UK Flood Risk
Flood Risk Consultants

Surface Water Drainage (SuDS) Strategy

Stephenson House, 75 Hampstead Road
Kings Cross, London NW1 2PL

Project Ref: QFRA 649

Version: 1.0

Date: 10/03/2017

UK Flood Risk Consultants
18 St Nicholas Rd
Plumstead
London SE18 1HJ
Tel:020 3468 1540

Email: ukfloodrisk@gmail.com
www.ukfloodrisk.co.uk

Revision Records

Date Issued	Report Version	Comments	Issued to
March, 2017	1.0	1st Issue	Patrick Nicholls

Written by	SG	Senior Flood Risk Consultant	10/03/2017
Reviewed & approved by	PR	Senior Flood Risk Consultant/Director	10/03/2017

Issue Date: 10/03/2017

DISCLAIMER

This document has been prepared solely as a Surface Water (SuDS) Assessment for the owner of this site. UK Flood Risk Consultants accepts no responsibility or liability for any use that is made of this document other than by the owner for the purpose for which it was originally commissioned and prepared.

UK Flood Risk Consultants
18 St Nicholas Rd
Plumstead
London
SE18 1HJ

UK Flood Risk
Flood Risk Consultants

Contents

Abbreviations

Abbreviation	Description
mAOD	Metres Above Ordnance Datum
DEFRA	Department for Environment, Food, and Rural Affairs
EA	Environment Agency
FRA	Flood Risk Assessment
LLFA	Lead Local Flood Authority
NPPF	National Planning Policy Framework
SFRA	Strategic Flood Risk Assessment
PFRA	Preliminary Flood Risk Assessment
SuDS	Sustainable Drainage Systems

1.0 Background

UK Flood Risk Consultants has been commissioned to prepare this Surface Drainage Strategy in support of a proposal consisting of development of surface drainage strategy (SuDS) for the improvement of surface runoff from the site located at Stephenson House, 75 Hampstead Road, Kings Cross, London NW1 2PL.

This SuDS has been carried out in accordance with the guidance and best practices in surface water management. Particularly, the guidelines of Sewers for Adoption, SuDS Manual (C697) and other technical design documents have been closely followed.

2.0 Surface Water Drainage Requirements

The Environment Agency suggests that the developers should demonstrate that the disposal of surface water from the site will not exacerbate existing flooding from new development within Flood Zones 3 and 2, development greater than 1ha in Flood Zone 1 and within areas that are known to suffer from surface water drainage or sewer flooding.

A surface water drainage assessment should be undertaken to demonstrate that surface water runoff from the proposed development can be effectively managed without increasing flood risk elsewhere. A surface water drainage assessment should include the following:

- Assessment of whether the development will increase the overall discharge from the site by calculating the change in area covered by roofs and hard-standing.
- Details of how overland flow from the new development can be intercepted to prevent flooding of adjacent land.
- Details of how additional onsite surface water attenuation can be provided to mitigate against known flooding problems or as a result of incapacity on the drainage systems.
- Demonstration that overland flows will not increase flood risk to both existing development and receiving watercourses.
- Agreement that the rates of discharge from the development are acceptable to the Environment Agency and utilities authorities.

3.0 General Description of the Site and the Proposals

3.1. Description of the site

The proposal site is the existing building- Stephenson House located at 75 Hampstead Road, Kings Cross, London NW1 2PL centred on the OS NGR 529178,182506 (**Appendix A**). The building is an existing mixed-use development in central London consisting of mainly offices, with some retail space.

London Borough of Camden is the Local Planning Authority. The access to the site is via Hampstead Road. The land use of the surrounding area is predominantly commercial use.

The nearest major watercourses from the site are the River Thames. The site has a relatively flat topography. Further details on the existing site and layout plan have been given in **Appendix A.**

3.2. Proposed Development

The building is to be significantly redeveloped with offices and retail space being supplemented by some residential flats. The building is seven storey in height with some commercial space also to be located in the basement along with plant space at both basement level and on the roof.

The aim of this report is to develop a surface drainage strategy (SuDS) for the improvement of surface runoff from the site. Further details about the proposed development plans have been given in **Appendix A.**

.

3.3. Surface Water Runoff Management (SuDS)

3.3.1. Surface Water Runoff Management

London Borough of Camden strongly encourages the principles of SuDS on all forms of development. This is particularly important for development sites that lie within flood risk zones, including minor development and building extensions. The developer should seek the most sustainable SuDS solution in order to reduce flood risk, improve water quality and improve the environment overall.

3.3.2. Estimation of Permeable and Impermeable Areas

The proposal consists of redevelopment of the building. This means there will be no further increase in the impermeable surface area. The surface runoff will therefore not be increased as a result of the proposed development.

3.3.3. Sustainable Urban Drainage Systems (SuDS)

The surface runoff from the site will be improved by implementing appropriate SuDS. The requirements for SuDS will ensure that any redevelopment or new development does not negatively contribute to the surface water flood risk of other properties and instead provides a positive benefit to the level of risk in the area. It will also ensure that appropriate measures are taken to increase the flood resilience of new properties and developments in surface water flood risk areas, such as those identified as being locally important flood risk areas.

The SudS hierarchy and management train has been discussed in Paragraph 1.3.2 of the SuDS Manual (C697) which aims to mimic the natural catchment processes as closely as possible. The general hierarchy of the SuDS measures is provided in **Table 1** below.

