

LOC-A-BLOC™ ARCHITECTURAL & LANDSCAPING ASPECTS

Over the years, many applications in residential, civil works, civic beautification and marine sea walls have proved that the LOC-A-BLOC™ Block Wall System delivers the benefits claimed.

The continuous research and development with Engineers and Architects has enabled the LOC-A-BLOC™ suite of products, to offer solutions that solve difficult and unique problems. A part of this development was to introduce a commercially available LOC-A-BLOC™ **DESIGN PROGRAM** late 2006 to assist in design and material quantity estimations for building entire walls.

BENEFITS OF THE SYSTEM

- strong, durable and robust;
- RTA, R57 compliance (Extensible systems);
- appearance simulates natural stone;
- environmentally friendly;
- ecological advantages;
- unique range of design solutions; vertical / layback;
- low maintenance;
- C.S.I.R.O. tested;
- factory made under exacting supervision; 3 sizes available up to 2.5ton;
- dry laid – requires no mortar for jointing;
- reduces construction time and labour costs;
- simple to use by owner/builders;
- can match existing walls;
- significantly reduces effect of tide cycles on sea wall construction times;
- mass gravity, cantilevered or re-enforced soil wall options available;
- LOC-A-BLOC™ Design Program for engineering & material quantities;**
- affordable

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DESIGN ALTERNATIVES

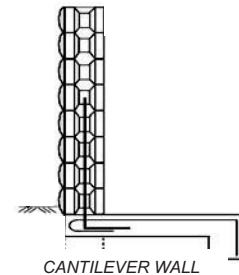
Walls can be designed and constructed using the following system methods:

- Cantilevered footing
- Soil (tensar) re-inforced wall
- Non structural walls (garden beds)
- Mass gravity (see 1800 Series, Section 5)

The features of each are:

Cantilevered Footing

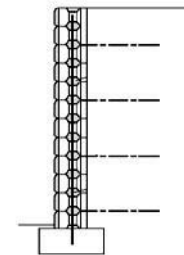
- Vertical wall
- Footing under front, centre or at rear of wall
- Cost effective for walls up to 3 metres



CANTILEVER WALL

Reinforced Soil Walls (RSW)

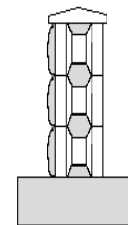
- Vertical wall
- Cost effective construction for walls in excess of 2 metres.
- Wall can be built before back filling (Back fill 3 days after core filling)
- Requires nominal concrete levelling pad only



SOIL (TENSAR)
RE-INFORCED
WALL

Non Structural Wall – Applicable to both 400 & 600 Series

- Extremely cost effective
- Up to 3 courses high for vertical walls
- Up to 4 courses high with 5 degree layback
- Only nominal or crushed rock footing is required
- Concrete core fill
- No special tools required
- Average handyman skills only required



Non Structural Wall

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IMPORTANT NOTES

The LOC-A-BLOC System is the subject of:

- Australian Patents PR2440 and 77149/91; and
- Certificate of Registration 112623
- Design Registration No: 2494/2001

Data published by LOC-A-BLOC™ Block Wall Systems is prepared with reference to the following documents:

- C.S.I.R.O. Report DMA 109 Tests on Walls Constructed with LOC-A-BLOC™ Units*;
- ABSAC Technical Opinion 149*;
- AS4678-2002 Earth-retaining structures
- AS1170-2002 Structural Design Actions
- AS 3600 SAA Concrete Structure Code;
- AS 3700 SAA Masonry Code (where applicable);
- BS6349 British Standard Code of Practice for Maritime Structures;
- Report No. SR471 Mahaffey & Associates, Investigation of Durability of LOC-A-BLOC™ Concrete Elements

AS2733 is generally not applicable but LOC-A-BLOC™ components comply with its strength requirements. LOC-A-BLOC™ Block Wall Systems acknowledges the work done in the preparation of this manual by R.J. McKean MIEAust CPEng, G W Engineers and Nigel Fletcher MIEAust CPEng. Information published by LOC-A-BLOC™ block wall systems cannot encompass all site conditions or load combinations, and is prepared as a guide only. Retaining walls should be individually designed by a suitably qualified Engineer.

