



**Secura**

Segmental Retaining Walls  
v.1.3





# Secura

The proven choice for  
efficient retaining walls.

By combining attractive off-site finishes  
with efficient on-site installation, Secura  
answers the brief for a diverse range  
of retaining wall applications including  
housing, commercial and highways.





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# 75 Years & counting

Behind every remarkable company lies a story of vision and exceptional determination.

At Tobermore our inspirational story began over 75 years ago when Sam Henderson returned from the war as a young man. His mother had saved £500 during his time away and this was quickly invested in a fledgling family business. Sam went on to lead the business into pioneering production of concrete products before subsequent developments laid the foundations for the Tobermore brand.

Today, Tobermore remains family owned and managed, with the same vision, determination and values which are driving the business forward as one of

the UK and Ireland's leading manufacturers of concrete paving and walling products. We are now trusted suppliers to some of the country's most prestigious schemes in partnership with leading contractors and housebuilders.

At Tobermore "average" is never acceptable. Our recent £4m investment in the world's most advanced manufacturing equipment is indicative of our determination to always serve our chosen markets with excellent quality and service.

In 2019 we launched a fresh new face for Tobermore reflecting the energy and spirit which drives our people to bring market-beating solutions to designers and contractors across the country. Innovation fuels our growth as we find new ways to further enhance product performance, making us enthusiastic about Tobermore's future in a market which recognises the true value of our 'right first time' responsive service.



“Our continual investment in people and new technology is securing Tobermore's excellence for both quality and service.”

David Henderson  
Managing Director







# Ef-Stop®


**Combatting efflorescence**

Every aspect of our product’s performance is researched and optimised to provide an excellent long-lasting appearance. In respect to the challenge of efflorescence, we have invested in manufacturing technology which enables us to produce virtually efflorescence free paving and walling.

Efflorescence is perhaps the single biggest problem encountered with decorative concrete paving and walling products. The cause of efflorescence is simply a chemical reaction between the cement in the concrete and rainwater causing the formation of calcium carbonate. This white, crystalline substance stains the surface and spoils the appearance of the paving or walling.

In the Tobermore manufacturing process, we cure our products in a warm vapour atmosphere for 12 hours, which ensures that efflorescence is dramatically reduced. Moreover, the vapour curing also enhances the colour, improves the strength and cures the products much faster, allowing products to be used almost immediately.



 **Ef-Stop®**  
Look for products with the Ef-Stop logo



Competitor's walling



**Vapour Cured**

The Ef-Stop protection includes an intense vapour curing process. Vapour penetrates to the core of the Secura block.



# ServiceSure

ServiceSure is Tobermore’s unique package of customer service benefits developed to ensure an efficient, consistent and streamlined experience. This unbeatable, seamless service follows your project from initial enquiry to delivery and beyond, keeping you fully informed at every stage.

**Delivery Excellence**

You can trust Tobermore to fulfil your order on time and in full as agreed. This industry leading service is proven week in week out, our average delivery performance is an outstanding 99.47% of orders on time and in full.

**99.4%**  
ON TIME IN FULL

**Easy Spec**

Our specification team is on hand across the UK and Ireland to support you with technical advice, design support and samples. Tobermore’s comprehensive website provides additional access to useful information. This is backed up by a package of the industry’s leading specification tools including NBS Plus/Create and BIM Level 2.



NBS  
Plus & Create



BIM  
Level 2



Design  
Services

**Fast Quote**

We always turn around quotes within one working day.

**Unrivalled Availability**

With more stock on the ground and a faster turnaround on batch controlled orders we offer market leading availability on a full range of paving and walling products. Because we manufacture everything on one site we can combine mixed product loads for customer friendly logistics.



**Intelligent Ordering**

Every order placed with Tobermore is sense checked on receipt by one of our trusted advisors who will liaise with you directly to ensure quantity, format and delivery details are right first time. All orders will receive an Order Confirmation with clear product and pricing information.



# Responsible Manufacturing

We care about our impact on the global environment, so we invest in a robust programme of continuous environmental improvement.



**Energy**

We are reducing our carbon footprint by hundreds of tonnes each year by investing in the production of our own clean energy output from solar panels and a 250kw wind turbine.



**Waste**

We have reduced our waste to landfill to zero through a process of continual improvement in production efficiency and the 100% recycling of manufacturing residue.



**Transport**

We maximise transport efficiency, through our “on time and in full” policy. All loads are despatched from a single site and vehicle use is optimised through back loading.



**Water**

We recycle 100% of the water used in our manufacturing process and manage our use of this precious resource by investing in systems to harvest rainwater.



**Packaging**

We use 100% recyclable packaging and provide the maximum protection for our products with minimum environmental impact.







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For Secura Grand Geogrid Reinforced Walls

Secura  
Grand



# The perfect retaining wall solution

Technical excellence lies at the core of the Secura segmental retaining wall system and Tobermore have engineered every aspect of its design to provide total assurance for the specifier. Secura’s innovative segmental block format delivers many benefits in addition to its core functionality.

**Attractive design**

Secura’s rugged stone finish and attractive colour range enables architects and landscape designers to blend the retaining wall’s structure into attractive landscaping schemes to complement the surrounding structures. Secura looks and works well compared to other retaining wall systems.

**Mortarless wall construction options**

Secura is engineered for simplicity and efficiency on-site by reducing the need for wet trades or specialist plant. Contractors appreciate its ability to adapt to the practical reality of site access challenges and varying site conditions. In each case Secura represents a fast, labour efficient option.

**The right choice**

Secura is the right choice for a vast range of applications - from smaller walls in residential projects up to taller walls in commercial applications. Secura Grand geogrid reinforced walls are also BBA HAPAS approved for use in highways and bridges.



**Design support**

By offering full technical support including the option of certified structural designs, we are ready to support you throughout your project.



**Capability**

Secura adapts from gravity walls of up to 1m retained height and two installation options capable of producing retaining walls up to 9m high.



**Versatility**

Secura adapts easily to a wide variety of layouts enabling curves, corners, steps and terraces to be built using the same simple component range and process.



**Cost effective**

The mortarless block construction facilitates rapid laying by hand, reducing man-hours for completion. The engineering integrity with built in 7° set back makes efficient use of land. The attractive factory finish eliminates the need for secondary rendering or painting on-site.



**ServiceSure**

Support is just an email or phone call away and our team are available on the ground. Secura is manufactured and stocked in the UK using locally-sourced materials for efficient delivery to site.

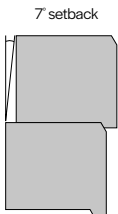


# Why Secura Grand?

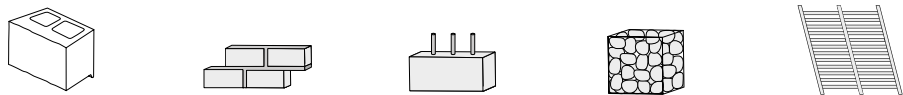


### Key Benefits of using Secura Grand as a Retaining Wall Solution

- ✓ Cost effective retaining wall solution
- ✓ Quick to install
- ✓ Mortar-free installation
- ✓ Builds up to 9m retained height
- ✓ Attractive stone finish with a range of colour options
- ✓ Full design and technical support available
- ✓ BBA HAPAS approved



### Retaining Wall Comparison



Benefits	Secura Grand	Masonry	Reinforced concrete wall	Gabion wall	Crib Wall
Attractive stone finish	✓	X	X	X	X
Mortarless option	✓	X	X	✓	✓
Maintenance free	✓	X	X	✓	✓
Speed of construction	✓	X	X	X	X
Cost effective	✓	X	X	✓	X
Simplicity on-site	✓	X	✓	✓	X
Reduced efflorescence	✓	X	X	✓	✓





# BBA HAPAS

Certification for Secura Grand Geogrid Reinforced Walls  
& Bridge Abutments



H A P A S

For Secura  
Grand Geogrid  
Reinforced Walls

**About BBA**  
BBA has been the leading UK authority on building product certification for more than 50 years. Its technical integrity is founded on its independent approach and delivered by the industry’s recognised experts. The BBA stands as a symbol of quality and reassurance for architects, building planners, Local Authorities, contractors and inspectors.

**About HAPAS**  
HAPAS (the Highway Authorities Product Approval Scheme) was set up by Highways England, the County Surveyors Society (CSS) and the British Board of Agrément (BBA) in 1998, with the clear objective of developing national approval assessment, testing and certification for innovative products, materials and systems for use in highways and related areas. The scheme which removes the need for individual authorities to carry out their own assessments and tests provides highway engineers with invaluable data on product performance, design and installation for project planning.

**Product Testing**  
Certificates are issued only after a rigorous assessment process which involves both laboratory and field testing, lasting up to two years and involving regular site inspections and performance trials. Once the certificate is issued, the manufacturer is audited every 6 months. The certificate is re-assessed every 3 years.

## Key features within the HAPAS Certification for Secura Grand Geogrid Reinforced Walls

**Strength**  
Secura Grand blocks are manufactured from concrete with a minimum 28 day compressive strength of 40 N-mm<sup>-2</sup> and satisfy the HE requirements for durability of class XF2 exposure in accordance with BS 8500-1 : 2015.

**Suitability**  
When designed and installed in accordance with the certificate, the Secura Grand Concrete Block Wall System for reinforced soil retaining walls and bridge abutments is satisfactory for the construction of reinforced soil retaining walls and bridge abutments up to a maximum height of 9 metres.

**Durability**  
When designed and installed in accordance with the certificate, the system will have adequate durability for the required 120 year design life of a retaining wall and bridge abutment in the conditions likely to be encountered in the UK.

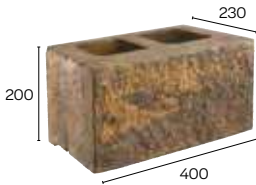
**Fire rating**  
Secura Grand is classified as Euroclass A1.



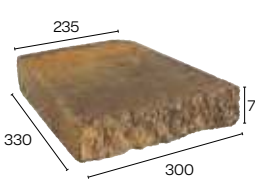
# Secura Grand Range & Technical



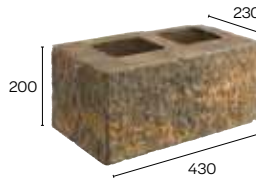
SCAN HERE



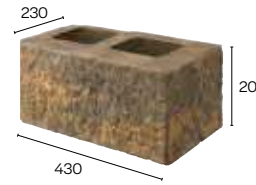
**Block**  
400 x 230 x 200mm



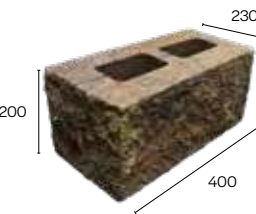
**Coping**  
300/235 x 330 x 70mm  
Tapered coping



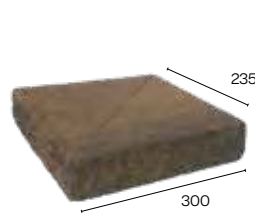
**Left Corner Block**  
430 x 230 x 200mm  
Can be used as end blocks.



**Right Corner Block**  
430 x 230 x 200mm  
Can be used as end blocks.



**Double Sided Block**  
400 x 230 x 200mm



**90° Coping**  
300/235 x 330 x 70mm  
Tapered coping

**Note:** Any external 90° corner will require left and right hand corner blocks, which are alternately laid between courses. To facilitate ordering these are supplied as a pair.

### Specification



Product type	Concrete Block
Manufactured to	BS EN 771-3:2011
Efflorescence	Minimum 12 hour vapour curing to significantly reduce the possibility of efflorescence
Strength	Typical tensile splitting strength of >30N/mm²
Design and Installation to	BS 8002:2015
Dimensional Tolerances	Length +3mm -5mm, width +3mm -5mm, height +3mm -5mm
UN5	<b>Plus</b> D41 310 <b>Create</b> 45-25-66/320
Applications	Can be built as a gravity, engineered reinforced or concrete backfilled retaining wall. Please refer to Tobermore's Secura Grand installation guidelines or consult with Tobermore for design advice.
Energy used	100% renewable energy
Water used	100% from our rainwater harvesting system and groundwater bore hole
Recycled content	Not less than 10%
Carbon footprint	5kgCo²e/ea
Recyclable	100% of this product can be recycled
Manufacturing & Delivery	From one location within the UK
Building rating	Refer to the Green Guide to Specification, 4th Edition 2009.

Tobermore products are manufactured in accordance with an accredited ISO 9001:2015 quality, Manufacturing facilities are accredited to ISO14001:2015 Environmental Management. The company publish environmental labels and declarations in accordance with BES 6001.

### Colour Range



### Stock

product	size (mm)	colours available	in stock	m² per pack	no. per m²	no. per pack	weight kg per pack GB	weight kg per pack NI/ROI
Secura Grand	400 x 230 x 200	Bracken, Heather, Slate	YES	3.84	12.5	48	1340	1340
Secura Grand Corners	430 x 230 x 200	Bracken, Heather, Slate	YES	-	-	32	1464	1464
Secura Coping	300/235 x 330 x 70 (tapered coping)	Bracken, Heather, Slate	YES	-	3.77LM	99	1415	1403
Secura Coping 90 degree Internal/External Kit (4 copings cut from corner coping)		Bracken, Heather, Slate	YES	-	-	-	105	105
Secura Double Sided End Block	430 x 230 x 200	Bracken, Heather, Slate	YES	-	-	32	1165	1165





# Regional Housing

Nicholl's Lane  
Stone

Products:  
Secura Grand  
Slate





# Housing

**Bushby Fields**  
Leicestershire

**Products:**  
Secura Grand  
Slate



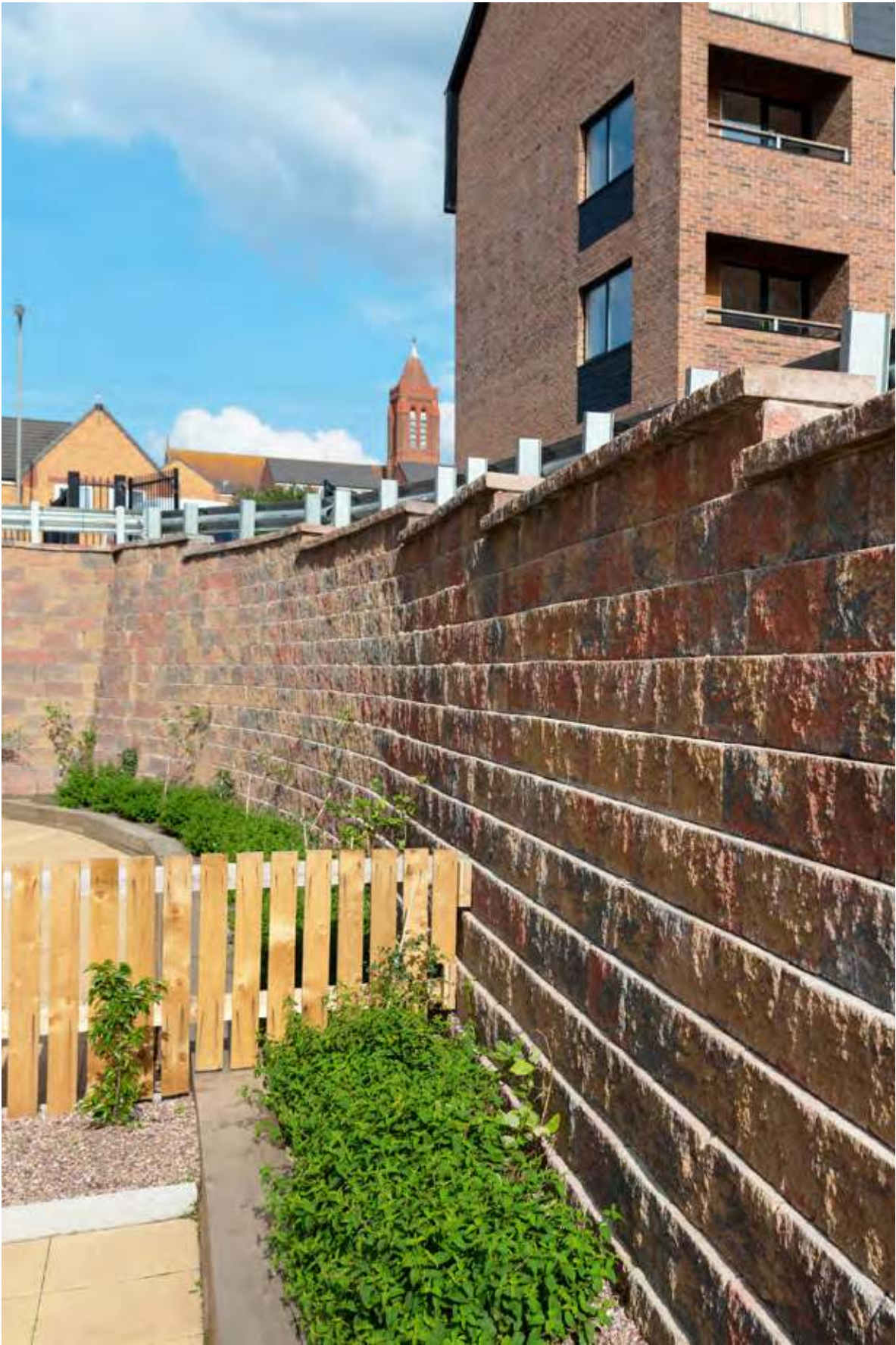


Housing

Baxters Green  
Nottingham

Products:  
Secura Grand  
Slate





Apartments

New Brunswick  
Liverpool

Products:  
Secura Grand  
Slate





# Commercial

**Pharmaceutical Facility**  
Cork

**Products:**  
Secura Grand  
Bracken





# Highway

**Leith Links**  
Edinburgh

**Products:**  
Secura Grand  
Heather



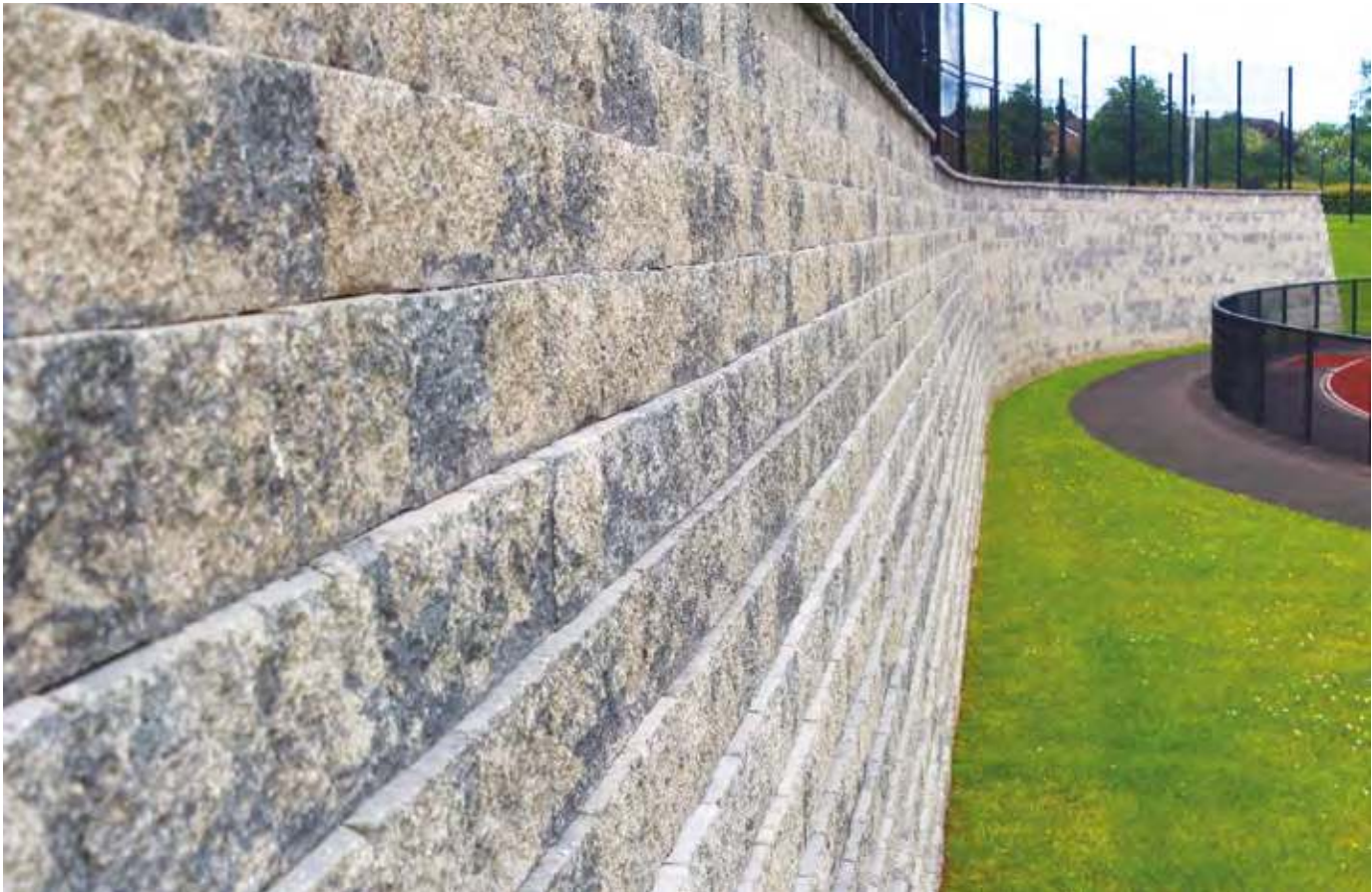
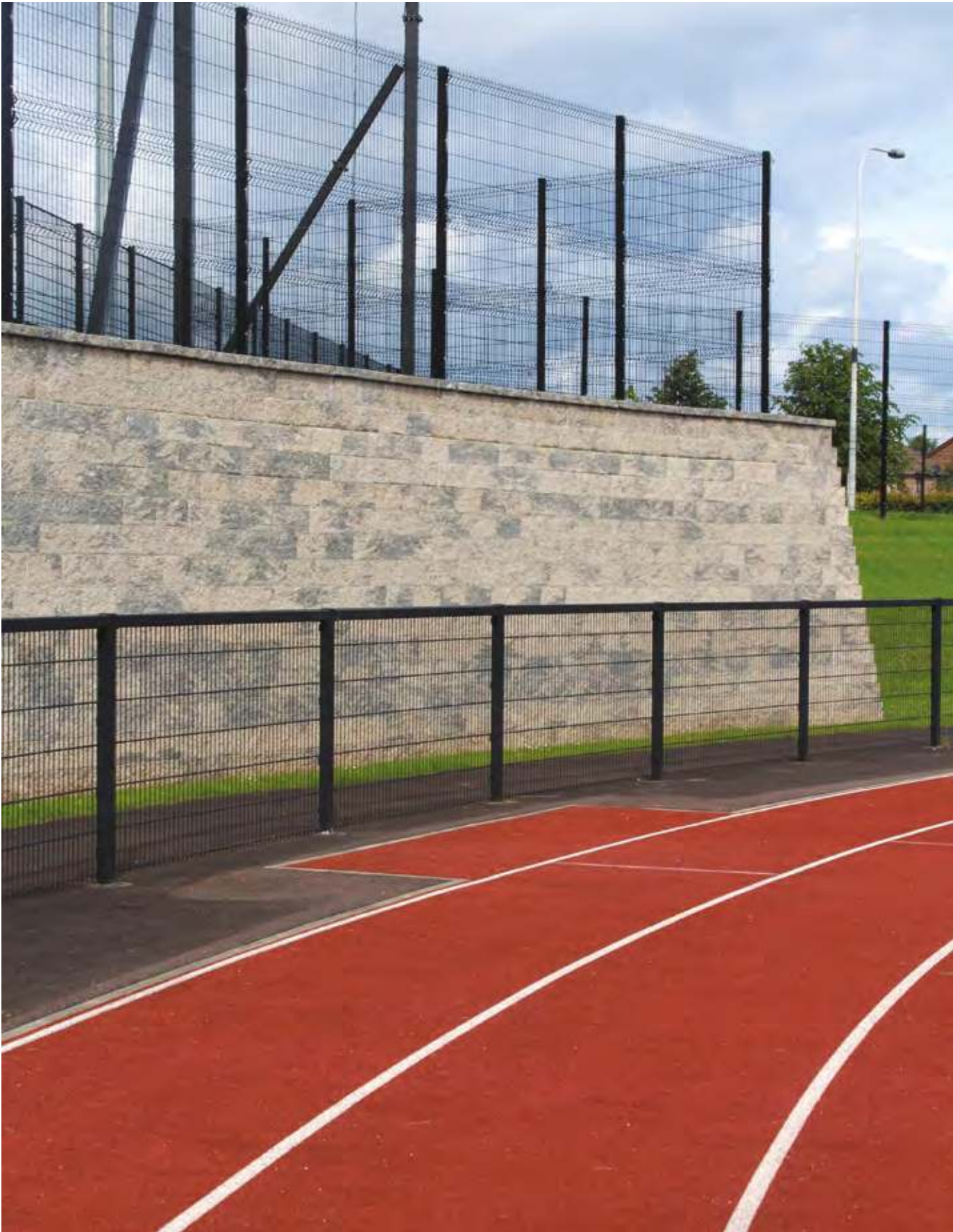


**Retail**

**Wembley**  
London

**Products:**  
Secura Grand  
Slate





Sports

Meadowbank Sports Arena  
Magherafelt

Products:  
Secura Grand  
Slate





Education

Denbigh School  
Milton Keynes

Products:  
Secura Grand  
Slate





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# Secura Grand Design & Installation



# Design & Specification

## Specification

For ease of specification Secura is fully supported under the NBS plus and NBS Create services. BIM models are also available at [tobermore.co.uk/professional/resources/bim](http://tobermore.co.uk/professional/resources/bim)



NBS Plus & Create



BIM Level 2

## Design Services

Tobermore provides a range of technical and design services to guide specifiers and installers to the correct retaining wall solution for each project. Our design advice is offered by a team of geotechnical experts experienced in the design of retaining wall schemes.

### Stage 1

#### Download a typical wall design.

Our online database of typical wall drawings includes options for 3 installation types at differing heights and site conditions. These drawings are a valuable tool for initial site planning and materials estimating. An index of these drawings is contained within the installation detailing sections of this guide. See page 60.

### Stage 2

#### Request Indicative preliminary retaining wall designs.

When your site conditions are not covered by our database of typical wall designs you can request our free of charge support service, which provides an indicative preliminary retaining wall design to facilitate site design and materials estimating.

### Stage 3

#### Indemnified retaining wall designs.

A fully indemnified design service can be arranged by emailing [technical@tobermore.co.uk](mailto:technical@tobermore.co.uk).





SECURA GRAND

# Gravity Wall

A gravity retaining wall relies solely on the weight and setback of the segmental concrete blocks to resist pressure and retain the soil behind it.

Secura Grand can be constructed as a gravity wall to a maximum retained height of 1m in situations where there is no crest or toe slope and no surcharge above the wall. The simplicity of the Secura Grand Gravity mortarless build technique makes it highly efficient for low walls.

**Suitability**

Max retained height

**1m**



Level



**Backfill Zone**



Free draining soil or aggregate.

