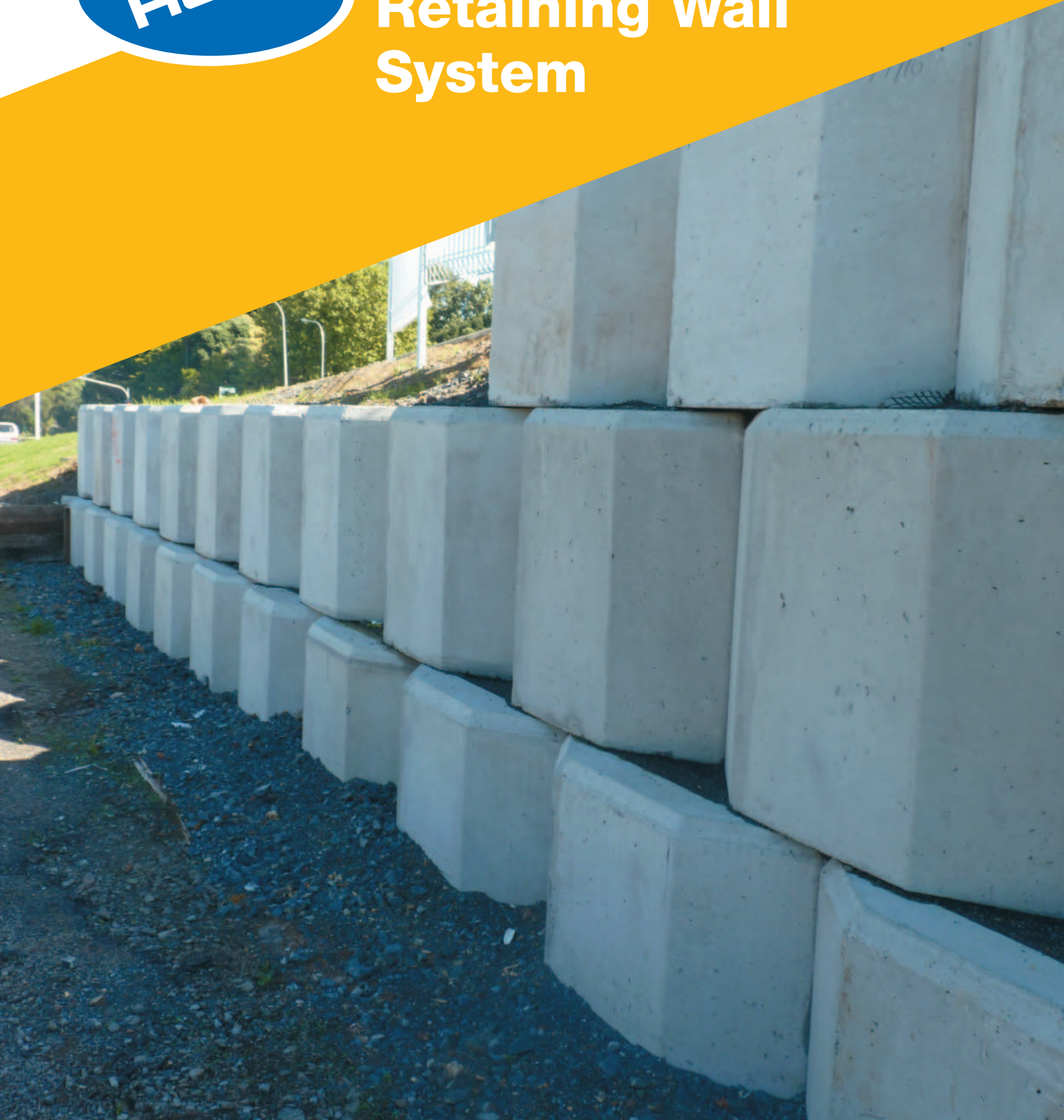




Retaining Wall System



Field Installation Guidelines

www.humes.co.nz 0800 502 112

Anchorbloc™

Disclaimer

The information provided in this installation guide is indicative and provided as reference only. Any Anchorbloc™ retaining wall must be built in accordance with a design prepared by a registered geotechnical engineer who is independently engaged. The engineer's design, details, and installation requirements take precedence if there is any conflict or ambiguity with the information contained below.

The Anchorbloc™ has no third party approval and is not a registered or certified product. The design of the system is based on conventional engineering principals that are well understood and documented. The design methodology for the product has been approved and documented in a number of international standards.

Every application for the Anchorbloc™ with a height exceeding 1.5m requires a specific design to be completed by a Chartered Professional Engineer and a building consent from the local council. This removes the need for independent certification.

To complete the design of an Anchorbloc™ retaining wall the engineers will require information on the Anchorbloc™ dimensions and weights and the properties of the soil on site. The required information on the blocks is provided in this document. The design process for an Anchorbloc™ retaining wall follows standard engineering principals for a gravity retaining wall and reinforced earth wall systems.

Contents

Introduction

Introducing Anchorbloc™	4
-------------------------------	---

Unit Specifications & Geometry

Standard Block.....	5
Half Height Block	5
Left Hand Block.....	6
Right Hand Block	6

Design Guide

Design Guide and Software	7
---------------------------------	---

Design Considerations

Foundations.....	7
Embedment.....	7
Soils and Compaction	8
Drainage	8
Surface Drainage.....	8
Shorelines and Rivers.....	9
Reinforcement	9

Engineering

Engineering.....	10
Tiers.....	11
Curves	11
Installations in the Void.....	12

Planning and Estimating

Planning.....	12
Estimating.....	12
Final Designs	12

Installation

Foundations.....	13
Placing Bottom Course	14
Placing Additional Courses	14
Backfilling	15
Installation of ACEGrid geogrid Tie Backs	15
Curves	16
Corners.....	18
Stepped Base Elevations	18

References

References	18
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The purchaser is responsible for correctly applying these installation guidelines. Humes does not accept any responsibility for performance problems, direct, indirect or consequential losses arising from any failure to correctly install the equipment in accordance with these guidelines. Fletcher Concrete and Infrastructure Limited 2010. Printed 03/10.



Introducing Anchorbloc™

Anchorbloc™

Is an innovative, simple and economic solution for one of the most basic civil engineering and contracting tasks: retaining and protecting embankments. It is a modular concrete block designed to form an integrated segmental retaining wall. Anchorbloc™ has a significantly lower installation cost when compared to other retaining wall systems such as timber or gabion basket structures.

The new Anchorbloc™ enables straight or curved layouts. They can be used from a single level structure up to a multi level engineered wall. Anchorbloc™s are fast to install, with no on-site concrete required. The 1.5 tonne blocks can be lifted by small to medium sized earth moving equipment, so a two person team can easily construct 85m² of wall per day.

The Anchorbloc™ has a unique patented design. Further stabilisation can be achieved by infilling the internal voids or by using geogrid locked to the blocks through the geogrid attachment locations. The internal void can be used to plant vegetation, install safety barriers, security fences and signs; for traffic and walkway requirements. Design software and support is available to assist engineers and contractors with Anchorbloc™ design options.

Anchorbloc™ can be used for river bank stabilisation, bridge abutments and wing walls for culverts and underpasses. There is also the ability to dismantle and re-erect an Anchorbloc™ structure in temporary situations or where the project may be reconfigured.

To complete an engineered wall Anchorbloc locking bars and ACEGrid geogrid fabrics are required. Humes recommends ACEGrid supplied by GPIL. This system has been tested by Holmes Solutions and certified for adequate performance on site. See "Reinforcement" on page 9 of the Anchorbloc Retaining Wall Systems Manual for further technical details.