To ensure the aesthetic quality of simulated dimensionally cut sandstone, many standard components form part of the range (refer to Sections 3 and 4). **Custom designed components can be manufactured to individual requirements.**

LOC-A-BLOC™ block wall systems cannot assume responsibility or liability for negligence, errors or omissions neither in its publications nor for the use made of the data published.

SYSTEM FEATURES

The system features an attractive sandstone look yet costs significantly less than dimensionally cut sandstone, which is a diminishing natural resource. Exposed faces are either bolstered in many variations or smooth.

The LOC-A-BLOC™ Block Wall System comprises three series of basic components:

- the 400 Series presenting a face 400mm long and 200mm high and of 200mm thickness (section 3)
- the 600 Series presenting a face 600mm long and 300mm high and of 300mm thickness (section 4)
- the 1800 Series presenting a face 1800mm long and 900mm high and of 900mm thickness. (section 5)

Each series has accessory units such as simple returns, mitred components for use in multi-directional walls and double sided faced components for above ground applications.

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The units are cored vertically and horizontally to enable reinforcement and service conduits or pipes to be laid throughout.

LOC-A-BLOC™ structural components are manufactured from 42 Mpa* sulphate resistant concrete that provides optimum strength and maximum resistance to salt water corrosion.

*Note: This may not always be the case as final specification is dependent on product application. For example, some non-sea walls could be manufactured from 25Mpa sulphate resistant concrete.

MECHANICAL PROPERTIES (STRUCTURAL ELEMENTS ONLY)

The values in Table 1 are from Report No. SR471 which details the test procedures and results. Please see note above.

TABLE 1:

Mechanical Properties of Precast Block 400 & 600 SERIES	
Compressive strength of block	42 Mpa
Water absorption of block (average)	8.15%
Mechanical Properties of Face 400 & 600 SERIES	
Compressive strength	42 Mpa
Water absorption	6.9%
Durability	Very High

The tests were carried out in compliance with the following:

- Compressive Strength - AS 1012, Part 14
- Water Absorption - AS 1012, Part 12
- Sulphate Soundness - Test method from AMDEL Report No. 1502 derived for measuring the durability of sandstone.

The AMDEL sulphate soundness test results on Australian sandstones indicate that sandstones experiencing weight losses of 3.5% can be classified as Durability Class A on a scale of A to D (Class D sandstones experienced weight losses of 50 to 100%). LOC-A-BLOC™ experiences NIL weight loss which makes the facing units equivalent to sandstones of very high durability.

The sulphate soundness test also indicated that LOC-A-BLOC™ will colour and weather in a similar manner to natural sandstone.

TYPICAL SHORT-FORM SPECIFICATION

All components supplied for the works shall be of the patented LOC-A-BLOC™ system as manufactured by LOC-A-BLOC™ Australia Pty Ltd.

All units shall be manufactured to comply with Australian Patent Numbers PR2440 and 77149/91, have all exposed faces bolstered, resembling sandstone in appearance unless otherwise specified.

The components shall be dense, hard, sound and true to size and shape. Any necessary cutting shall be by saw, neat and true to line.

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Structural components shall be manufactured from concrete that ensures durability in a marine environment, and comply with relevant sections of the manufacturer's Product Manual.

All reinforcing steel used in the construction of LOC-A-BLOC™ walls in a marine environment shall be either hot dip galvanised deformed bar, or stainless steel bar.

Grouting material shall have a 28 day design strength of 32 Mpa, a slump of 110mm – 150mm and maximum aggregate size of 10mm. The installer shall take all steps necessary to minimise the risk of efflorescence, by using grout, ash free and the use of concrete additives approved by LOC-A-BLOC™ Block Wall Systems.