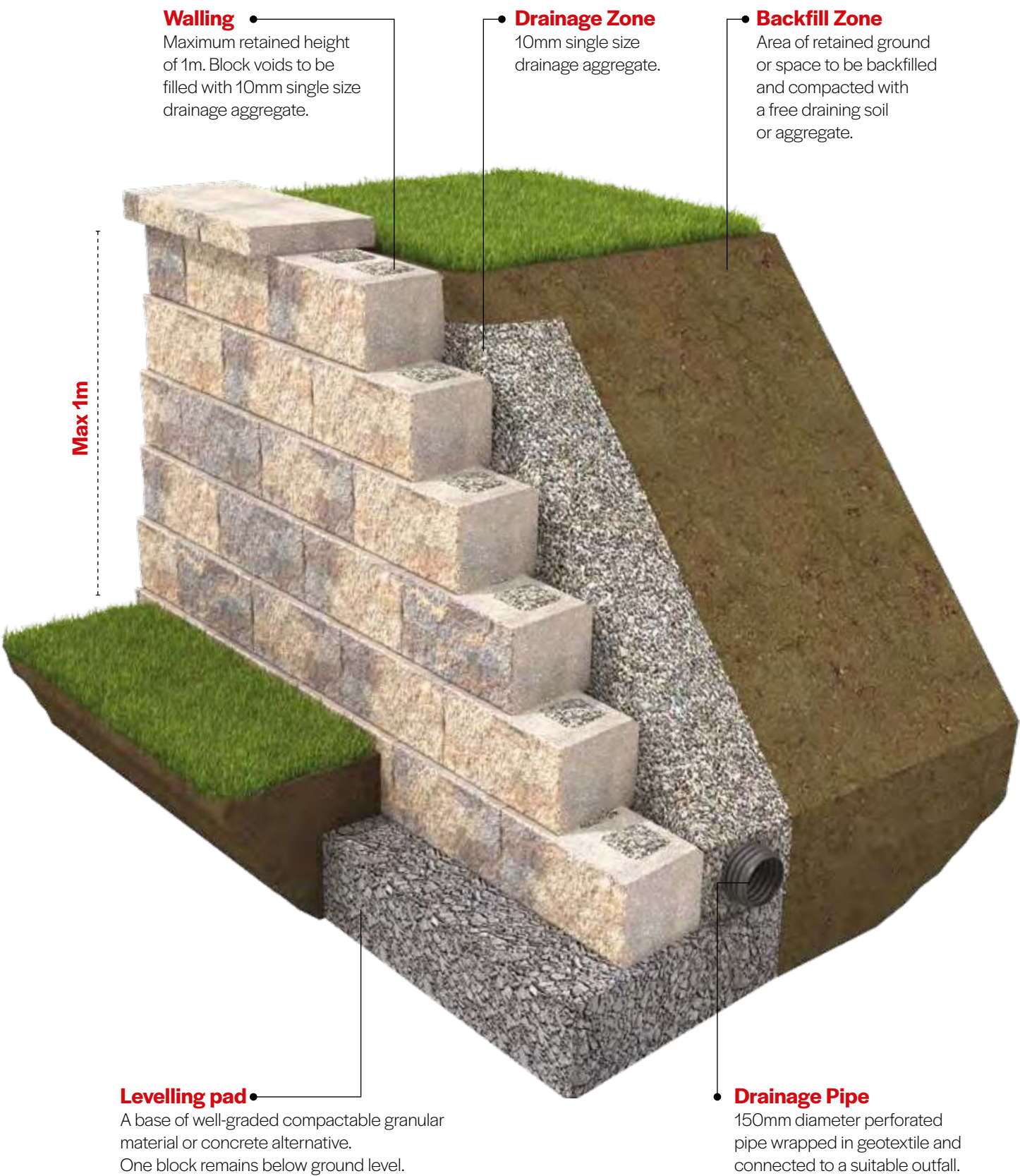
**Drainage Zone**



10mm single size drainage aggregate.

**Mortarless Installation**

When installed with an aggregate levelling pad, the Secura Grand gravity wall remains completely mortarless.





# Secura Grand Gravity Wall Installation



SCAN HERE

Preliminary actions

STRUCTURAL DESIGN

**Important:** The design of any retaining wall requires the input of an engineer to assess the unique conditions of every site in respect of loads in conjunction with site and soil conditions. The advice and typical wall designs in this guide are for information only to assist estimating and initial planning but should not be used for construction.

WORKING SAFELY

**Important:** Please refer to our safety notes on page 124 prior to commencement of any site works.

FILL MATERIALS

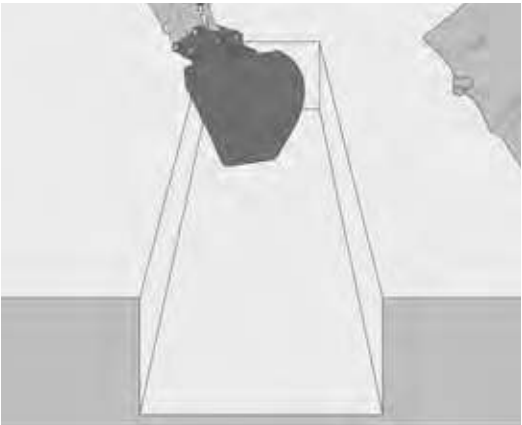
**Important:** Please ensure that the specified fill materials (see page 122) are available on site before commencement.

**Important:** The maximum gravity wall retained height is 1m on a site with no toe or crest slope and zero surcharge. Please review the geogrid or concrete reinforced options if the gravity option is not possible.

**Important:** Please read these installation guidelines in conjunction with the design drawings provided by the scheme engineer.

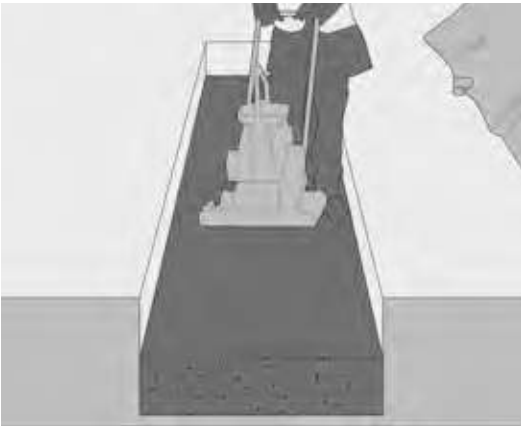
Step 1  
Setting out & trench excavation

- Mark out the location of the wall by checking the design drawings or by agreement with the project engineer, architect or client.
- Please refer to the table below for typical levelling pad details or if there is an engineers' site-specific design. This should be followed at all times. (Please refer to the table below for dimensions and recommended block courses below ground)
- Excavate the trench to a minimum 400mm depth and 600mm width. Remove any unsuitable material and replace it with compacted granular material. See specification for material on page 124. Ensure it is fully compacted using a plate compactor.



Step 2  
Laying the levelling pad

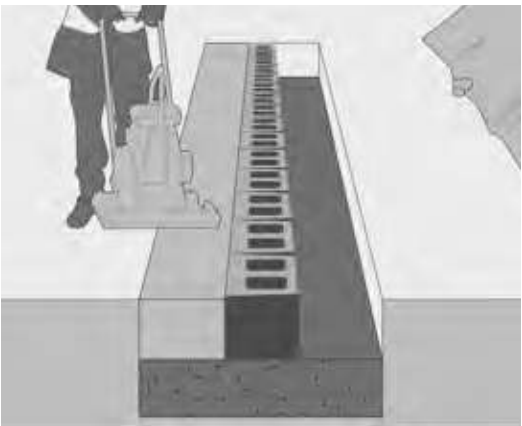
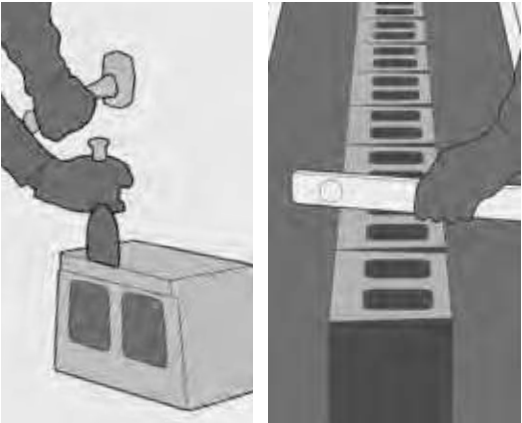
- Important:** If the line of the wall is on a gradient, the levelling pad must be stepped (see page 100). The top of the levelling pad must be at least 200mm below finished ground level. Lay a level levelling pad using one of the following two options:
  - Granular material option:** Lay a well-graded compactable granular material as specified on page 116 and compact fully using a plate compactor to ensure a level base. The typical depth of the levelling pad should be 200mm after compaction.
  - Concrete option:** Install a 200mm deep concrete levelling pad using C20/25 concrete.



Product	Min. internal radius	Max. external radius	Typical trench width (mm)	Typical trench depth (mm)	Levelling pad material	Typical levelling pad depth (mm)	Block courses below ground
Secura Grand	Refer to page 85	Refer to page 83	600 mm	400mm to accommodate one block plus levelling pad depth	Well-graded compactable material or C20/25	200 mm	1 (unless specified differently on the design drawings)

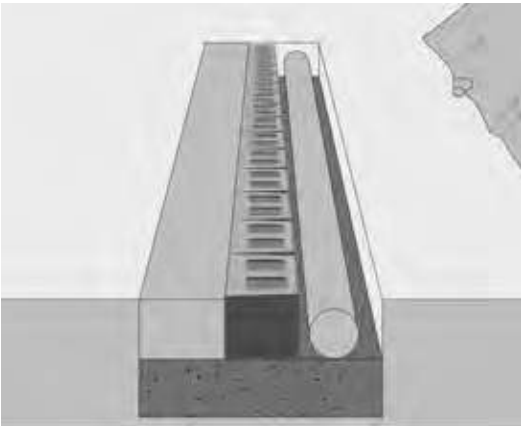
Step 3  
Installing the base course

- Important:** The top of the base course when installed must be below finished ground level.
- Block selection**  
Please ensure that you randomly select blocks from a minimum of three packs to achieve the desired colour blend. This should be done on the base course and for all other courses.
- Block preparation**  
To ensure a level base course, remove the nib from the base of the blocks to be used on the base course using a bolster and club hammer.
- Block Placement**  
Place the blocks onto the levelling pad and use a string line along the back of the blocks to check for alignment. Use a spirit level to ensure the blocks are level along their length and from front to back as the aesthetics of the finished wall depend on the base course being level. Leave a gap of 2mm between the blocks to allow for any movement of the ground.
- Front fill**  
Fill the gap in front of the base course with on-site soil and fully compact, level with the base course.



Step 4  
Laying drainage pipe

- Drainage Pipe**  
Lay a perforated drainage pipe centred on a line 150mm from the back of the base course. The pipe should connect to a suitable outlet/soakaway. The pipe can be wrapped in a geotextile to prevent clogging.
- Fill the Block Voids**  
Completely fill the two voids in each block with 10mm single size drainage aggregate. This requires approximately 9kg of 10mm drainage aggregate per block.

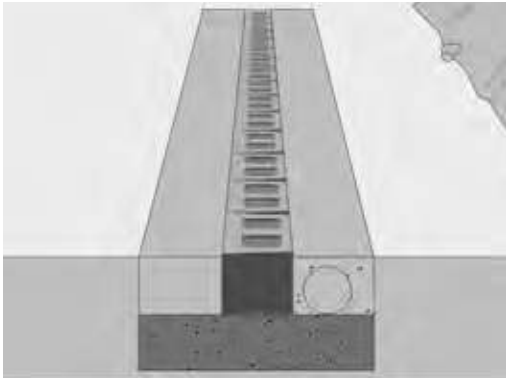




# Secura Grand Gravity Wall Installation

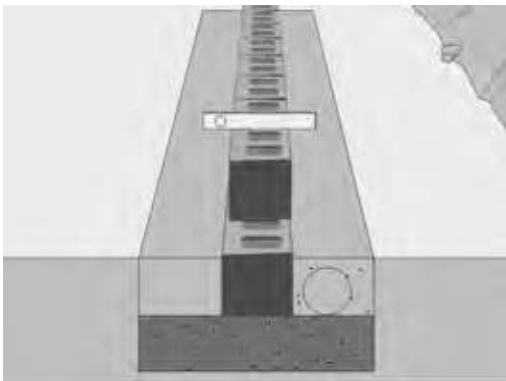
**Step 5**  
**Backfill the drainage material**

- Backfill the base course blocks to a distance of 300mm with 10mm drainage aggregate covering the perforated drainage pipe. Backfill until it is just under the top of the base course blocks to allow space for the nib on the next course. Subsequent layers will form a 300mm wide drainage column behind the wall.
- **Important:** Do not compact the drainage material.



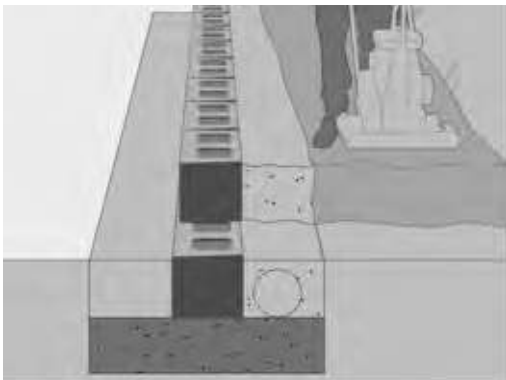
**Step 6**  
**Laying further block courses**

- Place the blocks on top of the base course ensuring that they are in running bond pattern in relation to the blocks on the base course. Vertical joints should not directly line up between courses. Push the blocks forward until the nib on the base of the block tightly locates against the blocks beneath.
- Use a spirit level to ensure the blocks are level as you build each course. Due to Secura's mortarless construction, the use of shims may be required occasionally to maintain level in the block course.
- Backfill 300mm drainage column.
- Fill the voids in each block with 10mm single size drainage aggregate. This requires approximately 9kg of 10mm drainage aggregate per block.
- Build the wall up a maximum of a further two courses.
- **Important:** Never build any higher than three courses before backfilling.



**Step 7**  
**Backfilling the area behind the drainage zone**

- Backfill the remainder of the space behind the drainage zone in maximum 200mm lifts with a free draining soil or aggregate and compact the backfill material until it is level with the drainage aggregate.
- Brush the top surface of the blocks to remove any debris which may affect the wall level prior to laying subsequent layers.
- **Important:** Do not compact the 10mm drainage column. Tracked machines, vibrating or static rollers should not be used within 1 metre from the back of the wall.



**Step 8**  
**Completing the wall**

- Repeat this process until you have reached the maximum gravity wall height of 1m (maximum 6 courses including base course). Top off with soil.
- **Copings:** To install the copings use a concrete exterior grade construction adhesive applied with a cartridge gun. Generously apply the adhesive to the block. For extra stability the last two courses of blocks can be bonded together as well as the coping blocks.

# Secura Grand Machine Installation

Installing Segmental Retaining Walls with the help of machinery can enhance the safety and speed of installation, all while saving money.

Secura Grand is fully compatible with common scissor/kerb grab attachments. The blocks can be clamped and guided into place with no special mechanical or hydraulic attachments required!

**Why machine lay Secura Grand?**

- Fast
- Safe
- Accurate
- Cost-effective

Building retaining walls just got easier, Secura Grand blocks can be accurately fitted and manually adjusted into place.

With safety in mind, machine laying Secura Grand means less manual handling and lower risk of on-site injuries because of heavy and repetitive lifting.

Machine laying Secura Grand retaining walls is most suitable on long walls where considerable progress can be made with the help of plant.



For questions about Machine Laying Secura Grand please contact our Retaining Walls team on:  
[retainingwalls@tobermore.co.uk](mailto:retainingwalls@tobermore.co.uk)



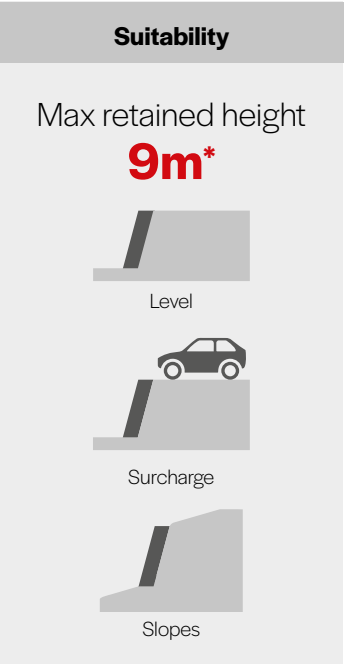
SECURA GRAND

# Geogrid Reinforced Wall

A Secura Geogrid Reinforced Wall is a practical solution for walls higher than 1m or where the surcharge or ground conditions exceed the criteria for a gravity wall. This installation method requires a greater backfill distance than a concrete backfill wall, so is ideally suited to sites which are not space limited.

Geogrid is a flexible geosynthetic material which is placed in layers between the Secura blocks and the backfill material, creating a reinforced mass. This mass combines its weight and internal shear strength to resist the overturning and sliding forces from the earth being retained. The Secura Grand blocks are the facing while the geogrid reinforced mass acts as the retaining structure.

The frequency of inclusion and the length of the geogrid layers is determined by three key factors; wall height, ground conditions and surcharge on top of the wall.



**Backfill Zone**



Well-graded compactable granular material. See full specification on page 118.

**Drainage Zone**



10mm single size drainage aggregate.

**Mortarless Installation**

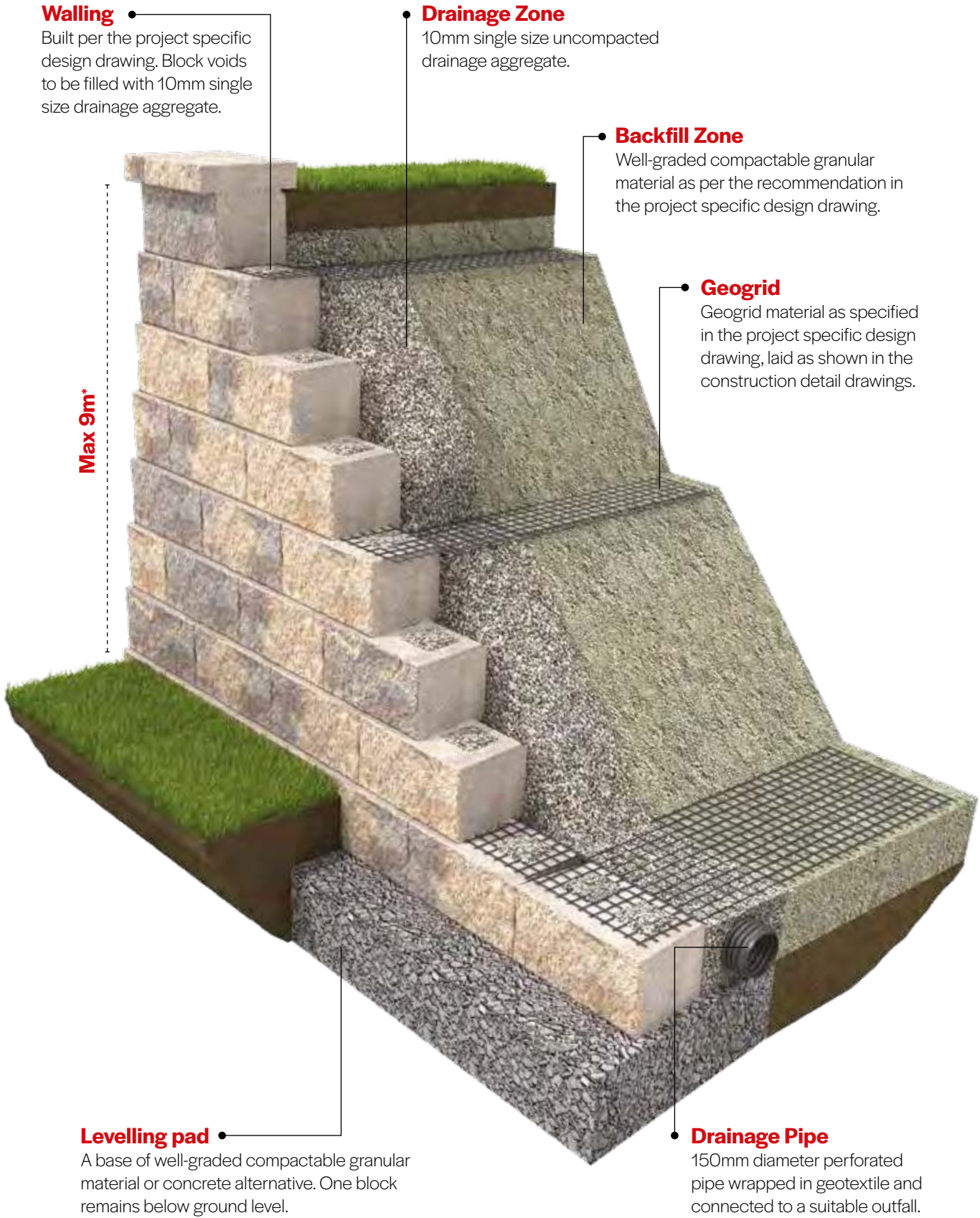
When installed with an aggregate levelling pad, the Secura Grand geogrid reinforced wall remains completely mortarless.

**Important: Permitted block tolerances**

Segmental Block Retaining walls are designed to be flexible structures which can tolerate some horizontal and vertical movement. Construction tolerances are permitted due to the nature of the system. Even with stringent quality control measures in place at the factory, modular block units may vary in height. Therefore, adjustments may need to be made to allow for the mortarless construction method.

It is an accepted construction practice in segmental block retaining structures to use shims under the blocks to compensate or a build-up of tolerances or an out of level base condition.

The level of the wall should be checked every 3rd course. Any adjustments necessary can be made using shims placed between the blocks. Shims should not be used on courses where there is a layer of geogrid to be installed. Cut pieces of geogrid or plastic shims can be used. The maximum allowable shim thickness per course is 3mm.



\*For walls higher than 9m please contact Tobermore technical department



# Securely engineered

Secura's geogrid reinforced wall design provides the perfect balance between performance, buildability and long-term durability.

**3X  
LOCK**

Secura benefits from a three-way lock which provides connections through the wall for exceptional structural stability.

**1  
Aggregate Action**

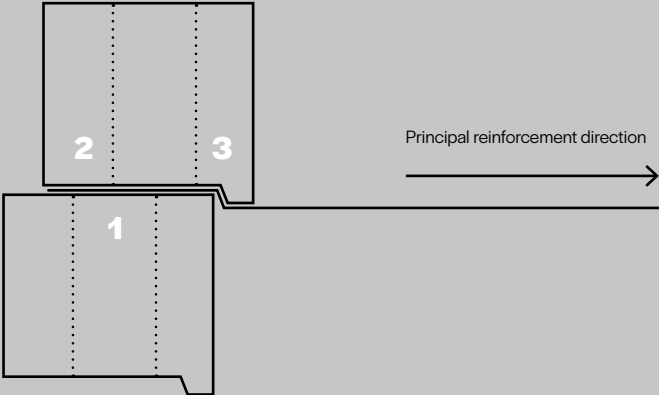
The granular aggregate fill in the hollow core of the Secura Grand blocks plays an important role in the integrity of the wall. Interaction between the geogrid and the aggregate acts as a lock, resisting movement.

**2  
Friction Lock**

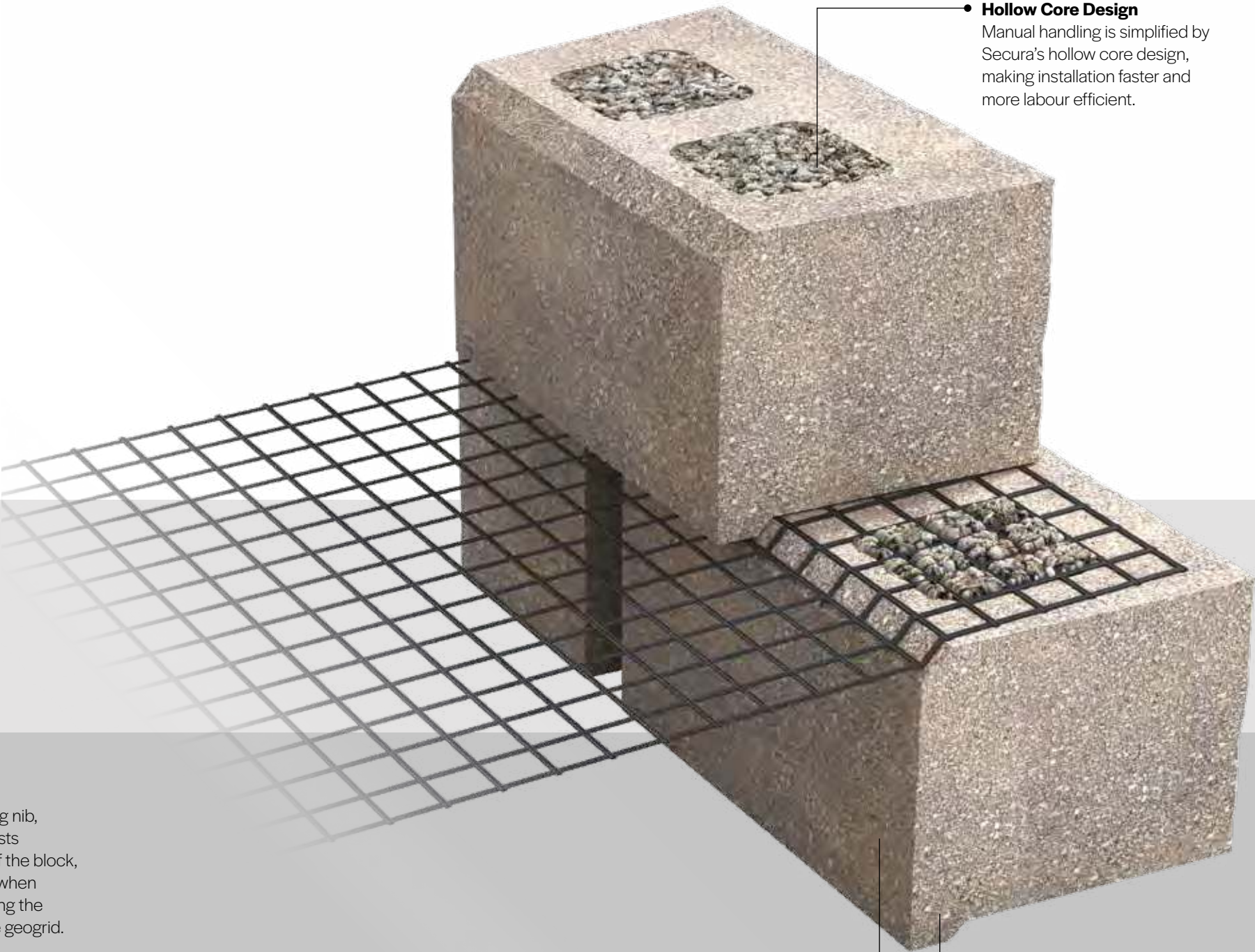
Under loading, the geogrid's ribbed texture grips the coarse surface of the Secura block creating friction to further resist movement.

