

Operation & Maintenance Plan for Sustainable Drainage Systems

Proposed Residential Development, Harras Dyke Farm,
Whitehaven

Washington Homes

Ref: K40340.OM/002

Version	Date	Prepared By	Checked By	Approved By
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1 INTRODUCTION

1.1 BACKGROUND

R. G. Parkins & Partners Ltd (RGP) has been appointed by Washington Homes to provide an Operation and Maintenance plan for surface water drainage systems for a proposed residential development at Harras Dyke Farm, Whitehaven.

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

- K40340-01 to 03 External Levels Plan
- K40340-04 to 05 Highways Longitudinal Sections
- K40340-06-08 External Works Plan
- K40340-09-10 External Works Construction Details
- K40340-11 Vehicle Swept Path Analysis Refuse Vehicle
- K40340-20 to 25 Foul and Surface Water Drainage Plan
- K40340-26 Surface Water Drainage Catchment Plan
- K40340-27 Drainage Cross Sections
- K40340-28 Surface Water Exceedance Plan
- K40340-29-30 Surface water Manhole Schedule
- K40340-31 Foul Water Manhole Schedule

1.2 SUDS COMPONENTS

The residential development utilises a series of SuDS features across the site to serve driveways / individual parking areas, roofs and access roads. These features include swales, a detention basin and oversized pipes as part of the overall surface water drainage strategy for the site. The SuDS features 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, a 10% allowance for urban creep, and an uplift of 40% on green areas.

The basin and swales shall remain private and shall be maintained by a third party Management Company, appointed by Washington Homes.

All below ground pipework, including oversized pipes shall be offered for adoption under a S104 agreement with UU or a NAV. Pipework shall be adopted up to the basin / swale headwalls, including the interconnecting pipework and flow controls.

All diverted land drainage shall remain private and shall be maintained by a third party management company.

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 SUDS DETENTION BASIN & FLOW CONTROL CHAMBERS

Detention basins are depressions used to store stormwater runoff, allowing pollutants to settle and filter out as the water gradually drains via an outfall pipe. Regular inspection and maintenance are required to ensure their effective long-term operation.

Maintenance of the detention basin will be relatively straightforward for a landscape contractor, and there should only be a small amount of extra work required for a SuDS detention basin over and above what is necessary for standard public open space.

The maintenance activities are outlined in Table 2.1 and refer to the recommendations in The SuDS Manual (CIRIA C753), Chapter 22, Table 22.1^[1].

Generally, the Flow Control devices will require little, if any maintenance and have a design life in exceedance of the upstream drainage systems. In the unlikely event that one or more of the devices block and a flow control chamber floods, the device is fitted with a removable weir wall and high-level overflow allowing flows to pass forward in extreme circumstances and for the chamber to be drained down to access for maintenance if required.

The detention basin shall be maintained by a third party Management Company, appointed by Washington Homes. All flow control chambers, and downstream pipework will be offered for adoption under a S104 agreement with UU or a NAV.

Table 2.1 Detention Basin Maintenance Activities and Schedule

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Remove litter and debris	Monthly
	Cut grass – for spillways and access routes	Monthly (during growing season) or as required
	Cut grass – meadow grass in and around basin	Half yearly (spring – before nesting season, and autumn)
	Manage other vegetation and removal of nuisance plants	Monthly (at start and then as required)
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect banksides, structures and pipework for any evidence of physical damage	Monthly
	Inspect inlets and basin bed for silt accumulation. Establish appropriate silt removal frequencies	Monthly (for first year), then annually or as required
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, forebays and outlet	Annually (or as required)
	Manage wetland plants in outlet pool	Annually (or as required)
Occasional maintenance	Re-seed areas of poor vegetation growth	As required
	Remove sediment from inlets, outlets and main basin when required	As required, estimated every 5 years
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
Remedial actions	Repair erosion or other damage by reseeded or re-turfing	As required
	Repair/rehabilitation of inlets and outlets	As required
	Re-level uneven surfaces and reinstate to design levels	As required
	Realignment of stone rip-rap or gabion mattresses	As required

2.2 DRAINAGE SWALES

Vegetated swales are long narrow landscaped depressions used to collect and convey stormwater runoff, allowing pollutants to settle and filter out as the water infiltrates into the ground or flows from one bay to the next through the treatment ‘train’. Regular inspection and maintenance is required to ensure the effective long-term operation of swales. Swales should drain within 24 hours of a storm event; remedial action shall be required if this is not achieved. The swales will be maintained by a third party Management Company. The following requirements outlined in Table 2.2 refer to the recommendations in The SUDS Manual (CIRIA C753), Section 17^[1].