Anchorbloc™ range

	1.0M	1/2 high 0.5M	1/2 wide LH	1/2 wide RH	Locking Bar
Item Code	05561	05562	05563	05564	78877
Height (mm)	1000	500	1000	1000	17.7
Width (mm)	1200	1200	600	600	65
Depth (mm)	900	900	900	900	840
Weight (void unfilled) (kg)	1500	750	750	750	
Weight (void filled) (kg)	2020	1010	1010	1010	
Block Volume (m ³)	0.61	0.305	0.305	0.305	
Void Volume (m ³)	0.30	0.15	0.15	0.15	
Lifting Points	2	2	1	1	

Notes:

- Block set back is 150mm
- Lifting points fitted, 2 x 2.5 tonne rated

- Geogrid attachments at 500mm centres up the height of the block
- Use one locking bar per Anchorbloc

- 1/2 high and 1/2 width blocks available on request

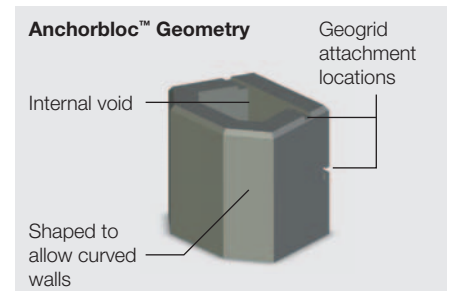
Applications

- Cut and fill highway projects
- Slope stabilisation
- Road widening
- Erosion protection for river and streams

- River bank stabilisation
- Roadside embankments
- Bridge abutments
- Submerged foundations
- Wing walls for culverts & underpasses

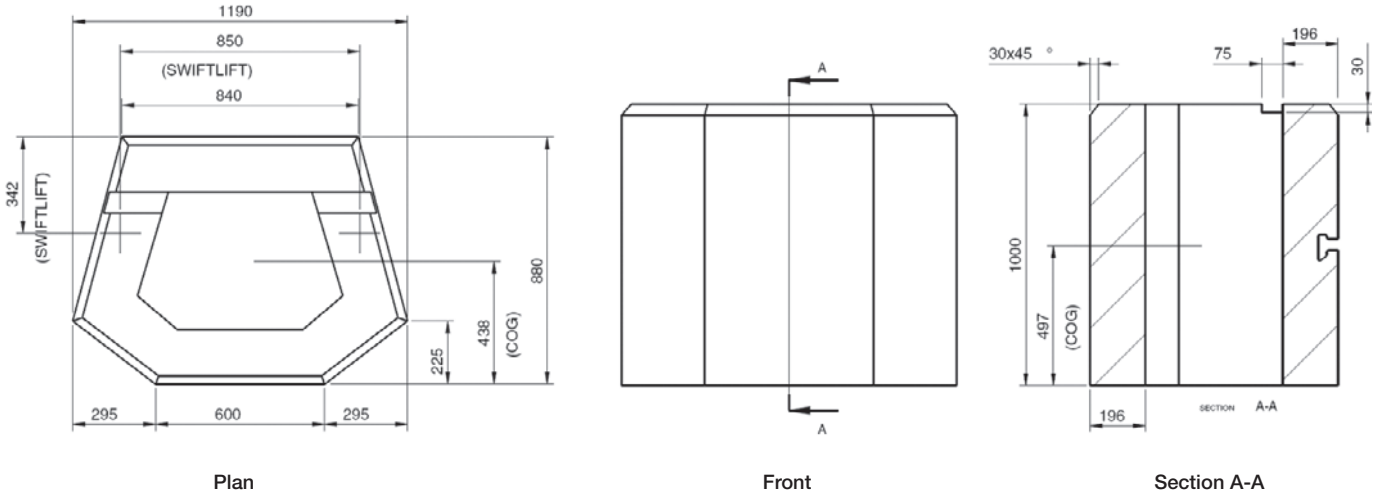
Standards

- Manufactured to NZS 3109: 1997
- Designed and engineered by Holmes Solutions Ltd

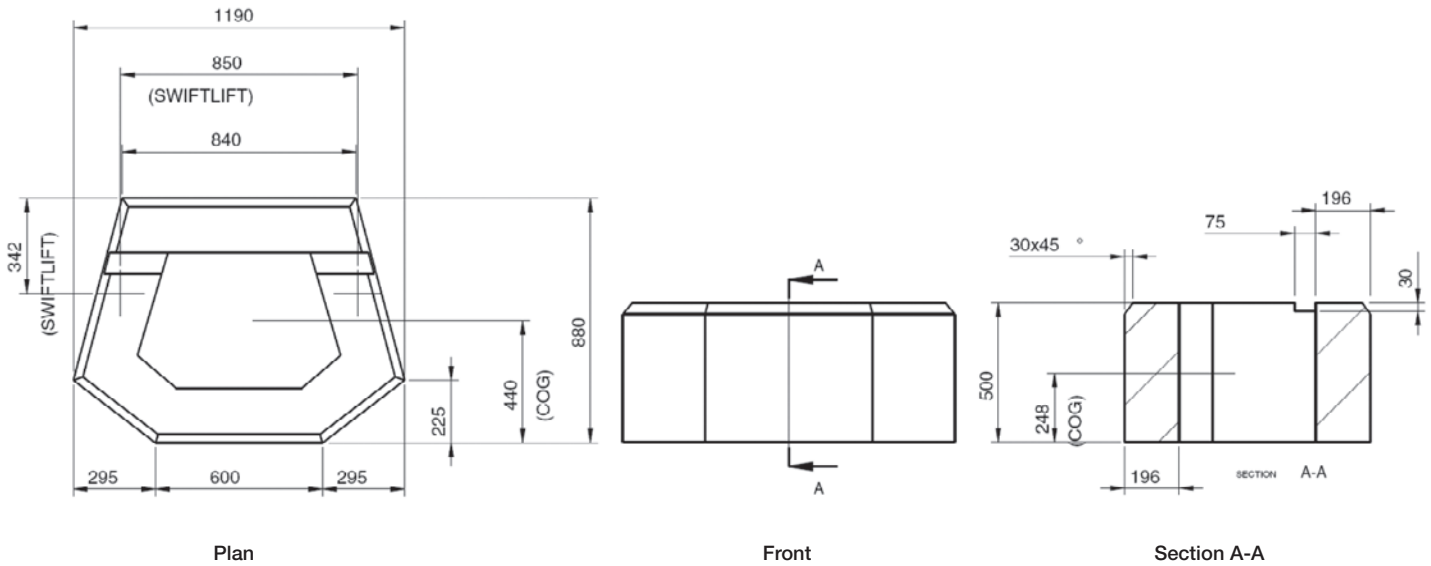


Unit Specifications & Geometry

Standard Block

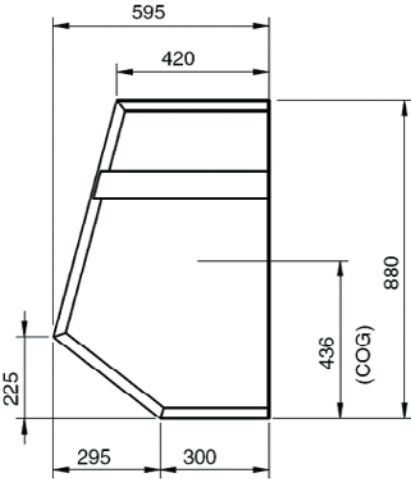


Half Height Block

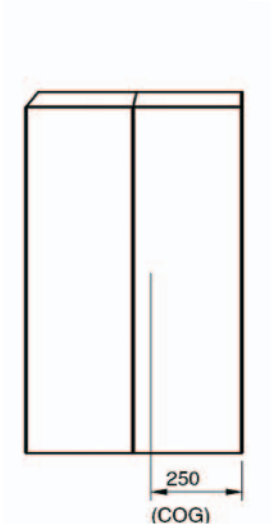


Unit Specifications & Geometry (continued)

