



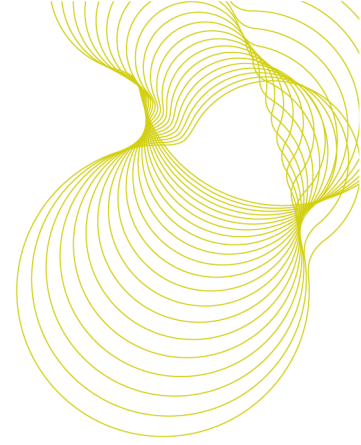
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**Assessment of durability  
of Deckmaster  
waterproof system**

Prepared for:  
Mr David Tomlinson  
Resdev Ltd

13 May 2013

Client report number 287055



**Prepared by**

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Name Dr Rupert Pool

Position Principal Consultant

Signature

**Approved on behalf of BRE**

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Name Dr Martyn Webb

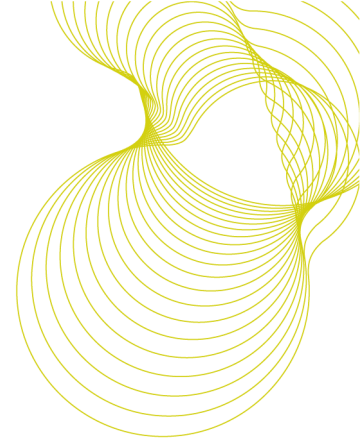
Position Principal Consultant

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Signature

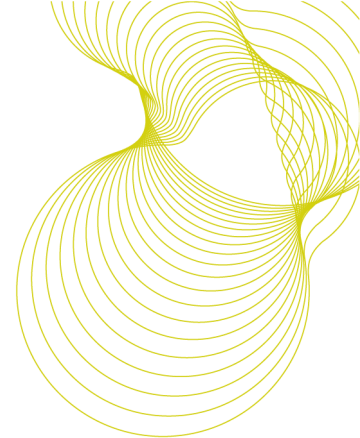
BRE  
Garston  
WD25 9XX  
T + 44 (0) 1923 664200  
F + 44 (0) 1923 664991  
E [construction@bre.co.uk](mailto:construction@bre.co.uk)  
[www.bre.co.uk](http://www.bre.co.uk)

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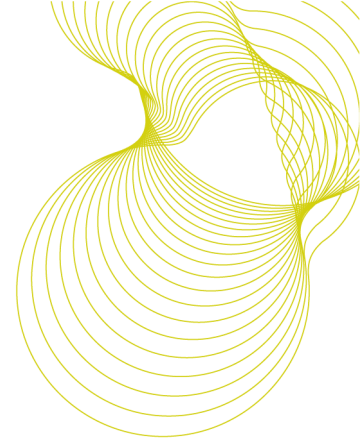


## 1 Introduction

- 1.1 BRE was asked to inspect the Deckmaster waterproofing system where it had been installed on multi-storey car parks and provide comments and opinion on the durability of the system.
- 1.2 BRE has previously carried out laboratory tests on the same system in accordance with BS EN 1504-2: 2004.
- 1.3 In order to assess the durability, BRE inspected three car parks where the Deckmaster waterproofing system had been installed and trafficked for a number of years. The assessment focused on the condition of the surface and waterproofing layers, signs of wear and abrasion and evidence of water ingress to the structure below.

## 2 Summary

- 2.1 BRE inspected the Deckmaster waterproofing system on the upper decks of three multi-storey car parks. The installations ranged from 4 to 15 years old. No maintenance works were reported to have been carried out (other than repainting line marking) on any of the sites.
- 2.2 The waterproof membrane appeared intact in each location and there was no evidence or reports of any water ingress to the decks below.
- 2.3 The surface of the system showed no degradation in areas that had not been trafficked. However, some surface abrasion had occurred in areas that were regularly trafficked by cars. In the most heavily trafficked areas, the top, pigmented layer had worn and some of the aggregate had been 'plucked' from the upper polyurethane layer. The underlying polyurethane layer appeared intact, but it is feasible that continued heavy trafficking could abrade the upper waterproof membrane. In this case, the upper layer may need to be recoated in these locations in order to maintain the slip resistance and prevent further abrasion of the waterproof layer.
- 2.4 Based on the results of the inspection and the results of testing to BS EN 1504-2, it is BRE's opinion that the Deckmaster system, if installed in accordance with the manufacturer's guidelines on to a suitable substrate and in a similar manner to the sites inspected by BRE, with localised recoating of heavily trafficked locations if necessary, would be expected to have **a service life of at least 20 years.**



