SPRING DEV 08 LTD

Purton Landfill Solar Farm

Sustainable Drainage Management Plan

1 INTRODUCTION

Sustainable drainage systems (SuDS) are a means of managing rainfall and subsequent runoff through landscape features. They are designed to maximise benefits from surface water management and are an environmentally friendly approach.

Typical aims of SuDS include:

- Controlling the flow, volume and frequency of water that leaves a development
- Intercepting silt and cleaning runoff from hard surfaces - preventing pollution
- Create opportunities for wildlife and biodiversity gains
- Create and sustain better places for people

This SuDS Management Plan is written to discharge Conditions 4, 5 and 6 for the Purton Landfill Solar Farm:

4. No development shall commence on site until details of surface water drainage have been submitted to and approved in writing by the Local Planning Authority. The plan must demonstrate that the development will not increase surface water runoff rates to adjoining Network Rail land (including drainage ditches) or the existing railway underpass. The development shall not be first brought into use until the surface water drainage has been constructed in accordance with the approved scheme.

5. (ref PL/2021/10405) planning permission – 'No development shall commence on site until a detailed drainage maintenance plan has been submitted to and approved in writing by the Local Planning Authority. The maintenance plan must include details of how vegetation across the site will be managed in order to prevent channelised surface water pathways from forming. Thereafter, the approved plan shall be implemented for the lifetime of the development.'

6. No development shall commence on site until details of the drainage arrangements during the construction phase have been submitted to and approved in writing by the Local Planning Authority. The plan must detail control measures to be used during the construction phase to prevent an increase in local flood risk and pollution risk to watercourses and waterbodies. Thereafter, the approved plan shall be implemented and adhered to throughout the construction period.

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2 SUDS AT PURTON LANDFILL SOLAR FARM

The SuDS at the Purton Landfill Solar Farm site are designed to provide attenuation for surface runoff from the site to ensure there is no increase of peak runoff from the site. The main features of the SuDS system is a ditch around the site which connects to a series of existing attenuation ponds. In addition, as part of this development a total length of 1,249 m of swales will be constructed along the contours of the site with a low gradient (~1:200). This ensures some flow through the swales whilst also encouraging the storage of water within the swale.

Spring Dev 08 Ltd will be responsible for the maintenance of the SuDS features on the site. Contact details for them are included at the end of this note.

3 CONSTRUCTION OF THE SUDS

The construction specifications within the CEMP and LEMP reports for the Site will be adhered to during the construction phase. An increase to the risk of flooding during construction will be avoided with the following mitigation measures put in place to manage water and silt from leaving the site:

- Swales are constructed prior to the connection points to the ditches, to contain any excess runoff within the swales and any silt runoff from the site will be prevented from entering the ditches.
- Swales will be constructed prior to the panels being installed in the areas that discharge down to these swales
- The constructed swales will be monitored after rainfall events, and if necessary further silt removed if there have been large depositions.
- The connections through to the ditches will be constructed during dry weather if possible and will be constructed from upstream to downstream to avoid a discharge of sediment into the ditches.
- Regular water quality monitoring (in terms of turbidity and oxygen levels) will be undertaken in the ditches and ponds and if there are signs of sediment entering these ponds then construction works will be ceased.
- The main construction drainage impacts are likely to be restricted to localised concentration of runoff from rutting of the ground surface and water quality issues from any increased sediment runoff from the site. With the capping layer over the landfill and the limited plant size required it is unlikely that any significant rutting could occur, however this will be monitored during construction, especially if works are undertaken during wet weather. If there are signs that rutting is resulting in concentrated runoff then the rutting should be smoothed out, and if necessary temporary shallow bunds should be dug across the rutting (using locally displaced material) to dissipate this runoff until such time as the ground surface can be repaired.

4 MANAGING THE SUDS

The SuDS at Purton Solar Farm have been designed for easy maintenance, that would include:

- Regular day to day care - grass cutting, checking inlets and outlets where water enters or leaves a SuDS feature
- Occasional tasks - managing vegetation in the ponds and swales. Removing any silt that builds up in the SuDS features. Checking for increased amounts of erosion on features following high flow events.
- Remedial work - repairing any damage where necessary

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Figure 1 shows the overall drainage plan for the site, with the key elements marked. Typical details are also provided in the following figures (2-4) of a generic swale design and the more specific details of the swales and outlets on this site.

