

LONDON BOROUGH OF HOUNSLOW SMALL SITES SMALL BUILDERS PROGRAMME

MAGDALA ROAD, ISLEWORTH, HOUNSLOW, TW7 7DD

Flood Risk Review

10030793-ARC-XX-XX-RP-CW-0115-01-Flood Risk Review

SEPTEMBER 2019



Author Kathryn Hooley

Checker Ian Joyner

Approver Ian Joyner

Report No 10030793-ARC-XX-XX-RP-CW-0115-01-Flood Risk Review

Date SEPTEMBER 2019

VERSION CONTROL

Issue	Revision No.	Date Issued	Description of Revision: Page No.	Description of Revision: Comment	Reviewed by:
1	0	17/09/2019	-	First Issue	IJ

This report dated 17 September 2019 has been prepared for London Borough of Hounslow (the “Client”) in accordance with the terms and conditions of appointment (the “Appointment”) between the Client and **Arcadis UK** (“Arcadis”) for the purposes specified in the Appointment. For avoidance of doubt, no other person(s) may use or rely upon this report or its contents, and Arcadis accepts no responsibility for any such use or reliance thereon by any other third party.

CONTENTS

EXECUTIVE SUMMARY	2
1 INTRODUCTION	3
1.1 Background	3
1.2 Aim and Objectives	3
1.3 Data Sources	3
1.4 Terminology	3
1.5 Limitations	4
2 SITE OVERVIEW	5
2.1 Site Description	5
2.2 Site Topography	5
3 SOURCES OF FLOOD RISK.....	7
3.1 Flooding from Rivers and the Sea.....	7
3.2 Flooding from Surface Water	8
3.3 Flooding from Groundwater.....	8
3.4 Flooding from Artificial Sources	9
3.5 Future Redevelopment	10
4 SUMMARY	11
5 REFERENCES	12

APPENDIX A – PLANNING POLICY AND FLOOD RISK

Executive Summary

The site (Magdala Road), which is currently predominantly occupied by garage buildings, associated hardstanding and a grassed area, is part of London Borough of Hounslow's Small Sites Small Builders Programme, and hence may be considered for potential future redevelopment with residential uses.

Flood risk to the site from a range of potential sources has been considered in this Flood Risk Review. The site has a 'very low' risk of flooding from rivers and the sea, equivalent to an annual chance less than 1 in 1,000 (0.1%). No other local sources of flooding are considered to pose an onerous risk to the site in the context of its potential redevelopment.

According to the National Planning Policy Framework (NPPF), a Flood Risk Assessment (FRA) is not necessary to support any future development of the site as it is located in Flood Zone 1 on the Flood Map for Planning (Rivers and Sea), is less than 1 hectare (ha) in area and this Flood Risk Review demonstrates that the site is not at risk of flooding from other local sources.

A Drainage Strategy should nevertheless be prepared to support future redevelopment of the site to ensure that proposals meet national and local requirements and off-site flood risk is not increased as a result of redevelopment proposals.

1 Introduction

1.1 Background

Arcadis Consulting (UK) Limited ('Arcadis') has been commissioned by the London Borough of Hounslow (LBH) ('the Client') to undertake technical surveys for land off Magdala Road, Isleworth, Hounslow, TW7 7DD ('the site').

The site is being considered for divestment under the Client's Small Sites Small Builders Programme, which aims to enable positive regeneration. This Flood Risk Review is required to document the risk of flooding and consider potential constraints on future redevelopment, which may include residential uses.

1.2 Aim and Objectives

The aim of this Flood Risk Review is to assess and document the potential risk of flooding to the site from all sources (including rivers, the sea, surface water, groundwater and artificial sources) in the context of the site's future development.

Specific objectives of the Flood Risk Review are to:

- Review available sources of published flood risk data, supplemented (where appropriate/necessary) by targeted data collection/consultation with the Environment Agency (EA) and/or the applicable Lead Local Flood Authority (LLFA).
- Consider all relevant forms of flood risk (e.g. rivers, the sea, surface water, groundwater and artificial sources), with a risk rating assigned (e.g. HIGH, MEDIUM, LOW) to each form of flooding.
- Confirm the site's Flood Zone designation and consider NPPF¹ acceptability in accommodating residential development, with reference to the Sequential and Exception Tests.

