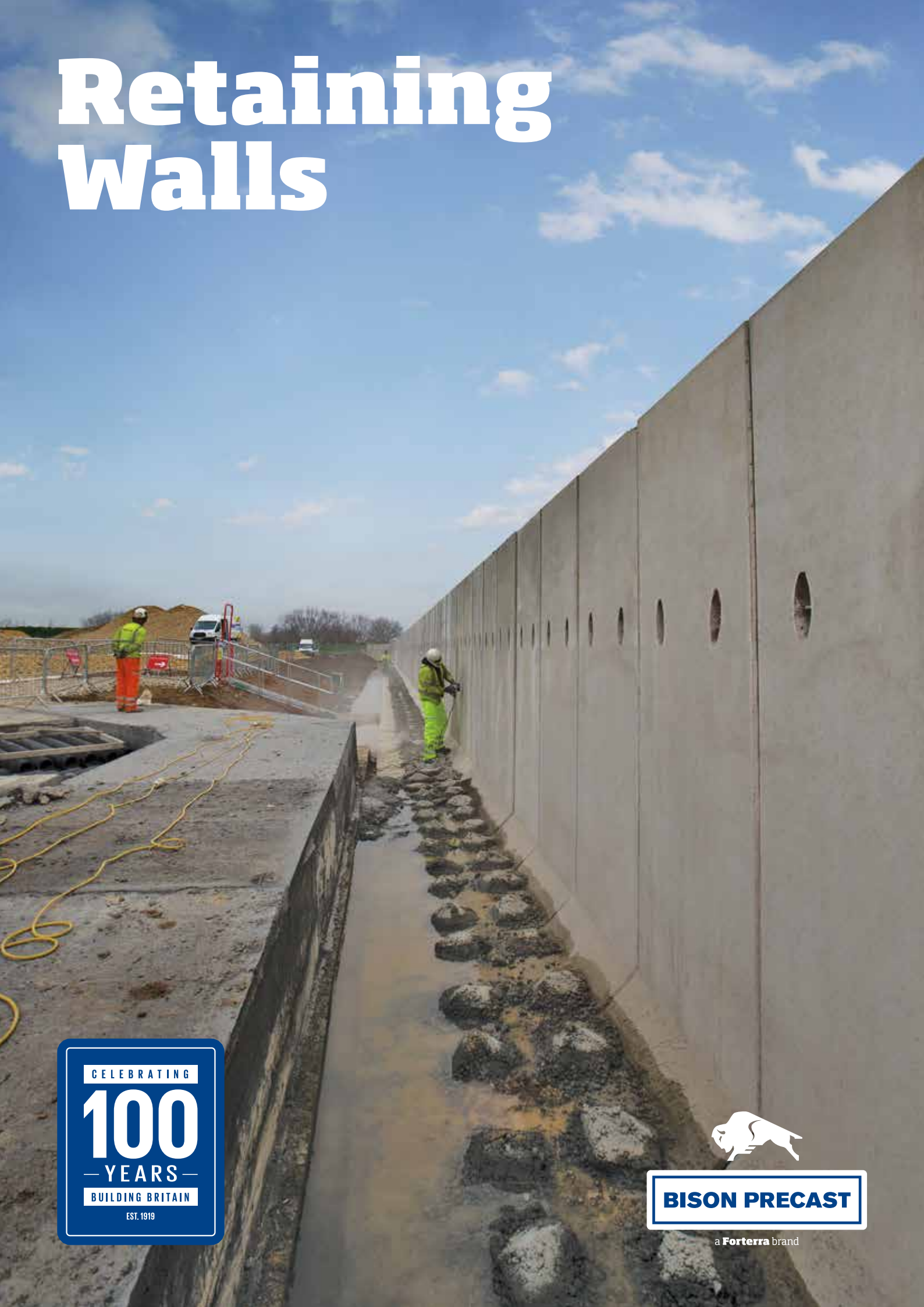


Retaining Walls



BISON PRECAST

a Forterra brand

Retaining Walls

Specifically engineered using over 50 years of experience within the precast and contracting sectors. Our design utilises a number of key features which focus on saving time and resource by up to 20%.



Our Precast Retaining Walls are manufactured at some of the most modern facilities in the country.

We understand that as a client you are looking for the most efficient fixing solution for your project, hence our design utilises a number of key features which focus on saving time and resource by up to 20%.

Engineering and Design

With customers ranging from the nuclear industry through to waste recycling, product performance requirements vary greatly.

A team of engineers and designers, can advise on all aspects of a project from outline design through to final value engineering.

Quality Assurance

From initial design through to on-site logistics, all aspects of the Bison Precast operation meet the most exacting quality standards.

These are maintained by Bison Precast's own in-house Quality Inspectors, and audited by external certification bodies.

Our precast facilities meets the requirements of ISO9001, ISO14001, BES6001 and ISO18001.

All units are designed in accordance with Eurocodes and CE certified to BS EN 15258.

