

79 Avenue Road, London, NW8 6JD

Flood Risk Assessment

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1.1 Glossary

Table 1: Glossary Table

Term	Definition
AEP	Annual Exceedance Probability – The probability of flooding in any one year, which are commonly referred to as follows: <ul style="list-style-type: none"> • 5% (1 in 20 annual chance) • 1% (1 in 100 annual chance) • 0.5% (1 in 200 annual chance) • 0.1% (1 in 1000 annual chance)
Design Standard	The required standard to which fluvial and tidal flood defences should be constructed to adequately defend the communities that benefit from those defences.
Designated Main River	A watercourse designated on the statutory main river map, which is maintained by Defra. The Environment Agency has permissive powers to maintain and construct defences on main rivers.
Flood Resilience	Flood resilience is the process of ensuring that, if a property is to flood, the amount of damage caused is kept to a minimum and that the recovery time and cost is reduced as much as possible. A property can be made flood resilient by using concrete/sealed floors, resilient plasters and grouts, lightweight internal doors and by raising electrics, power points and appliances.
Flood Resistance	A flood-resistant building will seek to reduce the damage caused by flooding through the use of temporary and permanent defence measures to restrict the ingress of water into the property. These measures include, but are not limited to; flood gates on doors, air brick covers and works to ensure the structure is watertight
Flood Zone 3 High Probability	An area with a 1% or greater annual probability of fluvial flooding or a 0.5% or greater annual probability of tidal flooding.
Flood Zone 2 Medium Probability	An area with between a 1% and 0.1% annual probability of fluvial flooding, or an area with between a 0.5% and 0.1% annual probability of tidal flooding.
Flood Zone 1 Low Probability	An area with less than a 0.1% annual probability of tidal or fluvial flooding.
Fluvial Flooding	Flooding from non-tidally influence rivers
FRA	Flood Risk Assessment
Groundwater flooding	Flooding from groundwater and aquifers. Usually occurs are the junction between permeable and impermeable rock strata, or in valleys sited within an area of permeable rock strata.
mAOD	Metres Above Ordnance Datum
NPPF	National Planning Policy Framework. See https://www.gov.uk/government/publications/national-planningpolicy-framework--2 for more information.
SuDs	Sustainable Drainage Systems
Tidal Flooding	Flooding from the sea or tidally-influenced sections of the river

1.2 Introduction

This Flood Risk Assessment (FRA) has been carried out by Form on behalf of Mrs Munisha Gupta to support their planning application for new development.

In preparation for this flood risk assessment, consultation has been had with the Environment Agency. This FRA has also been carried in accordance with the guidance set out in the National Planning Policy Framework (NPPF). Consideration has been given to the vulnerability of the development and whether it is appropriate in this location.

Flood resilience and mitigation measures have been discussed to show that residual risk has been considered and can be mitigated through careful planning, flood warnings and action plans as required.

This report is an FRA and, therefore, deals with environmental issues only in as much as they are impacted by flooding. The report is the property of Form and is produced for the exclusive use of our client, Mrs Munisha Gupta. The contents may not be made use of by any third party without the express written consent of Form. Without such consent, Form can accept no responsibility to any third party. By receiving this report and acting on it, the client, or any third party relying on it, accepts that no individual is personally liable in contract, tort, or breach of statutory duty (including negligence).

1.3 Site Description

1.3.1 Site Location

The site is currently occupied by a single detached three-storey residential dwelling and is situated on the western boundary of the Borough of Camden, close to the boundary with the City of Westminster. Whilst the site is not within a conservation area, it is close to the St John's Wood and Elsworth conservation areas.



Figure 1: Site Location Plan and Aerial View

1.4 Existing Site

The site is currently occupied by a single detached three-storey residential dwelling, see figure below.