No site inspection, topographic survey or flood estimation/modelling has been undertaken by Arcadis to inform this desktop review.

1.3 Data Sources

The following data sources have informed the preparation of this Flood Risk Review:

- EA lidar topographic data (2m tiles, TQ17NE) (Ref. 1)
- EA Long Term Flood Risk Maps, including the 'Risk of Flooding from Rivers and Sea Map', 'Risk of Flooding from Surface Water Map' and 'Risk of Flooding from Reservoirs Map' (Ref. 2)
- EA 'Flood Map for Planning (Rivers and Sea)' (Ref. 3)
- EA 'Recorded Flood Outlines' dataset (Ref. 4)
- LBH Strategic Flood Risk Assessment (SFRA) (Ref. 5)
- LBH Preliminary Flood Risk Assessment (PFRA) (Ref. 6) and Addendum (Ref. 7)
- LBH Local Flood Risk Management Strategy (LFRMS) (Ref. 8)
- LBH Surface Water Management Plan (SWMP) (Ref. 9)
- West London SFRA (Ref. 10)
- British Geological Survey (BGS) Geology of Britain Viewer (Ref. 11)
- Defra Magic Maps (for EA Aquifer Designations) (Ref. 12)

1.4 Terminology

Flood risk is a product of both the likelihood and consequences of flooding. Throughout this report, flood events are defined according to their likelihood of occurrence. Floods are described according to an 'annual chance', meaning the chance of a particular flood occurring in any one year. This is directly

¹ A summary of NPPF requirements with respect to flood risk is included in Appendix A.

linked to the probability of a flood. For example, a flood with an annual chance of 1 in 100 (a 1 in 100 chance of occurring in any one year on average), has an annual probability of 1%.

1.5 Limitations

This report has been prepared for the Client in accordance with the terms and conditions of appointment. Arcadis cannot accept any responsibility for any use of or reliance on the contents of this report by any third party. The copyright of this document, including the electronic format shall remain the property of Arcadis.

This report has been compiled from several sources, which Arcadis believes to be trustworthy. However, Arcadis is unable to guarantee the accuracy of information provided by others. The report is based on information available at the time. Consequently, there is a potential for further information to become available, which may change this report's conclusion and for which Arcadis cannot be responsible.

2 Site Overview

2.1 Site Description

The site is located at approximate National Grid Reference TQ163756 within the generally urban setting of Isleworth, Hounslow. It occupies an area of approximately 0.02 hectares (ha) and is roughly trapezoidal on plan, as illustrated in Figure 1.

The site is located at the junction of Magdala Road and Worple Road. It is bounded by Magdala Road to the north, Worple Road to the west, residential property to the east and an electricity substation to the south. The site is currently comprised of hardstanding used for car parking, garage buildings in the south-eastern part of the site and a grassed area in the north-western corner adjacent to the road junction.

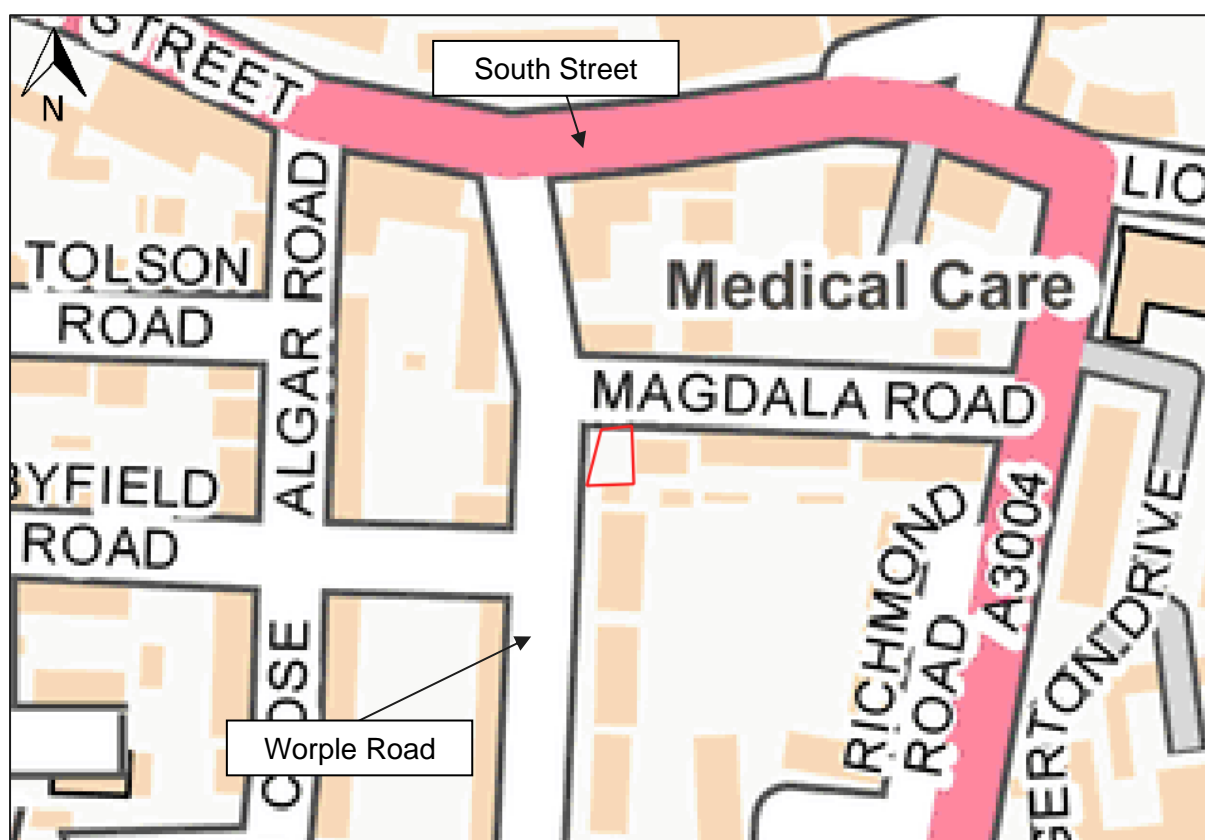


Figure 1 - Site Location (site outlined in red)

Contains Ordnance Survey data © Crown copyright and database right 2019

2.2 Site Topography

Lidar data, shown in extract in Figure 2, indicates that the site is at levels of 8.3-8.8m Above Ordnance Datum (AOD). The site is generally flat although the highest ground levels are found along the southern boundary of the site whilst the lowest ground levels are found in the north-eastern corner of the site.

Off-site, the surrounding area is generally flat albeit the site is located on a slightly raised area of land, which incorporates Worple Road and Algar Close, and is generally at least 0.5m higher than land to the west (along Algar Road) and to the east (along Richmond Road). The prevailing topography tends to slope downwards to the east towards the River Thames.