TYPICAL APPLICATIONS

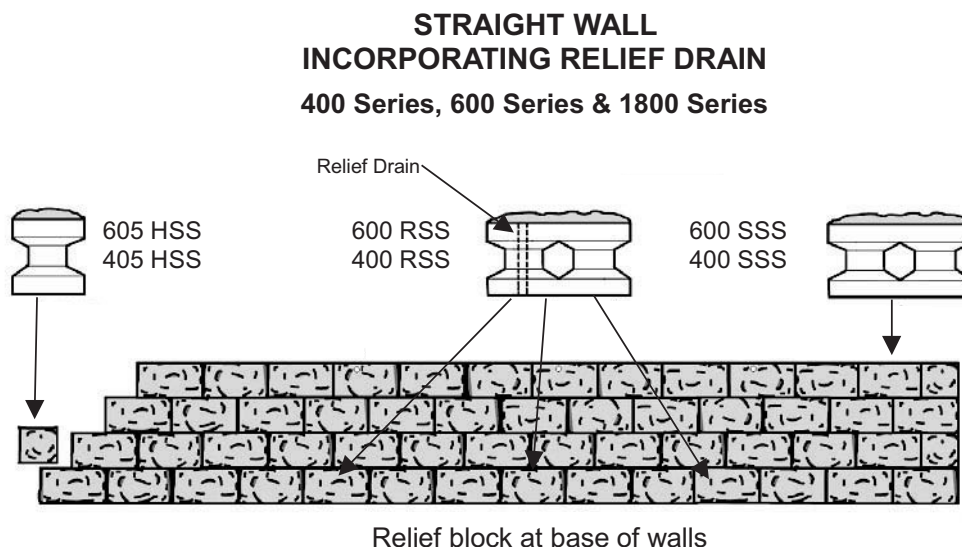
The LOC-A-BLOC™ System provides the Designer with endless possibilities that combine straight walls and curved or multi-directional walls with a variety of standard or customised finishing components.

The following are just some possibilities:

- | | |
|---|---|
| <input type="checkbox"/> mass gravity retaining walls; | <input type="checkbox"/> garden enhancements; |
| <input type="checkbox"/> reinforced concrete cantilever walls; | <input type="checkbox"/> recreational areas; |
| <input type="checkbox"/> reinforced soil walls; | <input type="checkbox"/> estate entrances; |
| <input type="checkbox"/> sea walls; | <input type="checkbox"/> barbecues |
| <input type="checkbox"/> bridge works; | <input type="checkbox"/> spa surrounds; |
| <input type="checkbox"/> basement construction; | <input type="checkbox"/> roundabouts; |
| <input type="checkbox"/> building foundations; | <input type="checkbox"/> permanent signage; |
| <input type="checkbox"/> decorative single skin structural walls; | <input type="checkbox"/> garden surrounds |
| <input type="checkbox"/> fences and piers | |

TYPICAL APPLICATION DIAGRAMS

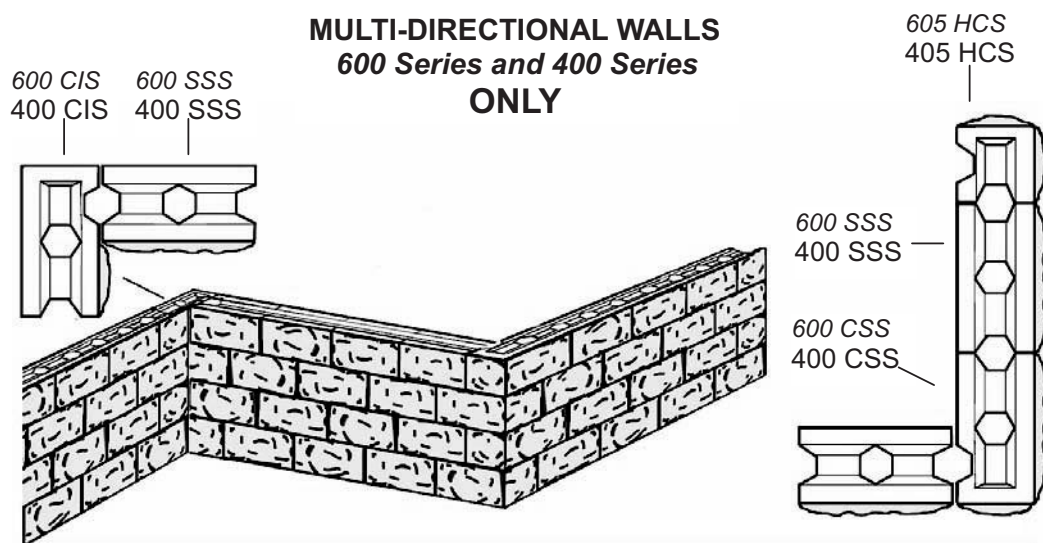
The simplicity and design flexibility of the LOC-A-BLOC™ System is shown in the following illustrations that include straight walls with drainage relief, multi-directional walls, double bolstered walls and curved walls.



