

PIONEER RANGE

retaining walls installation guide



RETAINING WALL

information

The Austral Masonry concrete sleeper retaining wall system is an ideal choice for retaining walls in gardens, other residential applications and commercial projects. The simplicity of the systems designed and custom made components makes them easy to install for a range of applications. No matter what the project, the result is always an attractive and low maintenance retaining wall.

Note: Information contained in this installation guide is offered as general advice only. Please consult with regulating council for local design requirements prior to the commencement of any retaining wall and consult with a professional engineer prior to commencing any retaining wall project. Councils may request walls over 0.8m in height and / or where a surcharge exists (e.g. driveway, house, fence or other structure) be designed and certified by a suitably qualified engineer.

Specifications

Product	Range	Description	Max Wall Height	Size	Weight	Coverage
	Pioneer Smooth	Standard Unit	800 mm*	1200 L x 200 H x 75T mm	41 kg	4.17 Units per m ²
			3m with engineering	1530 L x 200 H x 75T mm	53 kg	3.27 Units per m ²
				2000 L x 200 H x 75T mm	67 kg	2.50 Units per m ²
	Pioneer Timberlook	Standard Unit	800 mm*	1580 L x 200 H x 75T mm	51 kg	3.16 Units per m ²
			3m with engineering	2000 L x 200 H x 75T mm	66 kg	2.50 Units per m ²
	Pioneer Sandstone	Standard Unit	800 mm*	1580 L x 200 H x 75T mm	58 kg	3.16 Units per m ²
			3m with engineering	2000 L x 200 H x 75T mm	72 kg	2.50 Units per m ²
	Pioneer Slate	Standard Unit	800 mm*	1580 L x 200 H x 75T mm	58 kg	3.16 Units per m ²
			3m with engineering			

Maximum wall heights in good soils (gravels, sandy gravels, crushed sandstone).



POSTS AND ACCESSORIES

Joiner Post with deformed bar

Size	Description
1.15m	Post Steel 100UC Galvanised for wall 0.4m
1.15m	Post Steel 100UC Galvanised for wall 0.6m
1.55m	Post Steel 100UC Galvanised for wall 0.8m
1.95m	Post Steel 100UC Galvanised for wall 1.0m
2.35m	Post Steel 100UC Galvanised for wall 1.2m
2.75m	Post Steel 100UC Galvanised for wall 1.4m
3.15m	Post Steel 100UC Galvanised for wall 1.6m
3.55m	Post Steel 100UC Galvanised for wall 1.8m
3.95m	Post Steel 100UC Galvanised for wall 2.0m
3.95m	Post Steel 150UC23.4 Galvanised for wall 2.0m
4.35m	Post Steel 150UC23.4 Galvanised for wall 2.2m
4.75m	Post Steel 150UC23.4 Galvanised for wall 2.4m
5.15m	Post Steel 150UC23.4 Galvanised for wall 2.6m
5.95m	Post Steel 150UC23.4 Galvanised for wall 3.0m

End Post

Size	Description
0.6m	Post Steel 100PFC Galvanised for wall 0.2m
0.8m	Post Steel 100PFC Galvanised for wall 0.4m
1.2m	Post Steel 100PFC Galvanised for wall 0.6m
1.6m	Post Steel 100PFC Galvanised for wall 0.8m
2.0m	Post Steel 100PFC Galvanised for wall 1.0m
2.4m	Post Steel 100PFC Galvanised for wall 1.2m
2.8m	Post Steel 100PFC Galvanised for wall 1.4m
3.0m	Post Steel 100PFC Galvanised for wall 1.6m
4.0m	Post Steel 100PFC Galvanised for wall 2.0m

Joiner Post

Size	Description
0.8m	Post Steel Full Length 100UC Galvanised for wall 0.4m
1.2m	Post Steel Full Length 100UC Galvanised for wall 0.6m
1.6m	Post Steel Full Length 100UC Galvanised for wall 0.8m
1.8m	Post Steel Full Length 100UC Galvanised for wall 1.0m
2.2m	Post Steel Full Length 100UC Galvanised for wall 1.2m
2.6m	Post Steel Full Length 100UC Galvanised for wall 1.4m
3.0m	Post Steel Full Length 100UC Galvanised for wall 1.6m
3.4m	Post Steel Full Length 100UC Galvanised for wall 1.8m
3.6m	Post Steel Full Length 100UC Galvanised for wall 2.0m
3.0m	Post Steel 150UC23.4 Galvanised for wall 1.6m
3.6m	Post Steel 150UC23.4 Galvanised for wall 2.0m
4.0m	Post Steel 150UC23.4 Galvanised for wall 2.2m
4.4m	Post Steel 150UC23.4 Galvanised for wall 2.4m
4.8m	Post Steel 150UC23.4 Galvanised for wall 2.6m

Fence Brackets and Accessories

Description
Large fence bracket 1200 x 65 x 10mm Galvanised
Offset Fence bracket 150UC 6mm Galvanised
Straight Fence Bracket 150UC 6mm Galvanised
Straight Fence Bracket 100UC 3mm Galvanised
Straight Fence Bracket 100UC 6mm Galvanised
Offset Fence Bracket 100UC 3mm Galvanised
Offset Fence Bracket 100UC 6mm Galvanised
Pioneer Plinth Grey 2.4m