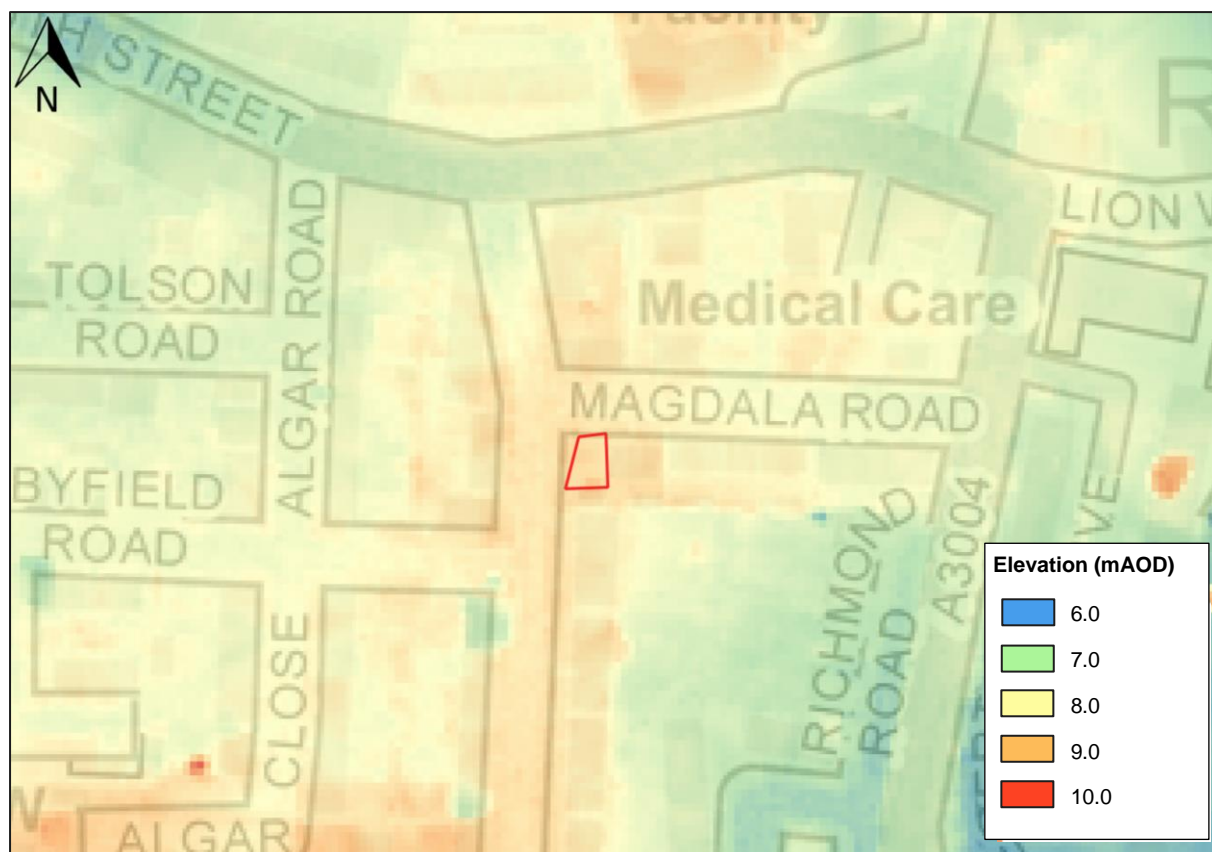


Figure 2 – Site Topography (filtered LiDAR data; site boundary outlined in red)

Contains Environment Agency information © Environment Agency and/or database right

3 Sources of Flood Risk

3.1 Flooding from Rivers and the Sea

Catchment Overview

The site is located in the catchment of the River Crane, which drains a total area of approximately 57km². The River Crane is located approximately 310m south-east of the site and discharges to the River Thames via the Crane Tidal Gates. The River Thames, which is tidal through this part of West London, flows in a northerly direction approximately 260m east of the site. The Duke of Northumberland's River is located approximately 340m north of the site and discharges to the River Thames over 500m downstream of the Crane Tidal Gates.

Historical Flooding

The PFRA and SFRA indicate that there are no historical flood outlines or recorded incidents of fluvial flooding at the site. This is corroborated by the EA 'Recorded Flood Outlines' dataset.

Flood Mapping

The Risk of Flooding from Rivers and Sea Map is informed by the EA National Flood Risk Assessment (NaFRA), which takes account of flood defence survey information and modelled river levels, factoring in a risk of overtopping of failure of raised defences where they exist, to provide a probabilistic assessment of flooding on a relatively coarse 50m grid. The Flood Map for Planning (Rivers and Sea), which is intended to inform the planning process, does not account for the impact of flood defences, but is created using detailed flood modelling (where available). The map also shows areas benefitting from defences. Extracts of these maps are shown in Figure 3 and Figure 4 respectively.



Figure 3 – Risk of Flooding from Rivers and Sea Map
Contains Environment Agency information © Environment Agency and/or database right



Figure 4 – Flood Map for Planning (Rivers and Sea)
Contains Environment Agency information © Environment Agency and/or database right

The Risk of Flooding from Rivers and Sea Map shows that the site is outside the extent of flooding associated with rivers and the sea and has a 'very low' risk of flooding, equivalent to an annual chance demonstrably less than 1 in 1,000 (0.1%). Accordingly, the Flood Map for Planning (Rivers and Sea) shows that the site is located in Flood Zone 1, equivalent to an annual chance of flooding less than 1 in 1,000 (0.1%).