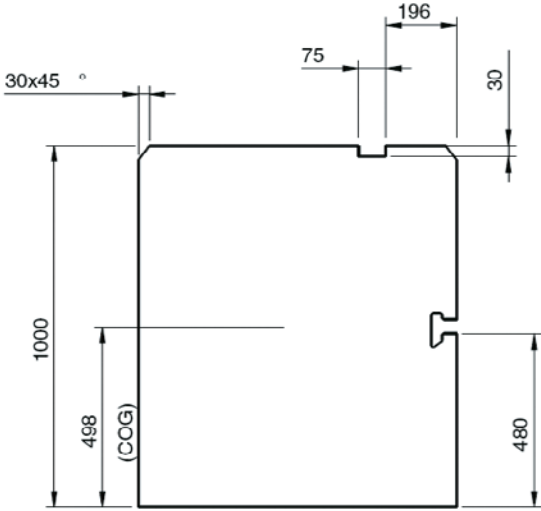
Left Hand Block



Plan

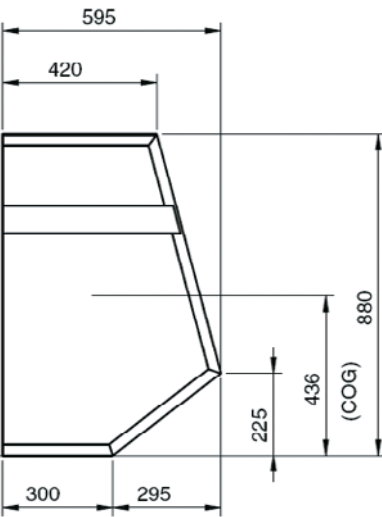


Front

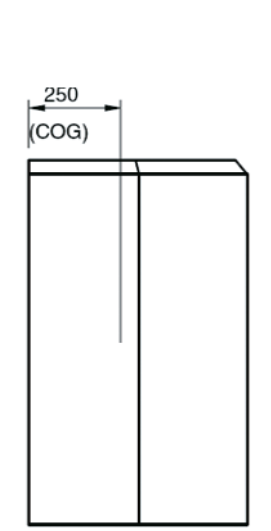


Section A-A

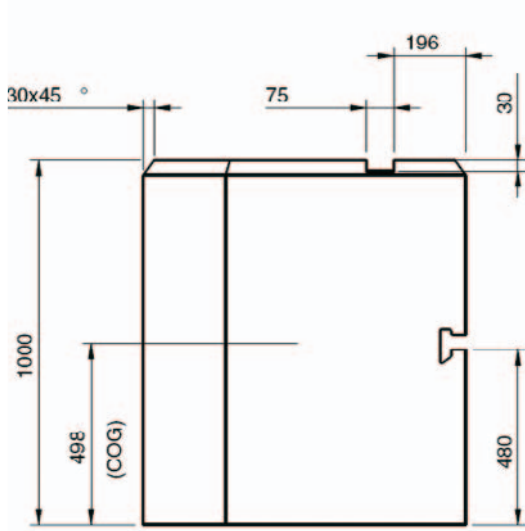
Right Hand Block



Plan



Front



Section A-A

Design Guide and Software

The table below is a guide outlining the documentation required when constructing an Anchorbloc™ wall.

Anchorbloc™s (1000mm h x 1200mm w)	Building consent from the local council	Engineered design
1	Not required	Not required
2-3	Yes	Standard design certified by a local chartered professional engineer
3+	Yes	Yes

Any Anchorbloc™ retaining wall exceeding 1.5 metres tall will require an independent design completed by a Chartered Professional Engineer and will require a building consent from the local council.

Design software and support is available to assist engineers and contractors with Anchorbloc™ design options.

Design Considerations

Foundations

Foundation soils on which the Anchorbloc™ wall will rest must be stiff, firm, and have sufficient capacity to support the wall. Any loose, soft, or compressible material must be removed and replaced with properly compacted backfill. The bearing capacity of the foundation soil should be addressed by a trained soils engineer

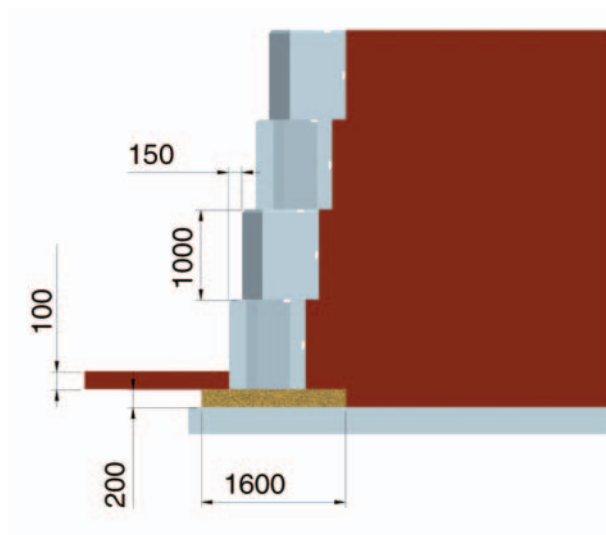
Anchorbloc™ walls are installed on levelling pads consisting of compacted hardfill and sand. This provides a stiff, yet somewhat flexible base to distribute the weight of the wall.

Rigid concrete footings are not required or recommended. Because the Anchorbloc™ are installed without Mortar, they are free to move slightly in relation to each other. Flexibility of the levelling pads and Anchorbloc™ wall accommodates movement (such as temperature induced movement, freeze/thaw actions, and moderate differential settlement) without damaging the structure. Anchorbloc™ walls have successfully been used on projects throughout New Zealand, including industrial applications, road corridors and shorelines.

Embedment

Anchorbloc™ retaining walls can be installed with the lower segment of the wall embedded below grade. A typical embedment design would allow one-tenth (1/10) of the wall height below grade. This provides for additional strength and resistance to sliding and overturning actions. Embedment should increase for special conditions such as slopes at the top of the wall, soft foundation soils, or shoreline applications.

Embedment provides enhanced wall stability and long term protection of the foundations and levelling pads.



Design Considerations (continued)

Soils and Compaction

With proper design an Anchorbloc™ wall can be constructed within a wide variety of soil conditions. Granular soils are preferred as fill in areas reinforced with ACEGrid Geogrids, however fine grained soils such as clays are acceptable.

Coarse soils require less soil reinforcement and are often easier to compact than finer soils. Problem materials such as expansive clays, compressible soils, or highly organic soils (such as top soil) should be avoided unless properly addressed in the designs.

Correct compaction of foundation and backfill soils is critical to the long term performance of the Anchorbloc™ retaining wall system. Loose backfill will add pressure on the wall, collect water, cause settlement, and will not provide adequate anchorage for soil reinforcement materials, such as ACEGrid geogrid and fabric.

Foundation and backfill materials should be compacted to at least 95 percent of Standard Proctor density (Proctor density is the maximum density a soil can achieve in a laboratory using a standard amount of compaction effort). Construction observations and testing for proper soil types and compaction should be provided by a suitably qualified soils engineer.

Guidelines for the material properties of soil types common in New Zealand are provided below. They specifically relate to the values recommended in the Works and Development Services Corporation (Ministry of Works) Retaining Wall Design Notes (1990) and are referenced to the US Department of Navy (1982) and Terzaghi (1967). They have been included to allow an estimate of the potential Anchorbloc™ wall design to be obtained with little knowledge of the local site conditions and soil properties. They should only be used for preliminary estimates of the design, are not intended to be used for detailed design applications, and do not substitute for soils information provided by a registered soils engineer.

Any Anchorbloc™ retaining wall exceeding 1.5m tall will require an independent design completed by a Chartered Professional Engineer and will require a building consent from the local council.

Drainage

Anchorbloc™ walls are designed assuming no hydrostatic pressure behind the walls. Drainage aggregate (angular gravel, clear of fines) placed behind the wall helps to eliminate water accumulation. As all Anchorbloc™ walls are manufactured by dry stacking the blocks (no mortar is used between the blocks) water is free to weep through the joints and the voids of the blocks.

For critical design situations and tall retaining walls it is advisable to install drainage material and filter cloth to quickly remove large volumes of water. Advice on the type of drainage material and where it is applicable should be provided by the Chartered Professional Engineer undertaking the detailed design.

If high ground water levels are anticipated or if the wall is along a shoreline, additional drainage material behind and below the reinforced fill may be required. Filter fabric may be required to prevent unwanted migration of fine soil particles into the drainage aggregate.

The best drainage solution for a retaining wall will always be site specific.

Surface Drainage

Wall sites should be graded to avoid water flows, concentrations, or pools behind retaining walls. If swales are designed at the top of the walls, properly line and slope them so water is removed before it can flow down behind the walls.

Special attention should be paid to storm water from building roofs gutter downspouts, paved areas draining to one point, or valleys in topography. Be sure to guide flow from these areas away from retaining walls. Slope the soil slightly down and away from the wall bases to eliminate water running along the base and eroding the soil. If finish grading, landscaping, or paving is not completed immediately after the wall installation, temporarily protect the wall from runoff until adjacent construction and drainage control structures are completed.

Design Considerations (continued)

Shorelines and Rivers

Anchorbloc™ walls can be used to retain soil and slopes in and around shorelines, river banks and spillways. The engineering design of the retaining wall needs to consider the additional weight of the fill material and the reduced bearing capacity of the soil under the wall, due to their saturated states. Consideration must also be provided to scouring under and around the blocks.