### 3 Site inspections

#### 3.1 Site 1 – Queen’s Square car park, Liverpool

Date of installation	1998
Date of inspection	24 April 2013
Approximately service life	15 years

System build-up (top down)	<ul style="list-style-type: none"><li>• 0.5 kg m<sup>-2</sup> UVR sealer</li><li>• 1 kg m<sup>-2</sup> polyurethane membrane with 0.4 – 0.8 mm aggregate scatter</li><li>• 1 kg m<sup>-2</sup> polyurethane membrane</li><li>• epoxy damp-proof membrane and primer</li><li>• <i>in-situ</i> concrete topping to pre-cast concrete planks</li></ul>
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Comments	<p>The Deckmaster system had been applied to the top deck of the car park and is regularly trafficked.</p> <p>The surface appeared intact in all locations that were inspected.</p> <p>The surface sealer, which provides the colour to the system, was noted to have been worn away by vehicular traffic in some locations. However, the underlying waterproof membrane had not been affected.</p> <p>In some heavily trafficked locations, the aggregate was noted to have been ‘plucked’ from the upper layer of PU membrane. The lower layer of PU membrane appeared intact beneath.</p> <p>There was no evidence of water ingress to the deck below.</p> <p>BRE understood that the only maintenance works that had been carried out were the repainting of the marking lines and the addition of anti-slip pedestrian paths on the vehicle ramps.</p>
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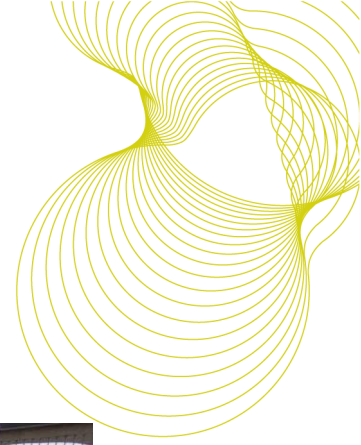


Figure 1 General view of Queen's Square car park

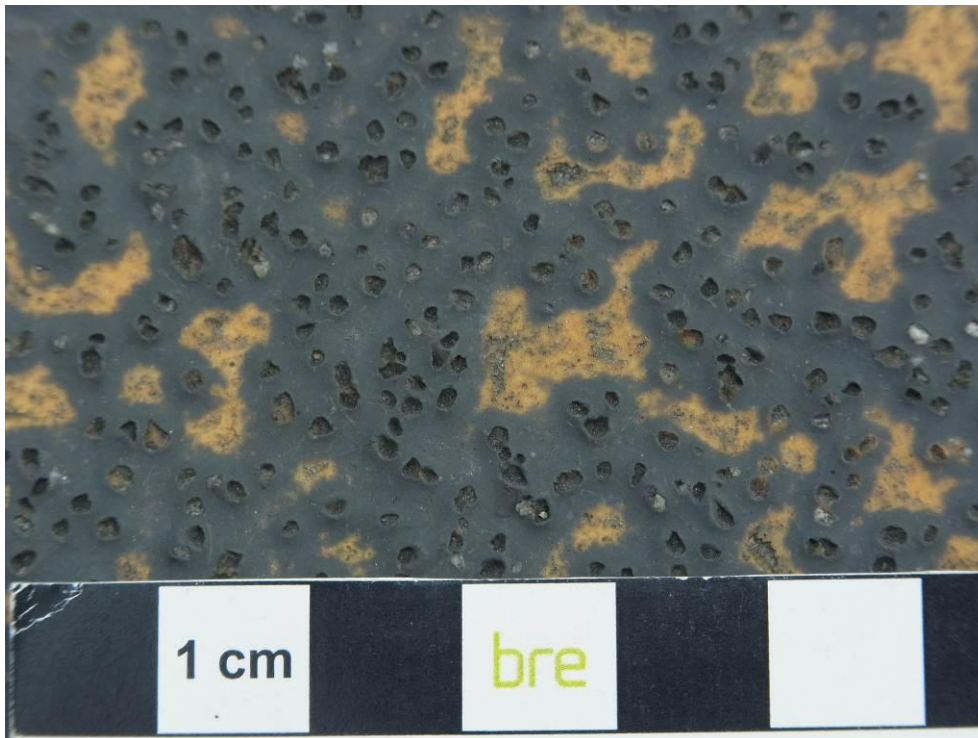
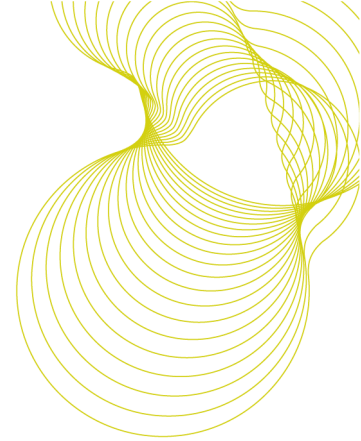


