



REPORTS 4 PLANNING

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Surface Water Management Strategy

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Report Ref: 215516DRA

Report Date: November 2021



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1 INTRODUCTION

1.1 Background

It is proposed to demolish the existing buildings and erect a 3-storey building containing apartments, a retail unit and car and cycle parking at 152-154 Uxbridge Road, Hayes UB4 0JH. This report includes a drainage strategy to meet the requirements of Policy SI 13 of the London Plan which requires the use of sustainable drainage measures and the achievement of greenfield runoff rates from the site and ensure surface water run-off is managed as close to its source as possible.

The location is at NGR TQ 11403 80796 (511403,180796) as shown in Figure 1.1 and plans are presented in Appendix 1.

Figure 1.1 Site Location



The Site is within the London Borough of Hillingdon, which is the local planning authority and the Lead Local Flood Authority (LLFA).

This report presents an outline SuDS drainage strategy for the proposed development to meet the requirements of the DEFRA non-statutory technical standards for SuDS¹ and local planning guidance including the London Plan.

1.2 Policy Requirements

1.2.1 DEFRA Non Statutory Technical Standards

The DEFRA non-statutory technical standards for SuDS¹ brings a national approach to drainage of new development consistent with the National Planning Policy Framework. The guidance presents standards which should be adopted where feasible.

Relevant standards state:

S2 For Greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event.

¹ Sustainable Drainage Systems Non-statutory technical standards for sustainable drainage systems. DEFRA March 2015

S3 For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

S4 Where reasonably practicable, for greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.

S5 Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event.

S6 Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with **S4** or **S5** above, the runoff volume must be discharged at a rate that does not adversely affect flood risk.

As the Site is brownfield, the drainage strategy should aim to not increase runoff volume or rate from the Site over the existing situation, if possible reduce these to the greenfield condition, and not increase flood risk to others.

1.2.2 The London Plan 2021

The London Plan² includes guidance on sustainable drainage. In particular, Policy SI 13 “Sustainable drainage” includes the following:

“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. There should also be a preference for green over grey features, in line with the following drainage hierarchy:

- 1) rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)*
- 2) rainwater infiltration to ground at or close to source*
- 3) rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)*
- 4) rainwater discharge direct to a watercourse (unless not appropriate)*
- 5) controlled rainwater discharge to a surface water sewer or drain*
- 6) controlled rainwater discharge to a combined sewer.*

C Development proposals for impermeable surfacing should normally be resisted unless they can be shown to be unavoidable, including on small surfaces such as front gardens and driveways.

D Drainage should be designed and implemented in ways that promote multiple benefits including increased water use efficiency, improved water quality, and enhanced biodiversity, urban greening, amenity and recreation.”

² https://www.london.gov.uk/sites/default/files/the_london_plan_2021.pdf

2 THE SITE

The Site is approximately 660 m² and occupies a corner position on Uxbridge Road, extending along Brookside Road.

2.1 Hydrological Setting

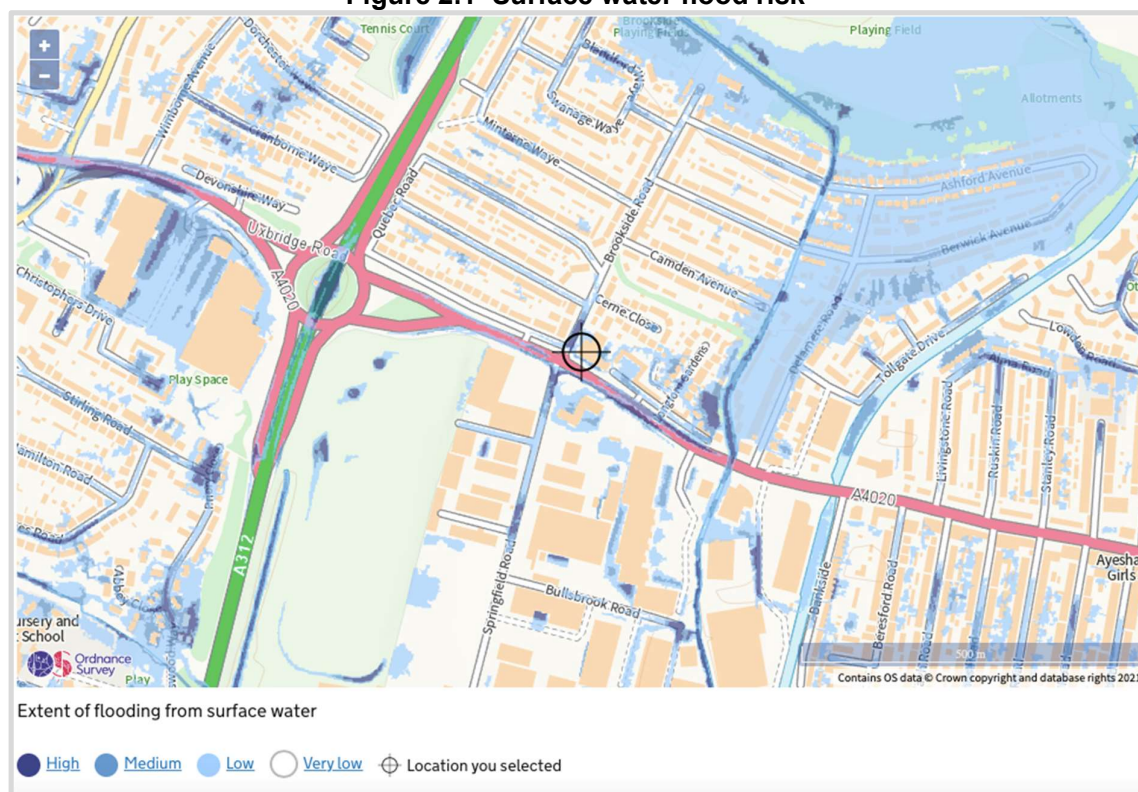
The Site is within the catchment of the Yeading Brook, which lies 215 metres to the south east. The Grand Union Canal lies 420 m to the south west.

