

# FORMER SYNGENTA WORKS, HAMPSTEAD LANE, YALDING, KENT [OFFICE BUILDING]

## SURFACE WATER / SuDS MAINTENANCE & MANAGEMENT PLAN



Reference: 22-0041

Revision: Issue 1.0

Date: 16/02/22

#### DRAINAGE

- Drainage Strategies
- S104 Drainage Design
- SUDS
- Flood Risk Assessments
- CSH SUR1

#### HIGHWAYS

- Transportation Assessments
- S38/278 Highway Design
- Junction Modelling
- Traffic & Parking Surveys
- Remedial Assessments

#### STRUCTURAL ENGINEERING



- All Structural Design
- Temporary Works
- Specialist Foundations
- Multi Storey & Basements
- RC Detailing

#### SPECIALIST SERVICES

- Site Assessments
- CDM 2015 Support
- TEKLA - Steelwork  
Fabrication drawings
- Expert Witness

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## Document Control Sheet

Issue	Status	Prepared / Revised by	Verified By	Date
1.0	FINAL	 MA	 C J Mellett	16/02/22

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## **1.0 Introduction**

- 1.1 BdR has been appointed by Civils Contracting Ltd (the Client) to undertake a Surface Water / Sustainable Drainage System (SuDS) Maintenance & Management Plan (MMP) for the office building and associated access road and car parking area at the Former Syngenta Works, Hampstead Lane, Yalding, Kent.
- 1.2 The function of the Surface Water / SuDS MMP is to bring awareness to those responsible for maintenance of the Surface Water / SuDS components regardless of whether individual components are below ground or on the surface.
- 1.3 Any contractor carrying out maintenance work must carry out a risk assessment and take all necessary precautions to comply with Health and Safety legislation current at the time that the work is to be carried out.
- 1.4 Where the user of the system is not responsible for the maintenance, then it is important to ensure that they know when the Surface Water / SuDS is not functioning correctly and who to contact if an issue arises.
- 1.5 This Surface Water / SuDS MMP includes brief details of the surface water design concepts and performance criteria for the development and how the owner or operator should ensure that any works undertaken within the site do not compromise the systems performance.

## **2.0 Design Concept**

- 2.1 Surface water runoff from the development is intercepted by Type A [Full Infiltration] permeable paving infiltrate directly to ground.
- 2.2 The design of the Type A [Full Infiltration] permeable pavements is based on the lowest BRE DG365 soakage test result achieved from 14 tests carried out across the site calculated at 0.4m/hr.

### **3.0 Performance Criteria**

- 3.1 The permeable paving has been designed such that there is no flooding up to and including the 1 in 100 years event plus 40% climate change.

#### **4.0 Surface Water Drainage System**

- 4.1 The below ground surface water system includes Type A [Full Infiltration] permeable paving.

## 5.0 Maintenance Requirements

5.1 Maintenance requirements fall into four categories;

➤ **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 necessary, it is likely to be due to site-specific characteristics or unforeseen events, and as such timings are difficult to predict.

➤ **Monitoring**

Monitoring must be carried out regularly to identify the maintenance required.

5.2 Maintenance should be carried out in accordance with the recommendations of the CIRIA C753 SuDS Manual 2015, which are included in Appendix 2.

