

INSTALLATION GUIDELINES

Secura Grand



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.

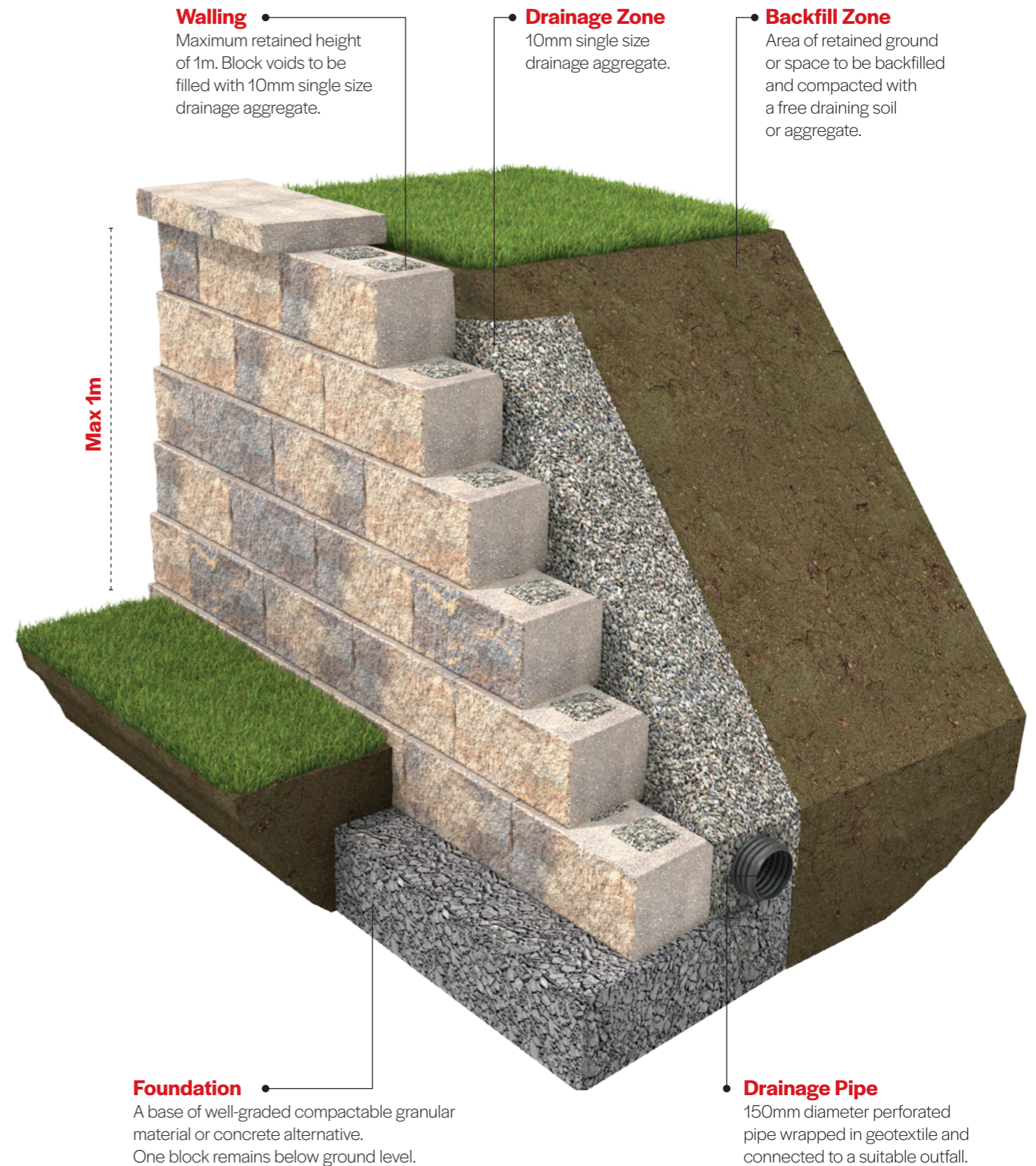
Secura Grand can be constructed as a gravity wall to a maximum retained height of 1m in situations where there is no crest or toe slope and no surcharge above the wall. The simplicity of the Secura Grand Gravity mortarless build technique makes it highly efficient for low walls.

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 foundation, the Secura Grand gravity wall remains completely mortarless.

Secura Grand Gravity 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 20 prior to commencement of any site works.

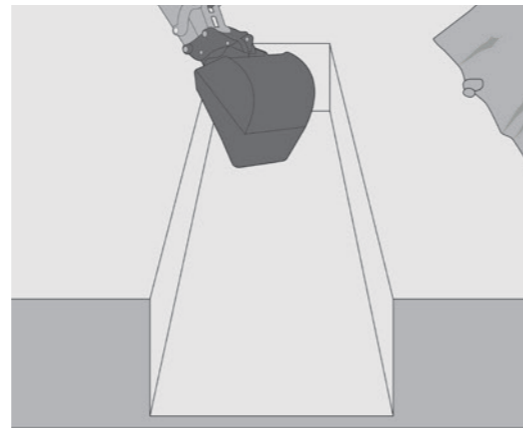
BATCH ORDERING
Important: If using a solid colour (Charcoal, Natural or Golden) please ensure you order from one manufacturing batch to avoid any colour shading which may occur.

FILL MATERIALS
Important: Please ensure that the specified fill materials (see page 18) 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.