**3  
Nib Lock**

Secura's rear retaining nib, which effectively resists forward movement of the block, also acts as a clamp when under load, maintaining the engagement with the geogrid.



**Hollow Core Design**  
Manual handling is simplified by Secura's hollow core design, making installation faster and more labour efficient.



**Mortarless Construction**  
Speed of construction is enhanced by Secura's mortarless geogrid or gravity construction methods which eliminate curing delays, regardless of wall height or weather conditions.

**Built In Set Back**  
Secura Grand's rear nib automatically produces the 7° setback for an extremely space effective design.



# Secura Grand Geogrid Reinforced Wall Installation

**Preliminary actions**

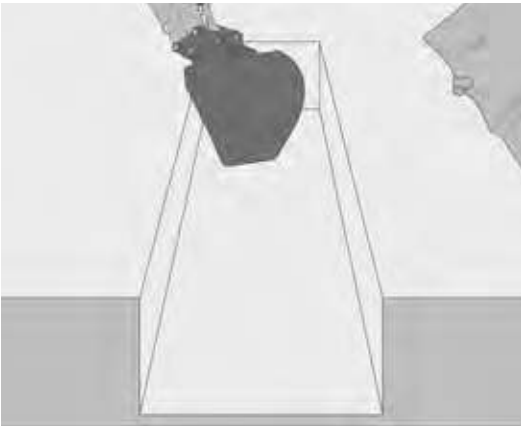
**STRUCTURAL DESIGN**  
**Important:** The design of any retaining wall requires the input of an engineer to assess the unique conditions of every site in respect of loads in conjunction with site and soil conditions. The advice and typical wall designs in this guide are for information only to assist estimating and initial planning but should not be used for construction.

**WORKING SAFELY**  
**Important:** Please refer to our safety notes on page 124 prior to commencement of any site works.

**FILL MATERIALS**  
**Important:** Please ensure that the specified fill materials (see page 122) are available on site before commencement.  
  
**Important:** Please read these installation guidelines in conjunction with the design drawings provided by the scheme engineer.

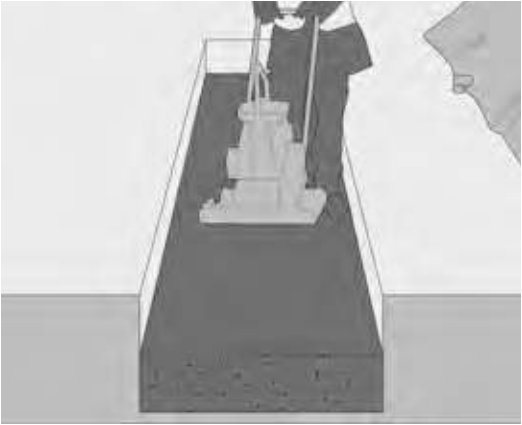
**Step 1**  
**Setting out & trench excavation**

- Mark out the location of the wall by checking the design drawings or by agreement with the project engineer, architect or client.
- Please refer to the table below for typical levelling pad details or if there is an engineer's site-specific design this should be followed at all times. (Please refer to the table below for dimensions and recommended block courses below ground)
- Excavate the trench to a minimum 400mm depth and 600mm width. Remove any unsuitable material and replace it with compacted granular material. See specification for material on page 122. Ensure it is fully compacted using a plate compactor.



**Step 2**  
**Laying the levelling pad**

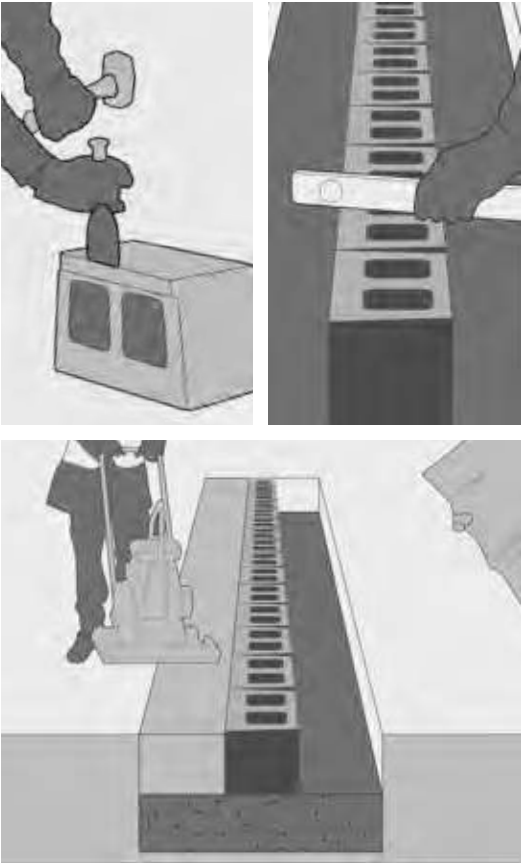
- Important:** If the line of the wall is on a gradient, the levelling pad must be stepped (see page 102). The top of the levelling pad must be at least 200mm below finished ground level. Lay a level levelling pad using one of the following two options:
  - Granular material option:** Lay a well-graded compactable granular material as specified on page 122 and compact fully using a plate compactor to ensure a level base. The typical depth of the levelling pad should be 200mm after compaction.
  - Concrete option:** Install a 200mm deep concrete levelling pad using C20/25 concrete.



Product	Min. internal radius	Max. external radius	Typical trench width (mm)	Typical trench depth (mm)	Levelling pad material	Typical levelling pad depth (mm)	Block courses below ground
Secura Grand	Refer to 85	Refer to 83	600 mm	400mm to accommodate one block plus levelling pad depth	Well-graded compactable material or C20/25	200 mm	1 (unless specified differently on the design drawings)

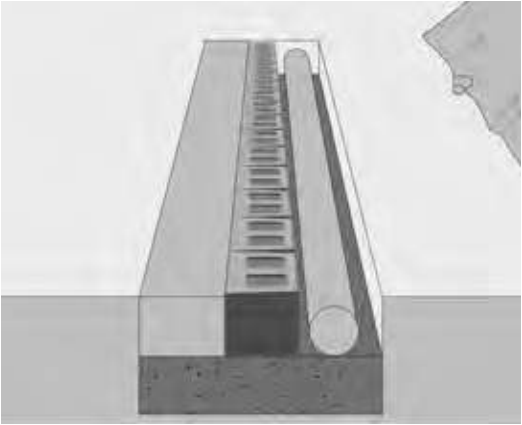
**Step 3**  
**Installing the base course**

- Important:** The top of the base course when installed must be below finished ground level.
- Block selection**  
Please ensure that you randomly select blocks from a minimum of three packs to achieve the desired colour blend. This should be done on the base course and for all other courses.
- Block preparation**  
To ensure a level base course, remove the nib from the base of the blocks to be used on the base course using a bolster and club hammer.
- Block Placement**  
Place the blocks onto the levelling pad and use a string line along the back of the blocks to check for alignment. Use a spirit level to ensure the blocks are level along their length and from front to back as the aesthetics of the finished wall depend on the base course being level. Leave a gap of 2mm between the blocks to allow for any movement of the ground.
- Front fill**  
Fill the gap in front of the base course with on-site soil and fully compact, level with the base course.



**Step 4**  
**Laying drainage pipe**

- Drainage Pipe:** Lay a perforated drainage pipe centred on a line 150mm from the back of the base course. The pipe should connect to a suitable outlet/soakaway. The pipe can be wrapped in a geotextile to prevent clogging.
- Fill the Block Voids:** Completely fill the two voids in each block with 10mm single size drainage aggregate. This requires approximately 9kg of 10mm drainage aggregate per block.

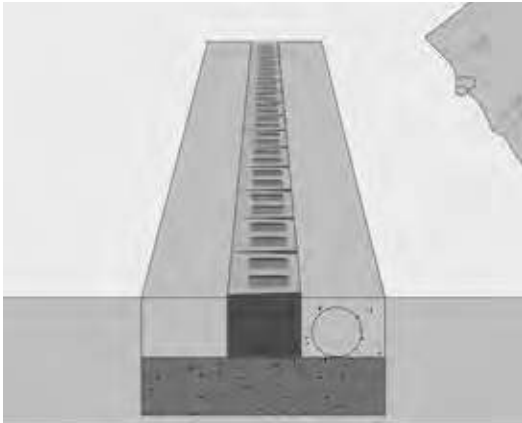




# Secura Grand Geogrid Reinforced Wall Installation

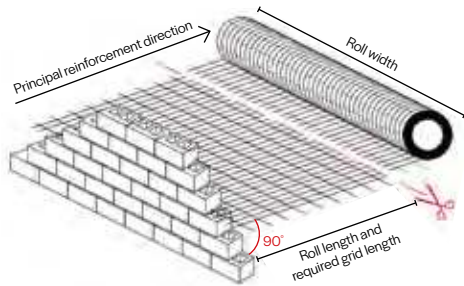
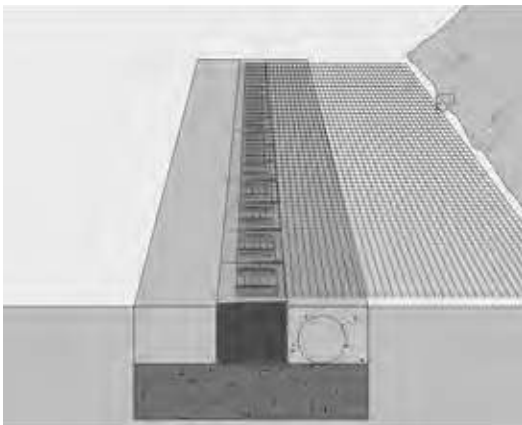
**Step 5**  
**Backfill the drainage material**

- Backfill the base course blocks to a distance of 300mm with 10mm drainage aggregate covering the perforated drainage pipe. Backfill until it is just under the top of the base course blocks to allow space for the nib on the next course. Subsequent layers will form a 300mm wide drainage column behind the wall.
- Compact the backfill zone until it is level with the drainage aggregate and the base course blocks.
- **Important:** Do not compact the drainage material.



**Step 6**  
**Installing the geogrid**

- **Geogrid design & type**  
On most projects the first layer of geogrid will be installed on top of the base course (check this with the tables on page 64 and the correct height specific design drawing). For walls which do not need to meet BBA HAPAS standards Tobermore recommend using Heusker Fortrac Geogrid.  
**Important:** For all geogrid reinforced retaining walls designed in accordance with BBA/HAPAS, Heusker Fortrac geogrids must be used. No substitutes are allowed. Heusker Fortrac geogrids are available from Tobermore.
- **Geogrid placement**  
Place the specified strength of geogrid on top of the base course blocks (free from debris), ensuring that it is 25mm back from the front edge of the blocks. Roll the geogrid out flat over the drainage aggregate and backfill material and pull it taut to remove any folds or wrinkles. Cut the geogrid to the specified length (check the design drawings).
- **Orientation and butting**  
**Important:** Ensure that the principal reinforcement direction is perpendicular to the wall. Ensure that the geogrid is butt jointed and never overlapping between the Secura blocks.

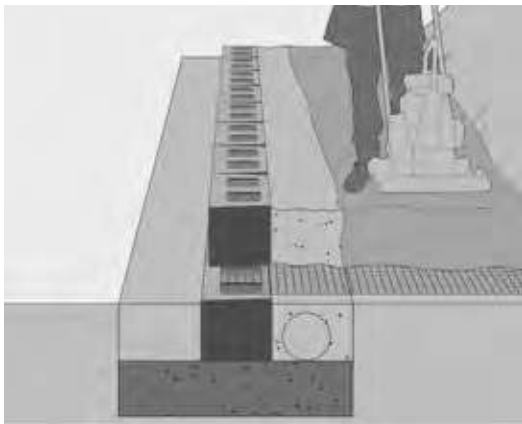
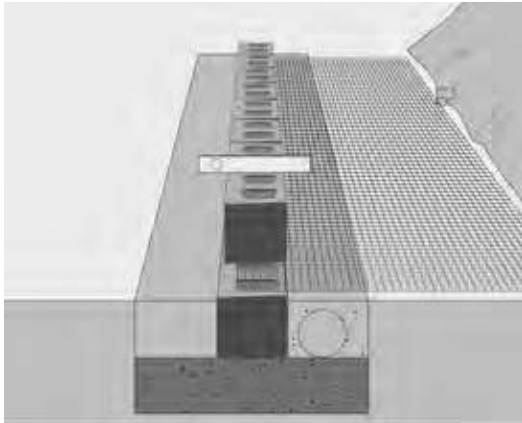


**Step 7**  
**Backfilling the reinforced zone**

- Using a well-graded granular compactable material, backfill the remainder of the reinforced zone to the distance from the rear of the wall as specified in the design drawing. See specification for the backfill material on page 118.
- Brush the top surface of the blocks to remove any debris which may affect the wall level prior to laying subsequent layers.
- **Important:** Site won material may be used in the reinforced zone ONLY IF IT COMPLIES with the specifications on page 118, and is in accordance with the Manual of Contract Documents for Road Works - Specification of Highway Works, Series 600. Testing should be carried out to confirm this prior to use.

**Step 8**  
**Laying further block courses**

- Place the blocks on top of the base course and geogrid ensuring that they are in running bond pattern in relation to the blocks on the base course. Vertical joints should not directly line up between courses.
- Push the blocks forward until the nib on the base of the block tightly locates against the blocks and the geogrid beneath.
- Use a spirit level to ensure the blocks are level as you build each course. Due to Secura's mortarless construction, the use of shims may be required occasionally to maintain level in the block course.
- Fill the voids in each block with 10mm single size drainage aggregate. This requires approximately 9kg of 10mm drainage aggregate per block.
- Build the wall up a further three courses or to the specified course where the next layer of geogrid is to be installed.  
**Important:** Never build any higher than three courses before backfilling.
- **Backfilling Process**  
**Backfill zone:** Place the backfill material on the geogrid and spread it out in the reinforced zone away from the 300mm drainage column. The backfill material should be placed and compacted in 200mm lifts, using a plate compactor, working away from the edge of the drainage column.  
**Important:** Tracked machines should not directly traffic over the geogrid. Vibrating or static rollers should not be used within 1 metre from the back of the wall.
- **Drainage Column:** Fill the gap between the wall and the backfill with 10mm single size drainage aggregate.  
**Important:** Do not compact the 10mm drainage aggregate.



**Step 9**  
**Completing the wall**

- **Continue building the wall, filling the block voids, backfilling with drainage aggregate, backfill material and compacting.**  
Install the geogrid at the correct locations as specified in the height specific design drawing. Geogrid layers can be installed and then placed over the face of the wall until backfilling and compacting is complete. It can then be brought back over and pulled taut on top of the levelled backfill material and staked into position. Top off the area behind the wall with soil.
- **Copings**  
To install the Secura copings use a concrete exterior grade construction adhesive applied with a cartridge gun. Generously apply the adhesive to the block. For extra stability the last two courses of blocks can be bonded together as well as the coping blocks.

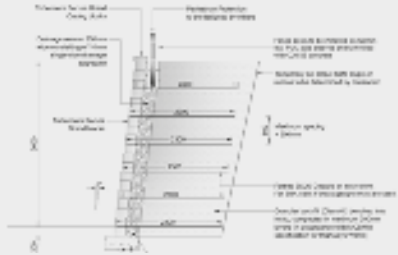


# Geogrid Reinforced Walls

## Typical Design Drawings

### FastFind

Visit [tobermore.co.uk/fastfind](https://tobermore.co.uk/fastfind)  
Enter the FastFind reference from the tables below to download the typical design drawing



The length and number of geogrid layers required in a geogrid reinforced wall is dependant on the wall height, surcharge and any slopes present above or below the wall. The following tables indicate the required positioning of each layer of geogrid. Please note the detailed position of geogrid required in the case of curves and corners as outlined in this guide. To download the typical drawing for print or use in your project package, please visit [Tobermore.co.uk/fastfind](https://tobermore.co.uk/fastfind) and enter the FastFind reference

from the tables below for the specific wall height required and specific surcharge situation. Please contact us directly for walls in excess of 3.6m at [technical@tobermore.co.uk](mailto:technical@tobermore.co.uk).

**Important:** These typical design drawings are based on the descriptions included and assume a minimum retained soil friction angle of 30°.

**Important**

STRUCTURAL DESIGN

The design of any retaining wall requires the input of an engineer to assess the unique conditions of every site in respect of loads in conjunction with site and soil conditions. The advice and typical wall designs in this guide are for information only to assist estimating and initial planning but should not be used for construction.

No vehicles, pedestrian only, flat crest 2.5KPa

FastFind reference	Retained wall height (m)	Number of courses including base course	Length of geogrid (mm)	Number of geogrid layers	1st layer (mm)	2nd layer (mm)	3rd layer (mm)	4th layer (mm)	5th layer (mm)	6th layer (mm)
GNVF1.0	1.0	6	None							
GNVF1.2	1.2	7	800	1	600					
GNVF1.4	1.4	8	1000	2	400	1000				
GNVF1.6	1.6	9	1100	2	200	1000				
GNVF1.8	1.8	10	1200	3	200	800	1400			
GNVF2.0	2.0	11	1350	4	200	800	1400	2000		
GNVF2.2	2.2	12	1450	4	200	800	1400	2000		
GNVF2.4	2.4	13	1600	4	200	800	1400	2000		
GNVF2.6	2.6	14	1700	5	200	800	1400	2000	2600	
GNVF2.8	2.8	15	1800	5	200	800	1400	2000	2600	
GNVF3.0	3.0	16	1900	5	200	800	1400	2000	2600	
GNVF3.2	3.2	17	2000	6	200	800	1400	2000	2600	3200
GNVF3.4	3.4	18	2200	6	200	800	1400	2000	2600	3200
GNVF3.6	3.6	19	2300	6	200	800	1400	2000	2600	3200

Vehicles present, flat crest 5KPa

FastFind reference	Retained wall height (m)	Number of courses including base course	Length of geogrid (mm)	Number of geogrid layers	1st layer (mm)	2nd layer (mm)	3rd layer (mm)	4th layer (mm)	5th layer (mm)	6th layer (mm)	7th layer (mm)
GVF1.0	1.0	6	800	2	200	800					
GVF1.2	1.2	7	800	2	200	800					
GVF1.4	1.4	8	1000	3	200	800	1400				
GVF1.6	1.6	9	1100	3	200	800	1400				
GVF1.8	1.8	10	1200	4	200	800	1400	1800			
GVF2.0	2.0	11	1350	4	200	800	1400	2000			
GVF2.2	2.2	12	1450	4	200	800	1400	2000			
GVF2.4	2.4	13	1600	5	200	800	1400	2000	2400		
GVF2.6	2.6	14	1700	5	200	800	1400	2000	2800		
GVF2.8	2.8	15	1800	5	200	800	1400	2000	2600		
GVF3.0	3.0	16	1900	6	200	800	1400	2000	2600	3000	
GVF3.2	3.2	17	2000	6	200	800	1400	2000	2600	3200	
GVF3.4	3.4	18	2000	6	200	800	1400	2000	2600	3200	
GVF3.6	3.6	19	2300	7	200	800	1400	2000	2600	3200	3600

No vehicles, pedestrian only 1:3 slope

FastFind reference	Retained wall height (m)	Number of courses including base course	Length of geogrid (mm)	Number of geogrid layers	1st layer (mm)	2nd layer (mm)	3rd layer (mm)	4th layer (mm)	5th layer (mm)	6th layer (mm)
GNVS1.0	1.0	6	1000	1	600					
GNVS1.2	1.2	7	1000	2	200	800				
GNVS1.4	1.4	8	1200	3	200	800	1400			
GNVS1.6	1.6	9	1300	3	200	800	1400			
GNVS1.8	1.8	10	1400	3	200	800	1400			
GNVS2.0	2.0	11	1550	4	200	800	1400	2000		
GNVS2.2	2.2	12	1650	4	200	800	1400	2000		
GNVS2.4	2.4	13	1800	4	200	800	1400	2000		
GNVS2.6	2.6	14	1900	5	200	800	1400	2000	2600	
GNVS2.8	2.8	15	2000	5	200	800	1400	2000	2600	
GNVS3.0	3.0	16	2100	5	200	800	1400	2000	2600	
GNVS3.2	3.2	17	2200	6	200	800	1400	2000	2600	3200
GNVS3.4	3.4	18	2400	6	200	800	1400	2000	2600	3200
GNVS3.6	3.6	19	2500	6	200	800	1400	2000	2600	3200

Important: Permitted block tolerances

Segmental Block Retaining walls are designed to be flexible structures which can tolerate some horizontal and vertical movement. Construction tolerances are permitted due to the nature of the system. Even with stringent quality control measures in place at the factory, modular block units may vary in height. Therefore, adjustments may need to be made to allow for the mortarless construction method.

It is an accepted construction practice in segmental block retaining structures to use shims under the blocks to compensate or a build-up of tolerances or an out of level base condition.

The level of the wall should be checked every 3rd course. Any adjustments necessary can be made using shims placed between the blocks. Shims should not be used on courses where there is a layer of geogrid to be installed. Cut pieces of geogrid or plastic shims can be used. The maximum allowable shim thickness per course is 3mm.



SECURA GRAND

# Concrete Backfill Reinforced Walls

The concrete backfill reinforced wall is ideal for use on sites where backfill space is limited or where it is preferable to avoid the greater amount of excavation which is required for a geogrid reinforced wall.

A no-fines concrete backfilled wall reduces the length of excavation required to approximately 40% of the overall wall height compared to the 70% required for a geogrid reinforced wall.

The Secura Grand blocks work in combination with the concrete backfill which attaches itself to the blocks, creating a homogenous mass. The width of the concrete backfill material required will vary depending on wall height, ground conditions and the surcharge above the wall.

**No-Fines Concrete**

No-fines concrete is a cost-effective backfill which also acts as the drainage zone. Unlike normal concrete, no-fines concrete eliminates the need for fine aggregates by using a thin layer of cement paste to hold the aggregates together and provide the strength. Due to the open texture, no-fines concrete provides good drainage properties.

The alternative option is to use a C20/25 structural concrete in combination with a layer of drainage geocomposite between the concrete and retained soil.

**Structural Concrete for reduced excavation**

When space is at a premium it is possible to reduce the distance behind the wall by a further 150mm by using C20/25 structural concrete as an alternative to no-fines concrete. When using this installation method, a layer of geocomposite is installed between the structural concrete and the retained soil.

**Backfill Zone**

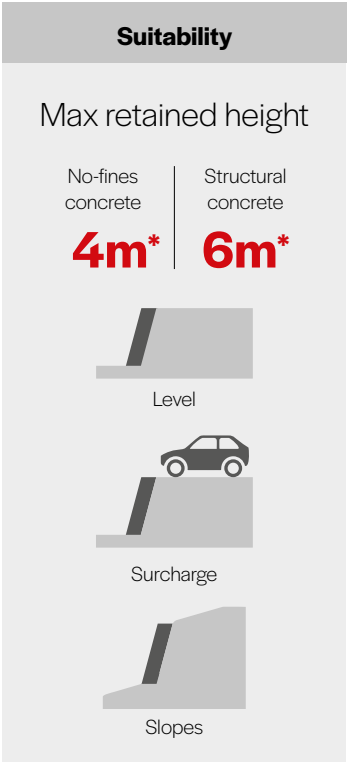


No-fines concrete or C20/25 structural concrete.

**Drainage Zone**



10mm single size drainage aggregate.

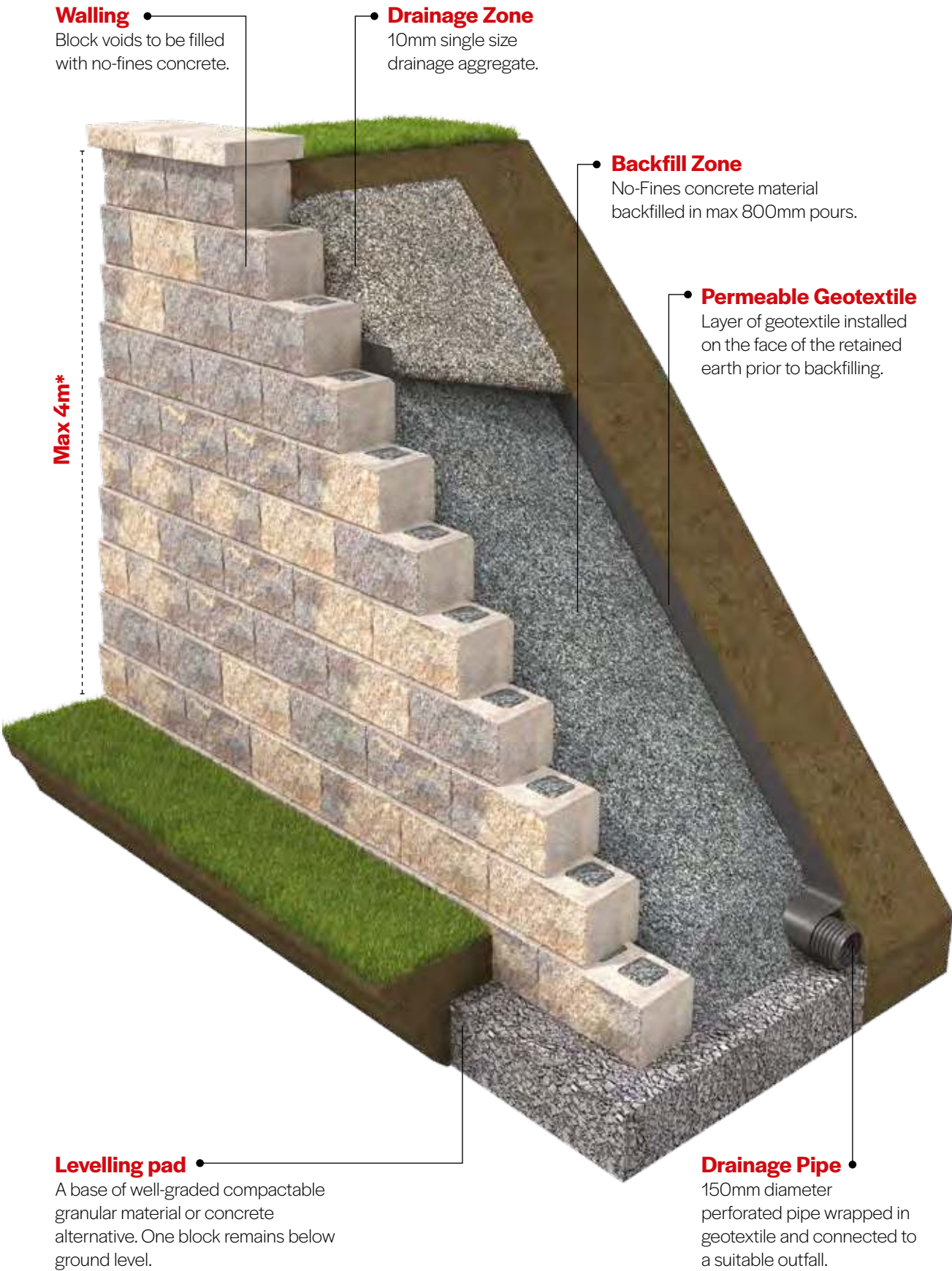


No-fines concrete

**Geotextile/Geocomposite**

Geotextile with no-fines concrete. Geocomposite with C20/25 structural concrete.