Figure 2 Queen's Square, abrasion of pigmented top coat and 'plucking' of some aggregate particles in the most heavily trafficked areas



### 3.2 Site 2 – Lowry Centre, Salford

Date of installation	2001
Date of inspection	24 April 2013
Approximately service life	12 years

System build-up (top down)	<ul style="list-style-type: none"><li>• 0.5 kg m<sup>-2</sup> UVR sealer</li><li>• 1 kg m<sup>-2</sup> polyurethane membrane with 0.4 – 0.8 mm aggregate scatter</li><li>• 1 kg m<sup>-2</sup> polyurethane membrane</li><li>• epoxy damp-proof membrane and primer</li><li>• pre-cast concrete slabs with in-situ concrete jointing</li></ul>
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Comments	<p>The Deckmaster system had been applied to approximately half of the top deck of the car park and was regularly trafficked.</p> <p>The surface appeared intact in all locations that were inspected.</p> <p>The surface sealer was noted to have been worn away by vehicular traffic in some locations and some aggregate had been ‘plucked’ from the surface. However, the underlying waterproof membrane had not been affected.</p> <p>There was no evidence of water ingress to the deck below.</p> <p>BRE understood that a ‘value engineering’ exercise by the designers had removed reinforced strips over slab movement joints from the specification; but that these had later been found to be necessary and consequently were applied by Deckmaster.</p>
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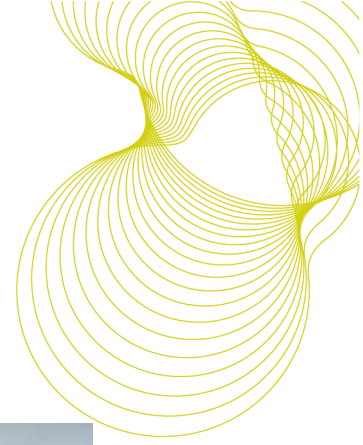
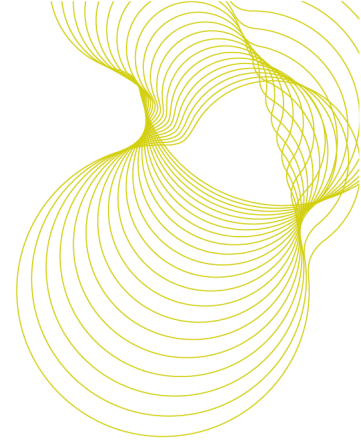


Figure 3 General view of Lowry Centre car park



Figure 4 Lowry Centre, localised abrasion of pigmented top coat





### 3.3 Site 3 – Audi dealership, Stockport

Date of installation	2009
Date of inspection	24 April 2013
Approximately service life	4 years

