

University of Reading Health & Life Sciences

Surface Water Drainage Management Plan

University of Reading

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Quality information

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1. Introduction

AECOM has been commissioned to prepare the surface water drainage strategy for the redevelopment of the existing academy site. This document has been prepared in response to Planning Condition 22 within the Planning Approval.

2. Surface Water Runoff Management Strategy

2.1 Existing Drainage Arrangements

The existing site area is occupied by the Engineering Building and Car Park 12 and is therefore largely impermeable. These are served by part of the existing surface water drainage system on the campus which outfall to the Whiteknights Lake.

The current drainage regime for the site is that any runoff generated on site is collected by an existing drainage network prior to discharge at an unattenuated rate into a surface water sewer within the site boundary.

2.2 Proposed Surface Water Drainage Strategy

In accordance with the Wokingham Borough Council Local Plan, the surface water run-off from the site should be reduced to a greenfield equivalent rate, wherever practicable. An assessment of this flow rate has been completed which indicates that the rates are less than 5.0l/s. Therefore, in accordance with guidance published by the EA/ DEFRA 'Rainfall Run-off Management for Development', the run-off shall be limited to this rate to minimise maintenance issues associated with small control diameters.

This will require the construction of an attenuation system within the overall site area to provide temporary storage of flows prior to discharge to the sewers. An assessment of the required storage volume has been completed which indicates that a nominal volume of approximately 230m³ is required. The initial design intent is that this will be provided within a permeable car park construction within the parking area to the east of the building, with the remainder provided using HDPE attenuation crates beneath the car park.

An assessment associated with the proposed rainwater harvesting system to provide water for flushing toilets within the building has been completed which indicates that 30m³ of water should be retained for this purpose. It is intended to provide this attenuation as part of an integral section of the main attenuation system. This will involve the installation of a deeper section of the tank which will be filled during routine operation of the drainage system which will be linked to a pump chamber, which will provide a water feed to a secondary header tank within the building.

This system will provide adequate treatment of run-off from the car park to remove hydrocarbons and silt from the run-off prior to discharge to the sewer network. The service yard area will require the provision of a separate oil separator to accommodate treatment of run-off. This will require an oil probe and alarm system linked to the BMS to allow for monitoring of pollutants.

3. Operation, Inspection and Maintenance

3.1 Ownership and Responsibilities

Following the 12 months maintenance period by the Principal Contractor following completion of works the client will take on the maintenance responsibility for the site.

An effective and reliable drainage system relies on each of the roles and responsibilities being clearly defined and unambiguous. An outline of the anticipated key roles and responsibilities are listed below.

Table 1 – Key Roles and Responsibilities

Section of Drainage	Ownership	Maintenance Responsibility
Natural turf playing pitches collector drains	Client	Client
Artificial surface playing pitches collector drains	Client	Client
Archery drainage	Client	Client
Building drainage	Client	Client
Other Open space drainage	Client	Client
Car park drainage	Client	Client
Access road drainage	Client	Client
Surface Water Pumping Station	Client	Client

3.2 Performance of the Drainage System

Continued monitoring will enable the owner to assess whether the performance requirements are being met. Performance monitoring is required to provide information for assessing structural, hydraulic, and environmental performance.

3.2.1 Structural Performance

Generally, structural performance will be monitored by identifying “change” by visual or dimensional means. This will include, amongst others, measurement of the level of sediment in the drainage systems and/or settlement in the landscaping or the road/hardstanding above it.

3.2.2 Hydraulic Performance

The hydraulic performance of the drainage network can substantially change if it becomes blocked during a period of high flows in the upstream network. The monitoring of hydraulic performance can help to reduce the risk of upstream flooding by providing a warning of increasing water levels.

Monitoring can provide information on performance directly such as;

- Water levels within the network,
- Head loss through the network,
- Flow through the network,
- Level of silt.

Indirect information on performance may include checking for signs of continued blockage upstream of, or within the wider network.

Information obtained requires an assessment to determine the effect on performance. Decisions on the need for intervention will be based on a comparison of the current performance with pre-determined performance requirements (information from the design presented in the health and safety file).

3.2.3 Environmental performance

Before inspections, an environmental assessment will be undertaken to identify any risks to the environment and any potential opportunities for enhancement. Appendix B contains the Environmental Review Form template. Important points to consider include, but not limited to, are:

- The removal and disposal of debris and trash,
- The removal and disposal of silt,
- The removal and disposal of any exotic and invasive species at the site (e.g. Japanese Knotweed, Giant Hogweed, Himalayan Balsam),

3.3 Inspection and Condition Assessment

The proposed SuDS features will require maintenance including litter and debris removal, sediment removal, vegetation maintenance and remediation to any damaged structures. The maintenance requirements will be the responsibility of a private maintenance company. Tables 2 to 6 provide a summary of the maintenance requirements for the natural turf pitches drainage system, permeable paving, bioretention areas, the geo-cellular storage and swales respectively. Appendix B contains the SuDS Maintenance Inspection Checklist.

Table 2 – Operation and maintenance requirements of underground geo-cellular tanks, in accordance with CIRIA C753 - The SuDS Manual

Maintenance Schedule	Required Action	Typical 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 sediment from pre-treatment structures and / or internal forebays	Annually, or as required
Remedial actions	Repair / rehabilitate inlets, outlet, 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
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Table 3 – Operation and maintenance requirements of permeable paving, in accordance with CIRIA C753 - The SuDS Manual

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surfaces from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to Significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 h after large storms in First six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Table 4 – Operation and maintenance requirements for surface water pumping station, in accordance with BS EN 12056-4:2000

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Checking by visual inspection all connection points for leakage	Quarterly
	Operation of valves, checking ease of operation and sealing. If necessary, reset and grease	Quarterly
	Opening and closing of non-return valves; checking seating and ball/flap; functional check	Quarterly
	Cleaning the pumping unit and the pipework directly connected to it; checking impeller and bearings	Quarterly
	Checking oil level, where necessary, refill or change oil (if oil chamber fitted)	Quarterly
	Internal cleaning of tank (if required or under special circumstances)	Quarterly
	Visual inspection of the electrical part of the plant	Quarterly
	Visually inspection of the electrical part of the plant	Quarterly
Occasional Maintenance	Every two years rinse out plant with water	Every 2 years
Remedial actions	As required to ensure safe operation of all parts of the pumping station	As required

4. Summary and Discussions

This maintenance plan provides details of operation, management and inspection procedures that need to be followed during the design life of the new drainage serving the Health and Life Sciences.

The new drainage system will need be inspected regularly to ensure it meets all performance requirements. All works identified during routine inspections will be subject to operation specific Method Statements and Risk Assessment.