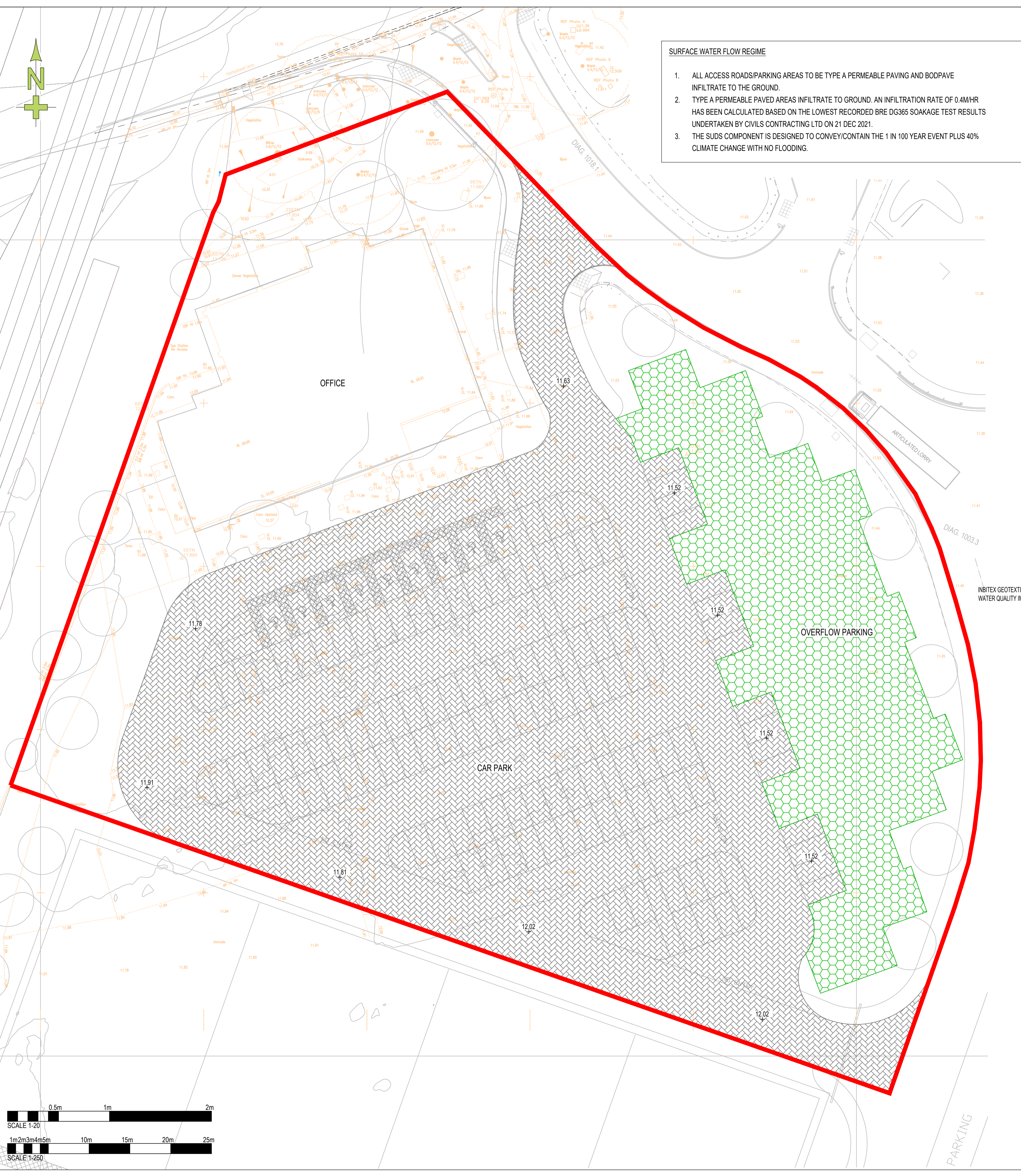


## 6.0 Maintenance Responsibilities

- 6.1 The developer will appoint a Management Company to assume delegated responsibility for the maintenance of the private areas and infrastructure.
- 6.2 Responsibility for the management of all aspects of the surface water drainage system will be taken on by a site facilities management company appointed by the developer prior to the sale of the first property on the site.
- The site facilities management company will be responsible for all common area maintenance above and below ground including but not limited to;
- Inspection of all metered facilities which are considered to be shared services such a common water, gas or electricity services used with the curtilage of the development area including power requirements of underground pump systems.
- 6.3 The responsibility for payment of these common area and amenity services including necessary cleaning, servicing, repairs and consumables to pipework and associated equipment costs will be paid on a shared basis by all owners for all properties for the life time of the development as a condition of the contract for the purchase of each property.
- 6.4 The operation and maintenance of the development's surface water drainage infrastructure will be the responsibility of the following stakeholders.