Table 1 General Hierarchy of SuDS Measures

Measures	Definition/Description
Prevention	The use of good site design and housekeeping measures to prevent runoff and pollution (e.g. rainwater harvesting/reuse).
Source control	Control of runoff at or very near its source (e.g. soakaways, porous and pervious surfaces, green roofs).
Site control	Management of water in a local area on site (e.g. routing water to large soakaways, infiltration or detention basins)
Regional control	Management of runoff from a site or several sites (e.g. balancing ponds, wetlands).

Table 2 below presents the feasibility assessment of the SuDS measures for the site.

Table 2 General Assessment of SuDS measures for the site

SuDS Measures	Issues/Description	Feasibility for the site
Prevention Good site design and housekeeping/rainwater harvesting/infiltration devices/education.	Surface runoff can be improved by implementing rainwater harvesting using water butts.	Yes
Source Control Porous and pervious materials/soakaways/green roof/infiltration trenches/disconnect downpipes to drain to lawns or infiltrate to soakaway.	Presence of Clay and fine soil means the infiltration measures may not be appropriate. Feasibility of soakaways or porous pavement will require field infiltration tests.	No
Site and Regional Control Infiltration/detention basins/ balancing ponds/ wetlands/underground storage/swales/retention ponds.	There is a potential for an attenuation storage tank to temporarily store the surface runoff prior to discharging the runoff into the sewer.	Yes

4.0 Outline Design of SUDS

4.1. Greenfield Runoff Estimation

The estimation of the Greenfield Runoff rate has been undertaken using the HR Wallingford's Greenfield Runoff Estimation tool available on the website: http://www.uksuds-.com/greenfieldrunoff_js.htm. The aim of the tool is to provide flow rate information based on a minimum amount of data so that anybody can use the tool. The methodology is built around the concept that a flow rate discharge constraint is needed for storm water runoff from a site, resulting in attenuation volume being needed. In addition, current drainage criteria include the requirement for the 100 year 6hr volume to be controlled.

The tool is based on the results of simple model analysis and correlating the results against key known site parameters. As such the results need to be treated as providing indicative information only and should not be used to produce final designs of drainage systems without additional modelling being carried out.

The peak flow estimation can now be estimated using two different formulae.

1) The formula developed in IH124 (IH 1994) and use of the FSSR growth curve information for regions of the UK (FSSR 14),

2) The use of FEH statistical correlation equation revised in 2008.

However, only the IH124 method can be used without providing specific parameter values. Therefore this method has been used for estimating greenfield runoff rate from the proposed development site.

Details about the parameters used in the estimation are provided in **Appendix B** and the results are summarised in **Table 3** below. The total area of the site is approximately 0.38 ha which is used in the estimation of greenfield runoff rates. The proposed development should consider the greenfield runoff rates especially for addressing surface water discharge requirements from the developed site. The greenfield runoff rates should also be utilised while developing detailed drainage strategy for the site. As the area of the site is relatively small, a minimum value of 5l/s applies for the site.

Table 3 – Greenfield Runoff Rates

Events	Greenfield runoff rates (l/s) (Estimated)	Greenfield runoff rates (l/s) (Adopted)
Qbar	1.58	5.00
1 in 1 year	1.34	5.00
1 in 30 year	3.63	5.00
1 in 100 year	5.04	5.04

4.2. Surface Runoff Storage Requirements

Surface water storage requirement has been estimated using the HR Wallingford's Storm water Storage Analysis tool. The aim of the tool is to provide flow rate and storage volume information for a site based on a minimum amount of data so that anybody can use the tool. A flow rate discharge constraint is usually required for storm water runoff from a site, resulting in attenuation volume being needed.

The total site area is 0.38 hectares. 100% of the area has been considered as a drained area that is impermeable. A climate change allowance factor of 1.3 has been used. The estimated attenuation storage volumes are summarized in **Table 4** below. Input information and further details about the calculations have been provided in **Appendix C**.

Table 4 Estimated Storage Volumes

Storage	Long-term storage (m^3)
Interception Storage	15
Attenuation Storage	270
Long-term Storage	0
Treatment Storage	46
Total Storage (excluding treatment storage)	285

From the table above, a total storage of approximately 270m^3 has been estimated. However, the site is already a fully developed one and therefore the proposed development will not lead to further increase of the impermeable area. The surface

runoff will not be increased post-development. Based on these conditions, in order to improve the surface runoff from the site, it is proposed that 50% of the estimated storage volume (i.e. 135m^3) will be implemented on the site.

4.3. Proposed SuDS

Due to the limited availability of space, open ground attenuation storage can not be provided.

Based on the estimate in **Table 4**, a storage tank with the total storage volume of 135m^3 will be provided as shown in **Appendix D.**

The location and layout of the tank and its dimensions (area and depth) can be changed to suit the site conditions. This will be to the client's discretion ensuring 135m^3 of attenuation storage is provided.

The stored water from the tank will be discharged into the existing sewer located at Hampstead Road or Drummond Street subject to discharge consent by the Sewerage provider (**Appendix D)**. The discharge into the sewer will be limited to the greenfield rate of 1.6 lit/sec by using flow controlling devices such as hydro-brake or vortex control device (**Table 3**).

Repair/Maintenance and use

The landowners will be fully responsible for regular repair and maintenance of the proposed attenuation storage and the drainage system. The repair and maintenance will include regular inspection of silt traps, manholes, pipework and pre-treatment devices, with removal of sediment and debris as required.

Appendix A Existing Site and Proposed Plans

Appendix B Greenfield Runoff Rates

Appendix C Surface Water Storage Requirements

Appendix D Proposed Layout of Surface Drainage (SuDS)