

Land North of Summer Lane

Pagham, West Sussex

OWNERS MANUAL

Relating to Surface Water Drainage Maintenance

The site has been designed in accordance with Sustainable Drainage Systems (SuDS) techniques.

An extract from the SuDS Manual (CIRIA C753) states “Sedimentation is one of the primary removal mechanisms in SUDS. Most pollution in runoff is attached to sediment particles and therefore removal of sediment results in a significant reduction in pollutant loads..”.

In order to remove sedimentation the surface water drainage design utilises deep seal trapped gullies throughout, catchpit manholes upstream of the surface water granular filter drains and bio-retention areas in attenuation ponds.

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1) Explanation of the Surface Water Drainage System

The Principle of SUDs has been adopted for the whole of the site, calculations have been carried out using MicroDrainage with a storm return period of 100 years and an allowance of 40% for climate change and 10% allowance for urban creep.

Generally, roof water drains direct to the domestic drainage system within each curtilage and from there will be directed to the below ground surface water network

Hardstanding areas and access roads or drives, drain to trapped gullies. Parking bays constructed of permeable paving will drain to ground, but will also contain an overflow provision which connects to the new below ground surface water network. All of these systems outfall to the surface water drainage system within the site.

Surface Water run-off from the main access road leading up to Plot 1, drains below the surface within a permeable gravel sub-base layer, the water runs along the road sub-base on a northern direction where it connects into the main onsite surface water drainage network. Rainfall run off from Plots 1-30, in the eastern side of the development, all drain into the main surface water network below the main road and drain northwards, where it discharges into an existing ditch which has been refurbished to accommodate flows from this development. The water runs along the ditch from east to west, where it eventually re-enters the site via a new headwall and then drains into the large basins and swales system in the western part of the development.

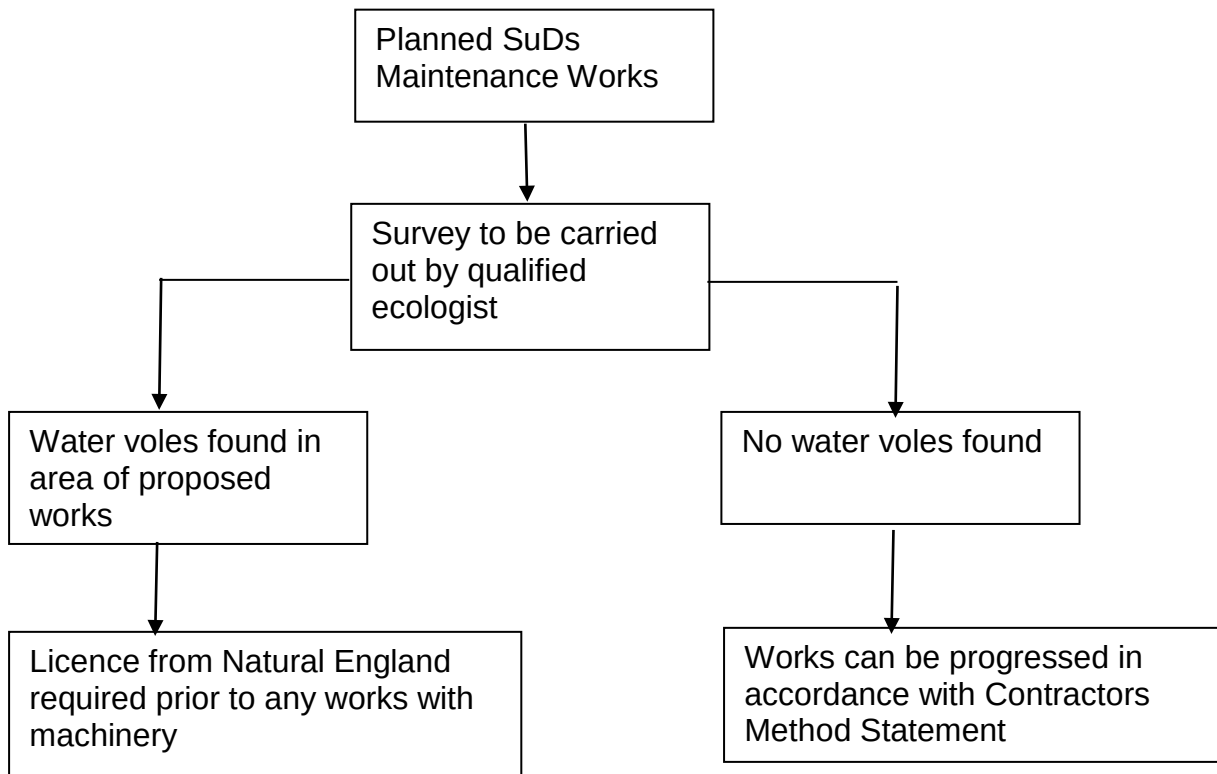
This large swale and the two attenuation basins provide temporary storage of the surface water by slowing down the flows at key manholes SW10 and SW2 through the use of Hydrobrake flow controls which are located inside of these manholes. During peak storm events the water levels in the swales and basins will rise temporarily and after the rainfall will drop back down to the existing levels, eventually keeping these basins dry, except for the main deeper channels in these basins which may have groundwater depending on the seasons.

