MHA
STRUCTURAL
DESIGN

21026 Beeches Farm, Tring
August 2023 Report for Discharge of Drainage Condition no.7

21026-MHA-XX-XX-RP-C-RP02

Rev	Description	Date
P01	Information	2023

Prepared	Chris Hadjivassiliou *MEng (Hons) CEng MICE*
Authorised	Mathai Mathew *MEng (Hons) CEng MIStructE*
Issued	Mathai Mathew

London
+44 (0) 20 7375 6340

Cambridge
+44 (0) 1223 776340

mhastructuraldesign.com

Registered in England & Wales
Company No. 04718155

1.0 Background

1.1.1 The existing site consists of farmhouse which are to be demolished as part of the proposed works. The site is located off Icknield Way, Tring, HP23 4LA and is occupied by Noble Foods Ltd. The proposals include the construction of new offices and supporting infrastructure, as shown in the Proposed Site Plan in Appendix A.

1.1.2 The site currently benefits from underground drainage infrastructure, which utilises infiltration techniques to dispose of both storm and foul water from the site.

1.1.3 This technical note has been prepared in response to conditions raised by Buckinghamshire Council in relation to the full planning submission for the proposed development. Conditions 7 in relation to the Proposed Drainage Strategy have been addressed in full.

1.1.4 This document should be read in conjunction with the provided documents, as listed below:

- 21026-MHA-XX-XX-PL-C-510 - Proposed Drainage Strategy
- 21026-MHA-XX-XX-PL-C-511 - Drainage Construction Details Sheet 1
- 21026-MHA-XX-XX-PL-C-512 - Drainage Construction Details Sheet 2
- Storm Drainage Hydraulic Calculations
- Infiltration testing results

2.0 Condition 7

2.1 SuDS Assessment

2.1.1 The Council requires an assessment of SuDS components as listed in the CIRIA SuDS Manual (C753) and provide justification for the exclusion if necessary.

SuDS Feature	Used	Justification
Rainwater Harvesting System	No	The use of rainwater harvesting is not considered economically viable on this site considering installation and operational costs.
Green Roofs	Yes	1500m2 of green roof has been proposed.
Infiltration Systems	Yes	An infiltration basin of approx. 46m3 has been proposed. It will be built into the chalk sub-grade which is present on site.
Proprietary Treatment Systems	Yes	The use of a proprietary treatment systems has been proposed in the form of a downstream defender before the water reaches the soakaway.
Filter Strips	No	Filter strips have not been considered the most effective proposal for this site due to the proposed site layout.
Filter Drains	Yes	Filter Drain has been proposed at the bottom of the embankment to intercept any run-off.

Swales	No	Swales are not suitable for this scheme due to available space and proposed land use.
Bioretention Systems	No	Bioretention Systems have not been considered the most effective proposal for this site due to the lack of available landscape areas.
Porous Pavements	No	Porous paving has not been proposed.
Attenuation Storage Tanks (oversized pipes)	No	Attenuation storage tanks have not been implemented as infiltration basins have be proposed instead.
Detention Basins	No	An infiltration basin has been proposed.
Ponds and Wetlands	No	There is insufficient space for a pond or wetland on this site.

Table 1 – SuDS Assessment

2.2 Water Quality Assessment

2.2.1 The simple index approach has been completed to assess the risk and demonstrate how the chosen SuDS features provide suitable treatment for the appropriate hazard level.

2.2.2 The simple index approach has been completed in compliance with the CIRIA SuDS manual Chapter 26. According to this manual, a three-step approach should be followed.

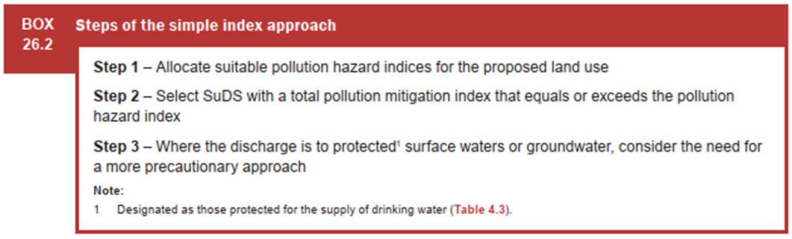

Figure 1 – Box 26.2 CIRIA 753

2.2.3 Two sources of potential hazard are identified, refer to Table 2 below.
- Non-residential roof area with TSS = 0.3, Metals = 0.2 and Hydrocarbons = 0.05
- Non-residential car parking with < 300 traffic movements per day with TSS = 0.5, Metals = 0.4 and Hydrocarbons = 0.4

2.2.4 This identifies the land use at a low pollution hazard level.

TABLE 26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways[1]	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways[1]	High	0.8[2]	0.8[2]	0.9[2]

Table 3 – Table 26.2 CIRIA 753

2.2.5 The proposed treatment provides a total SuDS mitigation index higher than the pollution hazard for the two land uses as shown in Table 3 below. A soakaway (pond) and a downstream defender provide suitable level of treatment and allows for the containment of TSS', metals and hydrocarbons.

TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters

	Mitigation indices[1]		
Type of SuDS component	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4[2]	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond[4]	0.7[3]	0.7	0.5
Wetland	0.8[3]	0.8	0.8
Proprietary treatment systems[5,6]	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

Notes

1 SuDS components only deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters.

2 Filter drains can remove coarse sediments, but their use for this purpose will have significant implications with respect to maintenance requirements, and this should be taken into account in the design and Maintenance Plan.

3 Ponds and wetlands can remove coarse sediments, but their use for this purpose will have significant implications with respect to the maintenance requirements and amenity value of the system. Sediment should normally be removed upstream, unless they are specifically designed to retain sediment in a separate part of the component, where it cannot easily migrate to the main body of water.

4 Where a wetland is not specifically designed to provide significantly enhanced treatment, it should be considered as having the same mitigation indices as a pond.

5 See Chapter 14 for approaches to demonstrate product performance. A British Water/Environment Agency assessment code of practice is currently under development that will allow manufacturers to complete an agreed test protocol for systems intended to treat contaminated surface water runoff. Full details can be found at: **http://tinyurl.com/qf7yuj7**

6 SEPA only considers proprietary treatment systems as appropriate in exceptional circumstances where other types of SuDS component are not practicable. Proprietary treatment systems may also be considered appropriate for existing sites that are causing pollution where there is a requirement to retrofit treatment. SEPA (2014) also provides a flowchart with a summary of checks on suitability of a proprietary system.

Table 4 – Table 26.3 CIRIA 753

2.2.6 The CIRIA SuDS manual tables above indicate that the peak pollution hazard indices will be for the car parking areas which will be covered by the soakaway as identified in Table 4. A downstream defender is also in use which will further contribute to mitigating the hazard level.

2.3 Construction Details of SuDS Features

2.3.1 Construction details have been prepared and can be found in drawing no. 21026-MHA-XX-XX-PL-C-511-Proposed Drainage Construction Details.

2.4 Maintenance of SuDS Features

2.4.1 The Council requires details of how and when the full drainage system will be maintained.

TABLE 12.5 Operation and maintenance requirements for green roofs

Maintenance schedule	Required action	Typical frequency
Regular inspections	Inspect all components including soil substrate, vegetation, drains, irrigation systems (if applicable), membranes and roof structure for proper operation, integrity of waterproofing and structural stability	Annually and after severe storms
	Inspect soil substrate for evidence of erosion channels and identify any sediment sources	Annually and after severe storms
	Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance or roof drain system	Annually and after severe storms
	Inspect underside of roof for evidence of leakage	Annually and after severe storms
Regular maintenance	Remove debris and litter to prevent clogging of inlet drains and interference with plant growth	Six monthly and annually or as required
	During establishment (ie year one), replace dead plants as required	Monthly (but usually responsibility of manufacturer)
	Post establishment, replace dead plants as required (where > 5% of coverage)	Annually (in autumn)
	Remove fallen leaves and debris from deciduous plant foliage	Six monthly or as required
	Remove nuisance and invasive vegetation, including weeds	Six monthly or as required
	Mow grasses, prune shrubs and manage other planting (if appropriate) as required – clippings should be removed and not allowed to accumulate	Six monthly or as required
Remedial actions	If erosion channels are evident, these should be stabilised with extra soil substrate similar to the original material, and sources of erosion damage should be identified and controlled	As required
	If drain inlet has settled, cracked or moved, investigate and repair as appropriate	As required

Table 5 – Table 12.5 CIRIA 753

TABLE 13.1 Operation and maintenance requirements for soakaways

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional maintenance	Remove sediment and debris from pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	As required, based on inspections
Remedial actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile (will require reconstruction of soakaway)	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
	Check soakaway to ensure emptying is occurring	Annually

Table 6 – Table 13.1 CIRIA 753

TABLE 14.2 An example of operation and maintenance requirements for a proprietary treatment system

Maintenance schedule	Required action	Typical frequency
Routine maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation	Six monthly
	Change the filter media	As recommended by manufacturer
	Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spill
Remedial actions	Replace malfunctioning parts or structures	As required
Monitoring	Inspect for evidence of poor operation	Six monthly
	Inspect filter media and establish appropriate replacement frequencies	Six monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly during first half year of operation, then every six months

Table 7 – Table 14.2 CIRIA 753

2.4.2 It should be noted that the maintenance regimes detailed above are initial recommendations and the actual maintenance work undertaken should be adapted to suit the system performance by the maintenance provider. The client will be responsible for the maintenance.

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APPENDIX

21026-MHA-XX-XX-PL-C-510-Proposed Drainage Strategy
21026-MHA-XX-XX-PL-C-511-Proposed Drainage Construction Details Sheet 1
21026-MHA-XX-XX-PL-C-512-Proposed Drainage Construction Details Sheet 2
21026-MHA-XX-XX-PL-C-513-Exceedance Flow Path
1200mm Downstream Defender Standard Detail
Storm Drainage Hydraulic Calculations