UK Flood Risk
Flood Risk Consultants

Surface Runoff (SuDS) Strategy
58 Mill Lane, London NW6 1NJ

Project Ref: QFRA 1392

Version: 1.1

Date: 11/12/2019

UK Flood Risk Consultants
55 Shepherds Lane
Dartford DA1 2NL

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

Revision Records

Date Issued	Report Version	Comments	Issued to
May 2019	1.0	1st Issue	Duncan Gilbert, Kilburn & District Houses Ltd
December 2019	1.1	Outline design of rainwater butt incorporated.	Duncan Gilbert, Kilburn & District Houses Ltd

Prepared by	SG	Senior Flood Risk Consultant	11/12/2019

Issue Date: 11/12/2019

DISCLAIMER

This document has been prepared solely as a Surface Water (SuDS) Assessment for the owners 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
55 Shepherds Lane
Dartford DA1 2NL

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 Runoff Strategy (SuDS) in support of a proposal consisting of change of use at basement level from retail (Class A1) to provide 1 residential (Class C3) unit together with single storey rear extension at lower ground floor level located at 58 Mill Lane, London NW6 1NJ.

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 (C753) and other technical design documents have been closely followed.

2.0 Relevant Planning Polices

2.1. National Planning Policy Framework (NPPF)

The revised National Planning Policy Framework was published on 24 July 2018 and sets out the government's planning policies for England. The NPPF sets out planning and policies related to development planning and flood risk using a sequential characterisation of risk based on planning zones and the Environment Agency's Flood Maps. The aim of the flood risk assessment is to identify which Flood Zones the site is located in and vulnerability classification relevant to the proposed development, based on an assessment of current and future conditions. The policy also encourages the developers to incorporate appropriate Sustainable Drainage Systems (SuDS) in order to address the surface runoff/drainage issues.

2.2. Flood and Water Management Act 2010

The method of drainage of surface water from the site is bound by the Flood and Water Management Act 2010. Schedule 3 Paragraph 5 of the Flood and Water Management Act 2010 states that the following hierarchy is to be applied to surface water runoff in the following order or priority:

- Discharge into the ground (infiltration)
- Discharge to a surface water body (lake, river, drain);
- Discharge to a surface water sewer, highway drain or another drainage system; or Discharge into a combined sewer.

2.3. Draft New London Plan

The Policy SI13 Sustainable Drainage of the Draft New London Plan has set out the following in order to address the surface runoff issues resulting from the development proposals:

A. Lead Local Flood Authorities should identify – through their Local Flood Risk Management Strategies and Surface Water Management Plans – areas where there are particular surface water management issues and aim to reduce these risks.

B. Development proposals should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible in line with the following drainage hierarchy:

    1. rainwater harvesting (including a combination of green and blue roofs)
    2. infiltration techniques and green roofs
    3. rainwater attenuation in open water features for gradual release
    4. rainwater discharge direct to a watercourse (unless not appropriate)
    5. rainwater attenuation above ground (including blue roofs)
    6. rainwater attenuation below ground[136]
    7. rainwater discharge to a surface water sewer or drain
    8. rainwater discharge to a combined sewer.

C. Development proposals for impermeable paving should be refused where appropriate, including on small surfaces such as front gardens and driveways.

D. Drainage should be designed and implemented in ways that address issues of water use efficiency, river water quality, biodiversity, amenity and recreation.

2.4. Local Flood Risk Management Strategy (2013)

London Borough of Camden's Local Flood Risk Management Strategy (2013) outlines Camden's priorities for local flood risk management. One of the key objectives of the Strategy is to improve flood risk understanding for properties, communities and infrastructure at risk of flooding from surface water, groundwater or ordinary watercourses. The Strategy sets out Council's approach to managing flood risk from local sources (i.e. surface water, ordinary watercourses and groundwater)) in both the short and longer term, with proposals for sustainable actions that will help

to manage the risk in a way that delivers the greatest benefit to the residents, businesses and environment of Islington.

3.0 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.

4.0 General Description of the Site and the Proposals

4.1. Description of the site

The proposal site is the existing residential dwelling located at 58 Mill Lane, London NW6 1NJ approximately centred on the OS NGR 524866,185124. The site is located within the administrative boundary of London Borough of Camden which is the Local Planning Authority.

Total site area is approximately 126m^2. The area of building footprint is approximately 80.6m^2 and the area of hardstanding pavement is approximately 27.4m^2.

The access to the site is via Mill Lane. The surrounding area consists of predominantly residential use.

There are no major watercourses in the vicinity of the site. The site topography is relatively flat and level. Further details about the existing site are provided in **Appendix A**.

4.2. Proposed Development

The proposal consists of change of use at basement level from retail (Class A1) to provide 1 residential (Class C3) unit together with single storey rear extension at lower ground floor level. The total footprint area of the proposed extension is approximately 18.3m^2. Further details about the proposals have been provided in **Appendix A**.

4.3. Surface Water Runoff Management (SuDS)

4.3.1. 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.

4.3.2. Estimation of Permeable and Impermeable Areas

The changes in land cover pre and post development have been summarised in **Table 1** below. It can be seen that the proposed development will lead a decrease of impermeable area by 9.1m^2. This means the surface runoff will be decreased as a result of the proposed development.