Offset Fence Bracket



Straight Fence Bracket

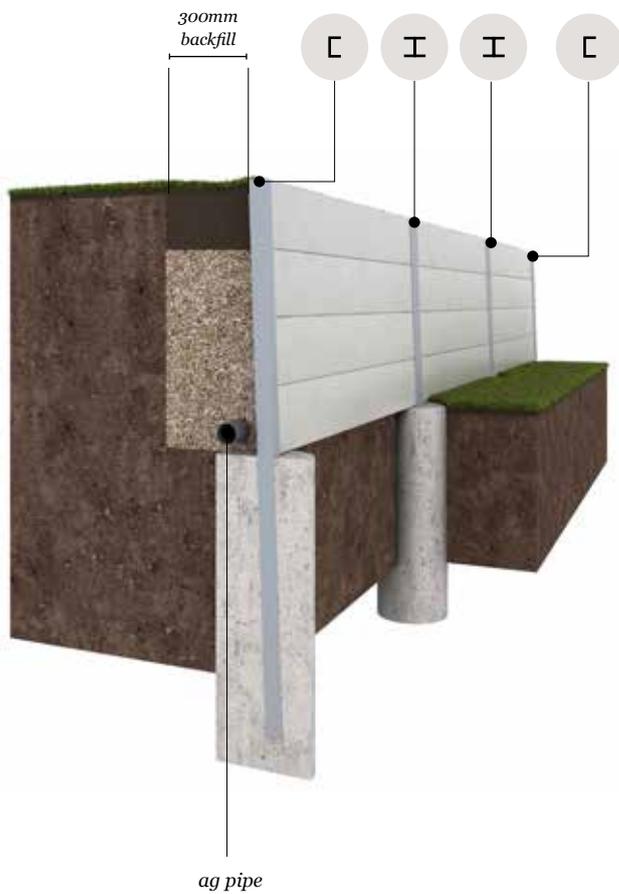
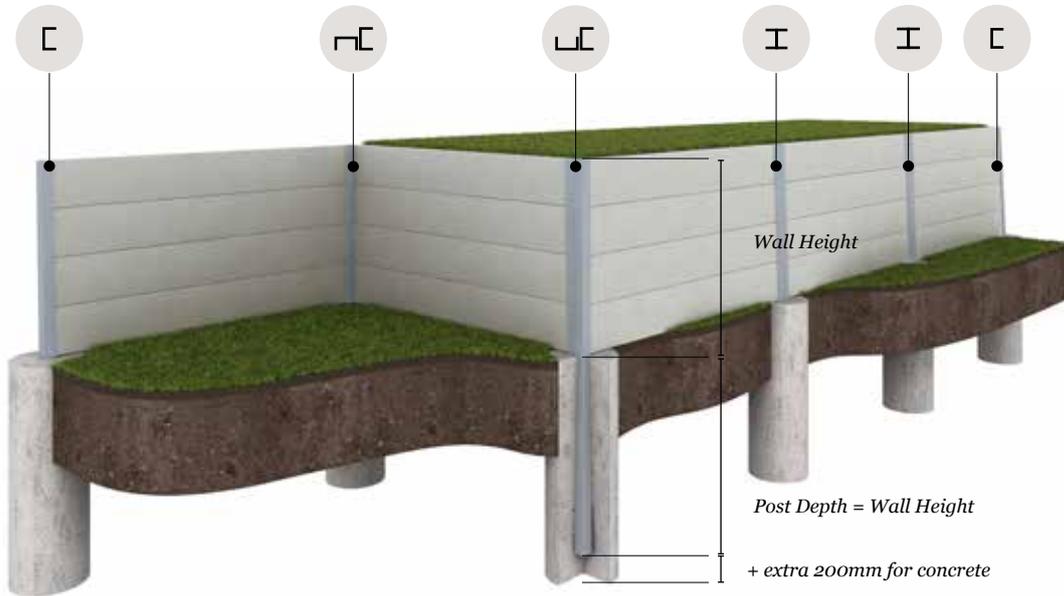


Joiner



Ender

POST TYPES AND PLACEMENT



Post types

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NOTE:

Retaining walls must be designed to AS4678

Most councils require that any retaining walls over 0.8m in height from natural ground level are subject to building approval.