**No-fines Concrete Backfill Reinforced Wall** (max retained height 4m)



\*For higher walls please contact Tobermore technical department



C20/25 Structural Concrete Backfill Reinforced Wall (max retained height 6m\*)



\*For higher walls please contact Tobermore technical department

# Secura Grand Concrete Backfill Wall Installation

Preliminary actions

These installation instructions are common for both no-fines concrete backfill and C20/25 structural concrete backfill. However, please note the variation between geocomposite layer on the structural concrete option compared to geotextile on the no-fines installation.

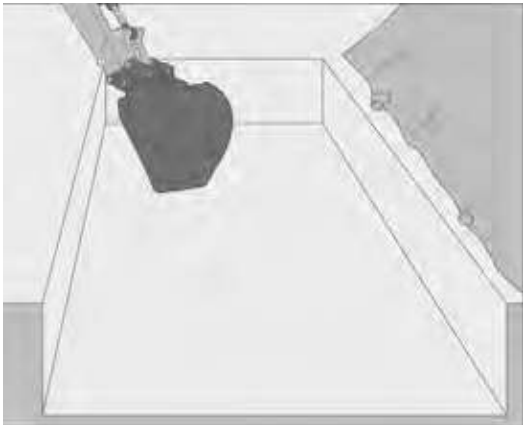
**STRUCTURAL DESIGN**  
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**WORKING SAFELY**  
**Important:** Please refer to our safety notes on page 124 prior to commencement of any site works.

**FILL MATERIALS**  
**Important:** Please ensure that the specified fill materials (see page 122) are available on site before commencement.  
**Important:** Please read these installation guidelines in conjunction with the design drawings provided by the scheme engineer.

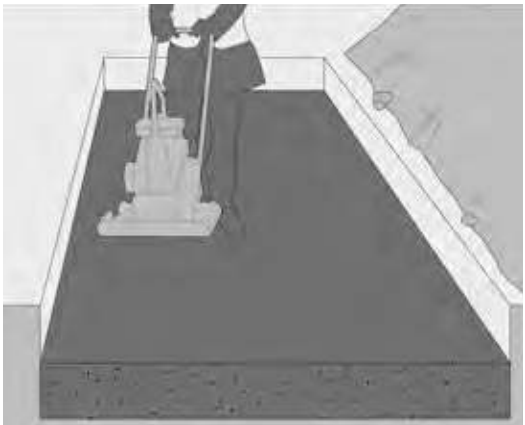
Step 1  
Setting out & trench excavation

- Mark out the location of the wall by checking the design drawings or by agreement with the project engineer, architect or client.
- Please refer to the table below for typical levelling pad details or if there is an engineers' site-specific design this should be followed at all times. (Please refer to the table below for dimensions and recommended block courses below ground).
- Excavate the trench to a minimum 400mm deep and to a width equal to the concrete backfill zone. Remove any unsuitable material and replace it with compacted granular material. See specification for material on page 122. Ensure it is fully compacted using a plate compactor.



Step 2  
Laying the levelling pad

- Important:** If the wall is on a slope the levelling pad must be stepped (see page 100). The top of the levelling pad must be at least 200mm below finished ground level. Lay a level levelling pad using one of the following two options:
- Granular material option:** Lay a well-graded compactable granular material as specified on page 122 and compact fully using a plate compactor to ensure a level base. The typical depth of the levelling pad should be 200mm after compaction.
  - Concrete option:** Install a 200mm deep concrete levelling pad using C20/25 concrete.



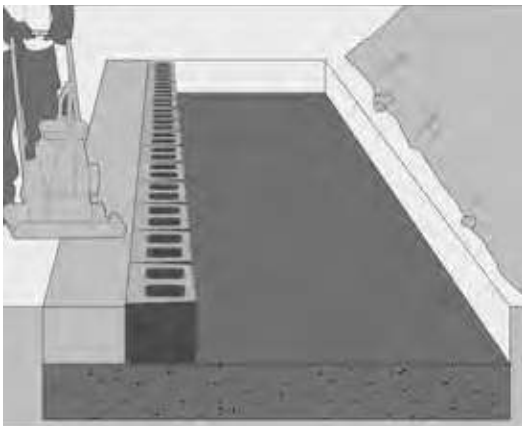
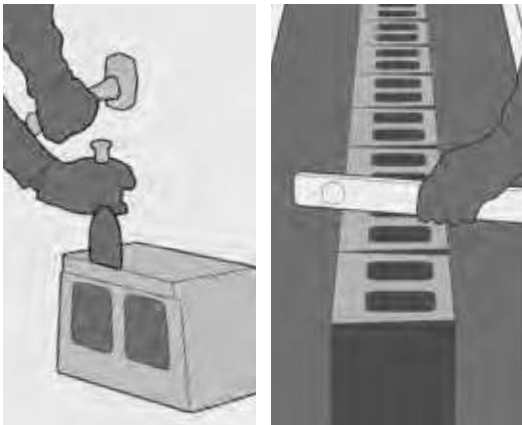
Product	Min. internal radius	Max. external radius	Typical trench width (mm)	Typical trench depth (mm)	Levelling pad material	Typical levelling pad depth (mm)	Block courses below ground
Secura Grand Concrete Backfill	Refer to page 85	Refer to page 83	400mm plus the width of the concrete backfill	400mm to accommodate one block plus levelling pad depth	Well-graded compactable material or C20/25	200 mm	1 (unless specified differently on the design drawings)



# Secura Grand Concrete Backfill Wall Installation

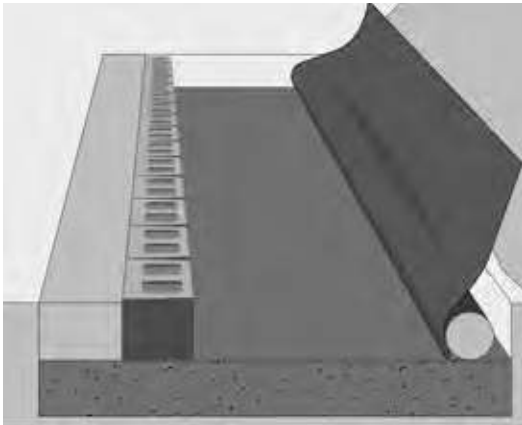
**Step 3**  
**Installing the base course**

- Important:** The top of the base course when installed must be below finished ground level.
- Block selection**  
Please ensure that you randomly select blocks from a minimum of three packs to achieve the desired colour blend. This should be done on the base course and for all other courses.
- Block preparation**  
To ensure a level base course, remove the nib from the base of the blocks to be used on the base course using a bolster and club hammer.
- Block Placement**  
Place the blocks onto the levelling pad and use a string line along the back of the blocks to check for alignment. Use a spirit level to ensure the blocks are level along their length and from front to back, as the aesthetics of the finished wall depend on the base course being level. Leave a gap of 2mm between the blocks to allow for any movement of the ground.
- Front fill**  
Fill the gap in front of the base course with on-site soil and fully compact, level with the base course.



**Step 4**  
**Geotextile/Geocomposite**

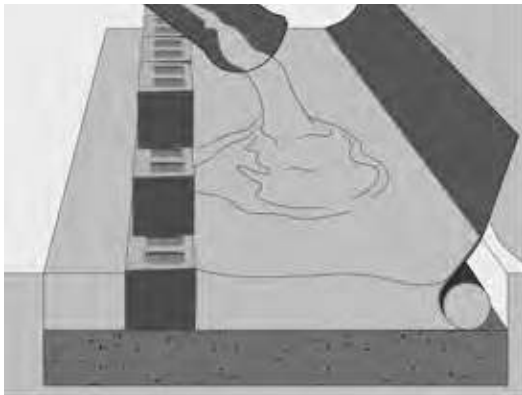
- A geotextile permeable membrane should be installed against the retained ground. Where C20/25 structural concrete is used, a geocomposite membrane must be used.
- Drainage Pipe:** Lay a perforated drainage pipe at the outer edge of the concrete backfill area. The pipe should connect to a suitable outlet/soakaway. The pipe should be wrapped in the geotextile to prevent clogging.
- Fill the Block Voids:** Ensure the base course blocks are completely level and then fully fill the blocks voids with concrete, poker/tamp to ensure the voids are fully filled.



**Step 5**  
**Laying further block courses**

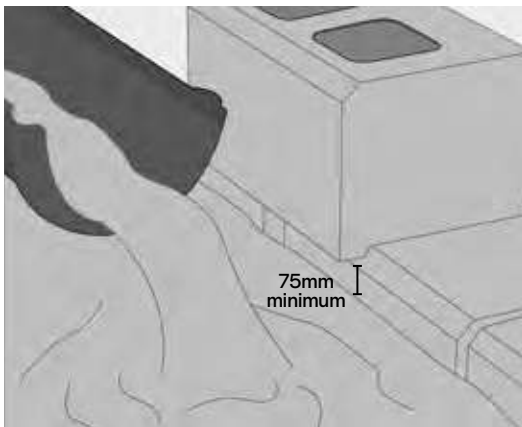
- Important:** It is important that no more than four courses are constructed and backfilled at a time.
- Place the blocks on top of the base course ensuring that they are in running bond pattern in relation to the blocks on the base course. Vertical joints should not directly line up between courses.
- Push the blocks forward until the nib on the base of the block tightly locates against the course beneath.

- Use a spirit level to ensure the blocks are level as you build each course. Due to Secura's mortarless construction, the use of shims may be required occasionally to maintain the level of the block course.
- Continue to fill the voids with concrete, poker/tamp to ensure the voids are fully filled.



**Step 6**  
**Backfilling the wall with concrete**

- Important:** The finished level of each pour must be a minimum of 75mm below the top of the block (to facilitate the nib on the rear of the next course). The maximum height of a pour should not exceed 800mm (4 courses).
- Backfill the wall with concrete to the required distance according to the engineer's design. Ensure the concrete fills the gaps at the rear of the blocks by poking/tamping. If using no-fines concrete, it should be sufficiently stiff to fill the voids and gaps between the blocks. See specification for no-fines concrete on page 117.
- Before the concrete has set, brush the top of the blocks to ensure there is no excess material. Brushing should be carried out on each course. Ensure that any concrete spilled onto the face of the blocks is cleaned off immediately.
- Important:** Each lift of concrete backfill must be cured (overnight) prior to installation of further courses and subsequent backfilling.



**Step 7**  
**Completing the wall**

- Repeat the block laying, void filling and backfilling process until the full height of the wall has been achieved.
- Important:** The concrete backfill must not be placed in greater than 800mm vertical lifts per day to avoid destabilising the blocks while the concrete hardens. Top off the area behind the wall with soil.
- Copings:** To install the Secura copings use a concrete exterior grade construction adhesive applied with a cartridge gun. Generously apply the adhesive to the block.
- For extra stability the last two courses of blocks can be bonded together as well as the coping blocks.

**Specification for No-Fines Concrete**

Material	Use	Stone to cement ratio (by weight)	Unit weight (kN/m3)	Aggregate size	Water to cement ratio*
No-fines concrete	Backfill to retaining wall	6:1 to 7:1	18	Clean crushed stone typically 14-20mm	1:2

\*Water/cement ratio is a guide value only and should be assessed on site to ensure the correct consistency, avoiding an overly wet mix.



# Concrete Backfill Walls

## Typical Design Drawings

### FastFind



**Visit [tobermore.co.uk/fastfind](https://tobermore.co.uk/fastfind)**  
Enter the FastFind reference from the tables below to download the typical design drawing



To download the typical drawing for print or use in your project package, please visit [Tobermore.co.uk/fastfind](https://tobermore.co.uk/fastfind) and enter the FastFind reference from the tables below for the specific wall height required and specific surcharge situation. Please contact us directly for walls in excess of 3.6m – [technical@tobermore.co.uk](mailto:technical@tobermore.co.uk).

**Important:** These typical design drawings are based on the descriptions provided and assume a minimum retained soil friction angle of 30°.

**Important**

STRUCTURAL DESIGN

The design of any retaining wall requires the input of an engineer to assess the unique conditions of every site in respect of loads in conjunction with site and soil conditions. The advice and typical wall designs in this guide are for information only to assist estimating and initial planning but should not be used for construction.

No vehicles, pedestrian only, flat crest, 2.5 KPa

FastFind reference	Retained wall height (m)	Number of courses including base course	Width of backfill Option 1: No-fines concrete (mm)	Width of backfill Option 2: C20/25 concrete (mm)
CNVF1.0	1.0	6	300	150
CNVF1.2	1.2	7	350	200
CNVF1.4	1.4	8	430	280
CNVF1.6	1.6	9	500	350
CNVF1.8	1.8	10	560	410
CNVF2.0	2.0	11	650	500
CNVF2.2	2.2	12	700	550
CNVF2.4	2.4	13	750	600
CNVF2.6	2.6	14	850	700
CNVF2.8	2.8	15	900	750
CNVF3.0	3.0	16	1000	850
CNVF3.2	3.2	17	1050	900
CNVF3.4	3.4	18	1100	950
CNVF3.6	3.6	19	1150	1000

Vehicles present, flat crest, 5KPa

FastFind reference	Retained wall height (m)	Number of courses including base course	Width of backfill Option 1: No-fines concrete (mm)	Width of backfill Option 2: C20/25 concrete (mm)
CVF1.0	1.0	6	450	300
CVF1.2	1.2	7	600	450
CVF1.4	1.4	8	710	560
CVF1.6	1.6	9	850	700
CVF1.8	1.8	10	1000	850
CVF2.0	2.0	11	1100	950
CVF2.2	2.2	12	1250	1100
CVF2.4	2.4	13	1350	1200
CVF2.6	2.6	14	1450	1300
CVF2.8	2.8	15	1550	1400
CVF3.0	3.0	16	1600	1450
CVF3.2	3.2	17	1650	1500
CVF3.4	3.4	18	1750	1600
CVF3.6	3.6	19	1850	1700

No vehicles, pedestrian only, 1:3 sloped crest

FastFind reference	Retained wall height (m)	Number of courses including base course	Width of backfill Option 1: No-fines concrete (mm)	Width of backfill Option 2: C20/25 concrete (mm)
CNVS1.0	1.0	6	350	200
CNVS1.2	1.2	7	400	250
CNVS1.4	1.4	8	500	350
CNVS1.6	1.6	9	575	425
CNVS1.8	1.8	10	700	550
CNVS2.0	2.0	11	800	650
CNVS2.2	2.2	12	850	700
CNVS2.4	2.4	13	900	750
CNVS2.6	2.6	14	950	800
CNVS2.8	2.8	15	1050	900
CNVS3.0	3.0	16	1150	1000
CNVS3.2	3.2	17	1200	1050
CNVS3.4	3.4	18	1250	1100
CNVS3.6	3.6	19	1350	1200

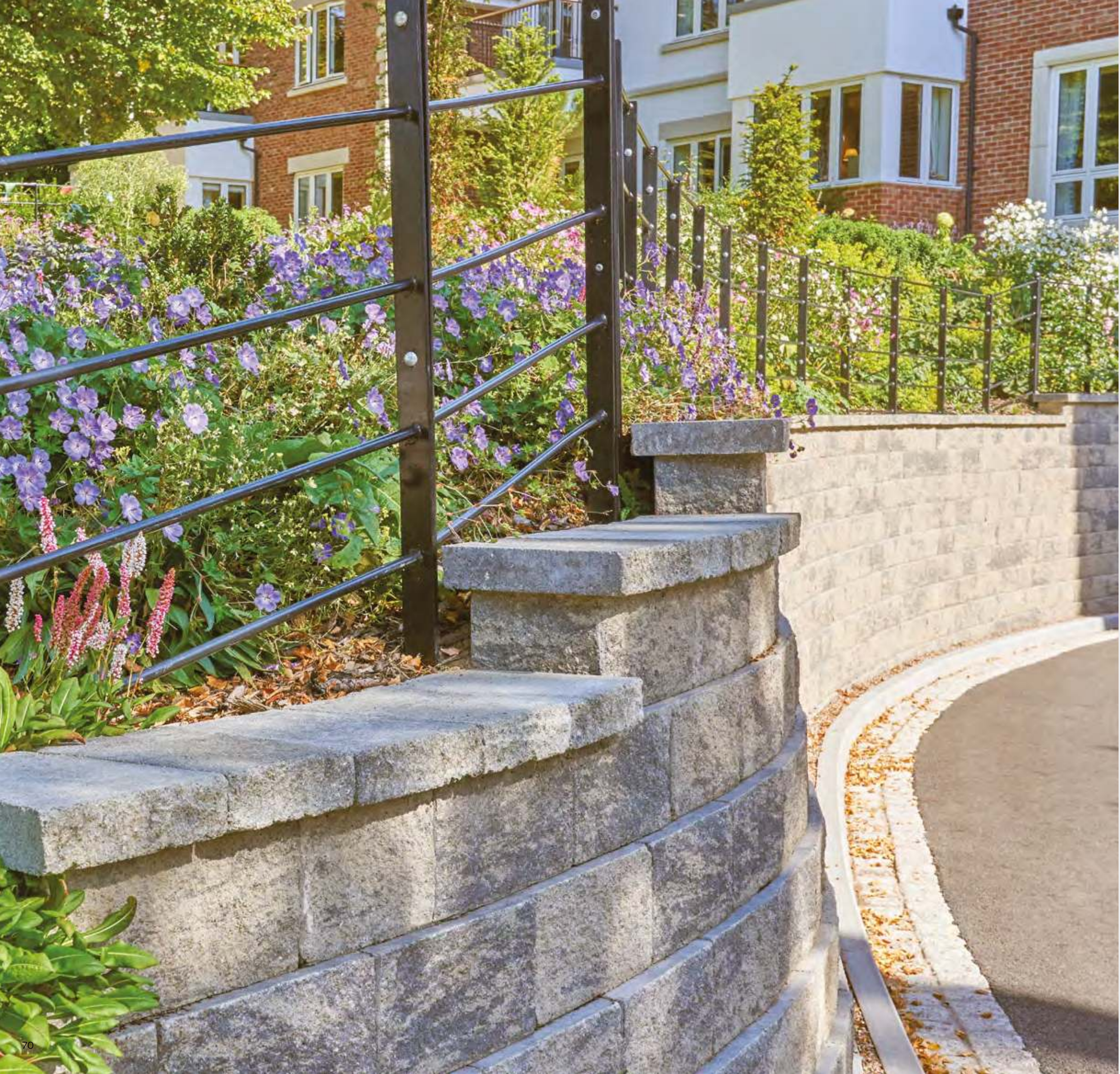
Important: Permitted block tolerances

Segmental Block Retaining walls are designed to be flexible structures which can tolerate some horizontal and vertical movement. Construction tolerances are permitted due to the nature of the system. Even with stringent quality control measures in place at the factory, modular block units may vary in height. Therefore, adjustments may need to be made to allow for the mortarless construction method.

It is an accepted construction practice in segmental block retaining structures to use shims under the blocks to compensate or a build-up of tolerances or an out of level base condition.

The level of the wall should be checked every 3rd course. Any adjustments necessary can be made using shims placed between the blocks. Shims should not be used on courses where there is a layer of geogrid to be installed. Cut pieces of geogrid or plastic shims can be used. The maximum allowable shim thickness per course is 3mm.





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# Construction Detailing



# Maintaining Running Bond

The structural integrity of Secura Grand retaining walls relies on the blocks being installed in a running bond with an overlap of at least 100mm. In a straight wall without corners the running bond can be maintained fully where the blocks are placed centrally over the course beneath in a half lapped position.

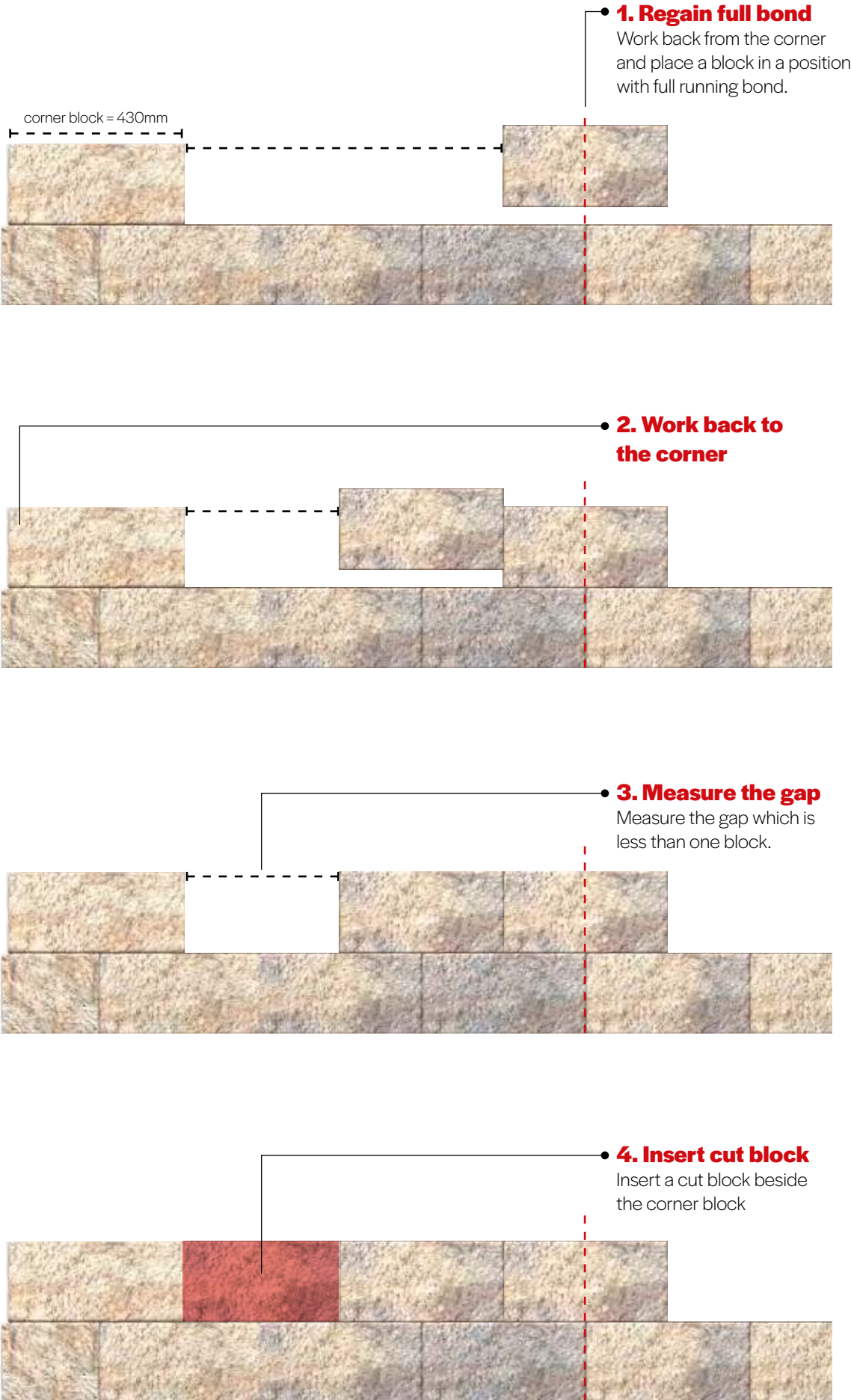
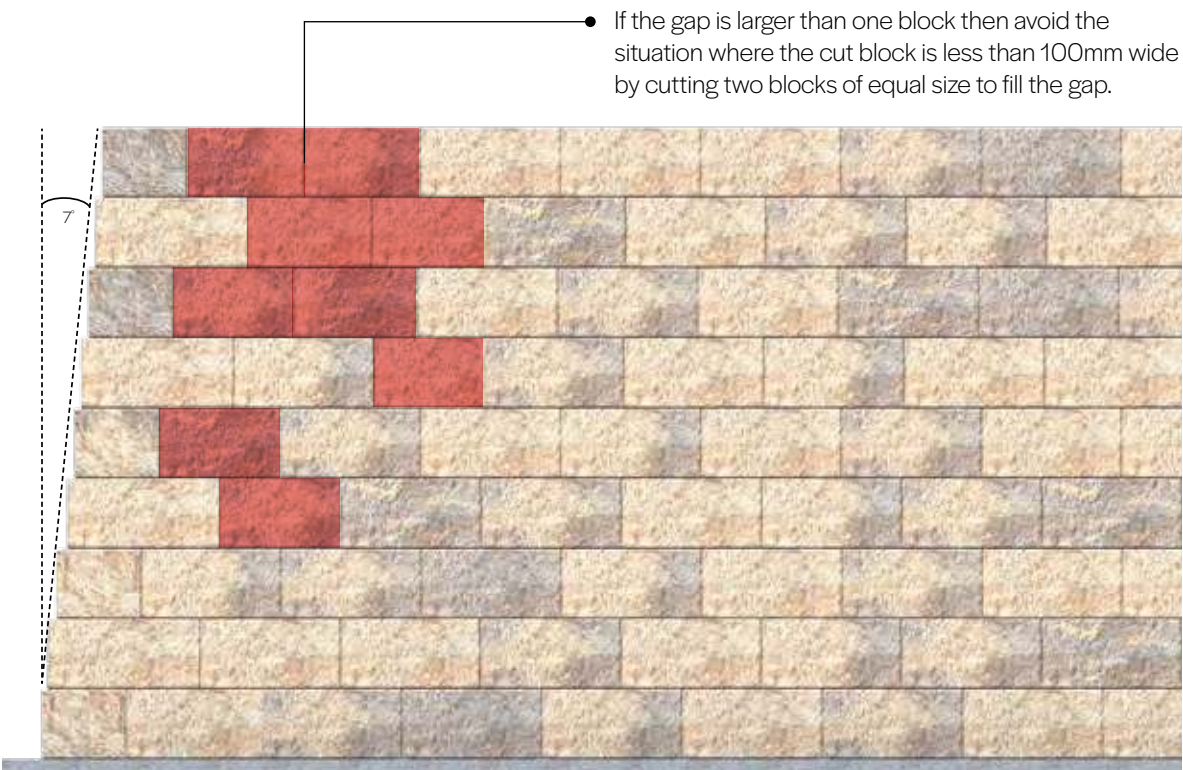
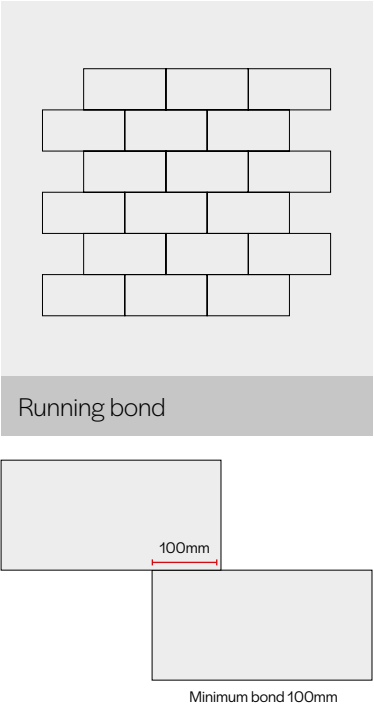
However, when the wall curves or emerges from a 90 degree corner, the bond pattern will become offset from the half-lapped position. While this may affect the aesthetics it is not a structural issue, providing a lap of at least 100mm is maintained. In cases where the bond overlap is less than 100mm the bond must be restored through the use of cut blocks.