In situations with water that can change heights rapidly the design must consider the influence of rapid draw down. There are specific design methods to allow for this situation (see the FHWA design manual for segmental retaining walls) that use reduced factors of safety for the draw down condition. The effects of rapid draw down can also be minimised by using free draining material (such as 16mm crushed and washed stone).

In areas of high flow or potential scour the Anchorbloc™ wall can be installed with a filler tube fitted between the blocks to provide additional protection from erosion of the backfill material. Alternatively, filter fabrics or a larger sized fill material can be utilised to prevent wash out from between the blocks.

Anchorbloc™ walls provide excellent stability and support for banks in and around rivers. They are easily installed and often require no additional ACEGrid geogrid or soil reinforcement. It is recommended that the Anchorbloc™ retaining wall be buried into the ground by 10% of the total wall height for applications involving flowing water to reduce the possibility of scour and increase the overall stability of the wall. In areas affected by floods and high flow rates, any Anchorbloc™ units that are dislodged or washed away can quickly and easily be retrieved and reused.

Reinforcement

ACEGrid Geogrids are durable, high strength polymer products designed for use as soil reinforcement. Horizontal layers of ACEGrid geogrid provide tensile strength to hold the reinforced soil together, so it behaves as a coherent mass. The ACEGrid geogrid reinforced soil mass becomes a gravity retaining structure with the Anchorbloc™ forming a facing element. Sufficient length and strength of ACEGrid geogrid can create a reinforced soil mass sufficiently large and strong enough to resist destabilising loads. ACEGrid geogrid layers can be directly attached to the Anchorbloc™ at 500mm intervals up the height of the wall.

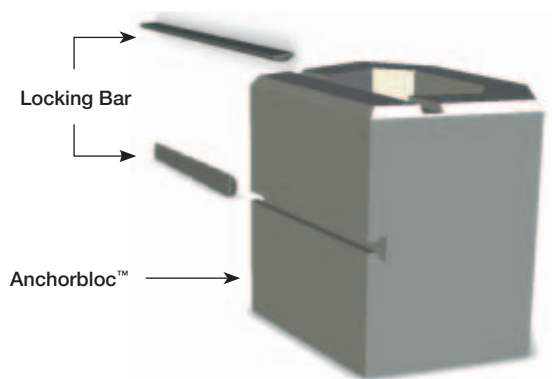
ACEGrid geogrid must be attached to the Anchorbloc™ using the Locking bar supplied by Humes. The locking bar has been developed specifically for this application and can generate up to 100% breaking load of most commonly used ACEGrid geogrid.

ACEGrid geogrid can be manufactured from several types of polymers that resist installation damage and long-term degradation. ACEGrid geogrid are designed to interact with the soil for anchorage and against pullout and resistance to sliding. Geogrids, the most common soil reinforcement for walls, are formed with an open grid like configuration. Product specific testing determines the durability, soil interaction, and strength of each type of ACEGrid geogrid. The connection detail between the ACEGrid geogrid and the Anchorbloc™ has also been extensively tested and certified.

The required type, length, vertical spacing, and strength of ACEGrid geogrid will vary depending on wall height, loading, slope, and soil conditions. Humes recommend GPIL (www.gpil.co.nz). Design advice and material specifications can be provided on request. All designs incorporating ACEGrid geogrid should be completed by a registered Soils Engineer.

ACEGrid geogrid layers must be nominally tensioned and free of wrinkles when placed. Most ACEGrid geogrid are stronger in one direction. It is important that the high strength direction be placed perpendicular to the wall face in one continuous sheet (no splices).

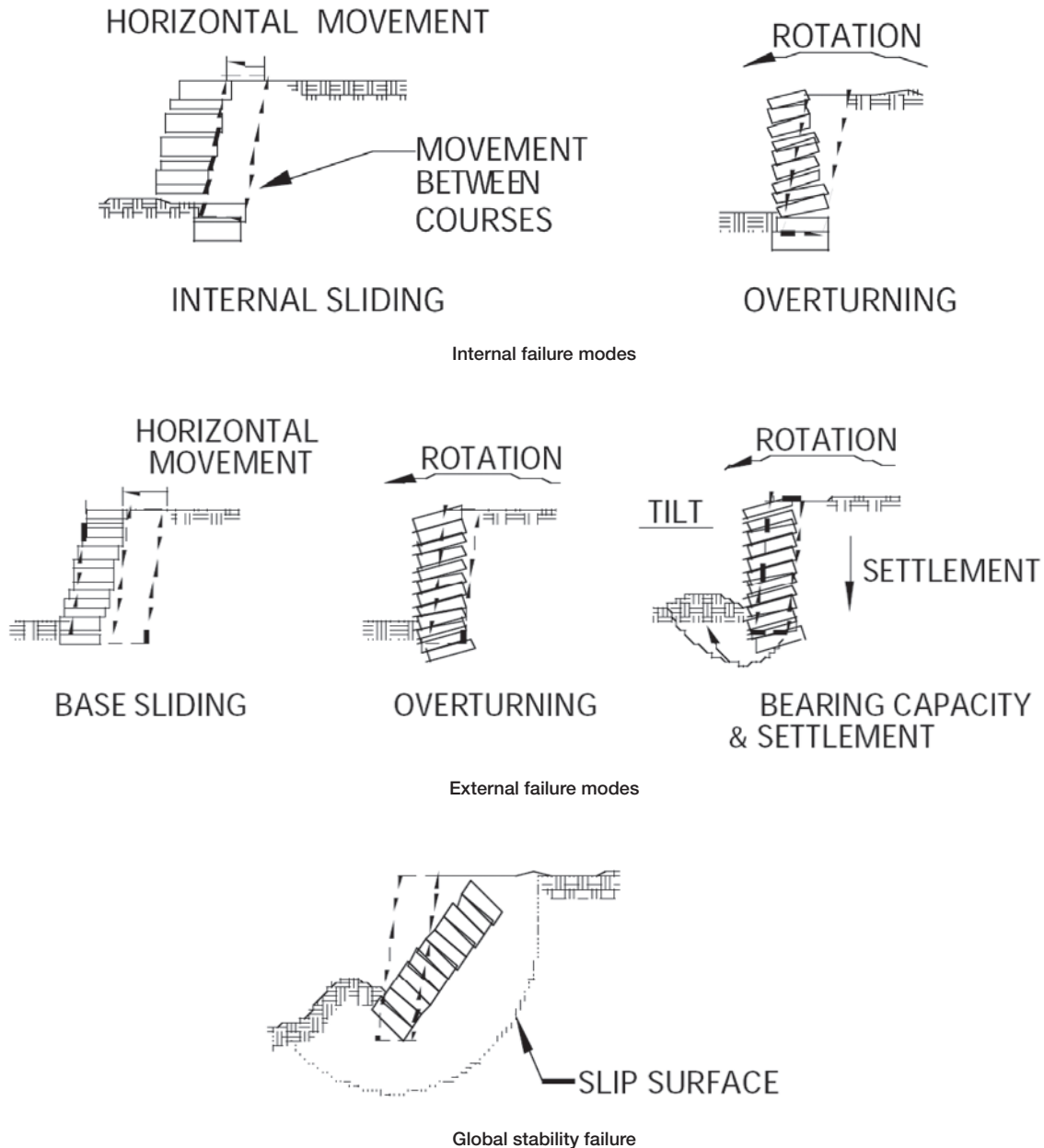
Along the wall length, and parallel to the face, adjacent sections of reinforcement are typically placed immediately next to each other without overlap to create 100 percent coverage with no gapping. Special details are used for curves and corners. The final design for a ACEGrid geogrid reinforced wall should be completed by a trained and registered soils Engineer.



Engineering

Anchorbloc™ walls are designed as traditional gravity walls. For unreinforced walls, the stabilising weight of the battered blocks is compared to the loading on the wall to ensure stability against overturning and sliding. When the applied load exceeds the stability of the Anchorbloc™ units alone, a larger gravity mass is created by reinforcing the soil.

Retaining walls have three forms of potential failure modes; internal stability failure, external stability failure, and global stability failure. These three failure modes are shown in the figure below. An internal stability failure is influenced by the wall itself. Possible internal failure modes include sliding of the blocks relative to each other and overturning of the blocks. The resistance against internal failures have little influence from the properties of the soil.



Exterior failures and global failures are related to the soil supporting the wall and have little influence from the wall itself and are primarily related to the onsite soil parameters.