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Typically, a retaining wall will require provision for the egress of water accumulating behind the wall. This is provided by way of part number 600 RSS which incorporates a 90mm diameter relief pipe or 400 RSS which incorporates a 50mm diameter relief pipe 1800 RSS which incorporates a 90mm diameter relief pipe.

Usually every fourth block in the first course will incorporate a relief drain pipe but the positioning and number of relief drains will be specified by the Design Engineer. 1800 Series will have either 1 or 2 relief pipes in each unit, depending on engineering requirements.

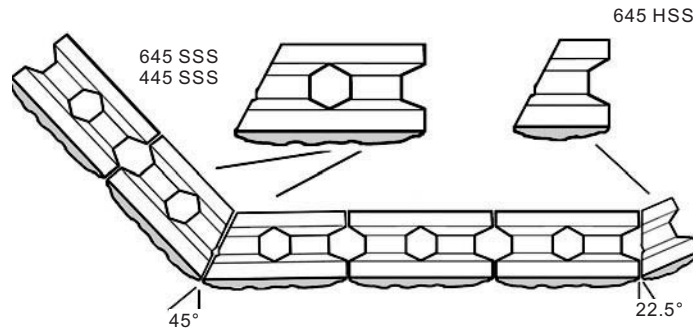


The above designs can also include double side bolstered, flat face and blank components.

The wall can be continued above ground by the inclusion of double side bolstered components in both the 600 Series and the 400 Series. When used with flat capping (either bolstered or bullnose) the wall provides a seating facility. The standard range of capping complements any configuration of wall. Special capping can be produced to Designer's specification.

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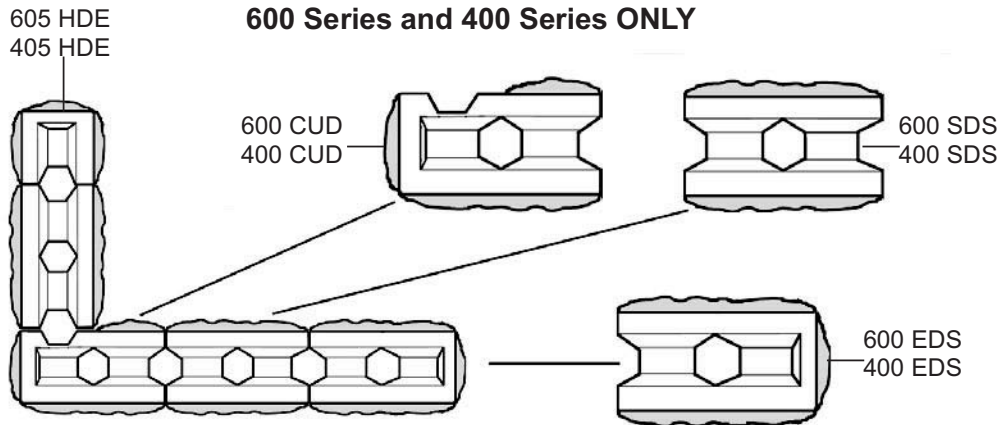
MITRED WALLS 600 Series and 400 Series ONLY



Factory produced mitred components enable 22.5° or 45° angles to be achieved without on-site cutting.

The above application can also include flat face and blank components.