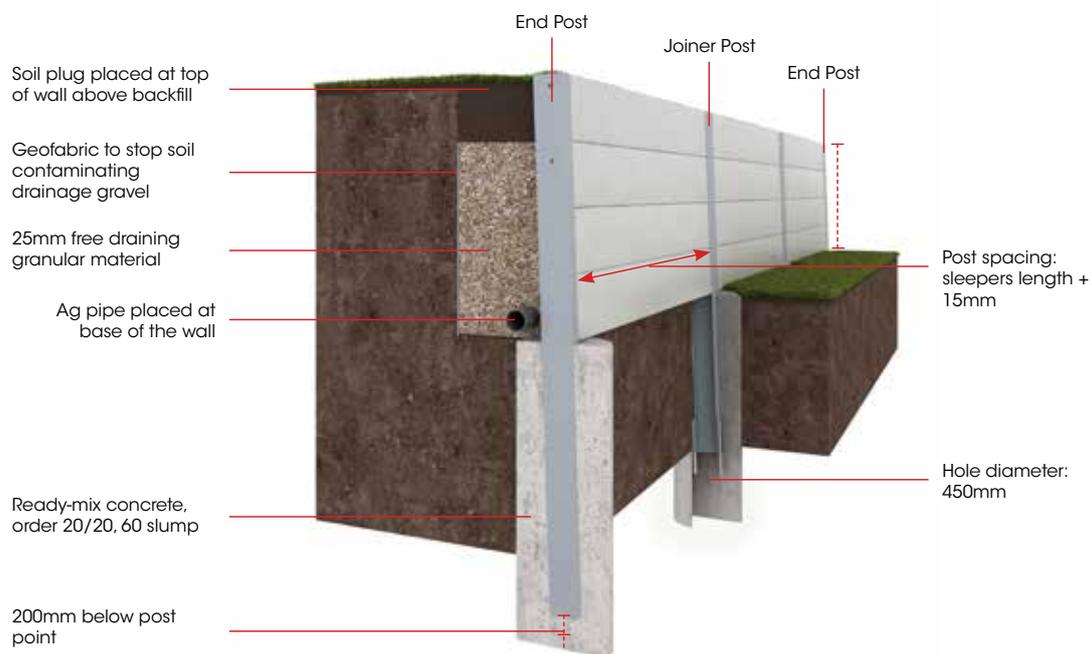
Any retaining wall that is less than 1.5m away from a building or other retaining wall also requires building approval.

PIONEER CONCRETE SLEEPER RETAINING WALLS

Overview

Austral Masonry's Pioneer concrete sleeper retaining wall system utilizes posts embedded in the ground and the strength of the concrete sleeper units to resist the lateral earth pressures. When built to engineering specifications and taking into accounts site conditions, these walls can be built to substantial heights, without costly structural reinforcement.

Cross Section Diagram - Pioneer Concrete Sleepers



Design Considerations

- Maximum wall heights table is based on a 5kPa surcharge load acting on top of the wall as per AS4678: 2002. This table is supplied as a guide only and must be referred to a qualified professional engineer. If imposed surcharge loads above 5kPa are applied, these designs are not appropriate.
- The Table above assumes the foundation material has a minimum bearing capacity of 200kPa.
- Designs assume no hydrostatic loading.
- The minimum embedment of wall below ground level is assumed to be the greater of $H/20$ or 100mm.
- Designs are based on Geogrid strength of 55kN/m²
- Designs assume flat slopes on top of the wall
- Global Stability may govern design criterias for steep slopes. A qualified geotechnical engineer should be consulted for such cases.

GENERAL DESIGN GUIDE FOR 5KPA SURCHARGE

Design for Surcharge Table - Guide Only

Wall Height	Sleeper Length (Max.)	Post Size (Mm)	Post C/C Spacing	Post Length
0.4m	2.00m	UC100	2020mm	1.15m
0.6m	2.00m	UC100	2020mm	1.15m
0.8m	2.00m	UC100	2020mm	1.55m
1.0m	2.00m	UC100	2020mm	1.95m
1.2m	2.00m	UC100	2020mm	2.35m
1.4m	1.53m Smooth	UC100	1550mm	2.75m
1.6m	1.53m Smooth	UC100	1550mm	3.15m
1.8m	1.53m Smooth	UC100	1550mm	3.55m
2.0m	1.53m Smooth	UC150	1550mm	3.95m
1.4m	1.58m Sandstone and Timberlook	UC100	1600mm	2.75m
1.6m	1.58m Sandstone and Timberlook	UC100	1600mm	3.15m
1.8m	1.58m Sandstone and Timberlook	UC100	1600mm	3.55m
2.0m	1.58m Sandstone and Timberlook	UC150	1600mm	3.95m

****Please Note:** This installation guide is prepared for retaining wall projects that do not require council approval. Please always check your local council requirements for building a retaining wall before commencement**. The above table does not allow for the additional load of attached Colorbond fences. Additional design criteria is required to allow for their wind loads.

Notes

- Ensure when backfilling do not push dirt from behind into the back of the wall with any machinery. Always place dirt/fill from the top, when using a Bobcat/Dingo, or if you prefer, by hand.
- Retaining walls in QLD over 0.8m or within 1.5m of another building require a Form 15 and 16 to be completed by an engineer (RPEQ) in order to receiving council approval. This requirement differs from state to state so please check with your Local Council before commencing on your project.

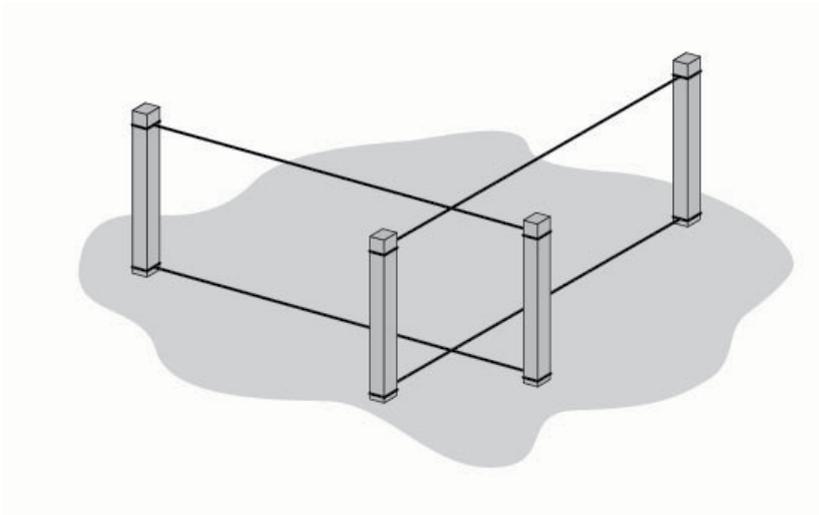
INSTALLATION

Step 1 Prepare the Area

Clear and level your site where you plan to build the retaining wall. Ensure you leave 300mm behind the retaining wall area for backfill.