System	Responsibility
Permeable pavement	Management Company

## **Appendix 1 Drainage Layout**



**SURFACE WATER FLOW REGIME**

1. ALL ACCESS ROADS/PARKING AREAS TO BE TYPE A PERMEABLE PAVING AND BODPAVE INFILTRATE TO THE GROUND.
2. TYPE A PERMEABLE PAVED AREAS INFILTRATE TO GROUND. AN INFILTRATION RATE OF 0.4M/HR HAS BEEN CALCULATED BASED ON THE LOWEST RECORDED BRE DR365 SOAKAGE TEST RESULTS UNDERTAKEN BY CIVILS CONTRACTING LTD ON 21 DEC 2021.
3. THE SUDS COMPONENT IS DESIGNED TO CONVEY/CONTAIN THE 1 IN 100 YEAR EVENT PLUS 40% CLIMATE CHANGE WITH NO FLOODING.

**WATER QUALITY MANAGEMENT**

THE EFFECT OF THE PROPOSED WORK ON LOCAL WATER QUALITY HAS BEEN ASSESSED USING THE SIMPLE QUALITATIVE METHOD AS SET OUT IN CIRIA REPORT C753 THE SUDS MANUAL 2015 [CHAPTER 26].

**BOX 26.2 Steps of the simple index approach**

**Step 1** - Allocate suitable pollution hazard indices for the proposed land use

**Step 2** - Select SuDS with a total pollution mitigation index that equals or exceeds the pollution hazard index

**Step 3** - Where the discharge is to protected surface waters or groundwater, consider the need for a more precautionary approach

Note: 1 Designated as those protected for the supply of drinking water (Table 4.3).

TABLE 10.6 - EXTRACT FROM CIRIA REPORT C753 - STEPS OF THE SIMPLE INDEX APPROACH

**TABLE 26.2 Pollution hazard indices for different land use classifications**

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roads	Very low	0.2	0.2	0.05
Other roads (typically commercial/industrial roads)	Low	0.3	0.2 up to 0.8 where there is potential for metals to leach from the road	0.05
Individual property driveways, residential car parks, low traffic roads (eg cut out 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

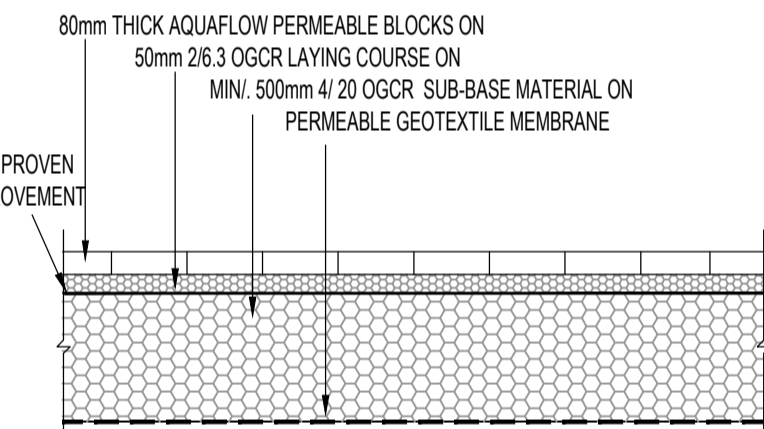
TABLE 10.7 - EXTRACT FROM CIRIA REPORT C753 - POLLUTION HAZARD INDICES FOR DIFFERENT LAND USE CLASSIFICATIONS

**TABLE 26.4 Indicative SUDS mitigation indices for discharges to groundwater**

Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates*	TSS	Metals	Hydrocarbons
A layer of dense vegetation underlain by a soil with good contaminant attenuation potential† of at least 300 mm in depth?	0.6*	0.5	0.6
A soil with good contaminant attenuation potential† of at least 300 mm in depth?	0.4*	0.3	0.3
Infiltration trench (where a suitable depth of filtration material is included that provides treatment, ie graded gravel with sufficient smaller particles but not single size coarse aggregate such as 20 mm gravel) underlain by a soil with good contaminant attenuation potential† of at least 300 mm in depth?	0.4*	0.4	0.4
Constructed permeable pavement (where a suitable filtration layer is included that provides treatment, and including a geotextile at the base separating the foundation from the infiltration underlain by a soil with good contaminant attenuation potential† of at least 300 mm in depth?	0.7	0.6	0.7
Bio-retention underlain by a soil with good contaminant attenuation potential† of at least 300 mm in depth?	0.8*	0.8	0.8
Proprietary treatment systems*†	These must demonstrate that they can address each of the contaminant types to acceptable levels for inflow concentrations relevant to the contributing drainage area.		

