

Operation & Maintenance Plan for Sustainable Drainage Systems

Proposed Residential Development, Queens Park, Millom

Thomas Armstrong and Home Group

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1 INTRODUCTION

1.1 BACKGROUND

R. G. Parkins & Partners Ltd (RGP) has been appointed by Thomas Armstrong on behalf of Home Group to provide an Operation and Maintenance plan for surface water drainage systems for a proposed residential development at Queens Park, Millom

In reviewing the enclosed information, reference should be made to the latest revisions of the following RGP drawings:

- K41327-41 Outline Drainage Layout
- K41327-42 Typical Drainage Construction Details 1 of 2
- K41327-43 Typical Drainage Construction Details 2 of 2

1.2 SUDS COMPONENTS

The proposed residential development at Queens Park, Millom utilises a series of Sustainable Drainage Systems (SuDS) as part of the overall surface water drainage strategy for the site.

- All private parking areas / driveways, hardstanding and roof drainage will drain into shared geocellular attenuation tanks located in suitable areas to serve the connected dwellings. These areas are to be privately maintained by Home Group.
- The isolated visitor parking areas which are detached from the residences are to be constructed as Type A (full infiltration) permeable block paving. These areas are to be privately maintained by Home Group.

All drainage systems have been designed to provide sufficient storage for the critical duration, 1 in 100-year design storm event with a 50% allowance for the future effects of climate change.

2 OPERATION AND MAINTENANCE REQUIREMENTS

As with all traditional drainage systems, SuDS need to be inspected and maintained regularly to ensure that they operate correctly and efficiently. If SuDS are not properly maintained, then there is a risk that the components become overloaded during periods of prolonged heavy rainfall potentially resulting in localised flooding within the development. Recommendations for the maintenance of the SuDS components are detailed in the following section.

As part of this process it is recommended that inspection and maintenance records are retained by the Management Company to track the progressive performance of the SuDS over time. The inspection records should include the following:

- Sediment condition and depth
- Water observations (sheen, smell, etc.)
- Unscheduled maintenance needs
- Components that do not meet performance criteria and require immediate maintenance
- Common problem areas, solutions and general observations
- Aesthetic conditions

For Health and Safety reasons as well as practicality, SuDS systems should be maintained during periods of dry weather wherever possible. Adhering to the recommended maintenance regimes outlined below will minimise the risk of maintenance activities being required when a fault becomes apparent, usually during a rainfall event.

2.1 GEOCELLULAR ATTENUATION STORAGE SYSTEMS

Regular inspection and maintenance is important for the effective operation of below ground storage systems. The tanks will be protected from sediment loads by the use of upstream silt traps with sumps. The highest risk of blockage and siltation is during and immediately after construction. Maintenance responsibility for the attenuation systems will be placed with Home Group. The following requirements refer to the recommendations in The SuDS Manual (CIRIA C753) [1].

Table 2.1 Geocellular Attenuation Storage Maintenance Activities and Schedule

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Inspect and identify any areas upstream of the system that are not operating correctly (i.e. rainwater pipe gullies, silt traps, inspection chambers). If required, take remedial action	Monthly for first 3 months, then six monthly thereafter
	Remove debris from any upstream catchment surfaces (may cause risks to performance)	Monthly for first 3 months, then six monthly thereafter (and after large storm events)
	Remove sediment from pre-treatment structures	Annually, or as required.
	Visual inspection of silt traps, distribution pipes and flow control chamber to ensure no obvious build-up of silt or other blockages. De-silt as required. Check to ensure there is no standing water in the chambers	Monthly for first 3 months, then six monthly thereafter (and after large storm events)
	Inspect external vent pipe and associated pipework to ensure free from blockage or damage	Annually, or as required
Remedial actions	Repair/rehabilitation of inlets, outlets and vents. De-silt as required.	As required
Monitoring	Inspect/check all upstream drainage inlets, outlets, vents and gullies to ensure that they are in good condition and operating effectively. Inspect access turrets and de-silt inside of tank if required	Monthly for first 3 months, then six monthly thereafter (and after large storm events)
	Survey inside of tank for sediment build up and remove if necessary	Every 5 years or as required.

2.2 PERMEABLE BLOCK PAVING

The following section refers to recommendations in the 'Design & Construction of Concrete Block Permeable Pavements', Edition 7, produced by Interpave [1] [2]. It is known that the infiltration rate of permeable block paving will decrease over time due to the build-up of detritus in the jointing material, and then eventually stabilise with age. This is accounted for in the pavement hydraulic design with a suitable factor of safety.

The maintenance of areas of permeable block paving will be the responsibility of Home Group.

Recommended maintenance is minimal, as outlined in Table 2.2 below, and generally no more extensive than that for conventional block paving and less than for conventional gully and pipe drainage. Also, any problems with permeable block paving become apparent on the surface via a visual inspection, unlike the below-ground inspections needed for traditional pipe drainage.

If the below measures are implemented as recommended, then the hydraulic performance of the permeable pavement should be unaffected over its design life. However, if the infiltration rate of the paving reduces significantly, allowing storm water to pond on the surface then it is recommended that the blocks should be uplifted and the laying course cleaned or replaced. The laying course and jointing material and permeable paving blocks may be reused, minimising costs.

Table 2.2 Permeable Block Paving Maintenance Activities and Schedule

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	A visual inspection of the paving should be undertaken to ensure the system is functioning correctly and that there has been no settlement of the jointing material between the blocks. If settlement has occurred then the jointing material should be topped up. The pavement should be inspected to check organic matter has not been displaced onto the surface of the pavement and that weed growth is controlled	3 months after construction, then every 6 months thereafter
	For individual driveways, surfacing should be swept to clear detritus and between joints	Every 6 months or as required
Occasional maintenance	The surface should be treated with a weed killer containing Glyphosate. Glyphosate based weed killers include: Roundup, Tumbleweed and B&Q complete. The widespread application of weedkiller has been shown to impact on the level of protects (microbes) which breakdown hydrocarbons within the permeable pavement and therefore weed killer should be spot applied to avoid reduction in performance of the permeable pavement.	As required
Remedial Actions	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required
Monitoring	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Every 3 months, 48hrs after large storms in first 6 months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers and silt traps	Annually

3 REFERENCES

- [1] CIRIA, *The SuDS Manual*, Report C753, 2015.
- [2] Interpave, *Design & Construction of Concrete Block Permeable Pavements*, Edition 7, December 2018.