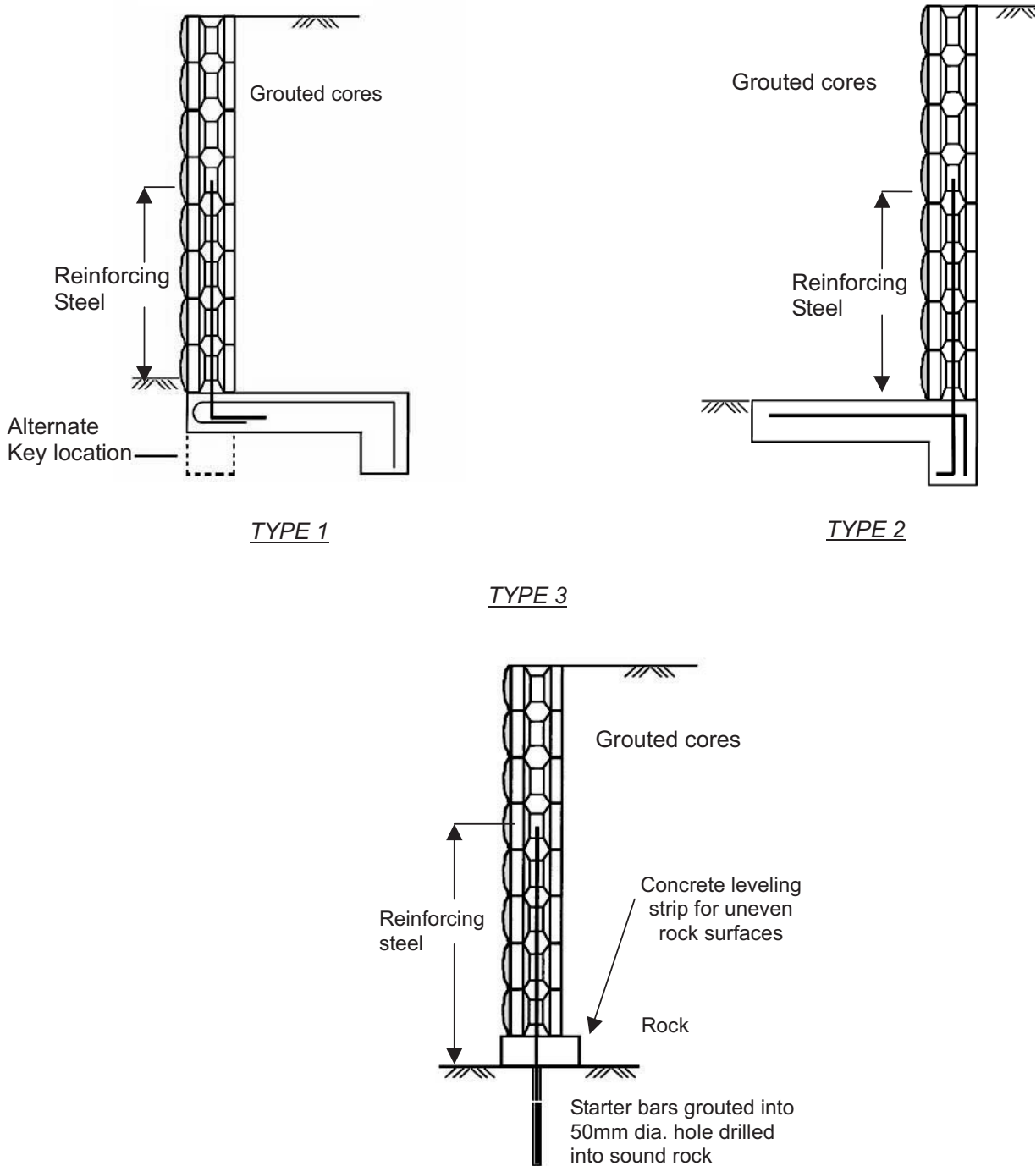
DOUBLE BOLSTERED WALLS 600 Series and 400 Series ONLY



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TYPICAL LOWER WALLS – REINFORCED (600 Series) Nominal Heights to 3.6 metres

