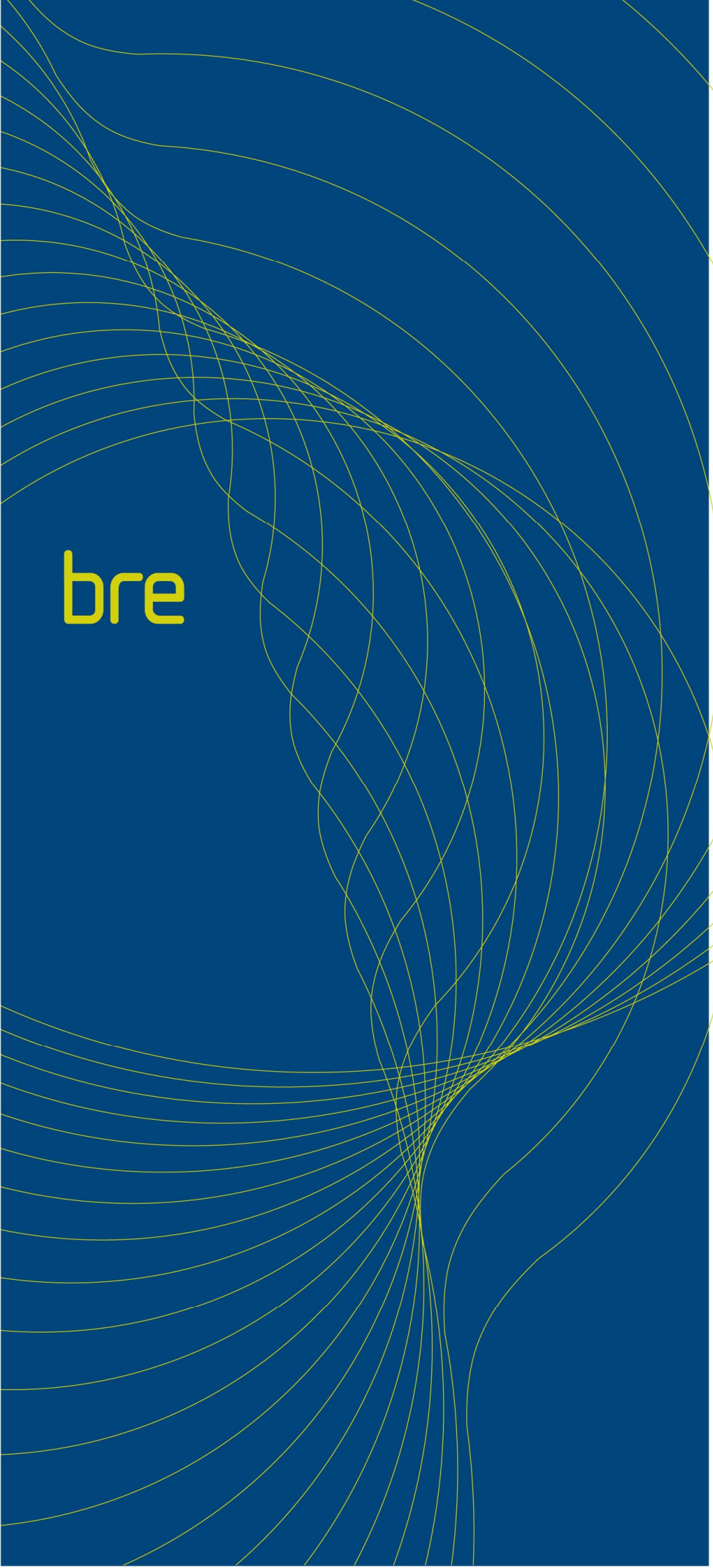

Testing of SmartDrain and SlotDrain Linear Drainage Units

Prepared for: Mike Challinor
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14th August 2013

Test report number 289 099

Prepared by

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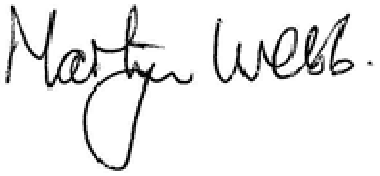
Position	Associate Director, Building Technology Group
Date	14th August 2013
Signature	

Approved on behalf of BRE

Name	Martyn Webb
Position	Principal Consultant, Building Technology Group
Date	14th August 2013
Signature	

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Contents

1 Introduction

Following instruction from Mr Mike Challinor (Manthorpe Building Products Limited) BRE carried out testing of Class A15 SmartDrain and SlotDrain Linear Drainage Units.