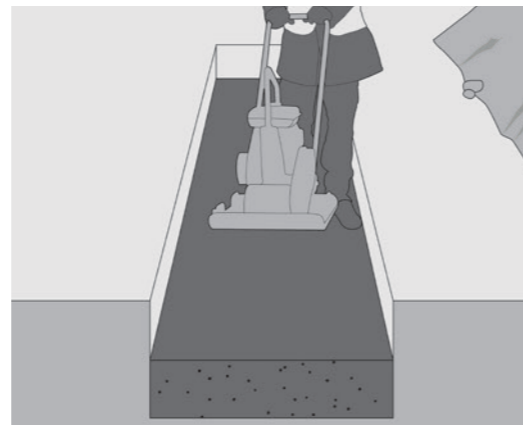
Step 1
Setting out & trench excavation

- 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 foundation 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 18. Ensure it is fully compacted using a plate compactor.



Step 2
Laying the foundation

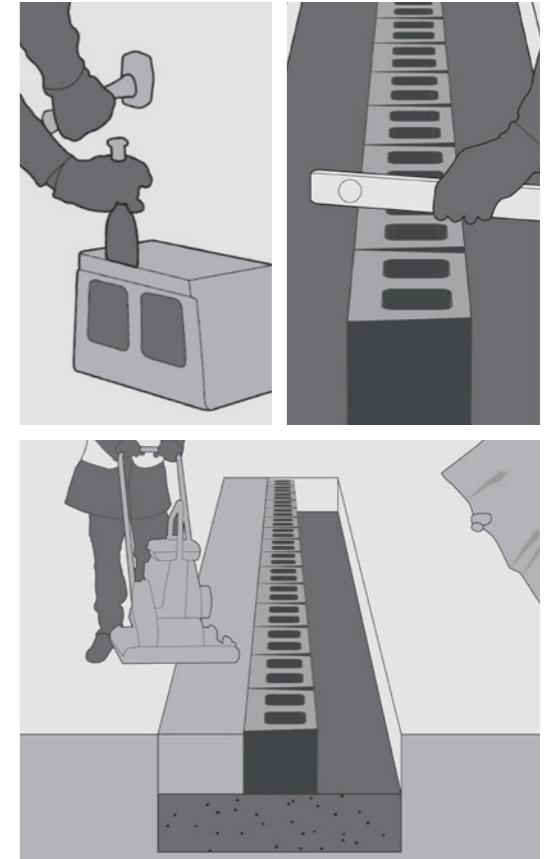
- **Important:** If the line of the wall is on a gradient, the foundation must be stepped. The top of the foundation must be at least 200mm below finished ground level. Lay a level foundation using one of the following two options:
1. **Granular material option:** Lay a well-graded compactable granular material as specified on page 18 and compact fully using a plate compactor to ensure a level base. The typical depth of the foundation should be 200mm after compaction.
 2. **Concrete option:** Install a 200mm deep concrete foundation using C20/25 concrete.



| Product | Min. internal radius | Max. external radius | Typical trench width (mm) | Typical trench depth (mm) | Foundation material | Typical foundation depth (mm) | Block courses below ground |
|--------------|--|---|---------------------------|--|--|-------------------------------|---|
| Secura Grand | 2.4m to the back of the base course block or 2.17m to the front. | This will be dependent on the height of the wall. Please refer to page 86 of our Secura brochure. | 600 mm | 400mm to accommodate one block plus foundation depth | Well-graded compactable material or C20/25 | 200 mm | 1 (unless specified differently on the design drawings) |

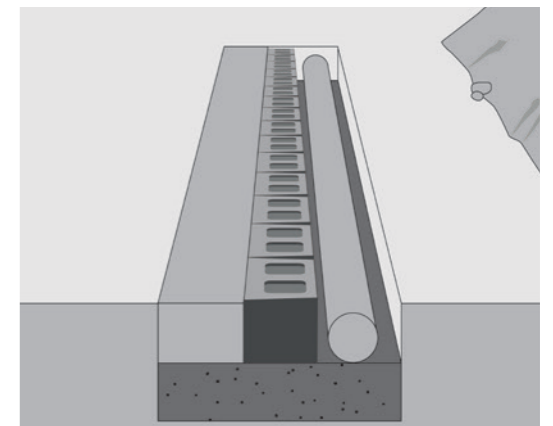
Step 3
Installing the base course

- **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 foundation 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

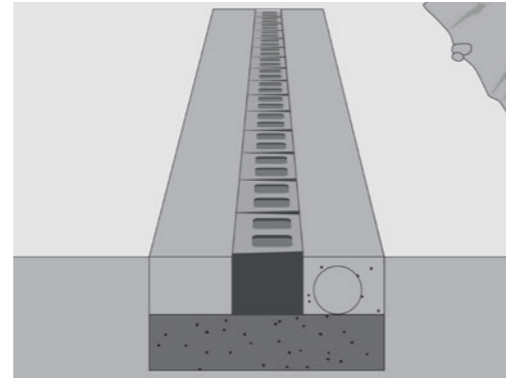
- **Drainage Pipe**
 Lay a perforated drainage pipe centred on a line 150mm from the back of the base course. The pipe should connect to a suitable outlet/soakaway. The pipe can be wrapped in a geotextile to prevent clogging.
- **Fill the Block Voids**
 Completely fill the two voids in each block with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



Secura Grand Gravity Wall Installation

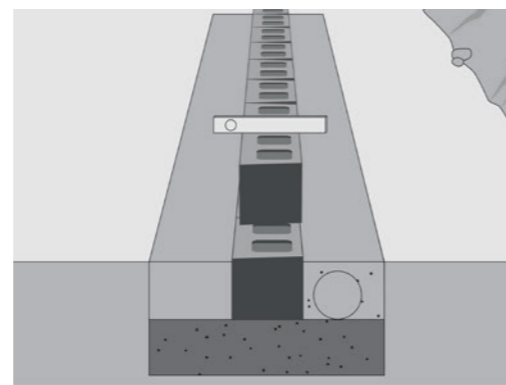
Step 5 Backfill the drainage material

- 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.



