SuDs Management Plan

21T2034 – Cleator Moor Innovation Quarter – Area 2

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SuDs Management Plan

Project: Cleator Moor Innovation Quarter – Area 2

Client: Copeland Borough Council

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Contents

1. Introduction

1.1 Billinghurst George and Partners has been commissioned by Copeland Borough Council to prepare a SuDS Management Plan regarding the proposed development comprising 2 no. buildings for hotel and student accommodation use with associated car parking on the greenfield site at land off Birks Road, Cleator Moor.

1.2 This SuDS Management Plan has been produced to demonstrate how the proposed use of Pipes and an Attenuation Tank will be managed and maintained to satisfy the requirements set out in CIRIA 753 and in accordance with the Cumbria Development Design Guide which is Cumbria County Council (CCC) criteria for Sustainable Drainage Systems (SuDS).

1.3 This report is provided to assist the adopting body/maintaining body in developing an appropriate Maintenance Plan.

1.4 The format of the manual will be agreed in advance with the principal designer and end user, and the manual will include relevant information from all designers, suppliers and subcontractors for every element of the project.

1.5 This manual will be reviewed by the principal designer, and handed over to the client on practical completion. Demonstration and Training will also be arranged for the building users and maintenance staff where required.

1.6 The operation and maintenance manuals will include the SUDS management plans, as well as any other information required for the operation and maintenance of the site drainage system.

2. Site Description

2.1 At approximately 4.0 Ha in size the Greenfield site is located approximately 5.15km southeast of Whitehaven and approximately 18km southwest of Cockermouth. The site is currently an overgrown greenfield. The site is bound by Birks Road to the south east, Cleator Moor football club and residential properties to the east, a public footpath and tree line to the north and Leconfield Street to the west.

2.2 From the topographical survey it is identified that the site falls from southeast to northwest from 88.0m AOD to 84.0m, this equates to a gradient of approximately 1 in 40. The site is relatively level from northeast to southwest.

2.3 The nearest named watercourse is Nor Beck, which is located approximately 150m north of the site proposals, running from east to west converging with Bowthorn Beck which runs from north to south. From the point it converges it is culverted and drains west then south ultimately converging with the River Keekle.

2.4 There are no other named or unnamed watercourses within close proximity to site.

3. Existing Drainage Regime

3.1 The equalivant greenfield run off rates from the existing site have been calculated using UKSuds.com. This calculation follows the IH124 method for calculation of greenfield runoff.

3.2 The greenfield runoff rate is calculated as 22.4 l/s, based on a developable greenfield area of 2.306 ha. The area excluded being the northern public footpath.

3.3 A 300mm diamter United Utilities combined sewer is located within the site following south to north along the route of the existing public footpath just north of the development proposal. This sewer continues into the Area 3 site beyond. Once within the adjacent site the sewer drains west parallel with Nor Beck and beneath Sanderson Park then south converging with another series of combined sewers in Leconfield Street.

3.4 The site is not currently served by wastewater systems.

4. Proposed Surface Water Drainage Solution

4.1 The scheme proposes to discharge surface water flows to Nor Beck northeast of the development proposals. Flows are to be controlled by a Flow Control unit restricted to 22.4 l/s that will be situated downstream of the attenuation. The discharge rate is to be agreed with the Lead Local Flood Authority and Environment Agency.

4.2 The surface water flows will pass through the proposed pipe network via gravity to the flow control manhole. The final connection to Nor Beck watercourse will be made via a gravity.

4.3 Due to the minimal amount of green open available space onsite and topography it is deemed a suitable solution to provide the attenuation volume to retain the 1 in 100 year + 40% climate change flood event below ground within an attenuation crate. The attenuation is to provide storage for approximately 430m^3, this volume is based on the total impermeable surface area and restricted discharge rate of 22.4 l/s.

4.4 The tank is to be maintained by a private management company, maintenance requirements for the tank are detailed in chapter 7 of this report. The tank is to be installed as per the manufacturer's drawings following detailed development of the design. The tank management is to be read in conjunction with the Landscapes maintenance documents.

4.5 The Flow Control is to be designed/installed to manufacturer's guidance and specification in accordance with relevant guidance and procedures. The Flow Control is to be managed and maintained by a private management company.

4.6 Any manufacturer's maintenance recommendations over and above what is stated on the maintenance tables will also be included in the maintenance plan.

5. SuDS Management and Maintenance

5.1 The proposed storm water system consists of the following SuDS components:

- Pipes
- Attenuation Tank
- Pervious Paving

5.2 There are three categories of maintenance activities referred to in this report:

Regular Maintenance (including inspections and monitoring)

Consists of basic tasks done on a frequent and predictable schedule, including vegetation management, litter and debris removal, and inspections.

Occasional Maintenance

Comprises tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks (sediment removal is an example).

Remedial Maintenance

Comprises intermittent tasks that may be required to rectify faults associated with the system, although the likelihood of faults can be minimised by good design. Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events, and as such timings are difficult to predict.

Note: The operations contained within this section specific to the maintenance of landscaping, shall be read in conjunction with any development landscape maintenance plan(s).

6. Pipes

6.1 Sewer Pipes form the basis of the drainage strategy, also for attenuation purposes, they will hold additional flows in the pipework and manhole chambers when flood exceedance occurs.

6.2 Table 1 regarding Pipes provides guidance on the type of operational and maintenance requirements that may be appropriate. The list of actions is not exhaustive and some actions may not always be required.