Step 2 Alignment

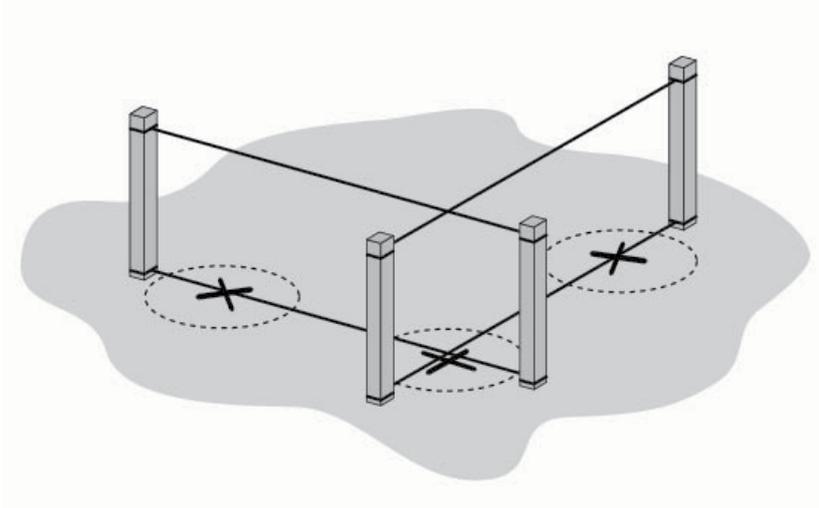
Place a star piquet or peg at both ends of the proposed wall. Attach two string lines at each end of the wall, top and bottom, to keep your wall aligned.



Step 3 Mark Out Holes

Starting from one end of the wall, mark a cross on the ground at intervals with their centre being approximately 20mm more than the length of the sleeper.

For example: If you are using 1530mm sleepers the hole centres should be 1550mm apart – note, this will vary on the length of sleeper

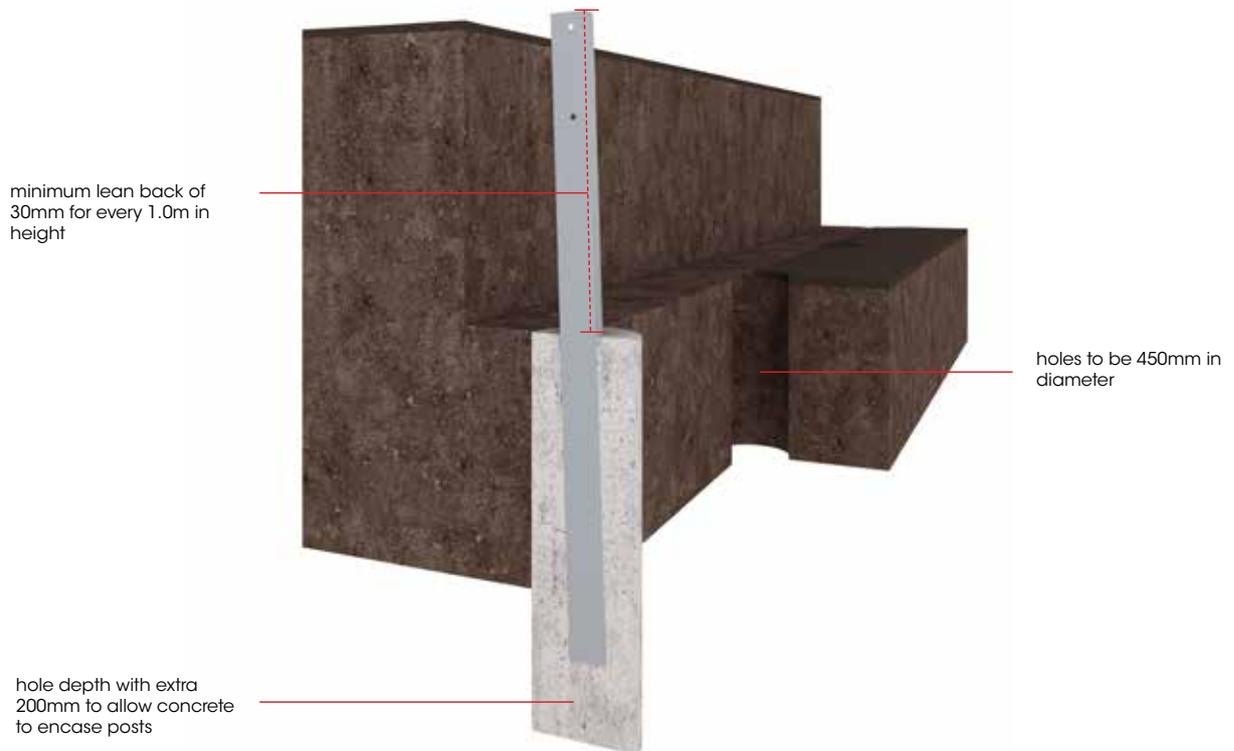




INSTALLATION

Step 4 Auger Holes and Pour Concrete

- Auger holes as per your engineers specifications as approved by council.
 - Pour concrete into holes, one at a time.
 - Make the concrete stiff. If using readymix concrete, order 20/20, 80 slump.
 - Set your post by lowering into ground until level with the top string lines.
 - Ensure there is a minimum lean back of 30mm for every 1.0m in height.
- The hole depth should be an extra 200mm deeper than the wall height to allow the concrete to encase the steel post.



