil, a layer of filter fabric can be used to stop it washing into (and clogging) the drainage material. Backfill consisting of heavy clays or organic soils are not recommended due to water holding properties.

Diagram C

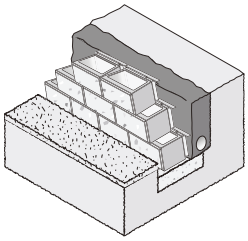


Tip: Do ensure you place drainage material behind the wall and compact the site soil. If you don't, water may build up behind your wall and start to push it over.

8. Additional courses

Sweep the top of the previous course clean. Place the next course of Modernstone™ units in a running bond pattern (ie. with the middle of the block over the vertical joints of the first course. The nibs on the first course units will fit into the recesses under the next units. Pull the unit forward until it locks with the nib on the unit below. Place the drainage material behind the second course of units, in cores and between units (as per step 7).

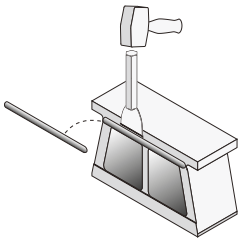
Diagram D



9. Install capping units

Place capping units on the top course. It is recommended that caps be secured using a construction adhesive such as Liquid Nails. Removing the top nib is not required for those caps with recesses.

Diagram E



10. Constructing corners

External and Internal corners are constructed Corner units to match. Lay the Corner units' largest split face in alternate directions. (See Diagram G)

Use a construction adhesive to secure corner blocks and caps.

11. Constructing curves

Curves as small as 1800mm (180cm) in radius can be constructed with Standard units.

External curves

For external (convex) curves, you will need to trim the tails of the blocks. Use a hammer and bolster on the back, top and bottom of the grooved tail. Use light hammer blows first then a heavier blow on top. Repeat the tracing and final blow if necessary. (See Diagrams H and I)

Internal curves

For internal (concave) curves use units spaced evenly to a scribed arc.

Modernstone™ Installation Guide

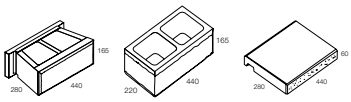
Modernstone™

This refined range with a sharp splitface is ideal for creating smart contemporary lines. Practical and easy to install, this highly adaptable range can be used for curves, corners and steps.

Recommended for:

Max. wall height	1050mm (with cap)
Straight walls	✓
Curved walls	✓
Corners	✓
Steps	✓

Units:



Standard unit | Corner unit | Classic cap

Colours:

Charcoal | Light Sands | Portstone | Cafe Creme

Diagram F

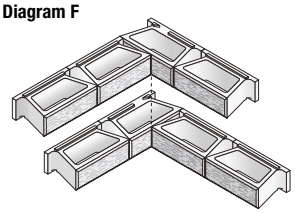


Diagram G

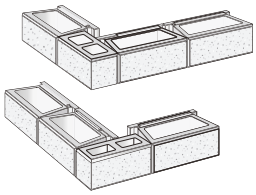


Diagram H

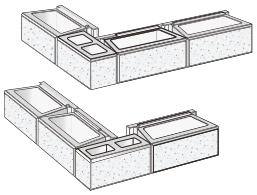
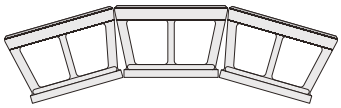


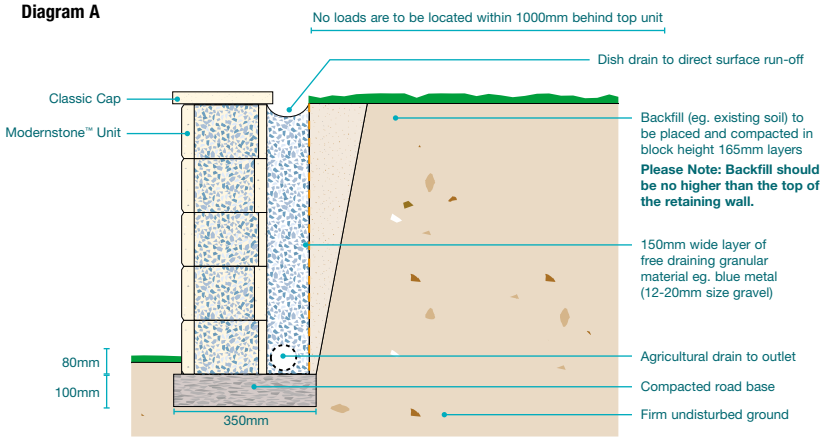
Diagram I



Backfill (eg. existing soil) to be placed and compacted in block height 162mm layers

Typical Wall Section

Diagram A



Please Note: Backfill should be no higher than the top of the retaining wall.

Table 1. Maximum Wall Height Gravel Fill		
	Maximum Courses For walls without gravel fills to all voids and cores	Maximum Courses For walls with gravel fills to all voids and cores
Poor soils – including sands, gravelly clays, sandy clays and silt clays	2 (324mm)	5 (810mm)
Average soils – including well graded sands and gravelly sands	3 (486mm)	5 (810mm)
Good soils – including gravels, sandy gravels and crushed sandstone	4 (648mm)	6 (972mm)

NOTES: Backfill retained by a retaining wall should be no higher than the top of the retaining wall.
Max. wall heights disclaimer: The gravity wall heights are maximum heights calculated in accordance with CMAA MA-53 Appendix D guidelines and a qualified engineer should confirm the suitability of the product for each intended application. As such, due consideration must be given to but not limited to: • Cohesion • Dry backfill: no ingress of any water into the soil behind the retaining wall • All retaining walls are designed for zero surcharge unless noted otherwise. These walls are intended for structure Classification A walls only as defined in AS4678 Earth Retaining. Structures as being where failure would result in minimal damage and/or loss of access.

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