Table 1 - Operation and Maintenance requirements for Pipes

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 debris from the catchment surface (where it may cause risks to performance)	Monthly
	Maintain vegetation to designed limits, within the vicinity of below ground drainage pipes and tanks to avoid damage to system	Annually or as required
	Remove sediment from pre-treatment structures and/or internal fore bays	Annually or as required
Remedial Actions	Repair physical damage if necessary	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 the pipe runs for sediment build up and remove if necessary	Every 5 years or as required

6.3 The pipes are installed at gradients which provide self-cleansing, therefore no significant maintenance is required.

6.4 Blockages should be removed if they occur.

6.5 Manholes/inspection chambers with silt traps should be inspected 6 monthly and emptied of any silt as required.

6.6 Back inlet gullies and rainwater pipes should be inspected 6 monthly and any blockages or silting up removed.

7. Attenuation Tank

7.1 The Attenuation Tank is to be located to the east area of site just off the service road. The Attenuation Tank is to be managed and maintained by a private management company.

7.2 The primary function of the Attenuation is to provide storage through the site during times of severe flood events up to and including 100 year + 40% climate change event. Table 2 provides guidance on the type of operational and maintenance requirements that may be appropriate.

Table 2 - Operation and Maintenance requirements for Crates/Tanks

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 debris from the catchment surface (where it may cause risks to performance)	Monthly
	Catch pits either side of tanks to be regularly inspected and cleared of any silt build up.	Annually
	Remove sediment from pre-treatment structures and/or internal fore bays via jetting or similar approved method.	Annually or as required
Remedial Actions	Repair/rehabilitate inlets, outlets, catch pit chambers and vents.	As Required
Monitoring	Inspect check/ all inlets, outlets, vents and catchpit to ensure that they are in good condition and operating as designed	Annually
	Survey inside of the tank from catchpit chamber for sediment build up and remove via jetting if necessary	Every 5 years or as required

7.3 Regular inspection and maintenance is required to ensure the effective long term operation of below ground storage systems. Maintenance responsibility for the system should be placed with a responsible organisation. Crates/Tanks above provides guidance on the type of operational and maintenance requirements that may be appropriate. The list of actions is not exhaustive and some actions are not always required.

7.4 Maintenance plans and schedules should be developed during the design phase, and will be specific to the type of tank that is adopted. Specific maintenance needs of the system should be monitored, and maintenance schedules adjusted to suit requirements. CDM 2015 requires designers to ensure that all maintenance risks have been identified, eliminated or reduced and/or controlled where appropriate. This information will be required as part of the health and safety file.

8. Pervious Paving

8.1 Regular inspection and maintenance is important for the effective operation of pervious pavements. Maintenance responsibility for a pervious pavement and its surrounding area should be placed with an appropriate responsible organisation. Before handing over the pavement to the client, it should be inspected for clogging, litter, weeds and water ponding, and all failures should be rectified. After handover, the pavement should be inspected regularly, preferably during and after heavy rainfall to check effective operation and to identify any areas of ponding.

8.2 Pervious pavements need to be regularly cleaned of silt and other sediments to preserve their infiltration capacity. Extensive experience suggests that sweeping once per year should be sufficient to maintain an acceptable infiltration rate on most sites. However, in some instances, more or less sweeping may be required and the frequency should be adjusted to suite site-specific circumstances and should be informed by inspection reports.

8.3 A brush suction cleaner (which can be a lorry-mounted device or a small precinct sweeper) should be used for regular sweeping. Care should be taken in adjusting vacuuming equipment to avoid removal of jointing material. Any lost material should be replaced. It is also possible to clean the surface using lightweight rotating brush cleaners combined with power spraying using hot water.

8.4 If the surface has clogged then a more specialist sweeper with water jetting and oscillating and rotating brushes may be required, especially for porous asphalt surfaces, to restore the surface infiltration rate to an acceptable level. The specialist equipment should be adjusted so that it does not strip binder from the aggregate in the asphalt.

8.5 The likely design life of grass reinforcement will be dictated by trafficking and is likely to be about 20 years if designed correctly. For concrete block permeable paving the design life should be no different from standard paving, assuming that an effective maintenance regime is in place to minimise risks of infiltration clogging. Porous asphalt will lose strength and begin to fatigue due to oxidation of the binder. This is likely to occur slightly faster in porous asphalt than normal asphalt, so the design life will be reduced slightly. Porous concrete should have a similar design life to a normal concrete slab.

8.6 The reconstruction of failed areas of concrete block pavement should be less costly and disruptive than the rehabilitation of continuous concrete or asphalt porous surfaces due to the reduced area that is likely to be affected. Materials removed from the voids or the layers below the surface may contain heavy metals and hydrocarbons and may need to be disposed of as controlled waste. Sediment testing should be carried out before disposal to confirm its classification and appropriate disposal methods.

8.7 See Table 3.0 (over page), it provides guidance on the type of operational and maintenance requirements that may be appropriate. The list of actions is not exhaustive and some actions may not always be required.

Table 3.0 - Operation and Maintenance requirements for Pervious Paving

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over the 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 surface from adjacent impermeable areas as this area is mostly likely to collect the most sediment.
Occasional Maintenance	Stabilise and mow contributing 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 50mm of the paving	As Required
	Remedial works 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 – 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 hr after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually