

Code for Sustainable Homes (CSH) Sur1 Report

**SUR1 MANAGEMENT OF SURFACE
WATER RUNOFF
SCHOOL APPROACH, FREDORA AVENUE, HAYES
UB4 8RH**

Version 1.0
Ref: EFRA 151

19TH MARCH 2015

A Perkins
Median Properties

Revision history

Version	Date	Amendments	Issued to
1.0	March 2015	1 st Issue.	A. Perkins

Quality control

Action	Signature	Date
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1.0 Introduction

1.1. Terms of Reference

River Thames Flood Risk Consultants has been commissioned by Mr A. Perkins to prepare this report in line with the requirements of SUR 1 of the Code for Sustainable Homes, in support of a proposed residential development at School Approach, Fredora Avenue, Hayes UB4 8RH. The assessment has been done in accordance with the best practices and the Technical Guide to the Code for Sustainable Homes.

This assessment includes the following:

- Determination of permeable and impermeable surface area pre and post development.
- Assessment of change in surface runoff as a result of development.
- If there was an increase in the impermeable surface post-development, review of calculations of pre-development rates and volume of surface water runoff based on a supplied existing site survey including drainage strategy.
- Review of calculations of post-development rates and volume of surface water runoff based on a drainage scheme.
- Confirmation of the sizing of any attenuation storage units and/or infiltration devices contained in the proposed drainage design, based on supplied infiltration testing results if necessary.
- Determination of the appropriate level of water treatment in accordance with CIRIA C697, The SUDS Manual.

1.2. Site Details

Figure 1 - Summary of site details

Site name	School Approach, Fredora Avenue, Hayes UB4 8RH
Site area	Approximately 124 m ²
Existing land-use	Garages and hardstanding
Purpose of development	New build 1-bedroom bungalow with parking and amenity
Nearest water body	Yeading Brook
OS NGR	509952,182102
Country	England (NPPF applies)
Local planning authority	London Borough of Hillingdon
Other authorities	Environment Agency Hertfordshire and North London



1.3. Site Description

The proposed site is the existing land at School Approach, Fredora Avenue, Hayes UB4 8RH. The total area of the site is approximately 124m². The vehicular and pedestrian access to the site is provided from School Approach. The site is currently being utilised as garage.

1.4. Development Proposals

The proposal involves construction of a one-bedroom bungalow house with a building footprint of approximately 53m². The access to the property is to be provided from School Approach. The development will comprise parking space and an underground rainwater harvesting tank. Approximately 40m² of the site will be utilised as amenity space with green turf and permeable surface . Details on the proposal have been provided in Appendix A.

2.0 SUR1 – Management of Surface Water Runoff

2.1. Aim

SUR 1 refers to the management of surface water run-off from developments. Its aim is to design surface water drainage for housing developments which avoid, reduce and delay the discharge of rainfall run-off to watercourses and public sewers using SuDS techniques. This will protect receiving waters from pollution and minimise the risk of flooding and other environmental damage in watercourses. There are two available credits in this scheme. One credit can be awarded by ensuring there is no discharge from the developed site for rainfall depths up to 5mm. One more credit can be awarded by ensuring that the run-off from all hard surfaces receive an appropriate level of treatment in accordance with The SuDS Manual to minimise the risk of pollution.

2.2. Sur 1 Hydraulic Control Criteria

Although there are no credits available for meeting the hydraulic control criteria, each must be met as a mandatory requirement for Issue Sur 1.

2.2.1. Peak rate of run-off and volume of run-off

In accordance with the 2010 Technical Guide to the Code for Sustainable Homes, the Peak Rate of Run-off criteria are as follows:

- *If there is no increase in the man-made impermeable area as a result of the new development, then the peak rate of run-off criterion does not apply.*
- *Where there is an increase in impermeable area, ensure that the peak rate of run-off over the development lifetime, allowing for climate change, will be no greater for the developed site than it was for the pre-development site. This should comply at the 1 year¹ and 100 year² return period events (see Calculation Procedures).*
- *Where the pre-development peak rate of run-off for the site would result in a requirement for the post-development flow rate (referred to as the limiting discharge) to be less than 5 l/s at a discharge point, a flow rate of up to 5 l/s may be used where required to reduce the risk of blockage.*

In accordance with the 2010 Technical Guide to the Code for Sustainable Homes, the Volume of Run-off criteria are as follows:

- *If there is no increase in the man-made impermeable area as a result of the new development, then the volume of run-off criteria does not apply.*
- *If the developed site would otherwise discharge, over the development lifetime allowing for climate change, a greater volume of rainwater run-off than the pre-development site for the 100 year 6 hour event, (see Calculation Procedures) then criterion A applies. If A cannot be satisfied then B applies.*

- *A: Ensure that the post development volume of run-off, allowing for climate change over the development lifetime, is no greater than it would have been before the development.*
- *The additional predicted volume of run-off for the 100 year 6 hour event must be prevented from leaving the site by using infiltration or other SuDS techniques (see Definitions).*
- *OR B: If A cannot be satisfied (full justification must be provided) then reduce the post development peak rate of run-off to the limiting discharge.*
- *The limiting discharge is the pre-development flow rate equivalent to the 1-year peak flow rate, mean annual flood flow rate ($\bar{Q}$) or 2 l/s/ha, whichever is the highest flow rate.*
- *For the 1-year peak flow rate the 1 year return period event criterion in section 1 above, applies. For all other events up to the 100 year return period event, the peak rate of run-off for the developed site must not exceed the limiting discharge.*
- *Where the limiting discharge flow rate would require a flow rate of less than 5 l/s at a discharge point, a flow rate of up to 5 l/s may be used where required to reduce the risk of blockage.*

From the information provided by the client (Appendix A), permeable and impermeable surface areas were calculated pre and post-development (Table 1). Table 1 shows that the total area of impermeable surface (garage footprint plus hardstanding front yard) is 124m². Post development, there will be a reduction in the area of the impermeable surface by approximately 40m². It is because, approximately 40m² of the area will be utilised as permeable surface on the amenity space as shown in Appendix A.

The proposed development will therefore not increase the man-made impermeable area of the development site. This means that the peak rate of run-off criterion does not apply to the site. Similarly, the volume of run-off criteria also does not apply to the site.

Table 1. Permeable and impermeable surface area.

Land cover	Pre-development, m ²	Post-development, m ²	Change, m ²
Hard standing surface area	65.0	31.0	-34.0
Building footprint	59.0	53.0	-6.0
Total impermeable surface	124.0	84.0	-40.0
Lawn/garden	0.0	40.0	40.0
Total permeable surface	0.0	40.0	40.0
Total Area	124.0	124.0	0.0

2.2.2. Water Quality Criterion

In accordance with the 2010 Technical Guide to the Code for Sustainable Homes, the Water Quality criteria are as follows:

- *One credit can be awarded by ensuring there is no discharge from the developed site for rainfall depths up to 5mm.*
- *One credit can be awarded by ensuring that the run-off from all hard surfaces shall receive an appropriate level of treatment in accordance with The SuDS Manual to minimise the risk of pollution.*
- *Note: The SuDS Manual best practice recommendations should be followed where there is a risk to groundwater from infiltration (for example contaminated land, developments with high risk of pollution incidents)*

The development proposes to implement an underground rainwater harvesting tank which will offer attenuation of the first 5mm of rain. Also, the amenity space covered with green turf and permeable surface will offer attenuation of the first 5mm of rain. Therefore, one credit can be awarded as there will be no discharge from the developed site for rainfall depths up to 5mm.

The run-off from the building footprint will be recycled for household purposes and will not be discharged directly to the public sewer. One credit can therefore be awarded for water quality.

2.3. Awarded Credits

The Code for Sustainable Homes SUR 1 offer 2 credits to new developments, provided that they are designed under particular specifications and they are satisfying specific criteria. The development satisfies both of the water quality criteria (SUR 1) and therefore can be awarded two credits.

Appendix A Development Proposals

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