2) Operating and Maintenance Responsibility

Drew Smith Homes are responsible for maintaining the surface water drainage systems on this site during the construction period. A management company nominated by Drew Smith Homes which during the construction period will have DSM as the sole directors. Upon handover and occupation a Maintenance Company will be handed over to residents who will take over as Directors.

The Management Company will appoint a managing agent who will ensure that the SuDS are maintained as set out in this document. The maintenance and operation will be funded through contributions from the residents to the maintenance company.

As part of the maintenance responsibility of the SuDS and drainage system, it is important that all future maintenance works consider the presence of water voles and other ecological sensitive receptors. As such prior to any intrusive maintenance works (which includes the use of heavy machinery where soils/ground is disturbed) to the new swales, ditches and basins an ecological survey should be carried out to determine the proposed method statements and if any licences are required ahead of the works. A simple flow chart has been provided below to describe the approach which needs to be considered:



3) Maintenance Schedule for catchpits, control chambers, flow control devices and gullies (including bottle gullies)

Flow Control Maintenance

Normally, little maintenance is required as there are no moving parts within the Flow Control. The Flow Control is fitted with pivoting by-pass door, which allows the manhole to be drained down should blockage occur. It is recommended that the unit be inspected at six monthly intervals with hose down if required. All 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.

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 six monthly
	Operation testing and jetting of debris to bypass door	Monthly
	Debris removal from catchment surface (where may cause risks to performance)	Monthly
	Remove sediment from control chamber sumps	Annually, or as required.
	Remove sediment and oil deposits from all trapped gullies including bottle gullies and catchpit chambers upstream of permeable paving to prevent silt entering permeable paving and reducing performance.	Annually, or as required.
Remedial actions	Repair/rehabilitation of inlets, outlets, overflows and vents.	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually and after large storms

4) Maintenance Schedule for Permeable Paving

Maintenance Schedule	Required Action	Frequency
Regular maintenance	Brushing & vacuuming	Three times/year at end of winter, mid-summer, 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.	As required.
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 depression's, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users.	As required.
	Rehabilitation of surface and 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.	3-monthly, 48h after large storms.
	If required take remedial action.	
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually.
	Monitor inspection chambers.	Annually.

5) Maintenance Schedule for Attenuation basins, bio-retention areas and swales

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Litter and debris removal.	Monthly
	Grass cutting – for spillways and access routes. Removal of tree samplings that seed themselves.	Monthly (during growing season), or as required.
	Grass cutting – meadow grass in and around basin. Ensure that the meadow grass is not cut lower than 10cm. No vehicle should track within 3-5m of the toe of the bank	50% of the area annually during late autumn period (eg 1 side/bank of the system each year or 50% in area terms spread out amongst the system). Adjust as required should any survey show Water voles are present.
	Manage other vegetation and remove nuisance plants and saplings.	Monthly (at start, then as required).
	Tidy all dead growth before start of growing season.	Annually.
	Remove sediment from all areas to include inlets outlet, forebay and open channel.	Annually (or as required).
Occasional maintenance	Check for poor vegetation growth due to lack of sunlight or leaf dropping litter and cut back adjacent vegetation where possible/	Annually
	Re-seed areas of poor vegetation growth. Alter plant types to better suit conditions, if required	Annually, or if bare soil is exposed over 10% or more of the basin/swale treatment area
	Prune and trim trees and remove cuttings.	2 years (or as required). Ensure this is undertaken outside of bird

		nesting season.
Remedial actions	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface.	As required.
	Repair of erosion or other damage by re-turfing or reseeding.	As required.
	Re-level uneven surfaces and reinstate design levels.	As required.
	Repair/rehabilitation of inlets, outlets and overflows.	As required.
	Remove and dispose of oils or petrol residues using safe standard practices	As required
	Repair of geomembrane liner with replaced areas with minimum overlap of 300mm.	As required - to be replaced within product design life
	Repair of gabion mattress sections.	As required - to be replaced within product design life of minimum 60 years.
	Repair of gabion mattress sections to open channel and laid in as indicated on drawings DSM/E4761/431 & 432.	As required - to be replaced within product design life of minimum 60 years.
Monitoring	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly/ after large storms.
	Inspect banksides, structures, pipework etc. for evidence of physical damage.	Monthly/ after large storms.
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly.
	Check flow control device and other mechanical devices.	Half yearly.