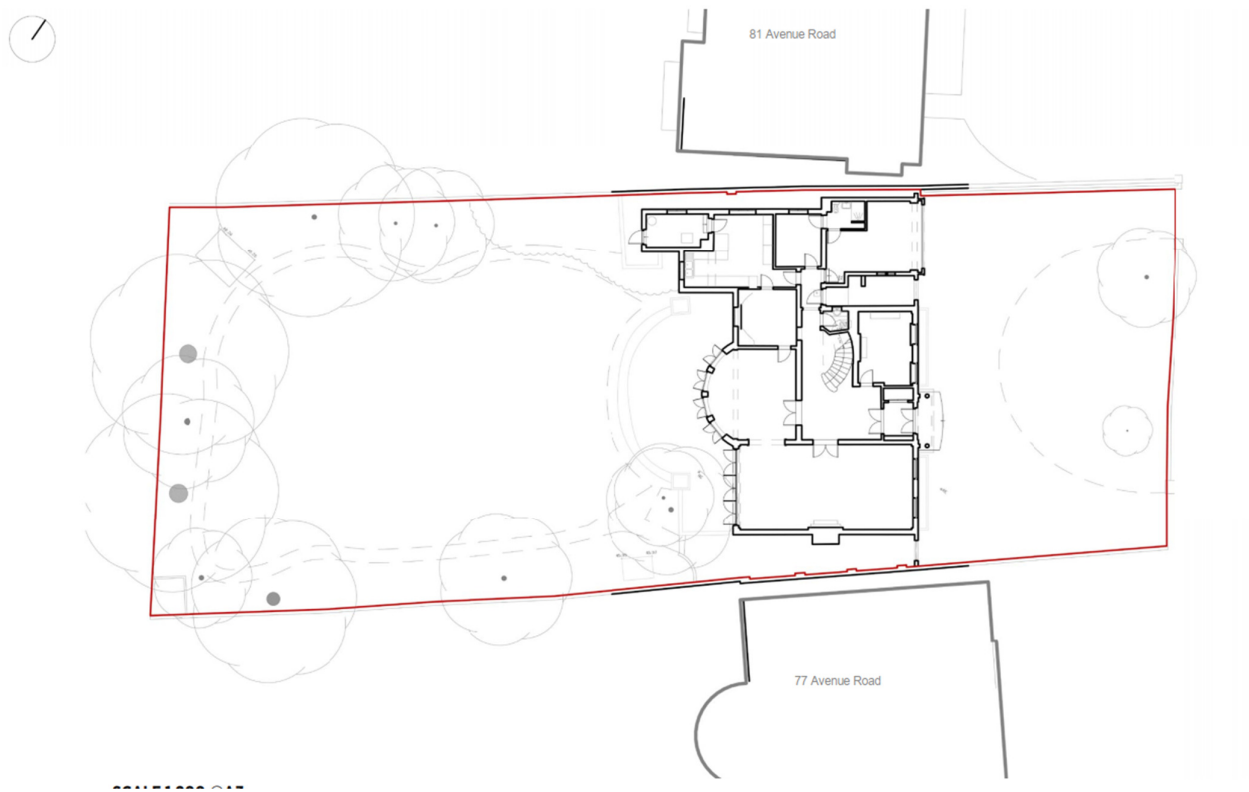


Figure 2: Existing Site Plan

The existing site area is 1422m² with 638m² of the impermeable area and 784m² permeable area.

1.5 The Proposed Development

The proposal is for the demolition of the existing building and its replacement with a new single-family dwelling, comprising a new basement level plus minimal second basement for a plant room. The existing building is not listed or recognised as a building of merit, and the development is not within a conservation area.



Figure 3: Proposed Site Plan

The proposed site area is 1422m² with 802m² of the impermeable area and 620m² of permeable area.

1.6 Local Topography

The site is flat, with ground levels generally being between 45.730 and 46.340. The land rises by approximately half a metre up from Avenue Road to the rear boundary via grass and hard paved slopes with a low gradient.

1.7 Geology

The risk from groundwater flooding in Camden is uncertain and more information is required to build up an understanding of it. Groundwater flooding occurs when the water table rises to the ground surface and inundates low lying areas. However, there are no known previous site-specific groundwater studies or flooding for the site.

1.8 Watercourses

The River Thames is approximately 5 Kilometres to the South-East and runs West-East towards London.

1.9 Existing Drainage

There are currently existing sewers within Avenue Road, therefore, It is assumed Foul and surface water is currently discharged via below ground drainage, joining up with the sewer mains located in Avenue Road.

As the land is a brownfield redevelopment site the existing areas are calculated to generate a surface water run-off of 17.7 litres/sec based on the existing 150dia pipe with a gradient of 1:100 connecting into the existing sewers within Avenue Road. The flow of 17.7l/s is based on the parameters specified within the Hydraulic water table flow gradients at full bore conditions.

1.10 Proposed Drainage

For the purposes of this assessment, the report will demonstrate how the run-off will be disposed of, and that the system will be capable of withstanding a 1:100-year (including an additional 40% as an allowance for climate change) rainfall event.

To dispose of the surface water run-off generated by the redevelopment scheme, it is anticipated that the run-off will be directed to a nearby public surface water sewer network, via an existing connection present on-site, in the absence of suitable soil conditions for infiltration or a watercourse/ditch.

In summary, it is established the HR Wallingford Web site (Greenfield runoff rates) states "Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements". Therefore taking into account the location and it's surrounding it is proposed that blockages from

vegetation and other materials are possible the site peak discharge rate will be restricted for all events (up to and including the 1:100-year plus 40% climate change rainfall event) to 5.0 litres/sec.

This will be managed by a Hydrobrake flow device located downstream of the last manhole within the site boundary.

Provide sufficient storage to ensure no off-site flooding as a result of the development during all storm events up to and including the 1 in 100 years plus 40% climate change event.

This has been demonstrated via Source Control (Micro Drainage) Storage estimate (Figure 4). A storage volume of between 51m³ and 74m³ will be used to ensure no offsite flooding will occur as a result of the development's implementation for all storm events up to and including the 1:100 year plus 40% for climate change.

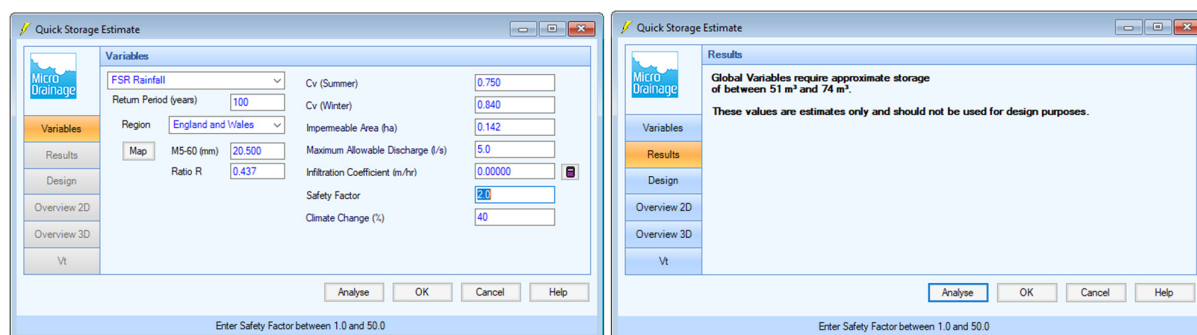


Figure 4: Micro Drainage Software Output of Storage Estimate

1.11 Previous Studies

There are no known previous site-specific Flood Risk studies for the site.

The 2014 London Borough of Camden Strategic Flood Risk Assessment (SFRA) has amalgamated wealth of information on flooding. There are detailed maps and historical flooding events as well as other information on the local flood risk.

The other document published by Camden is Managing flood risk in Camden (The London Borough of Camden flood risk management strategy). The document is detailed with maps and historical flooding events as well as surface water flooding.

The risk from groundwater flooding in Camden is uncertain and more information is required to build up an understanding of it. Groundwater flooding occurs when the water table rises to the ground surface and inundates low lying areas.

there is also a low risk of flooding from the Regent's Canal and the Hampstead Heath Ponds although if there was a breach in the ponds the effects would be severe. Responsibility for maintaining the Canal and the Ponds lies

with the Canal & River Trust and the City of London Corporation respectively. Camden is at no risk of flooding from rivers or the sea.