Table 1 Changes in Land Cover

Land Cover	Pre-development, m^2	Post-development (with SuDS), m^2	Change, m^2
Impermeable Surface Area			
Hard-standing	27.4	0	
Building footprint	80.6	98.9	
Total Impermeable	**108.0**	**98.9**	**(-) 9.1**
Permeable Surface Area			
Grass cover	0	9.1	
Total Permeable	**0**	**9.1**	**(+) 9.1**
Total Area	108.0	108.0	

4.4. Surface Water Runoff (SuDS)

4.4.1. Estimation of flows

The Rational Method has been used in order to estimate the peak surface runoff from the site

The Rational Equation is given by:

Q = Ar x P x Ri

Where, Ar = Effective catchment area, m^2

P= Impermeability factor

Ri= Rainfall Intensity, mm/hr

Q= Peak surface runoff, m^3/s

The peak surface runoff for the existing and proposed site conditions are summarised in **Table 2** below. An impermeability factor of 0.90 has been used for the site. A rainfall intensity of 100 mm per hour has been utilised. The impermeable areas in **Table 1** have been used as effective catchment area. **Table 2** shows that the peak runoff rates from the site in the pre and post-development conditions are 2.7 litre/sec and 2.4 litre/sec respectively. This implies that there will be a slight reduction in the peak surface runoff from the site post-development.

Table 2 Estimation of Peak Runoff Rates from the site

SuDS Measures	Pre-development	Post-development
# Rainfall intensity Ri, mm/hr	100	100
Effective catchment area, Ar m^2	108	98.9
Impermeability factor, P	0.90	0.90
Peak Runoff, m^3/s	(Ar x P x Ri/1000)/3600 = (108 x 0.90 x 100/1000) / 3600 =0.0027m^3/s = 2.7 litre/sec	(Ar x P x Ri/1000)/3600 = (98.9x 0.90 x 100/1000) / 3600 =0.0024m^3/s = 2.4 litre/sec

The rule of thumb is to use a constant rainfall intensity of 35mm/hr for initial sizing of conveyance system. 100mm/hr has been used and provides a more conservative solution

(see Environment Agency 2003, Rainfall runoff management for developments, Report-SC030219).

4.4.2. 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 the SuDS Manual (C753) which aims to mimic the natural catchment processes as closely as possible. The general hierarchy of the SuDS measures is provided in **Table 3** below.

Table 3 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 4 below presents the feasibility assessment of the SuDS measures for the site.

Table 4 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.	Rainwater harvesting (water butt) will improve the surface runoff from the site.	Yes

Source Control Porous and pervious materials/soakaways/green roof/infiltration trenches/disconnect downpipes to drain to lawns or infiltrate to soakaway.	Due to the presence of clay and fine soil, the infiltration SuDS will not be feasible.	No
Site and Regional Control Infiltration/detention basins/ balancing ponds/ wetlands/underground storage/swales/retention ponds.	Balancing pond/wetland will not be feasible due to limited space.	No

4.5. Outline Design of the Proposed SuDS

Based on the general assessment of the SuDS measures above, it is proposed that a rainwater harvesting (rainwater tank) will be implemented in order to improve the surface runoff from the site.

Outline design of rainwater tank

The outline design of the proposed rainwater butt (tank) is based on the HR Wallingford's online drainage design tool as given below:

https://www.uksuds.com/drainage-calculation-tools/rain-harvesting-tank-sizing

The Rainwater harvesting tank sizing tool provides methods for sizing rainwater harvesting tanks for stormwater management of runoff for individual and multiple properties. The method used is the same as that in the Rainwater harvesting code of practice BS 8515 ed. 2012 Appendix A.

The footprint area of the proposed extension is approximately 18.3m^2. Therefore, a roof area of 20m^2 has been considered for designing the rainwater tank. The design parameter and results have been provided in **Appendix B**. It can be seen that a 0.30m^3 (i.e. 300 litres) of the rainwater tank will be required. The layout of the proposed rainwater tank has been provided in **Appendix C**. The location of the water tank can be changed in order to suit the local condition.

4.6. Maintenance and Management Plan

The landowners will be fully responsible for the repair and management of the proposed rainwater tank throughout the lifetime of the proposed development. **Table 5** provides further details on the regular maintenance of the proposed rainwater tank.

Table 5 Regular maintenance and remedial measures for rainwater tank

Regular Maintenance	Actions/Remedial measures
Every 3 months	• Clean the tank and pipe fittings. • All the supply pipes and any outlets from the rainwater tank should be marked "Rainwater - Non potable".
Every 1 year	• Inspect and identify any crack or leakages from the tank and carry out essential recovery work to return to full working order.
Following all significant events	• Inspect and identify any crack or leakages from the tank and carry out essential recovery work to return to full working order.

UK Flood Risk
Flood Risk Consultants

Appendix A Existing Site and Proposed Plans

UK Flood Risk
Flood Risk Consultants

Appendix B Outline Design of Rainwater Tank

UK Flood Risk
Flood Risk Consultants

Appendix C Proposed Surface Runoff Improvement Measures (SuDS)