The specific design of an Anchorbloc™ wall will typically only consider the internal stability issues of overturning and sliding. These two failure modes are dependent on the properties of the Anchorbloc™ and any ACEGrid geogrid reinforcement and not specifically reliant on the properties of the soil which support the wall. The external failure mode and global stability are failures of the soil and very site specific (soil properties, site geometry, etc).

Engineering (continued)

When undertaking a detailed design of the retaining wall all failure modes, including the external failure modes and the global instability via slip circle, will need to be investigated and designed by a trained soils Engineer.

An Anchorbloc™ retaining wall will place a large compression force on the soil, due to the weight of the wall and the weight of the soil it is retaining. One possible failure mode is a bearing failure (crushing failure) of the soil underneath the wall. Another potential failure mode is that the entire slope gives way (global failure). These can occur due to weak soil in the hill side surrounding the wall. Both of these failure modes are very specific to the site and can only be determined by an engineer after inspecting the site and measuring the properties of the soil. They do not relate to the design of the retaining wall, but rather to the stability of the hillside.

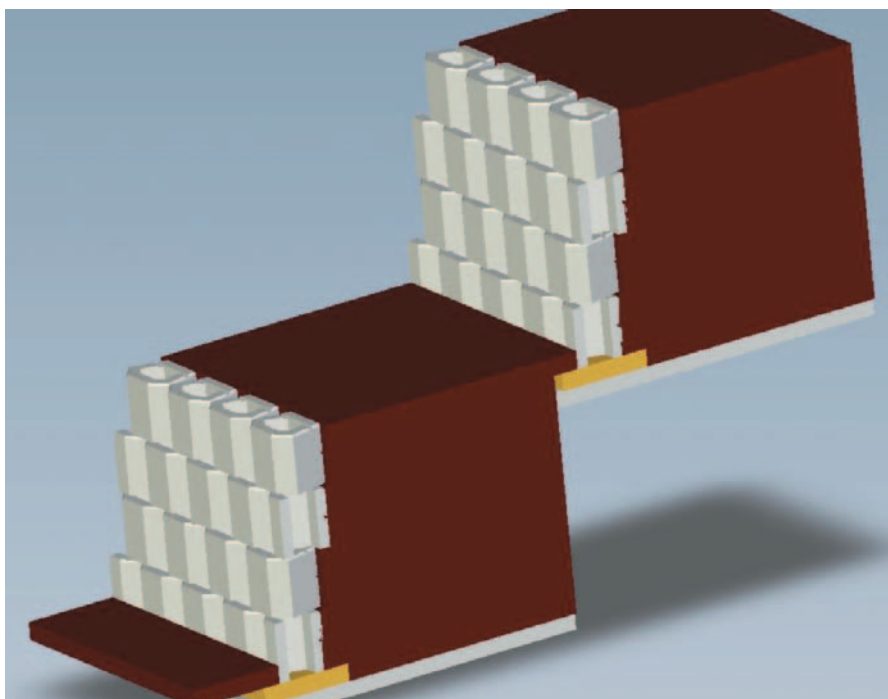
Each successive row of Anchorbloc™ are typically set back from the subsequent row by 150mm. This produced a tiered wall system that has increased strength and a strong aesthetic appeal. However, walls can be installed with varying set back or in a vertical orientation. Information is provided on the product summary sheets regarding the weight and centre of gravity of the different blocks, allowing designers to tailor the slope of their walls to meet their specific requirements.

Tiers

The use of multiple walls (or terracing) is an effective way to reduce the loading and gain greater overall height while maintaining an aesthetic appearance. The general rule for the walls is to space the second wall back by the approximately the height of the lower wall (i.e. the upper wall should be 4m behind a lower wall with a height of 4m). Closer wall spacing can be achieved under consultation from a Chartered Professional Engineer.

With a terraced wall the height of the upper wall should not normally exceed the height of the lower wall.

When undertaking a detailed design of a specific location a Chartered Professional Engineer will be able to provide more optimised designs with taller walls and closer spacing.



Curves

The trapezoidal shape of the Anchorbloc™ permits construction of concave, convex, and serpentine curves. The general construction requirements remain the same for both curved and straight installation, however care must be taken with the initial set-out of a curved wall to ensure the correct half block offset (running bond) pattern is maintained up the height of the wall. This is a particular concern for stepped and terraced walls.

With concaved walls (inside curve) the effective bend radius of each successive course increases up the height of the wall. With concaved walls there is no minimum bend radius for the bottom row; however gaps may appear between adjacent blocks in the upper courses while maintaining the correct running bond pattern. The size of the gap will increase in successive course up the height of the wall. Filler panels can be located in the vertical groves of adjacent Anchorbloc™ units to bridge these gaps.

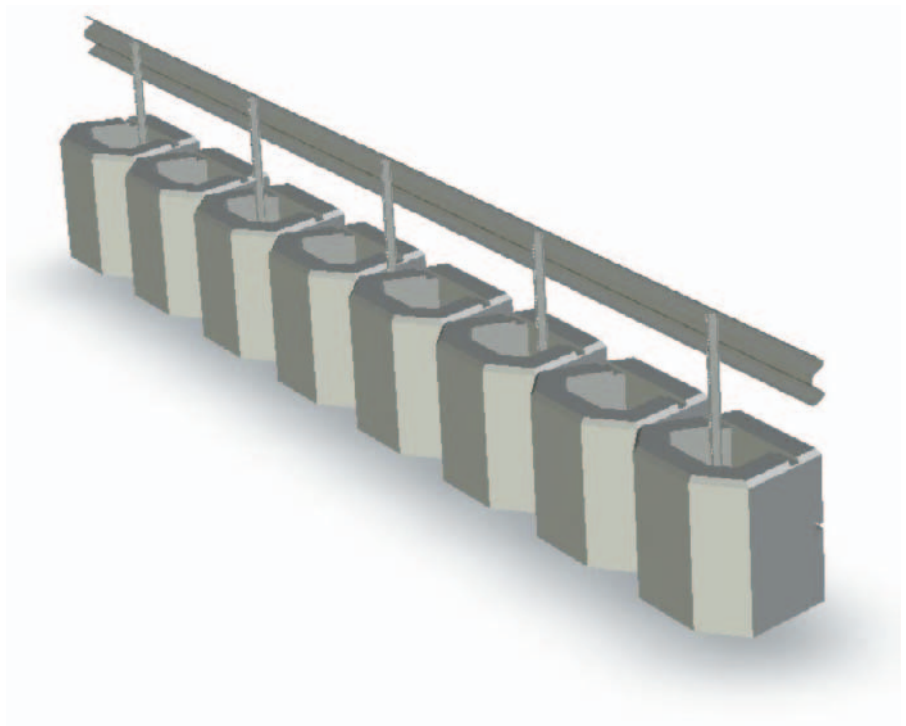
The radius of a convex curve (outside curve) will decrease up the height of an Anchorbloc™ wall. Care must be taken when placing the bottom blocks of the curve to allow a suitable clearance between blocks so that the upper row of blocks can be placed without clashing.

Recommendation for setting out curved structures is provided in the following the Humes Installation Guide.

Installations in the Void

Anchorbloc™ units have an internal void that passes through the height of the blocks. This void can be utilised in the top of blocks for installation of roadside hardware (guardrail, light columns, sign posts etc), especially in narrow roading corridors. Using the void to support the foundation elements of roadside hardware allow can increase the stability of foundation and allow for more useable space behind the wall.

For guardrail applications, CSP Pacific recommends using Nu-Guard 31™ for a reduced foundation load and lower barrier deflection.



Planning and Estimating

Planning

Accurate information needs to be gathered to allow the Anchorbloc™ wall to be successfully designed, including soil conditions, proposed wall heights, topography, groundwater levels, and surface water conditions. For walls exceeding 1500mm in height, it will be necessary to obtain a Building Consent from your local Territorial Authority and have an Engineering Design completed by a Registered Engineer. Humes can provide standard engineering design solutions for most retaining wall situations.

When designing the wall, make sure your layout considers the minimum bend radii, wall set backs, and any potential steps in the foundations. For walls retaining high imposed loads, large slopes, or tall walls it may be necessary to include ACEGrid geogrid reinforcement at various locations up the wall height. Humes can supply ACEGrid geogrid reinforcement and the certified attachment system for the Anchorbloc™ on request.