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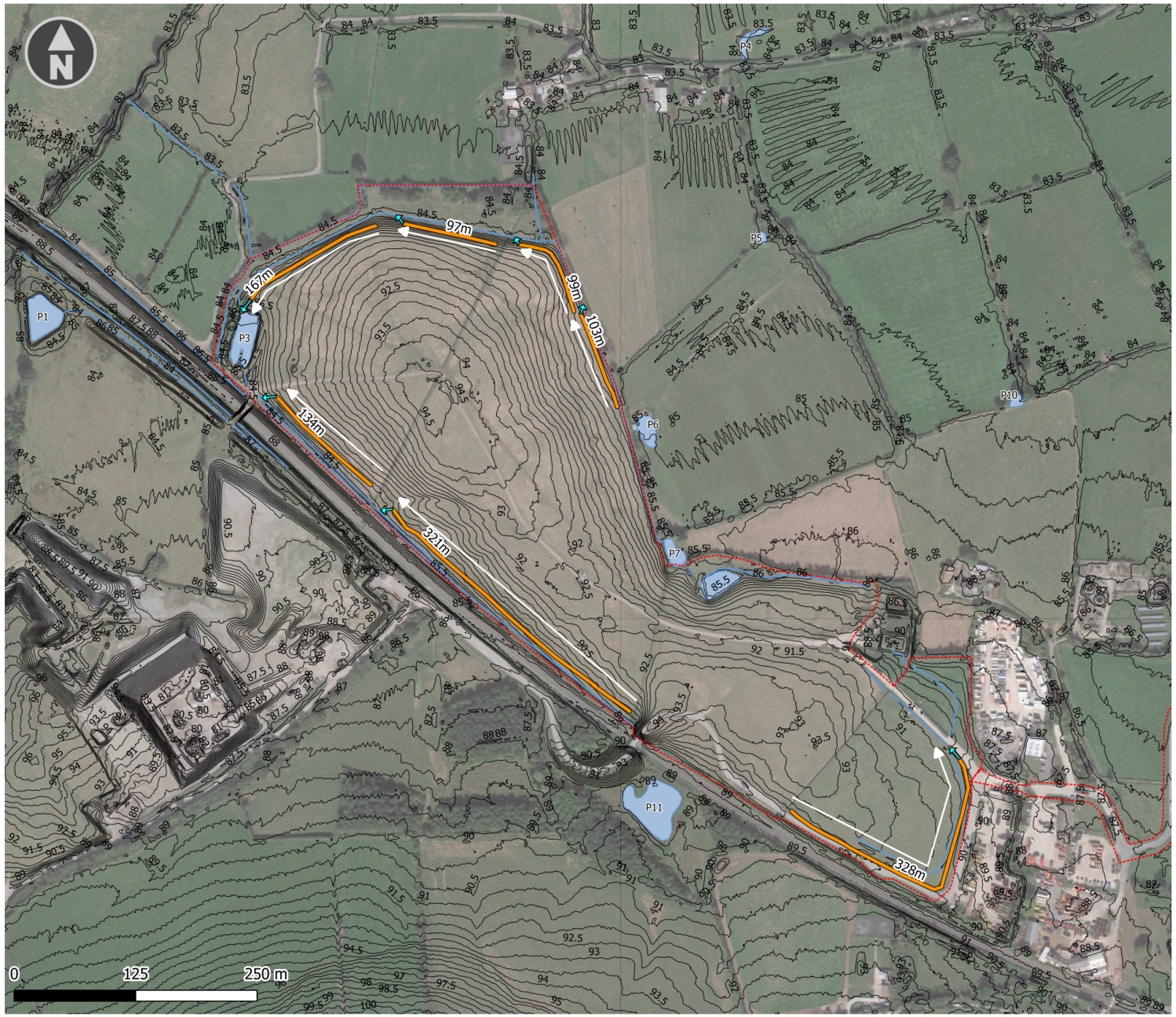
Figure 1 - Location of SuDS Features



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- Site Boundary
- Connection Points
- Ditches
- 0.5m Contours
- Existing Ponds
- Proposed Swale Locations

White Arrows indicated direction of drainage in proposed swales. Length of swales indicated above each individual swale.