The standard range of Bison Precast Retaining Walls are available from stock in seven different heights.

Each unit is designed to be loaded up from either side and can retain material level with the top of the wall including a surcharge or a sloping backfill from the top of the unit without any surcharge. The walls rely on holding down bolts to resist overturning moments.

Standard or Bespoke Retaining Walls

The standard range is available from stock. However, bespoke units offering variation in height, width, loading and accommodation of weep-holes or pipe openings can be provided.



The Standard Range

The standard range has been developed to offer the most economical solution in terms of transport costs and installation plant required whilst keeping installation times to a minimum.

As well as the standard range of retaining walls bespoke units can be designed and manufactured at our precast facilities to meet project specific requirements.



1.00m

Height:	1000mm
Width:	1000mm
Depth:	500mm
Weight:	450kg
Embedment:	150mm

1.50m

Height:	1500mm
Width:	1000mm
Depth:	750mm
Weight:	650kg
Embedment:	150mm

1.75m

Height:	1750mm
Width:	1000mm
Depth:	875mm
Weight:	1013kg
Embedment:	220mm

2.00m

Height:	2000mm
Width:	1000mm
Depth:	1000mm
Weight:	1138kg
Embedment:	250mm

2.50m

Height:	2500mm
Width:	1000mm
Depth:	1250mm
Weight:	1370kg
Embedment:	250mm

3.00m

Height:	3000mm
Width:	1000mm
Depth:	1500mm
Weight:	1800kg
Embedment:	250mm

3.75m

Height:	3750mm
Width:	1000mm
Depth:	1875mm
Weight:	2700kg
Embedment:	375mm

Retaining Walls Benefits



Joint Profile

All our standard units are provided with a unique interlocking detail, enhancing installation times through accurate and fast alignment. The added benefits of this detail also ensure a strong and reliable connection detail which can be sealed with an appropriate product/material

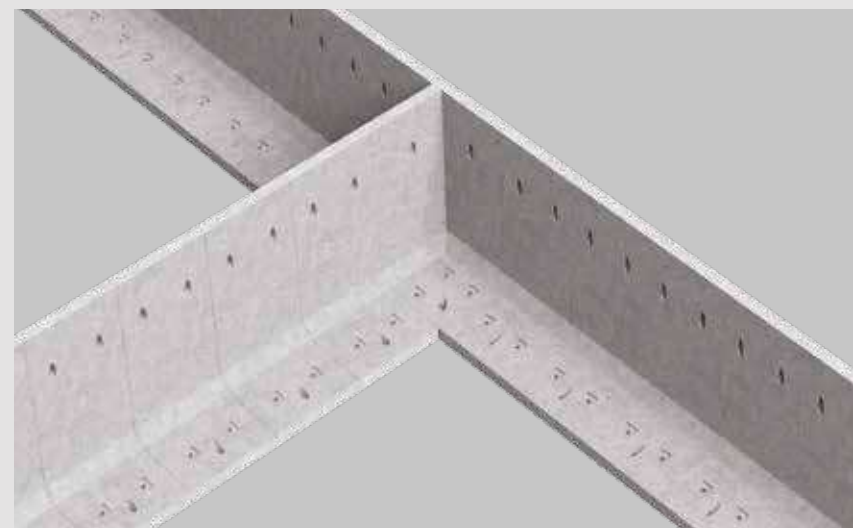
Finishes

Using state-of-the-art form liner technology the retaining wall unit can be cast with a preformed finish to provide an aesthetically pleasing appearance to the end user

We offer a range of economical corner details

The Forterra QuickLift System - no hidden costs for expensive lifting gear

Unlike many other systems we have no hidden costs for expensive lifting gear, or the requirement to fit lifting attachments. Using a standard lifting hook, a telehandler can complete a lift from delivery vehicle to final position with minimal secondary operations, increasing efficiency against alternative solutions by some 20%. In addition all lifting positions are located within working height zones eliminating the need to work at height



Using state-of-the-art form liner technology, Forterra Retaining Walls or bespoke precast items can be cast with a preformed finish to its outside face.



Hundreds of design options

We have over 200 designs to choose from and are happy to work with bespoke designs.

Rough & Textured Finishes



■ Marne



■ Red River



■ Lausitz

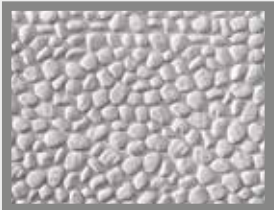
Stone & Rock Finishes



■ Mosel



■ Cheyenne



■ Romanche

Brick & Masonry Finishes



■ Brabant

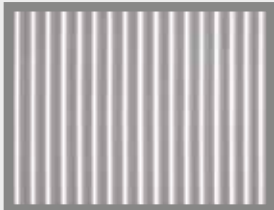


■ La Reunion



■ Mayenne

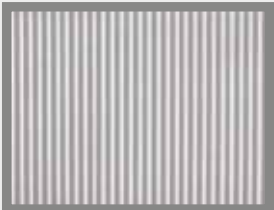
Rib & Wave Patterns Finishes



■ Amazonas

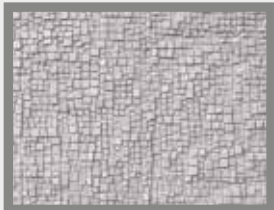


■ Amur



■ Fulda

Abstract & Wood Finishes



■ Champagne



■ Rugen



■ Spree

Design Scope/Philosophy

The reinforced concrete precast retaining wall unit has been designed in accordance with the latest set of Eurocodes.