Table 2.2 Swale Maintenance Activities and Schedule

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Litter and debris removal	Monthly or as required
	Grass cutting – To retain grass height within specified design range	Monthly (during growing season), or as required
	Manage other vegetation and removal of nuisance plants	Monthly until grass is established, then as required
	Inspect inlets, outlets and overflows for blockages and clear if required	Monthly
	Inspect infiltration surface for compaction, ponding and silt accumulation, record areas where water is ponding for > 48 hours	Monthly
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets and pre-treatment systems for silt accumulation; establish appropriate silt removal frequencies	Half yearly
Occasional maintenance	Re-seed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required, or if bare soil is exposed over 10% of more of the swale treatment area
Remedial actions	Repair erosion or other damage by re-turfing or reseeded	As required
	Re-level uneven surface and reinstate design levels	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface	As required
	Replacement / repair of check dams	As required
	Erosion control repair	As required
	Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip	As required

2.3 ATTENUATION STORAGE PIPES

Regular inspection and maintenance is required to ensure the effective long term operation of below ground storage systems. Maintenance responsibility for systems should be placed with a responsible organisation. At the proposed residential development, maintenance will be undertaken by a third party Management Company. The following requirements outlined in Table 2.3 refer to the recommendations in The SUDS Manual (CIRIA C753), Section 17^[1].

Table 2.3 Attenuation Storage Maintenance Activities and Schedule

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	Remove sediment from pre- treatment structures	Annually, or as required.
Remedial Actions	Repair inlets / outlets	As required
Monitoring	Inspect / check all inlets to ensure they are in good condition and operating as designed	Annually
	Inspect silt traps to ensure silt collection capacity	Monthly for 3 months after installation, then every 3 months and after a significant rainfall event.
	Survey inside of tank for sediment build up and remove if necessary	Every 5 years or as required.

3 REFERENCES

- [1] CIRIA, *The SuDS Manual*, Report C753, 2015.

APPENDIX A

HYDRO INTERNATIONAL OPERATION AND MAINTENANCE GUIDE

HYDRO-BRAKE[®] FLOW CONTROL MAINTENANCE AND SAFETY DATA SHEET

MAINTENANCE

Normally, little maintenance is required as there are no moving parts within the Hydro-Brake[®] Flow Control. Experience has shown that if blockages occur they do so at the intake, and the cause on such occasions has been due to a lack of attention to engineering detail such as approach velocities being too low, inadequate benching, or the use of units below the minimum recommended size. Hydro-Brake[®] Flow Controls are fitted with a pivoting bypass door, which allows the manhole chamber to be drained down should blockages occur. The smaller type conical units, below the minimum recommended size, are also available with rodding facilities or vortex suppressor pipes as optional extras.

Following installation of the Hydro-Brake[®] Flow Control it is vitally important that any extraneous material ie. building materials are removed from the unit and the chamber. After the system is made live, and assuming that the chamber design is satisfactory, it is recommended that each unit be inspected monthly for three months and thereafter at six monthly intervals with hose down if required. If problems are experienced please do not hesitate to contact the company so that an investigation may be made.

Hydro-Brake[®] Flow Controls are typically manufactured from grade 304 Stainless Steel which has an estimated life span in excess of the design life of drainage systems.

COSHH

Hydro-Brake[®] Flow Controls are manufactured from Stainless Steel, which is not regarded as hazardous to health and exhibits no chemical hazard when used under normal circumstances for the stated applications.

MANUAL HANDLING

The handling of Hydro-Brake[®] Flow Controls should be in accordance with current legislation and regulations:

- The Health and Safety at Work etc. Act 1974.
- The Management of Health and Safety at Work Regulations 1999 (amended 2003).
- The Manual Handling Operations Regulations 1992 (amended 2002).

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