CLIENT	Spring Che Ltd
PROJECT	Purton Landfill Solar Farm
TITLE	Proposed Swales with Contours

SCALE @ A3	CREATED BY	CHECKED BY
1:3,750	JS	AW
REFERENCE	**REVISION**	**DATE ISSUED**
J00725-015		5/8/2021

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Figure 2 - Indicative swale cross section (Source - The SuDS Manual, CIRIA 2015)

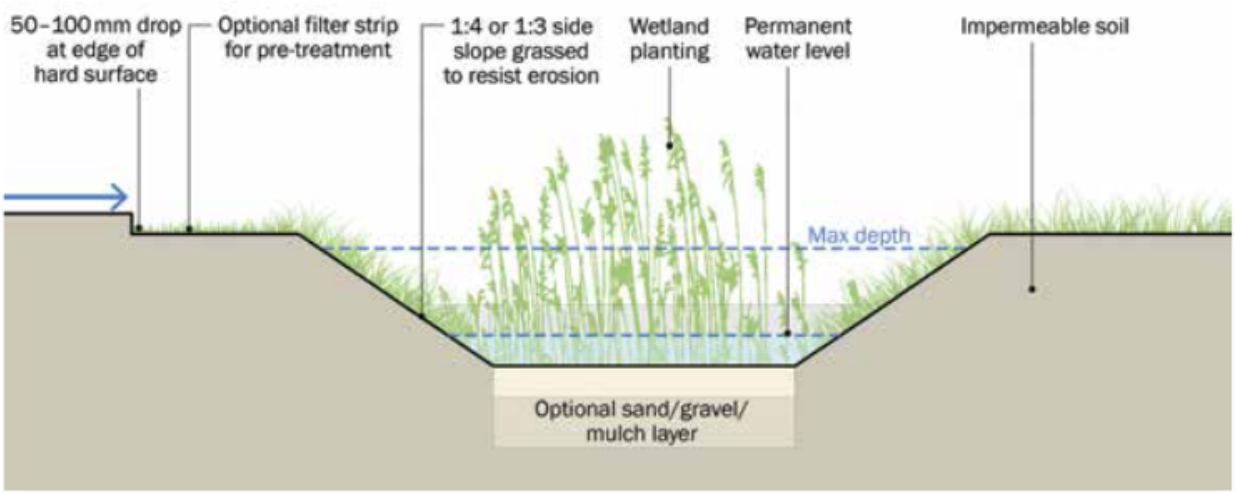

Figure 3 - Typical swale profile on Purton site

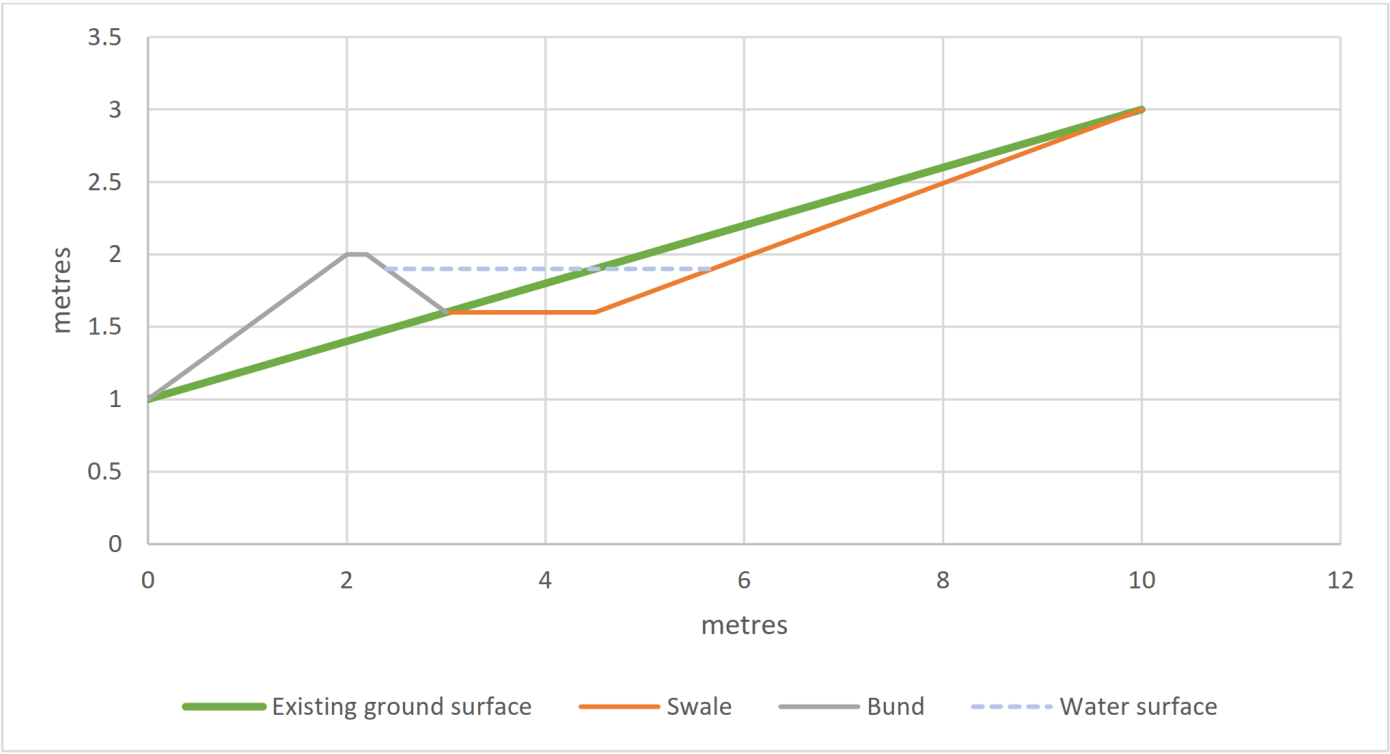

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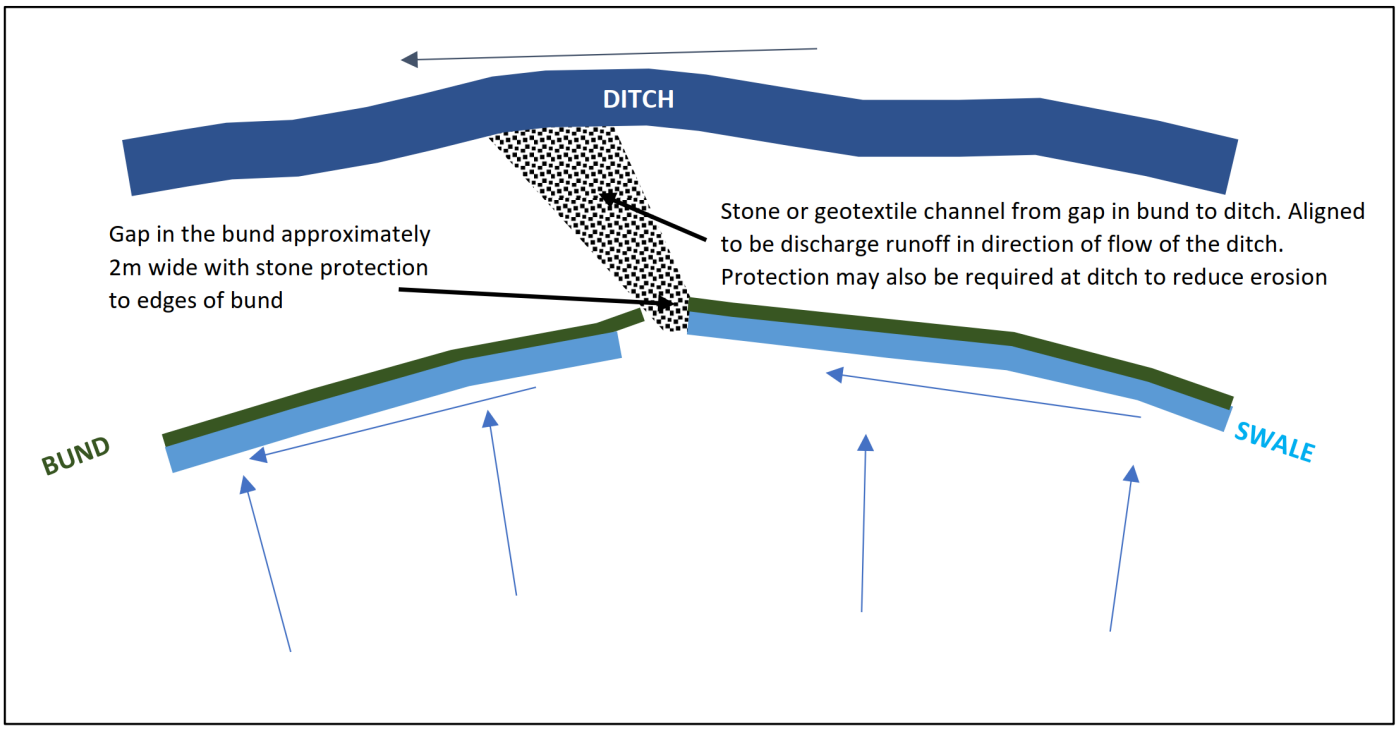
Figure 4 - Details of swale outlets into ditch