Overall, the site is considered to be at 'very low' risk of flooding from rivers and the sea and this form of flooding is not considered to pose an onerous risk to the site in the context of its potential future redevelopment.

3.2 Flooding from Surface Water

The Risk of Flooding from Surface Water Map is informed by 'direct rainfall' modelling undertaken at a high (2m) resolution. It illustrates those areas at elevated risk of surface water flooding in low spots down-gradient of sloping ground or in the topographic valleys associated with current or former watercourses. An extract of the map is shown in Figure 5 below.



Figure 5 – Risk of Flooding from Surface Water Map

Contains Environment Agency information © Environment Agency and/or database right

The map indicates that the site is at 'very low' risk of surface water flooding, equivalent to an annual chance less than 1 in 1,000 (0.1%).

In all surface water flood events modelled, including 'low' and 'medium' likelihood surface water flood events, with an annual chance of 1 in 1,000 (0.1%) and 1 in 100 (1%) respectively, surface water flooding is absent along Magdala Road and Worple Road adjacent to the site, as a result of the areas slightly elevated position compared to surrounding land.

According to the PFRA, there have been no recorded incidents of surface water flooding at the site. The nearest recorded surface water flooding incident occurred 250m south, at Worple Primary School. Mapping in the SWMP shows the Critical Drainage Areas (CDAs) in Hounslow which are areas recognised as vulnerable to surface water flooding. The site is not located in a CDA.

Overall, the site is considered to have a 'very low' risk of surface water flooding, and this form of flooding is not considered to pose an onerous risk to the site in the context of its potential future redevelopment.

3.3 Flooding from Groundwater

Groundwater flood risk is not as well-defined as other sources of flooding and an assessment of risk often requires consideration of geological conditions. Groundwater flooding can occur from two general mechanisms (i) 'clearwater flooding', where the water table in unconfined aquifers rises above the ground surface, associated with permeable bedrock such as chalk and common in areas where 'winterbourne' streams are present, which may run dry for much of the year; and (ii) 'river-groundwater interaction', where river levels interact with permeable superficial deposits along river valleys, potentially flooding areas away from the river without necessarily overtopping the river banks.

According to BGS mapping, the site is underlain by superficial deposits of the Kempton Park Gravel Member above London Clay bedrock. The superficial deposits are classified as a 'Principal Aquifer' by the EA, while the London Clay bedrock is classified as 'Unproductive' on account of its low permeability.

According to the PFRA, the site and surrounds are not located in a zone of Increased Potential for Elevated Groundwater (IPEG). Furthermore, the SFRA states that Hounslow is at low risk of groundwater flooding and the mapping presented in the PFRA indicates that there have been no incidents of groundwater flooding at the site.

The unproductive nature of the London Clay bedrock suggests that the likelihood of clearwater flooding is remote. Groundwater may present at shallow depths within the permeable river terrace gravels, perched above the London Clay bedrock at the site. However, local infiltration to these gravels will be reduced by the largely impermeable nature of the surrounding area, and regional groundwater levels in these gravels are anticipated to be in continuity with water levels in the nearby Rivers Thames and Crane. Since the site is shown to be elevated so as to be outside the potential extreme flood extents associated with these rivers, the likelihood of river-groundwater interaction causing groundwater to rise above ground the surface is considered to be similarly low.

The site is considered to be at 'low' risk of groundwater flooding and this form of flooding is not considered to pose an onerous risk to the site in the context of its potential future redevelopment.

3.4 Flooding from Artificial Sources

Sewers

Flooding from sewers can result from lack of sewer capacity, blockages within the sewer network or failure of infrastructure such as pumps. Any area that benefits from sewerage infrastructure has a potential risk of flooding, but the likelihood and consequences are most likely increased by topographic constraints such as low spots or flow paths that could influence the behaviour of floodwater originating from sewers.

