

**ROYAL QUAY, HAREFIELD
MS40837-R200**

SuDS Management and Maintenance Report

Revision History

Issue	Date	Nature And Location Of Change
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1. INTRODUCTION

1.1. Terms of reference

- 1.1.1. jnp group have been appointed by Oakford Homes to undertake a SuDS management and maintenance report to cover the proposed SuDS features for the residential development at Royal Quay, Coppemill Lock, Park Lane, Harefield.

1.2. Site Description

- 1.2.1. The site is approximately 1.2ha and located approximately 1km to the west of Harefield town centre within the London Borough of Hillingdon. It is proposed to develop part of the site with new build housing and associated car parking and external works which occupy 0.41ha of the total site area.
- 1.2.2. The site is adjacent to the Grand Union Canal, which subdivides just north of Coppermill lock to form a canal basin which enters the site.
- 1.2.3. The surface water drainage scheme for the development shall be based on the agreed Flood Risk Assessment (FRA) by RSK, dated April 2013, reference 13872-R3(1)-FRA. The scheme shall include a restriction in run off to 46.8 l/s and provision of storage onsite for the 1 in 100 year storm event plus 30% climate change, as outlined in the FRA.
- 1.2.4. In addition to the above FRA report RSK prepared an Addendum FRA Report, dated November 2013, reference 131872 R4 (1). This report was submitted to the Environment Agency (EA) who responded by letter dated 03 January 2014 acknowledging the proposed design strategy provided in the addendum report.
- 1.2.5. This reports provides a maintenance and management regime for the SuDS features that are proposed for the development as shown on the following drawings:
- Drawing no. MS30837 D408 Detailed Drainage Strategy Sheet 1 of 2
Drawing no. MS30837 D409 Detailed Drainage Strategy Sheet 1 of 2
- 1.2.6. It is assumed that all features described in this report will be maintained by a management company competent in maintain specialist SuDS contracted by the client.

2. SUDS MAINTENANCE AND MANAGEMENT REGIME

2.1. Permeable Paving

- 2.1.1. Before handing over to the client, the permeable paving system should be inspected for clogging, litter, weeds and water ponding so that any failures or defects can be rectified.
- 2.1.2. The permeable paved parking areas will become private and maintenance would be the responsibility of the management.
- 2.1.3. Over time, parts of the porous surface may suffer loss of hydraulic performance due to excessive detritus, such as leaf build up and fine materials being washed into the filtration medium. To minimise this, good housekeeping by sweeping the surface with a broom should be undertaken.
- 2.1.4. To clean effectively without damaging the porous systems integrity, suitable specialist equipment such as mobile high pressure water suction cleaners is required.

- 2.1.5. The water suction machine has the ability to remove contaminants and restore hydraulic performance without damaging the porous system. Care should be taken to ensure equipment does not remove jointing material, any lost material should be replaced as appropriate.
- 2.1.6. The use of conventional brush sweepers (Such as traditional road sweeping equipment) and hand held pressure washers must be avoided as the force detritus such as sand and silt into the surface voids, however as previously noted a hand help broom is appropriate to remove leaves etc.
- 2.1.7. Snow removal operations should be carefully considered and the use of sand/ash should be avoided as it may cause clogging of the system. The use of salt can also create a potential pollution problem and de-icing products may adversely affect materials.
- 2.1.8. The primary maintenance required for permeable paving is to clean the surface drainage voids (Between blocks). Fine debris and dirt can accumulate in the voids and reduce the systems performance. It is natural for clogging to occur over time but routine maintenance can help reduce the likelihood of this occurring.
- 2.1.9. Even though an inevitable loss in permeability should be expected over the lifetime of the system the longevity of the system will be increased by following the maintenance schedule for sweeping and high pressure washing, restricting the areas use by heavy vehicles, limiting the use of de-icing chemicals and sand, and implementing a stringent sediment control plan throughout the entire construction phase.
- 2.1.10. A maintenance schedule for permeable paving is provided below.
- 2.1.11. The table below and information provided above have been extracted from Interpave, and The SuDS Manual, Ciria 697.