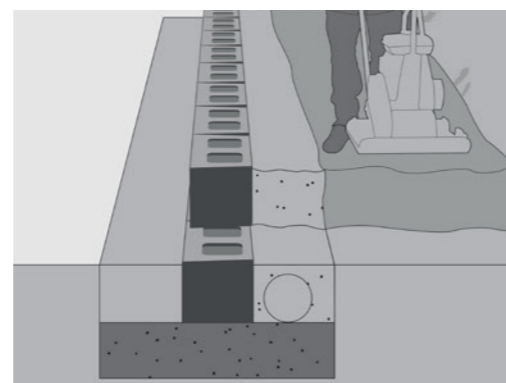
Step 6 Laying further block courses

- 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.



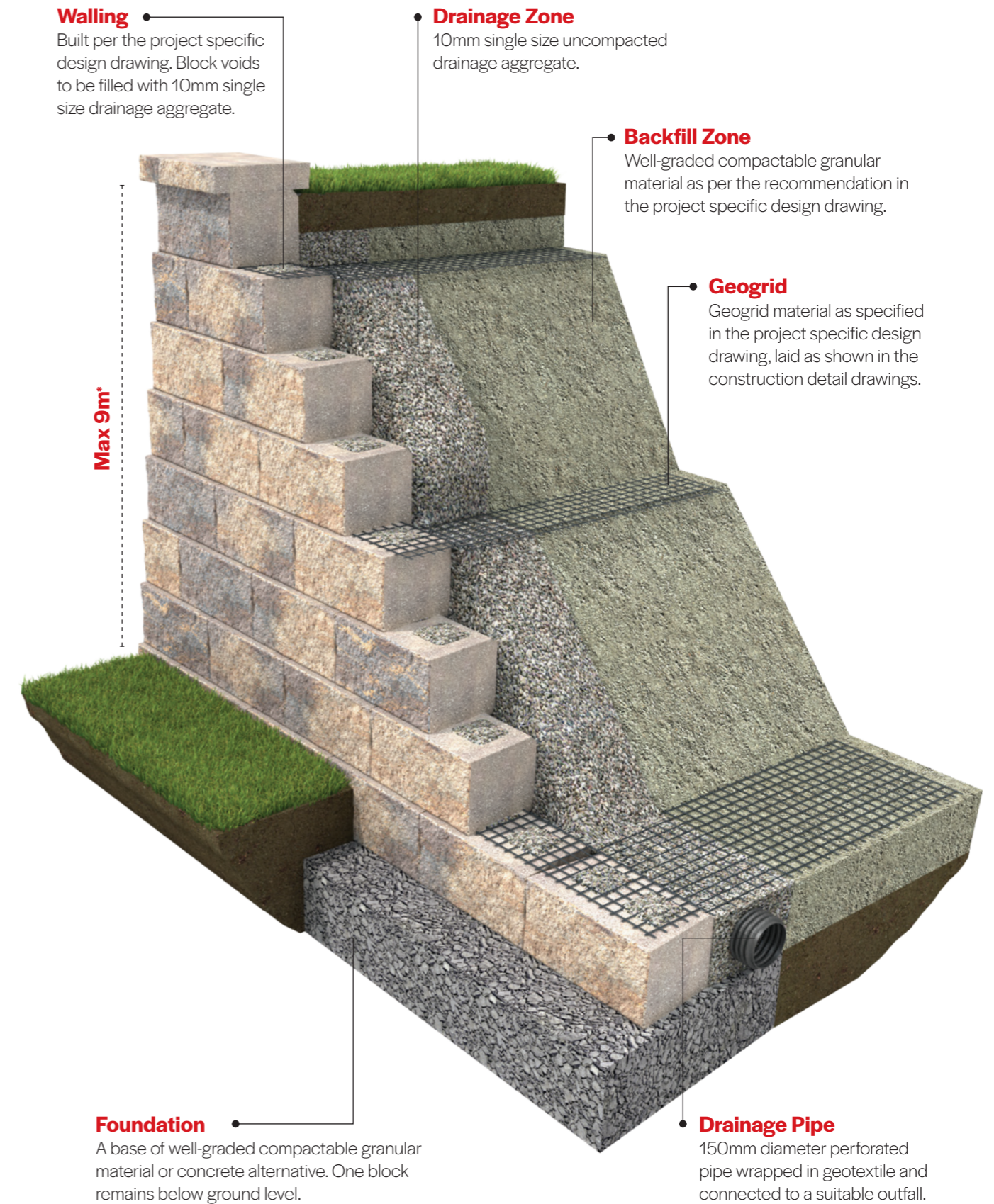
Step 7 Backfilling the area behind the drainage zone

- 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.