Figures 1 and 2 show a schematic diagram of the SmartDrain and SlotDrain units respectively. The drainage unit was cast into concrete haunching, approximately 1200 x 320 x 190 mm (SmartDrain) and 1200 x 320 x 250 mm (SlotDrain), by the client.

The units were delivered to BRE on 29th July 2013 and tested on 12th August 2013. Present during the testing were Messrs Dave Brooke and David Gall (BRE), and Mr Ben Hales (Manthorpe Building Products Ltd.)

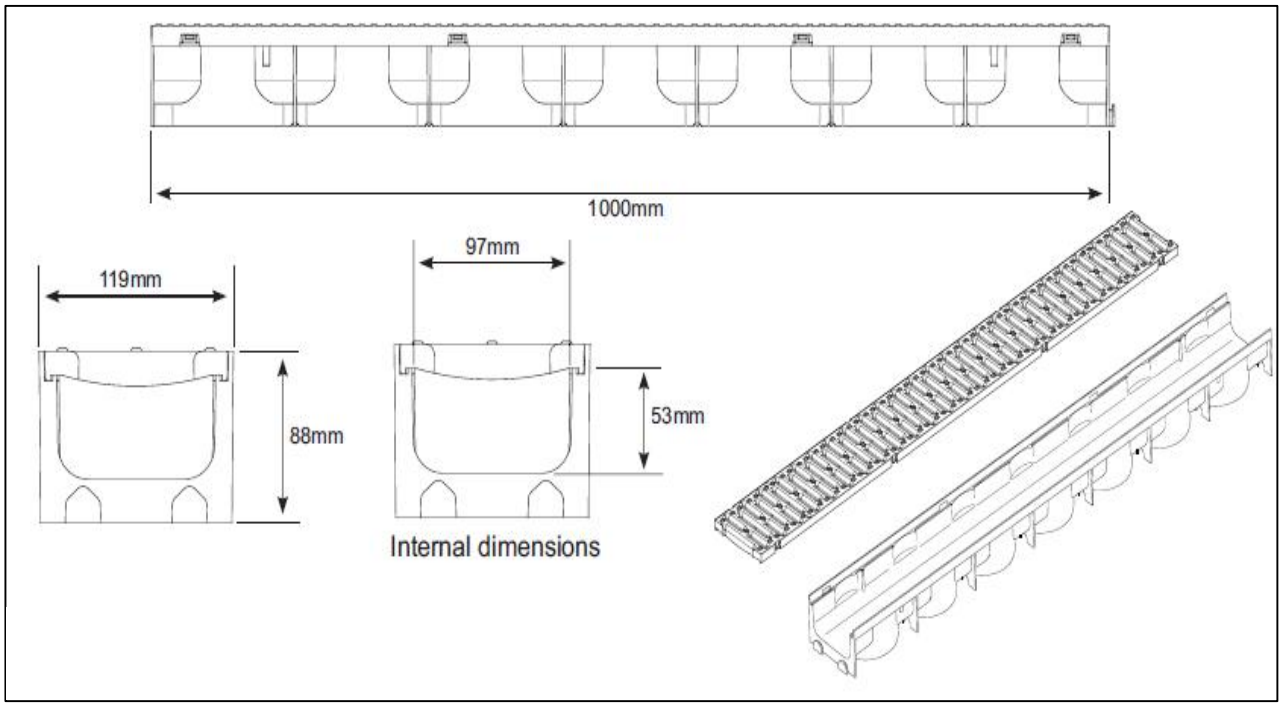

Figure 1: Schematic drawing of the SmartDrain Unit

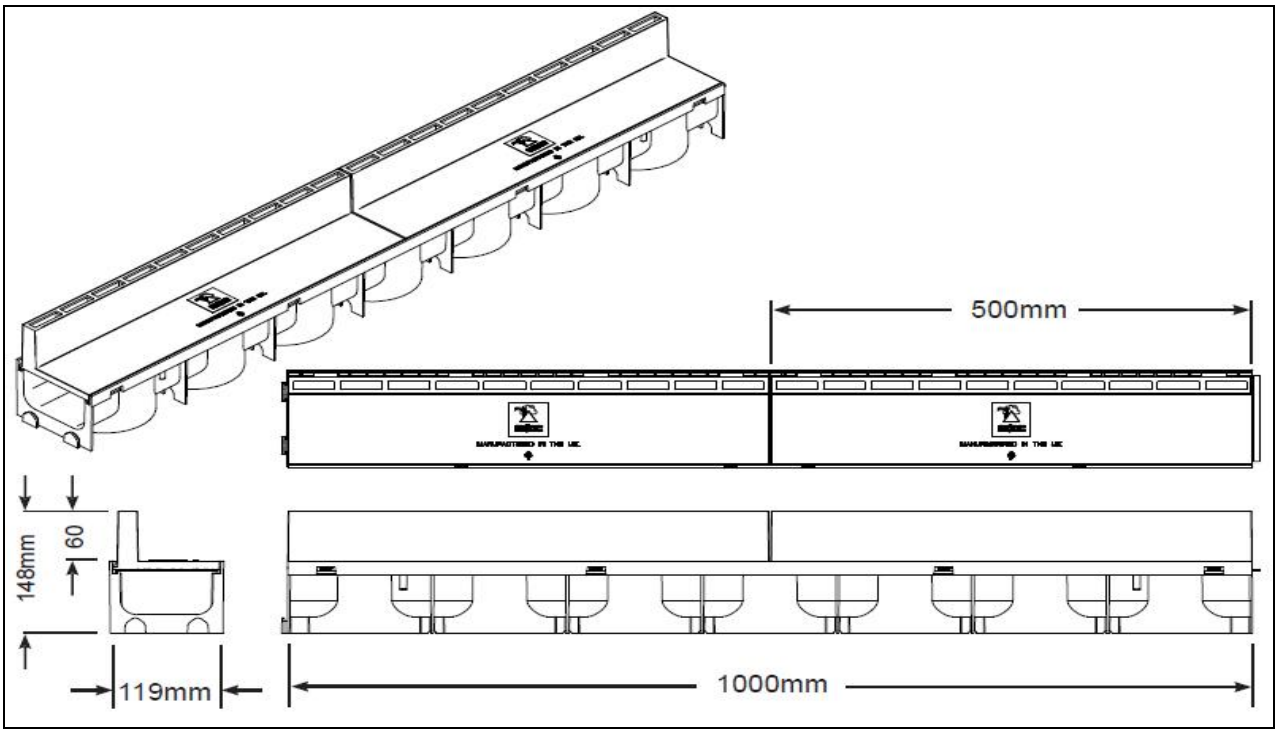

Figure 2: Schematic drawing of the SlotDrain Unit

2 Details of tests carried out

The following testing was undertaken in accordance with BS EN 1433:2002 'Drainage channels for vehicular and pedestrian areas Classification, design and testing requirements, marking and evaluation of conformity'.

Watertightness

Three samples of the SmartDrain units were tested in accordance with clause 7.5.1. Each sample consisted of a 1m total length of SmartDrain channel body, supplied by Manthorpe Building Products Limited as being bonded together approximately half way along the length of the channel body according to the manufacturer's instructions, and haunched in a concrete casing of approximately 1200 x 320 x 190 mm. See Figure 3 below. The ends of the channel body were sealed by means of an end plate. The units were filled with water to the maximum designed wetted perimeter as indicated by the manufacturer's representative, and the units were inspected for any signs of leakage through the channel body and the joint, for a period of 30 minutes.

It should be noted that the SmartDrain and SlotDrain units comprise the same channel body and jointing method, therefore only one type of unit (in this case SmartDrain) was considered necessary to demonstrate the performance of the jointing method.

Figure 3: Photograph showing 2 of the 3 assemblies for watertightness test of channel body

Load bearing capacity

Various sized loading plates in accordance with Table 12 of EN 1433 were used to perform the permanent set testing in accordance with clause 7.16 and maximum load testing in accordance with 7.15.

The units were placed into a compressive test rig as shown in Figures 4 and 5 of this Report.