5 SUDS MANAGEMENT

5.1 ATTENUATION PONDS, MAIN DITCH AND SWALES

The drainage system including the ponds and swales will be subject to a routine monitoring and maintenance schedule as part of the general site management. The key maintenance requirements for the ponds and swales will be the maintenance of vegetation and mowing of grass within and on the bank/verges of the swales/ponds, and the removal of sediment that has accumulated overtime and collection of litter and debris.

5.1.1 Actions:

- Reduce shading of the existing ponds to 40% shoreline shading through removal of tree branches.
- Remove any excess duckweed in spring, scooping them up by running a net across the surface.
- Remove excess blanket weed using a cane or stick, also in spring.
- Remove any excess aquatic or marginal plants in the winter (November to January inclusive). If marginals become too big in the summer, these can be cut back as required. Any vegetation to be left on the side of the pond for 48 hours before removal to designated compost area.
- Monitoring of sediment levels within the ponds, accumulated sediment should be periodically removed if it is impacting the attenuation volume of the ponds.
- Monitoring of sediment levels within the ditches and swales and periodic removal by hand if found to be impacting performance of the swales in terms of hydraulics and water quality.

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6 SUDS MAINTENANCE – SUMMARY

Table 1 – SUDS Maintenance

Action		Frequency	Unit Rate	Total
	Regular Maintenance			
1	Litter Management			
1.1	Pick up all litter in SuDS and remove from site	As required	Whole Site	
2	Grass Maintenance - all cuttings to wildlife piles			
2.1	Swales - one cut between mid-July and December. 2 phase cut for tall growth; phase 1 to 100 mm and then left for 3-7 days, final cut 50 mm.	Once annually		
3	Inlets and Outlets			
3.1	Inspect monthly, remove silt and debris. Strim vegetation (1 m minimum area around structures) to ensure access and unimpeded flow.	Once monthly		
	Occasional Tasks			
4	Pond Vegetation			
4.1	Reduce shading of existing ponds to 40% shoreline shading through removal of tree branches.			
4.2	Remove any excess duckweed with a net, and remove any excess blanket weed using a cane or stick. Remove any excess aquatic or marginal plants. Marginals to be cut back if too big. Left on the side of the pond for 48hours before moving to designated onsite compost area.	Once annually in spring Once annually (Nov-Jan inclusive) As required (in summer)		
5	Silt Management			
5.1	Inspect swales, ponds and ditches annually for silt accumulation	Once annually	See above for ponds and swales	

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5.2	Excavate silt, stack and dry within 10 m of the SuDS feature, but outside of design profile where water flows, spread, rake and overseed	As required	As above	
6	Native Planting			
6.1	Remove lower branches where necessary to ensure good ground cover to protect soil profile from erosion	As required		
	Remedial Work			
7	Inspect SuDS system regularly to check for damage or failure. Undertake remedial work as required.	Annually and after high rainfall events.		

