

REPORT REF: 217940-R07

DOCUMENT CONTROL

REV	ISSUE PURPOSE	AUTHOR	CHECKED	APPROVED	DATE
-	FIRST ISSUE	AMC	AMC	AD	07.02.25
A	FINAL ISSUE (UPDATED TO FINISHED INSTALLATION)	AD	AMC	AD	11.11.25
B	PHASED RESPONSE	AD	AMC	AD	26.02.26

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1.0 INTRODUCTION

This report is intended to verify that the Sustainable Drainage Systems (SuDS) which form part of the proposed development at Land at Ford Road, Arundel have been installed in accordance with the detailed design drawings. Conclusions have been drawn based on evidence provided by Esquire Developments including delivery notes, photographs and an as-built survey which has been compared against ACE's construction drawings.

Reference should be made to the following:

Appendix A – Proposed Phasing Plan; provided by Shakespeare Design Solutions (drawing ref. ESQ-061-FRA-SLP-PP | Rev. P5)

Appendix B – Suds Maintenance Schedule (report ref. 2107940-071)

Appendix C – ACE construction drawings: Engineering Layout (2107940-035-038); Drainage Strategy (2107940-039-042); Construction Layout (2107940-043-046); Construction Details (2107940-047-049); Drainage Details (2107940-053-056), Headwall Sections (2107940 150-155)

Appendix D – As_Built Survey; provided by Esquire Developments (dated 11.11.25)

2.0 SUSTAINABLE DRAINAGE SYSTEMS

The proposed drainage strategy utilises the following drainage features:

- Surface and Foul Water manholes and pipes
- Foul Water Rising Main and Pumping Station
- Attenuation Basins
- Flow controls and headwalls are also present on the site, with the drainage eventually discharging to an existing ditch which bounds the site to the south.

This drainage verification report refers to the information received for all phases of the project. Refer to **Appendix A** for the phasing plan.

A SuDS Maintenance Schedule was previously produced to identify the requirements for ongoing maintenance of the different SuDS features once construction is complete, which can be found in **Appendix B**.

Ardent's Construction drawings have been used as a comparison to Esquire's As-Built Survey, to verify the drainage information. Ardent's Construction drawings can be found in **Appendix C**, whilst the As-Built Survey can be found in **Appendix D**.

Verification for Surface and Foul Water manholes and pipes

ACE's Drainage Strategy (drawing number 2107940-039 to 042) shows the arrangement of the surface and foul water pipes and manholes.

Figure 1 and Figure 2, photos taken from site, shows the construction of a pre-cast concrete manhole and a drainage trench.

As-Built Survey provided is generally in accordance with the Drainage Strategy with the minor differences in inverts not making a practical difference to the functionality of the system.



Figure 1 – Pre Cast Concrete Manhole



Figure 2 – Drainage Trench

Verification for Foul Water Rising Main and Pumping Station

ACE Foul and Surface Water General Arrangement drawing (drawing number 2107940-039 to 042) indicates the position of foul rising main; located east of the site.

Figure 3 and Figure 4, photos taken from site, shows the construction of the rising main and the pumping station

As-Built Survey provided is generally in accordance with the Drainage Strategy.



Figure 3 – Pumping Station



Figure 4 – Rising main trench construction

Verification for Attenuation Basin and Headwalls

Refer to As-Built Survey, found in **Appendix D**.

As-Built Survey provided is generally in accordance with the Drainage Strategy. It is noted that the pond lining has now been installed along with carrier drains which had been omitted during the Phase 1 verification review. Figures 5-7 below show the installation of the liner on each pond.



Figure 5 – Pond 1 Liner Installation



Figure 6 – Pond 2 Liner Installation



Figure 7 – Pond 3 Liner Installation

It is also noted that the balancing pipe under the access road has been installed at 300 diameter; per discussions with site it has been confirmed that this was to keep the crown of the pipe out of the bound courses of the highway, as this pipe is not intended to take excessive flows this is therefore acceptable to the designer.

Finally it is noted that the headwalls on the pond were originally designed as concrete bagwork headwalls; these have been installed as ragstone headwalls which the designer confirms are an acceptable alternative.