2.1.1 Flood Risk

The Site is in flood zone 1, meaning the annual risk of flooding from rivers or the sea is less than 0.1%³.

There is a high risk of surface water flooding on Brookside Road adjacent to the Site, meaning an annual risk greater than 3.3%, and a low risk of surface water across the Site (Figure 2.1). The mapped depths of surface water flooding are below 300 mm.

Figure 2.1 Surface water flood risk



2.1.2 Rainfall

Rainfall data has been downloaded from the Flood Risk Estimation website and is shown in Appendix 2.

2.1.3 Climate Change

Current guidance on climate change⁴ increases in rainfall intensity are shown in

³ <https://flood-map-for-planning.service.gov.uk>

⁴ <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Table 2.1.

Table 2.1 Climate change allowances for rainfall intensity

<i>Applies across all of England</i>	<i>Total potential change anticipated for 2010 to 2039</i>	<i>Total potential change anticipated for 2040 to 2059</i>	<i>Total potential change anticipated for 2060 to 2115</i>
<i>Upper end</i>	10%	20%	40%
<i>Central</i>	5%	10%	20%

Both the central and upper end allowances should be used when considering surface water management on the Site. As this is a residential development in an urban area an increase of 40% has been used to assess rainfall impacts on the Site.

2.2 Geology

The Site is underlain by the London Clay Formation, comprising clay, sand and silt, with superficial geological deposits of the Langley Silt member recorded⁵. Lower Thames river terrace deposits are likely to underly the Langley Silt. The Site may include Made Ground in places.

A nearby borehole (BGS ID 581999 : location 511410,180710, 79 metres south of site) found made ground overlying 1 metre of firm sandy clay (prob. Langley Silt Member), underlain by over 3 metres of gravel and sand with stiff clay (London Clay) at depth.

The soils are described as “loamy soils, with a naturally high water table”⁶.

The geology and soils may only be conducive to use of soakaways at depth in the terrace gravels but some infiltration through permeable paving may be possible on superficial layers. Permeability on the site is classed by BGS as low to very low⁷. A site test of infiltration rates and depth to groundwater would be required to confirm this assessment.

Both the bedrock and the superficial geology are defined as unproductive aquifers. The site is not in a groundwater source protection zone.

2.3 Greenfield Runoff

The DEFRA technical guidance and the London Plan suggest the runoff from developments should emulate Greenfield runoff where feasible. Greenfield runoff is an estimate of the likely runoff from the Site before development occurred and is calculated using equations derived from natural river catchments. Available data from such catchments is limited and restricted to much larger areas than individual development sites, so Greenfield runoff is therefore a guide rather than a precise runoff calculation.

Greenfield runoff has been estimated using the HR Wallingford online Suds site⁸.

This provides an estimate of greenfield rates and an annual average peak flow of 4.17 l/s/ha is derived. The annual average peak flow has a probability of 1 in 2.3, and other probabilities can be derived from it as shown in Table 2.2. Further details are provided in Appendix 3.

⁵ BGS Geology of Britain viewer, <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

⁶ Soils online soils viewer, Cranfield University, <http://www.landis.org.uk/soils>

⁷ Groundsure report GS-8359871 for site, 25/11/21

⁸ UK Sustainable Drainage Guidance and Tools. HR Wallingford. http://geoservergisweb2.hrwallingford.co.uk/uksd/surfacewaterstorage_js.htm#Top

Table 2.2 Calculated Greenfield Runoff Rates

Return Period (years)	Peak Greenfield Rate (l/s/ha)	Peak Greenfield Rate (l/s)
1	3.54	0.79
30	9.58	2.15
100	13.3	2.98

2.4 Existing Development

The Site is currently occupied by retail and residential development and a yard area used for parking as shown in Figure 1.1. Both buildings and parking areas are impermeable and drain to sewer.

2.5 Runoff from the Existing Site

The existing buildings and hardstanding occupy the whole site which is therefore 100% impermeable.

In accordance with the Modified Rational Method, the peak existing run-off from the existing buildings is calculated from the formula:

$$Q = 3.61 \times C_v \times A \times i$$

where C_v is the volumetric runoff coefficient, A is the effective catchment area in hectares and i is the peak rainfall intensity in mm/hr. As the Site is small a critical duration of 30 minutes has been estimated, and rainfall intensities for this duration have been obtained from the Flood Estimation Handbook rainfall data (Appendix 3) and are 15.7 mm/hr and 73.1 mm/hr for the 30 minute 1 year and 100 year rainfall return periods respectively.

For the peak 1 in 1 year return period storm event, this gives an existing discharge rate from the site of:

$$Q_1 = 3.61 \times 0.75 \times 0.066 \times 15.7 = \mathbf{2.8 \text{ litres/sec}}$$

and, for the peak 1 in 100 year return period storm event, this gives an existing discharge rate from the site of:

$$Q_{100} = 3.61 \times 0.75 \times 0.066 \times 74.6 = \mathbf{13.3 \text{ litres/sec}}$$