Estimating

Humes staff can assist you in estimating the total volume of product required for your wall, including all Anchorbloc™, ACEGrid geogrid reinforcement, ACEGrid geogrid attachment bars, drainage material, and fillmaterial.

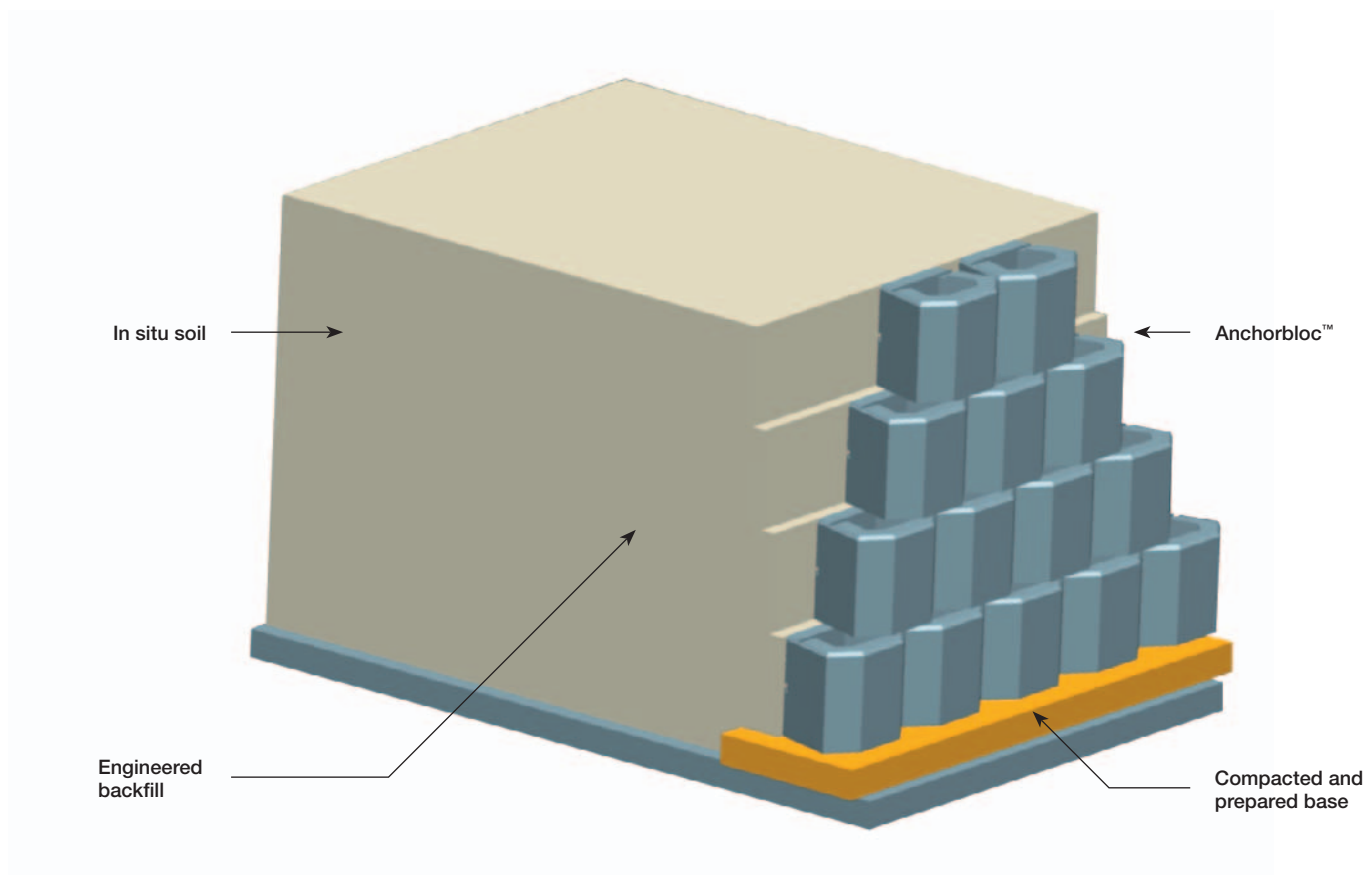
Final Designs

Preliminary wall designs suitable for tending purposes can be completed using the Anchorbloc™ design software (available online at www.humes.co.nz). This will provide a suitable preliminary design and an accurate Bill of Materials for the project.

A soils report by a qualified ACEGrid geogrid engineer will be needed to provide information on the reinforced and retained properties of the parent (in situ) soil. The soils report should address slope stability and the bearing capacity of the foundation soil.

Humes can provide full detailed designs for your retaining walls and assist with obtaining your Building Consent with the local Territorial Authority for an additional fee.

Installation Guide



Foundations

Foundation soils on which the Anchorbloc™ system will be placed must be stiff, firm, and have sufficient capacity to support the weight of the retaining wall. Any loose, soft, or compressible material should be removed and replaced with properly compacted backfill. The bearing capacity of the foundations should be specifically designed by a registered engineer.

Anchorbloc™ retaining walls are typically placed on a prepared base which is 1200mm wide and 200mm deep, depending on site conditions. The base should be constructed from hardfill with a particle size less than 65mm (GAP 65 or a suitable equivalent) which is compacted to the requirements of a registered engineer.

Care should be taken to ensure the prepared base is both flat and level. A uniform, level base will accelerate the construction of the entire wall and prevent any misalignment of the blocks up the height of the wall.

A layer of sand (GAP 7 or equivalent) approximately 25mm thick should be placed on top of the prepared base surface. The sand should be screed to achieve a flat surface that is level both along and across the prepared base. The out of tolerance of the sand layer should not exceed ± 5 mm.

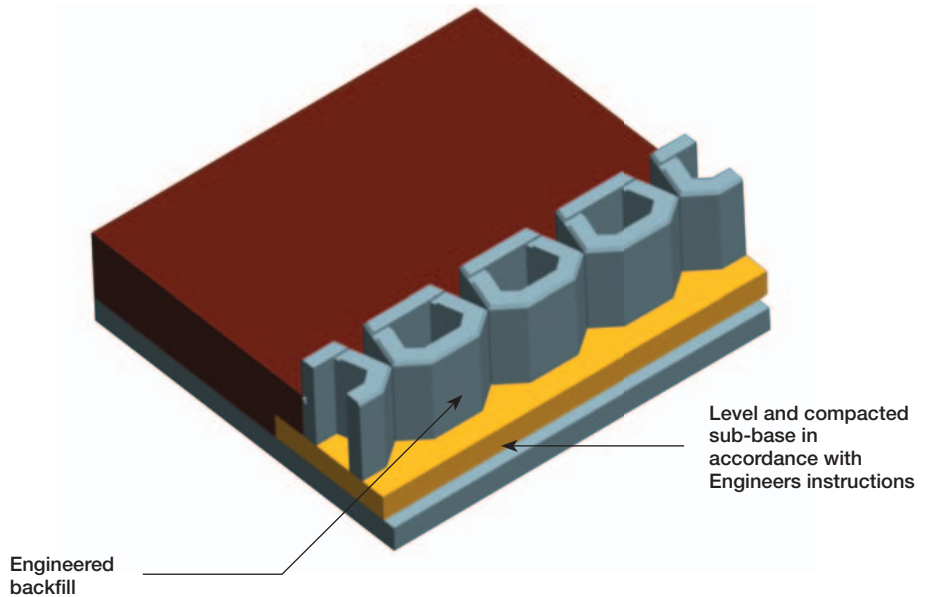
If the planned grade along the wall frontage is required to change elevation, the prepared base may be stepped in 1000mm increments (equivalent to one Anchorbloc™ height). The prepared base surface should always be started at the lowest level and worked upward.

Rigid concrete footings are not required nor recommended. Because the Anchorbloc™ units are installed without mortar they are free to move in relation to each other. A degree of flexibility in the foundation of the Anchorbloc™ retaining walls allows the blocks to accommodate minor deflections or differential settlements without damage occurring to the structure.

Placing Bottom Course

Make sure that the prepared surface is level and begin placing the base course units. If the levelling pad is stepped, begin at the lowest point and place the entire length of the lowest course before proceeding to the next course.

The units should be lifted into place using the Swift-Lift anchors located in the top face of the blocks. The location of the Swift-Lift points ensures the blocks hang slightly down at the front to facilitate placement. The blocks are typically lifted and placed using an excavator or directly from the delivery vehicle using a truck mounted hiab. Preferably, the lifting chains attached to each Swift-Lift point will be 1.5m or longer to minimise the potential for sideways loading on the lifting points.