Phased Comments

The development has been brought forward in phases as set out in **Appendix A**. We have evaluated the current status of the drainage within each parcel and as set out above the 'infrastructure' works have all been carried out in line with the required design. There are however a couple of minor items within the later phases that will require attention prior to approval of the system can be confirmed.

The areas of non-compliance are limited to on plot omissions and therefore suggest the early phases are suitable for discharge, while later phases could be partially discharged with individual plot omitted. A breakdown of the current phase status is set out below:

Phase 1

No outstanding items. Can be discharged.

Phase 2

Plot 13 – Gulleys not installed but an aco drain has been installed in front of the garage which the designer considers to be an acceptable replacement which will not affect the functionality of the scheme

Plot 17 –Gulleys to be installed next week.

Plot 19 – Gulleys to be installed next week.

Plot 20 – Gulleys to be installed next week.

Plot 44 – Gulleys to be installed next week.

Plot 45 – Gulleys to be installed next week.

Phase 3

Aim to discharge this phase mid-end of April.

Phase 4

Aim to discharge this phase mid-end of April.

Phase 5

Aim to discharge this phase mid-end of May.

3.0 CONCLUSIONS

A site visit was undertaken on the 6th February 2025 at which point all phase 1 drainage was installed and the remainder of the site constructed. Based on the information provided by the client and contractors in the form of photographs, the designer is satisfied that the SuDS features are being installed largely in accordance with the ACE design drawings.

Phase 1 of the development is accepted to have been completed in line with the design with subsequent phases largely in keeping, with some individual plots requiring additional gullies to meet approval.

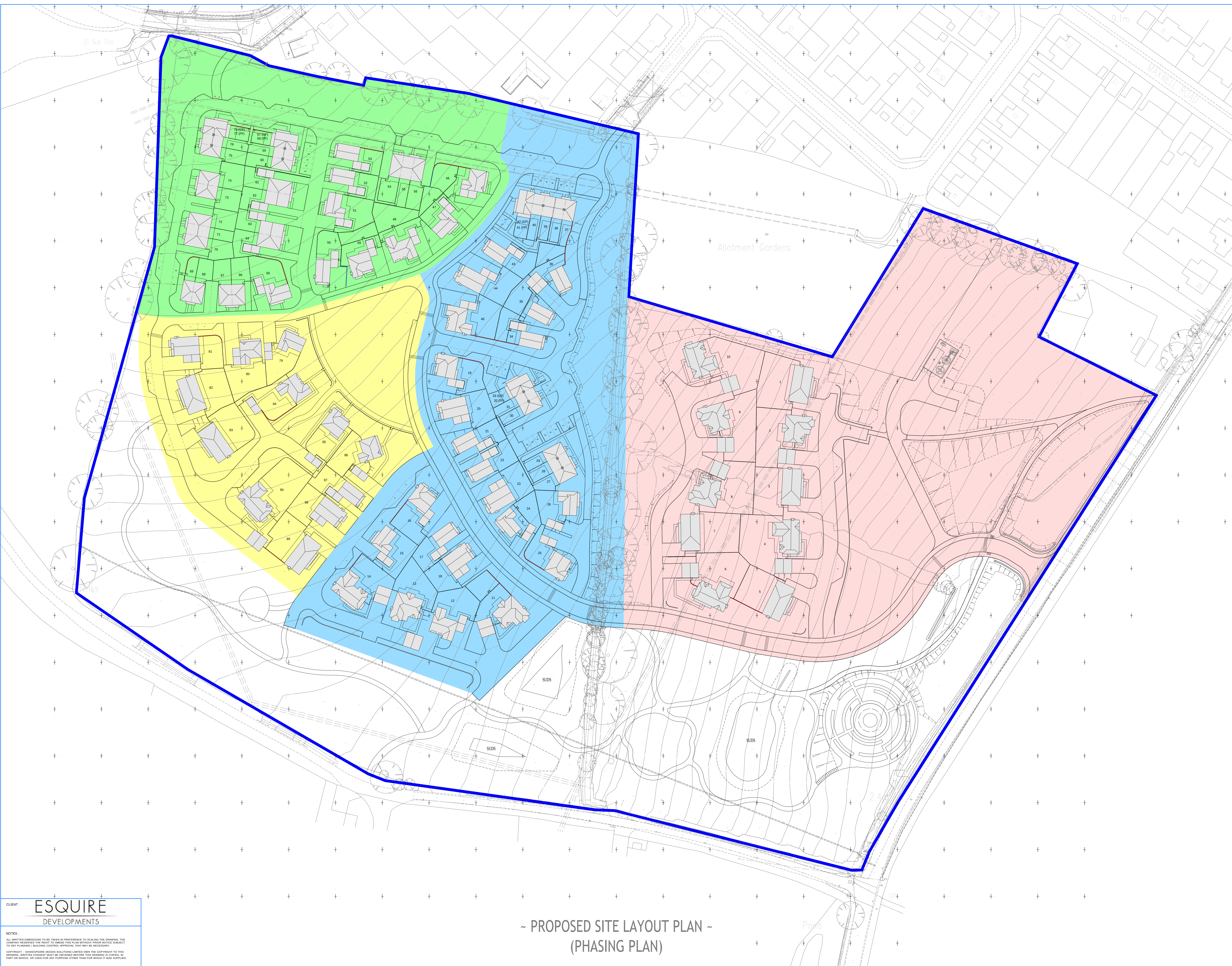
It is noted that we are only able to comment on the information we have received, and the as-built surveyed information provided.