It is primarily at risk from surface water runoff (i.e. rainwater that is on the surface of the ground and has not entered a watercourse, drainage system or public sewer), groundwater or flooding from sewers which have been filled beyond capacity due to heavy rainfall. All of these situations are only likely to occur in extreme rainfall events such as 1975 and 2002.

1.12 Methodology

This is a desk-based study that utilises existing information in the form of mapping and previously undertaken modelling. Conclusions made about the behaviour of flooding on site have been made using expert judgement and knowledge of similar events.

The sources of information used for this study include:

- The Environment Agency's Flood Map
- The 2014 London Borough of Camden Strategic Flood Risk Assessment (SFRA)
- Managing flood risk in Camden (The London Borough of Camden flood risk management strategy).
- Environment Agency Product 4 flood data.
- Discussions with the Environment Agency

1.13 Flood Risk Assessment

The Environment Agency's Flood Map for Planning gives an indicative prediction of areas at risk of flooding from fluvial or tidal flooding. The mapping is an amalgamation of historical flooding events and modelled flood levels projected onto topographical maps.

The Flood Map shows the extent of the natural floodplain if there were no defences or other man-made structures. They do not provide a definitive picture of where flooding would occur; rather, they provide an indicative prediction of areas at risk.

1.13.1 Tidal and Fluvial

The River Thames is approximately 5 Kilometres to the South-East and runs West-East towards London. According to the Environment Agency Flood Maps, as seen below the site is located within Flood Zone 1 with denotes a low probability of tidal and fluvial flooding.