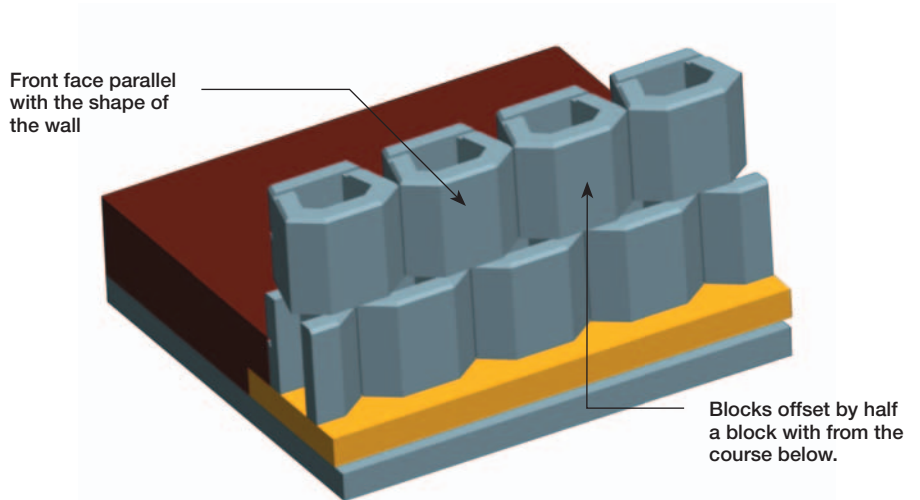


Lower the Anchorbloc™ units directly into position, taking care not to disturb the prepared base. It is recommended that the blocks be suspended approximately 25mm above the prepared base in the correct lateral location and then lowered down into the correct position. Each block should be checked for level both across and along the length of the wall. Care should be taken to ensure the top of adjacent blocks form a flat plane to facilitate the placement of subsequent courses.

The blocks should be placed to ensure a tight fit of the vertical surfaces on the widest part of the block, as shown below. A string line may be helpful for obtaining the correct placement of blocks in a straight wall. The front face of the blocks should directly follow the shape of the required wall. See the note in a subsequent section for guidance on placing blocks in curved walls.

Placing Additional Courses

Sweep the top of the installed units to remove any debris that may interfere with the placement of additional courses. Blocks in additional courses are placed offset by half a unit width to the course below to maintain a “running bond” pattern, as shown below. Blocks should be moved into location until the front edge of the block is located 150mm from the front of the blocks below and is touching the neighbouring block on the same level. The block should then be lowered into position taking care to maintain the location of the block relative to the surrounding blocks.



Vertical faced walls can be constructed using the same technique detailed above by placing the front face of each subsequent row in line with the row below. Care will be required to ensure the wall does not become sub-vertical (outward leaning) due to movement of the foundations or incorrect placement of the blocks

For curved walls, the blocks should be orientated at half of the angle between the two blocks below (bisect the angle). This ensures the face of the block is always oriented parallel to the direction of the wall. Correct alignment of the blocks will ensure the wall is erected quickly and will prevent misalignment of the blocks in subsequent courses

Installation Guide (continued)

Backfilling

An Anchorbloc™ wall has sufficient voids in and around the blocks to allow pore water to seep through the wall. As a result it is often not necessary to use additional drainage materials or filter fabrics behind the wall. However, drainage requirements for individual walls should follow the instructions of a registered engineer.

As each successive course of Anchorbloc™ units is placed it is preferable to install the backfill up to the top of the block in layers not exceeding 200mm. All backfill shall have the desired moisture content, as specified by the engineer, to add with achieving correct compaction densities. Avoid using heavy, self-propelled compactors or heavy rollers near the back of the wall to prevent the blocks from being pushed out of alignment.

Correct placement and compaction of backfill is important for the stability of a retaining wall and the backfilling of the Anchorbloc™ retaining wall should follow the instruction of a registered soils engineer. Care should be taken to provide adequate compaction between successive Anchorbloc™.

Fill material can be placed in the voids of the Anchorbloc™ to increase the weight and stability of the wall. Any fill material placed in the void must be undertaken prior to the next course being laid to allow adequate access to the voids. Top soil may be placed in the top 400mm of the void to allow for planting in the exposed void area after the wall is constructed.

Backing in walls using ACEGrid geogrid ties must follow the strict instructions of the registered design engineer. Attachment of the ACEGrid geogrid to the Anchorbloc™ is discussed in detail below.

Installation of ACEGrid geogrid Tie Backs

All Anchorbloc™ are supplied with Geogrid attachment points on the top surface and at mid height on the back of the block. The required type, length, strength, and vertical spacing of the ACEGrid geogrid will vary depending on the wall height, location, loading, slope, and soil conditions. A registered Design Engineer should prepare all final designs and specifications for the ACEGrid geogrid.



All Geogrid must be attached to the Anchorbloc™ using the approved Geogrid attachment bars supplied on request by Humes. When specified, all ACEGrid geogrid attachment must comply with the registered Design Engineers specifications and installation instructions.

All ACEGrid geogrid must be installed on fully compacted and finished backfill surfaces, equal in height with the locking bar slot on the blocks. It is important to ensure the ACEGrid geogrid is oriented with the strong direction perpendicular to the wall. Along the length of the wall and parallel to the face adjacent sections of ACEGrid geogrid should be spaced and overlapped (if necessary) in accordance with the suppliers recommendations.

For Mid-height ACEGrid geogrid layers:

1. Pin the end of the ACEGrid geogrid fabric (end furthest from the blocks) in accordance with the manufacturers instructions.
2. Lay ACEGrid geogrid fabric out towards the blocks.
3. Place the locking bar on top of the fabric, with the rounded edge facing the blocks. Fold the fabric over the top of the locking bar.
4. Roll the locking bar into the detail on the back of the block, engaging with the bottom of the locking bar first. Ensure the top of the locking bar engages in the slot.
5. Cut the fabric with a minimum of a 1.0m long tail out the back of the blocks (or to the manufacturers recommendations).
6. Tension the fabric using the manufacturers recommended procedures.

For Block Top ACEGrid geogrid layers:

1. Pin the end of the ACEGrid geogrid fabric (end furthest from the blocks).
2. Lay ACEGrid geogrid fabric out towards the blocks.
3. Fold the fabric on top of the locking bar ensuring a minimum of a 1m long tail protrudes past the locking bar.
4. Locate locking bar in the top slot detail with the rounded surface facing down.
5. Tension the fabric using the manufacturers recommended procedures.

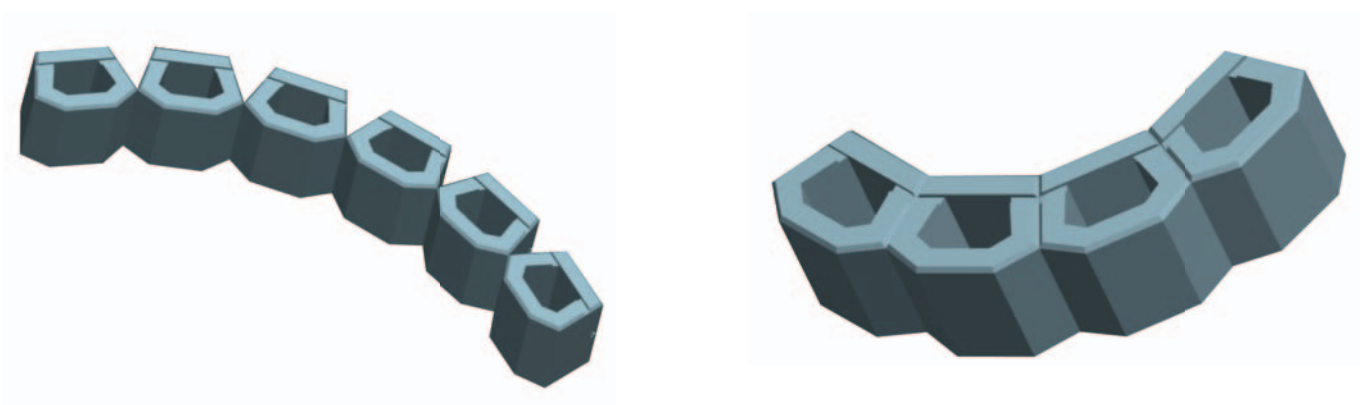
Installation Guide (continued)

Curves

The trapezoidal shape of the Anchorbloc™ permits construction of concave, convex, and serpentine curves. The general construction requirements described in this guide (levelling pad preparation, placement and backfilling) remains the same for a curved installation, however care must be taken with the lateral placement of the blocks.