LAND AT FORD ROAD, ARUNDEL

SuDS VERIFICATION REPORT



Appendix A – Proposed Phasing Plan



0 5.0 10.0 15.0 20.0 25.0

1:500 SCALE (m) @ A0
(1:1000 SCALE (m) @ A1)



— SITE BOUNDARY

- PHASING KEY -

- PHASE 1 : Plots 1-10 (10 Units)
- PHASE 2 : Plots 11-45 (35 Units)
- PHASE 3 : Plots 46-78 (33 Units)
- PHASE 4 : Plots 79-90 (12 Units)

P5	ADJUSTED FOR NEW HT 4E ON P18, 20, 23, 44, 81, 88	07/02/2024	SDS	PRE
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Rev	Description	sd/mm/yyyy	By	Issue



PROJECT :
- LAND AT FORD ROAD -
- ARUNDEL -

DRAWING TITLE :
- PROPOSED SITE LAYOUT PLAN -
(PHASING PLAN)

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DATE :
SEPTEMBER 2023

SCALE :
1:500 @ A0

DRN BY :

SDS

DRAWING NO.:

ESQ-061-FRA-SLP-PP

REV:

P5

CLIENT: **ESQUIRE**
DEVELOPMENTS

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~ PROPOSED SITE LAYOUT PLAN ~
(PHASING PLAN)

Appendix B – SuDS Maintenance Schedule

SuDS MANAGEMENT PLAN

This long-term Management Plan of the Sustainable Drainage System (SuDS) should be implemented at **Ford Road, Arundel** to ensure that the drainage network functions as designed. This plan is intended to cover all on-site drainage structures. The Site Management Team should oversee and implement the SuDS Management Plan and designate a qualified person who will be responsible for the proper operation and maintenance of the foul and stormwater structures.

Financial Responsibility

Financial responsibility of the maintenance will lie with the management company appointed to the site, Rendall and Rittner, whose details can be found below:

F.A.O Nicola Milburn (nicola.milburn@rendallandrittner.co.uk)
Rendall and Rittner
PO Box 154
NE24 9GF

Stormwater Runoff Quality

The stormwater management system protects and enhances the stormwater runoff water quality through the removal of sediment and pollutants, silt trapped gullies and attenuation basins will reduce the amount of pollutants entering the system. Preventive maintenance of the system will include a comprehensive source reduction program of regular sweeping and litter removal, prohibitions on the use of pesticides, and maintenance of bin areas.

Drainage System

Maintenance and cleaning of gullies, stormwater manholes, and SuDS components will assure adequate performance. This maintenance program is outlined below;

Maintenance Program

The Site Management Team will conduct the operation and maintenance plan set forth in this document. The Site Management will ensure that inspections and record keeping are timely and accurate. Inspection & Maintenance Log Forms (attached) should include the date and physical conditions of the structures, depth of sediment in structures, evidence of overtopping or debris blockage and maintenance required of each structure. Records of maintenance will be kept on file at the property and copies of Inspection & Maintenance Log sheets indicating all work and inspections will be available to the Council upon request.