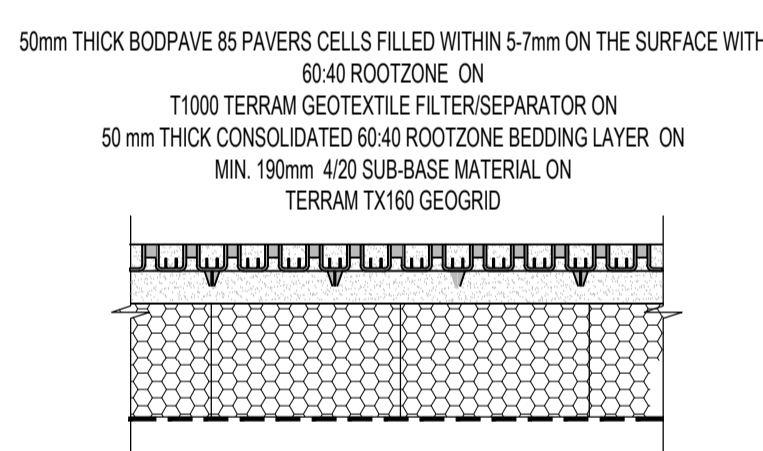
TABLE 10.8 - EXTRACT FROM CIRIA REPORT C753 - INDICATIVE SUDS MITIGATION INDICES FOR DISCHARGE TO GROUNDWATER

BASED ON THE INCORPORATION OF PERMEABLE PAVING IT CAN BE SEEN THAT THE TOTAL POLLUTION MITIGATION INDEX FOR THIS SUDS COMPONENT EXCEEDS THE POLLUTION HAZARD INDEX FROM ACCESS ROAD AND CAR PARKING AREAS.



1. ALL MANUFACTURERS PAVING AND ASSOCIATED PRODUCTS ARE TO BE INSTALLED TO MANUFACTURER'S GUIDELINES.
2. 2/3 AND 4/20 OPEN GRADED CRUSHED ROCK/GRAVEL MATERIAL TO BS EN 12620.
3. SUB-BASE TO HAVE A MINIMUM POROSITY OF 0.32 AND OFFER A STORAGE CAPACITY IN ITS VOIDS OF BETWEEN 30% AND 40%.
4. SC INTERGRID BY AQUAFLOW FORMPAVE - MIN. FLOW RATE THROUGH GEOTEXTILE TO BE 0.4m/hr.