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

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.

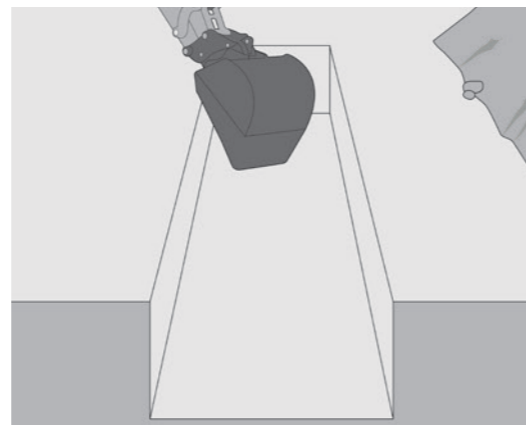
WORKING SAFELY
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BATCH ORDERING
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FILL MATERIALS
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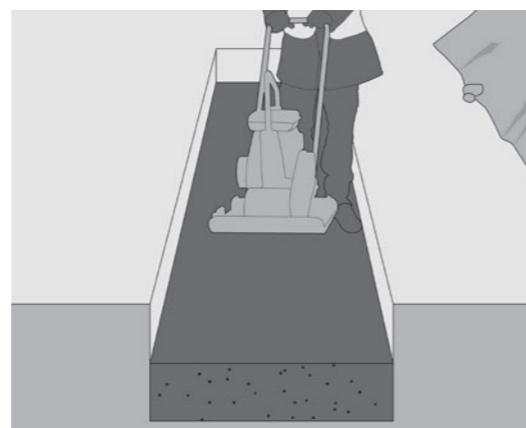
Step 1
Setting out & trench excavation

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- Please refer to the table below for typical foundation 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 18. Ensure it is fully compacted using a plate compactor.



Step 2
Laying the foundation

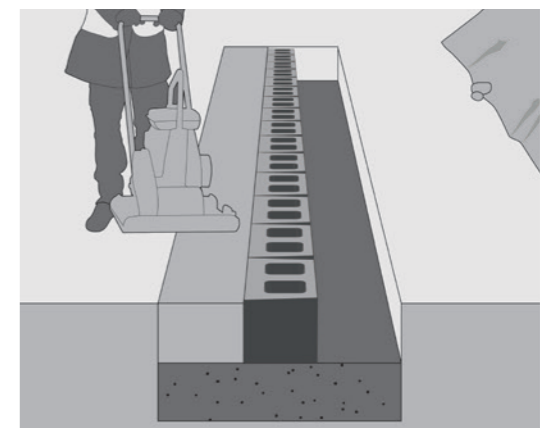
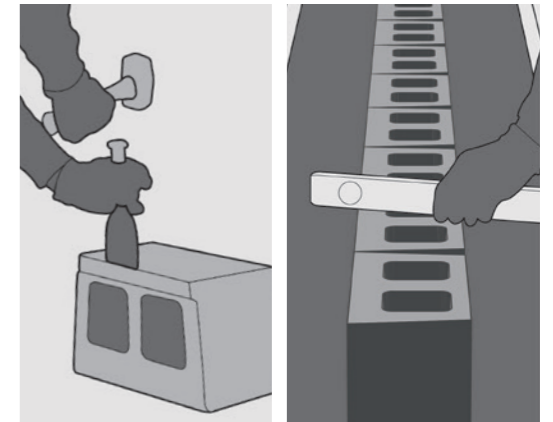
- Important:** If the line of the wall is on a gradient, the foundation must be stepped. The top of the foundation must be at least 200mm below finished ground level. Lay a level foundation using one of the following two options:
 - Granular material option:** Lay a well-graded compactable granular material as specified on page 18 and compact fully using a plate compactor to ensure a level base. The typical depth of the foundation should be 200mm after compaction.
 - Concrete option:** Install a 200mm deep concrete foundation using C20/25 concrete.



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| Secura Grand | 2.4m to the back of the base course block or 2.17m to the front. | This will be dependent on the height of the wall. Please refer to page 86 of our Secura brochure. | 600 mm | 400mm to accommodate one block plus foundation depth | Well-graded compactable material or C20/25 | 200 mm | 1 (unless specified differently on the design drawings) |

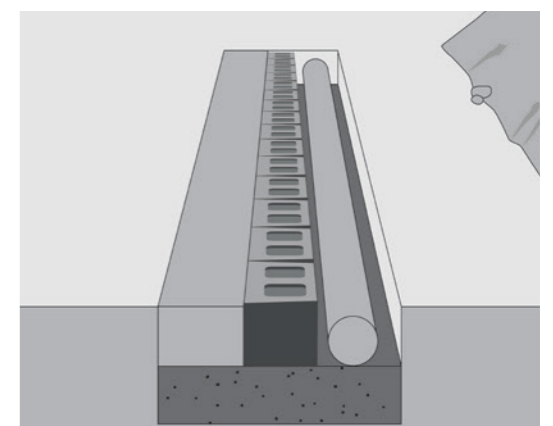
Step 3
Installing the base course

- 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 foundation 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