For walls with a 150mm set back per course (standard construction), the radius of the curve for each course varies up the height of the wall. Care must be taken with the initial set-out of a curved wall to ensure the correct half block offset (running bond) pattern is maintained.

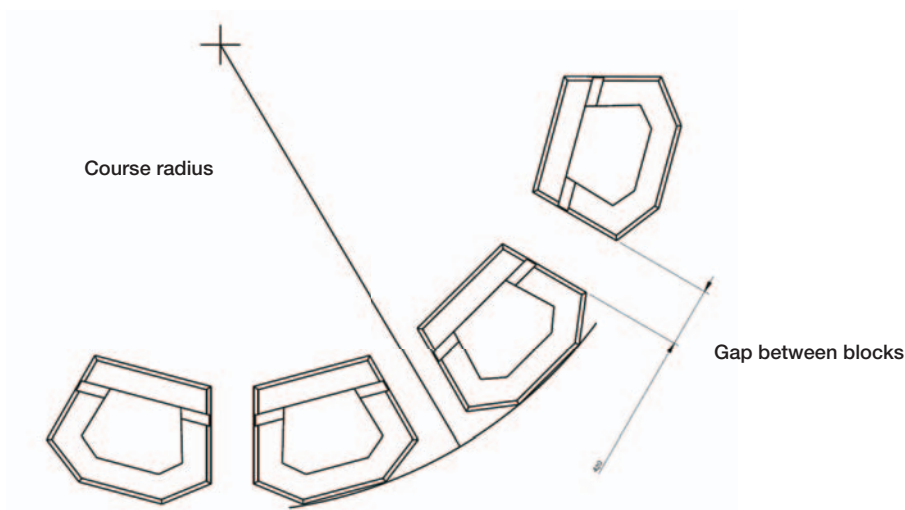
With concaved walls (inside curve) the effective bend radius of each successive course increases up the height of the wall. There is no minimum bend radius for concaved walls, however spaces may appear between adjacent blocks while maintaining the correct running bond pattern. The size (width) of the space will increase in successive course up the height of the wall. Filler tubes can be supplied by Humes to bridge any gaps in the walls generated from concaved curvatures.



Concaved (Inside Curve)



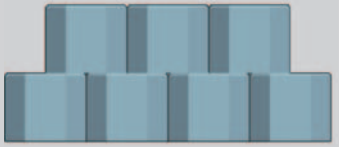

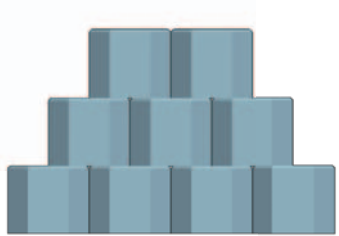
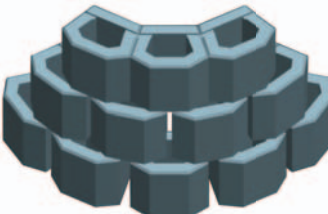
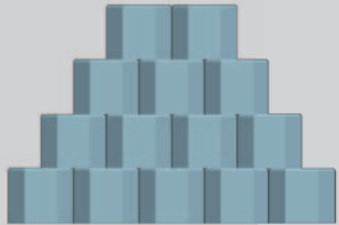
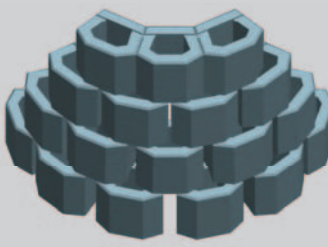
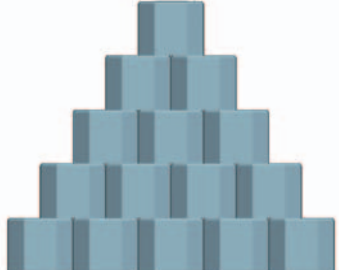
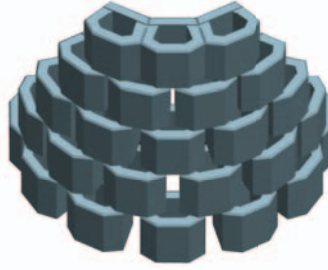
Convex (Outside Curve)

The radius of a convex curve (outside curve) will increase up the height of an Anchorbloc™ wall therefore, care must be taken when placing the bottom blocks of the curve to allow a suitable lateral clearance between blocks. Failure to do so will result in clashed with the blocks in higher course. Spaces between the blocks should be filled with Filler Tubes supplied by Humes. The minimum allowable radius for the top course of a convex wall is 2.3m. The minimum radius of the bottom course of blocks for walls of varying height can be calculated using the table below.



Installation Guide (continued)

Curves (continued)

Number of courses in wall	Front elevation		Minimum allowable radius of the bottom course (measured from centre of arc to front face)	Gap between blocks
1			2.5m	0.00m
2			2.7m	0.08m
3			2.8m	0.12m
4			3.0m	0.23m
5			3.2m	0.33m

Installation Guide (continued)

Corners

The shape of the Anchorbloc™ allows the creation of an unlimited variety of corners, as shown below. For more details contact Humes.

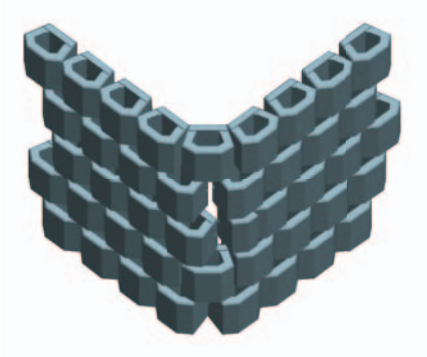


Figure 1 – Outside 90° Corner

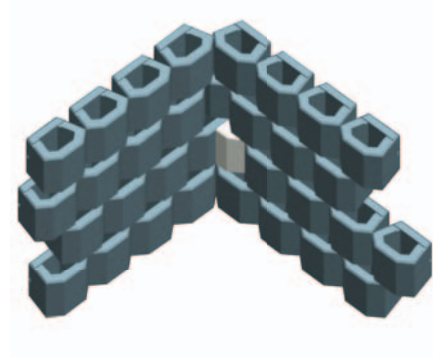
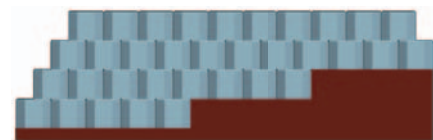
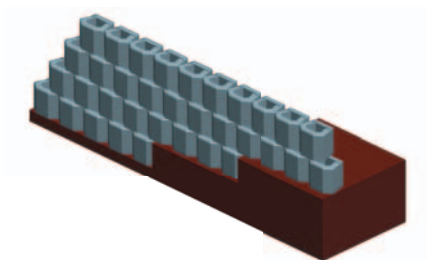


Figure 1 – Inside 90° Corner

Stepped Base Elevations

If the final grade along the front of the wall changes elevation the levelling pad and foundations may need to be stepped in 1.0m increments to match the grade change. When installing Anchorbloc™ with a stepped foundation always start at the lowest level and work upward.

The foundation should be stepped frequently enough to avoid using unnecessary Anchorbloc™ while maintaining the desired unit embedment depth.



References

The best design codes for a segmented retaining wall system such as the Anchorbloc™ are:

- *Design Manual for Segmental Retaining Walls*, TR 127, National Concrete Masonry Association, USA, 1997
- *Seismic Design Manual for Segmental Retaining Walls*, TR 160, National Concrete Masonry Association, USA, 1998

Some good guides for the construction and installation of the walls are:

- *Segmental Retaining Wall Installation Guide*, TR 146, National Concrete Masonry Association, USA, 1996
- *Inspection Guide for Segmental Retaining Walls*, TR 159, National Concrete Masonry Association, USA, 1998
- *Segmental Retaining Wall Drainage Manual*, TR 204, National Concrete Masonry Association, USA, 2002
- *Retaining Walls - Building Guide & Design Gallery*, TR 212, National Concrete Masonry Association, USA, 2000

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