

Operation & Maintenance Plan for Sustainable Drainage Systems

Housing Development

Flosh Meadows

Cleator

Washington Homes

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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 their proposed housing development at Floss Meadows in Cleator, Cumbria.

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

- RGP-2026-0032-41 Outline Foul & Surface Water Drainage Plan

1.2 SUDS COMPONENTS

The housing development at Floss Meadows utilises a Sustainable Drainage System (SuDS) as part of the overall surface water drainage strategy for the site as discussed below

1.2.1 DETENTION BASIN

All surface water run-off from roofs, driveways, access roads, shared surfaces and footways will be collected and conveyed via traditional below ground pipework into a single SuDS detention basin located in the open parcel of land in the south-west corner of the development site. The outfall from the basin will be controlled by a flow regulator device prior to discharging into an existing ordinary watercourse. Ultimately, final discharge of attenuated surface water will be into the River Ehen located to the south the development site. 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.

The detention basin and associated mains drainage will be offered for adoption to United Utilities or an equivalent NAV under a Section 104 Agreement. The required inspection and maintenance criteria for the detention basin is detailed below.

1.2.2 INTERCEPTION/CONVEYANCE SWALE

A shallow swale system is proposed to run along the northern boundary to intercept and convey overland flow from the upland area. The swale system will also provide a new diversion channel for the existing culverted watercourses that run through the development site. The swale will re-direct all flows towards the western boundary before being culverted into a new 450mm dia. pipe with final discharge into the existing ordinary watercourse located in the south-west corner of the site.

The swale and culvert pipe will remain private and will be maintained by a Management Company. The required inspection and maintenance criteria for the swale is detailed below.

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 will 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 will minimise the risk of maintenance activities being required when a fault becomes apparent, usually during a rainfall event. An example of a drainage maintenance inspection checklist is included in Appendix A for reference (see Table B.25 from The SuDS Manual ^[1]).

All maintenance activities should be detailed in the Health and Safety Plan and a risk assessment should be undertaken in accordance with CDM regulations.

2.1 SUDS DETENTION BASIN & HYDROBRAKE FLOW CONTROL CHAMBER

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 is required to ensure their effective long-term operation.

Maintenance of the detention basin will be relatively straightforward, 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 below and refer to the recommendations in The SuDS Manual (CIRIA C753), Chapter 22, Table 22.1 ^[1].

The detention basin and flow control chamber shall be maintained by the adopting authority. In addition to the recommended maintenance requirements, FP McCann Ltd also provides guidance for the operation and maintenance of their flow control devices, a copy of which is included in Appendix B. Generally, the flow control device will require little, if any maintenance and has a design life in exceedance of the upstream drainage systems. In the unlikely event that the device blocks and the flow control chamber floods the device is fitted with a pivoting by-pass door which can be accessed and opened from ground level via a pull handle and operating steel rope. This will allow the chamber to be drained down to provide access for maintenance.

Table 2.1 Operation and maintenance requirements for the SuDS detention basin

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 remove 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 reseedling 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 SWALE & LAND DRAINAGE DIVERSION CULVERT

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 to reinstate conveyance potential if this is not achieved.

The land drainage diversion pipe will comprise a 450mm dia. pipe with associated upstream and downstream headwalls.

The swale and land drainage diversion system will remain private and will be maintained by the Management Company. The following requirements refer to the recommendations in The SUDS Manual (CIRIA C753), Section 17^[1].

Table 2.2 Operation and maintenance requirements for the swale

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 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 reseedling	As required
	Re-level uneven surface and reinstate design levels	As required
	Scarify and spike topsoil layer to improve 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
	Remove and dispose of oils or petrol residues using safe standard practices	As required

3 REFERENCES

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

APPENDIX A

Example of drainage maintenance inspection checklist

General information			
Site ID			
Site location and co-ordinates (GIS if appropriate)			
Elements forming the SuDS scheme		Approved drawing reference(s)	
Inspection frequency		Approved specification reference	
Type of development		Specific purpose of any parts of the scheme (eg biodiversity, wildlife and visual aspects)	

Inspection date								
	Details	Y/N	Action required	Date completed	Details	Y/N	Action required	Date Completed
General inspection items								
Is there any evidence of erosion, channelling, ponding (where not desirable) or other poor hydraulic performance?								
Is there any evidence of accidental spillages, oils, poor water quality, odours or nuisance insects?								
Have any health and safety risks been identified to either the public or maintenance operatives?								
Is there any deterioration in the surface of permeable or porous surfaces (eg rutting, spreading of blocks or signs of ponding water)?								
Silt/sediment accumulation								
Is there any sediment accumulation at inlets (or other defined accumulation zones such as the surface of filter drains or infiltration basins and within proprietary devices)? If yes, state depth (mm) and extent. Is removal required? If yes, state waste disposal requirements and confirm that all waste management requirements have been complied with (consult environmental regulator)								
Is surface clogging visible (potentially problematic where water has to soak into the underlying construction or ground (eg underdrained swale or infiltration basin)?								
Does permeable or porous surfacing require sweeping to remove silt?								
System blockages and litter build-up								
Is there evidence of litter accumulation in the system? If yes, is this a blockage risk?								
Is there any evidence of any other clogging or blockage of outlets or drainage paths?								
Vegetation								
Is the vegetation condition satisfactory (density, weed growth, coverage etc)? (Check against approved planting regime.)								
Does any part of the system require weeding, pruning or mowing? (Check against maintenance frequency stated in approved design.)								
Is there any evidence of invasive species becoming established? If yes, state action required								
Infrastructure								
Are any check dams or weirs in good condition?								
Is there evidence of any accidental damage to the system (eg wheel ruts)?								
Is there any evidence of cross connections or other unauthorised inflows?								
Is there any evidence of tampering with the flow controls?								
Are there any other matters that could affect the performance of the system in relation to the design objectives for hydraulic, water quality, biodiversity and visual aspects? (Specify.)								
Other observations								
Information appended (eg photos)								
Suitability of current maintenance regime								
Continue as current								
Increase maintenance								
Decrease maintenance								
Next inspection								
Proposed date for next inspection								

APPENDIX B

Flow Control Device Operation and Maintenance Guide

StormBrake™ Operation and Maintenance Information

StormBrake™ operates without any moving parts, requires no power source, is self-activating and self-cleansing. As such, maintenance requirements are minimal. Inspection of the StormBrake™ should be carried out in accordance with the normal inspection protocol of the drainage line it is connected to. StormBrake™ is designed with larger inlet and outlet clearances compared to traditional flow controls, allowing debris to pass through more easily and reducing the risk of blockages occurring. If a blockage occurs, it is more likely to be positioned at the inlet to the StormBrake™. A bypass door is fitted to each StormBrake™ which can be opened via a guided stainless steel rope cable fitted to the top of the flow control chamber. Opening the bypass door allows quick drainage of any excess water in the chamber to allow removal of the blockage.

StormBrake™ is constructed from a minimum of grade 304 Stainless Steel (316 for certain applications) and is therefore expected to exceed the design life of any drainage system it is installed. Stainless steel is not regarded as a health or chemical hazard when used under normal circumstances.

Manual handling of the StormBrake™ should be in accordance with current legislation. A lifting loop is fitted to the top of each StormBrake™ to allow for easy lowering of the unit into the flow control chamber.