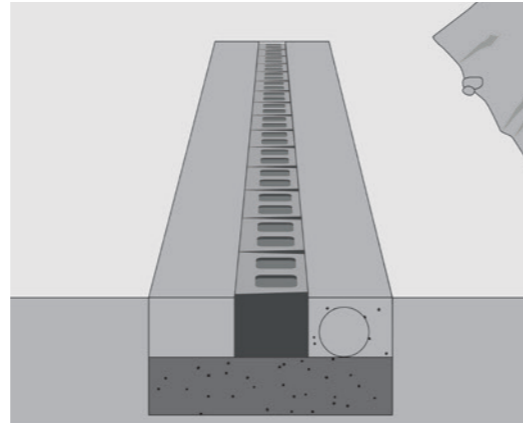
- Drainage Pipe:** Lay a perforated drainage pipe centred on a line 150mm from the back of the base course. The pipe should connect to a suitable outlet/soakaway. The pipe can be wrapped in a geotextile to prevent clogging.
- Fill the Block Voids:** Completely fill the two voids in each block with 10mm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



Secura Grand Geogrid Reinforced Wall Installation

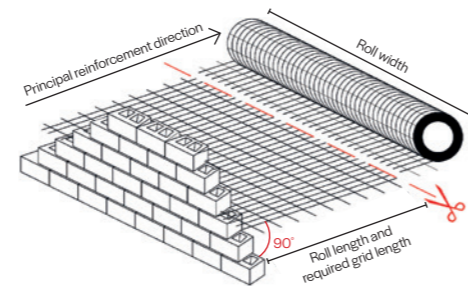
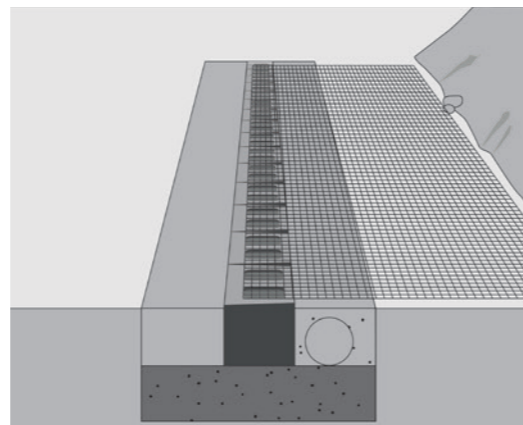
Step 5 Backfill the drainage material

- 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 of our Secura brochure and the correct height specific design drawing).
For walls which do not need to meet BBA HAPAS standards Tobermore recommend using high quality geogrids such as Tensar, Wrekin and Heusker Fortrac etc.
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.

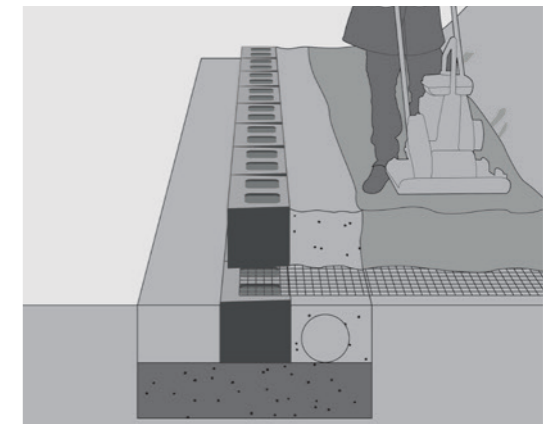
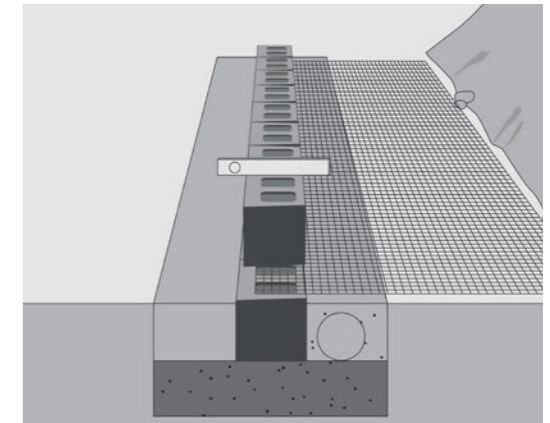


Step 7 Backfilling the reinforced zone

- 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 18.
- 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 18, 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.

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 for 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 asphalt shingles are suitable to be used as shims. The maximum allowable shim thickness per course is 3 mm

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.

Suitability

Max retained height

| | |
|-------------------|---------------------|
| No-fines concrete | Structural concrete |
| 4m* | 6m* |