Concurrent with inspection and cleaning, all litter shall be picked up and removed from the parking areas, external bin store, wetland areas, and soft landscaping.

Regular maintenance should include;

1. Inspect channel and gully inlet grates and remove any debris every 6 months or as determined to be reasonable based on experience with the installed systems to ensure that the gullies are working in their intended fashion and that they are free of debris; quarterly, inspect gully sumps and bottom of drain manholes; if depth of sediment in sumps exceeds 50% capacity, sediment must be removed. Excessive sediment shall be removed and properly disposed by a licensed drainage cleaning company.
2. Inspect all wetland and vegetated areas, and remove litter and debris as necessary. Replant bare areas or areas with sparse growth.
3. Inspection of external bin store for spillage and scattered litter must be performed on a regular basis to prevent the spread of pollutants into the stormwater management system.
4. Attenuation basin inlets, outlet and flow control manhole should be checked annually and after large storms to ensure that they are in good condition and operating as designed. Regular maintenance includes inspection and identification of any areas that are not operating correctly monthly for the first 3 months and then every 6 months after.

Winter Maintenance Program

Ensure that drainage structures are not blocked by ice, snow, debris or rubbish during winter months.

Fertiliser Use

Only slow-release organic low-phosphorous fertilisers will be used in any landscaped areas in order to limit the amount of nutrients that could enter the stormwater system.

Specialist Element		
Product Used	Lifespan	Maintenance Frequency
ABG Pozidrain (Swales, Detention Basins, Ponds)	120 Years	20 Years after installation and then 10 yearly thereafter. Uncover a portion of the liner, without damaging said liner and review the integrity of the product. Replace if required with product of equal or greater lifespan.
ABG Alphaline (Swales, Detention Basins, Ponds)	TBC	20 Years after installation and then 5 yearly thereafter. Uncover a portion of the liner, without damaging said liner and review the integrity of the product. Replace if required with product of equal or greater lifespan.
Landflex G3000 (Swales, Detention Basins, Ponds)	25 Years	20 Years after installation and then 5 yearly thereafter. Uncover a portion of the liner, without damaging said liner and review the integrity of the product. Replace if required with product of equal or greater lifespan.
Hydrobrake S Units	60 Years	20 Years after installation then 10 yearly thereafter. Inspect the hydrobrake units for signs of corrosion and contaminants. Replace with units of matching design head/ flow rate as required.

SuDS Element	Swales	
Maintenance Period	Maintenance Task	Frequency
Regular Maintenance	Remove litter and debris	Monthly, or as required
	Cut the grass – to retain grass height within specified design range	Monthly (during growing season) or as required
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
	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 vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Half yearly
Occasional Maintenance	Reseed 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 the filter strip area
Remedial Actions	Repair erosion or other damage by re-turfing or reseedling	As required
	Relevel uneven surfaces 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

	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

SUDS Element	Detention Basin	
Maintenance Period	Maintenance Task	Frequency
Regular Maintenance	Remove litter and debris	Monthly (or as required)
	Cut the 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 nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets, and overflows for blockages, and clear is required	Monthly
	Inspect banksides, structures, pipework etc. for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies	Monthly (for first year), then annually or as required
	Check any penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlets and forebays	Annually (or as required)
	Manage wetland plants in outlet pool- where provided	Annually
Occasional Maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
	Remove sediment from inlets, outlets, forebay and main basin	Every 5 years, or as required (likely to be

	when required	minimal requirements where effective upstream source control is provided)
Remedial Actions	Repair erosion or other damage by reseeding or returfing	As required
	Realignment of rip-rap	As required
	Repair/rehabilitation of inlets, outlets and overflows	As required
	Relevel uneven levels and reinstate design levels	As required