7 SUDS MAINTENANCE SPECIFICATION

7.1 GENERAL REQUIREMENTS

Table 2 General Requirements

Maintenance activities comprise • Regular Maintenance • Occasional Tasks • Remedial Work	Frequency
Generally Litter - collect all litter or other debris and remove from site at each site visit	Monthly

- Avoid use of weedkillers and pesticides to prevent chemical pollution.
- Protect all permeable, porous and infiltration surfaces from silt, sand, mulch and other fine particles.

7.2 SWALES

Swales are linear, grassed or vegetated channels that convey water from one place to another which can also store water and allow it to soak into the ground.

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Table 4 – Swale Maintenance

Swales	
Regular Maintenance	**Frequency**
Grass Once established and if not grazed, one cut from mid-July to the end of December. Where tall growth is to be cut back/strimmed, the cut should be 2 phase; phase 1 will be a cut to 100 mm then left for 3-7 days, phase 2 will be a cut to 50 mm.	Once annually
Consider carrying out an additional cut mid-February if there is excessive winter growth, and upon agreement with CA.	As required
Occasional Tasks	**Frequency**
Where there is build-up of silt in the swales (i.e. 150 mm or more above the design level) then remove and spread on site. Undertake when ground is damp in autumn or early spring.	As required
Spread excavated material on site above SuDS design profile, e.g. top of banks, in accordance with EA Waste Exemption Guidance,	As required
Remedial Work	**Frequency**
All damage to be made good to design profile unless there is a design flaw	As required

7.3 PONDS

Ponds are depressions in the ground that store water. Water levels will rise after a rainfall event, and then as the water soaks away into the ground or gets released into a watercourse or drain the levels will return to normal. Some water is often held back in a pond for final treatment (if required) or amenity interest.

Ponds can be permanent or temporary and are mainly open water features.

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Table 5 – Pond Maintenance

Ponds	
Regular Maintenance	**Frequency**
1. Removal of excess duckweed by running a net across the surface. 2. Removal of excess blanket weed with a cane or stick. 3. Remove any excess aquatic or marginal plants. Any removed vegetation to be left for 48 hours by the side of the pond before removal to designated compost area. 4. Cutting back of marginals if they become too big	1. As required in spring 2. As required in spring 3. As required in winter (Nov-Jan) 4. As required in summer
Occasional Tasks	**Frequency**
Where silt accumulates on apron or area in front of inlet or outlet then remove and apply on the land within design profile of the SuDS. Monitor silt accumulation within ponds. Remove silt as instructed but not more than 30% of pond area at any one time and to an agreed depth but not subsoil layer. Retain as much existing vegetation as possible to ensure rapid re-colonisation of open areas. Stack excavated material adjacent to pond to allow de-watering of silt. Silt removal to be undertaken during September to October to minimise damage to protected wildlife and ensure re-growth of vegetation before winter. Spread excavated material on site above SuDS design profile.	Annually or as required
Remedial Work	**Frequency**
Repair any damage to liners (if present) or control structures (if present)	As required

7.4 INLETS AND OUTLETS

Inlets and outlet structures may be surface structures or conveyance pipes with guards or headwalls. They are required to be free from obstruction at all times to ensure flow is unimpeded.

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Table 6 – Inlet/Outlet Maintenance

Inlets and Outlets	
Regular Maintenance	**Frequency**
Inspect surface structures removing obstructions and silt as necessary. Check there is no physical damage. Strim vegetation (1 m minimum around structures) and keep hard aprons free from silt and debris.	Monthly
Remedial Work	**Frequency**
Repair physical damage if necessary	As required

8 CONTACT DETAILS

For any queries relating to the SuDS or their maintenance please contact Spring Dev 08 Ltd.

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