Level

Surcharge

Slopes

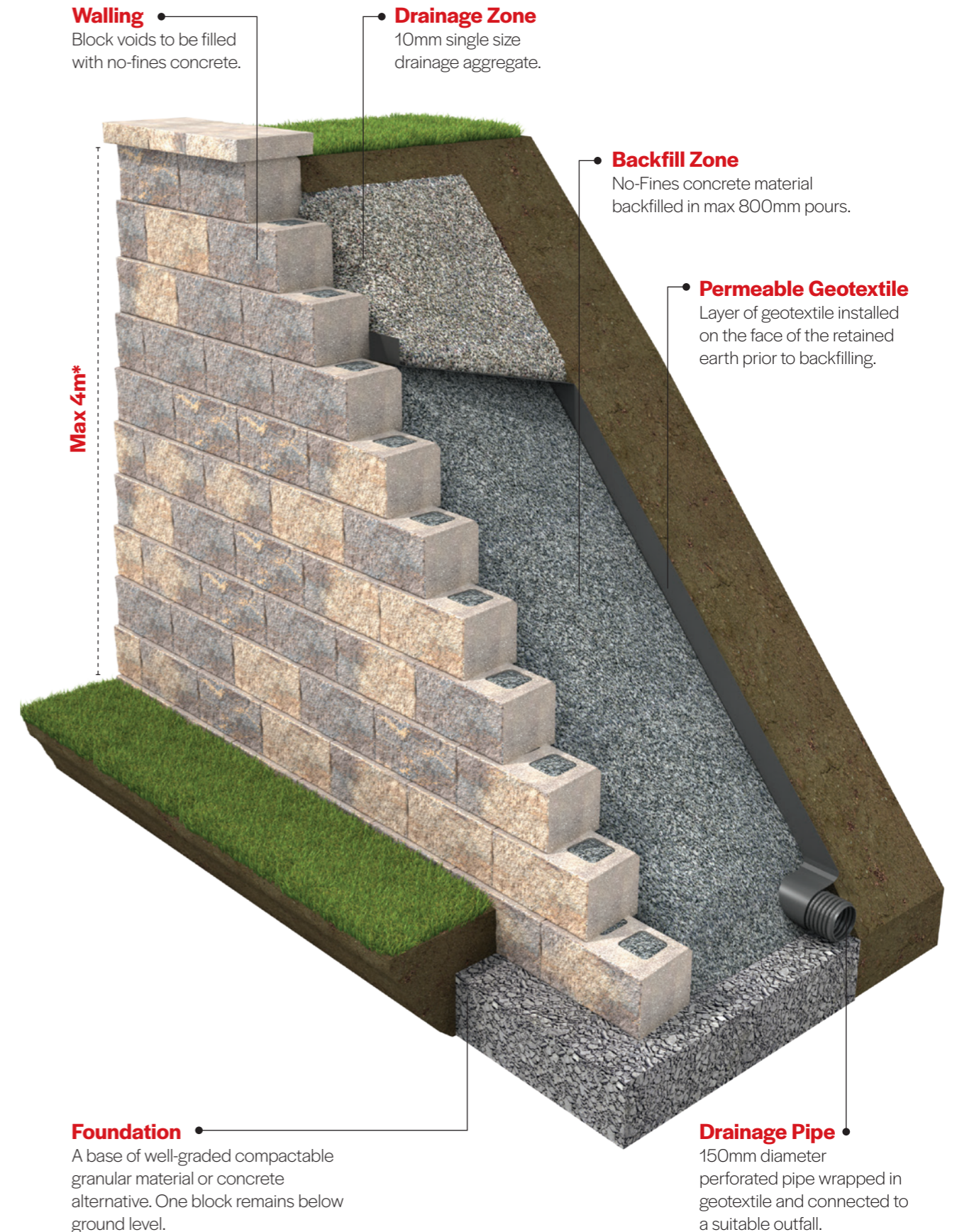


No-fines concrete

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

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.

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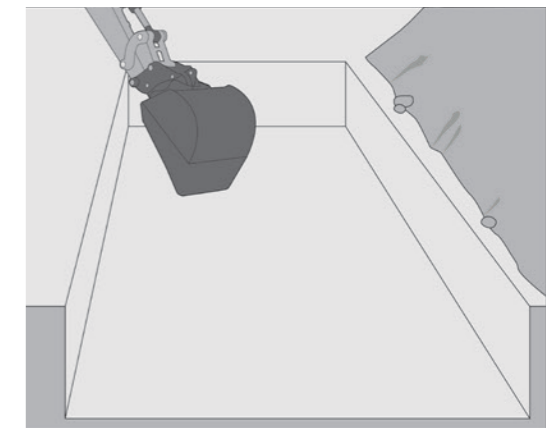
FILL MATERIALS

Important: Please ensure that the specified fill materials (see page 18) are available on site before commencement.

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 foundation 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 18. Ensure it is fully compacted using a plate compactor.

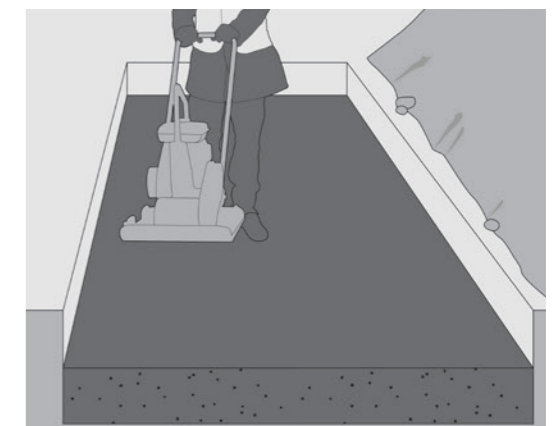


Step 2

Laying the foundation

Important: If the wall is on a slope the foundation must be stepped. The top of the foundation must be at least 200mm below finished ground level. Lay a level foundation using one of the following two options:

- Granular material option:** Lay a well-graded compactable granular material as specified on page 18 and compact fully using a plate compactor to ensure a level base. The typical depth of the foundation should be 200mm after compaction.
- Concrete option:** Install a 200mm deep concrete foundation using C20/25 concrete.