Maintenance Schedule	Required Action	Frequency
Regular maintenance	Brushing and vacuuming	Three times per year, at the end of winter, midsummer, after autumn leaf fall, or as required based on site specific observations of clogging or manufacturers recommendations
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weed.	
Remedial actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving.	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users.	As required
	Rehabilitation of the surface and the upper sub-structure	As required (if infiltration performance is reduced as a result of significant clogging)

Monitoring	Initial inspection	Monthly for 3 months after installation
	Inspect for evidence of poor operation and/or weed growth. If required take remedial action.	3 monthly, 48hrs after large storms.
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

2.2. SEL Attenuation System comprising of Permachannel, Permafilter and Permavoid

Overview of the SEL Attenuation System

2.2.1 The SEL Attenuation System comprises the following elements:

- Special Channels (Permachannel) - combined collection and silt/oil separation system to collect and treat runoff from car parking areas.
- Shallow high strength modular plastic conduits (Permavoid) - to convey and store part of run-off from the roof, car parking areas, access road, footpaths and service yards.
- Floating Oil Treatment Permafilter Bio-Mat – Treatment mats incorporated within the Permavoid units and are proposed at the water entry points throughout the modular conveyance system to provide a second stage of treatment.
- Modular plastic conduits (Permavoid) - to convey, store and treat part of run-off from the roof, car parking areas, access road, footpaths and service yards.
- Catchpit chambers – manholes with sumps to catch silt and debris.

2.2.2 The treatment channels have outlets at 1m centres, which connect to the shallow preformed conduit system via preformed connectors.

2.2.3 The runoff from the access road, car-parking areas hard standing areas and service is collected by the permachannel system and conveyed to the permavoid storage tanks/conduits located beneath the car park and hard standing areas around the car park. The permachannel has access lids and in-built silt traps.

2.2.4 Storage is achieved using interlocking permavoid modular plastic units assembled to form shallow underground structures. The plastic structures are surrounded with robust SELFlex membranes, which are protected by heavy duty SELTex geotextiles and provided with prefabricated inlet and outlet pipes connections that link with the pipe network.

Avoiding Damage to the System

2.2.5 The main cause of damage to the system is likely to be due to litter, excessive silt accumulation or physical damage to the system. Litter should be regularly removed from the site and the drainage inlets to the permachannel should be routinely inspected for blockages (see below). This is achieved via removable grills located on each length of channel system. To avoid excessive silt build up road and car park surfaces should be swept at least once a year.

- 2.2.6 During cold weather, if maintenance includes gritting to the car parks, then grit application should be kept to a minimum. Grit should not be stockpiled in areas that drain to the SUDS system.
- 2.2.7 If modifications to the site are proposed, designers and contractors should be made aware of the presence of the SUDS, so that due regard can be given to the system and damage avoided.

Maintenance

- 2.2.8 The manufacturer of the SEL system recommends the following inspections and maintenance. Records should be kept by the SuDS management company.

Maintenance Schedule	Required Action	Frequency
Regular maintenance	Sweep external surfaces	At least every 12 months
Remedial actions	Remove litter and blockages.	As required
	Remove silt and oil from inspection chambers and permachannel	As required but at least every 12 months
Monitoring	Inspect the permachannel for signs of blockage and oil spillage	Every 3 months
	Inspect all chambers for silt and oil build up	Every 12 months

Accidental Spillages

- 2.2.9 If accidental spillages occur of oil or other substances that can cause water pollution, they must be dealt with immediately. An example of this is if a car sump fails and there is large spillage of oil on the car park surface. A spillage kit appropriate to the size of the car park should be kept by the site manager. This should include adsorbent pads and socks and drain seals (an example supplier is Darcy Products Limited – www.darcy.co.uk).
- 2.2.10 As soon as a spillage is identified, the drain inlets in that area should be covered to prevent pollution entering the system. The pollution should then be cleared from the road or car park surface. The local permachannel system receiving the spillage should be emptied of all pollution that has entered. The permachannel should prevent any significant pollution entering the rest of the drainage system. The Environment Agency should be informed of the spillage and the actions taken

2.3. Hydrobrake Flow Controls

- 2.3.1. 3 no Hydrobrake flow controls are specified to restrict the flow of surface water into the Grand Union Canal to the agreed flow rate from the development site. Hydro International advise as follows:
- 2.3.2. Normally little maintenance is required as there are no moving parts within the Hydrobrake. Hydrobrake flow controls are fitted with a pivoting bypass door which allows the manhole to be drained down should blockages occur.
- 2.3.3. Following installation of the Hydrobrake it is vitally important that any extraneous material, i.e building materials, are removed from the unit and drainage system.
- 2.3.4. After the system is made live, and assuming the that Hydrobrake is performing satisfactory, it is recommended that each unit is inspected monthly for three months and thereafter at 6 monthly intervals with a hose down if required.