For the permanent set testing an initial datum point was established at the centre of the grating using a calibrated dial test indicator. After 5 applications of the permanent set load of 10kN a final reading of deflection of the grating was recorded and the permanent set of the grating was calculated as the difference between the initial and final readings.

For the maximum load testing the load was applied to achieve a target of 15kN. Upon reaching 15kN the load was maintained for a period of 30 seconds.

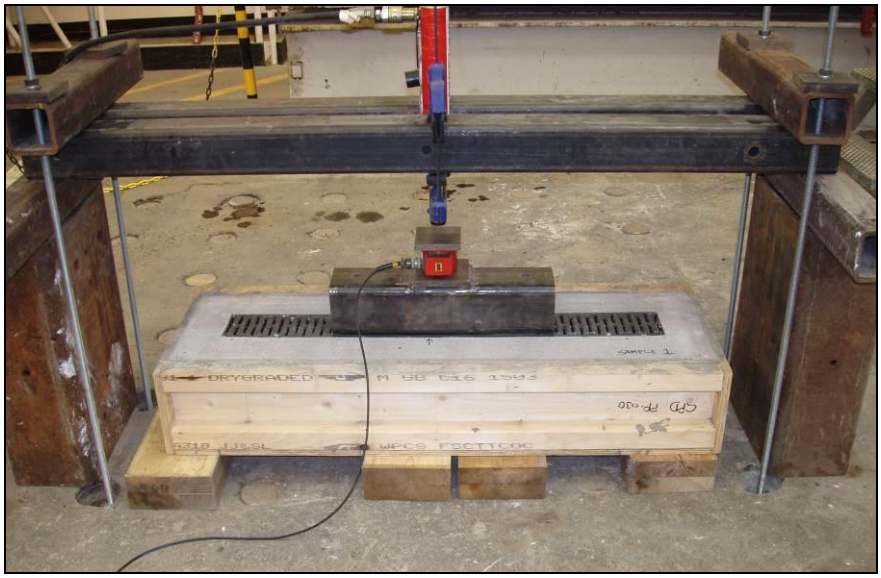

Figure 4: Photograph showing assembly for load test of SmartDrain unit

Figure 5: Photograph showing assembly for permanent set test of SlotDrain unit

3 Test results

Watertightness

SmartDrain Unit

Sample No	Specified	Actual	Assessment[1]
1	No visible leakage through the joint or body	No visible leakage through the joint or body	Pass
2		No visible leakage through the joint or body	Pass
3		No visible leakage through the joint or body	Pass

[1]Following completion of the 30 minutes test period the units were re-inspected approximately 3 hours after the initial application of water into the test samples. There was no visible leakage through the joint or body.

Load bearing capacity

SmartDrain Unit

Permanent set

Sample No	Specified maximum permanent set (mm)	Actual permanent set (mm)	Assessment
1	1.94 max	0.36	Pass
2		0.41	Pass
3		0.57	Pass

Load bearing capacity (continued)

Maximum load (SmartDrain Unit)

Sample No	Specified	Actual	Assessment
1	Unit shall withstand the test load for 30 seconds without cracking or excessive deformation	Unit withstood the test load for 30 seconds without cracking or excessive deformation	Pass
2		Unit withstood the test load for 30 seconds without cracking or excessive deformation	Pass
3		Unit withstood the test load for 30 seconds without cracking or excessive deformation	Pass[(2)]

[(2)]The unit was subsequently loaded to 60kN without cracking or excessive deformation

SlotDrain Unit

Permanent set

Sample No	Specified maximum permanent set (mm)	Actual permanent set (mm)	Assessment
1	0.40 max	0.04	Pass
2		Nil	Pass
3		Nil	Pass

Maximum load

Sample No	Specified	Actual	Assessment
1	Unit shall withstand the test load for 30 seconds without cracking or excessive deformation	Unit withstood the test load for 30 seconds without cracking or excessive deformation	Pass
2		Unit withstood the test load for 30 seconds without cracking or excessive deformation	Pass
3		Unit withstood the test load for 30 seconds without cracking or excessive deformation	Pass[(3)]

[(3)]The unit was subsequently proof loaded. At approximately 25kN a hairline concrete crack appeared on the surface of the unit adjacent to the slots, however the unit was further loaded to 60kN without any further cracking of the concrete or excessive deformation.

==========REPORT ENDS==========