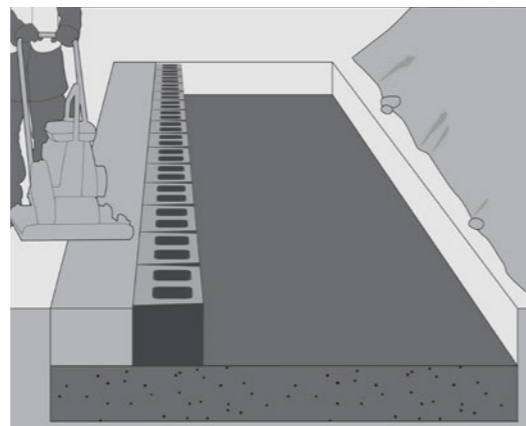
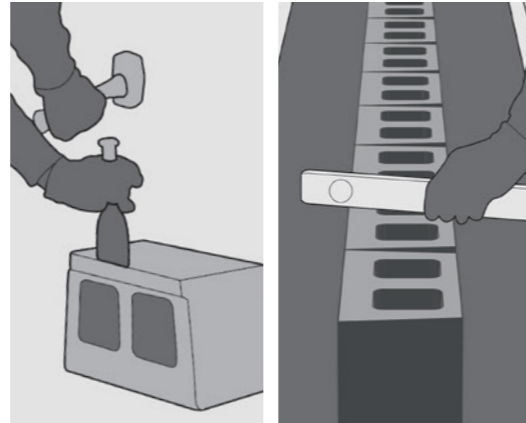


| Product | Min. internal radius | Max. external radius | Typical trench width (mm) | Typical trench depth (mm) | Foundation material | Typical foundation depth (mm) | Block courses below ground |
|---------------------------------------|--|---|---|--|--|-------------------------------|---|
| Secura Grand Concrete Backfill | 2.4m to the back of the base course block or 2.17m to the front. | This will be dependent on the height of the wall. Please refer to page 86 of our Secura brochure. | 400mm plus the width of the concrete backfill | 400mm to accommodate one block plus foundation depth | Well-graded compactable material or C20/25 | 200 mm | 1 (unless specified differently on the design drawings) |

Secura Grand Concrete Backfill Wall Installation

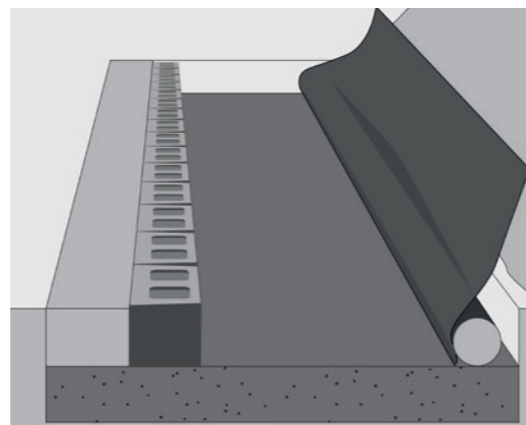
Step 3 Installing the base course

- **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 foundation 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

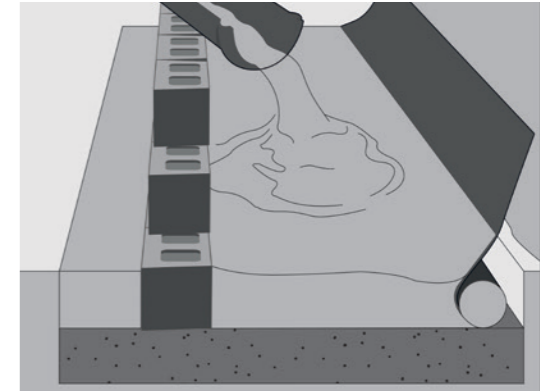
- A geotextile permeable membrane should be installed against the retained ground. Where C20/25 structural concrete is used, a geocomposite membrane must be used.
- **Drainage Pipe:** Lay a perforated drainage pipe at the outer edge of the concrete backfill area. The pipe should connect to a suitable 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

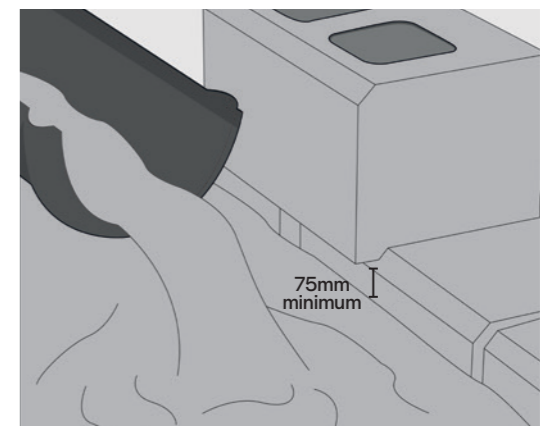
- **Important:** It is important that no more than four courses are constructed and backfilled at a time.
- Place the blocks on top of the base course ensuring that they are in running bond pattern in relation to the blocks on the base course. Vertical joints should not directly line up between courses.
- 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 18.
- 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/m ³) | 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.

Material Specifications

FOUNDATIONS

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 foundation 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

- Recommended Specification: Heusker/Fortrac 35/20 geogrid or equivalent. For BBA HAPAS certification Heusker/Fortrac 35/20 must be used.
- 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/m ³) | 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 pocking 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.