To regain the correct half lap bond, identify where the bond is running out then leave a gap and place the next block in a position where the running bond pattern can be established again.

Measure the gap remaining between the blocks and cut a block to size to fill the gap. If the gap is larger than one block then avoid the situation where the cut block is less than 100mm wide by cutting two blocks of equal size to fill the gap.

### Cutting Blocks

The use of a water suppressed masonry saw is recommended to reduce the risk of staining. Please observe regulations with regards to the use of PPE.





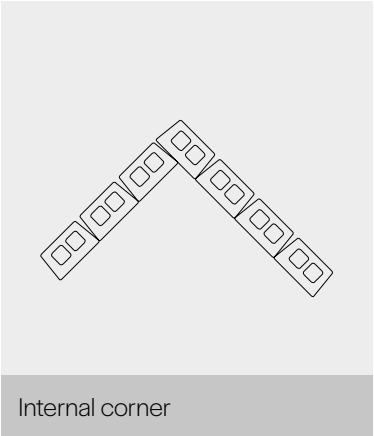
# Secura Grand Internal Corners

**Internal Corners**

Start construction of walls from the corner outwards, removing the rear nibs on the base course blocks.

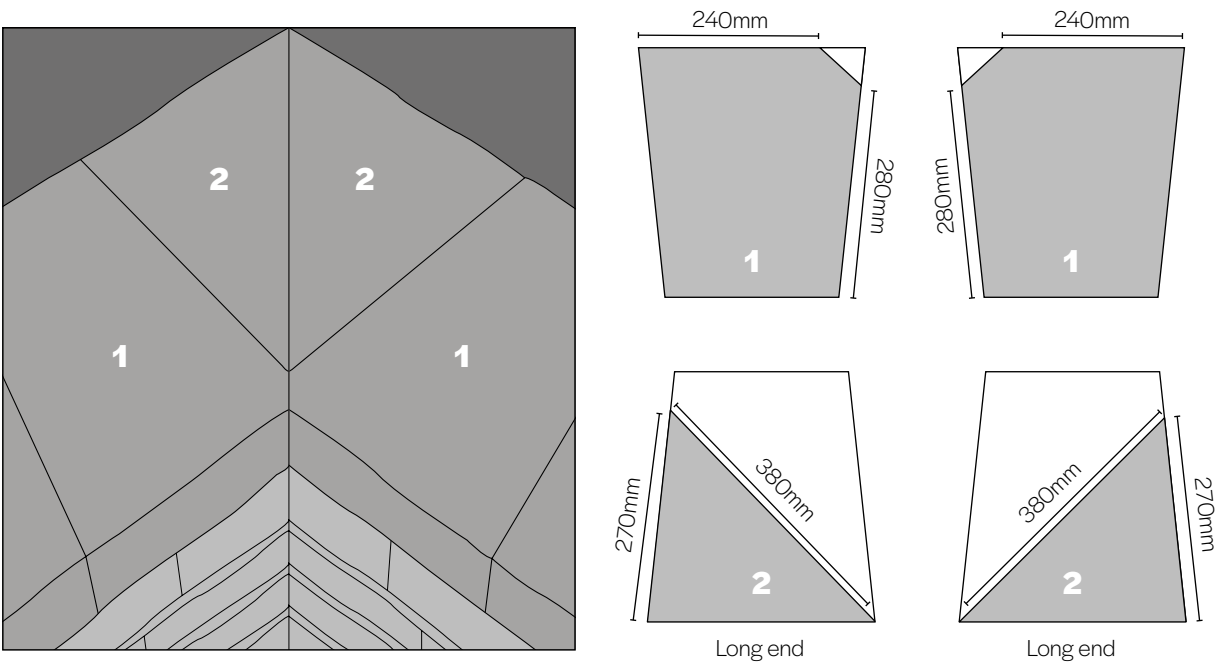
The setback in the Secura blocks creates a corner effect which means that action is required to maintain running bond. To do this, as you work away from the corner, place a block in a position with full running bond, laying further blocks back towards the corner. This will leave a space beside the corner block which you should measure and fill with a cut block.

Additional strength in the corner bond can be achieved by fixing the corner and cut block in position with construction adhesive. Alternate the corner blocks left and right for each course as you build.



**Corner Copings**

Follow the cutting plan illustrated to achieve an internal corner using the Secura coping. Secure the corner pieces in place with an exterior grade construction adhesive.



**Base course**

Start at the corner and build outwards.



**Second course**



**Subsequent courses**

Action may be required to maintain running bond. Establish running bond away from the corner and work back towards the corner, finishing with a cut block.

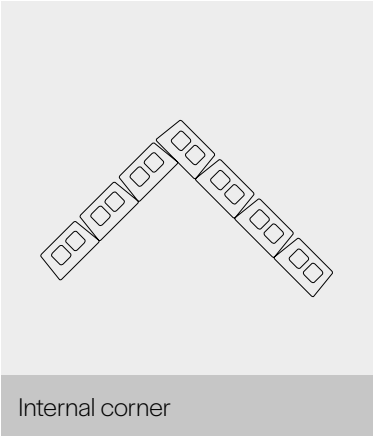




# Secura Grand Internal Corners & Geogrid

When accommodating internal corners in a geogrid reinforced wall it is essential to ensure that a continuous coverage of geogrid is maintained, however, the geogrid must not be overlapped on the same course of blocks.

To achieve the required retention of geogrid between blocks it is essential that the geogrid material follows in a line 25mm behind the face of the Secura blocks. To maintain the required specified strength of the geogrid it is essential that the principal reinforcement direction of the geogrid is always perpendicular to the wall.

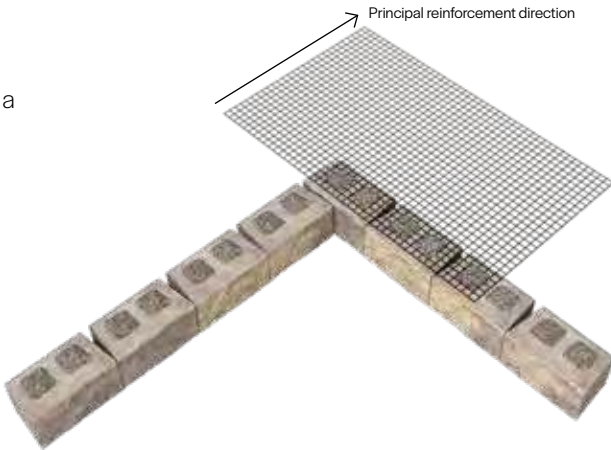


## First geogrid layer

Lay the geogrid to its required length with its principal reinforcement perpendicular to the block course. The geogrid sheet width should extend past the corner by a distance equivalent to 25% of the wall height.

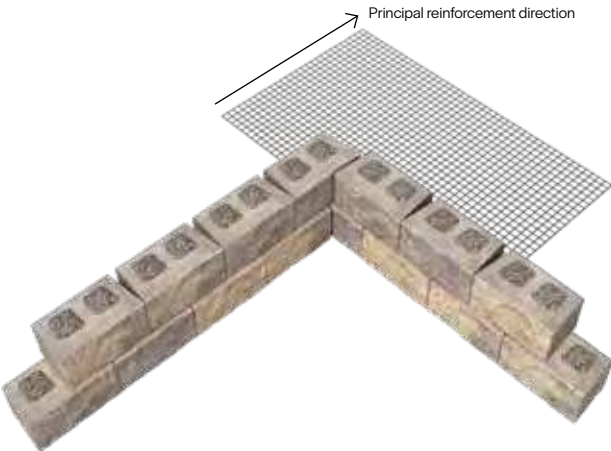
**i.e. 2m high wall = 0.5m geogrid sheet extension**

Maintain the placement of the geogrid 25mm behind the face of the block.



## Second course

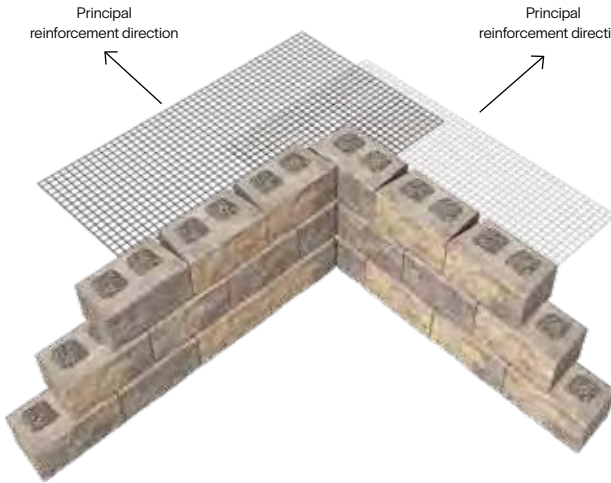
Place the next course of blocks onto the corner detail.



## Next geogrid layer

On the opposing side of the corner, create an overlap with the geogrid on the course below. Lay the geogrid to its required length with its principal reinforcement perpendicular to the block course. The geogrid sheet width should extend past the corner by a distance equivalent to 25% of the wall height.

Maintain the placement of the geogrid 25mm behind the face of the block. Continue the process to ensure maximum coverage of the reinforced zone while avoiding overlaps on the same block course.





# Secura Grand External Corners

**External Corners**

The aesthetics of external corners will be enhanced by using Secura corner blocks. To facilitate ordering, these are supplied as a pair.

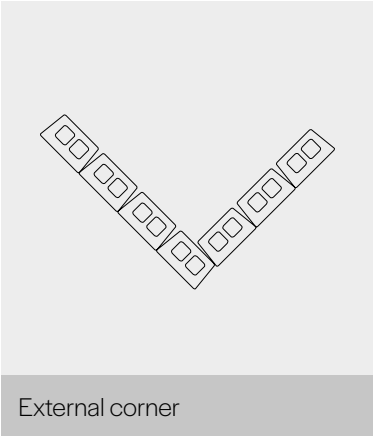
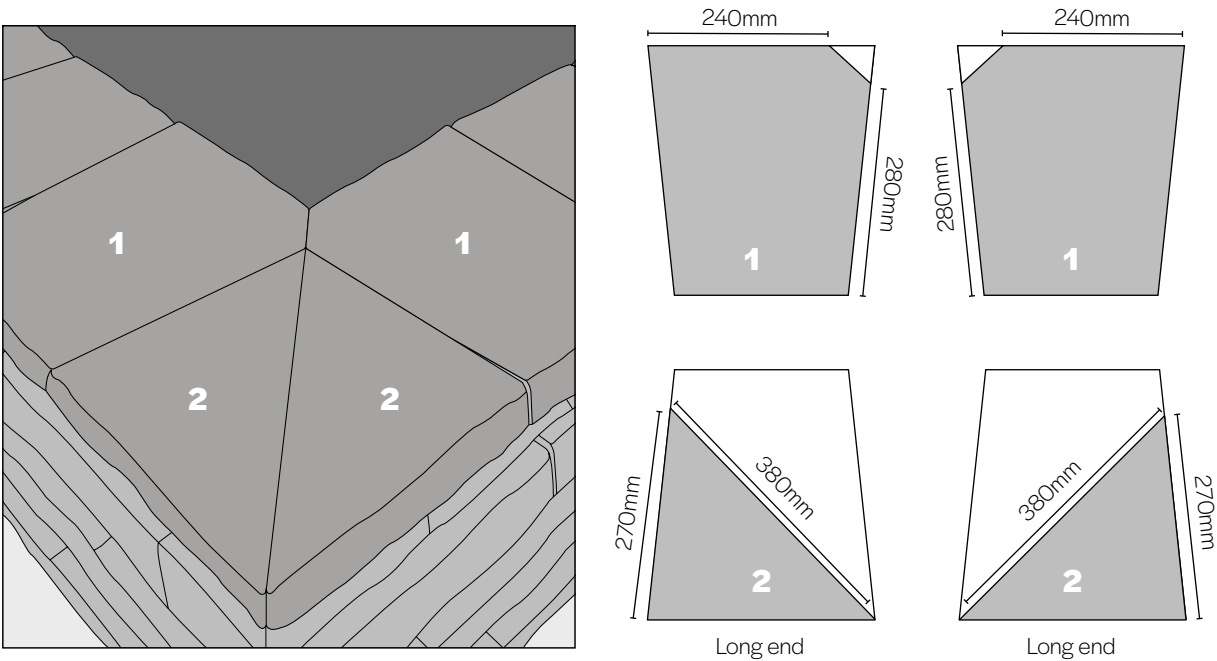
Start construction of walls from the corner block outwards, using left and right corner blocks alternatively. Remove the rear nibs on the base course blocks.

The corner blocks are longer than the Secura blocks and this combined with the corner effect means that action is required to maintain running bond. To do this, as you work away from the corner, place a block in a position with full running bond, laying further blocks back towards the corner. This will leave a space beside the corner block which you should measure and fill with a cut block. See page 78.

Additional strength in the corner bond can be achieved by fixing the corner and cut block in position with construction adhesive. Alternate the corner blocks left and right for each course as you build.

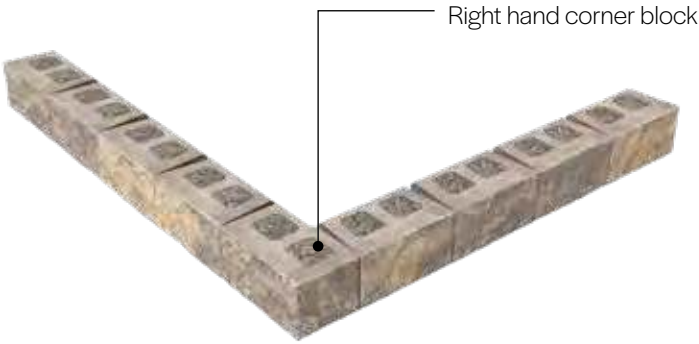
**Corner Coping Kit**

To make the installation of internal and external 90 degree corner copings easier they are supplied as a kit. There are four individual copings in each kit which have been precut at the factory to fit perfectly.



**Base course**

Start at the corner and build outwards.



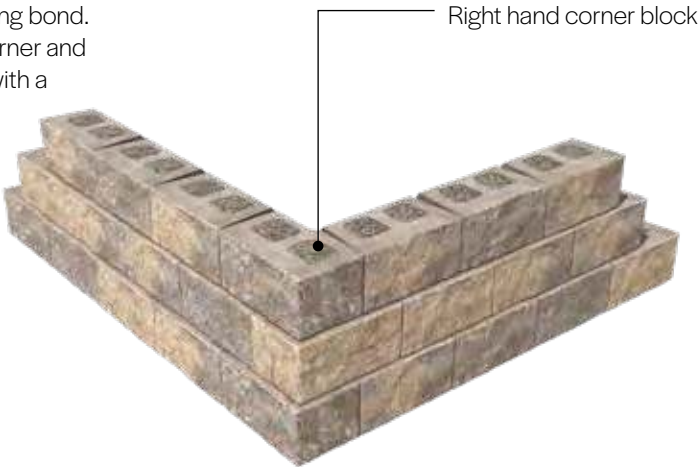
**Second course**

Alternate between left and right hand corner blocks on each course.



**Subsequent courses**

Action may be required to maintain running bond. Establish running bond away from the corner and work back towards the corner, finishing with a cut block. See page 76.

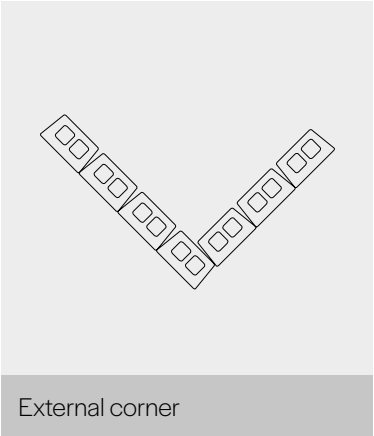




# Secura Grand External Corners & Geogrid

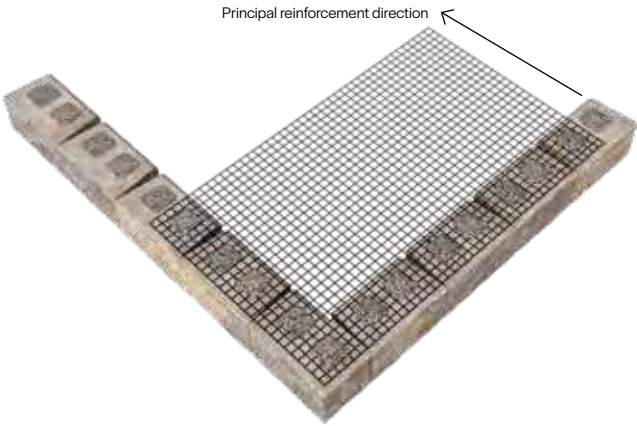
When accommodating external corners in a geogrid reinforced wall, it is essential to ensure that a continuous coverage of geogrid is maintained, however, the geogrid must not overlap on the same course of blocks.

To achieve the required retention of geogrid between blocks it is essential that the geogrid material follows in a line 25mm behind the face of the Secura blocks. To maintain the required specified strength of the geogrid it is essential that the principal reinforcement direction of the geogrid is always perpendicular to the wall.



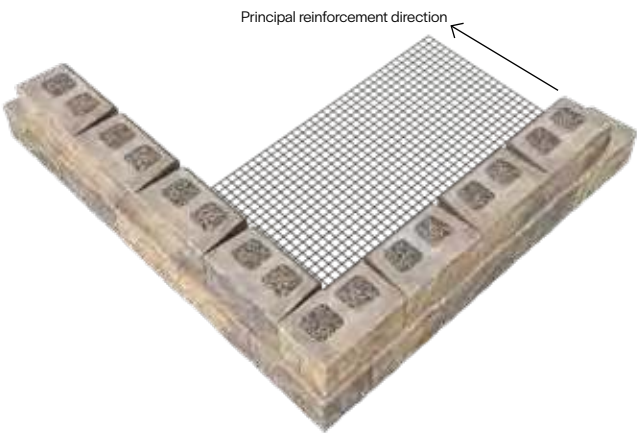
## First geogrid layer

Lay the geogrid into the corner and maintain the placement of the geogrid 25mm behind the face of the blocks on both walls.



## Second course

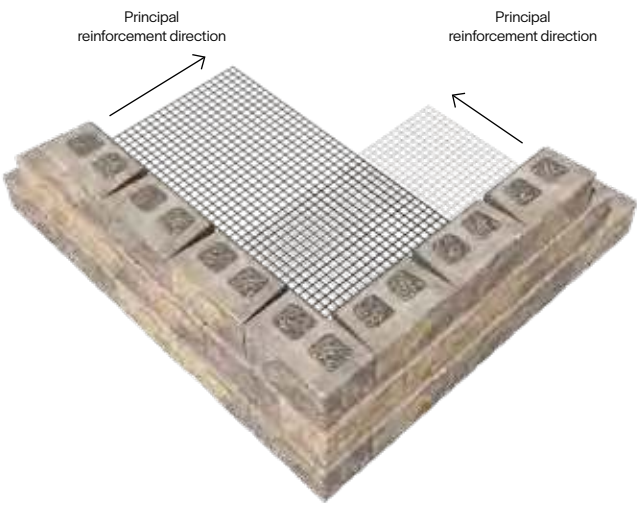
Lay the second course ensuring the geogrid never overlaps between the blocks.



## Next geogrid layer

Lay the geogrid into the corner and create an overlap, over the geogrid on the course below. Maintain the placement of the geogrid 25mm behind the face of the blocks on both walls.

Continue the process to ensure maximum coverage of the reinforced zone while avoiding overlaps on the same block course.



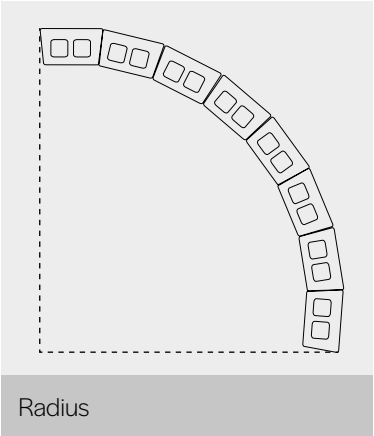


# Secura Grand External Curve Radius

**Constructing external curves for Secura Grand.**

External curved Secura Grand walls will taper inwards from the base course as the height increases due to the built-in 7 degree setback.

The table below indicates the minimum radius which should be built for a given wall height. Failure to establish the correct radius at the base course will limit the height to which the wall can be built.



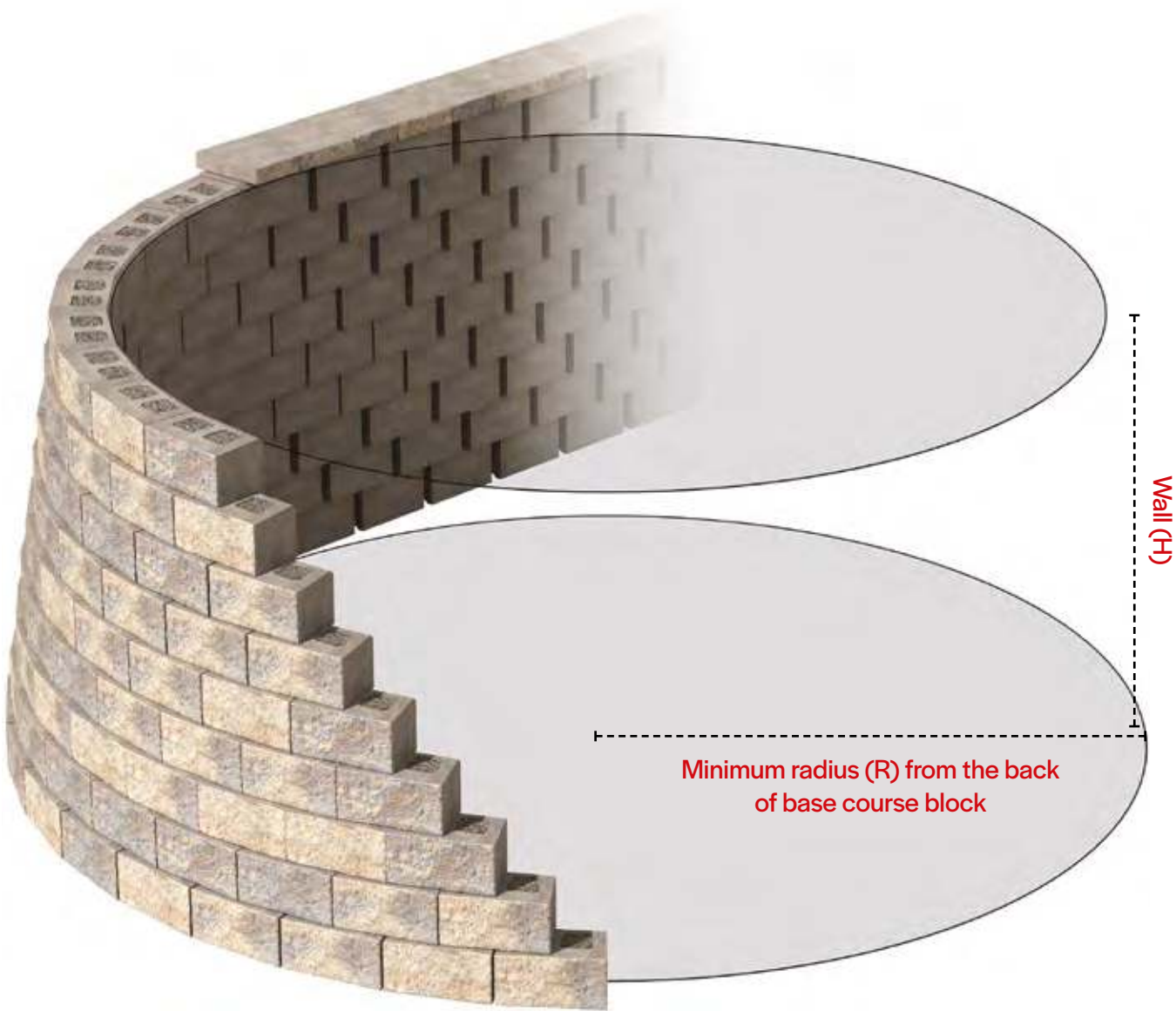
**External Curve**

Wall Height (including base course) (H)	Minimum radius(to the back of the base course block) (R)
1.2m	2.00m
1.4m	2.03m
1.6m	2.07m
1.8m	2.10m
2.0m	2.15m
2.2m	2.20m
2.4m	2.30m
2.6m	2.35m
2.8m	2.40m
3.0 m	2.50m
3.2m	2.60m
3.4m	2.70m
3.6m	2.80m

External Curve

**Typical example**

When wall height (H) is 1.8m, then the minimum radius (R) to the back of the wall is 2.1m.





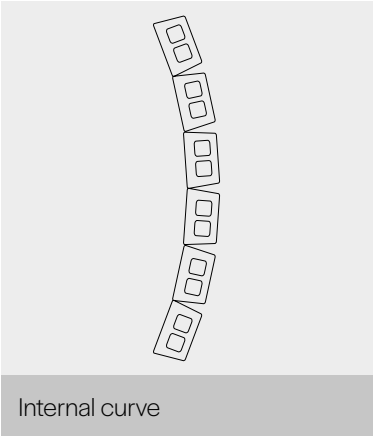
# Secura Grand Internal Curves

Where possible, review the site plan to remove the tightest curves. The minimum radius possible for an internal curve on a Secura Grand wall is 2.4m, when measured to the back of the base course blocks (2.17m to the front of the block).

When laying curved walls the installer must be aware that the running bond will become offset from the half-lapped position as the wall increases in height.

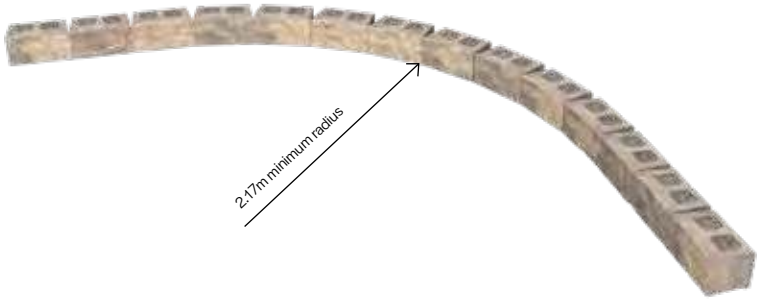
Every effort should be made to avoid the bond overlap falling below 100mm. See page 76 for details of how to maintain bond.

**Important:** Check for minimum radius while laying out the base course.



## Base course

The minimum radius possible is 2.4m measured to the back of the base course blocks (2.17m to the front of the block).



## Second course

Take care to lay the blocks with a running bond.



## Subsequent courses

As the wall increases in height, the setback will cause the running bond to offset. The use of cut blocks may be required to regain the running bond. See page 76 for details.