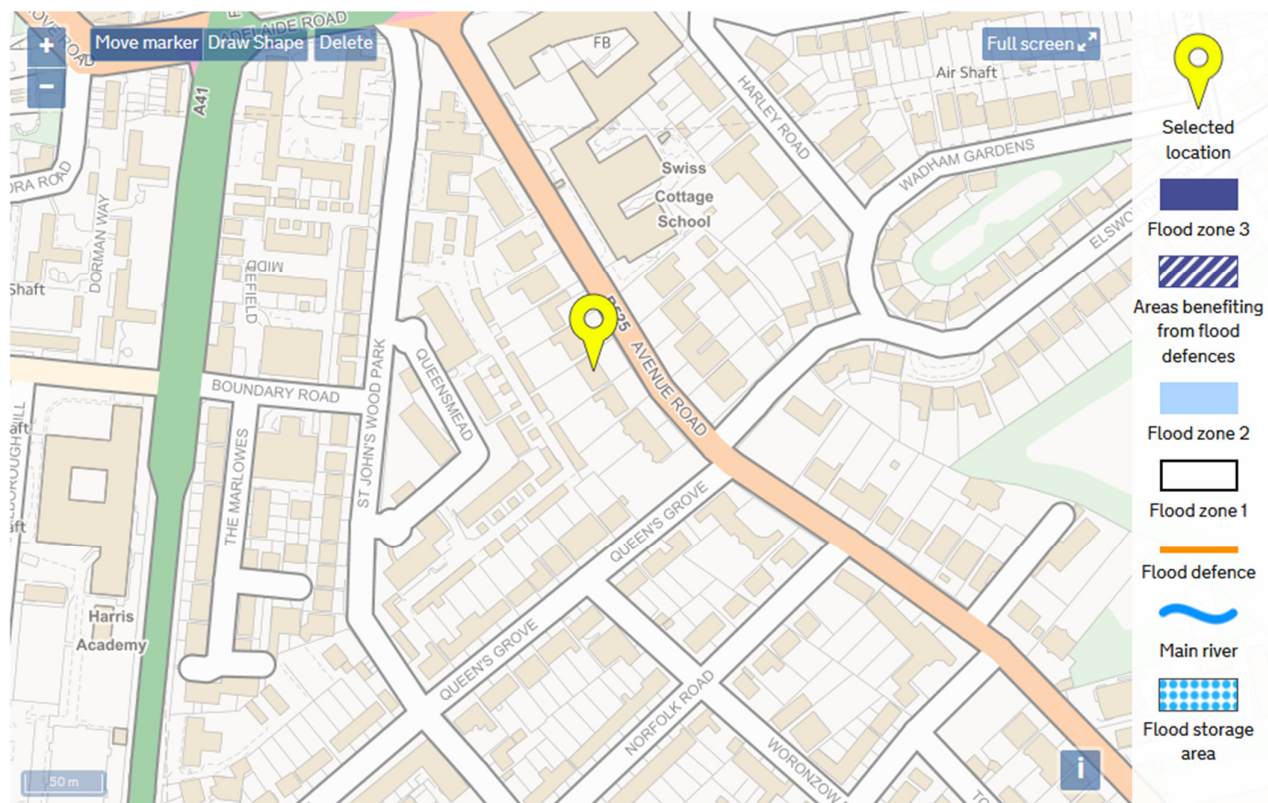


Figure 5: EA Tidal and Fluvial Flood Map with Site Indicated, October 2019

The Environment Agency has not provided any modelled flood levels as the River Thames is located so far away from the Site. However the 1 in 1000 year flood level is likely to be in the order of 5m AOD which is significantly

less than the 29m AOD approximate Site levels. It is therefore confirmed that no flood risk is posed to the Site from the River Thames.

1.13.2 Pluvial

Pluvial flooding occurs when natural and engineered drainage systems have insufficient capacity to deal with the volume of rainfall. Pluvial flooding can sometimes occur in urban areas during an extreme, high intensity, low duration summer rainfall event which overwhelms the local surface water drainage systems, or in rural areas during medium intensity, long-duration events where saturated ground conditions prevent infiltration into the subsoil. This localised floodwater would then be conveyed via overland flow routes dictated by the local topography.

Mapping included within the Strategic Flood Risk Assessment (SFRA, Map 22) shows that the Site was not subject to flooding during severe storm events that occurred in 1975 and 2002. Furthermore, Map 20 of the SFRA shows that the London Fire Brigade has not reported any incidents of flooding in the vicinity.

The 'Flood Maps for Surface Water' provided by the Environment Agency below indicates potential overland flow routes. This map confirms that some flooding may occur on Avenue Road during the 1 in 200-year rainfall event, however, the Site itself would not be subject to overland flows in a 1 in 30 or 1 in 200-year event.