AUGER HOLLERS TABLE

Auger Holes Table - Guide Only

For walls below 1m - Auger holes as per following engineer specifications

<i>Wall Height</i>	<i>Sleeper Length</i>	<i>Post Type</i>	<i>Post Spacing</i>	<i>Hole Diameter</i>	<i>Pier Depth</i>
0.2m	2.0m	100UC	2015mm	450mm	0.5m
0.21m - 0.4m	2.0m	100UC	2015mm	450mm	0.8m
0.41m - 0.6m	2.0m	100UC	2015mm	450mm	1.0m
0.61m - 0.8m	2.0m	100UC	2015mm	450mm	1.2m
0.81m - 1.0m	2.0m	100UC	2015mm	450mm	1.4m

For walls above 1m -Auger holes as per following engineer specifications, for walls over 1m please give our office a call for advice.

<i>Wall Height</i>	<i>Sleeper Length</i>	<i>Post Type</i>	<i>Post Spacing</i>	<i>Hole Diameter</i>	<i>Pier Depth</i>
0.2m	2.0m	100UC14.8	2015mm	450mm	0.5m
0.21m - 0.4m	2.0m	100UC14.8	2015mm	450mm	0.8m
0.41m - 0.6m	2.0m	100UC14.8	2015mm	450mm	1.0m
0.61m - 0.8m	2.0m	100UC14.8	2015mm	450mm	1.2m
0.81m - 1.0m	2.0m	100UC14.8	2015mm	450mm	1.4m
1.1m - 1.2m	2.0m	100UC14.8	2015mm	450mm	1.6m
1.21m - 1.4m	1.53m	100UC14.8	1545mm	450mm	1.6m
1.41m - 1.6m	1.53m	100UC14.8	1545mm	450mm	1.8m
1.61m - 1.8m	1.53m	100UC14.8	1545mm	450mm	2.0m
1.81m - 2.0m	1.53m	100UC14.8	1545mm	450mm	2.2m
2.01m - 2.2m	1.53m	100UC14.8	1545mm	450mm	2.4m
2.21m - 2.4m	1.53m	100UC14.8	1545mm	450mm	2.6m
2.41m - 2.6m	1.53m	100UC14.8	1545mm	450mm	2.8m
2.61m - 2.8m	1.53m	100UC14.8	1545mm	450mm	3.0m
2.81m - 3.0m	1.53m	100UC14.8	1545mm	450mm	3.2m

Soil Types

- Poor ($\phi = 25^\circ$): Soils with friction angle $\geq 25^\circ$, may include sandy clays, gravelly clays and sand. Expansive clays and organic soil MUST not be used within the soil reinforced zone.
- Average ($\phi = 30^\circ$): Soils with friction angle $\geq 30^\circ$, may include gravelly sands and well graded sands.
- Good ($\phi = 35^\circ$): Soils with friction angle $\geq 35^\circ$, may include gravels, sandy gravels, weathered sandstone and crushed sandstone.

INSTALLATION

Step 5 Check Posts

- Use a spirit level to make sure all your posts are aligned with the string line and are perpendicular on the sides.
- It is also important to measure the remaining distance to the top of your steel posts, to ensure the sleepers finish flush with the top of the posts.
- If required, lay a concrete pad on both sides of the steel post.