6) Maintenance Schedule for Filter trenches and porous pipework

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Litter and debris removal from trench surface, access chambers and pre-treatment devices.	Monthly (or as required).
	Removal and washing of exposed stones on the trench surface.	Annual (bi-annual the first year) or when silt is evident on the surface.
	Trimming of any roots that may be causing blockages.	Annual (semi-annual the first year).
	Remove weeds on the trench surface.	Monthly (at start, then as required).
Occasional maintenance	Removal of sediment from pre-treatment devices.	Six monthly
	Remove tree roots or trees that grow close to the trench.	As required.
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace filter media.	Five yearly.
Remedial actions	Clear perforated pipework of blockages.	As required.
	Rehabilitate infiltration or filtration surfaces.	As required.
	Replace geotextiles and clean and replace filter media, if clogging occurs.	As required.
	Inspect inlets, outlets and inspection points for blockages, clogging, standing water and structural damage.	As required.
Monitoring	Inspect pre-treatment systems, inlets, trench surfaces and perforated pipework for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly.

7) Maintenance Schedule for Grilles

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Litter and debris removal.	Monthly (or as required) or after heavy rainfall events
Occasional maintenance	Check moving parts and locks. Oil and ensure free moving. Replace when necessary.	As required.
Remedial actions	Remove build-up of sediment.	As required.
Monitoring	Inspect for blockages, and clear if required.	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly.

8) Maintenance Schedule for solid wall pipes

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 six monthly.
	Debris removal from catchment surface (where may cause risks to performance)	Monthly
	Inspect chambers and manholes for evidence of pipes operating correctly and take remedial action if necessary, to include jetting of pipework.	Monthly for 3 months, then annually

9) Maintenance Schedule Ditches and Culverts

Existing Ditches

There are two, existing ditches which curtail the site; the northern ditch which runs east to west, and the southern ditch which also flows east to west. The existing northern will be maintained by a Management Company and where it runs adjacent to the rear gardens of dwellings, a 3m easement will be provided from the top of bank. This will be required in order for the Management Company to undertake Maintenance in accordance with the schedule below. This easement is indicated on the ditch Maintenance Plan drawing DSM/E4761/014 and applies to Plots 29, 30, 31, 32, 33, 34 & 35 and will be written into the deeds of these dwellings. The dwellings will utilise demountable fencing to rear gardens where the easement is present in order to provide sufficient access for the Management Company to undertake maintenance procedures as required. The southern ditch will also be maintained by the management company and will encompass the ditch including, bridge crossings and associated culverts as indicated on the Ditch Maintenance Plan. This includes the section of ditch downstream of the outfall whereby the gabion mattress will be maintained as outlined in the maintenance schedule below. The areas to be maintained by Management Company are also indicated on the Conveyance Plan drawing 1177-WD-800-A1.

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. Close cut around outlet & structure. 100 – 150mm generally.	Monthly (during growing season), or as required.
	Manage other vegetation and remove nuisance plants.	Monthly (at start, then as required).
	Emptying of upstream silt traps	Monthly (at start, then as required).
Occasional maintenance	Check for poor vegetation growth due to lack of sunlight or dropping of leaf litter, and cut back adjacent vegetation where possible.	Annually
	Re-seed areas of poor vegetation growth. Alter plant types to better suit conditions, if required.	Annually, or if bare soil is exposed over 10% or more of the swale treatment area.
	Repair erosion or other damage by re-turfing or reseedling.	As required

Remedial actions		
	Re-level uneven surfaces and reinstate design levels.	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.
	Repair of gabion mattress sections to ditches and laid as indicated on drawings DSM/E4761/420 & 421.	As required - to be replaced within product design life of minimum 60 years.
Monitoring	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly
	Inspect infiltration surfaces for ponding, compaction, silt accumulation. Record areas where water is ponding for >48 hours.	Monthly, or when required.
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly.

10) Reasons for Maintenance

Surface water contains variable amounts of sediment which settles out at certain locations and could cause blockages if left. Road gullies also trap oil and prevent it entering the surface water sewer system.