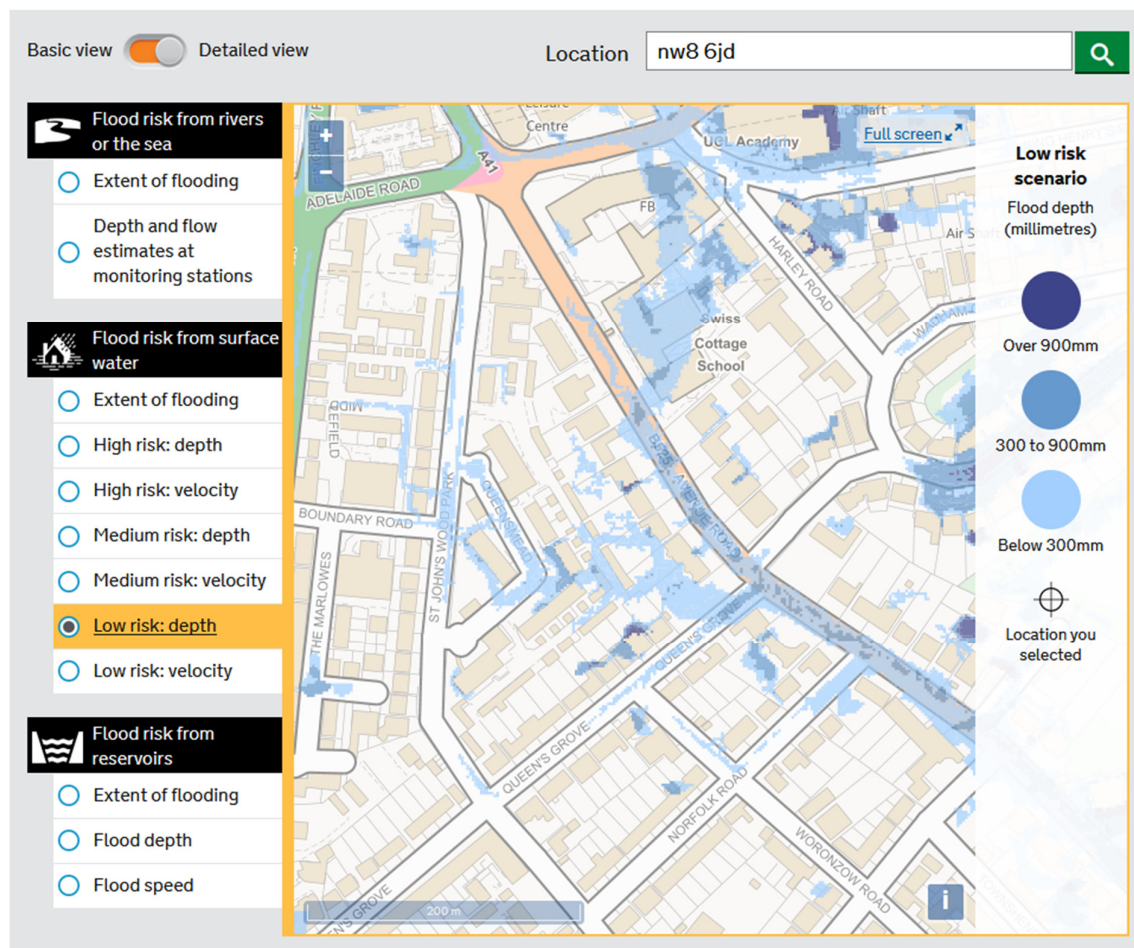


Figure 6: EA Pluvial Flood Map with Site Indicated, October 2019

Ordnance Survey (OS) spot levels indicate that any overland flow along Avenue Road would occur in a north to south direction. The topographic survey of the Site indicates that the street entrances to 79 Avenue Road would be 210mm above the main carriageway, and it is expected that any overland flows would be contained between the kerbs and would not flood the Site.

It is therefore considered that the pluvial flood risk posed to the Site would be low.

1.13.3 Groundwater

Based on the available information, the depth to the groundwater table cannot be confirmed, however, it is not expected that it would adversely impact on the Site or the development proposals. Form has no knowledge of previous incidents of above ground flooding in the area caused by a high groundwater table and it is considered very unlikely that such a risk would actually occur. In the unlikely event that flooding caused by a high

groundwater table did occur, as with the pluvial flood risk discussed above, floodwater is likely to be confined to the main carriageway providing a 210mm freeboard to the entrances of the Site.

The development proposals include a new basement which may well be below the groundwater table. However, it is expected that the basement is fully tanked and would mitigate the risk against any ingress of groundwater. It is envisaged that the integrity of the waterproofing would be investigated as part of the detailed design to allow any necessary mitigative works to be undertaken as part of the scheme, and ensure that it would be in line with current building standards.

As no additional below ground structures are proposed as part of the scheme, there would be no potential for the development to divert the flow of groundwater or increase flood risk to others. The risk of groundwater flooding to the Site itself and also elsewhere is therefore considered low.

1.13.4 Artificial Sources

Environment Agency mapping below shows that the Site would not be subject to flooding due to failure of any reservoirs in the area. The risk of flooding from artificial sources is therefore considered to be low.