**TYPICAL PERMEABLE BLOCK PAVING ACCESS ROAD / CAR PARK TYPE A - FULL INFILTRATION**  
SCALE 1:20



**BODPAVE 85 - GRASS SURFACE**  
NTS

1. ALL MANUFACTURERS PAVING AND ASSOCIATED PRODUCTS TO BE INSTALLED TO MANUFACTURER'S GUIDE LINES.

**CIVIL ENGINEERING NOTES GENERAL**

1. DO NOT SCALE FROM THIS DRAWING.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS AND SPECIFICATIONS ASSOCIATED WITH THIS PROJECT.
3. THE DEVELOPMENT LAYOUT AND SURVEY HAVE BEEN TAKEN FROM CIVILS CONTRACTING LTD'S FOUL DRAINAGE LAYOUT DRG. NO. 2210-50 REV A DATED JANUARY 22.
4. IT IS THE CONTRACTOR'S RESPONSIBILITY TO RECORD THE POSITION, SIZE, DEPTH, MATERIAL AND TYPE OF ALL EXISTING UTILITY MAINS AND SERVICES (E.G. POWER, GAS, TELECOMS, WATER, SEWERAGE) IN CLOSE PROXIMITY TO THE PROPOSED WORKS PRIOR TO CONSTRUCTION COMMENCING ON SITE.
5. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CHECK ALL LEVELS AND SETTING OUT INFORMATION PRIOR TO CONSTRUCTION WORKS COMMENCING ON SITE. ANY DISCREPANCIES MUST BE REPORTED TO THE PROJECT MANAGER IMMEDIATELY.
6. SIGNING, LIGHTING AND GUARDING OF ROADWORKS SHALL BE UNDERTAKEN IN ACCORDANCE WITH CHAPTER 8 OF THE TRAFFIC SIGNS MANUAL AND THE CODE OF PRACTICE SAFETY AT STREET WORKS AND ROAD WORKS PUBLISHED BY THE DEPARTMENT FOR TRANSPORT. TRAFFIC CONTROL SYSTEMS ARE TO BE AGREED WITH THE HIGHWAY AUTHORITY AND RELEVANT PERMITS OBTAINED. VEHICULAR AND PEDESTRIAN ACCESS MUST BE MAINTAINED THROUGHOUT THE DURATION OF THE WORKS.

**DRAINAGE - DESIGN STANDARDS**

1. DRAINAGE SYSTEMS TO REMAIN PRIVATE SHALL BE DESIGNED AND INSTALLED TO MEET THE REQUIREMENTS OF BS EN 752, BUILDING REGULATION DOCUMENT H AND NHBC STANDARDS.
2. SUSTAINABLE DRAINAGE SYSTEMS (SUDS) MUST BE DESIGNED, INSTALLED AND MAINTAINED TO MEET THE REQUIREMENTS OF THE NATIONAL STANDARDS FOR SUDS. IN THE INTERIM PERIOD BEFORE THE RELEASE OF THIS NEW DESIGN STANDARD SUDS MUST MEET THE DESIGN AND MAINTENANCE REQUIREMENTS OF THE APPROPRIATE SUDS APPROVING BODY (SAB) WHERE THE SAB HAS NO DESIGN STANDARD AVAILABLE SUDS MUST BE DESIGNED IN ACCORDANCE WITH CIRIA REPORT C697 THE SUDS MANUAL 2015.

**SUDS INFILTRATION STRUCTURES**

1. SUDS INFILTRATION STRUCTURES HAVE BEEN DESIGNED BASED ON THE SOIL INFILTRATION RATES PROVIDED BY CIVILS CONTRACTING LTD DATED DEC21. SOIL INFILTRATION RATES VARIED BETWEEN 0.3 AND 0.4m/hr. Bdr CANNOT BE HELD RESPONSIBLE FOR THE ACCURACY OF THIS DATA, OR FOR ANY VARIATIONS IN INFILTRATION RATES ACROSS THE SITE.
2. SOME OTHERWISE PERMEABLE SOILS AND SOFT ROCKS(eg CHALK) CAN HAVE THEIR PERMEABILITY SIGNIFICANTLY REDUCED BY SMEARING OF THE SURFACE DURING EXCAVATION ESPECIALLY BY MECHANICAL EXCAVATORS. THE EXPOSED SURFACE OF THE SOIL MUST BE MANUALLY CLEANED OF ANY SMEARING BEFORE THE GEOTEXTILE AND GRANULAR FILL SURROUNDING THE CHAMBER ARE INSTALLED. THIS CAN BE ACHIEVED BY SCORING THE EXPOSED SURFACES OF THE EXCAVATION WITH A RAKE.
3. INFILTRATION DEVICES ARE TO BE CHECKED REGULARLY TO ENSURE THEY ARE EMPTYING AND DEBRIS/ SEDIMENT REMOVED ON A REGULAR BASIS.
4. WATER TABLE LEVEL - WHERE THIS WAS FOUND/ NOT FOUND DURING THE GROUND INVESTIGATIONS, VARIATIONS IN THE WATER TABLE LEVEL COULD IMPAIR THE PERFORMANCE OF THE INFILTRATION DEVICE RESULTING IN LOCALISED FLOODING/PONDING OF SURFACE WATER.