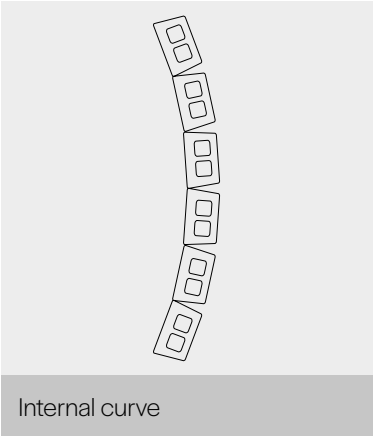




# Secura Grand Internal Curves & Geogrid

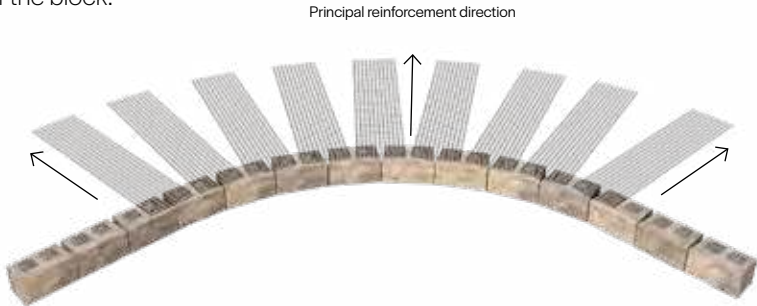
When creating curves in a geogrid reinforced wall it is essential that a continuous coverage of geogrid is maintained around the curve without gaps. However, the geogrid must not be overlapped on the same course of blocks.

To achieve the required retention of geogrid between blocks ensure that the geogrid material follows the curved line 25mm behind the face of the Secura blocks. The geogrid may need to be trimmed to achieve this, depending on the width of the geogrid and the degree of the curve. Ensure that the principal reinforcement direction of the geogrid is always perpendicular to the wall.



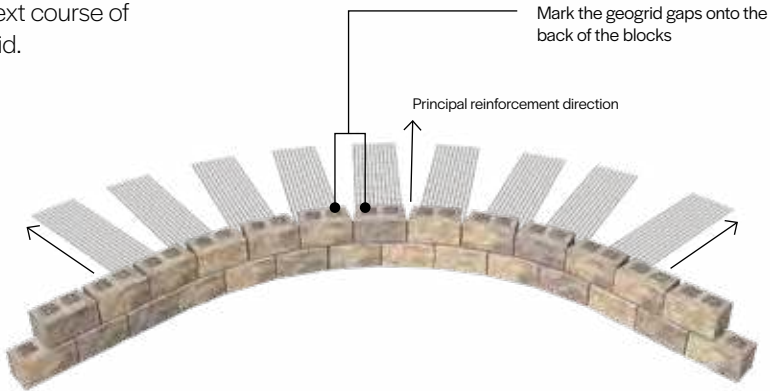
## First geogrid layer

Lay the geogrid around the curve, without overlaps whilst maintaining the correct direction of the principal reinforcement in the geogrid. Maintain the placement of the geogrid 25mm behind the face of the block.



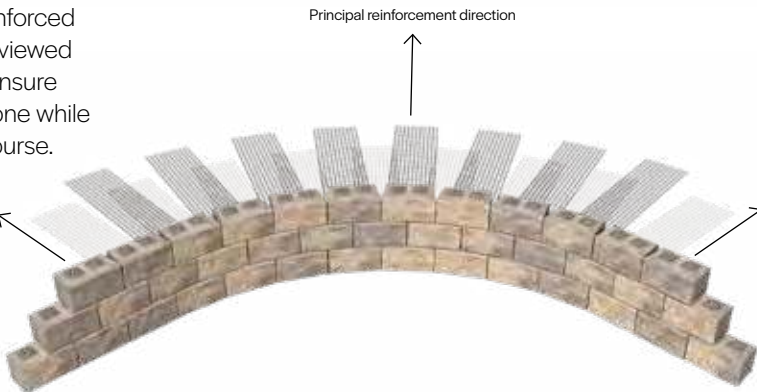
## Second course

Because the geogrid will be obscured after backfilling, it is necessary to mark the rear of the next course of blocks, indicating the gaps in the geogrid.



## Next geogrid layer

Lay the geogrid, positioned to provide coverage of the gap left between the geogrids on the course below. Ensure the whole area of the reinforced zone will be covered by geogrid (when viewed from above). Continue the process to ensure maximum coverage of the reinforced zone while avoiding overlaps on the same block course.





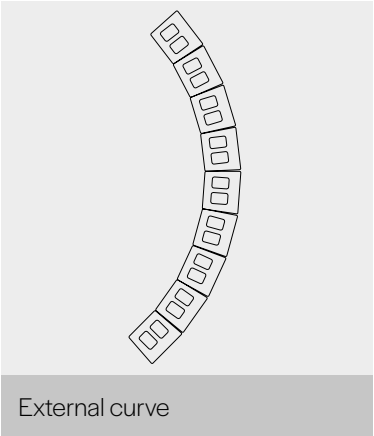
# Secura Grand External Curves

Where possible, review the site plan to remove the tightest curves. Use the table on page 84 to identify the minimum radius at the base course for different wall heights. The figures are measured to the back of the base course blocks.

When laying curved walls the installer must be aware that some degree of offset in the running bond will occur as the wall increases in height and the radius increases.

Every effort should be made to avoid the bond overlap falling below 100mm. See page 76 for details of how to maintain bond.

**Important:** Check for minimum radius while laying out the base course.



## Base course

The maximum curve is dependant on wall height. Please refer to the table on page 84 to ascertain the minimum radius for the base course.



## Second course

Take care to lay the blocks with a running bond.



## Subsequent courses

As the wall increases in height, the setback will cause the running bond to become offset. The use of cut blocks may be required to regain the running bond. See page 76 for details.

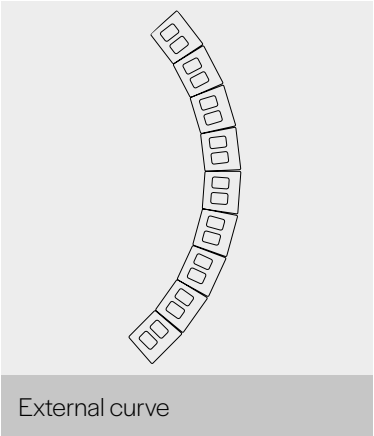




# Secura Grand External Curves & Geogrid

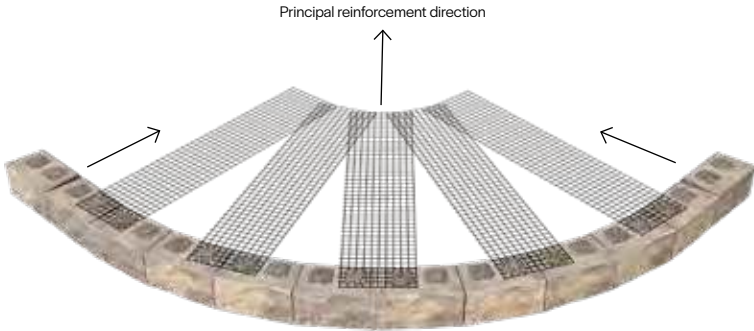
When creating curves in a geogrid reinforced wall it is essential that a continuous coverage of geogrid is maintained around the curve without gaps. However, the geogrid must never overlap between the blocks.

To achieve the required retention of geogrid between blocks ensure that the geogrid material follows the curved line position of 25mm behind the face of the Secura blocks. The geogrid may need to be trimmed to achieve this, depending on the width of the geogrid and the degree of the curve. Ensure that the principal reinforcement direction of the geogrid is always perpendicular to the wall.



## First geogrid layer

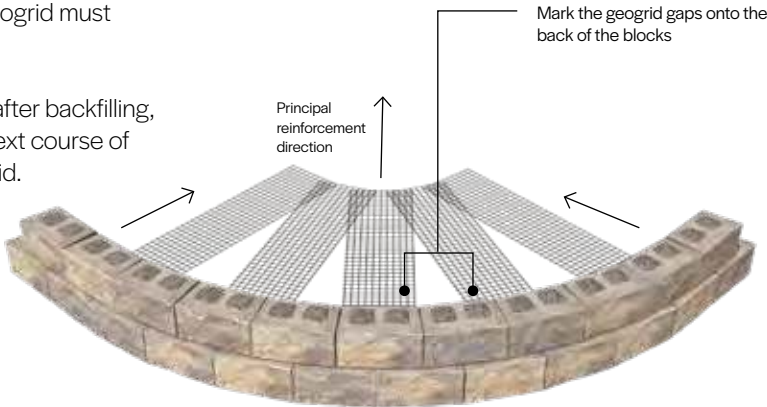
Lay the geogrid around the curve, without overlaps on the blocks whilst maintaining the correct direction of the principal reinforcement in the geogrid. Maintain the placement of the geogrid 25mm behind the face of the block.



## Second course

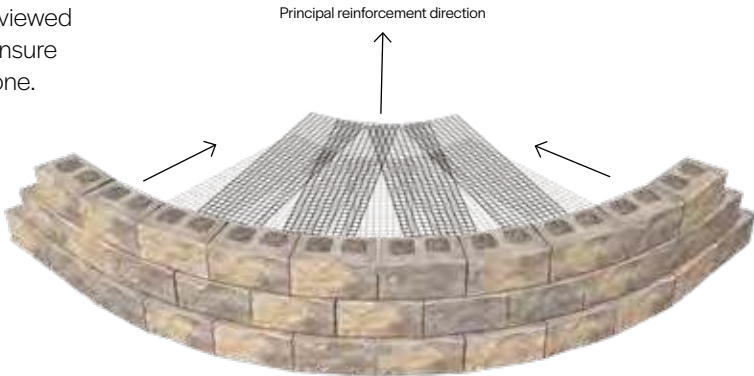
A small amount of overlap will occur at the tails of the geogrid, however this is acceptable. Geogrid must never overlap between the blocks.

Because the geogrid will be obscured after backfilling, it is necessary to mark the rear of the next course of blocks, indicating the gaps in the geogrid.



## Next geogrid layer

Lay the geogrid, positioned to provide coverage of the gap left between the geogrids on the course below. Ensure the whole area of the reinforced zone will be covered by geogrid (when viewed from above). Continue the process to ensure maximum coverage of the reinforced zone.





# Secura Grand Terraced Wall

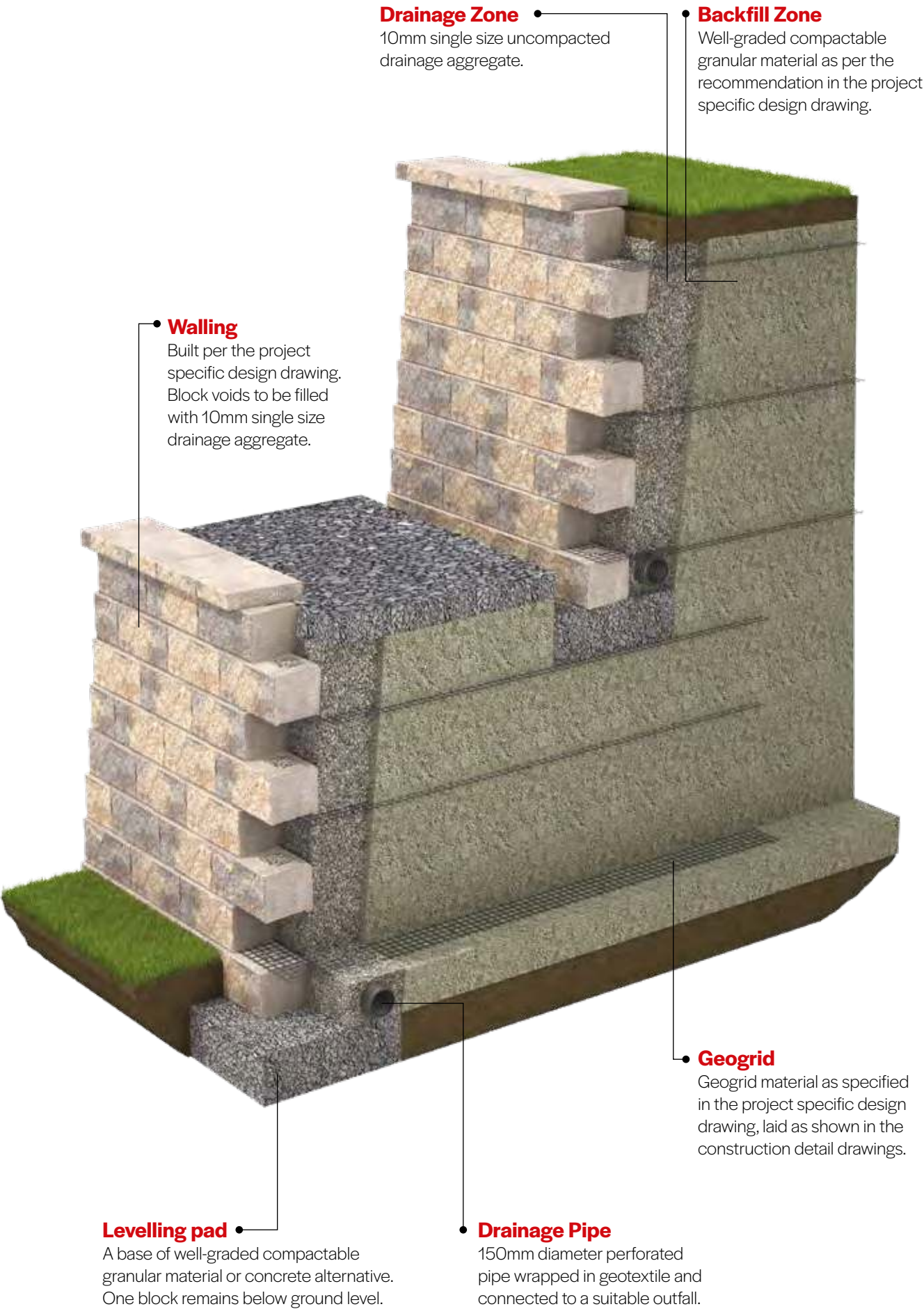
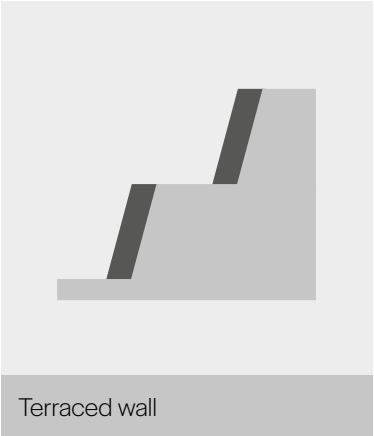
Terraced walls require the input of a qualified engineer especially when the walls are closer together than two times the height of the lower wall or if there is any buildings etc. above the wall or if there are more than two terraced walls. Soil, site conditions and drainage must also be factored into the design.

Terraced walls are an efficient way to avoid a single high wall which may be over-imposing aesthetically. By introducing areas of controlled planting into the terrace created between the walls an aesthetically pleasing scheme can be achieved.

The engineer's design must take account of any surcharge on the lower wall as a result of the construction of the upper wall. Additional reinforcement may be required to accommodate the additional loads.

To minimise the surcharge effect of the upper wall, and reduce the need for additional reinforcement, the walls should be made independent of each other by separating them by a distance at least two times the height of the lower wall. In this case the upper wall height must be equal to or less than the lower wall.

Careful planning by an engineer will be required where two walls are positioned and the width of the space between them is less than the height of the lower wall.





# Secura Grand Vehicle Restraint Barriers

Installing a crash/impact barrier above a Secura wall requires careful design consideration and construction as they create the potential for significant additional loads on the wall which must be factored into the wall design by a qualified engineer.

When designing a Secura wall it is important to plan in any barriers required as this may require additional geogrid. It is much more efficient to plan them in at the design stage than trying to accommodate them later, during construction. A failure to plan in advance for barriers will result in additional work on the wall due to the need for excavation of the drainage aggregate, backfill material and cutting of the geogrid.

The location and spacing of the barrier should be determined from the design drawings and PVC sleeves should be installed in the correct locations by tidily cutting around the geogrid to allow the placement and backfilling of the sleeve. The barrier's posts must be inserted to the required depth in the sleeve and concreted in place.

**Important:** Complete the retaining wall structure prior to the final assembly of barriers into the post sleeves. Sleeve to be fully filled with C20/25 concrete.



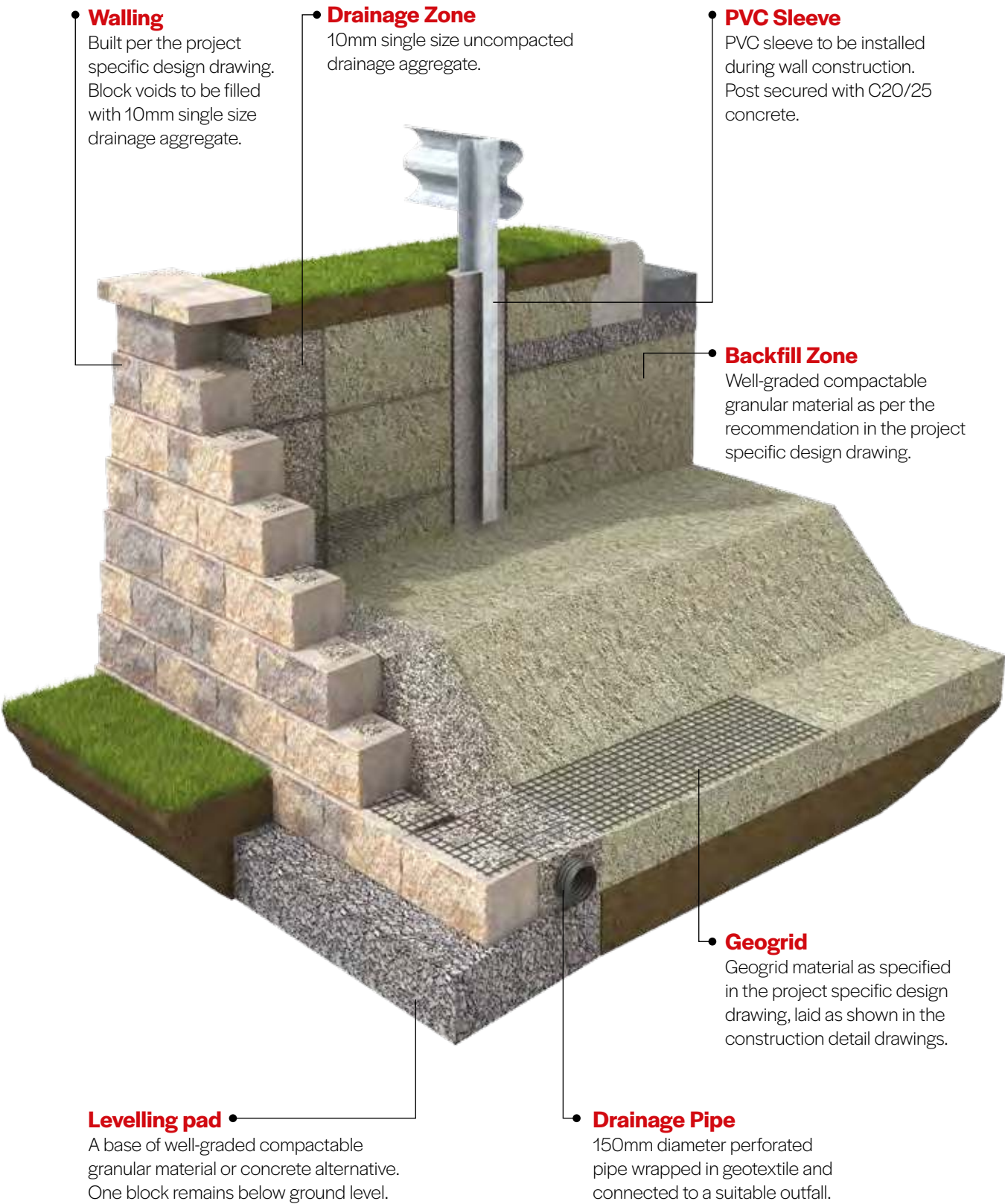
PVC Sleeve detail

## Typical car park vehicle restraint



**Note:** This is a typical construction detail. Vehicle restraints will require site specific design.

## Typical highway vehicle restraint



**Note:** This is a typical construction detail. Vehicle restraints will require site specific design.



# Secura Grand Fencing

When designing a Secura wall it is important to plan in any fences or railings required as this may require additional geogrid. It is much more efficient to plan them in at the design stage than trying to accommodate them later, during construction.

A failure to plan in advance for fences or railings will result in additional work on the wall due to the need for excavation of the drainage aggregate, backfill material and cutting of the geogrid.

The location and spacing of the fence posts should be determined from the design drawings and PVC sleeves should be installed in the correct locations by tidily cutting around the geogrid to allow the placement and backfilling of the sleeve. The fence posts must be inserted to the required depth in the sleeve and concreted in place.

**Important:** Close board fences create wind loads placing additional force on the wall and this should be factored into the design as extra reinforcement will be required. Complete the retaining wall structure prior to the final assembly of barriers into the post sleeves. Sleeve to be fully filled with C20/25 concrete.



PVC Sleeve detail

## Wind fence - close boarded

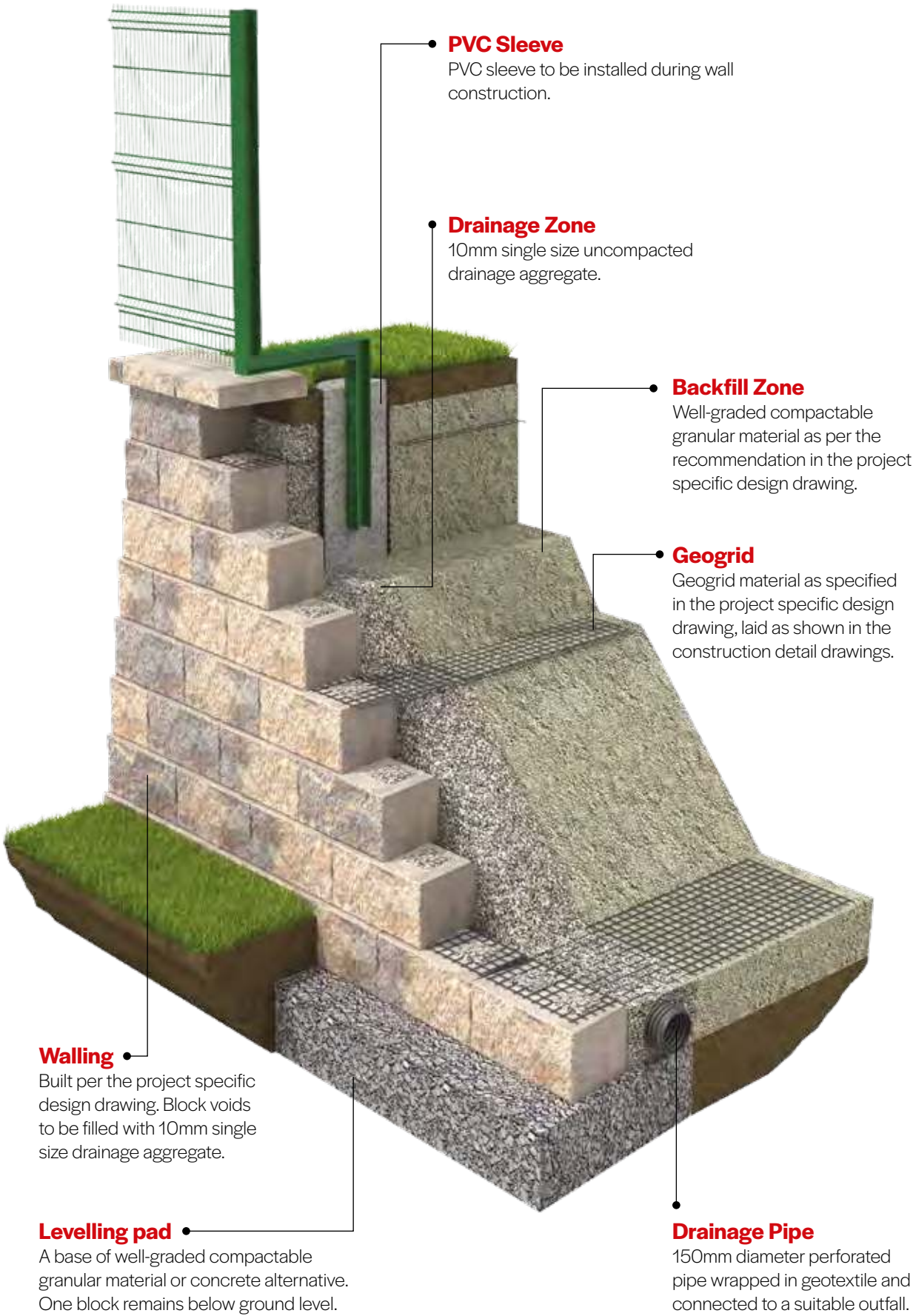


## Railings



**Note:** This is a typical construction detail. Wind loaded fences require site specific design.

## Cantilever fence



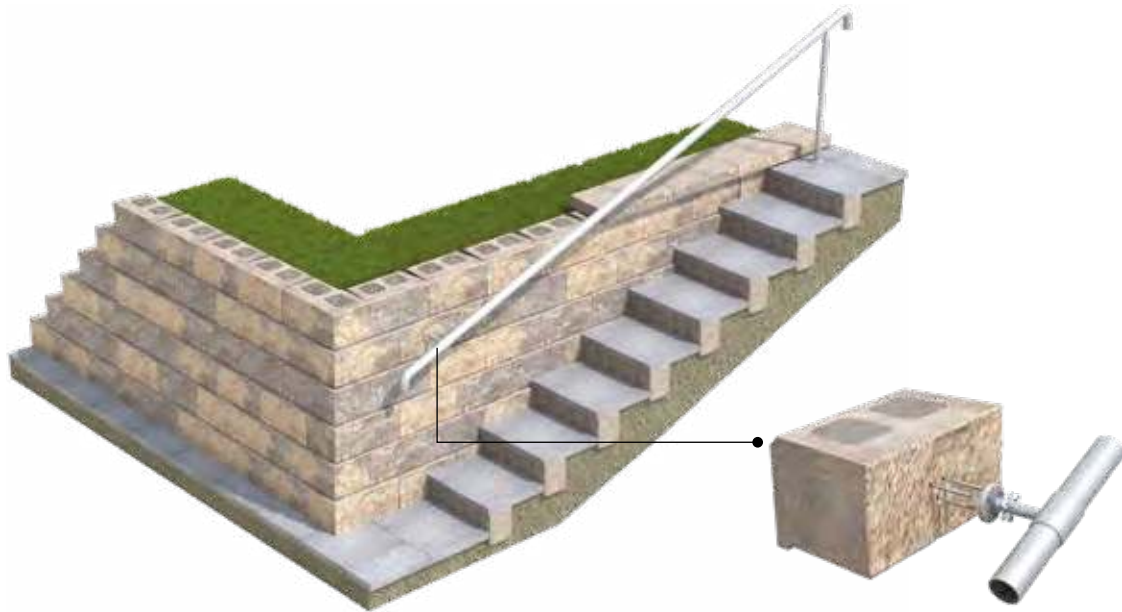


# Secura Grand Steps

Tobermore produce a wide range of paving materials with co-ordinating step components. Refer to local building regulations for step design detail.

If load bearing fixtures such as hand rails are to be fitted then these should be identified at the planning stage and the block voids should be filled with C20/25 concrete at the appropriate sections of wall. This is to ensure the maximum anchorage for the fixings in the event that they penetrate the block voids.

Step Detail - Corner



Step Detail - Curve



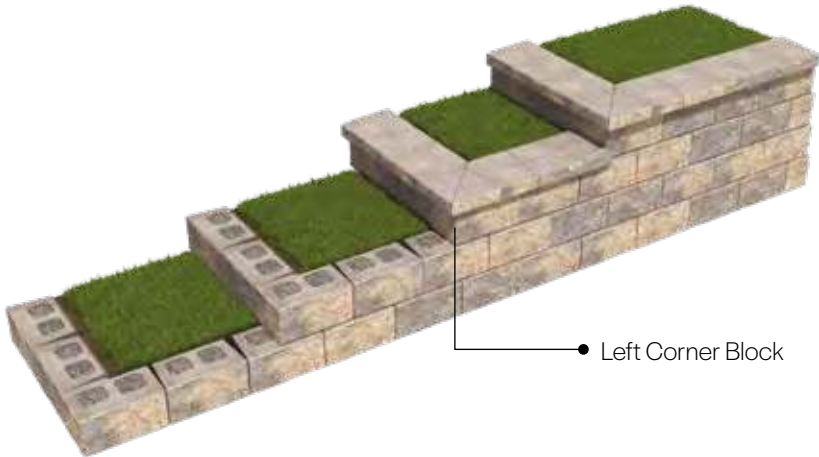
# Secura Grand Stepping Down

The Secura corner blocks provide an attractive decorative finish when stepping down and used in conjunction with the Secura coping.

Stepping Down



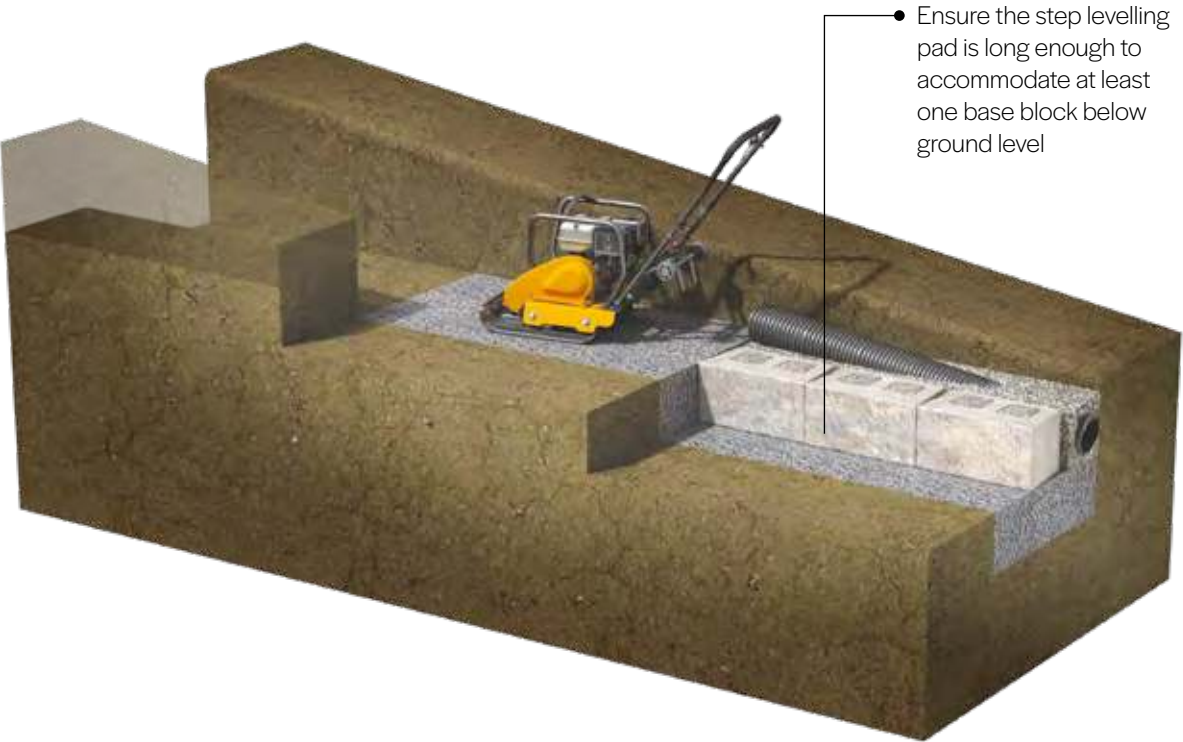
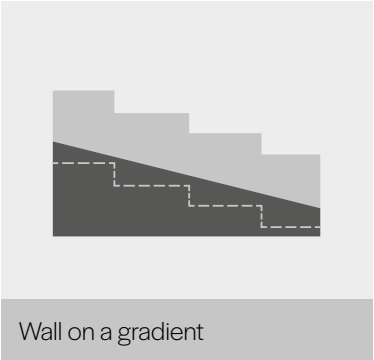
Stepping Down Corner





# Secura Grand Stepped up Levelling pad

**Important:** When the line of the wall follows a gradient then the levelling pad must be built up in steps. Site conditions must be assessed by an engineer and any toe slope or surcharges must be factored into the wall design.

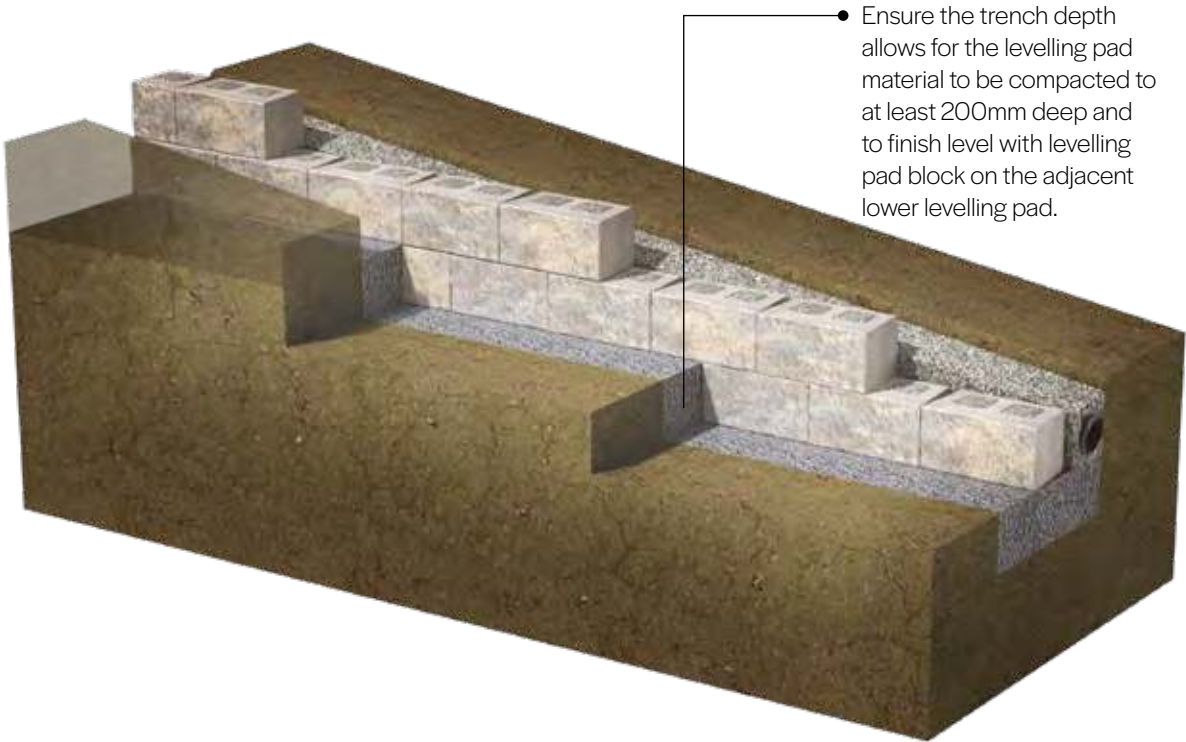


**Step 1**  
Levelling pad

- Starting at the lowest part of the gradient, form each length of levelling pad as normal by excavating a trench 600mm wide by at least 400mm deep.
- Each levelling pad step must be long enough to ensure at least one base course block is fully below ground as the slope rises.

**Step 2**  
Complete a section of stepped levelling pad

- Complete the levelling pad as per the specific wall type installation instructions contained earlier in this guide.



**Step 3**  
Second step up

- Now excavate the second step up, ensuring its length will facilitate at least one 200mm deep base course block to be fully below ground as the slope rises.
- Ensure the trench depth allows for the levelling pad material to be compacted to at least 200mm deep and to finish level with levelling pad block on the adjacent lower levelling pad.

**Step 4**  
Complete the steps

- Repeat the process, creating stepped levelling pads to the top of the gradient.
- Backfilling: Refer to the relevant installation pages 50 - 73 for details on the backfill process. Do not compact the 10mm drainage aggregate.
- Repeat these steps until you reach the top of the gradient.



# Copings

## Fixing copings to straight walls

Secura copings are tapered, so on straight walls they are installed alternatively. Start installing copings from both ends of the wall and cut as appropriate. They should be secured using an exterior grade concrete construction adhesive, applied onto the top of the blocks (not the coping).



**Cutting:** The use of a water suppressed masonry saw is recommended to reduce the risk of staining. Please observe regulations with regards to the use of PPE.

## Fixing copings to 90 degree corners

Corner coping kits can be used. Please refer to page 76 and 80

### External corners



### Internal corners



## Fixing copings to curves

To install copings on curved walls some cutting will be required. Start by placing copings dry on the wall as it is easier to make adjustments prior to glueing in position.

### External curve



### Internal curve







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Range & Technical	108
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Gravity Wall Installation	114

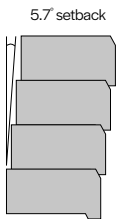
# Secura Lite



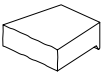
# Why Secura Lite?

**Key Benefits of using Secura Lite as a Retaining Wall Solution**

- ✓ Easy to build - suitable for DIY
- ✓ Mortar-free installation
- ✓ Builds up to 960mm retained height
- ✓ Attractive stone finish
- ✓ Vibrant long-lasting colours
- ✓ Ideal for domestic applications
- ✓ Available in a combination of three block widths



**Retaining Wall Comparison**



Benefits	Secura Lite	Block and Render	Masonry
Attractive stone finish	✓	X	X
Mortarless option	✓	X	X
Maintenance free	✓	X	X
Speed of construction	✓	X	X
Cost effective	✓	X	X
Simplicity on-site	✓	X	X
Reduced efflorescence	✓	X	X

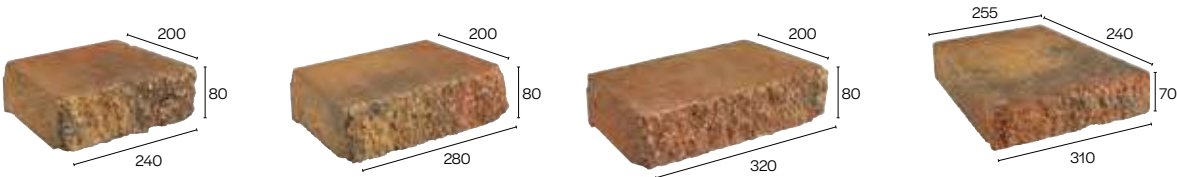




# Secura Lite Range & Technical



### Swatches



**Blocks (mm)**  
320 x 200 x 80  
280 x 200 x 80  
240 x 200 x 80

All three sizes in one pack

**Coping (mm)**  
310/255 x 240 x 70  
(tapered coping)

### Specification



Product type	Concrete Block
Manufactured to	BS EN 771-3:2011
Surface finish	Processed to give aged appearance
Efflorescence	Minimum 12 hour vapour curing to significantly reduce the possibility of efflorescence
Strength	Typical tensile splitting strength of >30N/mm²
Dimensional Tolerances	Length +3mm -5mm, width +3mm -5mm, height +3mm -5mm
Design and Installation to	BS 8002:2015
NBS	<b>Plus</b> D41 310 <b>Create</b> 45-25-66/320
Applications	Low height gravity retaining wall solution for walls up to a maximum of 880mm high. Please refer to Tobermore's Secura Lite installation guidelines.
Energy used	100% renewable energy
Water used	100% from our rainwater harvesting system and groundwater bore hole
Recycled content	Not less than 6%
Carbon footprint	1.6kgCo²e/ea
Recyclable	100% of this product can be recycled
Manufacturing & Delivery	From one location within the UK
LEED rating	Refer to the Green Guide to Specification, 4th Edition 2009.
www.bre.co.uk	

Tobermore products are manufactured in accordance with an accredited ISO 9001:2015 Quality Management. Manufacturing facilities are accredited to ISO14001:2015 Environmental Management. The company publish environmental labels and declarations in accordance with BES 6001.

### Stock

product	size (mm)	colours available	in stock	LM per pack	m² per slice	no. per m²	no. per pack	weight kg per pack GB	weight kg per pack NI/ROI
<b>Secura Lite</b> (all three sizes in one pack)	320 x 200 x 80 280 x 200 x 80 240 x 200 x 80	Bracken, Heather, Slate	YES	33.6	0.84	44.64	40 40 40	1121	1121
<b>Secura Lite Coping</b>	310/255 x 240 x 70 (tapered coping)	Bracken, Heather, Slate	YES	-	-	3.5LM	120	1316	1316





**Products:**  
Secura Lite  
Bracken



**Products:**  
Secura Lite  
Bracken



**Products:**  
Secura Lite  
Heather



**Products:**  
Secura Lite  
Slate



SECURA LITE

# Gravity Wall

A gravity retaining wall relies solely on the weight and setback of the segmental concrete blocks to resist pressure and retain the soil behind it. Secura Lite can be constructed as a gravity wall to a maximum retained height of 880mm in situations where there is no crest or toe slope and no surcharge above the wall. The simplicity of the Secura Lite Gravity mortarless build technique makes it highly efficient for low walls in the housing sector.

**Suitability**

Max retained height  
**880mm**



Level



**Backfill Zone**



Free draining soil or aggregate.

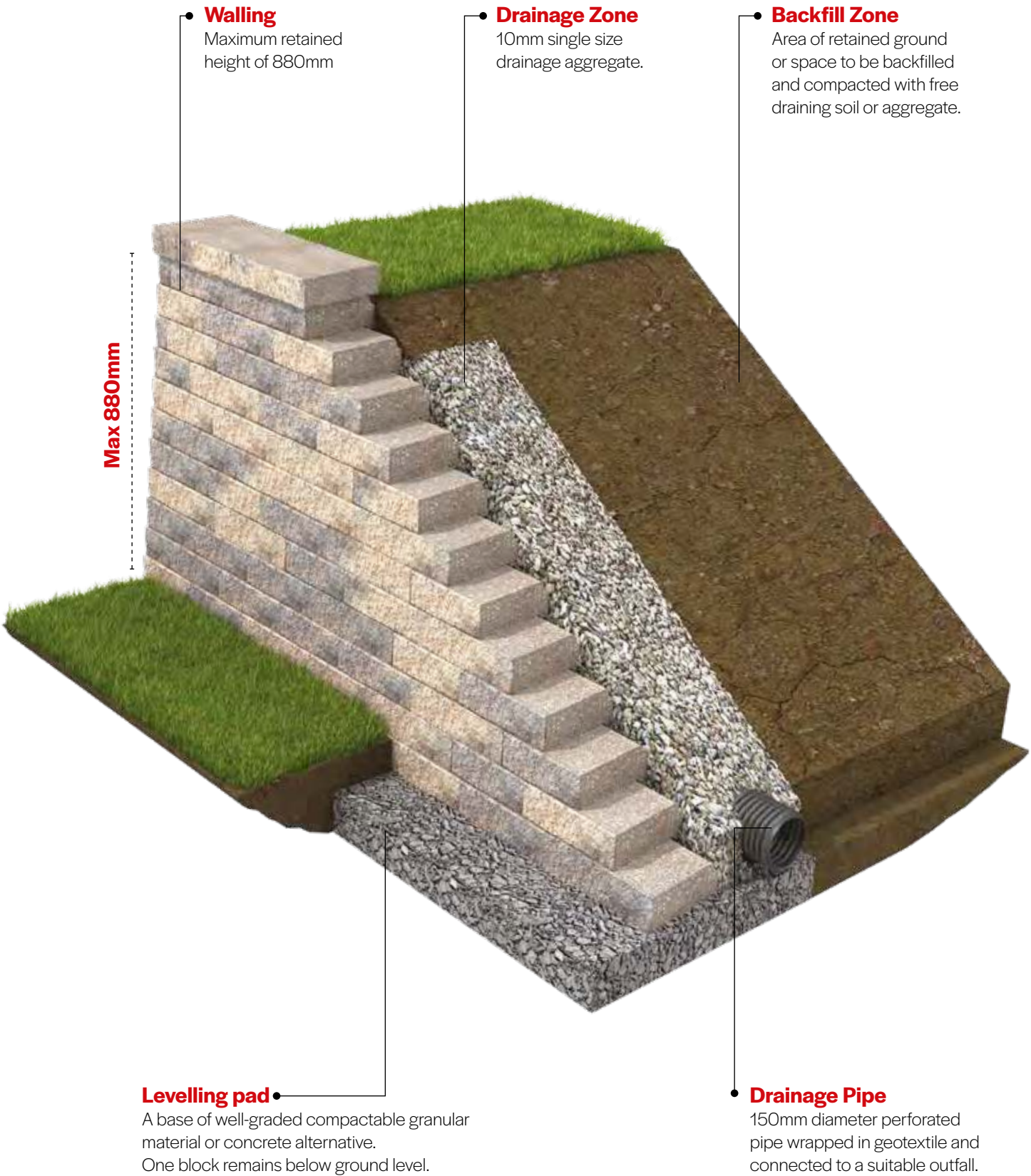
**Drainage Zone**



10mm single size drainage aggregate.

**Mortarless Installation**

When installed with an aggregate levelling pad, the Secura Lite gravity wall remains completely mortarless.





# Secura Lite Gravity Installation



SCAN HERE

Preliminary actions

STRUCTURAL DESIGN

**Important:** The design of any retaining wall requires the input of an engineer to assess the unique conditions of every site in respect of loads in conjunction with site and soil conditions. The advice and typical wall designs in this guide are for information only to assist estimating and initial planning but should not be used for construction.

WORKING SAFELY

**Important:** Please refer to our safety notes on page 124 prior to commencement of any site works.

FILL MATERIALS

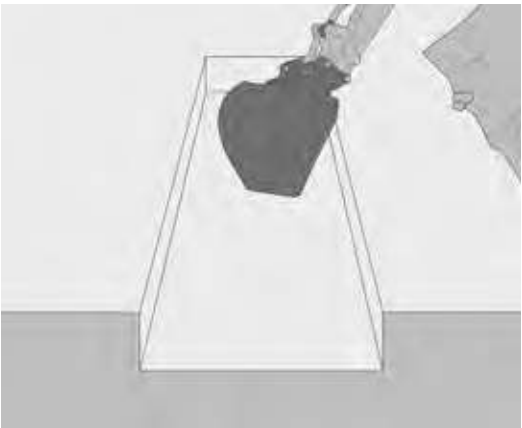
Please ensure that the specified fill materials (see page 122) are available on site before commencement.

GROUND CONDITIONS & MAXIMUM HEIGHT

**Important:** Secura Lite is designed for use only in locations where the wall will be finished with a flat crest, has a flat toe slope and where no surcharge exists behind the wall. Secura Lite must not be built to a retained height greater than 880mm. The 880mm maximum height is achieved with 12 courses of Secura Lite blocks including the base course below ground. If the location has a crest slope, toe slope or surcharge present then you must use the Secura Grand block and opt for either the geogrid reinforcement or concrete backfilled method of construction. Refer to page 66.

Step 1  
Setting out & trench excavation

- Mark out the location of the wall by checking the design drawings or by agreement with the project engineer, architect or client.
- Please refer to the table below for typical levelling pad details or If there is an engineers' site specific design this should be followed at all times. (Please refer to the table for dimensions and recommended block courses below ground).
- Excavate the trench to a minimum 180mm depth and 600mm width.
- Remove any unsuitable material and replace it with compacted granular material. See specification for material on page 116. Ensure it is fully compacted using a hand pummel or mechanical plate compactor.



Step 2  
Laying the levelling pad

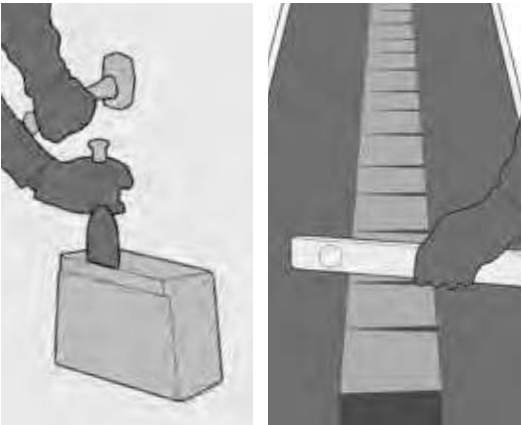
- Lay a level levelling pad across the full width of the trench using fully compact granular material as specified. Use a hand pummel or plate compactor to ensure a level base. The typical depth of the levelling pad should be 100mm after compaction.
- The top of the compacted levelling pad must be at least 80mm below finished ground level.
- Please refer to the table for typical levelling pad details. An engineer's site specific design should be followed at all times. (Please refer to the table below for dimensions and recommended block courses below ground).
- Important:** If the wall is on a slope the levelling pad will need to be stepped. See page 100.



Product	Max. Gravity wall height	Min. internal radius	Max. external radius	Typical trench width (mm)	Typical trench depth (mm)	Levelling pad material	Typical levelling pad depth (mm)	Block courses below ground
Secura Lite	880mm retained height	1.3m to the back of the block	1.7m to the back of the block	600 mm	180mm	Well-graded compactable material	100mm after compaction	1

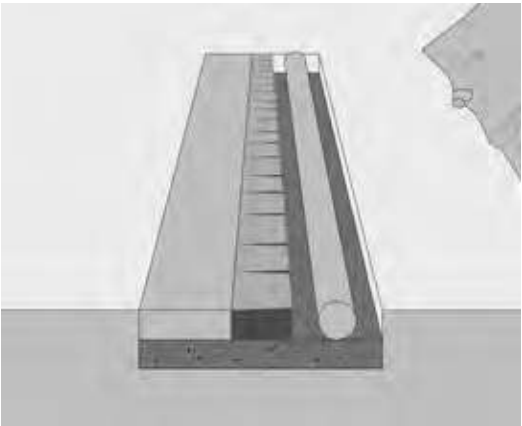
Step 3  
Installing the base course

- Important:** The top of the base course when installed must be below finished ground level.
- Block selection**  
Secura Lite is supplied in packs which include three block sizes. Ensure you randomly select all three sizes and mix the blocks from a minimum of three packs to achieve the desired colour blend. This should be done on the base course and all other courses.
- Block preparation**  
To ensure a level base course, remove the nib from the base of the blocks to be used on the base course using a bolster and club hammer.
- Block Placement**  
Place the blocks onto the levelling pad and use a string line along the back of the blocks to check for alignment. Use a spirit level to ensure the blocks are level along their length and from front to back as the aesthetics of the finished wall depend on the base course being level. Due to Secura's mortarless construction, the use of shims may be required occasionally to maintain level in the block course. Leave a gap of 2mm between the blocks to allow for any movement of the ground.
- Front fill**  
Fill the gap in front of the base course with on-site soil and fully compact, level with the base course.



Step 4  
Laying drainage pipe

- Most small walls will not require a drainage pipe. However, if extra drainage is required lay a perforated drainage pipe at the back of the base course and cover with 10mm single size drainage aggregate. The pipe should connect to a suitable outlet/soakaway.

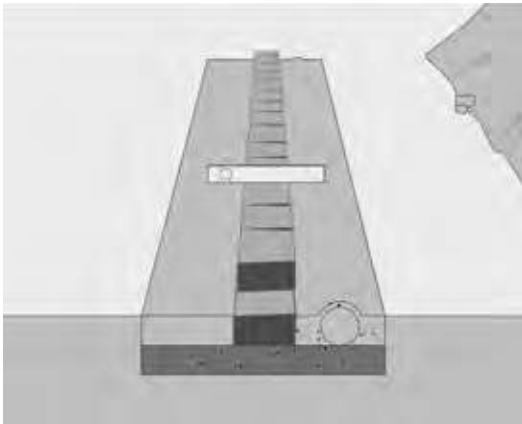




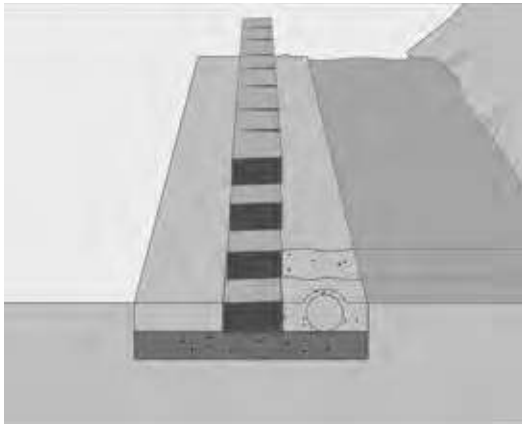
# Secura Lite Gravity Installation

**Step 5**  
**Laying the blocks on the second and subsequent courses**

- Before laying subsequent layers, brush the top surface of the blocks to remove any debris which may affect the wall level.
- Place the blocks on top of the base course ensuring the joints are staggered with the blocks on the base course. Vertical joints should not directly line up between courses. Push the blocks forward until the nib at the base of the block tightly locates against the blocks beneath. Use a spirit level to ensure the blocks are level as you build each course.
- **Wall Length**  
Blocks may have to be cut to achieve the desired finished wall length. Measure the length required for the partial block and cut with a masonry saw or split with a bolster and club hammer. Always use gloves and safety goggles when cutting blocks.

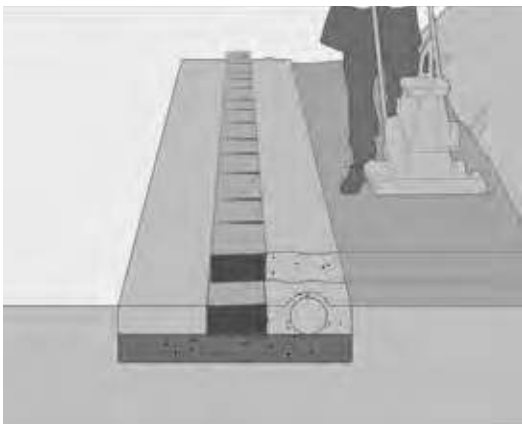
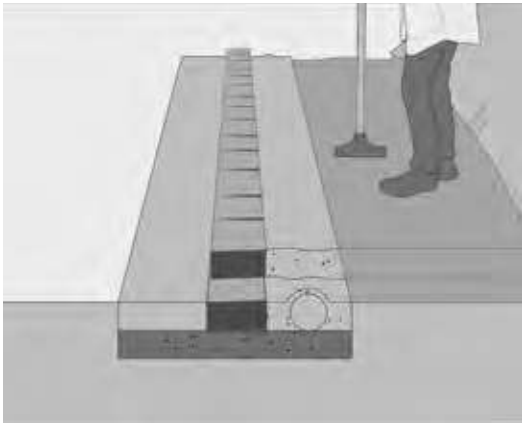


- **Important:** Do not build any higher than four courses before backfilling to avoid undue deformation of the wall. Fill the remaining space behind the drainage aggregate with soil. Fully compact the material using a plate compactor.
- **Important:** Do not compact the drainage aggregate. Continue building repeating the process of backfilling and compacting until you reach the required height (maximum retained height 880mm). Cover the top of the drainage column with soil.



**Step 6**  
**Backfilling**

- **If using a hand pummel to compact:**
  - **Backfill**  
When using a pummel, backfilling and compacting should be carried out every 2 courses (160mm). After the second course has been placed backfill the blocks with 10mm single size aggregate. It should be placed in a 125mm – 150mm wide column behind the wall and should extend up to a level two courses from the top of the finished wall. Fill the remaining space behind the drainage aggregate with soil. Fully compact the material using a pummel.  
**Important:** Do not compact the drainage aggregate. Continue building repeating the process of backfilling and compacting every two courses to reach the required height (maximum retained height 880mm). Cover the top of the drainage column with soil.
- **Or if using a plate compactor:**
  - Install the second, third and fourth courses. Place the blocks on top of the previous course ensuring the joints are staggered with the blocks below. Vertical joints should not directly line up between courses. Push the blocks forward until the nib on the bottom of the block tightly locates against the blocks beneath. Use a spirit level to ensure the blocks are level as you build each course.
  - **Backfill**  
After the fourth course has been placed backfill the blocks with 10mm single size aggregate. Backfilling should be done every 4 courses ( 360mm). It should be placed in a 125mm -150mm wide column behind the wall and should finish two courses from the top of the finished wall.



**Step 7**  
**Installing the copings**

- To install the copings use a concrete exterior grade construction adhesive applied with a cartridge gun. Ensure the adhesive is generously applied to the block to the front and rear. For extra stability the last two courses of blocks can be bonded together as well as the coping blocks.
- Secura Lite copings are tapered therefore on a straight wall the copings should be installed alternatively.
- See page 103 for installing copings on curves.





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# Technical Guidance



# Design Criteria

Important

STRUCTURAL DESIGN

The design of any retaining wall requires the input of an engineer to assess the unique conditions of every site in respect of loads in conjunction with site and soil conditions. The advice and typical wall designs in this guide are for information only to assist estimating and initial planning but should not be used for construction.

DRAINAGE DESIGN

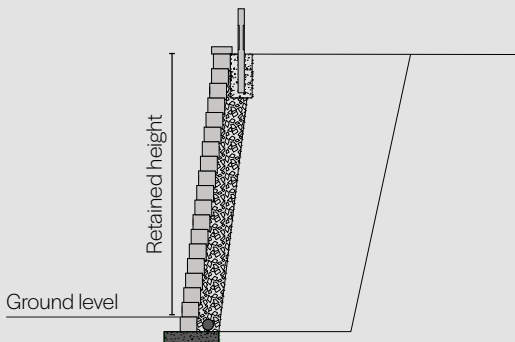
Retaining walls should be protected against additional loads created by the weight of accumulated water. Each Secura installation method includes a drainage element however professional advice should be sought to assess the water management of the extended site to include grading designs to protect the wall against elevated water flows such as natural watercourses or constructed runoffs from car parks, roads etc.

Site assessment

A qualified engineer will provide effective site assessment with the potential to identify the most efficient wall placement. Significant enhancements can be made to reduce the amount of excavation, avoid unnecessary complications and ensure safe solutions. A professional assessment will assess the impact of soil conditions and slopes at the crest and toe of the wall plus surcharges. A pre-build review of the construction site should also consider access to heavy machinery which must not be allowed to traffic within 1 metre of the back of the wall.

Wall height

Wall heights in this brochure are referred to as ‘Retained Height’, which is the distance from ground level to the top of the wall excluding any coping. Wall height is a critical factor in the design of the wall and backfill zones. Height specific wall drawings are contained within the installation section of this guide and in a FastFind drawing tool at [tobermore.co.uk/fastfind](http://tobermore.co.uk/fastfind). For details of wall heights in excess of 3.6m please contact us at [technical@tobermore.co.uk](mailto:technical@tobermore.co.uk).



**Note:** Retained height does not include the base course which is below ground. When quantifying for ordering or pricing please ensure you include the base course blocks.

Slopes

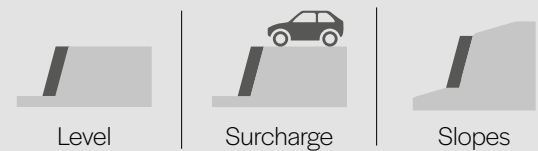
The presence of slopes either at the crest (the top) or at the toe (in front) of a wall must be factored into the wall design.

Surcharges

A surcharge is an additional load at the crest of the wall and is commonly caused by roadways, car parking or separate built structures. These must be evaluated by an engineer and factored into the wall design.

Our typical drawings in this guide show:

- Flat crest configuration without vehicles – 2.5 KPa
- Flat crest configuration with vehicles – 5KPa
- 1:3 slope, no vehicles



Soil types

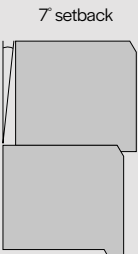
The soil type will also be a significant factor as it affects the friction angle and the stability of the overall mass to be retained. Soil conditions may also affect the levelling pad detailing. The compacting of soils and backfills is a critical factor in the retaining wall build process. Clay soils are typically the most mobile and require more reinforcement of the wall than mixed, glacial or gravel soils.

Materials

Please refer to the detailed specification of materials on page 116 for installation including granular materials, concrete, geogrid, pipes, geotextiles and geocomposites. It is best practice to secure adequate supplies of the correct materials prior to commencement on-site.

Secura Grand Setback

Secura Grand retaining wall blocks set backwards by 25mm on each course, this creates a setback angle of 7.12 degrees.



Wall selection

Secura retaining walls can be installed in several ways subject to height restrictions and the available space for the backfill zone. Professional design support can advise on the most efficient installation method for each individual project.

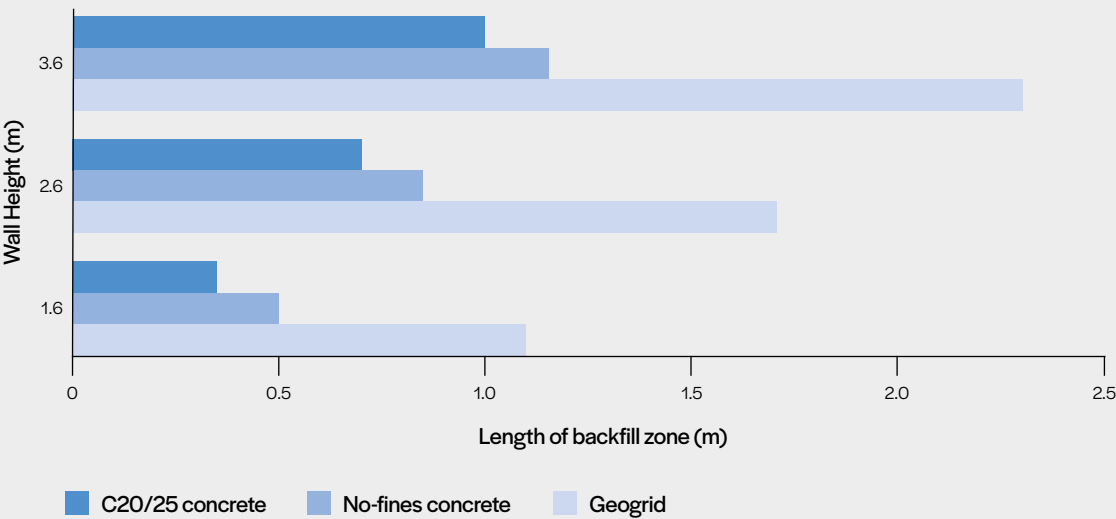
Health and safety

Details of typical fall protection are shown on page 120 however it is the contractors’ responsibility to carry out and action appropriate risk assessments to meet statutory requirements at each stage of the build process.

Example

The chart below shows the comparative distance required behind the Secura wall in different installation methods based on a flat crest with no vehicles.

- 3.6m high reinforced geogrid wall requires 2.3m excavation space
- 3.6m high no-fines concrete backfilled wall requires 1.15m excavation space and this can be reduced further to 1.0m if structural concrete C20/25 is used.





# Material Specifications

**LEVELLING PADS**

A minimum 200mm deep bed of well graded compactable granular material.

**Recommended Specification – Type 1**

- MOT Type 1 also known as DOT Type 1 named after the Department of Transport (DOT) specification for granular sub-base material.
- Must comply with the Department of Transport Specification for Highway Works, clause 803 (SHW 803). MOT Type 1 can be made from granite, limestone or clean crushed concrete.

The product is crushed to 40mm down to dust creating an aggregate containing a range of particle sizes that is easy to compact with excellent load bearing qualities.

Or

A minimum 200mm deep levelling pad of structural concrete.

**Recommended Specification – Type C20/25**

Strength class	20/25
Cylinder strength (MPa)	20
Cube strength (MPa)	25
Modulus of elasticity (GPa)	30
Tensile strength (MPa)	2.2

**DRAINAGE AGGREGATE**

- 10mm single sized drainage aggregate.
- Do not compact, to ensure a free draining path to drainage pipe at base of wall.

**GEOGRID MATERIAL**

- Tobermore recommend using Heusker Fortrac Geogrid.
- Geogrid must be installed perpendicular to the wall, rolled out in the direction of the principal reinforcement.

**BACKFILL AGGREGATE**

A well graded granular compactable material.

**Recommended specification – Class 6I**

Grading for 6I backfill as taken from BS Earthworks document series 600.

Sleeve size	Grading
125mm	100
75mm	85-100
14mm	25-100
2mm	15-100
600 microns	9-100
63 microns	<15

- Maximum of 15% clay permitted.
- Material must be machine compacted in lifts of 200mm maximum

**SITE WON MATERIALS**

Site won fill can only be used if tested to ensure compliance with Class 6I grading specification.

**NO-FINES CONCRETE BACKFILL**

**Typical Specification for no-fines concrete.**

Material	No-fines concrete
Use	Backfill to retaining wall
Stone to Cement ratio (by weight)	6:1 to 7:1
Unit Weight (kN/m3)	18.0
Aggregate size	Clean crushed stone typically 14-20mm
Water to cement ratio*	1:2

- \*Water/cement ratio is a guide value only and should be assessed on site to ensure the correct consistency, avoiding an overly wet mix.
- The optimum mix will facilitate the poking of no-fines backfill into the voids in and behind the Secura Grand facing blocks to create a monolithic structure.
- The no-fines concrete backfill must not be placed in greater than 800mm vertical lifts per day to avoid destabilising the blocks while the concrete hardens.

**C20/25 STRUCTURAL CONCRETE BACKFILL**

**Recommended Specification – Type C20/25**

Strength class	20/25
Cylinder strength (MPa)	20
Cube strength (MPa)	25
Modulus of elasticity (GPa)	30
Tensile strength (MPa)	2.2

- The C20/25 concrete backfill must not be placed in greater than 800mm vertical lifts per day to avoid destabilising the blocks while the concrete hardens.

**DRAINAGE PIPES**

A 150mm perforated drainage pipe should be wrapped in geotextile to prevent blockages.

**FENCE/BARRIER INSTALLATIONS**

Posts to be installed in pre-positioned 300mm diameter. PVC pipe sleeves and fully filled with C20/25 structural concrete following completion of the wall structure.

Post depths are determined based on the individual project conditions.

**COPING ADHESIVE**

Secura Copings to be secured with a generous application of exterior grade construction adhesive to the top of the Secura blocks.

**MOUNTING LOAD BEARING FIXTURES**

If load bearing fixtures such as hand rails are to be fitted then these should be identified at the planning stage and the block voids should be filled with C20/25 concrete at the appropriate sections of wall. This is to ensure the maximum anchorage for the fixings in the event that they penetrate the block voids.

**CUTTING BLOCKS**

The use of a water suppressed masonry saw is recommended to reduce the risk of staining. Please observe regulations with regards to the use of PPE.



# On-site Safety & Maintenance

### Wall Design

The design of any retaining wall requires the input of an engineer to assess the unique conditions of every site in respect of loads in conjunction with site and soil conditions. Correct site assessment and appropriate wall designs are the essential prerequisites to safety during construction.

### Risk Assessments

It is the responsibility of the contractor to ensure that a full site-specific Health & Safety risk assessment has been carried out prior to construction.

Adequate fall protection should be constructed to provide a safe working at height environment for all employees in compliance with current legislation. Please ensure compliance with the latest construction Health & Safety regulations. There are specialist companies who can provide fall protection solutions.

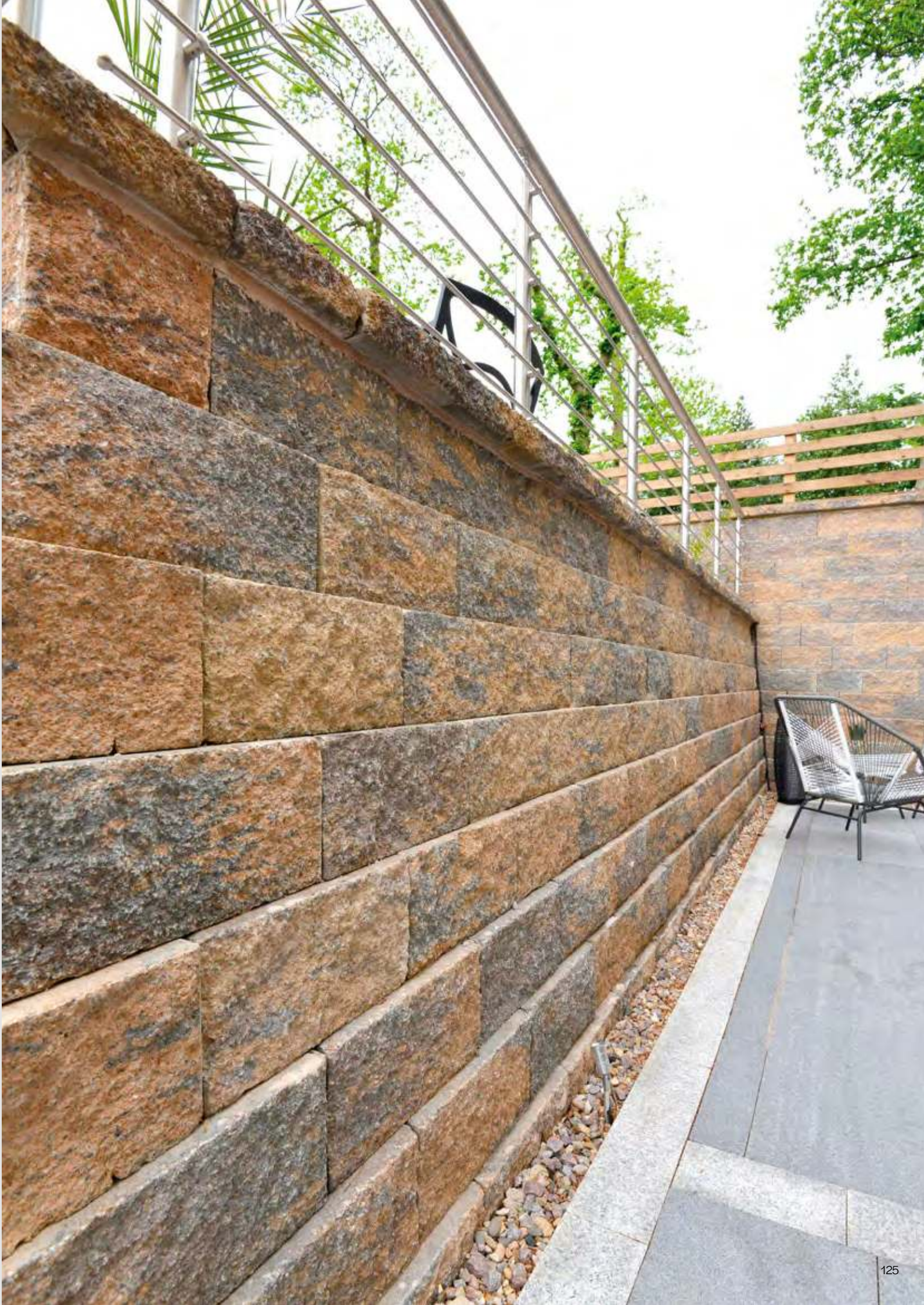
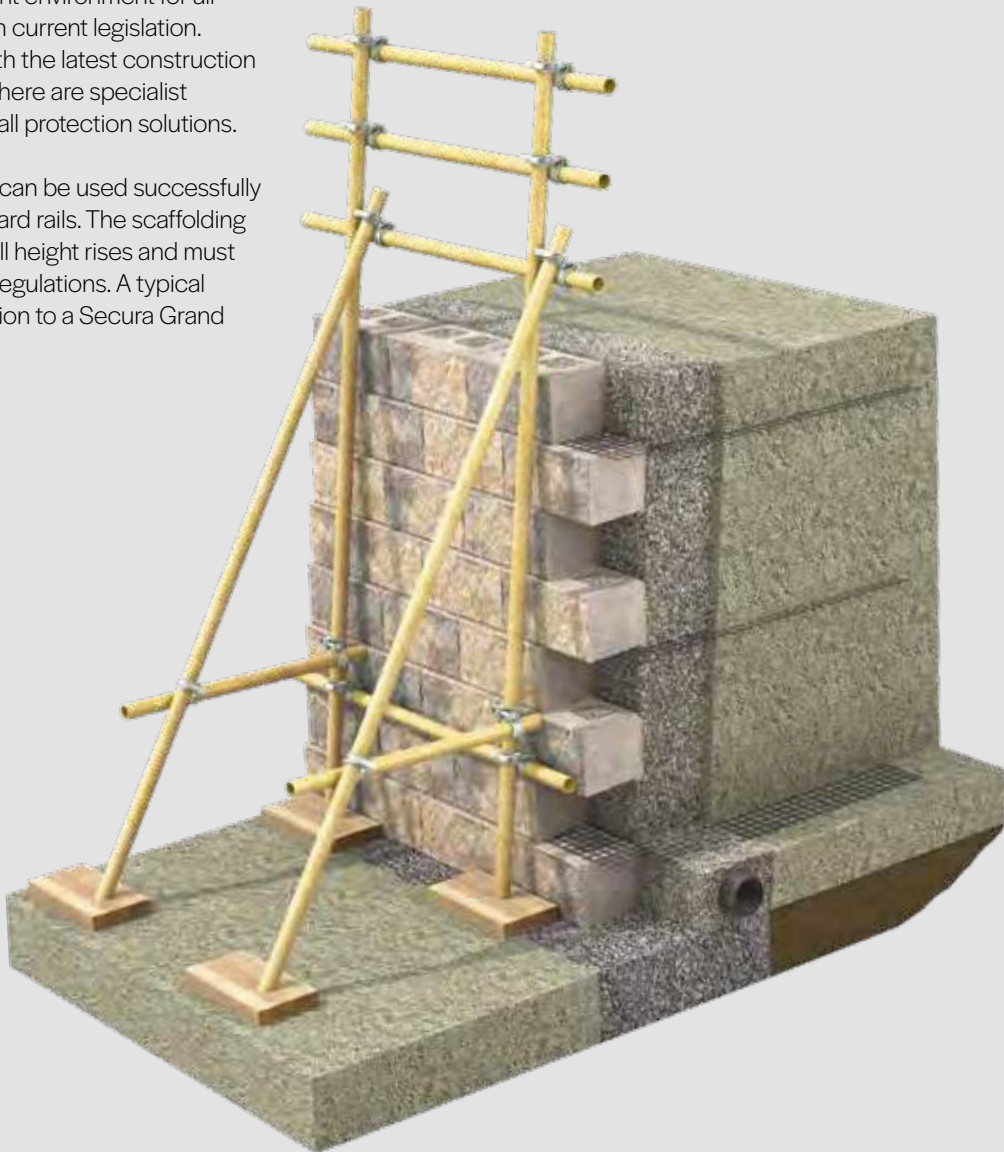
In our experience scaffolding can be used successfully to construct fall protection guard rails. The scaffolding and rails should rise as the wall height rises and must comply with Health & Safety regulations. A typical restraint is shown here in relation to a Secura Grand retaining wall.

### Cutting Blocks

The use of a water suppressed masonry saw is recommended to reduce the risk of staining. Please observe regulations with regards to the use of PPE.

### Maintenance

Secura segmental retaining walls require very little maintenance. However, where any specific requirements have been set out in the project engineers wall design, these should be adhered to.





# Instructions & Warnings

## As referred to in Tobermore’s Conditions of Sale

### CORE TERMS (PAVING & WALLING)

#### Product

All products should be carefully inspected for defects or damage upon delivery and prior to being laid or fitted.

#### Product Information

Within Tobermore, design and development of products is a continuing process, and product information is subject to change without notice. Accordingly, please check with Tobermore to ensure that the product information you have represents the most up-to-date product information.

#### Delivery

Tobermore will ship your products as soon as they are ready, due to yard storage restrictions all products must be delivered within 28 days of the material being ready for delivery.

#### Prior to installation

It is good practice to sort products to ensure consistency of colour, texture and dimensional tolerance. Any defects must be reported without delay. If products are installed with any form of defect which was clearly apparent prior to installation the installer will be responsible for all costs incurred to rectify the issue.

#### Installation

All products should be installed in accordance with the latest British Standard.

#### Colour & Texture

Tobermore produces paving and walling products with excellent density and durability. All products are manufactured in batches using naturally extracted raw materials including aggregates, pigments and cement etc. Products such Braemar, Sienna, Fusion, Mayfair Flags, Manhattan, City Pave and Fusion Kerbs are manufactured using premium naturally occurring granite aggregates. To achieve their final appearance some products undergo secondary processes, this involves shot blasting or grinding the surface of the product.

Whilst we have several factory procedures in place to help control shade, colour and texture within and between batches we cannot guarantee consistency. This is due to the natural materials and secondary processes. Therefore, slight variations in the finished products is normal between and within batches. These variations actually enhance the character and natural beauty of the products. Taking delivery of orders within 28 days can reduce the likelihood of variations.

To achieve the best possible finish we recommend the following advice is followed to evenly distribute any slight variations in shade, colour and texture over a large area. When the circumstances allow complete one area of paving, one retaining wall or one house / building by using products taken from the same batch. This is achieved by checking the batch code label displayed on the packs.

Always, thoroughly mix products from a minimum of three packs.

Where products are supplied in packs with vertical slices always take them “vertically slice by slice” this ensures that colours are distributed evenly.

When the circumstances do not allow the use of products from the same batch then it is extremely important to minimise possible colour banding/ shading by always, thoroughly mixing products from a minimum of three packs concurrently with some overlap between deliveries / batches.

Mixing thoroughly from a minimum of three packs is of particular importance when installing single colours such as Golden, Buff, Natural, Charcoal, Graphite, Silver, Mid-Grey, Sandstone, Alto Silver, Aaron Stone, Jura Grey and Innis Black.

We would always recommend that when purchasing products, especially in larger quantities, that they are all ordered at the same time.

Please note that the colour of new products will inevitably vary compared to those that have been installed for a period of time as weathering does take place.

All colour illustrations are as accurate as the printing process will allow. For a more accurate colour match please refer to actual product samples, which can be provided.

Colours and textures illustrated are representations and therefore should not be expected to be an exact match.

Note: Whilst we strive to ensure consistency, complimentary products such as Kerb Specials, Step Flags, Facing Brick Specials, Historic Circles etc. may not be an exact colour / texture or shade match to the standard version of the product as they will have been manufactured at varying times using different processes.

### CORE TERMS (PAVING & WALLING)

#### Tegula

Tegula is manufactured using a secondary process that distresses the edges and corners of the blocks to give the desired aged antique appearance. The process randomly distresses the blocks, therefore some blocks will be more distressed than others will, this is completely normal and does not affect the product performance.

#### Staining

Some chemicals that are commonly used in gardens such as lawn feed containing Ferrous Sulphate can stain concrete products. Any chemicals that are spilt must be removed immediately by rinsing away with clean water. Please check the information on the instruction label of the container holding the chemical.

#### Moisture

Occasionally, after installation, some units may show variations in shade and have a patchy appearance. This is due to the varying amounts of moisture within the concrete and the ground. The drying out process of concrete continues in-situ after installation. Some units may also retain more moisture than neighbouring units and take longer to dry out. This is caused by the variations in density of the naturally extracted aggregates used in the manufacturing process. Given time and natural weathering, the capillaries within the surface of the concrete will gradually close and any patches or moisture retention will dissipate as the product matures. This does not affect long-term performance..

#### Efflorescence

Efflorescence is a crystalline deposit that occurs naturally on the surface of concrete materials. It usually appears as white deposit but can also be brown or yellow in appearance. Tobermore use market-leading technology to significantly suppress the occurrence of efflorescence, however, if it occurs, it may mask the colour of the product for a period of time, but tends to be washed away gradually by rain. Tobermore do not replace products with efflorescence. Packs of products which have had packaging removed should always be re-covered with appropriate packaging to prevent the occurrence of secondary efflorescence.

#### Surface Scratches

Minor scuffs or bruises may occur during delivery, movement onsite, and installation (for example, during any plate vibrating process). In Tobermore’s experience, these marks usually weather off through time. To reduce the risk of surface scratches we strongly recommend the use of a vibrating plate with a rubber protective mat.

#### Ordering

To avoid waste, please ensure that your contractor accurately measures the area on site before ordering products. In Tobermore’s experience, dimensions taken from a project plan can vary significantly from the final layout. Depending on the layout of the project, we recommend ordering an additional 2 - 5% of material to allow for cutting, detailing and wastage.

#### Manufacturing & Quality Systems

Tobermore is a BS EN ISO 9001, BS EN ISO 14001 and BES 6001 registered company. Tobermore uses an integrated management system to manage all health & safety and environmental issues.

#### Product Maintenance

Routine cleaning and maintenance is required to keep the overall appearance of products in pristine condition. All concrete products can develop algae, lichen, and moss growths due to environmental conditions and may require cleaning. Areas adjacent to plant borders and trees may discolour from transfer of plant-life. Tobermore cannot accept responsibility for any of these conditions.

#### Queries & Complaints

Please contact one of Tobermore’s Paving & Walling Centres or offices (contact details at [www.tobermore.co.uk](http://www.tobermore.co.uk)) with any queries or complaints. Any complaints must be notified to Tobermore without delay.

### FOR SECURA PRODUCTS

#### Installation

All Secura products should be installed in accordance with the latest relevant British or European Standards. When constructing a retaining wall, ensure that you follow the design provided by the scheme engineer.











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