SUDS Element	Ponds and Wetlands	
Maintenance Period	Maintenance Task	Frequency
Regular Maintenance	Remove litter and debris	Monthly (or as required)
	Cut the grass – public areas	Monthly (during growing season)
	Cut the meadow grass	Half yearly (spring, before nesting season, and autumn)
	Inspect marginal and bankside vegetation and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Inspect inlets, outlets, banksides, structures, pipework etc. for evidence of blockage and/or physical damage	Monthly
	Inspect water body for signs of poor water quality	Monthly (May-October)
	Inspect silt accumulation rates in any forebay and in main body of the pond and establish appropriate removal frequencies; undertake contamination testing once some build-up has occurred, to inform management and disposal options	Half yearly
	Check any mechanical devices eg. penstocks	Half yearly
	Hand cut submerged and emergent aquatic plants (at minimum of 0.1m above pond base; include max 25% of pond surface)	Annually
	Remove 25% bank vegetation from water's edge to a minimum of 1m above water level	Annually

	Tidy all dead growth (scrub clearance) before the start of the growing season (Note: tree maintenance is usually part of the overall landscape management contract)	Annually
	Remove sediment from any forebay	Every 1-5 years, or as required
	Remove sediment and planting from one quadrant of main body of ponds without sediment forebay	Every 5 years, or as required
Occasional Maintenance	Remove sediment from the main body of big ponds when pool volume is reduced by 20%	With effective pre-treatment this will only be required rarely, eg every 25-50 years
Remedial Actions	Repair erosion or other damage	As required
	Replant, where necessary	As required
	Aerate pond when signs of eutrophication are detected	As required
	Realign rip-rap or repair other damage	As required
	Repair/rehabilitate inlets, outlets and overflows	As required

Element	Main River / Ordinary Watercourse	
Maintenance schedule	Required action	Frequency
Regular maintenance	Litter and debris removal.	6 Months
	Grass cutting along byelaw strips.	4-6 Months
	Manage other vegetation and remove nuisance plants.	1 Year
Occasional maintenance	Repair erosion or channel and bank damage.	1-2 years
	Re-level uneven surfaces and reinstate design levels.	1-2 years
	Remove build-up of sediment.	2-5 Years
Monitoring	Inspect inlets, outlets, erosion control, structures, channel base and channel banks and overflows for blockages, and clear if required.	1 Year or after a major flood event
	Remove and dispose of oils or petrol residues using safe standard practices.	ASAP

SuDS Operation and Maintenance Requirements

Maintenance Task	Description	Frequency
Regular Maintenance		
Litter management	Pick up all litter in suds and landscape areas and remove from site	Monthly
Grass maintenance	Mow all grass verges, paths and amenity at 35-50mm with 75mm max. Leaving grass in situ	As required or monthly
	Mow all dry dry suds basins and margins to low flow channels and other suds features at 100mm with 150mm max. Cut wet swales or basins annually as wildflower areas.	4-8 visits as required or annually
	Wildflower areas strimmed to 50mm on 3 year rotation 30% each year.	Annually
Inlets and outlets	Inspect monthly, remove silt from slab aprons and debris. Strim 1m round for access. Check grilles for debris.	Monthly
Hard surfaces	Sweep all paving regularly.	Annually
Occasional tasks		
Inspection and control chambers	Annual inspection, remove silt and check free flow.	Annually
Wetland and pond vegetation	Wetland vegetation to be cut at 100mm on 3 – 5 year rotation. 30% each year. All cuttings to be removed to wildlife piles or from site.	As required
Silt management	Inspect swales, ponds, wetlands annually for silt accumulation	Annually
	Excavate silt, stack and dry within 10m of the SuDS feature, but outside the design profile where water flows, spread, rake and overseed.	As required
Remedial work		
	Inspect suds system regularly to check for damage or failure. Undertake remedial work as required.	As required

Drainage Operation and Maintenance Log

Site Maintenance Supervisor: _____ Date: _____

☐ Routine ☐ Response to rainfall event __ in ☐ Other: _____

BMP	Frequency	Date Performed	Comments
Gullies and Manholes	Monthly Inspections		
	Maintenance Quarterly and as necessary		
Pavement Areas (parking, driveways, service areas)	Monthly Sweeping		
	Rubbish & Litter Removal as Necessary		
Landscaped & Vegetated Areas	Maintenance as necessary		
Attenuation Basins	Inspect and identify areas not operating properly every 3 months (for the first 3 months) and every 6 months after		
	Full bi-annual inspection		

DRAWINGS