Storage Capacity

The unit will be designed to be loaded from either side with the following conditions: retained material level with the top of the wall and with an applied surcharge of 10kN/m² or a sloping backfill with a maximum angle of 35° without an imposed surcharge.

The retained material will be assumed to be granular and drained with a specific maximum moist density of 18kN/m³.

For more information on specific material densities see table 1.

Steel Grades

All steel to be grade S275 UNO.
All Anchor Bolts to be min grade 4.6 UNO
See detailed bolt calculations.

Holding Down Bolts

Threaded rod anchor bars in grade 4.6 are used to anchor the base of the retaining wall into the cast in-situ concrete base

(by others). The length of the embedment will vary between units and loading, the minimum embedment depth into the in-situ base for the standard range is shown on pages 6 and 7. The rod is placed in the in-situ base through the preformed holes within the base of the precast wall unit and secured with min, 40N/mm² strength resin/non-shrink grout.

Exposure Conditions

Due to a nominal cover of 45mm (including Δ of 5mm) and the mix design used, the standard range of retaining walls meet an exposure condition of XD2 with an intended working life of 50 years.

Other exposure conditions can be designed for. Please contact Bison Precast for further details. The limiting crack width will be taken as 0.3mm.

Foundation Type

Assumed to be uncracked, mass/ reinforced concrete base of minimum strength 25N/mm². This is to be designed by others to resist the overturning and sliding forces exerted by the retaining wall unit and to consider the allowable ground bearing pressure to the relevant site.

Overall Stability

The primary job of the unit is to retain the material behind. To do this the stem and the base have been designed to withstand the applied forces. To resist overturning and sliding with a factor of safety of 2 for overturning and 1.5 for sliding respectively, the units require anchoring into a mass or reinforced insitu concrete base.

The grouted threaded rod will be post fixed into the suitable base below and secured with a washer plate on top of the unit to increase the bearing capacity onto the base slab and prevent punching shear of the bolt head through the unit. The resistance of the anchors into the base must be checked by others.

The overall ground bearing pressure must be checked by others and considered when designing the in-situ support base.

Reinforcement Notes

All reinforcement to be high yield with a yield strength of 500N/mm². All reinforcement to be Type 2 deformed bars including any specified mesh. Minimum lap length to be 40 x smallest lapped bar diameter.



Loading Option 1

- Backfill positioned over base of unit
- Level backfill
- 10kN/m² surcharge
- Drainage assumed to rear of wall system

Storage Material Densities

Table 1	Material								
	Medium dense sand	Loose sand & gravel	Grain	Woodchip	Sewage waste	Rolled silage	Paper waste	Composted green waste	PFA
Density (kN/m³)	18	16	8	8	11	4+72z (see note 1)	6	5	10

Note 1 z = depth below rolled surface of grass silage or the compacted surface of bedding (in m). Silage loading is in accordance with BS 5502-22.
Note 2 For other material bulk densities please refer to Table 7 within BS 5502-22

Standard Concrete Specification

The concrete shall be produced in accordance with BS8500 to meet an exposure condition of XD2 with an intended life of 50 years.

Compressive strength class	C40/50
Maximum water/cement ratio	0.5
Minimum cement/combination content	380 kg/m³
Allowable cement/combinations types	CEMI
Maximum aggregate size	20mm
Aggregates	Freeze thaw resisting
Chloride content class	Cl 0,40

Loading Option 2

- Backfill positioned over base of unit
- Sloped backfill at 35°
- No surcharge
- Drainage assumed to rear of wall system





Retaining Walls Storage Estimator The quick way to calculate your project.

Bison Precast has developed a unique online tool that calculates storage capacity and the number of Bison Precast retaining walls you need, helping you to plan your project quickly and easily.



**[forterra.co.uk/retaining-walls/
storage-estimator](http://forterra.co.uk/retaining-walls/storage-estimator)**



Forterra is a leading manufacturer of a diverse range of clay and concrete building products, used extensively within the construction sector, and employs over 1,900 people across 18 manufacturing facilities in the UK.

It is the second largest brick and aircrete block manufacturer in the country, and the only producer of the iconic London Brick. Other trusted brands from Forterra include Thermalite, Conbloc, Ecostock, Butterley, Cradley, Red Bank, Bison Precast, Jetfloor and Formpave.

forterra.co.uk



For the complete Bison Precast brochure range, visit bison.co.uk

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