FIGURE 1

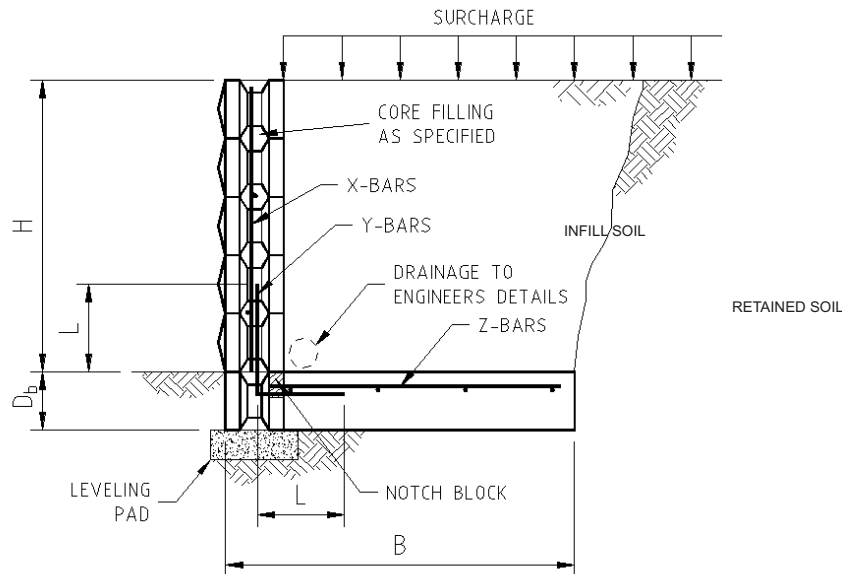


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TYPICAL LOWER WALLS – REINFORCED ONE POUR WALL / FOOTING PA No: PR6862 – Des Reg No: 2494/2001

EXPLANATION:

Base blocks become formwork for footing area. The steel can only protrude through the holes at the rear of the block work, therefore the accuracy of the steel placement is no longer an area in which specific expertise is required. By filling the base and wall at the same time, engineering strength of this cantilever is far superior than any other system to date.



Advantages of One Pour Wall / Footing Design and Construction:

- Full composite action
- Specialist steel fixers not required
- Form workers not required
- Halved pump costs (only 1 visit required)
- Construction time dramatically reduced
- Significant savings on footing costs

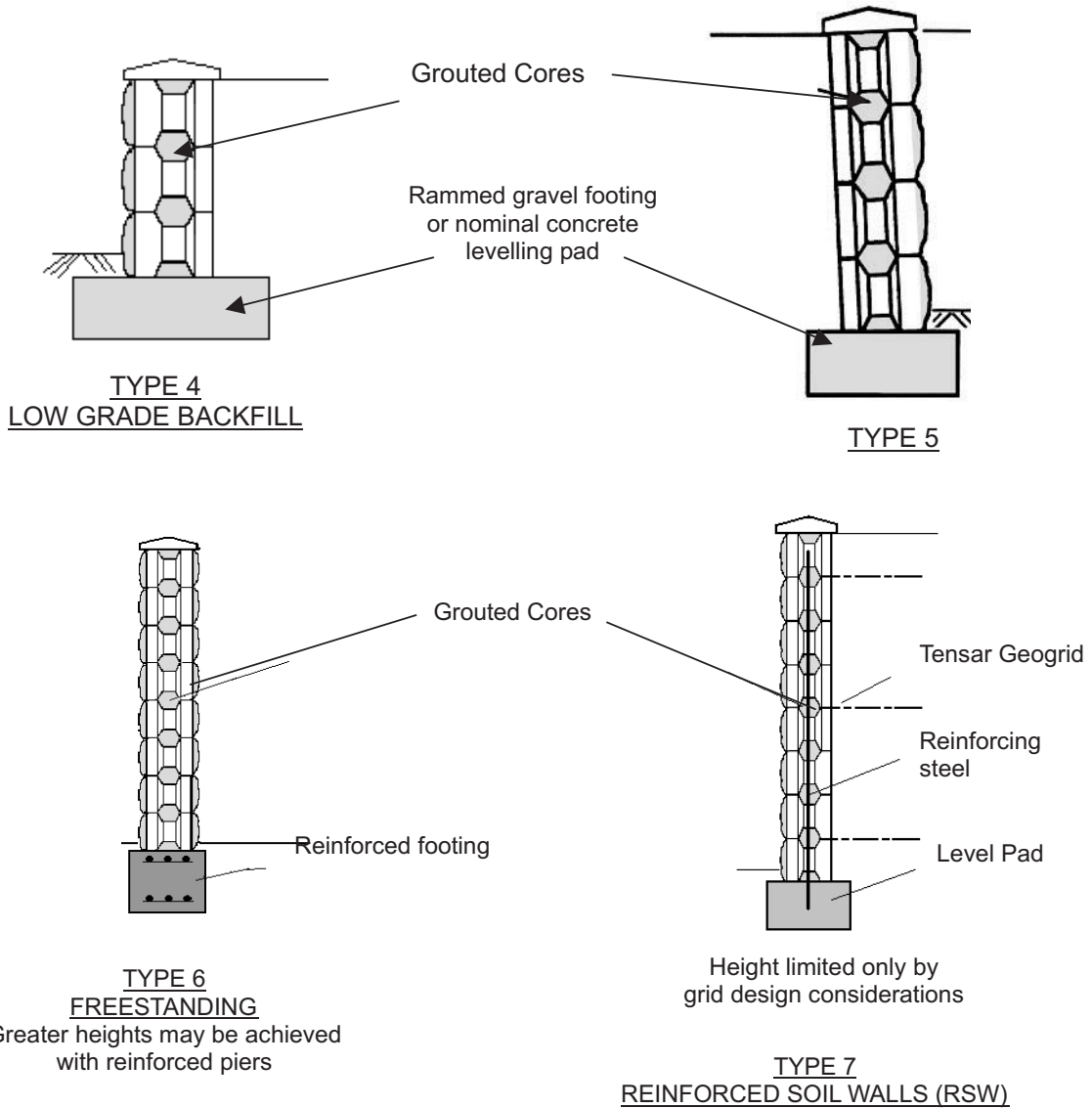
One Pour Wall / Footing Method:

- Excavate site
- Prepare and compact a crushed gravel levelling pad
- Lay two courses of LOC-A-BLOC™ Footing Blocks with steel in the cavities
- Complete laying block wall to full height or 1.5m lifts
- Ensure canal / footing steel is in place as per specification
- Pump concrete into footing area, ensuring proper vibration to allow footing block cavities to fill
- Screen base to correct grades at the same time
- Simultaneously core fill wall cavities and rod cavities
- Finish off as per LOC-A-BLOC™ design manual

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TYPICAL LOWER WALLS – UNREINFORCED 600 Series and 400 Series

FREESTANDING AND REINFORCED SOIL WALLS 600 Series and 400 Series



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TYPICAL HIGHER WALLS Nominal Heights above 3.6m

FIGURE 3

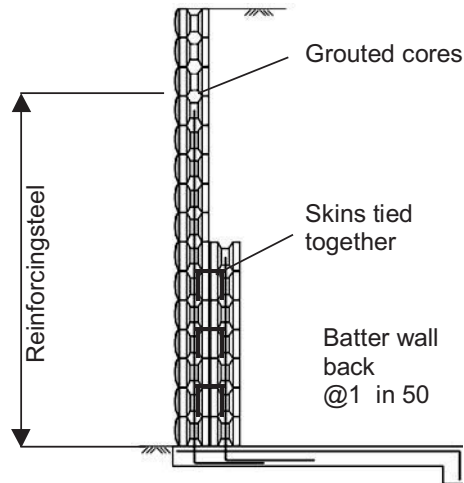


FIG 3.A
CANTILEVER WALL

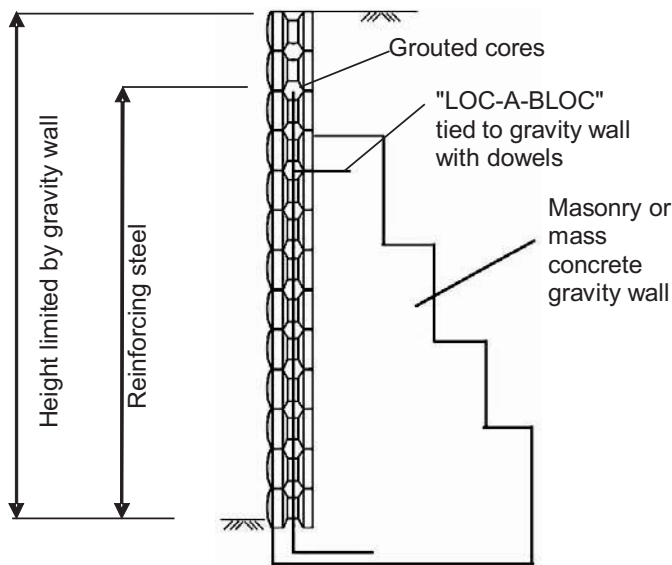


FIG 3.b
GRAVITY WALL

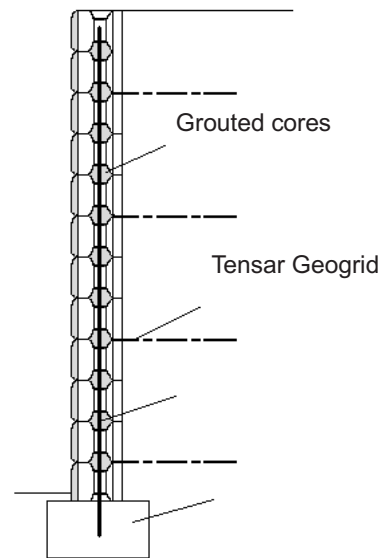


FIG 3.c

REINFORCED SOIL WALLS (RSW)
Height limited only by geogrid design considerations

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DRAINAGE METHODS

DRAINAGE Effective drainage is the most critical factor for retaining wall design. Several methods of drainage are shown in Figure 5 below.

EXAMPLES OF DRAINAGE METHODS

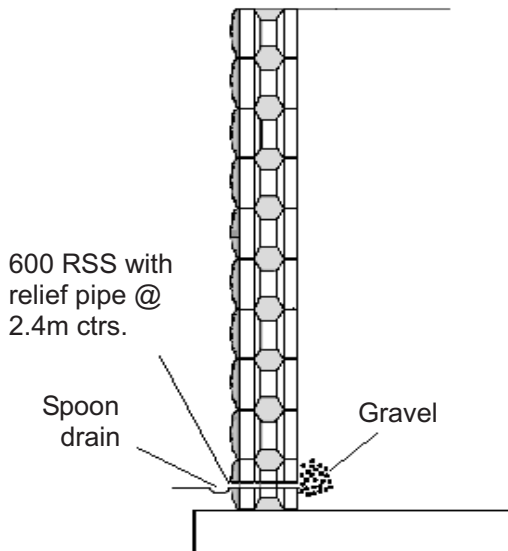


FIG 5. a

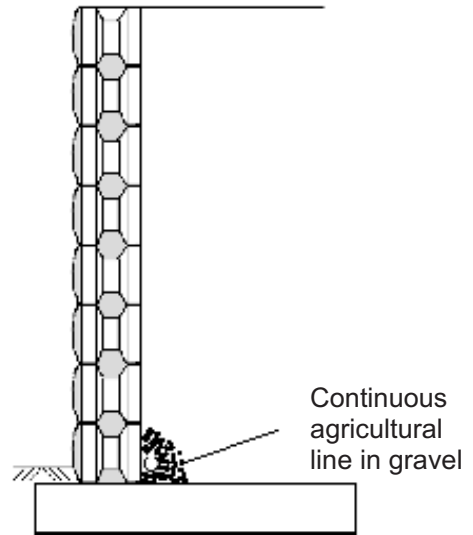


Fig 5. b

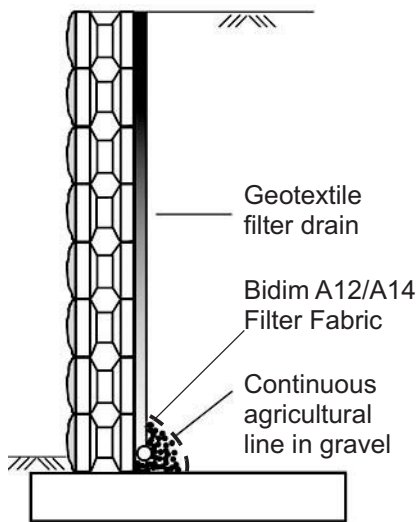


FIG 5.c

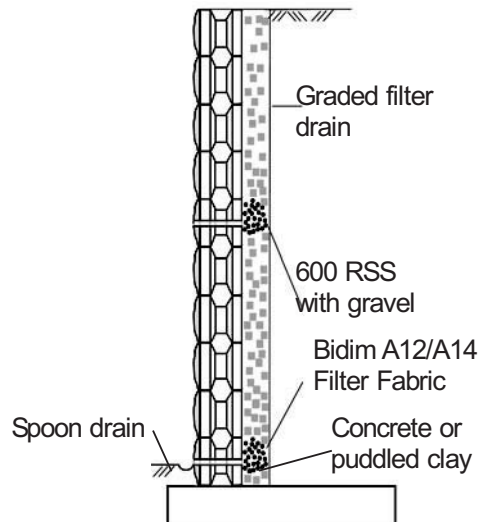


FIG 5.d