Mapping in the PFRA shows incidents of flooding from sewers by postcode. Therefore, it is not possible to identify if any of the recorded incidents occurred at the site. The mapping shows that there have been between 11 to 20 recorded incidents of sewer flooding in the 'TW7 7' postal district.

In the absence of site-specific information on sewer flooding, the Risk of Flooding from Surface Water Map can aid understanding. As this map illustrates that the site and immediate surrounds benefit from a slightly elevated position and the site is not affected by any flow paths or low spots, which could direct floodwater from sewers towards the site, it can be argued that sewer flooding in the vicinity does not pose a notably onerous risk over and above any similar site benefiting from sewers.

Reservoirs

The Risk of Flooding from Reservoirs Map illustrates the potential flood extent were large raised reservoirs to fail and release the water that they hold. The map shows that the site is not within this flood extent, with potential flooding in the vicinity of the site generally restricted to the east of Richmond Road, closer to the River Thames.

Canals

The Grand Union Canal joins the River Thames approximately 2.5km upstream of the site. As the canal is not embanked and is a considerable distance from the site, it is not considered to pose a flood risk to the site and surrounds.

Overall, the site is considered to be at 'very low' risk of flooding from artificial sources and this form of flooding is not considered to pose an onerous risk to the site in the context of its potential future redevelopment.

3.5 Future Redevelopment

A Flood Risk Assessment (FRA) is not necessary to support the development of the site as it is located in Flood Zone 1, is less than 1ha in area and this Flood Risk Review has demonstrated that the site is not at risk of flooding from other sources. Specific planning application validation requirements should however be confirmed with LBH at the time a future planning application is prepared.

A Drainage Strategy would be required to consider available connections and the capacity of the local sewer network, informed by consultation with Thames Water where necessary. A Drainage Strategy should be designed to meet the London Plan (Ref. 13, Policy 5.15) requirement that developers should aim to achieve greenfield runoff rates and use Sustainable Drainage Systems (SuDS) unless there are practical reasons for not doing so. LBH provide guidance for the application of SuDS in their SFRA and the Drainage Strategy should be developed in consultation with LBH, detailing methods to manage site drainage post-development. Climate change allowances, detailed in the SFRA, also need to be incorporated into the Drainage Strategy. The suitability of these allowances should be confirmed with LBH during consultation.

Overall, flood risk is considered unlikely to substantively constrain redevelopment potential at the site.

4 Summary

This desktop Flood Risk Review has investigated the risk of flooding to the site based on a review of relevant data and information in the public domain. The following has been concluded:

- The site is located outside the floodplain of the River Thames and is at 'very low' risk of flooding from rivers and the sea, equivalent to an annual chance of less than 1 in 1,000 (0.1%).
- No other sources of flooding are considered to pose an onerous risk of flooding to the site in the context of its potential redevelopment and the site is considered to be acceptable in principle for all types of redevelopment with respect to flood risk.
- The findings of this Flood Risk Review suggest that an FRA is not necessary to support the development of the site.
- It is recommended that a Drainage Strategy is designed in consultation with LBH and Thames Water and that it includes appropriate allowance for climate change.

Table 1 presents a summary of the risk of flooding by source. It should be noted that differing levels of information have been available to assess the risk of flooding for each source, and the ratings for flooding from rivers, the sea and surface water, for example are necessarily more detailed where they are informed by published flood maps and models.

Table 1 – Summary of Flood Risk by Source

Source of Flooding	Qualitative Flood Risk Rating
Rivers	Very Low
The Sea	Very Low
Surface Water	Very Low
Groundwater	Low
Artificial Sources	Very Low