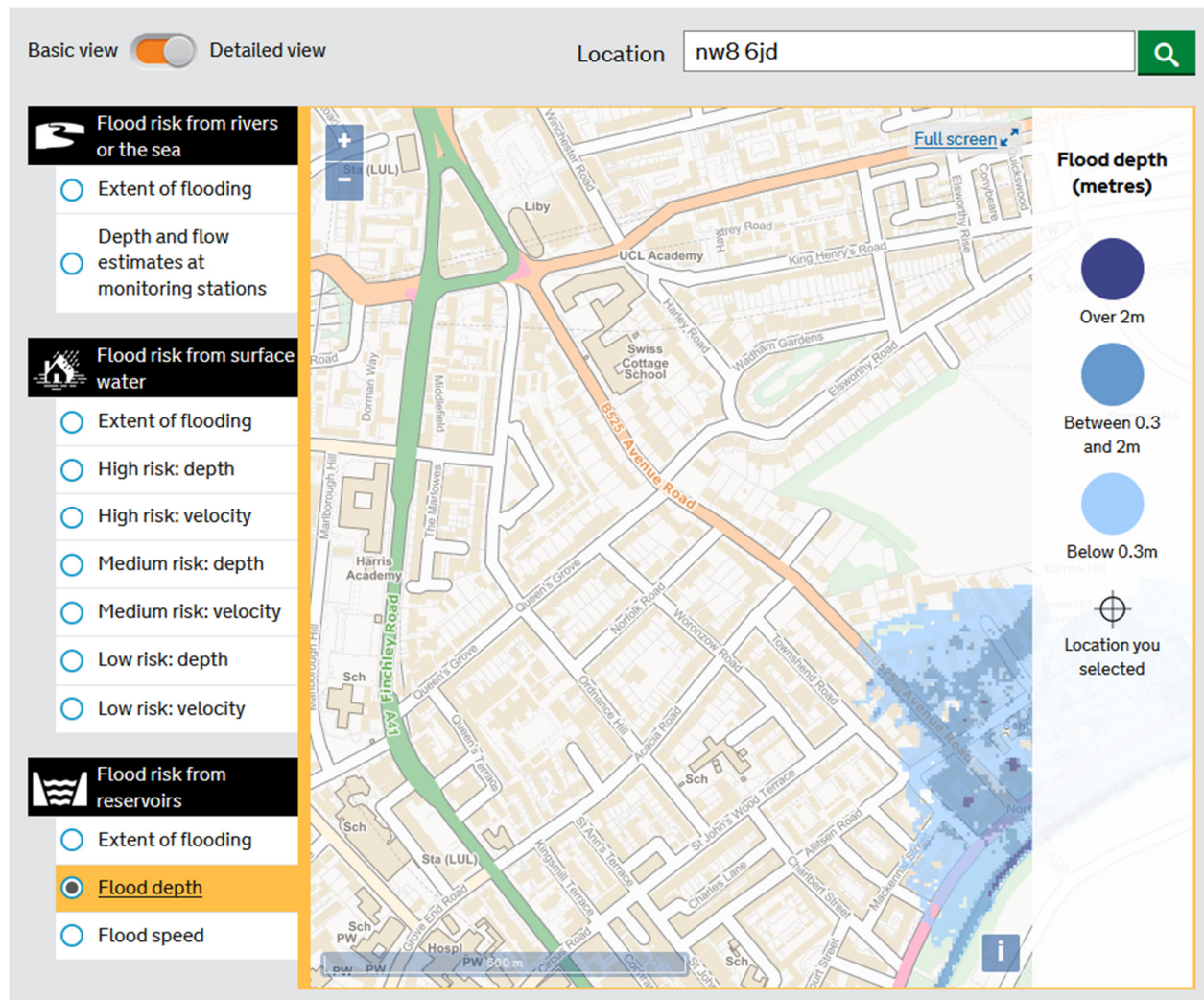


Figure 7: EA Reservoirs Flood Map with Site Indicated, October 2019

1.14 Conclusions

The Site is located within Flood Zone 1 and is therefore considered by the Environment Agency to be at low risk of tidal and fluvial flooding.

The flood risk from pluvial, groundwater and artificial sources has been assessed and found to be low.

The Environment Agency has confirmed that there have been no historic instances of flooding in the vicinity of the Site.

The site is to be designed to have a hydrobrake with a restricted flow of 5l/s and an attenuation tank with a capacity to take a 100 year plus 40% climate.

This report demonstrates that the proposed development is at low risk of flooding. It is therefore considered appropriate that the development meets all the requirements for planning approval under SuDs.