System build-up (top down)	<ul style="list-style-type: none"><li>• 0.75 kg m<sup>-2</sup> UVR sealer</li><li>• 1 kg m<sup>-2</sup> polyurethane membrane with 0.7 – 1.2 mm aggregate scatter</li><li>• 1.5 kg m<sup>-2</sup> polyurethane membrane</li><li>• epoxy damp-proof membrane and primer</li><li>• in-situ concrete topping to pre-cast concrete planks</li></ul>
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Comments	<p>The Deckmaster system had been applied to the top deck of the car park and was regularly trafficked.</p> <p>The surface appeared intact in all locations that were inspected.</p> <p>The surface sealer, which provides the colour to the system, was noted to have been worn away on the top of the aggregate particles by vehicular traffic. Some aggregate had been 'plucked' from the surface, leaving a small hole in the upper layer of membrane while the underlying waterproof membrane had not been affected.</p> <p>There was no evidence of water ingress to the deck below.</p>
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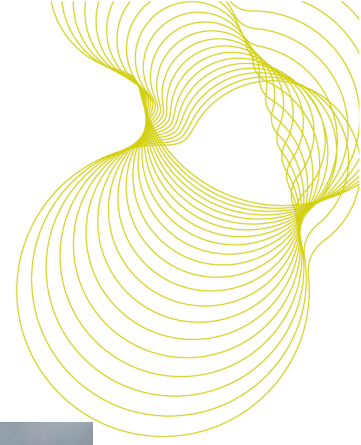


Figure 5 General view of Stockport Audi car park

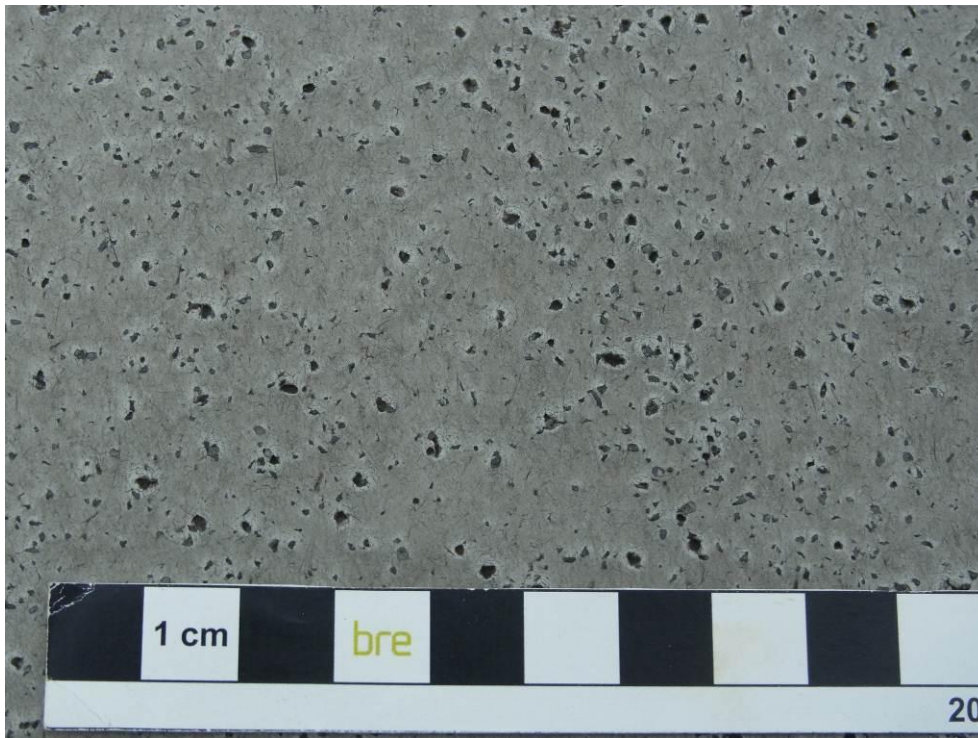


Figure 6 Stockport Audi, localised abrasion of pigmented top coat