5 References

1. Defra, 2019. Defra Data Service Platform. Accessed September 2019 via: <https://environment.data.gov.uk/>
2. Environment Agency, 2019. Long term flood risk information. Accessed September 2019 via: <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>
3. Environment Agency, 2019. Flood Map for Planning. Accessed September 2019 via: <https://flood-map-for-planning.service.gov.uk/>
4. Environment Agency, 2019, Recorded Flood Outlines dataset. Accessed September 2019 via: <https://data.gov.uk/dataset/16e32c53-35a6-4d54-a111-ca09031eaaaf/recorded-flood-outlines>
5. Jacobs, 2007. London Borough of Hounslow Strategic Flood Risk Assessment.
6. Capita Symonds, 2011. London Borough of Hounslow Preliminary Flood Risk Assessment.
7. London Borough of Hounslow, 2017. Addendum to the Preliminary Flood Risk Assessment.
8. London Borough of Hounslow, 2014. London Borough of Hounslow Local Flood Risk Management Strategy.
9. Capita Symonds, 2011. London Borough of Hounslow Surface Water Management Plan.
10. Metis Consultants, 2018. West London Strategic Flood Risk Assessment. Accessed September 2019 via: <https://westlondonsfra.london/>
11. British Geological Survey, 2019. Geology of Britain Viewer. Accessed September 2019 via: <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>
12. Defra, 2013. Magic Map Interactive Map. Accessed September 2019 via: <https://magic.defra.gov.uk>
13. Greater London Authority, 2019. The Current London Plan. Accessed September 2019 via: <https://www.london.gov.uk/what-we-do/planning/london-plan/current-london-plan>
14. Department for Communities and Local Government, 2018. National Planning Policy Framework.
15. Department for Communities and Local Government, 2014. Planning Practice Guide: Flood Risk and Coastal Change.

APPENDIX A – Planning Policy and Flood Risk

The National Planning Policy Framework

With regard to flood risk and surface water drainage, the National Planning Policy Framework (NPPF) (Ref. 14) and its accompanying flood risk and coastal change Planning Practice Guidance (PPG) (Ref. 15) set out the Government's planning policy for England and advises on '*how to take account of and address the risks associated with flooding and coastal change in the planning process*'. The principal aim of the NPPF is to achieve sustainable development by accounting for flooding at all stages of the planning process, avoiding inappropriate development in areas at risk of flooding and directing development away from areas where risks are highest. Where development is necessary in areas at risk of flooding, the NPPF aims to ensure it is safe, without increasing flood risk to third parties. Early adoption of, and adherence to, the principles set out in the NPPF with respect to flood risk, can ensure that detailed designs and plans for development take due account of flood risk and the need for appropriate mitigation, if required.

The Sequential and Exception Tests

The PPG identifies four Flood Zone classifications, detailed in Table A1 below.

Table A1 – Flood Zones

Flood Zone	Annual Probability of Flooding
1 – Low Probability	Fluvial and Tidal <0.1% (AEP)
2 – Medium Probability	Fluvial 0.1-1.0% AEP Tidal 0.1-0.5% AEP
3a – High Probability	Fluvial > 1.0% AEP Tidal > 0.5% AEP
3b – The Functional Floodplain	Fluvial and Tidal >5.0% AEP *Starting point for consideration. Local planning authorities should identify Functional Floodplain, which should not be defined solely by rigid probability parameters.

Source: PPG, Flood Risk and Coastal Change

The NPPF specifies that the suitability of all new development in relation to flood risk should be assessed by applying the Sequential Test to demonstrate that there are no reasonably available sites in areas with a lower probability of flooding that would be appropriate to the type of development proposed. The PPG provides guidance on the compatibility of each land use classification in relation to each of the Flood Zones, as summarised in Table A2.

Flood Risk Review

Table A2 – Flood Risk Vulnerability Classification

Flood Zone	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	✓	Exception Test required	✓	✓
Zone 3a	Exception Test required	✓	X	Exception Test required	✓
Zone 3b	Exception Test required	✓	X	X	X
Key: ✓ Development is appropriate X Development should not be permitted					

Source: PPG, Flood Risk and Coastal Change

When the Exception Test is triggered, this requires the development proposals to demonstrate wider sustainability benefits to the community that outweigh flood risk, and that the development will be safe for its lifetime, without increasing flood risk elsewhere and where possible reduce overall flood risk.

Arcadis UK

Arcadis Cymru House,
St Mellons Business Park,
Fortran Rd,
Cardiff
CF3 0EY

United Kingdom
T: +44 (0)2920 729 800

[arcadis.com](https://www.arcadis.com)