**Notes:**

1. DO NOT SCALE FROM THIS DRAWING.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS AND SPECIFICATIONS ASSOCIATED WITH THIS PROJECT.
3. THE DEVELOPMENT LAYOUT AND SURVEY HAVE BEEN TAKEN FROM CIVILS CONTRACTING LTD'S FOUL DRAINAGE LAYOUT DRG. NO. 2210-50 REV A DATED JANUARY 22.

**CDM REGULATIONS 2015 - SIGNIFICANT RISKS -**

1. NO SIGNIFICANT RISKS ASSOCIATED WITH THIS PROJECT.

**DRAINAGE KEY**

- SITE BOUNDARY
- ▨ TYPE A (FULL INFILTRATION) PERMEABLE PAVING
- ▩ BODPAVE (GRASS SURFACE)
- 33.08 ± PROPOSED LEVEL
- 33.08 ± EXISTING LEVEL

**FOR THE DISCHARGE OF PLANNING CONDITION 4**

Rev	Description	MA	CJM	Date
A	FOR APPROVAL	MA	CJM	22.02.22

**BdR**  
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Client  
**CIVILS CONTRACTING LTD.**

Project  
**FORMER SYNGENTA WORKS, OFFICE, HAMSTEAD LANE, YALDING, KENT**

Drawing  
**DRAINAGE LAYOUT & CONSTRUCTION DETAIL**

**FOR APPROVAL**

Scale @ A1	Date	Drawn by	Checked
1:250	22.02.22	MA	CJM
Job No.	Drg. No.	Rev	
22-0041	C10501 A		

## **Appendix 2** **SuDS Maintenance & Management Notes/Tables/Specifications**

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## **Pervious Pavements**

### **Description:**

Pervious Pavements together with their associated substructures are an efficient means of managing surface water runoff close to its source – intercepting runoff, reducing the volume and frequency of runoff, and providing a treatment medium.

### **Maintenance Issues:**

The silt and other sediments should be cleaned regularly to preserve the pervious pavement infiltration capacity.

### **Maintenance Regime:**

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 organization. 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.

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 suit site-specific circumstances and should be informed by inspection reports.

A brush and suction cleaner (which can be a lorry-mounted device or a smaller 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, as shown in **Figure 20.30 of CIRIA SuDS Manual 2015**.

If the surface has clogged then a more specialist sweeper with water jetting and oscillating and rotating brushes may be required, to restore the surface infiltration rate to an acceptable level. 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 minimize risks of infiltration clogging.

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.

The table 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.

Maintenance Plans and schedules should be prepared during the design phase. Specific maintenance needs of the pervious pavement should be monitored, and maintenance schedules adjusted to suit requirements.

Activity	Action Required	Frequency
<b>Regular maintenance</b>	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 surface from adjacent impermeable areas as this area is most likely to collect the most sediment
<b>Occasional maintenance</b>	Stabilise and mow contributing and adjacent areas. Removal of weeds or management using glyphosate applied directly into weeds by an applicator rather than spraying.	As required
<b>Remedial actions</b>	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving. 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)
<b>Monitoring</b>	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. Monitor inspection chambers	Annually

Many of the specific maintenance activities for pervious pavements can be undertaken as part of a general site cleaning contract (many car parks or roads are swept to remove litter and for visual reasons to keep them tidy) and therefore, if litter management is already required at site, this should have marginal cost implications.

Generally, pervious pavements require less frequent gritting in winter to prevent ice formation. There is also less risk of ice formation after snow melt, as the melt water drains directly into the underlying sub-base and does not have chance to refreeze. A slight frost may occur more frequently on the surface of pervious pavements compared to adjacent impermeable surfaces, but this is only likely to last for a few hours. It does not happen in all installations and, if necessary, this can be dealt with by application of salt. It is not likely to pose a hazard to vehicle movements.

CDM 2015 requires designers to ensure that all maintenance risks have been identified, eliminated, reduced and/or controlled where appropriate. This information will be required as part of the health and safety file.