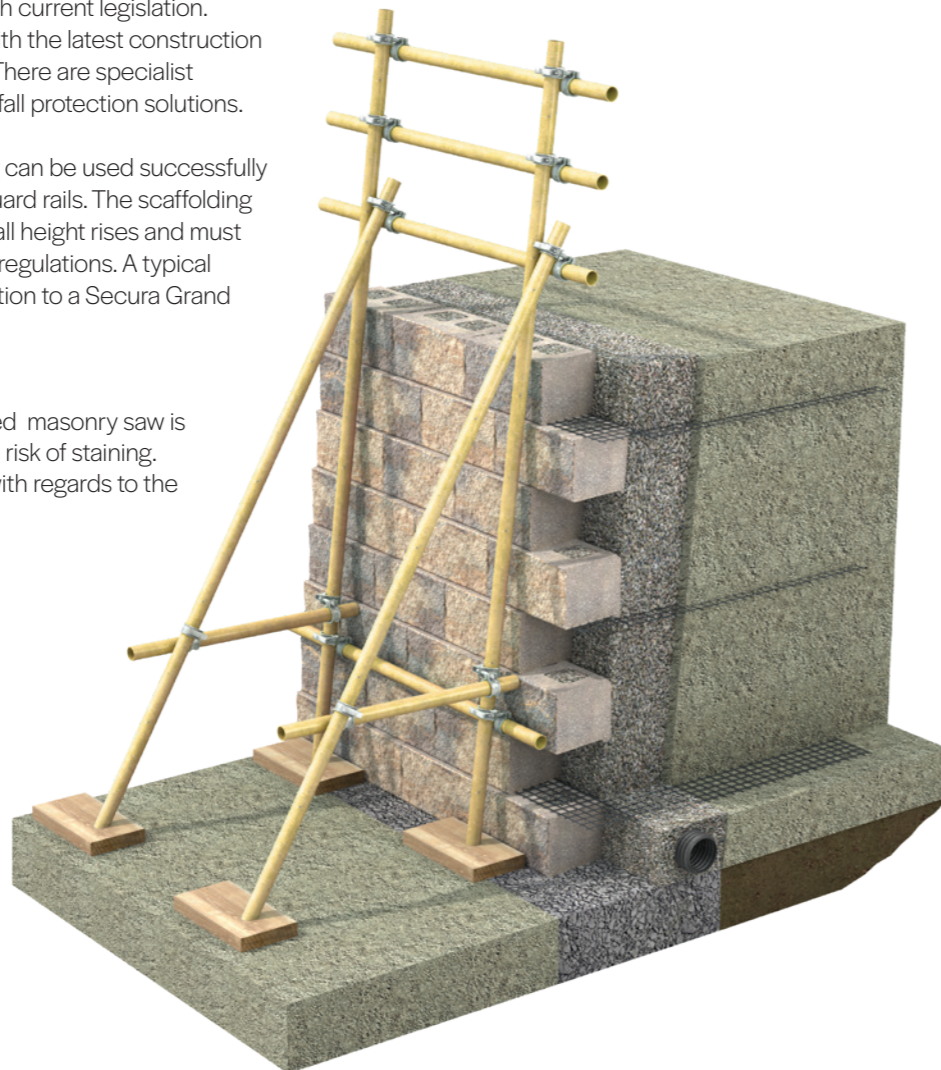
Cutting Blocks

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. Routine cleaning of the drainage pipe at the rear of the wall is important, to ensure free drainage.

As part of a site maintenance regime, routine inspections should ensure copings are soundly secured and any loose copings should be suitably re-fixed. Visual inspection for any movement in the wall should be included in the site maintenance regime.



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.

Prior to installation

It is good practice to sort products to ensure consistency of colour, texture and dimensional tolerance.

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. Products are manufactured using naturally occurring raw materials including aggregates, granite aggregates, pigments and sand. Although every effort is taken to ensure consistency, inevitably due to the presence of these naturally extracted raw materials variations in colour, shade and texture can occur. Therefore, colours and textures illustrated are representations and should not be expected to be an exact match.

Batch codes should be checked prior to installation to reduce the risk of product shading and ensure consistency of finish. When multiple packs are being installed in one area, please ensure you check that they are all from the same production batch. This can be done by checking the batch code label that is displayed on the packs. This is of particular importance when installing single colours such as Golden, Buff, Natural, Charcoal and Red. Tobermore therefore recommends that products are thoroughly mixed on site by drawing from a minimum of four pallets.

We would always recommend that when purchasing products, especially in larger quantities, that they are all ordered and manufactured in one batch to reduce the chances of colour / shade or texture variation.

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

All colour illustrations in Tobermore's brochures 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.

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.

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. Given time and natural

weathering, the capillaries within the surface of the concrete will gradually close and any patches will tone in with the surrounding area. This will not affect long-term performance.

Efflorescence

Efflorescence is a white crystalline deposit that occurs naturally on the surface of concrete materials. 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. (EasyClean products are protected with a glue dot)

To reduce the risk of surface scratches we strongly recommend the use of a vibrating plate with a rubber protective mat.

Ordering

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.

Laying multi-blend coloured paving blocks, flags and walling products

To achieve an even blend of colour when laying multi-blend paving blocks, flags and walling products, it is desirable to mix from 3 or 4 different pallets.

Queries & Complaints

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

FOR SECURA PRODUCTS

Installation - Secura

All Secura products should be installed in accordance with British Standard BS8002. When constructing a retaining wall, ensure that you follow the design provided by the scheme engineer.