SuDs Management Plan

21T2034 – Cleator Moor Innovation Quarter - Hub Building

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SuDs Management Plan

Project: Cleator Moor Innovation Quarter - Hub Building

Client: Copeland Borough Council

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1. Introduction

1.1 Billinghurst George and Partners has been commissioned by Copeland Borough Council to prepare a SuDS Management Plan regarding the proposed Hub Building and car parking on the brownfield site that was previously used as a storage yard at Leconfield Industrial Estate, Cleator Moor.

1.2 The Hub will be a community space that brings together different uses to create natural meeting opportunities for people across the wider site. Uses may potentially include café-bar, lecture theatre, offices and development workshop spaces.

1.3 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).

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

1.5 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.

1.6 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.

1.7 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 1.785 Ha in size the Brownfield site is located approximately 5.15km southeast of Whitehaven and approximately 18km southwest of Cockermouth. The site currently comprises existing service yards, old building footprints and part soft landscaping. The site is bound by woodland and grass to the northern, eastern and southern boundary, existing industrial buildings and demolished building footprints to the west.

2.2 The site is relatively flat at an approximate level of between 83.1m and 82.9m AOD, falls existing within the existing adjacent storage yard to provide drainage falls to gullies.

2.3 The nearest named watercourse is Nor Beck, which where open is located 50m north of the site. Through CCTV investigation it is evident that it is culverted at a point northwest of site and runs southwest into Leconfield Industrial Estate and through to Leconfield Street. Nor Beck culvert continues southeast through Norbeck Park and adjacent fields 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 brownfield run off rates from the existing site have been calculated in accordance with Cumbria County Council (CCC) standards, which ensures designers set about achieving a 50% reduced discharge rate on existing. This is as follows;

3.2 $\boldsymbol{Brownfield\ Discharge\ Rate = (140l/s\ x\ Ha.)\ x\ 50\%}$

3.3 The proposed hub building and parking forms part of a wider plan to re-develop this particular area of Leconfield Industrial Estate, the further expansion works are covered under a separate planning application. A Brownfield discharge rate has been calculated for the re-developed area the new hub and car park is within and is determined as 127.4 l/s. The Brownfield run off rate allocated for the proposed hub building and car parking is **42.4 l/s**, this leaves 85.0 l/s for the future development adajcent covered under an outline masterplan application.

3.4 Several United Utilities combined drains and manholes are located toward to primary access of Leconfield Industrial Estate. The 225-300mm diameter combined sewers drain from southeast to northwest along Leconfield Street in keeping with the topography of the highway.

3.5 A United Utilities 675mm diameter combined sewer is located just beyond the north western boundary, which drains southwest.

3.6 The overall existing site is currently served by wastewater systems through an existing network of separate private sewers. The surface water run off from the site currently discharges to the culverted Nor Beck watercourse in two locations, one to the west and the other to the northwest of the development site. The foul water flows from the site currently discharge to the existing 675mm diameter United Utilities sewer located to the northwest of site.

4. Proposed Surface Water Drainage Solution

4.1 The proposed hub building and car parking forms part of a wider plan to re-develop the particular area of Leconfield Industrial Estate, the further expansion works are covered under a separate planning application. A Brownfield discharge rate has been calculated for the re-developed area the new hub and car park is within and is determined as 127.4 l/s. The Brownfield run off rate allocated for the proposed hub building and car parking is **42.4 l/s**, this leaves 85.0 l/s for the next phase of works.

4.2 The new hub building and car park proposes to discharge surface water flows to the Nor Beck culverted watercourse via an existing connection. Surface water flows are to be restricted to a brownfield run off rate of 42.4 l/s, this rate is to be agreed with the Lead Local Flood Authority and Environment Agency.

4.3 Due to the existing invert connection levels a surface water pumping station is required. The final surface water connection for the site will be via gravity.

4.4 Due to the minimal amount of green open available space onsite 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 tank.

4.5 The attenuation is to provide storage for approximately 165m^3, this volume is based on the total impermeable surface area and restricted discharge rate of 42.4 l/s. It is proposed that volumes will be stored within a 1.5m deep attenuation tank.

4.6 The tank is to be maintained by private management companies, maintenance requirements for the tank are detailed in chapter 7 of this report. 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.

4.7 The Pumping Station is to be designed/installed to manufacturer's guidance and specification in accordance with relevant guidance and procedures. Pumping Stations are to be managed and maintained by a private management company.

4.8 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
- Permeable 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 beneath the new car parking. The 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 - 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