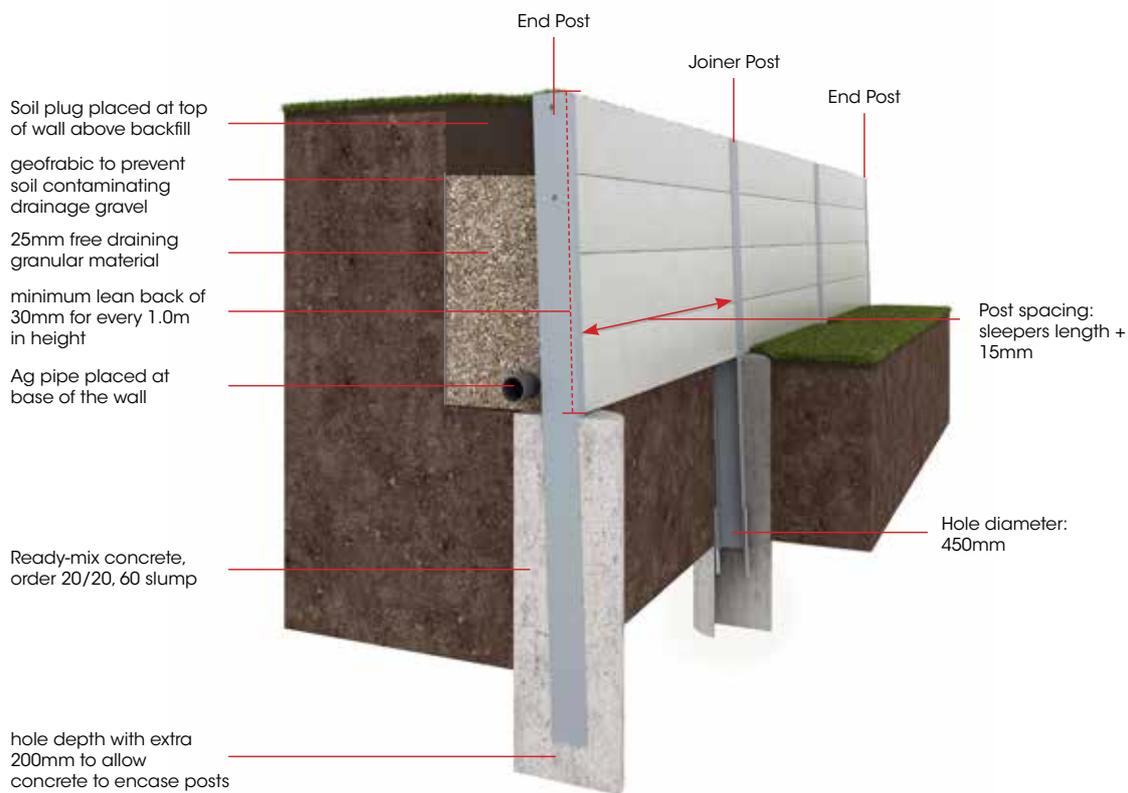


INSTALLATION

Step 6 Ag Pipe and Backfill

Allow the concrete to cure for two to three days before you place your sleepers in place. Lay geofabric in place at base of the wall.

Place ag pipe at the base then backfill with gravel to 200mm from the top.



Step 7 Soil Plug

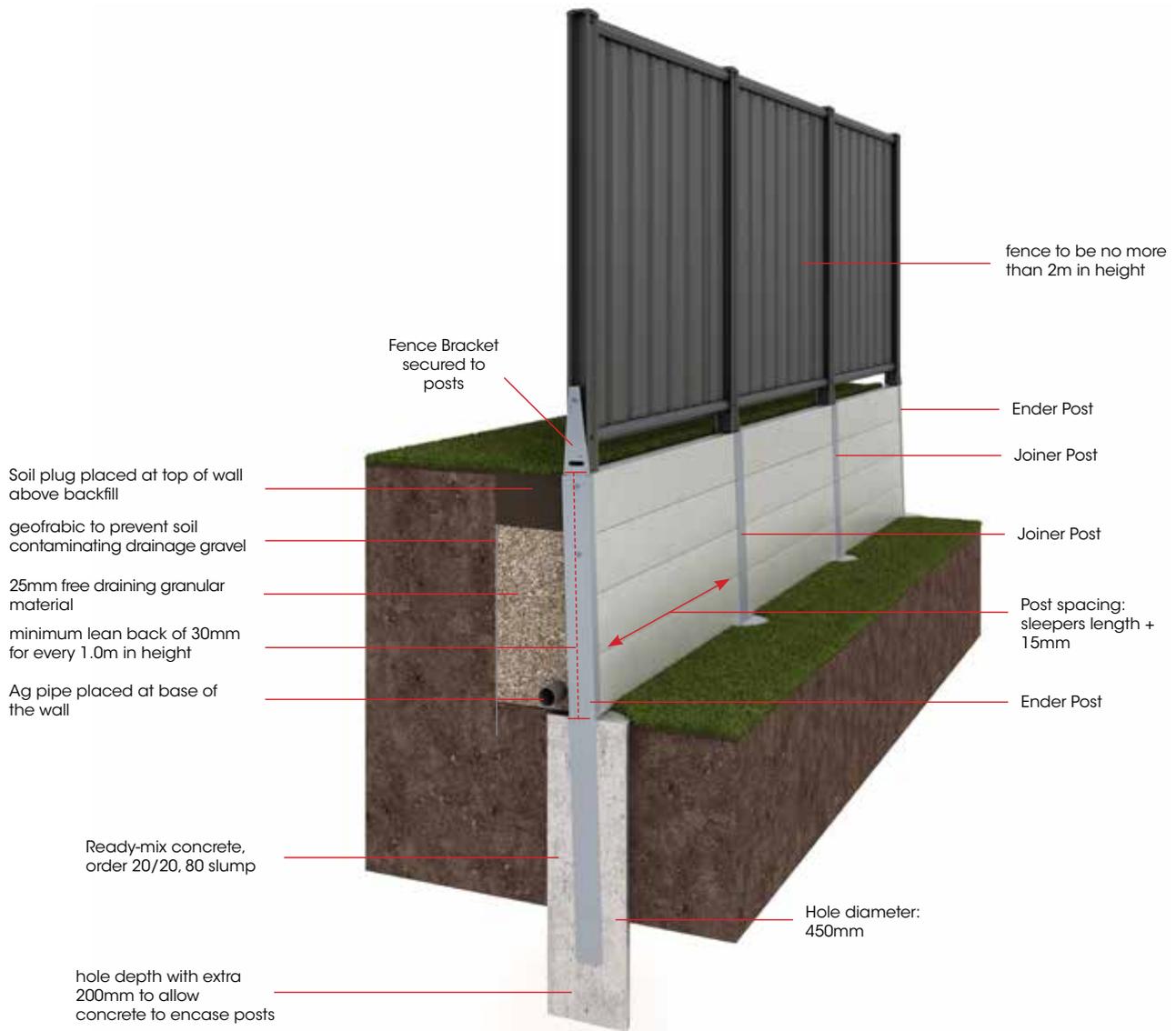
A soil plug is compacted over the drainage layer to prevent silt intrusion.

FENCE APPLICATIONS

Overview

Walls must be suitably designed to accommodate additional wind loading imposed on all types of closed fences; for example, increasing the embedment for the posts.

Cross Section Diagram - Fence Application



FENCE INSTALLATION

Step 1 Fence Brackets

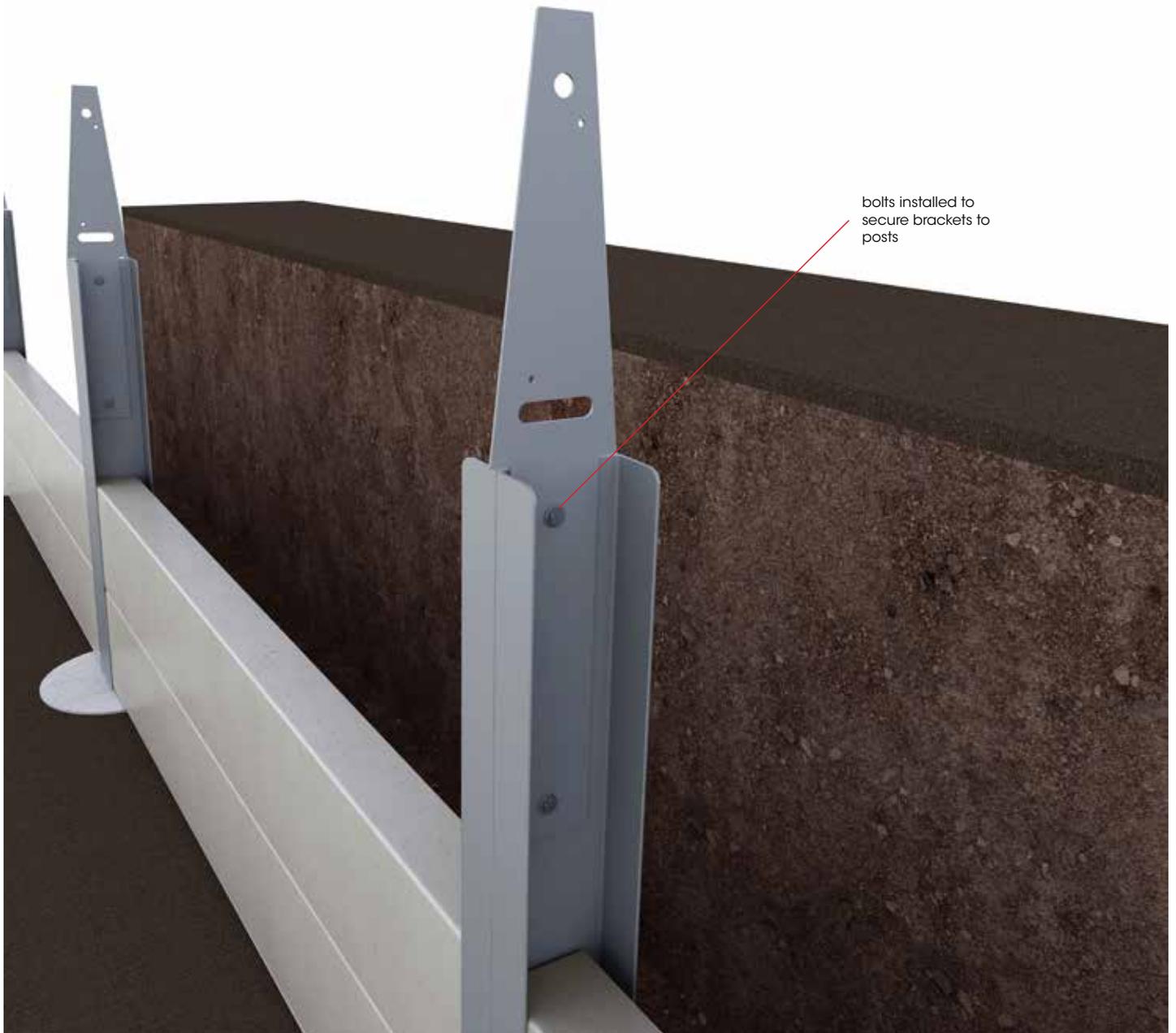
Before installing the top level of concrete sleepers, slide fence brackets into place, making sure to align the holes in the posts with the fence bracket holes.



FENCE INSTALLATION

Step 2 Bolts Installed

Firmly bolt the fence brackets to the posts ensuring the head of the bolt will still allow the concrete sleeper to be put in place.



FENCE INSTALLATION

Step 3 Concrete Sleepers

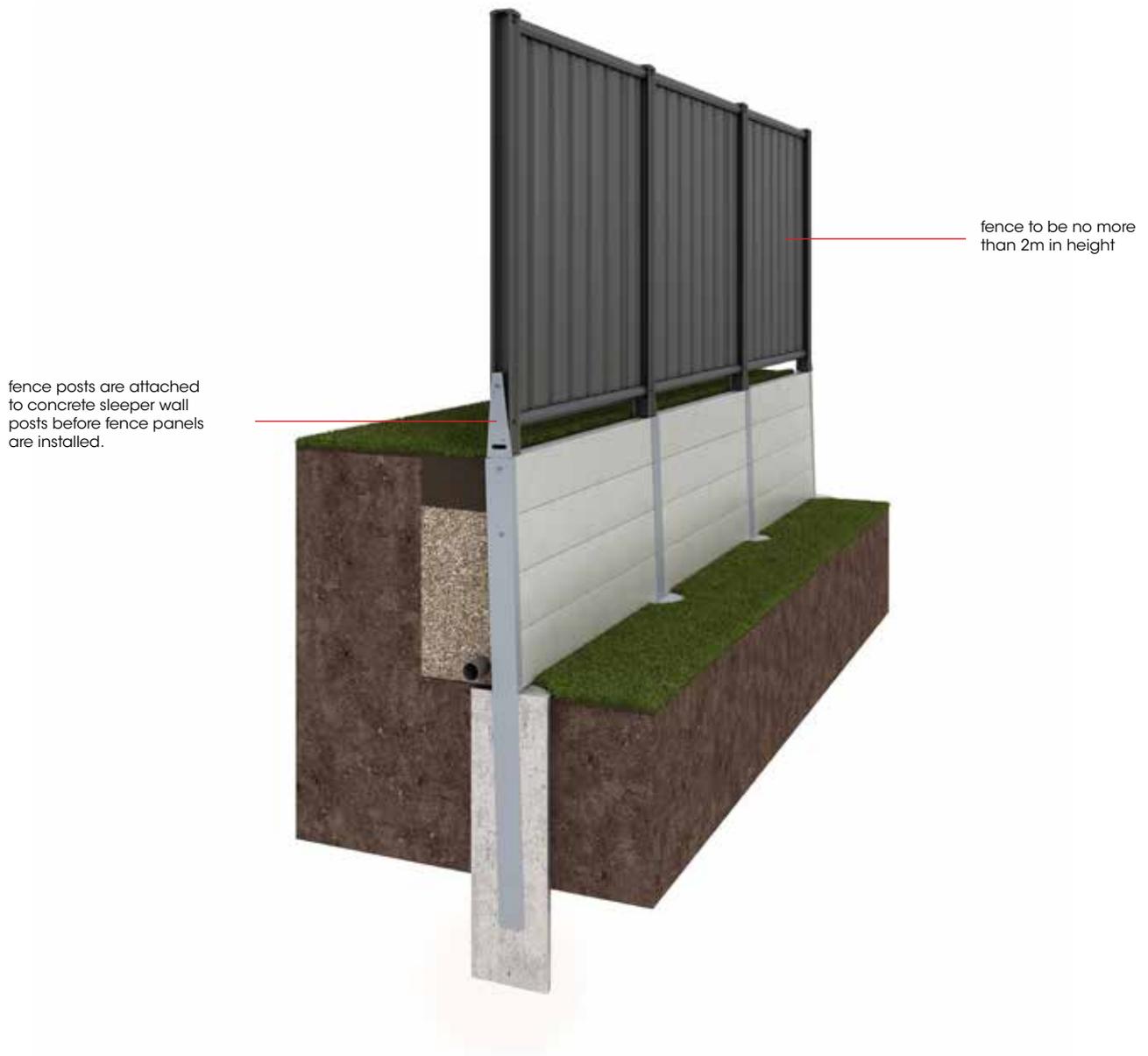
Install top level of concrete sleepers flush with the top of the posts.



FENCE INSTALLATION

Step 5 Fence Installation

Fence posts are attached to concrete sleeper wall posts before fence panels are installed.







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The product images shown in this brochure give a general indication of product colour for your preliminary selection. Austral Masonry recommends all customers see actual product samples at a selection centre prior to making final selections.

1. Stock colours. Colours other than stock colours are made to order. Contact your nearest Austral Masonry office for your area's stock colours. A surcharge applies to orders less than the set minimum quantity. **2. Colour and texture variation.** The supply of raw materials can vary over time. In addition, variation can occur between product types and production batches. **3.** We reserve the right to change the details in this publication without notice. **4.** For a full set of Terms & Conditions of Sale please contact your nearest Austral Masonry sales office. **5. Important Notice.** Please consult with your local council for design regulations prior to the construction of your wall. Councils in general require those walls over 0.5m in height and/or where there is loading such as a car or house near the wall be designed and certified by a suitably qualified engineer. **6. Max wall heights disclaimer.** The gravity wall heights are maximum heights calculated in accordance with CMAA MA-53 Appendix D guidelines and a qualified engineer should confirm the suitability of the product for each application. As such, due consideration must be given to but not limited to: Cohesion. Dry backfill, no ingress of any water into the soil behind the retaining wall. All retaining walls are designed for zero surcharge unless noted otherwise. These walls are intended for structure Classification A walls only as defined in AS4678 Earth Retaining Structures as being where failure would result in minimal damage and/or loss of access.